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INDEX

Sixty-sixth Quarto Volume—January 1, 1919, to June 30, 1919

AUTHORS

Acworth, W. M., 573, 877
Aishton, R. H., 1579
Andrews, Howard, 347
Anthony, C. C., 1105

Bardwell, R. C., 1321
Barr, William M., 1215
Barth, Kurt C., 643, 1036
Basford, George M., 1039
Begien, R. N., 1309
Beyer, O. S., Jr., 1313
Bogg, Pete, 824
Boublikoff, A. A., 1819
Brazier, F. W., 1212, 1673
Brennan, J. H., 500

Campbell, Major E. D., 1709
Cary, Robert J., 731
Chambers, C. E., 1496
Clegg, W. H., 1212
Coleman, Frederick C., 843, 1139
Cullen, George A., 943
Cummins, Albert B., 1041
Cunningham, Wm. J., 43
Curran, Arthur, 750
Cuyler, T. De Witt, 188, 1242

Daly, M. A., 1037, 1251
Denby, Charles, 252
Dodd, S. T., 1157
Dunn, Samuel O., 7, 53, 197, 436, 762

Edge, Senator Walter E., 1682
Elder, Jas., 1168
Elliott, Howard, 455, 578
Endsley, Louis E., 930
Ernst, F. B., 934
Erson, T., 878

Farquhar, Percival, 1421
Farrell, James A., 1090
Fay, Charles S., 1807
Fayant, Frank H., 775, 911
Fisher, O. E., 604
Fort, Gerrit, 316
Freer, Guy M., 461
Fristoe, J. W., 345
Fritch, L. C., 236
Fuller, C. E., 1791

Gaines, F. F., 1796
Gary, Elbert H., 1190
Gibbons, J. W., 1834
Gibbs, A. W., 1663
Glick, H. A., 1212
Goss, W. F. M., 854
Goto, Baron, 1203
Gray, Carl R., 1349

Haas, Exum M., 1199
Hall, U. K., 286
Hammill, F. H., 1253
Harding, H. McL., 582
Hardy, J. W., 1309
Hawley, Wm. E., 428
Henry, Philip W., 1259
Hines, Walker D., 244, 529, 848, 998, 1134, 1159, 1189, 1302, 1404
Hodge, Col. Henry W., 1683
Hoy, Sir William, 299
Humphrey, A. L., 853
Hurley, Edward N., 1089

Joffray, L. J., 1255
Johnson, Alba B., 156, 218, 293
Johnson, Benjamin O., 1063
Johnson, John H., 346
Jones, Paul, 384

Kahn, Otto H., 465
Kent, Fred I., 1088
Knickerbocker, E. J., 1808
Kruttschnitt, Julius, 258

Lamora, Julio, 1420
Lane, Franklin K., 543
Lane, F. W., 665, 706
Lavis, F., 825, 892, 945
Leigh, E. B., 879, 1248
Leighton, M. O., 1806
Lemmerich, Gustave E., 538, 587
Lichty, C. A., 1386
Lipetz, A. I., 1257, 1763
Lisman, F. J., 831, 883, 1221

McAdoo, William G., 139
McAuliffe, Eugene, 1254
McChord, C. C., 1528
McManamy, Frank, 1165, 1256, 1701
Middleton, P. Harvey, 579, 863, 1297, 1374, 1531
Milner, B. B., 1766
Mitchell, Charles E., 1107
Monlevade, Francisco de, 1424
Montgomery, F. B., 59
Moore, John, 1414
Morse, Charles A., 207, 666
Morton, E. M., 1839
Munoz, M., 863

Nay, Frank, 1535
Nicholson, J. M., 1252
Noonan, E. J., 698

O'Kelly, T. J., 1104
Osborn, Wm. Church, 1197

Parmelee, Julius H., 27, 236
Patterson, W. J., 1165
Payne, J. L., 31, 1555
Pearce, H. C., 285
Peck, George N., 1091
Plumb, Glenn E., 1137
Poleman, Walter, 344
Pomerene, Atlee, 729
Post, George A., 1136
Potter, W. B., 1157
Powell, T. C., 904
Pratt, E. E., 1089
Prouty, Charles A., 36, 483, 1835
Purdon, C. D., 237
Pyle, L. R., 1249

Randolph, O. C. F., 889
Ray, H. E., 387
Rea, Samuel, 458, 1147
Redfield, William C., 1263
Reeves, Cuthbert E., 556
Reynolds, T. W., 1245
Rhea, Frank, 1144
Ripley, E. P., 1815
Roberts, S. S., 955
Robinson, Bird M., 1377
Rodriguez, José S., 1420
Roesch, F. P., 1316, 1762
Roosevelt, Hon. Franklin D., 1682

Sandrus, Charles L., 237
Schwinn, F. S., 1188
Shaver, A. G., 137
Shipman, H. L., 495
Smith, Cedric B., 1295‡
Smith, T. Duff, 1312
Souby, J. M., 751
Sparrow, W. W. K., 1296
Sprague, Frank J., 1816
Stoek, H. H., 1311
Storey, W. B., 1249
Stuart, J. G., 497

Tatum, J. J., 773
Thayer, Robert E., 1785
Thelen, Max, 837
Thom, Alfred P., 192, 258, 1360
Thorne, Clifford, 307, 1036
Tollerton, W. J., 1699
Towner, M. E., 287
Townley, Calvert, 765
Townsend, J. Fred, 1296
Tyler, W. T., 1659, 1713

Villard, Harold G., 52

Warfield, S. Davies, 350, 459
Waterman, J. H., 287
Watters, R. J., 1169
West, A. E., 911
Wicsteed, H. K., 849
Willard, Daniel, 452
Williams, T. H., 1051
Wilson, L. F., 1808
Winant, Clinton D., 1116
Woodard, W. E., 851
Wyer, William, 1826

Yamaguchi, K., 1262

GENERAL INDEX

[Illustrated articles are indicated thus; Editorials thus†; Letters to Editor thus‡.]*

A

Abandoned Lines in 1918, 57*, 225
Accident (See also Safety First):
  Baltimore & Ohio near Pittsburgh, 513, 882
  Canadian Pacific at Bonheur, 168
  Flagging Rule, 1523†, 1528, 1541
  France, Collision in, 1059
  I. C. C. Bulletins Nos. 66 and 67, 547; No. 68, 991
  Monthly Summaries: December, 368; January, 510; February, 906; March, 1066; April, 1317; May, 1812
  Nashville Collision, Lesson of, 1133‡
  New York Central at South Byron, 175† 212*, 477‡, 491, 515, 574‡, 1010
  New York P. S. Commission's Investigation of Collision Problem, 574‡, 1388, 1553, 1805†, 1816
  "No Accident Weeks," 186, 411, 898, 1387, 1395, 1558, 1564, 1813
  Pennsylvania at Sabula, 1227
  Philadelphia & Reading at Fort Washington, 212, 1523†, 1528, 1541
  Rear Collisions, Prevention of, 236‡
  Records for 1917 and 1918, 878‡
  Responsibility for Collisions, 180‡
  St. Louis-San Francisco near Marshfield, 251
  Southern Pacific's Record, 605
  Union Pacific, near Beloit, 216
Accounting (See also Railway Accounting Officers' Association; also Division of Accounting):
  Back Pay, Reports on, 364, 601
  Calculating Machines, 896*, 1353*, 1428
  Corporate, 1535
  Depreciation Rates, Adequate, 427†
  Officers as Executives, 1397†
  Shop Accounting, Machines for, 896*
  Statement of Accounts Between Director General and Railroad Companies as of December 31, 1918, 433
  Store Department, 287
Acetylene Welding, 1331
Acoustic Properties of Convention Hall, 1575†
Adams Express Company: Claims Settled 60 Per Cent on Dollar, 1173
Additions and Betterments:
  Appropriation (See Director General Hines)
  Financing Improvements, 408, 598, 732
  Railway Business Association's Address to Director General Hines, 293
Advances (See Finance)
Advertising:
  Campaign to Promote Passenger Travel, 372, 858, 969, 977†, 1085, 1211
  Engineering Advertisers' Association, 868
  Exchange Transportation, 162
Africa, French Railroad Expansion in, 326
A. G. A. Railway Light & Signal Company's New Devices, 662*
Agreement (See Contracts)
Agricultural Section:
  Conference in Memphis, 858, 941
  Homeseekers' Bureau, 108, 364, 1085, 1229
Air Brake:
  Automatic Straight, 277, 821†, 840
  Cylinder Packing Set, 1475*
  Defect Card, 1168*
  Report of A. R. A. Committee, 1506*, 1770
Air Brake Association: Annual Convention, 1165*, 1212, 1341†
Airco Acetylene Generator, 1471*
Air Compressors, Sullivan WB-3, 703*
Air Consumption of Auxiliaries, 1165*, 1341†
Air Drill (See Drill)
Air Dump Car, 745*
Air Leaks, Front End, 1316
Air Pressure Gages and Testers, 1470*
Airplane (See Aviation)
Air Reduction Sales Company: Acetylene Generator, 1471*
Aishton, R. H.:
  Exhibit Praised, 1626
  President of A. R. A., 1576†, 1579, 1813*
A la Carte (See Dining Cars)
Alaskan Railroad Progress, 543*, 944, 979†, 1284, 1388
Allegheny Region:
  Annual Report, 394
  Conditions During February, 860; March, 1006
  Roads Transferred, 105, 1383
Allied Machinery Company, 1287
Allocation of Standard Cars, 1110, 1161, 1273
Amalgamation (See American Railroad Association—Reorganization)
American Association of Engineers:
  Engineering, a Profession or a Trade, 1081†, 1293†, 1295‡
  Hearing Before Board of Wages and Working Conditions, 963, 1081†
  Officers Elected, 1229
  Railroad Conference, 657, 699
  Railroad Sections Formed, 1387
  Salary Schedule, 370, 658, 963
American Association of Passenger Traffic Officers: Annual Convention, 298, 316
American Association of Railroad Ticket Agents: Annual Convention, 1443
American Automatic Hose Connector, 1477*, 1576†, 1698
American Brake Shoe & Foundry Changes, 1567*
American Bureau of Welding, 1068
American Car & Foundry Company:
  Exhibit of Railway Artillery, 1685*, 1709, 1799
  Heater, Electric Rivet, 1779
  Miniature Car, 1737
American Expeditionary Forces (See War, The)
American Institute of Consulting Engineers: Officers Elected, 467
American Institute of Electrical Engineers: Railroad Electrification, 765*
American Iron and Steel Institute: Rail Production in 1918, 1204
American Locomotive Company:
  Annual Report, 565
  Consolidatinn Type for Italian State Railways, 1219*
  Pennsylvania Lines, 2-10-2 Type, 249*
  Standard Types, 291*, 389*, 508*, 575*, 951*, 1193*
American Manufacturers' Export Association, 1090
American Passenger Traffic Association: Address of W. D. Hines, 244
American Railroad Association:
  Aishton, R. H., President, 1576†, 1579, 1813*
  Competitive Bids Under Clayton Law, Objections to Rules for, 1009, 1209, 1280
  Reorganization, 177†, 194, 535, 541, 621†, 659, 664†, 697, 1140, 1284, 1576†, 1579, 1813*
  Section I, Operating: Telegraph and Telephone Division's Annual Convention, 1542
  Section II, Engineering, 664†, 697
  Section III, Mechanical:
    Acoustic Properties of Convention Hall, 1575†
    Addresses by Convention Visitors, 1682*
    Air Brake Conditions, 1770
    Aishton, R. H., Address of, 1576†, 1579
    Atterbury, General, Message from, 1698
    Bacharach, Mayor, Address of, 1495*
    Campbell, Major, Address of, 1709
    Chambers, Chairman, Address of, 1496*
    Chambers, Chairman, Retires, 1655†, 1674
    Coal Weighing Devices, 1708
    Committees Appointed, 1577
    Discussing the Reports, 1623†, 1783†
    Election of Officers, 1657, 1673, 1737
    Enrollment Committee's Work, 1769
    Executive Committee's Meeting, 1576†, 1579, 1624†
    Exhibit of Railway Artillery, 1685*, 1709, 1799
    Exhibit of Supply Men (See Railway Supply Manufacturers' Association)
    General Committee Meeting, 1786
    General Committee, Report of, 1452†, 1499*
    Innovations Should Be Continued, 1784†
    Labor Situation Not Discussed, 1656†
    Master Car Builders' Association's History, 1496*, 1673
    Master Mechanics' Association's History, 1699
    McManamy, Frank, Honored, 1658
    McManamy, Frank, on Standardization, 1696†, 1701
    Mechanical Officers to Report on Convention, 1161, 1237†, 1438, 1544
    Organization, 535
    Pennsylvania Train Service, 1786
    Proceedings, 1495*, 1583*, 1623†, 1627*, 1661*, 1695†, 1699*, 1735†, 1739*, 1783†, 1787*
    Registration, 1460, 1515, 1607, 1648, 1681, 1697, 1716, 1799
    Report of Arbitration Committee, 1583*
    Report of Committee on Subjects, 1793
    Report of General Committee, 1452†, 1499*
    Report on Amalgamation of Other Associations, 1765
    Report on Brake Shoe and Brake Beam Equipment, 1491†, 1510*
    Report on Car Construction, 1640*, 1656†
    Report on Car Trucks, 1624†, 1644*
    Report on Car Wheels, 1575†, 1590*
    Report on Couplers, 1603*, 1623†
    Report on Depreciation for Freight Cars, 1492†, 1585
    Report on Design and Maintenance of Locomotive Boilers, 1753, 1787*
    Report on Design, Maintenance and Operation of Electric Rolling Stock, 1787*
    Report on Draft Gears, 1576†, 1605*
    Report on Fuel Economy and Smoke Prevention, 1739*, 1783†
    Report on Loading Rules, 1632*
    Report on Locomotive Headlights, 1735† 1753*
    Report on Mechanical Stokers, 1705, 1735†
    Report on Nominations, 1503*
    Report on Powdered Fuel, 1795*
    Report on Prices for Labor and Material, 1585*
American Railroad Association *(Continued)*
    Report on Revision of Passenger Car Rules of Interchange, 1590*
    Report on Safety Appliances, 1627
    Report on Scholarships, 1502*
    Report on Specifications and Tests for Materials (A. R. M. M.), 1747*
    Report on Specifications and Tests for Materials (M. C. B.), 1594*
    Report on Standard Blocking for Cradles of Car Dumping Machines, 1592*
    Report on Standards and Recommended Practice (A. R. M. M.), 1705*
    Report on Standards and Recommended Practice (M. C. B.), 1503*
    Report on Superheater Locomotives, 1736†, 1759
    Report on Tank Cars, 1656†, 1661*
    Report on Train Brake and Signal Equipment, 1506*, 1695†
    Report on Train Lighting and Equipment, 1667*
    Report on Train Resistance and Tonnage Rating, 1793*
    Report on Welding Truck Side Frames, Bolsters and Arch Bars, 1599*
    Rules of Order, 535, 1666
    Russian Mechanical Conventions, 1765
    Secretary Hawthorne's Work, 1738†
    Snow Fighting Equipment, 1708
    Special Guests, 1612, 1674, 1716, 1799
    Subjects for 1920 Convention, 1793
    Tollerton, W. J., Address of, 1699, 1736†
    Tollerton, W. J., Elected Chairman, 1576†, 1579, 1738†, 1813*
    Train Line Connectors Investigated, 1477*, 1576†, 1698, 1727*
    Tyler, W. T., Address of, 1655, 1659, 1695†, 1713
    Tyler, W. T., Vice-President, 1576†, 1579, 1813*
  Section VI, Purchasing and Distribution of Supplies, 1140, 1284
  Signal Division:
    Amalgamation with A. R. A., 621†, 659
    Committee on Valuation Appointed, 685
    Creosoting Wood Trunking, 643, 1036‡
    Future of, 622†
    Meeting, March, 621†, 622†, 624*
    Registration, 621†, 645
    Report on Contracts, 640*
    Report on D. C. Automatic Block Signaling, 635*
    Report on Mechanical Interlocking, 632*
    Report on Power Interlocking, 628*
    Report on Signaling Practice, 622†, 636*
    Report on Standard Designs, 639
    Report on Wires and Cables, 642*
    Rest in Peace (?), 661
    Stoltz, C. F., New Committee Chairman, 658*
    War Service of Members, 621†, 648*
American Railway Engineering Association:
  Address of President Morse, 663†, 666*, 705†
  Annual Dinner, 729*
  Committee Chairmen, New, 690*, 949
  Committee Subjects for 1920, 949
  Committee Work, 705†, 795†, 948
  Designs, Unified, 664†
  History, 686*
  Hooley, Mr., at Convention, 665, 706
  Members as Corporate Executives, 732
  Members with Railroad Administration, 737
  Nominees for Offices, 167
  Officers Elected, 738*
  Pennsylvania Officers at Convention, 707
  Proceedings, 663†, 666*, 705†, 708*, 795†, 797*
  Railroad Administration Approves Convention, 621†, 685
  Registration, 663†, 691, 733, 820
  Reorganization Under A. R. A., 664†, 697
  Report on Ballast, 705†, 726*
  Report on Buildings, 718*
  Report on Conservation of Natural Resources, 683
  Report on Economics of Railway Labor, 673*
  Report on Economics of Railway Location, 819
  Report on Economics of Railway Operation, 795†, 816*, 820
  Report on Electricity, 722*
  Report on Iron and Steel Structures, 795†, 800*
  Report on Masonry, 796†, 797*
  Report on Records and Accounts, 663†, 669
  Report on Roadway, 714*
  Report on Rules and Organization, 677*
  Report on Signals, 670*
  Report on Signs, Fences and Crossings, 684
  Report on Stresses in Track, 713
  Report on Ties, 706†, 724*
  Report on Track, 677*
  Report on Uniform General Contract Forms, 813*
  Report on Water Service, 795†, 801*
  Report on Wood Preservation, 708*
  Report on Wooden Bridges and Trestles, 860
  Report on Yards and Terminals, 706†, 721*
  Service for Younger Men, 664
  Slifer, Hiram J., Death of, 688*

American Railway Engineering Association (*Continued*):
Specifications, Prompt Publication of, 795†
War Service Record, 740
American Railway Express Company:
Miniature Car, 1737
Strike of Employees, 1227
American Railway Master Mechanics' Association:
Annual Convention (See American Railroad Association—Section 111)
Officers Appointed, 169
American Red Cross:
Cutler, Otis H., Work of, 1467*
Thanks to British Railways, 1442
American Short Line Railroad Association:
Meeting at Washington, 1377, 1422
Short Line Contracts, 505
American Steam Conveyor Corporation: Cinder Conveyor, 1017*
American Steel Foundries:
Annual Report, 616, 919
Atlas Safety Guard, 603*
American Train Control Company: Automatic Stop: C. & O., 846*
American Train Despatchers' Convention, 1837, 1839
American Welding Society Organized, 608, 914
American Wood Preservers' Association:
Annual Meeting, 322, 334†, 365
Treated Timber in Car Construction, 295
Americanization Program of Railways, 705†
Americas, Railways in the, 1421
Amster, Nathan L.: Testimony on Government Control Before Senate Committee, 462
Anderson Galleries: Library for Sale, 514
Annual Reports for 1918 (See also names of companies), 821†
Anti-Foaming Compound and Water Treatment, 1808‡
Appropriation Bill (See Congress)
Arc Welding (See Welding)
Argentina:
Railroad Notes on, 228, 377, 1112
Railroad Development, 977†, 1001*, 1047*
Transandine Railway Blocked, 1439
Arkansas & Midland:
Board of Referees to Determine Compensation, 1271, 1391
Federal Control, Question of, 1271
Army Ordnance Exhibit, 1685*, 1709, 1799
Army Port Terminals, 1809*
Artillery, Railway Mounted, 1205, 1685*, 1709
Ash Pan (See Locomotive)
Aspinall, Sir John A. F.: Engineering Problems of English Railways, 30
Association of Railway Executives:
Allocation of Standard Cars, 1110, 1161, 1273
Department of Transportation Proposed, 1360
Director General Hine's Meeting with, 406
Equipment Trust to Finance Standard Equipment, 1238†, 1273, 1336
Government Ownership, Sentiment Against, 1370
Legislation for Return of Railroads, 1242
Members, New, 467, 605
Officers Elected, 1837
Standing Committee's Plan for Government Regulation, 1†, 131, 178†, 188, 262
Association of Railway Chief Surgeons: Officers Elected, 1172
Association of Railway Electrical Engineers: Meeting, Semi-Annual, 1715, 1735†
Association of Railway Telegraph Superintendents (See American Railroad Association—Section I)
Ashton Valve Co.: Air Pressure Gage, 1470*
Atchison, Topeka & Santa Fe:
Signal Supervisors' Annual Luncheon, 644
Station at San Bernardino, 481*
Atlanta Freight Bureau: Why Test Should Be Made of Government Operation, 483
Atlantic Worm Driven Hand Brake, 1693*
Atlas Safety Guard, 603*
Attachments (See Legislation)
Atterbury, Brig. Gen. W. W.:
Distinguished Service Medal Awarded, 265
General Pershing's Congratulations, 839*
Message to Mechanical Convention, 1698
Return from France, 1375
Aurora, Elgin & Chicago: Commutation Fares Increased, 303, 372
Austin Company: Engine Terminal Layout, 538*, 587*, 994*, 1199
Australia:
American Machinery in, 786
Railroad Notes on, 373, 418, 613, 786
Railway Construction Proposed, 1319, 1439
Trans-Australian Needs Equipment, 1219
Austria:
Hoover, Herbert C., Director General of Railroads, 611
Railroad Notes, 273, 1319
Automatic Block (See Signaling)
Automatic Screw Cutting Die Head, 1690
Automatic Stop (See also Automatic Train Control): Discussion Before New York P. S. Commission, 1553, 1805†, 1816
Automatic Straight Air Brake: Report of Bureau of Safety, 277, 821†, 840
Automatic Train Control Committee:
Inspection of Devices, 507, 550, 707, 796†, 823†, 867, 940, 1117, 1273, 1438
Organization, 175†, 222, 248, 467, 1326, 1438
Plans Considered, 451
Requisites for Devices, 364
Automatic Train Line Connector, 1477*, 1576†, 1698, 1727*
Automobile Car: Illinois Central, 441*
Automobile, General Manager and Freight Conductor, 1185†
Automobile Trucks in Iowa, 252
Auxiliary Devices (See Locomotive)
Auxiliary Engineer Corps Proposed, 1804†, 1806‡
Aviation:
Canadian Pacific Prepares, 1223
Mail Service, 1223, 1336, 1839
Record Flights, 168, 607, 781, 1018, 1072, 1336, 1564

B

Babcock Water Gage Protector, 1733*
Back Pay (See Employee—Wages)
Bagdad Railway, Condition of, 516
Baggage Search by Prohibition Officers, 1215
Baker R. & L. Co.: Industrial Trucks, 1067*
Baker Valve Gear, 1734
Balanced Lever Starting Valve, 1802*
Balancer Type Welding Outfit, 1653*
Baldwin Locomotive Works:
Annual Report, 520
Consolidation Type; P. & R., 761*
Exhibit of Railway Artillery, 1709
Foreign Department, 1231, 1769
Vauclain, S. M., 1233*
Ball Engine Company's Ditchers, 511*
Ballast, A. R. E. A. Report on, 705†, 726*
Baltimore & Ohio:
Accident near Pittsburgh, 513, 882
Competitive Bidding Rules, Objections to, 1280
Locomotive Repair Shop at Glenwood, 1401*
Yardmen and Fuel Saving, 911
Baltimore & Ohio Chicago Terminal Transferred, 1383
Bankruptcy of the Railroads, 1132†, 1159, 1291†
Bar, Holding-on, 1619*
Barber 70-Ton Truck, 1780*
Barco Smokebox Blower Fitting, 1778*
Barges for New York Canal, 506
Baron Goto, Interview with, 1203
Barrett Co.; Holt Roof Connection, 744*
Beardmore, William, & Co., Ltd.: Locomotive Building in Glasgow, 516
Beatty Combination Punch and Shear, 1691
Belgium:
Damage to Railways by Germans, 275, 470, 1440
Inland Waterways Commission, 1277
Light Railway Construction, 1320
Publicity Department for Railways, 1320
Railroad Notes, 373, 418, 515, 909
Railwaymen and German Oppression, 501
Rolling Stock Conditions, 1785
Telegraph Material Needed, 1372
Bell-Mouth Sockets, 1780
Beloit, Kansas, Derailment, 216
Belt Type Finishing Machines, 1690
Bench Saw, 743*
Berwick Electric Rivet Heater, 1779
Bettendorf 70-Ton Truck, 1469*
Bids (See Competitive; also Rail)
Bill (See Legislation)
Birmingham, England, American Rails for, 1146, 1278, 1319
Black Tom Disaster Lawsuits, 558, 1152, 1281
Bievney Machine Company: Bell Type Finishing Machines, 1690
Blocking for Protecting Cars on Car Dumping Machines, 1592*
Board of Railroad Wages and Working Conditions:
Cases Before, 874†, 900
Engineers, Salaries for, 963, 1081†
Gaines, F. F., Chairman, 223
Report of Director General McAdoo, 247
Shopmen's Demands, 224, 874†, 900, 1066
Trainmen's Wage Increase, 926†, 944, 985*
Board of Referees (See Compensation Contracts)
Boiler (See Locomotive)
Bolivia:
Henry, Philip W., on Railways, 1259
Need for Railways, 1420
Bolt Inserts for Rail Fastenings, 1380*
Bonheur Train Accident; C. P., 168
Borden Company: Ratchet Handle, 746*
Boston & Maine: Reception to Fourteenth Engineers, 1228
Boston Port Terminal, 1809*
Bottom Outlet Valve on Tank Cars, 1663, 1781
Boundaries of Standard Time Zones, 1248
Bowser Oil Handling Apparatus, 1780
Bradford Motor Driven Lathe, 1693*
Bradshaw, George: Beware of Detours! 1115*
Brake:
Air (See Air Brake)
Atlantic Worm Driven Hand, 1693*
Automatic Straight Air, 277, 821†, 840
Brake Beam Support, Creco, 1618*
Brake Equipment, A. R. A. Mechanical Section Reports on, 1491†, 1506*, 1510*, 1695†
Brake Rod Jaw, Schaefer, 1622*
Brazil:
Electrification of Railways, 1424
Para, Proposed Railway in, 864*
President-Elect Pessoa on Visit, 1551
Railway in French Control, 561
Railway Notes from, 910, 1163, 1440
Brewster, William, Company: Small Tools, 1780
Brick, High Heat Resisting, 1781
Bridges and Buildings (See Station; also Yards and Terminals; also Construction, New):
Long Island Concrete Enginehouse, 891*
Louisville Bridge Pennsylvania, 238*
Raising of Pennsylvania Bridge Over Allegheny River at Pittsburgh, 1185†
Report of A. R. E. A. on, 718*, 795†, 800*, 805*
Bridges and Buildings (*Continued*):
Stefco Structural Steel Buildings, 1654*
Swing Bridge Design, A Radical Departure in, 905*
Brisbane, Mr., Is Disappointed, 1292†
British (See Great Britain)
Broadway Limited Restored, 1291†, 1333
Bronze for Valve Snap Rings and Piston Surfaces, 1791*
Brooklyn Chamber of Commerce: Kahn, Otto H., on Government Control, 465
Brooklyn Rapid Transit: Receivership, 113†
Brosius Grab Bucket, 1694*, 1782
Brotherhood of Locomotive Firemen and Enginemen: Convention, 1558, 1837
Brotherhood of Railroad Conductors:
Director General Hines on Labor Questions, 1302
Shepherd, L. E., Elected President, 1352
Brotherhood of Railroad Trainmen: Lee, W. G., President, 1387
Brotherhood of Railway Clerks: Convention, 1281
Brotherhood Plan for Railroad Control, 359, 383†, 397, 426†
Brown, Harold P.: Concrete Atomizer for Lining Arch Soffit, 702*
Bucket:
Brosius Grab, 1694*, 1782
Rand S., 742*
Bucyrus Company: Annual Report, 615
Buffalo, Rochester & Pittsburgh: Annual Report, 1034†*, 1076
Bulgaria: Lubricating Oil for Railways, 1112
Bullard Mult-Au-Matic, 1690
Bulldog Demagnetizer, 1780
Bunn, C. W.: Testimony on Government Control Before Senate Committee, 462
Bureau for Suggestions and Complaints: Director General McAdoo's Report on, 313
Bureau, Homeseekers', 108, 364, 1085
Bureau of Explosives: Annual Meeting, 542, 559
Bureau of Foreign and Domestic Commerce: Statistics of Exports, 1491†
Bureau of Railway Economics:
Net Operating Income in 1918 Compared with Standard Return, 771
Net Operating Income in 1919, 1559*
Railway Stockholders, Dec. 31, 1917, 1243
Traffic Performance in 1918, 894
Bureau of Safety: Report on Automatic Straight Air Brake, 277, 821†, 840
Bureau of Statistics: Railway Stockholders and Shares Held, 882
Burleson, Postmaster General:
Controversy with C. J. Post, 1102, 1291†
Telegraph and Telephone Lines Returned, 1118, 1443, 1839
Burma War Loan Special, 374*
Business Association (See Railway Business)
Business Conditions and Railway Purchases, 879*, 925†, 934*, 1263., 1284*
Business Conditions, Reports on, 1019, 1064
Buying Power (See Purchases)

C

Calculating Machines, Use of, 896*, 1353*, 1428
Calder, John: Competent Foremen, 977†
Camel No. 50 Door, 1621*
Canada:
Government Ownership in, 31*
Grand Trunk Pacific Receivership, 569†, 1065*
Railway Men in Military Service, 25
Railway Progress During 1918, 1555
Strike at Winnipeg, 1282, 1389, 1443, 1559, 1839
Canadian Pacific:
Aerial Service Contemplated, 1223
Annual Report, 875†*, 920
Explosion in Tunnel, 1227
Fire on Train at Bonheur, 168
Trans-Canada Express, 1173, 1370
Canadian Railway Club:
Mitchell, C. E., on Railroad Problem, 1107
Waterproofing Railway Ties, 849
Canadian Railway War Board, 31*
Capital Expenditures (See Division of)
Car:
Air Dump, 745*
Automobile; Illinois Central, 441*
Blocking for Cradles of Car Dumping Machines, 1592*
Concrete: Holland Railroads, 1113
Concrete: Illinois Central, 776*
Construction, A. R. A. Report on, 1640*, 1656†
Coupler (See Coupler)
Deliveries in 1918, 408
Demurrage Rates Cut, 747†, 1161
Door, Camel No. 50, 1621*
Door Latch and Lock, 1469*
Express and Baggage; Pennsylvania, 1609*
Floor Racks for Cars Handling Perishable Freight, 369*
Fuel Instruction; N. P., 1029†, 1037*
Hose Connector, Automatic, 1477*, 1576†, 1698, 1727*
Inspection and Maintenance, Unification of, 773
Interchange Rules, M. C. B., 169
Lighting Equipment, 1478*, 1520, 1667*, 1732*
Machine Shop, 1139*
Miniature, 1737
Mounts (See Railway Artillery)
Orders in 1918, 86*, 115†
Orders Since 1901, 879*, 934*
Painting, 1784†

GENERAL INDEX—Continued

[Illustrated articles are indicated thus; Editorials thus†; Letters to Editor thus‡.]*

Car (*Continued*)
Pennsylvania General Utility Express, 1609*
Repair Facilities, Shortage of, 1623†
Replacer, Attachment for, 408*
Return to Owners, 441, 447
Roof, Flexible, 1622*
Seat, Scarritt Simplex Coach, 1471*
Sleeping, First, 1281
Standard Passenger, 255*
Storage Battery, 1015*, 1726
Surplus Cars Sent West, 248
Tank Car Situation, 1656†, 1661*
Truck, for 70-Ton, 1469*, 1780*
Unit Railway, 1473*
Wheels, A. R. A. Report on, 1575†, 1590*
Window Device, Anti-Dropping, 1519*
Car, Freight:
Brake (See Air Brake)
Depreciation, A. R. A. Report on, 1492†, 1585
Draft Gear Tests, 1082‡, 1097*
Gondola, Concrete, 776*
Grain Car Situation, 1575†
Hopper and Gondola; Pennsylvania, 1451†, 1461*
Loading, Heavy, Urged, 161, 1296‡
Loading Rules, M. C. B., 265, 1632*
Maintenance, Standards for, 495
Orders in 1918, 86*, 115‡
Orders Since 1901, 879*, 934*
Production for Export, 115†
Refrigerator Car Insulation, 1522*
Refrigerator Cars, Lining and Floor Racks for, 369*
Refrigerator Car Pool, 591
Refrigerator Car Specialties, 1472*
Repairs and Inspection, Uniform, 773
Repairs in 1918 and 1917 Compared, 1096
Repairs Needed, 748†
Repairs, Standard, 487, 930‡
Repairs, Uniform Classification of, 495
Safety Appliances, Equipment with, 1627
Stake Pocket, Collapsible, 1654
Standard Cars Stored, 939, 1213
Surpluses and Shortages, May 1, 1919, 1273
Surpluses and Shortages Since January 1, 1918, 1110
Treated Timber in Construction, 295
Wheels with Reinforced Flanges, 1522
Car, Passenger (See Car)
Car Service Section:
Cars Returned to Owners, 441, 447
Embargo Regulations, 246, 901, 1270
Heavy Loading Urged, 161, 1296‡
Lining and Floor Racks for Cars Handling Perishable Freight, 369*
Refrigerator Car Pool, 591
Shipping Day Plan Modified, 1101, 1146
Surplus Freight Car Statistics, 1110, 1273
Work of, 145
Car Surplus (See Car, Freight)
Carbonization in Valve Chambers, 1762*
Carranza's Railroad Program for Mexico, 1550
Cash (See Finance)
Casting, Interchange, for Draft Gear, 1470*
Cement (See Concrete)
Central Railway Club:
Meeting in January, 270
Unification of Car Repairs, 773
Central Western Region:
Annual Report, 463
Conditions During February, 859
Loading Records, 170
Study of, 489*
Centralization (See Government Control)
Centralized Purchasing (See Purchases)
Certificate (See Finance)
Chair Casting, Creco Reversible, 1475*
Chamber of Commerce of the United States:
Annual Meeting, 1134
Business Situation, 1064
Industrial Board of the Department of Commerce, 1091
Referendum Vote on Remedial Railroad Legislation, 1398†, 1409
Reorganization, 1227
Channel Tunnel (See Great Britain)
Charts of Railroad Purchases, 879*, 934*
Chemical Specialties, Dearborn, 1179*
Chesapeake & Ohio:
Automatic Train Stop Demonstrated, 846*
Locomotive, Standard Mallet Type, 291*
Chesapeake & Ohio of Indiana Transferred, 365
Chicago:
Commutation Fares Increased, 303, 372, 569†
Director General Hines on Improvements, 408
Terminal Situation, 698
Thirteenth Engineers Returns, 1119, 1201*
Traffic Club (See Traffic Club)
Union Station Work, 225, 1227
Chicago & Eastern Illinois: Automatic Stops Inspected, 823†, 867
Chicago & North Western:
Cinder Conveyor, 1017*
Timber Treating Retort, 1385*, 1442
Chicago Association of Commerce: Resolutions on Railroad Legislation, 867
Chicago, Burlington & Quincy: Relief Department Payments, 1442
Chicago, Milwaukee & St. Paul:
Boiler, Oil-Fired, 1790*
Locomotive Firebox with Thermic Syphons, 151*
Chicago Pneumatic Tool Company:
Annual Report, 790
Drills, Air, 1721
Chicago Railway Equipment Company:
Annual Dinner, 376
Brake Beam Support, Creco, 1618*
Chair Casting, Creco Reversible, 1475*
Side Bearing, Multiple Rolling, 1522*
Chicago, Rock Island & Pacific: Railroad Legislation Outlined, 782
Chicago Traffic Club (See Traffic Club)
Chile:
Electrification Proposed, 471*
Equipment to Be Purchased, 1057
Railroad Notes, 273, 373, 470, 1057, 1371
China:
Economic Aspects of Control of North China, 1129†, 1144*
Japan's Railway Enterprises, 471, 517*, 786, 1129†, 1144*, 1203
Locomotives Needed, 252*
Map of Railway Lines, 958*, 1145*
Railway Notes from, 275, 327, 377, 562, 610, 1013, 1057, 1058, 1220, 1549
Revenues and Expenses for 1917, 1220
Unification of Railways Proposed, 959, 1163
Christmas Traffic at Washington, 108
Chrobaltic High Speed Cutters, 1730
Chronological History of Government Control, 73
Churchill, Lord: Nationalization of British Railways, 200, 253
Cincinnati Office Opened, 1029†
Cincinnati Rivet Head Catcher, 1476*
Cincinnati Terminal Problem, 126
Cinder Fill's Effect on Locomotive Water Supply, 1215*
Cinder Handling Plant; P. & L. E., 319*
Cinder Pit Conveyor, 1017*
Claims:
Compensation (See Compensation Contracts)
Director General Hines on, 899
Grain, 549
Handling, Rules for, 551
Reparation Claims, Handling of, 1007
Claims and Property Protection Section:
Empty Containers, Disposition of, 150
Loss and Damage Settlements, 899
Clark Tractractor, 1722*, 1822*
Clayton Law, Competitive Bids Under, 1009, 1209, 1280
Cleaning Locomotives by D. & M. Process, 1332*
Cleaning Materials for Railways, 1520*
Clearance Diagrams for American and French Equipment, 386*
Clearance Diagrams, Meaning of, 705‡
Clerk (See Employee)
Cleveland, Cincinnati, Chicago & St. Louis:
Annual Report, 1343‡*
Improvement Work, 1545*, 1818*
Sink Holes, 217*
Cleveland Engineering Society: Work of Sixteenth Engineers in France, 889
Cleveland Union Station, 153, 755*
Coal (See Fuel)
Coaling Station, "Rand S" Bucket for, 742*
Coastwise Steamship Situation, 507
Coach Seat, Scarritt Simplex, 1471*
Collision (See Accident)
Colombia: Railroad Notes, 1113, 1320
Colorado Brake Shoe & Foundry Co., 1125*
Combustion Chambers, 1797*
Commercial Club of Chicago: Elliott, Howard, on Needed Regulation, 578
Commission (See Contingent Fee)
Commission Regulation and Federal Control, 65
Committee on Standards (See Standard)
Commodities (See Prices)
Compensation (See Employee—Wages)
Compensation Contracts:
Board of Referees Appointed, 601, 1391
Claims for Extra Compensation Up to June 1, 1540
Contracts Executed, 49, 162, 223, 246, 451, 508, 742, 780, 860, 904, 1007, 1060, 1063, 1162, 1273, 1327, 1382, 1539
Federal Control Act Discussed, 751
Payments for 15 Months, 940
Short Lines, 49, 505
Situation, 49, 432
Standard Return Compared with Net Operating Income for 1918, 771
Competition (See Government Control)
Competitive Bids Under Clayton Law, 1009, 1209, 1280
Compilation of Operating Statistics, 896*, 1353*
Compression Brake Device, 1519*
Compressor (See Air Compressor)
Concrete:
Atomizer for Lining Arch, 702*
Car; Illinois Central, 776*
Cars in the Netherlands, 1113
Cement Production in 1918, 1270
Report of A. R. E. A. on, 797*
Roundhouses, 428*, 891*, 994*
Slag Aggregate, Specifications for, 798
Telephone Booth, 746*
Conductor (See Employee; also Brotherhood)
Congress:
Appropriation Bill Defeated, 221, 245, 281†, 301, 406, 431, 438, 503, 525‡, 527, 569†, 572‡, 583, 595
Congress (*Continued*)
Appropriation Bill, New, 1292†, 1293†, 1318, 1323, 1398†, 1404, 1492†, 1539
Bills for Railroad Legislation, 583, 1240, 1318, 1367, 1418, 1442, 1552
Cummins Bill, 1418, 1442, 1552
Esch-Pomerene Bill, 1367, 1398
Extra Session—President's Message on Return of Railroads, 1237†, 1238†, 1241, 1242, 1292†
Federal Control Act, 1073, 1141, 1352, 1391
Connector, Automatic Train Line, 1477*, 1576†, 1698, 1727*
Connection, Engine Pipe, 1780
Connection, Trunnion Type, 1654
Conservation of Material—Reclamation, 497
Conservation of Natural Resources, 683
Consolidated Classification Committee, 304
Construction, New (See names of foreign countries; also Bridges and Buildings; also Station; also Yards and Terminals):
Alaskan Railroad, 543*, 944, 979†, 1388
"Cost-Plus" Contracts, 1129†
C. C. C. & St. L. Improvements, 1545*, 1818*
Hocking Valley Second Track, 493*
Review of Year 1918, 2†, 93*
San Diego & Arizona Line: 931*
Container Club Organized, 324
Contingent Fee Covenant Modified, 1008, 1029†
Contracts:
Compensation (See Compensation Contracts)
"Cost Plus" in Railway Construction, 1129†
Covenant, Contingent Fee, 1008, 1029†
Grade Crossing, Agreement for, 813*
Signaling Work, Form for, 640*
Standard Car and Locomotive Orders of Railroad Administration, 768
War, 26, 224, 270, 926†, 973, 1050
Contractual Obligations of Railroad Administration, Dec. 31, 1918, 768
Conventions (See names of associations)
Conway, R. F., Co.: Concrete Car, 776*
Corporate Accounting During Federal Control, 1535
Corporate Executives, A. R. E. A. Men as, 732
Corps of Engineers, U. S. A., on Proposed Dept. of Public Works, 1804†, 1806‡
Cost:
Air Consumption of Auxiliaries, 1165*, 1341†
Equipment Shipped to A. E. F., 1050
Fuel in 1917 and 1918, 1115
Living and Railway Rates, 1434*, 1805†
Producing Ties, 346
Reproduction in 1920, 1236†
Stopping Trains, 1105, 1129†
Train and Locomotive Service, 1109, 1327
"Cost Plus" in Railway Construction, 1129†
Cotterill, Charles E.: Testimony on Federal Control Plan Before Senate Committee, 399
Coupler (See also Connector):
A. R. A. Mechanical Report, 1603*, 1623†
Trunnion Type, 1654
Type D Passenger, 1729
Coupling, Universal Air Hose, 1721
Covenant (See Contracts)
Cranes:
Loading Locomotives Into Ship, 981*
Portable Electric Stacking, 1016*
Surplus Government Material, 328
Creco Brake Beam Support, 1618*
Creco Reversible Chair Casting, 1475*
Credit (See Finance)
Creosote (See Ties and Timber)
Cuba: Railway Strike, 274, 610
Cumberland Valley: First Sleeping Cars, 1281
Cummins Bill (See Congress)
Cutler, Otis H.: Red Cross Work, 1467*
Cutter:
Chrobaltic High Speed, 1730
Gray's Sheet Metal, 1782
Cuyler, Thomas DeWitt: Legislation for Return of Railroads, 1242

D

D & M Cleaning Process for Locomotives, 1332*
Damascus Brake Beam Company: Collapsible Stake Pockets, 1654
Davidsonized Cast Tool Steel, 1691
Dawes, Charles G.: Plan for Railway Control, 220
Daylight Saving Law Repealed, 781, 1837
Dearborn Chemical Specialties, 1779*
Decreasing the "Man Mileage," 604
Deeming-Endsley Company:
Organization, 565*
Switch Point Hold Down, 745*
Deferred Maintenance (See Maintenance)
Defiance Multiple Spindle Drill, 1690
Deficit (See Finance)
Delaware & Hudson: Annual Report, 1131‡, 1178
De-Magnetizer, Bulldog, 1780
Demurrage Rates Cut, 747†, 1161
Denmark: Railways Need Equipment, 610
Dent Bill to Validate War Contracts, 26, 224, 270, 926†, 973
Denver & Rio Grande: Freight Terminal at Salt Lake City, 1083*
Denver & Salt Lake:
State Purchase Proposed, 1118
Tunnel, James Peak, 1559

Denver Shopmen's May Day, 1172
Department of Agriculture: Memphis Conference, 858, 941
Department of Commerce:
Disagreement with Railroad Administration on Rates, 779
Industrial Board (See Industrial)
Department of Public Works Proposed, 1103, 1804†, 1806‡
Department of Transportation Proposed, 1360
Depreciation for Freight Cars, 1492†, 1585
Depreciation Rates, Adequate, 427†
Derailment (See Accident)
Derails, The Use of, 1361*
Dial Air Pressure Gage, 1470*
Dining Cars:
A La Carte Service Resumed, 449, 477†, 573‡, 979†
Rental Charges for, 599
Director General Hines:
Accounts with Railroad Companies as of December 31, 1918, 433
Appeal for Efficiency and Economy, 1523†, 1541
Appointment as Director General, 176†, 187*
Appropriation Bill for $750,000,000 Defeated, 221, 245, 281†, 301, 406, 431, 438, 503, 525†, 527, 569†, 572†, 583, 595
Appropriation Bill for $1,200,000,000 Cut to $750,000,000, 1292†, 1293†, 1318, 1323, 1398†, 1404, 1492†, 1539
Cash Receipts and Disbursements, 770, 1160
Coal Purchasing Policy, 248, 450
Contingent Fee Covenant, 1008, 1029†
Deficit for 1918, 425†, 431
Deficit for Three Months of 1919, 1132†, 1159, 1291†
Employees, Increased Number of, 600
Financing Equipment Obligations, 595, 747†, 768, 855, 903, 940, 1005, 1062, 1132†, 1159
Freight Claims, Disposition of, 899
General Orders:
No. 18-B (Suits Against), 1327
No. 27—Supplements Nos. 15-22 (Wage Increases), 926†, 944, 985*, 1063, 1185†, 1214, 1215
No. 34-B (Unclaimed Freight), 900
No. 50-a (Suits Against), 248
No. 51 (Seniority Rights for Russian Railway Service Corps), 451
No. 57-A (Grain Claims), 549
No. 58 (Relations with State Commissions), 506
No. 59 (Monthly Traffic Reports), 551, 1383
No. 60 (Waybills), 858
No. 61 (Clocks Set Ahead), 781
Inspection Trips, 855, 913, 1005, 1213, 1381, 1539
Labor Questions, 1302
Maintenance Expenditures, 1383†, 1435, 1525†, 1804†
Meeting with Railway Executives, 406
Money Subject to Attachment, 1111
Passenger Men, Address to, 244
Permit System for Grain, 1292†, 1326, 1382
Public Improvements, Policy as to, 408, 1381
Railroad Administration Faces New Situation, 529
Railroad Problem, Solution of the, 1020, 1134
Railway Business Association's Address on Additions and Betterments, 293
Rate Advance Possible, 1381, 1405, 1539
Rate-Making Powers, 233†, 247, 1141, 1352, 1418, 1442
Rate Policies, 451
Relinquishment Not Being Considered, 527
Rental Charges for Equipment, 599
Short Line Contracts, 505
State Commissions' Relations with Railroad Administration, 303, 447
Steel Prices Controversy, 821†, 870, 902, 937, 980†, 992, 1020, 1091, 1109, 1161, 1186†, 1189, 1292†, 1324
Strike of Clerks, 779, 782
Support Needed for Difficult Task, 572‡
Testimony Before Senate Committee, 333†, 334†, 353
Ticket Agents, Address to, 1443
Victory Loan, Congratulation on, 1327
Waterway Policy, 998
Waterways and Railroads, Co-ordination of, 400
Director General McAdoo:
Annual Report, 113†, 139, 181, 213, 247, 281†, 311
Compensation Contracts Signed, 49, 162
Five-Year Test of Government Control Urged, 113†, 118, 156, 163, 188, 322, 334†, 353, 398, 461, 479†, 483, 503
General Orders:
No. 6 (Exchange Transportation), 162
No. 27 (Wage Increases), 103, 162, 237‡, 363, 749†, 874†, 926†, 944, 985*, 1080†, 1095
Government Operation a "Failure," 525†
Oil Traffic Handling Commended, 164
Public Improvements, 105
Standardization of Equipment, 524†
State Rate Authority Over, 65, 161, 248
Testimony Before Senate Committee, 113†, 118, 163, 235‡, 283†, 310
Vacation in California, 159
Distinguished Service Medal Awarded:
Atterbury, Brig. Gen. W. W., 265
Felton, S. M., 265
Hodges, George, 1275
Vauclain, Samuel, 1288
Wilgus, William J., 1018
Ditchers, Erie Power, 511*
Dividend Changes in 1918, 60
Division of Accounting:
Circulars of, 222, 508, 551, 552, 859, 1162, 1381, 1425
Claims, Handling of, 551
Prouty, C. A., Director of, 246
Division of Capital Expenditure:
Co-operation with Corporate Officers, 303
Expenditures for 1918, 248, 304
Improvements, Financing of, 598, 732, 769
Powell, T. C., Director of, 246*
Program for 1919 Reviewed, 769
Division of Finance:
Finance Committee Appointed, 858
Sherley, Swagar, Director of, 596
Division of Labor: Director General McAdoo's Report on, 181
Division of Law: Director General McAdoo's Report on, 311
Division of Operation:
Cars Returned to Owners, 441, 447
Director General McAdoo's Report on, 113†, 139
Maintenance Data Collected, 552, 734, 1271
Mechanical Officers to Report on June Conventions, 1161, 1237†, 1438, 1544
Passes, Issuance of, 551, 901
Standard Statistics, 1†, 43*
Tyler, W. T., Director of, 222*
Division of Public Service:
Demurrage Rates, 747†, 1161
Shipping Day Plan, 942, 1062, 1101
Thelen, Max, Director of, 246*, 303, 447
Division of Public Service and Accounting:
Back Pay, Reports on, 364, 601
Circulars, 222, 508, 551, 552, 859, 1162, 1425
Collection of Miscellaneous Rents, 162
Credit for Payment of Freight Charges, 364
Director General McAdoo's Report on, 281†, 311
Pullman Car Line Payments, 223, 486
Reorganization into Two Divisions, 246*
Division of Purchases:
Advisory Committee Created, 780, 858
Spencer, H. B., Director of, 596*
Division of Statistics: Equipment Exports, 1491†
Division of Traffic:
Consolidated Classification Committee Appointed, 304
Demurrage Rates Cut, 747†, 1161
Director General McAdoo's Report on, 213
Reparation Claims, Handling of, 1007
Spens, C. E., Assistant Director, 449
Doings of United States Railroad Administration (See United States)
Dominican Republic: Railway Notes, 1439
Door:
Camel No. 50, 1621*
Double Butterfly Firedoor, 1734*
Fire, 743*, 1778*
Latch and Lock, 1469*
National Car, 1782
Trap, 1724
Draft Gears:
A. R. A. Mechanical Report on, 1576†, 1605*
Casting, Harvey Interchange, 1470*
Tests of Inspection Section, 1082‡, 1097*
Drawbar Pull-Speed-Cut-off and Train Operation, 1766*, 1783†
Drexel Multiple Roller Side Bearing, 1522*
Drill:
Air, 1721
Defiance Multiple Spindle, 1690
Grinders, 1691
Press, Portable, 1619*
Socket, Bell-Mouth, 1780
Valveless Air, 1691
Drinking Fountain, Tuco Sanitary, 1781
Duff Screw Jacks, 1691
Duluth, Missabe & Northern: Roundhouse at Proctor, Minn., 425‡, 428*
Dunn, Samuel O.:
European Railway Service, Effect of War on, 762
Great Britain's Railroad Situation, 197
Opportunities for Railway Supply Exports, 53*
Railway Situation Acute, 436
Transportation Corps in the War, 7*
Duntley-Dayton Company:
Organization, 329*
Red Devil Rivet Cutter, 1618*
Du Pont Fabrikoid Company: Fabrikoid for Automobiles, 1693
Dutch East Indies: Railway Notes, 373, 1112

E

Earnings (See Revenues and Expenses)
Eastern Region:
Annual Report for, 361
Conditions During January and February, 859
Roads Transferred, 105, 365
Situation Under A. H. Smith, 1346*
Economics and the Railroad Problem, 207
Economics of Railway Operation, Report of A. R. E. A. on, 795†, 816*, 819, 820
Economy, Director General's Appeal for, 1523†, 1541
Economy, Fuel (See Fuel)
Ecuador: Railway Construction in, 866, 1114
Education:
Industrial Training of Employees, 569†
Scholarships, A. R. A. Report on, 1502
Scholarships, Westinghouse, 1235
Edwards, O. M., Company: Compression Brake Device for Car Window, 1519*
Efficiency (See Operating Efficiency)
Egypt: Railways Need Repair, 910
Electric Arc Welding Machines, 1476*
Electric Heated Boilers, 1787*
Electric Locomotive (See Locomotive)
Electric Storage Battery Company: Car Lighting Equipment, 1478*
Electric Tractors (See Tractors)
Electrification:
Brazilian Railways, 1424
Chilean Railways, 471*
French Railways, 1112, 1219
Japanese Project, 1163
Real Problem of, 765*
Report of A. R. E. A. on, 722*
Swedish State Railways, 516, 1112
Elgin, Joliet & Eastern: Telltale, Side Clearance, 702*
Elliott, Howard:
Employees, Increased Number of, 600
Needed Regulation, 578
Testimony Before Senate Committee, 455
Elwell-Parker Electric Trucks, 1521*
Elmquist, Charles E.: Testimony Before Senate Committee, 360
Elvin Stoker; Erie, 202*
Embargo (See Freight)
Emigration (See Maintenance of Way)
Employee (See also Labor; also Education):
Clerks, Inefficient, 180‡
Clerks, Strike of, 779, 782
Conductors and Bull Dogs, 1294‡
Director General Hines' Appeal for Efficiency and Economy, 1523†, 1541
Foreign Experience, Information Concerning, 1214
Foreman, Proper Recognition of, 977†
Foreman's Right to Discharge, 1341†
Harmony and Safety, 1104, 1294‡
Number and Compensation, 1060, 1080†, 1095
Number Increased During War, 600
Number of Men in Military or Naval Service, 25, 167, 224, 265, 321, 367
Pay by Check; Pennsylvania, 265
Railway Supply Labor Laid Off by Thousands, 335†, 337, 342
Relations with Officers, 604, 1341†
Relief Department Payments; C. B. & Q., 1442
Relief Department Payments; Pennsylvania, 1558
Safety (See Safety First)
Seniority Numerical Index Suggested, 384‡
Skilled Men to Be Retained, 105
Social Status of, 1442
Strike:
Clerks; N. C. & St. L., 779, 782, 867
Express Men, 1227
London Tube Railways, 375, 612
New York Harbor Workers, 1019, 1029†, 1384
New York Produce Handlers, 1814
Shopmen; Canadian, 1514
Shopmen; N. & W., 1558
Shopmen; Southern Ry., 1558
Winnipeg, Canada, 1282, 1389, 1443, 1559, 1838
Victory Loan Subscriptions, 1068, 1118, 1170, 1171, 1227, 1283, 1327
Wages:
Automobiles and Freight Conductors, 1185†
Back Pay for Short Line Employees, 900
Back Pay to Be Reported, 364, 601
Board of (See Board)
British Railwaymen's Demands, 375, 612,*775, 786, 1011*
Clerks, 180‡
Cost of Living and, 1434*
Garnishment Subject to Law, 1111
Increases—Director General Hines' Order, 926†, 944, 985*, 1063, 1185†, 1214, 1215
Increases—Director General McAdoo's Order, 27, 103, 162, 237‡, 363, 749†, 874†, 1095
Increases Estimated, 304, 478†, 1197
Maintaining High Wages, 5†, 747†, 1030†
Overtime Not Salary, 363
Payroll for January, 1919, 1060, 1080†
Payroll of Railroad Administration, 1093
Piecework Abolished, 365, 381†, 408, 523†, 978†
Punitive Overtime, 1080†, 1294‡, 1303, 1327
Railroad Police, Increases for, 780
Shopmen's Demands, 224, 597, 874?, 900, 1006
Sick-Leave Rules, 1296‡
Signal Department, 237‡, 780, 824‡
Telegraphers and Telephone Operators, 103, 1214
Telegraphers, Commercial, 107
Yard Foremen, 1215
Women's Service Section, Work of, 184
Wood Preservers' Association, 365
Engine (See also Locomotive): Hvid Oil Burning, 1728
Engine and Tender Pipe Connections, 1780
Enginehouse:
Construction, Tendencies in, 538*, 587*, 994*, 1199
Columbus; T. & O. C., 994*, 1380*
Heating and Ventilation, 1245*
Long Island City; L. I., 891*
Proctor; D. M. & N., 425†, 428*

GENERAL INDEX—Continued

[Illustrated articles are indicated thus; Editorials thus†; Letters to Editor thus‡.]*

Engine Terminal (See Yards and Terminals)
Engineer (See Officer; also American Association of; also American Railway Engineering Association)
Engineer Corps, Auxiliary, 1804†, 1806‡
Engineer Corps: War Work, 1172, 1557
Engineering a Profession or a Trade? 1081†, 1293†, 1295‡
Engineering Advertisers' Association Formed, 868
Engineering Council:
  Activities of, 1280
  Auxiliary Engineer Corps Proposed, 1804†, 1806‡
  Committee on Compensation, 1534
  Department of Public Works Proposed, 1103
  Salaries of Engineers, 963, 1081†, 1293†, 1295‡, 1534
Engineering Meeting in Chicago, 1103
Engineering Problems of English Railways, 30
Engineering Regiments (See Railway Regiments)
Engines, Steam vs. Internal Combustion, 1386
England (See Great Britain)
Equated Tonnage and Fuel Consumption, 1309
Equipment (See Standard; also Car; also Locomotive):
  Allocation of, 1110
  Car and Locomotive Orders in 1918, 82*, 86*, 115†
  Car and Locomotive Orders Since 1901, 879*, 925†, 934
  Cost, War, 1050
  Exports (See Foreign Trade)
  France, Needs of, 518
  Purchases and Business Conditions, 879*, 925†, 934*
  Rental Charges for, 599
  Standardization of (See Standard)
  Standards for Maintenance of Freight Cars, 487, 495
  Value Compared with That of Other Industry, 1248*
Equipment Companies: Certificates of Indebtedness from Railroad Administration, 595, 747†, 768, 855, 903, 940, 1005, 1062, 1132†, 1159, 1238†, 1273, 1336
Equipment Trust (See Finance)
Equitable Trust Company: Railroad Plans, 585
Erie:
  Loading Locomotives into Ship, 981*
  Locomotive Stoker, Elvin, 202*
Esch-Pomerene Bill, 1367, 1398†
Etchograph, 1780
European Railway Service, S. O. Dunn on, 762
Excess Earnings and Transportation, 1807‡
Executives (See Association of)
Exhibit (See Railway Supply Manufacturers' Association; also Ordnance Department; also names of associations)
Expenses (See Revenues and Expenses)
Expert, Employment of the, 235†
Explosion in C. P. R. Tunnel, 1227
Export Rates to Orient, 609, 860
Export Trade (See Foreign Trade)
Exports Control Committee:
  Annual Report, 317
  Discontinued, 449
  Organization, 150
  Weekly Reports of, 162, 222, 406, 451, 508, 599
Exports, Equipment (See Foreign Trade)
Express Claims Settled, 1173
Express Employees' Strike, 1227
Express Rate Increases in Ohio, 248

F

Fabrikoid for Automobiles, 1693
Fayant, Frank H.:
  English Railway Wages, 775
  French Guarantee System, 911
Federal Board for Vocational Education: Training Disabled Soldiers, 1333
Federal Control (See Government Control)
Federal Employment Service: Labor Recruiting Conference, 243, 282†
Federal Liquidating Association:
  War Cost of Equipment, 1050
  War Contracts, Liquidation of, 926†, 973
Felton, S. M., Awarded D. S. M., 265
Fibre Container Club, 324
Finance (See also Accounting; also Revenues and Expenses; also Division of Capital Expenditures; also Compensation Contracts):
  Accounts Between Director General and Railroad Companies, Dec. 31, 1918, 433
  Advances from Railroad Administration, 160, 233†, 363, 940
  Appropriation Bill (See Congress)
  Brooklyn Rapid Transit Receivership, 113†
  Cash Receipts and Disbursements of the Railroad Administration, 770, 1160
  Certificates of Indebtedness Issued by Railroad Administration, 595, 747†, 768, 855, 903, 940, 1005, 1062, 1132†, 1159
  Credit for Payment of Freight Charges, 364
  Credit, Re-Establishing, 177†, 282†
  Deficit for 1918, 425†, 431
  Deficit for Three Months of 1919, 1132†, 1159, 1291†
Finance (*Continued*):
  Dividend Changes in 1918, 60
  Equipment Trust to Finance Standard Equipment, 1238†, 1273, 1336
  Foreign Trade, Financing, 1088, 1089, 1090, 1524†
  Grand Trunk Difficulties, 1291†
  Guaranteed Income Plan, French, 911
  Guarantees, Government, 1130†, 1149
  Investment in Foreign Securities, 1524†
  Loans from War Finances Corporation, 768, 855, 903, 1072, 1388, 1814, 1822
  Morgan and the Southern Railway, 381†
  Receivership; G. T. P., 569†, 1065*
  Receiverships and Foreclosures in 1918, 34
  Stockholders and Shares Held, 882
  Stockholders and Shares Held December 31, 1917, 882, 1243
  Swedish Loan, 1523†
Fines for Violations of Law, 1558
Finland: Railway Notes, 1112, 1277, 1319
Firebox (See Locomotive)
Fire Doors, Types of, 743*, 1734*, 1748*
Fires:
  Canadian Pacific Train at Bonheur, 168
  Canadian Pacific Tunnel, 1227
  Miscellaneous, 430, 604, 781, 1092, 1140, 1333
Five-Year Test (See Government Control)
Flagging and Railroad Accidents, 1523†, 1528, 1541
Flanders, Repair Shop Train in, 1139*
Flanges for Freight Car Wheels, 1522
Flannery Flexible Staybolts, 1728*
Flexible Car Roof, 1622*
Floor Racks (See Car)
Ford, J. B. Co.: Wyandotte Cleaner, 1520*
Foreign Bond & Share Corporation, 1056
Foreign Railway Men at March Exhibit, 175†
Foreign Railway News (See Names of Countries): New Department of *Railway Age*, 175†
Foreign Securities, Investment in, 1524†
Foreign Trade (See also names of countries):
  Australia, American Machinery in, 786
  Cars and Locomotives Produced for Export in 1918, 115†
  Convention at Chicago, 234†, 1087
  Dunn, Samuel O., on, 53*
  Electrical Machinery, Field for, 615
  Exports of Equipment, 228, 333†, 470, 786, 865, 962, 1058, 1163, 1220, 1278, 1319, 1439, 1440, 1451†, 1491†, 1551
  Financing, 1088, 1089, 1090, 1524†
  Freight Rates to the Orient, 609
  London Office Opened by Simmons-Boardman Publishing Co., 1237†
  Mississippi Valley Association, 272
  Pan-American Conference, 1385, 1397†, 1419
  Peace-Time Market, 1451†
  Rails for Birmingham, Eng., 1146
  Shipping Situation, 1089, 1090
  Sweden Bidding in Our Markets, 1523†
Foreman (See Employee)
Forest Products Section:
  Southwestern Region, 314
  Standard Specifications for Timber Preservation, 445, 478†
  Tie Situation, 478†, 1305
Forms, Standard, 1†, 43*
Fort Washington Collision, 212, 1523†, 1528, 1541
Fountain, Tuco, Sanitary Drinking, 1781
Fourteenth Engineers' Reception in Boston, 1228
Fracar Journal Packing, 1522
France (See also Railway Regiments):
  Channel Tunnel, 1112
  Collision in, 1059
  Electrification of Railways, 1112, 1219
  Guarantee of Income Plan, 911
  Locomotives and Cars Needed, 518
  Railroad Notes from, 228, 418, 515, 610, 786, 909, 1112, 1113, 1319, 1371, 1440.
  State Railways in the War Years, Revenues and Expenses of, 52
  War's Effect on Railways, 762
Franklin Railway Supply Company:
  Firedoor, Double Butterfly, 1734*
  Pipe Connections, Joints for, 1780
Freer, Guy M.: Testimony on Government Control Before Senate Committee, 461, 479†
Freight:
  Charges, Credit for Payment of, 364
  Embargo Bureau of N. W. Region, 1270
  Embargoes Under Regional Directors, 246, 901
  Export (See Exports Control Committee)
  Loss and Damage (See Claims)
  Mechanical Transference, 582
  Shipping Day:
    Development and Death of, 1101, 1146
    Handling Company Freight, 387
    Kansas City, Results in, 170
    Pennsylvania Railroad's Notice, 1282
    Plan modified, 942, 1062, 1146
  Unclaimed, Disposition of, 900
  Waybills, Standard Forms of, 858
Freight Car (See Car Freight)
Freight Claims (See Claims)
Freight House (See Yards and Terminals)
Freight Rates:
  Advance Needed, 235†, 748†, 927†, 1032†
  Coal from Western Kentucky, 1337
  Commodity Prices and Rate Advances, 1032†
  English and American Compared, 573†, 1036‡
  Export to Orient, 609, 860, 1173
  Land Grant Rates to Government, 508
  Lumber from Pacific Coast, 233†, 247
  Railroad Administration and Department of Commerce Disagree on, 779
  Road and Building Materials Reduced, 372, 858, 1008
  Wages and Cost of Living, 1434*
Freight Statistics, New Classification for, 970
Freight Terminal (See Yards)
Freight Traffic Performances in 1918, 894
Freight Traffic Statistics for October, 154*; November, 150, 223; December and Year, 1918, 381†, 407; January, 550, February, 904, 941; March and Three Months, 1132†, 1159, 1161, 1213, 1291†; April, 1381
French Africa, Railroad Expansion in, 326
Frog (See Switch)
Front Ends (See Locomotive)
Frost Railway Supply Company: Interchange Casting for Spring Draft Gear, 1470*
Fuel (See also International Railway Fuel Association):
  Coal:
    Bucket, "Band S.," 742*
    Consumption in 1918, 901
    Dirt in, 1255
    Price Regulations Suspended, 247, 372
    Purchasing Policy of Railroad Administration, 248, 450, 1006, 1063
    Storage and Water Supply, 1817
    Storage During 1918, 1311
    Weighing Devices for Tenders, 1708
  Consumption, Records of; So. Pacific, 1423*
  Economy:
    Addresses at I. R. F. A. Convention, 1249, 1309, 1558
    Lame Engines, Tests of, 1309*
    Northern Pacific's Work, 1029†, 1037*
    Protection of Steam Lines, 333†
    Report of A. R. A. Committee, 1739*, 1783†
    Superheater Flues Kept Clean, 570†
    Supervising Coaling Stations, 234†
    Teamwork of Enginemen and Firemen, 1251
    Train and Engine Loading, 1051
    Yardmen and Fuel Saving, 911
  Locomotive Consumption in 1918, 236‡
  Locomotive Losses at Terminals, 1252
  Organization of Fuel Department, 1312, 1741*
  Pulverized Coal, Locomotive; L. V., 1782
  Pulverized Fuel Equipment Corp., 474 1288*
  Pulverized Fuel, Report on, 1249, 1795*
Fuel Conservation Section:
  Coal Consumption in 1918, 901
  Cost in 1917 and 1918, 1115
  Posters to Illustrate Firing Methods, 860
  Statistics, Importance of, 1079†
Fuller Engineering Company: Pulverized Coal Locomotive; L. V., 1782

G

Gage, Air Pressure, 1470*
Gage Glass, Moncrieff Reflex, 1782
Gaines, F. P., Chairman of Wage Board, 223
Garnishment (See Employee—Wages)
Garretson, A. B.: Government Ownership Plan Presented to Senate Committee, 383†, 397, 426
Gear Box, Gould & Eberhardt, 1690
Gear, Valve for Standard Locomotives, 1734
General Assembly of Iowa: Senator Cummins on the Railroad Problem, 1031†, 1041
General Committee (See American Railroad Association—Section III. Mechanical)
General Electric Company:
  Turbine Headlight Set, 1726*
  Welding Sets, 1653*
General Manager (See Officer)
General Orders (See Director General)
General Pershing Compliments Railway Men, 839*
Generators:
  Airco Acetylene, 1471*
  Headlight, 1726*, 1729*, 1732*
  Rating Axle, 1667*
  Spring Drive for Axle, 1692*
  Turbine Headlight Set, 1726*
  Welding, Self Exciting, 1653*
Germany:
  Belgian Railways During War, 275, 470, 501, 1440
  Cars Turned Over to Allies, 786, 1277
  Coal Shortage Acute, 327
  Railroad Notes, 1072, 1319
  Traffic and Rolling Stock Conditions, 228, 418, 612, 960
Gibraltar Tunnel Project, 1219
Gifford & Co.: Side Clearance Telltale, 702*
Glasgow Freight Terminal, 821†, 843*
Glass, Moncrieff Reflex Gage, 1782

Glenwood Locomotive Repair Shop; B. & O., 1401*
Gloucester Railway Car & Wagon Company: Repair Shop Train, 1139*
Gold Car Heating & Lighting Company: Valves, 1620*, 1733*
Golden Spike Celebration, 1227, 1283
Gondola Car (See Car, Freight)
Goto, Baron, Interviews *Railway Age* Representative, 1203
Gould & Eberhardt: Gear Box, 1690
Gould Coupler Company: Headlight Generator, 1729*
Gourlay, William: Better Express Service, 469
Governors' and Mayors' Conference: Railroad Administration Faces New Situation, 529
Government Control (See also Director General; also United States Railroad Administration):
Accidents Under, 878‡
Appropriation Bill (See Congress)
Brisbane, Arthur, on, 1292†
British Railway Costs Under, 1372
Compensation of Railroads under (See also Compensation Contracts), 751
Competition, F. J. Lisman for, 831, 883*
Competition, Judge Lovett for, 1†
Competition and Rail Transportation, 824‡
Conditions Before and Under, 118
Constitutionality of Act, 1073
British Railways During War, 197
Chamber of Commerce Discusses, 1134
Centralization Reduced, 570†
Chamber of Commerce on, 1398†, 1409
Chronological History of, 73
Commission Regulation Suspended, 65
Corporate Accounting During, 1535
Cummins, Senator, on, 1031†, 1041, 1136
Dawes, Charles G., on, 220
Department of Transportation Proposed, 1360
Don't Lose Your Punch, 382†
Dunn, S. O., on Railway Situation, 436
Elliott, Howard, on, 455, 578, 600
Esch-Pomerene Bill, 1367, 1398†
Expenses Accrued, but Unpaid, 1129†
Expenses Under, 3†, 27*, 116†, 1093
Experiment Unauthorized, 479†
Facts and Fancies Regarding, 283†
Failure of, 525†
Five-Year Test Urged by Director General McAdoo, 113‡, 118, 156, 163, 188, 235†, 283†, 310, 322, 334†, 353, 398, 461, 479†, 483, 503
Gray, Carl R., on, 1341†, 1349
Guarantee Plan, 1130†, 1149
Hayden, Charles, Outlines Legislation, 782
Hines, Director General, on, 333†, 334†, 353, 848, 1020, 1134
Hoy, Sir William, on, 299
I. C. C. Opposes, 133
Joint Committee on Interstate Commerce, Final Report of, 529
Kahn, Otto H., on, 465
Labor Situation, 181, 571†, 1350, 1186†, 1197
Lisman, F. J., on, 831, 883*, 1221
Mail Service, 281†
Operating Results, 139
Maintenance Work (See Maintenance)
Mitchell, C. E., on, 1107
Morse, Charles A., on, 207
Optimism, A Justified Spirit of, 1452†
Osborn, Wm. Church, on, 1186†, 1197
Passenger Service During, 316
Persons Employed in Washington, 1111
Plans for Railroad Legislation, 583
Plumb, Glenn E., on, 1137
Pomerene, Senator, on, 729, 796†
Private Initiative Killed, 234†
Prouty, C. A., on, 483, 1835
Prussianizing American Railways, 156
Public and Wage Increases, 749†
Public Opinion on, 1172, 371, 1370
Railroad Men Operating Railroads, 904
Railway Business Association's Recommendations, 409
Rate Advances Needed, 235†, 748†
Rate-Making Powers Under, 65, 161, 233†, 247, 248, 1141, 1352, 1418, 1442
Rea, Samuel, on, 1147
Re-Establishing Railway Credit, 177†, 282†
Relinquishment Not Being Considered, 527,
Resignations of Railway Officers, 233†
Return of Railroads, Dec. 31, 1919, 1238†, 1241
Ripley, E. P. on, 1815
Rivalry in Railroad Operation, 824‡
Senate Committee's Hearings (See Senate Committee)
Shippers' Views on, 59, 190, 237‡, 306
Signaling Status Under, 137
Solving the Railroad Problem, 177†
South African Experience, 299
Summing Up the Railroad Problem, 1079†
Telegraph and Telephone Lines Returned, 1118, 1443, 1839
Telephone Strike, 1079†
Test of, C. A. Prouty on, 483
Traffic Club of New York, Resolutions of, 108
Traffic Department Under, 61*, 213
Tyler, W. T., on, 1713
When Is a Railroad Under? 1271
Winant, Clinton D., on, 1116
Year of 1918, Reviewed, 5†, 62, 118
Government Guarantees (See Government Control)
Government Operation (See Government Control)
Government Ownership:
Brisbane, Mr., Is Disappointed, 1292†
British Railways, 200, 253
Canadian Situation, 31*
Chamber of Commerce Opposes, 1398†, 1409
Chicago Traffic Club Opposes, 609
Congress and the Appropriation Bill, 525†, 527
Labor Organizations for, 359, 383†, 397, 426†, 1137, 1839
Merchants' Association of New York Opposed to, 586
Montgomery, F. B., on, 59
Plumb Plan, 1137
Public Sentiment Against, 1370
Government Purchasing (See Purchases)
Government Regulation:
Chicago Commerce Association on, 867
Johnson, Alba B., on, 156
Lisman's, F. J., Plan, 831, 883*
Railway Executives' Plan for, 1†, 131, 178†, 188, 262
Ripley, E. P., Suggests Relieving I. C. C. of Power, 1815
Grade Crossings:
Agreement, Form of, 813*
Sign Protection, 684
Grades, Holding Trains on, 1169
Gradients' Effect on Hauling Power of Mikado Locomotives, 955
Grain:
Car Situation, 1575†
Claims, Disposition of, 549
Permit System of Handling, 1292†, 1326, 1382
Grand Rapids Machine Company: Grinders, 1691
Grand Trunk Difficulties, 1291†
Grand Trunk Pacific Receivership, 569†, 1065*
Graver, Wm. Tank Works:
Timber Treating Retort, 1385*, 1442
Underground Gasoline Storage, 1017*
Gray, C. R., on Government Operation, 1341†, 1349
Gray's Sheet Metal Cutter, 1782
Great Britain:
Aspinall, Sir John, on Engineering Problems of Railways, 30
British Imoort Restrictions, 517
Cost of Running Railways Under Government Control, 1372
Dunn, S. O., on Railroad Situation, 197, 762
English Channel Train Ferry, 509*
English Channel Tunnel, 611, 907, 962*, 1112
Government Ownership of Railways, 200, 253
Great Western Railway's Operations, 60
Labor Difficulties, 375, 612, 775, 786, 1011*, 1442
London Office of *Railway Age*, 1237†
London Traffic Congestion, 1319
Ministry of Ways and Communications Proposed, 787, 861, 925†, 957, 1013, 1059
Passenger Fare Bill Defeated, 1320
Railroad Notes, 273, 373, 377, 418, 515, 516, 561, 610, 1112, 1319
Rails Ordered in U. S., 1146, 1278, 1319, 1550
Rates in America, Comparison with, 573‡, 1036‡
Repair Shop Train in Flanders, 1139*
Season Ticket Holders, 1172, 877‡
Tie Purchases in U. S., 1392
Thomas, J. H., on Visit, 1319
Train Ferries for Irish Channel, 374
Transportation Service in War, 16
Wages, Frank H. Fayant on, 775
Wage Increases, 1011*
War's Effect on Railways, 762
Great Lakes Commerce Association, 969
Great Northern: Water Treatment, 1031†, 1053*, 1808‡
Great Western of England: Operations, Statistics of, 60
Greece:
Railway Improvements, 373 1440
Railway Supplies Needed, 610, 910, 1163
Grinders:
Drill, 1691
Internal, 1690
Metal Saw, 1520*
Rotary Surface Machine, 1694*
Grip Nut Company Reorganized, 171*
Guaranteed Income Plan, French, 911
Guns, Mounted (See Artillery)

H

Hammer, Sure-Lox, 1691
Hand Brake, Worm Driven, 1693*
Handlan-Buck Manufacturing Company: Signal Lamps, 662
Harbor Strike at New York, 1019, 1029†
Harmony and Safety, 1104, 1294‡
Harvey Spring Draft Gear with Interchange Casting, 1470*
Haskell & Barker Car Company: Annual Report, 919
Head, Automatic Screw Cutting Die, 1690
Heald Machine Company:
Grinder, Internal, 1690
Rotary Surface Grinding Machine, 1694*
Heater, Berwick Electric Rivet, 1779
Heating and Ventilation of Engine Houses, 1245*
Heating Boilers, 1787*
Heating Furnace, Rivet, 1619*
Herr, E. M., Electrical Machinery Export Business, 615
Heyl & Patterson, Inc.: Crane for Leading Locomotives into Ship, 981*
Highways and Railways, 1804†
Highways Transport Committee Reorganized, 1018
Hines, W. D. (See Director General)
Hocking Valley: Second Track Construction, 493*
Hodges, George:
Death of, 794*
Distinguished Service Medal Awarded, 1275
Hoist, Pneumatically Operated Cable, 1780
Holding Trains on Grades, 1169
Hollerith Cards for Operating Statistics, 1358*
Holland: Concrete Cars in, 1113
Holt Roof Connection, 744*
Homeseekers' Bureau Established, 108, 364, 1085
Hooley, Mr., at A. R. E. A. Convention, 665, 706
Hoover, Herbert C., Director General of Austrian Railroads, 611
Hoy, Sir William, on Government Operation, 299
Hopper Car (See Car, Freight)
Hose (See Car)
Hunt, Robert W., & Co.: Special Rail Inspection, 744
Hutchins Car Roofing Company: Flexible Roof for Repairs, 1622*
Hvid Oil Burning Engines, 1728

I

Illinois Central:
Automobile Car, 441*
Concrete Car, 776*
Water Softening Plant in Markham Yard, 895
Immigration (See Labor)
Improvements (See also Construction, New):
Financing by Companies, 408, 598, 732, 769
Railroad Administration's Policy, 105, 408, 1381
Stagnation in Improvement Work, 1237†
Independent Pneumatic Tool Company:
Coupling, Universal Air Hose, 1721
Hoist, Cable, 1780
Index, Seniority, for Employees, 384‡
India: Railroad Notes, 374, 418, 861
Indiana Channel Span, Louisville Bridge, 239*
Indiana Two-Cent Fare Law Repealed, 873†
Industrial Board of the Department of Commerce:
Organization, 510, 607
Peek, G. N., on Work of, 1091
Resignations of Members, 1186†, 1189
Steel Price Controversy, 821†, 870, 902, 937, 980†, 992, 1020, 1062, 1091, 1109, 1161, 1186†, 1189, 1292†, 1324
Industrial Car Manufacturers' Institute, 1658
Industrial Conditions in Railway Supply Field, 293, 335†, 337, 342
Industrial Education, 569†
Industrial Trucks, Baker, 1067*
Industrolite Fixture, 704*
Injector Indicator, Sellers, 1730*
Inland Traffic Offices, Discontinued, 552, 860
Insert (See Bolt)
Inspection and Test Section: Draft Gear Tests, 1082†, 1097*
Institution of Civil Engineers: Engineering Problems of English Railways, 30
Insulation, Keystone Hair Felt, 1522*
Insulbrix, 1781
Interchange (See Car)
Interlocking (See Signaling; also Railway Signal Association)
Internal Combustion vs. Steam Engines, 1386
International Railway Fuel Association:
Annual Convention, 1249, 1283, 1309, 1558
Internal Combustion vs. Steam Engines, 1386
International Railway Routes, 374
Interstate Commerce Commission:
Accident Bulletins, 547, 991
Accident Reports:
N. Y. C. at South Byron, 1010
P. & R., at Fort Washington, 1523†, 1528, 1541
St. L.-S. F., near Marshfield, 251
U. P., at Beloit, 216
Bureau of Safety's Report on Automatic Straight Air Brake, 277, 821†, 844
Esch-Pomerene Bill, 1367, 1398†
Federal Control, When Is a Railroad Under, 1271
Freight Statistics, Classification for, 970
Pullman Company's Compensation, 272
Railway Mail Pay Case, 1153
Rate Authority Under Government Control, 65, 233†, 247
Rate Power Restored by Cummins' Bill, 1418, 1442, 1552
Rates and Adequate Revenues, 1524†, 1835
Revenues and Expenses (See Revenues)
Standard Time Zone Boundaries, 227
Valuation of Winston-Salem Southbound, 1265

GENERAL INDEX—Continued

[Illustrated articles are indicated thus; Editorials thus†; Letters to Editor thus‡.]*

Interstate Commerce Commission Rulings:
Bill of Lading Case, 1122
Chicago Live Stock Exchange vs. Atchison, Topeka & Santa Fe, et al., 609
Coal Rates for Western Kentucky, 1337
Colorado P. U. Commission vs. A. T. & S. Fe, 1022
Competitive Bids Under Clayton Law, 1009, 1209, 1280
Fifteen Per Cent Case, 1391
Lumber, Classification of, 1174
Michigan Percentage Cases, 1122, 1174
Natchez Chamber of Commerce vs. Aransas Harbor Terminal Railway Company et al., 1122
Omaha Summer Excursion Fares, 609
Pacific Lumber Case, 233†, 247
Ripley, E. P., Favors New Body, 1815
Perishable Freight Investigation, 1840
Railroad Administration and Department of Commerce Disagree on Rates, 779
Standard Time Zones, 1248
Tap Line Divisions, 1122
Valuation Decisions, 320, 1122
Water Competition and Increased Rates, 1285
Interstate Iron and Steel Company: Annual Report, 565
Investment (See Finance)
Irish Channel Train Ferries, 374
Iron and Steel Prices (See Steel)
Iron and Steel Structures, A. R. E. A. Report on, 795†, 805*
Italy:
Consolidation Locomotive for State Rys., 1219*
Problem of Railway Transportation in, 1373
Railroad Notes on, 373, 472, 515, 561, 1112, 1219
Railroads' Service in War, 274
Rome-Constantinople Line Planned, 374

J

Jack Truck Union, 1692*
Jacks:
Ball Bearing Screw, 1691
Whiting Coach, 1691
Jamaica: Railroad Notes, 273, 418, 470
James Peak Tunnel Proposed, 1559
Japan:
Baron Goto, Interview with, 1203
Electrification Project, 1163
Railway Enterprises in China, 471, 517*, 786, 1129†, 1144, 1203
Railway Notes, 273, 418, 516, 866, 910, 1552
Yamaguchi, K., on Railways, 1262
Jar, Compound Rubber, 1478*
Jaw, Schaefer Brake Rod, 1622*
Jetty for River Bank Protection, 1279*
Johns-Manville Company, H. W.:
Air Brake Packing Set, 1475*
Refrigerator Car Insulation, 1522*
Johnson Bronze Company: Babcock Water Gage Protector, 1733*
Joint Committee on Interstate Commerce, Final Report of, 529
Joints for Pipe Connections, 1780
Journal Box Packing, Spring, 1621
Journal Packing, Stecos and Fracar, 1522
June Mechanical Conventions (See American Railroad Association, Section III, Mechanical)

K

Kanawha & Michigan: Tractors and Trailers, 1162*
Keller Pneumatic Tool Company: Valveless Air Drill and Sure-Lox Hammer, 1691
Keystone Hair Felt Insulation, 1522*
Korea, Light Railway Projected for, 516
Kruttschnitt, Julius: Testimony Before Senate Committee, 259, 306

L

Labor (See also Division of Labor; also Employee):
Administration Purchasing and Labor Policy, 5†
Director General Hines, on, 1502
Federation, A New, 1839
Government Control, Conditions Under, 181, 571†, 1350
Government Control, W. C. Osborn on, 1186†, 1197
Government Ownership Favored, 359, 383†, 397, 426†, 1137, 1839
Great Britain, Troubles in, 375, 612, 775, 786, 1011*, 1442
Immigration and Deferred Maintenance, 978†, 1341†
May Day in Denver, 1172
Railway Supply, Employees Discharged, 335†, 342
Recruiting Conference at Chicago, 243, 282†
Report of A. R. E. A., on, 673*
Review of Year 1918, 4†, 37*
Shop Accounting by Machine, 897
Subject for Convention Discussion, 1656†
Thomas, J. H., on Visit from England, 1319
Lake Line (See Waterways)
Lakewood Engineering Company: The Military Railway, 1557
Lakewood Tractors and Trailers, 1162*
Lame Engines (See Locomotive)
Lamps:
Carbide, 1691
Industrolite Fixture, 704*
Rear Platform, 2361
Signal and Marker, 662
Land Grant Rates on Government Traffic, 508
Landis, Screw Cutting Die Head, 1690
La Salle Portland Cement Company Sold, 615
Lathe, Bradford Motor Driven, 1693*
Latin-American Division of the Bureau of Foreign and Domestic Commerce: Argentine Railways, 997†, 1001*, 1047*
Law (See Division of)
Legal Decisions:
Bill of Lading, Original, 1840
Black Tom Explosion; L. V., 558, 1152, 1281
Bonds and Stocks Not Baggage, 227
Carmack Amendment, 273
Compensation for Transportation of Troops Under Land Grant Acts, 970
Contract to Establish Stations Void, 325
Cost of Industry Tracks, 1123
Cost of Joint Interlocking Northern Pacific vs. Puget Sound & Willapa Harbor, 1446
Crossing Accidents, 273
Cummins Amendment, Liability Under, 1123
Damages, Excessive, 325
Delivery at Private Siding, 325
Detroit Street Car Fares, 227
Discrimination in Spite of Embargo, 1392
Doing Business in a State, 1391
Exchange of Service Between Telegraph and Railroad Companies, 273
Express Rates in South Dakota, 272
Federal Control Act, 1073, 1391
Federal Control of Rates, 1141, 1352
Federal Employers' Liability Act, 109, 325, 515, 609, 785, 1123, 1230, 1337
Foreclosure Sale, Severance of Property for, 1392
Garnishment Proceedings, 109
General Orders, Application of, 272
Injuries to Passengers, 785
Interstate Railroad and Carrier by Water, 326
Joint Use of Railroad Property, 1391
Jurisdiction of Actions for Freight Charges, 325
Knowledge of Character of Shipment, 1391
Liquor Transportation, 227, 1215
Live Stock, Damage to, 109
Lumber Shipped from Forest to Mill Intrastate Commerce, 785
Misdescription of Lost Goods, 1337
North Dakota, Federal Rate Increases in, 970
Notice of Claim for Damages, 273, 326, 916, 1841
Rates for Transporting Waste Materials, 325
Right to Bridge Road, 325
Safety Appliance Act, 1391
Suits Against Director General, 248, 1327, 1337, 1391, 1392
Tank Cars, 1230
Tariffs, Interpretation of, 325
Taxation of Leasehold Interests, 916
Taxation of Union Tank Line Cars in Georgia, 916
Telegraph Lines on Right of Way, 785
Terminals and Hours of Service Act, 917
Webb-Kenyon Law, 227
Legislation:
Appropriation Bill (See Congress)
Attachments of Money, 1111
Auxiliary Engineer Corps Proposed, 1804†, 1806‡
Bills in Congress on Railroad Problem, 583, 1241, 1318, 1367
Esch-Pomerene Bill, 1367, 1398†
Minnesota Drinking Cup Law, 1336
Return of Railroads, 583, 1238†, 1241, 1242
Violations of Law, Fines for, 1558
War Contracts Validation Bill, 26, 224, 270, 926†, 973
Lehigh Valley:
Annual Report, 1239†*
Black Tom Lawsuits, 558, 1152, 1281
Locomotive, Pulverized Coal, 1782
Lesson of Nashville Collision, 1133‡
Level, Sterling Engineer's Wye, 705*
Lewis Automatic Drifting Valve, 1725*
Liberty Loan (See Victory)
Liberty Steel Products Company:
Buildings, 1654*
Clark Tructractor, 1722*
Liberty Tool Company: Shop Tools, 1619*
Library of Anderson Galleries for Sale, 514
Lighting (See also Lamps; also Generators):
Car Equipment, 1478*, 1520, 1667*, 1732*
Headlight (See Locomotive)
Roundhouses, 425†
Lining (See Car Service Section)
Liquidation (See Federal)
Lisman, F. J.: A Possible Solution of the Railroad Problem, 831, 883*, 1221
Loading (See Locomotive; also Car Freight; also Train Loading)
Loading Rules, A. R. A., Report on, 1632*
Loan (See Finance; also Victory)
Local Officers, Selection of, 1527‡
Location of Passing Sidings, 622†, 636*
Locomotive:
Air Leaks Around Steam Pipes, 1316
Ash Pan Design, 1315, 1329
Auxiliary Devices, Air Consumption of, 1165*, 1341†
Boiler Design and Maintenance, 1752, 1787*
Boiler in Pennsylvania, Simple Mallet, 1655†, 1675*
Boiler, Oil-Fired, 1787*
Boiler Water (See Water Treatment)
Brick Arches, Application of, 1328
China, Needs of, 252
Cinder Handling Plant, P. & L. E., 319*
Cleaning, by D. & M. Process, 1332*
Combustion Chambers, 1797*
Consolidation; Italian State Rys., 1219*
Consolidation; P. & R., 761*
Cost of Service per Mile, 1109, 1327
Deliveries in 1918, 408
Electric, by Westinghouse, 171
Electric Design, 1130†, 1157
Electric, Pennsylvania, 1648*
Engine House (See Engine House)
Exports (See Foreign Trade)
Feedwater Heater, Type E, 1731*
Firebox with Nicholson Thermic Syphons; C. M. & St. P., 151*
Firebox, Wm. H., Wood, Investigated, 661
Front End Design, 1315, 1329
Front End Leaks, 1316, 1329
Fuel Consumption in 1918, 236‡
Fuel Economy (See Fuel)
Fuel Losses at Terminals, 1252
Headlight Generator, 1729*
Headlight, Report of A. R. A., 1735†, 1753*
Headlight, Schroeder, 1732*
Headlight Set, Turbine, 1726*
Lame Engines and Fuel Consumption, 1309*
Loading Ship, Erie, 981*
Lubrication of Superheated Locomotives, 1759
Lubricator, Schlack's Force Feed, 1723*
Mallet, Heavy Standard, N. & W., 575*
Mallet, Light Standard, C. & O., 291*
Mallet, Simple, Pennsylvania, 1655†, 1675*
Orders for Export, 333†, 1451†, 1491†
Orders in 1918, 82*, 115†
Orders Since 1901, 934*
Piston Surfaces, Bronze, 1791*
Production for Export, 115†
Pulverized Coal, Lehigh Valley, 1782
Pyrometers, 1721*, 1736†
Repair Shop at Glenwood, B. & O., 1401*,
Repairs in 1918 and 1917, 1096
Return to Home Roads, 1068
Santa Fe Type, Pennsylvania, 249*
Santa Fe Type, Standard, 389*
Smokebox Blower Fitting, Barco, 1778*
Standard (See Standard Locomotives)
Stoker, Elvin, Erie, 202*
Stoker Fired, Advantages of, 747†
Stokers, A. R. A. Report on, 1705, 1735†
Superheater, A. R. A., Report on, 1736†, 1759
Superheater Flues and Fuel Loss, 570†
Tenders, Bracing, 1330*
Tonnage Rating, Charts for Standard Locomotives, 1195*, 1216*
Trainloads, Increasing, 955, 1051
Turntable, New York Central, 1151*
Turntable, Pennsylvania, 1397†, 1415*
Valve (See Valve)
War Department Locomotives Turned Over, 1438
Water (See Water Treatment)
Whistle Nuisance, 1524†, 1564, 1803†, 1812
Locomotive Boiler (See Locomotive; also Master Boiler Makers' Association)
Locomotive Cranes, Rental Charges for, 599
Locomotive Feedwater Heater, Type E, 1731*
Locomotive Superheater Company:
Pyrometer Equipment, 1721†, 1736†
Railroad Administration Takes Over, 474
Locomotive Terminal Problem, 538*, 587
London Office Opened, 1237†
London Traffic Congestion, 1319
Long Island:
Enginehouse at Long Island City, 891*
Luncheon to H. W. Thornton, 1171
Troop Movement for New York Parade, 1222
Loss and Damage (See Claims)
Louisville Bridge, Pennsylvania, 238*
Lubricator, Force Feed, 1723*
Lovett, Judge, for Competition, 1†
Lukens Steel Company's Plate Mill, 466*
Low Voltage Switch Machines, 1803†
Luminous Unit Co.: "Industrolite," 704*

M

McAdoo, William G. (See Director General)
McConway & Torley Company:
Coupler, Type D Passenger, 1729
Trunnion Type Coupler, 1654
McEwen, W. E.: Oil Industry During the War, 104
McLaughlin Joints for Engine Connections, 1780

McManamy, Frank:
Mechanical Officers to Report on June Conventions, 1161, 1237†, 1438, 1544
Retaining Skilled Workmen, 105
Tribute of Associates, 1658
Machinery and Engineering Supplies Held by War Department, 328, 564
Machinery Manufacturers' Association, 226, 1018
Machines, Calculating, 896*, 1353*, 1428
Mail:
Aerial Service, 1223, 1336, 1839
Pay Case Before I. C. C., 1153
Publications Delayed, 281†
Railroad Business Mail Carried Free, 507
Zone Postal Rates, 1102, 1291†
Maintaining High Wages, 5†, 747†, 1030†
Maintenance of Equipment:
Air Brakes, 1170, 1212
Freight Car Repairs, 487, 495, 773, 930‡
Unified Inspection and Repairs, 773
Maintenance of Way (See also American Railway Engineering Association):
Deferred Work, Under Government Control, 116†, 873†, 978†, 1188‡, 1804†
Director General Hines' Order, 1383, 1435, 1525†, 1804†
Emigration Problem, 978†, 1341†
Program for 1919, 600 734, 1006, 1271
Progress in 1918, 4†, 37*
Railroad Administration Collects Data, 552, 734, 1271
Tie Renewals Under Federal Control, 1351
Malay States: Railroad Notes, 275, 373, 377, 866
Man Mileage, Decreasing the, 604
Manning, Maxwell & Moore, Inc.: Hvid Oil Burning Engine, 1728
Maps:
Argentine Railways, 1002*
Chinese Railways, 958*, 1145*
Combined Railroad Systems, 883*
Mexican Railways, 1299*
Market Survey Committee, Report of, 1390
Marshfield Collision: St. L.-S. F., 251
Masonry, A. R. E. A., Report on, 796†, 797*
Massey, C. F. Co.: Telephone Booth, 746*
Master Boiler Makers' Association: Annual Convention, 1328*
Master Car Builders' Association (See American Railroad Association, Section III)
Master Car Builders' Rules Revised, 169, 265, 1223, 1262
Master Mechanics' Association (See American Railroad Association, Section III.)
Material, Conservation of, 497
Material Handling Machinery, Manufacturers' Association:
Meeting, Semi-annual, 1448
Organization, 226, 1018
Material Standards for Freight Car Repairs, 487
Materials, Specifications and Tests for, 1594*, 1747*
Materials, Taxation of, 507
May Day in Denver, 1172
McCrea, Colonel on Railway Work in France, 1045
Mechanical Freight Transference, 582
Mechanical Interlocking, R. S. A. Report on, 632*
Mechanical Officers to Report on June Conventions, 1161, 1237†, 1438, 1544
Mechanical Convention (See American Railroad Association, Section III)
Medal (See War, The)
Merchant & Evans Co.: Fire Doors, 743*
Merchants' Association of New York Against Government Ownership, 586
Metropolitan Railway of London: Audible Warning for Trackmen, 513
Mexico:
Carranza's Railroad Program, 1550
Equipment, Shortage of, 1298, 1301
Fontes, Col. P., on Visit, 1277*
Middleton, P. Harvey, on Railway Situation, 579, 863, 1297*, 1374, 1531*
Railroad Construction, 518, 1277, 1319
Railroad Situation, 374, 470, 515, 561, 610, 863, 907, 1113, 1420
Railway Executives' Visit New York, 863
Supplies Needed in, 1374
Trip Over Railway Lines, 1297*, 1374, 1531*
Yucatan Railways, Purchase of, 961
Michigan Central: Annual Report, 1342†*
Michigan Railroad Commission Abolished, 1281
Millburn, Alexander, Company: Carbide Lamp and Welding Torches, 1691
Mileage Built Since 1893, 2†, 93*
Military Railway, The, 1557
Mill Plate: Lukens Steel Co., 466*
Miller Train Control System; C. & E. I., 823†, 867
Miniature Car, 1737
Ministry of Wages and Communications (See Great Britain)
Minneapolis, St. Paul & Sault Ste. Marie: Superheater Flues and Fuel Loss, 570†
Minnesota Drinking-Cup Law, 1336
Mississippi Valley Association Organized, 272
Missouri Pacific: Water Treatment Results, 1321
Mobilization Aided by Railroads, 597
Moncrieff Reflex Gage Glass, 1782
Morgan and the Southern Railway, 381†
Morrison Switch Point Hold Down, 745*
Morocco, Railways in, 962
Mounted Railway Artillery, 1205, 1685*, 1709, 1799
Movies and Fuel Conservation, 1029†, 1037*
Morocco, Railways in, 962
Mult-Au-Matic, Bullard, 1690
Murphy Solidsteel Plate Roof, 1781

N

Nashville, Chattanooga & St. Louis: Strike of Clerks, 779, 782, 867
Nashville Collision, Lesson of the, 1133‡
National Association of Manufacturers: Report on Business Conditions, 1019
National Association of Owners of Railroad Securities: Plan for Return of Railroads, 1†, 350, 459
National Association of Tie Producers:
Organization, 343
Purchases by Competitive Buying, 1060
National Car Door, 1782
National Department of Public Works, Proposed, 1103, 1804†, 1806‡
National Foreign Trade Convention, 234†, 1087
National Industrial Conference Board: Railway Buying and Industrial Readjustment, 879*
National Industrial Traffic League:
Shipping Day Plan, 942, 1062, 1101, 1146
Meeting at Milwaukee, 1840
Meeting at New Orleans, 837
National Institute of Social Science:
Osborn, Wm. Church, on Government Control, 1186†, 1197
Railroad Problem Summed up, 1079†
National Lumber Manufacturers' Association:
Address of Director General Hines, 1020
Traffic Bureau, 170
National Parks and Monuments in Advertising Campaign, 1211
National Railway Appliances Association:
Annual Meeting 696
Exhibit, 175†, 650*, 663†, 664, 706, 820
War Service Records, 739
National Railway Devices Company: Shoemaker Fire Door, 1778*
National Rivers and Harbors Congress, 400
National Union of Railwaymen's Head on Visit to U. S., 1319
Navy and War Departments Pay Bills to Railroad Administration, 860, 1007
New England Telephone Strike, 1079†
Net Operating Income (See Revenues and Expenses)
Newark Port Terminal, 1809*
Newlands Committee, Final Report of, 529
New York Air Brake Company: Annual Report, 474
New York Barge Canal, 304
New York Central:
Accident at South Byron, 175†, 212*, 477†, 491, 515, 574‡, 1010
Annual Report, 1344†*, 1568
Safety Meeting at Cleveland, 1117
Turntable, 1151*
Victory Loan Rally, 1118
New York Harbor Strike, 1019, 1029†, 1384
New York, New Haven & Hartford: Locomotive, Standard Light Mountain Type, 1193*
New York Public Service Commission:
Membership Reduced, 1068
Prevention of Collisions, 515, 574‡, 1388, 1553, 1805†, 1816
South Byron Collision, 477†, 491, 515, 574‡
New York Railroad Club:
Foreign Night, 1257
Fuel Conservation, N. P., 1029†, 1037*
Fuel Conservation Section's Records, 1079†
Railroad Problem and Economics, 207
Railway Supply Industry and the Railroads, 822†, 851
Value of Standard Statistics, 477†
New Zealand Railway Equipment Imports, 973
Nicholson Thermic Syphons, C. M. & St. P., 151*
"No Accident" Campaign (See Accident)
Noise (See Locomotive-Whistle)
No-Ox-Id and Dearboline, 1779*
Norfolk & Western:
Annual Report, 928†*
Locomotive, Standard Mallet Type, 575*
Strike of Shopmen, 1558
North British Railway Freight Station at Glasgow, 821†, 843*
North Dakota Supreme Court: Rate-Making Powers of Director General, 1141, 1352
North Russian Transportation Corps, 1118
Northern Engineering Works: Crane, 1016*
Northern Pacific:
Fuel Conservation, 1029†, 1037*
North Dakota Rate Case vs. Director General, 1141, 1352
Northwestern Region:
Annual Report, 393, 573‡
Embargo Bureau, 1270
"No Accident" Week, 1395
Road Transferred, 1383
Number of Employees (See Employee)
Nyassaland Government Railway Development, 515

O

Officer:
Accounting Officers as Executives, 1397†
Director General Hines' Appeal for Efficiency and Economy, 1523†, 1541
Don't Lose Your Punch, 382†
Mechanical Conventions, 1161, 1237†, 1438, 1544
Post Graduate Course, 1655†, 1659
Public, Fair Theatment of the, 117‡
Relations with Employees, 604, 1341†
Resignations from Railways, 233†
Officer (*Continued*):
Salaries:
Big Salaries Justified, 750‡
Engineers, 370, 658, 963, 1081†, 1293†, 1295‡, 1534
Foremen, 977†
General Manager's Automobile Sold to Freight Conductor, 1185†
Justice for Lower Ranks, 524†
Payroll for January, 1919, 1060, 1080†
Payroll of Railroad Administration, 1093, 1437
Reports Ordered, 407
Sick Leave Rules, 1296‡
Selection of Local Officers, 1527‡
Ogden's Golden Spike Celebration, 1227, 1283
Ohio Express Rates Increased, 248
Ohio Rotary Milling Machine, 1690
Ohio State Industrial Traffic League, 916
Oil-Fired Boiler Design, 1787*
Oil Handling Apparatus, Bowser, 1781
Oil Industry, During the War, 104
Operating Efficiency (See also Division of Operation):
Director General Hines' Appeal to Labor, 1523†, 1541
Drawbar Pull-Speed Tests, 1766*, 1783†
Economic Length of Operating Districts, 795†, 816*
Excess Earnings and Transportation, 1807‡
Local Officers, Selection of, 1527‡
Relations Between Officers and Employees, 604, 1341†
Trainloads, Increasing, 955, 1051
Operating Income (See Revenues and Expenses)
Operating Statistics Section:
Compilation of Reports, 1353*
Cost of Train and Locomotive Service, 1109, 1327
Earnings and Expenses (See Revenues and Expenses—Monthly Summaries)
Employees and Their Compensation, 1060, 1080†
Freight Traffic in October, 154*; November, 150, 223; December and Year, 1918, 381†, 407; January, 550; February, 904, 941; March and Three Months, 1161, 1213; April, 1381
Passenger Traffic in October, 150; November, 449; December and Year 1918, 780; January, 1008; February, 1215; March and Three Months, 1213
Standard Forms, 1†, 43*, 477†
Work of, 149
Value of Standard Statistics, 477†
Optimism, A, Justified Spirit of, 1452†
Ordnance Department Exhibit of Railway Artillery, 1685*, 1709, 1799
Order of Railroad Station Agents: Annual Meeting, 1282
Ore, Steaming of, 573‡
Organization (See Labor; also names of associations):
Fuel Department, 1312, 1741*
Relations of Employees to Company, 604, 1341†
Supply Department, 285
Osthy, Oscar F., & Co.: Cast Tool Steel, 1691
Osterlein Machine Company: Rotary Milling Machine, 1690
Overtime (See Employee—Wages)

P

Pacific Lumber Rate Case, 233†, 247
Pacific Railway Club:
Officers Elected, 1171
Train Loading on S. P., 1051
Packing, Rogers Journal, 1522
Packing Set, Air Brake Cylinder, 1475*
Packing, Spring Journal Box, 1621
Painting Steel Cars, 1784
Painting to Prevent Deterioration, 1834
Palmer, Henry A.: Patriotism of Peace, 469
Pan-American Commercial Conference, 1385, 1397†, 1419
Para, Brazil: Proposed Railway, 864*
Passenger Car (See Car)
Passenger Fares:
British Bill Defeated, 1320
Chicago Suburban Fares Increased, 303, 372, 569†
Excursion Rates Announced, 1111
Indiana Two-Cent Fare Law Repealed, 873†
Michigan, Advance in, 1173
Revision of, 857
Passenger Service:
Address of W. D. Hines on, 244
Baggage Search by Prohibition Officers, 1215
Commuters, Treatment of, 117‡, 877‡
European Railways, 762
Federal Control, Gerrit Fort on, 316
Restoration of Normal Conditions, 856
Passenger Traffic:
Advertising Campaign to Stimulate, 372, 858, 969, 977†, 1085, 1211
Passenger Traffic Statistics for October, 150; November, 449; December and Year 1918, 780; January, 1008; February, 1215; March and Three Months, 1213
Passes (See also Regional Directors—Orders):
Pullman Annual Passes for General Chairman of Shop Crafts, 1214
Rules for Issuance of, 551, 901
Passing Sidings (See Signaling)
Pay (See Employee—Wages; also Officer—Salaries; also Mail)
Payroll of Railroad Administration, 1093, 1437

GENERAL INDEX—Continued

[*Illustrated articles are indicated thus**; *Editorials thus*†; *Letters to Editor thus*‡.]

Pennsylvania:
- Accident at Sabula, Pa., 1227
- A. R. E. A. Convention, Officers at, 707
- Bridge, Louisville, 239*
- Bridge Over Allegheny River at Pittsburgh, Raising of, 1185†
- Broadway Limited Restored, 1291†, 1333
- Car, General Utility Express, 1609*
- Cars, Hopper and Gondola, 1451†, 1461*
- Concrete Atomizer for Lining Arch at Trenton, 702*
- Convention Train Service, 1786
- Draft Gear Testing Machine, 1605*
- Employees, Increased Number of, 600
- Employees Paid by Check, 265
- Locomotive, Electric, 1648*
- Locomotive, 2-10-2 Type, 249*
- Locomotive, Simple Mallet, 1655†, 1675*
- Safety in Track Work, 1333
- Shipping Day Notice, 1282
- Tests to Determine Rating of Car Lighting Axle Generator, 1667*
- Turntable, 110-Ft., 1397†, 1415*
- Voluntary Relief Department, 1558
- Whistle Nuisance, 1524‡, 1564, 1803‡, 1812

Pere Marquette:
- Annual Report, 1033†*
- Safety Bulletin No. 13, 1115*

Permit System for Grain, 1292‡, 1326, 1382
Pershing, General, Compliments Railway Men, 839*
Personal Department, Value of a, 381†, 385, 877‡
Peru:
- Railway Construction, 373, 418, 531*, 866, 1012, 1163, 1439
- Railways, Report on, 531*, 1419

Philadelphia & Reading:
- Accident at Fort Washington, 212, 1523, 1528, 1541
- Locomotive, Consolidation Type, 761*

Piece Work (See Shops)
Pipe Connections, Joints for, 1780
Pipe Cutter, Ratchet, Handled, 746*
Piston (See Locomotive)
Pittsburgh & Lake Erie: Cinder Handling Plant at Youngstown, 319*
Plans (See Government Control)
Plate Mill, Lukens Steel Co., 466*
Plumb, Glenn E.: Government Ownership Plan, 359, 383†, 397, 1137
Pneumatic Cable Hoist, 1780
Pneumatic Rivet Cutter, 704*
Pocahontas Region:
- Annual Report for, 361
- Roads Transferred, 365
- Study of Operating Conditions, 835*

Poland: Railway Notes, 228, 1112
Pomerene, Senator, on Railroad Problem, 729, 796†
Pool of Refrigerator Cars, 591
Pork Barrel, the Same Old, 569†
Portland Cement Production in 1918, 1270
Port Terminals, Army, 1809*
Portugal, Railways, Condition of, 908
Post, C. J.: Controversy with Postmaster General Burleson, 1102, 1291†
Post Graduate Course for Officers, 1655†, 1659
Postmaster General (See Burleson)
Post Office (See Mail)
Powdered Fuel (See Fuel—Pulverized)
Powell, T. C., Director of Capital Expenditures, 246*
Power Interlocking, R. S. A. Report on, 628*
President Wilson's Message to Congress, 1238†, 1241
Press Against Government Ownership, The, 1370
Pressed Steel Car Company: Annual Report, 474
Prevention of Collisions (See Accident)
Price, Theodore: Railway Rates and Cost of Living, 1434*
Prices (See also Cost):
- Coal, 247, 372
- Commodities and Rate Advances, 1032†
- Industrial Board Organized, 468, 510, 607
- Labor and Material, 1585*
- Maintaining Wages and Reducing Prices, 1030†
- Standard Cars and Locomotives, 768
- Steel, 821†, 870, 902, 937, 980†, 992†, 1020, 1062, 1091, 1109, 1161, 1186‡, 1189, 1292†, 1324

Prohibition Officers' Right to Search Baggage of Interstate Passengers, 1215
Prouty, Charles A.:
- Government Control Test, 483
- Plan for Adequate Revenues, 1835

P. S. & A. Circular (See Division of Public Service and Accounting)
Public Improvements, Policy of the Railroad Administration as to, 105, 408, 1381
Public Service (See Division of)
Public, The Railways' Relations with:
- Fare Increases and Local Improvements, 569†
- Government Control, Sentiment on, 371, 1370
- Service Idea and the Traveler, 925†
- Unfair Treatment of Ticket Holders, 1174, 877‡
- Wage Increases, 749†, 1186†, 1197

Public Works, Proposed Department of, 1103, 1804†, 1806‡
Publicity Department for Belgian Railways, 1320
Publicity Policy of Railroad Administration, 977†
Publishers' Advisory Board: Zone Rate Postage Controversy, 1102, 1291†
Pullman Annual Passes for General Chairman of Shop Crafts, 1214
Pullman Car Lines: Payments to Railroads Discontinued, 223, 486
Pulverized Fuel (See Fuel)
Pulverized Fuel Equipment Corp., 474, 1288*
Pumping Outfit, Centrifugal, 746*
Punch and Shear, Combination, 1691
Punch, Don't Lose Your, 382†
Punitive Overtime (See Employee—War)
Purchases (See also Division of Purchases; also Contract):
- Buying Power, Menace of a Concentrated, 1263
- Central Control of, 3†
- Coal, 248, 450, 1006, 1063
- Contingent Fee Covenant, 1008, 1029†
- Equipment Buying and Business Conditions, 879*, 925†, 934*
- Division of, 596*, 780
- Government Slow Paying Bills, 113†, 175†, 233†, 236‡, 333†
- Labor and Railway Purchases, 5†, 523†
- Rail, 1096, 1186†, 1189, 1271, 1292†, 1324, 1383
- Railroad Administration Policy's, 481, 293, 333†, 1025
- Railway Business Association's Committee, 48
- Ties, 234†, 334†, 343 971, 1019, 1060 1096
- Value of Railway Plant Compared with That of Other Industries, 1248*

Purchasing Agents' Association of New York: Menace of a Concentrated Buying Power, 1263
Pyrometer for Locomotive Service, 1721*, 1736†

Q

Quigley Insulbrix, 1781

R

Rail:
- A. R. E. A. Report on, 716*
- Bids Asked by Railroad Administration—Orders Placed, 1186†, 1189, 1271, 1292†, 1324, 1383
- Fastenings by Bolt Inserts, 1380*
- Order from Birmingham, Eng., 1146, 1278, 1319, 1550
- Price Controversy, 821†, 870, 902, 937, 980†, 992, 1020, 1062, 1091, 1109, 1161, 1186†, 1189, 1292†, 1324
- Production in 1918, 1204
- Special Inspection, Value of, 744

Railograph Used in Valuations for Taxation Purposes, 556*
Railroad Administration (See United States)
Railroad Club of Washington:
- Organization, 467
- Powell, T. C., on Railroad Men, 904

Railroad Hearings (See Senate Committee)
Railroad Men in Military Service, 25
Railroad Men, T. C. Powell on, 904
Railroad Official (See Officer)
Railroad Police, Wage Increases for, 780
Railroad Problem (See Government Control)
Railroad Question, The, 824‡
Railroad Ticket Agents' Dinner: Ticket Agent as a Salesman, 943
Railroad Y. M. C. A. Membership Campaign, 1018, 1185†, 1282, 1333, 1414
Railway Accounting Officers' Association:
- Annual Meeting, 1397†, 1425*
- Corporate Accounting During Federal Control, 1535

Railway & Industrial Engineers, Inc., 1288*, 1566*
Railway Artillery, Mounted, 1205, 1685*, 1709, 1799
Railway Boards of Adjustment, 183, 184
Railway Business Association:
- Address to Director General Hines on Industrial Conditions, 293
- Annual Meeting, 176†, 218
- Committee Chairmen Appointed, 607
- Committee on Government Purchasing Policies, 48, 1025
- Executive Committee Appointed, 271
- Government Purchasing Policies, 48, 293, 1025
- Recommendations to Senate Committee on Interstate Commerce, 409
- Shall American Railways Be Prussianized? 156

Railway Club Secretaries Meet, 1626
Railway Executives (See Association of)
Railway Mail (See Mail)
Railway Purchases (See Purchases)
Railway Regiments:
- Fourteenth Engineers, Reception to, 1228
- General Pershing Compliments, 839*
- Sixteenth Engineers' War Record, 889
- Thirteenth Engineers Returns to Chicago, 1119, 1201*

Railway Regiments (*Continued*):
- Thirteenth Engineers' War Record, 607, 695, 965
- Tobacco Fund, 468
- Track Laying in France, 1172, 1557
- Transportation Department's War Service, 7*, 66*, 381†, 385*, 839*, 1045

Railway Signal Association (See American Railroad Association—Signal Division)
Railway Storage Battery Cars, 1015*, 1726
Railway Storekeepers' Association:
- Annual Convention, 285
- Conservation of Material, 497
- Reorganization—Section VI, A. R. A., 1140, 1284
- Sailing Day Plan Applied to Company Freight, 387

Railway Supply Industry (See also Foreign Trade):
- Contingent Fee Covenant, 1008, 1029†
- Contributions to Railway Efficiency Outlined at Meeting of N. Y. Railroad Club, 822†, 851
- Employees Laid Off by Thousands, 293, 335†, 337, 342
- Executives in War Activities, 24
- Exports, Opportunities for, 53*
- Optimism, Justified Spirit of, 1452†
- Payment of Bills Delayed, 113†, 233†, 236‡, 333†, 175†, 1492†
- Railroad Administration's Equipment Financing, 595, 747†, 768, 855, 903, 940, 1005, 1062, 1159, 1238†, 1273, 1336
- Situation After War—Government Purchasing Policy, 333†, 335†, 337, 382†, 396
- Storekeepers' Convention, 285
- Victory Loan Subscriptions, 1223
- War Contracts, 26, 224, 270, 926†, 973
- War Products Manufactured, 71, 265

Railway Supply Manufacturers' Association:
- Annual Meeting, 1658
- Exhibit, 523†, 873†, 1451†, 1455*, 1479*, 1494, 1514, 1626, 1655†, 1659, 1693
- Officers and Committee Men, 1456*

Ratchet-Handled Pipe Cutter, 746*
Rates (See also Freight Rates; also Passenger Fares):
- Advances Necessary, 235†, 748†, 927†, 1032†, 1381, 1399†, 1405
- Cost of Living and, 1434*, 1805†
- Federal Control Upheld by Supreme Court, 1141, 1352
- I. C. C. and Adequate Revenues, 1524†, 1835
- Rate-Making Powers of Director General, 65, 161, 233†, 247, 248, 1141, 1352

Rea, Samuel: Testimony on Government Control Before Senate Committee, 458
Reading Specialties Company: Attachment for Car Replacers, 408*
Rear Collision (See Accident)
Receivership (See Finance)
Reclamation of Scrap, 497
Reconstruction Program Needed, 335†
Records and Accounts, A. R. E. A. Report on, 663†, 669
Red Cross and Otis H. Cutler, 1467*
Red Cross Thanks British Railways, 1442
Red Devil Rivet Cutter, 704*, 1618*
Redfield, Secretary (See Department of Commerce; also Industrial Board)
Referendum (See Chamber of Commerce)
Refrigerator Car (See Car, Freight)
Refrigerator Department's Car Pool, 591
Regional Directors:
- Annual Reports of, 361, 393, 463, 573‡
- Allegheny Region:
  - Annual Report, 394
  - Conditions During February, 860; March, 1006
  - Roads Transferred, 105, 1383
- Central Western Region:
  - Annual Report, 463
  - Conditions During February, 859
  - Loading Records, 170
  - Study of, 489*
- Eastern Region:
  - Annual Report, 361
  - Conditions During January and February, 859
  - Operating Study, 1346*
  - Roads Transferred, 105, 365
- Embargoes, Issuance of, 246, 901, 1270
- Mechanical Conventions, 1161, 1237†, 1438, 1544

"No Accident" Campaigns, 186, 411, 898, 1387, 1395, 1558, 1564, 1813
Orders:
- Accounts Between Federal and Corporate Interests, Separation of, 943
- Addition and Betterment Work, 205
- Advertising, 1384
- Agents' and Operators' Wages, 392
- Agreements with Brotherhoods Concerning Safety Measures, 1100
- Air Brakes, Reports on, 1046
- Air Pumps on Locomotives, 205, 256
- American Chemical Society's Expenses, 105
- April Estimates, 942
- Army Medical Cars, 602, 603
- Assessments for Public Improvements 392
- Associations Approved, 444

Orders (*Continued*):
Automatic Train Control Devices, 602
Automobile Cars, Handling of, 759, 834, 942
Back Pay to Be Included in December Operating Expenses, 256
Bill-of-Lading Forms, 898, 942, 1304, 1438
Billing for Empty Tank Cars, 258
Billing of "Order" Shipments, 1202
Brakes on Standard Cars, 1046
Bulletin Boards for Brotherhoods, 1438
Bureaus, Over and Short, 444
Capital Expenditures Less Than $1,000, 1438
Car Hire Accounts, 1304
Car Inspectors Needed, 315
Cartmen's Custom House Bonds, 1101, 1138
Census, Statistics for, 1100
Chinese Alien Passengers, 759
Claims Against War Dept., 1383, 1438
Cleaning Stock Cars, 315
Coal Losses in Transit, 1100
Coal Mines, Development of, 603
Color Blindness, 758
Complaint Bureau, Posters of, 444
Consignments to Shippers' Order, 349, 1274
Contracts Must Terminate with Federal Control, 1100
Conventions, Attendance at, 1274, 1438, 1544
Corporate Obligations of Terminal Companies, 206
Cotton, Movement of, 834, 984, 1438, 1545
Counsel, Services of, 315
Deadheading Household Goods for Employees, 348
Demurrage Due from U. S., 1138
Derailments and Gasoline Fires, 1100
Discipline, 1384
Disregard of Shippers' Routes, 256
Duties, etc., 349
Earnings of Passenger Trains, 392
Eastern Car Pool Gondolas, 759
Eastern Freight Inspection Bureau, 898
Elimination of Sunday and Holiday Work, 256
Embargoes, 106, 486, 555, 834, 898, 942, 984, 1384
Employees in Service, etc., 759
Employment of Discharged Soldiers, 106, 206
Exchange of Local Transportation, 105, 159
Express Agents' Telegrams, 1046, 1100
Express Company's Agreement with Director General, 349
Express Employees Employed by Railroads, 205, 256
Federal Manager Chief Operating Officer, 105, 257
Fertilizer Shipments, 486, 834
Filing Time on Messages, 349
Fire and Casualty Insurance on Construction Work, 256
Fire Inspection Service, 349, 444, 602
Fire Losses and Protection, 443, 486, 555, 759, 942, 1100, 1383
Fish Fry Free, 392
Flexible Staybolts, 1545
Food Posters in Passenger Cars, 256
Forage Shipments, Weighing of, 444, 1545
Free Lighterage, New York, 759
Free Transportation (See "Passes" under this heading)
Freight Arrivals, Notice of, 1545
Freight Car Distribution, 206, 348, 392, 486, 556, 603, 758, 759, 834, 1100, 1202, 1384, 1544
Freight Car Repairs, 602, 1438
Freight Claims, 392, 555, 758, 898
Freight Destroyed in Transit, 159
Freight, Diversion of, 1274
Freight Packing and Marking, 1100
Freight, Passing Reports of, 1274
Freight, Rail and Lake, 1046
Freight, Standing Orders for, 758, 834
Gas Masks, 556, 898
Gasoline, Specification for, 444
Gasoline in Wrecks, 1384
General Foremen's Association, 486
Grain Cars, Preparation of, 1100, 1814
Headlight Generators, Use of, 1046
Heating of Troop Trains, 206
Hog Shipments, 106, 158, 759
Industry Tracks, 602, 1046, 1138, 1274
Inspection of Coal, 348
Inspection of Freight at Interchange Points, 106, 159, 392
Inspection of Fruits and Vegetables, 1384
Insurance of Elevators, 105, 206, 256
Insurance on Construction Work, 348
Insurance on Stationary Boilers, 158, 206
Interest on New Work During Construction, 205, 256, 1202
Interchange of Freight on Sundays, 602
Interchange Reports, Errors in, 943
Interest on Construction Work, 1138
International Railway Fuel Association, 602
Interstate Commerce Commission, Defending Complaints Before, 1202, 1274

Orders (*Continued*):
Intoxicated Soldiers, 1274
Journal Box Packing, 556
Label Holders for Express Cars, 1544
Leave of Absence to Employees, 314, 315
Legislation Affecting Railroads, 349, 444
Lettering of Locomotives, 555
Loading, Heavy, 555, 1274, 1383
Lock Nuts and Grip Unit Nuts Used on Boilers, 898
Locomotive and Car Builders' Dictionary, 602
Locomotive Fuel Contracts, 1384
Locomotives in Service, 759
Locomotives, New, Moved Free, 1544
Lunch Hour for Shopmen, 205
Mail, Railroad Business, 257, 314, 349, 393, 507, 1304
Maintenance Budget for 1919, 898, 1274
Maintenance of Industrial Side Tracks, 392
Maintenance of Telegraph Lines, 105
Maintenance of Way Expenditures, 1384
Master Boilermakers' Association, 257
Material, Classification of, 834
Material Requirements, 106
Mechanical Department Circulars, 486
Mechanical Stokers, Failure of, 602
Medical Attention for Sick and Wounded Soldiers, 314
Meetings of O. S. & D. Representatives, 349
Membership in Associations, 257, 314, 444
Mileage on Pullman Cars Moved Deadhead, 486
National Travelers' Aid Society, 942
No Accident Month Campaign, 898
Oil Cars, Movement of, 1544
Oil Shipments, 1544
Oiling Track Joints, 1138
Operating Statistics, 1274
Passenger-Equipped Refrigerator Cars, 205
Passenger Fares for War Industry Workmen, 1304
Passenger Train Performance, 556
Passes, 106, 159, 205, 206, 256, 257, 314, 392, 443, 444, 486, 555, 602, 603, 758, 834, 984, 1100, 1138, 1202, 1274, 1304
Payment of Government Bills, 205
Payment of War Taxes, 1100
Peddling in Cars, 1304
Per Diem Settlement, 942, 1202, 1544
Permit System for Freight, 444
Piece-Work Question, 1100
Pilot for Detour Movements, 315, 348
Pocket List, 1274
Posters, 486, 555, 602, 759, 943, 984, 1046, 1138, 1384
Private Car Movement, 315
Public Improvements, 1814
Pullman Passes for Ticket Sellers, 984
Quarantine Against Barberry Plants, 1138
Railway Storekeepers' Association, 257
Reclamation of Materials, 984, 1274
Reconsignment of Coal, 443
Removal of Coal and Water from Engines, 105
Rental Charge on Cars, 1384
Rental Charge on Locomotives, 257, 392, 556, 984
Repairs of Short Line Cars, 984, 1046, 1138
Repairs to Standard Cars, 1438
Report, Daily Situation, 759
Report of Classified Locomotive Repairs, 602
Routing of Freight, 349, 898, 1544
Safety Appliances on Freight Cars, 1383
Sailing Day Plan, 1384
Salaries of Claim Agents, 1438
Sale of Freight, 106
Sale of Relayer Rail, 392
Sale of Second-hand Rail, 602, 1046, 1100
Sanitary Maintenance of Cars, 1100
Scrap Iron Shipments, 486
Scrap, Reclamation of, 984
Sheds for Protection of Car Repairers, 603
Shipping Day Plans, 555, 759, 1100
Shop Supervision, 349
Short Lines, Relations with, 314
Short Lines, Transportation Over, 348
Smoking in Mail Storage Cars, 758, 1100
Soldiers, Sick and Wounded, 257
Southern Freight Inspection Bureau, 556
Southwestern Regional Association of Fire Prevention, 444
Standardization of Corrugated Engine and Tender Hose, 106
Station Forces, Shortening of Hours of, 392
Stationery Forms, 256, 257, 314, 315, 443
Statistical Data, Requests for, 556, 984
Steam Hose Coupling, Standard, 1814
Storage L. C. L. Shipments, 556
Stored Cars, 444, 555, 603
Stored Coal, Picking Up, 256
Storehouse Devices, 759, 1202
Superheaters, 1274, 1544
Superintendents of Telegraph, 158

Orders (*Continued*):
Surgeons Appearing as Witnesses, 486
Taxation of Material, 603
Tax on Telegrams, 984, 1304
Telegraph Messages, 158, 393, 444, 486, 555, 1046, 1100, 1304
Terminal Managers, Offices of, 1138
Tie Renewals, 759
Ties, Payment for, 898
Timetable Changes, 206
Toilets, Unsanitary, 602
Tracers and Passing Reports, 1274
Tracks, Taking Up, 158
Traffic Conditions, Reports of, 759
Transportation of Liquor, 1274
Troop Trains, Movement of, 392, 444
U. S. Employment Offices, 1138
Vacations for Train Despatchers, 205
Ventilation of Coaches, 315
Victory Liberty Loan, 984, 1046
Violations of Safety Appliance Laws, 105, 1100
Wage Cases, 486, 555, 602, 1384
Watermelons, Prepayment of, 1304
Weekly Report of Delayed Loads, 1202
Weighing Cars, 942
Weighing of Cars, Light, 898
Western Union Shipments, Routing, 105
Western Union Telegraph Franks, 205, 206
Wheat Crops, Preparations for, 1275
Whiskey Placards, Removal of, 898
Writing Material on Club Cars, 256, 314
Northwestern Region:
Annual Report, 393, 573‡
Embargo Bureau, 1270
"No Accident" Week, 1395
Road Transferred, 1383
Pocahontas Region:
Annual Report, 361
Roads Transferred, 365
Study of Operating Conditions, 835*
Payrolls Under, 1093
Regrouping Lines, 523†, 549, 552
Safety First Campaigns, 1558, 1564, 1813
Smith, A. H., Resigns, 1346*, 1387
Southern Region:
Annual Report, 395
"No Accident Week," 186, 411
Study of Operating Conditions, 593*
Southwestern Region:
Annual Report, 362
Reorganization, 523†, 552
Traffic Improvement Noted, 1539
Victory Loan, Congratulations on, 1327
Regulator, Vapor, 1620*
Relief Department (See Employee)
Relinquishment (See Government Control)
Rental Charges for Dining Cars, Locomotive Cranes, etc., 599
Repair Shop, Locomotive; B. & O., 1401*
Repair Shop Train, British, 1139*
Repairs (See Car; also Locomotive)
Reparation Claims (See Claims)
Reports Compiled by Machine, 896*
Resignations of Railway Officers, 233†
Resignations, Speaking of, 237‡
Retort, Timber Treating; C. & N. W., 1385*, 1442
Return of Railroads (See Government Control)
Revenues and Expenses:
Accrued Expenses Before and After Government Control, 1129†
Adequate Revenues and the I. C. C., 1524†, 1835
British Railways, 199, 1372
Chinese Railways for 1917, 1220
Excess Earnings and Better Transportation, 1807‡
Four Months, August to November, 235†
French State Railways in the War Years, 52
Increased Expenses and Wage Advances, 478†
Monthly Summaries: October, 169; November, 270; December, 363, 383†, 448; January, 597, 778; February, 965, 1008; March and Three Months, 1111, 1213, 1228; April and Four Months, 1437
Net Operating Income, 1915-1917, 1524†
Net Operating Income in 1918 Compared with Standard Return, 771
Net Operating Income in 1919, 1559*
Six Months Ended December 31, 425†, 431
Railroad Administration's Expenses, 1093, 1437
Year 1918—I. C. C. Report, 448, 478†, 778
Year 1918—Results Analyzed, 3‡, 27*, 116†, 236‡
Revolving Fund (See Appropriation Bill)
Rice Manufacturing Company: Red Devil Rivet Cutter, 704*, 1618*
Richmond Passenger Station, 401*
Ripley, E. P., Suggests Relieving I. C. C. of Power, 1815
River (See Waterways)
Rivet Cutter, Red Devil, 704*, 1618*
Rivet Head Catcher, Cincinnati, 1476*
Rivet Heating Furnace, 1619*
Roadway, Report of A. R. E. A. on, 714*
Roberts & Schaefer Co.: Bucket, "Rand S," 742*
Rogers, H. A., Company: Moncrieff Reflex Gage Glass, 1782
Rogers Journal Packing, 1522
Roof Connection, Holt, 744*
Roof, Flexible Car, 1622*
Roof, Murphy Solidsteel, 1781
Rotary Milling Machine, Ohio, 1690

GENERAL INDEX—Continued

[Illustrated articles are indicated thus; Editorials thus†; Letters to Editor thus‡.]*

Rotary Surface Grinding Machine, 1694*
Roumania Railroad Notes, 228, 1673, 1113
Roundhouse (See Engine House)
Rules for Competitive Bidding Under Clayton Law, 1009, 1209, 1280
Russia:
Boublikoff, A. A., on Railways, 1819
Lipetz, A. I., on Railways, 1257
Johnson, B. O., on Railways, 1063
Mechanical Conventions in, 1768
Railroad Disorganization in, 908, 962
Railway Service Corps, Seniority Rights for, 451
Railway Service Corps Wants Men, 1442
Testing Locomotives, 1311
Transportation Corps, American, 1118

S

Safety Appliances, Freight Cars Equipped with, 1627*
Safety Car Heating and Lighting Co.:
Car Lighting Fixtures, 1520
Sand on Axle Generator Belts, 1522
Spring Drive for Generators, 1692*
Safety First (See also Accident):
Beware of Detours! 1115*
"Bunk," 1442
Harmony and Safety, 1104, 1294‡
Meeting at Cleveland; N. Y. C., 1117
Regional Campaigns, 186, 411, 898, 1387, 1395, 1558, 1564, 1813
Track Work; Pennsylvania, 1333
Safety Guard, Atlas, 603*
Safety Section, Report of, 1008
Sailing Day (See Shipping Day)
St. Louis Railway Club: Gray, C. R., on Government Operation, 1341†, 1349
St. Louis-San Francisco:
Accident Near Marshfield, 251
Traingram System, 480†, 500*
Salary (See Officer; also Employee—Wages)
Salt Lake City Freight Terminal, 1083*
San Bernardino Station; A. T. & S. Fe, 481*
San Diego & Arizona: Line Along Mexican Border, 931*
Sand and Gravel Rates, 372
Sand on Axle—Generator Belts, 1522
Santa Fe (See Atchison, Topeka & Santa Fe)
Savage, W. J., Company, Inc.: Gray's Sheet Metal Cutter, 1782
Saw Grinder, Inserted Tooth, 1520*
Saw, Portable Bench, 743*
Scarritt Simplex Coach Seat, 1471*
Schaefer Equipment Company: Brake Rod Jaw, 1622*
Schlack's Force Feed Lubricator, 1723*
Scholarship (See Education)
Schroeder Headlight and Generator, 1732*
Scrap (See Reclamation)
Seat (See Car)
Second Pan-American Conference, 1385, 1397†, 1419
Second Track Construction, H. V., 493*
Secret Service and Police Section, 105
Secretaries of Railway Clubs Meet, 1626
Secretary of Transportation Proposed, 131
Security Holdings, Distribution of, 882
Security Owners (See National Association)
Sellers, William & Co., Inc.:
Injector Indicator: 1730*
Valve, Drifting, 1779*
Valve, Lever Starting, 1802*
Senate Committee on Interstate Commerce:
Brotherhood Plan, 359, 383‡, 397, 426†
Expenses and Payroll of the Railroad Administration, 1093, 1437
Hearings Concluded, 503
Plans Proposed, Railroad, 583
Railway Business Association's Recommendations, 409
Testimony of:
Amster, Nathan L., 462
Burn, C. W., 462
Cotterill, Charles E., 399
Cuyler, T. De Witt, 188
Elliott, Howard, 455
Freer, Guy M., 461, 479†
Fulbright, R. C., 308
Hines, Director General, 333†, 334†, 353
Garretson, A. B., 383†, 397, 426†
Interstate Commerce Commission, 133, 163, 189, 463
Kruttschnitt, Julius, 258*, 306
McAdoo, Director General, 113†, 118, 163, 235†, 283†, 310
Plumb, Glenn E., 359, 383†, 397, 1137
Rea, Samuel, 458
Rich, E. J., 309
Shippers, 190, 306
State Commissioners, 360
Thom, Alfred P., 192, 262
Thorne, Clifford, 307, 573‡, 1036‡
Warfield, S. Davies, 350, 459
Willard, Daniel, 452
Wooley, Robert W., 191, 463
Senator Cummins on the Railroad Problem, 1031†, 1041, 1136
Senator Pomerene on Railway Problem, 729, 796†
Seniority Index for Employees, 384‡
Serbia's Railroads Ruined, 470, 610
Service Idea and Railroading, 925†, 943
Sherley, Swagar, Director of Division of Finance, 596
Shippers' Views on Government Control, 59, 190, 237‡, 306
Shipping and Foreign Trade, 1089, 1090
Shipping Day (See Freight)
Shoemaker Fire Door, 1778*
Shops:
Accounting Systematized by Machines, 896
Committee's Recommendations on Operation, Supervision and Records, 1014
Denver Shopmen's May Day, 1172
Locomotive Repair; B. & O., 1401*
Piecework Abolished, 365, 381†, 408, 523†, 978†
Pullman Annual Passes for General Chairman of Shop Crafts, 1214
Repair Trains, British, 1139*
Strike (See Employee)
Tools, Labor Saving, 1619*
Wage Demands of Shopmen, 224, 874†, 900, 1006
Short Line Railroads:
Back Pay for Employees, 900
Contracts Executed, 49, 505, 904
Meeting at Washington, 1377
Siam:
Purchases of Railway Material, 419
Railroad Notes, 273, 373
Siberia:
Materials Required for Railways, 1372
Railroad Notes, 326, 561, 786, 1372, 1439
Trans-Siberian Under Allied Control, 228, 274*, 326, 374, 420, 612, 1058, 1219
Sick-Leave and Salary, 1296‡
Side Bearing, Multiple Roller, 1522*
Signaling (See American Railroad Association—Signal Division; also Switch):
Automatic Block Progress in 1918, 2†, 75*
Automatic Block, R. S. A. Report on, 635*
Automatic Stop (See Automatic Stop)
Interlocking Plants and Cost of Stopping Trains, 1105, 1129†
Flashing Signal, 662*
Government Control and Improvements, 137
Highway Danger Signal, 662*
Lamps, 235‡, 662
Passing Sidings, Location of, 622†, 636*
Report of A. R. E. A. on, 670*
Review of Year 1918, 2†, 75*
Wages in Signal Department, 237‡, 824‡
Zinc-Treated Ties' Effect on Track Circuits, 305
Signs, Fences and Crossings, A. R. E. A. Report on, 684
Simmons-Boardman Publishing Company:
Cincinnati Office Opened, 1029†
London Office Opened, 1237†
Simonds Metal Saw Grinder, 1520*
Simpled Coach Seat, 1471*
Sink Holes; C. C. C. & St. L., 217*
Sixteenth Engineers' Work in France, 889
Sixth National Foreign Trade Convention, 234‡
Skilled Men (See Employee)
Slag (See Concrete)
Smith, A. H.:
Eastern Region Under, 1346*
Resignation as Regional Director, 1346*, 1387
Smokebox Blower Fitting, Barco, 1778*
Smoke Prevention, A. R. A. Report on, 1739*, 1783†
Snow Fighting Equipment, 1708
Society of Railway Club Secretaries: Annual Meeting, 1626
Society of Terminal Engineers: Election of Officers, 1282
Socket (See Drill)
Solving the Railroad Problem, 177†
South African Railways:
Budget for 1918-19, 1164
Locomotive Problem, 274
Notes on, 327, 377, 470
Purchases of Supplies by, 864
State Control, 299
South Byron Collision: N. Y. C., 175†, 212*, 477†, 491, 515, 574‡, 1010
Southern Pacific:
Accident Record, 605
Fuel Consumption and Lame Engines, 1309*
Fuel Consumption and Train Load, 1423*
Safety Work "Bunk," 1442
Train Loading Efficiency in, 1051
Morgan and the Note Sales, 381†
Strike of Shopmen, 1558
Southern Railway Supply and Equipment Co.: Simplex Coach Seat, 1471*
Southern Region:
Annual Report, 395
"No Accident Week," 186, 411
Study of Operating Conditions, 593*
Southern Traffic League:
Election of Officers, 1229
Plan of Federal Control, 399
Southern Wheel Company: Flanges, Reinforced, 1522
Southwestern Region:
Annual Report, 362
Reorganization, 523†, 552
Spain:
Lavis, F., on Railway Development, 825*, 892, 945*
Spain (*Continued*)
Railway Lines Projected, 418, 611*, 825*, 865, 892, 945*, 1013
Speaking of Resignations, 237‡
Specialties for Standard Cars and Locomotives, 91, 255*
Special Metal Union Connection, 1620*
Specifications and Tests for Materials, 1594*, 1747*
Spencer, Henry B., Director of Division of Purchases, 596*
Spens, Conrad E., Assistant Director, Division of Traffic, 449
Sprague, Frank J.: Automatic Stop Proposals, 1805†, 1816
Spring Drive for Axle Generators, 1692*
Spring Journal Box Packing, 1621
Stake Pockets, Collapsible, 1654
Standard Cars:
Allocation of, 1110, 1161, 1273
Delivery to March, 31, 971
Equipment Trust Proposed, 1238†, 1273, 1336
Passenger, 255*
Railroad Administration Orders Summarized, 768
Specialties for, 91, 255*
Storage of, 939, 1213
Standard Designs, R. S. A. Report on, 639
Standard Forms of Waybills, 858
Standard Freight Car Repairs, 487, 495, 930*
Standard Locomotives:
Equipment Trust Proposed, 1238†, 1273, 1336
Has Standardization Been Justified? 50
Mallet Type, Heavy; N. & W., 575*
Mallet Type, Light; C. & O., 291*
McManamy, Frank, on, 1696†, 1701
Mountain Type, Light, 1193*
Pacific Type, Light and Heavy, 951*, 1216*
Railroad Administration Orders Summarized, 768
Reasons for, 1131†, 143
Santa Fe Type, Heavy, 389*, 508*
Specialties for, 91
Tonnage Rating Charts, 1196*, 1216*
Valve Gear, 1734
Who Was Right? 524†
Standard Railway Equipment Company: Murphy Solidsteel Roof, 1781
Standard Return (See Compensation Contracts)
Standard Seventy-Ton Truck, 1780*
Standard Specifications for Timber Preservation, 445, 478†, 558
Standard Statistics (See Operating Statistics Section)
Standard Time Zones Modified, 1248
Standardization of Corrugated Engine and Tender Hose, 106
Standardization—Who Was Right About? 524†
Standards and Recommended Practice (M. C. B.), 1503*; (A. R. M. M.), 1705*
Standing Committee (See Association of Railway Executives)
State Commission Rulings:
Louisiana: Railroad Service Demanded, 1123
New York: Service Unprofitable, 1122
Ohio: Express Rate Increases, 248
Pennsylvania: Grade Crossing Abolition, 1446
State Commissions:
Georgia: Annual Report, 1391
New Hampshire: Private Control Favored, 109
Government Control, Views on, 360
Michigan Railroad Commission Abolished, 1281
New York:
Membership Reduced, 1068
Prevention of Collisions, 574‡, 1388, 1553, 1805†, 1816
Rapid Transit Lines, 227
South Byron Collision, 477†, 491, 515, 574‡
Rate Authority Under Federal Control, 65, 161, 248, 1141
Relations with Railroad Administration, 303, 447, 506
State Prohibition Officers, Search of Baggage by, 1215
Station:
A. T. & S. Fe at San Bernardino, 481*
Chicago Union, 225, 1227
Cleveland Union Passenger, 153, 755*
Glasgow, Scotland, Freight, 821†, 843*
Richmond Passenger, 401*
Statistics (See also Operating Statistics Section; also Revenues and Expenses):
Compilation of, 896*, 1353*
Equipment Exports, 228, 470, 786, 865, 962, 1038, 1163, 1220, 1278, 1319, 1439, 1440, 1451†, 1491†, 1551
Freight Cars Equipped with Safety Appliances, 1627
Fuel Consumption; So. Pacific, 1423*
Rail Production in 1918, 1204
Signaling in 1918, 2†, 75*
Stock Distribution in 1917, 882
Tie Renewals, 1351
Staybolts, Flexible, 1728*
Steam Engines vs. Internal Combustion, 1386
Steaming Ore, Expense of, 573‡
Stecos Journal Packing, 1522

Steel, Davidsonized Cast Tool, 1691
Steel Building, Sectional, 1654*
Steel Jetties for River Banks, 1279*
Steel Price Controversy, 821†, 870, 902, 937, 980†, 992, 1020, 1062, 1091, 1109, 1161, 1186‡, 1189, 1292†, 1324
Stefco Structural Steel Building, 1654*
Sterling Model 16 M Level, 703*
Sterilizer, Portable Steam, 1519*
Stock Book and Store Department, 286
Stockholder (See Finance)
Stoker (See Locomotive)
Stone Franklin Company:
Car Lighting Equipment, 1732*
Organization, 1176*
Stopping Trains, Cost of, 1105, 1129†
Storage Battery Cars, 1015*, 1726
Storage of Coal During 1918, 1311
Storage of Standard Cars, 939, 1213
Storage Tank for Gasoline, 1017*
Stores (See Railway Storekeepers)
Straits of Gibraltar Tunnel, 1219
Strauss, Joseph B.:
Concrete Car, 776*
Swing Bridge Design, 905*
Strike (See Employee)
Suits Against Director General, 248, 1327, 1337
Sullivan Machinery Company: Air Compressors, 703*
Superheater (See Locomotive)
Sure-Lox Hammer, 1691
Sweden:
Electrification Proposed, 516, 1112
Loan from United States, 1523†
Railway Extensions in, 1320
Swind Machinery Company:
Bradford Motor Driven Lathe, 1693*
Gray's Sheet Metal Cutter, 1782
Swing Bridge Design of Strauss Bascule Bridge Co., 905*
Switzerland: Railroad Notes, 418, 610, 1012
Symington Corporation: Contractors' Claims for Government Work, 26, 224
Syphons, Nicholson Thermic; C. M. & St. P., 151*
Suggestions and Complaints (See Bureau for)
Supply (See Railway Supply Industry; also Railway Storekeepers' Association)
Supreme Court Upholds Federal Control of Rates, 1141, 1352
Switch Adjustment Bracket, 662*
Switch and Frog Design, 679*
Switch Machines, Low Voltage, 1803†
Switch Point Hold Down, 745*
Symington Chicago Corporation: War Contracts, Liquidation of, 926†, 973
Symington, T. H., Company: Draft Gear Tests, 1082†, 1097*

T

Table d'Hote, A la Carte System, 449, 477†, 573‡, 979†
Tank Cars, A. R. A. Report on, 1656†, 1661*
Tank, Gasoline Storage, 1017*
Taxation:
Railograph Use, 556*
Railway Materials in Indiana, 507
Telegraph:
Return to Private Owners, 1118, 1443, 1839
Superintendents' Convention, 1542
Traingram System; St. L.-S. F., 480†, 500*
Wage Increase for Operators, 103, 107, 1214
Telephone:
Booth, Concrete Cylindrical, 746*
Return to Private Owners, 1118
Strike in New England, 1079†
Wage Increase for Operators, 103, 1214
Telltale, Side Clearance; E. J. & E., 702*
Terminal (See Yards and Terminals)
Thayer, Robert E., in Charge of Our London Office, 1237†
Thefts, Campaign Against, 371, 512, 558, 780, 964, 1327, 1333, 1558
Thelen, Max, Director of Division of Public Service, 246*, 303, 447
Thirteenth Engineers:
Return to Chicago, 1119, 1201*
War Record, 607, 695, 965
Thom, Alfred P.: Five-Year Plan of Government Control Opposed, 188, 258
Thomas, J. H., on Visit Here, 1319
Thompson, A. W.: Resignation as Federal Manager of B. & O., 233†, 278*
Thorne, Clifford: Testimony on Government Operation Before Senate Committee, 307, 573‡, 1036‡
Thornton's, Henry W., Return from France, 1171
Ticket Agent as a Salesman, 925‡, 943, 1808‡
Ticket Agent's Reminiscences, A, 1808‡
Ticket Cases, Portable, 964
Ticket Holders, Treatment of, 117‡, 877‡
Ties and Timber:
Cost of Producing Ties, 346
Creosoting Wood Trunking, 643, 1036‡
Forest Products Section, 314, 343
Purchasing, Centralized, 334†, 343, 1019, 1096
Purchasing by Competitive Bidding, 1060
Report of A. R. E. A. on, 706†, 724*
Retort, Timber Treating; C. & N. W., 1385*, 1442
Standard Specifications for Timber Preservation, 445, 478†, 558
Tie Producers' Convention, 334†, 343
Tie Renewals, Statistics of, 1351
Tie Situation, 478†, 1305
Ties and Timber (*Continued*):
Tie Treatment and Government Control, 234†
Treated Timber in Car Construction, 295
Waterproofing Ties, 849
Wood Preservation, A. R. E. A. Report on, 708*
Wood Preservers' Convention, 322, 334†, 365
Wooden Bridges and Trestles, 800*
Zinc-Treated Ties' Effect on Track Circuits, 305
Time (See Standard)
Toledo & Ohio Central:
Bolt Inserts for Rail Fastenings, 1380*
Engine Terminal at Columbus, 994*
Toledo, St. Louis & Western: Standard Car Allocation Suit, 162
Tonnage, Equated, and Fuel Consumption, 1309
Tonnage Rating Chart for Standard Locomotives, 1195*, 1216*
Torches:
Portable, 1619*
Welding, Oxy-Acetylene, 1691
Tourist Travel (See Passenger Traffic)
Track:
Capacity and Passing Sidings, 622†, 636*
Derails, Use of, 1361*
Exhibits at Mechanical Convention, 1491†, 1514
Report of A. R. E. A. on, 677*
Stresses, Tests of, 713
Tractors:
Clark Tructractor, 1722*, 1822*
Electric; Kanawha & Michigan, 1162*
Electric Types, 1521*
Industrial with Standardized Parts, 1067*
Traffic (See also Division of Traffic; also Exports Control Committee; also Freight Traffic; also Passenger Traffic):
Improvement Noted, 1539
Location of Passing Tracks, 622†, 636*
Monthly Reports Ordered, 551
Oil Industry During War, 104
Ore at Head of Lakes, 573‡
Performance in 1918, 894
War, and Inadequate Facilities, 570†
Washington Christmas, 168
Weekly Reports on, 159, 450, 1110
Traffic Club of Chicago:
Addresses of Henry A. Palmer and William Gourlay, 469
Election of Officers, 916
Government Ownership Opposed, 609
Traffic Club of New York: Resolutions on Government Operation, 108
Traffic Club of Pittsburgh: Hines, Walker D., on the Railroad Problem, 848
Traffic Department Under Federal Control, 61*
Train Accidents (See Accident)
Train Brake and Signal Equipment, 1506*, 1695†
Train Ferries for Irish Channel, 374
Traingram System; St. L.-S. F., 480†, 500*
Train Lighting and Equipment, 1667*
Train Line Connectors, Automatic, 1477*, 1576†, 1698, 1727*
Train Loading:
Increasing by Reducing Grades, 955
Southern Pacific's Efficiency Record, 1051
Train Operation and Drawbar Pull, 1766*, 1783†
Train, Repair Shop, 1139*
Train Service, Cost of, 1109, 1327
Train Robberies (See Thefts)
Training Car Department Men, 1656†
Train Stopping, Cost of, 1105, 1129
Trainmaster and the Nashville Collision, 1133‡
Trainmen's Wage Increase (See Employee—Wages)
Trans-Australian Needs Equipment, 1219
Trans-Canada Limited, 1173, 1370
Transference of Freight Mechanical, 582
Trans-Mississippi Readjustment Congress, 513
Transportation and Excess Earnings, 1807‡
Transportation Corps, North Russian, 1118
Transportation Corps' Service with the A. E. F., 7*, 66*, 381†, 385*, 839*, 1045, 1375
Transportation Engineering Corporation, 1448*
Transportation Exchanged for Advertising, 162
Transportation, Secretary of, 131
Trans-Siberian Railway:
Allied Control of, 228, 274*, 374, 420, 612
Loan of $20,000,000, 1219
Losses $40,000,000 a Month, 326
Trap Door Plate, 1724
Treating Water (See Water)
Trinidad a Market for Supplies, 1114
Trip Over Mexican Railways, A, 1297*, 1374, 1531*
Troop Movement Section's Work, 1275
Troop Movements for New York Parade; L. I., 1222
Troop Transportation, Payment of Bills for, 860, 1007
Troop Transportation Statistics, 148, 597, 1275, 1281
Trucks (See also Tractors):
A. R. A. Mechanical Report on, 1624†, 1644*
Barber 70-Ton, 1780*
Bettendorf 70-Ton, 1469*
Electric Types, 1521*
Four-Wheel Drive Auto, 1734*
Jack, Union, 1692*
Trucson Steel Company: Bolt Inserts for Rail Fastenings, 1380*
Trunnion Type Coupler, 1654
Tuco Sanitary Drinking Fountain, 1781
Tuco Trap Door Plate, 1724
Tunnel:
English Channel, 611, 907, 962*, 1112
Gibraltar, 1219
James Peak; D. & S. L., 1559
Turbine Headlight Set, 1726*
Turntable (See Locomotive)
Tyler, W. T.:
Address Before Mechanical Convention, 1655†, 1659, 1695†, 1713
Director of Division of Operation, 222*
Vice-President A. R. A., 1576†, 1579, 1813*

U

Unification of Car Inspection and Maintenance, 773
Union Automatic Train Line Connector, 1727*
Union Jack Truck, 1692*
Union League Club of Chicago: Dunn, S. O., on Railway Situation, 436
Union Metal Products Company: National Car Door, 1782
Union Pacific:
Accident at Beloit, Kansas, 216
Competitive Bidding Rules, Objections to, 1280
Golden Spike Celebration, 1227, 1283
Union Railway Equipment Company: Refrigerator Car Specialties, 1472*
Union Station (See Station)
Union Switch & Signal Company: Switch Adjustment Bracket, 662*
Unit Railway Car, 1473*
United Kingdom (See Great Britain)
United Railways of Yucatan:
Purchase by Mexican Government. —— Storage Battery Cars, 1015*
United States Employment Service: Labor Recruiting, 243, 282†
United States Railroad Administration (See also Director General; also Government Control; also Regional Directors; also Division):
Advances to Railroads, 160, 233†, 363, 940
Advertising Campaign to Promote Travel, 372, 858, 969, 977†, 1085, 1211
A la Carte Service in Dining Cars Resumed, 449, 477†, 573‡
Appropriation Bill (See Congress)
A. R. E. A. Men with, 737
Building, New, 304, 1215
Campaign Against Car Thefts, 780
Cash Transactions, 770, 1160
Certificates of Indebtedness Issued, 595, 747†, 768, 855, 903, 940, 1005, 1062, 1159
Coastwise Steamship Situation, 507
Compensation (See Compensation Contracts)
Contractual Obligations, Dec. 31, 1918, 763
Convention of A. R. E. A., 621†, 685
Deficit for 1918, 425†, 431
Deficit for 1919, 1132†, 1159, 1291†
Doings of (See separate headings)
Expenses and Payroll, 1093, 1437
Freight Car Orders in 1918, 86*
Locomotive Orders in 1918, 82*
Locomotive Superheater Company Taken Over, 474
Mobilization Aided by Railroads, 597
Payroll, 1093, 1437
Publicity Policy, 977†
Purchasing and Labor Policy, 5†
Rail Orders, 1186†, 1189, 1271, 1292†, 1324, 1383
Rate Disagreement with Department of Commerce, 779
Restoration of Normal Conditions, 856
Situation to Be Faced, 529
Standard Equipment Orders Summarized, 768
State Commissions, Relations with, 303, 447, 506
War Department Pays Bills, 860, 1007
Waterway Policy, 998
Universal Air Hose Coupling, 1721
Universal Motor Co.: Pumping Outfit, 746*
Universal Packing & Service Company: Spring Journal Box Packing, 1621
Ureco Brine Tank Support, 1472*
Uruguay Railroad Notes, 561, 961, 1057
U. S. Light and Heat Corporation: Electric Arc Welders, 1476*
Utah Central Anniversary Celebration, 1387

V

Valuation:
Cost of Reproduction in 1920, 1239†
I. C. C. Order No. 3, 1122
Progress, 36*, 320, 914
Railograph Used for Taxation Purposes, 556*
Signal Division Committee, 685
Winston-Salem Southbound, 1265
Value of Railway Plant Compared with That of Other Industry, 1248*
Valve:
Balanced Lever Starting, 1802
Bottom Outlet, 1663, 1781
Bronze Snap Rings, 1791*
By-Pass, 1763*
Carbonization in Valve Chambers, 1762*
Combination Pressure and Vapor, 1620*
Drifting, 1763*, 1779*
Gear for Standard Locomotives, 1734
Lewis Automatic Drifting, 1725*
Packless Steam Heat End, 1733*
Setting and Fuel Consumption, 1309*
Valveless Air Drill, 1691

GENERAL INDEX—Continued

[Illustrated articles are indicated thus; Editorials thus†; Letters to Editor thus‡.]*

Vapor Regulator with Special Union, 1620*
Vaurlum, Samuel M.:
  Distinguished Service Medal Awarded, 1288
  President of Baldwin Locomotive Works, 1233*
Venezuela, Railway Notes from, 1112, 1420, 1439
Ventilation of Engine Houses, 1245*
Victory Liberty Loan:
  Colonel McCrea's Address, 1045
  New York Central Rally, 1118
  Subscriptions of Employees, 1068, 1118, 1170, 1171, 1227, 1283, 1327
  Subscriptions of Supply Trade, 1223
  Terms of, 750†, 822†, 1030†
Vincent, H. S.: Tonnage Rating Charts for Standard Locomotives, 1195*, 1216*
Virginian Railway: Automatic Straight Air Brake Tests, 277, 821†, 840
Voluntary Relief Department; Pennsylvania, 1558

W

Waddell, Dr. J. A. L., Elected Member in Academie des Sciences, 329*
Wages (See Employees)
Wallace, J. D., & Co.: Bench Saw, 743*
Walsh Construction Company: Water Softening Plant in Markham Yard of I. C., 895
War Contracts, Liquidation of, 926†, 973
War Contracts Validation Bill, 26, 224, 270
War Department:
  Cranes, Surplus, 328
  Information as to Railroad Men with Foreign Experience, 1214
  Locomotives Turned Over, 1438
  Payment of Bills for Transportation 860, 1007
  Machinery and Engineering Supplies on Hand, 564
  Sale of Surplus Property, 1177, 1232
War Finance Corporation: Loans to Railroads, 768, 855, 963, 1072, 1388, 1814, 1822
Warfield, S. Davies:
  Plan of Security Owners for Return of Roads, 350, 459
  Railway Executives' Plan for Government Regulation, 1†
War Loan Special in Burma, 374*
War, The (See also Railway Regiments; also Victory Liberty Loan):
  American Expeditionary Forces—Engineer Corps' Work, 1172, 1557
  American Expeditionary Forces—Transportation Corps' Work, 7*, 66*, 381†, 385*, 607, 839*, 1045, 1375
  American Railway Engineering Association's Service Record, 740
  Belgian Railways, Damage to, 275, 470
  Belgian Railwaymen and German Oppression, 501
  British Railways' War Record, 197
  British Repair Shop Train, 1139*
  Contracts with Government for War Work, 26, 224, 270, 926†, 973, 1050
  Cost of Railway Equipment, 1050
  Distinguished Service Medal Awarded, 265, 1018, 1275, 1288
  European Railway Service, Effect on, 762
  Italian Railways, Service of, 274
  Medals Awarded to W. W. Atterbury and S. M. Felton, 265
  Military Railway, The, 1557
  National Railway Appliances Association's Service Record, 739
  Railway Men in the Service, 25, 167, 224, 265
  Railway Mounted Artillery, 1205, 1685*, 1709, 1799
  Railway Signal Association Men's Activities, 624†, 638*
  Railway Supply Men's Services, 24
  Supply Industry's Manufactures, 71, 265
  Traffic and Inadequate Facilities, 570†
  Troop Movement Figures, 148, 597, 1222, 1275, 1281
Warren-Knight Company: Sterling Model 16 M Level, 703*
Washington:
  Christmas Traffic, 108
  People Employed by Government, 1111
Water Gage Protector, Babcock, 1733*
Waterproofing Railway Ties, 849
Water Service, A. R. E. A. Report on, 795†, 801*
Water Softening Plant in Markham Yard of Illinois Central, 895
Water Supply and Cinder Fill, 1215*
Water Supply and Storage Coal, 1817
Water Treatment:
  Anti-Foaming Compound, 1808‡
  Great Northern, 1031†, 1053*, 1808‡
  Illinois Central, 895
  Missouri Pacific, 1321
Waterways:
  Director General Hines on, 998
  Lake Line Established, 1111
  Making the Railroads Pay for, 1185†
  Policy Right or Wrong? 1333
  River Bank Protection, 1279*
  Rivers and Harbors Congress, 400
Waybill (See Freight)
Welding:
  Acetylene, 1331
  A. R. A. Mechanical Report on, 1599*
  Balancing Set, 1653*
  Electric Arc Machines, 1476*
  Flexible Staybolts, 1728*
  Generator, Self-Excited, 1653*
  Torches, Oxy-Acetylene, 1691
West Disinfecting Company: Sterilizer, 1519*
Western Lines Advertising Committee, 372, 1211
Western Railway Club:
  Election of Officers, 1284
  Electric Locomotive Design, 1130†, 1157
  Maintenance of Freight Equipment, 495
  Stokers for Locomotives, 747†
Western Society of Engineers:
  Chicago Terminal Situation, 698
  Election of Officers, 271
  Roundhouse Construction, 1199
Western Tie Producers Object to Centralized Purchasing, 1019
Western Wheeled Scraper Company: Air Dump Car, 745*
Westinghouse Air Brake Company:
  Annual Report, 919
  Humphrey, A. L., President, 918*
Westinghouse, Church, Kerr & Co.: Locomotive Repair Shop; B. & O., 1401*
Westinghouse Electric & Manufacturing Company:
  Annual Report, 1338
  British Holdings Sold, 616
  Locomotive Building at Essington, 171
  Scholarships, War Memorial, 1235
Wheeler, Mechlin & Rea, 1074*
Wheels:
  A. R. A. Report on, 1575†, 1590*
  Flanges, Reinforced, 1522
Whistle Nuisance (See Locomotive)
Whiting Coach Jacks, 1691
Willard, Daniel: Testimony on Government Control Before Senate Committee, 452
Window Device to Prevent Dropping, 1519*
Wine Railway Appliance Company: Drop Door Latch, 1469*
Winnipeg Strike, 1282, 1389, 1443, 1559, 1839
Winston-Salem Southbound: Final Valuation, 1265
Wire Crossings Over Railways, 1542, 1804†
Wires, R. S. A. Report on, 642*
Women (See Employee)
Wood (See Ties and Timber)
Wood, Wm. H., Firebox Investigated, 601
Woolley, Robert W.: Testimony Before Senate Committee, 191, 463
Wyandotte Sanitary Cleaner, 1520*

Y

Yards and Terminals:
  Army Port Terminals, 1809*
  Chicago Terminal Situation, 698
  Engine Terminal Layout, 538*, 587*, 994*, 1199
  Engine House (See Engine House)
  Freight Houses at Salt Lake City; D. & R. G., 1083*
  Glasgow Freight House, 821†, 843*
  Report of A. R. E. A. on, 706†, 721*
  Richmond Passenger Station Facilities, 401*
  Roundhouse (See Engine House)
  Terminal Problem, Director General McAdoo on, 126
  Turntable Design, 540
  Yard Foremen's Wages, 1215
  Yardmaster, Pointers for the, 782, 791, 794, 916
  Yardmen and Fuel Saving, 911
Y. M. C. A. Membership Drive, 1018, 1185†, 1282, 1333, 1414

Z

Zinc Treated Ties' Effect on Track Circuits, 305
Zionsville Cut-Off; C. C. C. & St. L., 1545*, 1818*
Zone Embargo Committees 246
Zone Postal Rate System, 1102, 1291†
Zone Regulations on Bituminous Coal Lifted, 247
Zones, Standard Time, 1248

NEW BOOKS

American Engineers Behind the Battle Lines in France, 116
American Methods in Foreign Trade, 823
American Society for Testing Materials Standards, 284

Boston & Lowell, Nashua & Lowell, and Salem & Lowell Railroads, 930

Concrete Engineers' Handbook, 284

Earning Power of Railroads, The, 877
Efficient Railway Operation, 1526

Government Ownership of Public Utilities in the United States, 1187
Government Ownership of Railroads, 1400

Lining and Loading Cars of Potatoes for Protection from Cold, 480

Modern Management Applied to Construction, 384

Proceedings of the American Railway Bridge and Building Association, 980
Proceedings of the American Railway Master Mechanics Association, 336
Proceedings of the International Railway Fuel Association, 384

Some Tests of Douglas Fir After Long Use, 750
Structural Engineers' Handbook, Second Edition, 336

Tests of a Flat Slab Floor, 930
Training for the Electric Railway Business, 1082

ELECTIONS AND APPOINTMENTS

*[*Indicates photograph and sketch. ‡Indicates sketch only.]*

Adams, C. E., 519
Adams, E. L., 648‡, 1326
Adams, E. V., 615
Adams, H. M., 860, 923, 974*
Adams, Nelson, 1565
Aishton, R. H., 1579, 1813*
Aitchison, Clyde B., 785*
Aitchison, J. F., 1184
Albertson, A. C., 522
Alexander, G. W., 174, 280‡
Alfred, F. H., 1127, 1280
Allen, C. E., 1184, 1236
Allen, J. E., 1395
Allen, J. H., 1394
Allen, J. W., 173
Allen, Samuel G., 474, 1025
Alsberg, Julius, 1286
Alward, H. F., 174
Ambursen, Nils F., 1233
Ames, Azel, Jr., 648‡
Amsden, S. C., 519*, 1842
Anderson, George T., 1395
Anderson, H. P., 872
Anderson, J. F., 872
Anderson, W. F., 112
Andrews, F. A., 423, 975
Anewalt, H. P., 860
Angel, C. P., 923
Apps, J. O., 379
Archdeacon, W. H., 1844
Ardley, Walter H., 976*
Armstrong, W. R., 1128*
Arn, William G., 1450
Arnold, C. R., 975
Aspinall, Sir John A. F., 316
Atkins, George F., Jr., 422
Atkins, G. H., 330
Atterbury, W. W., 265, 839*, 1375, 1698, 1837
Austin, B. N., 1844
Austin, Chellis A., 1233
Austin, H. P., 1769
Austin, W. J., 230, 870

Babcock, W. M., 1235
Bail, Sir James, 1392
Bainbridge, C. N., 174
Baker, Merrill G., 918
Baker, P. S., 111
Baker, W. D., 422
Ball, H. F., 474
Ballard, H. T., 1127
Balliet, H. S., 222
Balph, W. G., 1447
Banker, E. H., 422
Barbour, H. H., 171
Barbour, Robert, 1233
Barnes, A. H., 1574
Barney, H. M., 565
Barnum, M. K., 924

Barrett, C. D., 1124*
Barrett, J. W., 173, 1340
Bartlett, Henry, 222
Bartlett, K. W., 1025
Basse, William H., 1024
Batt, W. L., 1074
Baxter, Ernest, 170
Bayless, A. B., 1289
Beall, Charles B., 1449
Beals, C. L., 871
Beasley, John H., 1074
Beasley, John T., 1074
Beaumont, W. A., 1565
Beck, W. D., 107
Becker, Ben V., 919
Beecroft, Edward, 280
Beggs, Harry W., 1074
Beggs, Thomas G., 1074
Begien, R. N., 279*
Bell, J. T., 923
Bell, N., 174
Bell, R. W., 222
Belleville, J. M., 169
Beltz, John D., 1113‡, 923
Belvin, Preston, 1393
Benning, Clyde P., 790*
Benson, Roy, 174
Bently, F. H., 423
Berggren, O. E., 564, 614*
Berry, G. H., 619, 1028
Besuden, Edwin, 614
Betchel, S. V., 1566
Bevington, W. C., 1027, 1183*
Biard, A. J., 278, 975
Bickel, John, 1236
Bicknell, M. O., 1078, 1290‡
Biddle, W. B., 860, 923
Blackstone, H. L., 1184‡, 1236
Blagden, A. S., 519
Blair, G. L., 1183
Blair, N. F., 1565
Blanchard, W., 475
Bliss, P. A., 1128
Blomeyer, E. F., 111, 173, 1127, 1183
Boak, J. A., 924
Bock, E. L., 111
Bodemer, C. J., 568, 619
Bolan, J., 872
Bond, F. L. C., 280
Bond, L. H., 1450
Borden, E. R., 1232*, 1286
Borland, W. P., 222
Borrowdale, J. M., 1024
Bouillon, A. M., 424
Bourlier, H. C., 379
Bowser, L. M., 279
Bowser, S. F., 1566
Boyd, C. D., 1072
Boyd, W. W., 24
Bracy, W. W., 1396
Bradley, H. S., 1184
Brady, T. J., 923
Braid, Arthur F., 376
Bramlette, S. A., 111
Brandeis, Eugene, 1447
Brandon, J. D., 421
Brassert, Herman A., 1171
Brauns, Vernon T., 1286, 1393*
Brennan, C. M., 1393
Briggs, Carl R., 1074
Brigham, Dwight S., 1127
Bronez, F. L., 230
Bronner, E. D., 173
Bronner, Harry M., 1235
Brooks, W. E., 231
Brostedt, A., 280
Brown, Alexander C., 24
Brown, D. E., 422
Brown, F. D., 972
Brown, G. S., 1025
Brown, T. J., 424
Brown, W. E., 1184
Brown, W. L., 112
Buckwell, E. G., 1447
Buell, W. A., 421
Bugbee, M. L., 1393
Buker, H. W., 421
Bulkley, E. M., 1233
Bunch, C. L., 521
Bunney, W. H., 112
Burford, L. B., 1236, 1289‡
Burgess, S. E., 872
Burkhead, S. E., 1844
Burnap, Robert L., 1289
Burnett, J. A., 171
Burnett, R. W., 872
Burnham, C. G., 567
Burns, Nelson T., 179
Burrows, Irving, 230
Burt, A. M., 1383, 1438, 1450*
Burton, F. W., 1841
Burwell, L. T., 1393
Bush, B. F., 618, 923
Bush, Lincoln, 24
Bush, Samuel P., 24
Butler, W. W., 473, 564*
Buxton, C. B., 860
Byers, F. H., 232
Byram, H. E., 567
Byrd, Joseph, 378

Cady, P. C., 421
Calehan, H. R., 975
Calkins, R. M., 232
Callahan, D. F., 423
Callahan, J. E., 1027, 1078
Callery, James D., 919
Calvin, E. E., 231, 567
Cameron, H. D., 976, 1240
Cameron, O. K., 331
Camp, R. E., 1028
Campbell, D. R., 424
Campbell, J. E., 1289
Canfield, Charles H., 918
Canfield, John B., 614‡
Cannon, J., 232, 567, 923, 1027*
Caracristi, V. Z., 474, 1566*
Carey, Sheldon, 24
Carnahan, Frank, 179
Carr, Robert F., 24
Carroll, Phil, 278, 923
Carry, Edward F., 24, 170
Carse, Henry R., 1233
Carter, C. J., 1566
Cartier, Marcel E., 1176
Carter, Zenas W., 1448
Carver, J. L., 379
Chamberlain, S. A., 1236
Cheatham, Paul G., 1075
Cheney, W. H., 231
Cheyney, C. C., 1394
Chidley, Joseph, 1396
Clindblom, D. P., 1841
Christie, H. C., 1566
Church, W. L., 1233
Churchill, William, 1235
Clagett, Brice, 330
Clancy, J. R., 1184
Clark, C. J., 110
Clark, F. H., 1231*
Clark, H. G., 1574
Clark, John F., 1235
Clark, R. F., 924
Clarke, E. A. S., 171
Clarke, H. W., 110
Clarke, O. H., 976
Cleaver, G. C., 1028
Clement, M. W., 173
Clements, C. A., 1027
Clemmitt, Willis B., 1024
Clift, Albert E., 173*
Clifton, G. B., 1127
Clifton, W. H., 1230
Coapman, E. H., 1579, 1813*
Coburn, Ralph G., 1176*
Cochran, C. W., 558
Coffin, J. S., 474
Cohn, I. H., 918
Cole, Henry, 1564
Coleman, W. W., 24
Colklesser, W. R., 376
Collin, W. W., Jr., 379
Collins, A. M., 1233
Collins, George, 1236
Condict, Philip K., 1024
Conger, K. B., 1183
Conley, J. H., 475
Conley, J. T., 174
Conley, O. M., 231, 860
Connal, W. F., 976, 1340
Conner, W. F., 1844
Connors, F. E., 332
Connors, John, 792
Conover, O. D., 1447
Conwell, W. L., 1233, 1287*
Cooley, Roswell P., 170
Cooper, E. J., 1183
Corby, J. D., 376, 421
Corcoran, J. J., 1236‡
Corning, Warren, 24
Costigan, W. C., 379
Costin, E. M., 378, 422
Cotter, G. F., 870
Cottrell, William, 1175
Couchman, C. R., 1396
Counts, D. E., 1236
Courtney, G. L., 423, 1340
Cowan, J. L., 174
Cowan, J. L., 475
Cox, A. F., 476, 522*
Cox, Millard F., 565, 568
Coyle, B. H., 1395
Cramer, J. L., 1184
Craver, J. E., 1289
Crawford, C. H., 1769
Crawford, C. W., 1579
Crawford, R. W., 1447
Creelman, R., 280, 380*
Crombie, W. J., 1338
Cross, C. W., 493
Cross, John H., 972
Crounse, L. A., 1236
Croxton, W. W., 108
Crush, W. G., 378, 872
Cudding, H. W., 421
Cullen, G. A., 378
Culligan, W., 924
Cullinan, J. S. 1074
Culp, H. A., 279
Cummings, E. E., 1566
Cummins, C. R., 1565
Cunningham, W. J., 1383, 1450
Curtis, Dwight C., 1184
Curtis, James B., 1567
Curtis, Joel H., 975
Cushing, E. B., 741
Cutler, Otis, 24
Cutler, T. J., 1184, 1236

Daggett, George F., 227
Daly, J. W., 174
Dalzell, F. R., 423
Daniels, Randolph, 872
Darby, H., 421
Darling, J. P., 975, 1078‡
Darlow, A. M., 1027, 1183*
David, L. A., 923
Davidson, Sam, 1235
Davis, R. W., 568
Davison, H. M., 1176
Dean, H. H., 923
De Brun, F. H., 1232*
De Butts, R. H., 872
Deeming, Herbert, 565*
Deering, Thomas G., 171
De Funiak, E. A., 975
De Groot, E. H., Jr., 330
De Haven, S. E., 1231
De Hoyes, F. P., 794, 1396
Deimling, J. F., 1340
Delaney, John H., 1337
Delano, Frederic A., 1223
Dell, Fred C. J., 1713
Deneen, J. W., 111, 923
Denney, C. E., 222
Deppeler, J. H., 1074
D'Esposito, J., 1236, 1290*
De St. Phalle, F., 1231
Devereux, E. M., 1028
Dew, G. C., 620
Dewar, W. P., 378
De Witt, J. P. H., 227
Dickinson, F. T., 1125*
Dickson, Wm. S., 972
Diehl, W. J., 379
Dillenbeck, Clark, 111, 232*
Dinneen, H. H., 973
Ditmore, George W., 232, 331*
Dixon, D. F., 618
Dixon, H. A., 1340
Dixon, J. A., 1233
Dodge, L. C., 568
Dolan, James C., 1125*
Door, P. H., 972
Dore, R. L., 1395
Dow, F. C., 173
Dowell, W. W., 475
Downes, H. H., 1394
Downie, F. D., 1184
Downs, Lawrence A., 173*, 174
Drake, M. M., 232
Driscoll, D. M., 475
Driscoll, H. D., 1840
Drury, W. J., 1233
Duffee, L. W., 567, 792‡
Duffey, W. E., 330
Duffy, A. F., 173
Dugan, C. B., 475, 618‡
Duggan, O. E., 1565
Duke, Nat., 378
Dunn, Ballard, 378
Dunn, M. F., 111
Duntley, C. A., 329, 1024*
Duntley, W. O., 329*
Du Pont, Alexis I., 972
Durkin, J. W., 173
Dustin, A. C., 615
Dutch, R. B., 972
Duwe, Wm. H., 1289
Dyson, C. H., 231

Eager, Albert H., 476‡
Earling, A. J., 232
Eaton, C. M., 110
Ebling, J. N., 1176
Echols, F. G., 1842
Eck, W. J., 232
Eckert, M., 1027
Eddy, Charles B., 231
Edgar, W. M., 331
Edgell, T. S., 379
Edmondson, W. H., 1183
Edson, J. A., 553
Edward, James, 380
Edwards, B. M., 279
Edwards, J. I., 790
Edwards, J. L., 108
Egan, A. C., 112
Egan, J. M., 174, 331*
Eggleston, F. S., 870, 973
Egolf, Fred M., 421
Eklund, E., 790
Elliott, F. S., 379
Ellis, G. E., 1326
Elmer, William, 173, 792
Elmquist, Charles E., 1449
Elsey, Charles, 1078
Elson, H. J., 972‡
Elsworthy, R. S., 522
Emerson, C. E., 519
Endsley, Horace F., 563
English, H. A., 424
Ennis, W. C., 975
Epes, Horace, 1183
Evans, W. F., 378
Evans, W. W., 976
Eversman, W. A., 1183

Fairbairn, R. L., 280
Fairhanks, J. E., 1579
Fairhead, G. R., 332
Fairlanb, W. H., 564
Fairweather, Eugene E., 174
Farmer, C. C., 473*
Farrell, R. W., 618, 1127
Farris, J. A., 790
Featherston, J. M., 923
Felton, S. M., 265, 741
Fenstermaker, D. C., 1028
Fenwick, W. M., 872
Fergus, J. L., 1236
Fernald, Frank O., 871
Ferris, H. C., 871
Fike, C. L., 1395
Finke, W. F. H., 376
Fisher, H. D., 1125
Fitzhugh, J. G., 792, 1078
Fitzpatrick, F. F., 1233
Fitzsimmons, Edward J., Jr., 565
Flanders, L. R., 1184*
Flannery, J. Rogers, 24
Fletcher, Andrew, 1025
Fletcher, R. V., 1078
Florandin, Charles H., 1025
Flynn, W. J., 105, 1396
Foley, F. J., 1024, 1175*
Fontes, Col. P., 1277*
Forbes, R. C., 421
Ford, E. B., 568, 792‡
Ford, R. H., 568, 619*
Ford, T. S., 521, 618*
Foreman, H. G., 112
Foss, N. C., 232, 1183, 1396
Forster, H. J., 1579, 1813
Forsyth, Holmes, 376
Fowler, Geo. L., 1231
Fox, Charles Harry, 1028‡
Foyle, John W., 790
Fralich, J. S. Y., 474*
Frank, M., 1394
Fraser, Alan T., 476‡, 1340
Freund, Sanford H., E., 475
Frick, O. H., 619, 924‡
Friend, C. E., 112, 379‡
Frieser, F. G., 976
Fritch, William C., 331
Fuller, Alvin T., 870
Furlow, F., 174

Gadch, Nelson B., 790
Gadsen, P. H., 1449
Gaines, F. F., 223
Gaines, T. F., 231
Galbreath, W. V., 872
Gallagher, C. V., 280
Galloway, C. W., 279*, 378, 975
Ganley, F. S., 1028
Gannaway, J. F., 379
Gannett, J. K., 870
Garber, O. A., 174
Gardner, C. W., 378
Gardner, E. Le B., 1233
Gardner, Kenneth C., 230
Garland, W. L., 1338, 1393*
Garretson, A. B., 1352
Garriques, H. H., 379
Garza, Horacio V., 1396
Gascoigne, F. J., 112
Gault, A. K., 924
Gavan, W. S., 972
Geer, William A., 1183
Geiger, George, 111
Gemlo, William, 174, 331*
Gent, Ernest, 872
Gentles, A. L. G., 1232
Gibbes, J. W., 521
Gibbons, Frank, 1565
Gibson, W. B., 519
Gifford, H. E., 564
Gilbert, D. E., 174
Gilbert, Huntly H., 376
Gillen, U. E., 1844
Gillies, W. R., 1447
Gilman, Charles, 1074, 1231*
Gilman, L. C., 378
Gilmour, T. H., 976
Given, John B., 1235
Glass, D. D., 565
Globe, Arthur S., 1075
Glosser, W. W., 421
Godfrey, Charles H., 1450
Goldbaum, Joseph 1183
Golden, R. N., 1574
Golvin, G. H., 1235
Goodell, R. W., 232
Goodhue, Allan E., 1125‡
Goodwin, E. P., 111
Goodwyn, D. M., 619, 975
Gore, W. A., 923, 975
Gormaly, C. A., 1289
Gorman, J. E., 330
Gorsuch, C. B., 111, 923
Gourlay, William, 1564
Gosset, R. S., 112
Gowen, A. Y., 615
Graburn, A. L., 380
Graham, J. W., 174
Graham, R. H., 872
Grammes, R. A., 1395
Graner, A. L., 332
Gray, Carl R., 232, 278
Gray, D. G., 1574
Gray, D. L., 860
Gray, Howard A., 1025
Gray, H. J., 1844
Green, Charles A., 1393
Green, F. W., 820, 1078
Greiser, Joseph, 1574
Griffis, E. S., 474
Griffiths, W. E., 475
Grimshaw, S. T., 521
Grosvenor, H. J., 1566
Gumbes, J. H., 222
Gzowski, C. S., Jr., 1450

Hackett, J. R., 1844
Hackett, J. W., 520‡
Hague, C. E., 870
Haigh, J. J., 870
Haile, C., 378
Hall, E. B., 568

ELECTIONS AND APPOINTMENTS—Continued

[*Indicates photograph and sketch. ‡Indicates sketch only.]

Hall, E. J., 1447
Hall, W. H., 872
Hallett, W. K., 423, 521*
Hamilton, Edward L., 1564
Hamilton, E. F., 923
Hamilton, W. O., 872
Hamlin, Paul C., 1450
Hammond, E. W., 1028
Hankey, W. M., 1286
Hanlin, H. R., 923
Hanna, H. G., 112
Hansen, J. M., 24
Hanson, Andrew, 331
Harahan, W. J., 1450
Harden, Walter C., 619
Hardin, A. T., 1346*
Hardy, Francis H., 171
Harris, A. H., 1837
Harris, George H., 1340
Harris, R. C., 112
Harris, Walter B., 111
Hart, Edward, Jr., 1289
Hart, L. R., 522
Hartley, A. C., 422
Harwood, G. A., 1837
Hasenbalg, A. J., 111
Hastie, T. G., 568
Hately, Walter, 280, 380‡
Hathaway, H. G., 1565
Hawk, A. T., 1028
Hawkins, Morris S., 792
Hawks, J. D., 1289
Hawthorne, V. R., 1738‡
Haydon, J. D., 1289
Hayes, Ross F., 1287*
Hays, Howard H., 1564
Haywood, T. G., 1393
Heberle, J. F., 378
Heigho, E. M., 793‡
Heinemann, C. B., 330
Heller, A. A., 230
Hench, Jay L., 1394*
Hendricks, V. K., 332
Henney, J. S., 1395
Henry, E. J., 1236
Henry, S. T., 1288
Hensley, L. J., 423
Hepburn, A. B., 1233
Herr, E. M., 615, 919
Hershey, J. S., 378, 923‡, 1027
Hervey, Charles S., 1174
Hervey, T. H., 1183
Hesselman, W., 171
Hevron, J. W., 174
Heyer, George K., 615
Heyman, William, 171
Hiam, G. S., 976
Higgs, J. A., Jr., 1287
Hill, E. Logan, 276
Hill, L. M., 872
Hill, Nathaniel G., 378
Hilliard, E. J., 1450, 1574
Hillman, Edward D., 230
Hills, A. J., 112
Hills, J. E., 111
Hilton, A., 1028, 1127*
Hines, W. D., 187*
Hitchcock, E. A., 1447
Hix, Charles H., 378
Hoag, S. G., 378
Hoar, Robert, Jr., 110
Hoard, R. E., 1236
Hobbs, William H., 792
Hobson, J. S., 918, 973*
Hoff, Arthur B., 976
Hoffstot, Henry P., 230
Holbrook, C. F., 111
Holbrook, Percy, 1447
Holcomb, E. D., 174
Holcomb, J. R., 1184
Holder, W. L., 279, 975
Holland, Cyrus J., 170
Holley, William A., 1450
Holman, J. R., 1117
Holt, T. W., 1124
Holtorf, C. C., 1574
Hood, H. M., 1028
Hook, J. W., 1288
Hooper, Roscoe, 111
Hooven, C. E., 473
Hooven, Don, 474
Hoover, Geo. W., 1074
Hoover, Herbert C., 611
Hopkins, J. M., 24
Hopkins, Samuel D., 110
Hopkins, T. C., 1574
Hopper, L. J., 923
Horn, L. L., 522, 793*
Horn, J. M., 280
Horton, George P., 739
Hoskins, F. G., 1395
Howard, A. R., 1027
Howard, N. L., 1236, 1340*
Howlett, W. E., 1338
Hudson, R. N., 1395
Hudson, T. J., 1074
Hueston, C. H., 521, 618‡, 1078
Hughes, C. Z., 1184
Hughes, H. P., 1840
Humphrey, A. F., 1287
Humphrey, A. L., 24, 918*, 1025
Humphrey, W. D., 1174
Hungerford, S. J., 112*
Hunt, P. J., 111
Hunter, W. E., 619
Huntington, R. C., 520
Hurley, G. L., 111
Hurley, L. W., 1231
Hustis, J. H., 1346*
Hyde, S. Gordon, 1287

Jablinski, A. G., 614
Jackman, Edwin T., 1565
Jackson, E. D., 276*
Jackson, H. A., 520‡
Jackson, R. P., 1574
Jamieson, J. L., 522
Jarrell, J. F., 108
Jenkins, T. W., 230
Jewell, Frank J., 1565
Johanson, J. E., 1164
Johns, W. S., Jr., 423
Johnson, Alba B., 1233*
Johnson, Arthur H., 321
Johnson, A. S., 618
Johnson, B. O., 522
Johnson, C. C., 1844
Johnson, C. W., 565
Johnson, E. C., 1450
Johnson, George E., 792, 871‡
Johnson, Hugh S., 973
Johnson, J. H., 1450
Johnson, Reeves K., 1231
Johnson, W. S., 975
Johntz, H. H., 872
Jonah, F. G., 332, 793
Jonah, I. F., 741
Jones, Fred H., 1338
Jones, James A., 1124
Joor, Samuel F., 1842

Kaderly, W. F., 332
Kaighn, Charles, 1395
Karminski, Alexander, 1394
Karminski, Victor E., 1394
Katte, Edwin B., 1564
Keefe, J. H., 330
Keegan, Harry F., 1175
Keegan, John, 1176
Keig, Marshall E., 918
Keisel, W. F., Jr., 476*
Kellond, W. A., 872
Kelloway, C. J., 379
Kelly, F. S., 1844
Kelly, J. B., 1184
Kelsey, F. W., 1236
Kendree, F. A., 112
Kennedy, L., 1078
Kennedy, W. F., 619
Kessler, E. B., 1395
Kilgore, W. B., 330
Kimball, C. L., 1844
King, F. E., 232
Kinkead, T. M., 379, 423, 475‡
Kinnear, C. W., 112
Kirby, E. S., 1183
Kircher, Paul, 1843
Kirkland, W. B., 279
Kirkpatrick, T. E., 331
Kirkpatrick, V. V., 1396
Kirkpatrick, W. M., 332
Kline, Newman, 1574
Knoff, Emerson, 520*
Knowles, A. L., 565
Knowles, J. H., 379, 568*
Knowles, L. D., 1840
Koontz, J. R., 1840
Kracke, F. J. H., 1174
Kramer, Leroy, 231, 378, 567*

Lahey, Charles A., 111‡, 174
Lamb, Eugene H., 422
Lamb, I. B., 232, 332‡
Lamont, Robert P., 24, 421, 1393, 1565
Lamoreux, D. P., 972*
Lancaster, J. L., 231, 552
Landau, H. L., 1394
Landers, Eugene, 565
Lane, E. G., 1396
Lane, Wm. T., 171‡
Langdon, Paul D., 1235
Lapham, Charles, 619
Larmer, R., 1183
Larmour, R. E., 620*, 976
Lauderdale, J. H., 1027
Lawton, Alexander R., 976
Leber, G. A., 1395
Le Blanc, J. E., 379
Lee, Edwards, 760
Lee, Elisha, 330
Lee, Wallace R., 1769
Lee, W. G., 1387
Leitch, D. W., 924
Leith, W. E., 379
Leonard, Gardner C., 565
Le Page, I. E., 332
Lepreau, F. L., 665, 1124
Lepreau, William N., 700, 742
Lester, C. E., 1128‡
Lewis, F. R., 1175*
Lewis, Walter L., 567
Levy, Sam, 1235
Lincoln, D. R., 1840
Lincoln, W. C., 230‡
Livengood, J. G., 378
Logan, C. J., 1565
Lollis, E. W., 1395
Longstreet, P. E., 1338
Long, R. W., 1574
Lovett, R. S., 231
Lowe, T. J., 379, 424
Lucey, J. A., 173
Ludlow, Alden R., 376, 519
Lundie, John, 1447
Lyman, J. H., 232

McAdno, W. G., 913
McCabe, J. W., 1447
McCamphell, T. R., 422
McCauley, C. G., 700
McClymonds, J. W., 169
McComb, L. J., 473
McCormack, J. Stanley, 1231
McCowan, Andrew, 424*
McCoy, L. W., 331
McCrea, James A., 1045
McCulloch, Andrew, 423, 568‡
McCullough, J. J., 173
McCune, B. E., 378
McCune, John R., 919
McCutcheon, L. C., 174
McDermott, W. J., 872
McDonald, J. D., 1289
McDonnell, F. M., 331
McDonough, C., 173
McEwan, W. G., 521
McEwen, J. J., 1028
McFarlane, T. E., 975
McGee, H. E., 871
McGinley, John R., 919
McGuinness, F. V., 1448*
McGuire, Gordon A., 1450
McIntosh, J. A., 1231
McKay, Col. D. J., 1288*
McKay, Paul, 1236, 1289
McKeller, R. L., 450
McKinney, W. E., 923
McKirahan, M. E., 331
McKnight, Charles, 919
McLaren, Charles E., 1045
McLaughlin, J. B., 567
McLennan, H. R., 793
McLeod, D. W., 1027
McManamy, Frank, 1658
McMann, J. B., 975
McMillan, J., 1844
McNaugher, D. W., 565
McNaughton, A. B., 1844
McNiden, C. H., 615
McQuillen, J. E., 521‡
McQuilken, H. P., 1290, 1340‡
McVeagh, Hugh, 422
MacBain, D. R., 1395, 1396
MacDonald, G. E., 1340
MacDonald, Lorne, 1396, 1574
MacKenzie, L. R., 1024
MacLean, Malcolm, 565
Macrae, I. M., 280, 380‡
Madden, M. E., 331
Maddocks, W. H., 872
Maguire, M. W., 112
Mahan, J. H., 332
Mahaney, J. E., 1184
Mahon, W. D., 1449
Mahoney, J. T., 1393
Main, J. P., 1183
Main, W. T., 924
Manchester, W. D., 380
Manders, W. G., 280
Manion, E. J., 1442
Manley, F. H., 1124
Mann, Albert C., 1844
Manning, G. C., 1236
Mapother, W. L., 923
Marlow, W. T., 620
Marsales, Bernard R., 976
Marsh, A. Fletcher, 230
Martin, E. L., 793‡
Martin, G. R., 174
Martin, H. C., 1396*
Martineau, C. R., 565
Martineau, Wm. C., 565
Masengill, G. A., 923
Mason, C. T., 231
Mason, Edward W., 1078
Mason, J. E., 1125
Mason, R. A., 279
Massen, E. M., 564
Massey, C. F., 918, 973
Masten, George, 975
Mathews, C. W., 619
Mathews, Fred, 519
Matthews, B. W., 615‡
Maxfield, H. H., 1128‡
Maxson, W. E., 1027
May, H. C., 378
Maynard, A. R., 1233
Mayo, George W., 423
Mechlin, O. A., 1075
Meehan, F. X., 1286
Meeker, Royal, 1449
Melanson, H. H., 280, 423*
Mellier, Mabry, 1566
Mellon, R. B., 1124
Merkle, E. K., 1340
Merrifield, W. E., 923
Merritt, F., 793, 1027
Meyer, E. W., 1396
Meyer, N. A., 1127
Middleton, J. A., 231
Middleton, L. L., 170
Middleton, P. Harvey, 870, 1447
Miles, Harold R., 924‡
Millar, Leslie W., 473
Miller, C. F., 423
Miller, General Charles, 1234*
Miller, John F., 919
Miller, R. D., 1127
Miller, Truman F., 171
Mills, J. R., 1184
Mingus, G. W., 1287
Minnick, F. G., 1450
Minnis, James L., 1340
Mitchell, E. F., 278, 976
Mitchell, F. A., 379, 522
Mitchell, R. M., 424
Mitchell, R. R., 1184
Mock, Eugene, 280, 1184
Molitor, Frederic A., 1338
Mongin, A. H., 1289
Monroe, F. A., 1288
Montgomery, C. W., 423
Montgomery, R. H., 973
Moodie, W. T., 424, 619‡
Mooney, P., 332
Moore, C. Z., 1447
Moore, R. D., 1128
Moore, R. Walton, 1027, 1078
Moore, W. S., 565
Morgan, A. L., 521
Morgan, H. H., 564
Morkill, R. F., 648‡
Morrison, James, 379
Morrison, O. P., 565
Morse, Charles A., 222, 1438, 1450
Morton, J. D., 112
Mosby, W., 872
Mowat, H., 924
Mueller, A. M., 1024*
Muhlfeld, J. E., 474, 1288*, 1566*
Mulcahy, E. T., 421
Mulhern, J. W., 423
Muller, G. W., 924
Mullin, W. J., 923
Mulliken, A. H., 739, 1025
Mullins, A. Z., 1289
Mullins, W. J., 475
Munro, D. A., 1176
Munro, W. I., 424
Murphy, J. F., 567
Murphy, Thomas F., 1393
Murray, Robert, 739
Myers, James, 1844

Nash, C. L., 379
Nee, T. G., 1288
Neff, William N., 552, 618*
Nell, A. C., 870
Nelson, C. G., 174
Nelson, E. T., 872
Nelson, G. C., 174
Nelson, I. E., 424
Nelson, O. J., 1574
Nelson, V. E., 174
Nevins, B. E., 923
Newcomer, R. E., 793
Newhouse, B., 378
Nicholas, E. S., 421
Nichols, C. L., 1450, 1574
Nichols, J. H., 174
Nicholson, F. L., 1184
Niles, E. C., 330, 422
Nixon, Lewis, 1174
Noyes, Herman F., 1574

Oatman, J. B., 1028
O'Brien, John F., 1074
O'Connell, D., 422
O'Connor, J., 1184
Ogden, George D., 450
Ogden, W. E., 423
Ogilvie, C. S., 924
Oliver, H. W., 423
O'Neil, E. H., 380
O'Neill, P. T., 331
Oliver, L. L., 1844
Oplinger, J. W., 1184
Orchard, Thomas P., 170
Oren, F. B., 379
Ormsby, W. J., 1028
O'Rourke, G. M., 379
Orr, James, 332
Ortman, Randolph, 1567
Osgood, J. D., 790
Osthy, Oscar F., 1232, 1287*
Owen, A. E., 111
Owens, E. T., 167

Palmer, W. K., 24
Parish, Le Grand, 1493
Parker, G. H., 330
Parker, H. G., 112
Parker, L. G., 1025
Parmly, Randolph, 1233
Parrish, J. B., 111
Passmore, H. E., 171
Patterson, Charles F., 378
Patton, W. A., 112*
Payne, J. B., 278, 976
Pearce, W. D., 279
Pearce, W. G., 1567*

Pease, B. S., 1843
Peck, George L., 173, 975, 1127
Peck, J. W., 475
Peeler, T. L., 618
Pelley, J. J., 173
Pelter, F. P., 330, 331
Perham, H. B., 1442
Perkins, George B., 975‡
Perry, R. E., 280
Peters, Ralph, Jr., 1395
Peterson, Carl H., 1075‡
Petri, Philip, 1078
Pettibone, F. P., 552, 923
Pettigrew, G. T., 380
Phillips, J. L., 1286
Phinney, Robert H., 649
Phipps, L. F., 473
Pickard, F. W., 972
Pidcock, F. R., 1844
Pierce, Ogden, 1183
Piez, Charles, 24
Pillsbury, Charles S., 739, 1231
Pillsbury, George E., 1450
Piper, Henry M., 378
Pizzini, J. A., 1233
Plumly, C. A., 279, 423*
Poindexter, F. L., 111
Poor, F. A., 24, 740, 1842
Pope, G. D., 1233
Post, George A., Jr., 170
Powell, C. O., 1287
Powell, T. C., 231, 246*, 860
Powers, M. J., 619, 976
Prater, B. H., 1289
Pratt, E. W., 567*, 568
Pratt, Walter, 332
Preikschat, A. W., 473
Preston, Fred A., 740
Price, Oscar A., 567
Price, Theodore H., 231
Prince, B. C., 1236, 1289‡
Pringle, Norman W., 619*
Proctor, T. W., 173, 278‡
Prouty, C. A., 246
Prytz, B. G., 1074
Purvis, G. H., 923
Pyeatt, J. S., 552

Quigley, W. S., 473
Quinn, Stanley J., 1394

Rabbe, W. H., 474
Ralph, T. W., 112
Ramey, E. E., 332
Ramsay, W. C., 1184
Ramsey, C. W. P., 741
Ramsey, F. R., 1184
Randall, M. W., 519
Randolph, O. C. F., 329
Ray, George J., 378*, 379
Rayner, George R., 1124, 1175*
Reath, Theodore W., 1844
Rector, J. W., 378
Redier, R. P., 1288
Redmond, A. V., 424
Regan, J. H., 376
Regan, T. J., 279
Reid, Archibald, J., 174
Reid, H. G., 424
Reid, R. C., 1027, 1127‡
Replogle, J. L., 24
Reynolds, A. C., 111
Rhea, Frank, 1074*
Rhymer, S. U., 1450, 1844‡
Rice, F. E., 232
Rice, N. M., 170*
Richards, E., 872
Richards, I. B., 1289
Riddle, H. C., 423
Ridgely, J. A., 975
Riely, D., 379, 522
Riley, G. M., 1289‡
Rink, George W., 521*
Ritchie, A. B., 1844
Rivinus, F. Markoe, 1844
Robbins, Col. F. G., 280
Roberts, Warren R., 24
Roberts, Warren R., 740
Robertson, Alexander, 552
Robertson, R. B., 619‡
Robinson, G. D., 620
Robinson, Joseph, 1447
Robinson, J. A., 423
Robinson, R. B., 1128, 1184
Robinson, W. L., 111, 1450
Roblin, L. G., 424
Roche, W. G., 1184
Rodd, Thomas, 1236
Rodenbaugh, H. N., 278
Roe, John, 1395
Roe, R. E., 1844
Rogers, C. G., 279
Rogers, W. K., 793
Rohman, Harry D., 1175*
Rolfe, R. H., 1028
Romann, John H., 1176
Rose, Charles C., 1236
Rose, C. E., 174, 1184
Rosecrans, A. D., 422
Rosenbaum, W. E., 1280
Rosenfeld, S. D., 1711‡
Rosenwald, M. S., 919
Ross, E. R., 230
Ross, F. S., 1184
Ross, G. S., 1183
Ross, Norman S., 170
Roth, J. C., 378
Rothgery, C. H., 112
Rounds, J. J., 1236
Ruel, Gerard, 112
Ruland, M. J., 1340
Ruppert, George H., 1024
Russell, E. B., 330
Russell, Robert L., 174‡
Rutherford, F. A., 793
Ryan, C. H., Jr., 1127
Ryan, E. C., 1393
Ryan, William M., 473
Ryerson, Donald M., 1176
Ryerson, E. L., 1394

St. John, G. F., 1236
Sague, J. C., 1286
Sanburgand, C. P., 700
Sanctuary, E. N., 24
Sargent, Harry J., 568
Sargent, S. V., 972
Sasse, C. A., 1028
Sasser, E. C., 332
Sauerhammer, L. C., 923
Sauls, C. L., 521
Savage, H. D., 474
Sawyer, D. E., 1393
Sawyer, F. E., 331
Sawyer, L. M., 1338
Sawyer, Mott, 871
Schaefer, F., 1183
Schaeffer, Arthur, 1565
Schatzmann, Paul H., 1232
Schenck, A. A., 924
Schmid, R. L., 1236
Schneider, Joseph P., 918
Schoen, Eugene, 230
Schramm, C. M., 972
Schwab, Charles M., 24
Scott, E. K., 975
Scott, George W., 1393
Scott, G. E., 378, 475, 1125
Scott, S. Osborne, 280, 379*
Scott, W. B., 552, 923
Scott, W. Y., 619, 793*
Scudder, Charles J., 1574
Seagraves, C. L., 108
Sears, F. L., 1450
Seay, T. H., 423
Sechrist, T. O., 568
Seidel, G. W., 174
Selden, Charles, 280
Shank, S. L., 1844
Sharp, W. E., 171*
Sharpe, William, 1396
Shaufler, E. H., 1184
Shaw, A. H., 1844
Shaw, C. W., 174, 279*
Shaw, George H., 280
Shelley, H. T., 1843
Shelton, T. L., 423
Shepard, H. A., 231
Shepard, Walter, 924*
Shepherd, L. E., 1352
Sherley, Swager, 596‡, 974*
Shields, George, 1338
Sholes, Charles E., 1447*
Short, E. A., 276
Shorter, R. G., 923
Shoup, S. E., 232
Shubert, F. J., 1840
Sidwell, William, 1844
Simmons, E. A., 24
Simmons, H. H., 972‡
Simmons, J. A., 619
Sims, W. G., 423
Sines, G. H., 223
Skinkle, J. M., 1233
Slimp, J. E., 614
Sloan, W. C., 521
Small, W. T., 279
Smart, V. I., 171
Smith, A. H., 1346*, 1837
Smith, A. L., 1236
Smith, A. M., 871
Smith, Cameron C., 24
Smith, C. R., 871
Smith, D. C., 476
Smith, F. A., 1289
Smith, Fred C., 923, 1028
Smith, F. W., Jr., 173
Smith, Harold H., 1448*
Smith, J. L., 378
Smith, L. S., 331, 975
Smith, Lon R., 1393
Smith, M. R., 421
Smith, O. C., 871
Smith, R. H., 1029
Snell, Vivian G., 380
Snow, C. L., 519
Snyder, George W., 619, 793‡
Somers, L. A., 1447
Somerville, J. A., 231, 330, 923, 975*
Soper, Alex. C., 1233
Soper, James P., 1233
Souby, J. M., 1574
Spahr, George Walter, 870
Speiden, F. L., 232
Spencer, H. B., 596*
Spens, C. E., 422, 449, 860
Sperry, Henry M., 1124
Sprague, I. C., 1493
Stack, J. D., 871
Stafford, H. P., 1184
Staley, W. C., 923
Stamets, William K., 972
Stanton, W. Jerry, 230
Starbuck, R. D., 1844
Starkie, J. L., 423
Stearns, E. D., 1393
Stebbins, C. S., 280
Stembel, C. P., 794
Stephen, George, 280, 620‡
Stephenson, W., 1078
Stevens, George W., 422
Stevenson, B. C., 1127, 1183
Stevenson, John, Jr., 1232, 1447
Stevenson, W. J., 1127
Stewart, C. F., 923
Stewart, D. C., 173
Stewart, J. B., 423
Stewart, N. B., 1231
Stewart, Wm., 1233
Still, F. R., 870
Stimson, Earl, 739*
Stine, F. A., 378
Stoltz, C. F., 658*
Stone, H. M., 1128
Story, D. A., 280
Story, W. G., 976
Stratton, Lloyd O., 230*
Streiff, H. F., 700
Streyer, J. A., 111
Strickland, S. G., 231
Stringfellow, H., 174
Stripling, W. C., 1235
Sturdee, E. F. L., 522
Sutton, J. A., 424
Swanson, C. B., 1025
Swearingen, B. L., 923, 1074
Sweet, Edwin F., 1449
Symes, C. D., 649‡
Symington, C. J., 973
Synington, W. S., 973

Talbot, Percy, 1184
Talbot, P. W., 280
Talbott, J. O., 1184
Tallyn, Louis L., 379‡
Taussig, J. E., 1127
Taylor, Ezra S., 473*
Taylor, H. A., 330
Taylor, John M., 473
Taylor, J. A., 1837
Taylor, Knox, 1025
Taylor, L. R., 975, 1127‡
Taylor, S. B., 1074
Temple, Reginald H. M., 174, 976
Terbell, J. B., 1567*
Terry, J. L., 1393
Terry, J. W., 1027
Thayer, Robert E., 1237‡
Thelen, Max, 246
Thomas, G. M., 332
Thomas, J. H., 1319
Thompson, A. W., 278*, 233
Thompson, F. L., 1843
Thompson, George, 278, 975
Thompson, Harrison G., 1447, 1448*
Thompson, J. S., 1284
Thomson, M. A., 1236
Thornton, Henry W., 167, 1115, 1171
Throne, M. S., 976
Tiffin, S. G., 332
Tillar, Benjamin J., 1235
Tillman, R. F., 170
Tirrell, William W., 976
Tombs, Guy, 280
Tomlinson, G. W., 1078
Tone, Frank J., 1124, 1175*
Traugott, A. M., 1184, 1574*
Trees, Merle J., 651*, 652‡
Triplett, A. E., 872
Tripp, Chester D., 171
Tripp, Guy E., 24
Trowbridge, G. S., 1395
Truman, M. G., 1566
Trumbull, Horace N., 171
Turnbull, Thomas, 424
Turnburke, V. P., 1450
Turner, J. C., 330
Tyler, W. T., 222*, 278, 1579, 1813*

Underwood, E. Marvin, 280, 1078
Untegraff, W. D., 919
Urbutt, C. F., 619
Utley, E. H., 1027

Vail, E. W., 1236
Venatta, Jean K., 790*
Van Brunt, Arthur H., 112
Vance, W. H., 872
Vandersluis, W. M., 649‡
Vanneufville, G., 700
Van Schaick, A. P., 1231*
Van Sweringen, Geo. N., 519
Van Vliet, B. F., 1395
Van Winkle, A., 171
Vauclain, Samuel M., 170, 1233*, 1288
Veale, C. A., 1128
Veatch, C. E., 1184
Veazey, W. B., 923
Velasco, I. M., 794
Vercoe, H. L., 424
Vizard, G. J., 1184, 1236, 1284
Voettcher, Charles, 615
Vogt, Axel S., 475‡
Volentine, Robert F., 1394
Vosburgh, L. F., 174
Vose, Charles T., 111

Waddell, Dr. J. A. L., 329*
Wade, Harold E., 1393
Waggoner, W. B., 473
Wagner, J. A., 330
Wagner, S. T., 111
Waggoner, R. J., 619
Walber, J. G., 422
Waldron, Fred H., 790, 1074
Walker, C. E., 1176*
Walker, I. O., 1128
Walker, J. P., 330
Walker, W., 280
Wallace, Frank G., 564
Walsh, John, 1124
Walsh, J. L., 872
Walsh, J. P., 1074
Walters, Edward, 1393
Walters, Luther M., 567
Walton, C. W., 1233
Walton, George O., 522
Ward, J. M., 231
Warner, S. G., 1184
Warner, William, 792‡
Waters, R. H., 1289
Watkins, W. H., 174
Watson, Arthur, 316
Watson, F. J., 1396*
Watson, Roos, 564
Wear, F., 618
Weatherston, R. J. S., 380, 1574
Weaver, H. A., 1184
Weaver, Joseph B., 230
Webb, George H., 741, 1340
Webb, W. A., 521, 792, 820
Webb, W. L., 619
Weitzel, H., 423
Webster, Erwin R., 1176
Wehrhane, Henry H., 1233
Weldon, A. T., 280
Weller, James E., 173
Wells, D. L., 1236
Wells, J. R., 521, 872*
Welsh, R., 1286
Wesley, Philip G., 1393
West, J. L., 378
Westinghouse, H. H., 919
Weston, J. D. Jr., 1844
Wharton, A. O., 223
Wheeler, Earl, 1074*
Whele, Louis B., 1449
Whitby, T., 871
White, J. D., 174
White, R. B., 1183
White, T. W., 424
White, W. H., 1447
Whitehead, C. N., 378, 552, 792*
Whitelam, G. E., 174
Whitenton, W. M., 871
Whitford, Morton D., 918
Whiting, J. L., 564
Whitney, E. L., 423
Whitney, Travis H., 1174
Whittaker, F. M., 860
Whittenberger, H. E., 1127, 1289
Whittington, A. G., 1027
Wilber, B. E., 232
Wilcox, G. R., 1128
Wildman, C. B., 923, 1027*
Wilgus, William J., 741, 1018
Wilkes, John L., 618
Williams, D. A., 1290
Williams, George W., 1395
Williams, H. M., 1183
Williams, I. T., 1028
Williams, John Skelton, 596, 974
Williams, J. C., 332
Williams, J. W., 423
Williams, L. T., 1183
Williams, R. D., 1564
Williams, Walter S., 1395
Williams, William H., 924
Williams, W. E., 521, 871, 923
Williams, W. J., 872
Williams, W. K., 1183
Willock, R. S., 1127
Willsie, A. N., 790*
Wilson, Charles H., 230
Wilson, J. R., 975, 1078, 1287
Wilson, K. E., 872
Wilson, R., 423
Wilson, W. S., 423, 521‡
Winby, F. C., 1842
Winby, L. P., 1842
Winburn, W. A., 378, 567
Winkler, F. A., 174
Wisman, C. M., 423
Wistner, H. W., 923
Witt, S. J., 1340
Wittenberger, H. E., 1183
Wood, D. O., 924
Wood, W. E., 1028
Woodin, W. H., 1025
Woodruff, J. M., 1566
Woods, A. A., 1027, 1289‡
Wood-Smith, G. F., 1447
Woodward, T. M., 423
Worcester, H. A., 1346*
Workman, E. A., 174
Worman, H. L., 1128
Woulfe, F. J., 568
Wright, E. S., 1340
Wright, James F., 1078
Wyche, T. J., 379
Wyles, Tom R., 740
Wynn, John, 279

Yappen, A., 174, 232
Yeamans, Charles W., 174, 280*
Yocum, A. H., 619
Yohe, J. B., 521
Yorston, H. K., 924
Young, C. D., 173, 792
Young, Joseph H., 278*, 792

Zahrt, W. G., 1566
Zimmerman, E. C., 1393
Zimmerman, Frederick G., 918

OBITUARY

*[*Indicates photograph and sketch. ‡Indicates sketch only.]*

Andrews, Robert, 1025*
Atlee, John, 232, 379
Aylesbury, Walter T., 494

Balkwill, James, 620
Barrett, Thomas W., 1236
Boger, W. P., 1128
Bradfield, J. P., 794‡

Calthrop, Sir Guy, 620‡, 1028
Carney, Charles, 1844
Childs, F. Howard, 473
Compton, Charles B., 522‡, 619
Coombs, E. Hampton, 1396
Cronk, Waldo B., 332

De Laney, Harry, 1078
Denney, William G., 421
Dewy, C. E., 1290*, 1396
Dougherty, Curtis, 976*
Duer, Bruce W., 476‡

Eldredge, P. C., 1236‡
Ewings, C. H., 112

Francis, W. C., 476, 521
Fraser, Allen T., 924, 1340
Frost, John B, 380
Fulton, Samuel T., 918
Furber, George Pope, 568

Gallagher, J. D., 1286*
Gifford, Malcolm, 614
Greeney, M. J., 794

Hackett, John J., 112
Harrower, John J., 620‡
Haskell, Frank W., 918*, 1124
Hayward, W. W., 473
Henderson, Charles F., 976‡
Higgins, W. H., 232
Hodges, George, 794*, 923, 1275
Hodgins, George S., 332*
Hulsizer, George W., 1396‡, 1450
Hurst, Frank D., 620

Ingalls, G. H., 1450
Ingram, W. F., 1078
Inwood, T. G., 331
Irwin, R. L., 278, 976, 1078
Isaacs, M. A., 1235
Isbester, George C., 740

Jacobi, Charles H., 1128‡

Kearney, E. F., 620*, 924
Keeler, David B., 380‡
Kissinger, V. T., 794‡
Kline, Henry C., 232

La Bau, Francis, 380*
Lawless, Edward, 924, 1028
Leonard, James W., 1290‡
Livingston, John F., 522

McClure, Harold M., 784
Manspeaker, Louis Vincent, 740
Moore, Richard W., 872‡
Nichols, Lewis A., 1125‡, 1338
Noon, William N., 1128

Oakes, Thomas F., 794‡

Page, A. F., 620
Perine, David M., 1078‡
Pleasants, William H., 794, 976
Purves, Thomas B., 1028

Remington, Carl, 1574
Remone, Pollok H. C., 522
Reynolds, Randolph S., 376, 1124
Riley, William, 232

Scott, George Wesley, 568
Sinclair, Dr. Angus, 172*
Slifer, H. J., 424*, 688*
Souther, Frank May, 1128
Stradley, Carl, 522‡

Thompson, Joseph C., 1574
Trombley, Frank, 522‡
Turner, Dr. Walter V., 172*

Van Valkenburgh, Willard, 1028, 1127
Viles, James, 1125*

Wade, Frank E., 1176*, 1393
Walker, Donald, 972
Washburn, M. P., 174
Watts, Amos H., 976
White, George R., 568‡
Wilson, William B., 568‡
Wood, John L., 1565
Worden, Harry F., 276
Writer, Jasper A., 1024

Young, J. V., 332, 619

RAILWAY CONSTRUCTION

Athabasca, Grande Prairie & Fort Vermillion, 1449

Baltimore & Ohio, 1177
Black Mountain Railroad, 1126
Burkeville Railway, 566

Canadian Pacific, 1126
Central of Georgia, 277
Chicago & North Western, 1235
Chicago, Burlington & Quincy, 1449
Chicago, Rock Island & Pacific, 422
Chicago Union Station Company, 475
Cisco & Northwestern, 110

De Queen & Eastern, 1076
Denver & Rio Grande, 1842
Eastland, Wichita Falls & Gulf, 1449
Erie, 1177

Frankfort & Shelbyville Electric, 422

Great Northern, 1126

Illinois Central, 277, 422, 475, 1126

Live Oak, Perry & Gulf, 1339

Northern Pacific, 422
North-West Route, Limited, 1449

Oregon, California & Eastern, 871

Pennsylvania Railroad, 110, 330, 377, 1177, 1567
Quebec & Ungava, 475
Quebec Central, 791

St. Felicien & Ungava, 475
Sand Springs, 422
Sioux City Stock Yards Company, 1177
Southern Pacific, 277
Southern Railway, 1126, 1177, 1842

Texas & Pacific, 1339
Texas Roads, 617
Toyah Valley Sulphur Company, 1842

FINANCIAL NEWS

Alabama Great Southern, 277
Ann Arbor, 1177
Artesian Belt, 1567

Baltimore & Ohio, 330, 871, 974, 1843
Boston & Maine, 110, 277, 422, 920, 1026, 1235, 1339, 1449, 1843
Brooklyn Rapid Transit, 277, 1395
Buffalo, Rochester & Pittsburgh, 617

Canadian Northern, 1235
Canadian Pacific, 920, 1843
Central of Georgia, 1395
Chicago & Eastern Illinois, 1449
Chicago & North Western, 422, 974
Chicago, Indianapolis & Louisville, 1843
Chicago, Milwaukee & St. Paul, 1026
Chicago, Rock Island & Pacific, 330, 377, 791, 1449
Chicago, St. Paul, Minneapolis & Omaha, 566
Cincinnati, Hamilton & Dayton, 1339
Cleveland, Cincinnati, Chicago & St. Louis, 1395
Colorado & Southern, 330
Cumberland Valley, 330

Delaware & Hudson, 1177, 1235
Denver & Rio Grande, 475, 1395
Denver & Salt Lake, 1026

Erie, 617, 791, 920

Fort Smith, Subiaco & Eastern, 377

Georgia Coast & Piedmont, 617, 1339
Grand Trunk, 791, 1339
Grand Trunk Pacific, 617

Hocking Valley, 475

Illinois Central, 422, 791
Indianapolis & Frankfort, 377

Lehigh & New England, 475
Lehigh Valley, 617, 1395
Louisiana & Northwest, 1339
Louisville & Nashville, 1026

Manistee & North Eastern, 110
Michigan Central, 475, 1395
Missouri, Kansas & Texas, 1177
Missouri, Oklahoma & Gulf, 1026
Missouri Pacific, 566

New York Central, 277, 377, 566, 871, 974, 1177, 1395
New York, Chicago & St. Louis, 566, 617
New York, New Haven & Hartford, 475, 566, 1177, 1339
New York, Ontario & Western, 974
Norfolk & Western, 974, 1026, 1235
Northern Central, 422

Oeklawaha Valley, 422

Pennsylvania, 110, 277, 330, 377, 617, 791, 871
Peoria & Eastern, 1843
Pittsburgh, Cincinnati, Chicago & St. Louis, 110, 377, 1449

Reading Company, 1395

St. Louis-San Francisco, 110
South Carolina & Georgia, 974
Southern Pacific, 974, 1449
Southern Railway, 377, 422, 974
Staten Island Rapid Transit Co., 974

Terminal Railroad Association of St. Louis, 1843
Texas & Pacific, 791
Toledo, St. Louis & Western, 277
Trinity & Brazos Valley, 330

Watauga & Yadkin River, 110
Waycross & Western, 330
Western Maryland, 871
Western Pacific, 1026, 1177

Annual Review Number

Railway Age

EDITORIAL

Judge Lovett for Competition

Judge Robert S. Lovett, who has been director of the Division of Capital Expenditures of the McAdoo Railroad Administration, having resigned that office, is now to resume his duties as president of the Union Pacific. In giving up his duties for the administration, he discussed at some length the railroad situation, and far and away the most significant part of this discussion deals with the subject of competition. Judge Lovett was one of E. H. Harriman's right-hand men, and it will be recalled that the Harriman lines were dissolved under an order of the supreme court because their merger was in contravention of the Sherman law; in other words, because they had tended to stifle competition. His earlier training, therefore, must have acquainted Judge Lovett thoroughly with all that there was to be said in favor of the elimination of competition. He has now had a year of experience in railroad operation where competition has been completely eliminated; nevertheless, he is emphatic in expressing the opinion that much of the progress made in the science of railroading, much of the excellence of service which the public has received from the railroads, is due directly to competition. He is emphatic in the expression of the belief that competition should continue in the future, and he brushes aside as trivial the economies which are to be gained by the elimination of competition. This estimate of the savings under the Railroad Administration, made by the elimination of competition, bears out what most close students of the past year's railroad history believe. Judge Lovett's opinion, however, is based on knowledge which no outside student of railroad affairs has. It should carry very great weight in any discussion of Mr. McAdoo's proposal for a continuation of government operation for another five years.

Warfield Won't Come In

On Tuesday, December 31, the Standing Committee of the Association of Railway Executives held a meeting at which S. Davies Warfield, president of the National Association of Owners of Railroad Securities, was present. The Railway Executives' Committee, as has been mentioned previously in these columns, has worked out a tentative plan, laying down the fundamentals which it is believed Congress should consider in developing a solution of the railroad problem. In arriving at a plan upon which all could agree, it was necessary for each of the interests represented on the committee to make sacrifices. It was undoubtedly felt that the plan must be general enough in its terms to serve as a basis for constructive legislation and not as a ready-made structure. While this tentative plan has not been made public, some of its main features have been discussed publicly. Federal incorporation and federal regulation to the exclusion of State regulation, and the placing of responsibility upon some government office for the results of regulation, as well as giving to some body the authority to regulate, are fundamental to this plan. No matter how divergent the views of those who have intelligently thought about this railroad problem have been as to details, these main principles have been almost universally accepted. It is a little hard to see how any thinking man can refuse to accept these principles, unless he adopt advocacy of government ownership; not so with Mr. Warfield, however. Although Samuel Untermyer, counsel for the Security Owners' Association, has come out as personally favoring government ownership, Mr. Warfield has not, so far as we know, done so; but, after the conference with the railway executives, he makes the statement that "we may say, however, that the fundamentals of our plan, now under consideration, differ materially from those of the plan of the executives' association." Mr. Warfield has been in close touch and cognizant of each step in the working out of the railway executives' plan. It would have seemed feasible to have co-operation, but apparently that is not to be. A fundamentally different plan is to be worked out by Mr. Warfield's association. If it is advocacy of government ownership, well and good; the issue can be squarely met. If it is an attempt to play upon local prejudices by a reiteration of States' rights theories, it will serve but to befog the issue and interject controversies where co-operation and unity are so vitally important.

Standard Operating Statistics

Careful, discriminating and constructive work has been put into the production of the standard operating statistics forms which are described by Professor W. J. Cunningham in this issue. The forms are more useful and much more logical than those used by a large number of American roads heretofore. They are in all probability more logical than the form of statistics in use on any railroad in the country. Their full value will neither be appreciated nor obtained by the very men who now have the best systems of operating statistics on their own roads. A man who has studied the figures reported monthly on a certain form for his 2,000 or 4,000 or 6,000 miles of road for 20 years will in all probability find it difficult if not entirely useless to try to get the same information as quickly and as accurately from the new standard form of statistics as from his own forms. This is no reflection on the Operating Statistics Section of the United States Railroad Administration. After an executive has followed for years the operations of his property through the variation in certain statistics—learned to see reflected in certain figures the approach of certain conditions even before these conditions are suspected by the operating officers on the ground, has hammered at this thing or that thing through an insistence on a better showing in a principal figure in his statistics, it would be absurd to expect that he could use a new tool as easily and as successfully. It is for the younger generation of railroad men and for railroad officers whose forms of statistics, handed down to them possibly from predecessors, have been clumsy and ill-devised, that the new forms will come as a great immediate benefit. As a side light on the magnitude of the task that the Railroad Administration undertook, it would be interesting to try to picture how large a pile of these

operating statistics would have to be gone through by the director general of 250,000 miles of railroad if he were personally to attempt to supervise or even to keep himself informed of the operation of the railroad system of which he is the head. On the other hand, an executive operating only 3,000 or 4,000 miles could use the statistics shown on Professor Cunningham's forms to great advantage, and without plunging himself helplessly into an unmanageable mass of figures.

Railway Signaling Situation

SIGNAL INSTALLATIONS very generally proved their value in facilitating the enormous traffic in troops and war supplies which had to be moved. Operating officers are coming to realize more and more the value of short block sections—that is, automatic signals—for other purposes than preventing collisions. Every hour saved between terminals in running time means a decided saving in locomotives, cars and overtime. Some roads have practically eliminated the use of the "31" train order through the operation of their trains by signal indication. The advantage of the remote control of outlying switches by low voltage switch movements to prevent the stopping of heavy freight trains is becoming more and more apparent, and the number of installations of this character is increasing each year.

The signal departments have been greatly handicapped during the year by the loss of experienced men. A large number of the employees went into the army, while others quit to go with manufacturers of war supplies because the wages received were much higher than the railroads could hope to pay. As it takes about two years to develop a good maintainer, it is easy to see what the loss of experienced men means to a railroad. While General Order No. 27 and Supplements Nos. 4 and 8 increasing wages helped materially in holding the employees, a feeling of dissatisfaction was created because of the discrepancy existing between the wage scales of the two supplements. This feeling was further increased as Supplement No. 8 was applied on a majority of the roads, giving signal workmen less than men in other departments doing work of a less exacting nature. The application of either supplement meant that the men, in many instances, would receive more than their immediate superiors, and this is the condition which exists at the present time. A number of experienced signal officers have accordingly entered other fields of work or have taken positions in the ranks in order to benefit by the increased wages.

The entire wage situation has been demoralizing. Signal department officers have been placed in a bad light, because they could offer nothing but promises to their men. The morale of the men was badly affected because they saw those in other departments doing work that did not require the training necessary for the signal department getting considerably more money than they were. As a direct result, the men are inclined to view with suspicion the interpretations of the award made by their superior officers.

A development of importance in the signal field during the past year is the large number of employees who have joined a union. Perhaps 70 per cent of the signal repair and construction men in the country are now unionized and many of the large roads are solidly organized. On December 19 an organization of signal supervisory officers was formed at Chicago to act as a unit in connection with all matters affecting them. This has been another direct outgrowth of the wage situation as outlined above. It is not surprising that men in the signal departments have taken these steps since the Railroad Administration has placed a premium upon organization.

Railway Construction in 1918

THERE IS LITTLE about railway construction during 1918 that is comparable with that of previous years. The mileage of new lines built, 721, comprises such a combination of projects carried over from previous years and short mine, oil and lumber spurs undertaken as war measures since the advent of federal management that it bears no definite relation to the 979 miles of new main lines completed during 1917. The acid test of war necessity resulted in the postponement of more than one project, while the high prices and difficulties of securing deliveries of materials, especially rails, under war conditions, were also deterring influences. Therefore the mileage of new line completed cannot be taken as an index of the normal attitude toward new railway ventures.

The second track mileage of 1918 is constituted very nearly the same as the new line mileage. The longer stretches of second track completed comprise projects of a year's standing or longer, while the shorter sections consist of work undertaken this year under the established policy of the Railroad Administration to provide additional main tracks where light construction promised speedy completion and therefore early utilization in the relief of congested traffic

Of far greater importance this year than either the new line or multiple track construction has been the terminal work, both freight and engine. In engine terminals especially, which proved so woefully inadequate a year ago, the number of complete new projects is particularly evident. Freight yard work in the main has involved the extension of existing terminals, usually following the line of established plans for future extensions, but in many cases involving provision for additional tracks where they could be best applied to relieve congestion. Wye connections and cut-offs affording communication between facilities of normally competing properties were also features of the season's work and these in most cases accomplished much in the relief of traffic while involving but limited expenditures.

Another phase of the additions and betterments program that must not be lost sight of is the renewed interest taken in water treatment—interest that took material form in the construction of a large number of water softening plants. This tendency is also a direct consequence of the engine troubles of a year ago that were brought to a pronounced crisis by the severe season. The important economies to be obtained from these plants, if efficiently operated, will go a long way toward further development in this line.

Taken as a whole, the season's progress on the terminal projects is probably a disappointment to most of those concerned. Possibly the program was too ambitious, or the estimates of material and labor available were more optimistic than they should have been. The necessity for a review of the improvement budget by a centralized body implied a volume of work that could not be completed without the lapse of considerable time. As a consequence, many of the projects were not authorized until late in the season, thus placing a premium on construction methods that would hasten completion as rapidly as possible. Slow delivery of materials also had a marked influence in delaying work. Particularly in yard work, progress was delayed by the lack of a sufficient amount of relayer rail; that is, owing to a delay in the rail renewal programs of the roads, the relayer rail was not available in adequate quantities.

Nearly all work undertaken during the last year was war work in the sense that the improvements undertaken would be of definite advantage in handling war traffic. As a consequence the bulk of the new work was concentrated in the East, particularly east of Pittsburgh. But as this territory is normally one of dense traffic, the possibilities are that nearly all of the improvements will be of definite, permanent value, with the roads restored to private operation.

Railway Expenses Under Government Control

If there were not such serious possibilities of disaster in government experimentation with privately owned property under a form of guarantee that recognizes only the physical property, it would be interesting to see Mr. McAdoo given an opportunity to make good on his predication that the economies incident to unification under government control would make possible a material reduction in rates, probably within a year, without any reduction of the high wage scales established this year. Of course, talk of a reduction in rates from the level established this year is very conservative as compared with the claims usually made by government ownership advocates, that the government could reduce rates and raise wages at the same time; but even so, if Mr. McAdoo has any facts to demonstrate the possibility of an early reduction in rates, it seems strange that they have not been made public.

While much has been made of the saving of $4,000,000 in officers' salaries by charging them to the corporate accounts instead of to operating expenses, and of the $25,000,000 reduction in traffic expenses, and while scattering figures have been given out of savings made here and there by rerouting of traffic, joint use of facilities, etc., they are insignificant as compared with the total increase in expenses and do not bulk very large as compared with the margin of uncertainty as to the amount of the wage increase. Wages have been increased so fast that no one apparently knows yet within $100,000,000 to $200,000,000 how much the increase in payroll will aggregate for the year. We know that in the nine months ending with September 30 the railroads had handled 2.1 per cent more tons of revenue freight one mile and 14.3 per cent more passengers one mile than they did in the corresponding period of 1917, at an increased operating expense of $779,000,000; and while we know that the larger part of that amount represents wage increases, and some of it represents the increased cost of fuel and other supplies, we do not know how much of it represents the wage increase and therefore do not know whether government operation has been economical or extravagant aside from the question of wages.

We realize that the rate advance was in effect for only about half of the year, while much of the wage increase applied throughout the year, and we know that the increase in revenues on a yearly basis probably exceeds the amount of the wage increase for a full year; but we also know that some very large expenses will have to be incurred in the near future that were not incurred in 1918 because it was not possible during the war to keep up the proper amount of maintenance work. While maintenance expenses have been greater this year than last year, that fact is largely due to the higher wages and material costs and at least as far as maintenance of way and structures is concerned a considerably larger amount will have to be expended in the coming year to make up for work deferred during the period of government control.

While it was hardly to be expected that the economies incident to unification would show their full results in the first year, it is also probable that many economies made in the name of war necessity will not be possible hereafter. Coal operators are already exerting pressure to bring about the discontinuance of the coal zone system, shippers and state commissioners are already agitating for a relaxation of the pressure for heavy car loading, and if the Railroad Administration continues its present efforts to show that the government can give a better passenger service than was possible during the war it may find that the effect of the war was not entirely on the side of increased expenses.

It is rather futile to attempt to disagree with so courageous an optimist as Mr. McAdoo, particularly in the face of the uncertainties of the coming year, but we do not hesitate to register an opinion that the forthcoming annual report of the Railroad Administration will be able to deduce a more favorable outlook from the 10 months' figures of 1918 earnings and expenses, which should be available by that time, than it will be possible to extract from the complete figures for the year.

Central Control of Purchases

Alba B. Johnson, president of the Baldwin Locomotive Works and of the Railway Business Association, in referring to the standard locomotives, said that "The workman who is responsible for the best workmanship should be entitled to the selection of his own tools." With cars and locomotives designed and purchased by central committees for all the railroads in the country the opposite is true, for here we have, in effect, a small body of men indiscriminately handing out to the vast army of railway workers cars and locomotives, and giving little consideration to whether or not they meet the local conditions. This standard equipment, with its appurtenances, is determined upon by a committee made up of representatives from different sections of the country. The experience of most of them is different from that of the others. Their operating conditions are different; they have preconceived ideas of how cars and locomotives should be designed and what should be used on them based on the experience they have had in their respective territories. In an endeavor to come to an agreement many compromises are made. This is particularly true of the appliances that go on the equipment. No one common standard can be agreed upon, with the result that four or five are listed as having given good service. One committeeman swears by one device, a second by another, and so on, and in an endeavor to come to an agreement a group selection is made.

This done, the committee on design is through with its work and the matter passes on to a central purchasing committee, which with the accepted list before it attempts to make the necessary purchases. Its business is to buy the equipment at the lowest possible price. The committee members are business men not as familiar with the merits of the design or the material they purchase as those who are to use it. They seek the lowest price and buy from the man who makes the most attractive offer. Not being sufficiently familiar with the service value of the apparatus under consideration they do not know when it is economy to pay more for a certain device than for another. The first cost of any article is by no means an indication of its relative value. The service it renders and the cost of maintenance should be very carefully considered. Some railway supply concerns get greater returns from the sale of repair parts than from the sale of the original device itself. They can afford to lower the price because of the profit in repair parts, and further, it would not be impossible to raise the price on these repair parts in order to make up for what was lost in the lower price of the original article. With purchases made in this way—what happens? The equipment is built and sent to the railroads regardless of whether the roads to which it is sent should happen to have any of the particular standard equipment appliances on their own equipment. This complicates not only the operation of the new equipment, but its maintenance. The men that handle it are not familiar with the particular appliances provided and the men repairing it must provide themselves with a new line of repair parts. The seller is far removed from the user. In doing business with a committee at Washington for all the railroads on a large scale there is not that personal touch that is common when the appliances are sold directly to the

railroads themselves. There is not that incentive to the equipment manufacturer to provide service with his products. Where the railroads buy individually and anything goes wrong with the article purchased, the local representative of the supply company is notified and gets on the job immediately. He has a particular interest in the service his device gives on that road, for he—not alone his company—is after a repeat order. Under centralized purchases the road communicates with Washington and after the usual red tape accompanying the administration of large bodies, the equipment manufacturer is notified and a representative having no direct personal interest in the matter is sent out to rectify the trouble.

Satisfactory results cannot be obtained by making purchases in this way. The service a device gives is far more important than its first cost when its ultimate value is considered. Centralized purchases, furthermore, tend to restrict development. When the number of appliances performing the same functions is limited for the sake of standardization, the manufacturers do not have the same incentive to improve their products or to introduce new designs, on account of the difficulty in getting them into service in sufficiently large numbers thoroughly to determine their service value. On the other hand, devices will sometimes be accepted and a relatively large number placed in service before the design has reached a satisfactory stage of development. The latter has been found particularly true in the case of at least one appliance that is being used on the standard locomotives.

Service and economy demand that "the workman who is responsible for the best workmanship should be entitled to the selection of his own tools." This cannot be attained through a central organization. It cannot be attained when the purchaser buys on a price basis alone. Those who are to use what is to be purchased should have the opportunity and should be capable of determining the kind and make of the article to be bought, and those that do the purchasing should only seek to get the best price obtainable.

Maintenance of Way Progress in 1918

MAINTENANCE OF WAY WORK was subjected to very little constructive supervision by the Railroad Administration during the working season of 1918. There was some interference in the handling of labor, largely with respect to wages and methods of employing men, while with materials and supplies the activities of the government other than in the administration of priorities were limited almost entirely to standardizing the specifications and methods of purchasing ties. The work suffered early in the season from the lack of a clearly defined policy. Maintenance officers hesitated to go ahead with the work because they were not sure of their authority to proceed. They finally came to understand that they were to conduct the work along the usual lines, but no general policy was enunciated at any time during the year.

Responsibility for the failure to assume direct charge of maintenance of way work while other departments of the railroads were being subjected to such detailed supervision may be charged primarily to the delay in organizing a maintenance department under either the central or the regional authorities until late in August, when C. A. Morse, chief engineer of the Chicago, Rock Island & Pacific, was made assistant director of operation in charge of maintenance of way and structures. Maintenance of way or engineering assistants to the regional directors were appointed about the same time. Since their appointment these men, working individually and also collectively as a committee, have endeavored to expedite maintenance of way activities, but their efforts came too late in the season to exert a material influence on the condition of the roads at the close of the year. Most of their time has also been directed to the construction rather than the maintenance activities of the Railroad Administration.

With the opening of the season in 1918 maintenance officers were confronted with the necessity of maintaining tracks and structures that had been suffering for several years from a lack of sufficient labor and material, while carrying an ever-increasing traffic. Rail renewals had been estimated by various authorities as being in arrears in amounts up to 10,000,000 tons. Tie renewals had also been inadequate, while many roads were struggling along with only skeleton forces. Work on the cantonments had also drawn large numbers of bridge carpenters from the service.

The labor situation is discussed at length in another article in this number, and attention is directed to the delay in obtaining action in the matter of wages, meantime tying the hands of the officers of the individual roads in the exercise of their own initiative in obtaining men. These measures may have been necessary to prevent a disastrous competition for labor, but in the absence of prompt centralized action it tended to hamper the organization of adequate forces during the early part of the season when the most effective work could be done. This deficiency in forces was estimated in July at from 30 to 50 per cent.

With regard to rails, the roads were even more unfortunate. Previous to the initiation of government operation the roads had contracted for about 2,000,000 tons of rails for delivery during 1918, but in allocating the supply of steel available for all national needs the War Industries Board found it impossible to allot manufacturing capacities to the production of rails in excess of about 25,000 tons per week, and it was not until November that this rate of production was appreciably increased. As a result deliveries of rails during the year aggregated only about 1,200,000 tons, or less than half of the normal consumption of rails in this country. As long as the production of rails was limited by the lack of manufacturing capacity there was no occasion for the Railroad Administration to place any additional orders, and since these difficulties have been removed the government has failed to take any further action.

With respect to ties, the efforts of the Railroad Administration, while probably holding down prices and preventing confusion and inequitable distribution, have resulted in decreasing the production materially. It is probable that more ties would have been made in this country during the past year if there had been no interference. Deliveries of other track and structural materials were restricted by the same influences that limited the production of rails, and the consequent shortage of materials culminated toward the end of the year in a centralized movement for conservation of all materials used in maintenance of way work. This was a matter of national necessity and secured the enthusiastic cooperation of railway officers and men, but after about two months of this campaign the end of the war removed the principal necessity for it on other considerations than economy. While this campaign undoubtedly saved much steel and iron, and gave the men a better appreciation of the value of the materials they used, there is no question but that the tracks and structures would have been in a better condition if these measures of economy had not been necessary.

It is a commonly accepted fact that the roads are in a depreciated state of maintenance at the present time, and that the condition is far inferior to what it was when the government took control. Just how much so cannot be expressed readily in figures, although it is now very important that this should be done, for when the government took over the roads it agreed to return them to their owners in as good physical condition as when taken, or to compensate them for the difference. The determination of this difference is now one of the most perplexing problems imposed upon the maintenance officers of the Railroad Administration and the corporate organizations of the railroads.

Administration Purchasing Policy Inconsistent with Labor Policy

DIRECTOR GENERAL MCADOO has been quite insistent that wages of railroad employees should not be decreased, but should be maintained permanently at the present high level. Business men generally, throughout the country, seem to be largely of the same opinion, except that, instead of stating that the present schedule should be maintained permanently, they suggest that it should not be reduced in any greater proportion than the cost of living. One branch of the Railroad Administration, however, is apparently not very greatly in sympathy with the director general's views, at least its actions do not indicate that it is. Word seems to have gone forth from the purchasing department, for instance, that purchases all along the line should be curtailed or discontinued until lower prices prevail.

As labor is a large factor in determining the prices for most of the materials that the railroads use, it would appear that the purchasing departments are doing their best to upset market conditions and indirectly force wages down, in accordance with the law of supply and demand. This action is exceedingly unfortunate. Railroad managers in times past have been severely criticised because when traffic and earnings fell off they curtailed their expenditures at the very time that they should have been improving their facilities, and getting the equipment into condition for renewed activity as soon as more prosperous conditions prevailed. Manifestly, the improvements could be made more cheaply under such conditions, because of the more plentiful supply of labor and material and the fact that the work would not interfere to any great extent with the comparatively light traffic. The railroad manager had the excuse that his finances would not permit him to make the expenditures. It would seem, however, that under present conditions, when the administration is urging every possible effort to be made looking toward the re-employment of "war workers" and returning soldiers, that Congress would be glad to add sufficiently to the Railroad Administration's revolving fund to make it possible to provide the additional facilities and equipment that will be greatly needed under heavy traffic conditions that are sure to come not many months hence.

Those men who are following the industrial situation most closely expect that for a period of from possibly three to six months there will be a necessary slowing up because of changing over to normal conditions. They predict, however, that thereafter business conditions will improve rapidly and that the country may expect a long-continued period of heavy business activity. Under these circumstances it is advisable, and even quite necessary, that those industries that can place extensive orders for equipment, either for repairs or improvements, should do so at this time, in order to tide over the temporary business depression. It is useless to look forward to lower prices, except possibly because of unsettled conditions for very brief periods, and it is exceedingly desirable that the government should guard against any flurries of this sort. It would seem that if the situation is handled properly the railroad corporations might be prevailed upon to cooperate in the buying movement even though they have not been shown much consideration since the establishment of federal control. Even if it is not possible for them to cooperate because of financial or other conditions, it must be remembered that there is a large amount of deferred maintenance to be taken up and also that there are many improvements that can be made that will pay for themselves within a very limited period, and which will justify considerable expenditures at this time even though there may be a considerable falling off of prices after the reconstruction period, which, however, will probably extend over a number of years.

A large amount of the present locomotive and car equipment cannot be operated economically, and it will be good business to scrap it just as quickly as possible. It is true that, particularly in relation to locomotives, the older equipment has been placed in good repair; nevertheless it does not have sufficient capacity to handle the heavy train loads that are necessary in the interests of economical operation. A keen observer recently made the remark that a locomotive which was built 15 years ago was a liability because it could not haul heavy enough trains. On the other hand, many locomotives which are 10 years old could be rebuilt or fitted with capacity-increasing devices. The expense would be offset by the savings within a comparatively brief period, in some cases in as short a time as one year. Those roads that were carrying out extensive programs for rebuilding and strengthening car equipment in pre-war days profited richly by it under the conditions of heavy traffic that have existed during the past few years.

If high wages are to be maintained it will be necessary to reduce the cost of operation and to furnish the roads with the kind of equipment that can be used to the best advantage toward this end. If the Railroad Administration is really in earnest about maintaining the present wage scale, and we believe it is, then it should lend its help in making it practicable. The new director general has an opportunity to do a big constructive piece of work in this direction.

A Year of Government Operation

A MOMENTOUS CHANGE in mental attitude among railroad men and the public has marked the 1918 year of railroad operation under the direction of the government Railroad Administration. This change of mental attitude is far more important as having an effect on the future than are the physical changes which have taken place, important as these are when viewed in detail. The fact that more miles of railroad have been torn up than have been built, the fact that in a period of greatest need of every additional railroad facility not over half of the freight car building capacity of the country has been used, and that, whereas the government's order for 100,000 freight cars is but little more than half of what the private corporations were wont to order each year in normal times, and that only about a tenth of the government's order has been delivered, the lasting importance of these things is small when compared to the change in point of view of the public and the two million men actually engaged in railroad operation.

The general public over the entire country for the first time in the history of the United States realizes that there is a railroad problem. For years the more intelligent and thoughtful people of the country contemptuously and with some warmth branded the cry of railroad difficulties as a cry of wolf. The less thoughtful mass of citizens did not bother their heads one way or the other about the railroads.

Analogous to this attitude was that of the greater number of railroad employees and a goodly part of the railroad officers. Dissatisfaction with railroad management both on the part of the public and of employees and officers was rife, but it was largely a dissatisfaction with details. Annoyances and petty injustices bulked large in the horizon of those who thought about railroads at all, and even with those whose businesses compelled them to come in daily or periodical but less frequent contact with railroad operation, it was the personal equation which defined and circumscribed the opinions held on railroad questions. Now everyone knows that there is a railroad problem, and notwithstanding the continued potency of the purely personal point of view of this problem, it is receiving a consideration based on an attempt. at least, to understand something more of it than an occasional personal contact with it would impart;

it is this that distinguishes the present situation from any other in the history of the country.

Personal grievances against the railroads, while they were operated by private owners, fell into well-defined ruts. The shipper who wanted a transportation service below cost, the traveler who demanded a service comparable to that on the finest excess fare trains whenever and wherever he traveled, the railroad officer who was everlastingly being handicapped and beaten down in his requests for authority to make expenditures, and the employee who compared his wages and conditions of employment with conditions in other lines of work, all experienced a general shaking up during the past year that brought the railroad problem more nearly into its proper perspective. The shipper experienced a service and rates that he had not dreamed possible in these free and politically governed United States, the traveler experienced annoyances—"dis-service," as Director General McAdoo so aptly terms it—and high rates that temporarily took the breath of complaint out of him; the railroad officer found that what he had considered a shortsighted restriction was in reality an incentive to better work; and the railroad employee alone was satisfied with a satisfaction which resulted only too often in his quitting his job. Self-analysis not being one of the besetting sins of the country, what has taken place, so far from having shaken the faith of the citizens in any of the above categories, has led to a more self-assertive discussion of the railroad problem than ever indulged in heretofore, and in this discussion lies potentiality of great good. The significance of the statistics reflecting railroad operation in the past year lies largely in the fact that they have attained conscious significance for the first time in the minds of the great majority of people in the country.

In Europe, the four years of war have left a complicated physical problem of railroad rehabilitation. In this country, while there is suspended animation in railroad extension and railroad betterment and actual deferment of necessary repairs and upkeep of facilities, there has been no widespread and serious deterioration of the physical property of railroads. There is a widespread and serious impairment of the working ability and team play of railroad men. Allowed to go on, this might well prove to be destructive. Convincing discovery that something is wrong is the first step toward the discovery of a remedy for this wrong.

Take, for instance, the problems that the Railroad Administration has tackled as set forth in the account published elsewhere of the work of the administration. Many of these things are unimportant in themselves, many others have been handled illogically or not entirely in a disinterested manner, but look at the advertising they have had. It has been worth more than all of the traffic department's expenditures on advertising put together.

The Railroad Administration engaged the services of some of the most able of railroad officers. It was free to draw upon, and did draw upon, the services of railroad executives whose best thought and genius was hardly purchasable for a money wage. With this as a groundwork, with the credit of the government behind it, with an overthrowing of the precedent of railroad officers in the handling of the wage problem and with power to increase rates to almost any extent, the United States Railroad Administration demonstrated that there was a railroad problem. The year, 1918, has outlined in broad, crude strokes of unmistakable vigor the difficulties which have beset the railroads and the public in its relation with the railroads in the past.

If, however, there was too little public interest taken in the railroad situation in the past, there has been a very intimate interest taken in railroad management by various groups of bankers. Not infrequently, this interest amounted virtually to banking control of railroad management. There was keen competition until a few years ago between the three or four larger banking houses, which were known as houses of original issue, for the financing of the large railroad systems which sold issues of from ten to fifty million dollars of securities at one time. There was competition among the smaller banking houses to participate in the syndicates headed by the houses of original issue, and there was competition between the smaller houses to underwrite smaller issues of notes, equipment trust certificates, and other securities in amounts ranging from a million to five million dollars.

The bankers were represented on the boards of directors and the voice which they had in the selection of the management was often compelling. As long as railroad securities could find a ready market among individual investors and institutions, such as savings banks and life insurance companies, it was to the interest of the bankers to have the companies sell securities up to a limit of safety. During all this time the bankers appreciated the dangers of the course that government regulation was taking and stood with the railroad men in an attempt to change this course. When, however, it became evident that the united efforts of railroad men and bankers would prove of no avail, and when, furthermore, the market for railroad securities narrowed almost to the vanishing point, the bankers' point of view radically changed. It was argued that the logic and the justice of the situation demanded that the government, having through regulation forced the railroads into an impossible situation, should now assume responsibility; and the taking over of the roads by the President quite possibly met with the approval of many of the bankers and met with no serious opposition from any of them.

The attitude now of many bankers is that they are willing to consider railroad financing if the railroads have good security to offer, but that good banking forbids them to loan money to railroad companies, with the exception of a few of the stronger ones, under present conditions. There is a tendency to get out from under the railroad problem entirely. Private credit, the bankers say, financed the building of 260,000 miles of American railroad, but unwise, silly, demagogic regulation on the part of the federal government, and more especially of the states, has irreparably damaged this credit structure, and now probably the best thing to do is to have the government use the public credit to support the railroad securities now outstanding and to finance future needs. So runs the argument.

Private industry bids fair to offer a field for profitable banking for years to come in this country. Transportation facilities were necessarily a first consideration. With transportation facilities provided, private credit can be used profitably to establish innumerable new industries.

The bankers who heretofore profited, and at the same time performed a useful public service, from the transferring from the railroad companies to investors, savings banks and insurance companies the stocks and bonds issued by the road and conveying to the railroad company the proceeds of the sale less a commission, stand ready to step out and let the institutions holding the outstanding securities protect their own interests and the railroad managements do their future financing in any way they can find available.

The situation is not without elements of hopefulness. With public interest thoroughly aroused in the railroad situation, with some of the more objectionable features of banking domination of railroad managements in a fair way to be eliminated, with the more statesmanlike of the bankers working in a constructive way on the railroad problem, with the development of means for the distribution of securities among the small investors rather than among the savings banks and insurance companies, and with the hope of elimination of pernicious state regulation, the prospects for a satisfactory solution of the railroad problem are good.

American Railway Forces in the Great War

Remarkable Story of Transportation Department of A. E. F. Made Public for First Time

By Samuel O. Dunn
Editor of the *Railway Age*

THERE is nothing more romantic and striking in the entire history of war than the story of the raising and organization of the American army in the Great War, of the sending of 2,000,000 members of it to Europe and of its participation in a struggle carried on more than 3,500 miles from the nearest part of its own country. One of the most extraordinary chapters in this story must be devoted to the work done by the transportation department of the American army.



Samuel O. Dunn

Expeditionary Forces in France

A great deal of the attention of government officials and the public has justifiably and necessarily been devoted to the problem of providing shipping with which to move our troops and supplies for them from the United States to Europe. It has been tacitly assumed by many that, with the landing of the troops and supplies in France, the problem of military transportation would be solved. It has not been generally understood that the American forces have been situated mainly in eastern France, and that therefore when troops and supplies have reached Europe there has still remained the necessity of transporting them across France to the front for distances of 500 to 1,000 miles. Since the armistice was signed large parts of our troops have been moved from the general district in which they were stationed before up to the Rhine. Therefore, while the cessation of hostilities has reduced in some ways the demands upon our Transportation Corps, it has increased greatly the average distance that supplies must be moved, and therefore the distances over which our railway men must operate and our trains must be moved.

When the United States entered the war in April, 1917, the officers and employees of American railways knew extremely little—in fact, practically all of them knew next to nothing—about the way in which the railways of Europe were constructed, equipped and operated. Even as late as July, 1917, the transportation department was practically non-existent. One year later—in June, 1918—it had a personnel of 1,300 officers and 30,000 men, was operating through eleven French ports, and over an extensive system of railways and inland waterways. It was running exclusively American trains, the first train which was exclusively American in equipment and personnel having been run on July 1, 1918, from Gievre to Nevers, a distance of 83 miles.

When the armistice was signed, in November, 1918, the American Transportation Corps had a personnel of 1,970 officers and 53,136 enlisted men. In addition, 553 officers and 21,452 men were attached to it for duty, making a total assigned and attached personnel of 2,523 officers and 74,588 men. Of this number, 576 officers and 21,832 men were on duty in the zone of the advance, and 1,947 officers and 52,756 men in the Service of Supply. Of those on duty in the Service of Supply, 779 officers and 22,079 men were at work at the ports; 328 officers and 546 men in the headquarters' organization (at Tours), and the rest were concerned with train operation, car and locomotive erection, maintenance of way, and inland waterway transport.

On November 30 there were 37 American railway officers and 2,687 men engaged in operating trains for the French, while 126 officers and 2,530 men were engaged in maintenance of way work for the French. The total number of men engaged in operating American trains was 16,000, while 6,139 were working in American railway shops, and 3,927 were engaged in the maintenance of American trackage. These figures relate only to railway work which was being done in the rear of the advanced zone. The Transportation Corps was operating over 5,000 miles of line; was transferring traffic from ships to cars and barges at 30 ports, and was handling about 32,000 tons of freight and about 10,000 soldiers daily. American railway men, directed by American railway officers, were running through trains made up entirely of American locomotives and cars, and hauling exclusively American freight over three lines of communication from French ports to the American front for distances of 500 to 1,000 miles.

In considering the significance of the service rendered by our transportation forces in France, it must never be forgotten that our supplies and troops were moved over railways which already were being used to render two other kinds of service. First, the French railways over which operations were conducted had to continue to be used for moving their commercial freight and passenger business. Second, they had to continue to transport the military passenger and freight business of the French Government. The American transportation organization and traffic had to be superimposed upon and co-ordinated with those previously existing, and the French roads were regarded as badly congested before our forces arrived. This point must be emphasized before an adequate understanding of what has been done can be obtained.

It will be long before a full and adequate account will or can be given of all the things that have been achieved by our transportation forces in France, and the way that these things have been done. The almost impenetrable veil interposed until recently by the censorship between the army supply and transportation service and the American public has now been lifted. All the data are at present available to those who have time and opportunity to get them and capacity to assimilate them. The present difficulty about telling the story is that it is so big and is replete with such a vast number of important details, that nobody who has not been in touch throughout with all the developments can learn the entire story except by giving literally months to the task of mastering it. So, too, those who have been in touch throughout with the developments are restrained from

telling them either by official considerations, or by the fact that they are too busy.

The writer has had opportunity to visit Tours, the headquarters of the American Service of Supplies, which includes the Transportation Corps. He is the first American press representative to visit the headquarters of the Transportation Corps since the signing of the armistice. He is, therefore, the first who has been officially given full access to all the sources of information as to what has been done, how it has been done, and the difficulties that have had to be overcome in doing it. The article which follows will, in consequence, give the first authorized and connected account of the work of the Transportation Corps. Necessarily, however, it will be incomplete. When the entire history is written it will fill a volume; and a most instructive and valuable volume it will be to those interested in the important subject of military railway transportation in its numerous phases.

What Actually Has Been Done

Many things have been published about what the American railway men have done in France. Insofar as these have been correct they have been very fragmentary. In many cases they have been more astonishing than true. One yarn which has gained widespread currency and cre-



Landing Freight at French Bassens, Bordeaux

dence is that our railway men have built, equipped and operated a new four-track railway clear across France. It can hardly be necessary to tell railway men that this report is without foundation. What our railway men have done is to take over the operation, and maintain and enlarge the facilities of existing French railways to the extent necessary, first, to move our own armies and supplies to the front, and, second, to enable the French army to continue to carry on its part of the struggle with unimpaired energy and effectiveness.

In some cases this has involved merely loaning the French railways American railway troops to operate the trains and maintain the rolling stock and tracks of French railways. In other cases it has involved the operation of American trains over the same lines as French trains, and the maintenance of the tracks and equipment by American railway soldiers. In other cases, it has meant the exclusive construction, maintenance and operation of yards, terminals and even entire parts of lines by our soldier railway men.

The principal ports of debarkation for American supplies have been those in the region of St. Nazaire and those in the region of Bordeaux, on the western coast of France. These groups of ports are served almost solely by the Paris-Orleans, one of the five large privately managed railways of France. The Americans were moving so large a part of the business passing over this road, and were so largely operating and maintaining it when the armistice was signed, that negotiations were pending for turning its management entirely over to our Transportation Corps. Of course, these negotiations have now been terminated.

While, however, more use was made of the Paris-Orleans than any other road, our railway men were also using portions of the lines of the Etat (a government-owned railway which embraces the old Western and State railways), the



Steam Shovel and Train on Embankment Between Canal and River Loire; Nevers Cut-Off

Paris, Lyons & Mediterranean, the Est (Eastern) and the Midi (Southern). These are all the large railways in France except the Nord (Northern). A large part of the Nord was practically destroyed during the war, it being in the principal zone of hostilities, and 45 per cent of it having at one time been in the possession of the Germans. Furthermore, the available parts of it have been used by the British in handling their troops and supplies. It should be added that a portion of our troops and supplies have been handled by the French railroads with their own equipment and personnel. This was especially true during the early part of our participation in the war.

Some of the New Facilities Provided

In order to make it possible to transfer from the ships to the railways all the vast quantities of supplies shipped from America to France for our army, it was necessary greatly to enlarge the transfer facilities at many of the important French ports. In order to enable the French railways to handle this vast additional traffic, it was necessary greatly to enlarge the facilities of the railways by building second, third and fourth tracks in some places; by building cut-offs in other places; by constructing numerous large yards and



One of the Ten American Berths at Bassens

vast storehouses; by building shops to erect and maintain locomotives and cars, and by importing and putting in service large quantities of railway equipment and materials. Over 300 large construction projects (to be exact, 316) were undertaken for the Transportation Corps. The total number of miles of new trackage actually built was 937, and the number of cars shipped from the United States knocked down and erected in France up to December 12 was 15,068.

The number of locomotives from the United States put in service by our military forces in France was 1,105. Up to December 12 the complete record of the Transportation Corps with respect to the ordering, acquisition and erection of locomotives and cars was as follows:

	Locomotives			Freight cars		
	From U. S.	Other sources	Total	From U. S.	Other sources	Total
No. ordered	1,600	425	2,025	30,000	1,040	31,040
On sea	34	...	34	400	...	400
At port	139	...	139	747	...	747
At shop for erection	19	63	82	1,238	...	1,238
Erected today (Dec. 12)	8	...	8	80	...	80
Erected to date	1,105	336	1,441	15,068	988	16,056

Amount of Traffic Handled

The magnitude of the work which the Transportation Corps has done is indicated, although only partially indicated, by the tonnage of supplies and the number of soldiers it has handled. Between June 1, 1917, and November 30, 1918, the total tonnage of supplies moved for the American Expeditionary Forces was 6,547,621 tons. What was accomplished is much better indicated by the increase in the tonnage handled per month and per day. In June, 1917, the tonnage handled was 24,524, or 817 tons per day, while in November, 1918, the tonnage handled was 920,972, or 30,699 tons per day.



Gantry Cranes at American Bassens, Bordeaux

The business handled was rapidly increasing when the armistice was signed, and in the first twelve days of December the tonnage unloaded at the ports averaged 31,926 tons daily. And this was less than one-third of what it was expected to handle daily when the American army in Europe had grown to 4,000,000 men. Plans had been made and were being carried out for providing a transportation capacity of 101,000 tons a day by June, 1919, if the war lasted until then.

In the eighteen months from June, 1917, to November, 1918, inclusive, the number of troops transported into France was 1,865,440, and the number of animals, 53,117. The number of troops handled by the Transportation Service in France is not, of course, the same as the number that arrived in Europe, since many American soldiers reached England, for example, who never got to France, but were returned home after the signing of the armistice.

It is hardly necessary to say that such stupendous things were not done by American railway officers and men in a foreign land and under wholly strange conditions without encountering tremendous difficulties which it required great imagination, foresight, patience, energy and administrative ability to overcome. Fortunately, the War Department called to its assistance just when they were needed several of the foremost railway men of the United States. It has been chiefly to their efforts that the wonderful record that has been made is due, and they have received the loyal and able support of the many railway officers and men who voluntarily left much more remunerative posts at home to enter a service abroad which required of them the hardest and most unremitting exertion; which separated them from their friends and families for months or years, and which afforded none of the excitement and was surrounded by none of the glamor of combatant military service.

Some Difficulties of the Problem

The problem presented to our transportation department was so difficult, partly because it was necessary to operate over railways whose facilities were not only inadequate but had been developed and operated in entirely different ways from the railways in the United States. Another thing which made it difficult was that there were no officers or men on American railways who had been trained before the war for military railway service, and that there were almost no officers in the regular army of the United States who knew anything about the operation of railways. In consequence, it was difficult for the army men to understand why railway organization and operation could not be made to fit their hard-and-fast military notions, and equally difficult for the railway men to understand many things which the army men demanded and insisted upon for more or less substantial military reasons.

It is an open secret that, owing to these conditions, there was much friction, at times, both between the French and American railway officers, and between the American army men and railway men. The organization of the transportation department, and its relations to other branches of the service, were, in consequence, changed repeatedly, the most important reorganization effected having been made as recently as November 12. In spite of all difficulties, however, the results attained have been far greater than the most optimistic would have believed possible a year and a half ago.

The development of our military transportation service has been carried on partly in the United States and partly in Europe. When it became necessary to send troops to the Mexican border, a transportation service was organized by the War Department, with Samuel M. Felton, president of the Chicago Great Western Railway, as its head. On our entrance into the war in Europe this service was expanded, and Mr. Felton was made Director of Military Railways. On Mr. Felton and his staff were imposed the heavy duty and responsibility of providing from the United States the transportation supplies and men needed overseas.

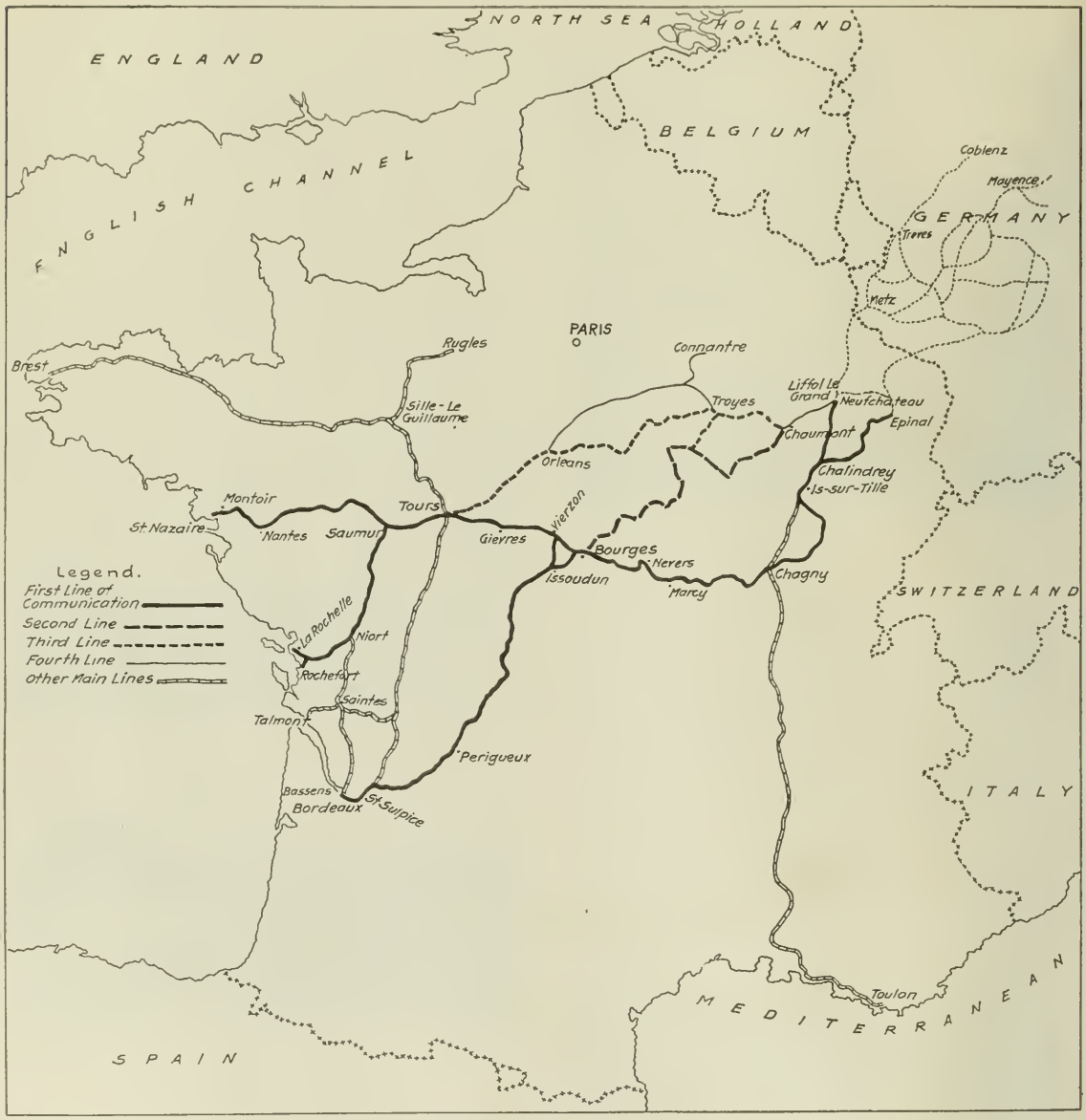


General View, Nevers Cut-Off; Looking East Toward Loire Valley

In Europe there was organized, with W. W. Atterbury, vice-president in charge of operation of the Pennsylvania Railroad (now a brigadier general), at its head, a department which was called at one time the "Transportation Service," and more recently the "Transportation Corps." Its work has been to develop and manage the transportation

service in Europe. The present article is concerned almost solely with what has been done overseas. It would, however, be very incomplete if it did not note the fact that those who have been in the overseas service are unanimous in commending the energy and efficiency which Mr. Felton and his organization in the United States have shown in their portation was to play in America's participation in the struggle when he had said to Secretary of War Baker, in accepting command of the American Expeditionary Forces: "The success of our armies is going to depend on how they are kept and supplied, i. e., upon transportation."

The commission sent to Europe to investigate the trans-



Lines of Communication, American Expeditionary Forces. Light Dotted Lines Show Advance into Germany

efforts to fill all the requisitions which have been made by the transportation department in Europe.

Early Stages of the Work

The first step was taken toward organizing our transportation service overseas, when, in May, 1917, a commission was sent to Europe to investigate the situation from a transportation point of view. General Pershing had expressed his opinion of the importance of the part transportation situation was composed of Col. William Barclay Parsons; Major (now Colonel) W. J. Wilgus, formerly vice-president of the New York Central; Capt. A. B. Barber, of the Corps of Engineers, U. S. Army; W. A. Garrett, formerly president of the Seaboard Air Line, and later vice-president of the Chicago Great Western, and F. de St. Phalle, of the Baldwin Locomotive Works. They were the first American soldiers to arrive in France, and reported to General Pershing in June.

Col. Parsons soon joined his regiment, Capt. Barber was assigned to general staff duty, Mr. Garrett returned to America, and soon Maj. Wilgus was left as the sole nucleus of the transportation service. He associated with him Capt. L. A. Jenny, formerly chief draughtsman of the New York Central, who had come with General Pershing. These two men, sitting on soap boxes, with packing cases as a desk, at 149 Boulevard Haussman, in Paris, drew up what became known as "Requisition No. 6." This set forth the amount and kinds of railway equipment, port equipment, tools and materials which were needed then; and it has been the basis of all requisitions made for the transportation service since that time.

American Men, Equipment and Trains

Major Wilgus outlined the general policy with respect to military transportation which the conditions seemed to warrant. He set forth that the American army must prepare to operate its own trains, made up of its own locomotives and cars, and manned by its own men, from the seaports to the front, over the French railways under trackage rights.

The principle of trackage rights, which is so familiar in America, was entirely unknown in France, and at first the French railway officers did not know what Major Wilgus was talking about. They found it hard to understand how it was possible to operate two systems of transportation over the same tracks at the same time.

Major Wilgus favored the use in France of rolling stock built in America, and designed according to American practice with only such limitations as were imposed by the clearances and the strength of the bridges of the French railways, which generally were not sufficient to accommodate the larger types of American locomotives and freight cars. The type of locomotive favored by Major Wilgus and adopted for general transportation service was a Consolidation of 36,000 lb. tractive effort; while freight cars of 30 tons capacity were adopted. These big locomotives and cars—especially the latter—looked very large on the French railways, the average capacity of whose freight cars is about 15 tons. It was specified that all American locomotives and cars should be equipped with air brakes, which are unknown upon the freight equipment of French railways. The couplers were to be of the French type, in order that American and French cars might be handled in the same trains.

General Pershing took the view that the operation of our military railway service should be placed in charge of a man of large experience in the operation of commercial railways in the United States, and indicated to Secretary Baker his opinion that the ablest American railway man available should be secured. Apparently hearing nothing in response from Secretary Baker, General Pershing appointed Major Wilgus to his staff with the title of Director of Military Railways.

Meantime, Secretary Baker had secured the services of W. W. Atterbury and sent him to France, where he arrived in September, 1917. The situation presented an opportunity for serious embarrassment and friction. These were prevented by Mr. Atterbury and Major Wilgus. Finding the transportation plans well advanced, Mr. Atterbury offered to return to the United States. Since, however, he had been sent by Secretary Baker, it was agreed that he should be made Director General, and Major Wilgus, with the unselfishness and patriotism he has shown throughout, accepted appointment as Deputy Director General. In due course Mr. Atterbury was given the rank of brigadier general and Major Wilgus the rank of colonel.

Fundamental Principles of Supply Service

In the early part of August, 1917, General Pershing established the principle that there must at all times be kept on hand in France 90 days' supplies of all kinds for our troops. Forty-five days' supply must be available at base ports; 30 days' supply at intermediate storage points, and 15 days' supply at advance storage points, which were to be 50 or 60 miles from the front.

It was originally estimated that, on the average, there would have to be provided and transported 100 pounds of supplies daily for every American soldier in France. This included supplies of all kinds—munitions, clothing, coal, foodstuffs, etc.—and was based on the needs of soldiers of all kinds, combatant and non-combatant, from generals down to stevedores. It was on the basis of this estimate that the original plans of the transportation service were formulated. If, for example, there were 300,000 men in France it would be necessary to handle 15,000 (short) tons of freight daily for them. Experience showed that this estimate was much too large, and later ones were based on an average requirement of 50 lb. per day per man.

The actual consumption, after the army had become large, was about 40 lb. per man per day. The original estimate erred on the right side, however, and the error doubtless contributed toward the development of a supply service for our army which was so complete and adequate in all respects that it became one of the wonders of Europe. In addition to supplies bought in France, the tonnage for our army actually unloaded at the French ports on December 12 was almost 32,000 tons, or about 35 lb. per man.

Practically all supplies for American troops must be brought to Europe by water. Therefore, before any large movement of supplies could begin, it was necessary to select the ports through which it should be carried on. The selection of these ports must be made, not only with regard to their capacity for receiving and unloading deep draught vessels, but also with regard to the uses to which they were being put already and to the freight-carrying capacity of the railways serving them.

The northern French ports, such as those of Calais and Boulogne, and the railways serving them, were not available, principally because they were being used by the British for handling their troops and supplies. The port of Bordeaux presented great possibilities, because of its situation on the deep estuary of the Gironde river, but it had been heretofore used mainly for passenger business and lacked facilities for handling large quantities of freight.

The Mediterranean ports were not regarded as immediately available because ships attempting to enter the Mediterranean from the west were in great danger of submarine attacks near Gibraltar, and the Mediterranean itself was long infested with submarines.

The port most available for our service at first was St. Nazaire. It was possible to begin immediately, with the facilities in existence, handling through this port supplies for an army of 200,000 men. The first American line of communication was, therefore, originally opened from St. Nazaire to the front.

As time went on, and the number of Americans in France and the amount of supplies which had to be furnished them increased by leaps and bounds, it became necessary rapidly to increase the number of ports used and greatly to enlarge the facilities of many of them. Five entire groups of ports finally were used. These were as follows:

Channel Group.—Le Havre, Fecamp, Hornfleur, Rouen, Cherbourg, St. Malo, Granville.

Brest Group.—Brest, Lorient, St. Brieuc.

Loire River Group.—St. Nazaire, Montoir, Donges, Usine Brulee, Nantes, Les Sables d'Alone, La Pallice, Rochefort, La Rochelle, Ponnay-Charente, Marans.

Gironde River Group.—Bordeaux, Pauillac, Blazefort, St. Loubes, American Bassens, French Bassens, St. Sulpice, St. Pardon, Bayonne.

Mediterranean Group. Marseilles, Toulon, Cette.

The submarine menace to the Mediterranean ports in due course was greatly reduced by the activity of the navies of the allied powers. Great improvements were made by our forces at St. Nazaire, but the most extensive port facilities constructed were those on the Gironde River estuary in the neighborhood of Bordeaux.

Several very important and interesting articles could be devoted solely to the great works constructed under the direction of the Transportation Department for the enlargement of the facilities of the French ports. The principal dock project was at American Bassens, near Bordeaux. The docks at this point consist of 10 berths of 410 ft. each, served by four tracks along the front of the docks. Electric gantry cranes are used for unloading cargoes from ships and placing the supplies on cars. Immediately back of the docks are classification yards and warehouses. There is at present a covered storage capacity of 121,984 sq. ft. and open storage capacity of 262,170 sq. ft. The project is also served by large receiving, classification and departure yards, and engine terminals are connected with the Paris-Bordeaux line of the Paris-Orleans Railway. Of the 38.6 miles of trackage planned 32.9 miles have been constructed, with complete engine facilities.

American Lines of Communication

A "line of communication," in military parlance, is not, of course, a line of railway, but a route which is kept open to the rear of the army over which orders, intelligence and supplies of all kinds may be brought up. The general headquarters of our Expeditionary Forces have been located at Chaumont, in eastern France—a name which was jealously and successfully guarded until the armistice was signed. The headquarters of the "S. O. S."—Service of Supply—which includes the Transportation Corps, are located at Tours, about one-third of the distance from St. Nazaire and Bordeaux to Chaumont.

The first line of communication of our forces, as finally developed, ran from the St. Nazaire, or Loire River group of ports and the Bordeaux, or Gironde River group of ports, over the Paris-Orleans Railway to Bourges, and thence over the Paris, Lyons and Mediterranean Railway via Marcy, Allerey and Is-Sur-Tille to Liffol Le Grand. Under the plans originally adopted this line of communication was to be used exclusively until the tonnage handled exceeded 25,000 tons daily.

Then a second line of communication was to be opened, which was the same as the first to Bourges, from whence it passed through Etais, Larouge and Neufchateau to Liffol Le Grand. When these two lines of communication were handling a total of 40,000 tons daily, a third line was to be opened from Tours via Orleans and Troyes to Neufchateau.

When the first three lines of communication were handling 50,000 tons a day still a fourth line was to be opened from Brest on the western coast via Versailles, Paris, Connate and Bar Le Duc to Liffol Le Grand; from the Bordeaux Group of ports over a line of railways to Tours not used by the first line of communication, and from Toulon on the Mediterranean to a connection with the first line of communication at Tours. With these four lines of communication it would have been possible to have handled 101,000 tons daily, and the plans which were being carried out contemplated the full opening of all these lines by June, 1919.

As a matter of fact, a large majority of the supplies for our forces were being handled over the first and second lines of communication when the armistice was signed, although the two lines of communication which had not been fully developed were being used to a substantial extent.

The development of a line of communication involved a great deal more than the mere provision of port and railway facilities. As already indicated, General Pershing required base (or port) storage for 45 days' supplies, intermediate storage for 30 days' supplies, and advance (or regulating) storage for 15 days' supplies. This made it necessary to construct vast storage warehouses, and railway yards for taking supplies in and out of them, along the various lines of communication.

The Development of Storage Facilities

Base storage was provided at Montoir, St. Sulpice, St. Luce, Nantes, Donges, St. Pardon, St. Loubes, Miramas, Blaye Furt and Aigrefeuille. Intermediate storage was provided at Gievres, Montierchaume, and Nevers. Advance, or regulating, depots for general supplies, were provided at Is-Sur-Tille, Liffel Le Grand, and Tavaux. Ammunition depots were provided at Donges (near St. Nazaire), Mehun, Issoudin and Les Cors (all near Bourges) and St. Loubes (near Bordeaux).

The following data regarding the plans made for storage depots at certain places, and the extent to which they had been carried out, will give some idea of the magnitude of this part of the undertaking:

Port (or Base) Storage Projects

Montoir (*Near St. Nazaire*).—Projected to receive general cargo from a proposed pier. Plans called for receiving, classification, departure and storage yards, covered and open storage, locomotive terminal for watering, coaling and making light repairs.

Trackage planned for 230 miles, of which 125 was built when the armistice was signed.

Covered storage planned, 4,215,000 sq. ft., of which 1,786,000 sq. ft. was finished.

Open storage planned, 9,812,000 sq. ft., of which 6,926,000 sq. ft. had been provided with tracks.

All engine terminal facilities finished.

St. Sulpice (*In Bordeaux District*).—Plans called for 146 miles of track, of which 91 were completed. Plans called for 3,263,000 sq. ft. of covered storage, of which 2,762,000 were completed. Plans called for 6,864,000 sq. ft. of open storage, of which tracks had been laid for 3,140,000 sq. ft.

Intermediate Storage (30 Days)

Gierves.—This place was on the first line of communication, and handled traffic from St. Nazaire, Nantes and La Rochelle; in the later stages of the war it also handled traffic from Brest. Plans called for 264 miles of track, of which 132 were completed; 4,419,000 sq. ft. covered storage, of which 3,553,000 had been completed, and 10,387,000 sq. ft. of open storage, of which tracks had been laid for 6,000,000 sq. ft. Engine terminal facilities had been completed and in operation for some time.

Montierchaume.—The intermediate storage facilities at this point served the same purpose on the railway line from Bordeaux that the storage facilities at Gievres served on the line from St. Nazaire. The plans called for 225 miles of yard trackage, of which 49 miles were finished; 4,079,000 sq. ft. covered storage, of which 1,123,000 sq. ft. were finished, and 9,600,000 sq. ft. of open storage, of which very little was in service, because of the relatively small amount of trackage that had been built.

Advance, or Regulating Storage

Is-Sur-Tille. — Plans were made here in conjunction with the French, and provided for complete engine facilities, and 95 miles of receiving and classification yards, all of which were completed. The plans also called for 1,847,000 sq. ft. covered storage, of which 1,355,000 sq. ft. had been completed, and 5,110,000 sq. ft. open storage, of which 4,186,000 sq. ft. had been provided with yard tracks. Is-Sur-Tille was the regulating station for the first line of communication, and also for traffic coming up from the Mediterranean ports.

Liffol Le Grand. — This place provided advance storage for the second, third and fourth lines of communication, and could serve as a supplemental station for Is-Sur-Tille. The plans called for complete engine terminal facilities, which were 80 per cent complete; 72 miles of track, of which 42 miles had been built; 407,900 sq. ft. open storage, all of which was completed, and 1,144,000 sq. ft. of open storage, of which 584,000 sq. ft. were available.

One cannot contemplate the vast storage facilities provided without having forcibly brought home to him the fact that the nature of all the traffic handled was very different from that of most of the traffic handled on our railways in the United States, and that, therefore, while many of the methods used in handling it might be similar to those used in the United States, many other methods must be used which were different from those with which our railway men at home are familiar.

A fundamental point which must always be borne in mind is that our Transportation Department served only one shipper—viz., the American Expeditionary Forces—and that it handled only one kind of freight for it—viz., freight for military purposes. In consequence, of course, the determination of the order in which the various kinds of commodities should be moved forward, and the points to which they should be moved, was entirely in the hands of the army men; and there was but one thing to do with commodities which the army did not immediately need, and that was to put them in storage.

The Transportation of Supplies

Ships carrying supplies came partly direct from the United States, and partly from England. During the later months of the year all ships from the United States moved in convoys, protected by cruisers and destroyers. The ships in a convoy were always in danger of being scattered by a storm or other cause; and therefore they always had a predetermined point of rendezvous. When they reached the rendezvous point notice of their arrival there was sent by wireless to Brest, together with information as to their contents. Admiral Wilson of the American Navy who was located at Brest then got into touch with the army Service of Supply, and ascertained where the Service of Supply wished the ships to be unloaded—whether at St. Nazaire, Bordeaux or elsewhere.

All convoys were required to come in sight of Brest, and on the arrival of a convoy there it was instructed regarding the port to which it was to go. Communication between the Service of Supply and Admiral Wilson was handled by one code; and between Admiral Wilson and the ships at sea by a different code; and the codes were changed daily. Therefore the enemy had little opportunity of picking up information regarding the movements of ships.

The storage depots in the zone of the advance—in other words, in the neighborhood of actual hostilities—are called "regulating" stations, because their current conditions and needs really determine the entire handling of supplies from day to day and month to month. As already indicated, the advance stations must have on hand 15 days' supplies of every kind at all times. As fast as their supplies are consumed they make requisition on the intermediate storage points; which, in turn, when they fall below 30 days' supplies, make requisition on the base storage points.

The disposition of a cargo when it arrives in port is determined entirely by its character, and by the supply situation as disclosed by the requisitions which have been made from the various storage points, all information regarding these matters being centralized at the headquarters of the Service of Supply at Tours. It may be, for example, that a regulating depot is getting very short of foodstuffs of certain kinds, and that a convoy arrives bearing a large quantity of these foodstuffs. The Transportation Corps, in that case, probably will make up solid trainloads of foodstuffs at the port of debarkation and run them through to the regulating station.

Or, it may be that certain intermediate stations have fallen below their quota of certain kinds of supplies. In that case, the transportation department will move these kinds of supplies directly to them as fast as the ships bring them in. Of course, in the normal course of events, supplies go from the ships into base storage, and thence to intermediate and advance storage; and the transfers are ordinarily made in large shipments; but the normal course of any kind of events often is interrupted.

It is hardly necessary to say that the system which was in use when the armistice was signed was a result of a long series of developments, beginning with the entrance of the United States into the war. It was, in fact, something intermediate between that which was used immediately after the United States entered the war and that which it was planned to have developed and in use in June, 1919, if the war lasted until then. The tonnage actually unloaded at the various ports in November, 1918, was as follows:

Port	Tonnage	Per cent of total
Brest	67,611	7.34
St. Nazaire	193,846	21.05
Nantes	77,637	8.43
Bordeaux	236,563	25.69
Bayonne	13,268	1.44
Havre	43,529	4.73
Rouen	34,179	3.71
Cherbourg	715	.08
Marseilles	99,866	10.84
La Pallice	82,185	8.92
Rochefort	60,085	6.52
La Sable De Sou	11,488	1.25
Total	920,971	100.00

The Classification of Supplies Handled

The tonnage unloaded at the ports in November was divided among the various classes of supplies as follows:

Supplies	Tonnage	Per cent of total
Coal	207,644	22.55
Forage	68,154	7.40
Foods	177,791	19.30
Clothing	9,451	1.03
Oil	23,629	2.51
Other quartermasters' supplies	63,657	6.91
Transportation materials	89,721	9.74
Motor transportation	50,096	5.44
Engineering supplies	75,272	8.17
Ordnance	64,195	6.97
Medical	10,973	1.19
Signal Corps	3,114	.34
Air Service	9,166	1.00
Gas Service	2,883	.31
Troop property	993	.11
Red Cross	3,765	.30
Y. M. C. A.	2,148	.23
Naval	1,780	.19
Steel billets	54,379	5.91
Miscellaneous	3,161	.34
Totals	920,972	100.00

"Ordnance" in the above classification embraces munitions of all kinds; and it is a striking fact that ordnance constituted less than 7 per cent of the supplies transported. Of course, however, a vast work of transportation was carried on in the United States in handling the fuel and raw materials which were used in the manufacture of the ordnance which ultimately formed so small a part of the supplies unloaded and transported in France.

The tonnage handled in November—about 921,000 tons—was about one-third the approximately 3,030,000 tons per month which it was planned to be handling in June, 1919, when it was assumed the United States would have an army of 4,000,000 men in France. The capacity of the Channel ports for handling American supplies was to be increased from 3,000 tons to 8,000 daily; that of the Brest group, from 2,500 tons to 13,000 tons daily; that of the Loire River group (St. Nazaire, etc.), from 15,600 to 36,500 tons daily, with an increase from 31 to 65 berths for ships; that of the Gironde River group (Bordeaux, etc.), from 9,700 to 28,100 tons daily, with an increase from 22 to 34 berths for ships; and that of the Mediterranean group (Toulon, etc.), from

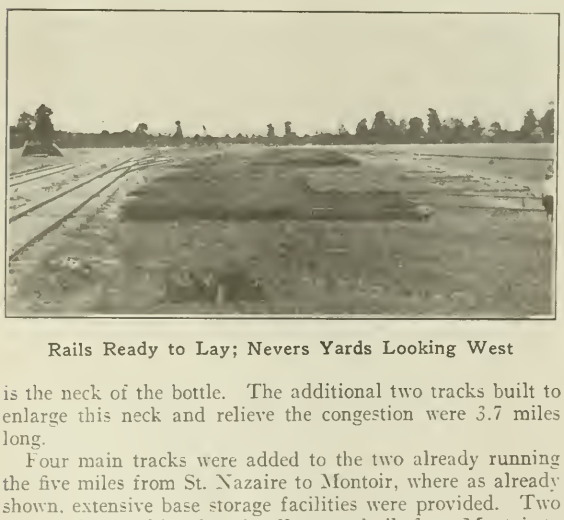
4,200 tons to 15,000 tons daily, with an increase from 18 to 27 in the number of berths for ships. To summarize, the number of berths for American ships was to be increased from 74 to 150, and the tonnage capacity of the ports from 35,000 tons to 101,000 tons.

New Railway Facilities Provided

It would, of course, have been impossible to have handled the enormous amount of traffic for the American armies in the first year of our participation in the war, much less that which it was planned to handle in future, without an enormous increase in the capacity of the French railways. In order to increase the capacity of the part of the lines used and to be used by our transportation service, a large amount of new equipment was provided, and some important construction projects were carried out. Reference already has been made to the equipment provided. The new construction done included multiple track lines, cut-offs, locomotive and car shops, yards, terminals, etc.

The most important construction project carried out was the Nevers cut-off. Nevers is the junction point of the lines of the Paris, Lyons & Mediterranean Railway from Bourges, Chagny, Cosne and Moulins, and the lines through the city were very much congested. The French wished the Americans to relieve the congestion by building a large yard to the northeast of the city. Instead, they decided to build a cut-off which would render it unnecessary for American trains to pass through the congested city at all. The cut-off saves 8.6 track miles of haul for American traffic. It is a double-track railroad 5.5 miles long. Its construction necessitated about 162,000 cu. yd. of excavation, the placing of about 428,000 cu. yd. of embankment, and the construction of 900 lineal ft. of bridging. The work was started on February 20, 1918, and the line was put into service on October 19.

Another important piece of construction work was the addition of two main tracks to those of the already double-track line from Bourges to Pont Vert. A glance at the map will show that the railways from St. Nazaire and Bordeaux, which were used by the Americans as their first line of communication, converge at Pont Vert, and the line from there to Bourges



Rails Ready to Lay; Nevers Yards Looking West

is the neck of the bottle. The additional two tracks built to enlarge this neck and relieve the congestion were 3.7 miles long.

Four main tracks were added to the two already running the five miles from St. Nazaire to Montoir, where as already shown, extensive base storage facilities were provided. Two new tracks—making four in all—were built from Montoir to Donges, which is an important ammunition storage point. From American Bassens (near Bordeaux), to the base storage plant at St. Sulpice, a distance of 6.5 miles, a third track was provided. A three-track line was provided through Nantes, where there had been only one line. Both the Etat (State) and Paris-Orleans Railway enter Nantes, but there had never been a connection between them. The Americans built a wye connection from the Etat to the storage plant at St. Luce. They also built a wye connection between the lines entering Perigueaux to avoid unnecessary switching.

New engine terminals and yards had also to be provided at various places on the lines over which our trains operated, besides those at the storage points, which already have been mentioned. Saumur was the end of engine runs from Montoir on one line of railway and from La Rochelle and Rochefort on another. Facilities were provided here for handling 65 locomotives, including inspection, coaling, minor repairing, etc. Fifteen miles of yards were projected, of which 13 were finished.

Perigueaux was the end of the engine run from Bordeaux.



Cars Dumping off Trestle, Half-Mile West of Loire River; Nevers Cut-Off

The engine terminal plans here were the same as at Saumur. The plans had been 90 per cent carried out when the armistice was signed, and the terminal was in service.

The engine run eastward from Saumur was to Gievres, and the next run was to Marcy. The engine run eastward from Perigueaux was to Montierchaume. Complete engine facilities were planned for these points, and were practically complete The American service was using French facilities at points farther along on the lines of communication, but it was planned to provide facilities for handling our locomotives at Etais, San Germain du Puy, Poincoin, Orleans, Troyes and Liffol Le Grand.

Besides providing facilities for taking care of both French and American equipment when it was in service, it was necessary for the American Transportation Department to provide shops for getting it ready to put into service after it was received in France. The erection of locomotives and cars from the United States and the repair of those of France and Belgium by our transportation forces were begun in December, 1917. From that time up to the middle of December, 1918, the shop troops erected 1,055 locomotives from the United States, 99 for the French, and inspected and overhauled 359 from Belgium. They had also repaired 1,423 French locomotives. Records for the same period showed that 14,302 cars from the United States and 975 from other sources were erected, and that 45,995 were repaired for the French.

Locomotive Erection Shop at St. Nazaire

The large locomotive shop, where most of the work on locomotives is done, is at St. Nazaire. Locomotives for overseas shipment are erected and tested in the United States and then knocked down or partially knocked down for shipment. The knocked down locomotives are crated in sixteen boxes, the largest of which weighs 33,000 lb. The partially knocked down locomotives are complete except rods, cab, stack, piping and odd fittings.

Arrangements were made to rent ten locomotive emplacements in Shop No. 1 from the Societe Anonyme des Ateliers et Chantiers de la Loire, nine emplacements in Shop No. 2

from the Societe Anonyme des Chantiers et Ateliers de Saint Nazaire (Penhouet) and the necessary storage and shifting tracks, all the above being located on the Bassin de Penhouet at St. Nazaire.

The main storage tracks located at Shop No. 1 include 14,600 ft. of shifting and storage tracks and embrace 54,500 sq. ft. of locomotive box storage. At Shop No. 2 the yard includes only 2,080 ft. of track with no box storage, this yard being used principally for shifting.

The locomotive boxes are unloaded from the vessels by use of the French Titan cranes, loaded on flat cars and shifted to the locomotive box storage yard, unloaded by a



Locomotive Shops at Nevers

35-ton locomotive crane, and sorted out into complete locomotives, or held until the complete sixteen boxes are available. When sorted properly they are again loaded on flat cars, seven cars to a locomotive, and shifted either to Shop No. 1, close at hand, or Shop No. 2.

The locomotives under erection are handled in the French shops by two 100-ton electric cranes and are erected in proper sequence, that is, the drivers are placed, then the chassis, the boiler, etc., until the locomotive is completed and ready to be sent to Montoir engine facilities to be tested.

The first locomotive was turned out at St. Nazaire shops October 27, 1917. Since that time, up to and including December 12, 1918, 1,032 locomotives have been completed.



Repairing Locomotives at Nevers

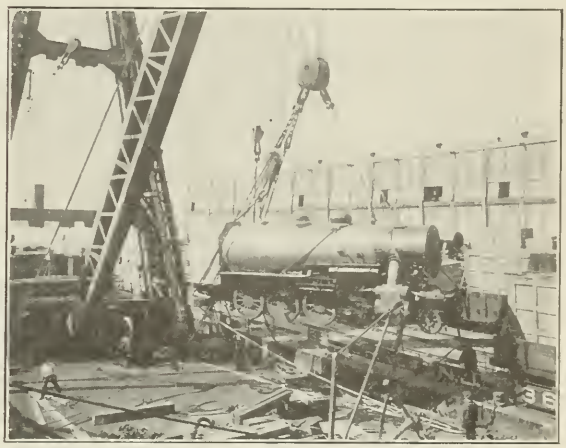
This does not include 30 smaller type saddle tank locomotives completed at Rennes. The maximum daily output was obtained on September 6, when 14 locomotives were completed, this number consisting of seven partially erected type and seven knocked down type. The maximum weekly total was obtained during the week September 1 to 7, 1918, and was 69 locomotives. This number included 39 partially erected type and 29 knocked down type, and one saddle tank locomotive. The maximum monthly total was obtained in September, 1918, and was 215 locomotives, 77 partially erected, 137 knocked down, and one saddle tank.

It is estimated that erecting shops No. 1 and No. 2 are capable of an output of 300 locomotives per month, 200 knocked down, and 100 partially erected. This capacity was never realized, due to the fact that the locomotives were not received from the States in sufficient numbers, or were held up in the ports.

When it was first proposed by the Transportation Department that locomotives should be shipped to Europe only partially knocked down, the Shipbuilding Board protested upon the ground that no ships were in existence which could stand up under the strain of such an immense concentrated load. But boats were found which would stand up; and as many as 12 to 15 partially knocked down locomotives, together with their tenders, have been shipped to Europe in a single ship. This method of shipment has saved time and labor on both sides of the Atlantic, but especially after the engines have arrived in Europe. Gantry cranes, which have been erected both at Bordeaux and St. Nazaire, have been used in transferring locomotives from the ships to the docks.

Car Erecting Shops at La Rochelle

The large car erecting shops are at La Rochelle. These shops cover an approximate total area of 1,453,000 sq. ft. The buildings utilize an area of approximately 157,000 sq. ft. There are 34,325 ft., or about 6½ miles, of track, which include two sets of erecting tracks, four sets of un-



Hoisting Locomotive from Lighter to Ship

loading tracks, one locomotive and crane repair track and three tracks for painting.

An erecting set comprises six tracks spaced at 17 ft., 58 ft., 30 ft., 58 ft. and 17 ft. centers. The two outside tracks at each side are crane and unloading tracks. The two middle tracks are the erecting track and crane track. The erecting track is covered for its entire length of approximately 1,300 ft. and is divided into sections, according to the phases of construction, as follows: 200 ft., truck storage and erection; 450 ft., erecting and riveting; 180 ft., flooring; 300 ft. for side and end lining, and 220 ft. for roofing. The painting facilities consist of three tracks, each 1,000 ft. long, which were never covered as originally planned.

The 58 ft. intervals between tracks, at the first approach to the plant proper, are used for storage of car boxes, but further along the various buildings are placed in this space. The buildings included are the power house, offices, shop buildings, waste sheds, store houses, machine and blacksmith shops and quarters.

Car parts are received from the United States crated in 100-car lots. The crates are sorted and stored until the parts for a 100-car lot are on hand. Erection starts with the assembling of trucks, which are then moved along the track to

the erection position, where a frame, to which the outside fittings have been previously riveted, is placed on the trucks by two 15 ton locomotive cranes. The car then passes through the various phases of construction, each operation comprising a phase, being completed as nearly as possible at the same time, so that no delay occurs.

The first car was turned out at La Rochelle shop February 26, 1918. Since that time, up to and including December 11, 1918, 14,850 cars have been completed. The maximum daily output was obtained on September 26, 1918, when 150 cars were completed. The maximum weekly total was obtained during the week September 22 to 29, 1918, and was 700 cars. The maximum monthly total, obtained in September, 1918, was 2,370 cars. These totals include cars of all types, that is, flat, box, low and high side gondolas, refrigerator and Roger ballast cars.

Most of what has been said in the foregoing has related to the handling of supplies. This was, of course, very much the largest and most difficult service rendered by the Transportation Department. But the handling of troops was no small matter. About 70 per cent of our troops who came direct from the United States to France were disembarked at Brest, and taken over the Etat (State), Paris-Orleans, and Est (eastern) railways to the American front. But a clear majority of all our soldiers were not brought direct to France, but were transported from the United States to Great Britain in British ships, and thence forwarded to France. Large quantities of supplies were also shipped via this route, while other large quantities were obtained in Great Britain. This rendered it necessary to establish a branch of the Transportation Department in London; and this branch did a work of great importance.

Transportation Service Across Great Britain

Until February, 1918, there was no representation of the Transportation Corps in England, each supply officer arranging his own transportation.

Early in February the Army Transport Service established an office under the direction of Captain R. C. Stone, as acting superintendent. Captain Stone formerly represented J. H. W. Steel Company, at Galveston. Later in February, Captain, and now Major, Walter S. Franklin, formerly assistant general freight agent of the Pennsylvania Railroad, was sent from France to represent the Director General of Transportation in England, with an office in the British War Office under the Director of Movements, acting as liaison officer in connection with the movement of supplies and troops. Early in March, First Lieut. George R. Williams, formerly traffic manager of Chase & Company, Jacksonville, Florida, was placed in charge of the rail movement of supplies.

These three officers, with the addition of certain other officers at the ports, carried on the movement of troops and supplies until the arrival of Colonel M. C. Kennedy, Deputy Director General of Transportation, in May. Colonel Kennedy was formerly president of the Cumberland Valley Railroad. In July, First Lieut. Clarence T. Mackenson, Jr., formerly division freight agent of the Pennsylvania Railroad at Altoona, was assigned to duty in connection with the movement of troops.

The accompanying tables show the monthly movement of troops and of supplies through the various British ports. At the port of London two large sheds were used in Royal Albert dock and in addition to these sheds, vessels were loaded in the Thames, as well as at Batavier Wharf. Many of the ships were very small, but were the best obtainable under the circumstances. During the summer and fall there were, on an average, three or four ships loaded from the port of London per week.

The other principal freight port was Swansea, where a large shed was taken over, with additional open storage space

DEBARKATION OF U. S. TROOPS IN GREAT BRITAIN, MAY 18, 1917, TO NOV. 24, 1918

	Liverpool		London		Southampton		Glasgow		British Channel Ports		Total	
1917	Officers	Men	Officers	Nurses	Officers	Men	Officers	Men	Officers	Nurses	Officers	Men	Nurses
May	129	732	....	201	....	....	....	....	(a) 4	306	133	1,038	329
June	27	93	....	....	....	....	....	....	(a) 37	150	64	243	64
July	171	3,333	....	....	....	....	....	....	(b) 48	1,155	219	4,488	194
Aug.	413	8,715	....	....	....	....	....	....	....	....	413	8,715	....
Sept.	1,861	11,048	....	33	....	....	....	....	....	....	1,861	11,048	33
Oct.	1,835	22,969	....	141	....	....	159	2,298	....	....	1,994	25,267	141
Nov.	499	9,129	....	130	....	....	....	....	....	....	499	9,129	130
Dec.	1,312	21,554	....	160	....	....	159	805	....	....	1,471	22,359	160
1918													
Jan.	3,051	17,417	....	21	....	....	....	....	....	....	3,051	17,417	21
Feb.	902	6,369	....	172	....	....	25	153	70	....	....	927	6,522	242
Mar.	1,225	18,910	....	144	....	....	....	....	....	....	....	1,225	18,910	144
April	1,120	26,633	141	....	93	659	91	2,413	....	....	....	1,304	29,705	141
May	3,514	92,868	553	44	150	5,677	13	477	....	....	....	3,721	101,413	553
June	2,693	62,356	310	1,969	115	4,355	....	....	....	....	....	4,777	117,190	873
July	5,228	121,400	677	525	267	7,235	218	556	14,414	....	220	6,796	168,617	1,001
Aug.	5,287	122,369	547	820	261	5,779	200	....	....	....	20	6,388	151,438	747
Sept.	2,781	87,953	808	325	532	14,970	506	757	16,210	97	10	4,405	135,436	1,563
Oct.	3,465	92,636	170	52	796	10,565	....	317	7,047	101	....	4,630	112,250	271
Nov.	1,680	33,122	372	....	45	....	295	....	....	....	....	1,725	33,122	667
Total	37,193	759,606	4,774	3,735	2,259	49,240	1,219	2,077	43,817	268	339	12,106	298	45,603	974,397	7,274

Grand Total, 1,027,174.

(a) Falmouth.
(b) Devonport.

in the immediate neighborhood; and other sheds were used as required. Certain other ports were used for particular cargoes that were assembled from points that were adjacent to these ports. Cardiff and Barry were used principally for coal, with deck loads of motor trucks, water carts, etc.

From the first part of August until the cessation of hostilities there were approximately 100 vessels employed exclusively in the transport of American supplies and coal from England to France. The vessels sailing from the port of London discharged at Havre and Rouen, and those from the Bristol Channel ports at the Western coast ports of France.

In the case of the freight movement, as soon as the Railway Transport Office ascertained to what port the freight should be forwarded, the embarkation officer at the port was notified to call forward the freight from the manufacturer and issue the necessary permission for the railways to accept the tonnage. The co-operation received from the various British officers controlling the railway movement, as well as the railway officials, has been excellent.

Moving Troops from Britain to France

The main troop movement was through the Port of Liverpool, although a large number of troops were debarked at Glasgow, London and Southampton, also a number at Bristol Channel ports.

Three ports of embarkation were used from England to France, namely, Southampton, Folkestone and Dover. From these ports troops were carried to Cherbourg, Havre and Calais. With the exception of troops for training with the British or to be brigaded with the British, the entire movement was made through Southampton, the larger proportion being moved to Havre. Four American ships were placed in the cross-channel trade from Southampton to Havre to carry American troops. These vessels were pooled with the British ships in order to be used to the greatest possible advantage.

When a troop convoy left America for Great Britain, a cable giving the date of departure, and the number and character of troops on board each ship, was despatched by the War Department through the Navy to Admiral Sims, who delivered this information to the liaison officer at the British War Office, under whose direction the troops were distributed to American rest camps in England. What was known as a "Convoy notice" was issued by the War Office to the various parties interested, giving the distribution of the troops. Train times on the British railways were worked out in accordance with the various railway requirements, and the troops moved through under the direction of the British embarkation and railway officials. After arrival at the various American rest camps, the troops were called forward by the American embarkation officer at Southampton in as large numbers as the space that could be secured on the cross-channel transports would permit.

At Dover and Folkestone the rest camps were large enough to accommodate the number of troops moving through these ports, so that the troops were moved directly from the port of debarkation to the port of embarkation, and there embarked as fast as they could be accepted in France.

The first rest camp turned over to the American army was at Winchester. Later, a portion of the British camp at Southampton was turned over and then a camp at Romsey was constructed for the use of the Americans. Some smaller camps were later built in the immediate vicinity of Winchester and in the fall of 1918 the hutted camp at Codford was taken over. In the spring of 1918 a camp was erected at Knotty Ash, Liverpool, in order to relieve the congestion occurring at that point when a large convoy arrived. This camp was of great assistance in promptly unloading vessels and in reducing the large number of trains which had to be moved immediately on arrival of a convoy.

The capacity of the camps was as follows: Knotty Ash, Liverpool, 10,000; Winchester, 10,000; Standon, 3,000; Remsey, 7,000; Codford, 10,000; and Southampton, 5,000.

Convoys of troops arriving in England varied from 5,000 to 30,000 per day. During the months of June, July, August and September, 1918, an average of approximately 160,000 troops a month were debarked at various ports in England, moved through into the rest camps in England and again called forward and embarked for France. The movement of this large number of troops and accompanying baggage required very careful planning. The average stay of troops in England was only from three to four days. Often 60 to 80 special trains had to be run to handle a convoy of troops.

In addition to the transient troops there were in training in England approximately 20,000 American aviation troops, who required moving from point to point, and to whom supplies had constantly to be moved.

Too much praise cannot be given to the Director of Movements, British War Office, and the various railway and other officials acting under his direction, who actually arranged the details of the movement of American troops and supplies through England. There was never any complaint or suggestion which was brought to their attention that did not receive careful consideration, and in many instances they willingly changed their old-established methods when shown that by other methods a quicker movement or a saving could be made. Brigadier-General O. H. Delano-Osborne, Colonel B. Way, and Captain P. Eardley-Wilmot were largely responsible for the spirit of co-operation which prevailed throughout their entire department.

From the accompanying table giving the details regarding the debarkation of United States troops in Great Britain it will be noted that the total number of officers transported across Great Britain from May 18, 1917, to November 24, 1918, was 45,603; men, 974,297; nurses, 7,274. The increase in the movement after April, 1918, as disclosed by the figures, was extraordinary. Of the total of 1,027,174 officers, men and nurses transported across Great Britain in the 18 months covered, 822,059, or 80 per cent, were handled in the six months, May to October, inclusive.

TRANSPORTATION DEPARTMENT IN GREAT BRITAIN COMPARATIVE STATEMENT TONNAGE, FORWARDED TO FRANCE

	February-November, 1918									
	February	March	April	May	June	July	August	Sept.	October	Nov.
Cement	.....	10,351	10,419	17,056	14,536	17,474	14,520	15,660	6,814	1,007
General cargo	480	2,131	16,174	28,822	21,986	16,582	21,609	20,254	24,106	18,445
Potatoes	.....	8,555	4,139	1,705	1,688	.....	.....	1,104	10,111	18,091
Lumber	.....	1,600	.....	.....	.....	.....	4,300	15,300	3,300	.....
Total: Mis: Sups:	480	22,637	30,732	47,583	38,210	34,056	40,429	52,318	44,331	37,543
Coal, coke, etc.	25,173	39,782	53,708	74,087	87,386	116,303	145,659	145,044	215,959	180,343
Grand total	25,653	62,419	84,440	121,670	125,596	150,359	186,088	197,362	260,290	217,886

Army Transport Service

It will be seen from the foregoing that the Transportation Corps was not concerned solely with railway operation, but that it also had control of an extensive water service from Great Britain to France. Besides this, it conducted, during the later stages of the war, an important inland waterway service. The Director of the Army Transport Service, who was on the staff of the Director General of Transportation,

supervised the operation and maintenance of all port terminals under American control, the movement of ocean tonnage between the port terminals of the American Expeditionary Forces and England and other European countries; and also the operation of inland waterway transport routes under American control.

Quite an extensive inland waterway service was operated from Le Havre clear across France to the American front. The cargo of ships arriving at Le Havre was partly unloaded into barges there. The ships were then moved down to Rouen, a port with a shallower channel, where the rest of their cargo was unloaded into other barges. The barges were towed down the Seine river by tugs until the canal system was reached, after which they were towed by horses. It takes about six weeks to move freight in this way from Le Havre to Chaumont.

Needless to say, this route has been used chiefly for the transportation of coal and other commodities not requiring rapid movement. The size to which the traffic over this route had grown is indicated by the fact that in November 210 barges, carrying 295,467 tons of freight, were dispatched over it. Of this freight 206,282 tons were loaded at Le Havre, 87,281 at Rouen, and 1,354 tons at Paris.

Problems of Organization

It is much easier now to present a statement of the things that have been done by our transportation forces in France than it is to give an adequate idea of the difficulties that have had to be overcome in accomplishing them. The difficulties encountered have been of many kinds, but probably the most formidable have been those of organization. The transportation department had to operate over foreign railways; it had to be fitted into, and to meet the requirements of the American army; and these two things caused many difficulties and some heart burnings.

Relations with French Railways

The French system of handling railway rolling stock and trains differs sharply from American practice. In America the movement of all trains, passenger and freight, regular and extra, over a division, is subject to the centralized control of a train dispatcher, while control of the distribution of cars is centralized in the superintendent of transportation. In France, on the other hand, the movement of trains and distribution of cars are subject to the highly decentralized control of numerous chefs-de-gare. The French chef-de-gare system has been lucidly described by Lieut.-Col. Frederic A. Delano, Deputy Director General of Transportation, in a special report, which was published in the *Railway Age* for November 8, page 823.

As Col. Delano says, the chef-de-gare "is a good deal more than our station agent, even though the position of station agent or local agent in some of our large stations in America is not infrequently very important. Under French methods of operation, the chef-de-gare not only is in complete charge of all operations within the limits of his station, including distribution of cars and movement of trains, but a through train having arrived at the station may not pass out of it without his authority."

The American transportation department created a central car office to record, trace and control the movements of American cars in accordance with American practice. This office and its method of working were an object of much curiosity and interest to French railway men.

It was not possible similarly to solve the problem of train movement by the introduction of American practice. The American supply trains, and French trains manned by American railway soldiers, had to be run over the same tracks as French trains manned by French railway men.

The American practice of operating trains by means of train dispatching and the block system was incompatible with the French practice of giving the chef-de-gare absolute authority over all trains within his territory, and of holding trains at one station until word had been telegraphed that trains on the same track had left the next station ahead. Since the chef-de-gare system was in possession, and since the French railway authorities would not set it aside or modify it, it was necessary for the American transportation department to conform to it. In consequence, it was necessary to give all American train service soldiers 30 days' training in French railway operating practice under the direction of French railway employees before they could be allowed to take trains out by themselves.

This was not the worst feature of the undiluted retention of the chef-de-gare system. As Col. Delano pointed out, it has placed a serious limitation upon the transportation capacity of the lines used at a time when increased capacity has been vitally needed. There have been negotiations between the American and French transportation officers looking to the adoption of a better system, but they have come to nothing.

When the war began the French War Department placed an official called the "Commissaire Militaire" in the office of each chef-de-gare to deal with and, indeed, direct him regarding transportation for military purposes. For a similar purpose the American transportation department created an officer unknown to railway practice in the United States—the "Railway Transport Officer." An officer having this title was placed in the office of each chef-de-gare on the principal American lines of communication, his principal task apparently being to prevent the French functionary from interfering unduly with the handling of American trains and freight cars. The term "Railway Transport Officer" was borrowed from the British, who give the title to many men dealing with the railways regarding military matters.

As Col. Delano pointed out, there are many single track lines in the United States which handle more trains with our despatching and block signal system than can be handled on double track lines in France under the chef-de-gare system. The need for increased capacity on the French railways used by our lines of communication was so great that it is probable if the war had continued much longer the American practice of operating trains with the despatching and the block systems would have had to be superimposed in some way upon the chef-de-gare system.

In justice to the chef-de-gare system, however, it must be said that, inefficient as it seems to the American railway mind, the French were operating many of the fastest trains in the world under it before the war, with a record for safety which put the record of American railways to shame.

No Adequate Study of Military Transportation

The most difficult problem with which those concerned with the conducting of transportation for the American forces in France have had to struggle has been that of effecting satisfactory and efficient working relations between the railway transportation service in the rear of the advance zone and other branches of the American Expeditionary Forces. It has been clearly recognized ever since the American Civil War, and especially since the Franco-Prussian War, that railway transportation must play a part of great and growing importance in modern war.

The War Department of the United States has a War College which has been maintained for the study and theoretical solution of the problems that arise in warfare.

Apparently, however, it never occurred to anybody in authority in our army or War Department to give any attention to the subject of modern military transportation. The Great War had been in progress in Europe two and a half years when we entered it; the railways of the contraband countries had been organized and reorganized repeatedly to meet the various and changing military requirements imposed upon

hem; but if anybody in the War Department, or the regular ırmy, or even in the army engineer corps, of the United States ıad carefully observed, reflected upon and drawn definite conclusions from what had been done with respect to transportation during the war in Europe, he has never let anybody know it.

Some years ago Brigadier-General (then Major) Connors, vrote a "Manual of Military Railways." General Connors, ıs a young man, was an employee of the Chicago and North Western at Clinton, Iowa, before he went to West Point Military Academy. He had always taken a keen and intelligent nterest in railway operation. He had studied all that had



Locomotive Repair Shop at Nevers

been done in the operation of military railways up to the time his book was written. But he recognized more clearly than anybody else, perhaps, that his book was completely out of date within a few months after the Great War began; and yet, his book was the only authoritative thing our War Department had on the subject of the organization and operation of military railways.

That serious mistakes were made and friction resulted in dealing with the problem of military transportation after we entered the war is not, therefore, very surprising.

Early Organization Based Upon False Assumptions

When we entered the war our military authorities proceeded upon an assumption derived from the experience of the Civil War and the Franco-Prussian war—viz., that military railways were to be used solely for fighting purposes; that the operation of military railways was constantly an operation of movement, and that as fast as railways which had been used for military purposes were left behind the zone of actual hostilities, they would be turned back to purely civil operation. They, therefore, made the Transportation Department a branch of the Corps of Engineers, and organized the railway troops sent to Europe into engineer regiments, with regular army officers as Colonels.

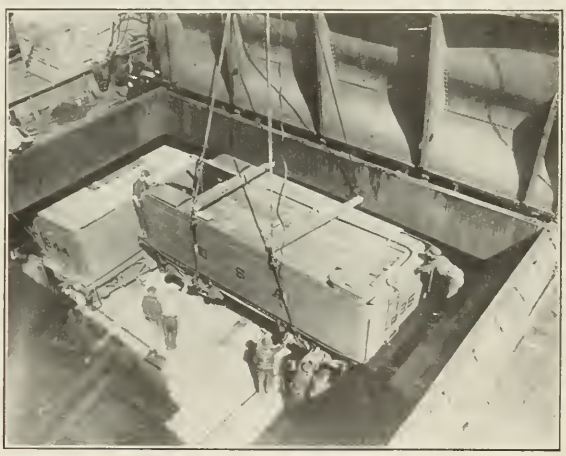
If the basic assumption that military railways were to be used solely for fighting purposes had been correct this regimental organization might have served very well. General Pershing had not been long in Europe, however, when he became convinced that it was incorrect. As already indicated in July, 1917, he appointed Col. (then Major) Wilgus to his immediate staff as Director of Military Railways. Col. Wilgus and the other members of the original American railway commission to Europe had studied and reported to General Pershing upon the transportation organization and methods used by the British and French, especially the former; and in September, 1917, General Pershing cabled to America that the best experience showed that transportation should be handled by a separate corps officered by men thoroughly versed in the commercial operation of railways. The great importance, under modern conditions, of military railways in handling supplies in the zone of the rear, as compared with their importance in aiding in carrying on hostilities in the zone of the advance, was being grasped by General Pershing.

When General Atterbury arrived in October he was made, as Col. Wilgus had been, a direct staff officer of General Pershing. The Transportation Department at that time had charge of all railway operation, and of all construction incidental to it; and it was still, theoretically, a part of the Engineer Corps. There were then nine American railway regiments in Europe, of which three had been assigned to the British, and one to the French. The members of these railway regiments were among the first American soldiers to arrive, there being only about 20,000 Americans in Europe, in July.

In the early fall a regular schedule for the movement of troops to Europe was worked out, which called for 1,200,000 men, of whom only 20,000 were to be railway troops. None of these additional railway troops had arrived in December, but they had begun to be sorely needed.

The situation with respect to the condition of freight cars had become very acute on the French railways. No cars from America were then being erected in France; and counting all cars, old and new, including those derived from Great Britain and Spain, the total cars that could be kept in service was declining. The condition of locomotives was remaining about stationary, but was far below the pre-war standard.

The French asked the Americans to furnish them 6,000 men about equally divided between locomotive repair and car repair workers. The 35th Engineer Regiment, which was then being organized for a car repair unit was expedited, and by taking from the cantonments in the United States all the suitable men that could be obtained there were secured about 500 more. Thus, by January, of the 6,000 men for which the French had asked, about 2,000 had been supplied. Mean-



Locomotive Tenders in Hold of Ship

time, none of the railway troops which had been asked for some months before had been received.

Under the defective draft system adopted in the United States no special provision was made for securing special men for the Transportation Department. Railway men were drafted into the ordinary army military units, and once they were in it was very hard to find them and get them out.

First Important Reorganization

Up to February, 1918, the Department of Transportation had under it railways, light railways, roads and inland water transportation, and the Director General of Transportation

was on the staff of the commander-in-chief. Then an important reorganization was effected. The Service of Supply was created, with a commanding general in charge. Within the Service of Supply was created a Service of Utilities, and this was divided into a Department of Construction and Forestry, and a Department of Transportation. All railway construction was taken from the Transportation Department and turned over to the Department of Construction and Forestry, leaving to the Transportation Department only the authority of designing the structures it wanted built.

Army Transport Service Transferred

In April the Army Transport Service, which had always been a branch of the Quartermaster Department, had been transferred to the Transportation Department. This did not lighten the burden of the Transportation Department, in one way since the Army Transport Service had a deplorably insufficient and disorganized force of stevedores at the ports. It was a move in the right direction, however, because it put the entire transportation of supplies, from the time ships reached their rendezvous, under a single organization.

The Transportation Department then had four branches, those of operation, construction (design), army transport service (water) and business management (including accounting, treasury and similar functions).

The entire situation was then extremely unsatisfactory. There were at that time about 15,000 railway men in France, most of them engaged in ordinary railway operation. They were, however, all organized on a regimental basis. Now, a regiment, whether an engineer regiment of 1,500 men, or an infantry regiment of 3,000, will seldom fit into ordinary railway operation anywhere. In consequence, it was necessary to break up the regiments and assign the companies composing them where they were most needed. As *railway* workers, the men, the "non-coms" and the junior officers were subject to the orders of the *railway* men in direct charge of their work. As *soldiers*, on the other hand, they were subject to the control and discipline of their colonels and other *military* officers, who in many cases were in remote parts of the country. For a time there was not even in General Atterbury's office a personnel officer, who could centralize the handling of the personnel matters of the department from a military point of view. It is hardly necessary to say that, with the Transportation Department cut off from light railways, compelled to go to the Department of Construction and Forestry to get its construction work done, etc., the situation was unsatisfactory from its point of view.

Meantime, the establishment of an independent and permanent Transportation Corps, ranking with the other corps of the regular army, was mooted. In July the so-called "Service of Utilities" died. The "Transportation Department" was changed to the "Transportation Service," reporting direct to the Service of Supply; construction and forestry were made a branch of the Engineer Corps; and a special department of light railways and roads was established at general headquarters at Chaumont. At the same time a schedule for 4,000,000 American soldiers in France was worked out. The Transportation Department reported that this should include 150,000 railway men; but the general staff cut this estimate 20 per cent.

In April there were 270,000 American troops in France; and in June there were 1,300,000. Railway troops had not been arriving in anything approaching sufficient numbers, since it was estimated that 60,000 were needed for every 1,000,000 troops. In July and August alone, however, about 15,000 railway troops were received. This created much confusion. They could not be used immediately since, as already indicated, it takes about 30 days to teach each man enough about French operating rules and methods to put him in service; and it is impracticable to take out of the service enough of the men who were already in service to train them.

By September 15, however, enough men had been trained to enable the Transportation Department to begin operating through trains, yards and terminals from St. Nazaire to the advance zone at Is-Sur-Tille. Previously our railway men had been engaged in running American trains for shorter distances, and in helping the French operate trains, yards and terminals.

Another Important Reorganization

Some time previously Major E. G. Bliss, an able, young regular army man and son of Gen. Tasker H. Bliss, was appointed personnel officer of the Transportation Service, with the title of Director of Military Railway Service. He and Capt. Baker worked out a plan for militarizing the railways in a way that would enable them better to perform their transportation function, and which at the same time would fit them better into the purely military organization. They proposed to create a "Transportation Corps" in the Service of Supply, in place of a mere "Transportation Service." They estimated that an organization to handle all American transportation when the Expeditionary Forces had increased to 4,000,000 should contain 6,669 officers and 187,150 enlisted men. This was to be distributed between 30 railway divisions, 15 grand divisions, and 30 ports. They opposed continuance of the regimental form of organization, and recommended distribution of the railway troops in companies which should be under the discipline and command of their railway superiors as to military as well as railway matters. This recommendation was approved in principle in September.

Soon after another important development occurred. Col. J. A. McCrea, formerly general manager of the Long Island Railroad, had been general manager of the Transportation Service. On October 1 he was made Deputy Director General of Transportation in the zone of the advance; and soon after General Pershing wired General Atterbury that he would expect him to be responsible for the efficient operation of the railways in the American lines of communication to the Rhine. Up to this time the Transportation Service (or Corps) had had jurisdiction only to the advance regulating storage stations at Is-Sur-Tille and Liffol Le Grand. An impenetrable veil had been drawn there, and all transportation in the zone of hostilities had been handled from general headquarters at Chaumont.

The New Transportation Corps

The results of these various changes in organization were summarized in General Order No. 52, issued by Major General Harbord, commanding general of the Service of Supply, on November 12, and in General Order No. 35, issued by Brigadier-General Atterbury, Director General of Transportation on the same date. These orders well merit reading, and even study, as they crystallized the best thought of many of those who had given the most consideration to the subject of what the organization of a system of military railways operating under the conditions of modern war should be.

In General Order No. 52 General Harbord said in part:

1. Under instructions of Commander-in-Chief, American E. F., the Transportation Corps of the American E. F. will be re-organized by the Director General of Transportation.

2. The railway lines of communication of the American E. F. will be divided into grand divisions under the command of a general superintendent who will be assisted by an adjutant, a supply officer, a personnel adjutant, and such other administrative and technical staff as may be necessary. The general superintendent will act as commanding officer of all railway troops assigned to his grand division. His duties in this connection will be the same as those prescribed in army regulations for a regimental commander.

3. The railway grand divisions will be sub-divided into railway divisions, each division to be commanded by a divison superintendent who will be directly responsible to the general superintendent of the railway grand division for the technical and the military efficiency of the troops under his command. The division superintendent will be assigned such technical and administrative staff as may be necessary by the general superintendent.

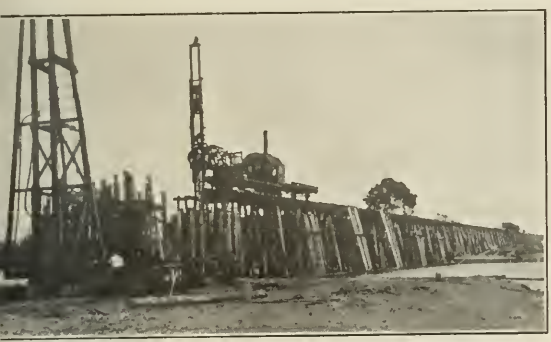
4. The large railroad shops located at Nevers, La Rochelle and St. Nazaire will be considered, so far as organization is concerned, as equivalent to a railway grand division. In each of these shops the superin-

endent will be the commanding officer of all transportation corps troops nd individuals assigned thereto, and will be assisted by an administrative taff as provided above for a general superintendent of a railway grand ivision, and such technical staff as may be necessary.

5. Each part will be considered as analagous to a railway grand division o far as organization is concerned. The general superintendent of the ort will be the commanding officer of all transportation corps troops and ndividuals assigned thereto, and will be assisted by an administrative staff s provided above for a general superintendent of a railway grand division, nd such technical staff as may be necessary.

6. All transportation corps troops engaged in the Inland Water Trans- ort Service will form a military unite under the command of the hief of Inland Water Transport Service. The duties of the Chief f Inland Water Transport Service will be the same as those prescribed for general suprintendent of a railway grand division. He will be assisted y an administrative staff as provided above for a general superintendent f a railway grand division, and such technical staff as may be necessary.

7. The transportation corps will consist of transportation corps com-



Pile Driver Over Loire River; Nevers Cut-Off

anies (railway) to be numbered serially, beginning with No. 1; transporta- on corps companies' stevedore to be numbered serially, beginning with lo. 801, and a transportation corps at large. The companies will be as- gned to station and duties by the director general of transportation in ac- ordance with the needs of his service.

8. A transportation corps company (railway) will consist of the ollowing:

Captain	1
1st Lieutenants	2
2nd Lieutenants	3
Total commissioned	6
1st Sergeant	1
Sergeants 1st Class	4
Supply Sergeant	1
Mess Sergeant	1
Sergeants	11
Corporals	20
Cooks	5
Mechanics	7
Buglers	2
Privates 1st Class	66
Privates	132
Total enlisted	250

9. A transportation corps company (stevedore) will consist of the fol- owing:

Captain	1
1st Lieutenant	1
2nd Lieutenant	1
Total commissioned	3
1st Sergeant	1
Mess Sergeant	1
Supply Sergeant	1
Sergeants	6
Corporals	12
Cooks	5
Mechanics	5
Buglers	2
Privates 1st Class	72
Privates	145
Total enlisted	250

10. A transportation corps at large is authorized to be composed of ne following enlisted grades:

M. E. S. G.	400
M. E. J. G.	600
R. S. Maj	20
B. S. Maj.	40
Sgts. 1st-cl.	840
Sergeants	800
Corporals	800
Cooks	50
Mechanics	100
Privates 1st-cl.	1000
Privates	1000

11. Officers not assigned to organizations will be considered as belonging o the transportation corps at large, and will be assigned to duties under ne direction of the director general of transportation.

12. The present regiments and battalions, t. c., will be abolished, and their personnel will be organized into companies.

13. The enlisted men of regimental headquarters and battalion headquarters who cannot be provided for in the reorganization of the companies will be transferred to the transportation corps at large, and will be carried as headquarters detachments at their present stations.

As new regiments, battalions or other organizations arrive in France and are assigned to the transportation corps they will be transferred and reorganized as outlined herein upon request of the director general of transportation.

General Order No. 35, issued by General Atterbury, was in part as follows:

HEADQUARTERS ORGANIZATIONS

The operation and maintenance of all broad gage railroads under American control; the operation and maintenance of ocean terminals and docks and appurtenances thereto; the operation of inland waterway routes and appurtenances thereto and the erection and maintenance of floating equipment, motive power and rolling stock for the American Transportation Service will be under the direction of the director general transportation.

The Director General Transportation will be assisted by the following staff:

(a) Deputy Directors General Transportation (personal staff). Such number as may be necessary.
(b) Deputy D. G. T. Railway Department of the Service of Supply.
(c) Deputy D. G. T. Railway Department of the Zone of Advance.
(d) Deputy D. G. T. with the French Ministry.
(e) Deputy D. G. T. with the C. G., Base No. 3.
(f) Director of Army Transport Service.
(g) Engineer of Construction.
(h) Business Manager.
(i) Director Military Affairs.

Deputy Directors General Transportation (personal staff) will be the personal representatives of the Director General Transportation. The senior deputy at headquarters will act for the Director General Transportation in his absence.

The Deputy Director General Transportation for the Railway Department, S. O. S., will, under the direction of the D. G. T., supervise the operation and maintenance of all broad gage lines under American control between the port terminals and the zone of advance, including equipment and structures, and will perform such other duties as may be delegated by the D. G. T. The headquarters of the deputy director for the railway department, S. O. S., will be as stated in paragraph 2.

The General Manager for the Railway Department, S. O. S., will be responsible, subject to the supervision of the deputy director general transportation, S. O. S., for the performance of such duties connected with the actual operation and maintenance of the lines of railway, equipment and



Steam Shovel (2½ yd.) Loading Dump Cars; Nevers Cut-Off

structures referred to in paragraph 6, as may be assigned to him. He will be assisted by:

(a) Assistant general managers.
(b) General superintendent motive power.
(c) General superintendent transportation.
(d) General superintendent telegraph and telephone.
(e) Engineer maintenance of way.
(f) General superintendents.
(g) Signal engineer.

The Deputy Director General Transportation, Zone of the Advance, will be charged with duties and have an organization of the S. O. S., and in addition an assistant deputy director general transportation for each American field army, whose duties will be outlined by the deputy director general transportation, zone of advance. His jurisdiction shall comprise such broad gage lines of railway as may be turned over to the transportation corps, American E. F., for operation and maintenance in the zone of the advance. The headquarters of the deputy director general transportation for the zone of the advance will be general headquarters, American E. F.

The Deputy Director General Transportation with the Ministre des Travaux Publics et des Transports will be stationed at Paris. He will represent the D. G. T., in the transaction of business between the transportation corps and the French ministry.

The Deputy Director General Transportation with the D. G. T., Base No. 3, will be stationed at London. He will perform such duties as representative of the D. G. T. as may be assigned to him.

The Director Army Transport Service will under the direction of the D. G. T. supervise the operation of all port terminals under American control, including the handling of ships and all floating plant and the transfer and delivery of supplies to the railway transportation service or to storages, the operation of inland water transport routes under American control, the movement of ocean tonnage between the port terminals of the American E. F. and England and other European countries, the distribution of shipping to the various ports of the A. E. F.; the maintenance of all port and inland waterway terminal facilities under American control, including cranes, equipment and such rolling stock and motive power as may be necessary to a port terminal operation. He will be assisted by the following staff:

(a) Deputy director A. T. S.
(b) Executive officer.
(c) General inspector.
(d) Chief of European service division.
(e) Chief of inland water transport service.
(f) Chief troop and cargo division.
(g) Chief terminal facilities division.
(h) Chief marine engineer.
(i) Chief operation division.
(j) Chief lighterage and harbor craft division.
(k) General superintendents and superintendents at port.

The Engineer of Construction will be responsible for survey, design and inspection to insure construction according to specification of all new lines of railway (broad gage), terminals, docks, shops, buildings and other structures, connected with the transportation service of the American E. F.

The Business Manager will be responsible for the procurement of supplies for the transportation corps, American E. F.; for the keeping of accounts; for the compilation of all statistics affecting transportation, and for the duties pertinent thereto and incidental therewith.

The Director of Military Affairs will be responsible for the military organization of the transportation corps, American E. F., as a whole; for the procurement and assignment of personnel, and for the keeping of such records as may be required by military authority. He shall establish and maintain liasion on military questions with the general staff and with other staff departments, and is charged with the co-ordination of the various departments of the transportation corps on military matters.

Territorial Boundaries

Geographical:

The line of demarcation between the railway department for the S. O. S., and the railway department for the zone of advance, will be established by agreement between the deputy directors general transportation for the respective zones, and may be changed from time to time to meet the needs of the service, subject to the approval of the director general transportation.

The line of demarcation between the port terminals and the contiguous railway grand divisions will be established by the director army transport service and the deputy director general transportation, S. O. S., and may be changed from time to time to meet the needs of the service, subject to the approval of the director general transportation. Nothing in this provision shall be construed as nullifying existing arrangements established pursuant to General Orders 31, Headquarters Transportation Service.

Railway Lines:

The railway lines in the zone of the S. O. S. will be divided into grand divisions as follows:

St. Nazaire and LaRochelle to Gievres.
Gievres to Is-sur-Tille.
Bordeaux to Vierzon and Bourges.
Brest to Tours.
Toulon and Marseilles to Chagny.
Tours to Sens and Cosne to Chatillon.

No designation of grand divisions will be made at this time for the zone of the advance, except that all lines radiating from Is-sur-Tille, north and east will be considered as one grand division.

Port Terminals:

The following designation of port terminals is hereby made.

Le Havre and Rouen.
Brest (group).
St. Nazaire.
Nantes (group).
La Pallice and Rochefort.
Bordeaux (group).
Marseilles (group).
London, England (group).

The organization of the transportation corps will be effected as prescribed in General Orders 52, Headquarters, S. O. S., by the commanding officers of the existing transportation corps regiments or the commanding officers stevedore troops, as the case may be, subject to the general supervision of the general superintendent of the railway grand division, port terminal, chief inland water transport service, or the suprintendent of the shop, as the case may be, in which the troops are located. The companies thus organized will be reported to the general superintendents, and superintendents of shops and chief inland water transport service. Rosters will immediately be prepared of the individual companies and forwarded to these headquarters. The company will constitute the unit for administration and record.

The general superintendent of a railway grand division, port terminal, chief inland water transport service or superintendent of a shop, will upon the completion of the reorganization, become the actual commanding officer of all transportation corps troops stationed within the territorial limits of his jurisdiction. His staff will consist of an adjutant, to be chosen from the officers under his command and of no higher rank than major; a supply officer, of rank of captain, and a personnel adjutant, of rank of captain.

General superintendents of railway grand divisions, port terminals, and chief of inland water transport service and superintendents of shops may delegate at their discretion such administrative and technical duties as they see fit to subordinate officers. This delegation of authority cannot relieve the general superintendent or chief of inland water transport service or superintendent of shop of his responsibility as commanding officer of all transportation corps troops under his jurisdiction.

Commissioned officers will not be assigned to railway grand divisions, port terminals, inland water transport service or shops according to a fixed table of organization; as far as possible each railway grand division will be provided with the necessary number of officers to carry on the technical and military functions of the particular railway grand division. This same rule will apply in the assignment of officers to port terminals, shops and inland water transport service. As far as possible these officers will be assigned to companies in accordance with tables of organization prescribed in G. O. 52, Hdqrs., S. O. S.

To create an "esprit de corps" and to simplify the designation of the transportation corps territorial commands, each railway grand division, port terminal, shop and inland water transport operation, will be given a designation "Grand Division, Transportation Corps." These numbers will be referred to only in the internal administration of the transportation corps. In all matters involving organization, equipment, administration and record, each transportation corps company will be considered as a separate unit of the army. In the same manner all individuals of the transportation corps at large will be considered as headquarters detachments of the particular territorial command in which they may be stationed.

Designation of Grand Divisions

The present railway grand divisions, port terminals, shops and inland water transport operations will become.

Ports—

St. Nazaire ..... 1st grand division, T. C.
Bordeaux (group) ..... 2nd grand division, T. C.
London, England (group) ..... 3rd grand division, T. C.
Le Havre and Rouen ..... 4th grand division, T. C.
Brest (group) ..... 5th grand division, T. C.
Marseilles (group) ..... 6th grand division, T. C.
La Pallice and Rochefort ..... 7th grand division, T. C.
Nantes (group) ..... 11th grand division, T. C.

Inland Water Transport Service—

Seine river operation ..... 12th grand division, T. C.

Railways—

Zone of advance ..... 13th grand division, T. C.
St. Nazaire and La Rochelle to Gievres ..... 14th grand division, T. C.
Gievres to Is-sur-Tille ..... 15th grand division, T. C.
Brest to Tours ..... 16th grand division, T. C.
Bordeaux to Vierzon and Bourges ..... 17th grand division, T. C.
Toulon and Marseilles to Chagny ..... 18th grand division, T. C.
Tours to Sens and Cosne to Chatillon ..... 20th grand division, T. C.

Shops—

Nevers ..... 19th grand division, T. C.
La Rochelle ..... 21st grand division, T. C.
St. Nazaire ..... 22nd grand division, T. C.

Additional grand divisions, T. C., will be established as required upon recommendation to and with the approval of the director general transportation.

General superintendents of the above mentioned grand divisions will so far as railways are concerned, immediately assign units to railway divisions.

Titles

The following titles will be adopted for the Railway Grand Division Organization:

General superintendent.
Adjutant.
Personnel adjutant.
Supply officer.
Assistant general superintendent.
Chief R. T. O.
Superintendent motive power.
Superintendent telegraph and telephone.
Engineer maintenance of way.
Accounting officer.
General road foreman of engines.
Troop movement officer.
Statistical officer.

The following titles will be adopted for the Railway Division Organization:

Division superintendent.
Adjutant.
R. T. officer.
Chief train despatcher.
Division operator.
Terminal superintendent.
Engineer maintenance of way.
Signal supervisor.
Track supervisor.
Master carpenter.
Master mechanic.
Engine house foreman.
Car repair foreman.
Foreman miscellaneous repairs.
Storekeeper.
Locomotive and air brake inspector.
Car inspector.
Trainmaster.
Terminal trainmaster.
General yardmaster.
Yardmaster.
Road foreman of engines.

The following titles will be adopted for the Port Terminal Organization:

General superintendent.
Assistant general superintendent.
Adjutant.
Personnel adjutant.
Supply officer.
Executive officer.
Finance officer.
Statistical officer.
Property officer.
Gear keeper.
Supervisor of operation.
Marine intelligence officer.
Boarding officer.
Marine superintendent (lighterage and harbor craft).
Port steward.
Marine engineer.
Superintendent troop and cargo division.
Disposition officer.
Chief stevedore.
Dock superintendent.
Dock officer.
Stevedore officer.
Warehouse superintendent.
Warehouse officer.
Terminal trainmaster.
Yardmaster.
Superintendent port terminal facilities.
Engineer inspection and maintenance.
Mechanical engineer.
Electrical engineer.

The following titles will be adopted for the Port Terminal Organization when such is subsidiary to a larger port:

Superintendent.	Disposition officer.
Adjutant.	Chief stevedore.
Executive officer.	Dock superintendent
Finance officer.	Dock officer
Statistical officer.	Stevedore officer.
Property officer.	Warehouse superintendent.
Gear keeper.	Warehouse officer.
Supervisor of operations.	Terminal trainmaster.
Marine intelligence officer.	Yardmaster.
Boarding officer.	Superintendent port terminal facilities.
Marine superintendent (lighterage and harbor craft).	Engineer inspection and maintenance.
Port steward.	Mechanical engineer.
Marine engineer.	Electrical engineer.
Superintendent troop and cargo division.	

GENERAL PROVISIONS

Nothing in this order will be interpreted as superseding provisions of former general orders of the transportation service on the question of responsibility of all commanding officers of transportation corps troops for the state of discipline, sanitation and military and professional efficiency, of the troops under their command; nor shall anything in this order be construed as superseding the existing authority and responsibilty of section or other military commanders, as provided by law, army regulations, orders and bulletins.

In the event that a grand division, T. C., as provided for in Paragraph 24 of this order, is commanded by an officer who is not senior in rank, he will issue the necessary orders by direction of the general manager, or director of army transport service, as the case may be.

Under this organization the principal officers were as follows. Where more than two names are given in brackets for one office, the men named have successively held that office:

Director General of Transportation	Brig. Gen. W. W. Atterbury.
Deputy Director General of Transportation	Col. W. J. Wilgus. Col. M. C. Kennedy. Lt. Col. F. A. Delano. Col. J. A. McCrae. Col. G. T. Slade.
Assistant Deputy Director General	Col. H. C. Nutt.
Director of Army Transport Service	Col. R. E. Wood. Lt. Col. H. B. Moore. Brig. Gen. Frank P. McCoy.
Engineer of Construction	Col. H. C. Booz. Col. H. M. Waite. Lt. Col. A. W. Hudson.
Business Manager	Col. C. M. Bunting. Lt. Col. I. A. Miller.
General Manager of S. O. S.	Col. F. Mears.
General Manager of Zone of the Advance	Col. H. H. Adams.
Assistant General Manager S. O. S.	Col. F. G. Robbins.
General Superintendents	Lt. Col. E. Stenger. Lt. Col. Hinkle. Major Alex. Woodruff. Major Taylor. Lt. Col. B. L. Bugg. Major E. H. Shaughnessy.
Signal Engineer	Major Vandersluis.
Port Terminal Superintendents	Capt. R. C. Stone. Major John A. McDonald. Lt. Col. C. A. Stern. Lt. Col. F. W. Green. Lt. Col. G. T. Newbury. Lt. Col. J. H. Elliott. Major T. R. Ryan. Major W. D. Wells.
Inland Water Transport Director	Lt. Col. L. E. Lyon.
Shop Superintendents	Lt. Col. G. S. Gaskill. Lt. Col. George H. Vincett. Major McDonnell.
General Manager's Staff in the S. O. S:	
General Superintendent Motive Power	Col. H. H. Maxfield.
General Superintendent Transportation	Col. D. C. King
Engineer Maintenance of Way	Major Dilman.
Superintendent Telegraph and Telephone	Major E. R. McFarland.
Army Transport Service Staff	
Director General Army Transport Service	Lt. Col. E. B. Cushing.
Executive Officer	Major O. D. Miller.
Superintendent Troops and Cargo	Lt. Col. Coates.
Chief of Operations Division	Lt. Col. Coates.
Chief Inspector	Major D. W. McCormick.
Chief Marine Engineer	Major George C. Cook.
Chief of Terminal Ports Division	Lt. Col. R. W. Stovel.
Chief of Lighterage and Harbor Craft Div	Lt. Com. H. W. Barstow.
Chief Personnel Officer Trans. Corps	Major C. A. Lohr. Major E. G. Bliss.
Director of Military Affairs	Major E. G. Bliss.

Col. Wilgus is really senior deputy director general. Col. Kennedy, as already indicated, was located in London. The duties of Col. Slade (formerly vice-president of the Northern Pacific) correspond to those of a vice-president in charge of operation. Col. McCrea is deputy director general in the zone of advance. Lt. Col. Delano (formerly president of the Wabash and later of the Monon), who was the latest arrival among the higher officers, is located in Paris, and handles relations with the higher officers of the French railways. Col. Nutt (formerly general manager of the Salt Lake Route) is assistant to Col. McCrea in the zone of the advance.

It will be noted that this organization restricted the Transportation Corps to standard gage railways, ports and inland waterways. Light railways and motor transport were left in other branches of the service. It even continued the rule of confining the construction department of the Transportation Corps to the designing of the structures it needed, their actual construction being left in the hands of the construction and forestry branch of the Engineer Corps. Under this arrangement the construction plans of the Transportation Corps had first to be submitted to the Construction and Forestry branch, and if it approved them, to the French railway authorities.

Those approved by the French were then returned to the Construction and Forestry Department. This department did all construction work for the Expeditionary Forces on a priority schedule, and railway and port projects had to take their turn with it. It was thought desirable by the general staff to have all construction work for the army concentrated in a single department largely because labor for construction purposes was inadequate and it was believed that it would be most satisfactorily distributed among the different classes of projects if all construction work was in charge of a single department.

One of the interesting and important facts regarding the numerous railway storage and other structures which have been constructed by our forces in France is that they have been built without any agreements or contracts with the French as to their disposition after the war. It is assumed that the French will desire to acquire many of them, but on what basis they shall be paid for has never been determined. It may be said that the French should pay what they have cost. They are likely to take the position that many of the structures are not suited to their need in time of peace. Furthermore, it is going to be very difficult to determine what has been the actual cost of the work which has been done. It has been done by soldiers for soldiers' pay. In some cases the soldiers have been workmen experienced in the kind of work done; in most cases, by soldiers who were not experienced workmen, and many of whom did not relish the tasks they were required to perform. On what basis should the cost of such labor be computed? Again, the materials used were bought in America at high prices, and taken to Europe in ships owned or chartered by the United States Government. On what basis should the cost of these materials be computed?

The problem of determining on what basis the French should pay for the structures built by our soldiers, and for our locomotives and cars, if they decide to take them, is an extremely complicated and difficult one. Meantime, the French are engaged in preparing a bill for the use of their land, railways, and so on, by our forces; and whatever may be their true opinions, their railway representatives are endeavoring to make it clear that they do not even like our railway rolling stock. In the end, a large bill will be presented by each side to the other, and it will require long negotiations to reach a settlement.

Considering all the conditions, the American Transportation Corps has done a remarkable work in Europe, and it would have been possible to appreciate much better the energy and genius that were being devoted to its work if the war had gone on some months longer, and the large plans that had been made for conducting its work had been more fully carried out.

The writer is under obligations to several of the officers of the Transportation Corps for having put information at his disposal, and especially to General Atterbury, Col. Wilgus, Col. M. C. Kennedy, Lieut. Col. F. A. Delano, Major W. S. Franklin, Major E. G. Bliss, director of military affairs; and Capt. J. D. W. Melvin, historical officer of the Transportation Corps. Maj. Bliss is a West Point and regular army man, and Capt. Melvin until the war was a daily newspaper man, but both during their service in the Transportation Corps have acquired a broad knowledge of railway matters. The writer also acknowledges kind co-operation and assistance from Brigadier-General Conners, Chief of Staff to the Commanding General of the Service of Supply.

Railway Supply Heads in War-Time Activities

Performed Important Service in Army, on Shipping Board and on War Industries Board

LIKE THE RAILROADS, railway supply companies contributed large numbers of men of all classes to the fighting forces and other direct war activities of the country. A host of these won marked distinction in various fields of patriotic endeavor, but because of lack of space it has been necessary to limit this article to a discussion of the direct war work performed by the presidents and chairmen of boards of railroad materials industries in the United States. The high quality of the services rendered by these men is typical of that which characterized the efforts of other members of the supply fraternity, in all branches of the industry.

The greatest number of railway supply executives who entered government service joined some division of the army, usually as commissioned officers. Our records show that at least 11 joined the military branch, seven served on the War Industries Board, three on the Emergency Fleet Corporation, and two with the American Red Cross.

Charles M. Schwab, chairman of the Bethlehem Steel Company and director general of shipping of the United States Shipping Board Emergency Fleet Corporation during the war, was one of the most prominent men before the public during the conflict. The results he achieved for the government are well known. Another of the most powerful officials in the country during the war was J. L. Replogle, president of the American Vanadium Company and chairman of the Wharton Steel Company, who was director of steel supply of the War Industries Board. With him rested the final decision as to the allocation of steel among the consuming industries of the country.

Another important officer of the Emergency Fleet Corporation was drawn from the ranks of the supply industry. Charles Piez, president of the Link Belt Company, Chicago, was made vice-president of the Fleet Corporation in the latter part of 1917, vice-president and general manager in August, 1918, and director general of shipping recently, to succeed Mr. Schwab. Another Chicago man, Edward F. Carry, president of the Haskell & Barker Car Company, served as director of operations of the United States Shipping Board from October, 1917, until July, 1918, when he was appointed chairman of the Port and Harbor Commission.

The large cantonment construction projects which were brought to completion in record time were built under the direction of a railway supply man. Warren R. Roberts, president of Roberts & Schaefer Company, Chicago, was placed in charge of the Construction Division of the army which did this work in the summer of 1917. He was promoted from major to lieutenant-colonel in May, 1918.

Samuel P. Bush, president of the Buckeye Steel Castings Company, Columbus, Ohio, was during the period of the war director of the Facilities Divisions, War Industries Board and chairman of the Division of Forgings, Guns, Small Arms and Small Arms Ammunition. J. Rogers Flannery, president of J. Rogers Flannery & Co., Pittsburgh, was chairman of the Committee on Railway Supplies of the War Industries Board. The secretary of the Committee on production of that board was J. M. Hansen, president of the Standard Steel Car Company, Pittsburgh.

The splendid work done by American railroad engineers in the construction of new lines in France is common knowledge, but it is not so generally known that a railway supply man assisted the director general of military railways, who was in charge of that work, throughout the period of the war. E. N. Sanctuary, president of the Oxy-Acetylene Appliance Company, served in the office of S. M. Felton at Washington, when the latter was organizing railway engineering units for service abroad. Mr. Sanctuary was commissioned major in the Engineer Officers Reserve Corps.

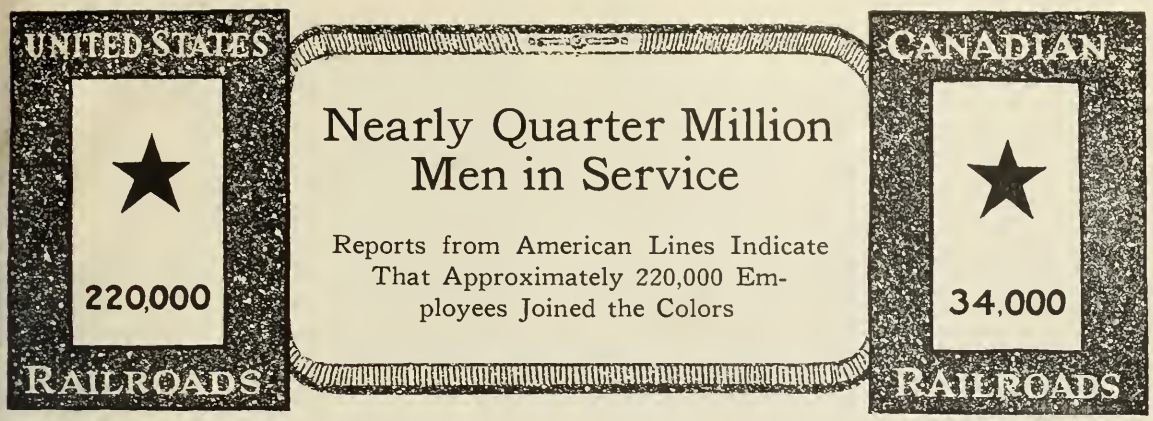
J. M. Hopkins, chairman of the board of the Camel Company, Chicago, served as a member of the Priorities Committee of the War Industries Board at Washington, and in that capacity handled all export matters except those for Japan and for the allied governments having war missions.

Guy E. Tripp, chairman of the board of the Westinghouse Electric & Manufacturing Company, New York, was at first commissioned colonel in the production division of the Ordnance Department of the army, and was later promoted to the rank of brigadier-general and placed in control of the offices having charge of the production of ordnance material in their respective sections of the country. Other railway supply executives who served in the army include Cameron C. Smith, chairman of the Union Steel Casting Company, Pittsburgh, who was a major in the Ordnance Reserve Corps; W. K. Palmer, president of the W. K. Palmer Company, Kansas City, Mo., major in the Engineers Corps; E. A. Simmons, president of the Simmons-Boardman Publishing Company, regional constructing quartermaster, with the title of major; Lincoln Bush, consulting bridge engineer, New York, colonel in the Construction Division Quartermaster's Corps; Robert F. Carr, president of the Dearborn Chemical Company, Chicago, major, Department of Purchases, Storage and Traffic; W. W. Coleman, president of the Bucyrus Company, South Milwaukee, Wis., special representative in the office of the Chief of Ordnance, Washington, D. C.; and Warren Corning, president of Warren Corning & Co., Chicago, aide-de-camp to the chief of engineers of the United States Army, with the rank of captain.

Robert Patterson Lamont, president of the American Steel Foundries, Chicago, responded to the call of the government by assuming the duties of assistant chief in the Procurement Division of the Ordnance Department at Washington, with the rank of lieutenant-colonel. Later he was promoted to division chief of ordnance.

A. L. Humphrey, president of the Union Switch & Signal Company and vice-president and general manager of the Westinghouse Air Brake Company, Pittsburgh, served throughout the war as a member of the Labor Advisory Committee of the Council of National Defense. Alexander C. Brown, president of the Brown Hoisting Machinery Company, Cleveland, Ohio, was chief of the Locomotive Crane Section and assistant to the commissioner of finished products on the War Industries Board. Sheldon Carey, president of the Browning Company, Cleveland, was chairman of the committee of the War Industries Board which was charged with the responsibility for keeping up the production of locomotive cranes in this country early in the war.

Otis Cutler, chairman of the American Brake Shoe & Foundry Company, New York, served the American Red Cross at Washington as director of the Bureau of Insular Possessions. F. A. Poor, president of the P. & M. Company, Chicago, was also in the service of the Red Cross. W. W. Boyd, president of the Unit Construction Company, St. Louis, Mo., was with the Emergency Fleet Corporation during the war.



Nearly Quarter Million Men in Service

Reports from American Lines Indicate That Approximately 220,000 Employees Joined the Colors

APPROXIMATELY 220,000 railroad men, or 12 out of every 100 employed on the railroads in the United States, responded to their country's call for defenders in its time of need. Data recently received from 190 roads, representing a combined operated mileage of 186,488, or 67 per cent of the mileage of the country, show that 152,450 railroad officers and employees had left the service to join the colors. Assuming that the remaining lines of the United States contributed a proportionate number of men to the army and navy, over 74,000 additional honor men are accounted for. Reports received from roads representing 78 per cent of the country's mileage just one year ago indicated that nearly 71,000 railway men had joined the armed forces of the nation up to that time. Enlistments were much heavier in 1918, being twice the number for the first year of our participation in the war.

The railroads of Canada, which bore the burdens of war much longer than this country, also made enviable records, contributing approximately 34,000 men to the conflict. The Canadian Pacific system gave 9,661 to fight the cause of the Dominion and the Grand Trunk system has 4,846 stars on its service flag, 816 of which represent enlistments in the United States military and naval forces.

Some individual American lines were exceptionally heavy contributors to the nation's armed forces. The Pennsylvania system leads with a total of 24,487 in service at the conclusion of hostilities, or 15,468 more than at the end of the year 1917.

The New York Central system reported that 15,374 officers and employees had joined the army or navy during the war, as compared with a total of 7,143 who had enlisted up to the end of 1917. The Illinois Central system is third in rank with enlistments totalling 8,775, or 6,859 in excess of the number on the service flag a year ago. The Baltimore & Ohio system reports an honor roll of 5,731 as compared with 1,760 at the end of 1917.

Other roads which gave large numbers of employees to the colors are the Chicago & North Western, 5,386 men (1,573 in 1917); the Atchison, Topeka & Santa Fe, 5,383 men (3,000 in 1917); the Union Pacific system, 5,333 (2,008 a year ago); the Southern Pacific, west of El Paso, 5,142 (1,874 in 1917); the Chicago, Burlington & Quincy, 4,874 (1,486 in 1917); the Chicago, Milwaukee & St. Paul, 4,000 men (1,645 a year ago); the Rock Island system 3,838 (1,457 in 1917). The remaining lines with honor rolls containing more than three thousand names are as follows: the Erie, 3,576 (1,375 in 1917); the Northern Pacific, 3,543 (1,638 in 1917); the Boston & Maine, 3,284 (1,201 in 1917); the New York, New Haven & Hartford—including the Central New England—3,199 (1,446 in 1917), and the Philadelphia & Reading, 3,000 men (1,283 in 1917).

The following is a partial list of the roads and the number of their employees who entered military or naval service:

AMERICAN LINES.

Name of railroad	Number of employees in military or naval service
Abilene & Southern	3
Ahnapee & Western	72
Alton & Southern	10
Alabama, Tennessee & Northern	37
Apalachicola Northern	45
Arizona Eastern	146
Atchison, Topeka & Sante Fe	5,383
Atlantic Coast Line	2,150
Augusta Southern. (See Georgia & Florida.)	
Baltimore & Ohio	5,478
Baltimore & Ohio, Chicago Terminal	253
Bangor & Aroostook	154
Beaumont & Great Northern and Trinity Branch of M., K. & T. of Texas	47
Belt R. R. of Chicago	215
Bessemer & Lake Erie	418
Birmingham & Northwestern	10
Boston & Albany	558
Boston & Maine	3,284
Buffalo Creek	10
Buffalo, Rochester & Pittsburgh	850
Central Indiana	15
Central New England. (See N. Y., N. H. & H.).	
Central of Georgia	750
Central of New Jersey	720
Central Vermont	248
Charlotte Harbor & Northern	16
Chesapeake & Ohio (east of Louisville)	2,470
Chesapeake & Ohio of Indiana	312
Chicago & Eastern Illinois	1,169
Chicago & North Western	5,386
Chicago & Western Indiana	174
Chicago, Burlington & Quincy	4,874
Chicago Great Western	958
Chicago Heights Terminal. (See Baltimore & Ohio Chicago Terminal.)	
Chicago, Indianapolis & Louisville	356
Chicago Junction	300
Chicago, Milwaukee & St. Paul	4,000
Chicago, Ottawa & Peoria	29
Chicago, Rock Island & Pacific (including Chicago, Rock Island & Gulf)	3,838
Chicago, St. Paul, Minneapolis & Omaha	1,127
Chicago, Terre Haute & Southeastern	150
Cincinnati, Indianapolis & Western	138
Cincinnati, Lebanon & Northern	40
Cleveland, Cincinnati, Chicago & St. Louis	1,986
Clinton, Davenport & Muscatine	7
Colorado & Southern	287
Colorado, Wyoming & Eastern	6
Columbia, Newberry & Laurens	30
Copper River & Northwestern	50
Davenport, Rock Island & Northwestern	10
Delaware & Hudson	1,253
Delaware, Lackawanna & Western	2,289
Denver & Rio Grande	719
Detroit, Toledo & Ironton	206
Duluth & Iron Range	316
Duluth & Northern Minnesota	11
Duluth, Missabe & Northern	367
Duluth, South Shore & Atlantic and Mineral Range	275
Durham & Southern	9
East Broad Top Railroad & Coal Co	10
East Carolina	5
Elgin, Joliet & Eastern	1,026
El Paso & Southwestern	345
El Paso Union Passenger Depot Co.	5
Erie	3,576
Evansville & Indianapolis	35
Fairchild & Northeastern	1
Flint River & Western	8
Fort Worth & Denver City	78
Gainesville Midland	7

Name of Railroad	Number of employees in military or naval service
Galveston, Houston & Henderson	7
Georgia & Florida and Augusta Southern	94
Georgia Northern	27
Georgia Coast & Piedmont	15
Grand Rapids & Indiana	43
Grand Rapids, Grand Haven & Muskegon	21
Great Northern	2,550
Gulf, Texas & Western	14
Hocking Valley	454
Houston & Brazos Valley	3
Houston & Texas Central	131
Hudson & Manhattan	259
Illinois Central (including Yazoo & Mississippi Valley)	8,775
Illinois Southern	56
Illinois Terminal and Missouri & Illinois Bridge and Belt	16
Indiana Harbor Belt	410
Indianapolis Union	80
International & Great Northern	215
Kanawha & Michigan and Kanawha & West Virginia	255
Kansas City Northwestern	272
Kentucky & Indiana Terminal	98
Kentwood & Eastern	21
Lake Charles & Northern	10
Lake Erie & Eastern	23
Lake Erie & Western	323
Lehigh & Hudson River	56
Lehigh & New England	130
Lehigh Valley	2,049
Litchfield & Madison	14
Long Island	725
Lorain, Ashland & Southern	12
Los Angeles & Salt Lake	388
Louisiana & Northwest	52
Louisville Bridge & Terminal	39
McCloud River	8
Maine Central (including Portland Terminal)	887
Michigan Central	1,863
Mineral Range. (See Duluth, South Shore & Atlantic.)	
Minneapolis & St. Louis	674
Minneapolis Eastern	1
Minnesota Transfer	171
Mississippi River & Bonne Terre	44
Missouri & Illinois Bridge & Belt. (See Illinois Terminal.)	
Missouri, Kansas & Texas (north of Red River)	706
Missouri, Kansas & Texas of Texas	644
Mobile & Ohio	808
Monongahela	45
Monongahela Connecting	130
Nevada-California-Oregon	27
Nevada Northern	59
New York & Long Branch	22
New York Central	9,321
New York, Chicago & St. Louis	517
New York, New Haven & Hartford (including Central New England)	3,199
New York, Ontario & Western	385
Norfolk & Portsmouth Belt Line	32
Norfolk & Western	2,461
Northern Pacific	3,543
Northwestern Pacific	241
Ocean Shore	4
Ohio River & Western	12
Oklahoma Railway	95
Oregon Electric. (See Spokane, Portland & Seattle.)	
Oregon Short Line	1,369
Oregon-Washington Railroad & Navigation Lines	954
Oregon Trunk. (See Spokane, Portland & Seattle.)	
Pacific & Idaho Northern	6
Pennsylvania Lines West of Pittsburgh	6,624
Pennsylvania Railroad—Eastern Lines	16,831
Philadelphia & Reading	3,000
Pittsburgh & Lake Erie	750
Pittsburgh & West Virginia and West Side Belt	75
Rio Grande Southern	20
Richmond, Fredericksburg & Potomac and Washington Southern	375
Rock Island Southern	37
Rutland	181
St. Joseph & Grand Island	160
St. Louis National Stock Yards Railroad	13
St. Louis Southwestern of Texas	117
St. Louis, Troy & Eastern	13
St. Paul Bridge & Terminal	10
St. Paul Union Depot	67
Salina Northern	2
San Diego & Arizona	62
San Francisco-Oakland Terminal Railways	162
Sibley, Lake Bisteneau & Southern	2
South Georgie	10
Southern Railroad in Mississippi	73
Southern Pacific (west of El Paso)	5,142
Southern Railway	5,487
Spokane, Portland & Seattle (including Oregon Trunk and Oregon Electric	213
Staten Island Rapid Transit	250
Susquehanna & New York	7
Terminal Association of St. Louis and affiliated lines	600
Texas & Pacific	790
Tidewater Southern	3
Toledo & Ohio Central and Zanesville & Western	466
Toledo, Peoria & Western	66
Toledo, St. Louis & Western	210
Toledo Terminal	21
Tonopah & Tidewater	11
Trans-Mississippi Terminal	143
Trinity & Brazos Valley	37
Ulster & Delaware	51
Union Pacific	2,850
Utah Railway	6
Wabash	1,634
Washington & Old Dominion	44
Washington Southern. (See Richmond, Fredericksburg & Potomac.)	
Weatherford Mineral Well. & North Western	
West Side Belt. (See Pittsburgh & West Virginia.)	
Western Pacific	42
Wheeling & Lake Erie	248
Wichita Falls & Northwestern	62
Wichita Valley	13
Wisconsin & Michigan	9
Woodworth & Louisiana Central	1
Yazoo & Mississippi Valley. (See Illinois Central.)	
Zanesville & Western. (See Toledo & Ohio Central.)	
CANADIAN LINES	
Atlantic, Quebec & Western	10
Algoma Central & Hudson Bay	38
Canadian Government Railways	2,409
Canadian Northern	3,500
Canadian Pacific	9,661
Grand Trunk Railway System	4,846*
Quebec Oriental Railway	12

*Of this number, 816 cover enlistments in U. S. Army and Navy; the balance, Canadian Expeditionary Forces.

A Bill to Render Justice to Contractors

REPRESENTATIVE S. HUBERT DENT, JR., of Alabama, on December 7 introduced a bill in Congress to provide relief where formal contracts have not been made in the manner required by law for contractors who have undertaken work for the government during the war emergency. The bill was referred to the Committee on Military Affairs and on December 19 was reported with an amendment back to the house, but has not yet been passed. The bill provides that Congress authorize the secretary of war to pay or discharge any agreements, expressed or implied, made in good faith by any officer or agent for the acquisition of land or materials when the agreement has been executed in whole or in part, or where expenditures have been made or obligations incurred in good faith. The bill protects the government against fraud and is not a bar to the recovery of money if the government has been defrauded.

The following letter has been sent out by the Symington Chicago Corporation, Symington Machine Corporation, Symington-Anderson Company, Symington Forge Corporation, and the 75 mm. Shell Association, American Fuse Manufacturers' Association, Committee on Boosters and Adapters:

1. On November 25, 1918, Comptroller Warwick ruled:

"There are in the hands of contractors many informal papers, such as *letters, purchase orders, procurement orders*, etc. These papers generally are intended to be and are preliminary to the execution of contracts. *In themselves they place no obligation on the government.* The latter may be liable on a *quantum meruit* for the fair value of articles delivered and accepted, but it has no legal obligation for expenses incurred, value of incomplete work, material on hand or arranged for, etc., unless a contract in legal form has been made. Of course, it is understood a legal contract can not be made now for articles the government does not need, and this is true regardless of prior negotiations or understandings, written or oral."

2. The claims board and the district ordnance offices have ruled that the government will deal only with prime contractors.

This means that, instead of checking the sub-contractors' claims in advance, the government wants the prime contractors to settle with the sub-contractors, and assume the risk that such settlement would later be approved by the government.

3. Only legislation by Congress can relieve the situation created by the comptroller's ruling.

4. If, as we believe, the government will ultimately have to check sub-contractors' claims before repaying to the prime contractors their disbursements on this account, why should not this government checking be done now, before the sub-contractors' material is stored and their cost records scattered?

We believe that pressure should be brought on the claims board to check sub-contractor's claims now.

5. In order to impress Congress and the country with the importance of immediate action if industrial disaster is to be averted, a meeting of prime and sub-contractors on government work will be held at the Hotel Cleveland, Cleveland, Ohio, on Friday, January 3, 1919, at 11 a. m., for the purpose of, (*a*) adopting a resolution requesting Congress to pass legislation at once legalizing payment on so-called informal contracts; (*b*) of urging on the claims board that claims of sub-contractors be checked and approved by government accountants immediately.

Railway Revenues and Expenses in 1918

Record Breaking Revenue But Net Income Nearly $250,000,000 Under Government Guarantee

By Julius H. Parmelee
Chief, Bureau of Railway Economics

TEN YEARS HENCE the railway historian will analyze the results of the year 1918 with a perspective born of full knowledge of intervening events. He will review the vents of 1918 in their proper relationship to preceding and ucceeding years. To those of us, however, who glance back-ard over the year as we cross the threshold into 1919, the ask of interpreting its ecord of swift changes s doubly difficult; dif-icult both because 918 was a year of nique and unprece-lented happenings, nd because we cannot et see how it will be inked with the years hat are ahead.



Julius H. Parmelee

In particular, discus-ion of the financial re-ults of 1918 is made ifficult by appear-nce for the first time n American railway istory of a govern-nental guarantee of et income. The in-ection of this and ther accompanying factors into the situation leads to several esults: for one thing it makes comparison with earlier eriods of less significance, inasmuch as the year's net in-ome is fixed and predictable months in advance of Decem-er 31; for another, it renders the aggregates of revenue and xpense less susceptible to analysis, since the rates underly-ng railway revenues and the wages and prices underlying ailway expenses have been subjected to such unnatural and udden changes that the revenue and expense totals have emporarily ceased to serve as adequate standards of traffic nd operation; still again, emphasis has shifted from con-ecture regarding the amount of net income—for that is now ixed—to estimate of the amounts which the government will e called upon to turn over to railway corporations under its uarantee. Bearing in mind these difficulties and changes in mphasis, let us turn to the finances of the American rail-ays, as set forth in their revenue and expense accounts for 918, and interpret them as best we may in the light of ex-sting information and potential developments.

Briefly stated, the year 1918 was one of record revenues nd record expenses, but with net income lower than for any ear since the fiscal year 1915, and nearly $250,000,000 nder the annual amount guaranteed by the Railroad Control ct of March 21, 1918.

Railway revenues and expenses for 1918 broke all records. evenues approached the five billion-dollar mark, while xpenses reached almost to four billions. Railway revenues ad crossed the four-billion-dollar line for the first time in 917; during 1918 they increased over $800,000,000 above he 1917 total. Not only was the 1918 aggregate a record, ut the increase of five-sixths of a billion dollars over the receding year was the greatest single year's increase in the istory of American railways. Similarly, operating expenses surpassed all other years both in aggregate amount and in the amount of increase during the year. Railway expenses for 1918 amounted to nearly four billions, whereas in 1917 they had been $2,854,000,000; the increase of one and an eighth billions over 1917, as in the case of revenues, was a record for the increase of a single year.

Normal taxes, exclusive of special war levies, increased to $190,000,000 in 1918, also a record. This was about $10,-000,000 more than the normal taxes charged against railway income in 1917. The exact amount of war taxes paid by the railways in 1917 has not been reported by the Interstate Commerce Commission; the total was probably in the neighborhood of $40,000,000; what will finally be charged against the railway income of 1918 depends on two factors not as yet fully determined, namely, the tax rate applicable under the war revenue bill now pending in Congress, and the extent to which railway companies are able to charge the special levies of 1917 and 1918 in the income accounts of those two years. The war taxes payable by the railways on their income for 1918 will be a charge against the railway corporations, while normal taxes are met by the United States Railroad Administration before arriving at the net income guaranteed to the roads.

The final resultant of the year's operations was that net income, the "standard return" as defined by the Railroad Control Act, declined from $974,000,000 in 1917 to $687,-000,000 in 1918, a decrease of $287,000,000, or thirty per cent. This $687,000,000 is nearly $250,000,000 less than the average net income of the same roads during the three-year test period, which formed the basis of the government's guarantee. In other words, the United States Railroad Administration will be called upon to make up a deficiency of that amount out of government funds.

The statistical data presented in the foregoing paragraphs are set forth in somewhat greater detail in Table I, which is a comparative income account of the railways of Class I, or so-called "million-dollar" roads, (including switching and terminal companies), for the years 1917 and 1918. The aggregates for 1918 are necessarily estimated in part, as only preliminary returns for November are available as this review is written, and only partial returns for December. The tax entry for 1917 is also estimated in part, owing to the fact already noted that the Interstate Commerce Commission has not yet reported the war taxes of that year.

TABLE I

Item	1918	1917	Increase or decrease: Amount	Increase or decrease: Per cent
Operating revenues	$4,880,000,000	$4,043,000,000	$837,000,000	20.7
Operating expenses	3,975,000,000	2,854,000,000	1,121,000,000	39.3
Net revenue	905,000,000	1,189,000,000	d 284,000,000	d23.9
Taxes	190,000,000	180,000,000	10,000,000	5.6
Net rental balances	Dr. 28,000,000	Dr. 35,000,000	7,000,000	20.0
Net operating income	687,000,000	974,000,000	d 287,000,000	d29.5

d = Decrease.

Discussing first the year as a whole, the facts that press for attention are the great increase in revenues, the still greater increase in expenses, and the resultant decline of $287,000,000 in net operating income. Revenues increased $837,000,000; every month except January showing an increase over the corresponding month of 1917. Table II makes it clear that the monthly increases were accelerated

from January up to August and September, due largely to the speeding up of war traffic during the spring and summer months, while there was a slackening during the later months of the year. The general rate increases made effective in March and during June played their part, of course, in the increased revenues, especially during the last half of the year from July to December.

TABLE II

Month	Operating revenues (000 omitted) 1918	1917	Increase
January	$285,084	$300,841	d $15,760
February	289,684	265,362	24,322
March	365,912	317,150	48,762
April	370,615	319,328	51,287
May	378,242	345,904	32,338
June	393,309	349,670	43,639
July	468,380	348,394	119,986
August	502,760	366,224	136,536
September	488,136	358,798	129,338
October	489,500	381,000	108,500
November	445,000	355,000	90,000
December	403,500	335,500	68,000
Twelve months	$4,880,122	$4,043,174	$836,948

The principal rate increases of the year 1918 were the 25 per cent flat increase in freight rates made effective by the director general on June 25, and the general passenger rate increases of June 10. Passenger rates were increased to three cents a mile wherever they were below that figure, while an additional tariff of half a cent per mile was added to the passenger charge when the traveller carried a Pullman ticket. This extra tariff on Pullman travel was removed on December 1. On March 25, the Interstate Commerce Commission made effective in Official Classification Territory a large part of the increases not already allowed in the course of the Fifteen Per Cent Case; on June 22 the Commission granted a 10 per cent increase in express rates, the railroads' proportion of which increased in similar ratio. These principal increases, together with many minor adjustments and some changes in accessory charges, accounted for probably not less than $600,000,000 of the total increase in revenues, amounting to $837,000,000. The balance came from increase in traffic, which was relatively greater in the passenger than the freight service.

Passenger-miles increased approximately 15 per cent, a large part of this increase representing troop movements. In other words, what may be termed normal passenger travel remained almost stationary. Troop movements were especially heavy in the summer months, but grew less extensive during the later months of the year, both on account of the armistice of November 11 and on account of restriction of railway travel made necessary by the influenza epidemic. This last factor also affected normal travel, especially in October and November. December travel showed a number of vagaries; consolidated troop movements were heavy, and there was also a large movement of discharged soldiers returning home on their own account. These men received a reduced rate of two cents per mile, so that the revenue derived from their travel was not so great, relatively, as from other classes of passengers. Probably half a million discharged soldiers returned to their homes during December. Normal travel was also heavy in December. The increase in passenger travel during 1918, all classes combined, produced revenue well above $100,000,000, possibly close to $150,000,000.

Freight traffic, up to October, was only slightly greater than during the corresponding period of 1917. What increase may have occurred during the last two months of the year, together with the increases up to October, probably brought into the treasuries of the federal roads an amount approaching $100,000,000.

Revenue from the carriage of mail showed a slight but consistent decline throughout the year, the total decrease approaching five millions. Express revenue increased nearly $25,000,000.

Railway operating revenues for 1918 have been estimated above at $4,880,000,000. These were distributed among the several classes of service as follows:

Freight revenue	$3,400,000,000
Passenger revenue	1,040,000,000
Mail	55,000,000
Express	130,000,000
All other	255,000,000
Total revenues	$4,880,000,000

The increase in the various forms of railway revenue, reduced to the basis of percentages of increase over the year 1917, are shown by months in Chart I.

Operating expenses as a whole increased $1,121,000,000 in 1918. In some respects this increase over the already heavy expense of 1917 stands out as the one significant feature of the year's operations. The rate of increase was nearly 40 per cent as compared with 1917, and 67 per cent as compared with 1916. The increase was due primarily to increased wages, secondarily to the higher cost of fuel and other supplies, and finally to the additional costs brought about by heavier traffic.

Wage increases accounted for considerably more than half of the total increase in expenses. Five general wage in-

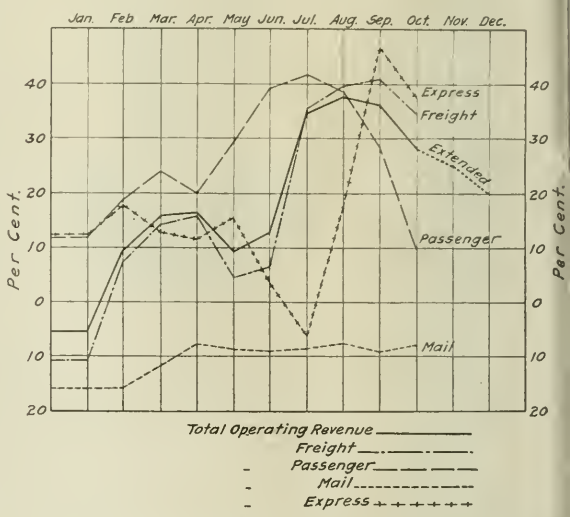


Chart 1—Rate of Increase or Decrease of General Revenue Accounts by Months, 1918 Compared with 1917. Only Decrease Was for Mail

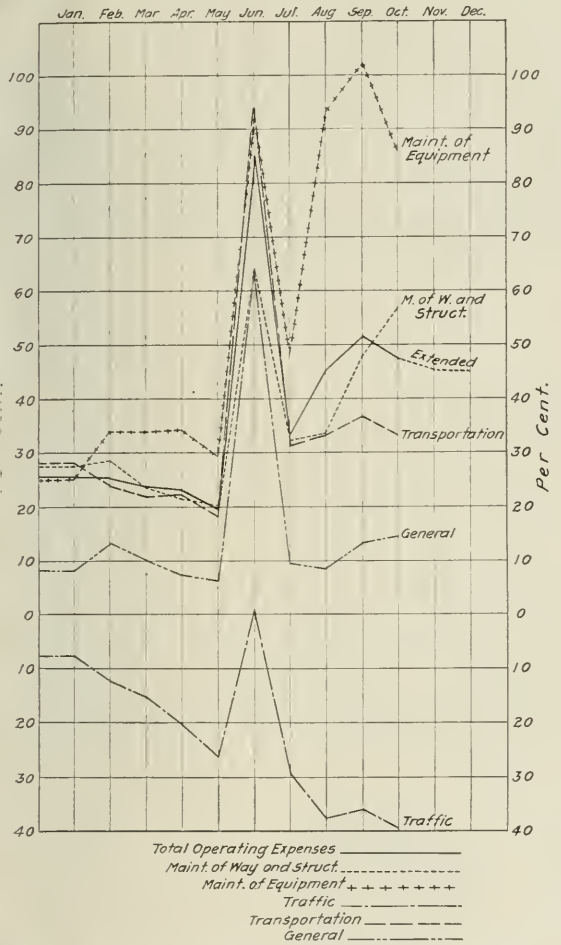
creases were granted by the director general of railroads during 1918, and there were many minor and local adjustments as well, virtually all of them in the upward direction. The principal increases, together with the annual amounts which they are roughly estimated to have added to the railway payroll, were as follows.

A general increase to all railway employees receiving less than $250 per month was granted by General Order No. 27, promulgated May 25. This increase was retroactive to January first, and represented a payroll addition estimated from $300,000,000 to $350,000,000 per year. The second principal increase, also retroactive to January 1, was that to shopmen announced on July 25. This increase has been estimated at not less than $125,000,000 per year. The third and fourth increases were made effective September first, and affected the wages of maintenance of way employees and of clerks, respectively. These two increases aggregated some $150,000,000 per year. The fifth increase became effective October first and applied to telegraphers, towermen, block and telephone operators, etc. This increase amounted to $30,000,000 or more per year. These principal increases, together with many smaller adjustments, accounted for a total

ddition to the railway payroll variously estimated at from 600,000,000 to $700,000,000.

Increased cost of fuel represented another considerable ddition to operating expenses. Railway locomotives consumed some 650,000,000 tons of fuel in 1918. The average rice paid by the roads was higher in 1918 than in 1917 by n amount not yet fully known. It may have been as great s fifty cents per ton, in which case the increased cost of uel due to increase in unit prices would be about $80,000,000.

Other supplies increased also in cost, some of the per-nit increases ranging well above 100 per cent. The total



hart II—Rate of Increase or Decrease of General Expense Accounts by Months, 1918 Compared with 1917. Only Decrease Was in Traffic Account

mount of such increases is not easily computable, but in ie aggregate it represented a considerable item. Still anther factor of increased operating expense, as in the case f revenue, was the increase in traffic.

The principal operating expense accounts were as follows:

Maintenance of way and structures	$620,000,000
Maintenance of equipment	1,100,000,000
Traffic	50,000,000
Transportation	2,050,000,000
General and other	155,000,000
Total expenses	$3,975,000,000

All these accounts except traffic showed heavy increases ver 1917. Traffic expenditures fell off over 20 per cent, owing to the abolition of traffic solicitation, consolidation of ticket and other agencies, and other practicable economies under the conditions of unified operation. Maintenance expenditures increased over 50 per cent, maintenance of equipment increasing over 60 per cent and maintenance of way about 40 per cent. Transportation expenses were greater by 35 per cent.

The customary comparison of monthly expenditures with those of the preceding year offers but little interest in the case of the year 1918, because the retroactive features of the two largest increases in wages tend to overweight the expense accounts of some months and underweight those of other months. Chart II portrays the rate of increase over 1917 of the various classes of expense, by months, and shows very clearly how much out of line were certain of the months. Some of these variations from normal can be traced back definitely to one or more of the five principal wage increases. For example, the chart marks a sudden upward trend in all the expense accounts for June, the month in which the larger part of the back pay resulting from the general increase of May 25 was charged. The rate of increase approached more nearly to normal in July, but in August, September and Oc-

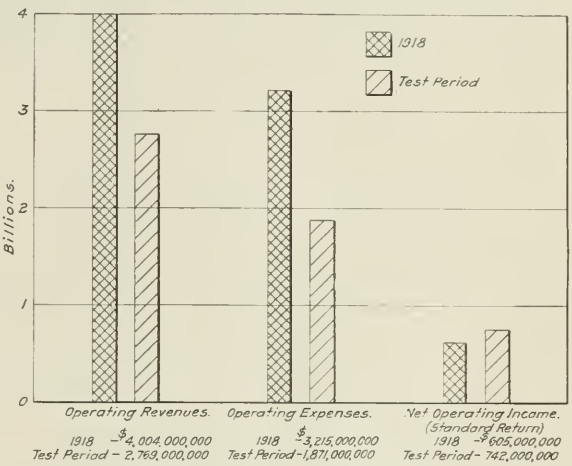


Chart III—Revenues, Expenses and Net Operating Income for Ten Months to October, 1918, Compared with Ten-Twelfths of Test Period

tober maintenance of equipment expenses show unusually large increases. Part of this abnormal showing grew out of the retroactive feature of the shopmen's increase of July 25. The general order making this increase effective provided that the July increase should be charged in the July accounts, while the increase for the six months from January to June should be brought into the accounts as soon as possible after August 1. Some roads did not succeed in computing and charging the back pay in full until September and even October. The maintenance of way increase of September 1 is clearly reflected in the jump in maintenance of way expenses, from a 33.5 per cent increase in August to a 47.5 per cent increase in September. The other wage increases cannot be so closely traced in the expense statements, either because they were scattered through the various accounts, as in the case of the clerks, or because they did not represent a relatively large addition to total expense, as was the case with the telegraphers.

Finally we come to the vitally significant item of net operating income, or standard return. This amounted in 1918 to $687,000,000, which was a decline of $287,000,000 from the results attained in 1917. The calendar year 1917 as a whole, however, showed better results than the average year of the three-year test period selected by Congress as the basis of its guarantee of net income. As a consequence the

deficiency which the director general's revolving fund will be called upon to make up is not the difference of $287,000,000 between the results of 1918 and 1917, but rather the difference of about $250,000,000 between 1918 and the annual average of the test period. I say "about $250,000,000," since only a few of the compensation contracts have been signed as this is written, and there is some question as to what amounts will be guaranteed a number of the roads, although in many other cases the amount is, of course, virtually agreed upon even though the formal contract has not been completed.

To portray somewhat more clearly to the eye how the tremendous increase in expenses affected net operating income in 1918, Chart III has been drafted, showing for the first ten months of 1918 the total revenues, total expenses, and net operating income of roads of Class I, as compared with ten-twelfths of the test period average. Switching and terminal companies are not covered by this chart, and the results should not be compared in detail with the other charts and the tables, which do include such companies. The general results, however, are not affected by the exclusion. Revenues in 1918 far outstripped those of the test period, but as expenses increased in even greater ratio, net operating income shows a very appreciable decline.

If it has been difficult to analyze the results of 1918, even more difficult is it to offer predictions regarding 1919. So many uncertainties face the American railways on the threshold of a new year that even the most guarded prophecy might easily be upset overnight. Among the vital questions pressing for answer are these: Will unified operation and control continue through 1919? What traffic will be offered the railways? What will be the trend of wage and prices? Will the increased rates be maintained? And many others. If I were permitted a very cautious guess as to the possibilities for 1919, it would be that traffic will decrease but little, if at all, in the aggregate, although its composition and character will change considerably; that wages and prices will remain at or close to the high levels reached in 1918; finally, that the rate increases of 1918, being in effect from the very first of the year 1919, will bring net operating income back to or above the level of the government guarantee. One result that will almost certainly come out of this last factor will be a demand from the public for rate reductions. This point was recently touched upon by Director General McAdoo, when he predicted that the extension of unified control would make possible substantial reductions in both freight and passenger rates. However this may be, rates, prices, wages, and traffic will certainly react on each other, the final result being a matter that lies today on the lap of the gods.

Engineering and Operating Problems of English Railways

SIR JOHN A. F. ASPINALL, general manager of the Lancashire & Yorkshire, has been chosen president of the Institution of Civil Engineers, and in his inaugural address, delivered before that body in London, on November 5, he made an interesting survey of some of the weighty problems now confronting the engineering profession in England.

More than 3,000 members of the institution have joined the fighting forces of the Empire, and 307 military orders and distinctions have already been conferred upon them; the number who have lost their lives is 291. Nearly one-half of the whole number—1,430—have been commissioned as officers of the Royal Engineers. The speaker mentioned with gratification the general recognition of the important service rendered in the war by the engineering profession—mathematicians, chemists, physicists, metallurgists and electricians—who are to be credited with rapid progress in defeating every hostile invention. The railways have not felt the deadening effect of government operation, as have other great industries, largely because the work has not been taken out of the hands of the men familiar with it.

The first problem considered by Sir John was that of the structure gage of British railways, there being 66 different loading gages applicable to 150 sections of lines; and the list of these must be studied when sending freight cars off from their home road. Progress in making larger freight cars is slow and at present almost impossible because of the limitations in width and height imposed at a thousand places. During the war English cars have been sent to France and have been run with facility, but French cars could not be run far in England. The speaker believed it possible to make great improvements in the structure gage without in any way altering the space between the two tracks of a double-track railway, which in most cases is six feet. He offered no specific remedy for this general problem but said that this and also the standardization of locomotives and cars ought to be actively undertaken; and "any change which may take place in the ownership of railways" ought to lead to an active policy; which probably would not cost more than a few days' war expenditure. The speaker had nothing definite to say concerning proposed amalgamations or state ownership, but alluded to the probable limitation of the number of designs of engines, if any change should be made. As to cars, running gear, brake gear, and some other details ought to be standardized without regard to whether more comprehensive plans can be agreed upon. Extended quotations are made from the recent address of Alba B. Johnson, at Chicago, on standardization.

Improved appliances for unloading coal at seaports, and for loading and unloading other heavy goods; the need of larger coal cars and the importance of abolishing private ownership of freight cars, and thus promoting standardization on the part of the railroads, are discussed at length; and the speaker then proceeded to discuss permanent way. Wooden sleepers (ties) are less plentiful than formerly, and are costing more; and it is suggested that when the steel mills of the kingdom are released from the burdens of war, they might be used to make the 300,000 tons of steel sleepers which could be used annually to replace the 4,500,000 wooden sleepers which need to be taken out each year. The speaker seems to hold that standard dimensions could be agreed upon for steel sleepers throughout the kingdom, and suggests that their use might become as extensive in England as it is today on the continent.

Another suggestion based on recent experience on the continent, is that light railways might be laid extensively in Britain for the development of agriculture; the hundreds of miles of 60-centimeter gage track which has been laid by the British army in France and Belgium might profitably be used in England. A committee of engineers and road surveyors, in combination with the Board of Agriculture, could decide where and how such railroads should be laid to be most useful.

Looking to the future and considering the probability of greatly lengthening freight trains, Sir John calls attention to the fact that wireless telephones will probably be available so that the engineman at the head of a train can communicate instantaneously with the runner of an engine at the rear of the same train, the two stopping or starting or setting the brakes at the same instant.

The future of electrical railway operation is discussed at length, with reference principally to recent experiences in America; and, observing that the railway demand for electric current will be far in excess of that for any other industry, the speaker thought that the generating stations ought to be owned by the railway companies. England must take into account the abilities of her competitors. Countries rich in waterpower can sell electric current at low prices; and Norway today is exporting current by cable to Denmark.



Executive Committee of Canadian Railway War Board
Left to Right: Howard G. Kelley, president, Grand Trunk Railway; D. B. Hanna, president, Canadian Northern (Government) Railway; Lord Shaughnessy, chairman of the Canadian Railway War Board and chairman of the Canadian Pacific; A. H. Smith, formerly president of the New York Central, now regional director of the United States Railroad Administration, but still representing the American lines in Canada; E. W. Beatty, K. C., President, Canadian Pacific, and W. M. Neal, general secretary, Canadian Railway War Board.

The Confused Railway Situation in Canada

Present Form of Government Ownership Forced on Canada by Circumstances; Whole Question Is Still to Be Settled

By J. L. Payne
Controller of Statistics, Ottawa, Canada

THE PRESENT SITUATION with respect to government ownership and operation of railways in Canada is the result of circumstances rather than the development of a definite policy. In so far as there was anything in the nature of a matured plan for the extension of the government system, which has been in existence for nearly fifty years, it had reference entirely to the Maritime Provinces; and the course of events in that direction will not be understood short of a clear grasp of the history of the Intercolonial. It was my privilege a year or two ago to set forth in the *Railway Age* (October 5, 1916, page 589), the essential facts with regard to that much discussed road, and it is therefore unnecessary at this time to do any more than epitomize those facts in their bearing on the position of matters today. There is sure to be confusion in the minds of readers if the historical aspect is omitted. It is fundamental, especially at this critical juncture in the discussion of railway policy in the United States and Canada.



J. L. Payne

Government did not start out in 1867 to give a demonstration of state ownership. That idea had no place whatever in the minds of those who built the Intercolonial. The principle, as against corporate control, was not even mooted. The Intercolonial, it must always be remembered, was constructed solely as an integral part of the bargain of confederation. The provinces down by the sea were reluctant to join with the upper provinces in a federal union, for a very good reason. They were cut off from central and western Canada by the closing of the St. Lawrence during the winter months. Their commercial interests were focussed in Boston and the eastern states. They were British in sentiment; but they were bound by ties of trade very closely to the United States. They felt themselves quite separated from Ontario and Quebec, and today, after the lapse of more than half a century, thousands of Nova Scotians still speak of the upper provinces as "Canada."

To win the people of Nova Scotia and New Brunswick over to the confederation idea it was necessary to offer them railway connection, and the Intercolonial was the result. The building of such a line was made a matter of specific contract in the British North American Act—the charter and constitution of the Dominion of Canada. It was to be the material link of political union, and out of that fact, without agreement on the point, grew up the idea that the road must never be regarded as a commercial undertaking. That is to say, it was tacitly understood that transportation tolls should be imposed solely for the purpose of meeting operating expenses. In practice, for reasons as to which there has been much debate, there were many years when it did not accomplish that much. Rightly or wrongly, the deficit of the Inter-

colonial were often attributed to political interference with the management. It is foreign to my purpose to discuss for one moment that phase of Intercolonial history, as it also is to write a syllable which could be construed as taking either side in the broad controversy over state ownership as a principle. I must be understood as being an entirely neutral recorder of the basic facts which have brought about the present railway situation in Canada, and nothing more.

Government began its railway enterprises with the Intercolonial, and was assumed to have ended with the building of the Prince Edward Island narrow gage line when that province entered the confederation in 1873. That was all the founders of the Dominion had in view. It was done as a matter of agreement based entirely on the necessities of the case.

The question of principle, apart from the original bargain, has no place in the official records. Other railways were built by private corporations; so that in 1903, when the Grand Trunk Pacific was projected, there were in New Brunswick and Nova Scotia 1,395 miles of line thus owned. This mileage attached to 26 separate roads, of which 9 were in Nova Scotia and 17 in New Brunswick. This will make it clear that the government had not dreamt of setting apart the Maritime Provinces as a field in which to exploit by monopoly the principle of state control. Not one of these lines paralleled the Intercolonial. They were all more or less in the nature of feeders to the government system. Almost without exception they connected with the Intercolonial. In time they came to be regarded as branch lines, although two or three of them could not properly be so classified. For the most part they served a local purpose. Few of them managed to make ends meet without a hard struggle. They constantly looked to the government road for assistance, chiefly in the way of equipment. The Intercolonial was the artery; they were the veins. In this situation there grew up an agitation for consolidation. It was believed that under such a re-casting a better service would be provided in the districts served, especially by the smaller roads, and that it would be a good thing in the long run for the government system itself.

The process of acquirement has been slow; but during the past 15 years lines have been taken over representing an aggregate of a little more than 500 miles, all in the province of New Brunswick. The basis of purchase was in essence the present value, which in some cases took the form of assuming outstanding liabilities. Under the circumstances it is quite impracticable to give either the cost to government or even a suggestion of how present value was appraised. The terms were a matter of arrangement between the government and the owners. This acquired mileage has not been added to the mileage of the Intercolonial as yet, the new properties being simply operated separately as before; and it would be altogether premature to say anything whatever about results. The bulk of the new mileage has been in possession of the government for but a short time, and as to the lines which have been operated for a number of years no change of importance is discernible in either gross or net earnings.

Extension of Government Ownership

The construction of the Grand Trunk Pacific, which was begun in 1905, marks a pivotal period in the extension of government ownership in Canada. That system was to begin at Moncton, in New Brunswick—practically at the Atlantic coast—and end at Prince Rupert on the Pacific. It will be remembered that the company was to build from Winnipeg to the Pacific coast, while the government undertook to build the eastern section, 1810 miles in length, officially designated the National Transcontinental. Without going into a considerable mass of details arising out of the bargain, let it suffice to say the construction of the Winnipeg-Moncton section was a mere variation of the form in which the government was to aid the enterprise. The capital cost thus far has been $170,000,000 in round figures, without including charges on account of deficits. The ultimate cost of the line, equipped for traffic up to capacity, is estimated at $100,000 per mile. It is built up to a high standard; but runs for many hundreds of miles through an unproductive and quite undeveloped country. When the time came for the Grand Trunk Pacific to take over the National Transcontinental, thereby creating a new system from ocean to ocean, it was unable to do so. Financial difficulties barred the way. As that aspect of the situation as a whole will be taken up a little farther along, it is only necessary at this point to say that the government began the operation of the National Transcontinental in a tentative way in 1913. It has continued to do so. For the year 1917 the gross earnings were $7,113,246, which fell short of meeting operating expenses, from which it is obvious the loss to the dominion treasury on interest account and deficits has been relatively large. This taking over of the National Transcontinental was the first long stride toward the creation of the largest railway system on this continent. Up to this time no effort has been made to throw all the mileage acquired into a single railway with both central control and centralized administration. Ownership and operation are both in government hands; but not under a common name nor a single central management. But I must not get ahead of the chronological order of events.

A year after the outbreak of war the financial difficulties of the Grand Trunk Pacific and the Canadian Northern reached an acute stage. The former had its parent, the Grand Trunk, to fall back upon, although government was joint guarantor of its bonds; but the latter stood alone. A royal commission was appointed in 1916 to consider "in a comprehensive way the conditions and necessities of railway development in Canada," and the famous Drayton-Acworth report* was the immediate result. It is unnecessary for the purposes of this sketch of events to repeat any of the details of that significant finding. The taking over by government of the Grand Trunk, the Grand Trunk Pacific and the Canadian Northern was recommended. The setting up of a huge state system was held to be both unavoidable and expedient. Government had just given $60,000,000 to the Canadian Northern and $8,000,000 to the Grand Trunk Pacific to meet immediate and urgent needs. Thus far possession of only the Canadian Northern has been assumed. Bearing in mind that up to 1903 government had owned and operated only 1,788 miles of line, which represented no material change as against the early days of confederation, it is well to see what was the position of matters in 1918. This is the situation today:

GOVERNMENT MILEAGE

Intercolonial	1,518
Prince Edward Island	275
National Transcontinental	1,810
Canadian Northern	9,405
Branch lines acquired	524
Total	13,532

Here was a big change. By a few swift strokes the government had altered the entire railway map of Canada. In doing so it had increased its capital liabilities on railway account from $120,000,000 in 1910 to $800,000,000 in 1918. If it had carried out the Drayton-Acworth recommendations to the full the final aggregate would not have been less than $1,250,000,000 on 18,876 miles of lines. Of course, this has meant no more than a transfer of responsibility from corporate to public shoulders; but that does not modify the significance of the movement as a vital change in the Canadian railway situation.

Railway Age Gazette, May 4, 1917, pages 953 and 957.

The Public Attitude

As this is intended to be a mere statement of facts, free from the expression of personal opinion or comment, it is necessary to answer certain questions which must obviously arise in the minds of those who read. The public attitude, for example, is immediately suggested. The process by which such revolutionary changes were brought about may be expected to have its place in a frank history of events. The suspicion is unavoidable that all this must have been preceded by elaborate discussions in Parliament, in the press and on public platforms, of the underlying principle. Let it therefore be said at once that public judgment on these vast changes has neither been specifically sought nor positively declared. The matter in any of its aspects has not been an issue before the people. What has been done by the government has been the result of what was believed to be irresistible necessity. The National Transcontinental was built by the government and, although intended to be handed over to the Grand Trunk Pacific, was never taken off its hands. By reason of guarantees of bonds by the provinces and the Dominion, the taking over of the Canadian Northern was practically compulsory. The owners were at the end of their tether under war conditions, and the chief guarantors saw no avenue of escape from assuming a liability which already lay at their door. The definite grasping of these facts is essential to an understanding of the otherwise surprising statement that the Canadian public has to a large extent been both passive and silent. At all events, one would search the records of Parliament and the newspapers in vain to find anything which could be fairly recognized as a general discussion of the policy of government ownership as against the policy of corporate ownership. Nor has the government itself made any clear-cut announcement on the question.

Looking ahead, it might fairly be asked whether or not the government intends to give effect to the recommendations of the Drayton-Acworth report as respects the Grand Trunk and the Grand Trunk Pacific. I do not know, and it would be improper and impolitic to surmise. Nobody knows. The Grand Trunk in 1917 had net earnings of $13,179,039, and showed a surplus of $1,962,995 after meeting all its fixed charges. This is to be viewed, however, in the light of its obligations on account of the Grand Trunk Pacific. It is the guarantor of large responsibilities incurred by that road. The Grand Trunk Pacific itself had a shortage of $205,000 as between gross earnings and operating expenses in 1917, to which should be added fully $7,000,000 on account of fixed charges. The situation in this regard has not been materially changed since 1916, and at the end of that year Sir Henry Drayton and W. M. Acworth reported to the government as follows: "We estimate the present annual liability of the Grand Trunk in connection with the Grand Trunk Pacific system to be considerably over $5,000,000 per annum, and after January, 1923, it will increase to over $7,000,000. * * * We recommend that the control both of the Grand Trunk Pacific and of the Grand Trunk be assumed by the people of Canada." A. H. Smith, in his minority report, recommended that the operation of the Grand Trunk Pacific be transferred to the Canadian Northern, which would admit of a considerable reduction in mileage; but, since the latter road has been definitely taken over by the government, it will be seen that this suggestion is now out of the question.

Neither the war nor the burdens arising therefrom can very well have any direct effect on the situation as presented in the foregoing paragraphs. What has been done was held to be unavoidable. It was regarded as the most prudent and promising way of meeting a liability which already lay at the door of the government by reason of the public guarantees outstanding. In other words, the choice exercised was believed to be the best for the defense of the dominion treasury. Whether or not the same force, proceeding from precisely similar impulses, will lead to the early absorption of the Grand Trunk Pacific is a question which would seem to demand an early answer; but what that answer will be rests with the judgment of those who govern.

Inevitably, the aggressions of the government led to more or less general and sporadic talk, in the press and among men, on the comprehensive topic of nationalization. Having gone so far, it became a question for debate whether or not it would be both logical and expedient to go further—to the point of throwing all the railways of Canada into a common pool. There were factors on the surface which gave a suggestion of strength to such a bold scheme. The net earnings of all lines produced a balance on the credit side; while any combination which excluded the Canadian Pacific was more or less weak. Nevertheless, both the Drayton-Acworth report and the Smith report strongly urged the leaving of the Canadian Pacific alone. This created an obstacle. In so far as there was any discussion at all, either academic or constructive, it had its foundation very largely, if not wholly, in the situation created by the distressing finances of the Canadian Northern and the Grand Trunk Pacific. Probably some positiveness might have been given to these arguments, outside of the propaganda at Kitchener, Ont., but for the interest centered in the war. Be that as it may, the point I am trying to make is that nothing has happened in a definite way to show the trend of public judgment either for or against state ownership. The action of government was based on monetary considerations rather than an avowed principle, and there the whole matter rests at the present time.

New Rates a Relief

Meanwhile, it may be said that the railways of Canada have had strong reasons for welcoming the relief which the new scale of rates has given them. That scale became effective on August 12, last, and, while it has given a fillip to gross earnings, it is much too early to speculate on the possible effect on net earnings. Much has happened to suggest that the additional inflow will be balanced by the additional outflow, for it is already clear that the McAdoo award to employees, plus the rising cost of supplies, has greatly added to operating expenses. It should be understood that the McAdoo ruling as to rates of wages found almost instant acceptance in Canada, and was a striking demonstration of the sympathetic relationship which prevails between the two countries as respects railways. On the other hand, there is just the shadow of a hope that the final balance for the fiscal year may be favorable; for the one outstanding benefit of the war, over against all the trials which it brought, was the development of efficiency in the operating departments. The movement of a greatly swollen volume of traffic in 1916 and 1917 had to be carried out with less equipment than was available in 1914 and 1915. Not only was there an actual decrease in the number of rolling stock units, but the loss of skilled labor from the shops made repairs slow and unsatisfactory. The introduction of female help was valuable, but it scarcely restored the conditions which existed prior to wholesale enlistments in the Canadian army. The operating officers made a virtue of necessity, however, and strove by every means to increase the average carload, train-load and so on. They were like the cheerful old liar who, when asked to explain how his dog had managed to climb a tree to escape from a pursuing bear, said: "He had to, the bar was crowdin' him so." In these heroic efforts to accomplish the seemingly impossible they had great assistance from the Railway War Board, whose work it was my pleasure to record a few months ago.

The collapse of the Germans and the ending of the war has brought the railways of Canada, in common with those of other countries, sharply up against the problems of peace.

It would be premature to make predictions. Nothing has yet happened to indicate the probable trend of events.

The nightmare of a possible reaction and great upheavals in trade is scarcely driven away by the hope that adjustments will swiftly take place; for the relationship between commerce and traffic is so intimate that the ups and downs of one always mean the rising or falling of the other. The remembrance of what occurred in 1914 and the early part of 1915, when the paralyzing blow of war struck the railways, is a vivid part of the contemplations of peace. Nor can responsible officers find any comfort in the uncertain and unexpressed attitude of public or official judgment as to what may be done in the vital matter of nationalization, as to which I am as much in the dark as are they.

Receiverships and Foreclosure Sales in 1918

The Government by Taking Over the Roads Suspended the Natural Economic Laws of Railroad Bankruptcy

SINCE THE LAW taking over the railroads specifically provides that without the permission of the director general of railroads the property of a railroad company used in transportation service shall not be attached by the courts, the receiverships established in 1918 were few and unimportant with the exception of the Denver & Rio Grande. In the case of that road the order of the court appointing a receiver was so worded as to put the question of whether or not a receiver should take charge of the property up to the director general of railroads. The other six roads are unim-

RAILROADS IN THE HANDS OF RECEIVERS

Name of road	Mileage	Date of receivership	Bonds of old company	Stock of old company	Total old company securities
Artesian Belt	46	April 25, 1917	.....	$70,000	$70,000
Birmingham, Columbus & St. Andrews	38	Dec. 24, 1908	$250,000	4,500,000	4,750,000
Boston & Maine	2,298	Aug. 29, 1916	43,338,000	42,655,191	85,993,191
Connecticut River	88	Aug. 31, 1916	2,260,250	3,233,300	5,493,550
Vermont Valley	25	Aug. 31, 1916	3,800,000	1,000,000	4,800,000
Boyne City, Gaylord & Alpena	94	Nov. 19, 1913	800,000	669,300	1,469,300
Cape Girardeau Northern	104	April 14, 1914	1,500,000	110,000	1,610,000
Chicago & Eastern Illinois	1,136	May 27, 1913	59,289,000	18,267,900	77,556,900
Chicago, Peoria & St. Louis	255	July 31, 1914	4,000,000	4,000,000	8,000,000
Colorado Midland	338	July, 1918	9,532,000	10,000,000	19,532,000
Creston, Winterset & Des Moines	22	June 25, 1914	200,000	98,600	298,600
Dansville & Mt. Morris	15	June, 1894	150,000	50,000	200,000
Denver & Rio Grande	2,610	Jan. 26, 1918	121,802,000	87,779,800	209,581,800
Denver & Salt Lake	255	Aug. 16, 1917	12,514,000	12,182,500	24,696,500
Elkin & Allegheny	15	Dec. 13, 1915	480,000	476,300	956,300
Evansville & Indianapolis	146	May 27, 1913	2,500,000	2,000,000	4,500,000
Fellsmere Railroad	16	Jan. 5, 1917	.....	.....	.....
Florida, Alabama & Gulf	26	Feb. 27, 1914	500,000	150,000	650,000
Fort Smith & Western	254	Oct. 9, 1915	6,240,000	5,000,000	11,240,000
Fort Smith, Subiaco & Eastern	14	Feb., 1918	400,000	150,000	550,000
Georgia & Florida	348	Mar. 27, 1915	7,820,000	8,750,000	16,570,000
Georgia Coast & Piedmont	100	July 14, 1916	1,807,287	1,572,000	3,379,287
Gould Southwestern	18	April 14, 1914	8,929	51,000	59,929
Greenville & Western	23	Aug. 29, 1917	460,000	50,000	510,000
Greenville Northwestern*	12	Dec. 1915	.....	.....	.....
Gulf, Florida & Alabama	157	May 9, 1917	4,410,000	4,410,000	8,820,000
Haynesville & Montgomery	9	Mar. 1, 1917	41,000	50,000	91,000
Houston & Brazos Valley	29	Nov. 27, 1915	420,000	24,000	444,000
Illinois Southern	140	Sept. 18, 1918	3,398,000	5,000,000	8,398,000
International & Great Northern	1,160	Aug. 11, 1914	26,347,000	4,822,000	31,169,000
Kansas City, Mexico & Orient	964	April 17, 1917	31,000,000	20,000,000	51,000,000
Kansas City Northwestern	200	Feb., 1917	.....	.....	.....
Kansas City, Ozark & Southern	15	Dec. 23, 1914	.....	.....	.....
Liberty-White	50	Nov. 12, 1914	4,050	300,000	304,050
Louisiana & North West	121	Aug. 23, 1913	2,250,000	2,300,000	4,550,000
Macon & Birmingham	97	Feb. 1, 1908	500,000	500,000	1,000,000
Manitee & North Eastern	190	Dec., 1918	1,172,000	1,172,000	2,344,000
Marshall & East Texas†	72	Jan. 25, 1917	1,180,000	200,000	1,380,000
Michigan East & West‡	72	Jan., 1918	.....	200,000	200,000
Missouri & North Arkansas	365	April 1, 1912	8,353,295	8,340,000	16,693,295
Missouri, Kansas & Texas	1,744	Sept. 27, 1915	101,728,750	76,283,257	178,012,007
Missouri, Kansas & Texas of Texas	1,792	Sept. 27, 1915	35,638,054	10,152,500	45,790,554
Nevada Short Line	12	Jan., 1916	.....	.....	.....
Ocilla Southern	110	July 12, 1918	416,000	265,000	681,000
Orangeburg Railway	17	June 17, 1916	.....	100,000	100,000
Palatine, Lake Zurich & Wauconda	15	Oct. 19, 1914	.....	230,000	230,000
Pine Bluff & Northern	10	Feb. 9, 1916	43,000	160,000	203,000
Pittsburg, Shawmut & Northern	205	Aug. 1, 1905	14,655,000	15,000,000	29,655,000
Richmond & Rappahannock*	26	Oct. 25, 1917	458,000	500,000	958,000
Rome & Northern	28	Feb. 28, 1911	.....	1,000,000	1,000,000
St. Louis & Missouri Southern	8	April 13, 1915	.....	.....	.....
St. Louis, El Reno & Western	42	Oct. 9, 1915	817,000	970,800	1,787,800
Salina Northern	81	July 27, 1917	1,500,000	1,162,300	2,662,300
San Antonio, Uvalde & Gulf	317	Aug., 1914	4,413,000	280,000	4,693,000
Sharpsville	18	Jan. 20, 1897	68,779	350,000	418,779
Southwestern Railway	30	Nov. 11, 1917	354,000	35,000	389,000
Tennessee & North Carolina	37	Sept. 13, 1916	454,000	306,100	760,100
Tennessee Central	295	Dec. 31, 1912	12,232,900	7,941,450	20,174,350
Texas & Pacific	1,947	Oct. 27, 1916	54,621,000	38,763,810	93,384,810
Tidewater & Western	93	May 14, 1917	300,000	300,000	600,000
Toledo, Peoria & Western	248	July 2, 1917	4,895,000	4,076,900	8,971,900
Toledo, St. Louis & Western	454	Oct. 22, 1914	27,602,000	19,947,600	47,549,600
Trinity & Brazos Valley	369	June 16, 1914	8,760,000	304,000	9,064,000
Wabash, Chester & Western	65	July 15, 1914	690,000	1,250,000	1,940,000
Waupaca Green Bay	3	Aug., 1917	75,000	1,400	76,400
Waycross & Western	43	Aug., 1918	384,000	420,000	804,000
Wichita Falls & Northwestern	329	June, 1917	.....	2,000,000	2,000,000
Williamsport & North Branch	56	Jan. 8, 1917	545,000	1,324,662	1,869,662
Totals	20,333	.....	629,377,294	433,258,070	1,062,635,364

* Discontinued.
† 20 miles of this road were sold at foreclosure, leaving 72 miles in hands of receivers.
‡ This property was sold at foreclosure in 1918, but it is still in the hands of receivers.

portant and form no part of the main line railroad mileage of the United States. The director general ruled that the receivership extended only to the free assets of the Denver & Rio Grande Railroad Company and did not pertain to the railroad itself. The receiver, therefore, took charge only of the free assets of the company not used in the transportation business and a federal manager was appointed for the Denver & Rio Grande in the same way as for a solvent company. It would seem proper, however, to include the mileage of the Denver & Rio Grande in our annual table since the company itself is bankrupt and the company owns the mileage shown in our table although temporarily a receiver is not in charge of this mileage.

The Colorado Midland not only went into the hands of a receiver but as mentioned elsewhere in the article on

RECEIVERSHIPS ESTABLISHED IN 1918

Name of company	Mileage	Funded debt outstanding	Stock outstanding
Colorado Midland	338	$9,532,000	$10,000,000
Denver & Rio Grande	2,610	121,802,000	87,779,800
Fort Smith, Subiaco & Eastern	14	400,000	150,000
Illinois Southern	140	3,398,000	5,000,000
Manistee & North Eastern	190	1,172,000	1,172,000
Michigan East & West	72	.....	200,000
Ocilla Southern	110	416,000	265,000
Waycross & Western	45	384,000	420,000
Totals	3,519	$137,104,000	$104,986,800

abandoned lines, a considerable part of it was actually abandoned and is to be torn up.

While there is nothing in the law taking over the railroads which specifically forbids a reorganization of a railroad property in bankruptcy there were no important foreclosure sales during the year. Even if a bankrupt company were to be reorganized the railroad which it owned could not be taken away from the federal manager. The short lines shown in our table are those that were sold under foreclosure but were not taken over by the government.

Of the roads still in the hands of receivers, the Missouri, Kansas & Texas, the Texas & Pacific, the Boston & Maine,

FORECLOSURE SALES IN 1918*

Name of company	Mileage	Funded debt outstanding	Stock outstanding
Alabama, Tennessee & Northern	195	$4,436,087	$7,350,000
Cincinnati, Findlay & Fort Wayne	93	1,150,000	1,250,000
Kansas City & Memphis	56	862,000	840,000
Leavenworth & Topeka	57	250,000	50,000
Marshall & East Texas†	20	.....	.....
Michigan East & West	72	.....	200,000
New Mexico Central	116	.....	2,500,000
Ozark Valley	45	150,000	50,000
Stockton Terminal & Eastern	19	84,400	263,900
Tennessee Railway	61	1,129,000	1,000,000
Watauga & Yadkin River	29	.....	3,169,800
Totals	763	$8,061,487	$16,673,700

* The receivership of the Pacific & Idaho Northern was ended June 21, 1918, without foreclosure proceedings.
† See large receivership table.

and the Toledo, St. Louis & Western are the most important.

A plan has been worked out for the reorganization of the Boston & Maine under which plan, published in the *Railway Age* of September 20, page 537, holders of guaranteed stock of leased lines are to accept stock in the new company which is to be formed. The fact that James H. Hustis, the receiver, had the confidence of the Railroad Administration as well as the various interests involved in the Boston & Maine reorganization aided materially in the working out of a sound plan of reorganization. Furthermore, since the plan needed the approval of the Railroad Administration before it could become effective this gave a leverage to bring all interests together that would otherwise have been lacking.

It must be remembered that not only in the Denver & Rio Grande case, but in the case of all the larger roads shown in our table of roads now in the hands of receivers the road itself is being operated by a federal manager appointed by the director general and not by the receiver.

Had it not been for the government's taking over the roads and had no relief been afforded in the way of increased rates,

SUMMARY OF FORECLOSURE SALES IN 43 YEARS

Year	No. of roads	Miles	Bonds and stocks
1876	30	3,840	$217,848,000
1877	54	3,875	198,984,000
1878	48	3,906	311,631,000
1879	65	4,909	243,288,000
1880	31	3,775	263,882,000
1881	29	2,617	137,923,000
1882	16	867	65,426,000
1883	18	1,354	47,100,000
1884	15	710	23,504,000
1885	22	3,156	278,394,000
1886	45	7,687	374,109,000
1887	31	5,478	328,181,000
1888	19	1,596	64,555,000
1889	25	2,930	137,815,000
1890	29	3,825	182,495,000
1891	21	3,223	169,069,000
1892	28	1,922	95,898,000
1893	25	1,613	79,924,000
1894	42	5,643	318,999,000
1895	52	12,831	761,791,000
1896	58	13,730	1,150,377,000
1897	42	6,675	517,680,000
1898	47	6,054	252,910,000
1899	32	4,294	267,534,000
1900	24	3,477	190,374,000
1901	17	1,139	85,808,000
1902	20	693	39,788,000
1903	13	555	15,885,000
1904	13	524	28,266,000
1905	6	679	20,307,000
1906	8	262	10,400,000
1907	6	114	13,777,000
1908	3	138	2,547,000
1909	13	2,629	250,033,000
1910	17	1,100	93,660,109
1911	13	1,386	40,741,453
1912	12	661	25,910,990
1913	6	1,159	86,163,850
1914	9	1,470	83,189,500
1915	11	3,914	283,258,782
1916	26	8,355	703,444,855
1917	20	10,963	557,846,348
1918	11	763	24,735,187

it is quite possible that instead of being one of the shortest lists of railroad receiverships that has ever been published in the *Railway Age* the list this year would have been the greatest in the history of American railroads.

SUMMARY OF RECEIVERHIPS FOR 43 YEARS

Year	No. of roads	Miles	Bonds and stocks
1876	42	6,662	$467,000,000
1877	38	3,637	220,294,000
1878	27	2,320	92,385,000
1879	12	1,102	39,367,000
1880	13	885	140,265,000
1881	5	110	3,742,000
1882	12	912	39,074,000
1883	11	1,990	108,470,000
1884	37	11,038	714,755,000
1885	44	8,836	385,460,000
1886	13	1,799	70,346,000
1887	9	1,046	90,318,000
1888	22	3,270	186,814,000
1889	22	3,803	99,664,000
1890	26	2,963	105,007,000
1891	26	2,159	84,479,000
1892	36	10,508	357,692,000
1893	74	29,340	1,781,046,000
1894	38	7,025	395,791,000
1895	31	4,089	369,075,000
1896	34	5,441	275,597,000
1897	18	1,537	92,909,000
1898	18	2,069	138,701,000
1899	10	1,019	52,285,000
1900	16	1,165	78,234,000
1901	4	73	1,627,000
1902	5	278	5,835,000
1903	9	229	18,823,000
1904	8	744	36,069,000
1905	10	3,593	176,321,000
1906	6	204	55,042,000
1907	7	317	13,585,000
1908	24	8,009	596,359,000
1909	5	859	78,095,000
1910	7	735	51,427,500
1911	5	2,606	210,606,882
1912	13	3,784	182,112,497
1913	17	9,020	477,780,820
1914	22	4,222	199,571,446
1915	12	20,143	1,070,808,628
1916	9	4,439	208,159,689
1917	19	2,486	61,169,962
1918	8	3,519	242,090,800

Progress Report on the Valuation Work

War Has Seriously Interfered With It, Both Retarding the Work and Increasing Its Cost

By Charles A. Prouty
Director, Division of Valuation, Interstate Commerce Commission

THE WAR HAS SERIOUSLY interfered with the progress of our valuation work, having both retarded the work itself and increased its cost. The effect has been somewhat different upon different sections of that work.

Engineering Section.—The majority of our engineers were within the draft age, and many of them were included in the draft. An active demand for various kinds of engineering service was created by the war. All this made it difficult to obtain and retain competent engineers. It frequently happened that 25 per cent of our engineering force was changed in a single month. Since experience is of the essence of things in our work, this very much reduced the efficiency of our force and interfered with our progress.



C. A. Prouty

Four years ago I estimated that our field work should be finished as of an average date, January 1, 1920. But for the war we shoud have been six months ahead of that program. As it is we are just about along with it. In the Southern and Pacific districts we have already disbanded several of our road and track parties and shall finish before the end of the year, even with our reduced force. In the Western district we shall complete our road and track work somewhat before January 1, while our structural and mechanical work will extend over into the following year. In the Central and Eastern districts our field work in all branches will extend slightly beyond January 1. On the whole, our field work will be completed just about as of an average date January 1, 1920, as predicted.

The effect in the engineering section has been more serious in the office than in the field for various reasons which need not be referred to. It had been estimated that our office work would be cleaned up in from a year to a year and six months after the completion of our field work. Owing to the delays of the war that estimate must be increased by about one year.

It is now estimated that engineering reports will be filed in Washington, upon all properties, in about three years from January 1 next. Here, again, we shall be somewhat ahead in some districts and somewhat behind in others.

Accounting Section.—The effect of the war during its continuance was perhaps more serious upon our accounting work than anywhere else. The number of accountants actually taken into military service was not great, but the activities of the war, both on the part of the government and in private enterprise, seemed to call for a great amount of accounting effort which very much increased the demand for accountants as well as the compensation paid. It was especially difficult to find accountants at the salaries which the commission could offer who were competent to make reports. With the close of hostilities this difficulty is fast passing away and it is apprehended that we shall find it easily possible to conclude our accounting work within the time above indicated for the completion of engineering reports.

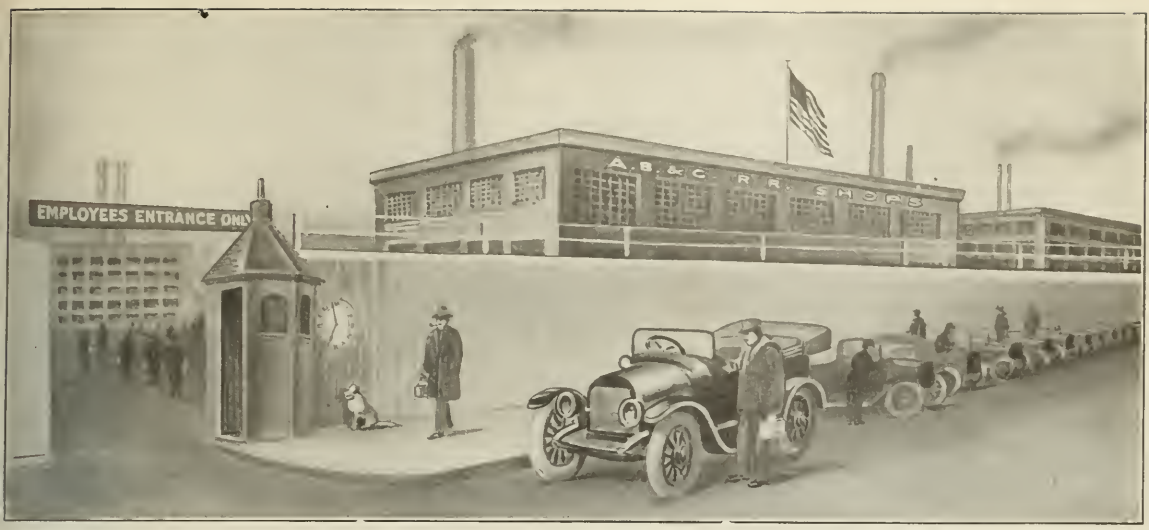
Land Section.—Most of our land appraisers were beyond the draft age and the war did not materially interfere with the prosecution of this branch of our work. While only about 150,000 miles of railway have actually been covered by our land appraisers in the field up to the present time, there will be no difficulty in bringing the work of that section to a completion along with that of our accountants and engineers.

In a word, we expect to complete our field work for the most part next year, and to finish the entire work within the two following years. This brings the valuation work to the point where reports of all sections upon all properties are filed with the commission in Washington. No estimate has ever yet been made as to the time which may be required to adjust the objections which carriers will make to these reports, but it is believed that after a little this will go forward rapidly.



From the New York Tribune

And All He Asked for Was a Sword and a Gun



A Year of Prosperity for Railway Labor

Federal Control and Industrial and Military Activity Have Introduced Marked Innovations in Past Practices

With the signing of the armistice on November 11 the word *finis* was placed on many formidable tasks which had been imposed on industry and commerce of this country. Of these, none has given greater concern than that of maintaining an adequate supply of labor. We still have today a labor problem of no mean proportions, but it is essentially different than that of the war period, although many of the perplexing difficulties yet to be overcome are in a sense an inheritance of the departing year. However, the indications are that the great problem of labor shortage will soon be no more, and it is now possible to review the trying times of the last twelve months as a book in which the last chapter has been written.

Three and a half years of war in Europe previous to our entrance into the conflict virtually stopped immigration, which for years was our chief source of common labor; the enormous growth of war industries created an unprecedented demand for men, and finally our own participation in the war led to the withdrawal of several million men for military duty and employment in government construction projects. So while there came to be an enormous shortage of help of all kinds, it was most severe in lines of industry or commerce requiring common labor, machinists and young men of military age. The railroads suffered in all branches of the service, but primarily in those employing men of the classes enumerated above. The problems of the various departments of railway service were essentially different and for that reason they are treated separately in this article. Nevertheless the underlying causes of difficulty were inter-related, and a number of influences were brought to bear which affected all departments to a greater or lesser extent. Federal interference, the wage advances, the attitude of the Railroad Administration toward organized labor, the employment of women, the activities of the Federal immigration bureau, all constitute interesting phases of the trying times from which we are just emerging and indicate the nature of the many and diversified factors which will play an important part in the ultimate outcome of the no less difficult period into which we have but recently entered.

Going back to the first days of the past year, the plight of the railroads was indeed serious. The armed forces of the nation had already claimed about 70,000 men, the war industries had taken many more, and these factors had perfected their instrumentalities for recruiting and inducting additional forces at a rapid rate, with the further advantage over the railroads in the form of a much greater attractiveness of the service—the army and navy—through an appeal to patriotism and the industries through much higher wages. In addition, the draft was already removing certain classes of men.

Immigration, which has been the source of such a large proportion of track forces, had become a minus quantity, for whereas the average number of aliens entering this country annually during the years 1905 to 1914, inclusive, was 1,012,000, this number has since never exceeded 300,000, and was more than neutralized in later years by an even greater emigration. A further disquieting influence was that arising from an appreciation of the labor shortage by the men themselves, resulting in a marked spirit of unrest, characterized by unreasonable demands for increased wages and improved working conditions, and a marked tendency to jump from job to job in an effort to seek the Utopian position affording maximum pay and minimum work.

Efforts to overcome problems confronting all employers of labor in this country followed several diverting channels, which were actuated by a number of independent activities. Some of these were fruitful of excellent results, some were not. They may be classified as follows: The development of additional sources of supply, improved wage and employment conditions, the unification of labor solicitation tending to eliminate competition, and efforts to increase production.

Immigration

Considerable speculation naturally occurred in regard to increasing the supply of labor from the outside, an idea

fathered by the fact that thousands of Asiatic workers have been passed through Canada on their way from the Orient to Europe, and plans were advanced even as early as the summer of 1917 by certain employers of labor in the West for the introduction of these Asiatics as temporary labor in this country. The United States Department of Labor refused absolutely to entertain this idea, which at no time progressed beyond the speculative stage. Whether it would have been wise to undertake this project in view of the political gunpowder it contained, is a question, but the fact remains that if a large number of these men had been employed here during the past year their removal from the labor market at the present time would now be serving effectively as a counterbalance for the present reduced demand for men.

Mexico was also suggested early in the year as a potential source of supply, but the operation of the literacy clause of the new immigration law served to exclude the peon. The Department of Labor for a long time turned a deaf ear to any suggestions for assistance even from this source, and for many months held up as a glittering possibility a plan for importing some 100,000 Porto Ricans, against whom no political objection could be raised because they were already classed as American citizens. Statistics are not available to show how many of these men actually reached this country, but they did not become an important factor in the solution of the labor difficulty.

Action was finally taken on the Mexican situation on June 20, when Secretary of Labor Wilson issued a department order temporarily removing the restrictions as to head tax, illiteracy and contract labor for Mexicans who would come to this country temporarily for work on farms, in mines or on railroads. However, the conditions imposed on the Mexican in waiving these restrictions were so severe as to offer little inducement for him to enter. Among other things his employer was required to withhold and deposit with the government 25 cents for each day of his sojourn in this country. Since this plan for obtaining immigrants proved impotent under these provisions they were finally removed in August, too late in the year to be of much avail.

That enlistments and the effect of the selective draft had made considerable inroads on the railroads is indicated by the fact that over 200,000 railway employees joined the colors. The Railroad Administration requested the War Department to grant relief from the operation of the draft law, in the form of instructions to the local draft boards to give deferred classifications to essential railway employees. This was not done, but following the passage of the second draft law calling for the registration of all male citizens between the ages of 18 and 45 inclusive who were not registered previously, instructions were issued to the railroads to request all essential employees to present industrial exemption claims when filling out questionnaires. This, however, came too late in the war to be of any effect.

The Employment of Women

Another effort toward increasing the supply of labor was directed toward the employment of women to a larger extent in pursuits in which they had been used in the past, and also as substitutes for men in classes of work formerly done by men only. That these efforts have been accompanied by no little success is evidenced by an increase in the number of women employed from 60,000 in January, 1918, to about 100,000 in October. Of 81,000 employed on July 1, 61,000 were engaged in clerical work, at which they replaced many men and served greatly to relieve the situation in the clerical departments. The remaining 20,000 were employed in shops, scrap yards, coach yards, storehouses, etc. Some were also used on track work but as compared to the total number engaged the proportion in this work was small. Various obstacles were presented to their use for such work, among which were the need of better facilities for their comfort and their inability to do the heavier work. Finally in October, orders were issued in the Eastern and Central Western regions to discontinue the employment of women as track laborers, warehouse truckers, night watchmen and callers at train headquarters, the conclusion being that these forms of employment were unsuited to them both from the physical and social standpoints.

Boys have been used in increasing numbers in shops, offices, and on the track, following various plans for encouraging them to enter the service during summer vacations. College students, many of whom found railroad employment during their vacations, were also used in considerable numbers, but enlistments measurably reduced the possibilities of relief from that source during 1918. One interesting example of what was accomplished along this line, however, was the use of a special gang of University of Chicago students on track work on lines of the Burlington in Wyoming.

The Federal Employment Service

One factor which has exerted a considerable influence on the solution of the labor problem was the United States Department of Labor through the agency of the United States Employment Service. This is a function of the labor bureau that had been designated originally to help immigrants find work, but which had gradually been expanded so that at the beginning of the year there were 100 branches or employment offices in operation throughout the United States. Special impetus given to this department of the labor bureau during 1918 led to its rapid expansion so that there were some 600 government labor agencies in operation by midsummer.

In accordance with the policy pursued by the government for centralized control of many national activities suffering from inadequacy because of the war, the employment service undertook to centralize the employment and distribution of labor. On June 17, President Wilson issued a proclamation approving this plan and urging all employers engaged in war work to refrain from recruiting unskilled labor in any manner except through the government agencies. The plan provided that after August 1, all industries employing more than 100 men would be required to employ common labor exclusively through this service. Theoretically this was excellent. The competition for labor was keen. Various industries and localities were bidding against each other for the few men unemployed with the result that wages offered by the more profitable enterprises were assuming most unreasonable figures, while men were being shipped back and forth across the country from one labor center to another. To introduce order into this chaotic situation and supply men where most needed, a plan was introduced to take men from non-essential pursuits, thus giving the laborer one central agency for employment of all kinds. This was unquestionably an excellent plan, providing it could be carried out without any deceleration in the recruiting of labor during the transition period.

Skepticism as to the success of this plan was expressed early in the program by employers of common labor, including railroad men, because the first step announced by the federal service in the execution of its plan was to close all existing agencies or place them directly under government control through a formality known as "federalizing." It also became the policy of the service at once to frown upon the fee agency for the obvious reason that in the face of a most profound shortage of labor there could be no excuse for making a man pay for the privilege of getting a job.

The execution of the plan, however, was not as drastic as originally proposed as indicated by the orders issued by the Railroad Administration requiring the roads to comply with the wishes of the employment service. The private agencies were placed under government control, as were the agencies

of the individual railroads, but the roads were permitted to continue the solicitation of labor along their lines and at points where there were no agencies.

Matters did not move very smoothly, although there is a difference of opinion as to the reasons for the difficulties. Officers of the employment service hold that they did not receive the complete co-operation of the railroads, while the railroad officers, on the other hand, infer that the employment service was not organized to handle unskilled labor of the kind commonly employed by railroads. One suggested shortcoming was a lack of adequate supervision to insure that the man actually did ship out after he had been registered or assigned to a given job. Chief among the objections, especially in the early days of federal labor supervision, was that the employment service attendants usually lost interest in the railroad officer's request for men as soon as he stated the rate he was authorized to pay for his help, presumably because the recruiting of men for munition plants at much higher rates proved more congenial. Another source of difficulty was the inability of the employment service to control the activities of some of the great war industries in their strenuous campaigns for help.

Repeated reports of these difficulties to regional officers finally led to regional instructions to the effect that applications for men at the government agencies did not relieve the individual railroad officer from responsibility for the maintenance of an adequate force to conduct the work under his direction. This naturally led to a greater exercise of individual initiative in the procuring of men. Some railroads opened their own agencies in the labor centers, and although most of these were "federalized," a few were said to have made more or less use of the old private agencies. The federal service, however, has continued to be a potent factor in the recruiting of men and is still being called on to supply men for railroad work.

Compensation

Adequate compensation for employees was one of the earliest subjects considered by the Railroad Administration. On January 4, the director general conferred with the officers of four railway brotherhoods with regard to demands made on the railroads before they were taken over by the government. As a result of this conference the director general announced a plan for the appointment of a committee to investigate the entire subject of wages and a committee thus appointed a short time later, consisting of Franklin K. Lane, secretary of the interior; C. P. McChord, member of the Interstate Commerce Commission; J. Harry Covington, chief justice of the Supreme Court of the District of Columbia; and William R. Willcox, of New York, held its first meeting on January 21. Other meetings followed almost daily for the purpose of hearing deputations representing all classes of railway employees until about March 1, when the committee commenced the preparation of its report which was made public in May. Under the provisions of this report all classes of employees were treated alike under a plan founded on two fundamental principles, (1) that the purpose of a wage advance was to afford the employee relief from the heavy increases in the cost of living since the first year of the European war, and (2), that the burden of this increased cost of living fell heaviest on the man with the smallest earnings. Accordingly it was recommended that an advance be granted the employees on a sliding scale of percentages, figured on the rates of pay in effect in December, 1915, these percentages ranging from a maximum of 43 per cent for the man receiving $46 or less a month to nothing for the person receiving $250 per month or more.

The recommendations of this report were made effective on May 25, by an order of the director general known as Order No. 27. This embodied two modifications of the original report tending to correct the inadequacy of its provisions with respect to common laborers and shopmen, since the percentage of increase provided for in the report, over the wages in effect on December, 1915, were entirely inadequate to compete with the rates being paid these classes of employees by other industries. Accordingly the shop trades were awarded a minimum hourly rate of 55 cents, while laborers were given a minimum of 2½ cents per hour more than the rates in effect on December 31, 1917.

One of the effects of applying these advances by percentages over rates in effect December, 1915, was that the employee lost all advantage of any advances received in the intervening two years, unless there had been a clearly defined change of position. There was, however, one exception to this. Train service employees who had profited by the basic eight-hour day legislation of 1917, obtained advances clearly over and above the additional compensation resulting from the eight-hour day, since the order provided that the rates of increase in their pay should be determined from the average monthly compensation for the fiscal year of 1915 for each class of service, and that these percentages should then be applied to the mileage rates in existence at that time.

The wage award of Order No. 27, however, proved unsatisfactory to nearly all classes of employees and pleas for relief to the Railroad Board of Wages and Working Conditions, created by one clause of Order No. 27, were presented by many different groups of men. The hearings of these various complaints led to the promulgation of certain supplements to Order No. 27, providing special awards of wage increases for individual classes of employees. As each of these involved conditions peculiar to the several classes of employment they are treated under separate headings.

Maintenance of Way Employees

In no department of railway service at the beginning of the past year was there as great disparity between the wages paid by the railroads and the outside interests as in the maintenance of way department. Supervisory officers had done their best during 1917 to improve working conditions and housing and feeding facilities, but it became apparent very soon in the spring of 1918 that no matter how great were the advances attained in these conditions it was impossible to hold men if there was an appreciable spread between the wages they were being paid and those which they could get elsewhere. Not only were the men afforded opportunities for doing common labor at considerably higher rates, but many of the brighter and more intelligent of them were being recruited for the semi-skilled trades of the war plants. The bridge and building carpenter forces too, had been subject to enormous inroads for some time because of the activities in cantonment, ship building, and munition works construction.

Government control of the railroads introduced a disturbing factor, since it made the individual roads uncertain as to their authority in granting wage advances to meet the competitive conditions. Although the wage commission was at work within less than a month after Mr. McAdoo assumed control of the railroads, it was confronted with such an enormous task that relief could not be expected in time to be of much benefit for the early days of the working season.

The first action taken on the part of the Administration was an attempt at temporary standardizations of track laborers' wages by the regional directors. Thus the director of the Western region issued an order on March 30, fixing the rate of wages for track laborers in the southwest and western territories at 25 cents and in the northwestern territory at 27½ cents, with the latter rate applying also to all terminals. When Order No. 27 finally appeared on May 25, it was found to be virtually impotent as far as the lower classes of labor were concerned. Consequently orders were issued by regional directors granting additional raises in rates to track forces. Orders were also issued calling atten-

tion to the need of making living and working conditions as attractive as possible.

These measures proved ineffective in keeping up the forces. Inquiries made of railway officers during the month of July indicated that the shortage in the track forces at that time was from 30 to 50 per cent of the estimated number required to complete the season's program. Conditions, however, were found to vary greatly since some roads had nearly the full complement while others had a totally inadequate force.

Hearings by the Board of Wages and Working Conditions on the status of employment in the maintenance of way department finally became the basis for Supplement No. 8 to Order No. 27 issued September 10 and made effective as of September 1. This superseded provisions of Order No. 27 insofar as it applied to the employees covered in the supplement and in place of the percentage increases provided in the order there were introduced specific advances for hourly, weekly and monthly rates of pay according to a carefully prepared classification of employees. For instance, track laborers were advanced 12 cents per hour over the rate in effect on January 1, 1918, with a minimum of 28 cents and a maximum of 40 cents. Track foremen were granted an advance of $25 per month over the rates of January 1, with a minimum of $100 a month, while assistant foremen were given 5 cents an hour more than the laborers.

Generally speaking, the provisions of Supplement No. 8 were satisfactory insofar as they concerned most of the laborers and craftsmen, but early interpretations of this supplement indicated that the foremen, especially in the case of bridge and building and water service groups, would in many cases receive less compensation than the men who worked for them. Later interpretations, taking into account the provisions for a basic eight-hour day, under which it was assumed that the new monthly rate was based on an eight-hour working day with provisions for overtime provided a reasonable spread over the compensation to the workmen in most cases.

No mention is made in Supplement No. 8, or any other supplement, of draftsmen or engineering assistants in the maintenance and construction departments, but some interpretations have classified these men either as clerks in Supplement No. 7, or as under a blanket provision of Supplement No. 8, so that in these cases the engineering assistants in the minor positions have been fairly well provided for. Engineers holding positions comparable to those of the lower division officers have not been covered in any way by Supplement No. 8, although most of the division officers have received recognition in the form of a supplemental regional order granting additional compensation. Thus, on August 1, roadmasters received an advance of $25 per month over the rate in effect on January 1, 1918.

The Mechanical Department

During 1917 the demands of munition plants for skilled mechanics had seriously depleted the ranks of the railroad shop men. At the beginning of 1918 there was a serious shortage of both skilled and unskilled workers. Director General McAdoo's promise to grant adequate wages was quite as effective in holding the men as any actual increase could have been and comparatively few mechanics left the service during the early part of the past year. The employees of the mechanical department were not satisfied with the increases awarded by the provision of General Order No. 27, and the disapproval of the findings of the commission was so strong that strikes took place in two shops. It was evident that the employees had expected to be awarded wages commensurate with those paid to mechanics in war industries. In hearings before the Board of Wages and Working Conditions the representatives of the shopmen's organization asked for a rate of 75 cents an hour. Supplement No. 4 to General Order No. 27 established minimum rates of 68 cents an hour for mechanics, boiler makers, blacksmiths, sheet metal workers, molders and first class electrical workers, 58 cents an hour for carmen and second class electrical workers, and 45 cents an hour for helpers. It provided also for foremen paid on an hourly basis a rate 5 cents higher than their respective craft and an increase of $40 a month for foremen paid on a monthly basis, with a minimum of $155 and a maximum of $250. For the sake of uniformity all foremen were later placed on an hourly basis, the basic eight-hour day was established and the increases were made retroactive to January 1, 1918.

Other classes of labor in the shops were granted increased wages under the provisions of Supplement No. 7 issued September 5, 1918, the minimum rates established being $110 per month for stationary engineers; $90 a month for stationary firemen and power house oilers; 38 cents an hour for locomotive boiler washers; 33 cents an hour for power transfer and turntable operators; 31 cents an hour for shop, roundhouse and storehouse laborers, and 28 cents an hour for common labor. The rates specified in Supplement No. 7 were not retroactive but were effective September 1, 1918.

The increases in the wages resulting from the application of the new schedules have been variously estimated at from 40 to 60 per cent in the locomotive department and from 40 to 90 per cent in the car department, varying considerably, depending on the basis of payment previously in force. The supplements to General Order No. 27 made no provision for increases in the piece work prices, and this has resulted in the abolition of piece work in practically all shops. In general the mechanical department employees were well pleased with the wages awarded by Supplements 4 and 7. The migration of railroad shop employees to other industries practically ceased and many who had left railroad service returned to their former occupations.

Director General McAdoo stated that he expected every railroad employee, by faithful and efficient service, to justify the large increases of pay granted to them. However, the evidence at hand indicates that this result was not secured. The shopmen were given an opportunity to increase their earnings very materially, but instead of working steadily after the new rates went into effect, many of the men worked only enough days in each month to earn a small amount in excess of what they formerly received. The percentage of absentees in the shops was in some instances as high as 30 and to find 20 to 25 per cent "laying off" was not unusual.

While piece work systems were not abolished, the earnings under existing piece work rates were in most cases only slightly higher and in some cases even lower than the established minimum wage for mechanics. Consequently when the higher rates went into effect, there was no longer sufficient incentive for men to increase their production to a point where they would earn more than the guaranteed rate per hour. On the few roads where the rates earned on piece work were considerably higher than the present wages, the system is still in effect and the unit production has not fallen off appreciably, but where the incentive has been removed, the output has fallen very markedly.

Records of the average earnings on roads which had piece work systems before and since the wage increases went into effect are available. On one typical road these data showed that whereas the men earned an average of 45 cents an hour under the old piece work system, they were now earning 35 cents an hour, but were of course receiving the minimum rate of 58 cents an hour. On another road it was found that the output was but 60 per cent as much per man as formerly and 40 per cent as much work was being turned out per dollar as before. These are by no means extreme instances, as in some cases the records for whole shops show that the men's earnings have dropped to from 20 to 30 per cent of what they had been while the work was being done at piece rates. It is probably no exaggeration to say that in the shops

where piece work has been eliminated, the output per man has decreased 30 per cent and the labor cost of doing the work has increased 50 per cent.

The experience gained during the past year demonstrates plainly that increasing the hours worked does not increase the output in proportion. In general as much work was done in a ten-hour day as in a thirteen-hour day and the officers of one road stated that they expected to secure practically the same output with the shops running 48 hours a week that was obtained when the men were working 70 hours a week. It should be stated, however, that the eight-hour day has not been received with favor, particularly by the car men, and under this condition the normal production cannot be secured.

In considering the records of the shops, the fact must not be overlooked that supervising officers were working under unfavorable conditions. The foremen as a class were underpaid. Many had given up their positions to return to work at the trade and this tendency became even more marked after the issuance of General Order No. 27. Had the foremen been granted salaries commensurate with their responsibilities the labor situation would undoubtedly have been improved. The inadequate wages not only made it difficult to secure competent men for the supervising forces, but it also resulted in the foreman losing authority as, where the workers receive higher wages than the supervising forces, they feel that the foremen are their inferiors and obey instructions grudgingly, if at all. It was not until November 1 that the supervising forces were granted adequate wage increases. While the final wage scales for the foremen were in general quite satisfactory, they came too late. The most trying times had passed and the roads had lost the full production that might have been secured had the foremen been able to exercise complete authority in the management of the shops.

Special Supplements for Other Classes of Employees

Aside from the shop and maintenance of way employees, several other large groups of railway workers received special consideration in supplemental orders. Thus Supplement No. 7, referred to previously, also granted increases in pay to clerks in all departments, station employees and laborers in stations, storehouses and warehouses. In the case of employees paid by the month this supplement, in general, granted increases of $25 per month over rates in effect on January 1, 1918, with minimums of $87.50 for clerks, $45 for boys under 18 years of age serving as messengers, office boys, etc., $70 for janitors, elevator operators, watchmen, etc.

Supplement No. 10, dated November 16, announced increases to telegraphers, telephone operators, except switchboard operators, agent telegraphers, agent telephoners, towermen, levermen, tower and train directors, block operators and staff men. Under this supplement wages in effect January 1, 1918, were reduced to an hourly basis according to a formula given and to which an increase of 13 cents was added, with a minimum of 48 cents per hour. These advances were made effective as of October 1. On October 23 Supplement No. 11 was announced granting wage advances to non-telegrapher station agents. This was essentially an advance of $25 per month with a minimum of $95.

Train and Engine Service

The train and engine services were probably affected less by the labor shortage than any other class of employment. The reason for this is obvious; employment in these services is more attractive than in any other, so that outside employment did not offer sufficient inducements for men in the train or engine service to leave the railways, while most applicants for railway employment naturally preferred work in train and engine services to that in any other branch of the service.

Owing to the operation of seniority rules in both the train and engine services, any shortage of men would be manifested only in the positions at the bottom of the ladder. There were shortages in certain localities at different times in the ranks of firemen, brakemen and switchmen, but apparently the worst shortage occurred during the influenza epidemic of recent months. In the East, particularly in the New York district, some difficulty was experienced in keeping the switching forces at a working level, making it necessary to lower the standards in recruiting men. In the West some shortage of firemen and brakemen was experienced in the Northwest states, but practically no difficulty was experienced in the Southwest. This is explained primarily by differences in traffic which was depressed to a considerable measure in the Southwest by an adverse season. Train and engine service employees have received no wage awards other than that granted them by General Order No. 27, but representations have been made to the Board of Wage and Working Conditions concerning which no report has appeared to date.

The Accounting Department

Even in the past it has been customary in the accounting department of many of the larger railroads to employ women for some classes of work. The individual opinions of accounting officers differ greatly as to the extent to which they can be profitably employed instead of men. There are not a few accounting officers who express the opinion that in normal times it is better to employ men only in the general auditing offices as well as in freight offices. Others are of exactly opposite opinion and believe that women are better fitted for the greater part of the routine work of clerks in audit offices than are the classes of men who can be attracted by the comparatively low wage which has been paid. The result of the war and scarcity of men, especially those of the age employed in auditing offices, led to the substitution of girls for men even where the policy of the road or the opinion of the auditor was against such substitution. There was, however, comparatively little of drastic change in such employment of women to do men's work. Certainly, there was no such new experiment involved as was involved in the employment of women in shops, as track laborers, or in signal towers.

From such canvass of accounting officers as the *Railway Age* has made, opinion appears to be divided as to the desirability of continuing the employment of women where before the war men were employed. For instance, on one road it is pretty generally believed that the substitution of women and the extension of the use of computing machines and tabulating machines forced on the road by scarcity of men has resulted in demonstrating quite clearly the economy and feasibility of such a change. On another road, competing in the same labor market, the consensus of opinion appears to be that even where more extended use is made of calculating and tabulating machines, it is, under ordinary circumstances, more economical to employ boys to operate the machines than to have girl operators. Accounting officers in other parts of the country are similarly divided in opinion. The great majority would agree, however, that extension of the use of mechanical devices has tended toward greater efficiency in the audit office.

One objection to the use of women throughout the work of an auditor's office below the rank of chief clerk is that no chief clerks are being trained in the ranks. The question, of course, arises as to whether in time women may not rise from the ranks and qualify as chief clerks. Most auditors doubt this, but time only can prove it. It will be recalled that when girls first began to be employed extensively as stenographers in railroad offices, the cry of "Where are we going to get our next generation of railroad officers from, if none are being trained as stenographers?" was raised. The

question thus raised solved itself owing to the fact that it was still necessary for quite large classes of railroad officers to employ male stenographers if for no other reason than because of the necessity of traveling over the line at frequent intervals, and, furthermore, because of the fact that there were plenty of other ways for an embryo railroad officer to get a training in railroad work other than starting in as a stenographer. The objection to the employment of women in the accounting offices, however, has somewhat more force. It is quite feasible to employ women exclusively as clerks in nearly all branches of audit office work, and it is not so apparent that the future chief clerk and accounting officer can get the necessary training to fit him for his job in any other way than serving as a clerk.

Some roads after they began to employ women in the auditor's office more extensively, adopted a system of giving the clerks a rest, even if but for a few minutes, at frequent intervals during the day, the single rest period at lunch time being thought to be insufficient. Where a five or ten-minute rest period at intervals of two or three hours has been adopted, it is generally considered to work well and to increase rather than decrease the output of the clerks. This might, however, have been equally the case had it been tried out with men clerks in the way it is now being tried out with the girls.

Government Attitude Toward Labor

In no branch of the railroads has the effect of the government attitude toward labor been more clearly shown than in the mechanical department. One of the first significant changes was a marked increase in the number of men enrolled in labor organizations. Soon after the Railroad Administration announced that no distinction should be made between members and non-members of labor organizations, representatives of organized labor appeared at the shops where the mechanics had not already formed unions. As a result of the activities of the federation, there is probably not a shop in the country today in which a local lodge has not been formed. This movement has been furthered by the evident advantages of organized labor in enforcing its claims on the administration and by the widespread opinion among the workers that organized labor has been especially favored in the wage awards.

The removal of the power of determining wages from the officers of the individual roads has had an unfortunate effect on discipline, particularly in the shops and among train service employees. The men became imbued with the belief that any favors they were to receive would be determined by the authorities at Washington and that the administration of discipline would likewise be governed by the central body. This has resulted in flagrant cases of insubordination. Men have refused to obey the orders of their supervisory officers, have denied their power to discharge them and whenever they were not satisfied with decisions in matters affecting wages or working conditions, have carried the matter to Washington in the form of complaints or grievances. In general the men have been inclined to give credit for all the benefits they have received to the Railroad Administration, but have placed all the blame for undesirable conditions on the local officers. The general detrimental effect of this situation on the morale of the workers can readily be appreciated.

Later in the year, the administration officers seem to have arrived at a realization that the men were not giving a fair day's work for a fair day's pay. Belated attempts were made to increase the production of the shops. The general supervisors of equipment visited a number of shops and by personal appeal endeavored to speed up the workers and restore discipline. These men have stated that the workers are not giving the government the output which they had given to the railroads under private control, regardless of the fact that wages have been increased and working conditions improved. In one case following an unpopular reduction in the working hours, the men deliberately cut the output more than 50 per cent. The equipment inspectors have also insisted that insubordination must cease, and that shopmen must obey their officers. This movement should result in better output in a short time under the present conditions.

Since the signing of the armistice labor conditions have undergone a rapid change. In the sections of the country where many war industries are located, there are now plenty of mechanics available. In other sections a slight shortage of skilled labor is reported. The working period in the shops has been reduced to eight hours per day and where it is found that a single shift will not give the required output, the second shift is to be organized. This arrangement has been put in force in order to give employment to the maximum possible number of men during the reconstruction period. With the decrease in the demand for skilled labor there has come a change in the attitude of the worker. The unit production probably reached the low point during the last months of the year and during the coming months there should be a marked improvement both in morale and output.



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German Prisoners Unloading Rail at St. Nazaire, France

The Standardizing of Operating Statistics

Scope and Purposes of the Railroad Administration's New Plan for Uniformity in Statistical Reports

By Wm. J. Cunningham*
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When the operating statistics section of the United States Railroad Administration's Division of Operation was created in April, 1918, it was charged with three important tasks. The first was to devise a plan for the roads under federal control which would insure uniformity in the compilation and reporting of the statistics which deal with operating efficiency; the second was to prepare the report forms and to promulgate instructions making the standard methods and report forms effective; the third was to utilize, for the purposes of administrative control, the information made available by the new reports. The first two tasks have been practically accomplished. They related to the organization of ideas. The third task, which is one of operation, is in the early stages of development.



W. J. Cunningham

The methods and forms were promulgated under date of July 15, 1918, and were made effective with the reports for the month of August. At this date, it may be said that the operating statistics section, and its Advisory committee on operating statistics,† have, by standardizing operating statistics, brought about in that field what the Interstate Commerce Commission has accomplished in standardizing railroad accounting. It is now possible to make comparisons of the operating results of individual railroads, and of districts and regions, not only with respect to the financial features which are reflected in the monthly and annual report forms prescribed by the Interstate Commerce Commission, but also with respect to the important units of physical performance, as reported on the new standardized operating statistics forms. The qualifications and uncertainties heretofore due to variations in statistical practice, no longer attach to the interpretation of the statistics relating to train performance and to the utilization of locomotives and cars.

Everyone who has studied the statistics of physical performance of individual roads, or who has attempted to make comparisons as between roads, has found wide divergencies in statistical practice. Not only have there been noticeable differences in the several regions, but as between roads in the same territory there have been marked variations in methods and in bases which invalidated an unqualified comparison of units. Some roads have had well developed and scientific statistical systems; others have been content with little more than the rather meagre statistical requirements of the Interstate Commerce Commission. The Commission has been interested primarily in the financial returns, and its requirements have touched but lightly on statistics of physical performance.

The policy of the operating statistics section in designing the new forms and setting the new requirements, has been to continue the best in current practice, and at the same time to avoid placing too great a burden on the larger number of roads which have not been so progressive in that respect. The aim has been to utilize all of the basic data heretofore called for by the annual reports of the Interstate Commerce Commission, and to superimpose upon that structure the additional information considered essential to a scientific exhibit of the more important phases of physical performance. The new plan is not complete. It is believed, however, that the initial requirements are scientifically comprehensive without being carried so far toward the ideal as to be impractical or unjustifiably burdensome.

While the new plan was made effective with the figures for August, 1918, it was not possible to obtain complete returns for the first two months. A large amount of correspondence and many conferences were necessary to insure a clear understanding on certain features which were new to many roads. The October returns, however, are fairly complete, and, beginning with that month, the Operating Statistics Section is attempting to fulfill its functions of utilizing the figures for purposes of administrative control.

Purposes of Standard Forms

The purposes of the standard forms, as announced by Director of Operation Carl Gray's circular of July 15, 1918, are:

(a) To furnish the director general, the director, division of operation, and the regional directors with the basic data and the significant averages, ratios or unit costs which relate to or furnish indices of operating efficiency. Insofar as it is practicable the information on these forms will be utilized in supplying, through the operating statistics section of the division of operation, the statistical requirements of the several sections of the division of operation or of other divisions.

(b) To provide uniform bases, methods and forms which will insure uniformity in practice, and avoid any question as to comparability in so far as bases and methods are concerned.

While it may appear that the primary object of the new plan is to keep the central administration currently informed, and to furnish its officials and the regional directors with the data necessary to an intelligent supervision of operation, it is just as much the intention to give the local officials (the federal managers, general managers, and their subordinates) much information not heretofore universally available. The distribution of the monthly summaries, which show for each road and each region, the basic data and significant units, are designed to increase the interest of the local officials in operating efficiency by informing them not only as to their own results, but also as to those of other roads with which comparisons may fairly be made. It is realized that statistics are effective only to the extent that they are used, and that their use by the local officials should be more effective than

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†The committee met from time to time during April and May. It consisted of G. R. Martin, vice-president, Great Northern; J. G. Drew, vice-president, Missouri Pacific; H. W. MacKenzie, comptroller, Seaboard Air Line; J. J. Ekin, general auditor, Baltimore & Ohio, and W. C. Wishart, statistician, New York Central. The manager of the operating statistics section acted as chairman.

their use by the central or regional directors. The potential value of the figures lies in their successful application locally. Their value to the central or regional officials lies in their indication as to the extent and the effectiveness of the interest taken locally in improving the units of efficiency.

There is abundant evidence to support the belief that greater interest is now being taken in the figures, and that this added interest will yield substantial returns in increased attention to the details of operation which find their expression in the statistical units.

It is unnecessary to describe the plan in detail, as the forms are familiar to the majority of the readers of the *Railway Age*. The principal purpose of this article is to discuss a few of the fundamentally important principles and to explain why certain data are considered essential to a comprehensive statistical plan.

The first series of forms are numbered O. S. 1 to O. S. 7, inclusive, the prefix O. S. being the symbol assigned to the Operating Statistics Section. O. S. 1 relates to freight train performance; O. S. 2, to passenger train performance; O. S. 3, to locomotive performance; O. S. 4, to distribution of locomotive hours; O. S. 5, to freight car performance; O. S. 6, to locomotive and train costs, and O. S. 7, to the income account.

The more important features which are new to many roads appear in the reports giving the details of freight train performance, and the distribution of locomotive hours (Forms O. S. 1 and O. S. 4).

Form O. S. 1, Freight Train Performance

The freight service afforded the widest field for harmonizing differences in statistical practice and for setting scientific standards, as it has the greatest opportunities for statistical control.

The standard report of freight train performance gives the customary statistics pertaining to train miles, locomotive miles, and car miles. It is confined to "straight" freight service, and does not include mixed and special trains.

In addition to the statistics just mentioned, the form calls for the following data not heretofore universally compiled, viz:

Gross ton miles;
Net ton miles (from the train reports);
Rating ton miles;
Train hours.

Gross ton miles are defined as the gross weight of the train (cars, contents and caboose) multiplied by the miles the train is moved. The figures are to be compiled from the conductor's train report. Gross ton miles represent the gross transportation product of train miles and locomotive miles. They are the product which may be credited to the operating department, and against which the direct expenses of train wages, fuel and other locomotive and train supplies may be charged. Subject to qualifications which will be referred to, gross ton miles are the best measure of train and locomotive efficiency. They represent the weight behind the drawbar and the distance which that weight is moved.

The computation of gross-ton miles has been common throughout the West and Southwest, but has not been as common throughout the South and East. An examination of the statistical reports of all railroads made by the operating statistics section last May indicated that they were computed either for the entire system or for parts of systems making up about 75 per cent of the road mileage of all Class 1 roads in the United States. The requirement that gross-ton miles be made a standard measure, therefore, introduced nothing new to the great majority of railroads. However, there have been differences in the methods used which made it difficult to compare the figures. Some roads adopted certain arbitraries, instead of making exact computations; others included only the slow, or tonnage freight trains; and others added in the weight of the locomotives, so as to afford a measure of traffic density for the purposes of maintenance of way statistics. It is now required that gross-ton miles shall be computed from the actual gross weights as reported for each car in the train on the conductor's "wheel" report. The weight of the locomotive is not included, as it is not considered a part of the transportation product.

Net-ton miles are defined as the net weight of the freight (revenue and non-revenue) in the cars of the train, multiplied by the miles the train is run. These figures, as well as the gross-ton miles, are taken from the conductor's train report, and therefore correspond with the gross-ton miles. The net-ton miles thus derived represent the net-transportation product which should be credited to the operating department, but the figures should always be related to the gross-ton miles when an analysis of operating results is undertaken.

There is nothing new in net-ton miles as a measure of train efficiency. The novelty is in the method of compilation. Except in the few cases where the net-ton miles have been derived from the same source as the gross-ton miles, the net-ton miles compiled from waybills have been used for train efficiency statistics. For reasons which will be cited the waybill ton miles cannot satisfactorily answer the purposes of a scientific exhibit of freight-train performance, although they are valuable as a measure for obtaining the average revenue per ton mile and the average haul per ton. Ton-mile statistics have been required for many years by the Interstate Commerce Commission, and it has been the common practice for railroads to use these figures as a base for obtaining the train load and the car load.

Net-ton miles from the waybills are defective as a measure of train efficiency because they do not correspond to the actual production of the train miles and car miles of a given period, and because they are not available in time for current and effective use. Waybill ton miles for a given month are based on the waybills actually taken into account in that month. There is always a "lap-over" of ton miles which should have been credited to the performance of the previous month, and a shortage of ton miles actually produced in that month, but not taken into account until the following month. In theory, under normal conditions, the "lap-over" should balance the shortage, but in practice there is always a discrepancy, its degree depending upon local conditions. An interruption due to congestion, washouts, or snow blockades, may delay the billing on a substantial percentage of the freight, particularly if the trouble occurs during the latter part of the month. Consequently the train, locomotive, and car miles made in that month, and their operating expenses, will be charged against that month's performance, but a considerable amount of the transportation product is held up to go into the accounts of the next month.

Under governmental control the extent of this "lap-over" has increased because of the adoption of the universal interline waybill, which has resulted in a greater proportion of interline waybills. These are the waybills which are slow in being taken into account. Moreover, the "short-routing" of freight, the common use of paralleling lines, and of terminals and other accounting short cuts, which are authorized under unified control, add to the difficulties of giving each road and each month its proper credit for ton-mile production.

Finally there is the objection of delay in obtaining the information. Waybill ton miles are rarely available until well along in the second month. The waybill ton miles of January are usually not available until March 15. The information is then too old to be used effectively for operating control.

The computation of net-ton miles from the conductor's train reports is, in a measure, a duplication of the work of compiling similar information from the waybills, but it is believed that the additional expense is amply justified. Under the new plan the net production in ton miles is available on the 15th day of the following month, or one month earlier than the waybill ton miles. There can be now no question concerning the propriety of comparing the net with the gross ton miles, nor with relating both units of product with the

ain miles, locomotive miles, train hours, and operating ex-enses of the particular period under review.

It may be possible later to utilize the net-ton miles, from ie "wheel" reports, for the purposes of the Interstate Com-ierce Commission, and thus avoid the duplication of effort. 'his proposal is now under consideration.

Rating-ton miles are defined as the potential production in

UNITED STATES RAILROAD ADMINISTRATION
W. G. McADOO, DIRECTOR GENERAL

Form O. S. 1
Page 1 of 2 pages

(Name of reporting carrier)

FREIGHT TRAIN PERFORMANCE

(Not including mixed, special, or motor car trains)

Month of _____, 191 , compared with same month of previous year.

ITEM	MONTH OF _____ THIS YEAR	MONTH OF _____ LAST YEAR	INCREASE OR DECREASE AMOUNT	INCREASE OR DECREASE PER CENT
1. (a) Average miles of road operated (*Note A*)				
(b) Average miles other main tracks operated (*Note A*)				
2. Train miles (*Note B*):				
(a) East				
(b) West				
(c) Total				
3. Locomotive miles (*Note B*):				
(a) Principal and helper, east				
(b) Light, east				
(c) Principal and helper, west				
(d) Light, west				
(e) Total				
4. Car miles (*thousands*) (*Note B*):				
(a) Loaded, east				
(b) Loaded, west				
(c) Loaded, total				
(d) Empty, east				
(e) Empty, west				
(f) Empty, total				
(g) Caboose, east				
(h) Caboose, west				
(i) Caboose, total				
(j) Total, east				
(k) Total, west				
(l) Grand total				
5. Gross ton miles (*thousands*) (*Note C*):				
(a) East				
(b) West				
(c) Total				
6. Rating ton miles (*thousands*) (*Note D*):				
(a) East				
(b) West				
(c) Total				
7. Net ton miles (*thousands*) (*Note E*):				
(a) East				
(b) West				
(c) Total				
8. Train hours (*Note F*):				
(a) East				
(b) West				
(c) Total				

NOTES.

(A) Miles of road—miles of first running track. Miles other main tracks—miles of second, third, fourth, or other multiple running tracks, not including yard tracks and sidings.

(B) Follow "Classification of train miles, locomotive miles, and car miles," Interstate Commerce Commission, July 1, 1914. Include electric locomotive trains, but exclude mixed, special, and motor car trains. Train miles—Account 801, both ordinary and light; locomotive miles—Account 811; car miles—Account 821. Where movement of traffic as a whole is not east and west, substitute north for east and south for west, or combine north and south with east and west according to traffic movement.

(C) Gross ton miles—tons of 2,000 lbs. behind locomotive tender (cars, contents, and caboose) moved one mile; to be computed from conductors' train reports. Include electric locomotive trains, but exclude mixed, special, and motor car trains.

(D) Rating ton miles—the potential gross ton miles which would have been produced had all trains been loaded to 100 per cent of the slow freight rating for normal weather conditions, taking account of changes in rating over sections of the run. When the potential train load in the direction of favoring grades is now expressed in number of cars an arbitrary tonnage rating should be used as the basis for Item 6.

(E) Net ton miles—tons of revenue and nonrevenue freight moved one mile; to be computed from the conductors' train reports.

(F) Train hours—the elapsed time of trains between the time of leaving initial terminals and time of arrival at final terminals, including delays on the road. May be taken from conductors' train reports or from dispatchers' train sheets.

Form O. S. 1, Sheet 1

ross-ton miles based on the rated train load for each train in; in other words, the gross-ton miles which would have een produced if every train had been loaded to 100 per cent f the slow freight rating for normal weather conditions. The ross-ton miles show the actual production; the rating-ton iiles, the potential production; the ratio of the former to the atter is an index of train loading efficiency.

The purpose of basing the potential on the summer slow reight rating for all classes of freight trains may not be ioroughly understood. The suggestion has been made that : is unfair to charge a superintendent with the slow freight ating for a preference freight or for a way freight, and that : is unfair to refuse him credit for necessary reductions in atings because of abnormal weather conditions. The force f this suggestion is recognized, but the answer is that the 00 per cent base must be fixed. It is the "bench mark" rom which the degree of variation in performance is to be ieasured. A movable base would defeat the purpose of the eport. It is recognized that the ratio of actual to potential annot be 100 per cent unless the ratings are too low. A ratio as low as 50 per cent may not imply criticism. It may actually represent a relatively good performance when consideration is given to the character of the traffic, unbalanced movement, or adverse weather conditions. The ratio in that case is not to be interpreted as an indication that the operating department was but 50 per cent efficient. It is proper, however, to compare that ratio with the same ratio of preceding months, and to make inquiries as to the reasons for changes. If it were permissible to have a varying base the ratio would not show the effect of changes in the relative proportion of fast freights, and would not show the effect of cold weather, requiring arbitrary reductions in tonnage ratings.

The principle adopted is that the general average for all freight trains shall be expressed in terms of summer rating for slow freights. It may not be proper to make absolute comparisons between the ratios of individual roads because of differences in traffic and operating characteristics, but it is

UNITED STATES RAILROAD ADMINISTRATION
W. G. McADOO, DIRECTOR GENERAL

Form O. S. 1
Page 2 of 2 pages

(Name of reporting carrier)

FREIGHT TRAIN PERFORMANCE

(Not including mixed, special, or motor car trains)

Month of _____, 191 , compared with same month of previous year.

ITEM	MONTH OF _____ THIS YEAR	MONTH OF _____ LAST YEAR	INCREASE OR DECREASE AMOUNT	INCREASE OR DECREASE PER CENT
AVERAGES.				
9. Per freight train mile:				
(a) Locomotive miles, east (*excl. light*) (3a ÷ 2a)				
(b) Locomotive miles, west (*excl. light*) (3e ÷ 2b)				
(c) Locomotive miles, total (*excl. light*) (3a + 3c) ÷ 2c				
(d) Loaded car miles, east (4a ÷ 2a)				
(e) Loaded car miles, west (4b ÷ 2b)				
(f) Loaded car miles, total 4c ÷ 2c				
(g) Empty and caboose car miles, east (4d + 4g) ÷ 2a				
(h) Empty and caboose car miles, west (4e + 4h) ÷ 2b				
(i) Empty and caboose car miles, total (4f + 4i) ÷ 2c				
(j) Total car miles, east (4j ÷ 2a				
(k) Total car miles, west 4k ÷ 2b				
(l) Total car miles, total 4l ÷ 2c				
(m) Gross ton miles, east (5a ÷ 2a)				
(n) Gross ton miles, west (5b ÷ 2b)				
(o) Gross ton miles, total (5c ÷ 2c)				
(p) Rating ton miles, east (6a ÷ 2a)				
(q) Rating ton miles, west (6b ÷ 2b)				
(r) Rating ton miles, total (6c ÷ 2c)				
(s) Net ton miles, east (7a ÷ 2a)				
(t) Net ton miles, west (7b ÷ 2b)				
(u) Net ton miles, total (7c ÷ 2c)				
10. Per freight train hour:				
(a) Train miles, east (*speed in miles per hour*) (2a ÷ 8a)				
(b) Train miles, west (*speed in miles per hour*) (2b ÷ 8b)				
(c) Train miles, total (*speed in miles per hour*) (2c ÷ 8c)				
(d) Gross ton miles, east (5a ÷ 8a)				
(e) Gross ton miles, west (5b ÷ 8b)				
(f) Gross ton miles, total (5c ÷ 8c)				
(g) Net ton miles, east (7a ÷ 8a)				
(h) Net ton miles, west (7b ÷ 8b)				
(i) Net ton miles, total (7c ÷ 8c)				
11. Net ton miles per loaded car mile:				
(a) East (7a ÷ 4a)				
(b) West (7b ÷ 4b)				
(c) Total (7c ÷ 4c)				
12. Per cent loaded to total car miles (*excl. caboose*):				
(a) East 4a ÷ (4a + 4d)				
(b) West 4b ÷ (4b + 4e)				
(c) Total 4c ÷ (4c + 4f)				
13. Per cent net ton miles to gross ton miles:				
(a) East (7a ÷ 5a)				
(b) West (7b ÷ 5b)				
(c) Total (7c ÷ 5c)				
14. Per cent gross ton miles to rating ton miles:				
(a) East (5a ÷ 6a)				
(b) West (5b ÷ 6b)				
(c) Total (5c ÷ 6c)				

Form O. S. 1, Sheet 2

proper to compare the ratio of any one road in any one period with its corresponding ratio in another period.

Train hours are defined as the aggregate elapsed time of trains between the times of leaving initial terminals and of arrival at final terminals, including delays on the road. A relatively small number of roads have taken cognizance of the importance of the time element in operating statistics, but it seldom is sufficiently emphasized. In these times, when maximum production is the desideratum, the product must be

measured by time as well as by volume per train unit. If an increase in the train load is accomplished at the sacrifice of a correspondingly greater reduction in train speed, the net result is a loss in ton miles per train hour. The unit "Ton miles per train hour" is obtained by dividing the total ton miles by the total train hours. Train efficiency may be increased (a) by increasing the train load without a corresponding reduction in train speed; (b) by increasing the train speed without a corresponding reduction in the train load; or (c) by increasing both the train load and the train speed. The effect of the changes in one or both factors is reflected in ton miles per train hour. The policy of the operating statistics section is to emphasize the importance of this unit in analyzing the net results of train operation. The prime importance of the time factor is recognized also on Form OS-5, in the unit "Ton miles per car day." The two elements—weight and speed—must be considered both separately and together. The units just described reflect their combined effect.

Attention is directed to the fact that all of the basic data, averages and percentages are shown separately by directions. The figures are reported as east, west and total, the instructions providing that in the cases where the movement of traffic as a whole is not eastward and westward, north should be substituted for east, and south for west, or north and south should be combined with east and west according to the traffic movement. This subdivision of the statistics is of the highest value in analyzing the results, inasmuch as it is possible to determine the effect of unbalanced traffic and of other operating or traffic features which are favorable in one direction and unfavorable in the opposite direction. It frequently happens that the total train load (both directions combined) will show no change, yet an analysis will develop the fact that a marked loss has occurred in one direction, this loss being neutralized by a corresponding gain in the opposite direction. Without the statistics by directions a loss in one direction would not be known and no credit would attach to the gain in the other direction.

Averages and Ratios—From the basic data on the first page of Form OS-1, the significant averages and ratios are derived and reported on page 2. The more important of these units have already been referred to in the discussion of the basic data.

Of first importance is "Net ton miles per train hour." This is the resultant of the average net train load and the average train speed in miles per hour. Since all of the items on the report call for a comparison with the previous year, and for the amount and percentage of increase or decrease, it is easy to measure the relative effect of changes in the components of any average.

How Results Are Analyzed

To illustrate, a specific case may be taken with the actual figures. The net ton miles per train hour show an increase from 4,877 to 5,216, or 6.9 per cent. This better performance was due to an increase in the net train load from 488 to 499, a gain of 2.3 per cent, and an increase in the train speed from 10.0 to 10.5 miles per hour, a gain of 5.0 per cent. Next in order, an examination may be made of the factors which influence the net train load. In the first place, it is noted that the ratio of locomotive miles to train miles shows a slight increase from 1.032 to 1.041, or 0.9 per cent. This indicates, probably, a slightly greater use of helpers or double-headers. Next, it is found that the net tons per loaded car mile increased from 22.5 tons to 24.2 tons, a gain of 7.6 per cent. The changes in these factors should have a favorable influence on the train load. On the other hand, it is noted that the per cent of loaded to total car miles—74.4 per cent last year, 71.2 per cent this year—shows a loss, a decrease, of 4.3 per cent, and that the per cent of net ton miles to gross ton miles fell from 47.0 per cent to 46.1 per cent, a loss of 1.9 per cent. These factors exert an unfavorable influence on the net train load. Finally, it is found that the per cent of gross ton miles to rating ton miles has changed in the right direction—76.5 per cent to 77.3 per cent, an increase of 1.3 per cent. These changes may be summarized:

	Per cent
Favorable	
Car load increased	7.6
Per cent of rating hauled increased	1.3
Unfavorable	
Per cent of loaded car miles decreased	4.3
Per cent of net to gross ton miles decreased	1.9
Incidental Factors	
Ratio of locomotive miles to train miles increased	0.9
Loaded car miles per train mile decreased	4.6
Empty car miles per train mile increased	11.6
Total car miles per train mile decreased	0.3
Gross ton miles per train mile increased	4.6
Rating ton miles per train miles increased	3.1
Net Result	
Net tons per train mile increased	2.3

The changes in each average or ratio may be analyzed by referring to the changes in the basic data. For example, what caused the loss in the per cent of net to gross ton miles? By referring to the basic data, it is found that both net ton miles and gross ton miles show an increase, but the increase in gross was 17.8 per cent, while the increase in net ton miles was 15.4 per cent. The cause of this is seen in the car mile statistics, where the empties show an increase of 26.4 per cent, while the loads show an increase of but 7.5 per cent. Since all of the statistics are shown separately by directions it is possible to trace the effect of changes in the relation of eastward to westward traffic. In this case, it is noted that the per cent of increase in gross ton miles was identical in each direction, viz., 17.8 per cent, but, in the case of net ton miles, the increase eastward was 16.8 per cent, while in the westward direction the increase was but 12.6 per cent. The loss, then, occurred in the westward movement. Looking again at the car miles, it is seen that the loads in the eastward direction increased 17.0 per cent, while westward they decreased 5.4 per cent. With the empties, the conditions are reversed. Eastward they show an increase of 22.4 per cent; westward the increase was 27.5 per cent.

These examples show the possibilities of analysis of each single factor and its effect on units of performance. The forms are designed to reflect all important items of information, and each form, while independent in its own field, is interrelated to a greater or lesser extent with the other forms applying to other phases of operation. In other words, the forms are designed to "tie in" to each other and together to furnish the complete exhibit.

Form O. S. 2, Passenger Train Performance

The degree of refinement attaching to the statistics of freight train performance is not justified in connection with the passenger service. The latter is not so susceptible of control. The trains must be run as scheduled, whether they are fully or but partly loaded. Consequently there is little to be gained by computing gross ton miles in passenger service. Instead of gross ton miles, Form OS-2 calls for passenger train car miles as a measure of performance. No additional accounting is required, since all of the basic data are required for the purposes of the annual report to the Interstate Commerce Commission.

Form O. S. 3, Locomotive Performance

Compared with the orthodox locomotive performance sheet, this report appears to be rather meagre in scope, but, in connection with the data reported on Forms OS-1 and 2, it fur-

shes the vital information for freight, passenger and vitch service, in the following averages:

Locomotive miles per locomotive day—
(a) Serviceable locomotives;
(b) Total locomotives;
Per cent of serviceable to total locomotives;
Gross ton miles per locomotive mile—freight;
Passenger train car miles per locomotive mile—passenger;
Pounds of coal per locomotive mile—freight, passenger and switch;
Pounds of coal per 1,000 gross ton miles—freight.

Much of the information appearing on the average locotive performance sheet, which the new form is designed displace, appears on the reports of freight and passenger ain performance, and of locomotive and train costs, (Forms S-1, 2 and 6), as well as on Form OS-4, next described.

orm O. S. 4, Number of Locomotives and Distribution of Locomotive Hours

This form has caused more additional work than any other ngle report for the reason that, except on a very small mber of roads, no data of the kind has heretofore been

UNITED STATES RAILROAD ADMINISTRATION
W. G. McADOO, DIRECTOR GENERAL

Form O. S. 4

(Name of reporting carrier)

DISTRIBUTION OF LOCOMOTIVE HOURS

Month of _____, 191 , compared with same month of previous year.

Figures for previous year to be shown in red above figures for this year

ITEM	LOCOMOTIVE HOURS IN— FREIGHT SERVICE		PASSENGER SERVICE		YARD SWITCHING SERVICE		MIXED, SPECIAL, WORK SERVICE		TOTAL TRAIN, YARD AND WORK SERVICE	
	Hours	Per Cent	Hours	Per Cent	Hours	Per Cent	Hours	Per Cent	Hours	Per Cent
SERVICEABLE LOCOMOTIVES.										
1. On road or in yard switching service										
2. At terminals										
3. In enginehouse										
(a) Mechanical dep't										
(b) Transportation dep't										
(c) Total										
4 Stored										
5. Total serviceable (*Items 1 to 4*)		100		100		100		100		100
		100		100		100		100		100
	Hours		Hours		Hours		Hours		Hours	
UNSERVICEABLE LOCOMOTIVES										
6. Awaiting repairs										
7. Undergoing repairs										
8. Stored or awaiting sale										
9. Total unserviceable (*Items 6 to 8*)										
9. Grand total (*Items 5 and 9*)										
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
1. AVERAGE NUMBER OF LOCOMOTIVES:										
(a) Serviceable										
(b) Unserviceable										
(c) Total (*Items 11a and 11b*)		100		100		100		100		100
		100		100		100		100		100

NOTES.

Include all locomotives (steam and electric) on the road—owned, rented or leased, or assigned by U. S. Railroad Administration. Exclude owned locomotives in service on other roads.

Item 1, hours on road, represents the time in productive road and yard switching service. For locomotives in road service it should be taken from dispatchers' train reports or dispatchers' train sheets and based on hours from leaving time at initial terminal to arriving time at final terminal, including any switching time and delays en route. In yard switching service, the information may be taken from yard records, and based on hours between times locomotive leaves engine terminal to begin yard switching work and time it is returned to engine terminal.

Item 2, hours at terminals, represents time at terminals before and after the period of productive service, exclusive of enginehouse time reported in item 3. For road service, it may be taken from enginehouse and yard records and based on hours between time locomotive is delivered to transportation department and time locomotive leaves initial terminal; and between arriving time at final terminals and time locomotive is delivered to enginehouse forces. For yard switching locomotives, data to be taken from enginehouse and yard reports and based on hours between time locomotive is delivered to transportation department at engine terminal and time it leaves engine terminal for yard switching work; and hours between time locomotive reaches engine terminal at end of day and time it is delivered to enginehouse forces.

Item 3a, in enginehouse for light running repairs and other enginehouse work. (See items 5 and 7.)

Item 3b, in enginehouse after enginehouse forces have completed their work and locomotive is available for service.

Item 4, locomotives under white lead or stored, but in serviceable condition and available for service.

Item 6, in hands of or awaiting orders of mechanical department for repairs when held more than 24 hours on that account.

Item 7, in shops or enginehouse undergoing repairs when held more than 24 hours on that account.

Item 8, includes unserviceable locomotives stored while awaiting orders for sale, demolition, or other disposition.

Item 11a, obtained by dividing the number of hours in item 5 by the number of hours in the month.

Item 11b, obtained by dividing the number of hours in item 9 by the number of hours in the month.

Form O. S. 4.

ot. It has been necessary, therefore, to set up new ords to meet the requirements. In effect it is necessary to count for every hour of every locomotive every day, and show for serviceable locomotives the aggregate hours and percentage of the total hours for each class of service:

(a) On the road in productive service;
(b) At terminals, standing-by, either before beginning or after completing the road run;
(c) In enginehouses for attention of the mechanical department;
(d) In enginehouses awaiting call from the transportation department.
(e) Stored while in serviceable condition.

A locomotive which is held out of service on account of needed repairs for a period in excess of 24 hours is classified as unserviceable. The hours of unserviceable locomotives are reported under three divisions:

(a) Awaiting repairs;
(b) Undergoing repairs;
(c) Stored or awaiting sale (or other disposition).

Considerable difficulty has been experienced in obtaining complete reports compiled strictly in accordance with the requirements of the form. It was considered inadvisable to promulgate rules in detail which would specify exactly how the local officers should arrange to gather the basic data. The Administration believed that the better plan would be merely to indicate by the form and by the foot notes what is desired, and let each road proceed in its own way to gather and compile the statistics. The same principle applied to the other forms, and the results have been satisfactory except in the single case of distribution of locomotive hours. It may be necessary to promulgate instructions which will specify in minute detail the sources of information and the methods to be followed locally.

The importance of this information as to locomotive utilization justifies the cost and the trouble incident to its compilation. The statistics thus far available show some remarkable variations in the per cent of time locomotives are usefully employed, the per cent of time they are standing-by at terminals, and the per cent of time they are in the engine houses. The data will be extremely valuable to supervising and executive officers in passing upon the recommendations of the local officers for new power. The low per cent of time on the road will surprise many who have had little conception of what it really is. Many will be astonished, too, to note the extent of the stand-by losses at terminals. These statements, however, should not be interpreted as underestimating the difficulties which are inherent in increasing the per cent of time on the road, or in decreasing the idle time at terminals before starting or after completing the run. Nevertheless, it is maintained that effective remedial measures may not be applied intelligently without a knowledge of the facts. Or, to state it in slightly different form, it is only by the aid of complete statistics that the way will be pointed clearly to effective remedies. The statistics may, in certain cases, prove to be embarrassing to local officials, but they should have no difficulty in explaining an apparently poor showing in locomotive utilization, if local handicaps are insurmountable. On the other hand, the figures should furnish the local officials with the most effective argument to support their recommendations for additional and improved terminal and enginehouse facilities, where such are needed.

The publication of the summaries of these reports for individual roads and for regions will undoubtedly cause a greater interest to be taken in obtaining the maximum practicable utilization of motive power.

Form O. S. 5, Freight Car Performance

The purpose of this form is to indicate the degree of efficiency in freight car utilization. The basic data consist of the number of cars on line daily (divided to show separately those which are serviceable and those which are unserviceable); the total freight car miles—loaded, empty and total; and the total net ton miles—revenue and non-revenue combined. From these figures are derived the three factors which reflect the measure of car efficiency:

(a) Net ton miles per loaded car mile;
(b) Per cent of loaded to total car miles;
(c) Car miles per car day.

The resultant of the three factors is as shown in the inclusive unit:

(d) Net ton miles per car day.

A gain in any one factor or a loss in any one factor increases or decreases the net result. If, for example, the car-

load is increased at the expense of the car miles per car day, or the per cent of loads, the net result may be a loss in net ton miles per car day, notwithstanding the greater car load. The net result may be improved by increasing one or more of the three factors, or by increasing one or two factors without causing a relatively greater decrease in the remaining factors. The tendency since the government assumed control of the railroads has been to increase the carload and to decrease the per cent of loads, the car miles per car day showing little change. During the early months of the year, the net result was a decrease in ton miles per car day, but in recent months the greater car load and the improvement in car movement has resulted in a net gain in ton mile productivity per car. It should be noted, however, that this unit does not reflect the collateral benefits to the shipping public by the better distribution of empty cars. The policy of the Administration has been to move the empties in train loads to the regions where they were needed for prospective loading, and while this has necessarily meant more empty car miles than were made prior to unified control, the amelioration of car shortage has meant less embarrassment to shippers.

Form O. S. 6, Locomotive and Train Costs

In this form an attempt is made to segregate what are commonly termed the "direct" or "out-of-pocket" expenses of train service, viz., locomotive repairs, enginehouse expenses, train enginemen, locomotive fuel, other locomotive supplies, trainmen, and train supplies and expenses. These expenses are shown separately for the freight and passenger services, and are related to the train miles, locomotive miles, gross ton miles (in freight service) and passenger train car miles (in passenger service), with average costs (a) per locomotive mile; (b) per train mile; (c) per 1,000 gross ton miles (freight); and (d) per 100 passenger car miles (passenger). There is nothing unusual in the form and it requires little additional accounting.

Form O. S. 7, Condensed Income Account and Operating Expenses by Primary Accounts

This is merely a reproduction of the condensed income account reported monthly to the Interstate Commerce Commission, and of the details of operating expenses by the primary accounts required by the annual report form of the commission.

Publication of Summaries

As already stated, the publication of the monthly summaries is still in the development stage. The August and September reports were too incomplete to permit summarizing. The October figures, however, are fairly complete, and summaries of the important figures on the reports of freight train operation, locomotive operation, distribution of locomotive hours, freight car performance, locomotive and train costs, and the income account, will be available before this article is printed. Hereafter they will appear regularly for each month at an earlier date. It is planned to have the summaries of physical performance distributed about the first of the second month, i. e., the summaries for December should appear about February 1. Those which show operating expenses should be available about two weeks later. The policy of the Administration is to give a general distribution of the summaries to the officers of the individual roads, as well as to the officers of the Administration, so that the information thus made available may have the widest field for usefulness.

The underlying theory of the new plan of standardized operating statistics is that the transportation department is charged with a given number of locomotive days and car days and is credited with its production in net ton miles. The ton miles, in turn, are related to the expenditure in train miles, locomotive miles, and car miles, and the supplementary statistics throw light on the components of the train load and the car load, and the effect thereon of changes in ratios of net to gross ton miles, of loaded to total car miles, and of preference freights, or other lightly loaded trains, to total freight trains. The desiderata are that each locomotive and car shall be kept employed to its capacity and produce the maximum of ton miles with the minimum of train, locomotive, and car miles. The statistics are designed to show clearly the relation between the ton mile production and the time element in equipment utilization, and to indicate the relation between the actual and the potential train production.

The railroads in all sections of the country have cooperated cheerfully in making the new plan a success, and they are displaying an earnest effort to meet the requirements of the new forms. There is gratifying evidence that the adoption of the standard methods, and the more general distribution of summaries showing the operating results for all railroads, are doing much to increase the interest in operating statistics. The success of the new plan is to be measured by the use which is made locally of the reports of the individual roads, and the interest which is taken in the summaries. The results thus far are encouraging.

Railway Supply Problems

Chairman A. L. Humphrey of the committee on government purchasing policies of the Railway Business Association, has issued an invitation to railway supply men who may have criticisms or suggestions for "strengthening the association attitude, work or methods," to meet with the committee at the Hotel La Salle, Chicago, at 11 a. m., January 8. This is the day before the annual convention of the Railway Business Association.

Mr. Humphrey states that "it is the earnest hope of the present officers of the association that the forthcoming convention will be regarded and remembered by everyone in the railway supply craft as a democratic clearinghouse, whose conclusions are representative of the whole industry.

"All of us know a great deal more now about selling goods under government control than we knew on January 1, 1918. Such control will continue for a period not yet determined. Regardless of the ultimate disposition of the roads, government control for the immediate future will be our environment. What, if any, are the practices which the whole industry can agree in thinking could be modified advantageously to manufacturers and not to the injury of the public?

"Are conditions of bidding on contracts satisfactory? Are contractual terms fair? Has the adjustment from a commission to a salary selling basis been successfully accomplished and without increase in selling cost? Have design and specification preserved employment to makers of appliances or material formerly established in use? Is it reasonably easy to obtain trials for new or partly demonstrated devices? Do federal officers observe commercial ethics in such matters as adherence to contracts and avoidance of cancellations? Have you found in the Railroad Administration an attitude of respect for the integrity and general character of railway supply men as a commercial group? Has the pre-war improvement in remittances for goods continued under government control and can you suggest ways of overcoming present obstacles to more rapid accounting and the adoption and enforcement of a standard period for remittances? What other phases if any do you believe deserve consideration?

"If you cannot be present, the committee will discuss a letter and, if so stipulated, hold its source confidential."

Present Status of the Contract Negotiations

Few Roads Have Executed Their Contracts With the Government. Difficulties With the Short Lines

VER SINCE THE LAW was passed by Congress taking over the railroads for operation by the government during the period of the war and for 21 months thereer negotiations have been carried on between the legal detments of the railroads and the Railroad Administration regard to the form of contract which was to be made been each company and the government. The Railway Execves Advisory Committee and the administration came to agreement upon the standard form of contract on Sepiber 5, 1918.

After the standard form was agreed upon, each road necesily had to apply it to its individual case, and apparently ie considerable modifications will have to be made in the ndard form to fit specific cases. On the other hand, the tracts that have so far been signed do not vary greatly m the standard form. The lists of roads show only those tracts which are furtherest advanced. The others are in ious preliminary stages which it would be hard to classify. The compensation fixed in the contract is the rental which government is to pay the corporations for the use of the ds, and from this compensation the corporations must pay ir interest, corporation expenses and such dividends as y can pay.

CONTRACTS EXECUTED

Name of Road	Annual Compensation
Atchison, Topeka & Santa Fe	$42,885,310
Buffalo, Rochester & Pittsburgh	3,276,410
Chicago, Burlington & Quincy	33,390,079
Chicago, St. Paul, Minneapolis & Omaha	4,934,789
Chicago & North Western	23,364,028
Colorado & Southern and Wichita Valley	2,833,578
Fort Worth & Denver City	1,891,386
Gulf, Texas & Western	29,734
Lehigh Valley	11,321,233
Minnesota & International	202,455
New York, Ontario & Western	2,103,589
Norfolk & Western	20,640,899
Northern Pacific	30,130,068
Richmond, Fredericksburg & Potomac	1,137,373

CONTRACTS CIRCULATED AMONG MEMBERS OF RAILRIAD ADMINISTRATION STAFF AND REGIONAL DIRECTORS, BUT NOT YET EXECUTED BY DIRECTOR GENERAL

Name of Road	Standard Return as Certified by I. C. C.
Atlantic Coast Line	$16,180,915.15
Atlanta & West Point	252,995.16
Augusta Southern	22,587.01
Birmingham & North Western	34,522.00
Central of Georgia	3,450,903.32
Central New England	1,468,123.63
Central of New Jersey	9,352,301.13
Charleston & Western Carolina	466,921.15
Delaware, Lackawanna & Western	15,749,476.74
El Paso & Southwestern	4,145,102.30
Gainesville Midland	22,731.00
Georgia	858,622.00
Georgia & Florida	d 562.98
Great Northern	28,666,681.07
Galveston Wharf	562,069.92
Lehigh & Hudson River	519,371.13
Pennsylvania Railroad East	46,312,932.00
Southern Pacific	38,021,937.62
Texas & Pacific	4,107,432.49
Trinity & Brazos Valley	d 238,904.66
Western Railway of Alabama	288,237.53
Washington Southern	468,432.81

d—deficit.

CONTRACTS DRAFTED AND SENT TO COMPANIES

Name of Road	Standard Return as Certified by I. C. C.
Abilene & Southern	.....
Alabama & Vicksburg	$322,854.00
Anthony & Northern	.....
Buffalo & Susquehanna	.....
Boston & Maine*	.....
Denison & Pacific Suburban	4,702.45
Fort Worth Belt	55,108.00
Georgia, Florida & Alabama	57,637.73
Fairchild & Eastern	.....
Los Angeles & Salt Lake	3,420,417.00
Kansas City, Mexico & Orient	9,073.00
Maine Central	2,955,696.88
New England Steamship Co.	.....
Rutland	1,023,883.21
Salina Northern	.....
Union Freight of Boston	.....
Weatherford, Mineral Wells & Northwestern	31,148.57

*Tentative draft submitted by company for discussion.

CONTRACTS PREPARED IN PRELIMINARY FORM, BUT AWAITING FURTHER INFORMATION FROM COMPANIES OR SETTLEMENT OF SPECIAL CLAIMS

Name of Road	Standard Return as Certified by I. C. C.
Atlanta, Birmingham & Atlantic	$358,058.43
American Refrigerator Transit Co.	.....
Ann Arbor	526,882.96
Buffalo Creek	409,397.00
Chicago, Milwaukee & St. Paul	27,154,551.02
Durham & Southern	134,221.70
Elgin, Joliet & Eastern	2,862,177.21
Erie	15,503,938.92
Escanaba & Lake Superior	58,688.01
Florida East Coast	2,842,842.20
Grand Rapids & Indiana	929,385.42
Louisville & Nashville	17,310,494.67
Louisiana & Mississippi Railroad Transfer	.....
Memphis, Dallas & Gulf	.....
San Antonio, Uvalde & Gulf	.....
Vicksburg, Shreveport & Pacific	.....
Winston-Salem Southbound	260,251.62

CONTRACTS DRAFTED BY COMPANIES AND SUBMITTED IN PRINTED FORM, BUT AWAITING FURTHER INFORMATION ON DECISION OF SPECIAL CLAIMS

Name of Road	Standard Return as Certified by I. C. C.
Bath & Hammondsport	$7,221.43
New York Central and five allied companies	.....
New York, Susquehanna & Western	800,587.17
Ocean Steamship Co. of Savannah	.....
Union Pacific	.....

NOTE.—The present status of the contracts does not necessarily indicate the order in which they will be signed.

Short Lines

The Railroad Administration very early indicated that it did not care to be burdened with a large number of the so-called short-line railroads, and in spite of their protests announced its intention of relinquishing many of them from federal control, after they had received the same notices that were sent to other roads stating that they had been taken over by the government. This was partly because many of the smaller roads were not considered "needful or desirable" for the purposes of federal control, and partly because of the difficulty of reaching an agreement with the owners of the roads as to their compensation. On June 29 the Railroad Administration issued an order relinquishing nearly 2,000 small roads which were not considered needful or desirable, including some 1,400 plant facility roads as well as several hundred of the so-called short lines; but it had become apparent that many of the roads had been seriously affected by the fact of federal control whether any jurisdiction had been exercised over them or not, particularly by the uncertainty as to whether they had been taken over, and it was announced that "to preserve in every reasonable respect a status for the railroads so relinquished as favorable as that which they enjoyed during the three-year test period, great care will be taken to see that the railroads so relinquished are given fair divisions of joint rates, are insured a reasonable car supply—circumstances considered—and are protected against any undue disturbance in the routing of traffic."

The short lines had been particularly affected by the difficulty in making financial arrangements because of the uncertainty as to whether the government had taken them over and as to whether their earnings were to be guaranteed, and also by the diversion of their traffic in many instances to the trunk line railroads. They were also affected indirectly by the wage increases ordered by the director general and they

were not given the same advantages as to priority in materials and supplies that were accorded the railroads in the government system.

In order to secure a measure of protection a committee representing the short-line railroads entered into negotiations with representatives of the Railroad Administration for a contract which would make them certain guarantees, but without any provision for compensation by the government, and after two or three months of negotiations the director general offered the short lines a form of contract under which the roads were to be restored in a sense to federal control, but were not to be included in the government railroad system. An earlier form of contract offered by the Railroad Administration was rejected by the short line committee, but after some modifications had been made it was accepted by the committee of the American Short Line Railroad Association and recommended by it to the individual companies.

This contract, approved by Director General McAdoo on October 25, was published in the *Railway Age* of November 1, page 778, together with an account of the short-line situation. It provides that the roads are to remain under the management and direction of their owners, entitled to all revenues and responsible for all expenses, that joint rates shall be divided on the basis in effect on January 1, 1918, and that such arrangements shall be made for the routing of competitive traffic as will guarantee to the short line the same amount of competitive traffic as was enjoyed for the average of three years ending December 31. The short lines were to have the benefit of the purchasing agencies of the director general and were to receive an equitable allotment of cars and motive power.

This form of co-operative contract, as it is called, has been signed by the director general in the case of the following railroads:

Cumberland & Manchester.
Eastern Carolina.
Georgia Northern.
Pecos Valley Southern.
Missouri & North Arkansas.
South Georgia.
Western Allegheny.
Midland Railway.

No definite list of the railroads relinquished has ever been given out by the Railroad Administration, but a list has been made of 753 railroads operating 27,319 miles, or an average of 36 miles each, which have not been included among the roads operated by the Railroad Administration, and exclusive of the industrial or plant facility roads.

Has Locomotive Standardization Been Justified?

Better Results Would Have Been Obtained Had the Roads Purchased Their Own Power

One of the most radical innovations instituted by Director General McAdoo in his year's control of the railroads was that of establishing 12 standard designs of locomotives to be purchased for the railways under the jurisdiction of the Railroad Administration. This was done against the better judgment of a large majority of both railway men and locomotive equipment manufacturers and despite the fact that the President in his message to Congress said that, "Nothing will be altered or disturbed which it is not necessary to disturb." The proclaimed purpose for entering upon such a program was to provide new locomotives quickly, at as low a cost as possible, and to reduce to a proper minimum the classes of locomotives to be ordered for the railroads under government control. With the backing of but few friends, among them an officer of a locomotive building company and a railroad officer, the director general on February 13 requested S. M. Vauclain, vice-president of the Baldwin Locomotive Works, and chairman of the Committee on National Defense, one of the champions of standardization, to appoint a committee of locomotive builders to consider this problem and report within the week.

This was done and on February 19 this committee made its report to Mr. McAdoo, part of which was printed in the *Railway Age* of April 26, page 1085, in which it was stated that: "While it may be said, and truly so, that these standard designs could be rushed out quickly and the building of locomotives from them accomplished within a few months, if this is done, the factors just mentioned (providing the greatest interchangeability with existing equipment) cannot be taken into consideration within the limitations of time given and effort would have to be directed towards standardizing the details among these new types proposed without any reference to the standards now in use. This, in our opinion, would not be advisable, and we feel that the proper execution of such a series of standard designs cannot be carried out in time to permit the building of any of these locomotives for 1918 delivery. As the builders now have a considerable amount of untaken capacity for this year we would respectfully suggest that if it is your desire that this year's full capacity (of the locomotive builders) be utilized, the railways be permitted to order for quick delivery, or until these standard designs can be properly worked out, such locomotives as they require exact duplicates of those now in service on their lines."

This part of the report passed unheeded and on February 22 a committee made up of railway mechanical officers, under H. T. Bentley, superintendent motive power of the Chicago & North Western, as chairman, met—not to consider the practicability of standardization—but to proceed with the work of preparing designs for the 12 different classes of locomotives that have since been ordered. The entire preparation of these designs was under the immediate direction of Henry Walters, chairman of the Atlantic Coast Line and the Louisville & Nashville, and special representative of the director general.

Early in April the work had progressed sufficiently for the preparation of tentative general specifications, which were sent out to the various roads with the request that they indicate the number of the different types they would care to have allotted to them. On April 30 an order for 1,025 of these locomotives was announced. During all this time sentiments were expressed by both railway men and equipment manufacturers against such an extreme policy, particularly while the nation was at war; these were published both in the columns of the *Railway Age* and the daily press.

If, by chance, the general plan of locomotive standardization was in any way practical for the railways in this country, the plan would have to be followed a large number of years in order to in any way justify it. This indicates that the director general had a firmly fixed idea that the railways would remain under the control of the government, if not permanently, for a considerable length of time. This thought was also made more evident by the manner in which the order for the first 1,025 locomotives was distributed be-

ween the American Locomotive Company and the Baldwin Locomotive Works—so that each company would have some of each type to build and thus be prepared to meet future orders—which was done at a sacrifice of speed in production. Conditions as they exist today, however, indicate that complete government control will soon cease—regardless of the act that the director general is so actively backing the five-ear extension plan—and shows what a long chance the Railroad Administration took in its endeavor to institute uch a radical program. The accredited aims which the director general sought in establishing these standards, namely, uickness of delivery and low first cost, have not been realzed. In fact, the order for 1,025 locomotives announced April 30 and which was added to later, making a total of ,430, has only been about half completed, even though the ocomotives were specified for 1918 delivery. While comparble information can hardly be obtained regarding the first ost, it is apparent that had the suggestion of the builders' ommittee been followed and those roads needing locomotives ost been permitted to order existing designs, the costs of anufacturing incidental to new designs would have been liminated, much work saved and a greater output obtained. he standardization of locomotives as planned by the Raiload Administration was, therefore, not a war measure, but art of a definite plan to completely unify the railroads, and ie speed of delivery which was so apparently necessary at ie time was sacrificed in an attempt to work to that end.

Had the strongly recommended "liquid reserve" plan hich involved one type of standard locomotive (Mikado) of design to meet general conditions, been followed and the oads been permitted to order locomotives of an existing degn and construction to meet their particular needs, undoubtedly the output would have been greater, the first cost wer, and the director general would have had less difficulty getting the railroads to pay for the locomotives built.

ailroads Hesitate to Pay for Standard Locomotives

When the locomotives were ordered a statement was made at they would be allotted upon completion to the various ilroad systems where they were most needed and that they ould be lettered "U. S." and remain the property of the overnment during its control of the roads. Thus at the eginning, the impression was general that the roads were be provided with locomotives and that the statement of e number of each design needed to meet their requirements r new locomotives, which was requested when the tentative ecifications were issued, was not a direct order on the overnment for them. In fact the roads were not permitted place individual orders with the locomotive companies and ere forced to take the standard locomotives if they were in ed of new power. The Toledo & Ohio Central contested e right of the Railroad Administration to make it pay for e standard equipment and the matter is now in the courts. The roads cannot be blamed for not wanting to purchase e standard locomotives and be obliged to operate them hen the roads are returned to their owners, particularly when ese locomotives are not as well adapted to the particular eeds as the locomotives of the road's own design. Furtherore, all of the standard locomotives will be a constant urce of expense to the roads on account of the new design detail parts which will have to be carried in stock.

Deliveries and Service

Up to the middle of December 368 light Mikado, 118 eavy Mikado, 72 eight-wheel switcher, 48 six-wheel vitcher, 19 light Santa Fe and three heavy Mountain type andard locomotives, or a total of 628, had been delivered the railroads. The Mikados and Switchers were the first be delivered and on roads where they have been in service ng enough to determine their performance to a fair dee, it has been found that in most cases they have given good service. The chief criticism heard is that regarding the grates, grate rigging and front end arrangement. These details were made standard on all locomotives, regardless of where they were to go, and in many cases it has been found necessary to alter them to meet the local fuel conditions.

In the case of one road to which a number of the standard locomotives were sent, they were found to be inferior to the road's own locomotives of but slightly less tractive power, particularly in the amount of fuel used. This same road has had much trouble with the stoker equipment, which is of a different design from that used on the road's other locomotives. Engine failures have been caused on account of this, which have delayed traffic and necessitated the use of relief locomotives. The engines were held out of service waiting for repair parts with which to repair the stoker. If the road had had the privilege of specifying the equipment desired it would have ordered that with which its other locomotives were equipped and with which its engine crews were familiar and for which it had material in stock for repair parts.

On another road several standard locomotives were delivered almost before the road knew it was to receive them. They were delivered under their own steam and one arrived with the grates burned out. As all grates had to be changed, the engines had to be held out of service until the work was done. The rod packing used on these engines was of a different design from any used on that road, although other standard locomotives were equipped with packing that conformed to its standards. As no packing was sent with the engines, delays were caused until the road procured the proper packing for the engines. One of the engines met with an accident and as there were no spare parts and no drawings of the standard locomotive, a draftsman had to go out on the road to the engine and make a sketch of the parts needed for patterns and forgings to make repairs. This, of course, required holding the locomotive out of service for some time.

Repair Problems

As pointed out in our discussion of standard locomotives last spring, the problem of handling the repairs to these locomotives is no small matter, and taken in the aggregate, the extra cost for equipping shops for handling these locomotives—of an entirely new design—cannot be overlooked. It should, in fact, be added to the cost of the locomotives, as it is directly chargeable to the standardization plan. On the smaller lines this will be particularly noticeable. If standardization were to continue it would be from 10 to 15 years before any beneficial effects could be obtained from standard locomotives from a maintenance standpoint. Even after the government releases the control of the roads and the railroads have control over the purchase of locomotives, the tools, taps, dies, patterns, etc., will have to be carried in stock to maintain these standard locomotives. Thus, while the builder—if he builds nothing but standard locomotives during 1919—may find some advantages, the railroads will be at a disadvantage during the life of the engines. The disadvantage to the railroads is many times greater than the advantage that is to be gained by the builders. Moreover, locomotives should be designed from the standpoint of operation and not the convenience of the builder.

On one road in particular a complete set of patterns will have to be made for the standard locomotives assigned to it, as no part of the standard locomotives is common to that of its own locomotives. Grates were the first part to be considered, then the other details follow in order, pistons, cylinder heads, cylinders and parts, crossheads, driving boxes, shoes and wedges, ash pan castings, crown brasses, engine trucks, tender trucks and trailer truck brasses and boxes. The road manufactures all repair parts of grey iron and wrought iron and steel at its railway shops. Many fittings

are entirely different from those that have been used on that road for years, such as gage cocks, cylinder cocks, water gages, blower valves, angle and globe valves, lubricators, injectors and checks. There are twice the number of specialties on the standard engines as on the roads' standard locomotives, for which the vital repair parts have had to be ordered from the manufacturers. In addition to this, drawings for the locomotives will have to be purchased at a cost of between $500 and $600. As none of the locomotives have gone through the shops it is not possible to tell just what additional equipment will be needed there. Confusion will be caused the repairing forces due to the fact that they have an entirely new class of locomotive to handle to which they must accustom themselves. The material for repairs will have to be carefully watched as other locomotive equipment will not fit.

Design of the Locomotives

As to the design of the locomotives themselves, the standardization committee is to be congratulated on the work it accomplished in the short space of time allotted it for the work. Strong efforts were made to produce a modern locomotive in every respect and from the reports thus far received of the few Mikados and Switchers that have been in service long enough so that an opinion can be formed of their performance, these have been found to be of fundamentally good design. After adjusting the draft appliances and the grates to suit the local conditions they have been found to be free steamers and to have ample boiler capacity.

In most cases the road men like them, although on some roads objections have been made to the cab arrangement. The kind of special devices that have been applied to them, where they were different from those used on the particular road operating them, has caused the greatest trouble. While it was the desire of the Railroad Administration to apply the same specialties to each standard design of locomotive, it would have been more logical to apply the accepted specialties in accordance with the wishes of the roads that were to use the locomotives.

Of course, as has been repeatedly pointed out, no standards can be made to meet all conditions and they must at best represent a compromise in design. The force of this was felt particularly on those roads which use anthracite coal as fuel. On one road in particular, which was provided with standard locomotives, provision had to be made for burning soft coal even though all the locomotives on that road were anthracite burners.

The Present Situation

With about half of the first order of 1,430 standard locomotives to be completed and all of the second order of 600 to come, it would seem to be unnecessary for the Railroad Administration to place any further orders for standard locomotives, as by the time the present orders are completed the roads may be back in the hands of the private owners. Since, however, there is great need for new locomotives, it should allow each road to order such types and designs as are best suited to its particular needs. In fact, there is evidence that this is being considered by the Railroad Administration, for it is reported that five roads have been permitted to go into the market for locomotives of their own design; the Baltimore & Ohio and the Virginian for Mallet locomotives, the Philadelphia & Reading for locomotives having the Wootten type firebox, the Boston & Maine, as the standard designs do not meet its clearance limitations, and also the Kansas City Southern. Even though the Pennsylvania has been in need of locomotives, it has been permitted to build them to its own design. Undoubtedly more roads will seek to order locomotives to their own design as soon as some definite assurance is given as to when the government will relinquish its control of the roads.

The French State Railways in the War Years

Harold G. Villard in The Economic World

As is generally known, the State Railways of France belong in the main to two systems, the one, commonly known as the Ancien Réseau (Old System), constructed many years ago, and the other, known as the Western Railroad System (Chemin de Fer de l'Ouest), acquired from its private owners two or three years before the war. Of these two systems the Ancien Réseau has not been directly affected by military operations, though its traffic has naturally been increased by the war conditions. Parts of the Chemin de Fer de l'Ouest, on the other hand, have at times been interfered with by the opposing armies, though at the same time the movement of freight and passengers has been greatly augmented by the proximity of the system to the chief fighting area. For many years before the war, the old system of state railroads was notorious both for the inefficiency of its service and for the inability to earn even the interest on the cost of its construction. Before the Western System passed into the hands of the government it had been a prosperous property; but after its purchase by the state its operating costs rose, and it became a burden upon the French government, instead of a financial aid, as had been prophesied by the advocates of the purchase.

It is of interest to know how these two state railroad systems of France have fared during the war years. In a recent number of Le Monde Économique, Paris, the operating results of the roads for 1916 are given, together with comparative figures for 1915. It appears that in 1916 the receipts of the old system amounted to $16,267,125, a gain of $2,015,186 over the 1915 receipts. The operating expenses for 1916 footed up $16,379,673, an increase of $2,390,829 over those of 1915. The operating deficit for 1916 was accordingly $112,547, the coefficient of operating expense in 1916 being 100.69 per cent, as against 98.15 per cent in 1915. To the operating expense of 1916, however, must be added fixed charges of $3,798,343, or $60,119 more than in 1915. Hence the total deficit incurred in the system in 1916 was $3,910,891—this deficit being $435,562 greater than that for 1915. The deficit in both years, of course, had to be made good out of the French treasury, and added *pro tanto* to the burden of the French nation in its war period.

The financial situation of the Western System in the first two years of the war may be summed up as follows:

Receipts in 1916	$59,624,904
Increase over 1915	10,479,492
Operating expenses in 1916	57,083,699
Increase over 1915	11,480,140
Net earnings from operation in 1916	2,541,205
Decrease from net earnings of 1915	1,000,648
Fixed charges in 1916	25,731,115
Increase over 1915	408,038
Deficit in 1916	23,189,910
Increase over 1915	1,408,686
Expense ratio in 1916 (per cent)	95.74
Expense ratio in 1915 (per cent)	92.79

It will be seen, therefore, that the combined deficit of the two state railway systems in 1916 amounted to over $28,000,000. Of course, the operating conditions are abnormal.

The five great private railway systems have been similarly affected. But in 1916, when the expense ratio on the old system of the state was over 100 per cent and that on the western system nearly 96 per cent the average expense ratio on the five private railway systems was only 71.37 per cent. It varied from 64.7 per cent on the Paris-Lyons-Mediterranean railway to 82.25 per cent on the Nord railway. The most productive part of the last-named system is in the invaded districts of France, so that its operating expense ratio is abnormally high. Le Monde Économique concludes by saying that the above figures form a telling argument against state ownership and operation of railways.



e North River, New York, from the Woolworth Building. Copyright by Irving Underhill, N. Y

Opportunities for Railway Supply Exports

The Business Interests Must Have Co-operation of Both the Government and the Bankers

By Samuel O. Dunn
Editor of the *Railway Age*

London, England, November 28, 1918

NE OF THE THINGS I have been doing since I arrived in Great Britain has been to seek information which may throw light on the outlook for the sale of Ameri- n railway equipment and supplies in foreign countries, th during the period of industrial reconstruction which e have entered, and following the actual period of re- nstruction.

It is well known that until the Great War in Europe began e sales of American railway equipment and materials in reign countries were quite small. The leading countries of urope , and especially Great Britain and Germany, not only pplied their own needs, but sold most of the railway ma- rials which were exported to other countries.

During the war, however, these countries became unable en to meet their own requirements, much less those of other untries, also. In consequence, orders for locomotives, cars, d many specialties were poured upon America in a flood. ur own railways were not buying as largely as they nor- ally had, and our manufacturers welcomed these orders, d filled them rapidly until our own country entered the ar. Thus, a large export business in railway equipment d supplies was built up. These were years when the mber of locomotives built in the United States for foreign ilways was as great as the number built for American ilways. The foreign buying of American made cars, rail- ay specialties of many kinds and machine tools also was rge.

How much of this business will our manufacturers be able retain during the period of reconstruction, and also after e period of reconstruction? These are important questions r our manufacturers, for our railways, which will get what- er traffic our export business may afford, and for the merican people in general, whose prosperity will depend in small measure in the future upon our export business in anufactures.

In the short time I have been here, during which affairs Great Britain, and indeed, throughout Europe, have been a turmoil, I have got more impressions than detailed in- rmation. I feel sure, however, from what I have been told on every side, that the impressions I have received would be merely deepened by the acquisition of more detailed information, and, therefore, I shall give the impressions now, hoping to supplement them later, if fortune is kind, with more actual information.

Great Demand for Equipment Supplies

The most outstanding point of all is, that the railways of all the world now need vastly more equipment and materials of every kind than they ever did before. We all know that the railways of America need many thousands of locomotives, many hundreds of thousands of passenger and freight cars, many millions of tons of rail, and other materials and supplies in proportion. They need them, not merely for new construction and permanent improvements—although a vast amount of new construction and of permanent improvements is needed—but to make good the deterioration of tracks, structures and rolling stock which has occurred within recent years, and especially during the two years since the United States entered the war.

The situation is, of course, much more acute in other countries, and especially in those which have participated in the Great War since its commencement over four years ago. No foreign soldier has set foot on the soil of Great Britain, except as a prisoner; but it is hardly an exaggeration to say that the railways of that country are four years behind their requirements for locomotives, cars and work on the permanent way. They are so far behind, because since the beginning of the war they have practically acquired no new equipment and have kept their expenditures for maintenance at the minimum physically possible. The British railways build in their own shops most of their own locomotives and cars. During the war, their shops—which in many cases have been enlarged—have been devoted mainly to the manufacture of munitions.

The government has recognized in a very substantial way the deterioration which has been occurring by granting the railways in addition to the guaranteed return on their capital an allowance of 12½ per cent in excess of their ordinary

expenditures for maintenance, which has been put into special funds to be used after the termination of the war in making up deferred maintenance.

The conditions in the various parts of the British Empire — Canada, Australia, South Africa, New Zealand, etc.— which have not been in the zone of hostilities, as well as in the neutral countries of Europe, such as the Scandinavian countries, Spain, Holland, Switzerland, and so on, have been somewhat similar to those in Great Britain. The same thing may be said of the South American countries. The belligerent countries outside the immediate zone of hostilities have had to use all their resources of men and materials to carry on the war; and the neutral countries have had to see their railways deteriorate because they could not get materials to keep them up.

Far worst of all, of course, has been the case of the countries on whose soil hostilities actually have been conducted. Belgium, France, Italy, Russia, Roumania, and the Balkan countries have not only seen all their railways deteriorate, but they have seen large parts of them actually destroyed— tracks torn up, bridges blown up, cars burned, etc.

Prior to the war the aggregate amount of new railway construction going on in the world was great, and afforded a large market for equipment and materials of every kind. It is hardly necessary to say that all over the earth the war has practically stopped railway construction, and thereby stopped the development of new territories and new resources which railway construction always causes, and which, under modern conditions cannot occur without new railway construction.

Neither the market for railway equipment and materials which now exists, nor that which in the near future will exist, can be said to be as large in proportion as the need of the railways of the world for new equipment and supplies. It would require a fabulous amount of new capital to finance all the needs of the world's railways; and the world's supply of capital has been greatly depleted during the war, and it will take years to replenish it. But it cannot be replenished without a vast increase of production for the purpose of industrial reconstruction; and no such increase of production can occur until the railways are put into condition to handle the things produced. Therefore, the reconstruction of the railways will be one of the first things undertaken in every country whose statesmen and business men understand the present economic conditions and necessities; and this should mean that there will soon be the largest market for railway equipment and materials that ever was opened up.

America's Great Productive Capacity

The railway equipment and supply manufacturers of the United States—I use the term to include all that make anything used in construction, maintenance, or operation—have, of course, a vastly larger productive capacity than those of any other country—probably under present conditions larger than those of any other two, or even four countries. If as large a program of railroad reconstruction, improvement and new construction should be entered upon at once in the United States as the welfare of the country demands, our railway manufacturers probably would have their hands pretty full for some time filling domestic orders. But, in view of the existing confusion and uncertainty in our railway field it may be that our railways will not for some time place enough orders to use all the capacity of our railway manufacturers, and that they will be able to take a large amount of business from abroad.

That they can soon get a much larger business abroad than they ever have had seems highly probable, if they will go after it right, and can get the right kind of co-operation from our government.

In dealing with the export field, it would seem that our manufacturers should be very careful to think not merely of the present and immediate future, but also of the distant future. If they do not, one result may be that the more business they get during the period of intense reconstruction, the less they will get after that period is ended.

Relations of United States and British Empire

The two greatest powers of the world now, in point of area, population, natural resources, and manufacturing activity, are the United States and the British Empire. In the long run our export trade in railway equipment and supplies, and in everything else, is going to depend very largely upon the relations between the governments and peoples of these two countries. We can do more business, on the whole, with the British Empire than with any other country; and at the same time, the British undoubtedly will be, for years to come, our principal competitors for foreign trade. The way in which our competition with them is carried on will have a great influence upon the welfare not only of the peoples of our two countries, but upon the welfare of those of the entire world. Therefore, the governments of the two countries, each let us hope intelligently and fully representing the true interests of its own people, cannot too soon reach a clear understanding as to just how much and what kind of governmental stimulus and governmental restriction are to be applied to the business interests of the two nations in trading with each other and in competing for the trade of outside countries. The peoples of the two nations must not only trade with each other, but compete with each other; but their trade should be carried on in such a way as to promote the welfare of both, while their competition should be a friendly, open, honorable, sportsmanlike rivalry, and not be characterized to any degree by the dishonorable, underhanded, spy-ridden methods which were used by the Germans in pushing their foreign business before the war.

Now, as to the sale of American equipment and supplies to the railways within the British Empire, it would seem that the following will be about the situation: The efforts of the British government and British business men already are being energetically applied, and will be for some time thus applied, to filling their own plants with orders. Prior to the war, there long had been much unemployment in Great Britain. The British people live in fear that a return of extensive unemployment would result in a serious development of Bolshevism in these islands. Therefore, under the leadership of their government, they are going to try to provide employment for every person who wants it, and especially for their returning soldiers. This is going to be a herculean task, for their population is very large, and these islands are very small. They can only accomplish the task by developing manufactures of all kinds to the utmost, since manufactures can give employment to more people within a given area than any other line of industry. The manufacture of railway equipment and supplies is a branch of the iron and steel trade, and there has been during the war an immense increase of the capacity of the iron and steel plants of Great Britain. This increased capacity has been devoted principally to producing munitions. Besides the enlargement of private plants, the government itself had built several large plants at a cost of several hundreds of millions of dollars, some of which had hardly got fully into operation when the armistice was signed. Both the private and government munition plants must be, in so far as is practicable, converted to the uses of peace.

The government and the business men already are turning rapidly to the work, first of filling with orders for industrial products plants that are now in shape to make such products, and, second of converting to the uses of peace plants which as yet are adapted only to the service of war. The British railway companies, as already indicated, have large reserves which they can apply as soon as they can get the necessary labor out of munition works and the army to

uilding new cars and locomotives. The private manufac-rers of locomotives and cars of Great Britain—who rdinarily get about 90 per cent of their orders from rail-ays outside of Great Britain—already are in the field for rders, and will begin largely to increase their output of ilway supplies and equipment as soon as they can get their ants converted to peace purposes and get enough labor.

The chief railways for which equipment and supplies have the past been made in Great Britain may be roughly di-ded into the following classes: First, the privately-owned ilways; second, the state-owned railways of such colonies those of Australia and South Africa; and third, railways foreign countries which have been financed principally by nglish capital, such as several of those of Argentina. It ems pretty certain that the manufactures of other countries, cluding those of the United States, will not stand a good ance of getting very much business from any of these rail-ays until the manufacturers of Great Britain are busy and bor has as much employment as the manufacturers can ve it.

However, the railways mentioned have a large mileage d large needs. In spite of the great expansion of the iron d steel trade, it does not seem probable it could within y reasonable time supply all the requirements of these ilways. Therefore, it would appear that the time is not r distant when many railways within the British Empire, d railways outside the Empire which are controlled by ritish capital, will turn to America to buy equipment and pplies.

The prospect of soon developing a large export trade in ilway equipment and supplies with the other countries hich have been belligerents in this war seems much better an that of the prospect of soon developing such trade with e British Empire. The British and Americans ought to able between them to get most of the business which rmerly went to the Germans. Now, since the surplus ca-city of our manufacturers in the United States is greater an that of the manufacturers of Great Britain, we should able, it would seem, to get more of this business than ey. In the neutral countries our manufacturers certainly and as good, or a better, chance as the British.

Must Comply With Foreigners' Wishes

It already has been intimated that in seeking this business ur manufacturers should think not merely of the present, ut even more of the future, provided they wish to build up a ermanent foreign market for their trades. One of the most mportant points to be considered is that European designs nd methods of manufacture have differed widely from those America. There are many people in the United States ho believe that because, within recent years, our manufac-rers have succeeded in selling to foreign railways large uantities of equipment and materials made according to merican designs and standards, they will be able to con-nue to do so. Undoubtedly the familiarizing of foreign ilway officers with the actual service of American products ill have this tendency. There are very many things, how-ver, that the foreign railway officer wants made in accord-nce with his ideas, rather than in accordance with those of ue American manufacturer. Now, during the period of re-onstruction, while the demand for railway supplies will be great, the American manufacturer may be able largely to ucceed in forcing the foreigner to take what the American ants him to take; but if he does, he is likely to find that hen the demand declines the foreigner will turn to some ritish or German manufacturer who will make him what e really wanted all the time, and the American export trade ill have made a merely temporary customer instead of a ermanent one.

One of the marked characteristics of railway equipment nd materials manufactured in Europe, and of many other things for that matter, is that it is more finished than American manufacture ordinarily is. The European not only wants his locomotive, for example, to work well, but he wants it to look well. Therefore, he hand-works and finishes and polishes every part of it, and then paints it with bright colors. Now, whether American manufacturers like it or not, they probably must recognize the fact that if they are to capture and hold foreign markets they must indulge the taste, not merely of the European, but also of the South American and many other people for this kind of thing.

The great objection of American manufacturers to meeting foreign demands as to design, finish, and so on, is that it interferes with the quantity production which appeals so strongly to America. Perhaps a compromise of some kind can be struck, but it seems highly probable that large American manufacturers, in order to get and hold foreign trade, will have to set aside parts of their plants, or even establish separate plants, in which special machinery will be used and specially trained workmen will be employed, to make things as the foreigners want them made. It goes without saying that this would increase the cost of production; and how costs of production in the different countries will compare after such questions as those of wages and the distribution of raw materials are settled under peace conditions is still a matter of conjecture.

Some Things We Can Sell Abroad

A very large number of bridges has been destroyed in all the countries in which actual hostilities have been carried on; and America should be able to replace many of these. American bridges have established a good reputation throughout the world; and it is not so necessary to construct them according to foreign ideas of good practice.

That countries throughout the world will go to the United States for rails seems certain. The American makers of track fastenings should be able to get a large business in Spain, Portugal, France, Italy, and other countries, but they must be willing to make them to metric dimensions, and to meet foreign specifications. There will be a large market in Europe and elsewhere for American-made springs; but I gain the impression that if American manufacturers are to hold a substantial business in Europe they must follow European practice, even if they have to provide separate plants for the purpose.

Success of American Machine Tools

One of the great successes in Europe during the war has been made by American machine tools. There is no question that in the making of machine tools America leads the world. "Imitation is the sincerest praise"; and there are two or three concerns in Great Britain which are giving American machine tools this high praise by copying them without saying anything about the fact that what they are making are copies. How American tool makers will be able to meet this unfair competition is conjectural. It would appear, however, in view of the wonderful results obtained with our machine tools during the war, that our manufacturers should be able to build up and hold an immense foreign trade, especially if they can eliminate unfair competition such as that mentioned.

Talk of Electrification of Railways

There is much talk of electrification of railways in Europe. This has been suggested as one means by which British railways might be able to enlarge their capacity and reduce their expenses without increasing their structure gages.

The most important project for electrification which is receiving serious consideration is on the state railways of Belgium. The railways of that country have lost a large share of their rolling stock and have been largely destroyed. Since they must be so largely rebuilt, it seems to have been

concluded by their management that in the long run the most economical and progressive thing that could be done would be to reconstruct them for electrical operation practically throughout. Apparently, the plan adopted would be that of erecting large power-houses near the coal fields. Indications are that there will be a large development of the manufacture of electrical machinery and apparatus in Great Britain, and sentiment evoked by the war probably would tend to give British manufacturers a prior claim upon business in Belgium; but American manufacturers surely would have a good chance to get some of the business.

There probably will be an extensive reconstruction of block signals on European railways and American makers of signal apparatus and supplies should stand a very good chance to get a large part of this business. It is well-known that the automatic signal system, whose operation involves the use of much less labor than the manual controlled system, has been developed almost entirely by American inventors and manufacturers; and it would appear that there should soon be a large foreign market for automatic signal apparatus and supplies.

Many years ago when Lord (then General) Kitchener desired to make his famous advance upon Khartoum to rescue General Gordon, he needed practically to build and equip an entire railway line within a very short time. He asked the British builders to furnish him quickly a number of locomotives and cars, and also some bridges. The British replied they could not fill the order within so short a time. He then applied to America, and our manufacturers started the locomotives, cars and bridges to him within 30 days. It was a great achievement. Unfortunately, those locomotives and cars were kept in service on the railways of Egypt for years afterward, alongside equipment built in England. Having been turned out so quickly, they inevitably presented a very poor appearance, and gave a rather poor service compared with the English-built equipment, with its excellent design, fine lines and perfect finish. The railway men in Egypt soon forgot the circumstances under which the American equipment was built, and, in consequence, it became a permanent obstacle to the sale of additional American locomotives and cars in Egypt.

The lesson suggested by this incident does not require elaboration. There undoubtedly will be a large demand for American locomotives and cars and for various specialties used upon them, during the period of reconstruction. But whether they will in future years be a good or a bad advertisement of American manufacturers will depend upon how they are built. There is no question that American builders can do work that satisfies the foreigner. For a few years before the United States entered the war our builders were engaged more or less in making equipment for railways in accordance with foreign design—for example, for the railways of India, some of the standard designs of which were copies—and the results were very satisfactory. After the United States entered the war, however, the American government took the view that this interfered with quantity production; that quantity production was the thing most needed; and since then locomotives for export have been built chiefly according to American standards. Now, undoubtedly, for the good both of the foreign railway and the American manufacturer, the former should be educated gradually to accept American standards; but until education has done its perfect work, it will probably be good business to let the foreigner have very largely what he wants.

Financing Railway Construction Abroad

One of the great countries in which extensive work of reconstruction will have to be done is Russia. Her railways are in deplorable condition, and she needs a vast additional mileage of railways to enable her to develop her great natural resources. Her situation and her standards of railway construction seem to make her much the most promising market in Europe for American railway equipment and materials; but it is to be feared it will be some years before she will have the stable government and the financial conditions which will make her a safe customer with which to do business. In entering the Russian market, it will be very important to enter through Siberia and to work harmoniously with the Japanese, who have a great influence in the Orient.

It cannot be too strongly emphasized that in the promotion of foreign trade of all kinds the business men of America must have the cordial support and the intelligent and friendly co-operation of their government. They must also have the support and co-operation of their great banking interests. The great export trade of Germany and Great Britain in railway manufactures is largely owing to the fact that their financiers have invested capital in foreign railways and then used their influence to cause the railways in which they have made investments to buy their equipment and materials from the manufacturers of their home countries. Of course, American financiers cannot be expected to make large investments abroad unless they can be made to feel reasonably sure that their government, in case of need, will help to protect their investments. There are vast parts of the earth, especially in Eastern Europe, Asia—particularly in China—Africa and South America, where the construction of a large mileage of new railways is needed. If American capital builds railways in these parts of the world, these railways naturally will go to America for materials for their construction, and also for equipment and materials for their subsequent operation and maintenance. American manufacturers of railway equipment and materials doubtless in any event will get a large amount of foreign business for some years; but in the long run they probably must look to the construction of railways in foreign countries by American capital to afford them the largest part of their permanent market abroad.

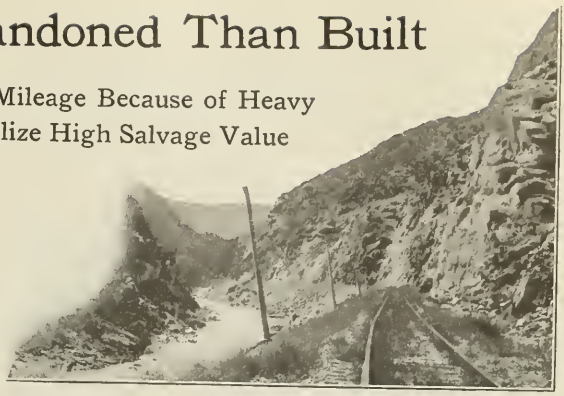
Hundreds of tons of high explosives, including T. N. T., the property of the French and Italian governments, has been towed out to sea from South Amboy, N. J., and dumped overboard 35 miles from Scotland Neck lightship. This was done by order of the Railroad Administration, in order to get the dangerous stuff out of the hands of the railroads. Two hundred and twenty-eight carloads had been stored at Wilmington, Del., for some time, awaiting disposition, and the residents of that city had become nervous for fear of disaster. Some of the material was removed to interior points designated by the French government.



With the Czecho-Slovaks in Siberia

More Railway Lines Abandoned Than Built

Operation Discontinued on Large Mileage Because of Heavy Expenses and Opportunity to Realize High Salvage Value



FOR THE SECOND TIME since the construction of the railway system of the United States was first undertaken in 1831, more miles of main lines have been abandoned a year than have been built. The only other year in which s condition existed was in 1917. In 1918, 445.83 miles main lines were abandoned permanently and taken up, 2.68 miles additional were abandoned permanently but ve not yet been taken up, and 224.37 miles were abanied for operating purposes for the period of federal con- owing to the consolidation of parallel lines. A total of 82.88 miles of main lines has therefore been abandoned operating purposes during the year which has just closed. is is considerably in excess of the mileage of new lines lt as indicated in another article. A total of 200.32 miles main lines has also been abandoned in Canada, this mile- being confined to the Pacific Coast extensions of the nadian Northern and the Grand Trunk Pacific in Western berta and British Columbia, where joint operation was tituted, in this way releasing considerable quantities of ck materials for military use on the French front.

A decrease in the mileage of railway lines in operation the United States for two successive years does not necesily indicate that this country is oversupplied with railys or that there are no further large areas needing transtation facilities. Rather, these statistics are a striking mmentary on the conditions through which the railways of United States have been passing in recent years. The usal of the state and national commissions to permit rates be increased commensurate with the rising costs of operan have forced many of the smaller and weaker lines into nkruptcy. Obviously the first roads to go under have been se in sparsely settled areas or with light traffic. Under se conditions banks have been reluctant to advance the nds necessary for the reorganization and rehabilitation of properties, and, being unable to operate at other than a s, there has been no alternative for them except to suspend erations. Even under these conditions the state commisns have, in most instances, refused to permit the abandonnt and taking up of the lines and it has been necessary the owners to go into the courts to secure the necessary hority after proving their inability to operate successfully. The abandonment of these lines has received a decided petus during the last two years. Costs of operation have en rapidly on the small roads as well as on the larger tems. When the government took over the roads a year no distinction was made between the large and small es in the President's proclamation. However, the Raild Administration soon showed an unwillingness to assume ancial responsibility for the operation of many of these aller lines which were not essential to a unified national nsportation system and a large number of them were ned back to their owners shortly before July 1. Facing increased costs of operation brought about by the war, plemented by the wage advances granted the employees the roads under federal control, confronted with the dision of traffic to the government-operated lines, and with le or no relief through increased rates, the owners of many these properties have abandoned hope and shown a disition to dispose of the roads for what they could secure.

Another condition leading to the abandonment of weak roads has been the high prices which have prevailed for second hand materials. The shortage of railway supplies, and particularly of steel, raised the prices for many second hand materials to the point where they could be sold for considerably more than their cost new. In a number of instances this has resulted in the junk value of lines being greater than the amounts actually paid for them several years previous. Naturally, therefore, the owners of roads who were contemplating their abandonment in the near future have hastened to take advantage of these conditions to secure the highest possible return from their properties. The conclusion of the war, with the probable early return of the material market to a more nearly normal condition, will largely remove this latter incentive.

The statistics of lines abandoned this year also include a new factor. In working out the details of the policy of unified control of the railways of the United States as a single system the Railroad Administration has found it possible to co-ordinate the facilities of parallel lines in numerous instances. In some cases parallel single track lines have been converted for double track operation. In other cases one line has been abandoned and the traffic of both roads concentrated on the other line. This accounts for the 224.37 miles of lines reported as abandoned in the third column of the table accompanying this article.

Although it is in the far west that the greatest need for transportation facilities exists, it is in this same area that the largest mileage of lines has been abandoned.

The longest line on which operation was abandoned during the year was the Colorado Midland, extending from Divide, Colo., 194.20 miles to New Castle. Operation of this road ceased on August 1 and plans were made for its dismantling before winter, but the Colorado Utilities Commission prevented the track from being removed and the matter is now in the courts. The next longest road to be abandoned was the Las Vegas & Tonopah, 117 miles long, in Nevada.

The longest line abandoned and taken up is the North Pole route, in Alaska, 90 miles, and the next longest line is the Wisconsin & Michigan, 52.8 miles.

In considering these roads which have been abandoned one should not lose sight of the fact that many other lines in operation in the United States are unremunerative, but, being parts of larger systems, which as a whole are solvent properties, they cannot be abandoned. Particularly in the mountainous states of the west, as in Colorado, many of the larger systems are handicapped by branch lines tapping mining regions of earlier days, but now largely abandoned or extending into areas for which there has never been a sufficient demand for railways to justify their construction permanently. If left to themselves such lines would be clearly insolvent and abandoned, but as parts of a larger

system they have constituted a drain on the earnings of the remunerative lines and the state commissions have in general refused to permit their abandonment. The time would now seem opportune to make a study of lines of this character in order to ascertain where they may be abandoned and to remove this drain on the railways before they are turned back to their owners.

Railroad Abandoned in 1918

United States	Lines abandoned permanently and taken up (Miles)	Lines abandoned permanently and not taken up (Miles)	Lines abandoned temporarily through consolidation during period of Government control (Miles)
Atlantic Coast Line—Sebring, Fla.	.....	.70	.....
Baltimore & Ohio—West Baltimore to Washington main track, 1.40 miles; Hansrote, W. Va., to Magnolia, third track, 5.85 miles; total	7.25	.....	.....
Oliver Junction, Pa., to Oliver, 0.54 mile; Moore's Junction, Pa., to Redstone Ovens, 0.27 mile; Youngstown Junction to Youngstown Works, 0.96 mile; between Ft. Hill, Ohio, and Walton, Ind., 1.45 miles; total	.....	.....	3.22
Baltimore & Ohio Chicago Terminal—Part of South West Spur	1.10	.....	.....
Buffalo Creek R. R. at Buffalo, N. Y.	0.12	.....	.....
Bullfrog Goldfield—Beatty, Nev., to Rhyolite	3.70	.....	.....
Central of Pennsylvania—Bellefonte, Pa., to Mill Hall, 27.38 miles; branch lines, 1.36 miles; total	.....	28.74	.....
Chicago, Milwaukee & St. Paul—Northfield, Minn., to Canon Falls, 13.8 miles; Rock Valley, Ia., to Hudson, S. D., 9.4 miles; Madrid, Ia., to Philadelphia, 3.00 miles; Cement Line in Milwaukee, Wis., 1.00 mile; total	27.20	.....	.....
Chicago & North Western—Near Palmer, Mich.	4.50	.....	.....
Chicago, Rock Island & Pacific—Colgate, Okla., to Lehigh	.....	.....	6.54
Chicago Union Station Company	0.70	.....	.....
Cincinnati, Findlay & Ft. Wayne—Findlay, Ohio, to Ft. Wayne, Ind.	.....	.....	91.93
Cleveland, Cincinnati, Chicago & St. Louis—Near Zionsville, Ind.	.....	4.80	.....
Colorado Midland—Divide, Col., to Newcastle	.....	194.20	.....
Cripple Creek & Colorado Springs—Colorado Springs, Colo, to Cameron	.....	39.00	.....
Cybur, Gulf & North Western	.....	10.00	.....
Deer River (formerly Carthage & Copenhagen)	8.75	.....	.....
Denver & Rio Grande—Sonora, Col., to Graneros	18.05	.....	.....
Short Spurs to mines in Colorado, 0.99 mile, and in Utah, 1.03 miles; total	.....	2.02	.....
Duluth, Missabe & Northern—Iron Junction, Minn., to Biwabik	.....	.....	15.37
Elk & Little Kanawha, Baggs, W. Va., to Shock	.....	26.30	.....
Escanaba & Lake Superior—In Michigan.	3.50	.....	.....
Garden Bay Railway—Garden, Mich., to Cooks Mills	.....	.....	13.80
Galveston, Harrisburgh & San Antonic, Blodgett, Tex., to Stella Junction	.....	4.51	.....
Great Northern—At Helena, Mont., 3.96 miles; Hanover to Lewiston, 7.69 miles; total	.....	.....	11.65
Greeley Terminal	3.00	.....	.....
Hauto to Nesquehonings	.....	.....	4.07
Houston & Texas Central—Waco, Tex., to Ross	.....	.....	12.00
Kansas City Southern—Kansas City, Mo.	.....	1.04	.....
Las Vegas & Tonopab—Las Vegas, Nev., to Beatty	.....	117.00	.....
Lehigh & New England—Howerton Junction, Pa., to Howerton	0.97	.....	.....
Lehigh Valley—Stockton Junction, Pa., to Roan, 7.66 miles; Sheppton branch to Beaver Meadow Colliery, 1.85 miles; Hickory Run to Hickory Run Brick Works, 1.30 miles; from M. & H. Division to Morris Ridge Colliery, 0.58 mile; Austin Branch to Lawrence Colliery, 0.46 mile; part of Tomhicken Colliery branch 0.28 mile; part of Coleraine branch 0.12 mile; total	12.25	.....	.....
Packer No. 5 Jct. to Ashland, Pa.	.....	.....	4.07
Liberty White—McComb, Miss., to Tylertown	.....	24 78	.....
Maine Central R. R.—Waterville, Me., to Benton	.....	2.26	.....
Meridian & Memphis—A. & V. Jct. to Meridian, Miss.	.....	.....	3.00
Missouri, Kansas & Texas of Texas—San Marcus, Tex.	.....	.....	1.15
Mobile & Ohio—on Illocton Branch	1.07	.....	.....
Montpelier & Wells River—Montpelier, Vt., to Barre	.....	.....	3.81
New Orleans Terminal—At New Orleans	.....	0.99	.....
New York Central—Cardiff Junction to Cardiff, Ill.	3.48	.....	.....
New York, New Haven & Hartford—Northampton, Mass., to Shelburne Junction, 18 miles; South Deerfield, Mass., to Turners Falls, 9 miles; total	.....	.....	27.00
Norfolk & Western—Lucas, Va., to end of Periwinkle branch, 2.81 miles; Blackstone, W. Va., to end of Blackstone branch, 5.52 miles; total	8.33	.....	.....
Northern Pacific—Groningen, Minn., to Banning	4.42	.....	.....
North Pole Route—Alaska	90.00	.....	.....
Ocilla, Pinebloom & Valdosta, Lax, Ga., to Lelaton	14.00	.....	.....
Olympia & Owingsville—Olympia, Ky., to Owingsville	6.80	.....	.....
Oregon-Washington—Black River Junction, Wash., to Argo	.....	.....	6.11
Ozark Valley Ry.—Williamsville, Mo., to Cascade	35.00	.....	.....
Pere Marquette—Carters to Honor, 5.13 miles; Spencer, Mich., to Kalkaska, 7.01 miles; total	12.14	.....	.....
Portland & Southeastern—In Arkansas.	22.00	.....	.....
Richmond & Rappahannock River—Richmond, Va., to Seven Pines	25.52	.....	.....
Seaboard Air Line—Between Atlanta, Ga., and Birmingham, 14.55 miles; between Archer, Fla., and Earlybird, 1 mile; total	15.55	.....	.....
Southern Railway System—From M. P. 418 to 420, 1 mile; M. P. 424.6 to 426.3, 1.7 miles; Blacksburg, S. C., to Gaffney, 0.31 mile; Gaffney to Cowpens, 0.25 mile; Cowpens to Mt. Zion, 0.75 mile; M. P. 490 to 492.3, 2.27 miles; Central, S. C., to Tugalo river, 17.2 miles; Tugalo river to Cornelia, Ga., 8.5 miles; total	31.98	.....	.....
From M. P. 423.8 to 424, .20 miles; Cowpens, S. C., to Mt. Zion, 1.37 miles; Central, S. C., to Tugalo river, 12.5 miles; Tugalo river to Cornelia, Ga., 5.2; total	.....	19.27	.....
Southwestern Railway—Henrietta, Tex., to Archer City	.....	29.07	.....
Traverse City, Leelanau & Manistique—Traverse City, Mich., to North Port	29.20	.....	.....
Wabash Railway—Albia, Ia., to Tracy	.....	.....	20.00
Western Maryland—From End of Jackson branch eastward, 1.73 miles; West of Lanaconing, 0.72 miles; total	2.45	.....	.....
Narrows Park, Md., to Mertens	.....	8.00	.....
Wichita Falls & Northwestern—Frederick, Okla.	.....	.....	.65
Wisconsin & Michigan—Aragon, Mich., to Faithorn Junction, 7 miles; Constine, Wis., to Everett, Mich., 31.8 miles; Peshtigo Harbor, Wis., to Bagley Junction, 14 miles; total	52.80	.....	.....
Total	445.83	512.68	224.37
Canada			
Canadian Northern—In British Columbia.	94.00	.....	.....
Grand Trunk Pacific—Lobstick Junction, Alta., to Red Pass Junction, B. C.	106.32	.....	.....
Total	200.32	.....	.....



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Back in "Old Blighty"

A Shipper's View of the Railroad Problem

Opposes Government Ownership or Operation. Suggests Larger Powers for Central Regulating Body

By F. B. Montgomery*

COMPLYING with the *Railway Age's* request for an expression of my views regarding the disposition of the railroad problem, I will say at the outset that I am posed to government ownership and government operation. hall not enter into a discussion of the merits and defices of railway nationalization further than to say that her my observation of federal control in this country nor knowledge of government ownership as it has worked out other lands, has convinced me that private operation is economic anachronism. In this connection it should be ne in mind that a shipper's interest in transportation ins and ends with service rendered; he will espouse any eme of operation which, in his estimation, will produce ximum results with a minimum of expense. It is there- significant that after eleven months of practical experie with government operation the leading shippers' orization unanimously adopted a resolution in its annual vention condemning both federal control and ownership recommending the early return of the railways to their ners.

Assuming that the carriers revert to private operation, the stion arises whether they should return to the conditions ch obtained previous to the war or whether some moditions should be made in their organization and in the s governing them. Opinions on this subject are diverse. own ideas, which follow, are subject to change as I give matter more intensive study, and I wish it to be understood that they represent my personal views only, and in no se indicate those which may be taken by the company ch I represent, or the National Industrial Traffic League, which I am a member.

Competition between railways is a desirable economic dition and should be re-established. The larger trunk s, however, should have the right to purchase and condate adjacent and connecting short lines and roads ch are not self-supporting—subject to the approval of Interstate Commerce Commission. The carriers should insured rates which will produce a liberal return on the ue of their property with a surplus not exceeding four cent annually. By a liberal return I do not mean reves which will place badly managed, poorly located or r-equipped lines in the profit-producing class. Lack of sight and business ability should be penalized in the nsportation field as it is in other industries. The prac- l effect of giving weak roads a generous return would be llow excessive profits to the strong lines.

The Act to Regulate Commerce should be amended to e the Interstate Commerce Commission full authority r capital issues of every kind; plenary power to authorize l regulate the pooling of equipment of all kinds, the joint of terminals and other facilities; control of maintenance rk in every detail with authority to determine the extent the work which shall be done and the expenditures which y be properly made therefor; the right to authorize or veto construction of new lines, or the extension of old ones, er weighing their merits from the standpoint of public cessity and convenience; authority to order augmented or reduced transportation service as the needs of the public may dictate.

The railways should retain the desirable features of unified operation brought about by government operation. Both passenger and freight train mileage should be reduced to a point not beyond the necessities and requirements of the public. There should be further consolidation and enlargement of freight trains when in the interest of economy and service. Through routing should be encouraged to reduce delays and congestion in break-up yards. Heavy loading of equipment is likewise an operating principle which has come to stay, but, it should not be observed to the extent of delaying the movement of shipments which should be handled expeditiously on account of commercial necessity. The joint ticket offices which have been established in the large cities of the country are undoubtedly a great convenience to the public and will probably be retained for that reason although they are of doubtful economy.

Those portions of the commerce act should remain unchanged which give the Interstate Commerce Commission the authority to suspend tariffs which place upon the carriers the responsibility of justifying rates of, and grant to shippers the right to route traffic. Much has been said about economical routing since the director general gave the carriers the right to deviate from the routing instructions of the shipper. It is my conviction that in times of peace the shipper is much better qualified to route traffic than the railroads. Because of his intimate knowledge of the location of the consignee with reference to alternate lines, and the character of the unloading facilities of each—if plant delivery cannot be made—he is better able to route in such a manner as to insure delivery with minimum detention at unloading platforms or in interchange yards. A recent experience of the company I represent illustrates the results which accrue from interference in routing by railroads. A heavy tractor was shipped to a point in Pennsylvania and routed over a line which had special facilities for unloading the machine at destination. The car was rerouted over another road with the consequence that it had to be switched back at destination to the line originally designated, before the tractor could be unloaded.

Another feature of government operation which has been widely proclaimed as conducive to economy and improved service is the unification of terminals. Although I do not condemn joint terminal operation and, in fact, recommend its adoption to the extent that the Interstate Commerce Commission may deem economical, it has not yet been thoroughly tried out. The best of theories do not always work out satisfactorily in practice. In making this remark I have the experience of my own company in mind. Under former conditions shipments from our Deering plant would pass through the Chicago terminal district within 24 to 48 hours. At the present time, with the terminals under one management, the best time for like movements is 72 hours.

Another idea which seems to be quite prevalent among both railroad officers and shippers is that the power to regulate railroads should be taken from the state commissions, leaving the Interstate Commerce Commission the only regulatory body in the country. It is my conviction that the territory served by our railways is too large to warrant such a concentration of authority. Innumerable matters of local

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concern and of no consequence to the remainder of the country can be better settled by a state body, thereby relieving the national commission of much detail which would have to be handled from a distance. It should also be borne in mind that the police power of the individual states gives them the authority to regulate traffic moving exclusively within their borders and this cannot be taken away from them without an amendment to our constitution. But such radical action is not, in my opinion, necessary. Through the Shreveport case which defined the relation of interstate to intrastate regulation, the Interstate Commerce Commission has all the authority over state rates that it needs.

Dividend Changes

THE PRINCIPLE LAID DOWN in the President's proclamation taking over the roads, in so far as it applied to dividends, was the continuance of dividends at the regular rate where these dividends had previously been paid from surplus earnings. There is still some doubt and uncertainty, however, in regard to dividends, and the Baltimore & Ohio, Chicago, Milwaukee & St. Paul, and the Wabash are holding up their dividends, the first two pending a settlement of the contract with the government, and the Wabash pending a decision of the Administration.

The Baltimore & Ohio reduced its annual rate on the common stock in the second half of 1918 from 5 per cent, paid in 1917, to 4 per cent. Thus if the contract is signed with the government 4½ per cent total will be paid out in dividends for 1918.

The Buffalo, Rochester & Pittsburgh reduced its dividend rate, the rate in 1917 being 6 per cent; while 3 per cent was paid in the first half of 1918, only 2 per cent was paid in the second half of the year; thus, the dividends paid in 1918 amounted to 5 per cent, but the stock is now on a 4 per cent basis.

The Alabama Great Southern in 1917 paid a regular dividend of 5 per cent and 2 per cent extra on the common, and a regular dividend of 6 per cent and 1 per cent extra on the preferred. In 1918, a semi-annual dividend of 3 per cent was declared on the common, for the first half year, and 3½ per cent on the preferred, and in August no dividend was declared on the common, and 3 per cent was declared on the preferred.

The Buffalo & Susquehanna paid 7 per cent on the common in 1917 and a 1¼ quarterly dividend on the common in the first quarter of 1918, but in the remaining three-quarters, "at the behest of the Railroad Administration," declared quarterly dividends of 1¼ per cent each, making a total for 1918 of 5½ per cent.

The Cripple Creek Central paid 6 per cent on its common stock in 1917 and 1½ per cent quarterly for the first two quarters of 1918, but passed the dividend in the third quarter, making 3 per cent paid in 1918, according to the latest advices.

The Union Pacific, in 1917, paid regular dividends on the common of 8 per cent and paid 3½ per cent extra dividends. In 1918, the stock was put on a regular 10 per cent dividend basis, although in the first quarter a regular dividend of 2 per cent was declared with a half per cent extra.

In the next and succeeding quarters the regular dividend was 2½ per cent. Thus, the stock paid 11½ per cent dividends in 1917 and 10 per cent in 1918. The Pittsburgh, Cincinnati, Chicago & St. Louis, a subsidiary of the Pennsylvania, reduced its annual dividend from 5 per cent, paid in 1917, to 4 per cent.

Operations of the Great Western Railway of England

THE GREAT WESTERN of England is the largest railway in the United Kingdom, its operating mileage being greater by a thousand miles than that of the next largest British railway. The Great Western serves an extensive territory, west, northwest, and southwest of London, including the important cities of Birmingham, Bristol, Plymouth, Cardiff, Birkenhead and Swansea. A statement recently issued from the Great Western statistical department makes available certain information regarding its operations during the last normal year preceding the war (1913), and the first four years of the war period, (1914, 1915, 1916 and 1917). From this statement the statistics in the table have been taken by the Bureau of Railway Economics, as being of general interest to students of the American railway problem, and also as throwing light on the relative operation of British railways under normal and war conditions.

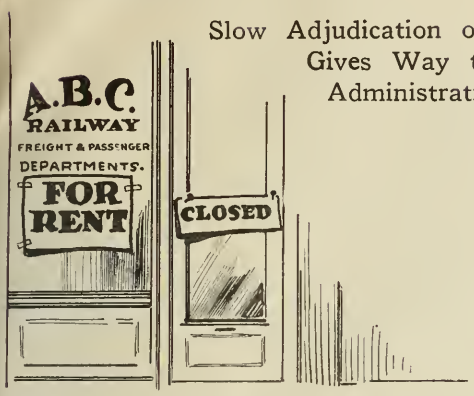
GREAT WESTERN RAILWAY

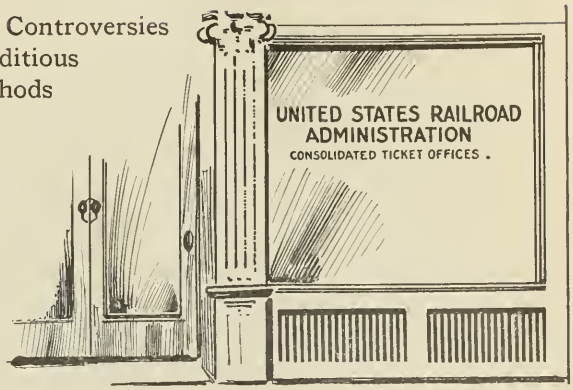
Item	1913	1914	1915	1916	1917	Per cent of increase 1917 over 1913
Mileage:						
Miles of line	3,025	3,028	3,029	3,030	3,002	d 0.76
Main track	5,073	5,096	5,119	5,127	5,084	0.22
All tracks	6,645	6,695	6,743	6,766	6,706	0.92
Total Investment:						
Road and equipment	$515,903,000	$520,542,000	$523,121,000	$524,261,000	$524,552,000	1.68
Other investment	33,391,000	33,603,000	33,590,000	33,665,000	33,635,000	0.73
Total	549,294,000	554,145,000	556,711,000	557,926,000	558,187,000	1.62
Income Account:						
Total operating revenues*	$77,966,200	$78,837,500	$81,237,900	$84,526,700	$91,542,500	17.41
Total operating expenses	50,641,300	51,618,800	54,234,500	57,539,000	64,288,600	26.95
Net operating revenue*	27,324,900	27,218,700	27,003,400	26,987,700	27,253,900	d 0.26
Miscellaneous receipts	1,528,800	1,364,800	1,453,100	1,594,400	2,180,700	42.64
Gross income	28,853,700	28,583,500	28,456,500	28,582,100	29,434,606	2.01
Interest, rentals, etc.	9,514,800	9,585,300	9,616,700	9,680,800	9,693,400	1.88
Dividends	18,388,200	18,089,000	17,647,400	17,647,400	17,647,400	d 4.03
Balance for year	950,700	909,200	1,192,400	1,253,900	2,093,800	120.24
Equipment:						
Locomotives†	3,090	3,104	3,104	3,131	3,147	1.84
Cars—total	92,346	92,448	93,252	93,979	94,423	2.25
Passenger cars‡	5,681	5,703	5,634	5,601	5,576	d 1.85
Other passenger-train cars	3,011	3,013	3,010	3,014	2,990	d 0.70
Freight cars	75,875	76,189	76,967	77,634	78,128	2.97
Company service cars	7,779	7,543	7,641	7,730	7,729	d 0.64
Train-miles	52,588,713	53,331,756	52,733,343	51,734,073	47,706,684	d 9.28
Passenger train	32,419,547	33,056,501	30,351,630	27,868,363	22,755,883	d 29.81
Freight train	20,169,166	20,275,255	22,381,713	23,865,710	24,950,801	23.71
Per cent passenger train	61.6	62.0	57.6	53.9	47.7	.....
Per cent freight train	38.4	38.0	42.4	46.1	52.3	.....

*Adjusted in 1914-1917 to correspond to the Government guarantee of net revenue. †Includes 20 electric motor cars throughout. ‡Includes 40 electric trailer cars throughout. d Decrease.

Radical Changes Take Place in Traffic Field

Slow Adjudication of Rate Controversies Gives Way to Expeditious Administrative Methods





No division of railroading has been so radically modified by federal control as to organization and authority as the traffic department. The passing of competition proved the death knell of all solicitation of business. On the other hand, the rapidly rising costs of transportation during the war made increased revenues imperative, and these were secured not through the slow, cumbersome processes of the Interstate Commerce Commission and the state regulatory bodies, but promptly through a proclamation by the President. Under the authority conferred by the federal control act, the director general, acting for the President, initiated a freight rate advance of 25 per cent without hearings of any kind or referring the matter in any way to the interstate or state commissions. He knew that the railways needed more money and needed it immediately, so he proceeded to get it. At the same time that he increased freight rates he advanced passenger fares to three cents and authorized additional transportation charges for parlor and sleeping car passengers.

The original order, No. 28, provided that interstate rates should supersede state rates. As the result of strenuous protests by state commissions and others the intra-state freight rates were not cancelled but remained in force with the increase prescribed in the director general's order.

Realizing that General Order No. 28 was an emergency instrument and hence unavoidably imperfect, the director general created three territorial freight traffic committees and 25 district committees to iron out such inequalities and injustices as were contained in the order. He later authorized the appointment of representatives of the shipping public to membership on these bodies, so that no action would be taken without giving due consideration to the viewpoint of the railroad patron. This organization, under the director of the Division of Traffic of the Railroad Administration, practically replaced the Interstate Commerce Commission and the state commissions in rate regulation.

The same expeditious methods employed in securing increased revenues for the railroads were used to increase the returns of the American Railway Express Company. The operation of the company was taken over by the director general of railroads on November 18; two days later he issued General Order No. 56 announcing an advance in express rates, effective January 1, which is calculated to produce an increase in revenues of about $24,000,000 annually.

Not only did the Railroad Administration advance its charges, but it saw to it that they were paid promptly. In General Order No. 25, which became effective on August 1, all transportation charges were put on a cash-on-delivery basis with the exception that credit is allowed under bond for 48 hours after sending a shipment, if prepaid, or after delivery at destination, if it be a collect consignment.

Through the unification of all the important lines in the country a more general introduction of uniform practices was obtained and railroad facilities and forces were more extensively pooled. Time tables and tickets were standardized, universal mileage scrip was introduced and interchangeable tickets were put on sale between certain large cities. Universal transit was established, *i. e.*, all existing tariffs which provided that outbound shipments from a transit point should pass over the road hauling the inbound were altered to permit movement over any line. Joint livestock agencies were created at the large western markets, and consolidated ticket offices have been opened in most of the large cities of the country.

From the standpoint of the shipper the very first general order was a serious invasion of his rights. It provided that the designation of routes by shippers was to be disregarded by railroads when speed and efficiency of transportation service may thus be promoted. While this action was prompted by the desire to remove all obstacles in the way of operating efficiency during the war, it deserves mention because it took from the shipper a prerogative which he long considered inviolable.

The importance of the traffic department as a railroad sales organization disappeared with the elimination of competition under government operation. Not only was all solicitation of traffic abolished, but all off-line traffic offices were closed. Although the Railroad Administration arranged that the informative work performed by these agencies should be taken over by resident lines, there has been considerable complaint on the part of shippers concerning the manner in which this service has been rendered since the change was made. The justice of their criticisms has been recognized by the director of the Division of Traffic and the regional directors who recently took steps to strengthen the traffic service departments of the railways. Exhaustive instructions issued by B. L. Winchell, Southern regional director, regarding traffic service work, were published in the *Railway Age* of December 13, page 1073. If these activities are carried on with the thoroughness suggested in Mr. Winchell's circular, it is doubtful whether the director general will be able to show any saving through the elimination of solicitation.

Other traffic activities discontinued under federal control were advertising and industrial development work. During the war when the rails were burdened with unprecedented tonnage it was not considered good policy to do anything which would tend to increase railroad traffic. It is understood that steps are now being taken to resume the stimulation of passenger traffic to some extent, and it is probable that the railroads will again take a leading part in the industrial expansion of the country. That the Railroad Administration

is planning to encourage passenger travel, which during the war was curtailed as far as possible, is further indicated by the recent restoration of a number of passenger trains which had been removed from service under federal control. In his report of the activities of the Railroad Administration during its first seven months of existence the director general stated that passenger service to the extent of 21,000,000 train miles a year had been eliminated in the territory west of Chicago and the Mississippi river, while in the eastern region the reduction in train mileage was equivalent to 26,420,000 per annum. Many of the trains annulled were superfluous, constituting duplications of service under competitive conditions. These will not be restored under government operation.

Although industrial development work was suspended during the war, the activities of the railroad agricultural departments were encouraged, as they were recognized as useful organizations in promoting a maximum yield of foodstuffs. To further strengthen the existing agricultural departments of the railways the director general created an Agricultural Section with headquarters at Washington and two agricultural committees, one for the North and West and the other for the Southeast, Texas and Oklahoma.

The director general's activities in the traffic field of transportation were not confined to emergency measures calculated to satisfy the demands of war conditions, but in some respects affected basic principles. Early in his term of office he appointed a special committee on uniform classification to formulate a report as to uniform rules, descriptions and weights with a view to completing that portion of the work. This body prepared Consolidated Classification No. 1, which has been the subject of hearings before the Interstate Commerce Commission at various cities throughout the country.

The director general has also proposed the standardization of class freight rates on a basis intended to eliminate the discriminations and inequalities resulting from differences between the rates of various States and between state and interstate rates and to bring about a greater degree of uniformity in those sections of the country where conditions of transportation, density of traffic and of population, etc., are similar. The plan, as submitted by the Railroad Administration to the Interstate Commerce Commission and the state railroad commissions, provides for a system of class rate scales, graded according to mileage, for adoption in all of the States except official classification territory, because the rates in that territory are already on a more uniform basis than in other sections of the country. Four scales are proposed, three of which are related to each other on a percentage basis. It is not probable that these scales will be made effective except after extended hearings before the various commissions. Nevertheless, some shippers have expressed the fear that the sole purpose of the plan is to effect a further increase in rates.

One Year of Government Control of Railroads

Radical Changes Possible Because of Autocratic Power Placed in Hands of Director General

In the annual review number of the *Railway Age* published a year ago, on January 4, 1918, there were recorded the first steps taken by Director General McAdoo toward co-ordinating the transportation facilities of the United States into a single system. We are now awaiting the appointment of a new director general of railroads, one of the most important of whose functions, it is believed in many quarters, will be to wind up the affairs of the Railroad Administration organized by Mr. McAdoo and to arrange for the restoration of the railroads to their owners at an early date.

Meanwhile Congress is beginning this week an inquiry into the railroad situation with a view to determining what ought to be the government's policy toward the railroads either now or permanently, an inquiry which will involve to a considerable extent the question as to how much of the policy adopted by Mr. McAdoo for a year during which the country was at war should be retained during times of peace. It seems to be generally accepted that if the railroads are returned to the management of their owners it will be under conditions differing greatly in many respects from those which formerly prevailed and that regardless of opinions as to the success of Mr. McAdoo's policy as a whole many lessons have been learned during the past year which will have permanent results.

A review of the manifestations of that policy and of what has been accomplished under it during the past year is, therefore, timely, but the various activities of the Railroad Administration have been so fully reported from week to week in our columns and a comprehensive official report prepared by the various departments and regional directors of the Railroad Administration is to be issued so soon that a detailed chronicle of events is hardly warranted at this time.

On June 17, after Director General McAdoo had been in charge of the railroads for over five months, he issued a public statement declaring that the policy of the Railroad Administration has been informed and shaped by a desire to accomplish the following purposes, named in what he conceived to be the order of their importance:

The Policy of the Railroad Administration

First. The winning of the war, which includes the prompt movement of the men and material that the government requires. To this everything else must be subordinated.

Second. The service of the public, which is the purpose for which the railways were built and given the privileges accorded them. This implies the maintenance and improvement of the railroad properties so that adequate transportation facilities will be provided at the lowest cost, the object of the government being to furnish service rather than to make money.

Third. The promotion of a spirit of sympathy and a better understanding as between the administration of the railways and their 2,000,000 employees, as well as their 100,000,000 patrons, which latter class includes every individual in the nation, since transportation has become a prime and universal necessity of civilized existence.

Fourth. The application of sound economies, including:

(a) The elimination of superfluous expenditures.

(b) The payment of a fair and living wage for services rendered and a just and prompt compensation for injuries received.

(c) The purchase of material and equipment at the lowest prices consistent with a reasonable but not an excessive profit to the producer.

(d) The adoption of standardized equipment and the introduction of approved devices that will save life and labor.

(e) The routing of freight and passenger traffic with due regard to the fact that a straight line is the shortest distance between two points.

(f) The intensive employment of all equipment and a careful record and scientific study of the results obtained, with a view to determining the comparative efficiency secured.

While many students of transportation have formed a strong impression that Mr. McAdoo was also actuated by a desire to demonstrate that these purposes could be accomplished more successfully by the government than by private enterprise, it will be fair to endeavor to appraise the results of the year by the extent to which these objects have been attained, giving consideration to the fact that Mr. McAdoo undoubtedly had in mind a longer period than one year and that it could hardly be expected that the full results could be obtained in that period.

As the primary purpose of the government in taking over the railroads was to increase the efficiency of the trans-

portation system for the handling of the war traffic, the first question to be asked, in any analysis of the results of the year, naturally involves the volume of traffic handled. The statistics are available, in the monthly reports compiled by the Operating Statistics Section of the Division of Operation, for the 10 months ending with October, which nearly covers the period of war traffic this year, as the armistice was signed on November 11. For this period railroads operating 228,665 miles had handled a total of 365,855,394 net ton miles of freight (revenue and non-revenue), as compared with 358,977,441 in 10 months of 1917. This is an increase of 1.9 per cent. It is assumed that the real increase in traffic handled was somewhat greater than this figure indicates because one of the primary policies of the Railroad Administration has been to save ton miles by the rerouting of freight to avoid circuitous routes and cross-hauling, but the exact amount of this saving cannot be determined.

Increased Expenses

This record-breaking traffic was handled, however, at record-breaking expense, largely on account of the increases in the wages of railroad employees, the bulk of which were made effective for the entire year, whereas the rate increase was in effect for only six months. There have also been large increases in the cost of fuel and other supplies, and while the proportion of the increase attributable to these items is not known, the total increase in operating expenses for the 10 months ending with October 31, for which statistics are available, was $903,000,000, an increase of 38 per cent, as compared with an increase in revenues, caused principally by the increases in rates, of $607,000,000, or 20 per cent. While a large number of economies have been effected, such as those resulting from the rerouting of traffic, the reduction of passenger train mileage, the joint use of facilities in many places, the discontinuance of traffic solicitation and the charging of many salaries and other general expenses to the corporate accounts rather than to operating expenses, their amount has been so small as compared with the increases in expenses in other directions that they became appreciable only when segregated, at least so far as this year's experience is concerned. While various statements have been given out by the Railroad Administration from time to time of the estimated savings resulting from these various economies, in one or more regions at a time, they have not been grouped in such a way as to give any very definite idea as to their aggregate. Regional Director A. H. Smith, in a report covering the operations of the Eastern region, on August 29, mentioned economies amounting to approximately $36,000,000 a year. Doubtless more comprehensive figures will be shown in the forthcoming annual report of the Railroad Administration.

The report made by Mr. McAdoo to the President on September 3 included an estimate of $23,566,633 for the saving effected by the closing of freight and passenger offices and curtailment of advertising, but these reductions in expenses were not in effect throughout the year, and the Interstate Commerce Commission statistics for 10 months show a decrease in traffic expenses of only $12,000,000. The report of September 3 also mentioned a saving of $4,000,000 in salaries of officers, but the 10 months' figures show an increase of $12,000,000 in general expenses, which indicates that the saving in officers' salaries has been more than offset by the increase in the wages of clerks, and other general office expenses. The increase in operating expenses includes $138,000,000 for maintenance of way and structures, $333,000,000 for maintenance of way and equipment and $426,000,000 for transportation, and while the maintenance of equipment account probably includes more work than was done during the corresponding period of 1917, it is certain that the amount of work performed on the maintenance of way and structures, on account of shortage of labor and materials, was considerably less than in 1917.

What the expenses would have been if the railroads had remained under private management during the past year of course can never be determined.

The efficiency of transportation involves not only the volume of traffic handled, but the expedition with which it is moved and the promptness and regularity with which cars are supplied. While this can hardly be demonstrated statistically, it seems to be generally recognized that the classes of traffic regarded as essentials during the war period, which constituted the bulk of the traffic moved this year, have been given remarkably good service and a special expedited service has been furnished in the case of many especially important commodities, such as food supplies, oil, and other articles which have been consolidated and moved in solid trains via the routes best fitted to handle the traffic from the west to the seaports, avoiding delays at intermediate terminals. While the Railroad Administration discontinued the publication of the statistics of car surpluses and shortages which have been compiled since 1907 by the American Railway Association, the weekly and monthly reports of traffic conditions which it has issued have disclosed only occasional and local car shortages since the early months of the year and in recent weeks considerable surpluses have been reported in various sections, particularly in the case of coal cars, of which there were large shortages last year.

Co-ordination of Government Departments

One of the most important ways in which the efficiency of the transportation service has been improved under the Railroad Administration, as far as the war traffic is concerned, has been the result of a closer co-ordination of the railroad service with the various other governmental war agencies and between our government and the representatives of the Allies. This was developed as the government gained organization experience after some unfortunate experiences in the earlier part of the war period, and the fact that the Railroad Administration was itself a government institution probably helped to promote harmonious relations. Better co-ordination of the government's traffic requirements was repeatedly urged by the Railroad's War Board last fall in order to prevent the confusion and congestion which resulted from the conflict of priority orders, but the War Board itself was not able to bring this about.

One of the first acts of the Railroad Administration after it had been organized was to appoint representatives of the Division of Traffic as traffic officers of the Food and Fuel Administrations, the War and Navy Departments, the War Industries Board and the War Trade Board. Thus, whereas priority orders had formerly been issued by 568 quartermasters in the War Department alone, the authority to issue such orders for the department was concentrated in the hands of the manager of inland traffic, and as the traffic officers of the various departments were able to work together, it was possible to carry out a general priority program without conflict and the prompt and preferred movement of war supplies was facilitated. It has come to be recognized that the congestion at the eastern seaports in 1916 and 1917 was caused by the unregulated shipment of export freight to a few ports regardless of the possibility of loading it into vessels, and it seemed impossible to increase the use of other ports because of lack of terminal facilities and because of the preference of the ships for certain ports, particularly New York.

This year the Railroad Administration perfected the permit system and the use of regulating embargoes to prevent the accumulation of freight at the ports, the government developed increased storage and handling facilities at numerous ports, the Shipping Board and the marine department of the Railroad Administration arranged for sailings from those ports and the Railroad Administration, after a study of traffic routing conducted by a special committee, ar-

ranged for the diversion of export freight to the ports where it could be handled, obtaining a much greater use of the southern and gulf ports. Later an exports control committee was formed to direct the routing of export freight and developed a zone system which greatly facilitated the regulation of this traffic.

The removal of the obstructive congestion which last winter almost paralyzed operations at some of the eastern terminals had a most vital bearing on the country's war efforts. So serious was the situation at one time that the late Lord Rhonda, food controller of England, sent a message to Washington saying that "unless America can increase the quantity of supplies I am unwilling to guarantee that the allied nations can hold out." Still later the representatives of the allied governments in Washington predicted disaster unless the shipment of food supplies was expedited and the centralized efforts of the Railroad Administration and its co-operation with other departments made it possible to meet the demands.

Coal Traffic

Until recently the coal situation has been regarded as one of the most critical factors limiting the productiveness of America's war machine, and particularly during last winter it was the occasion of bitter controversies as to whether the responsibility for insufficient production belonged to the railroads, the coal operators, or the Fuel Administration. One of the most urgent recommendations of the Railroad's War Board was the adoption of a zone system to eliminate cross-hauling and reduce the distances over which coal should be transported. While the railroad committee had no power to put its recommendations into effect, the plan which it had worked out was taken as the basis of the plan later adopted by a joint committee of the Railroad and Fuel administrations which has been credited by the Fuel Administration with saving over 160,000,000 car miles. Co-operation between the two administrations and the coal producers and consumers also made it possible to maintain a heavy traffic in coal during the summer months when operating conditions were most favorable, and up to December 31 the railroads had handled 624,628 cars more of coal than they handled in 1917, with practically no increase in the number of cars.

This is simply one illustration of the things that were made possible by the co-operation engendered by the war. In former years railroads have tried to get consumers to buy and producers to ship coal during the months of favorable weather, without much success, because the producers could not ship without being assured of a market and consumers were reluctant to order in advance or had little storage capacity. This year advance ordering became a matter of self-preservation as well as a patriotic duty.

Service of the Public

As to the second purpose mentioned by Mr. McAdoo in his statement, the service of the public in general, it must be admitted that the Railroad Administration during the past year has been less successful than in the handling of the war traffic, to which, of course, everything else was subordinated. Passenger service in particular has suffered in spite of many improvements effected in various ways in such matters as rearrangement of schedules, joint use of terminals, consolidated ticket offices and timetables and interchangeable tickets. Trains have been overcrowded and many privileges formerly accorded to the traveling public have been withdrawn. However, these conditions have been accepted cheerfully on the whole by the majority in the same way that various discomforts and inconveniences caused by the war in other ways have been accepted. There has been more complaint on the part of shippers regarding the loss of some of their privileges and because of the frequent disturbance of established conditions, while shippers whose products were listed among the non-essentials have had little occasion to praise the service. Many representatives of the more essential industries have paid high tribute to the quality of the service accorded them.

As far as the maintenance and improvement of the railroad properties are concerned, the results have not been conspicuously successful because of the priority of other demands upon the supplies of labor and materials. Only 38 per cent of the authorizations for capital improvements had been expended up to November 1, and while special attention has been paid to the repair of cars and locomotives, rail and tie renewals have fallen behind. While the capital expenditures represent a greater sum of money than has been so expended in the past two or three years, the increased prices will offset the difference to a considerable extent. Deliveries of cars and locomotives have not fulfilled the expectations announced by the Railroad Administration when the orders were placed, but while some of the delay is doubtless attributable to the time consumed in the preparation of standard designs and under the new method of centralized purchasing the requirements of the railroads in the United States were allowed to give way to the requirements for equipment for use on our military lines abroad.

As to the promotion of a spirit of sympathy and a better understanding between the administration of the railways and their employees, opinions seem to differ widely. While Mr. McAdoo has made himself popular with the employees whose wages he has increased, the various wage orders have caused some dissatisfaction because of changes in the relations between the wages of various classes of employees, and there have been indications that the popularity of the director general has been somewhat at the expense of the discipline and of the respect for supervising officers because of the tendency on the part of employees to look to Washington. There have been also many reports of lack of courtesy on the part of employees which has been attributed by some observers to the lack of respect for local officers, but may be attributed in part to the general spirit of independence at a time when men were scarcer than jobs.

Any analysis of the results obtained this year in the direction of the application of economies, which Mr. McAdoo stated as his fourth purpose, would better await more complete reports which are soon to be made available. The various steps taken in this direction have been rather fully described in various issues of the *Railway Age*.

In all that it has accomplished the Railroad Administration has had an enormous advantage over private railroad corporations in the almost autocratic power placed in the hands of the director general by the federal control law and the ability to subordinate the question of expense. Whether or not such powers would be allowed to continue long during peace times, the director general was given sufficient authority to make rates commensurate with the expenses and was given in addition an appropriation from which he can draw if the rate increase for this year proves insufficient. He was not hampered by the difficulties of reconciling conflicting interests and he was able to disregard the various restrictions imposed by laws and commission orders on the railroads. The Sherman law did not apply to his operations, the right given the shippers to route their freight became non-existent, he was able to increase demurrage rates to a figure sufficient to penalize delays in loading and unloading cars, the tariff minimum weights no longer stood in the way of economical loading of cars, and neither competition nor the pressure of shippers, labor organizations or state commissions was allowed to interfere with sound railroad practices. Whether similar powers can, as a matter of practical politics, be conferred upon the railroads under other conditions and whether they could be made equally effective without a considerable degree of centralization, are questions that will doubtless be fully discussed in the near future.

The Suspension of Commission Regulation

Interstate Commerce Commission Divested of Most of Its Authority; State Bodies Ignored

One of the most interesting aspects of the railroad situation during the past year has been the practical absence of commission regulation. When affairs came to such a pass that the government realized the necessity of giving more consideration to the practical question of getting the utmost efficiency out of the transportation machine than to the question of preventing some railroads from earning too much money, the government demanded for itself a freer hand than it had allowed the railroad managers. This was justified both on the ground of efficiency and on the theory that the government need not regulate itself. When the federal control act was passed, very largely in the language which had been suggested to Congress by Mr. McAdoo's representative, it was found to contain a provision that the carriers while under federal control should remain subject to all laws and liabilities as common carriers "except in so far as may be inconsistent with the provisions of this act or any other act applicable to such federal control or with any order of the President."

As a result, while the organization of the Interstate Commerce Commission has been made useful in various ways by the Railroad Administration, and while it has been allowed to preserve the continuity of its records and, therefore, has been kept about as busy as before, the commission has been temporarily divested of most of the authority it formerly possessed.

The state commissions were not even mentioned in the federal control law and they have been almost as completely ignored by the Railroad Administration ever since. As far as railroads are concerned, the state commissions have hardly even been kept busy, except for their efforts to preserve their former prerogatives and to persuade Mr. McAdoo and his organization to accept their co-operation in some way that would give them a hand in the game.

The relation of the Interstate Commerce Commission to federal control has been very clearly set forth in the commission's annual report, of which an extensive abstract was published in the *Railway Age* of December 6. In the first stages of federal control individual commissioners and bureaus of the commission performed some useful services for the Railroad Administration, four commissioners took part in the negotiations with the railroad companies over the draft of the standard compensation contract, and the commission itself, under the terms of the law, has certified to the President the amount of the net operating income for the years 1915, 1916 and 1917, which is the basis for the compensation of the companies.

Another function of the commission in relation to the Railroad Administration has been advisory, the rendering of advice at the request of the director general in matters affecting the shipping and traveling public, such as the proposed consolidated freight classification and the advance in express rates. In both cases the commission was not asked to decide anything. The Railroad Administration assumed the responsibility but the commission was asked to give its judgment as to the effectiveness of the methods proposed to attain the desired object.

The authority which the commission has so long exercised in the regulation of rates was largely taken away from it by the provision in the federal control law authorizing the President to initiate rates and prohibiting their suspension, although the commission was authorized to enter upon a hearing and review presidential rates after they were in effect, upon complaint. Under the broad powers thus conferred the director general was able to put into effect a 25 per cent increase in freight rates and an advance in passenger fares to 3 and 3½ cents a mile without even asking the commission's advice and upon less than the statutory 30 days' notice, and while the commission retained its jurisdiction over the rates of carriers not under federal control and over the joint rates between federal and non-federal roads, it has usually been prompt to accede to the requests of the Railroad Administration in such cases. While a large number of complaints have been filed with the commission attacking rates made by the Railroad Administration, the commission has decided only a few of them, which involve questions of relationships, rather than absolute reasonableness. In these cases the commission asserted its power to change the rates but it has not yet passed directly upon the 25 per cent increase in any case and numerous problems created by the somewhat arbitrary manner in which the increase was put into effect are still before it. Meanwhile numerous adjustments of rates of the kind which formerly were referred to the commission have been handlded by joint committees, of railroad traffic officers and shippers, created by the Railroad Administration.

State Commissions Not Consulted

The Interstate Commerce Commission has apparently appreciated the necessity for the exercise of autocratic powers by the Railroad Administration during war time, and whether or not it has approved everything that has been done, it has at least been able to maintain harmonious relations with the Railroad Administration; but the same thing cannot be said of the state commissions. The very fact that there are 47 of them made it difficult to deal with them on any effective basis of co-operation, and when the Railroad Administration early indicated its intention of handling the transportation situation as a national proposition, without taking time to consult with the state authorities or allowing itself to be interfered with by them, a state of strained relations soon became apparent, which was not improved by the tendency on the part of some railroad officers to make the most of their independence. The difficulty was increased by the fact that the provisions in the law are not so specific as to remove all doubt as to the respective jurisdiction of the states and the federal government. The law provided that nothing in the act should be construed "to amend, repeal, impair or affect the existing laws or powers of the several states, except wherein such laws, powers or regulations may affect the transportation of troops, war materials, government supplies or the issue of stocks and bonds." The state commissioners argued that this was intended to preserve state regulation in so far as it did not interfere "in any proximate and tangible way with the transportation of troops and munitions," and that this included authority over intrastate rates as an exercise of police powers. The Railroad Administration never specifically stated its interpretation of this language, but in practice it has initiated intrastate as well as interstate rates and has filed tariffs with the state commissions "for information only" and not in accordance with state statutory provisions.

In matters of service the Railroad Administration has acted apparently upon the assumption that its authority was complete, and while Mr. McAdoo has indicated a willingness to receive advice and suggestions from the state commission-

ers, and in many cases has adopted their recommendations in local matters, it was made clear to the state commissioners that the deciding power was at Washington, and that their recommendations would have more practical effect than their orders. This, however, was not the kind of recognition that the state commissioners wanted, and while many of them were jealous of their authority and resented being ignored, others were frankly puzzled as to how to comply with their local statutes. During the war most of the state commissions refrained from actively pressing the issue, but at the convention of the National Association of Railway and Utilities Commissioners in Washington after the armistice was signed the restraint was removed and resolutions were adopted asking recognition of the full and unimpaired authority of the states, and declaring that "in any event it is the duty of each state commission to exercise and maintain its statutory authority to the extent which it may deem the public interest demands."

Mr. McAdoo yielded to the protests of the state commissioners, reinforced by a number of congressmen, particularly from the South, in one important instance. When General Order No. 28 was issued, providing for the general increase in rates, it was proposed to remove all conflict between state and interstate rates by first raising the state rates to the level of the interstate rates in the same territory before applying the 25 per cent increase. This would have resulted in some very large increases in some states, and Mr. McAdoo was finally persuaded to omit the first advance.

Transportation Facilities of the A. E. F.

Necessary to Build Vast Piers, Docks and Warehouses and Much Track, Rolling Stock and Other Facilities

THE RAILWAY TROOPS recruited in this country under the direction of S. M. Felton, director general of military railways, and sent to France for work in connection with the transportation of the American Expeditionary Forces, up to November 30 aggregated 1,921 officers and 62,859 men actually attached to organized military units, in addition to a large number of officers and men sent from time to time as casuals.

While the complete story of the accomplishments of the railway engineers in France, as their contribution to the big job of winning the war, is yet to be told, we have secured some data which gives an idea of the extent of the transportation operations required to meet the needs of our army abroad. Before the armies could function in the field vast piers, docks and warehouses had to be built at the French ports assigned to the American forces, and railroads with the necessary rolling stock for the transportation of troops and supplies had to be either constructed or secured from the French. These operations involved the development of some 16 French ports from the English Channel to the Mediterranean, with such facilities as piers, unloading machinery, warehouses, and railroad yards and terminals, the repair, expansion and maintenance of the standard gage railroad lines assigned by the French, the construction of narrow-gage lines from the rail heads of the main lines to points near the trenches, and the provision of cars and locomotives, as well as the crews to operate them.

A total of 957 miles of standard gage railway track had been laid in France by the American railway engineers up to November 30. This comprises yards and sidings only, as, contrary to a rather widespread impression which has been allowed to spread because of the secrecy maintained during the war, the Americans built no new main line railroad in France, except for the 5.75 mile double track cut-off built to run trains around the city of Navarre, which was described in the *Railway Age* of December 6. As fast as they could supply the men and equipment the American railroad men undertook the operation of their own trains over several hundred miles of French railroads which had been assigned to their use, extending from the various ports toward the American front in the Toul sector, and they built their own yards, terminals and sidings, including terminal facilities for each engine district.

The transports supplying the American Expeditionary



S. M. Felton, Director General of Military Railways, and Commissioned Officers of His Staff. Front Row, Left to Right: Major W. W. Sullivan, Lt. Col. W. H. Holcombe, Col. J. M. Wright and S. M. Felton

Forces used 74 berths located at La Havre, Brest, St. Nazaire, Les Sables-d'Olonne, Nantes, La Pallice, Rocheport, Paullac, Bassens, Bayonne and Marseilles. New trackage had to be built in connection with the development of these ports, whose capacity was increased from 5,000 tons a day last January to 33,400 tons a day at the close of hostilities. From the ports the rail lines used by the Americans converge toward the front and in the vicinity of the trenches supplies were transported from the standard gage railheads over more or less temporary light railways of 60 cm. gage that were extended as the line advanced.

A total of 1,358 standard gage steam locomotives of the "Pershing" Consolidation type have been shipped to France for the use of the American Expeditionary Forces, and 65 additional engines of this kind have been shipped for the use of the French government. In addition, 332 locomotives of this kind were en route to France on November 30 or on docks in the United States awaiting shipment. Fifteen extra tenders for these engines have also been shipped. Thirty saddle tank switching locomotives are now in use by the American Expeditionary Forces. Ten gasoline locomotives of 150 h.p. each are in use in France, and six additional engines of this kind were en route.

Forty-five 36-inch gage steam locomotives are in use in France and one such engine was en route. One hundred and ninety-one steam locomotives of the 60 cm. gage are in use in France, and 30 of these engines were either en route or are on the docks in the United States awaiting shipment. Sixty-five 35 h.p. gasoline locomotives, 60 cm. gage, are in use in France, while 108 50-h.p. gasoline locomotives, 60 cm. gage, are in France, and one was en route. A total of 2,189 locomotives had been shipped to France either for the use of the American Expeditionary Forces or of our Allies.

The following standard gage freight cars have been delivered in France for the use of the American Expeditionary Forces: 4,459 box cars, ordinary; 3,350 box cars with cabs, 1,225 high-side gondolas with tarpaulins, 1,425 high-side gondolas without tarpaulins, 3,429 low-side gondolas, 1,700 flat cars, 675 tank cars, 950 refrigerator cars, 400 ballast cars, 150 six-yd. dump cars, 150 12-yd. dump cars, 100 16-yd. dump cars, two 100-ton freight cars, 796 motor cars, 352 hand cars, 108 push cars, total 19,271; 3,217 standard gage cars were either en route to France or on the docks in the United States awaiting shipment.

The following narrow gage cars have been delivered to the American Expeditionary Forces, or were en route thereto: 36-inch gage, 400 flat logging cars; 40 cm. gage, 500 dump cars, and 1,000 push cars; 60 cm. gage, 600 box cars delivered and 65 en route, 166 tank cars, 500 flat cars, 1,555 low-side gondolas, 230 one-yd. V-dump cars, with 64 additional en route. One hundred of the 1½ V-dumps have been delivered and 100 were on the way; 100 artillery trucks have been delivered and 100 additional were en route; 970 motor cars, 180 inspection cars, 300 hand cars and 990 push cars have also been delivered.

Shipments to France of locomotive cranes total 120, ranging in capacity from 7½ to 35 tons. Thirty-three five-ton gantry cranes and 15 10-ton gantry cranes were also shipped for the unloading of equipment at the ports of debarkation.

Two standard gage locomotive repair shops, each accommodating a road equipment of 1,500 locomotives have been constructed. One of these shops is situated at Nevers and the other at Melun. At La Pallice one standard gage erection shop with a capacity of 100 cars per day was completed. Twelve engine houses, each handling from 50 to 75 locomotives per day have been built.

A narrow gage locomotive repair shop accommodating 120 locomotives per month was constructed at Dijon, and an addition to this plant is being erected which will increase its capacity 50 per cent. There are two base and four field narrow gage engine houses which have also been built.

The following narrow gage track and track materials have been sent to France: 150 miles 40 cm. fabricated track, with 12-lb. rail; 490 miles of 60 cm. fabricated track, with 25-lb. rail; 435 miles, 25-lb. rail and fasteners.

Court Overrules Director General

In a suit brought by Robert McKay against the Erie Railroad Company to recover $25,000 for personal injuries, Judge Vickery, of the Court of Common Pleas, Cleveland, Ohio, overruled a motion to have the Erie dismissed as a defendant and the director general substituted, in accordance with the order of the director general concerning the filing of personal injury claim suits. This motion was denied by the judge, who stated orally that he believed that under Section 10 of the Act of Congress of March 21, 1918, actions such as the one before him were properly brought against the carrier company. While this case was pending prior to the date of the director general's order, the tenor of the court's remarks did not indicate that his holding would have been different if the action had been brought since.



Front Row Left to Right: Col. J. Milliken, Major W. W. Houston, Major G. R. Tuska and Capt. C. R. McKinsey



The Motive Power and Rolling Stock Situation

Condition of Locomotives Much Improved During the Year; Car Conditions Are Less Favorable

DURING THE PAST YEAR, up to November 30, the records of the Railroad Administration show that the railroads of the United States have received 2,343 new locomotives, of which 1,364 were built on orders placed by the railroads prior to the institution of government operation, 546 were United States Railroad Administration standard types and 200 were Russian Decapod locomotives. An additional 105 Consolidation locomotives built for U. S. Army use overseas were placed in service during the latter part of 1917 and early in 1918. The last of these, however, was withdrawn from service to be sent overseas during the month of September.

The distribution among the various regions of the locomotives placed in service during the year is shown in Table I. It will be seen that there are to be delivered on orders already placed, 1,428 locomotives, 544 on orders placed prior to January 1, 1918, and 884 on orders for standard locomotives.

These locomotives have been placed in service on the lines where the need has been the greatest, irrespective of ownership. Table I shows that 91 new locomotives built for roads in the Southern, Central Western and South Western regions, on orders placed by the roads themselves in 1917, have been placed in service on roads in the Eastern, Allegheny and Pocahontas regions. In addition to the new locomotives, 22 old locomotives have also been transferred from roads in the south and west to those in the east, making a total of 113 locomotives now operating in regions other than those in which the owning roads are located. There undoubtedly are some other locomotives which have been transferred between intraregional lines, but no complete data for these are available. The details of the interregional transfers are shown in Table II.

TABLE II—INTER-REGIONAL TRANSFERS OF LOCOMOTIVES FROM SOUTHERN AND WESTERN RAILROADS TO EASTERN ROADS

Purchaser or owner	New locomotives: Type	New locomotives: Number	Old locomotives: Type	Old locomotives: Number	Location
A. T. & S. F.	2-8-2	16	....	..	Penn. R. R.
A. C. L.	4-6-2	2	....	..	N. & W.
C. & N. W.	....	..	2-8-0	4	B. & O. (Allegheny Region)
C. G. W.	....	..	2-8-0	1	Penn. Lines West
C. R. I. & P.	2-8-2	10	....	..	Penn. Lines West
	....	..	2-8-0	2	Penn. Lines West
C. St. P. M. & O.	....	..	2-8-0	2	B. & O. (Allegheny Region)
E. P. & S. W.	2-8-2	5	....	..	Virginian
Ill. Cent.	0-6-0	3	....	..	B. & O. (Eastern Region)
M. K. & T.	2-8-2	15	....	..	C. & O.
	....	..	2-8-0	1	Penn. Lines West
Mo. Pac.	....	..	2-8-0	2	B. & O. (Allegheny Region)
M. & O.	....	..	2-8-2	1	C. & O.
St. L.-S. F.	2-10-2	11	....	..	Virginian
S. A. L.	Mallet	3	....	..	Virginian
	Mallet	4	....	..	N. & W.
	2-10-2	3	....	..	N. & W.
	....	..	2-8-0	2	C. & O.
Southern	2-10-2	5	....	..	B. & O. (Eastern Region)
	....	..	2-8-0	3	C. & O.
Southern Pacific	....	..	2-8-0	2	Penn. Lines West
Union Pacific	0-6-0	6	....	..	Penn. Lines West
	0-6-0	2	....	..	B. & O. (Eastern Region)
	2-8-2	1	....	..	Penn. R. R.
	2-8-2	5	....	..	B. & O. (Eastern Region)
	....	..	2-8-0	2	B. & O. (Allegheny Region)
Total		91		22	

TABLE I—DISTRIBUTION BY REGIONS OF NEW LOCOMOTIVES PLACED IN SERVICE FROM JANUARY 1 TO NOVEMBER 30, 1918

Regions	Eastern	Allegheny	Pocahontas	Southern	North Western	Central Western	South Western	Total
New locomotives from builders	538	96	45	...	...	...	...	...
Transferred from western and southern railroads	31	17	43	*17	...	*48	*26	...
Total new locomotives	569	113	88	103	131	297	63	1,364
Built by railways	*16	176	1	28	9	3	0	233
U. S. R. A. standard locomotives	264	60	10	83	68	50	11	546
Russian locomotives	61	61	..	68	0	0	10	200
Total new locomotives	910	410	99	282	208	350	14	2,343
Additional locomotives to be received on orders placed prior to January 1, 1918	116	49	30	46	78	164	61	544
U. S. R. A. standard locomotives on order not yet delivered	...	...	...	...	...	...	...	884

*Diverted to Eastern, Allegheny and Pocahontas regions.

No Immediate Shortage of Power

Notwithstanding the fact that the number of locomotives actually built for the use of the railways in the United States during the past year and the four preceding years has materially fallen behind the 10-year average of 1907 to 1917 inclusive, and that there was an acute shortage of power apparent at the close of 1917, there is at the present time very little evidence of a lack of sufficient power to meet immediate requirements. This does not mean, however, that there is no need for new power. Old locomotives have been kept in service at a sacrifice in operating efficiency to preclude a repetition of conditions existing last winter. The number of locomotives built each year during the above mentioned 10-year period for domestic steam railroad use has averaged approximately 3,300. For the past five years, beginning with 1914, the railroads have fallen behind this figure by an average of about 1,300 locomotives each year, a decrease which can be accounted for only partially by the increase in tractive effort of the locomotives built during recent years.

There are, broadly, three factors to which the present fortunate situation must be attributed: (1) In general the power of the country is in much better condition now than at the beginning of any winter for several years past: (2) the application of economy and capacity increasing devices to existing equipment has increased the effectiveness for service of a large number of locomotives, and, (3) there are now retained in service many locomotives which, if new power were available, would, and could economically be scrapped.

Power Now in Good Condition

That the condition of power is much better than it was last year is evidenced by the fact that for several months past there have constantly been stored in serviceable condition from 800 to 1,000 locomotives, over half of them on the eastern roads, where extraordinary demands are most apt to arise. This improvement has been made possible by the increased working hours which have been in effect since last spring, the decrease in labor turnover during the latter part of the year and the increase in the number of men employed on locomotive maintenance. Both of the latter are the result of the wage increases put into effect by the Railroad Administration.

What has been accomplished in increased shop output will be evident from an inspection of Table III, showing the condition of power for alternate weeks during a period of 18 weeks, for the months of August to November inclusive, which has been compiled from data collected by the equipment maintenance section of the Division of Operation of the Railroad Administration. For this period, which is practically one-third of the year, it is evident that the number of locomotives turned out of shops (including all engines out of service for repairs over 24 hours) is nearly 23 per cent greater than during the corresponding period of 1917, while the number of employees in the locomotive department has been approximately nine per cent to 11 per cent greater than the number in service last year. Taking the country as a whole, the increase in output is more than accounted for by the increase in maintenance forces and the increase in working hours from the eight, nine and ten-hour days in effect in various parts of the country, to the 70-hour week which was in effect on many roads from March to November 25. During the period covered by the table it also will be seen that there has been a gradual increase in the number of locomotives being repaired for other lines, the maximum shown being 284 during the first week in November.

Since November 25, when working time was reduced from 70 hours a week to a nine-hour day basis, followed on December 9 by a further reduction to an eight-hour day, there has been a decrease in output which has been felt more particularly in running repairs. The eight-hour day necessitates the employment of three shifts at engine terminals, with a consequent increase in supervision, where two shifts have heretofore been the rule. At present, in most cases practically the same number of men who have constituted the two shifts must be redivided into three. It will, of course, be possible gradually to build up these forces to overcome the present shortage as demobilization progresses. The power has been put in such good condition during the past summer and fall that the reduction in back shop output following the reduced number of working hours on the whole need give little immediate concern.

Old Power Modernized

Since 1914, the conditions which have restricted the buying of new power have directed attention to the possibilities for increasing the capacity of a large number of existing locomotives by the application of economy and capacity increasing devices, most important of which are the superheater, mechanical stoker and brick arch. During the past four years not less than 10,000 old locomotives have been equipped with one or more of these devices. In some cases the conversion has made unnecessary the purchase of a new class of power to perform the service which these engines were becoming unsuitable for, but which they are now capable of performing satisfactorily. In such cases each converted locomotive has saved the purchase of a new one, while in others the saving in new locomotives has been in proportion to the increase in capacity effected by the change, which conservatively would be between 10 and 20 per cent. It is evident that these 10,000 converted locomotives have had a material influence in preventing an acute power shortage.

TABLE III—WEEKLY SUMMARY OF THE CONDITION OF POWER ON THE RAILROADS OPERATED BY THE UNITED STATES RAILROAD ADMINISTRATION

Week ending	Number of locomotives: On lines	Number of locomotives: Serviceable	Number of locomotives: In or awaiting shops	Per cent of locomotives out of service for over 24 hours	Number of locomotives turned out of shops: 1918	Number of locomotives turned out of shops: 1917	Number of locomotives turned out of shops: Increase	Number of locomotives: Being repaired for other lines	Number of locomotives: Stored serviceable	Number of employees in locomotive department: 1918	Number of employees in locomotive department: 1917	Number of employees in locomotive department: Increase
August 3.....	62,764	53,665	9,999	14.4	5,329	4,462	867	190	924	261,915	241,104	20,811
August 17.....	62,740	53,398	9,342	14.8	5,260	4,337	923	177	708	262,056	240,615	21,441
August 31.....	62,908	53,932	8,974	14.2	5,828	4,940	888	194	848	264,349	241,845	22,504
September 14.....	63,119	53,774	9,345	14.8	5,686	4,507	1,179	199	994	273,752	245,996	27,756
September 28.....	63,126	53,987	9,139	14.4	6,083	4,806	1,277	236	913	275,326	247,533	27,793
October 12.....	63,162	53,874	9,288	14.7	5,576	4,599	977	245	901	270,287	249,543	20,744
October 26.....	63,247	53,711	9,536	15 0	5,807	4,723	1,084	274	875	271,554	250,195	21,359
November 9.....	63,269	53,357	9,912	15.6	5,791	4,636	1,155	284	878	276,837	253,066	23,771
November 30.....	63,418	53,641	9,777	15.4	6,317	5,054	1,263	259	1,119	281,384	253,788	27,596

Many Locomotives Should Be Scrapped

While the use of obsolete locomotives, to scrap which authorization has been secured or is contemplated, may be effective in preventing an acute shortage of power, it can be justified only to meet an emergency. With such locomotives in service it cannot truly be said that there is no shortage of power. In the interest of economical operation it is now imperative that there be a heavy purchase of new power in order that the three or four years' accumulation of scrap power may be gotten off the lines.

The Car Situation

Although there has been some improvement in the percentage of bad order cars in the course of the year, it is doubtful if there has been any real improvement in the condition of freight cars such as noted in connection with locomotives.

In the first place the number of new cars delivered to the railroads during the past year was less than half the number which were placed in service during 1917, and is hardly large enough to take care of normal replacements. The extreme need of equipment during the past year has therefore led to the retaining in service of a large number of cars which should be and will be retired at the first opportunity. These cars, unlike old locomotives, cannot be kept in condition to remain in service without causing an undue proportion of failures, and the need of retirement is therefore greater than in the case of motive power.

Those roads which had practically completed extensive reinforcement programs prior to our entrance into the war still have their equipment in excellent condition. Many roads, however, were only instituting such programs or had only partially carried them out before the pooling of equipment took the rolling stock out of the control of the owning roads. In such cases there has been very little opportunity during the past year to continue the betterment program, the proportion of cars on home roads being so small as to very seriously slow up this work.

The pooling of equipment has also tended to decrease the output of running repairs. It is a comparatively simple matter to supply material for the repairing of home line cars at outlying points where mill facilities are not available. Considerable delay is inevitable, however, where a very large percentage of the cars on the repair tracks belong to foreign lines, each requiring more or less special material.

The destruction of the incentive of the pieceworker following the failure to adjust the piecework wage differential to correspond to the increase in hourly rates, has had a much more marked effect in reducing the output in the car department than it has in the locomotive department.

The effect of these adverse conditions is not reflected in the percentage of bad order cars, which has been maintained between five and six per cent, a figure approximately equal to the average for the country in 1917. An inspection of Table IV, however, shows that of the total number of bad order cars shown on the weekly statements of the maintenance of equipment section of the Division of Operation of the Railroad Administration for the six weeks ending November 23, from 58.7 per cent to 60.7 per cent are classed as needing heavy repairs. Of the corresponding daily output the number of heavy repairs has averaged a fraction above 10 per cent. It is evident, therefore, that there is an accumulation of cars needing heavy repairs, which eventually must be reckoned with. If this situation is to be improved some means should be taken to return the cars to the owning roads at the earliest possible opportunity, where in many cases material for reinforcing is already available, as in this way only can the greatest output be obtained for the labor expended.

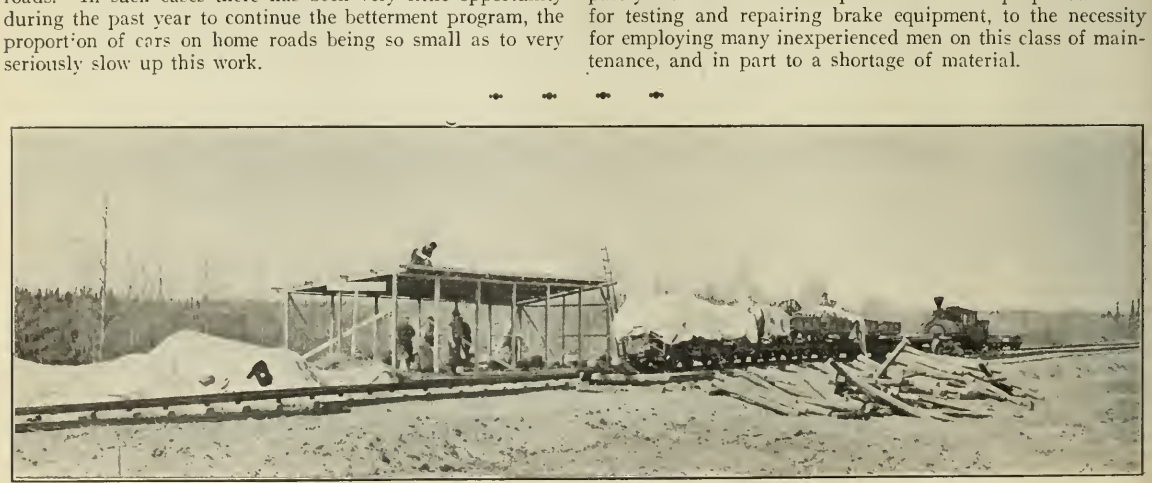
Air brake conditions have been notably poor during the past year. This is due in part to a lack of proper facilities for testing and repairing brake equipment, to the necessity for employing many inexperienced men on this class of maintenance, and in part to a shortage of material.

TABLE IV—WEEKLY REPORTS OF CAR CONDITIONS FOR ALL REGIONS

Week ending	Oct. 19	Oct. 26	Nov. 2	Nov. 9	Nov. 16	Nov. 23
Number of roads reporting	139	139	138	139	139	139
Total revenue cars	2,478,704	2,441,111	2,451,255	2,437,344	2,430,606	2,447,922
Bad order cars—1918	140,328	139,548	135,462	134,874	132,853	130,048
Bad order cars—1917	131,036	132,501	128,957	129,414	124,162	123,056
Heavy repairs—1918	82,459	82,078	79,559	79,198	77,966	78,941
Light repairs—1918	57,869	57,470	55,903	55,676	54,887	51,107
Percentage of bad order cars	5.7	5.7	5.6	5.6	5.5	5.3
Average number of bad order cars repaired per working day	86,486	83,279	83,728	83,469	82,274	82,805
Heavy repairs	9,332	8,871	8,578	8,797	8,173	8,209
Light repairs	77,154	74,408	74,750	74,672	74,101	74,596
Number of cars transferred to other shops	5,075	626	589	253	485	524
Number of employees—1918	140,021	138,703	158,959	142,500	141,540	143,169
Number of employees—1917	118,758	123,156	124,256	124,521	123,966	124,319
Number of cars damaged in trains	13,605	13,060	12,446	12,364	12,255	12,668
Cost of labor	$126,630	$121,275	$90,464	$122,463	$128,925	$135,887
Cost of material	$154,708	$151,476	$170,532	$162,818	$179,972	$182,005
Number of cars damaged in yards	5,264	4,868	5,267	5,275	5,159	5,242
Cost of labor	$54,308	$46,823	$53,492	$49,959	$50,886	$52,406
Cost of material	$76,589	$61,135	$68,072	$66,920	$93,720	$70,987
Cars held to be dismantled	5,584	7,211	6,920	6,823	6,646	6,640

TABLE V—PERCENTAGE OF BAD ORDER CARS BY REGIONS

Week	Oct. 19	Oct. 26	Nov. 2	Nov. 9	Nov. 16	Nov. 23
Eastern	6.3	6.4	6.2	6.3	6.1	6.1
Allegheny	7.1	7.1	7.1	7.0	6.7	6.4
Pocahontas	5.9	6.9	5.8	5.6	5.6	5.1
Southern	4.4	4.8	4.5	4.7	4.8	4.4
Central Western	5.0	4.9	4.7	4.8	4.8	4.7
South Western	3.1	3.1	2.9	2.9	2.8	2.8
North Western	5.7	5.4	5.4	5.2	5.3	5.2
All regions	5.7	5.7	5.6	5.6	5.5	5.3



Bailey—First Station South of Nenana, Mile 407.

The Supply Industry's Output of War Products

How Manufacturers of Railway Materials Responded to Call for Military and Naval Equipment

MODERN WARFARE is a struggle of industries as well as of armies and navies. One of the things which made the German Empire so formidable a foe was the fact that it was the leading producer of guns, ammunition and other military supplies, for many years prior to the opening of hostilities in 1914. The United States and Canada, although industrial nations, had manufactured products useful to mankind in the pursuits of peace, and when involved in the conflict were forced to refit and remodel their shops and factories to supply war-time needs. How rapidly and how well this was done is common knowledge, but the extent to which railway supply companies participated in this work has not been given any appreciable publicity up to this time.

For the purpose of gathering a few facts concerning the part taken by the railroad supply industry in the manufacture of war supplies, the *Railway Age* recently sent inquiries to practically all companies which can be properly classed as belonging to that field. This information was not sought with the idea of setting out any particular manufacturers as worthy of greater distinction than others. In fact, approximately 25 per cent of those replying stated that they had continued to supply the railroads of this country exclusively throughout the war. In doing so they were performing a patriotic and highly important service, as adequate transportation is second only to the army and navy as an arm of warfare. The sole aim of the inquiry was to learn the degree in which some supply industries were transformed by the world upheaval and the various kinds of war materials they made.

The materials manufactured by railway supply companies include a great variety of war supplies. Among them were aeroplanes and accessories for airplane motors, 155 mm. howitzers, gun and ammunition carts, gun carriages, machine gun parts, shells, shell forgings, artillery hub bushings, drop bombs, steel mines and buoys, life boats and life boat parts, steel work for U. S. destroyers and merchant vessels, flanging and machine work on armored fighting tanks, entrenching shovels, linings for steel helmets and engineer depot motor truck machine shops. A number of companies supplied materials and machinery for the shipbuilding yards, such as shipbuilding gantry locomotive cranes, railroad material, work locomotives, ship material and staybolts for marine tube boilers. One manufacturer produced roofing and waterproofing papers for cantonments; another shipped iron culvert pipe to France for use in the construction of military railways; a considerable number manufactured cars or locomotives, or parts thereof, for war service abroad.

Six railway supply companies reported that they had devoted 100 per cent of their plant capacity to war work; two stated that they were in the 98-per cent class; three rated their production at 95 per cent; one at 92 per cent; two at 90; two at 80, and the remainder at varying percentages below that figure. Some were unable to make any definite estimate of the proportion of their output which could be classed as war production.

The lack of uniformity in the replies received makes generalization difficult. In the belief that the information received concerning the individual companies will prove of interest, some of the facts divulged in response to our inquiries are presented.

What Each Company Did

The American Brake Shoe & Foundry Company acquired five new plants primarily for war work at Erie, Pa. These cover an area of about eight acres. One plant was devoted exclusively to war production and employed about 7,500 men. In one shop the company produced 155-mm. howitzers at the rate of 10 per day; in another shop 155-mm. high explosive shell bodies at the rate of about 3,000 per day, and in another 9.2-in. shell bodies at the rate of 1,300 a day.

The American Castings Company, Birmingham, Ala., received one direct war contract which called for a large shipment of National lock joint cast iron culvert pipe to France for use in connection with the construction of military railroads.

The American Flexible Bolt Company, Pittsburgh, Pa., increased its plant capacity considerably toward the end of 1917 to provide for an anticipated increase in the locomotive staybolt business. When this did not materialize because of war conditions the company contracted with the Emergency Fleet Corporation for its requirements of staybolts for marine tube type boilers. This work is still in progress, and the company expects to continue the manufacture of staybolts for marine boilers.

The American Steel Foundries produced shell forgings, ingots for shell forgings, castings for gun mounts and gun carriages, together with other Ordnance Department castings, and castings for submarines and battleships, davitt fittings, anchors and miscellaneous castings for the Emergency Fleet Corporation. Approximately 40 per cent of the company's steel casting capacity, 10 per cent of its structural plant capacity and 100 per cent of its forge plant, were used for war purposes. About 40 per cent of the total number of employees were engaged in war production. The company's forging shop at Indiana Harbor, Ind., was constructed primarily for war work. It consists of a main structure, 600 ft. by 175 ft., with an addition, 75 ft. by 500 ft. There is also a pump house in connection with this plant, 36 ft. by 300 ft. A number of additions have been made to the old plants of the American Steel Foundries during the past two years, but these were intended as permanent fixtures in the company's equipment and not solely as a means for increased war production.

In 1917 about 62 per cent of the locomotives built by the *Baldwin Locomotive Works* were for war service. During the first ten months of 1918 the proportion was 67 per cent. In addition to locomotives, the company built shells and gun carriages, although the relative output of these was small. As the result of war demands, the existing plants at Philadelphia, Pa., and Eddystone were enlarged. In Philadelphia an addition was built to the truck shop, and an eight-story reinforced concrete building was erected for shell work. New shops for shells and a large locomotive erecting shop were also constructed at Eddystone, Pa.

The Barco Manufacturing Company, Chicago, used most of its capacity for Railroad Administration work. About 15 per cent of its output, however, consisted of specialties for the Pershing engines manufactured for use on the military railways in France.

The Berger Manufacturing Company, Canton, Ohio, is another 100 per cent concern. Its output consisted of sheet metal products.

The Buda Company, Harvey, Ill., manufacturer of trucks and tractors, was on a 60 per cent war basis.

The L. S. Brach Supply Company, Newark, N. J., devoted 95 per cent of its plant capacity to war production. It manufactured telegraph and telephone instruments, antenna reels, radio sets, metal flagstaffs, breast reels, projectors, compasses, etc.

The Chicago Bridge & Iron Works, Chicago, was on a 100 per cent war basis, 75 per cent of its output being ship material for the Emergency Fleet Corporation, 15 per cent powder plant work, 5 per cent steel tanks for the army and navy departments, and 5 per cent miscellaneous structures for plants engaged on war contracts.

The Cleveland Twist Drill Company, Cleveland, Ohio, devoted practically 98 per cent of its plant capacity to war work. It erected one new plant, which added about one-third to the total manufacturing floor space. Its production consisted of the company's regular line of drills, reamers, etc. The importance of a drill becomes evident when one considers that a 3-in. shrapnel shell contains 70 drilled holes, totalling 19¼ in. in depth. On a conservative estimate, a million shells of somewhat similar dimensions were the daily food of the European Mars. That means that 1,600,000 ft., or over 300 miles of drilled holes were shot away every 24 hours on the battle fronts of Europe.

The Dominion Foundries & Steel, Ltd., Hamilton, Ont., reports that 80 per cent of its capacity was devoted to ordnance work and the balance to indirect war work. Cast steel slugs and shell forgings represented 80 per cent of the output previous to the signing of the armistice; miscellaneous work, including machining of shrapnel and 4.5-in. shells, constituted 5 per cent of the total production, ship castings and forgings 5 per cent, and the remainder, castings and forgings and rolled plate for railway cars, locomotives, etc. The company's plant is now from four to six times its pre-war size. The Dominion Foundries claims to be the originator of the direct conversion of shell scrap to shell forgings. It also claims a forging record of 1,846 9.2-in. shell forgings made on a single press in a 24-hour run. It also believes it holds the record for 6-in. shell forgings, i. e., 3,115 produced by a single press in a 24-hour run.

Among the war products manufactured by *A. Gilbert & Sons Brass Foundry Company, St. Louis, Mo.,* were artillery hub bushings and shells. Approximately 62 per cent of the tonnage of the company consisted of war materials.

The Hale & Kilburn Corporation, Philadelphia, used 80 per cent of its plant capacity and 95 per cent of its employees for war work. It manufactured drop bombs, machine gun parts, steel mines and buoys, truck bodies and limbers, repair cabinets, artillery trailers and steel work for U. S. destroyers and merchant vessels. An old plant with 700,000 ft. of floor space was devoted to war work and a new plant, 50 ft. by 200 ft., was constructed for the same purpose.

The Hayes Track Appliance Company, Richmond, Ind., furnished derails to a number of navy yards, shipbuilding plants and cantonments, but the volume of this business was small. About 20 per cent of the capacity of the company during one month was used for an order of material for the American Expeditionary Forces in France.

Heywood Brothers & Wakefield Company devoted about 70 per cent of the capacity of its car seat plant, located at Wakefield, Mass., to the production of war materials. Here a great variety of articles were produced, among them field litters, navy deck chairs, ammunition truck linings, aeroplane chairs, camp stools, entrenching shovels and deck coverings for destroyers and patrol boats.

The Independent Pneumatic Tool Company was on a 100-per cent war basis. Its output of pneumatic tools was increased approximately 300 per cent over the production during peace times.

The Keith Railway Equipment Company, Chicago, devoted most of its manufacturing capacity to the production of car equipment for domestic use. It received an order for the government for 500 flat cars for service in France, but this order was later canceled because of the conclusion of hostilities.

The Lackawanna Steel Company, Buffalo, N. Y., manufactured rolled steel shapes, rails, plates, structural material, bars, etc., for the use of the army and navy and other departments of the government. While no exact records are available, the company devoted its entire output to government work during a considerable portion of last year.

The Laconia Car Company, Laconia, N. H., used about 25 per cent of its plant capacity and a like percentage of its men on war work. Its only war product was 75-mm. shell forgings.

The Lakewood Engineering Company, Cleveland, was practically on a 100-per cent war basis. It added two small plants during the war and increased the capacity of the Lakewood plant by the addition of four large buildings. Its output consisted of industrial cars and concrete mixers.

The Lehon Company, Chicago, was on a 90-per cent war basis. Its output included material for railroad cars built for service in France, roofing and waterproofing papers for cantonments, hospitals, etc.

The Lima Locomotive Works, Lima, Ohio, did not engage in any direct war work, except the production of locomotives for overseas use, detailed information concerning which is published elsewhere in this issue.

About 5 per cent of the output of the *Morden Frog & Crossing Works, Chicago,* was for overseas railroads and navy and cantonment yards in this country.

The More-Jones Brass & Metal Company, St. Louis, Mo., produced brass, bronze and phosphor bronze castings used in connection with orders for the Navy, Ordnance Department and Shipping Board.

The National Car Coupler Company, Attica, Ind., devoted about 95 per cent of its plant capacity to war production. About 80 per cent of the war output was tractor work and 5 per cent locomotive cranes.

The Orton & Steinbrenner Company, Chicago, rated its war output at 98 per cent. It produced locomotive cranes, shipbuilding gantry locomotive cranes, clamshell and orange-peel buckets, all but 2 per cent of which were contracted for by the War Department. The company constructed one temporary building, containing about 8,000 sq. ft. of floor space for war purposes. It doubled its peace-time output.

The Parkesburg Iron Company, Parkesburg, Pa., devoted about 11.6 per cent of its capacity during 1918 to orders for the United States Navy and 14.4 per cent to contracts of the Emergency Fleet Corporation. The sole output of the company consisted of Parkesburg charcoal iron boiler tubes.

The Pettibone Mulliken Company, Chicago, manufactured frogs and switch material for railway construction in France. It estimates that about 20 per cent of its plant capacity was devoted to this work.

The Pittsburgh Testing Laboratory has been engaged entirely in war work. This company is not a manufacturing concern, but rendered service to this country by testing materials and inspecting the workmanship of the products of industrial plants. This inspection was done not only for the United States government, but for the governments of the allied nations. The company's six-story laboratory and office building and equipment at Pittsburgh was turned over to the Bureau of Aircraft Production as a research laboratory. A new laboratory, having approximately 35,000 sq. ft. of floor space, was built to take its place and additional laboratories were installed at Detroit, Mich., and Birmingham, Ala., while the size of the New York branch was quadrupled.

The H. K. Porter Company, Pittsburgh, Pa., produced locomotives for the army and navy in this country and abroad, and for the use of the allied nations, turning out marine engines and reversing engines for the use of the Emergency Fleet Corporation, and at the same time did all of the

flanging and a good deal of the machine work on the armor plate for 5,000 of our armored fighting tanks. The company was on a 92-per cent war basis.

The St. Louis Car Company, St. Louis, Mo., devoted about 90 per cent of its plant capacity and a like percentage of its employees to war production. Its output included aeroplanes, gun and ammunition carts, engineer depot motor truck machine shops, life boat parts and freight cars for war service in France. A new steel shop, with 200,000 sq. ft. of floor space, was erected for war work.

The T. H. Symington Company did not utilize its plant at Rochester, N. Y., for war work, but did organize a new company which constructed a plant at Chicago for the forging and machining of 75-mm. shrapnel and high explosive shells and of 75-mm. field guns and 155-mm. shells.

Approximately 50 per cent of the output of the *Western Wheeled Scraper Company, Aurora, Ill.*, consisted of standard gage air dump cars for the construction and maintenance of military railways in France. In addition, the company produced small narrow gage cars for work near the front lines and practically every earth and stone handling tool that it manufactured for construction work on roads and railroads, including elevating graders, engine and horse-drawn road graders, wheeled scrapers, drag scrapers, grading plows, rock crushers, dump wagons and cars. The company was on a 95-per cent war basis.

A Chronological History of Government Control

Important Steps in the Development of the Organization and Policy of the Administration

DURING THE 12 MONTHS that have elapsed since the government assumed control of the railroads, the roads have undergone changes which have been unprecedented. The director general's small original staff has developed into a great central and regional organization with departmental heads at Washington. Many of the short line railroads originally taken over have been relinquished, corporate interests have been divorced from the operating organization, rates have been increased and wages have been raised. Traffic activities have been consolidated or discontinued; cars and locomotives built to standard designs have been introduced. There is not a single department that has not undergone radical changes. While the history of government control cannot be told in a few words, a concise list of the more important developments in the order of their occurrence should prove of interest. With that thought in mind, the list given below has been prepared:

December 26, 1917. President Wilson issues proclamation taking over the railroads and appointing William G. McAdoo director general of railroads.

December 27. Director General McAdoo issues first order and appoints as assistants Walker D. Hines and A. H. Smith.

December 28. Railroads pass into control of the government at 12 o'clock noon.

December 29. General order No. 1 issued, directing employees to continue in performance of regular duties.

December 31. The Railroads' War Board resigns. Government control for purposes of accounting begins at 12 o'clock midnight.

January 4, 1918. President Wilson addresses joint session of Congress on the railroad situation. Bill for control of the railroads introduced.

January 18. Eastern, Southern and Western regions created and A. H. Smith, C. H. Markham and R. H. Aishton appointed regional directors. Railroad wage commission created.

January 21. Demurrage rates increased. Railroad wage commission organized.

January 26. Judge John Barton Payne appointed general counsel.

January 29. Demurrage rules changed to take effect February 10.

February 2. Circular on additions and betterments sent to railroads.

February 4. Railroad control bill reported to the Senate. Director general outlines duties of regional directors.

February 6. Commission on Car Service and Bureau of Car Service of Interstate Commerce Commission merged and reorganized as Car Service Section, Division of Transportation. W. C. Kendall, manager.

February 9. Organization of director general's staff announced as follows: Assistant to director general, Walker D. Hines; general counsel, John Barton Payne; director Division of Transportation, C. R. Gray; director Division of Traffic, Edward Chambers; director Division of Finance and Purchases, John Skelton Williams; director Division of Labor, W. S. Carter; director Division of Public Service and Accounting, C. A. Prouty; manager locomotive section, Division of Operation, Frank McManamy. Interregional traffic committee appointed.

February 15. Embargo rules of Railroad Administration issued.

February 15. Marine section of Division of Transportation created.

February 19. Safety section, Division of Transportation organized with Hiram W. Belnap, manager.

February 21. General Order No. 8 issued, outlining duties of employees.

February 22. Committee on cars of the Council of National Defense delegated to investigate standards for freight cars.

February 22. Engineering committee delegated to review improvement work appointed with Francis Lee Stuart chairman.

February 22. Railroad control bill passed by the Senate.

February 28. Railroad control bill passed by the House of Representatives.

March 7. Organization of Division of Finance and Purchases with central and regional committees announced.

March 12. Division of Capital Expenditures created and R. S. Lovett appointed director.

March 16. General Order No. 11, on universal interline way billing issued.

March 18. Circular No. 10 issued directing that expenses of financial and corporate offices shall not be charged to operating expenses.

March 21. Railroad control bill approved by President Wilson.

March 22. Consolidation of ticket offices at Atlanta authorized.

March 22. Railway board of adjustment No. 1 created.

March 26. Section for protection of property, Division of Law, created. General Order No. 15, requiring industries to pay for and maintain industry tracks, issued.

March 27. Railroad Administration asks prices on 100,000 freight cars.

March 28. Regional traffic committees created.

March 29. Specifications for standard freight cars announced. Director general authorized to exercise powers conferred on President Wilson by Congress. Inspection and tests section, Division of Transportation, created with C. B. Young as manager.

March 30. Traffic soliciting discontinued. Salaries of corporate officers charged to corporate accounts, after April 1 by Circular No. 17.

April 1. Freight car repair section, Division of Transportation, created with J. J. Tatum as manager.

April 9. Railroad traffic activities to be consolidated or discontinued. Director general orders that suits against railroads must be brought in district where plaintiff resides or where cause of action arose.

April 13. Coastwise steamship lines taken over.

April 19. Tentative specifications for standard locomotives announced.

May 1. Universal interline billing in effect. Fuel conservation section created and Eugene McAuliffe appointed manager.

May 2. Distribution of orders for 100,000 standard freight cars and 1,025 standard locomotives announced.

May 3. Committee on Mail Transportation appointed with Guy Adams as chairman.

May 8. Report of the Railroad Wage Commission made public.

May 18. Budget for improvements and extensions during 1918 given out.

May 20. Freight charges placed on a cash basis by provision of General Order No. 25.

May 23. Director General McAdoo announces that roads will be operated by federal managers.

May 25. General advances in freight and passenger rates ordered. General Order No. 27 covering general wage advance issued. Theodore H. Price appointed actuary of the Railroad Administration.

May 31. Troop movement section, Division of Transportation, created with George Hodges as manager.

June 1. Allegheny and Pocahontas regions created; C. H. Markham and N. D. Maher appointed regional directors. B. L. Winchell becomes new director of Southern region. Board of Railroad Wages and Working Conditions organized.

June 6. State commissioners ask suspension of the rate order.

June 7. Organization of American Railway Express Company announced.

June 11. Central Western and Southwestern regions formed; Hale Holden and B. F. Bush appointed regional directors.

June 11. Operating statistics section of the Division of Operation created with W. J. Cunningham as manager.

June 14. District directors for New England, and Ohio-Indiana districts appointed.

June 21. Board of Adjustment No. 2 organized.

June 22. Interstate express rates increased.

June 29. Railroad Administration relinquished nearly 2,000 short line railroads.

July 1. Announcement made that rates would be changed without authority of the Interstate Commerce Commission.

July 1. Mechanical department, Division of Operation, organized with Frank McManamy in charge as assistant director, Division of Operation.

July 3. Operating department of the Pullman Company taken over.

July 4. First standard locomotive completed.

July 10. Express and mail section of Traffic Division established with F. S. Holbrook as manager. Agricultural section established with J. L. Edwards, as manager.

July 19. Section of insurance and fire protection organized with Charles N. Rambo as manager.

July 22. Three general and 25 district freight traffic committees appointed.

July 22. Short line railroad section formed with E. C. Niles as manager.

July 24. Wages of mechanical department employees increased by Supplement No. 4 to General Order No. 27.

August 30. Bureau of Suggestions and Complaints established under the direction of Theodore H. Price.

August 30. Freight claim section created with John H. Howard as manager.

August 20. Interchangeable mileage script on sale.

September 1. Director General McAdoo orders railroad employees to abstain from political activities.

September 1. Engineering and maintenance department of Division of Operation established; Charles A. Morse appointed assistant director, Division of Operation.

September 3. Director general reports to President Wilson on first seven months of operation of the railroads.

September 4. Director general approves standard compensation contract.

September 5. Wages of agents, clerks and laborers increased by Supplement No. 7 and wages of maintenance department employees increased by Supplement No. 8 to General Order No. 27.

September 6. Division of Inland Waterways created.

October 22. First compensation contracts signed by Director General McAdoo.

October 25. Short line contract approved by Director General McAdoo.

October 25. Standard scale of class rates submitted to the Interstate Commerce Commission.

November 16. Wages of telegraph and telephone operators increased by Supplement No. 10 to General Order No. 27.

November 18. American Railway Express Company taken over.

November 20. Express rates increased effective January 1.

November 22. Director General McAdoo announces intention to retire.

November 22. Members of Board of Adjustment No. 3 announced.

December 2. President Wilson in address to Congress proposes to relinquish railroads.

December 5. Judge Lovett resigns as director of the Division of Capital Expenditures.

December 10. Theodore H. Price resigned as actuary of the Railroad Administration to take effect January 1.

December 11. Director General McAdoo in letter to chairman of congressional committees, proposes five-year extension of federal control.

December 20. Carl R. Gray, director, Division of Operation, resigned to take effect January 15, 1919.

December 28. Supplement 13 to General Order 27 issued, making a further revision of the wage scales of telegraph operators and similar employees on the basis of a minimum of 48 cents per hour.

January 1. Secret service branch of Claims and Property Protection section of the Division of Law terminated and Secret Service and Police Section of the Division of Operation created with W. J. Flynn as chief.

Transportation of mail to Chicago by airplane has been indefinitely postponed, this because of unsuitable machines or inexperienced aviators. The Post Office Department and the War Department seem to disagree as to the cause. One of the aviators in the mail service was killed on December 30 while making a trial flight, and two others have been injured.

A Review of Railway Signaling for the Past Year

Conditions Affecting the Work. New Block Signals Nearly All Automatic. Considerable Progress in Interlocking



As in other branches of railroad work the signal department program has been carried on during the past year with the one essential purpose of helping to win the war. The appropriations during 1918 have been large, but the actual volume of work done has been somewhat less than that of previous years. The production and the actual installation of the materials have not kept pace with the plans authorized. The improvements of the 12 months, as represented in our tables, have cost something like seven millions of dollars, the expenditures in this department to November 1, as reported by the Railroad Administration, having amounted to $5,965,544. The delays have been largely due to the priorities for war materials which greatly handicapped the production of signal supplies. The orders now on hand that will carry over into 1919 and the amount of new work in prospect indicate a favorable year for good business in the signal field. A large amount of maintenance work should be done throughout the country during the coming year and material for this class of work will be in demand. The total authorization for the signal departments for 1918, as recorded at Washington, amounted to $16,601,166, or much more than double the amount mentioned above as expended in the first ten months; and most of these unexpended appropriations will, no doubt, be carried out as early as practicable in 1919.

The railroads have been handicapped in maintaining their signals by the large number of new employees. During the past year the railroads have shown a tendency to place orders earlier in the year to cover material for the following year's work. This is of direct benefit, as the construction program can be started earlier than would otherwise be the case.

Orders for signal material have been received almost entirely from the larger roads. Possibly only 5 to 10 per cent of all the material ordered has been for the use of electric lines. The average prices for signal material at present are approximately 5 per cent higher than those existing a year ago, while the cost of materials and labor entering into the manufacture of signal materials in the past year is approximately 10 to 20 per cent higher. With the material and labor markets remaining at their present level the prospects are that prices will show no decided decrease in the near future.

No important developments in new signaling devices or systems have taken place during the past year. In this connection it may be noted that some railroads which have heretofore regarded up-to-date signaling as unnecessary for their lines have found that under the necessity of obtaining maximum traffic capacity it is necessary to follow modern methods. With the heavy reconstruction period ahead and the prospect that the United States will serve as the storehouse for the world, the future appears bright from the signaling standpoint as the railroads will have to handle heavy traffic and this condition should be reflected in connection with signal construction programs.

During the past year several bad collisions have occurred with heavy loss of lives. These accidents again brought to the attention of railroad and government officers the necessity of preventing insofar as possible such occurrences in the future. In this connection the automatic train stop has been receiving careful consideration of the officers whose duties it is to investigate and report on such devices. The Bureau of Safety of the Interstate Commerce Commission has strongly advocated the development of such a device as an adjunct to the present signal system for the prevention of collisions. A committee was to have been appointed by the Railroad Administration to make a thorough study of this question, but no action has yet been taken, and it is doubtful whether such action will now be taken unless other collisions occur in which the loss of life is much greater than has occurred in the past. Should this happen, public opinion may force the passage of legislation requiring such safeguards and this legislation may prove more detrimental than if the railroads themselves had developed and applied the necessary safeguards.

A review of the statistics of block and interlocking signals construction during the past year and of the plants now in course of construction shows a total of 1,966 miles of road block signaled in the United States and Canada since January 1, 1918, or 843 miles less than the total recorded for the

NEW BLOCK SIGNALS COMPLETED IN 1918; MILES OF ROAD.

	Automatic (Table A)			Manual (Table D)			
	S. T. miles.	D. T. miles.	Total miles.	S. T. miles.	D. T. miles.	Total miles.	Both Total miles.
United States	1,009	798	1,807	78	57	135	1,942
Canada	6	18	24	....	....	....	24
Total	1,015	816	1,831	78	57	135	1,966

NEW BLOCK SIGNALS UNDER CONSTRUCTION, December 31, 1918.

	Automatic (Table B)			Manual Table (E)			
	S. T. miles.	D. T. miles	Total miles.	S. T. miles.	D. T. miles.	Total miles.	Both Total miles.
United States	938	577	1,515	....	....	....	1,515
Canada	....	....	....	....	....	....	....

NEW BLOCK SIGNALING PROPOSED FOR 1919

	Automatic (Table C)			Manual (Table F)			
	S. T. miles.	D. T. miles.	Total miles	S. T. miles.	D. T. miles.	Total miles.	Both Total miles.
United States	820	478	1,298	140	....	140	1,438
Canada	4	....	4	....	....	....	4
Total	824	478	1,302	140	....	140	1,442

INTERLOCKING SIGNALS

	Plants	Number of Levers		
		Mechanical	Electrical	Total
Completed in 1918—				
United States	142	1,982	1,222	3,204
Canada	1	6	....	6
Under construction December 31, 1918—				
United States	135	1,604	1,642	3,246
Canada	....	....	....	....
Proposed for 1919—				
United States	80	932	1,264	2,196
Canada	1	17	....	17
Total	81	949	1,264	2,213
Total United States	357	4,518	4,128	8,646
Total, Canada	2	23	....	23
Total, United States and Canada.	359	4,541	4,128	8,669

calendar year 1917. It is very difficult to make exact comparisons of the total mileage of road worked under the space interval system because in numerous cases the new automatic signaling has taken the place of the manual block system, and some roads have not been careful to give the full facts in such cases. Nearly all of the new block signaling installed in 1918 is automatic and in the work now under construction (1,515 miles in the United States), and proposed for 1919 (1,438 miles), the non-automatic mileage is almost negligible.

In interlocking work the roads have not made the same progress as in 1917. The total number of plants completed or on which important changes have been made is 143, as compared with 187 the previous year. There are 135 plants now under construction as compared to 164 last year. The proposed new work for 1919, totaling 81 plants, is 27 less than the number proposed a year ago. The figures given under the column of proposed work are far from complete, as a number of the roads which contemplate extensive work are not yet ready to announce their programs. As was the case last year, the Interborough Rapid Transit Company, operating both elevated and subway lines, has expended several millions of dollars on interlocking and block signal work, and the work done or proposed by this company is prominent in all three of the interlocking tables. The figures so far available, together with the data concerning work now under construction and in respect to plants for 1919 are shown in the accompanying tables.

The data from which the totals here presented are made up is given in the tables under nine heads, as follows:

A—Automatic Block Signaling Completed in 1918.
B—Automatic Block Signaling Under Construction.
C—Automatic Block Signaling Proposed.
D—Manual Block Signaling Completed in 1918.
E—Manual Block Signaling Under Construction (none).
F—Manual Block Signaling Proposed.
G—Interlocking Completed in 1918.
H—Interlocking Under Construction.
I—Interlocking Proposed.

Block Signaling Completed

From the reports received the largest mileage of automatic block signals installed on a single road was on the Northern Pacific, which put in service 185 miles of single track and 48 miles of double track signaling, using 387 signals. Other roads installing a mileage of over 100 are the Illinois Central, which completed 191 miles of single track and 12 miles of double track signaling, with a total of 386 signals; the Great Northern, which installed 139 miles of single track and 11 miles of double track signals, with a total of 291 signals; the Los Angeles & Salt Lake, with 132

TABLE A—AUTOMATIC BLOCK SIGNALS INSTALLED IN 1918*

Name of Road	Miles of Road S. T.	D. T.	From	To	No. of Signals	Type of Signals	Control System	Remarks
Atchison, T. & S. Fe	..	6	Shouton	New Boston	15	Union "S"	Track and line	
	..	..	Cameron	Bohn	3	Union "S"	Track and line	
	..	7	Braddock	Wilson	6	Union "S"	Track and line	Signals for one track only.
	..	6	Police City	Wright	13	3-pos. U. O.		
	17	..	Christie	Santa Fe Junc.	40	3-pos. U. O.		
Atlanta & West Point	19	..	Norman, Ga.	Hollansville	27	Union "B"	Automatic permissive	Union.
	4	..	Atlanta Belt	Oakland J.	4	Union "B"	Automatic permissive	Union.
Atlantic Coast Line	1	6	Florence, S. C.	Java	11	Union "S"	Polarized	
Baltimore & Ohio	..	27	Confluence	Smallsville	45	Union T2	A. C.	Replacing manual.
	..	26	Viaduct Junc.	Piney	52	Union T2	A. C.	Replacing manual.
Balt. & Ohio (W. Lines)	19	..	Botkins	Jen. J.	51	D. C. Motor	Normal clear	
	5	..	Piqua J.	Kirkwood	15	D. C. Motor	Normal clear	
	..	16	Attica	Willard	21	D. C. Motor	Less than 1 mile	
	..	..	Oakley Ave.		..			
B. & O. Chicago Term.	..	1	Broadway	Andrew Sq.	7	Light, 3-color	A. C. track ckts	
Boston Elevated	..	4	Irving	Experiment	6	Union "S"	Polarized, d. c.	
Central of Georgia	..	9	Hapeville	Atlanta	17	Union "S"	Polarized, a. c.	
Central of New Jersey	..	1	Oak Island J.	Pt. Newark	6	Union "B," 2-arm		Union.
Ches. & Ohio of Ind.	1	..	Cincinnati	Brighton	5	D. C.		
Chicago, B. & Quincy	..	74	Burlington	Ottumwa	175	Top post: l. q. 60 deg.		
	..	48	Amazonia, Mo.	Napier	95	Top post: l. q. 60 deg.		
	..	2	Gibson, Neb.	Omaha	20	Top post: l. q. 60 deg.		
	2	..	Holdredge, Neb.	Holdredge Junc.	8	Top post: l. q. 60 deg.		
	..	21	Mendota, Ill.	Princeton	57	Top post: l. q. 60 deg.		
	..	7	Wataga, Ill.	Galesburg	44	Top post: l. q. 60 deg.		Three-track.
	1	..	Mason City		2	Federal "4"	Line	
Chicago Great Western	..	3	So. Minneapolis	Hennepin Ave.	13	5 bottom post, 8-color		
Chicago, Mil. & St. P.	..	2	Kinnick Draw	Union Sta.	24	Light, 3-pos., a. c.		
	36	..	Harlowton, Mont.	Lennep	50	3-pos., top post, d. c.		Replacing 2-pos.
	34	..	Three Forks	Piedmont	43	Color-light, 3-pos., a. c.		
	42	..	Deer Lodge	Superior	191	Color-light, 3-pos., a. c.		
	..	..	Avery, Idaho	Ethelton	..	Color-light, 3-pos., a. c.		A. C. track circuit, replacing d. c. five miles.
Chicago, R. I. & Pacific	..	8	Allerton, Ia.	Clio	21	Union "S"		Revision; change from S. T. to D. T.
Chicago, T. H. & S. E.	2	..	Vermilion River		2	Union "B" U. O.		
Copper Range	1	..	M. P. 17	M. P. 18	6			
El Paso & S. W.	6	..	El Paso	M. Yard	10			Union.
	14	..	El Paso	Mastodon, N. M.	27			Union.
	30	..	Moore's, Ariz.	Peatt, N. M.	40			Union.
	4	..	Junction	Forest, Ariz.	6			Union.
	25	..	Lewis Sp'gs, Ariz.	Osborn	52			Union.
Erie	..	35	Lomax, Ind.	Griffith	58	Union "S"		
N. Y., Susq. & W.	2	1	Paterson	N. Paterson	3	Union "S"		
Grand Trunk	24	..	Shelburne, N. H.	Bates, Me.	42	G.R.S. "2 A" bottom-post, low volt., d. c.	Polarized line	A. P. B.
Great Northern	31	..	Troy, Mont.	Bonners Fy., Ida.	53	G. R. S. "2 A"		A. P. B.
	31	..	Stryker, Mont.	Rexford	67	G. R. S. "2 A"		A. P. B.
	43	..	Essex, Mont.	Columbia Fs.	80	G. R. S. "2 A"		A. P. B.
	34	..	Blackfoot, Mont.	Summit	74	G. R. S. "2 A"		A. P. B.
	..	11	Long Lake, Minn.	Delano	17	G. R. S. "2 A"	Line for distant ind.	Normal clear.
Illinois Central	37	..	Gibson City, Ill.	Clinton	73	Hall "K" 3-pos,. u. q.	Normal clear	Traffic direction.
	45	..	Clinton, Ill.	Springfield	86	Hall "K" 3-pos,. u. q.	Normal clear	Traffic direction.
	102	..	Broadview, Ill.	Freeport	190	Hall "K" 3-pos,. u. q.	Normal clear	Traffic direction.
	4	..	Waterloo, Iowa	Mona	9	Hall "K" 3-pos,. u. q.	Normal clear	Traffic direction.
	..	12	Princeton, Ky.	Eddyville	19	Hall "K" 3-pos,. u. q.	Normal clear	Traffic direction.
	1	..	Fulton, Ky.	Oakes, Tenn.	7	Hall "K" 3-pos,. u. q.	Normal clear	Traffic direction.
Yazoo & M. V.	2	..	Leland, Miss.		2	Hall "K" 3-pos,. u. q.	Normal clear	Traffic direction.
Interboro R. T. Co.	..	42			702	Light		Aggregate of 13 sections, all elevated or subway lines in New York City; includes two-track, three-track and four-track lines.
Lehigh Valley	4	1			12	3-pos. U. O.		Aggregate of five short sections.
Los Angeles & Salt Lake	4	..	Guelph, Nev.	Rox	7	Federal "4 A" U. O., 3-pos.		A. P. B.
	11	..	Crestline, Nev.	Tomas, Utah	18	Federal "4 A" U. O., 3-pos.		A. P. B.
	117	..	Lynndil, Utah	Salt Lake City	199	Federal "4 A" U. O., 3-pos.		A. P. B.

miles of single track signaling and a total of 224 signals; the Chicago, Burlington & Quincy, which completed two miles of single track and 129 miles of double track work, with a total of 399 signals, and the Chicago, Milwaukee & St. Paul, which installed 112 miles single track and 5 miles of double track automatics, using a total of 321 signals. Of this latter installation 112 miles were installed in the electrified territory in Montana, the signals consisting of the color light type, of which 284 were used.

The Interborough Rapid Transit Company, New York City, installed 702 signals on its elevated and subway lines. These lines are of three general classes, namely, two track lines on which all trains stop at stations at frequent intervals, and on which, as a rule, there is no block signaling except at curves; four track lines on which the two inner tracks are used for express trains and are completely signaled, and three track lines, the middle track of which is in most cases signaled for the movement of trains in both directions. On these middle tracks the trains usually run toward the business district in the morning and in the opposite direction in

TABLE A—AUTOMATIC BLOCK SIGNALS INSTALLED IN 1918*—(Continued)

Name of Road	Miles of Road S.T.	D.T.	From	To	No. of Signals	Type of Signals	Control System	Remarks
Maine Central	..	5	Fairfield	Clinton	10		D. C.	Changed from S. T. to D. T.
Michigan	3	..	Conners	Snell	4	3-pos., a. c.	"T. D. B."	Union.
N. Y. Central (Eastern)	..	9	Schuyler J.	Little Falls	18	Hall, normal d.		Third and fourth tracks.
	..	4	Poughkeepsie		12	Hall, normal d.		Revision; four-track.
	..	1			..	Hall, normal d.		Short sections.
C., C., C. & St. L.	..	20	Middletown	Dayton	32			
	..	11	Lenox	Bridge Junc.	9	Union "B" and "T 2"		One-track signaled.
	..	4	Galion	Crestline	4			
	..	1	Sedansville	Storrs	1			
Michigan Central	8	..	Paine's	Mershon	28	Union "B" and "T 2", Pole line		
	4	..	Hoyt, Mich.	Saginaw	18	Union "B" and "T 2" Pole line		
Pittsburgh & L. E.	..	5	Struthers, O.	Youngstown	14	Union "T 2" 3-pos.	A. C.	For L. E. & Eastern R. R.
New York Connecting	..	6	Oak Point	Woodside	10	Union "S" 3-pos. U. Q.	A. C.	Left-hand quadrant; suspended.
N. Y., N. H. & H.	..	5	New Rochelle, N.Y.	Woodlawn	23	Union "S" 3-pos. U. Q.	A. C.	Left-hand quadrant; suspended; replacing controlled manual; four track.
	..	18	Braintree, Mass.	Greenbush	46	G. R. S. "2 A" 3-pos. U. Q.	A. C., 220 volt	Left-hand quadrant.
Norfolk & Western	50	..	Atkins, Va.	Bristol	92	3-pos. a. c. U. Q.	A. P. B.	
	..	2	N. Roanoke	Roanoke	5	3-pos. d. c. U. O.	Polarized t. ckt.	
	..	11	W. Vivian	Iaeger	19	3-pos. a. c. U. Q.		To replace d. c. signal.
Northern Pacific	..	17	Rice, Minn.	Little Falls	22	G. R. S., "2 A"	Track and line	Replacing manual system
	92	..	Tostin, Mont.	Garrison	162	G. R. S., "2 A"	A. P. B.	Part to replace manual
	..	7	Minneola	De Smet	11	G. R. S., "2 A"		
	71	..	De Smet	St. Regis	117	G. R. S., "2 A"	A. P. B.	
	22	..	St. Regis	Paradise	37	G. R. S., "2 A"	A. P. B.	
	..	24	Easton, Wash.	Lester	38	G. R. S., "2 A"		
Pennsylvania	..	7	N. Philadelphia	Chestnut Hill	27	Position-light	A. C. track ckts.	
	..	7	Selinsgrove J.	Northumberland	29	Position-light	A. C. track ckts.	Unit includes 11 interlocked signals.
	..	2	Sch. River	N. Philadelphia	13	Position-light	A. C. track ckts.	Four track = 8 miles of track.
	..	4	Kahway	S. Elizabeth	24	Position-light	A. C. track ckts.	Six track = 21 miles of track.
	..	7	Camden	Haddonfield	19	Position-light	A. C. track ckts.	Union
N. Y., Phil. & N.	..	31	Delmar	Pocomoke	42	Position light	A. C. track ckts.	G. R. S. Replaces manual
	..	..			3	Position-light	A. C. track ckts.	Unit in replaces manual
Penna., W. of Pittsburgh	..	..	Fort Wayne	G. R. & I. Junc.	6			Replacing manual
	..	6	Indianapolis	Ben Davis	22			Replacing manual.
	4	..	Miller, O.	Jewett	7			Replacing manual
Pere Marquette	26	..	S. Lyon	Fowlerville	34	3-pos., U. O.	D. C. polarized	
	18	..	Riverside	Grass	25	3-pos., U. O.	D. C. polarized	
	13	..	Grand J.	Fennville	14	3-pos., U. Q.	D. C. polarized	
Southern	..	97	Spartanburg, S. C.	Toccoa, Ga.	126	3-pos., U. Q., N. C.	A. C. track	
Alabama & Vicksburg	..	..	Champion Hill	Smiths	15	Union "S"	D. C. track	
Cin., N. O. & Tex. P.	..	13	Science Hill	Fishing Creek	21	3-pos., U. O.	A. C. track	
	..	9	Moreland	South Fork	12	3-pos., U. O.	D. C. track	
Southern Pacific	5	..	Edgewood, Cal.	Metcalf	9			Union.
	..	2	Stockham, Ariz.	Tucson	14			Union.
So. Pacific (No. of Ashland	9	..	Walker, Ore.	Goshen	12	Union "B"	D. C.	
Galveston, H. & S. A.	..	9	Eureka	West Junction	15	Union "B," L. Q.		Switch indicators.
	..	7	San Antonio	Withers	12	Union "B," L. Q.		Switch indicators at some switches.
Houston & Tex. Cen.	..	..	Houston		4	Union "B," L. Q.		Junction of H. E. & W. T. and T. & N. O.
Union Pacific	..	18	Burns, Wyo.	Archer	66	Union "B" 2-pos., L. Q.		Two-arm (home and dist.).
	..	20	Manhattan, Kan.	Junction City	83	Union "B" 2-pos., L. Q.		Two-arm (home and dist.).
	..	4	Dale Creek, Wyo.	Hermosa	18	Union "B" 2-pos., L. Q.		Two-arm (home and dist.).
Oregon Short Line	14	..	Pocatello	Fort Hall	36	G.R.S. "2 A" 2-pos., L. Q., bottom-post mech.		Track and wire, d. c.
	..	..	Pocatello	Huntington	11	Union "B"		Revisions.
	..	..	Granger	Pocatello	12	Union "B"		Revisions.
Oregon-W. R. & N. Co.	..	2	Kamela, Ore.	Hanlon	5		Polarized	G. R. S.
Union Trac. Co., Ind.	15	..	Broad Ripple	Noblesville	15	Light	A. P. B. 55-volt	G. R. S.
Wash., Balt. & A.	..	36	Baltimore	Dist. Columbia	38	Light, 3-pos.		Union.
Western Maryland	..	10	Big Pool	Clear Spring	7	Union "S"	Polarized	S. T. changed to D. T.
Total	1009	798						
				Canada				
Canadian Government	4	..	Newcastle	Derby Junc.	7	Top post	A. P. B.	
Canadian Pacific	..	2	Pasqua		2	G. R. S. "2 A"		
	..	3	Java		3	G. R. S. "2 A"		
	..	3	Rosser		1	G. R. S. "2 A"		
	..	3	Poplar Pt.		1	G. R. S. "2 A"		
	..	2	Virdin		1	G. R. S. "2 A"		
	..	2	Ft. William		1	G. R. S. "2 A"		
Grand Trunk	..	1	Point Claire, Que.		1	G. R. S. "2 A"		
	1	..	St. Bruno, Que.		1	Hall "K"		
	..	1	Scarboro Junc.		2	G. R. S. "2 A"		
	1	..	Beamsville		1	G. R. S. "2 A"		
	..	1	St. David's		1	G. R. S. "2 A," 3-pos.		
Total	6	18						

*In tables A, B and C the column headed "double track" includes also the mileage of three-track and four-track lines. In these tables the name of the maker of signal apparatus, where it has been given, is shown in the last column: Federal; G. R. S. (General Railway Signal Company); Hall; Union (Union Switch & Signal Company).

New York, New Haven & Hartford: The 69 semaphore signals have high power electric lights giving indications not only at night but also in the daytime.

the afternoon. Automatic train stops are used in connection with all automatic block signals on this road. Express tracks and middle tracks are equipped with automatic block signals at suitable intervals to allow the running of trains three blocks apart, under a headway of 90 seconds. Approaching the stations on express tracks automatic block signals with automatic train stops are placed very close together so as to constitute a system limiting the speed of trains.

In Canada very little automatic block signal work has been completed during the past year.

Block Signals Now Under Construction

Only three roads reporting have over 100 miles of automatic block signals under construction on December 31, 1918. The Atchison, Topeka & Santa Fe has under construction 172 miles of single track and 116 miles of double track signaling, on which 468 signals will be used. The

TABLE B—AUTOMATIC BLOCK SIGNALS UNDER CONSTRUCTION DECEMBER 31, 1918*

Name of Road	Miles of Road S.T.	Miles of Road D.T.	From	To	No. of Signals	Type of Signals	Control System	Remarks
Atchison, T. & S. Fe...	..	4	Camden, J.	Floyd	6	Union "S"		
	..	13	Eldorado	Augusta	18	Union "S"		
	..	26	Winfield J.	Newkirk	40	Union "S"		
	..	5	Glorietta	Decatur	8	3-pos. U. O.		
	..	3	Hutchinson	Kent	6	3-pos. U. O.		
	..	27	Goffs	Danby	30	3-pos. U. O.	A. C., polarized	Union.
	..	38	Danby	Bagdad	51	3-pos. U. O.	A. C., polarized	
	54	..	Christie	Stockton	98	3-pos. U. O.	D. C., polarized	
	118	..	Larson	Fresno	211	3-pos. U. O.	D. C. Polarized	
Gulf, Col. & S. Fe.	1	..	Lindsay		10	Union "S" 3-pos. U. O.		
	..	..	Ardmore	Arbuckle	2	Union "S" 3-pos. U. O.		
Atlanta & W. P.	13	..	Hogansv., Ga.	La Grange	15	Union "B"	A. P. B.	
Atlantic Coast Line	..	6	Falling Creek, Va.	James River	11	Union "S"	Polarized	
Baltimore & Ohio	..	10	Foley, Pa.	Manila, Pa.	16	Union "T 2"		Three-track Automatic Replacing manual.
	..	32	Sand Patch	Confluence	42	Union "T 2"		Three-track Automatic Replacing manual.
Balt. & Ohio (Western).	..	12	Willard	Greenwich	21		D. C.	Normal clear.
	..	4	Erie J.	No. Lima	15		D. C.	Normal clear.
Boston Elevated	..	1	Sullivan Sq.	Everett	12	Light, 3-pos.	A. C.	
Brooklyn R. T. Co.	..	7	New York		129	Color-light	A. C.	Overlap control; automatic train-stops; time-control approaching stations and on steep descending grades; includes one mile of 4-track; four miles middle track with traffic direction locking; G. R. S. apparatus.
Chesapeake & Ohio	..	12	Silver Grove	Cincinnati	38	Union "B," 3-pos.		Revision.
	21	..	Charlotteville	Gordonsville	56	3-pos. light	D. C.	Includes 57 ramps for automatic train control on 15 miles of line.
Chicago, B. & Quincy	..	52	Princeton, Ill.	Wataga	242	Top post, l. q. 60 deg.		
	11	..	Dietz, Wyo.	Ranchester	31	Top post, l. q. 60 deg.		
Chicago, Mil. & St. P.	..	12	Junction	Milbank, S. D.	13	3-pos.	D. C.	
	98	..	Othello, Wash.	Cle Elum	136	Color-light, 3-pos.		
	72	..	Cle Elum	Maple Valley	101	Color-light, 3-pos.		
	28	..	Black River	Tacoma	48	Color-light, 3-pos.		
Chicago, R. I. & Pac.	..	6	Topeka	Bishop	14	Union "S"	Polarized	Changed from S. T. to D. T.
	..	9	Paxico	McFarland	9	Union "S"	Polarized	Changed from S. T. to D. T.
El Paso & S. W.	19	..	Forrest, Ariz.	Lee	40			Union.
Illinois Central	29	..	Gilman, Ill.	Gibson City	50	Hall "K" 3-pos., U. O.	Normal clear	Traffic direction.
	71	..	Springfield, Ill.	Marine	128	Hall "L" 3-pos., U. O.	Normal clear	Traffic direction.
	12	..	Vaughan, Miss.	Canton	20	Hall "K" 3-pos., U. O.	Normal clear	Traffic direction.
	21	..	Canton	Asylum	40	Hall "L" 3-pos., U. O.	Normal clear	Traffic direction.
	21	..	Ilsley, Ky.	Princeton	43	Hall "L" 3-pos., U. O.	Normal clear	Traffic direction.
Yazoo & M. V.	7	..	Memphis	State Line	4	Hall "L" 3-pos., U. O.	Normal clear	Traffic direction.
	..	9	State Line	Cormorant	15	Hall "L" 3-pos., U. O.	Normal clear	Traffic direction.
	43	..	Lake Cormorant	Coahoma	62	Hall "L" 3-pos., U. O.	Normal clear	Traffic Direction.
Interboro R. T. Co. (N.Y.)	..	15			307	Light		Aggregate of four lines in Manhattan and Brooklyn; includes 7 miles of middle track signaled in both directions.
Louisville & N.	..	16	Maplewood	Breurwood				
	17	..	Jackson, Ky.	Oakdale	..			
	136	..	Henderson, Ky.	Amqui	..			
Missouri, Kan. & Tex.	..	..	Labette, Kan.					
New York Central	..	7	William St.		17	Hall	Normal d.	
	..	9	Little Falls	St. Johnsville	16	Hall	Normal d.	Third and fourth tracks.
Kanawha & Mich.	..	..	Elk River Bridge		2	Light, 2-color		G. R. S.; gauntlet.
	..	..	Langsville, Ohio		2	Light, 2-color		G. R. S.; gauntlet.
New York, N. H. & H.	..	..						
Central New Eng.	..	16	Hopewell Junc.	Holmes	34	Union "S," low v.	Polarized	
Pennsylvania	..	10	Pittsb'gh, 12th St.	Thomson	34	Position-light	See note	
Penna., W. of Pittsburgh	6	..	Mansfield	Toledo, J.	6			New third-track.
	2	..	Alliance	Massillon	38			New third and fourth tracks.
	17	..	Leetonia	Alliance	19			New third-track.
Pere Marquette	67	..	Fowlersville	Elmsdale	90	3-pos. U. O.	D. C.	
	23	..	Grand Rapids	Waverly	43	3-pos. U. O.	D. C.	
Philadelphia & Reading.	..	1	Del. River		6	Union, U.O., top-post	A. C., Normal d.	
	..	2	Trenton Junc.		9	Union, U.O., top-post	A. C., Normal d.	Three-track.
	..	4	Ewing	Glenmore	9	Union, U.O., top-post	A. C., Normal d.	
	..	19	Glenmoor	Manville	86	Union, U.O., top-post	A. C., Normal d.	Four-track = 74.4 miles of track.
	..	1	Manville	B. Brook J.	3	Union, U.O., top-post	A. C., Normal d.	
Southern	..	76	Charlotte	Spartanburg	96	3-pos., U. O.	A. C.	
	..	9	Toccoa, Ga.	New Switzerland	8	3-pos., U. O.	A. C.	
Alabama G. S.	..	21	Burstall, Ala.	Vance	12	3-pos., U. O.	D. C.	Revision.
	..	7	B. A.	Russel Junc.	12	3-pos., U. O.	D. C.	
Cin., N. O. & T. P.	..	17	Helenwood		32	3-pos., U. O.	D. C.	
Southern Pacific	2	..	Hilt, Cal.		4			Union.
	2	..	Folsom, Cal.		4	Light		Union.
	..	11	Kern Junc.	Sivert	..			Addition for second main track.
So. Pacific (N. of Ashland)	5	..	Oswego, Ore.	Jean	11	Light	A. C.	
Galveston, H. & S. A.	..	12	El Paso	Ysleta	26	Union "B" 2-pos. l. q.	Polarized, wireless	Switch indicators.
Wabash	24	..	Lafayette, Ind.	Clymers	30	Bottom-post	Polarized	S. T. changed to D. T.
Western Maryland	..	14	Williamsport	Clear Spring	12	Union "S"	Polarized	
Total	938	577						
				Canada				
Canadian Government	..	5	Fairview	Halifax	10		Polarized	
Canadian Pacific	2	..	Winnipeg		1	G. R. S. "2 A"		
	3	..	Whytewold		2	G. R. S. "2 A"		
	2	..	Bradbury		1	G. R. S. "2 A"		

Illinois Central is installing 204 miles of single track and 9 miles of double track signals with a total of 362 signals. The Chicago, Milwaukee & St. Paul is installing 198 miles of single track and 12 miles of double track signals using a total of 298 signals. Of this mileage 198 miles of single track is in the electrified territory in Montana, where signals of the three position a. c. color light type are used.

The Chesapeake & Ohio has under construction 21 miles of single track and 12 miles of double track signaling, using 94 signals. In connection with this work automatic stops are being installed, including 57 ramps for automatic train control on 15 miles of the line (single track). The Interborough Rapid Transit will install 307 light signals on its lines in Manhattan and Brooklyn, including 7 miles of middle track to be signaled in both directions.

Block Signaling Proposed

Of the work proposed for 1919, six lines expect to install more than 100 miles of automatic block. The Northern Pacific proposes to install 360 signals on 213 miles of single track; the Kanawha & Michigan will install 150 miles of single track signals and 13 miles of double track automatic block using a total of 210 signals; the Chicago, Milwaukee & St. Paul will install 127 miles of single track and 17 miles of double track signals using 261 signals; the Cleveland, Cincinnati, Chicago & St. Louis will install 124 miles of double track signaling using 200 signals; the Great Northern will install 17 miles of single track signals using 217 signals, and the Chesapeake & Ohio will install 98 miles of single track and 15 miles of double track work using a total of 134 signals.

TABLE D—MANUAL BLOCK SIGNALING INSTALLED IN 1918

	Miles
Atchison, Topeka & S. F., San Diego., Cal., to Camp Kearney	27
Long Island—Hicksville to Pinelawn	7
Floral Park to Garden City	3
New York, Chicago & St. Louis—Brocton to Buffalo	47
New York, New Haven & Hartford—Berlin, Conn., to Middletown	10
Pennsylvania W. of Pittsburgh—Frankfort, Ind., to Ben Davis	41
Total	135

All of the foregoing is single-track line except the Long Island items, which are double track, and the N. Y. C. & St. L., which consists of 39 miles of double track, and 8 miles three-track line. The New Haven installation is operated by the electric train staff.

TABLE F—MANUAL BLOCK SIGNALING PROPOSED FOR 1918

	Miles
Texas & Pacific—Fort Worth to Baird (single track)	140

Manual Block Signaling

Table D, covering manual block signaling completed during the year, shows a total of 78 miles of single track, 49 miles of double track and 8 miles of three track lines which have been equipped with this type of signaling. The New Haven road's installation is operated by the electric train

TABLE C—AUTOMATIC BLOCK SIGNALS—PROPOSED NEW CONSTRUCTION, 1919*

Name of Road	Miles of Road S.T.	Miles of Road D.T.	From	To	No. of Signals	Type of Signals	Control System	Remarks
Atchison, T. & S. Fe	..	5	Ramsey	Eldorado	7	Union "S," U. Q.	D. C.	
	7	..	Norfolk	Cushing	10	Union "S," U. Q.	Polarized	
	2	..	Caney	Owen	13	Union "S," U. Q.	Polarized	
	12	..	Ochelata	Bartlesville	20	Union "S," U. Q.	Polarized	
	3	..	Escondida	Fall Brook	10	Union 3-pos., U. Q.	Polarized	
Atlanta & West Point	..	..	La Grange, Ga.	Montgomery, Ala.	119			
Baltimore & Ohio	..	1	Laughlin J.	Schenley	15	Union "T 2"	D. C.	Replacing manual.
	..	1	Pittsburg, 33d St.	Pine Creek	4	Union "T 2"	D. C.	Replacing manual.
	..	35	Willow Grove	Goehring	68	Union "T 2"	D. C.	Replacing manual.
B. & O. Chic. Term.	2	..	Chicago		3			Aggregate of three sections; one take-siding indicator.
Boston & Maine	1	..	Kittery, Me.	Navy Yard	5			
	32	..	N. Cambridge	Clinton J.	74			
Brooklyn R. T. Co.	..	7	Brooklyn, N. Y.		129			Aggregate of three sections.
Chesapeake & Ohio	..	7	Russell, Ky.	Greenup	20	Union "B"	D. C.	3-pos., to take place of 2-pos.
	98	..	Charlottesville	Clifton Forge	98		A. C.	
	..	8	Richmond	Westham	16			
Chicago & W., Ind.	..	9	Twelfth St.	Eighty-first St.	..	A. C.	D. C.	To replace manual; 21 miles t'k.
Chicago, Mil. & St. P.	..	15	Savanna, Ill.	Green Island	16	Top-post, 3-pos.	D. C.	Replacing 2-pos.
	..	2	Milwaukee	Grand Ave.	10	Top-post, 3-pos.	D. C.	Replacing 2-pos.
	5	..	Sioux City		15			
	122	..	Mobridge, S. D.	Hettinger	220	Bottom-post, 3-pos.	D. C.	These signals were formerly in service on the electrified section of the road, which now has light signals.
Chicago, N. S. & Mil.	1	..	Howard Ave.		4	Union "M"	A. C.	
Chicago, R. I. & Pac.	..	6	Tindall, Mo.	Trenton, Mo.	12	Union "S"	D. C.	Addition for second track.
	..	4	Peoria, Ill.		12	Color-light	A. C.	Including yard.
Cumberland Valley	..	11	M. R.	Shippensburg	24			
Erie	..	37	Jefferson J.	Carbondale	71			Road operated by D. & H. Co.
	..	6	Griffith	Hammond	13			Op. jointly; Erie and C. & O.
Ft. Dodge, D. M. & S.	7	..	Kelley	Ames	8			
Great Northern	41	..	Newport, Wash.	Hillyard	80	G. R. S. "2 A"	A. P. B.	
	23	..	Wenatchee	Leavenworth	47	G. R. S. "2 A"	A. P. B.	
	53	..	Skykomish	Everett	90	G. R. S. "2 A"	A. P. B.	
Interboro R. T.	..	5	Fordham Rd.	Gunhill Road	9	Light		Three-track line.
New York Central								
C., C., C. & St. L.	..	63	Crestline	Berea	100		D. C.	
	..	61	Pana	Lenox	100	Color-light, 3-pos.	D. C.	
Kanawha & Mich.	150	13	Corning, O.	Gauley Bridge	210	Color-light, 3-pos.	A. P. B. on S. T.	
Toledo & O. C.	11	..	New Lexington	Corning	22	Color-light	A. P. B.	
New York N. H. & H.	..	28	Boston Switch	Readville	95		A. C.	To replace controlled manual.
Norfolk & Western	4	..	Clare	Ancor	16	3-pos. U. Q.	A. P. B.	
Northern Pacific	213	..	Glendive, Mont.	Huntley	360	G. R. S. "2 A"	A. P. B.	
N. W. Pacific	2	..	Almonte	Mill Valley	4	Light	A. C.	Union.
Pennsylvania, W. of Pitts	..	5	Clymers	Logansport	13			Replacing manual.
	..	55	Rochester, Pa.	Bayard	..			Replacing manual.
	..	23	Ingram, Pa.	Dinsmore	..			Replacing manual.
	..	2	Ashland Ave.	Western Ave.	6			Replacing manual; four-track.
	..	7	Collier's, W. Va.	Wh. Junction	..			Replacing manual; three-track.
	..	21	Jewett, Ohio	Uhrichsville	..			Replacing manual; three-track.
Philadelphia & Reading	..	8	Eastwick	Darby Creek	21	Inclosed disk	D. C.	Hall N. D.
Southern (*None*)								
Southern Pacific								
Houston & Tex. Cen.	12	..	Hempstead	Courtney	..	Union "B"		
Terminal R. R. Assn.	..	..	St. Louis		6	G. R. S. "2 A"	D. C.	Less than one mile.
Terre Haute, I. & E.	14	..	Plainfield, Ind.		12		G. R. S., A. P. B.	
Texas & Pacific	5	..	Dallas	Eagle Ford	..			
Union Pacific	..	27	Le Roy, Wyo.	Evanston, Wyo.	112	Union "B" 2-pos. L. O.		Two-arm; 112 *blades.*
Oregon Short Line	..	..	Various		20	Union "B" 2-pos. L. O.		Revision.
Wabash	..	6	Mitchell	Granite City	9	Bottom-post	Polarized	
Total	820	478						
Canada								
Canadian Pacific	2	..	Engen		1			
	2	..	Harfield		1			

TABLE G.—INTERLOCKING PLANTS COMPLETED IN 1918*

1	2	3	4	5
			No. of working levers	
Road	Plants	Character	Mechanical	Electric
Atchison, Topeka & Santa Fe..	6	C.	..	49
	..	J.	12	..
	..	M.	28	..
	..	Y.	..	11
Atlantic Coast Line.....	8	C.	50	*
	..	D.	11	*
	..	J.	25	*
Baltimore & Ohio.....	12	C.	16	..
	..	E. D. T.	..	52
	..	E. T. T.	6	..
	..	J.	151	7
	..	M.	51	..
B. & O. Western Lines.....	3	C.	46	..
	..	C. J.	13	..
B. & O., Chicago Terminal.....	1	C.	25	..
Boston & Maine	1	Y.	10	..
Boston Elevated	1	T.	..	4
Brooklyn Rapid Transit Co....	3	C. T.	..	22
	..	X.	..	57
Central of Georgia.....	1	C.	92	..
Central of New Jersey.	2	E. F. T.	46	..
Chesapeake & Ohio	2	C.	18	..
	..	X.	10	*
Chicago & Alton.....	1	C.	24	..
Chicago, Burlington & Quincy..	6	J. D.	..	34
	..	T.	..	60
	..	C.	24	..
	..	J.	12	..
Chicago, Milwaukee & St. Paul.	5	D.	10	..
	..	J.	152	..
Chicago, North Shore & Mil....	1	C.	3	..
Delaware, Lack. & Western....	1	Y.	..	25
Detroit United	5	C	94	..
Duluth, M. & N.....	1	D.	..	7
Duluth, S. S. & A.....	1	C.	11	..
Great Northern	2	C.	14	..
	..	E. D. T.	15	..
Illinois Central	2	C.	13	..
		J.	..	53
[illegible] & Mississippi Valley.	2	D.	8	..
	..	J.	21	..
[illegible] Terminal Station	1	C.	16	..
Interborough R. T. Co. (N. Y. ..	..	....	..	444
Long Island	1	....	3	*
Missouri Central	1	E. D. T.	3	..
New England Transportation ...	1	J.	22	..
Missouri, Kansas & Texas.....	1	C.	23	..
New York Central	5	J.	65	..
	..	X.	86	..
	..	S.	46	..
	..	T.	44	..
Cleve., C. C. & St. Louis..	2	C. J.	..	45
	..	T.	21	..
Michigan Central	1	T.	18	..
New York, New Haven & Hart.	4	E. F. T.	16	..
	..	J.	19	..
	..	Y.	36	44
Central New England.....	2	E. D. T.	14	..
Northern Pacific	3	C.	36	..
Pennsylvania	16	C.	12	23
	..	J.	8	..
	..	M.	120	134
New York, Phila. & N....	3	C.	42	..
	..	D.	4	7
	..	J.	17	..
Penn. W. Pitts.....	3	C.	39	..
	..	J.	33	..
	..	Y.	14	..
Pere Marquette	1	E	13	..
Richmond, F. & P.....	1	....	..	?
San Francisco-Oakland	1	C.	..	..
St. Louis-San Francisco.....	1	....	..	..
Seaboard Air Line.....	5	C.	12	..
	..	D.	12	..
Southern	8	C.	59	..
	..	D.	4	..
	..	J.	29	..
	..	M.	8	..
Southern Pacific	4	J.	20	63
Galveston, H. & S. A.....	1	D.	7	..
Houston & T. C.....	2	C.	8	29
Louisiana Western	1	D.	4	..
Texas & N. O.....	1	C.	20	..
Union Pacific	2	C.	11	..
	..	E. D. T.	6	..
Oregon Short Line.....	1	J.	2	..
Wabash	..	....	..	..
Washington, Balt. & A.....	1	C. Y.	..	52
Total	142	.....	1,982	1,222
	Canada			
Grand Trunk	1	E.	6	..

*In tables G, H and I a number of electro-mechanical plants (indicated by a star) have been reported without a separation of the electric from the mechanical levers; in which cases the number in the first column includes all of the levers of both kinds. In these three tables the number of plants entered against the name of each road represents the total reported by that road.

ABBREVIATIONS IN TABLES G, H AND I

C.—Crossing.
D.—Drawbridge.
E.—Electric ry. crossing.
E. D. T.—End of double track.
E. F. T.—End of four track.
E. T. T.—End of third track.
J.—Junction.
M.—Miscellaneous and unclassified.
S.—Station.
T.—Terminal.
X.—Crossovers.
Y.—Yard.

staff. The total of 135 miles installed compares with 301 miles a year ago, which would indicate that railroad officers are recognizing more and more the value of the automatic system as compared with the manual.

Table F, representing new manual block signaling proposed for 1919, shows that one road expects to install a total of 140 miles of single track manual block.

New Interlocking Completed

The figures in table G are to be taken as an exhibit of work done rather than as showing the precise amount in the increase of interlocking apparatus in use in the country. A considerable portion of the items represent the reconstruc-

TABLE H.—INTERLOCKING PLANTS UNDER CONSTRUCTION, DECEMBER 31, 1918*

1	2	3	4	5
			No. of working levers	
Road	Plants	Character	Mechanical	Electric
Alton & Southern.....	1	C.	29	..
Atchison, Topeka & Santa Fe..	6	E. D. T.	17	..
	..	J.	5	..
	..	M.	28	..
	..	X.	20	..
Atlantic Coast Line.....	4	C.	12	..
	..	D.	5	..
	..	J.	12	..
Baltimore & Ohio.....	7	J.	46	83
	..	J. D. T.	17	*
	..	M.	41	..
	..	T.	..	47
Balt. & Ohio (Western).....	4	J.	78	*
Balt. & Ohio, Chicago Terminal.	1	J. C.	91	..
Boston & Maine.....	3	C.	..	71
	..	J.	6	*
Boston Elevated	2	J.	..	37
	..	T.	..	4
Brooklyn Rapid Transit Co. ..	7	D. T.	..	74
	..	T.	..	41
	..	X.	..	171
Buffalo, R. & P..... ...	1	J.	..	..
Central of Georgia.....	1	....	..	..
Chesapeake & Ohio.....	11	C.	34	..
	..	J.	70	84
	..	X.	44	..
Chicago & Alton.....	1	C.	15	..
Chicago, Milwaukee & St. Paul	1	J.	29	..
Chicago, R. I. & Pacific.....	1	E. D. T.	11	..
Detroit United	1	E.	18	..
Interboro R. T. Co.....	8	....	94	..
Jacksonville (Fla.) Terminal...	3	....	75	122
Lehigh Valley	2	J.	18	..
	..	J.	..	28
Louisville & Nashville.....	1	....	..	54
Missouri Pacific	2	C.	36	..
New York Central (East).....	6	J.	68	..
	..	T.	80	..
	..	X.	53	..
	..	X.	..	116
Cleve., C. C. & St. Louis..	1	T.	16	..
Pittsburgh & Lake Erie....	2	Y.	..	99
New York, New Haven & Hart.	3	T.	17	11
	..	D. J.	..	42
	..	X.	15	15
Penn. W. Pitts.....	3	J.	..	40
	..	D. Y.	66	..
Pennsylvania	20	C.	..	19
	..	D.	8	..
	..	T.	..	83
	..	X.	36	38
	..	M.	88	156
Philadelphia & Reading.....	17	C.	45	54
	..	J.	70	87
	..	Y.	16	35
	..	Y.	..	43
Richmond (Va.) Terminal.....	1	T.	..	40
St. Louis Merchants Bridge....	1	C.	..	35
Seaboard Air Line.....	2	C.	10	..
	..	D.	3	..
Southern	2	C.	..	35
	..	J.	12	..
Galveston, H. & S. A.....	3	C.	24	..
	..	M.	16	..
Morgan's L. & T.....	1	E. D. T.	10	..
Texas & N. O.....	2	C.	10	..
Union Pacific	2	C.	9	..
	..	D.	24	..
Total	135	.....	1,604	1,642

*See note under Table G.

tion of old plants or important enlargements to provide new tracks or rearrangement of tracks, rather than the construction of entirely new plants. Also some duplications necessarily occur, as a joint plant may be reported by two or more roads. The same observations also apply to tables H and I.

From the returns received, the largest electric interlocking plant completed during the year is one with 60 working

levers located at LaVergne, Ill., on the Chicago, Burlington & Quincy. The Illinois Central completed a plant with 53 working levers at Pullman Junction, Chicago, while the Central of Georgia placed in service an electric plant of 92 working levers at Macon. This, however, consisted of the reconstruction and enlargement of an existing plant.

Electro-pneumatic interlocking plants have been installed on four lines; a 25-lever plant on the Delaware, Lackawanna & Western, at Orange, N. J.; one of 18 levers on the Southern Pacific at San Francisco; Boston Elevated one of four levers, and the Interborough Rapid Transit installed no less than 35 plants with a total of 444 working levers. The largest of these was a 44-lever plant located at 180th Street, on the White Plains Road line. The plants ranged in size from 44 down to three working levers.

Table I.—New Interlocking Proposed for 1919*

1	2	3	4	5
			No. of working levers	
Road	Plants	Character	Mechanical	Electric
Atchison, Topeka & Santa Fe..	4	E. D. T.	..	34
	..	J.	..	24
	..	M.	24	..
Baltimore & Ohio.....	9	C.	12	..
	..	E. D. T.	33	..
	..	E. T. T.	37	..
	..	E. T. T.	42	..
	..	J.	89	..
	..	M.	30	..
Balt. & Ohio, Chicago Terminal.	2	C.	16	..
	..	J.	48	..
Belt Railway, Chicago.....	1	C.	..	168
Boston & Maine.....	6	J.	32	*
	..	Y.	..	178
Brooklyn Rapid Transit Co....	8	T.	..	181
	..	X.	..	20
	..	M.	..	70
Chicago, Milwaukee & St. Paul.	1	D.	..	16
Chicago, R. I. & P.....	3	E. D. T.	35	..
Chicago, Terre Haute & S. E...	1	C.	16	..
Cumberland Valley	1	C.	..	..
Great Northern	1	J.	20	..
Illinois Traction	1	C.	6	..
Interboro R. T.....	..	M.	..	118
Missouri, Kansas & Texas.....	2	C. J.	12	22
New York Central	..	....	..	..
Cleve., C. C. & St. Louis..	2	C. J.	..	57
	..	C. J.	34	*
Toledo & Ohio C.....	2	C.	12	..
	..	J.	20	..
New York, Chicago & St. Louis	2	C.	..	..
	..	C.	34	..
New York, New Haven & Hart.	3	X.	102	10
Norfolk & Western.....	2	D.	..	22
Northern Pacific	1	C.	12	..
Penna. W. of Pitts.....	2	C.	..	40
	..	J.	..	46
Philadelphia & Reading	9	J.	..	150
	..	J.	64	*
	..	J.	37	..
	..	J.	..	18
San Francisco-Oakland T.....	1	J. Y.	..	40
Southern	..	....	..	..
Alabama G. S.	2	D.	..	6
	..	J.	..	28
Cin., N. O. & T. P.....	4	E. D. T.	45	..
	..	E. D. T.	..	16
Texas & Pacific	2	C.	7	..
Union	2	....	..	..
Union Pacific	4	E. D. T.	36	..
	..	T.	45	..
Wabash	2	D	32	..
Total	80	.....	932	1,264
	Canada			
Grand Trunk Pacific.....	1	C.	17	..

*See note under Table G.

Ninteen electro-mechanical plants were installed, ranging in size from 6 to 43 working levers. One push-button electro pneumatic machine was completed during the year on the New York, New Haven & Hartford at the Cedar Hill (New Haven), hump classification yard, 44 units. The Southern Pacific installed one six-lever low voltage electric plant operated by interlocked circuit controllers at Stockham, Ariz., while a low voltage layout was put in on the Oregon Short Line at Pocatello, Idaho.

Interlocking Under Construction

Column 5 in Table G includes electro-pneumatic plants and contains data from seven roads on which such work is under construction, namely, the Boston Elevated, with one 37-lever and one 4-lever plant; the Baltimore & Ohio, with one 14 and one 30-lever plant; the Jacksonville (Fla.), Terminal, with one 122-lever plant; the Interborough Rapid Transit Company, with 8 plants ranging in size from 4 to 24 working levers, having a total of 94 working levers for all; the Pennsylvania, with one 83 and one 51-lever plant, at Philadelphia; the Philadelphia & Reading, with one push-button electro-pneumatic machine of 43 units, installed at Rutherford, Pa., yard, and the Richmond (Va.), Terminal, with one 40-lever plant.

The largest all-electric interlocking plant under construction is one of 74 working levers on the Brooklyn Rapid Transit at Coney Island Creek, protecting the terminal and drawbridge. The next largest is a 72-lever plant being installed at Rochester, N. Y., to replace a pneumatic plant on the New York Central.

The Atlantic Coast Line has one electro-mechanical plant under construction; the Chesapeake & Ohio has 7 electro-mechanical plants ranging in size from 12 to 38 working levers; the Jacksonville Terminal is installing one 48 working lever electro-mechanical plant; the Big Four has one 16-lever plant; the New York, New Haven & Hartford one 30 and one 28-lever plant, while the Philadelphia & Reading is revising one plant which will have 67 working levers; the Pennsylvania is installing 10 electro-mechanical plants ranging in size from 7 to 47 working levers each. The eight interlocking plants on the Interborough covered by the items in Table H are located on six different lines, namely, Third Avenue elevated; Nostrand Avenue, Brooklyn; Eastern Parkway line; White Plains Road line; Webster Avenue line; additions on the Fourth and Lexington Avenue line.

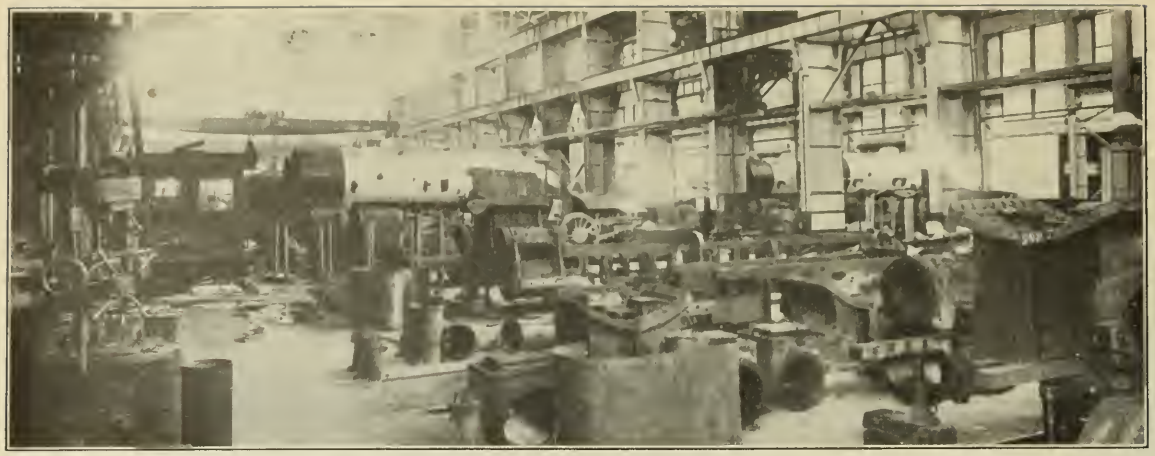
Interlocking Proposed for 1919

Column 5 in Table I shows electro-pneumatic plants proposed on four roads. The Union Railroad (Pittsburgh, Pa.), will install two plants on the Clairton branch. The Norfolk & Western will install one 12 and one 10-lever electro-pneumatic plant. The Interborough Rapid Transit is contemplating installing 11 electro-pneumatic interlocking plants ranging in size from 3 to 32 working levers, totalling 118 in all at various points on the Lexington Avenue, East Parkway, Nostrand Avenue, White Plains Road and Webster Avenue lines. The New York, New Haven & Hartford is contemplating the installation of an electro-pneumatic push-button machine at a hump yard in Boston, 32 units.

The Philadelphia & Reading is contemplating installing two electro-mechanical machines, one of 35 and the other of 29 working levers. The Big Four is contemplating the installation of a 34-lever electro-mechanical machine, while the Baltimore & Ohio has under consideration the installation of a 37-working lever machine.

The largest all-electric machine contemplated for 1919 is one at Hayford, Ill., on the Belt Railway of Chicago, which is to have 168 working levers. The next largest electric machine is to be located at the East New York Terminal on the Brooklyn Rapid Transit line, at Tower 'B' and is to consist of 136 levers, while the third largest is contemplated at East Penn Junction, on the Philadelphia & Reading, 96 working levers.

The American Metric Association held its second annual meeting at Baltimore and Washington on December 27 and December 28. David A. Molitor, of Detroit, Mich., outlined his work for the C. E. Schmidt Company, tanners. He found that about 500 different commodities were being purchased for the use of this company and that they were recorded in many different units. By entering the weight or measure of everything in metric units marked economy was effected. The metric weights and measures were then used exclusively.



Government Locomotive Orders Predominate in 1918

Railroad Administration and Director General Military Railways Place Most of Year's Business

THE NUMBER OF LOCOMOTIVES reported as having been ordered during the 12 months of 1918 was 4,888, of which 2,802 were on domestic orders for companies in the United States and Canada, and 2,086 were on orders for shipments to other countries. These figures compare with a total in 1917 of 6,142, of which 2,704 were on domestic orders and 3,438 were for export, principally to the war zone in France.

The leading feature in the locomotive market during the past year, as in every other essential industry in the country, was, of course, the predominance of government orders. Of the 2,593 locomotives reported as having been ordered for service in the United States (that is, excluding the domestic orders for Canada), no less than 2,030 were included in the orders for standard locomotives placed by the United States Railroad Administration. Of the 209 locomotives ordered for roads in Canada 195, or practically all, were ordered by the Canadian government for the Canadian Government Railways.

Table I—The Locomotive Orders in 1918

Domestic—		
United States Railroad Administration	2,030	
Other railroad orders	525	
Industrials, etc.	38	
Total United States	2,593	
Canadian railroads	209	
Total domesic		2,802
Foreign—		
Director General Military Railroads	1,404	
Other foreign	682	
Total foreign		2,086
Total of all orders		4,888

Of the total of 2,086 locomotives ordered for export, no less than 1,404 were on orders for the United States military railroads, this figure excluding those orders that were cancelled after the signing of the armistice. The remainder of the orders for export also included a considerable number of locomotives for foreign governments—South Africa, England, Chili, China, Italy, etc.

The number of locomotives ordered for domestic service in 1918, inclusive of the Canadian orders, as will be seen from Table II, was greater than last year but not as great as 1916. It was greater than the totals of domestic orders in 1914 and 1915, which were poor years. It was only about 1,700 less than in 1912 and bears no comparison whatever to the big totals of 1905 and 1906. It is perhaps not necessary to refer in greater detail than this to the domestic figures, first, because there were so many foreign orders to bring up locomotive production, and, secondly, because the domestic situation is referred to in greater detail in another article on that subject elsewhere in this issue.

Table II—Domestic Orders for Locomotives Since 1901

Year	Locomotives	Year	Locomotives
1901	4,340	1910	3,787
1902	4,665	1911	2,850
1903	3,283	1912	4,515
1904	2,538	1913	3,467
1905	6,265	1914	1,265
1906	5,642	1915	1,612
1907	3,482	1916	2,910
1908	1,182	1917	2,704
1909	3,350	1918	2,802

It is also interesting to observe that the orders for export were likewise not as great as in 1917. They bade fair to be much the same as those of that year, but the signing of the armistice put an end to the placing of further orders for the United States military railroads and resulted in cancellations of orders already placed, amounting to 1,500, in the latter part of November.

A Review of the Year

The whole situation in the locomotive market this year has been one of great uncertainty. It is not necessary to refer in detail to the causes for this that resulted from the standard locomotive program, inasmuch as the whole standardization question is referred to at great length in an article elsewhere in this issue, entitled "Has Locomotive Standardization Been Justified?"

It is worth while to sketch briefly what has taken place in the locomotive building industry during the past year. First, it will be noted that during the early months of the

year some 200 locomotives were placed on order by various railroads themselves, as will be seen from the appended lists of orders. The first standard locomotive order was placed by the United States Railroad Administration in April after extended discussion and totaled 1,025 locomotives, 555 being given to the American Locomotive Company and 470 to the Baldwin Locomotive Works. In June this was supplemented by an order for 390 locomotives, 245 to the American Locomotive Company, 100 to the Baldwin Locomotive Works and 45 to the Lima Locomotive Works, the last company being given an additional order for 15 locomotives in July, bringing the total of all orders at that time to 1,430,

Standard Locomotives Delivered to December 21.

Alabama & W. Point & Western Ry. of Ala.	2		0-8-0	American
Atlantic Coast Line	5		0-6-0	American
Baltimore & Ohio	50	Lt.	2-8-2	Baldwin
Central of New Jersey	10		0-6-0	American
	10	Hvy.	2-8-2	American
Chicago & Alton	10	Lt.	2-8-2	American
Chicago Junction	14		0-6-0	American
Chicago & Eastern Illinois	15	Lt.	2-8-2	American
Chicago Great Western	10	Lt.	2-8-2	Baldwin
Chicago, Milwaukee & St. Paul	50	Hvy.	2-8-2	American
Cleveland, Cincinnati, Chicago & St. Louis	25	Lt.	2-8-2	Baldwin
El Paso & South Western	5	Hvy.	2-8-2	American
Erie	16		0-8-0	American
	15	Hvy.	2-8-2	American
Grand Trunk Western	16	Lt.	2-8-2	American
Grand Trunk—East	15	Lt.	2-8-2	American
Lake Erie & Western	15	Lt.	2-8-2	Baldwin
Lehigh & Hudson River	4	Lt.	2-8-2	Baldwin
Louisville & Nashville	20	Hvy.	2-8-2	American
Michigan Central	20	Lt.	2-8-2	American
Nashville, Chattanooga & St. Louis	10	Lt.	2-8-2	American
New York Central	33	Lt.	2-8-2	Lima
	25		0-8-0	American
	50	Lt.	2-8-2	American
New York, Chicago & St. Louis	10	Lt.	2-8-2	American
Pennsylvania Lines West	17		0-6-0	American
Pittsburgh & West Virginia	3	Lt.	2-8-2	Baldwin
Pittsburgh, McKeesport & Youghogheny	10	Hvy.	2-8-2	American
Rutland	2		0-8-0	American
	6	Lt.	2-8-2	American
Seaboard Air Line	4		0-6-0	American
	10	Lt.	2-8-2	American
Southern	20		0-8-0	American
	25	Lt.	2-8-2	American
	29	Lt.	2-10-2	American
Terminal R. R. of St. Louis	6		0-6-0	American
Texas & Pacific	11	Lt.	2-8-2	American
Toledo & Ohio Central	5		0-8-0	American
	15	Lt.	2-8-2	American
Union Pacific	20	Lt.	2-8-2	American
Wabash	20	Lt.	2-8-2	American
Western Pacific	5	Lt.	2-8-2	Baldwin
Wheeling & Lake Erie	5		0-8-0	American
	10	Hvy.	2-8-2	American

Total—Six-wheel switching, American		56
Eight-wheel switching, American		75
Light Mikado, American	253	
Baldwin	112	
Lima	33	
		398
Heavy Mikado, American		120
Light Santa Fe, American		29
Total to December 21		678

orders having been placed so that all three companies were working on the standard designs.

Late in July, however, the Baldwin Locomotive Works, after having under way about 100 of the standard locomotives, all light Mikados, was given an order for 500 of the so-called "Pershing" locomotives for the military railroads in France and ceased production on the Railroad Administration engines to devote its entire energy to the new order. This was soon supplemented by additional orders for 10 and 500, respectively, and again in September by two orders of 500 and 1,000 respectively. The signing of the armistice removed the need for the last 1,500, and they were accordingly cancelled about the middle of November. Baldwin's production continued on the 250 or so "Pershing" locomotives remaining on the July orders.

The American and Lima companies prior to this had received additional orders for 500 and 100 standard locomotives, respectively, from the Railroad Administration. Following the signing of the armistice these orders were also held up for a time—and that to the utter consternation of the whole railway supply field—but were soon reinstated and definite contracts signed, bringing the total of all the standard locomotives placed to date by the Railroad Administration to 2,030. Of these orders there had been delivered to December 21, the latest date for which figures are available at this writing, 678 standard engines, including the 112 already referred to built by Baldwin, 33 from Lima and 543 from the American Locomotive Company. These details are given in one of the tables.

The First Gun and the Eleven Hundredth Engine

The Railroad Administration's standardization program has called for all kinds of adverse comment. It is only just to note here that it has been quite the opposite as far as the United States Military Railroad program is concerned. The department of which S. M. Felton has been the head, adopted standardization from the start, but it did not dally around for weeks and months as so many other of Mr. Baker's otherwise estimable departments did to reach that end. It adopted at the "first crack out of the box" a design that was being built at the Baldwin Locomotive Works for the British government, changed it to the extent principally of adding a superheater, managed to secure its first completed locomotive in 20 working days, and that design, with very minor changes, is still the one that is being produced at this writing, a year and one-half later. When the war ended with the signing of the armistice the American army in France had yet to receive its first American guns, its first tanks, its first airplanes. It was receiving, however, its eleven hundredth erected standard gage locomotive, and had received nearly a thousand more of smaller size.

Production in 1918

The total number of locomotives produced in 1918 was 6,475, including 3,668 on domestic orders and 2,807 on orders for the United States military railroads and for other railroads outside the United States and Canada. This total compares with a total of 5,446 in 1917, of which 2,585 were for domestic service and 2,861 for export. In spite of the high rate of production which was attained at various times during the year the total was not as great as in the peak years of 1906 and 1907, when 6,952 and 7,362 locomotives were produced respectively.

Table IV—The Locomotives Built

Domestic	3,668
Foreign	2,807
Total	6,475

Comparison with Previous Years

Year	Domestic	Foreign	Total	Year	Domestic	Foreign	Total
1896	866	309	1,175	1907*	6,564	798	7,362
1897	865	386	1,251	1908*	1,886	456	2,342
1898	1,321	554	1,875	1909*	2,596	291	2,887
1899	1,951	514	2,475	1910*	4,441	314	4,755
1900	2,648	505	3,153	1911*	3,143	387	3,530
1901	.....	...	3,384	1912†	4,403	512	4,915
1902	.....	...	4,070	1913†	4,561	771	5,332
1903	.....	...	5,152	1914†	1,962	273	2,235
1904	.....	...	3,441	1915†	1,250	835	2,085
1905*	4,896	595	5,491	1916†	2,708	1,367	4,075
1906*	6,232	720	6,952	1917†	2,585	2,861	5,446
				1918†	3,668	2,807	6,475

* Includes Canadian output.
† Includes Canadian output and equipment built in railroad shops.

A Statement of Mr. Baruch's

In Mr. Creel's Official Bulletin of November 2 there appeared a statement (reproduced in the *Railway Age* of November 8), authorized by B. M. Baruch, chairman of the War Industries Board, to the effect that the standard gage steam locomotive industry of the United States, operating under the direction of the War Industries Board, had increased its rate of production approximately 100 per cent in the preceding three months. During the last week of October the output of the three standard gage companies was 144 locomotives. From 1910 to August, 1918, the statement said, the largest number ever turned out in a single year was 3,776, which would represent an average weekly output of 72.6 loco-

motives. The statement, continuing, emphasized the fact that this increase in production was accomplished without expenditure to increase plant facilities or to enlarge the existing works, but was made possible by a redistribution of orders and concentration of the plants on particular types of locomotives.

The figures that are now available show, however, that Mr. Baruch's statement has not worked out as his publicity man had hoped. The production of steam locomotives was by no means doubled in 1918, and, in fact, the totals for this year, even inclusive of more than 600 little narrow gage gasoline locomotives, as well as other small equipment included in the *Railway Age's* reports, was but 1,000 larger than in 1917 and did not come within 4,000 of being double the figures for that year, nor within 2,000 of being double the domestic production alone in 1910, 1912 and 1913. A reference to Table IV in this article will bear out these last statements. With all due respect to the about to be deceased War Industries Board, it could not keep up with what Mr. Creel's Bureau could say about it.

The statement also continues to the effect that the "Pershing" locomotive, built on standard plans for the United States military railways is said to have been made the sole type of steam locomotive in use behind the American lines in France, and also to have been adopted by the British and French governments as the standard type for their armies on the western front. It might be considered somewhat unkind to observe that the so-called "Pershing" locomotive was already in service on the British lines of communication even before we went into the war, or if one drew attention to the fact that there have been other designs of steam locomotives sent over for the American Expeditionary forces, and that American locomotive plants themselves have built engines to French designs for use behind the fronts. But enough has been said to show that, like much other Washington publicity, the statement of Mr. Baruch was far from the facts and should never have been published.

The Lists of Orders

The lists of orders appended are from official sources. They will, no doubt, suffer from a few omissions of small and less important orders, but will, nevertheless, show in a clear way the business that the locomotive plants have received during 1918. The *Railway Age* did not as usual send out letters to all the railroads this year, because it was able to obtain most of its data from the Railroad Administration, from the director general military railroads, and from other government sources. The usual letters were sent to the builders, and the output figures were obtained directly from them. Lists from the builders, as well as the usual weekly reports, permitted the checking and amplification of the lists in the usual way.

Locomotive Orders in 1918

Ordered by the United States Railroad Administration

Purchaser	No.	Cylinders	Weight	Type	Super-heater	Brick Arch	Valve Gear	Mechanical Stoker	Builder
United States Railroad Administration....	287	26 x 30	290,800	2-8-2	Yes	Yes	Walschaert	Duplex	American
	183	26 x 30	290,800	2-8-2	Yes	Yes	Walschaert	Duplex	Baldwin
	60	26 x 30	290,000	2-8-2	Yes	Yes	Walschaert	Duplex	Lima
	130	27 x 32	320,000	2-8-2	Yes	Yes	Walschaert	Standard	American
	87	27 x 32	320,000	2-8-2	Yes	Yes	Walschaert	Standard	Baldwin
	20	27 x 30	320,000	4-8-2	Yes	Yes	Baker	Standard	American
	15	27 x 30	320,000	4-8-2	Yes	Yes	Baker	Standard	Baldwin
	3	28 x 30	352,000	4-8-2	Yes	Yes	Baker	Standard	American
	2	28 x 30	352,000	4-8-2	Yes	Yes	Baker	Standard	Baldwin
	30	.....	.....	2-8-0	Yes	...	.....	.....	Baldwin
	10	25 x 28	270,000	4-6-2	Yes	Yes	Baker	.....	American
	33	25 x 28	270,000	4-6-2	Yes	Yes	Baker	.....	Baldwin
	10	27 x 28	300,000	4-6-2	Yes	Yes	Baker	Duplex	American
	10	27 x 28	300,000	4-6-2	Yes	Yes	Baker	Duplex	Baldwin
	75	27 x 32	352,000	2-10-2	Yes	Yes	Southern	Duplex	American
	49	27 x 32	352,000	2-10-2	Yes	Yes	Southern	Duplex	Baldwin
	40	30 x 32	390,000	2-10-2	Yes	Yes	Southern	Hanna	American
	10	30 x 32	390,000	2-10-2	Yes	Yes	Southern	Hanna	Baldwin
	130	31 x 28	165,000	0-6-0	Yes	Yes	Baker	.....	American
	20	21 x 28	165,000	0-6-0	Yes	Yes	Baker	.....	Baldwin
	75	25 x 28	214,000	0-8-0	Yes	Yes	Baker	.....	American
	75	25 x 28	214,000	0-8-0	Yes	Yes	Baker	.....	Baldwin
	15	23 & 35 x 32	440,000	2-6-6-2	Yes	Yes	Baker	Standard	American
	15	23 & 35 x 32	440,000	2-6-6-2	Yes	Yes	Baker	Standard	Baldwin
	5	25 & 39 x 32	540,000	2-8-8-2	Yes	Yes	Baker	Duplex	American
	41	25 & 39 x 32	540,000	2-8-8-2	Yes	Yes	Baker	Duplex	Baldwin
	70	.....	.....	Lt. 2-8-2	...	...	.....	Duplex	Lima
	30	.....	.....	Unassigned	...	...	.....	.....	Lima
	25	.....	.....	Lt.2-8-2	...	...	.....	Duplex	American
	73	.....	.....	Hvy. 2-8-2	...	...	.....	Standard	American
	95	.....	.....	Hvy. 2-10-2	...	...	.....	Duplex	American
	16	.....	.....	Lt. 4-6-2	...	...	.....	.....	American
	10	.....	.....	Hvy. 4-8-2	...	...	.....	Standard	American
	105	.....	.....	0-6-0	...	...	.....	.....	American
	25	.....	.....	0-8-0	...	...	.....	.....	American
	60	.....	.....	2-8-8-2	...	...	.....	Duplex	American
	91	.....	.....	Unassigned	...	...	.....	.....	American

Director General Military Railways

FRENCH STANDARD GAGE

Director General Military Railways.....	510	21 x 28	166,400	2-8-0	Yes	No	Walschaert	.....	Baldwin
	500	21 x 28	166,400	2-8-0	Yes	No	Walschaert	.....	Baldwin
	100	25 x 28	202,500	2-10-0	Yes	No	Walschaert	.....	Baldwin
	100	25 x 28	200,000	2-10-0	Yes	No	Walschaert	.....	American

*FRENCH STANDARD GAGE LOCO. TENDERS

5	.....	100,000	2-8-0	...	...	.....	.....	American
15	.....	112,000	2-8-0	...	...	.....	.....	Baldwin

60 C/M GAGE LOCOMOTIVES

104	4 & 5½ x 7	15,000	50 hp. gasol'e	...	...	G'r s. rod driv.	.....	G. D. Whitcomb Co.
60	2 & 9 x 12	34,500	Steam	No	No	Walschaert	.....	Davenport
30	2 & 9 x 12	34,500	Steam	No	No	Walschaert	.....	Vulcan

*Not included in totals.

Other Orders from Railways

Purchaser	No.	Cylinders	Weight	Type	Super-heater	Brick arch	Valve Gear	Mechanical Stoker	Builder
Bingham & Garfield	1	26 & 41 x 28	473,000	0-8-8-0	Yes	No	.....	.....	American
Cambria & Indiana	2	22 x 28	240,000	2-8-2	Yes	Yes	.....	.....	Baldwin
Canton R. R.	1	18 x 24	105,000	0-6-0	No	Yes	.....	.....	Baldwin
	1	21 x 28	162,000	0-6-0	No	Yes	.....	.....	Baldwin
Central of Georgia	3	27 x 28	318,000	4-8-2	Yes	Yes	.....	.....	American
	10	25 & 38 x 32	440,000	Mallet	Yes	Yes	.....	Duplex	American
Central Vermont	5	27 x 30	276,000	2-8-2	Yes	Yes	.....	.....	American
Chesapeake & Ohio	15	22 & 35 x 32	437,000	2-6-6-2	Yes	Yes	.....	Duplex	American
	10	27 x 28	295,000	0-10-0	Yes	Yes	.....	.....	American
Columbia & Nehalem River	1	17 x 24	120,650	2-6-2	No	No	.....	.....	Baldwin
Delaware & Hudson	20	27 x 32	295,000	2-8-0	Yes	Yes	.....	.....	American
Delaware, Lackawanna & Western	15	28 x 30	321,000	2-8-2	Yes	Yes	.....	.....	American
Fairport, Painesville & Eastern	1	22 x 26	156,000	0-6-0	Yes	Yes	.....	.....	Baldwin
Hocking Valley	20	22 & 35 x 32	437,000	2-6-6-2	Yes	Yes	.....	Duplex	American
Illinois Central	4*	29 x 32	367,000	2-10-2	Yes	Yes	.....	.....	American
	25	21 x 26	169,000	0-6-0	Yes	Yes	.....	.....	American
Long Island	4	23 x 28	203,000	0-8-0	Yes	Yes	.....	.....	American
Maine Central	8	22 x 28	202,000	4-6-0	Yes	Yes	.....	.....	American
	4	21 x 28	166,000	0-6-0	Yes	Yes	.....	.....	American
Missouri, Kansas & Texas	25	28 x 30	314,000	2-8-2	Yes	Yes	.....	(10 Duplex)	American
*Norfolk & Western	20	22 & 35 x 32	427,000	2-6-6-2	Yes	Yes	Baker	Duplex	American
Northern Electric	1	.....	120,000	4-0-4	...	...	.....	Electric freight	Gen. Electric
Pennsylvania Railroad	42	.....	.....	Switching	Yes	Yes	.....	.....	Juniata Shops
	150	.....	.....	2-10-0	Yes	Yes	.....	.....	Juniata Shops
	115	.....	.....	4-6-2	Yes	Yes	.....	.....	Juniata Shops
	59	.....	.....	2-8-2	Yes	Yes	.....	.....	Juniata Shops
	1	.....	.....	Mallet	Yes	Yes	.....	.....	Juniata Shops
Portland Terminal	2	21 x 28	166,000	0-6-0	Yes	Yes	.....	.....	American
Western Pacific	5	28 x 30	330,000	2-8-2	Yes	No	.....	.....	American

*Orders reported by builders as of 1918, but not included in this year's totals because reported in last year's *Railway Age*.

From Private Car Lines and Industrials

Purchaser	No.	Cylinders	Weight	Type	Super-heater	Brick arch	Valve Gear	Mechanical Stoker	Builder
Alan Wood Iron & Steel Co.	1	22 x 26	160,000	0-6-0	...	...	.....	.....	Baldwin
American Bridge Company	1	18 x 24	100,000	0-6-0	No	Yes	.....	.....	Baldwin
Arlington Mills	1	.....	60,000	4-0-4	...	...	Electric	switch	Gen. Electric
Baldwin Locomotive Works	3	22 x 26	160,000	0-6-0	No	No	.....	.....	Baldwin
Baltimore Car & Foundry Co.	4	22 x 26	160,000	0-6-0	No	No	.....	.....	Baldwin
Brier Hill Steel Company	4	22 x 26	160,000	0-6-0	No	No	.....	.....	Baldwin
Commonwealth Edison Co.	1	.....	120,000	4-0-4	...	...	Electric	switch	Gen. Electric
Delaware River Steel Co.	1	16 x 24	97,000	0-4-0	...	...	.....	.....	American
Forged Steel Wheel Co.	1	22 x 26	160,000	0-6-0	No	No	.....	.....	Baldwin
Hudson Coal Co.	1	11 x 16	42,000	0-4-0	...	...	.....	.....	American
Inland Steel Company	1	17 x 20	91,000	0-4-0	No	No	.....	.....	Baldwin
Lackawanna Steel Co.	2	.....	.....	0-8-0	...	Yes	.....	.....	American
Miami Conservancy Dist.	3	16 x 24	96,000	0-4-0	...	...	.....	.....	American
	10	14 x 22	76,000	0-4-0	...	...	.....	.....	American
New York Shipbuilding Corp.	1	19 x 24	133,000	0-6-0	No	Yes	.....	.....	Baldwin
Republic Iron & Steel Co.	1	22 x 26	175,000	2-6-0	No	Yes	.....	.....	Baldwin
Struthers Furnace Co.	1	22 x 26	160,000	0-6-0	No	No	.....	.....	Baldwin
Trumbull Steel Co.	1	22 x 26	160,000	0-6-0	No	No	.....	.....	Baldwin
United States Metals Refining Co.	2	8 x 12	20,500	0-4-0	No	No	.....	.....	Baldwin
Virginia Shipbuilding Corp.	1	10 x 16	39,000	0-4-0	No	No	.....	.....	Baldwin

Canadian Government Railways

Purchaser	No.	Cylinders	Weight	Type	Super-heater	Brick arch	Valve Gear	Mechanical Stoker	Builder
Canadian Government Rys.	6	21 x 26	154,400	0-6-0	Yes	Yes	.....	.....	Canadian
	4	16½ x 22	100,100	Ng. 4-6-0	Yes	No	.....	.....	Canadian
	10	21 x 26	154,400	0-6-0	Yes	Yes	.....	.....	Canadian
	60	27 x 30	277,550	2-8-2	Yes	Yes	.....	.....	Canadian
	50	24 x 32	240,000	2-8-2	Yes	Yes	.....	.....	Montreal
	15	24 x 28	264,000	4-6-2	Yes	Yes	.....	.....	American
	20	21 x 26	160,000	0-6-0	Yes	Yes	.....	.....	American
	30	24 x 28	254,000	4-6-2	Yes	Yes	.....	.....	Montreal
Canadian Pacific	10	25 x 32	300,000	2-8-2	Yes	Yes	Walschaert	.....	Montreal shops
	4	24½ x 30	273,000	4-6-2	Yes	Yes	Walschaert	.....	Montreal shops

Orders from Other Countries

Purchaser	No.	Cylinders	Weight	Type	Super-heater	Brick arch	Valve Gear	Mechanical Stoker	Builder
Alto Cedro Sugar Co.	1	.....	.....	2-6-0	...	...	.....	.....	American
Banes R. R. (Cuba)	2	16 x 20	80,000	2-8-0	No	Yes	.....	.....	Baldwin
British War Mission	50	19 x 26	142,000	4-6-0	Yes	Yes	.....	.....	Baldwin
Central of Brazil	3	21½ x 26	165,000	2-8-0	Yes	Yes	.....	.....	American
	1	20 & 32 x 26	280,000	0-8-8-0	Yes	Yes	.....	.....	American
	2	21½ x 26	167,000	2-8-0	Yes	Yes	.....	.....	American
	1	16 & 25 x 20	157,000	2-6-6-2	Yes	No	.....	.....	Baldwin
	3	18 x 22	119,000	2-8-0	Yes	No	.....	.....	Baldwin
Central Cunagua (Cuba)	2	18 x 24	121,600	4-6-0	Yes	No	.....	.....	Baldwin
Central Resulta (Cuba)	1	13 x 12	28,300	0-4-0	Fireless		.....	.....	Baldwin
Chaparra Sugar Co (Cuba)	1	15 x 20	74,000	2-6-0	No	No	.....	.....	Baldwin
Chilean State Rys.	20	22 x 28	195,000	2-8-2	Yes	Yes	.....	.....	American
	1	17 x 18 & 19 x 20	167,000	Comb. Rack & Adhesion	Yes	No	.....	.....	Baldwin
Cienfuegos, Palmira & Cruces	4	.....	120,000	404	Electric	freight	.....	.....	Gen. Electric
Constitutionalist Rys. of Mexico	8	.....	.....	2-8-2	...	...	.....	.....	Lima
F. C. Norte del Cuba	5	19 x 26	137,000	4-6-0	Yes	No	.....	.....	Baldwin
Frazar & Co. (Japan)	2	6 x 12	12,800	0-4-0	No	No	.....	.....	Baldwin
Ingenio San Luis (Santo Domingo)	1	11 x 16	43,000	2-6-0	Yes	No	.....	.....	Baldwin
Insp. Fed. des Estrades (Brazil)	3	16 x 20	81,000	2-8-0	No	No	.....	.....	American
	2	16 x 20	80,000	4-6-0	No	No	.....	.....	American
Italian State Rys.	150	21¼ x 27½	147,000	2-8-0	Yes	No	.....	.....	American
Lunghai-Pienlo Ry. (China)	4	21 x 28	181,350	2-8-2	Yes	Yes	.....	.....	Baldwin
Manati Sugar Co. (Cuba)	1	13 x 18	50,000	0-6-0	No	No	.....	.....	Baldwin
Nippon Seikosho (Japan)	1	13 x 18	58,000	0-4-0	No	No	.....	.....	American
Paris-Lyons-Med. (France)	100	.....	.....	2-8-2	...	...	.....	.....	Baldwin
Pekin-Kalgan (China)	5	20 x 28	186,000	2-8-2	Yes	Yes	.....	.....	American
	3	20 & 32 x 26	290,000	Mallet	Yes	Yes	.....	.....	American
Peking-Mukden Ry. (China)	10	21 x 28	188,000	2-8-2	Yes	Yes	.....	.....	Baldwin
Porcella, Vicini & Co. (Santo Domingo)	1	8 x 14	27,000	2-6-0	No	No	.....	.....	Baldwin
Rhodesian Rys.	9	22 x 24	172,000	4-8-2	Yes	Yes	.....	.....	American
Shantung Ry. (China)	5	21 x 26	160,000	2-8-0	Yes	Yes	.....	.....	American
	2	20½ x 26	160,000	2-8-0	Yes	Yes	.....	.....	American
South African Rys.	20	22 x 26	195,000	4-8-2	Yes	No	.....	.....	American
South Manchurian Ry.	25	23 x 28	230,000	2-8-2	Yes	Yes	.....	.....	American
	5	.....	112,000	404	Electric	freight	.....	.....	Gen. Electric
Tientsin Pukow (China)	10	20 x 28	195,000	2-8-2	Yes	Yes	.....	.....	American
United Rys. of Havana	6	20 x 26	159,000	2-8-0	Yes	Yes	.....	.....	American
	2	20 x 26	177,000	4-6-2	Yes	Yes	.....	.....	American
Usina Malemba (Brazil)	1	10 x 16	36,000	0-4-2	No	No	.....	.....	Baldwin



Freight Car Orders in 1918 Exceed 1917 Figures

The Amount of Business Now on Hand Insures a Big Year in 1919 from Production Standpoint

BECAUSE OF THE 100,000 standard freight cars ordered by the United States Railroad Administration in 1918, of which, however, only about 12 per cent have been delivered to date, the orders for freight cars in 1918 for domestic service in the United States and Canada were considerably in excess of those of 1917. They were not, however, as great as those of 1916, were only half those of

Table I—The Freight Car Orders in 1918

Domestic—		
United States Administration	100 000	
United States Army or Navy	740	
Other railroad orders	1,227	
Private car lines and industrials	12,146	
Total United States	114,113	
Canadian railroads	9,657	
Total domestic		123,770
Foreign—		
Director General Military Railroads	36,875	
Other foreign	16,672	
Total foreign		53,547
Total of all orders		177,317

1912, and did not compare at all with those of the big years 1905 and 1906.

The orders for freight cars in 1918 totaled 177,317, of which 123,770 were on domestic orders and 53,547 were on foreign orders, principally for the United States Military Railroads in France. The orders in 1917 totaled 131,558 (excluding the 30,500 Russian cars which were cancelled), of which 79,367 cars were for domestic service and 34,167 were for export, principally for France and the Military Railroads.

The passenger car orders this year were practically non-existent, war-time activities and presumably the omnipresent government desire for standardization not permitting the placing of such orders. The orders for passenger cars listed

Table II—The Passenger Car Orders of 1918

Domestic, United States and Canada	131
Foreign	26
Total	157

total only 157, including 131 for domestic service and 26 for export, as compared with 1,167 in 1917, of which 1,124 were for domestic service, 6 for the United States Government and 37 for export.

The article preceding this one, treating of the locomotive orders in 1918, contains a resumé of the locomotive business of the United States during the year just past. Even with the chance of covering similar ground in this article, it is worth while to sketch briefly what has occurred in the freight car market during 1918.

As in the case of locomotives, the predominating feature during the past year, insofar as the orders for freight cars were concerned, was the great proportion the government purchases held to the total orders. Unlike 1917, there were few orders from governments of other countries. The government orders referred to were those placed by our own authorities, either the United States Railroad Administration or the Director General Military Railroads.

The year opened very auspiciously with prospects for

Table III—Domestic Orders for Cars Since 1901

	Freight cars	Passenger cars		Freight cars	Passenger cars
1901	193,439	2,879	1910	141,024	3,881
1902	195,248	3,459	1911	133,117	2,623
1903	108,936	2,310	1912	234,758	3,642
1904	136,561	2,213	1913	146,732	3,179
1905	341,315	3,289	1914	80,264	2,002
1906	310,315	3,402	1915	109,792	3,101
1907	151,711	1,791	1916	170,054	2,544
1908	62,669	1,319	1917	79,367	1,167
1909	189,360	4,514	1918	123,770	131

heavy orders from the railroads, which were soon dispelled with the announcement that purchases for our own railroads would be centralized and placed by the Railroad Administration. It was not until April, however, that orders for 100,000 standard cars were placed, divided as follows:

25,000	40-ton double sheathed box.
25,000	50-ton single sheathed box.
20,000	50-ton composite gondola.
5,000	70-ton low side gondola.
25,000	55-ton hopper.
100,000	

Quantity production on these orders was promised by the Railroad Administration for August, but was not reached until November, and up to December 21, the latest date for which figures are available at this writing, only 11,815 have been delivered.

The orders placed by the Director General Military Railroads totaled 36,875. The first orders this year were in February and totaled about 5,000. In July an order for 10,000 additional was divided among several builders, and

was shortly afterward supplemented by 20,000 more. In September an additional 40,000 cars were ordered, but immediately following the signing of the armistice this last 40,000 was cancelled before production had been begun on them. One of the tables, giving a resumé of the orders on hand at the various car building plants of the country as

Table IV. Freight and Passenger Cars Built

	1918	
	Freight	Passenger
Domestic	81,767	1,481
Foreign	42,941	92
	124,708	1,573

Comparison with Previous Years

	Freight			Passenger		
Year	Domestic	Foreign	Total	Domestic	Foreign	Total
1899	117,982	1,904	119,886	1,201	104	1,305
1900	113,070	2,561	115,631	1,515	121	1,636
1901	132,591	4,359	136,950	1,949	106	2,055
1902	161,747	2,800	162,599	From 1902 to 1907		1,948
1903	153,195	1,613	152,801	passenger car fig-		2,007
1904	60,955	1,995	60,806	ures in these two		2,144
1905*	162,701	5,305	165,155	columns included		2,551
1906*	236,451	7,219	240,503	in corresponding		3,167
1907*	280,216	9,429	284,188	frt. car columns.		5,457
1908*	75,344	1,211	76,555	1,645	71	1,716
1909*	91,077	2,493	93,570	2,698	151	2,849
1910*	176,374	4,571	180,945	4,136	276	4,412
1911*	68,961	3,200	72,161	3,938	308	4,246
1912†	148,357	4,072	152,429	2,822	238	3,060
1913†	198,066	9,618	207,684	3,076	220	3,296
1914†	.....	.....	104,541	.....	...	3,691
1915†	59,984	14,128	74,112	1,935	14	1,949
1916†	113,692	21,309	135,001	1,769	70	1,839
1917†	119,363	32,038	151,401	1,969	31	2,000
1918†	81,767	42,941	124,708	1,481	92	1,573

* Includes Canadian output.
† Includes Canadian output and equipment built in company shops.

of November 1, contains a column showing the status of the military orders on that date—that is, before any cancellations had taken place. From that column it will be seen that there were then outstanding orders for 85,834 cars. There had been shipped on these orders 2,575 cars, leaving 83,259 to be delivered. These figures are also to be shown as follows:

TOTAL OF ALL CARS ORDERED BY THE UNITED STATES MILITARY RAILROADS FROM THE TIME THE UNITED STATES ENTERED THE WAR TO NOVEMBER 1, 1918.

	Ordered	Shipped	Remaining to be shipped
Standard gage cars	98,069	19,395	78,674
Narrow Gage cars	8,579	3,994	4,585
Total of *all* military cars ordered	106,648	23,389	82,359

Figures for standard gage cars include 6,000 sets box car metallics ordered by military railroads and 36 shuttle cars and 73 mortar cars ordered by the ordnance department.

These military cars have been an important factor in the year's business, but they have not been sufficient to impede the production of other cars, and it cannot be said that the car building plants have been particularly rushed at any time.

The resumé of freight car orders on hand on November 1 shows a total of 235,614 cars, of which only 20,400 had been delivered, leaving a total of 215,214 still to be delivered, divided about evenly between foreign and domestic orders. This total represents nearly double as many cars as have on the average been produced annually for the past five years inclusive of 1918. Even with the elimination of such orders

Standard Car Deliveries to December 21.

Atlantic Coast Line	50	50-ton Gondola..Am. Car & Fdy.
	250	50-ton Gondola..Pressed Steel
Bessemer & Lake Erie	250	55-ton Hopper...Am. Car & Fdy.
	250	55-ton Hopper...Standard Steel
Buffalo, Rochester & Pittsburgh	500	55-ton Hopper...Pressed Steel
	300	55-ton Hopper...Pullman
Carolina, Clinchfield & Ohio	250	55-ton Hopper...Standard Steel
	250	55-ton Hopper...Am. Car & Fdy.
	250	55-ton Hopper...Pressed Steel
Chicago & North Western	1,250	40-ton Box.....Am. Car & Fdy.
	217	50-ton Box.....Am. Car & Fdy.
	10	50-ton Box.....Haskell & Barker
	500	50-ton Gondola..Am. Car & Fdy.
	500	50-ton Gondola..Haskell & Barker
Chicago, Burlington & Quincy	422	40-ton Box.....Am. Car & Fdy.
Charleston & Western Carolina	10	40-ton Box.....Am. Car & Fdy.
Cleve., Cin., Chicago & St. Louis	81	40-ton Box.....Am. Car & Fdy.
	200	55-ton Hopper...Am. Car. & Fdy.
	200	55-ton Hopper...Pressed Steel
	200	55-ton Hopper...Pullman
	200	55-ton Hopper...Ralston
	200	55-ton Hopper...Standard Steel
Georgia	100	50-ton Gondola..Pressed Steel
Kanawha & Michigan	300	55-ton Hopper...Pressed Steel
	200	55-ton Hopper...Ralston
Michigan Central	86	50-ton Gondola..Am. Car & Fdy.
	200	50-ton Gondola..Haskell & Barker
	200	50-ton Gondola..Pressed Steel
	200	50-ton Gondola..Standard Steel
Missouri Pacific	16	40-ton Box.....Am. Car & Fdy.
New York Central	500	40-ton Box.....Am. Car & Fdy.
	423	50-ton Gondola..Am. Car & Fdy.
	500	50-ton Gondola..Pressed Steel
	500	55-ton Hopper...Pressed Steel
	500	55-ton Hopper...Standard Steel
New York, New Haven & Hart.	357	55-ton Hopper...Pressed Steel
	500	55-ton Hopper...Pullman
	200	55-ton Hopper...Ralston
	400	55-ton Hopper...Standard Steel
Toledo & Ohio Central	293	55-ton Hopper...Am. Car & Fdy.
Total	2,279	40-ton Box
	3,009	50-ton Gondola
	6,300	55-ton Hopper
	227	50-ton Box
	11,815	to December 21

for the United States Military Railroads as have been cancelled since November 1, the indications for a big year from the production standpoint in 1919 are very favorable.

The largest single order remaining is, of course, that of 100,000 cars for the United States Railroad Administration. As of November 1, only 2,742 of these cars had been deliv-

A Resumé of the Freight Car Orders on Hand on November 1.

	Total on order November 1	U. S. military roads	Allied and neutral	Private lines and corporations	Army and navy	Railroad Administration	Total foreign	Total domestic
American Car & Foundry Co	66,465	17,684	14,236	2,928	617	31,000	31,920	34,545
Bettendorf Co.	4,034	1,000	.....	.....	34	3,000	1,000	3,034
Cambria Steel Co	7,036	1,120	.....	2,916	.....	3,000	1,120	5,916
Chicago Steel Car Co	256	.....	.....	256	.....	.....	.....	256
General American Tank Car Co	4,386	1,425	.....	2,706	255	.....	1,425	2,961
Haskell & Barker Car Co	18,450	10,450	.....	.....	.....	8,000	10,450	8,000
Keith Car & Manufacturing Co	6,000	1,150	3,000	350	.....	1,500	4,150	1,850
Keith Railway Equipment Co	500	500	.....	.....	.....	.....	500	.....
Kilbourne & Jacobs Manufacturing Co	280	280	.....	.....	.....	.....	280	.....
Koppel Industrial Car Co	800	800	.....	.....	.....	.....	800	.....
Laconia Car Co	1,150	.....	.....	150	.....	1,000	.....	1,150
Lakewood Engineering Co	387	387	.....	.....	.....	.....	387	.....
Lenoir Car Co	3,000	.....	.....	1,000	.....	2,000	.....	3,000
Liberty Car & Equipment Co	3,150	2,150	.....	.....	.....	1,000	2,150	1,000
McGuire-Cummings Manufacturing Co	500	.....	.....	.....	.....	500	.....	500
Magor Car Co	2,808	749	1,035	20	4	1,000	1,784	1,024
Mt. Vernon Car Manufacturing Co	7,209	1,200	500	1,509	.....	4,000	1,700	5,509
Pacific Car & Foundry Co	2,390	.....	.....	388	2	2,000	.....	2,390
Pacific Tank Car Co	949	660	.....	289	.....	.....	660	289
Pressed Steel Car Co	25,860	10,875	220	761	4	14,000	11,095	14,765
Pullman Co.	19,909	7,709	3,200	1,000	.....	8,000	10,909	9,000
Ralston Steel Car Co	5,400	1,400	.....	.....	.....	4,000	1,400	4,000
St. Louis Car Co	2,750	1,750	.....	.....	.....	1,000	1,750	1,000
Standard Car Const. Co	2,923	2,100	.....	823	.....	.....	2,100	823
Standard Steel Car Co	48,094	21,745	9,134	2,128	.....	15,000	30,879	17,215
Western Wheeled Scraper Co	928	700	.....	228	.....	.....	700	228
Total cars on order November 1	235,614	85,834	31,325	17,539	916	100,000	117,159	118,455
On November 1 there had been shipped on these orders	20,400	2,575	6,368	8,463	252	2,742	8,943	11,457
Leaving to be shipped	215,214	83,259	24,957	9,076	664	97,258	108,216	106,998

ered, a figure which had been brought up on December 21 to 11,815. The table headed Standard Car Deliveries to December 21, 1918, will show to what railroads these cars have gone.

Freight Car Production in 1918

The number of freight cars built in 1918, as shown in one of the tables, totaled 124,708, of which 81,767 were on domestic orders and 42,941 for the United States Military Railroads, or for other foreign service. The total production for 1918 was less than in 1917, when 151,401 cars were produced, of which 119,363 were for domestic and 32,038 were for foreign service. It is not necessary to discuss the domestic total in detail here, because that is taken up in an article elsewhere in this issue entitled the "Motive Power and Rolling Stock Situation." It is necessary to observe, however, that whereas the total production of cars for domestic service makes 1918 one of the low years in the period from 1899 to date, the production of cars for foreign service is by far the largest yet reported. These cars that we are building for overseas service, like the locomotives, represent one of America's achievements in the war. It is the hope of every American supply man that we can continue to keep up that total now that the war is over, and thereby secure the fair share of foreign trade in freight cars that is due America's plants in that industry.

The production of passenger cars in 1918 was very low, the total of 1,573 being the lowest since 1901.

The lists of orders which follow are compiled from official sources. A reference to the way in which the data is obtained will be found at the end of the preceding article on locomotive orders in 1918.

Ordered by the United States Railroad Administration

Purchaser	No.	Class	Capacity	Construction	Weight	Draft Gear	Builder	Plant
United States Railroad Administration....	1,000	D. s. box	80,000	St. und'frame	44,000	Westinghouse	Am. Car & Fdy.	Berwick, Pa.
	5,000	D. s. box	80,000	St. und'frame	44,000	.....	Am. Car & Fdy.	St. Louis, Mo.
	3,000	D. s. box	80,000	St. und'frame	44,000	Cardwell	Am. Car & Fdy.	Chicago
	2,000	D. s. box	80,000	St. und'frame	44,000	Sessions	Am. Car. & Fdy.	Memphis, Tenn.
	2,000	D. s. box	80,000	St. und'frame	44,000	.....	Standard Steel	Hammond, Ind.
	4,000	D. s. box	80,000	St. und'frame	44,000	Sessions	Mt. Vernon	Mt. Vernon, Ill.
	1,000	D. s. box	80,000	St. und'frame	44,000	Sessions	Pac. Car & Fdy.	Seattle, Wash.
	1,000	D. s. box	80,000	St. und'frame	44,000	Sessions	Pac. Car & Fdy.	Portland, Ore.
	1,000	D. s. box	80,000	St. und'frame	44,000	Cardwell	Liberty Car Eq.	Hammond, Ind.
	1,500	D. s. box	80,000	St. und'frame	44,000	Westinghouse	Keith Car	Sagamore, Mass.
	1,000	D. s. box	80,000	St. und'frame	44,000	Westinghouse	Laconia	Laconia, N. H.
	2,000	D. s. box	80,000	St. und'frame	44,000	Sessions	Lenoir	Lenoir City, Tenn.
	500	D. s. box	80,000	St. und'frame	44,000	Westinghouse	McGuire-Cummings	Paris, Ill.
	5,500	S. s. box	100,000	Steel frame	44,000	Sessions	Am. Car & Fdy.	Madison, Ill.
	3,500	S. s. box	100,000	Steel frame	44,000	Westinghouse	Am. Car & Fdy.	Berwick, Pa.
	6,000	S. s. box	100,000	Steel frame	44,000	.....	Pullman	Pullman, Ill.
	6,000	S. s. box	100,000	Steel frame	44,000	Cardwell	Haskell & Barker	Michigan City, Ind.
	1,000	S. s. box	100,000	Steel frame	44,000	Sessions	St. Louis	St. Louis, Mo.
	3,000	S. s. box	100,000	Steel frame	44,000	Cardwell	Bettendorf	Bettendorf, Ia.
	3,000	Gondola	100,000	Composite	44,000	.....	Am. Car & Fdy.	St. Louis, Mo.
	1,000	Gondola	100,000	Composite	44,000	Sessions	Am. Car & Fdy.	St. Charles, Mo.
	1,000	Gondola	100,000	Composite	44,000	Sessions	Am. Car & Fdy.	Terre Haute, Ind.
	6,500	Gondola	100,000	Composite	44,000	Cardwell	Murray Pr. Steel	Hegewisch, Ill.
	5,500	Gondola	100,000	Composite	44,000	.....	Stand. Steel	Hammond, Ind.
	2,000	Gondola	100,000	Composite	44,000	Cardwell	Haskell & Barker	Michigan City, Ind.
	1,000	Gondola	100,000	Composite	44,000	Sessions	Magor Car	Passaic, N. J.
	3,500	Hopper	110,000	Steel	40,840	Westinghouse	Am. Car & Fdy.	Berwick, Pa.
	2,500	Hopper	110,000	Steel	40,840	Sessions	Am. Car & Fdy.	Huntington, W. Va.
	5,000	Hopper	110,000	Steel	40,840	Sessions	Pressed Steel	McKees Rocks, Pa.
	5,000	Hopper	110,000	Steel	40,840	Sessions	Stand. Steel	Butler, Pa.
	3,000	Hopper	110,000	Steel	40,840	Westinghouse	Cambria	Johnstown, Pa.
	2,000	Hopper	110,000	Steel	40,840	.....	Pullman	Pullman, Ill.
	4,000	Hopper	110,000	Steel	40,840	Sessions	Ralston	Columbus, Ohio.
	2,500	L. s. gondola	140,000	Steel	49,500	Sessions	Pressed Steel	Allegheny, Pa.
	2,500	L. s. gondola	140,000	Steel	49,500	Sessions	Stand. Steel	Butler, Pa.

United States Military Railroads

French Standard Gauge

United States Military Railways.....	No.	Class	Capacity	Construction	Weight	Draft Gear	Trucks	Roofs	Builder
	650	Box	66,000	Composite	34,000	French Standard	Arch Bar	Canvas Cov'd	Liberty
	350	Box	66,000	Composite	34,000	French Standard	Arch Bar	Canvas Cov'd	St. Louis
	2,609	Box	66,000	Composite	34,000	French Standard	Arch Bar	Canvas Cov'd	Am. Car & Fdy.
	250	Box	66,000	Composite	34,000	French Standard	Arch Bar	Canvas Cov'd	Mt. Vernon
	1,500	Box	66,000	Composite	34,000	French Standard	Arch Bar	Canvas Cov'd	Pressed Steel
	210	Box	66,000	Composite	34,000	French Standard	Arch Bar	Canvas Cov'd	Standard Steel
	2,000	Box	66,000	Composite	34,000	French Standard	Arch Bar	Canvas Cov'd	Pullman
	400	Tank	66,000	Steel	35,300	French Standard	Arch Bar	None	Standard Car Cons.
	400	Tank	66,000	Steel	35,300	French Standard	Arch Bar	None	Gen. American
	1,500	Flat	66,000	Composite	26,500	French Standard	Arch Bar	None	Haskell & Barker
	1,000	Flat	66,000	Composite	26,500	French Standard	Arch Bar	None	Standard Steel
	6	Flat	200,000	Composite	.....	French Standard	Arch Bar	None	Standard Steel
	700	Flat	66,000	Composite	26,500	French Standard	Arch Bar	None	Pullman
	300	Flat	66,000	Composite	26,500	French Standard	Arch Bar	None	Standard Car Cons.
	750	Refrigerator	66,000	Composite	47,200	French Standard	Arch Bar	Canvas Cov'd	Haskell & Barker
	500	L. S. Gonds.	66,000	Composite	28,900	French Standard	Arch Bar	None	Cambria
	1,500	L. S. Gonds.	66,000	Composite	28,900	French Standard	Arch Bar	None	Haskell & Barker
	1,929	L. S. Gonds.	66,000	Composite	28,900	French Standard	Arch Bar	None	Amer. Car & Fdy.
	1,000	L. S. Gonds	66,000	Composite	28,900	French Standard	Arch Bar	None	Pressed Steel
	400	L. S. Gonds.	66,000	Composite	28,900	French Standard	Arch Bar	None	Standard Steel
	700	L. S. Gonds.	66,000	Composite	28,900	French Standard	Arch Bar	None	Liberty
	600	L. S. Gonds	66,000	Composite	28,900	French Standard	Arch Bar	None	St. Louis
	500	L. S. Gonds	66,000	Composite	28,900	French Standard	Arch Bar	None	Gen. American
	6,750	H. S. Gonds.	66,000	Composite	32,800	French Standard	Arch Bar	None	Standard Std.
	4,400	H. S. Gonds.	66,000	Composite	32,800	French Standard	Arch Bar	None	Amer. Car & Fdy.
	1,500	H. S. Gonds.	66,000	Composite	32,800	French Standard	Arch Bar	None	Haskell & Barker
	2,300	H. S. Gonds.	66,000	Composite	32,800	French Standard	Arch Bar	None	Pressed Steel
	500	H. S. Gonds.	66,000	Composite	32,800	French Standard	Arch Bar	None	Pullman
	557	Ballast	66,000	Composite	32,600	French Standard	Arch Bar	None	Amer. Car & Fdy.
	100	Dump	12 yd.	Composite	31,300	French Standard	Arch Bar	None	West. Wh. Sc.
	100	Dump	12 yd.	Composite	33,000	M. C. B.	Arch Bar	None	West. Wh. Sc.
	100	Dump	16 yd.	Composite	38,000	M. C. B.	Arch Bar	None	West. Wh. Sc.
	250	Dump	20 yd.	Composite	52,000	French Standard	Arch Bar	None	West. Wh. Sc.
	*4	Motor	.....	.....	.....	None	None	None	Fair., Morse
	*112	Push	.....	Wood	.....	None	None	None	Buda Co.

60 C/M Gauge

100	L. S. Gonds	22,000	Composite	9,500	Special	Arch Bar	None	Magor
64	V-Dump	1½ yd.	Steel	1,800	Special	None	None	Kilbourne & Jacobs
100	Side Dump	1½ yd.	Steel	1,800	Special	None	None	West. Wh. Sc.

36-inch Gauge

400	Logging	.....	Composite	18,000	¾ size M. C. B.	Arch Bar	None	Gregg

*Not included in totals.

Other Orders from Railways

	No.	Class	Capacity	Construction	Builder
Atchison, Topeka & Santa Fe	50	Ore	100,000	St. un.	Am. Car & Fdy.
Aliquippa & Southern Ry.	25	Hop.	110,000	Steel	Pressed Steel
Birmingham Southern Ry.	20	Flat	140,000	Steel	Pressed Steel
*Chicago & North Western	50	Cab. un	.....	.....	Bettendorf
Chicago, Milwaukee & St. Paul†	1,000	.....	.....	.....	Co. shops
*Chicago, St. Paul, Minneapolis & Omaha	10	Cab. un	.....	.....	Bettendorf
Colorado & Wyoming	100	G.S.bod.	100,000	Steel	Pressed Steel
*Illinois Central	50	Cab. un	.....	.....	Bettendorf
Monongahela Conn., R. R.	25	Hop. bod	110,000	Steel	Pressed Steel
Monongahela Valley Tract. Co.	4	Ballast	60,000	Steel	Am. Car & Fdy.
	2	Tank	8,050g	Steel	Pa. Tank Car
Norfolk & Western	1	Dyn.	.....	.....	Burr Co.
*Union Pacific	50	Cab. un	.....	.....	Bettendorf

†Order totals 5,000, of which only 1,000 were on the 1918 program.

From Private Car Lines and Industrials

	No.	Class	Capacity	Construction	Builder
Air Nitrates Company	3	Gon.	100,000	Steel	Pressed Steel
Aetna Ref Co.	50	Tank	.....	.....	Gen. American
Allegheny Steel Co.	5	Gon.	140,000	Steel	Pressed Steel
	4	Hop.	110,000	Steel	Pressed Steel
Aluminum Co. of Am.	20	Hop.	140,000	Steel	Pressed Steel
American Ammonia Co.	1	Tank	8,050g	Steel	Pa. Tank Car
American Cyanide Co.	20	Hop.	.....	.....	Chic. St. Car
American Linseed Co.	20	Tank	10,050g	Steel	Pa. Tank Car
American Ry. Equip. Co.	6	Tank	8,050g	Steel	Pa. Tank Car
	21	Hop.	110,000	Steel	Pressed Steel
Am. Smelting Sec. Co.	4	Tank	.....	.....	Gen. American
Am. Sheet & Tin Plate Co.	20	Tank	10,050g	Steel	Pa. Tank Car
Am. Steel & Wire Co.	100	Gon.	100,000	Steel	Pressed Steel
	10	Tank	8,050g	Steel	Pa. Tank Car
American Car Co.	4	Tank	10,050g	Steel	Pa. Tank Car
Anaconda Copper Min. Co.	3	Hop.	120,000	Steel	Mt. Vernon
Armour Car Lines	75	Tank	.....	.....	Chic. St. Car
Aspromet Company	6	Tank	8,050g	Steel	Pa. Tank Car
Balfour Williamson & Co.	4	Tank	8,050g	Steel	Pa. Tank Car
Bethlehem Steel Co.	30	Quarry	.....	.....	Magor
Biery Oil Company	13	Tank	8,050g	Steel	Pa. Tank Car
Bigheart Ref. Co.	40	Tank	8,050g	Steel	Pa. Tank Car
	20	Tank	10,050g	Steel	Pa. Tank Car
Bleyler Tank Line	10	Tank	8,050g	Steel	Pa. Tank Car
Bodenheimer Molasses Co.	5	Tank	.....	.....	Chic. St. Car
Brier Hill Steel Co.	40	Hop.	140,000	Steel	Pressed Steel
	10	Gon.	140,000	Steel	Pressed Steel
	25	G. S.	.....	.....	Clark Car
Bunker Hill & Sullivan Mining & Con. Co.	6	Hop.	110,000	Steel	Pressed Steel
Butterworth, Judson Co.	75	Tank	7,250g	Steel	Cambria
Caddo Oil Refining Co.	15	Tank	8,050g	Steel	Pa. Tank Car
	15	Tank	8,050g	Steel	Pa. Tank Car
Calumet & Ariz. Mining Co.	3	Tank	.....	.....	Gen. American
Cambria Steel Co.	1	Tank	10,200g	Steel	Cambria
	2	Tank	10,200g	Steel	Cambria
	5	Hop.	.....	.....	Cambria
	47	I-bm. gon. bod.		.....	Cambria
Canadian Equipment Co.	50	Auto. dp	16 yd	.....	West. Wh. Sc.
Carnegie Steel Co.	12	Gon.	.....	.....	Chic. St. Car
	35	Tank	10,050g	Steel	Pa. Tank Car
Certain-teed Products Co.	5	Tank	8,050g	Steel	Pa. Tank Car
Champlin Refining Co.	10	Tank	8,050g	Steel	Pa. Tank Car
Clark Car Co.	500	Ext. side dump		.....	Cambria
	250	Ext. side dump		.....	Cambria
Clinton Iron & Steel Co.	6	Gon.	110,000	Steel	Pressed Steel
Columbia Naval Stores Co.	3	Tank	8,050g	Steel	Pa. Tank Car
	3	Tank	8,050g	Steel	Pa. Tank Car
Condon & Bolen	17	Hd. dp	12 yd.	.....	West. Wh. Sc.
Consumers Ref. Co.	75	Tank	.....	.....	Gen. American
Crucible Steel Co.	4	Tank	10,050g	Steel	Pa. Tank Car
	8	Hop.	110,000	Steel	Pressed Steel
Detroit Iron & Steel Co.	7	Gon.	100,000	Steel	Pressed Steel
Discovery Bay Logging Co.	1	Flat	.....	.....	Pac. Car & Fdy.
Doherty, Henry L., & Co.	200	Tank	8,050g	Steel	Pa. Tank Car
Dunbar Moy. & Sugar Co.	10	Tank	.....	.....	Gen. American
Du Pont, E. I., de Nemours & Co.	1,864	Solv. Rec.	....	Wood	Am. Car & Fdy.
	205	Gun Cot.	....	Wood	Am. Car & Fdy.
DuPont, E. I., de Nemours & Co.	1,000	Solv. Rec.	....	Wood	Am. Car & Fdy.
DuPont Eng. Co., Agent	35	Flat	100,000	Wood	Am. Car & Fdy.
	16	Box	.....	Wood	Am. Car & Fdy.
	44	Shell	.....	Wood	Am. Car & Fdy.
	30	N. g. box	30,000	St. un.	Am. Car & Fdy.
	60	Flat	.....	St. un.	Am. Car & Fdy.
	4	Box	.....	St. un.	Am. Car & Fdy.
	1	Flat	.....	St. un.	Am. Car & Fdy.
	20	Flat	30,000	St. un.	Am. Car & Fdy.
DuPont Eng. Co.	6	N. g. flat	....	Wood	Am. Car & Fdy.
	10	Shell	.....	Wood	Am. Car & Fdy.
Eagle Gasoline Co.	10	Tank	.....	.....	Gen. American
Eastern Refining Co.	10	Tank	8,050g	Steel	Pa. Tank Car
Emlenton Refining Co.	5	Tank	8,050g	Steel	Pa. Tank Car
	5	Tank	8,050g	Steel	Pa. Tank Car
Ensign Oil Company	2	Tank	8,050g	Steel	Pa. Tank Car
Evans, Thwing Ref. Co.	50	Tank	80,000	Steel	Am. Car & Fdy.
Federal Oil & Supply Co.	1	Tank	8,050g	Steel	Pa. Tank Car
Foco Oil Company	10	Tank	8,050g	Steel	Pa. Tank Car
Follansbee Bros.	1	Hop.	110,000	Steel	Pressed Steel
Foundation Co.	25	N. g. box	....	Wood	Am. Car & Fdy.
	6	N. g. flat	....	Wood	Am. Car & Fdy.
	24	Box	.....	Wood	Am. Car & Fdy.
	4	Flat	.....	Wood	Am. Car & Fdy.
	23	N. g. box	....	Wood	Am. Car & Fdy.
	6	N. g. flat	....	Wood	Am. Car & Fdy.
	22	Box	.....	Wood	Am. Car & Fdy.

*Orders marked with an asterisk are not included in the totals.

	No.	Class	Capacity	Construction	Builder
	5	Flat	.....	Wood	Am. Car & Fdy.
Franklin Baker Co.	2	Tank	8,050	Steel	Pa. Tank Car
Galena Signal Oil Co.	1	Tank	8,050g	Steel	Pa. Tank Car
Gen. Am. Tank Line	555	Tank	.....	.....	Gen. American
General Electric Co.	3	Gon.	100,000	Steel	Pressed Steel
General Equip. Co.	15	Tank	10,000g	Steel	Pressed Steel
Gen. Petroleum Corp.	30	Tank	10,050g	Steel	Pa. Tank Car
Golden Rule Ref. Co.	10	Tank	8,050g	.....	Std. Car Cons.
Great American Ref. Co.	50	Tank	.....	.....	Gen American
Great Northern Ref. Co.	10	Tank	.....	.....	Gen. American
Gulf Refining Co.	50	Tank	8,050g	.....	Std. Car Cons.
Gulf Sulphur Co.	40	Tank	10,000g	Steel	Standard Steel
Hammond Lbr. Co.	2	Ballast	.....	.....	Pac. Car & Fdy.
Hanaghan & Hanlon	10	Tank	.....	.....	Gen. American
Hanna M. A., Company.	7	Gon.	100,000	Steel	Pressed Steel
	2	Hop.	100,00	Steel	Pressed Steel
Heaslip Mol. & Sugar Co.	10	Tank	.....	.....	Chic. St. Car
	10	Tank	8,050	Steel	Pa. Tank Car
	10	Tank	8,050	Steel	Pa. Tank Car
Hillman Oil & Gas Co.	20	Tank	8,050g	.....	Std. Car Cons.
Hoffman Oil & Ref. Co.	2	Tank	10,050	.....	Std. Car Cons.
Home Petroleum Co.	25	Tank	8,050g	Steel	Pa. Tank Car
Humble Oil Co.	30	Tank	12,000g	Steel	Pressed Steel
Illinois Oil Company	10	Tank	8,050g	Steel	Pa. Tank Car
Illinois Zinc Co.	10	Hop.	100,000	Steel	Am. Car & Fdy.
Imperial Oil Co.	100	Tank	.....	.....	Gen. American
Imperial Oil Co.	2	Tank	.....	.....	Gen. American
Indiahoma Ref. Co.	35	Tank	.....	.....	Chic. St. Car
	20	Tank	.....	.....	Chic. St. Car
	200	Tank	.....	.....	Gen. American
Ingersoll-Rand Co.	2	Hop.	110,000	Steel	Pressed Steel
Inland Steel Co.	30	Gon.	.....	.....	Chic. St. Car
	16	Hop.	.....	.....	Chic. St. Car
Inter. Coal Products	1	Tank	10,050g	Steel	Pa. Tank Car
Inter-Ocean Ref. Co.	12	Tank	8,050g	Steel	Pa. Tank Car
	13	Tank	10,050g	Steel	Pa. Tank Car
Johnson Oil Ref. Co.	10	Tank	.....	.....	Chic. St. Car
Jones, Fred R.	30	H'd dump	12 yd	.....	West. Wh. Sc.
Kanotex Refining Co.	50	Tank	80,000	Steel	Am. Car & Fdy.
LaBelle Iron Works	15	Hop.	110,000	Steel	Pressed Steel
	20	Gon.	140,000	Steel	Pressed Steel
	5	Tank	10,050g	Steel	Pa. Tank Car
Liberty Oil Co., Ltd.	10	Tank	10,050g	Steel	Pa. Tank Car
Liberty Oil Co.	10	Tank	8,050g	Steel	Pa. Tank Car
Liberty Ref. & Oil Prod.	50	Tank	8,050g	.....	Std. Car Cons.
Lone Star Ref. Co.	15	Tank	.....	.....	Gen. American
	10	Tank	8,050g	Steel	Pa. Tank Car
	10	Tank	8,050g	Steel	Pa. Tank Car
Louisiana Oil Ref. Corp.	20	Tank	10,050g	Steel	Pa. Tank Car
	70	Tank	8,050g	Steel	Pa. Tank Car
Lyon Lumber Company.	25	Log.	60,000	St. un.	Bettendorf
Manhattan Oil Co.	20	Tank	.....	.....	Gen. American
Marland Ref. Co.	200	Tank	.....	.....	Gen. American
Metal & Thermit Corp.	4	Tank	.....	.....	Chic. St. Car
Mexican Petroleum Corp.	50	Tank	100,000	Steel	Am. Car & Fdy.
Midvale Steel & Ord. Co.	6	Gon.	.....	.....	Cambria
Milton Mfg. Co.	6	Tank	100,000	Steel	Am. Car & Fdy.
Minn. General Elec. Co.	1	Air dump	30 yd	.....	West. Wh. Sc.
Musher & Co.	6	Tank	8,050g	Steel	Pa. Tank Car
Mutual Ref. & Prod. Co.	50	Tank	.....	.....	Gen. American
National Carbon Co.	5	Tank	8,050g	Steel	Pa. Tank Car
National Tube Company.	263	Gon.	140,000	Steel	Pressed Steel
	120	Hop.	140,000	Steel	Pressed Steel
	50	Coke	140,000	Steel	Pressed Steel
	27	Flat	140,000	Steel	Pressed Steel
	10	Skelp	200,000	Steel	Pressed Steel
New Jersey Zinc Co.	10	Gon.	140,000	Steel	Pressed Steel
N. Y. Shipbuilding Corp.	10	Flat	100,000	Steel	Am. Car & Fdy.
No. Am. Oil & Ref. Co.	100	Tank	.....	.....	Gen. American
North American Ref. Co	50	Tank	.....	.....	Chic. St. Car
	50	Tank	.....	.....	Chic. St. Car
	50	Tank	.....	.....	Gen. American
Ohio Valley Refining Co.	50	Tank	8,050g	Steel	Pa. Tank Car
Okla Petroleum & Gas Co.	100	Tank	.....	.....	Gen. American
Okmulgee Prod. & Ref. Co.	50	Tank	8,050g	.....	Std. Car Cons.
Oliver Iron Mining Co.	100	Dump	.....	.....	Magor
Oliver Mining Co.	70	Air dump	20 yd	.....	West. Wh. Sc.
Ozark Ref. Co.	5	Tank	8,050g	.....	Std. Car Cons.
	5	Tank	10,050g	.....	Std. Car Cons.
Ozarks Co.	1	Box	100,000	St. un.	Am. Car & Fdy.
Pacific Coast Steel Co.	75	Charging	....	.....	Pac. Car & Fdy.
Panhandle Ref. Co.	25	Tank	8,050g	.....	Std. Car Cons.
Paragon Refining Co.	20	Tank	12,000g	Steel	Pressed Steel
Pease, F. M.	100	Tank	10,200g	Steel	Cambria
	100	Tank	10,200g	Steel	Cambria
	300	Tank	10,200g	Steel	Cambria
Penn. Am. Ref. Co.	8	Tank	8,050g	Steel	Pa. Tank Car
Pennsylvania Tank Line.	17	Tank	8,050g	Steel	Pa. Tank Car
	2	Tank	10,050g	Steel	Pa. Tank Car
	4	Tank	8,050g	Steel	Pa. Tank Car
	1	Tank	8,050g	Steel	Pa. Tank Car
	1	Tank	8,050g	Steel	Pa. Tank Car
Phelps, Dodge & Co.	50	Ore	100,000	.....	Pressed Steel
Phoenix Cotton Oil Co.	5	Tank	8,050g	Steel	Pa. Tank Car
Pierce Oil Corp.	50	Tank	.....	.....	Gen. American
	100	Tank	.....	.....	Gen. American
Pine Pool Gasoline Co.	40	Tank	.....	.....	Gen. American
Price, F. V. B.	5	Tank	10,000g	Steel	Am. Car & Fdy.
Publiker Ward Distilling Co.	1	Tank	8,050g	Steel	Pa. Tank Car
Red River Refining Co.	10	Tank	10,050g	Steel	Pa. Tank Car
	15	Tank	10,050g	Steel	Pa. Tank Car
Remington Arms Co.	2	Hop.	110,000	Steel	Pressed Steel
Republic Iron & Steel Co.	50	Gon.	140,000	Steel	Pressed Steel
River Terminal Co.	20	Tank	8,050g	Steel	Pa. Tank Car
Semet-Solvay Co.	95	Coke	100,000	Steel	Pressed Steel
Shippers Car Line	200	Tank	8,050g	.....	Std. Car Cons.
Sinclair Ref. Co.	500	Tank	.....	.....	Gen. American
Skinner & Eddy	150	Gon.	.....	.....	Magor
Sloan & Zook	35	Tank	.....	.....	Gen. American
Smith, Levi, Inc.	1	Tank	8,050g	Steel	Pa. Tank Car
	3	Tank	8,050g	Steel	Pa. Tank Car
Southern Oil Corp.	25	Tank	10,050g	Steel	Pa. Tank Car
Spanish Am. Iron Co.	100	Ore	140,000	.....	Am. Car & Fdy.
Staley, A. E., Mfg. Co.	6	Tank	8,050g	Steel	Pa. Tank Car
Standard Car Equip. Co.	200	Tank	8,050g	.....	Std. Car Cons.

Purchaser	No.	Class	Capacity	Construction	Builder
Standard Car Equip. Co..	100	Tank	10,050g	.....	Std. Car Cons.
	5	Tank	8,050g	.....	Std. Car Cons.
	11	Tank	10,050g	.....	Std. Car Cons.
Sterling Ref. Co.....	10	Tank	.....	.....	Gen. American
Sugar Products Co.....	10	Tank	8,050g	.....	Std. Car Cons.
Sunshine State Oil & Ref. Co.	20	Tank	8,050g	.....	Std. Car Cons.
	15	Tank	8,050g	.....	Std. Car Cons.
	15	Tank	10,050g	.....	Std. Car Cons.
*Swift & Co.....	300	....	.....	Beef un.	Bettendorf
*Swift & Co.....	100	Tank	8,050g	Steel	Pa. Tank Car
Tennessee Coal & Iron.	15	Tank	10,050g	Steel	Pa. Tank Car
	10	Tank	10,050g	.....	Std. Car Cons.
Texas Co.	75	Tank	.....	.....	Gen. American
Thompson-Starrett Co....	400	Gun cot.	.....	.....	Kil. & Jac.
Titusville Oil Works....	10	Tank	8,050g	Steel	Pa. Tank Car
Trumbull Steel Co.....	20	Gon.	100,000	Steel	Pressed Steel
Union Rolling Mill Co..	1	Gon.	140,000	Steel	Pressed Steel
	1	Hop.	110,000	Steel	Pressed Steel
United Oil Mfg. Co.....	1	Tank	8,050g	Steel	Pa. Tank Car
United Gas Imp. Co....	3	Tank	10,050g	Steel	Pa. Tank Car
U. S. Industrial Alcohol Co.	50	Tank	8,050g	Steel	Pa. Tank Car
	50	Tank	8,050g	Steel	Pa. Tank Car
United Verde Copper Co.	8	Auto.dmp	20yd	.....	West. Wh. Sc.
Vancouver Equip. Co....	8	Hop.	.....	.....	Pac. Car & Fdy.
	2	Flat	.....	.....	Pac. Car & Fdy.
Warren Oil Co.....	100	Tank	.....	.....	Gen. American
	30	Tank	8,050g	Steel	Pa. Tank Car
Western Paper Makers Co.	1	Tank	.....	.....	Chic. St. Car
Westinghouse Elec. & Mfg. Co.	10	Hop.	110,000	Steel	Pressed Steel
West Penn. Steel Co....	2	Gon.	140,000	Steel	Pressed Steel
	10	Hop.	110,000	Steel	Pressed Steel
Wheatcroft, J. H.....	50	Tank	.....	.....	Gen. American
Whitaker, Glessner Co..		Hop.	110,000	Steel	Pressed Steel
	4	Gon.	100,000	Steel	Pressed Steel
White Eagle Pet. Co....	30	Tank	80,000	Steel	Am. Car & Fdy.
Wichita Valley Ref. Co..	5	Tank	10,050g	Steel	Pa. Tank Car
	10	Tank	8,050g	.....	Std. Car Cons.
Wright Prod. & Ref. Co.	20	Tank	.....	.....	Gen. American
Youngstown Sheet & Tube Co.	10	Tank	10,050g	.....	Std. Car Cons.

Canadian Railways

Purchaser	No.	Class	Capacity	Construction	Builder
Canadian Gov't. Rys....	5,000	Box	80,000	St. fr.	Can. Car & Fdy.
	1,000	Box	80,000	St. fr.	National
	650	Gon.	100,000	Comp.	Eastern Car
	750	Flat	80,000	Comp.	Eastern Car
	250	Side dp.	80,000	Wood	Hart-Otis
	200	S.&d.dp.	80,000	Wood	Hart-Otis
	50	Tank	8,000g	Steel	Pressed Steel
	250	Refrig.	.....	.....	Can. Car & Fdy.
	15	Tank	8,050g	Steel	Pa. Tank Car
Canadian Pacific.....	1,300	Box	80,000	St. und'frame	Angus shops
	106	Refrig.	60,000	St. und'frame	Angus shops
	18	Vans	....	Wood	Winnipeg shops
	2	Snplws.	....	Wood	Winnipeg shops
	1	Snplw.	....	Wood	Angus shops
	65	Ore	100,000	Steel	Angus shops

Other United States Government Orders

Purchaser	No.	Class	Capacity	Construction	Builder
U. S. Gov't.....	1	Gasoline motor car, hydrogen generating unit		Steel	McKeen
U. S. Gov't, Ord Dept..	75	Tank	.....	.....	Gen. American
	150	Tank	.....	.....	Gen. American
	150	Ammun.	60,000	St. un.	Am. Car & Fdy.
	10	Tank	60,000	Steel	Am. Car & Fdy.
	12	Gun car.	.....	Steel	Am. Car & Fdy.
	65	Gun car.	.....	Steel	Am. Car & Fdy.
	2	Flat	.....	.....	Pac. Car & Fdy.
	36	Shuttle	.....	.....	Pullman
	73	Mortar	.....	.....	Pullman
U. S. Navy	2	Box	60,000	.....	Am. Car & Fdy.
	2	Flat	80,000	.....	Am. Car & Fdy.
	30	Flat	100,000	.....	Am. Car & Fdy.
	2	Flat	.....	.....	Chic. St. Car
	6	Flat	.....	.....	Chic. St. Car
	18	Flat	.....	.....	Chic. St. Car
	4	Box	.....	.....	Magor
	4	Flat	100,000	Steel	Pressed Steel
	30	Air dump	16 yd.	.....	West. Wh. Sc.
	12	Air dump	12 yd.	.....	West. Wh. Sc.
	6	Flat	.....	.....	Chic. St. Car
	6	Flat	.....	.....	Chic. St. Car
	10	Air dump	16 yd.	.....	West. Wh. Sc.
	2	Box	60,000	St. un.	Bettendorf
	30	Flat	100,000	St. un.	Bettendorf
	2	Flat	80,000	St. un.	Bettendorf

Orders from Other Countries

Purchaser	No.	Class	Capacity	Construction	Builder
Altro Cedro Northern..	20	Cane	60,000	St. un.	Am. Car & Fdy.
Arbel, Pierre (France)..	50	Gon.	80,000	Comp.	Pressed Steel
Am. Metals Co. (Mexico.	15	Hop.	110,000	Steel	Pressed Steel
	15	Tank	12,000g	Steel	Pressed Steel
Baragus Sug. Co. (Cuba)	50	Cane	60,000	Steel	Pressed Steel
Brazil Rys. Co.....	300	Box (Iron Work)	.....	.....	Am. Car & Fdy.
Brazil Rys. Co.....	200	Stock (Iron Work)	.....	.....	Am. Car & Fdy.
British Government.....	2,050	Box (Iron Work) ..	40,000	.....	Am. Car & Fdy.
	1,200	Box (Iron Work)	40,000	.....	Am. Car & Fdy.
Bush & Daniels.....	12	Box	44,000	St. un.	Am. Car & Fdy.
Caragol, Manuel	6	Cane	60,000	St. un.	Am. Car & Fdy.
Central Cespedes (Cuba)	20	Cane	.....	.....	Magor
Central Cunagua.....	110	Cane	60,000	St. un.	Am. Car & Fdy.
	1	Tank	60,000	Steel	Am. Car & Fdy.
Cent. Lutgarda (Cuba)..	25	Cane	.....	.....	Magor
Cent. Macagua (Cuba)..	15	Cane	.....	.....	Magor
Central Patria	1	Cane	60,000	St. un.	Am. Car & Fdy.
Cent. Portagulete (Cuba)	10	Cane	.....	.....	Magor
Central San Augustin (Cuba)	25	Cane	.....	.....	Magor
Chandler & Co.....	2	Box	44,000	Wood	Am. Car & Fdy.
	6	Flat	44,000	Wood	Am. Car & Fdy.
Colombian Northern	6	Box	30,000	St. un.	Am. Car & Fdy.
Cuba Northern	50	Box	60,000	St. un.	Am. Car & Fdy.
	200	Box	60,000	St. un.	Am. Car & Fdy.
Cuba Northern	10	Tank	6,000g	Steel	Am. Car & Fdy.
	4	Tank	100,000	Steel	Am. Car & Fdy.
Cuban Am. Sugar Co....	80	Cane	.....	.....	Magor
Egyptian State Rys....	30	Tank	.....	.....	Gen. American
Frazar & Co.....	300	Flat bod. (Iron Work)	60,000	.....	Am. Car & Fdy.
	200	Box bod. (Iron Work)	60,000	.....	Am. Car & Fdy.
	500	Sets trucks	60,000	.....	Am. Car & Fdy.
Guantanamo & Western..	25	Box	80,000	St. un.	Am. Car & Fdy.
Guantanamo & Western..	17	Cane	60,000	Steel	Am. Car & Fdy.
Haganaers, Lionel	100	Dump	.....	.....	Magor
Haytian Am. Sugar Co..	200	Cane	.....	.....	Magor
Italian State Railways..	5,000	Gon. (Cabs & brks)	40,000	St. un.	Am. Car & Fdy.
	5,000	Gon. (Without cabs)	40,000	St. un.	Am. Car & Fdy.
Lindo, August A., (Jamaica)	50	Cane	.....	.....	Magor
Rhodesian Railways.....	150	Gon.	66,000	Steel	Pressed Steel
South Porto Rico Sugar Co.	60	Cane	60,000	St. un.	Am. Car & Fdy.
Stork & Co., Chas. F....	150	Box (Iron Work)	.....	.....	Am. Car & Fdy.
	15	Gon. (Iron Work)	.....	.....	Am. Car & Fdy.
	20	Flat (Iron Work)	.....	.....	Am. Car & Fdy.
	80	Flat (Iron Work)	.....	.....	Am. Car & Fdy.
	4	Gon. (Iron Work)	.....	.....	Am. Car & Fdy.
	7	Gon. (Iron Work)	.....	.....	Am. Car & Fdy.
United Fruit Co	175	Cane	.....	.....	Magor
United Rys. of Yucatan..	400	N. g. box	60,000	St. un.	Mt. Vernon
	100	Box	60,000	.....	Mt. Vernon
Veritientes Sugar Co....	86	Cane	60,000	Steel	Am. Car & Fdy.
West India Manag't Consult. Co.	20	Cane	60,000	St. un.	Am. Car & Fdy.

Passenger Car Orders in 1918—Domestic

Purchaser	No.	Class	Construction	Builder
Am. Smelt. & Ref. Co..	1	Caboose type passenger car	Wood	McKeen
Bevier & Southern.....	1	Coach	Wood	Am. Car & Fdy.
Brooklyn Rapid Transit.	2	Pass. bodies..	Steel	Am. Car & Fdy.
Duluth & Iron Range..	5	Coaches	.....	Pullman
New York Municipal....	100	Subway	Steel	Am. Car & Fdy.

Canadian

Purchaser	No.	Class	Construction	Builder
Canadian Gov't Rys....	14	Sleeping	.....	Pullman
	7	Dining	.....	Pullman
Canadian Pacific	1	Official	Steel	Pullman

Export

Purchaser	No.	Class	Construction	Builder
Chandler & Co.....	1	1st class....	Wood	Am. Car & Fdy.
Chandler & Co.....	1	2nd class....	Wood	Am. Car & Fdy.
Colombian Northern.....	2	3rd class....	Wood	Am. Car & Fdy.
Dollar, Robert, Company.	3	Din. & sleep..	Wood	Am. Car & Fdy.
Guantanamo & Western..	2	3rd class....	Wood	Am. Car & Fdy.
Lunghai Ry. Co.....	4	3rd class....	Wood	Am. Car & Fdy.
United Rys. of Yucatan.	3	1st class....	St. un.	Am. Car & Fdy.
Guantanamo & Western.	1	1st class....	Wood	Am. Car & Fdy.
United Rys. of Yucatan	2	1st class....	St. un.	Am. Car & Fdy.
	3	1st class....	St. un.	Am. Car & Fdy.
	4	Mail & exp...	St. un.	Am. Car & Fdy.

Electric Locomotive Headlights—Wayfarers along the line of the New York & Long Branch Railroad have recently been startled by headlights of certain night trains which throw rays of equal power to those of many naval searchlights. Older hands among them privately express some doubt as to the merit of the arrangement since for several years the practice on the well fenced railroads of the East has been to get away from the powerful oil reflectors of the early days of railroading. Some engine drivers say that the brilliant rays tend to confuse signal lamps which they and trackmen must observe. They admit that if a large white church or a man of war in holiday paint were to stray upon the track in front of a fast express, the glaring headlights might enable them to see it in time to stop unless they were making up time on a downgrade.—*New York Times.*

Specialties for Standard Cars and Locomotives

Data Revised to Date and Arranged in Tabular Form for Ready Reference

THE SPECIALTIES applied to the standard cars and locomotives built for the Railroad Administration have been published in the *Railway Age* from time to time during the year. The first list was given in the June 14 issue, page 1448; and the second list on page 1540 of the June 21 issue; with an additional list on page 1586 of the June 28 issue. These lists gave in general the amounts of the various specialties ordered, and in order to give a better idea of the distribution of the use of these specialties among the various classes of equipment the accompanying tables have been compiled. A few minor changes were made in the original lists showing the distribution of the orders, primarily on account of delivery.

The companies receiving orders for the specialties for the locomotives are shown in the table under the various specialty items and on which class of power these specialties are used. In case one specialty is used on all locomotives, such as the American Arch Company arch, it is so designated.

The table showing the specialties for the cars includes only those for the cars which have been built thus far, as information is not obtainable as to just which of the specialties will be applied to the other cars.

SPECIALTIES FOR THE STANDARD LOCOMOTIVES

	All locomotives	Mikado		Mountain		Pacific		Santa Fe		Switcher		Mallet	
		Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	0-6-0	0-8-0	2-6-6-2	2-8-8-2
Air Brake—													
Westinghouse Air Brake Co.	...	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
New York Air Brake Co.	...	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Arch—													
American Arch Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bell Ringer—													
Harry Vissering & Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Blow-off Cock—													
Everlasting Valve Co.	...	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Southern Loco. Valve Gear Co.	...	No	Yes	No	No	No	No	Yes	No	No	Yes	No	No
Okadee Co.	...	Yes	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes
Blower Fitting—													
Barco Manufacturing Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bolster—Tender Truck—													
Pittsburgh Steel Foundries	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Brake—													
American Brake Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Brake Beams—Tender Truck—													
Chicago Railway Equip. Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Brake Beam Support—													
Chicago Railway Equip. Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Brake Shoes—													
American Brake Shoe & Foundry Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Buffer—Radial—													
Franklin Railway Supply Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bumper—Front—													
Commonwealth Steel Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bushings—Cylinder and Valve—													
Hunt-Spiller Mfg. Corp.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cellars—Driving Box—													
Franklin Railway Supply Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coal Pusher—													
Locomotive Stoker Co.	...	No	No	No	No	Yes	No	No	No	Yes	Yes	No	No
Coupler—													
National Mall. Cast. Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coupler Yoke—													
Buckeye Steel Castings Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Crosshead Shoes—													
Hunt-Spiller Mfg. Corp.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Draft Gear—													
Westinghouse Air Brake Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dust Guards—													
W. N. Thornburg Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fire Door—													
Franklin Railway Supply Co.	...	No	Yes	No	No	No	No	Yes	Yes	No	Yes	No	No
National Railway Device Corp.	...	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Frame—Tender—													
Commonwealth Steel Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Frame—Tender Truck Side—													
American Steel Foundries	...	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Buckeye Steel Castings Co.	..	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Gages—Steam—													
Ashcroft Mfg. Co.	..	Yes	Yes	No	Yes	No	No	No	Yes	Yes	No	No	Yes
Ashton Valve Co.	...	No	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	No
Gages—Steam Heat—													
Ashton Valve Co.	...	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No
Gages—Water—													
Sargent Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gage Cocks—													
Nathan Mfg. Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grate Shaker—													
Franklin Railway Supply Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Headlight Case—													
Schroeder Headlight & Gen. Co.	...	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Handlon & Buck Mfg. Co.	...	Yes	Yes	No	No	No	No	No	No	No	No	Yes	Yes
Adams & Westlake Co.	...	No	No	No	No	No	No	No	No	Yes	No	No	No
Headlight Equipment—													
Pyle National Co.	...	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Schroeder Headlight & Gen. Co.	...	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No	No
Injectors—													
Nathan Mfg. Co.	..	Yes	Yes	No	No	No	No	No	No	Yes	No	Yes	No
Hancock Inspirator Co.	...	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes
Ohio Injector Co.	...	No	No	No	No	No	No	Yes	No	No	No	No	No
Joints—Metallic Pipe—													
Barco Manufacturing Co.	...	No	Yes	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Franklin Railway Supply Co.	...	Yes	No	No	No	No	No	No	No	Yes	Yes	No	No
Greenlaw Mfg. Co.	...	Yes	No	Yes	Yes	No	No	No	No	No	No	No	No
Lubricator—													
Nathan Mfg. Co.	...	Yes	Yes	No	No	No	No	No	No	No	Yes	Yes	Yes
Detroit Lubricator Co.	...	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Lubricator—Driving Box—													
Franklin Railway Supply Co.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

	All loco-motives	Mikado		Mountain		Pacific		Santa Fe		Switcher		Mallet	
		Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	0-6-0	0-8-0	2-6-6-2	2-8-8-2
Oil Cups—Guide, Piston Rod, Valve Stem—													
Hancock Inspirator Co	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Packing—Piston & Valve Rod—													
United States Metallic Pack. Co	...	Yes	Yes	No	No	No	Yes	No	No	Yes	No	No	No
Paxton-Mitchell Co	...	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Packing Rings—Cylinder and Valve—													
Hunt-Spiller Mfg. Corp	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reverse Gear—													
Ragonnet (Frank. Ry. Sup. Co.)	...	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes
Lewis (Commonwealth Sup. Co.)	...	No	Yes	Yes	No	No	No	No	Yes	No	No	Yes	No
Mellin (Am. Loco. Co.)	...	No	No	No	No	No	No	No	No	Yes	No	No	No
Brown (Sou. Loco. Valve Gear Co.)	...	No	No	No	No	No	No	No	No	No	Yes	No	No
Safety Bar (Unit)—													
Franklin Railway Supply Co	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sanders -													
U. S. Metallic Packing Co	...	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Hanlon Loco. Sander Co	...	Yes	Yes	Yes	No	No	No	Yes	Yes	No	No	No	No
Harry Vissering & Co	...	No	No	No	No	Yes	Yes	No	No	No	No	No	No
Side Bearing—Tender—													
E. S. Woods & Co	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Springs—													
Crucible Steel Co	...	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes
Ft. Pitt Spring & Mfg. Co	...	No	Yes	No	No	No	No	No	Yes	Yes	No	Yes	Yes
Pittsburgh Spring & Steel Co	...	Yes	No	No	No	Yes	No	No	Yes	No	No	No	No
Railway Steel Spring Co	...	Yes	Yes	No	No	No	No	No	No	Yes	No	No	No
Standard Steel Works	...	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	No	No
Union Spring & Mfg. Co	...	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Sprinkler—													
Wm. Sellers Co., Inc	...	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No
Hancock Inspirator Co	...	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stoker—													
Locomotive Stoker Co	...	Yes	No	No	No	No	Yes	Yes	No	No	No	No	Yes
Standard Stoker Co	...	No	Yes	Yes	Yes	No	No	No	No	No	No	Yes	No
Hanna Loco Stoker Co	...	No	No	No	No	No	No	No	Yes	No	No	No	No
Superheater—													
Locomotive Superheater Co	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Throttle Valve—													
Chambers Valve Co	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Truck—Trailer—													
Hodges (Baldwin Loco. Works)	...	Yes	No	No	No	No	No	No	No	No	No	No	No
Cole-Scoville (Am. Loco. Co.)	...	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Uncoupling Device—													
Imperial Appliance Co	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Valves—Blower—													
Sargent Company	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Valve Gear—													
Walschaert	...	Yes	Yes	No	No	No	No	No	No	No	No	No	No
Pilliod Co. (Baker)	...	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Southern Loco. Valve Co	...	No	No	No	No	No	No	Yes	Yes	No	No	No	No
Valve—Check—													
Nathan Mfg. Co	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Valve—Piston—													
American Balanced Valve Co	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Valve—Safety—													
Consolidated Safety Valve Co	...	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No	No
Coale Muffler & Safety Valve Co	...	No	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No
Ashton Valve Co	...	No	No	No	No	No	No	No	Yes	No	No	No	Yes
Valve—Steam Heat—													
Vapor Car Heating Co., Inc	...	No	No	Yes	No	Yes	No	No	No	No	No	No	No
Leslie Co	...	No	No	No	Yes	No	Yes	No	No	No	No	No	No
Ventilator—Cab—													
Rushton (Pald. Loco. Works)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wheels—Rolled Steel—													
Forged Steel Wheel Co	...	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Standard Steel Works	...	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes

SPECIALTIES FOR STANDARD CARS THUS FAR BUILT

	D. S. Box	S. S. Box	Comp. Gon.	55-Ton Hopper	L. S. Gon.
Angle Cock Holders—					
Western Railway Equipment Co	Yes	Yes	Yes	Yes	Yes
Bearing, Journal—					
Magus	Yes	Yes	Yes	Yes	Yes
Keystone	Yes	Yes	Yes	Yes	Yes
Haskel & Barker	Yes	Yes	Yes	Yes	No
Ajax	Yes	Yes	Yes	Yes	Yes
Bostwick & Lyons	Yes	Yes	Yes	Yes	No
Bearings, Lick Frictionless—					
Wine Railway Appliance Co	Yes	No	Yes	No	No
E. S. Woods & Co	No	Yes	Yes	No	No
A. Stucki Co	No	No	Yes	Yes	Yes
Bolsters, Truck—					
American Steel Foundries	Yes	Yes	Yes	Yes	Yes
Buckeye Steel Castings Co	Yes	Yes	Yes	Yes	Yes
Gould Coupler Co	Yes	Yes	Yes	Yes	No
Scullin Steel Co	Yes	Yes	Yes	Yes	No
Bettendorf Co	No	Yes	Yes	Yes	No
Boxes, Journal—					
National Mall. Cast. Co	Yes	Yes	Yes	Yes	Yes
Gould Coupler Co	Yes	Yes	Yes	Yes	Yes
American Mall. Cast. Co	Yes	Yes	Yes	Yes	No
Union Spring & Mfg. Co	Yes	Yes	Yes	Yes	Yes
T. H. Symington Co	Yes	Yes	Yes	Yes	No
Brakes, Air—					
New York Air Brake Co	Yes	No	No	No	No
Westinghouse Air Brake Co	No	Yes	Yes	Yes	Yes
Brake Beams, Tender—					
Buffalo Brake Beam Co	Yes	Yes	No	Yes	No
Davis Brake Beam Co	Yes	No	Yes	Yes	Yes
American Steel Foundries	Yes	No	Yes	No	No
Joliet Railway Equipment Co	Yes	Yes	Yes	Yes	No
Damascus Brake Beam Co	Yes	No	Yes	Yes	No
Haskell & Barker	Yes	Yes	Yes	No	No
Pressed Steel Car Co	Yes	No	No	Yes	Yes
Chicago Railway Equipment Co	No	Yes	Yes	Yes	No
Brake Shoes—					
American Brake Shoe & Fdry. Co	Yes	Yes	Yes	Yes	Yes
Couplers—					
American Steel Foundries	Yes	Yes	Yes	Yes	Yes
Buckeye Steel Casting Co	Yes	Yes	Yes	Yes	Yes
Gould Coupler Co	Yes	Yes	Yes	Yes	Yes
McConway & Torley	Yes	Yes	Yes	Yes	Yes
National Mall. Cast. Co	Yes	Yes	Yes	Yes	Yes

	D. S. Box	S. S. Box	Comp. Gon.	55-Ton Hopper	L. S. Gon.
Davis' 3d Point Suspension—					
Chicago Railway Equipment Co	Yes	Yes	Yes	Yes	
Door Fixtures (Slide)—					
Camel Company	No	Yes	No	No	No
Draft Gear, Friction—					
Westinghouse Air Brake Co	Yes	Yes	Yes	Yes	Yes
Standard Coupler Co	Yes	Yes	Yes	Yes	Yes
Union Draft Gear Co	Yes	Yes	Yes	Yes	Yes
Keyoke Railway Equipment Co	Yes	Yes	Yes	Yes	Y
Dust Guards—					
Wm. N. Thornburgh Co	Yes	Yes	Yes	Yes	Ye
Ends, Pressed Steel—					
Pressed Steel Mfg. Co	Yes	Yes	Yes	No	No
Chicago & Cleveland Car Roof Co	No	No	Yes	No	No
Frames, Truck—					
American Steel Foundries	Yes	Yes	Yes	Yes	Yes
Bettendorf Co.	Yes	Yes	Yes	Yes	No
Buckeye Steel Cast. Co	Yes	Yes	Yes	Yes	Yes
Gould Coupler Co	Yes	Yes	Yes	Yes	No
Scullin Steel Co	Yes	Yes	Yes	Yes	No
Hose, Air Brake—					
New York Air Brake Co	Yes	No	No	No	No
Westinghouse Air Brake Co	No	Yes	Yes	Yes	Yes
Uncoupling Device—					
Imperial Appliance Co	Yes	Yes	Yes	Yes	Yes
Wedges, Journal Box—					
Western Railway Equipment Co	Yes	Yes	Yes	Yes	Yes
Wheels, Cast Iron—					
Brass Foundry & Machine Co	Yes	Yes	Yes	Yes	No
Louisville Car Wheel & Supply Co	Yes	Yes	Yes	No	No
Albany Car Wheel Co	Yes	Yes	Yes	No	No
Southern Car Wheel Co	Yes	Yes	Yes	Yes	No
New York Car Wheel Co	Yes	Yes	Yes	No	No
Ramapo Car Wheel & Foundry Co	Yes	Yes	Yes	Yes	No
Buffalo Car Wheel & Foundry Co	Yes	Yes	Yes	Yes	No
Brown Car Wheel Works	Yes	Yes	Yes	No	No
Griffin Car Wheel Works	Yes	Yes	Yes	Yes	Yes
Western Steel Car Co	Yes	Yes	Yes	No	No
Standard Car Wheel Co	Yes	Yes	Yes	No	No
National Car Wheel Co	Yes	Yes	Yes	Yes	No
Wheels, Steel—					
Standard Forged Steel	No	No	No	Yes	Yes
Pressed Steel (Carnegie)	No	No	No	Yes	Yes
Yokes, Draw Bar—					
Buckeye Steel Castings Co	Yes	Yes	Yes	Yes	Yes
Union Draft Gear Co	Yes	Yes	Yes	Yes	Yes



Only a Small Addition to Main Track Mileage

Large Expenditures for Construction During 1918 Devoted Mostly to Terminal Facilities

IN TERMS OF MAIN TRACK completed and placed in service, railroad construction in the United States during 1918 amounted to less than at any time since the Civil War. Only 721.57 miles of new line was completed during the past year in the United States and only 135.08 miles in Canada. As shown by the diagram, these figures are far below those of any other year during the last 25. However, based on total expenditures authorized, railroad construction in the United States ranks well with recent years. This will be confirmed by an examination of the detail data which lists the amount of first track, second track, etc., completed during the past year, and gives also, under the heading of other important work under construction, the other projects of railroad work authorized, including in this the construction of main tracks on which work has not been completed. This list includes only projects costing $100,000 or more, upon which work has been started, but excludes authorized work not yet started.



Curves of Mileage Built in the United States and Canada Since 1893

The amount of second track completed is larger than last year or any year since 1914, but is only about half the mileage completed in 1913. The total for multiple tracks in the United States includes third track, 76.95 miles, fourth, fifth and sixth tracks, 57.43 miles. In Canada only

MILES OF NEW LINE COMPLETED IN THE UNITED STATES SINCE 1893.

1893	3,024	1906	5,623
1894	1,760	1907	5,212
1895	1,420	1908	3,214
1896	1,692	1909	3,748
1897	2,109	1910	4,122
1898	3,265	1911	3,066
1899	4,569	1912	2,997
1900	4,894	1913	3,071
1901	5,368	1914	1,532
1902	6,026	1915	933
1903	5,652	1916	1,098
1904	3,832	1917	979
1905	4,388	1918	721

4.28 miles of second track was completed, with no additions to other than first and second main tracks.

In the United States the new mileage of first main tracks includes 59.7 miles on the Atlantic Coast Line in Florida, 53 miles on the Government Railway in Alaska, and 48 miles on the Gulf, Mobile & Northern in Mississippi and Tennessee. Most of the mileage of new lines, however, is in short sections, and a considerable portion is in connection with the development of coal lands.

Second-track work includes 64.05 miles on the Southern; 60.77 on the Santa Fe Coast Line from Goffs to Cadiz, Cal.; some 63 miles in short stretches on the Great Northern, and 48½ miles similarly divided on the Atchison, Topeka & Santa Fe. In general, the new second track mileage is in short stretches, following the policy of the Railroad Administration to secure additional mileage of second track where it could be obtained with the least effort. This applies also to the additions to multiple main tracks.

In contrast with the greatly decreased activity in the construction of new lines, the roads authorized more than the usual amount of improvement work along existing lines. The congestion of last winter, particularly on the eastern roads, demonstrated forcefully the need for more facilities, particularly for the care of locomotives at terminals. As a result a record-breaking amount of work of this character was undertaken this year, as indicated by the fact that the Pennsylvania Railroad alone had under way over 200 projects involving expenditures of over $100,000 each and ranging from that figure up to $5,000,000.

While the necessity for so large an amount of such work is indicative of the starvation policy to which the roads have been subjected during recent years, it also demonstrates the gradual transition from the extensive to the intensive development of our transportation system. While relatively large areas in the far west are still without proper transportation facilities, it is to be expected that expenditures for railway work will, in the future, be diverted in increasingly large proportions to improvements along exist-

NEW TRACK BUILT IN 1918.

UNITED STATES—	No. Cos. building	First track	Second track	Third track	Fourth or more track	Total
Alabama	1	7.60	.....	.....	.....	7.60
Alaska	1	53.00	.....	.....	.....	53.00
Arizona	1	55.00	1.97	.....	.....	56.97
California	3	40.09	60.77	.....	.....	100.86
Colorado	3	9.55	4.87	.....	.....	14.42
Connecticut	..	.....	.....	.....	2.00	2.00
Florida	4	104.78	1.75	.....	.....	106.53
Georgia	2	15.10	23.50	.....	.....	38.60
Idaho	1	10.84	.....	.....	.....	10.84
Illinois	3	5.40	23.37	3.00	18.00	49.77
Indiana	1	42.10	23.70	6.34	.....	72.14
Iowa	..	.....	9.12	.....	.....	9.12
Kansas	2	34.80	37.45	6.45	.....	78.70
Kentucky	1	12.28	9.00	.....	.....	21.28
Louisiana	1	3.00	3.01	.....	.....	6.01
Maryland	1	6.20	7.87	2.83	4.27	21.17
Maine	..	0.71	7.47	5.96	0.36	14.50
Massachusetts	1	0.17	2.42	4.44	0.50	7.53
Michigan	..	.....	0.66	.....	.....	0.66
Minnesota	..	.....	43.49	4.26	4.25	52.00
Mississippi	1	30.00	8.80	.....	.....	38.80
Missouri	1	1.01	13.27	.....	.....	14.28
Montana	..	.....	57.71	1.07	1.16	59.94
Nebraska	..	.....	13.58	.....	.....	13.58
New Jersey	2	5.93	7.24	4.33	5.78	23.28
New Mexico	..	.....	12.08	.....	.....	12.08
New York	5	6.57	30.31	12.29	4.89	54.06
North Carolina	2	6.30	15.83	.....	.....	22.13
North Dakota	..	.....	4.36	.....	.....	4.36
Ohio	1	8.00	94.70	19.20	15.62	137.52
Oklahoma	2	6.28	.....	.....	.....	6.28
Oregon	3	8.94	.....	.....	.....	8.94
Pennsylvania	7	45.80	34.03	6.78	0.60	87.21
South Carolina	1	38.80	41.72	.....	.....	80.52
Tennessee	2	20.00	4.00	.....	.....	24.00
Texas	3	39.70	20.96	.....	.....	60.66
Utah	2	16.13	.....	.....	.....	16.13
Virginia	2	11.38	8.00	.....	.....	19.38
Washington	2	7.53	2.30	.....	.....	9.83
West Virginia	5	60.57	32.19	.....	.....	92.76
Wisconsin	1	5.00	.....	.....	.....	5.00
Wyoming	2	3.01	20.05	.....	.....	23.06
Totals	70	721.57	681.55	76.95	57.43	1,537.50
Canada	..	135.08	4.28	.....	.....	139.36
Mexico	..	10.00	.....	.....	.....	10.00

NEW TRACK BUILT IN 1917.

	Miles					
UNITED STATES—	No. Cos. building	First track	Second track	Third track	Fourth or more track	Total
Alabama	2	6.30	36.64	.....	.....	42.94
Alaska	1	108.00	.....	.....	.....	108.00
Arkansas	3	10.05	.....	.....	.....	10.05
California	7	108.89	.....	.....	.....	108.89
Colorado	1	.62	3.77	.....	.....	4.39
Connecticut	1	.21	.....	.45	3.50	4.16
Florida	1	5.00	.....	.....	.....	5.00
Georgia	3	18.43	23.71	.....	.....	42.14
Idaho	2	23.36	.....	.....	.....	23.36
Illinois	4	9.01	24.89	11.80	4.10	49.80
Indiana	..	.....	47.85	.....	.....	47.85
Kansas	1	21.50	27.12	.....	.....	48.62
Kentucky	3	29.80	13.20	1.09	.....	44.09
Louisiana	5	39.80	.....	.....	.....	39.80
Maryland	1	1.68	6.70	.....	.....	8.38
Massachusetts	..	.....	.....	1.21	1.99	3.20
Michigan	4	7.83	2.13	.....	.....	9.96
Minnesota	1	11.75	22.14	.....	.....	33.89
Mississippi	4	28.42	12.50	.....	.....	40.92
Missouri	2	3.55	.79	.....	.....	4.34
Montana	2	94.40	36.00	.....	.....	130.40
Nevada	2	10.00	.....	.....	.....	10.00
New Jersey	2	2.70	3.96	4.83	3.31	14.80
New Mexico	1	.16	5.11	.....	.....	5.27
New York	3	3.74	8.45	12.50	12.46	37.15
North Carolina	5	16.85	4.50	.....	.....	21.35
Ohio	1	27.19	18.18	.....	.....	45.37
Oklahoma	3	23.80	18.20	.....	.....	42.00
Oregon	2	17.00	.....	.....	.....	17.00
Pennsylvania	15	61.89	21.62	2.70	1.77	87.98
South Carolina	1	21.50	82.90	.....	.....	104.40
South Dakota	1	.19	.....	.....	.....	.19
Tennessee	4	27.81	.70	.....	.....	28.51
Texas	3	63.50	41.35	.....	.....	104.85
Utah	2	67.20	15.82	.....	.....	83.02
Virginia	3	19.73	33.35	.....	.....	53.08
Washington	3	13.68	.....	.....	.....	13.68
West Virginia	6	35.54	6.72	.....	.....	42.26
Wisconsin	2	29.99	.....	1.20	1.24	32.43
Wyoming	1	7.81	95.11	.....	.....	102.92
Totals	108	978.88	613.41	35.78	28.37	1,656.44
Canada	6	206.95	.....	.....	.....	206.95

ing lines intended to modernize and to increase their capacities.

The inauguration of federal control introduced an element of uncertainty early in the year which greatly retarded the inauguration of new projects. Work was in general continued on those projects which were already under way, but the necessity of securing federal approval for new work seriously delayed its inauguration. Facing a labor shortage, many roads had planned to undertake their improvement program as early in the spring as weather conditions would permit, but the work of organizing the Division of Capital Expenditures so delayed the issuance of approvals that it was late in May before any considerable number of projects were authorized. Then the entrance of many roads with large budgets into the market for labor and materials further complicated the inauguration of the work which was approved. As a result, out of the total of $1,199,426,026 of Additions and Betterments work, chargeable to capital account which had been authorized up to November 1, less than one-half is now completed.

Owing to the lateness of the season at which this work was authorized, many expedients have been undertaken to secure its completion. A premium has been placed on short construction periods and every effort has been made to finish as much of the work as possible before winter. This has been particularly true of engine terminals which were so badly needed last winter.

While the uncertainty as to the disposition of the roads makes any prediction as to the outlook for construction activities during 1919 extremely hazardous, the large amount of work now under way and unfinished will, if carried to completion, provide a fairly busy year in itself. With the further improvements which must be made, the director general estimated recently that the roadway improvement work alone (excluding equipment) would aggregate $550,000,000 next year.

Railroad Construction in the United States in 1918

Alabama & Vicksburg

Bridge over Big Black river, in Mississippi, cost $174,000 completed.

Alabama Great Southern

Second Track: Between Russell, Miss., and Toomsuba, 8.8 miles.

Other Important Work Under Construction: Second track from Burstall, Ala., to Vance, 31.9 miles, 90 per cent completed; Warrior River Bridge at Eutaw, Ala., cost $237,475 completed.

Alaska Railroad

First Track: Between Seward, Alaska, and Fairbanks, 53.00 miles.

Other Important Work Under Construction: Building in Alaska,, from mile 224 to mile 265, 41 miles; mile 365 to mile 380, 15 miles standard gage, and from mile 414 to mile 456, 42 miles of narrow gage.

Americus & Atlantic

First Track: Between Mata, Ga., and Methvins, 2.00 miles.

Apache Railroad

First Track: Holbrook, Ariz., to Duke's Peak, 55.00 miles.

Ashland, Odanah & Marengo

First Track: In Wisconsin, not specified, 5.00 miles.

Atchison, Topeka & Santa Fe

First Track: Washington, Okla., to Cole, 3.28* miles.

Second Track: La Junta, Colo., to Casa, 4.87 miles; Dodge City, Kans., to Wright, 7.64 miles; Dodge City to Seare, 4.46 miles; White to Augusta, 4.09 miles; Winfield to Arkansas City, 4.00 miles; Decatur, N. M., to Glorietta, 4.98 miles; Camden Junction, Mo., to Floyd, 2.57 miles; at Shopton, Iowa, 1.52 miles; Albuquerque, N. M., to Hahn, 4.00 miles; Gallup, N. M., 3.1 miles; Western division, Kan., M. P., 344 to 352, 7.45 miles; total, 48.59 miles.

Third Track: Turner, Kan., to Holliday, 6.45 miles.

*Change of line.

Other Important Work Under Construction: Illinois division, change in line, 0.28 miles, cost $110,870, 30 per cent completed; second track mile posts, 418-422, Missouri division, 3.47 miles, cost $551,551, 80 per cent completed. Unclaimed freight building at Topeka, Kan., cost $310,825 completed; second track and change of line and grade, 11.82 miles, from Arkansas City, Kan., to Newkirk, Okla.; second track, from Eldorado, Kan., to Augusta, 9.9 miles, cost $351,559, 16 per cent completed; second track, from Winfield, Kan., to Arkansas City, 12.3 miles, cost $603,654, 19 per cent completed; extension of Bartlesville branch and terminals at Tulsa, Okla., cost $815,000; new track and yard change at Hutchinson, Kan., cost $143,518 completed; second track, 4.45 miles, at Dodge City, Kan., cost $148,579, 50 per cent completed; engine terminal at Las Vegas, N. M., cost $236,857, completed; reconstruction of bridge at Pinta, Ariz., cost $157,022 completed; shop and station facilities at Gallup, N. M., cost $616,066 completed; car shops and lumber shed at San Bernardino, Cal., cost $402,975 completed; spur to U. S. cantonment at Camp Kearney, Cal., cost $382,098 completed; new depot and track at San Bernardino, Cal., cost $831,547 completed.

Atchison, Topeka & Santa Fe Coast Lines

Second Track: Goffs, Cal., to Cadiz, 60.77 miles.

Atlanta & West Point

Second Track: College Park, Ga., to Palmetto, 17 miles, completed.

Atlantic Coast Line

First Track: Sebring, Fla., to Moore Haven, 59.70 miles.

Other Important Work Under Construction: James River bridge, Richmond, Va., cost $231,117, 58 per cent completed; additional freight facilities, Richmond, Va., cost $360,882, 50 per cent completed; new passenger station at Norfolk, Va., cost $155,450, completed; single track, extension of Haines City branch 81 miles, between Sebring and Imnolkalee, Fla., cost $1,000,000, 44 per cent completed.

Baltimore & Ohio System

First Track: Penn Mary, Md., to Bear Creek, 4.80 miles; West Baltimore to Washington Road, 1.40 miles; North Dayton, O., connecting track between Wellston branch and main line; branch line at Great Cacapon, W. Va.; connection with Coal & Coke Ry., at Hampton, W. V.

Second Track: Evans, Pa.; Holloway, Ohio, to Flushing; Carlisle, Ohio, 11 miles; Defiance, Ohio, 1.30 miles.

Third Track: At Philadelphia, Pa., 0.60 miles.

Fourth Track, At Philadelphia, Pa., 0.60 miles.

Other Important Work Under Construction: Additions to Clearmont yard, Baltimore, Md., cost $160,000, completed; Annapolis Junction, Md., to Admiral, tracks and other facilities for Camp Meade, cost $408,120, completed; diversion of main lines through Cumberland, Md., cost $225,000, 80 per cent completed; additional yard tracks at Keyser, W. Va., cost $150,000, 80 per cent completed; rearrangement and standardization of fourth track line, from Bailey's to W. Baltimore, Md., cost $200,000, 40 per cent completed; track to Camp Sherman, at Chillicothe, Ohio, cost $191,692 completed; second track, 23.3 miles, from Milford Junction to La Paz Junction, Ohio, cost $785,957, 85 per cent completed; second track, Storrs, Ohio, to Culloms, 2.20 miles, cost $208,007, 44 per cent completed; reconstruction of bridges from Cook's Mill, Pa., to Sand Patch, cost $191,200 completed; construction of bridge superstructures from Sand Patch to Collensville, cost $104,500, 96 per cent completed; strengthening bridges from Uniontown, Pa., to Cheat Haven, cost $325,380, 90 per cent completed; constructing bridge No. 315, at Etna, Pa., cost $102,000; construction of Astor Bridge at Flemington, W. Va., cost $478,900 completed; Baltimore, Md., construction of yard at Mt. Winans, cost $700,000, 85 per cent completed; enlargement of Bay View yards, cost $160,000, 80 per cent completed; heavy repair shops, Glenwood, Pa., cost $1,732,605, 70 per cent completed; additions to round house at Brunswick, Md., cost $125,000, 84 per cent completed; additions to round house at Grafton, W. Va., cost $175,000, 78 per cent completed; erection of heavy repair shops at Cumberland, Md., cost $1,216,000, 65 per cent completed; Thawing house at Curtis Bay, Baltimore, Md., cost $100,000, completed; reconstruction of bridges from Cuba to Orient, Ohio, cost $249,130, completed; engine terminal facilities at De Forest Junction, Ohio, cost $146,280, 80 per cent completed; 12 additional stalls to round house at Garrett, Ind., cost $155,000, completed; a new power plant at Garrett, Ind., completed; 8-stall engine house at Ivorydale, Ohio, cost $130,637, 90 per cent completed; engine terminal improvements at Lorain, Ohio, cost $101,790, 5 per cent completed; rebuilding bridge No. 3, at North Dayton, Ohio, cost $407,832, completed; new receiving yard at North Dayton, cost $116,186, completed; engine house remodelling, at South Chicago, cost $106,700, 5 per cent completed; extending engine house at Storrs, Ohio, cost $100,050, 5 per cent completed; enlarging engine house at Stock Yards, Ohio, cost $100,000, 91 per cent completed; freight house, office, etc., at Parkersburg, W. Va., cost $268,013, completed; five additional stories on freight house at Allegheny, Pa., cost $228,000 completed; transfer bridge pier 10, at Locust Point, Baltimore, Md., cost $137,833, completed.

Barton County & Santa Fe (A. T. & S. Fe.)

First Track: In Kansas not specified, 31.20 miles.

Bay Point & Clayton

Other Important Work Under Construction: Extension to Bay Point, Cal., including overhead crossing over the Santa Fe and Southern Pacific, cost $100,000, work not started but expected to be finished by June, 1919.

Bessemer & Lake Erie

First Track: Deer Creek Junction, Pa., branch to new mines of Inland Steel Company, 1.60 miles.

Second Track Henlein, Pa., to Kremis, 2.00 miles; Blacks Run to River Valley, 1.00 mile; total 3.00 miles.

Other Important Work Under Construction: Deer Creek Junction, Pa., branch to new mines of Inland Steel Co., 2.54 miles, cost $410,000, 50 per cent completed; change of grade and alinement, Pardoe to Cool Spring, cost $1,828,095, 45 per cent completed; Blacks Run to River Valley, Pa., double track bridge over Allegheny river, Pennsylvania Railroad and highways with approaches, cost $2,149,112, 96 per cent completed; K. O. Junction, new yard tracks, cost $378,711, completed; enlargement of yard and facilities

at Conneaut Harbor, O., cost $209,316, completed; change of grade and alinement at Rural Ridge, Pa., cost $290,000, 45 per cent completed; change of grade and alinement from Culmerville to bridge No. 7, Pa., cost $1,617,778, 70 per cent completed; change of grade and alinement from Harrisville, Pa., to Grove City, Pa., cost $896,000, 31 per cent completed (work held up, continuation undecided); change of grade and alinement at Hartstown, Pa., cost $490,000, 91 per cent completed (work deferred); North Bessemer, Pa., new 400-ton coaling plant and tracks, cost $160,000, 59 per cent completed.

Black Mountain Railway

First Track: In North Carolina, not specified, 2.30 miles.

Black Mountain Railroad

Other Important Work Under Construction: Grading completed on 8 miles and ready for track laying between Hulen, Ky., and head of Packetts Creek.

Boston & Albany

Other Important Work Under Construction: Reconstruction of drawbridge over Chelsea river at Chelsea, Mass., cost $280,300, 35 per cent completed; renewal of bridge over North Elm street and public square at Westfield, cost $250,000, 6 per cent completed.

Boston & Maine

Second Track: From North Chelmsford, Mass., to West Chelmsford, 2.25 miles.

Third Track: From Westminster, Mass., to South Ashburnham, 3.94 miles; Cummings, Me., to North Berwick, 5.64 miles.

Other Important Work Under Construction: Rebuilding bridge No. 180, at Zoar, Mass., cost $215,000, 28 per cent completed; rebuilding bridge No. 154, at Greenfield, Mass., cost $308,500, 60 per cent completed; rebuilding bridge No. 108, at Saco, Me., cost $105,000, 15 per cent completed; improvements in yard and signals at Boston, Mass., cost $148,812, nearing completion; engine house and yard facilities at Rotterdam, N. Y., cost $643,000, 23 per cent completed; engine house and yard facilities at Lowell, Mass., cost $1,000,000, 14 per cent completed; engine house facilities at East Deerfield, Mass., cost $800,000, 40 per cent completed; rebuilding bridge No. 148, East Deerfield, cost $274,000, completed; engine house and facilities, East Cambridge, cost $171,000, nearing completion; additional yard facilities, Lawrence, cost $100,000, completed.

Buffalo Creek

First Track: At Buffalo, N. Y., 0.18 mile.

Buffalo, Rochester & Pittsburgh

Second Track: In Pennsylvania, at Falls Creek, 0.18 mile; from Marion Center, Pa., 2.6 miles.

Other Important Work Under Construction: Shop terminal facilities, at East Salamanca, N. Y., cost $706,500, completed; additional yard tracks at East Salamanca, cost $133,245, completed; shop terminal facilities at Elk Run Junction, cost $696,606, completed.

Carolina & Northeastern

First Track: Rehoboth, N. C., to Lasker, 4.00 miles.

Catasauqua & Fogelsville

Other Important Work Under Construction: At Guth, Pa. (Jordan Bridge), replacing viaduct with 3-span arch and filling at cost of $150,000, 83 per cent completed.

Central New England

Second Track: Highlands and Reynolds branch, N. Y.

Other Important Work Under Construction: Strengthening Poughkeepsie Bridge, Poughkeepsie, N. Y., cost $370,000, completed.

Central of New Jersey

Third Track: Between North Branch, N. J., and White House, 4.07 miles.

Fourth Track: Between North Branch, N. J., and White House, 4.07 miles.

Other Important Work Under Construction: Elimination of grade crossing, Westfield, N. J., cost $303,157, 88 per cent completed; additional yard tracks, Newark, N. J., cost $118,584, completed; Broad street terminal, Newark, N. J., cost $632,663, completed; extra power house, Ashley, Pa., cost $161,123, completed; new coal pier No. 18 at Jersey City, N. J., cost $1,506,513 (1918 allowance $800,000); storage yard, Port Newark, Newark, N. J., cost $227,003, 92 per cent completed; renewal bridge No. 1 at Phillipsburg, N. J., cost $475,642, 17 per cent completed; coal thawing sheds, Jersey City, cost $252,380, 7 per cent completed; additional yard tracks, Allentown, Pa., cost $279,556, 53 per cent completed; extension of service plant, Jersey City, cost $188,902, 90 per cent completed; extension fifth track, Bayonne, N. J., to Jersey City, cost $111,591, 5 per cent completed; storage yard pier No. 18, Jersey City, cost $828,686, 48 per cent completed (1918 allowance, $500,000).

Chartiers Southern

First Track: Clarksville, Pa., to near Jefferson, 3.50 miles.

Other Important Work Under Construction: Extension from Eighty-Four, Pa., to Marianna, 10.20 miles, work indefinitely postponed, cost $1,385,000. 65 per cent completed; Champion to near Jefferson, 9 miles, cost $1,912,840, 50 per cent completed; Crucible to Nemacolin mine, 5.50 miles, cost $835,000, 10 per cent completed.

Chesapeake & Ohio

First Track: Extension Big Coal branch from Seth, W. Va., to Whitesville, 13.3 miles, branch line up Big Elk Run of Coal river, 3.8 miles; Marsh Fork extension, Little Marsh, W. Va., to Hozy Creek, 6.5 miles; branch up Pond Fork from Madison, W. Va., 11.6 miles; branch Man, W. Va., up Huff creek of Guyandot river, 2.7 miles.

Second Track: Harbourville, W. Va., to Clover Valley, 1.44 miles; Peeks Mill to Peach creek, W. Va., 3.38 miles; West Hamlin to Salt Rock, W. Va., 7.08 miles; Logan, W. Va., to Stollings, 1.1 miles; Bremo to Strathmore, 3.00 miles.

Other Important Work Under Construction: Eight-stall addition to roundhouse, Fulton, Va., cost $109,136, completed; renewal of bridge over Coal river with double track structure, St. Albans, W. Va., cost $151,445, completed; third track from Big Sandy Junction to Russell, Ky., 11.3 miles, cost $490,000, 4 per cent completed; renewal bridge No. 44 with double track structure, Clover Valley, W. Va., cost $153,516; extension of line from Man to Gilbert, W. Va., 13.0 miles, cost $850,053, 71 per cent completed; new additional westbound yard, Russell, Ky., cost $819,618, 70 per cent completed; renewal bridge No. 66, Martha, W. V., with double track structure, cost $135,678, 50 per cent completed; water station at Silver Grove, Ky., cost $131,000, 3 per cent completed; additional shop facilities, Huntington, W. Va., cost $535,500, 50 per cent completed.

Chicago & Alton

Other Important Work Under Construction: Track elevation, Rockwell to Kedzie avenues, Chicago, cost $275,793, 85 per cent completed (work held up); yards and tracks, Carlinville, Ill., cost $144,971, 62 per cent completed; freight terminal, Chicago, cost $1,400,000 (work held up).

Chicago & Eastern Illinois

Second Track: At Okaw, Ill., 0.33 mile; Jackson (Ind.) coal branch, 1.64 miles; total 1.97 miles.

Chicago & Erie

Other Important Work Under Construction: Freight station and yard, Webster avenue, Chicago, cost $232,681, completed; addition to yards, Marion, O., cost $445,641, completed.

Chicago & North Western

Other Important Work Under Construction: Ore docks and yards, Ashland, Wis., cost $1,727,200, completed; elevator (6,000,000 bu.), South Chicago, Ill., cost $4,583,348, completed; elevator (1,500,000 bu.) Council Bluffs, Ia., cost $1,604,053, completed; extension of shop buildings, Chicago, cost $721,054, completed; track elevation, Milwaukee, Wis., cost $1,192,614, completed; addition to engine house, Nelson, Ill., cost $182,000, completed; track elevation, Mayfair, Chicago, cost $792,000, completed; reconstruction Des Plaines river bridge, Galena division, cost $149,550, completed; Franklin-Orleans street viaduct, Chicago, cost $709,340, completed; 20-stall addition to engine house, Fond du Lac, Wis., cost $185,745, completed; Poposia mine spur, 3.77 miles, at Hudson, Wyo., cost $139,020, completed.

Chicago, Burlington & Quincy

First Track: Cut-off on old line at Orin Junction, Wyo., 1.16 miles.

Second Track: At Smithboro, Ill., 0.18 mile; at Beardstown, 1.64 miles; at Girard, 0.22 mile; Keyesport to Shattuc, 10.43 miles; Smithboro to Durley, 2.63 miles; at St. Joseph, Mo., 0.08 mile; Crawford, Neb., to Rutland, 5.95 miles; Ashland to Greenwood, 7.63 miles; Sheridan, Wyo., to Dietz, 3.70 miles; total 32.46 miles.

Chicago, Indianapolis & Louisville

Other Important Work Under Construction: Midland, Ind., yard and engine terminal (1918 appropriation $38,500), cost $230,282, 16 per cent completed.

Chicago, Milwaukee & St. Paul

First Track: Techny, Ill., to Bensenville, 3.7 miles.

Second Track: Techny, Ill., to Bensenville, 3.5 miles; Montevideo, Minn., to Milan, 5.6 miles; total 9.1 miles.

Other Important Work Under Construction: Track elevation, Milwaukee, Wis., cost $2,083,444, completed; track depression, Minneapolis, cost $1,365,261, completed; new station, Butte, Mont., cost $272,945, completed; roundhouse, Sioux City, Ia., cost $120,902, completed; electrification, Othello-Argo, cost $8,990,741, to be completed by July, 1919; additions to shops, Dubuque, Ia., cost $115,000, completed; engine terminal, Ottumwa Junction, Ia., cost $772,300, completed; bridge over Missouri river, Chamberlain, S. Dak., cost $210,200, completed.

Chicago, Rock Island & Pacific

Second Track: Allerton, Ia., to Clio, 7.6 miles; Tindall, Mo., to Trenton, 4.3 miles; Topeka, Kan., to Bishop, 6 miles; Paxico, Kan., to McFarland, 3.90 miles.

Other Important Work Under Construction: Track elevation, Chicago, cost $144,780, 87 per cent completed; second main track; engine terminal, Burr Oak, Ill., cost $246,935, 60 per cent completed.

Chicago Union Station

First Track: At Chicago, Ill., 0.70 mile.

Chicago, St. Paul, Minneapolis & Omaha

Other Important Work Under Construction: Engine terminal, St. Paul, Minn., cost $108,563, completed.

Cincinnati, Indianapolis & Western

Other Important Work Under Construction: Coal branch from Dana, Ind., 5 miles, cost $103,461, 90 per cent completed; track elevation, Indianapolis, Ind., cost $100,000, 60 per cent completed; freight house and office building, Indianapolis, cost $201,520, 90 per cent completed.

Cincinnati, New Orleans & Texas Pacific

First Track: In Tennessee, from M. P. 236.25 to 237.25, 2 miles.

Second Track: In Tennessee, M. P. 216.1 to 217.5, 1.40 miles; M. P. 215.3 to 215.4, 0.4 miles; M. P. 213.4 to 213.8, 0.40 miles; M. P. 229.2 to 230, 0.80 miles; M. P. 236.2 to 237.2, 1 mile; in Kentucky, from M. P. 124 to 132, and from M. P. 143.7 to 146.7, 9 miles; total 13 miles..

Other Important Work Under Construction: Reconstruction of Tennessee river bridge, Chattanooga, Tenn., cost $268,175, completed; second track, Helenwood, Tenn., to Robbins, 6.00 miles, cost $354,000; Huffman to Lancing, cost $1,311,841.

Cleveland, Cincinnati, Chicago & St. Louis

Second Track: Union City, Ind., to Winchester, 9.00 miles; between Marion, Ohio, and Nelson, 33.00 miles; Ansonia to Union City, 9.00 miles; Columbus to Avenue, 4.60 miles; total 55.60 miles.

Other Important Work Under Construction: Additional yard facilities at Mattoon, Ill., cost $115,000, grading completed; building 4.30 miles of first track near Zionsville, Ind., 10 per cent completed; building second track from Briar, Ind., to Beech Grove, 9 miles, 50 per cent completed, and from Augusta, Ind., to Whitestown, 11 miles, 10 per cent completed; separation of grades in Indianapolis, Ind., cost $600,000, 75 per cent completed; new receiving yard at Brightwood, cost $176,000, completed; additional yard facilities at Beech Grove, cost $145,000, completed; rebuilding bridge No. 6 at Cleveland, Ohio, cost $221,450, substructure completed, superstructure to be completed by March, 1919; separation of grades at four streets in Columbus, cost $332,287, completed; additional yard facilities at Bellefontaine, cost $270,000, and rearrangement of tracks, relocation of freight house and track connections at Bellefontaine, cost $128,000, completed; additional yard facilities at Sharonville, cost $545,000, to be completed by March, 1919; additional yard facilities at Columbus, cost $265,000, grading completed; new engine terminal at Galion, cost $219,000, and additional yard facilities at Galion, cost $152,000, completed; extension of yard, Bellefontaine, O., cost $135,000, completed; rearrangement of tracks at Galion, O., cost $100,400, completed; engine terminal and yards at Ansonia, O., to cost $184,800.

Colorado Railroad

First Track: M. P. 83 to Ingleside (Colo.) branch, 0.19 mile.

Columbia & Nehalem River

First Track: In Oregon, not specified, 1.00 mile.

Cumberland Valley

Second Track: Newville, Pa., to Oakville, 2.71 miles; Maugansville, Md., to Hagerstown, 1.93 miles; total 4.64 miles.

Other Important Work Under Construction: Extension of second track and revision of grade and alinement from Oakville, Pa., to Shippensburg, cost $440,000, 35 per cent completed; additional yards at Cumbo, W. Va., to cost $120,000, 65 per cent completed.

Delaware & Hudson

First Track: At Ninevah, N. Y., 0.24 mile.

Second Track: Windsor, N. Y., to Ninevah, 6.50 miles.

Third Track: Between Oneonta, N. Y., and Albany, 1.28 miles.

Other Important Work Under Construction: From Schenevus, N. Y., to Richmondville Summit, 12.45 miles main track, signals, bridges, etc., cost $814,712, 45 per cent completed; $450,000 of the appropriation was cancelled.

Delaware, Lackawanna & Western

Other Important Work Under Construction: Elimination of 26 grade crossings, Orange, N. J., cost $2,173,165, 99 per cent completed; elimination of grade crossing and new passenger station, Madison, N. J., cost $646,250, 98 per cent completed; grade crossing elimination, Passaic, N. J., cost $197,631, 90 per cent completed; grade crossing elimination, East Buffalo, N. Y., cost $284,776 completed; grade crossing elimination, Buffalo, N. Y., cost $424,770, completed; engine terminal, Jersey City, N. J., cost $148,174, completed; power plant, East Buffalo, cost $284,646, completed; extension of piers No. 3 and No. 4, at Hoboken, N. J., cost $146,835, 95 per cent completed; rebuilding power house, Hoboken, cost $121,646, 35 per cent completed; additions to engine terminal Gravel Place, Pa., cost $117,714, completed.

Denver & Rio Grande

First Track: Cokedale, Colo., to Bon Carbo, 7.19 miles; Hooper (Utah) branch to Kingsville and to Cox, 2.76 miles; total 9.95 miles.

Other Important Work Under Construction: Yard and engine terminal at Soldier Summit, Utah, cost $850,000, 41 per cent completed; second track, Buttes, Colo.-Pueblo, cost $103,435, 67 per cent completed.

Detroit Terminal

Second Track: In Michigan, at various points, 0.66 mile.

Duluth & Iron Range

Other Important Work Under Construction: Logging spur, 18 miles, from Wales, Minn., cost $215,997, completed; repair shop, Two Harbors, Minn., cost $192,854, completed.

Duluth, Missabe & Northern

Other Important Work Under Construction: Coal handling bridge, Duluth, Minn., cost $239,750; steel and concrete ore dock, Duluth, cost $3,839,714, 85 per cent completed; Missabe mine spur, cost $177,399, completed; spur to Carson Lake and Fletcher mines, cost $263,105, 95 per cent completed.

El Paso & Southwestern

Other Important Work Under Construction: Change of line, M. P. 117-144, Eastern division, cost $514,063, completed.

Erie

Other Important Work Under Construction: New engine terminal, Croxton, N. J., cost $875,695, completed; renewal of bridge No. 192.22, cost $183,064, completed; coaling plant, Hornell, N. Y., cost $255,000, completed; revision of engine terminal, East Buffalo, cost $248,137, completed; elimination of grade crossing, Louisiana street, Buffalo, cost $269,689, completed; engine terminal, Salamanca, N. Y., cost $237,293, 90 per cent completed; elimination of grade crossings, Jamestown, N. Y., cost $475,075, 40 per cent completed; engine terminal facilities, Brockwayville, Pa., cost $142,445, 75 per cent completed; engine terminal, Avoca, Pa., cost $260,000, 30 per cent completed; improved engine terminal, Ferrona, Pa., cost $201,552, completed; engine terminal facilities, Meadville, Pa., cost $415,081; classification yard, Girard, O., cost $169,643, completed; elimination of grade crossing, P. R. R. and Liberty road, Girard, cost $150,000, 20 per cent completed; improved freight handling facilities, Akron, O., cost $241,061, 95 per cent completed; separation of grades, Youngstown, O., cost $147,840, 70 per cent completed; enlarging the yard at Kenmore, O., cost $113,583, completed; engine terminal facilities, Dayton, O., cost $245,703, completed.

Franklin & Abbeville

First Track: Prevost Spur (La.), 3.00 miles.

Galesburg, Rockford & Northern

Other Important Work Under Construction: Building extension from Hooppole, Ill., to Geneseo, 16 miles, work includes two 100 ft. bridges, cost $325,000, 5 per cent completed.

Galveston, Harrisburg & San Antonio

First Track: Rosenberg, Tex., to Damon Mound, 22.00 miles.

Second Track: Ysleta, Tex., to El Paso, 12.49 miles; San Antonio to Withers, 6.47 miles; total 18.96 miles.

Other Important Work Under Construction: Galveston (Tex.) Causeway, (G., H. & S. A. share), $207,280, expected to be completed by June, 1920.

Grand Trunk Western

Other Important Work Under Construction: Yard extension, Nichols, Mich., cost $406,000, to be completed June, 1919; car shops, Port Huron, cost $473,000, completed.

Great Northern

Second Track: Long Lake, Minn., to Delano, 11.56 miles; Kandiyohi to Pennock, 11.02 miles; Campbell to Breckenridge, 15.31 miles; Cut Bank, Mont., to Blackfoot, 25.33 miles; total 63.22 miles.

Third Track: At Minneapolis, Minn., 4.26 miles.

Fourth Track: At Minneapolis, Minn., 4.25 miles.

Other Important Work Under Construction: Ward street bridge, Minot, N. D., cost $135,391, 90 per cent completed; water supply, at Bowdoin, Mont., cost $162,980, 97 per cent completed; engine house, etc., Bowdoin, cost $276,675, completed: ore dock, Allouez, Wis., cost $748,682, completed; freight house, team tracks, etc., St. Paul, cost $1,832,771, 90 per cent completed; yard extension, Minot, N. D., cost $125,000, completed; rebuilding snow sheds, Tye, Wash., to Scenic, cost $170,000, completed; lining two tunnels, Butte division, cost $185,000, 90 per cent completed; new material yard (Minneapolis Belt Line), Northtown, Minn., cost $927,762, completed.

Gulf & Ship Island

Other Important Work Under Construction: Spur track extension 34.5 miles, Hovey, Miss., to Kiln, cost $260,000, 80 per cent completed.

Gulf, Colorado & Santa Fe

Second Track: At Galveston, Texas. 2.00 miles.

Other Important Work Under Construction: Galveston Causeway (G. C. & S. F. share), $305,151, 50 per cent completed; reconstruction of Gulf & Interstate Railway from Port Bolivar, Tex., to High Island, cost $172,810, completed.

Gulf, Florida & Alabama

First Track: Pensacola, Fla., to Navy Yard, 5.08 miles.

Gulf, Mobile & Northern

First Track: McLain, Miss., to end of track, 30.00 miles; Middleton, Tenn., to Barrett's Divide, 18.00 miles; total 48.00 miles.

Other Important Work Under Construction: Extension of Blodgett branch, McLain, Miss., north, to be 31 miles long; total cost $560,000, 92 per cent completed; extension of Middletown-Jackson line, to be 40 miles long, 80 per cent completed.

Hocking Valley

Second Track: Delaware, Ohio, to Marion, 6.90 miles; Marion to Walbridge, 6.00 miles; total 12.90 miles.

Other Important Work Under Construction: Passing track beeween Marion, Ohio, and Pemberville (to be absorbed later as second track), cost $443,000, 70 per cent completed; additional yard tracks at Walbridge, O., cost $394,740, and at Columbus, cost $128,000, completed; grade crossing elimination at Columbus, cost $224,331, completed; fuel and water stations at Walbridge, Carey, Columbus, Logan, and Nelsonville, O., cost $367,659, completed; ten-stall engine house, turntable, shops and tracks at Nelsonville, O., cost $120,000, completed.

Houston & Texas Central

Other Important Work Under Construction: 12-mile belt line around Dallas, Tex., cost $834,500.

Illinois Central

Second Track: Belleville, Ill., to Wilderman, 2.8 miles.

Third Track: From Du Quoin, Ill., to Bois, 3 miles.

Fifth Track: Chicago, Twenty-second to Fortieth street, 5 miles, and Kensington to Riverdale, 4 miles

Sixth Track: Chicago, Twenty-second to Fortieth street, 5 miles, and Kensington to Riverdale, 4 miles.

Other Important Work Under Construction: Branch from Golconda, Ill., 6.5 miles, cost $125,000, 40 per cent completed; Chicago, reconstruction of bridges from Sixty-third to Sixty-seventh streets, inclusive, cost $537,000, 94 per cent completed, and Fifty-first to Sixtieth streets, inclusive, cost $821,850, 50 per cent completed; raising tracks between Fifty-first and Sixty-seventh streets, cost $426,800, to be completed by June, 1919; building suburban stations at Sixty-third, Sixty-fourth, Sixty-sixth and Sixty-seventh streets, cost $302,270, completed; depot and office building Sixty-third street, cost $878,000, completed; reconstruction St. Charles Air Line bridge, cost $151,420, 80 per cent completed; classification yard, cost $1,500,000; track elevation from Grand Crossing to Kingston, cost $2,082,300, 31 per cent completed; engine terminal at Hawthorne, cost $150,890, 75 per cent completed; four track bridge over Kankakee river, Kankakee, Ill., cost $346,357, 71 per cent completed, and engine terminal, cost $136,476, completed; engine terminal and additional yard tracks, Champaign, cost $259,000, completed; additional yard tracks, Centralia, cost $171,710, 85 per cent completed; water supply, Du Quoin, Ill., cost $100,000, 10 per cent completed; engine terminal, Carbondale, cost $300,000, completed; engine terminal and yard tracks, Mounds, cost $458,000, 95 per cent completed; inbound freight house, East St. Louis, cost $142,810, and engine terminal and additional yard tracks, East St. Louis, cost $130,290, completed; engine terminal, Clinton, cost $200,949, completed; engine terminal and yard at Amboy, cost $316,170, completed; passenger station, Mattoon, cost $107,715, and engine terminal, cost $116,530, completed; renewal of bridges on system, cost $1,715,340, to be completed by December, 1919; change in line and additional yard tracks, Stithton, Ky., cost $128,300, completed; engine terminal at Paducah, Ky., cost $265,000, completed; change of grade and line 13.5 miles from Princeton, Ky., to Dawson, cost $802,000, 58 per cent completed; engine terminal, Fulton, Ky., cost $190,000, completed; grade separation at East Junction, Memphis, Tenn., cost $161,160, and additional trackage Nonconnah yard, Memphis, cost $328,920, nearing completion.

Indianapolis Union Railway

Other Important Work Under Construction: Elevation of Union tracks at Indianapolis, Ind., cost $8,060,000, 25 per cent completed.

International & Great Northern

Other Important Work Under Construction: New shop buildings, San Antonio, Tex., cost $229,163, completed.

Jacksonville Terminal Company

Other Important Work Under Construction: Reconstruction and enlargement of passenger and freight facilities at Jacksonville, Fla., cost about $2,500,000, to be completed in 1919.

Kanawha & Michigan

First Track: Gauley Bridge, W. V., to Belva, 5.60 miles.

Other Important Work Under Construction: Local freight station, Charlestown, W. Va., cost $175,000, completed; storage yard, Dunbar, W. Va., cost $100,000, 90 per cent completed; extension Hobson, O., to Meigs, 5.5 miles, cost $431,725, 10 per cent completed; extension from West Charleston, W. Va, to Dunbar, 3.90 miles, cost $100,000, 25 per cent completed

Kansas City Southern

First Track: Kansas City, Mo., 1.01 miles.

Second Track: Kansas City, Mo., 1.01 miles.

Kentucky & Indiana Terminal Railroad

Other Important Work Under Construction: Engine terminal, including 3.30 miles of terminal yard track at Louisville, Ky., cost $350,000, completed, and concrete coaling station to cost $100,000, 10 per cent completed.

Klamath Falls Municipal

First Track: Klamath Falls, Ore., to Dairy, 6.00 miles.

Lake Erie & Western

Other Important Work Under Construction: Roundhouse, Lima, O., cost $250,000, 30 per cent completed.

Lake Erie, Franklin & Clarion

First Track: Reidsburg Junction, Pa., to Alsace, 3.00 miles.

Lake Superior & Ishpeming

Other Important Work Under Construction: Shops and engine terminal at Presque Isle, Marquette, Mich., to include 20-stall roundhouse and other structures also about four miles terminal tracks, cost $430,000, 75 per cent completed.

Lancaster & Chester

Other Important Work Under Construction: Bridge renewal work on Catawba river in South Carolina, cost $125,000, completed.

Lehigh & New England

First Track: Bethlehem, Pa., to Allentown, 3.00 miles.

Lehigh Valley

Third Track: Manchester, N. Y., to Farmington, 3.75 miles.

Other Important Work Under Construction: Renewal of bridges, No. 269, Athens, Pa., cost $248,560; No. 407, Stafford, Pa., cost $146,000; No. 386, Wadsworth, N. Y., cost $266,000; No. 379a, Rochester Junction, N. Y., cost $109,700, and No. 341b, Geneva Junction, N. Y., cost $138,517; all completed; engine terminal and tracks, Ashmore, Pa., cost $1,200,000, to be completed in January, 1919; new boiler house, Perth Amboy, N. J., cost $196,164, completed; Hamburg Turnpike viaduct, Buffalo, N. Y., cost $216,013, 83 per cent completed; Avenue R, bridge, Newark, N. J., cost $193,135, completed; engine terminal, East Buffalo, N. Y., cost $688,710, completed; Fitt Farm engine terminal, Buffalo, cost $509,687, completed; engine terminal, Suspension Bridge, cost $431,107, completed; engine terminal, Manchester, cost $684,458, completed; new pier and bulkhead pier 44 East River, New York, cost $142,010, completed; changes on piers D, H, and L at Jersey City, N. J., cost $240,360, completed.

Live Oak, Perry & Gulf

First Track: Enconfina (Fla.), river west 4.00 miles.

Second Track: Altag, Fla., to main line, 1.75 miles.

Other Important Work Under Construction: Extension from Enconfina (Fla.), river west 10 miles, of which 7 miles are under construction.

Long Island

First Track: At Bethpage Junction, N. Y., 0.02 mile.

Second Track: Floral Park, N. Y., to Garden City, 3.11 miles; Hempstead to Meadow Brook, 1.84 miles; Hicksville to Pinelawn, 6.45 miles; total 11.40 miles.

Other Important Work Under Construction: Yard changes, Long Island City, N. Y., cost $140,930, completed; terminal facilities at Camp Upton, cost $250,000, completed; improved engine house facilities, Long Island City, cost $104,440, 70 per cent completed; improvements, including classification yard, Bay Ridge, cost $262,227, 70 per cent completed; freight yard at Bushwick, cost $247,230, 90 per cent completed; rearrangement and new station and track at Rockaway Park, cost $127,892, completed.

Louisville & Nashville

First Track: Kildav, Ky., to Seagrove, 9.58 miles; Grays Knob to mouth of Turtle Creek, 2.70 miles.

Other Important Work Under Construction: Bulkheads and bank protection, Pascagoula, Miss., cost $123,464, 82 per cent completed; second track 7.55 miles from Corbin, Ky., to Arkle, cost $252,502, 40 per cent completed; terminal yard at De Courcey, Ky., cost $1,356,471, completed; extension of yard at Montgomery, Ala., cost $276,200, 44 per cent completed; yard facilities at Radnor, Tenn., cost $2,170,067, 89 per cent completed; Lexington & Eastern branch from Blackey, Ky., 3.5 miles, cost $150,000, 60 per cent completed, and from Hamdin, Ky., 6.68 miles, $230,000, 42 per cert completed; branches in Perry county, Ky., 7.91 miles, cost $229,099, 75 per cent completed; Kentucky & Virginia, spur from Evarts, Ky., 6 miles, cost $210,000, 36 per cent completed; reconstruction of coal wharf, Mobile, Ala., cost $114,251, 78 per cent completed.

Madison, Illinois & St. Louis

Other Important Work Under Construction: Engine terminal in north end of Madison yard in Venice, Ill., cost $140,000, 30 per cent completed.

Mahoning Coal Road

Other Important Work Under Construction: Coalburg, O., enlargement of yard, cost $402,451 completed; additional car repair tracks, cost $110,000, 10 per cent completed, and new engine terminal, cost $675,000, 30 per cent completed; Hunrod avenue viaduct, Youngstown, O., cost $310,285, 31 per cent completed

Maine Central

First Track: Fairfield, Me., to Benton, 0.71 mile.

Second Track: Waterville, Me., to Clinton, 7.47 miles.

Other Important Work Under Construction: Shop improvements, Waterville, Me., cost $247,625, completed; renewal of bridge, Gardner, cost $120,000; terminal improvements at Mattawamkeag, cost $145,000, to be completed by June, 1919.

Marion & Eastern

First Track: Pittsburg, Ill., eastward, 1.00 mile.

Miami Mineral Belt

First Track: Huckerville, Kan., to Baxter Junction, 2.20 miles; Monarch to Naylor, 1.40 miles; total 3.60 miles.

Michigan Central

Other Important Work Under Construction: Engine terminal and yard, Niles, Mich., cost $1,378,500, to be completed July, 1919; draw bridge, River Rouge, Detroit, Mich., cost $541,000, to be completed July, 1920; boiler and tank shop, Jackson, Mich., cost $355,000, to be completed March, 1919; steel car repair shop, West Detroit, Mich., cost $210,000, completed; new roundhouse and facilities, Joliet, Ill., cost $161,600, to be completed March, 1919.

Midland & Northwestern

First Track: Flory, Tex., to Seminole, 17.00 miles.

Minneapolis, St. Paul & Sault Ste. Marie

Other Important Work Under Construction: Concrete arch bridge, Frogner, Minn., cost $133,800, 38 per cent completed.

Missouri, Kansas & Texas

Other Important Work Under Construction: Rearranging and enlarging yard and locomotive facilities at New Franklin, Mo., cost $150,000, completed; building terminal and water supply at Appleton City, Mo., cost $300,000, 20 per cent completed; building subway to carry Main street under tracks, Parsons, Kan., cost $150,000, 65 per cent completed; rearranging and enlarging freight yard and building a reclamation plant at Parsons, cost $350,000, completed; enlarging and rearranging locomotive facilities and yard at Fort Worth, Tex., cost $300,000, 10 per cent completed; grade separation to eliminate street crossings, Dallas, Tex, cost $360,342, 85 per cent completed.

Missouri Pacific

Other Important Work Under Construction: Track elevation, Omaha, Neb., cost $198,500, completed.

Monongahela Railroad

Second Track: South Brownsville, Pa., to Luzerne, 4.61 miles.

Other Important Work Under Construction: Terminal improvements at

Brownsville, Pa., cost $667,200, 32 per cent completed; additional yard tracks, Big Meadow Run, Pa., cost $159,600, completed; second track from Big Meadow Run to Rush Rue, cost $120,000, 60 per cent completed, and from Masontown, Pa., to Antram, cost $171,000 to be completed March, 1919; shops at South Brownsville, Pa., cost $105,000, 4 per cent completed; additional side tracks at Big Meadow Run, Pa., cost $216,000, 45 per cent completed.

Morgan's Louisiana & Texas

Other Important Work Under Construction: New machine shops, Algiers, La., cost $152,800, completed.

Morgantown & Wheeling

First Track: Between state line and Brave, Pa., 2.20 miles; between Blacksville, W. Va., and state line, 1.50 miles; total 3.70 miles.

Nashville, Chattanooga & St. Louis

First Track: Cravens, Tenn., to Alten Park; Coalmont, Tenn, to Tatesville.

Other Important Work Under Construction: Grade reduction, Chattanooga division, M. P., 76.84, cost $272,740, nearing completion; engine terminal, Atlanta, Pa., cost $206,796, 6 per cent completed; connecting track, Radnor, Tenn., 4.33 miles, cost $963,177, 20 per cent completed; freight house and team tracks, Cleveland, O., cost $129,544, completed; grade crossing elimination at Cleveland, O., to cost $2,136,000, to be completed June, 1920; yard extension at Bellevue, O., cost $133,787, completed.

New York Central

First Track: At Grand Central Terminal, New York, 1.56 miles; extension of New Jersey Junction, West New York, N. J., 0.17 mile.

Second Track: Through Lyons, N. Y., yard, 1.03 miles.

Third Track: Through Poughkeepsie, N. Y., 1.63 miles; Dunkirk, N. Y., 1.82 miles.

Fourth Track: Through Poughkeepsie, N. Y., 1.10 miles; Dunkirk, N. Y., 0.60 mile; Granton, N. J., to Little Ferry, 1.50 miles; Perry, Ohio, to Painesville, 6.42 miles.

Other Important Work Under Construction: Syracuse, N. Y., Solvay engine house, cost $900,000, 2 per cent completed; new engine terminal, Watertown, N. Y., cost $900,000, 15 per cent completed; additions and extensions to engine house at Clearfield, Pa., cost $120,000, 85 per cent completed; additional eastbound yard at Minoa, N. Y., cost $250,000, 28 per cent completed; third and fourth track, Syracuse Junction branch, Syracuse, N. Y., cost $460,000, 44 per cent completed; engine house extension and alterations, Minoa, N. Y., cost $204,000, 47 per cent completed; additions to engine house facilities at Cherry Tree, Pa., cost $150,000, 75 per cent completed; extension of car repair shop, East Buffalo, N. Y., cost $550,000, 3.1 per cent completed; engine house improvemnts, De Witt, N. Y., cost $250,000, 40 per cent completed; engine terminal and yard tracks, Genesee Junction, N. Y., cost $214,000, 16 per cent completed; freight repairs shop facilities, New Durham, N. J., cost $200,000, 3 per cent completed; additional shop facilities, Avis, Pa., cost $855,000, 12 per cent completed; addition to Massey street yard, Watertown, N. Y., cost $120,000, 25 per cent completed; Piers K4 and K5, Weehawken, N. J., cost $1,564,000, 3 per cent completed; reconstruction 149th street bridge, New York, cost $284,700, 24 per cent completed; elimination of yard crossings at Duchess Junction, N. Y., cost $424,813, completed; reconstruction of bridge No. 698C, at Rochester, N. Y., cost $128,450, 17 per cent completed; elimination of grade crossing, Hertel avenue, Buffalo, N. Y., cost $400,390, 71 per cent completed; new yard at West Albany, N. Y., cost $546,107, 40 per cent completed; general improvements, Utica, N. Y., cost $509,940, 15 per cent completed; yard extension, Little Ferry, N. J., cost $313,535, 33 per cent completed; passenger station facilities, Poughkeepsie, N. Y., cost $329,037, completed; express building, Buffalo, N. Y., cost $742,318, 97.5 per cent completed; ice house and repair yard, Weehawken, N. J., cost $397,192, 45 per cent completed; new freight house and team yard, West Lockport, N. Y., cost $106,878, completed; new engine house facilities, Belle Isle, N. Y., cost $784,153, 94 per cent completed; engine terminal and yard improvements, Gardenville, N. Y., cost $2,264,800, 83 per cent completed; change of alinement, Tonawanda, N. Y., cost $1,849,092, 14.5 per cent completed; improvements, Grand Central terminal, New York, cost $3,701,530, 72 per cent completed; new trackage at Norwood, N. Y., cost $151,000, work delayed; third and fourth track improvements at Dunkirk, N. Y., cost $174,900, 96 per cent completed; terminal improvements, Erie and Wesleyville, cost $221,847, 96 per cent completed; grade separation, Erie, Pa., cost $139,985, 50 per cent completed; new west bound yard, Dock Junction, Pa., cost $541,612, 70 per cent completed; new west bound freight main and yard tracks, Perry to Painesville, O., cost $204,328, 71 per cent completed; water supply improvements at Nottingham, O., cost $109,730, completed; extension to locomotive shops, Collinwood, O., cost $350,000, 20 per cent; East One Hundred and Fifth street subway, Cleveland, O., cost $125,243, completed; new freight terminal, Cleveland, O., to cost $4,513,000, nearing completion; additions to Kinsman Road yard, Cleveland, O., cost $140,000, 45 per cent completed; additions to yard, Marcy, O., cost $100,000, 45 per cent completed; new yard, Rockfort, O., cost $960,885, 65 per cent completed; grade separation, Elyria, O., cost $354,595, 30 per cent completed; new yard and engine terminal, Minerva, O., cost $500,000, 45 per cent completed; engine terminal and additional yard facilities, River Rouge, Mich., cost $173,896, completed; grade separation, Detroit, Mich., cost $267,589, 85 per cent completed; Russell street freight house and team tracks, Detroit, Mich., cost $341,442, completed; yard extension at Elkhart, Ind., cost $279,000, 80 per cent completed.

New York, New Haven & Hartford

First Track: Casanova N Y., to connection with New York Connecting 0.08 mile.

Second Track: Casanova, N. Y., to New York Connecting 0.06 mile.

Third Track: Casanova, N Y., to New York Connecting 0.08 mile; South Bay Junction, Mass., to Boston freight terminal, 0.50 mile; total 0.58 mile.

Fourth Track: Casanova, N. Y., to New York Connecting 0.06 mile; South Bay Junction, Mass., to Boston freight terminal, 0.50 mile; total 0.56 mile.

Fifth Track: Belle Dock Junction, Conn., to Quinnipiack, 1.00 mile.

Sixth Track: Belle Dock Junction, Conn., to Quinnipiack, 1.00 mile.

Other Important Work Under Construction: Strengthening bridge, Waterbury, Conn., cost $118,171, completed; rebuilding bridge, Hartford, Conn., cost $370,090, completed; Thames river bridge, New London, Conn., cost $2,740,000, 84 per cent completed; rebuilding bridge, Mystic, Conn., cost $211,131, 91 per cent completed; enlargement of South Boston cut for four tracks, Boston, Mass., cost $972,000, 84 per cent completed; freight classification yard and engine facilities, Cedar Hill, Conn., cost $2,349,200, 50 per cent completed; additional yard tracks, Waterbury, Conn., cost $184,100, 86 per cent completed; extra classification yard, Midway, Conn., cost $217,000, completed; freight terminal and classification yard, Boston, Mass., cost $1,697,000, 11 per cent completed; classification yard and engine facilities, Pawtucket, R. I., cost $1,403,780, 30 per cent completed; additional side tracks, Springfield, Mass., cost $170,000, 80 per cent completed; connecting track from Highland branch yard to Naugatuck line, Waterbury, Conn., cost $340,000, 7 per cent completed; additional yard tracks, Hartford, Conn., cost $223,000, 5 per cent completed; passenger station, New Haven, Conn., cost $1,434,713, 54 per cent completed; improvements at coaling plant pier No. 4, Boston, Mass., cost $113,491, completed; engine house and terminal facilities, Danbury, Conn., cost $204,895, completed; new and enlarged engine house facilities, Boston, Mass., cost $762,822, completed; Cedar Hill engine terminal, New Haven, Conn., cost $181,500, 24 per cent completed; engine facilities, South Worcester, Mass., cost $157,240, 70 per cent completed; four coal towers, East Providence, R. I., cost $184,636, completed.

New York, Susquehanna & Western

Other Important Work Under Construction: Additional tracks and warming house, Undercliff, N. J., cost $212,000 completed; additional engine terminal facilities, Little Ferry, N. J., cost $101,623, completed.

Norfolk & Portsmouth Belt

First Track: From connection with Virginian Railway in Virginia to Elizabeth River, 2.47 miles.

Norfolk & Western

First Track: Putnam, Va., to end of line, 8.91 miles; in West Virginia, extensions of Western branch, 0.25 mile and of Alma branch 0.96 mile; total 10.12 miles.

Other Important Work Under Construction: Coal handling machinery pier No. 3, Lamberts Point, Va., cost $400,000, 50 per cent completed; reinforced concrete viaduct, Lynchburg, Va., cost $205,000, completed; freight station, Roanoke, Va., cost $380,000, completed, and increased engine terminal and yard facilities, cost $1,710,000, 10 per cent completed; additional tracks, Shenandoah, Va., cost $154,000, completed; additional yard tracks, Hagerstown, Md., cost $600,000, 3 per cent completed; third track from Pelton, Va., to Vicker, 2.80 miles, cost $240,000, 58 per cent completed, coal and water station, Vicker, Va., cost $140,000, 98 per cent completed; additional yard facilities, Bristol, Va., cost $700,000, 88 per cent completed; additional storage tracks, Bannon, O., cost $100,000, 70 per cent completed; station building, Camp Lee, Petersbing, Va., cost $200,000, completed; freight station, Winston-Salem, N. C., cost $167,000, completed.

New York Connecting Railroad

First Track: Sunnyside Junction, N. Y., to Fresh Pond, 4.32 miles.

Second Track: Sunnyside Junction, N. Y., to Fresh Pond, 4.32 miles.

Third Track North right of way line of N. Y., N. H. & H., to Woodside avenue, N. Y., 3.73 miles.

Fourth Track: North right of way line of N. Y., N. H. & H., to Woodside avenue, N. Y., 3.73 miles.

Northern Pacific

Second Track: Jamestown, N. D., to Eldridge, 4.36 miles; Bozeman, Mont., to Logan, 32.38 miles.

Third Track: Billings, Mont., 1.07 miles.

Fourth Track: Billings, Mont., 1.16 miles.

Other Important Work Under Construction: Yellowstone division, construction dyke work and rip rap along Yellowstone river and similar work in Montana division; cost, $218,707, 95 per cent completed; second track from Jamestown, N. D., to Windsor, 12 miles, cost $328,937, 77 per cent completed; second track, Laurel, Mont., to Park City, 7.47 miles, $145,197, 44 pe cent completed; Kission, Mont., to Livingston, 5.6 miles, cost $118,486, 38 per cent completed; rehabilitating and improving to main line standards on Pasco, Sunnyside and other branches in Washington, cost $559,361, completed.

North Texas & Santa Fe

First Track: In Texas, not specified, 0.70 mile.

Oregon Short Line

First Track Menan, Idaho, to Annis, 2.72 miles; Keever to Thomas, 4.54 miles; Lincoln to Ammon, 3.58 miles; Garland, Utah, to Bear River City, 9.57 miles; Baker to Urban, 3.80 miles; total 24.21 miles.

Other Important Work Under Construction: Replacing 50-span pile trestle with steel spans and concrete piers and abutments at bridge 20-A, near Burley, Ida., cost $200,996, nearing completion; Teton Valley branch, near Tetonia, Ida., to Brown Bear coal mines, construction 9.05 miles branch road, with 2.00 miles of siding, cost $289,897, 15 per cent completed.

Oregon-Washington Railroad & Navigation Company

First Track: Primo, Wash., to Vesta Creek, 3.21 miles. Between Pine Creek and Masonia, 2.32 miles.

Second Track: Hanlons, Wash., to Kamela, 2.30 miles.

Other Important Work Under Construction: New line from Pine Creek, to Masonia, Ida., 10.54 miles, cost $380,000; work deferred, filling trestle, L-2, St. John Junction, Ore., cost $119,088. Completed; grade revision through Sullivan Gulch, Portland, Ore., cost $488,187, 95 per cent completed; change in line, Alto, Wash., 5,070 feet, cost $177,018, 95 per cent completed; dredging and construction of wbarf and warehouse, Seattle, Wash., cost $354,080. Completed.

Pennsylvania Railroad

First Track: Carnbrook, Pa., southward 1.86 miles; Meadows Yard, N. J., 0.31 mile; connection with the Waverly Passaic branch, 0.46 mile; branch on the Meadows, 1.33 miles; at Princeton, N. J., 0.35 mile; at Trenton, 0.33 mile, West Morrisville, Pa., 0.08 mile; Petty Island branch, 2.22 miles; South Philadelphia, 1.06 miles; Manayunk, Pa., 0.63 mile; Coatsville branch, 2.03 miles; Unity branch extension, 2.42 miles; Turtle Creek branch extension, 4.78 miles; Ten-mile Run branch, 0.24 mile; Sixtieth street branch, Philadelphia, Pa., 4.51 miles; Girard Point to Essington, 6.51 miles; Essington to Chester, 1.48 miles; at Ridley river, 0.49 mile; at Darby river, 0.40 mile; at Stoney Creek yard, 0.35 mile; Camden N J., 1.98 miles.

Second Track: Mt. Holly, Birmingham, N. J., 4.81 miles; second track and change of line, Brownsville Junction to Linn, Pa., 2.46 miles; change of line and grade and second track, Bullis Mill., N. Y., to Eldred, Pa., 7 miles; grade revision and second track, Corry, Pa., to Brownell, N. Y., 3.50 miles; Glynden, Pa., to Spartansburg, 3.50 miles; Fifty-ninth street, Philadelphia, Pa., to Grays Ferry, 1.75 miles; at Peach Bottom, Md., 2.22 miles; at Meadows, N. J., 0.29 miles; at Princeton, N. J., 0.31 mile; at Trenton, 0.33 mile; at West Morrisville, Pa., yard, 1.90 miles; Petty Island branch 0.25 mile; Chelton avenue, Pa., 0.21 mile; at South Philadelphia, 1.06 miles; Manayunk, 0.63 mile; Saltsburg, 0.49 mile; Ten-mile Run branch, 0.38 mile; Sixtieth street, Philadelphia, 2.54 miles; Girard Point and Essington, 5.48 miles; Essington to Chester, 1.41 miles; South Chester branch, 0.04 mile; Marcus Hook, 0.34 mile.

Third Track: At Elkton, Md., 1.5 miles; Bayview yard, Md., 1.33 miles; Meadows yard, N. J., 0.26 miles.

Fourth Track: Newark, Del., to Elkton, Md., 2.53 miles; at Beacon Hill, Md., 1.74 miles; at Meadows Yard, N. J., 0.21 mile; Winans, Md., to S. Y. Tower; South Duquesne, Pa., to Drakesburg.

Fifth Track: Marcus Hook to Claymont, Pa.; at Philadelphia, 0.44 mile; at Torresdale, Pa., 0.20 mile; Parkersburg to Pomeroy, 1.10 miles.

Sixth Track: Edgely, Pa., to Tullytown, 0.73 miles; Philadelphia, Pa., 0.71 mile.

Other Important Work Under Construction: Car repair yard facilities, Greenville, N. J., cost $256,770, completed; additional yard tracks, Sunnyside yard, Long Island City, cost $458,598, 60 per cent completed; new yard tracks, Metuchen, N. J., cost $145,324, 42 per cent completed; protecting center pier of Passaic river bridge, Newark, N. J., cost $184,300, completed; changes at passenger station, New York, cost $436,483, completed; facilities at U. S. Cantonment, Wrightstown, N. J., cost $229,000, completed; Steelton, Pa., yard facilities, cost $225,686, and freight station and car load delivery tracks, cost $119,940, both completed; tank and caboose shop at Altoona, Pa., cost $216,994, completed; extension to power plant, cost $1,354,752, and extension to Juniata shop buildings at Altoona, Pa., cost $748,750, under way; oil mixing and storing plant, South Altoona, Pa., cost $184,267, completed; renewal of two bridges, Orrton Pa., cost $373,716, completed; reconstruction of bridge No. 57.99, Reading, Pa., cost $316,196, 65 per cent completed; side track, Bolivar, Pa., cost $176,162, completed; rebuilding freight facilities, Connellsville, Pa., cost $201,657, completed; additional classification tracks, Conemaugh, Pa., cost $176,645, completed; new engine facilities, Derry, Pa., cost $124,705, 25 per cent completed; improved freight facilities, East Liberty, Pa., cost $565,811, and at Greensburg, Pa., cost $101,051, both completed; extension of yard tracks, Pitcairn, Pa., cost $104,502, 50 per cent completed, engine and storehouse facilities, Pitcairn, Pa., cost $100,018, completed; coaling station, Pitcairn, Pa., cost $150,000, completed; improved engine facilities, Youngwood, Pa., cost $323,262, 95 per cent completed; locomotive terminal facilities, West Brownsville Junction, Pa., cost $245,913, 95 per cent completed; grade crosssing elimination, Buffalo, N. Y., cost $184,648, 73 per cent completed; additional freight facilities, Buffalo, N. Y., cost $741,764, 85 per cent completed; ore dock facilities and track changes at Buffalo, N. Y., cost $123,046, completed; grade crossing elimination, Mineral Springs road, Buffalo, cost $283,237; Shocks Mills freight storage yard, Marietta, Pa., cost $467,905, completed; change of line and grade, Larabee, Pa., cost $192,171, 98 per cent completed; elevating existing main track and grading for second track at Brownell to Sherman, N. Y., cost $312,036, 58 per cent completed; additional engine house facilities, South Oil City, Pa., cost $126,385, 98 per cent completed; elimination of grade crossings and rearrangement of freight facilities, Erie, Pa., cost $142,107, 90 per cent completed; engine house and facilities, Kane, Pa., cost $194,084, 90 per cent completed; extension to engine house, additional ash pits, oil house, etc., Renovo, Pa., cost $103,450, 85 per cent completed; bridge at Lewistown Junction, Pa., cost $135,300, completed; bridge at Nanticoke river, Pa., cost $114,000, completed; new receiving yard and shipping tracks, Farnhurst, Del., cost $132,769, completed; extension of second track, from Harrington, Del. to Greenwood, cost $376,755, 95 per cent completed; extension to engine house, Philadelphia, Pa., cost $120,607, 80 per cent completed; relocating freight station and tracks at Roberts avenue and King street, Philadelphia, cost $140,074, completed; storage yard, Twenty-second street and Margie street, Philadelphia, cost $160,793, completed; replacing bridge at Kensington avenue, cost $153,299, and at Second street, on main line, Philadelphia, cost $126,113, both completed; new line, Saltsburg, Pa., to Turtle Creek branch, 8.4 miles, cost $769,746, 60 per cent completed; removing 1,000 ft. of cover at west end of Radebaugh tunnel, cost $518,231, 4 per cent completed; partial development of new classification yard at west end, Sharpsburg, Pa., cost $1,431,876, 62 per cent completed; 10-mile branch to Waynesburg, Pa., cost $402,884, 60 per cent completed; 10-mile branch to Pitt Gas Coal Co., at Besco, Pa., cost $140,466, 60 per cent completed; engine house facilities, additional yard tracks and shop appurtenances, Blairsville, Pa., cost $219,556, 65 per cent completed; removing old tunnel lining 200 ft. at Radebaugh, Pa., cost $132,415, completed; new engine facilities, Gardenville, N. Y., cost $1,023,106, 75 per cent completed; new bridge over Red Bank creek, Red Bank, Pa., cost $234,400, 75 per cent completed; bridge over Clarion river, Parkers Landing, Pa., cost $289,657, 73 per cent completed; bridge over East Sandy creek, East Sandy, Pa., cost $226,820, 73 per cent completed; bridge over Mahoning creek, Mahoning, Pa., cost $213,163, 75 per cent completed; replacing engine house, extending machine shop and other repair facilities, Pitcairn, Pa., to cost $310,000, 84 per cent completed; change of line and grade, Freeport, Pa., to Butler Junction, Pa., cost $1,072,017, completed; additional engine house facilities at Shire Oaks, Pa., cost $142,986, 70 per cent completed. Rebuilding bridge at Schuylkill river, Ridgewood, Pa., cost $275,254, completed; rebuilding bridge at Schuylkill river, Orrton, Pa., cost $246,947, completed; rebuilding bridge over Schuylkill river, Frick Lock, Pa., cost $151,370, completed; Coatesville, Pa., Pomeroy yard, cost $308,755, 90 per cent completed; West Mainsville, Pa., eastbound receiving yard and westbound departure yard, cost $71,714, completed; new bridge over Schuylkill river, Manayunk, Pa., cost $815,623, completed; new bridge over Leverington avenue, Manayunk, Pa., cost $135,790, 71 per cent completed; foundations, Sullivan Way, undergrade bridge, Trenton, N. J., cost $154,857, 86 per cent completed; new engine house and shop facilities, Phillipsburg, N. J., cost $138,141, 19 per cent completed; freight station and delivery tracks, Harrisburg, Pa., cost $526,500, 78 per cent completed; revision and enlargement of yard at Meadows, N. J., cost $1,224,560, 37 per cent completed; relocation work and passenger and freight station and yards, Princeton, N. J., cost $433,557, 81 per cent completed; westbound receiving and classification yard and transfer facilities Waverly, N. J., cost $1,507,210, 20 per cent completed; bridge over Avenue R, Newark, N. J., cost $175,000, completed; covered pier and tracks, Greenville, N. J., cost $688,171, completed; storage yard and track connections for U. S. Government and submarine boat corporation, Newark, N. J., cost $144,868, completed; developments between Passaic and Hackensack rivers, Meadow, N. J., cost $290,306, completed; reconstruction of Baltimore & Potomac tunnels, Baltimore, Md.; cost $840,874, completed; coal pier and export pier, rearranging track, Baltimore, Md., cost $541,191, completed; construction of new tracks at south end of Gunpowder river bridge, Maryland, to north end of Bayview yard, 19.5 miles, cost $1,290,983, 15 per cent completed; extension No. 1 track 6.7 miles between Baltimore and Washington, cost $456,845, 12 per cent completed: new pier and grain elevator, (Canton), Baltimore, Md., cost $2,680,011, 30 per cent completed; new engine house and machine shop, etc., Greenwich, Pa., cost $543,830, 14 per cent completed; South Chester bridge locomotive and car facilities at Thurlow, Pa., cost $474,730, 1 per cent completed; two-track joint line, Broad street to Delaware avenue and Hoyt street, South Philadelphia, 2 miles, cost $260,700, 4 per cent completed; South Chester branch closing gap in line 4 miles, track at Chester, Pa., cost $382,386, 95 per cent completed; additional tracks and revision of Thurlow yard, Marcus Hook, Pa., and Thurlow, Pa., cost $544,800, 5 per cent completed; new yard, Edge Moor, Del., cost $2,222,000, 8 per cent completed; additional facilities at engine house, Wilmington, Del., cost $585,355, 15 per cent completed; track elevation at South Philadelphia, Pa., Pennsylvania portion, cost $4,231,316, 96 per cent completed, and Philadelphia, Baltimore & Washington portion cost $753,467, 90 per cent completed; yard at West Philadelphia, cost $2,147,448, 18 per cent completed; Sixtieth street branch, Fifty-eighth street to Junction with Chester and Philadelphia bridge, Philadelphia, 10 miles, cost $1,594,602, 42 per cent completed; branch from Chester to Gerard Point, and connection with main line at Eddystone, between Chester and Philadelphia, Pa., cost $3,091,703, 66 per cent completed; reconstruction of Pequa creek bridge, Pequa, Pa., cost $184,319, 4 per cent completed; engine terminal at Perryville, Md., cost $262,287, 1 per cent completed; elimination of grade crossing at Chestnut Hill bridge, Philadelphia, cost $925,000, completed; extension to engine house, ash pits at Gray's Ferry yard, Philadelphia, cost $107,990, 12 per cent completed; change of line and grade from Delaware avenue branch, Trenton to Cumberland street, Philadelphia, cost $623,833, completed; overhead bridge at Trenton, N. J., cost $148,855, completed; alterations to hog abattoir, Philadelphia, Pa., cost $162,354, 90 per cent completed; electrification from West Philadelphia to Chestnut Hill, cost $221,105, and electrification from Philadelphia to Paolia, cost $1,843,875, completed.

Pennsylvania—Western Lines

First Track: North Columbus, O., to Worthington,* between Worthington and Lewis Center, 8.00 miles.

Second Track: Lewis Center, O., to Delaware 5.06 miles; at Bellaire 2.20 miles; Wardwell to Bristolville 11.60 miles; total 18.86 miles.

Third Track: Leetonia, O., to Alliance Junction, 13.00 miles; Alliance, O., to Maximo, 6.20 miles, at Maximo, O.; at Canton, O.; Marsfield to Toledo Junction; Moravia, O., Lawrence Junction to Mahonington and H. F. Tower; Smithville to Millbrook, O.

Fourth Track: Alliance to Maximo, O., 6.20 miles; at Alliance, O., 3.00 miles; at Maximo, O.; at Canton, O.; Moravia, O.; Lawrence Junction to Mahonington and H. F. Tower.

Other Important Work Under Construction: Raising bridge No. 1 over Allegheny river, Pittsburgh, Pa., cost $1,654,320, completed; coaling station, Yankee Crossing, O., cost $110,701, completed; additional yard facilities, Stark, O., cost $875,084, 90 per cent completed; new freight terminal, Chicago, cost $4,457,775, completed; viaduct Polk and Taylor streets, Chicago, cost $300,000, 95 per cent completed; track elevation from Stony Island to State Line, Chicago, cost $3,519,180, 97 per cent completed; reconstructing bridge over Beaver river, Rochester, Pa., cost $814,014, completed; receiving and storage track at Kinsman street yard, Cleveland, O., cost $373,832, completed; track elevation, Cleveland, O., cost $2,307,371, completed; second track, Bayard-Alliance, O., cost $809,540, 90 per cent completed; second track grade revision and line change at Summitville, O., cost $1,524,064, complete except track laying; yard and engine house, Mingo Junction, O., cost $4,386,071, 50 per cent completed; low grade line from Kenwond to Rochester, Pa., cost $1,647,288; additional yard facilities, Austinburg, O., cost $108,450, completed; relocation main tracks, enlarging yard facilities and engine house facilities, Mosier yard, Ohio, cost $3,492,000; engine house facilities, Wheatland, Pa., cost $130,642, completed; second track, Burgoon to Tiffin, O., 11.20 miles, cost $651,354, under way: track elevation, Columbus, O., cost $136,752, completed; new engine house layout, Sandusky, O., cost $208,280, completed; rearranging and enlarging yard, Sandusky-Bay Junction, Ohio, cost $288,454, completed; rearranging yard facilities, South Akron, O., cost $532,300, completed.

Philadelphia & Reading

First Track: In Pennsylvania, at various places, 1.00 mile.

Second Track: At Glenmoore, N. J., 1.50 miles; between Reading, Pa., and Harrisburg, 1.50 miles.

Other Important Work Under Construction: Concrete arch bridge over Schuylkill river, Philadelphia, Pa., cost $915,374, 30 per cent completed; bridge work under way at Tulip and Emerald streets and Erie avenue yard, Philadelphia, cost $309,196, undergrade crossing, Asylum Road, Trenton Junction, N. J., cost $113,600, 52 per cent completed; additional track and replacing and extension of bridges, Trenton Junction, to Hopewell, cost $539,645, 65 per cent completed; additional east and west bound tracks, Belle Meade to Manville, N. J., cost $732,680, 72 per cent completed; additional tracks Eastwick to Darby Creek, Pa., cost $211,986, 80 per cent completed; track work, bridge work and drainage at Tulip and Emerald streets and Erie avenue yard, Philadelphia, Pa., cost $623,969, 80 per cent completed; change in alignment and new yard from Lester to North Essington, Pa., cost $187,420, completed; engine facilities, Sancon Creek, South Bethlehem, cost $636,435, 75 per cent completed; east and west bound receiving yard and west bound classification yard, Rutherford, Pa., cost $106,824, completed; east bound classification yard extension, Rutherford, Pa., cost $196,512, 85 per cent completed; coaling station and sand house, Philadelphia, Pa., cost $175,760, completed; engine terminal, Reading, Pa., cost $264,150, 92 per cent completed; Erie avenue yard, Philadelphia, Pa., cost $189,453, 72 per cent completed; engine house and machine shop, Philadelphia, Pa., cost $339,517, 93 per cent completed; 12-stall engine house, Reading, Pa., cost $226,426, 29 per cent completed; 13-stall engine house, Tulip street yard, Philadelphia, Pa., cost $255,487, 64 per cent completed; additional east and west bound track, Robesonia, Pa., to Sheridan, Pa., and Robesonia to Womelsdorf, cost $350,033, 15 per cent completed; replacing viaduct with arch and fill, McAuley, Pa., cost $101,558, 10 per cent completed; east bound departure tracks, air testing plant, etc., at Rutherford, Pa., cost $142,921, 20 per cent completed; engine terminal, South Bethlehem, cost $626,525, 7 per cent completed; smoke elimination, boiler washing plant heating plant for engine house, Erie avenue yard, Philadelphia, Pa., cost $109,987, 13 per cent completed; additional main track, Blandon, Pa., to Fleetwood, cost $161,158, 18 per cent completed; new machine shop and engine house, Rutherford, Pa., cost $288,468, 25 per cent completed; engine house facilities, Darby Creek, cost $358,848, 16 per cent completed; extension fourth track, Wissahicken avenue to Falls bridge, Philadelphia, Pa., cost $249,091, under way.

Pittsburgh & Lake Erie

Other Important Work Under Construction: Enlargement of terminal yard and building new facilities, Hazelton, O., cost $2,201,588, 35 per cent completed; revision of main line, Lowellville to Struthers, O., cost $520,889, 48 per cent completed; improvements at Groveton, Pa., including additional yard tracks, change of grade and alinement, signals and interlocker, coaling plant, water station, ash plant and sand house, cost $430,000, 12 per cent completed; rebuilding coach and tender shop, McKees Rocks, Pa., cost $253,787, completed; extension of east ward yard, McKees Rocks, cost $631,000, 3 per cent completed; central warehouse, Pittsburgh, cost $157,746, completed; replacing viaduct with enbankment, Rankin, Pa., cost $605,770, 28 per cent completed; Lynch classification yard, Port Vue, Pa., cost $209,328, 70 per cent completed;

Pittsburgh, Cincinnati, Chicago & St. Louis

First Track: Indianapolis & Frankfort R. R., Frankfort, Ind., to Ben Davis, 42.10 miles.

Second Track: Alton to Glade Run, O., between Horatio, O., and Onward, Wheeling Junction, W. Va., to East Steubenville, 1.00 mile; Glenn's Run, W. Va., to Wheeling, 5.19 miles; Philadelphia, Ind., to Irvington, 9.08 miles; at Hawthorne Yard, Indianapolis, Ind., 1.77 miles; at Ben Davis, Ind., 0.31 mile; at Frankfort, Ind., 1.80 miles.

Third Track: Trimmer, Ind., to Boone, 6.34 miles.

Other Important Work Under Construction: New freight station and track layout, Kokomo, Ind., cost $132,322, completed; new joint yard, additional main tracks and grade changes, Logansport, Ind., cost $766,714, completed; track elevation Thirty-ninth street to Sixty-ninth street, Chicago, cost $6,549,405, 45 per cent completed; second track, Wheeling Junction, W. Va., to East Steubenville, cost $192,888; grading 74 per cent completed, and track laying 52 per cent completed; Chester, W. Va., to state line at Philipsburgh, Pa. (new Cumberland & Pittsburgh, Ry.), cost $1,556,867, grading 92 per cent completed, bridge work 72 per cent completed; additional yard facilities, Bradford, O., cost $434,122, completed; yard facilities and construction of joint yard with Pennsylvania, Western Lines, Columbus, O., cost $1,097,992, work begun; improvements to engine house facilities, Columbus, O., cost $364,499, 25 per cent completed; improved yard facilities, Dennison, O., cost $1,663,690, to be completed by June, 1919; engine house and shop facilities, Chicago, cost $490,866, completed; new yard, engine house and yard facilities, Jefferson, Ind., cost $1,228,000, grading and masonry under way; new joint freight yard, east of Belt Railway at Indianapolis, Ind., cost $1,669,352, 92 per cent completed; Indianapolis track elevation, South to Downey streets, cost $347,951, completed; from Cruse to Noble streets, cost $966,006; Ohio river bridge, Louisville, Ky., cost $3,334,474, completed; track elevation, Delta to Stanley avenues, Cincinnati, O., cost $427,211, completed; freight station facilities, Cincinnati, O. (Cincinnati, Lebanon & Northern Railway), cost $301,782, grading 20 per cent completed; construction and rearranging track in east yard, Terre Haute, Ind., cost $118,400, and improvements to shop facilities, cost $143,045, completed; improvements to station and track facilities, Frankfort, Ind., cost $189,427, completed; grade reduction passenger siding and track changes from Frankfort to Logansport, Ind., cost $630,015, to be completed by July, 1919.

Pittsburg & Shawmut

Other Important Work Under Construction: Permanent lining of Coulter tunnel, Coulter, Pa., cost $243,180, 19 per cent completed.

Portland Terminal Company

Third Track: At Portland, Me., 0.32 mile.
Fourth Track: At Portland, Me., 0.36 mile.

Puget Sound & Cascade

First Track: In Washington, not specified, 2.00 miles.

Raritan River

Other Important Work Under Construction: Engine terminal at South Amboy, N. J., cost $200,000, 25 per cent completed.

Richmond, Fredericksburg & Potomac

Other Important Work Under Construction: Double track reinforced concrete bridge over James river, at Richmond, Va.; R. F. & P. proportion of cost, $211,589, 74 per cent completed; track depression, Richmond, Va., cost $323,080, 95 per cent completed.

Rutland Railroad

Other Important Work Under Construction: New shops, Rutland, Vt., cost $277,700, completed.

St. Joseph & Grand Island

Other Important Work Under Construction: Reconstruction of bridge over Mississippi river, St. Joseph, Mo., cost $1,174,056, 98 per cent completed.

San Diego & Arizona

First Track: Clover, Cal., to Jacumbo Siding, 25.28 miles.

Sand Springs

First Track: Between Tulsa, Okla., and Sand Springs, 3.00 miles.

Southern Railway System

First Track: From Central, S. C., to Tugalo river, 38.80* miles; from Tugalo river, Ga., to Cornelia, 13.10* miles; total 51.9* miles.

Second Track: In North Carolina from M. P. 383.5 to 391.4, from M. P. 391.7 to M. P. 407.4, and from M. P. 409.9 to M. P. 416.6, 15.83 miles; from Blacksburg, S. C, to Gaffney, 6.17 miles; Gaffney to Cowpens, 7.83 miles; Cowpens to Mt. Zion, 5.05 miles; M. P. 485.6 to M. P. 487.3, 3.27 miles; Central, S. C., to Tugalo river, 19.40 miles; Tugalo river, Ga., to Cornelia, 6.50 miles; total, 64.05.

*Replacing old line.

Other Important Work Under Construction: Additional main tracks building from Belmont to Bessemer City, N. C., cost $865,402; Bessemer City to Blacksburg, S. C.; Gaffney to Cowpens, S. C., cost $897,551; Cowpens to Mt. Zion, S. C., cost $596,664; and from Greer, S. C., to Greenville, cost $628,518; yard and engine terminal facilities, Selma, N. C., cost $319,511, completed; new yard facilities, Monroe, Va., cost $359,522, completed; new yard and engine terminal, Pomona, N. C., cost $929,771, completed; yard and engine terminal, Hayne, S. C., cost $437,097, 98 per cent completed; yard and engine terminal, Alexandria, Va., cost $451,226, completed; Warrior river bridge, Barney, Ala., cost $125,000, masonry completed; draw bridge at Congree river, cost $117,000, 60 per cent completed; second hand steel bridge over Catawba river, cost $176,000, completed; Toccoa, to Ayersville, Ga., North Broad river viaduct, Tuccoa yard track, and 8 miles of additional track, to cost $1,524,520, 97.3 per cent completed; viaduct at Birmingham, Ala., cost $199,705, 80 per cent completed.

Southern Pacific

First Track. Between Colusa, Cal., and Hamilton, 12.81 miles; Hoover, Ore., to Idanha, 1.94 miles.

Second Track: Between Tucson, Ariz., and Stockham, 1.97 miles.

Other Important Work Under Construction: Enlarging and putting in concrete lining to the San Fernando tunnel (Cal.), cost $187,263, 20 per cent completed; protection work for classification yard at Los Angeles, Cal., cost $173,190, completed; constructing 28 miles of belt line, Calipatria, cost $537,060, 40 per cent completed; building second track, Kern Junction, to Sivert, Cal., cost $366,579, 1 per cent completed; second track from Cameron to Tehachapi, Cal., cost $769,312, 2 per cent completed, and from Cameron to Mojave, 9 miles, cost $272,070, 2 per cent completed; new terminal facilities, Bay Shore, Cal., cost $861,762, 97 per cent completed; filling and grading at Sacramento, Cal., cost $147,170, 2 per cent completed; new wharf facilities at Oakland Pier, $437,300, 20 per cent completed; wood preserving works at Oakland, cost $324,730, 3 per cent completed; dredging and bulkheading at West Alameda, cost $14,320, 22 per cent completed; enlarging tunnels (3 to 12 inclusive) between Cisco, Cal., and Lakeview, cost $106,360, 98 per cent completed; terminal facilities, Deming, N. M., cost $263,191 and terminal facilities at Bowie, Ariz., cost $223,393, both to be completed by March, 1919.

Staten Island Rapid Transit Co.

Other Important Work Under Construction: Track for new coal yard at Arlington, S. I., cost $120,224, 83 per cent completed.

Stouts Mountain & Hanceville

First Track: Hanceville, Ala., to Stouts Mountain, 7.60 miles.

Tampa Southern

First Track: Orient, Fla., to Palmetto, 36.00 miles.

Texas & Pacific

Other Important Work Under Construction: Reconstruction of engine terminal, Texarkana, Texas, cost $110,000, 40 per cent completed.

Tidewater Southern

First Track: Manteca, Cal., to South Manteca, 2.00 miles.

Toledo & Ohio Central

Other Important Work Under Construction: Engine terminal, Columbus, Ohio, cost $433,000, 74 per cent completed; shortening, enlarging and lining tunnel at Moxalala, Ohio, cost $120,000, 28 per cent completed; from Pleasantville to Eckerts, Ohio, low grade line 10.5 miles, cost $500,000, 80 per cent completed.

Toledo, St. Louis & Western

Other Important Work Under Construction: Reconstruction of bridge over Wabash river, Silverwood, Ind., cost $144,000, completed.

Union Freight

First Track: At Boston, Mass., 0.17 miles.

Union Pacific

First Track: Boulder, Colo., branch to coal mine, 2.17 miles; Hastings, Neb., through C. B. & Q., crossing, 0.10 miles; Winton, Wyo., branch to coal mines, 1.85 miles; total, 4.12 miles.

Second Track: In Wyoming, east end of Sherman tunnel to Hermosa, 1.25 miles.

Other Important Work Under Construction: Reconstructing substructure bridge No. 38, Waterloo, Neb., cost $151,730, completed; lining tunnel with concrete, Aspen, Wyo., cost $455,064, completed; reconstruction of James street viaduct at Kansas City, Kan., Union Pacific share, $151,697, 1 per cent completed; second track, Manhattan to Junction City, Kan., 20.5 miles, cost $931,942, 70 per cent completed; additions to roundhouse and tracks, Grand Island, Neb., cost $128,226, completed; coal facilities, Grand Island, cost $155,404, 98 per cent completed; passenger station, North Platte, Neb., cost $175,640, completed; track changes in yard, Laramie, Wyo., cost $177,216, 70 per cent completed; concrete snow sheds, Laramie, Wyo., to Ogden, Utah, cost $959,163, 99 per cent completed; track changes in yard, Rawlins, Wyo., cost $104,339, 98 per cent completed; engine terminal, Kansas City, Kan., cost $238,180, 99 per cent completed; army camp facilities, Funston, Kan., cost $136,695, 92 per cent completed; engine terminal, Ellis, Kan., cost $378,658, 98 per cent completed; coach repair yard, Denver, Colo., cost $107,600, 96 per cent completed; engine terminal, Marysville, Kan., cost $275,733, 92 per cent completed; engine terminal, Hasting, Neb., cost $253,139, completed; passenger station, Grand Island, Neb., cost $152,050, completed; freight station, Salina, Kan., cost $192,733, 80 per cent completed; coal station, Laramie, Wyo., cost $101,991, 97 per cent completed; power house, Omaha, Neb., cost $594,279, and machine shop extension, cost $159,667, both completed; Winton branch, Wyoming, extension 4.38 miles, cost $212,000, 91 per cent completed; engine terminal, Green River, Wyo., cost $997,996, 5 per cent completed; engine terminal, Council Bluffs, Ia., cost $1,688,501, 5 per cent completed; engine terminal, Junction City, Kan., cost $1,220,034, 10 per cent completed; coal and ash handling facilities, Sidney, Neb., cost $194,050, contract let; machine shop extensions, Omaha, Neb., cost $546,571, contract let; machine shop, Cheyenne, Wyo., cost $1,713,463, contract let.

Union Railroad

Other Important Work Under Construction: Building 5 miles double track, branch line to Clairton, Pa., track to be laid in 1919.

Virginian Railroad

First Track: Extension of Stone Coal branch, Laurel Fork, 2.34 miles; Piney Creek extension from Pemherton, W. Va., to Fireco, 7.40 miles; Upper Piney Creek branch, Fireco, W. Va., to Piney Fire Creek Coal Co., 2.40 miles; Beards Fork branch, 2.49 miles, Beards Fork.

Second Track: Q. M. Junction, Va., to Carolina Junction, 8.00 miles; in West Virginia, M. P. 366.4 to M. P. 371.5, 5.10 miles; total 13.10 miles.

Other Important Work Under Construction: Additions and improvements to coal pier, Sewalls Point, Va., cost $703,317, 99 per cent completed.

Western Maryland

First Track: Branch line (Somerset Coal Railway), Grays Junction, W. Va., to Bell; branch line, Fairmont, W. Va. (Fairmont, Helens River Railway).

Second Track: Security, Md., to Hagerstown; from Big Pool, Md., to Clear Springs, 5.65 miles.

Other Important Work Under Construction: Yard and engine terminal, Bowest, Pa. (Connellsville), cost $315,000, 75 per cent completed; additional yard tracks, Hagerstown, Md., cost $315,000, 15 per cent completed; passing siding from Cumberland, Md., to Big Pool, cost $150,000, 30 per cent completed; second track, Clear Spring, Md., to Williamsport, cost $605,000, 35 per cent completed; second track, Knobmount, W. Va., to Seymour, cost $175,000, 15 per cent completed.

Western Pacific

Other Important Work Under Construction: Replacing bridge No. 139.79 at American river, Sacramento, Cal., cost $259,468, 99 per cent completed; replacing bridge No. 177.80 South Yuba river, Marysville, Cal., cost $121,170, 75 per cent completed.

Western & Atlantic

Other Important Work Under Construction: Engine terminal at Hills Park (Ga.) yard near Atlanta, cost $360,000, 20 per cent completed.

West Jersey & Sea Shore

Other Important Work Under Construction: Drawbridge at Racoon Creek, Bridgeport, N. J., cost $177,562, 10 per cent completed; raising big timber creek bridge, Westville, N. J., cost $106,533, completed; track elevation and elimination of grade crossings, Camden, N. J., cost $358,462, 44 per cent completed, and elevating track Spruce to Everett streets, cost $775,013, completed.

Wheeling & Lake Erie

Second Track: Gambrinus, Ohio, to Kemery, 2.71 miles; Harmon to Lonas, 1.33 miles; total 4.04 miles.

Other Important Work Under Construction: New yard and terminal facilities, Jewett, Ohio, cost $100,000, 96 per cent completed; yard tracks, Canton, O., cost $250,000, completed; new freight station, Canton, O., cost $206,000, 98 per cent completed, except paving.

Yazoo & Mississippi Valley

Second Track: Baton Rouge, La., to North Baton Rouge, 3.01 miles.

Other Important Work Under Construction: Second track from Marionette to Prichard, Miss., 11.53 miles, cost $275,900, 45 per cent completed; raising track in Cleveland district, 20 miles, cost $381,890, completed; shop buildings, Baton Rouge, La., cost $143,430, completed.

Railroad Construction in Canada in 1918

Canadian Northern

First Track: Glidden, Sask., westerly 21.60 miles; Moose Jaw (Sask.) terminals, 0.90 mile; Bonar, Alta., southwesterly 2.20 miles; total 24.70 miles.

Canadian Pacific Western Lines

Other Important Work Under Construction: Building six-mile line from York, B. C., cost $200,000, 60 per cent completed.

Essex Terminal Railway

First Track: Ojibway, Ont., to Quarry of Amherstburgh, 9.20 miles.

Grand Trunk Pacific

First Track: Duro, Sask., to Engen, 3.23 miles; Harfield to Yorath, 0.95 mile; total 4.18 miles

Other Important Work Under Construction: Coal mixing plant at Edson, Alta., cost $120,000, 40 per cent completed; repairs and alterations to roundhouse at Rivers, Man., cost $100,000, completed; extensions to roundhouses at Melville, Sask., Biggar and Edmonton, Alta., cost $100,000, completed; Pine and Mule Creek diversion mile 91 to 94, provision of earth dump to make permanent line over these creek beds, cost $450,000, 15 per cent completed.

Intercolonial

Other Important Work Under Construction: Terminal facilities at Halifax, cost $2,849,000, 90 per cent completed; additional train track extensions to freight sheds and track rearrangement at deepwater terminal, Halifax, cost $130,000, 90 per cent completed.

Pacific Great Eastern

First Track: In province of British Columbia, 30.00 miles.

Sydney & Louisburg

First Track: Bridgeport, N. S., to New Man Shaft, 1.00 mile.

Toronto, Hamilton & Buffalo

Second Track: Stoney Creek, Ont., to Kinnear, 4.28 miles.

Other Important Work Under Construction: Sorting yard at Bridgehury, Ont., cost $300,000, 60 per cent completed; replacing steel viaducts at Stoney Creek, Ont., cost $130,000; at Hamilton, improvements under-way including extension of Kinnear freight yard and extension to shop buildings, cost $128,200.

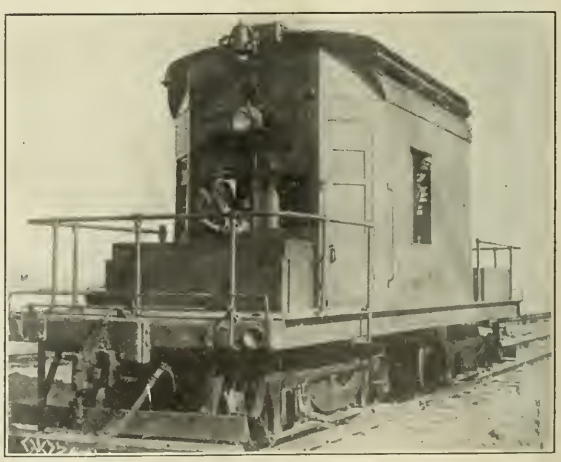
Lake Huron & Northern Ontario

First Track: In the Province of Ontario, 66.00 miles.

Railroad Construction in Mexico in 1918

Tampico Panuco Valley

First Track: Panuco, Vera Cruz to Los Indios, 10.00 miles.



The Gas-Electric Locomotive Used at the Aberdeen, Md., Proving Grounds

Doings of the United States Railroad Administration

Telegraph Operators Receive Increase; Few Developments in Closing Week of 1918

WASHINGTON, D. C.

THE RAILROAD ADMINISTRATION has authorized the resumption of a limited amount of advertising of passenger service to begin soon after the first of the year. Such advertising has been almost completely discontinued during the war. It is proposed now to use advertising for new service and seasonal service such as that to Florida, the South and California. The advertising will be devoted principally to localities and will not be in the name of individual railroads, but as it will be used mainly in cities where there are consolidated ticket offices they will be referred to for information as to routes and schedules.

Further Wage Increase for Telegraph Operators

Director General McAdoo has issued the following Supplement No. 13 to General Order No. 27, making a further revision of the wage scales of telegraph operators and similar employees on the basis of a minimum of 48 cents per hour:

Effective October 1, 1918, for positions held by telegraphers, telephone operators (except switchboard operators), agents, agent telegraphers, agent telephoners, towermen, levermen, tower and train directors, block operators and staffmen, the following rates of pay, rules for overtime, and working conditions upon railroads under federal control, are hereby ordered, superseding General Order No. 27, its Supplements Nos. 10 and 11, and in lieu thereof.

ARTICLE I.

(a) All employees herein specified shall be paid on the hourly basis except those provided for in Article IV.

(b) To determine the hourly basis for positions held by monthly paid employees, multiply by 12 the regular monthly rate in effect as of January 1, 1918, prior to the application of General Order No. 27 (exclusive of all compensation for extra services), divide by 306 (number of working days for the year), and apply provisions of Section (e) of this article.

(c) To determine the hourly rate for positions held by weekly paid employees, multiply by 52 the regular weekly rate in effect as of January 1, 1918, prior to the application of General Order No. 27 (exclusive of all compensation for extra services), divide by 306 (number of working days for the year), and apply provisions of Section (e) of this article.

(d) To determine the hourly rate for positions held by daily paid employees, multiply the daily rate in effect as of January 1, 1918, prior to the application of General Order No. 27 (exclusive of all compensation for extra services), by 365, divide the result by 306 (number of working days for the year), and apply provisions of Section (e) of this article.

(e) Employees who were on January 1, 1918, prior to the application of General Order No. 27, paid on a basis of 10 hours or more to constitute a day's work, shall receive one-eighth of the wages received for 10 hours on January 1, 1918, prior to the application of General Order No. 27, as their basic hourly rate; employees working less than 10 hour and over 8 hours shall receive one-eighth of the wages received for the number of hours recognized as a day's work.

(f) Where there are no regularly assigned or established daily hours, for the purpose of computing the hourly rate, daily hours shall be regarded as ten, one-eighth of which will be the hourly rate.

(g) In determining the hourly rate, fractions less than one-fourth of one cent shall be as one-fourth of one cent; over one-fourth and under one-half, as one-half cent; over one-half and under three-fourths, as three-fourths of one cent; over three-fourths, as one cent.

ARTICLE II.—RATES OF PAY.

For positions held by telegraphers, telephone operators, (except switchboard operators), agents (except as provided in Article IV.), agent telegraphers, agent telephoners, towermen, levermen, tower and train directors, block operators and staffmen, to the rates in effect on January 1, 1918, prior to the application of General Order No. 27, add 13 cents per hour and 2 cents per hour additional in lieu of vacations (applicable to all roads irrespective of present practice). Where this increase fails to establish a rate of 48 cents per hour, establish a minimum rate of 48 cents per hour.

ARTICLE III.—PRESERVATION OF RATES AND CLASSIFICATION.

(a) The minimum rates and all rates in excess thereof, as herein established, and higher rates which have been authorized since January 1, 1918, shall be preserved.

(b) The entering of employees in the positions occupied in the service or changing their classification or work shall not operate to establish a less favorable rate of pay or condition of employment than is herein established.

(c) Where existing pay roll classification does not conform to Article II, employees performing service in the classes specified therein, shall be classified in accordance therewith.

ARTICLE IV.—EXCEPTIONS.

The provisions of this order will not apply:

(a) To cases where salaries less than $30 per month are paid to individuals for special service which only takes a portion of their time from outside employment or business.

(b) To agents whose compensation as of January 1, 1918, was upon a commission basis, or upon a combination of salary and commissions (not including express or outside commissions).

(c) To agents whose duties are supervisory and who do not perform routine office work, nor the small non-telegraph stations (except where they are now included in agreements), which, on account of the varying character and extent of their work and responsibilities, can not be intelligently treated as a class.

The federal manager on each railroad is hereby instructed to consider the individual cases of the smaller non-telegraph stations, or stations paid on a commission basis or on a combination of salary and commission, both as to compensation and working conditions, with committees of employees, and where agreement can be reached are authorized to put the same into effect.

In case of disagreement, either as to compensation or working conditions, or as to whether a station comes properly under the terms of this article, the exact points of such disagreement shall be reported to the Board of Railroad Wages and Working Conditions through the regional director for consideration and recommendation to me.

ARTICLE V.—HOURS OF SERVICE—OVERTIME AND CALLS.

(a) Eight consecutive hours, exclusive of the meal hour, shall constitute a day's work, except that where two or more shifts are worked, eight consecutive hours with no allowance for meals shall constitute a day's work.

(b) Overtime shall be computed at the rate of time and one-half time. Even hours shall be paid for at the end of each pay period; fractions thereof will be carried forward.

(c) When notified or called to work outside of established hours, employees will be paid a minimum allowance of two hours at overtime rate.

(d) Employees will not be required to suspend work during regular hours or to absorb overtime.

ARTICLE VI.—UNITED STATES MAIL.

When the carrying of United States Mail and Parcel Post by the employees herein specified becomes unduly burdensome or interferes with the proper operation of trains, they will be relieved from such work.

ARTICLE VII.—DISCIPLINE AND GRIEVANCES.

(a) An employee disciplined, or who considers himself unjustly treated, shall have a fair and impartial hearing, provided written request is presented to his immediate superior within five days of the date of the advice or discipline, and the hearing shall be granted within five days thereafter.

(b) A decision will be rendered within seven days after completion of hearing. If an appeal is taken, it must be filed with the next higher official and a copy furnished the official whose decision is appealed within five days after date of decision. The hearing and decision on the appeal shall be governed by the time limits of the preceding action.

(c) At the hearing, or on the appeal, the employees may be assisted by a committee of employees, or by one or more duly accredited representatives.

(d) The right of appeal by employees or representatives, in regular order of succession and in the manner prescribed, up to and inclusive of the highest official designated by the railroad to whom appeals may be made is hereby established.

(e) An employee on request will be given a letter stating the cause of discipline. A transcript of the evidence taken at the investigation or on the appeal will be furnished on request to the employee or representative.

(f) If the final decision decrees that charges against the employee were not sustained, the record shall be cleared of the charge; if suspended or dismissed the employee will be returned to former position and paid for all time lost.

(g) Committees of employees shall be granted leave of absence and free transportation for the adjustment of differences between the railroad and the employees.

(h) Where the time limits in discipline and grievance rules now in effect are more extensive, they may be preserved.

ARTICLE VIII.—RULES FOR APPLICATION OF THIS ORDER.

(a) The pay for female employees, for the same class of work, shall be the same as that of men, and their working conditions must be healthful and fitted to their needs. The laws enacted for the government of their employment must be observed.

(b) If the operation of this order creates either unreasonably low, or excessively high rates, for service, individual cases and circumstances considered, it will be the duty of the Board of Railroad Wages and Working Conditions to investigate, on complaint, and recommend equitable treatment therefor.

(c) Vacations with pay are abolished, effective January 1, 1919.

ARTICLE IX.—INTERPRETATION OF THIS ORDER.

The rates of pay and rules herein established shall be incorporated into existing agreements and into agreements which may be reached in the future, on the several railroads; and should differences arise between the management and the employees of any of the railroads as to such incorporation, intent or application of this order, such question of differences shall be referred through the director of the Division of Labor as prescribed in Supplements 6 and 6a to General Order No. 27 for decision, subject always to review by the director general.

Agreements or practices, except as changed by this order, remain in effect.

In a statement accompanying the order Director General McAdoo said:

"In reaching the conclusions upon which this order is

based, I have given special consideration to the problem presented of work on Sundays and holidays. I am in full sympathy, as every reasonable man must be, with the natural desire of the employees to be released from Sunday and holiday labor as far as possible. Not only are employees the better for such periods of rest and recreation, but they naturally prefer for that purpose Sundays and holidays, because all the habits of our people are so adjusted that rest and recreation are more feasible and satisfactory on those days than on other days.

"I am satisfied that in the past there has been a great deal of unnecessary work on Sundays and holidays, and that methods can and must be adopted to confine such work in the future to what is necessary. At the same time we must face the fact that the entire public expects the railroads to be operated on Sundays and holidays as well as on other days; hence it is impossible to adopt any plan which will eliminate Sunday and holiday labor.

"This order which I am promulgating will, in itself, go far toward eliminating Sunday and holiday work wherever practicable, and toward reducing such work where it cannot be eliminated to the fewest number of hours. This will result from the fact that hereafter all such work will be paid on an hourly basis instead of on a monthly basis,as has been true in the past to a considerable extent. Therefore, the employing officer will realize that he must pay additionally for every hour of Sunday and holiday work, and his anxiety to prevent unnecessary expense will be a strong inducement to eliminate unnecessary work on those days. I regard this as a great step forward, and I believe I am justified in expecting that it will bring about a marked reduction in Sunday and holiday work of an avoidable character.

"I propose to supplement this action by definite orders that a special study must be made for the purpose of eliminating Sunday and holiday work wherever practicable, and, where it cannot be eliminated, of minimizing it to the fewest number of hours. I believe the special effort which will consequently be made in this direction will, coupled with the strong inducement arising from the new basis of payment, bring about an early and substantial reform in this important matter.

"Employees who have heretofore had to work on Sundays and holidays will get through this order a direct compensation for that condition, by reason of the fact that their hourly rates of pay in the future will be, to a large extent, substantially increased, as from an examination of Article I, it will be seen that in determining the hourly wage a divisor of 306 days has been used, which will, in a large measure, compensate for punitive Sunday and holiday overtime.

"It has not been practicable to adopt a plan for paying a punitive overtime rate for time worked on Sundays and holidays. The object for such punitive allowances is to impose a penalty or punishment for the work to which the allowances attach. In the nature of things, it is unjustifiable to impose such punishment in respect of work which cannot be avoided. Such punitive allowance is not necessary to cause the elimination of such work, or its reduction to a minimum, because that result can and will be brought about by the adoption of the hourly rates and special instructions which will be issued to reduce Sunday and holiday work where practicable."

Successful Handling of Oil Traffic

W. E. McEwen, chairman of the transportation committee of the Western Petroleum Refiners' Association, has written a letter to Director General McAdoo, expressing appreciation of the "magnificent efforts made by the United States Railroad Administration during the war period to render a transportation service to the oil industry that would enable it to meet the demands made upon it by the United States government, its allies and industries engaged in war work.

"It is perhaps safe to say," he said, "that no single industry was more important in the successful carrying on of the war than the oil industry, and in its early days it was realized that if the problems before us were to be met, the transportation question, involving the movement of petroleum and its products, required the closest attention. With this in mind, the oil industry appealed to the United States Railroad Administration for assistance in working out a plan by which the mileage on the tank cars might be doubled without any material increase in the tank car equipment, in order that the steel might be conserved for other important purposes.

"The appeal met with a hearty response and in the western district the regional directors appointed B. L. Swearingen as supervisor of oil traffic, with headquarters at Kansas City, to supervise the movement of oil traffic in the western district. The writer was appointed by the oil industry to co-operate with Mr. Swearingen and secure the assistance and help of the shippers.

"J. A. Middleton was assigned by the Railroad Administration at Washington to the oil division of the United States Fuel Administration, who in turn appointed O. M. Conley at Kansas City to also render assistance in meeting the emergency, Mr. Middleton afterward being succeeded by O. M. Conley at Washington, and F. B. McKay succeeding Mr. Conley.

"These joint offices were opened early in April when conditions were chaotic, and when a great many of the refineries in the mid-continent field in particular, were shut down or only partially operating on account of shortage of equipment. The refiners were requested to work as a unit and assist in consolidating the oil shipments into trainload lots, and this request was met with a hearty response. The Railroad Administration arranged to consolidate this freight, symbol it, and move it through to destination or breaking point in solid trainload lots.

"Without going into the details of the matter it suffices to say that within 30 days there was such an improvement that from that time on there was never a shortage of tank cars in the oil industry in the western field. There never was a demand made upon the western oil industry that it was not able to meet so far as transportation facilities were concerned. There never was a time that there was not at least a day and a half's loading of cars on hand. During the first 10 months of the year there was loaded from the mid-continent field 256,082 cars, compared with 200,603 cars for the same period of 1917, an increase of 55,479 cars, with practically no increase in the amount of equipment. From April 20 to November 30 inclusive, there was loaded from the mid-continent field a total of 3,585 solid trains of oil, containing 100,530 cars.

"In the month of January the mileage per car per day on tank cars of Western refiners was 26.16; in June 56.27, and in September 58.4, an increase of 100 per cent in the mileage performance.

"What was accomplished in the oil industry is one of the most concrete illustrations in the history of railroading of the economic gain by the co-operation between the shipping public and the railroads. These accomplishments were made possible by the whole-hearted co-operation, starting with the yard employees of the railroads, and on up the line, including the operating officials and car service section at Washington, railroad executive officials at Washington, and particular mention should be made of the magnificent co-operation rendered by the three western regional directors and their assistants. This coupled with the unselfish efforts of the refiners in lending their assistance in carrying out the systems adopted, made possible the meeting of all problems confronting the industry from a transportation standpoint in the western district.

"On July 1 the traffic department of this organization was asked to represent the tank car committee of the petroleum war service committee, in order to supervise in behalf of the shippers the entire tank car equipment of the industry, and while the industry as a whole regret the necessities that compel you to resign your position as director general of railroads, we want you to feel that we owe a debt of gratitude to you and appreciate to the utmost the magnificent assistance rendered, and it would be a source of keen regret were this economical method of handling freight to be dispensed with, as the systems devised enable the railroads to handle more freight with less equipment, saves congestion in terminals by reason of the trains moving through solid, and is of equal benefit to the shippers, the railroads, and the public at large.

"While the jurisdiction of the Kansas City office only extended to the territory west of the Mississippi river and Chicago, I also want to commend the eastern regional directors and their assistants for the hearty co-operation rendered in the movement of the very large tonnage that originated in this field that moved to the seaboard for export and to the large industrial institutions of the East in meeting the war problems."

To Retain Skilled Railroad Men

The mechanical department of the Division of Operation is taking steps to prevent the possible loss of trained shop employees to the railroad service as a result of any reduction in force which may seem necessary at particular points. If the men are not needed at one place arrangements will be made to locate them elsewhere, as it is believed that more men instead of less men will be needed in the next few weeks. Frank McManamy, assistant director of the Division of Operation, has addressed a letter to the regional directors stating that a number of cases have recently been brought to his attention where in the readjustment of shop forces skilled workmen have been laid off.

"Every trained railroad employee represents a certain definite investment," Mr. McManamy said, "therefore, when reorganizations make reductions in forces necessary, all reasonable efforts should be made to retain these men in railroad service. Before a reduction in force is made at any point, steps should be taken to ascertain if the men to be laid off can not be profitably used at some other point, either on that line or on some other line within your region, in which event transfer should be made and transportation provided.

"If the men cannot be profitably used in your region, this office should be advised, giving the number of skilled workmen to be released and their occupation, so that efforts may be made to place them elsewhere, thus retaining in railroad service, men who have been trained and are proficient in that line of work."

More Roads Transferred

Effective on December 26, according to Circular No. 68, the Pittsburgh & Lake Erie, the Monongahela, the Pittsburgh & West Virginia, and the West Side Belt Railroad were transferred from the Allegheny region to the Eastern region, and the Grand Rapids & Indiana Railroad was transferred from the Eastern region to the Allegheny region.

Secret Service and Police Section Created

Effective January 1, 1919, according to Circular No. 69, the secret service branch of the Claims and Property Protection section of the Division of Law is terminated, and instead thereof the Secret Service and Police section of the Division of Operation is created. W. J. Flynn is appointed chief of the Secret Service and Police section with office in Southern Railway building, Washington, reporting to the director, Division of Operation. The chief of the Secret Service and Police section will deal through the regional directors as to matters affecting the police service of the various railroads under the jurisdiction of the several regional directors.

Concurrence of R. R. Administration on Public Improvements No Longer Required

Director General McAdoo has issued Circular No. 44-A, cancelling Circular No. 44, dated July 29, which requested public authorities to secure the concurrence of the Railroad Administration where public improvements are contemplated for which a portion of the cost exceeding $500 would be charged against a railroad under federal control.

Orders of Regional Directors

EXPENSES OF AMERICAN CHEMICAL SOCIETY.—Supplement 4 to Circular 136, Southwestern regional director, same as File 102-22A361 of Eastern regional director. (See *Railway Age,* December 27, page 1164.)

Recognition of Federal Manager as Chief Operating Officer.—Circular 148 of the Southwestern regional director, same as file 1500-96A360 of the Eastern regional director. (See *Railway Age,* December 27, page 1163.)

Maintenance of Wires During Winter.—Circular Letter No. 416 of the Southern regional director gives instructions similar to those issued in other regions for the maintenance of telegraph and telephone lines during the winter season. (See *Railway Age,* December 13, page 1078.)

Removal of Coal and Water from Engines.—The Eastern regional director, file No. 500-1-68A336 orders that when engines are moved dead to repair shops it is desired that coal and water be removed before shipment is made.

Violations of Safety Appliance Laws.—In Order 144 the Southwestern regional director states that numerous violations of safety appliance laws and of the director general's order No. 8 are being reported by traveling federal inspectors. He directs that immediate action be taken effectively to stop these violations; car and mechanical department heads should be given to understand that the federal laws and the orders of the director general must be observed.

Insurance and Inspection of Elevators.—In Order 145 the Southwestern regional director quotes a letter from the director of the Division of Finance and Purchases which states that an exception has been made to General Order 24 to provide that the insurance on all passenger and freight elevators in properties operated by the Railroad Administration be continued with the distinct understanding that the insurance carries an obligation on the part of the insuring companies to inspect the elevators with reasonable frequency.

Routing Western Union Shipments.—The Eastern regional director, file No. 600-4-95A320, states that in order to protect the Western Union Telegraph Company in its contractual rights of exchange transportation over many of the lines under federal control, it has been decided that an exception shall be made to the routing provisions of General Order No. 1, and that the Western Union Telegraph Company shall be given the right to route its shipments, and that such routing instructions shall be observed in the future handling of its traffic.

Exchange Transportation Between Carriers of Local Card Passes.—The Eastern regional director, file No. 2100-41A-343 announces that considerable local exchange transportation between carriers has been issued for account of officers and employees frequently traveling on a line of road other than the employing road, either on official business, or journeying between residence and place of business. There are no objections, and in fact it is desirable that such arrange-

ments shall be continued, subject to such local arrangements as to restrictions on trains, suburban zones, or otherwise, as may have heretofore existed.

Disposition of Certain Kinds of Freight. In Supplement 1 to Circular 110, the Southwestern regional director states that the provision in General Order 34A, calling for the sale of shipments which have been on hand for 60 days after notice of arrival has been given consignees, is not intended to necessitate the holding of commodities of small value, such as sand, coal and low grade ore, the freight and demurrage charges on which may equal or exceed the sale value at the expiration of the two-month period. In some cases it will be found desirable for a road to take over the property for its own use and settle with the owner. In other cases a prompt sale will be advisable, or it will be necessary to unload the property in the best available space.

Acceptance of Embargoed Freight. — In Supplement 1 to Circular 58 the Central Western regional director calls attention to the large accumulation of export freight at Seattle, Wash., occasioned by the non-observance of embargoes. At present there are approximately 3,500 cars of export freight at Pacific ports. In addition, there are about 1,000 cars held back on the line from week to week awaiting opportunity to move into the terminal. There is also a vast amount of export freight unloaded on the ground and on the docks. To avoid a still larger accumulation and to permit the disposition of freight now on hand, embargo restrictions must be observed literally. This applies not only to Pacific ports, but to all points that are embargoed.

Material Requirements.—The Eastern regional director, file No. 3000-446, quotes as follows from a letter received under date of December 6 from the Central Advisory Purchasing Committee:

"Effective at once, it will not be necessary to file through this office, or with the Requirements Division, War Industries Board, any advice as to your requirements.

"The Commodity Section handling specific articles will remain as long as they can be of any service, and as the Central Advisory Purchasing Committee is represented on the most important of these Sections, information or assistance may be secured direct through the Section without handling through the Requirements Division.

"This phase of the work of the department has, therefore, ceased."

Standardization of Corrugated Engine and Tender Hose. — The Eastern regional director, file 500-1-67A339, announces that the Division of Railway Supplies of the War Service Committee of the Rubber Industry of the U. S. A. has recommended to the Railroad Administration that the sizes of corrugated engine and tender hose in conducting water from the tender to the boiler of locomotives be standardized, and that on and after a fixed date the following sizes, only, shall be made and supplied to railroads and railroad equipment companies:

2½ inches x 36 inches	3 inches x 48 inches
2½ inches x 42 inches	3 inches x 54 inches
2½ inches x 48 inches	3½ inches x 36 inches
3 inches x 36 inches	3½ inches x 42 inches
3 inches x 42 inches	3½ inches x 48 inches

Free Transportation for Clergy.—The Eastern regional director, file No. 2100-7A334, refers to instructions of December 4, with respect to half rates for clergy, members of religious orders and account charity.

Effective January 1, 1919, the director general desires that there shall be no change in the past practice of the various railroads with respect to the furnishing of passes to members of the clergy, Sisters of Charity, inmates and managers of charitable or eleemosynary institutions, or otherwise furnished for charitable account. While the general practice is expected to be on the basis of one-half rate as published by the Passenger Traffic Committee, federal and general managers are authorized to issue such passes of this character as it has been the custom for the lines in their charge to issue in the past.

Uniform Method of Handling Hog Shipments.—The Southwestern and Central Western regional directors in Circulars 149 and 224, respectively, outline instructions regarding the establishment of uniform practice in handling hog shipments to market centers, quoted from a telegram from the Car Service Section. A standing embargo has been placed on all shipments of hogs to or through market centers and to regulate further movements and thereby avoid congestion and prevent loss. The Stabilization Committee of the Food Administration will determine the number of carloads which can be absorbed by each market daily. The terminal managers at each market center will allocate as between various roads the number of carloads of hogs which may be received daily, on the basis of past performance. The transportation officer of each line will allocate the car supply within his jurisdiction on the basis of orders received and the known ability of shippers to load and ship. The plan is now in effect at Chicago, East St. Louis, Sioux City, Milwaukee and South St. Paul.

Inspection of Freight at Interchange Points.—The Eastern regional director, file No. 600-96A337, announces that it is customary at most of the interchange points for each line to have inspectors for examination of freight make an inspection and record as to ventilation, refrigeration, etc., including loading, bracing, stability of packages and general condition of the freight. This was necessary for interline settlements. Under Railroad Administration operation this duplication can be reduced to save labor and avoid delays in moving traffic. As a general practice, therefore, the inspection and record at junction points between federal controlled railroads should be made only by the receiving railroad and by the carrier delivering shipment to consignee or to a line not under federal control.

As a rule, at present, this is already being done by joint car inspectors in the matter of open top cars. This order applies particularly to iceboxes, ventilators and other classes of inspection not heretofore so conducted. There will be local exceptions to this new practice, depending upon the line upon which the ice houses are located and other details, which the respective managers can develop at their several junction points.

Employment of Discharged Soldiers.—In confirmation of a telegram dated December 8, the Eastern regional director, file No. 1200-35-2A315, announces that the Railroad Administration will be allowed to send representatives to various camps, cantonments, etc., to secure such labor as will be available.

While such representatives will not be allowed to deal directly with soldiers to be discharged, or to make contracts or attempt to directly recruit labor within the camp, camp commanders will interpret these instructions in a very broad sense and in such a way as to facilitate, as much as possible, the efforts of the Railroad Administration to secure labor, the details to be worked out between the camp commanders and the representatives of the Railroad Administration; in other words, the properly accredited representatives of the Railroad Administration can go into the camps and, through the commanding officers, direct the men to vacant positions.

It is suggested that one man be designated for each camp to act as a medium between camp commanders and representatives of the various railroads; but if deemed advisable and the commandant will allow, this number may be increased. Possibly this may be best accomplished if each federal manager upon whose territory a camp may be located, shall station someone to keep in touch with the commanding officer at the camp, and list any men who wish to enter the railroad service, and their suitability for such employment, and report them to the federal manager and adjacent federal managers for employment, keeping a list to be compiled and submitted at the end of the month to this office.

General News Department

"Canadian National Railways" is the title now used to designate all of the railways operated by the Canadian Government—the Inter-colonial, the National Transcontinental and the Canadian Northern.

The Union Station in Richmond, Va., just completed, on West Broad street, will be open for business on January 6, at noon. Trains of the Atlantic Coast Line run to this station. The Byrd street station is to be converted into a freight terminal for the Atlantic Coast Line.

Employees of the Pennsylvania Railroad furloughed for military service, up to November 1, numbered 24,712, and it is announced that every one of these who returns honorably discharged can have his former position or another equally good.

W. D. Beck, division superintendent of the Chicago & North Western, at Norfolk, Neb., has been appointed representative of the government in the hearings to be held at San Francisco on wages and working conditions of the employees of the railroad-owned steamship lines on the Pacific Coast.

The Fuel Administration has in preparation a compilation of all rules and regulations promulgated during the life of the administration. This will be brought down to date January 1, 1919, and will be issued as soon thereafter as possible. It will be a bound volume of perhaps 500 pages. All persons desirous of obtaining a copy of this should communicate at once with the Bureau of Education, Washington, D. C.

Railroad Hearings Before Senate Senate Committee

The hearing before the Senate committee on interstate commerce on the question of the disposition of the railroads was postponed from Thursday until Friday of this week. Mr. McAdoo was expected to be the first witness to outline his views as to why the period of federal control should be extended for five years.

Railway Business Association

The Annual dinner of this association will be held at Hotel La Salle, Chicago, on January 9. The speakers will be Harry H. Merrick, president of the Chicago Association of Commerce, and vice-president of the Central Trust Company of Illinois; H. H. Westinghouse, chairman of the Westinghouse Air Brake Company, who has just returned from Europe, and Samuel O. Dunn, editor of the *Railway Age*. Alba B. Johnson, president of the Baldwin Locomotive Works, and president of the association, will preside.

Government Increases Pay of Commercial Telegraphers

The postmaster general on December 31 ordered increases of from 5 to 10 per cent in the wages of employees of the telegraph systems now in control of the department (the Western Union and the Postal). The increases amount to 5 per cent for employees who have been in service between six and eighteen months and 10 per cent for employees longer in service. The increases must advance no salary above $200 monthly or above an additional $35 monthly since January 1, 1918. Neither will the increases apply to premium earnings or to employees at nonfunctional offices. Those working on Sunday may accept regular pay scale or demand compensatory time during the following week, as they desire.

The department finds that revenue conditions at this time would not justify the increases now authorized unless, by a careful plan of elimination of waste incident to duplication and by effecting other economies which will not impair the efficiency of the service, the revenue conditions can be made to meet such increases. Believing that this can be done, the order for such increases is accordingly issued.



Czecho-Slovak Troop Train Stopped at the Monument Marking the Boundary Between Europe and Asia

Traffic News

Coal loading for the week ended December 14 amounted to 222,301 cars, as compared with 183,898 in the corresponding week of 1917. The total increase in 1918 up to and including the week ending December 21 over the same period of 1917 was 624,628 cars.

The car service section of the Railroad Administration has cancelled its requirement that agents must observe the Food Administration's regulations regarding the loading of cars with food and feed commodities, but the continued co-operation of shippers is asked in the efforts of the railroads to keep up the loading of cars to their full capacity.

Encouragement of Agriculture

The Railroad Administration has established a homeseekers' bureau, to furnish free information about opportunities for persons who wish to engage in farming, stock raising and kindred pursuits. J. L. Edwards, manager of the agricultural section of the Traffic Division, will have general charge of the work. J. F. Jarrell will be transferred from the Bureau of Suggestions and Complaints to be supervisor of the new bureau. Other members will be C. L. Seagraves, industrial commissioner of the Santa Fe, and W. W. Croxton, general passenger agent of the Atlanta, Birmingham & Atlantic. Standing committees of railroad agricultural agents will collate information by states. The homeseekers' bureau and the railroads will be in a position to give inquirers fresh data concerning the advantages offered by various localities and it is expected that returning soldiers will be aided in finding locations.

Washington Christmas Traffic

Christmas passenger traffic through the Washington terminal this year was the largest in the history of the city, at least a third greater than a year ago, and because of the large number of war workers in the city temporarily, it will, no doubt, be many years before the railroads are called upon to handle anything like the same volume of traffic again. Passengers were induced by advertisemets to buy their tickets and engage their accommodations well in advance. The make-up of extra trains was planned so that the work and confusion in the railroad yards was reduced to a minimum. While some trains were late, as a rule they were on time, and there was a noticeable lack of the confusion in the station that has been noted in the past.

Tickets sold in Washington for the period named numbered 111,369 and the revenue was $731,998. The total number of persons arriving was 256,555; the total departing was 335,000; the number going through was 223,631; the number stopping off in Washington for the holidays was 32,924, and the net exodus from Washington proper was 78,445. Many of these were war workers who will probably not return. The number of pieces of baggage handled was 69,030, and the number of parcels handled in the parcel room, 27,780, an increase of 50 per cent over a year ago. The number of meals served at the restaurant was one-third larger than a year ago.

To handle this large volume of traffic there were run out of Washington 2,055 sleeping cars and 3,905 passenger coaches, being an increase over a year ago of 686 sleeping cars and 869 coaches. The sleeping cars required 287,700 pillow slips, 493,200 towels, 369,900 sheets, and each sleeping car was equipped with six white coats for the porters, or a total of 12,330. Practically everyone who applied for sleeping car accommodations was accommodated. Extra baggage transfer forces were provided, and on Christmas day there was no delayed baggage left over in the station as has generally been the case.

The smoothness and lack of confusion with which the business was conducted this year is attributed to the fact that it was all directed by one authority which co-ordinated the work of all the departments of all the roads.

The Traffic Club of New York

At the regular meeting of the Traffic Club of New York, held on December 30, the following resolutions were adopted:

Government ownership, management or operation of railroads is not conducive to economic efficiency, and private initiative, enterprise and responsibility in the creation, extension, improvement and operation of the American railroads should, as a matter of national policy, be fostered and preserved.

The extension of the present system of federal control for a period of five years, or any extension beyond the limitation now prescribed by law of one year and nine months after the proclamation of peace, is earnestly opposed as prejudicial to the public interest.

The recognized impracticability of continuing government operation of the railroads for twenty-one months after peace under the present law is a conclusive reason why the properties should be relinquished, and in view of the termination of hostilities it should be the policy of the Railroad Administration to restore the integrity of individual properties and prepare for their return to the respective owners.

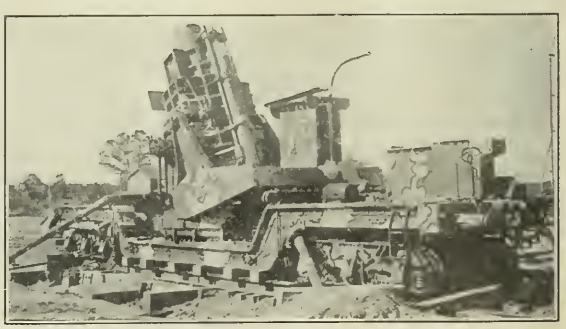
The principle of reasonable, responsible and adequate governmental regulation of transportation facilities is recognized and accepted, but such regulation should provide for the encouragement, protection and development of the railroads.

The Congress should promptly enact such revised legislation as will provide a uniform system of regulation in essential matters, safeguard the public interest, insure adequate revenue to provide for equitable treatment of all questions affecting wages and working conditions of employees and attract sufficient capital to maintain and develop transportation facilities which shall meet the necessities of the commercial, manufacturing and agricultural interests of the country.

Energetic efforts should be exerted to accomplish the early return of the transportation systems of the country to the control and management of their owners, and the enactment of suitable legislation for the protection of the shipping and traveling public, the carriers and their employees.



Unloading Freight from Panama, at Anchorage, Alaska.



Another of the Big Railroad Guns Recently Demonstrated at Aberdeen, Md.

Commission and Court News

State Commissions

The Public Service Commission of New Hampshire, in its annual report, just issued, asks why consolidation and unification of railroads cannot be carried out as well under private ownership as under the government. Rehearsing what are called strictly local questions, the commission asks: "Do farmers wish to have the statute requiring the railroads under certain conditions to maintain farm crossings annulled? Do the property owners wish to surrender their statutory right to call upon the railroads to pay for damages caused by fires from their locomotives? Does the state wish to be deprived of the right to require suitable train service to reasonably accommodate the public?"

Court News

Stipulation for Notice of Loss

Cattle injured by exposure during the first part of their journey were unloaded at a way station, and the shipper, having there disposed of most of the animals, had the remainder transported under the original bill of lading to the destination named. The cattle were not injured in this latter carriage. The Circuit Court of Appeals, Eighth Circuit, holds that the 10-day period after unloading within which notice of loss was required to be given ran from the time of unloading at the way station, and transportation to the original destination did not extend the period. Any other ruling would open the door to discrimination. The requirement could not be waived. A telegram by the shipper to an officer of the railroad company, notifying him that the shipment would suffer injuries if precautions were not taken was not noticed within the provision; and oral notice of loss, given to an agent at the point where the animals were unloaded, although followed by investigation, was not sufficient.—Olson v. C., B. & Q., 250 Fed. 372. Decided March 9, 1918.

Taking of Railroads for War Purposes— Effect on Garnishment Proceedings

A garnishee summons was served on several garnishee railroad companies on January 29, 1918. Notice was thereafter given to the defendant, the Pennsylvania, as required by statute. Several of the garnishees had, when the summons was served, certain traffic balances in their hands belonging to the Pennsylvania. On motion to quash the proceedings it was urged that by virtue of the provision in the President's proclamation of December 26, 1917, the traffic balances were not garnishable. That provision is to the effect that, except with the prior written consent of the Director General, no attachment by mesne process or on execution shall be levied against the property used by any of the transportation systems taken under federal control in the conduct of their business as common carriers. It was admitted that no written consent of the general director had been obtained granting the levy of the garnishment. The plaintiff claimed however, first, that this particular clause of the proclamation is without warrant of law; second, that traffic balances are not included within the terms of said clause—in other words, that such traffic balances are not "property used by any of said transportation systems in the conduct of their business as common carriers." The federal district court for the District of Minnesota holds that under section 1 of the act of August 29, 1916, c. 418, empowering the President, in time of war, through the Secretary of State, to take possession and assume control of any system or systems of transportation, the clause was fully authorized and valid. What is implied in a statute is as much a part of it as what is expressed, and, when a power is conferred, everything necessary to carry it out and make it effectual will be implied. It is obvious that governmental control of railroads, to be effective, should be exclusive, and not subject to interference by private parties.

The plaintiffs' second contention was not sustained. Certainly cars, engines, coal machinery, would all be wholly within the terms used. Moneys coming in as traffic balances are simply earnings constituting a revolving fund, and form part of a working or liquid capital. Such a fund is just as necessary to the successful operation of a railroad as cars, engines, or coal. The liquid capital may be part of a wage fund today, part of a coal furnishing fund tomorrow, and part of a car rental fund the day after. The court will take judicial notice that no railroad system can be successfully operated without such a fund. The tying up of such a fund would clearly be detrimental to the successful operation of a railroad system, in the same way that the seizure of any other of its property would be. The traffic balances were therefore held within the scope of the President's proclamation, and therefore not subject to garnishment. Dooley v. Pennsylvania, 250 Fed. 142. Decided May 10, 1918.

The Federal Employees' Liability Act

The Utah Supreme Court holds that a railroad employee who helps to remove old discarded rails from the track is not engaged in interstate commerce within the act.—Perez v. Union Pacific (Utah) 173 Pac. 236. Decided May 23, 1918.

The New York Court of Appeals holds that one of a switch engine crew engaged in making up interstate trains, killed by an engine while going to work some eight minutes before beginning work, was engaged in interstate commerce when killed.—Knowles v. New York, N. H. & H. R. (N. Y.), 119 N. E., 1023. Decided May 28, 1918.

The South Carolina Supreme Court holds that where a conductor, when injured, was engaged in switching a car to the siding to be sent to its home road outside the State, he and the railroad were engaged in interstate commerce.—Payssom v. Seaboard Air Line (S. Car.), 96 S. E. 150. Decided May 3, 1918.

The South Carolina Supreme Court holds that if a car on which a repairer was working when he was killed was to be returned to state service after repairs, the state law fixed the rights and duties of the railroad and the repairer's administratrix; if after repairs it was to be used in interstate commerce the federal act fixed these rights and duties.—Cook v Southern (S. Car.), 96 S. E. 148. Decided April 12, 1918.

The Illinois Supreme Court holds that a servant in switchyards operating a motor to carry switchmen back and forth, injured while hauling switchmen who had been looking after cars of coal moving within the state, but (because they belonged to the company) subject to reconsignment to points without the state, was not engaged in interstate commerce.—Illinois Central v. Industrial Board (Ill.), 119 N. E., 920. Decided June 20, 1918.

The Kentucky Court of Appeals holds that a member of a section gang whose duty it was to repair and maintain the tracks, an instrument of interstate commerce, who left the place where he had been employed on the track under orders of the foreman to meet him at a certain station with a hand car, was employed in interstate commerce within the act.—Williams v. Chesapeake & Ohio (Ky.), 204 S. W., 292. Decided June 21, 1918.

The Maryland Court of Appeals holds that a railroad employee, whose work consisted in taking care of a camp car used by bridge carpenters, and cooking meals for them, injured in a collision while engaged in cooking in the camp car placed on a side track, was engaged in interstate commerce within the act, the railroad being an interstate line, and the car traveling from place to place on the line as repairs were needed.—P. B. & W. v. Smith (Md.), 103 Atl., 945. Decided February 27, 1918.

Where an empty car marked "shop" is being switched from the yards of one carrier, where it had stood for several days, to an interchange track for the purpose of returning it home for repairs, the switching being wholly within the state, the West Virginia Court of Appeals holds that an employee injured while engaged in the operation is not engaged in interstate commerce, though the car was forwarded promptly by its owner to its shop in another state for repair. The mere use of the word "shop" on a car is not equivalent to a designation for haulage in interstate traffic.—Ewing v. Coal & Coke Ry. Co. (W. Va.), 96 S. E., 73. Decided May 7, 1918.

Supply Trade News

Dwight P. Robinson & Co., Inc., constructing and consulting engineers, announce the opening of their offices at 61 Broadway, New York. This organization is prepared to construct, either from their own designs or from the designs of others, hydro-electric developments, steam power plants, transmission systems, industrial plants, housing developments and steel and reinforced concrete structures; to undertake the electrification of steam railways; to act as consulting engineers, and to make engineering and financial reports and appraisals.

H. W. Clarke, who until December 15 was connected with the advertising service department of the McGraw-Hill Company at Chicago, has been appointed manager of advertising for the Chicago Pneumatic Tool Company, Chicago. Prior to his connections with the McGraw-Hill publications he spent eight years with the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., part of the time as a member of the sales and publicity departments, and later as western publicity representative, with headquarters at Chicago.

Philadelphia Branch for Walworth Manufacturing Company

Walworth Manufacturing Company, with general offices at Boston, and works at Boston and Kewanee, Illinois, with branches in New York, Chicago and Seattle, has recently purchased the business of Hunter & Dickson Company, at 241-247 Arch street, Philadelphia, Pa., and after the first of the year will operate it as one of its branches.

Hunter & Dickson Company was founded in 1881. The business began in one room and basement, about 25 by 25 feet, at the present location. Mr. Hunter and Mr. Dickson began their career as boys in the employ of Morris, Tasker & Company in the early sixties. In 1891, Mr. Dickson died, and the business was continued by Mr. Hunter, who later incorporated it in 1900 as Hunter & Dickson Company. In 1913, Mr. Hunter sold out his interest to C. J. Clark, who became president, with Samuel D. Hopkins, vice-president; C. M. Eaton, treasurer, and Robert Hoar, Jr., secretary. Their sales were about $50,000 the first year, and the business has steadily progressed until of late years it has amounted to several million annually.

Equipment and Supplies

Locomotive Deliveries

Sixty-one locomotives were shipped to railroads under federal control during the week ending December 21 including 48 of the U. S. R. A. standard types, as follows:

Works	Road	Number	Type
American	*N. Y. C.	3	USRA Mikado.
	*Southern	10	USRA Santa Fe.
	C. & N. W.	6	Mikado.
	*Grand Trunk W.	16	USRA Mikado.
	Penn L. W.	4	USRA 6-w. Switch.
	Seab. Air Line	4	USRA 6-w. Switch.
	Southern	2	USRA 8-w. Switch.
	Penn. L. W.	1	Santa Fe.
	Rutland	1	USRA 8-w. Switch.
	Total	47	
Lima	N. Y. C.	7	USRA Mikado.
Baldwin	West. Pac.	1	USRA Mikado.
	Ill. Cent.	2	Mikado.
	Penn. R. R.	2	Mikado.
	C. B. & Q.	1	Mikado.
	A. T. & S. F.	1	Mikado.
	Total	7	
	Grand total	61	

*Three United States Railroad Administration Mikados constructed for the New York Central and six United States Railroad Administration Mikados constructed for the Grand Trunk West were sent to Buffalo and four United States Railroad Administration Santa Fe locomotives were shipped to Potomac Yards, Va., to be stored as parts of emergency pools.

Financial and Construction

Railway Financial News

Pittsburgh, Cincinnati, Chicago & St. Louis.—This company has declared a semi-annual dividend of 2 per cent, making the dividend for the year 4 per cent, or 1 per cent less than in 1917.

Watauga & Yadkin River.—The Oil City Trust Company, of Oil City, Pa., has purchased this road at receiver's sale for $160,000. The road operates 29 miles of line between North Wilkesboro, N. C., and Darby.

Pennsylvania Company.—This company, which controls the Pennsylvania Lines West of Pittsburgh, has declared a semi-annual dividend of 1 per cent, making 6 per cent for the year, the same as in 1917.

Manistee & North Eastern.—The Michigan Trust Company, of Grand Rapids, has been appointed receiver for this road, operating 190 miles of line between Manistee and points in western and central Michigan.

St. Louis-San Francisco.—This company has sold to bankers $10,598,000 prior lien mortgage 6s, series C, dated July 1, 1918, maturing 1928. The bonds are being offered at 96 and interest, to yield about 6.55 per cent.

Boston & Maine.—George W. Anderson, former Interstate Commerce Commissioner, and now a judge of the United States Circuit Court, has been confirmed as one of the trustees of the Boston & Maine stock owned by the New Haven, but under the board's control. He will succeed the late Chief Justice Marcus P. Knowlton and will serve without pay. Judge Anderson, in accepting the position pointed out that usually a federal justice should not be permitted to be active in the administration of a railroad, but that in his case the circumstances are peculiar.

Railway Construction

Cisco & Northwestern.—This company has been incorporated with a capital stock of $500,000 to build a railroad between Cisco, Texas, and Graham, 70 miles. The incorporators are: R. O. Lee, G. D. Ward, C. H. Lee, N. W. Maxcill, J. H. Garner, G. C. Lingle, J. B. Elitch, B. S. Huey, T. R. McDaniels, D. E. Jones, F. E. Harell, J. R. Skinner, J. A. Lauderdall, J. J. Butts, D. K. Scott, W. E. Spencer, William Reagan, E. B. Gude and A. J. Ward, all of Cisco.

Pennsylvania Railroad, Western Lines.—This road will build a freight house at Alliance, Ohio, which will be 40 ft. by 250 ft., of brick and timber construction, and to cost about $35,000.

A contract has been let to G. A. Fuller, Cleveland, Ohio, for the construction at Denison avenue, Columbus, Ohio, of a 32-stall enginehouse, annex and office; car shop, oil house, power house, sand house, fan house, and service building. These buildings will be of reinforced concrete and brick construction, with concrete foundations.

At Ft. Wayne, Ind., the company has under construction and in contemplation a car repair building, store room and office building, machine shop, blacksmith shop, oil and paint storehouse, and firing-up shed.

Trade Publications

Ditching on the Pennsylvania—The Ball Engine Company, Erie, Pa., has just issued Bulletin S20, entitled "What the Erie Ditcher Is Doing for the Pennsylvania," which shows in an illustrated manner the variety of work which this equipment is doing on different divisions of this road. Figures of cost and operating conditions are included. This booklet also contains a discussion of the advantages of the Erie Ditcher in this class of work.

Railway Officers

Railroad Administration

Central

S. A. Bramlette has been appointed representative of the Division of Labor of the Railroad Administration, effective December 16, with office at Washington, D. C. Mr. Bramlette will be assigned to conduct investigations and to represent the Division of Labor in other specific matters to which he may be assigned, affecting employees of the railroads under federal control.

Federal and General Managers

The Manistique & Lake Superior has been added to the jurisdiction of **E. F. Blomeyer**, general manager of the Ann Arbor, with headquarters at Toledo, O.

J. B. Parrish, general superintendent of the Chesapeake & Ohio, has been appointed general manager of the Chesapeake & Ohio; the Ashland Coal & Iron; the Sandy Valley & Elkhorn, and the Long Fork Railroad, with office at Richmond, Va., vice **J. P. Stevens**, deceased.

Operating

George Geiger has been appointed assistant superintendent of the Virginian Railroad, Norfolk Division, with headquarters at Victoria, Va.

A. C. Reynolds, car accountant of the New York, Ontario & Western, with office at Middletown, N. Y., has been appointed superintendent of car service, and the title of car accountant has been abolished.

G. L. Hurley has been appointed superintendent of the Alabama division of the Seaboard Air Line, with office at Savannah, Ga., vice **J. A. Streyer**, resigned.

Roscoe Hooper has been appointed superintendent of telegraph of all lines under the jurisdiction of **J. A. Edson**, federal manager, with headquarters at Kansas City, Mo., succeeding **R. L. Logan**, deceased.

J. W. Deneen will resume his duties as superintendent of the Cumberland division of the Baltimore & Ohio, Eastern Lines, vice acting superintendent **C. B. Gorsuch**, who will resume his position of relief superintendent.

The jurisdiction of **M. F. Dunn**, general safety agent of the Maine Central and the Portland Terminal, has been extended over the lines of the Bangor & Aroostook, and the Grand Trunk Lines in New England, with office at Portland, Me.

C. F. Holbrook, trainmaster on the Chicago, Milwaukee & St. Paul, at Portage, Wis., has been transferred to the Twin Cities Terminals division, with headquarters at Minneapolis, Minn., succeeding **J. E. Hills**, who has been promoted to assistant superintendent of the Chicago Terminals division, with office at Chicago, to succeed **A. J. Hasenbalg**, who has been transferred to Portage, Wis., as trainmaster on the LaCrosse division.

E. P. Goodwin, general inspector of transportation of the Chesapeake & Ohio, has been appointed assistant to the general manager of the Chesapeake & Ohio; the Ashland Coal & Iron; the Sandy Valley & Elkhorn, and the Long Fork Railroad, with office at Richmond, Va., and the office of general inspector of transportation has been discontinued; **E. L. Bock**, assistant general superintendent of the Chesapeake & Ohio, has been appointed general superintendent of the Western general division, with office at Huntington, W. Va., and **F. L. Poindexter**, fuel agent, has been appointed assistant to the general superintendent of the Western general division and will continue in charge of fuel matters, with office at Huntington, W. Va. The position of fuel agent has been discontinued.

John D. Beltz, whose appointment as acting superintendent of the Baltimore & Ohio, with headquarters at Pittsburgh, Pa., has already been announced in these columns, was born on December 19, 1879, at Limaville, Ohio. He was educated in the schools at Alliance, Ohio, and later attended Curry College, Pittsburgh. In March, 1894, he began railway work with the Baltimore & Ohio, in the boiler shop. About 1896, Mr. Beltz entered the service of the Pennsylvania Railroad at Homestead as ticket agent and clerk. In 1898 he returned to the Baltimore & Ohio as a fireman, and from that position was appointed engineman. In 1912 he was appointed assistant road fireman of engines, and in 1913 was appointed assistant trainmaster. The following year he was promoted to trainmaster, and in 1917 was appointed assistant superintendent, which position he held until his recent appointment as acting superintendent as above noted.

Financial, Legal and Accounting

P. J. Hunt has been appointed freight claim agent of the Los Angeles & Salt Lake, with headquarters at Los Angeles, Cal.

Charles T. Vose has been appointed supervisor of fire protection of the Maine Central, the Portland Terminal, the Bangor & Aroostook, and the Grand Trunk Lines in New England, with office at Portland, Me.

Traffic

Charles A. Lahey, formerly assistant general freight agent of the Chicago, Milwaukee & St. Paul, and more recently assistant manager of inland traffic for the United States Food Administration, located at Washington and New York City, has returned to the St. Paul to become general freight agent of the lines east of the Missouri river, effective January 1. Mr. Lahey was called to Washington early last spring to assist the Food Administration in the handling of transportation problems, and during the last four months, while in New York, has been intimately associated with the handling of export grain and grain products. Starting from a clerical position with the St. Paul ten years ago, he has held various positions in the traffic department, and for the four years preceding his service with the Food Administration was in active charge of rate litigation before the Interstate Commerce Commission and state railroad commissions.

Engineering and Rolling Stock

Walter B. Harris, supervisor of track of the Okolona district of the Mobile & Ohio, has been promoted to roadmaster of the St. Louis division, with office at Murphysboro, Ill.

W. L. Robinson, supervisor of fuel consumption of the Baltimore & Ohio, Western Lines, Dayton & Union, and the Dayton Union Railroad, has been appointed superintendent of fuel and locomotive performance, and his former position has been abolished.

The jurisdiction of **A. E. Owen**, chief engineer of the Central of New Jersey and the New York & Long Branch, has been extended over the Philadelphia & Reading Railroad, the Atlantic City Railroad, and the Port Reading Railroad, vice **S. T. Wagner**, resigned.

Clark Dillenbeck, engineer of bridges and buildings of the Baltimore & Ohio, with office at Philadelphia, Pa., has been appointed assistant chief engineer of the Philadelphia & Reading, the Central of New Jersey, the New York & Long Branch, the Atlantic City Railroad, and the Port Reading Railroad. **P. S. Baker** has been appointed engineer of bridges and buildings of the Philadelphia & Reading, the Atlantic

City Railroad, and the Port Reading Railroad, vice Clark Dillenbeck.

Purchasing

C. H. Rothgery has been appointed storekeeper of the Baltimore & Ohio, Western Lines, with headquarters at Lorain, Ohio, vice **W. H. Dean**, transferred.

R. C. Harris, supervising engineer for the Pennsylvania Railroad, Western Lines, at Columbus, Ohio, has been appointed general storekeeper, with headquarters at Pittsburgh, Pa. **C. W. Kinnear**, assistant engineer of motive power at Toledo, Ohio, has been appointed assistant general storekeeper, with office at Pittsburgh.

Corporate

Executive, Financial, Legal and Accounting

Arthur H. Van Brunt, advisory counsel of the Pittsburgh & West Virginia and the West Side Belt, has been appointed general counsel of those companies, with office in New York, effective January 1, and the office of advisory counsel has been abolished.

The following appointments have been made on the Canadian National Railways (the new title adopted to include the Canadian Northern and the Canadian Government Railways): **Gerard Ruel**, counsel; **A. J. Hills**, assistant to the president; **T. W. Ralph**, assistant auditor of disbursements; **H. G. Foreman**, chief accountant; **E. A. Kendree**, assistant auditor of freight receipts; **F. J. Gascoigne**, assistant auditor of passenger receipts; **W. L. Brown**, assistant auditor of agencies, and **H. G. Parker**, auditor of freight overcharges. **J. D. Morton**, assistant comptroller of the Canadian Northern at Toronto, Ont., has been appointed general auditor of that road and the Canadian Government Railways; **C. E. Friend**, general auditor of the Canadian Northern at Winnipeg, Man., has been appointel comptroller of both roads; **R. S. Gosset**, auditor of disbursements of the Canadian Northern at Toronto, Ont., has been appointed to the same position also on the Canadian Government Railways, and **H. G. Hanna**, auditor of the Canadian Northern, has been appointed auditor of passenger receipts of the same road and the Canadian Government Railways. The jurisdiction of the following Canadian Northern officers has been extended over the Canadian Government Railways: **W. F. Anderson**, auditor of freight receipts, and **A. C. Egan**, auditor of agencies.

Samuel J. Hungerford, whose appointment as assistant vice-president of the Canadian Northern Railway System and the Canadian Government Railways, with headquarters at Toronto, Ont., has already been announced in these columns, was born on July 16, 1872, near Bedford, Que. He was educated in the common and high schools and began railway work in May, 1886, as a machinist apprentice on the South Eastern, and later served with its successor, the Canadian Pacific, at Farnham, Que. He was then machinist at various places in Quebec, Ontario and Vermont. From August, 1897, to February, 1903, he was consecutively chargeman, at Montreal; assistant foreman at Farnham, Que., locomotive foreman at Megantic, general foreman at McAdam Junction, N. B., and locomotive foreman at Cranbrook, B. C., on the Canadian Pacific. In February, 1903, he was appointed master mechanic on the Western division at Calgary, Alta. The following January he became superintendent of locomotive shops at Winnipeg, Man., and four years later was appointed superintendent of shops at the same place. In March, 1910, he became superintendent of rolling stock of the Canadian Northern and the Duluth, Winnipeg & Pacific, at Winnipeg, Man., and in May, 1915, was transferred in the same capacity to the Canadian Northern at Toronto, Ont. On November 1, 1917, he was appointed general manager, eastern lines, of the Canadian Northern, at Toronto, which position he held at the time of his recent appointment as assistant vice-president, as above noted.



S. J. Hungerford

William A. Patton, assistant to the president of the Pennsylvania Railroad Company and president of the New York, Philadelphia & Norfolk, retired on December 31, 1918, from active service, under the provisions of the pension plan; after a continuous service of 53 years and 11 months. Mr. Patton was born at Union Furnace, Pa., on October 21, 1849. He entered the service of the Pennsylvania Railroad in the office of the general superintendent, at Altoona, in January, 1865. In December, 1871, he was transferred to Philadelphia, and in August of the following year was appointed chief clerk in the office of **A. J. Cassatt**, then general manager. Mr. Cassatt, in 1882, temporarily withdrew from the railroad service and Mr. Patton went into the office of the president, and on February 10, 1897, he was appointed assistant to President **Frank Thomson**. Mr. Patton has retained the same position, in association with the three succeeding presidents, Cassatt, McRea and Rea. In the promotion and development of the New York, Philadelphia & Norfolk, now an important and prosperous link in the Pennsylvania System, Mr. Patton had a prominent part. On May 24, 1884, he was made vice-president of that road, and in June, 1899, became president. He remained not only president, but also the actual operating executive until the road was, for operating purposes, incorporated with the southern grand division of the Pennsylvania Railroad in 1917. He has been prominently identified with the agricultural and commercial development of the Maryland and Virginia peninsula and was also active in the promotion, construction and operation of the Norfolk & Portsmouth Belt Line Railroad. Mr. Patton has long been prominent in the affairs of the Young Men's Christian Association, and has been general chairman of the Pennsylvania Railroad Department, at Philadelphia, since August, 1899. He is also a member of the International Committee of Young Men's Christian Associations of North America. He is a director in 45 corporations of the Pennsylvania System.



W. A. Patton

Operating

W. H. Bunney, general superintendent of the Montana, Wyoming & Southern, has been promoted to general manager, succeeding **M. W. Maguire**, resigned, and the office of general superintendent has been abolished.

Obituary

C. H. Ewings, who resigned in July, 1917, as superintendent of freight transportation of the New York Central, died at his home in Tarrytown, N. Y., on December 27.

John J. Hackett, superintendent of terminals of the Cleveland, Cincinnati, Chicago & St. Louis, at Cincinnati, Ohio, died at his home in that city on December 11, aged 46 years.

EDITORIAL
Railway Age

According to that part of the annual report of the director general of railroads covering the Division of Operation, the locomotives ordered by the Railroad Administration "were built from standardized designs for various reasons, the principal of which are as follows: First. To reduce to a minimum the time required to prepare drawings, patterns, and dies, and thus enable deliveries to begin quicker than where separate drawings and patterns would have been necessary for each lot of locomotives allocated to a particular road. Second. To secure quantity deliveries. This method of construction has resulted in delivery being made at a quantity rate which could not have been approached had the locomotives been ordered to individual designs. Third. It has also provided a supply of equipment, the parts of which are largely interchangeable, which is available for use anywhere in the event of congestion. This removes the necessity of carrying a large stock of repair parts particular to the locomotive and avoids delay which results when repair parts must be ordered from some distant owning road." This all sounds very nice, but it does not at all agree with the facts presented in the article in the *Railway Age* of January 3, page 50. Moreover, nothing in the above reasons could possibly influence the *Railway Age* to modify the position taken in the above-mentioned article, which clearly proved that the standardization program was a most serious mistake.

And These Are the Reasons!

The Brooklyn Rapid Transit is one of the largest street railway systems in the world. It has been a partner of New York City in building its share of the dual subway system. While some of the problems of operation are peculiar to this system and are peculiarly difficult, on the whole, it is representative of many of the best managed urban street railways. The fact that it has been so well managed in recent years and that it has had strong banking support, lays emphasis on the significance of the bankruptcy of the company. There was $2,000,000 interest due on January 1, and it was decided that it would be better to put the company into the hands of a receiver at once, rather than to try to borrow this amount of money, with no prospects of immediate relief from the impossible situation of the company. The Brooklyn Rapid Transit has been far-sighted in its treatment of its employees; it has necessarily had to advance wages, and has done so in a generous spirit, but, notwithstanding this fact, has had a strike in recent months. Fuel and all materials used in the operation of a street railway have gone up in price from 25 to over 100 per cent.; the five-cent fare, with no charge for transfers, has remained rigidly in force. It might be supposed that, since the city was a partner with the Brooklyn Rapid Transit in the building of new subways, it would have done everything in its power to help the company. On the contrary, under the present administration the city has pursued what appears to be a consistent policy of nagging obstructionism towards the company. What the Brooklyn Rapid Transit and many other street railways need is a higher fare. Anyone who knows enough arithmetic to subtract one sum from another—expenses from earnings—can prove this fact for himself.

Brooklyn Rapid Transit Receivership

There has been much complaint by railway supplymen because of the slow rate of pay on the part of the railroads since they have been taken over by the government. It was bad enough before in many cases, but is far worse under present conditions. Some of the railway supply companies are financially embarrassed because of this delay and relief should be granted promptly. One supply company states that where its specialties have been used for repairs or renewals in order to modernize equipment, its product has paid for itself in increased earnings long before the bills have been paid by the railroads. Investigation develops that this is by no means an unusual or isolated case. Government representatives are having much to say about the necessity for continued prosperity and the maintenance of high wage scales. How can these things continue if business is to be throttled for the want of funds to which it is rightly entitled? Is the government sufficiently interested in the prosperity of the country and the maintenance of high wage scales to right these wrongs for which it is responsible and which are inexcusable? Ought not the railway supply companies to unite and insist upon the universal use of the trade acceptance in dealing with the railways?

A Poor Customer

Is No Middle Course Available?

Director General McAdoo persists in contending that the only alternative policies available for dealing with the railroads are to return them at once to the competitive management of the companies, or to provide for a continuance of government operation for five years.

The objections to either of these policies are obvious, and repeatedly have been forcibly stated. What system would be tested under his five-year plan? This never has been made clear. Does he intend a test of the present policy of unified operation? It seems apparent to everybody except himself and a few others, that if the present policy of "unification" were continued five years the railways would be so "scrambled" and would establish such financial relations with the government, that they never could be returned to private management. But if his five-year plan should be adopted, would the result actually be a test of the present system? Some one else will succeed Mr. McAdoo as director general. Nobody knows what his successor's policy would be. Therefore, nobody knows of what policy we should have a test.

As to the immediate return of the railways to their owners without guarantees of net income, this would cause disaster to many companies. Some roads are earning more than their guaranteed net return, others much less. This is largely owing to the policy followed by the Railroad Administration during the last year. The ruin of numerous railway companies might cause a panic which would be disastrous to the entire nation.

However, it is not true that no course but the two mentioned is open. The country really is confronted with two railway problems. One is, what to do with the roads in the near future—say, for two years. The other is that of adopting a permanent policy of railway ownership, regulation and management. We must take some time to solve the latter problem. It can, however, be solved as well in two years

as in five. The immediately pressing question is, what policy shall be followed while a permanent solution is under consideration? The Railroad Administration itself has power to answer that question in a safe and rational way. First, the existing guarantees of net operating income can be, and ought to be, continued for perhaps two years—say, to January 1, 1921. Peace, apparently, will be signed within the next six months. The law provides for a continuance of government control not more than 21 months after the return of peace. Therefore, a continuance of the guarantees of net operating income until January 1, 1921, probably would cover a period not much shorter than the time until peace shall be signed, plus the 21 months specified by law. Morally and economically, is there any more reason why the government should pay the price fixed by it for wheat before the armistice was signed, than why it should continue for a reasonable time the guarantees to the railway companies?

It having been settled that the guarantees will be continued for two years, the railways, thus protected from financial disaster, could be returned to *operation* by the owning companies soon, and at the same time government *control* could be continued as long as the guarantees are continued. It seems constantly to be overlooked that there is a wide difference between government *control* and government *operation*. The law does not require government *operation;* it was adopted by the director general despite the fact that it was not apparently intended by Congress. The railway companies continued to operate the properties some months after government control was adopted, and the director general can restore them to operation by the companies at any time, without actual abandonment of government control.

Is early restoration of the railways to private operation desirable? It is evident that public sentiment is opposed to government ownership and operation, or to centralized management from Washington, whether by the government or a private monopoly. There is no reason to believe that public sentiment will change. Therefore, there is no reason to believe that the restoration of the roads to private operation would make a sound and satisfactory ultimate solution of the railway problem more difficult. Since it appears clear that the final solution ought not, and probably will not, involve centralized management from Washington, it would seem that the early restoration of the roads to private operation would make the final solution less rather than more difficult.

What would, or rather what ought to be the relations between government control and private operation if the former, together with the guarantees of net operating income, should be continued for two years? The directors and managers of the properties during this period would or should be allowed to exercise as to most matters the same initiative and authority they did before government operation was adopted. There would have to be some exceptions, but the return of the companies to private operation would solve some of the most perplexing problems now presented. For example, at present budgets for capital expenditures are first made by the federal managers, then submitted by them to the corporations, and finally passed upon by the administration at Washington. If the roads were returned to private operation the budgets would be made up by the companies themselves. Doubtless, while the government continued to guarantee net income they should continue to be passed upon by the administration at Washington. Doubtless while the final solution of the railway problem is in abeyance the government should prevent capital expenditures obviously having a purely competitive purpose; but, on the other hand, it should approve all expenditures intended to provide increased facilities where they are needed. As for expenditures for maintenance of way and maintenance of equipment, the government should not interfere with them insofar as they are intended to put the railways in good operating condition.

The director general in his statement before the Senate committee on Interstate Commerce last Friday mentioned specifically 17 "reforms which should be continued under peace conditions." Anybody familiar with railway conditions and the attitude of railway men, whether officers of the companies or of the Railroad Administration, who glances over this list of "reforms," will see at once that most of them ought to be and doubtless would be continued under private operation, if continuance of them were permitted. Among those which almost every railway man will agree should be continued are the following: "Maintenance of the permit system so as to control traffic at its source"; "maintenance of heavy loads for cars"; "unification of terminals"; "maintenance of the sailing date plan"; "consolidation of ticket offices"; "maintenance of the uniform freight classification"; "maintenance of common timetables between important points"; "maintenance of high demurrage rates and uniform rules"; "through way-billing of freight from point of origin to destination"; "simplification of the old practice of apportioning interline passenger revenue."

If government operation should be abandoned, and government control substituted for it, doubtless there should continue to be a director general with a small staff in Washington. It would seem there should be no difficulty in bringing about the co-operation between the various railway companies, under the supervision of the director general, which would be necessary to maintain these reforms. In fact, many of them were largely introduced under private operation, and many of the others the railway companies would have introduced but for federal laws requiring competition.

If the railways should be returned to private operation doubtless it should be understood that present wages and freight and passenger rates would be maintained while the guaranties of net operating income were maintained. What should ultimately be done about wages should be determined in accordance with future economic and industrial developments. If wages were maintained it probably would be necessary to maintain existing rates to protect the government from incurring a deficit. As for off-line agencies, the companies ought to be allowed and encouraged to restore them at least to the extent necessary to provide the shipping public with adequate service.

Two of the most important points to be considered are the effects which an attempt to continue the present system of operation, even for a short time, probably would have upon the morale of the railway organizations and upon the business of the country. An early restoration of the railways to private operation undoubtedly would have a beneficial effect upon morale. We believe it would also render it more easily practicable to proceed with the increased expenditures, both for maintenance and for improvements, which the economic welfare of the country imperatively demands shall be proceeded with. Once the companies were actually operating the properties again it should be possible for them to agree comparatively easily with the Railroad Administration as to what expenditures should be made for maintenance, and they probably would be much more disposed to use their resources in making needed improvements than if the entire management of the properties remained in the hands of the government.

Altogether aside from the differences which inevitably must arise between the government and the companies regarding matters of this kind, it is obvious that the organization of the Railroad Administration is rapidly going to pieces. Mr. McAdoo, Judge Lovett and Mr. Gray already have resigned. Most of the other high officers of the administration would like to see government operation discontinued soon because most of them hope and expect, when it is terminated, to return to the service of the companies. Most of them, it also should be added, are strongly opposed to the proposal to continue government operation for five years more.

It is not necessary in the interests of the railways, their employees or the public, as Mr. McAdoo tries to persuade us, either to return the roads at once to private operation on the pre-war basis or to hold them for five years. There is a middle course which can be adopted and which would be better for everybody concerned than either of the extreme policies which he contends are the only alternatives.

Surplus Capacity Available For Foreign Trade

In a paper read before the Reconstruction Conference, held under the auspices of the National Chamber of Commerce at Atlantic City the first week of December, James A. Farrell, president of the United States Steel Corporation, said: "The task before us today in respect to foreign trade expansion, is not so much to convince, as to advise and guide. Entrance into foreign trade is no longer a matter of choice with us. Everybody in these times is ready to concede the significance of the fact that the American industries presenting the most nearly unbroken record of prosperity and sustained labor employment are those which have been accustomed regularly to market overseas from 10 to 35 per cent of their products."

The applicability of Mr. Farrell's words to the railway supply field is at once evident. The supply field, to take his first point, after having supplied large numbers of cars and locomotives to our Allies and for our own forces overseas, has come to realize the value of foreign trade and to the belief Mr. Farrell mentions, that foreign trade is no longer a mere matter of choice.

One of the outstanding features in the business of supplying materials to the railroads has been the varying amount of business that has been done year by year over any extended period. It has been emphasized again and again in these columns and elsewhere, that the railroads of this country have had the habit, brought upon them of necessity, of buying in big quantities when business was good and prices were high and of doing quite the opposite when business in general was bad and prices were low. The railway supply field has been unfortunate in that it has not had a balance wheel, as it were, in foreign trade to tide it over from one period of prosperity to the next. It has not been fortunate enough to have that 10 to 35 per cent of production for export to which Mr. Farrell refers. A perusal of the figures for locomotive and car production given in last week's *Railway Age* on pages 83 and 87, respectively, will bear out this statement. For greater convenience these totals have been reduced to a percentage basis and the percentages are shown in the following table:

Percentage of Equipment Built for Export

	Locomotives	Freight cars
1905	11	3
1906	11	3
1907	11	3
1908	20	2
1909	10	3
1910	7	3
1911	11	4
1912	10	3
1913	14	5
1914	12	..
1915	40	19
1916	34	17
1917	53	21
1918	43	34

It will be seen from these figures that in but one year prior to the war did the locomotive production for export exceed even as low a percentage of total output as 14 per cent. That year was 1908 when the export percentage of 20 was attained only because of the small domestic output. In freight cars the smallness of the production for export is even more pronounced. Never until the war has output for foreign countries even gone higher than 5 per cent of the total production. Our production of cars for export is, in other words, almost a new business for us, dating back only to 1915 when the demands of the war introduced a new element into our foreign trade.

The production of locomotives for export since 1915 has been a most important part of our total locomotive business, having reached in four successive years, 40, 34, 53 and 43 per cent, respectively. It may be an aside to note at this point that whether we should like to have it continue to attain such high percentages as were reached, particularly in 1917, is a question. It will be borne in mind that the 53 per cent foreign production reached in that year has generally been regarded since as a mistake due to sending locomotives to Russia while our own railroads were suffering from lack of motive power needed to help us "carry on" in our own part in the great struggle. The fondest lovers of export trade would not wish to have a thing of that kind happen again. They want export trade to help us in our domestic industry, not to take the place of it.

The locomotive producing capacity of this country is usually figured as being about 7,000 yearly, including both the building plants and the railroad shops in the United States and Canada. In 1906 a total production was attained of 6,952 locomotives and in 1907 of 7,362 locomotives. In no year since has the total production reached as high a figure as 5,500 with the exception of 1918, when a total production of 6,475 was attained, inclusive, however, of some 600 or more small gasoline locomotives for light railway service behind the lines. The fact that there exists a very large surplus capacity for export production in even our better years is evident.

The capacity for freight car production in the United States and Canada is generally conceded to be in the neighborhood of 350,000 cars annually. It is somewhat surprising to discover that in only one year in the last 30 at least, has the production exceeded even 250,000. The year in question was 1907 when 284,188 cars were built exclusive of the output of railroad shops, the figures for which were not then obtained. Judging by this and by the totals as a whole, given in last week's *Railway Age,* it is safe to say that the United States and Canada actually have a surplus productive capacity of no less than 100,000 to 200,000 cars annually which could be devoted to export business. In 1914, despite this fact, we sent abroad only about 15,000 cars. In 1918 we sent over only 42,941 cars, principally for war service. Even the latter total could be doubled in normal times without detriment to production for our own roads.

Emphasis has been placed again and again in the columns of this paper in recent months on the great markets for railway equipment that lie before us. We know that there is only one country besides ourselves that is in a position to export railway supplies and material to a world that has practically gone without railway material for over four solid years. That country is Great Britain and her car and locomotive plants will have such great demands upon them that they will be able to fill only a small part of them. Belgium, before the war a very large exporter of freight cars, will have to rebuild its car building plants and rehabilitate its own railways before it can again be an exporter—it will probably be an importer for many years instead. France, which lost four of its five locomotive plants in the Hun invasion, will be in a somewhat similar, though probably not so severe, position. Germany and Austria we can dismiss. The tag "Made in Germany" and disorganization due to revolution will guarantee that. In short, the markets and capacity are ours to as great an extent as we can use them.

That now is the time to make the most of all these facts is generally realized in the supply field.

For the time being apparently, there is but little prospect of new business from the Railroad Administration. The domestic railroads are out of the market for new equipment

until their future status is more settled. Supply men have long since given up hope that the government Railroad Administration would follow out the government's suggestion as expressed by the War Industries Board, to help over the readjustment period. Similarly—though for entirely different reasons—the military railroads are no longer purchasers. In short, the time has now come when the railway supply field is preparing to exploit new markets. It is fortunate in having substantial orders on hand to tide it over the transition period, if such it may be called, and fortunate in that the future prospects for both domestic business (once the domestic situation is adjusted) and foreign trade are exceedingly good.

The railway supply companies are well equipped for foreign trade. The American Locomotive Company, the Baldwin Locomotive Works, the American Car & Foundry Company, the Standard Steel Car Company, the Westinghouse and General Electric companies, the Westinghouse Air Brake Company, etc., already have large and well-organized export departments and will, no doubt, be able to make the most of the prospects available to them. It is unfortunate that so many other companies are not likewise well organized for export trade and that something has not as yet been done to take advantage of the new Webb law, permitting organization for foreign trade. As time goes on this matter will probably receive its due consideration, for it is impossible to believe that the American railway supply field is going to leave a single stone unturned to make the most of the new export business that is waiting for its usual aggressive attention.

That Elusive Surplus

REGARDLESS OF THE EFFORTS of the advocates of permanent government operation of the railroads to minimize the importance of financial results, the American public is going to weigh this consideration fully in passing upon the work of the United States Railroad Administration and in acting on the plea that this plan be given a longer period in which to make good. The director general himself has not overlooked opportunities to emphasize this feature in the past. In the hearings before Congress when the railway control bill was under consideration last winter he indicated that the government stood to gain approximately $100,000,000 a year from the start, as the net operating incomes of the roads in 1917 were approximately that much in excess of the average for the three-year period taken as a basis for fixing the proposed guaranteed compensation. In spite of this forecast we find at the end of the first year of government operation, that not only has this $100,000,000 surplus not been gained, but another $150,000,000 has disappeared with it, this being the estimated deficit from government operation during the year. In other words, the financial results have fallen $250,000,000 short of the director general's own estimate, in spite of the large advances in rates made six months ago. In the face of these figures the savings resulting from the elimination of the "high salaries formerly paid railway officers," the consolidation of ticket offices, the elimination of outside agencies, etc., to which the Railroad Administration has repeatedly pointed with pride, appear insignificant.

Serious as this deficit of $150,000,000 is, it does not tell the entire story. The government is pledged under the law to maintain the properties of the carriers under its direction to the standards existing at the time they were taken over. This it has not done. This failure in itself does not necessarily call for criticism, for it was advisable in the national interest to postpone much work which could safely be carried over in order to concentrate men and materials on those projects most essential to the winning of the war. The needed expenditures which were not made for the maintenance of the properties during 1918 cannot be avoided, but are simply deferred. In other words, the Railroad Administration is now facing a large accumulation of deferred maintenance which will enter into the 1919 operating accounts, but which really should constitute a charge against 1918, and which should be added to the deficit of $150,000,000 to give a true indication of the results for the year.

The conditions under which the roads have been operating during 1918 have made it necessary to retain in service much equipment which would normally have been retired and written off the books. Now that the crest of the traffic load has been passed and the demand for equipment has lessened it will be possible to retire many of the cars and locomotives which economical considerations would have released last year, but which were necessary to handle the business. The retirement of this equipment now will lead to a large operating charge.

In the maintenance of way field the situation is even more serious. It is possible to defer a certain class of maintenance work for a considerable period without serious trouble, but it is common experience that this work must be taken up and that it costs more to overcome the neglect later than to have done the work originally. Take the renewal of rails alone; only about 1,200,000 tons of new rails were laid in track in 1918, or over 1,000,000 tons less than normally. At the prevailing prices this alone involves an expenditure of perhaps $75,000,000 for labor and the necessary auxiliary materials. Likewise there was a decrease in the number of ties renewed of approximately 50,000,000, equivalent to an expenditure of at least $60,000,000. These are typical of a large amount of work incident to the repair and renewal of tracks, bridges and buildings which was deferred but which must be met.

It is true that the gross expenditures for the maintenance of equipment and for maintenance of way during 1918 were considerably in excess of those for preceding years, but this indicates not that more work was done but that it cost much more per unit of work. If the accumulated deficiencies in maintenance were evaluated and that sum added to the deficit already announced it would undoubtedly aggregate well over $500,000,000 as the cost to the people of the United States for the first year of government operation, or $1,500,000 for every day in the year, including Sundays and holidays.

New Books

American Engineers Behind the Battle Lines in France. By Robert K. Tomlin, Jr. Size, 9 in. by 12 in. 91 pages. Bound in board. Sold by McGraw-Hill Book Company, 239 West 39th Street, New York. Price $2.00.

In this book the Engineering News-Record has reproduced the series of articles which have recently appeared in its pages by Robert K. Tomlin, its former managing editor and the correspondent of the McGraw-Hill publications in France. Mr. Tomlin's articles cover a wide range of engineering subjects, including roadbuilding, water supply, topographical work, bridge and building construction, as well as the construction and operation of light and standard gage railways behind the lines. One of the early articles reproduced discusses the nature of the light railway, and another describes the activities of a railway engineer regiment, showing what a wide range of work such a regiment may be called upon to do. Two of the most interesting papers cover the use of the light railway behind the British front, showing not only what the light railway did on this front, but detailing the enormous amount of business it handled and how the railways were operated to carry this business.

Letters to the Editor

Are the Railroads Fair to the Public?

To the Editor:

I assume that you represent very fairly the opinion of a majority of the higher officials of the railroads in the United States, as well as of a majority of the bondholders and shareholders. Of the officials there are a few thousand, of the investors perhaps 400,000. Therefore, you speak for, possibly, half a million people. On the other hand, I look at railroad questions from the point of view of the public who use the railroads, so that I represent nearly a hundred million. And I would like to give you my opinion—which is, I think, the very general opinion—as to the present railroad situation.

First, let me say that I am opposed, and that I think the public as a whole is strongly opposed to government ownership of the railroads, for reasons too many to be stated in this letter. But I do think there is a strong public sentiment in favor of a better control of the railroads. Thoughtful people feel that the railroad officials and the investors who employ the officials are not quite honest in the attitude which inspires their conduct toward the public. They fail to recognize that common honesty requires them to give the public a fair return for the special privileges which the railroads receive, and also requires them to show the confidence in the public which they claim from the public.

Let me give you an instance of what I mean. If I have been a commuter on, let us say, the Lackawanna Railroad for twenty years, and some morning I leave my ticket at home, the company insists that I shall pay my fare to and from New York that day. Is this quite honest? The conductor knows me perfectly well, knows that I have a commutation ticket, knows that I have paid for my ride and am entitled to my ride. Yet it does not seem to be thought very exceptional. Suppose a great store like Altman's, which has to face competition, behaved in this way to customers who had actually paid for goods and to whom it had not delivered the goods, how long would it have any customers?

The company's only excuse for collecting from me money which I have already paid to them is to say that if they tried to treat a commuter fairly when he had forgotten his ticket, they would be constantly defrauded. That is just the excuse Germany gave for invading Belgium. Is there any such danger of fraud? In England, the commuter, or season-ticket holder as he is called there, receives from the company a ticket good for a month, three months, or a year. It is never punched, and on most days he does not show it at all; he simply says, "Season," and has no further trouble. Once or twice a month inspectors ask to see all season-tickets. And on such an occasion, if you have left your ticket at home, the inspector asks for your visiting card, which he turns in to the season-ticket department for verification. I once asked the head of one of the great English railroad systems if this method led to many frauds. He told me that his system spent $500,000 per annum on inspectors, but that he did not think that the fares which passengers evaded amounted to $50,000 a year. In another way the season-ticket holder's convenience is considered by the English railways. If he finds that, because he is taking a vacation, or is ill, he will not be traveling for a part of the period covered by his ticket, he mails it to the head office, to be kept there until he asks for it again, and when he does, the term covered by the ticket is correspondingly extended. In other words, the railways give full value to the passenger and do not attempt to take advantage of him on technicalities.

Is it not the duty of the railroad officials, and would it not be their best policy, to get rid once for all of the idea that everybody in the United States who is not a railroad official is dishonest? Is not money wasted, and is not the public needlessly inconvenienced, by the elaborate precautions which are taken in order that no one shall ever get a ride he has not paid for? And is not the suspicious attitude of the railroad officials toward the public partly explained by the fact that these officials know that in the past the railroads have not been strictly honest in their treatment of the public? A large Pittsburgh steel manufacturer once told me that before legislation regulated interstate commerce, he could ship his product from Pittsburgh by an Ohio river boat to Cincinnati, then put it on a Pennsylvania Railroad train at Cincinnati and haul it through Pittsburgh to New York, and pay less freight for this absurd performance than if the same load had been originally given to the Pennsylvania Railroad at Pittsburgh for transportation to New York. Today no railroad official or shareholder would dare to defend such a dishonest policy in regard to rates.

Again, is it honest for a railroad to print in its bills of lading clauses which the courts have repeatedly declared to be absolutely void and without effect? Is it honest to print on excursion tickets stipulations as to the limitation of liability which have been condemned in the same way by the courts? In both instances there can be no purpose except to deceive ignorant people so that they will not claim their legal rights.

These points I have mentioned are only slight examples of the unfairness with which the people in general believe they are treated by the railroads. I could fill your whole paper with instances of the same kind. And this unfairness, which is clearly dishonest in view of all the railroads owe to the public, will influence the opinion of every citizen who asks himself how far government control should go.

Until railroad officials realize how wrong they have been, and realize the importance of their obligations to the public, they certainly will not change their policy. Mr. Harriman ran the Union Pacific as autocratically and as arbitrarily as the German "high command" ran the German army. The Kaiser and his generals never thought of the good of the German people as a whole, but only of the power and glory of the military leaders. The only way to govern a country properly, or to manage its railroads properly, is to serve all the people honestly.

It seems to me that the railroad officials should begin by trusting the people, and then proceed to show the people that the railroads themselves are trustworthy. You have great influence with the railroad officials, and you could do great good by exerting that influence in the direction I have tried to indicate. This is the right time to raise the whole question. The reason this country showed so fine a spirit in the war is that the American people knew that the position of the allies was moral and the position of the Germans immoral. We were perfectly sincere when we took that ground, and the result is that the moral sense of our people is keener than it was before the war. A good many public questions are going to be decided by the standard of morality, and if the policy of the railroads is morally unjustifiable the people will insist upon a change of policy. On the other hand, if the upper officials and the shareholders will put their house into good moral order, I am sure that the American people of course, a vastly larger productive capacity than those of will see that the railroads are treated by the government with all the honesty that the highest morality calls for.

A Thinking American.

German Railway Equipment for France.—Press despatches state that M. Claveille, the French Minister of Public Works, announced in the Chamber of Deputies of Paris on December 29, that France will receive 70,000 cars and 2,600 locomotives of the rolling stock which Germany must hand over to the Allies. Germany already has delivered 3,800 cars and 200 locomotives.

McAdoo's Testimony Before Senate Committee

Reviews Accomplishments in One Year of Federal Control and Urges Five-Year Test Under Peace Conditions

A review of the accomplishments of the United States Railroad Administration during the year just closed was presented by Director General McAdoo at the hearing before the Senate Committee on Interstate Commerce on January 3 in connection with his argument that the period of federal control should be extended for five years. Mr. McAdoo declared that even under the handicap of war conditions a sufficient showing has been made to indicate that the reforms accomplished are desirable as permanent measures and that the country is entitled to a more complete test of centralized management under government control.

An abstract of Mr. McAdoo's prepared statement follows:

Railroad Conditions When Government Took Control

To review the results of the past year of federal control, it is helpful first to survey the railroad conditions that immediately preceded that control.

(1) For several years, railroads in seasons of heavy business had developed conditions of transportation stringency similar to the conditions of financial stringency that characterized our banking situation prior to the passage of the federal reserve act, but the periods of transportation stringency were even more frequent and more pronounced. It was impracticable for the scores of different railroad companies to depart from their competitive practices and join in a co-ordination of facilities and effort so as to meet the traffic demand made upon them and enable them to handle their "peak load" successfully. These competitive rivalries prevented any sort of central control of the traffic itself. Therefore it was impossible to stop the loading of traffic which could not be promptly disposed of at destination, or to encourage movement to destinations where the traffic could be promptly handled. To an important extent there was inadequacy of terminal facilities and a serious lack of co-ordination and use of those in existence. In the fall of 1916 the transportation stringency reached such a point that traffic was almost paralyzed through inability to dispose of it at destination. In the fall of 1917, despite strenuous efforts, and yet under a larger degree of co-ordination than had ever before been attempted, to prevent such a situation, a paralysis of the transportation situation again occurred. These conditions were most aggravated in the territory east of Chicago and St. Louis, and north of the Ohio and Potomac rivers, but the acute conditions in this territory reacted unfavorably on the transportation situation throughout the rest of the country, damming up the traffic on connecting lines and producing congestion and distress throughout the country.

Very serious conditions of car shortages existed both in the fall of 1916 and in the fall of 1917. In 1916 the situation became so critical that a special investigation was inaugurated by the Interstate Commerce Commission, with the result that under date of December 28, 1916, Commissioner McChord made a report in which he stated that "in some territories the railroads have furnished but a small part of the cars necessary for the transportation of staple articles of commerce, such as coal, grain, lumber, fruits and vegetables."

In its report of December 1, 1916, the Interstate Commerce Commission, after reviewing the car shortage situation in detail and telling of investigations into conditions at widely separated points, said:

"Substantially all told the same story of failure of transportation facilities and resulting embarrassment and losses. It abundantly appeared that the movement of loaded cars was in the main and on the whole very slow. The time of movement of grain from Iowa points to Chicago was shown to be as low as 2 days and as high as 25 days, the greater part taking from 4 to 8 days. Serious delays to loaded cars in switching to points of unloading at large terminals and in passing through such terminals out to other cities, explained much of the failure in car service."

I need not recount the varying expedients adopted by the railroads under private control to bring order out of the railroad chaos, none of which was adequate or successful. The railroad executives of the country tried valiantly during 1917 to solve the problem. Most of them patriotically sought to find means of keeping the transportation system functioning. Competitive and private control, however, were unequal to the task.

(2) The great movement of traffic overseas without satisfactory co-ordination of rail and ocean transport, the heavy building operation in the way of construction of cantonments, shipbuilding plants, storage depots, munitions plants, etc., the transfer to war activities of the ships and tugs of the coastwise service, thereby throwing still another new burden on the railroads, the increasing and exacting movement of troops,—all these operated to accentuate difficulties and develop the grave weaknesses inherent in the unco-ordinated competitive activities of all the different railroad companies.

(3) These difficulties were further accentuated by inability to get promptly new locomotives which had been ordered (but which could not be delivered because much of the locomotive output was being devoted to our Allies) and to an entire absence of any locomotives in the reserves of the railroad companies.

Many lines had entirely inadequate facilities for repairing the locomotives they own. This was shown by the fact that up to December 14, the total number of locomotives sent to other line shops for repairs were 2,220. For instance, 423 locomotives of the Baltimore & Ohio were repaired in the shops of other lines, while B. & O. shops repaired only 24 locomotives belonging to other lines, leaving the net assistance received by the B. & O. 399 locomotives. Two hundred and one locomotives of the Pennsylvania Lines West were repaired in other line shops, while the shops of the Pennsylvania Lines West repaired only 55 locomotives belonging to other lines, leaving the net assistance received by the Pennsylvania Lines West, 146 locomotives. Thirty-six locomotives of the Central Railroad of New Jersey were repaired in other line shops, whereas they repaired no locomotives of other lines.

Prior to federal control the railroads had voluntarily transferred into the congested Eastern territory 107 engines from the West and South. The Railroad Administration, in addition, put into service in the East 130 locomotives constructed for lines in the West and South. In addition, the Railroad Administration relocated 215 locomotives already in the East. This ability to place locomotives promptly where they were most needed regardless of the interest of any particular line greatly assisted in bringing order out of chaos. Notwithstanding the tonnage handled during the year, which has been the heaviest ever known, there are now stored in good condition and ready for winter service 1,189 locomotives, while one year ago there was not a single serviceable locomotive in storage. This improved condition has been due largely to the co-ordination of shop work which

has resulted in an average increase of 20.93 per cent each week in the number of locomotives receiving classified repairs.

(4) The relations with labor were of the most unsatisfactory and threatening character. The cost of living had greatly increased. Insistent demands were urged by railroad labor for corresponding increase in wages. There was no method for an amicable adjustment of labor disputes. To a large extent there appeared to be a lack of confidence on the part of labor in the management of the railroad companies if not an actual hostility thereto. There was imminent prospect of the most serious strikes that had ever threatened the railroad situation.

(5) The financial situation of some of the railroad companies was precarious. The rapid increase in operating costs, due to increased prices of materials and supplies and the increased expense of operating under the conditions of transportation stringency, were threatening to impair the ability of many railroad companies to meet their interest and dividends, so that the railroad plight was a serious menace to the general financial situation. Even if railroad credit had been at its best instead of at its poorest, it would have been difficult at the time to raise funds for urgently needed capital expenditures because of the credit demand of the government and the high rates prevailing for money.

(6) The country was at war. Its industrial power was being turned into war channels. The volume of traffic to be transported for war purposes was steadily growing and promised to keep growing to a degree which could not be foreseen. The nation's success in the war was largely dependent upon the transportation machine functioning with an efficiency surpassing anything which had ever been known in the past. Yet all the factors were rapidly converging to produce a prolonged and serious transportation paralysis.

For these reasons the President took possession and control of the railroads on December 28, 1917. Simultaneously with his proclamation the country entered upon 10 weeks of the worst winter that had ever been known and transportation which before was slowing down in an alarming way was confronted with the danger of almost complete stoppage.

These were the conditions under which the United States Railroad Administration began its work.

Conditions Under Government Control

The principal railways and transportation systems of the country have now been under the control of the government for one year, a year marked by the participation of the United States in the greatest war in history, a year in which the railroads were required to carry a greater burden both of freight and of passenger traffic than ever before in their history, a year which began with terrific blizzards and an alarming coal shortage, a year in which enormous amounts of foodstuffs and other supplies had to be transported through the United States to the seaboard for shipment abroad, a year in which an army of millions of men had to be transported from their homes to camps and cantonments and then to the seaboard in order that they might take their places on the battlefields of France and Belgium. The year is now behind us. In the last few months there has been an entire absence of any transportation stringency, although the traffic carried was the heaviest of even this unprecedented year. The contrast between transportation conditions during the autumn just passed and the autumns of 1916 and 1917 is marked.

I shall recount some of the things that have been accomplished:

The Movement of Troops

From January 1, 1918, to November 10, 1918, a total of 6,496,150 troops were moved over the American railways, 4,038,918 having been transported on special trains. These movements required a total of 193,002 cars of all types, including 167,232 coaches for draft and regular train movements. These troops were transported in comparative freedom from accident, due largely to the steadfast maintenance of a reasonable rate of speed.

Movement of Food to Europe

The food situation in the allied countries of Europe became extremely critical in February last, representations being made by Great Britain, France and Italy that unless the program of food deliveries promised by the Food Administration was kept pace with, Germany and her associates inevitably would win the war. While the facts could not be told at the time because of the possible effect on the morale of the nations fighting the Central Powers, it was nevertheless true that according to official word received from the Entente allies, the outcome of the war depended upon the ability of the American railways to transport sufficient supplies of foodstuffs to the Atlantic seaboard for shipment abroad. This problem was met. It was no time for halfway measures. The safety of the world hung in the balance. Empty box cars were rushed from all portions of the East, South, to the southwestern grain states. Conflicting traffic of all kinds was held up. Every facility of the Railroad Administration and of the railroads under its jurisdiction was thrown into the balance. Officials and employees worked day and night. The result was magnificent. By March 15 the vessel capacity of the Allies had been satisfied and there was available at North Atlantic ports an excess on wheels of 6,318 carloads of foodstuffs exclusive of grain on cars and in elevators.

Since that time there has never been any danger of the American railways failing to transport the necessary amount of food supplies for Europe. It perhaps is not too much to say that this was one of the turning points in the war.

Coal and Other Essential Supplies

Another critical situation which faced the railroads during the year just passed and was met, had to do with the coal supply. Constant predictions have been made that the railroads would not function sufficiently to transport enough coal to supply the Nation's needs; these predictions have not been realized. New England's demands have been met, and 28,153,317 tons, the largest tonnage of coal ever known, has been moved to the Lake Erie ports, and transported to the Northwest. In 1917 only 26,826,000 tons were moved over this route; in 1916 only 24,692,000 tons, and in 1915 only 21,507,000 tons. Some indication of the freight traffic problems facing the railroads in the year just passed may be gained from the fact that there was a net increase of 741,666 cars, or approximately 37,083,300 tons of bituminous coal loaded during the 10 months ending October 31, 1918, as compared with the same ten months in 1917.

At the same time special attention was being given to the movement of fruits, of cotton, of oil, of iron, and of the other principal products of the farms, the factories and the mines of America. Wherever necessary, special trains were utilized to transport these staple articles, and other methods were made available which resulted in fully meeting the situation.

Bureau for Suggestions and Complaints

In order to furnish the public a medium for communicating directly with the Railroad Administration concerning bad service the Bureau for Suggestions and Complaints was established with very helpful results. Many constructive criticisms have been received and acted on. A total of 1,328 commendations and 714 complaints of individual discourtesy or incompetence have been received during the 16 weeks since the formation of the bureau to December 24, 1918. The commendations have outnumbered the complaints almost two to one. This in itself is a tribute to the railroad employees of the Nation. Other letters have been received calling attention

to "organic" defects in railroad service. A sharp decrease in the number of complaints has marked the return of peace and the consequent improvement of service.

Property Protection

Promptly after the inauguration of federal control attention was directed toward minimizing the enormous drain upon railroad revenues as a result of loss as well as damage to freight and the activities of thieves. When this work was begun it was found that shipments of all kinds were being tampered with and stolen. While there are not available authentic statistics as to the volume of thefts from carriers in recent years, for 1914 carriers reported to the Interstate Commerce Commission a total of $10,310,780.41 of thefts of merchandise from cars and terminals, including concealed and unlocated losses. The principal thefts have been of four classes:

(1) Thefts of merchandise from cars and terminals.
(2) Thefts of tools, machinery, appliances, brasses, etc.
(3) Padded payrolls.
(4) Embezzlements.

The following statistics reflect the activities as far as reported to the Railroad Administration of the police agencies of the carriers under the direction of the Railroad Administration from April 1, 1918, to December 1, 1918:

Arrests for thefts	10,530
Convicted	6,069
Pending	2,075
Employees arrested	3,241
Value of goods recovered	$667,578.54
Number of sentences imposed of one year or over	1,095
Fines imposed	$150,509.63

Economies

During the war period essential war necessities had to be met regardless of cost. In peace time, naturally, one of the chief aims of railroad operation should be the saving of money. But even though expense could not be made the first consideration during the war strict attention was given to this point and orders were issued to effect savings wherever possible without interfering with the war program. Many of the economies brought about, such as rerouting, common use of terminals, etc., will be reflected but slightly in the operating income accounts of the carriers for the year 1918. They will appear fully in the statements for the year 1919. Nevertheless reports so far received from five of the seven regions show that on a group of selected principal items, savings totaling $85,576,424.71 have been effected in the period from December 31, 1917, to December 31, 1918. Reports from the two remaining regions are not yet available. The specific items which produced this saving include the unification of terminals and stations, the elimination of passenger service, also reductions in organizations and miscellaneous economies.

Equipment has been saved by the elimination of non-essential passenger trains, by the common use of freight cars, the common use of repair shops, the emergency use of the Pennsylvania Hudson river tubes for the movement of anthracite coal from the Jersey terminals to Long Island, a step which could not have been taken under private control; the introduction of the coal zone plan in co-operation with the Fuel Administration, which resulted in the saving of car miles and permitted the production and transportation of several million tons more coal than would otherwise have been possible; the utilization of the Cape Cod canal for the transportation of coal to New England, the operation of locomotives under steam from factories to the point of delivery instead of hauling them as dead freight in the past, the introduction of the "sailing day plan" for less than carload freight, the establishment of special organizations to handle refrigerator and tank cars and the elimination of circuitous routes.

Unification of Terminals

It having been shown that bad terminal conditions were proving a serious handicap to the necessary transportation business, terminal managers were appointed at the larger terminals with jurisdiction over the facilities of all lines. Successful efforts have been made to route freight so as to arrive at the specific terminal where it was to be disposed of. Interchange switching in terminals has been largely eliminated. The report on operations and the reports of the various regional directors will give in detail what has been accomplished in this respect.

Solid Trains

In order to meet the extraordinary war demand and rush food and other supplies through to destination, arrangements were made early in the year for the forwarding of consolidated trains of export freight, principally war supplies, of food, grain, munitions, etc. Under this arrangement a total of 5,090 special export trains have been handled from Western terminals, containing 124,198 cars of export freight, in the Eastern region, the trains being filled out with other freight to make the full train load as required. With the concurrence and co-operation of shippers, plans were made to put into effect in June for assembling livestock, fresh meat, live and dressed poultry and perishable freight, in solid trains, and forwarding them from Chicago, St. Louis, Cincinnati, Buffalo and other Western points, on specific days of the week, via roads best fitted to handle them, resulting in a reduction in the feeding requirements for livestock and in the number of fast freight trains required to handle. In the Eastern region the decrease in Chicago alone has been 11 trains per day, and the average cars per train of high class and perishable freight has been increased from 23 to 36. Grain, oil and cotton are being consolidated and forwarded in train-load lots from Western points, resulting in a large saving in labor, in switching, eliminating cross hauls and facilitating movements. In the Eastern region alone a total of 981 special oil trains have been run since June 1 containing a total of 25,034 cars.

Elimination of Circuitous Routes

One of the most wasteful practices in railroad operation in the past has been the use of circuitous routes in the handling of freight traffic, often for competitive reasons. General Order No. 1 directed that everything possible be done to alter this condition. In order to economize in rolling stock and motive power comprehensive studies were undertaken for the purpose of developing new routes which would not only be shorter but more economical and efficient. As a result, car, engine and train miles have been saved, and the shipping public has been benefited because more cars have been available and more expeditious movement of traffic has been secured. Shippers were not responsible for the former extensive use of circuitous and uneconomical routes, as this routing was largely influenced by the agents of the interested railroads. Shippers have gladly responded to what are now the combined efforts of all railroad representatives under federal control to influence the use of direct and economical routes, and consequently the original routing as specified by shippers is now, generally speaking, in accordance with the established routing instructions, and extensive diversions are unnecessary. Therefore the increase in efficiency cannot be measured by the car miles saved through diversions of freight in transit.

The savings in distance via many of the new routes is so great as to merit special mention. One from Los Angeles to Dallas and Fort Worth is over 500 miles shorter than the one formerly used; another, from the oil fields of Casper, Wyoming, to Montana and Washington state points, is 880 miles shorter; fruit from southern California to Ogden is hauled

201 miles less; and a new route between Kansas City and Galveston has been developed which is 289 miles shorter than the 1,121 miles previously traversed via one of the lines. The ore traffic moving from Minneapolis and Michigan mines to Lake Superior and Lake Michigan ports was rerouted with gratifying results. During the ore shipping season a total of 64,770 loaded and empty cars were rerouted with a saving of 3,577,464 car miles. A few other typical cases of shortening of routes follow:

Between	And	Long route	Miles	Short route	Miles	Saving in miles
Duluth, Minn.	Chicago, Ill.	CB&Q-NP	606	Soo Line	465	141
Duluth, Minn.	Milwaukee, Wis.	CM&St.P-NP	499	Soo Line	376	123
Chicago, Ill.	Kansas City, Mo.	CGW	596	AT&SF	458	138
Chicago, Ill.	Kansas City, Mo.	C&EI-MP	573	C&A	483	90
Chicago, Ill.	Milwaukee, Wis.	Soo Line	145	CM&St.P	85	60
Chicago, Ill.	Mason City, Ia.	C&A-M&St.L	485	CM&St.P	356	129
Chicago, Ill.	Ft. Dodge, Ia.	C&A-M&St.L	490	CGW	373	117
Chicago, Ill.	Little Rock	CRI&P	1,277	C&A-MP	633	644
Chicago, Ill.	Minneapolis	CRI&P	524	C&NW	408	116
Chicago, Ill.	St. Paul, Minn.	IC-M&St.L	503	CM&St.P	412	91
Minneapolis	Des Moines, Ia.	CB&Q	614	CRI&P	270	344
Minneapolis	Kansas City, Mo.	CM&St.P	666	CRI&P	494	172
Minneapolis	Omaha, Neb.	CB&Q	736	CSt.PM&O.	377	359
Minneapolis	Peoria, Ill.	Soo-C&A	609	CRI&P	458	151
Minneapolis	St. Louis, Mo.	Soo-C&A	742	CB&Q	617	125
Portland, Ore.	Ogden, Utah	S&P lines	1,339	UP lines	857	482
Portland, Ore.	St. Paul, Minn.	UP-CGW	2,127	SP&S-GN	1,815	312
Everett, Wash.	Spokane, Wash.	NP	444	GN	306	138
Billings, Mont.	Butte, Mont.	GN	405	NP	236	169
Billings, Mont.	Spokane, Wash.	GN	762	NP	613	149
Butte, Mont.	Great Falls	CM&St.P	387	GN	171	216
Chicago, Ill.	Clinton, Ia.	CRI&P	259	C&NW	138	121
Chicago, Ill.	Sioux City, Ia.	CB&Q	615	IC	509	106

In a few instances it has been necessary to increase the length of hauls temporarily to avoid accumulations.

By rerouting, a total of 16,863,633 car miles has been saved in the Eastern and Northwetsern regions alone.

Better Operation

The operating results may be summarized briefly: The railroads during the first 10 months of federal control produced 1.9 per cent more ton miles with a *decrease* of 2.1 per cent in train miles and a decrease of 5.8 per cent in loaded car miles. The average train load increased from 655 tons to 682 tons, a gain of 4.1 per cent, and the average car load increased from 26.8 tons to 29.0 tons, a gain of 8.2 per cent. The increase in traffic in 1918 was accomplished by the use of approximately 3.4 per cent more freight cars and approximately 1.4 per cent more freight locomotives than in 1917. Compared with 1916, the 1918 increase in freight cars was 6.9 per cent and the increase in freight locomotives was 2.4 per cent.

It should be explained that the total ton miles handled are much less than they would have been in the past for a corresponding volume of traffic by reason of cutting out circuitous hauls. The general statement may be made that the actual transportation production is greater than is indicated by ton-mile statistics. In whatever degree the actual performance of moving tons from one place to another place as required is accomplished by moving the tonnage over shorter routes, to that degree the ton-mile statistics understate the real performance when they are compared with a period when the shorter routes were not used.

Probably it would not have been possible to meet the enormous demands made upon the transportation system during the past year without the utilization of the permit system, which prevents the loading of traffic in the absence of assurance that it can be disposed of at destination. This is a reform which under government control would succeed in peace times as well as in war times, and is one of the most important means of preventing transportation stringency or congestion. It means controlling the traffic at the source, in the public interest, instead of letting the traffic choke the public interest at destination.

Some of the means used to bring about the desired result were strictly war measures and probably could not or should not be utilized in time of peace. For instance, this is true with regard to the elimination of many passenger trains, although passenger trains run merely for competitive reasons are often wasteful and do not give the needed service to the public.

The Exports Control Committee, which has played a vitally important part in the proper handling of supplies for overseas shipment, probably could not be operated under peace conditions, although under unified control an important adjustment of traffic to port capacity will be practicable, even under peace conditions.

Reforms Which Should Be Continued Under Peace Conditions

Many of the changes in railroad operation inaugurated during the period of the last year should prove of permanent value and should continue if possible whatever form of control is decided upon for the railroads. Such reforms include:

1. The maintenance of the permit system so as to control the traffic at its source.
2. The maintenance of heavy loads for cars.
3. The pooling of repair shops.
4. The elimination of circuitous routes.
5. The unification of terminals.
6. The maintenance of the "sailing day plan."
7. The consolidation of ticket offices.
8. The utilization of universal mileage tickets.
9. The standardization of equipment.
10. The maintenance of the uniform freight classification introduced by the United States Railroad Administration.
11. The maintenance of common time tables between important points.
12. The maintenance of high demurrage rates and uniform rules.
13. The establishment of through waybilling freight from point of origin to destination.
14. Rendering unnecessary the rebilling by connecting or intermediate routes.
15. The elimination of the old practice of paying in mileage or per diem rental for the use of freight or passenger cars of one carrier by another.
16. The simplification of the old practice of apportioning interline passenger revenue.
17. The utilization of water routes for the relief of crowded rail lines.

Wasteful Competition

Some of these reforms can be continued should the roads be returned to private operation; others cannot. Competition and self-interest dictate that when the roads are under private control, each carrier gets as much business as possible and keep it, regardless of the fact that the aggregate result may be wasteful and uneconomical. For instance, where two or more competing lines operate between two important cities the convenience of the public can best be served if alternating trains be operated at short intervals over the different roads. Competition, however, always results in each of the roads "bunching" their trains at the times when the demand for transportation is the heaviest. Competing lines can hardly be expected to route freight over the lines of competitors, even though these competing lines may have the shorter route and be able to handle this particular traffic more economically. Lines with advantageous terminal facilities cannot be expected under private control to place such facilities at the disposition of competitors operating under less favorable circumstances. One company will not forego loading and hauling traffic even though this seriously embarrasses the general situation, because its connections cannot conveniently receive and dispose of the traffic. Private carriers may not enforce rules which, although designed to bring about efficiency and economy, might drive business away from their lines. All the waste resulting from these prac-

tices and running into huge costs, is paid for by the public in the form of increased rates.

Public Service Freight Bureaus

Under private control of railroads, and for competitive reasons, practically all railroads maintain so-called off-line agencies, the original function of which was solicitation of traffic. These off-line agencies were abandoned by the Railroad Administration for the reason that the competitive causes which gave rise to their establishment no longer existed. It was found, however, that in some measure these agencies had performed real service to the public and therefore the establishment of public service freight bureaus has been begun with a force trained to handle for shippers matters which were formerly handled by the off-line agencies.

Labor and Wages

The participation of America in the European war with the consequent shortage in man power available in this country, and the increase in the cost of living has made the railroad labor problem a difficult one during the past year. However, the great bulk of railroad labor has demonstrated a fine spirit of patriotism and has co-operated heartily with the government. The labor troubles which were facing the railroads when they went under government control were practically all eliminated and with a few exceptions there has been quiet in the railroad labor world during the last 12 months.

In order to place railroad labor upon a living wage and provide fair working conditions, an investigation into labor conditions on the railroads was begun immediately after the carriers were taken by the government, with the result that many reforms in working conditions, decreases in the hours of labor and increases in the rates of pay have resulted. These investigations have been continued since the machinery was set up for the thorough investigation and hearing of all grievances and representations about wages and working conditions. This machinery generally has recognized the so-called "bi-partisan" principal of equal representation of employer and employee on boards. Decisions, however, have always been made by the director general since he is charged with that responsibility as the chief representative of the government.

The critical labor conditions are strikingly brought out in the report of the Railroad Wage Commission. This commission heard representatives of every class of employees, railroad officials and experts on the subject and examined hundreds of written statements and personal letters from employees. The requests presented to the commission for wage increases, if granted, would have involved an outlay of something over one billion dollars per year in excess of wages paid in 1917. In its report the commission, after reciting the various demands for wages made by railroad labor in 1916 and 1917, and reviewing increases given by the railroads under private control, said:

"But these advances were not in any way uniform, either as to employments, or as to amounts, or as to roads, so that one class of labor benefited much more than another on the same road, and as between roads there was the greatest divergence. The situation has been dealt with as pressure made necessary, and naturally those who, by organization or through force of competition, could exert most pressure fared best. Things came to a head just before the government took over the railroads. Another three months of private management and we would have seen much more extensive concessions in wages, or there would have followed an unfortunate series of labor disturbances. The government, therefore, has now to meet what would have come about in the natural course. Indeed, the patience of the men was only allayed after government intervention by the assurance that the matter of wages would be promptly taken up and that the awarded increases would be retroactive as of January 1 of this year."

The commission also said: "It has been a somewhat popular impression that railroad employees were among the most highly paid workers, but figures gathered from the railroads dispose of this belief. Fifty-one per cent of all employees during December, 1917, received $75 per month or less, and 80 per cent received $100 per month or less. Even among the locomotive engineers, commonly spoken of as highly paid, a preponderating number receives less than $170 per month, and this compensation they have obtained by the most compact and complete organization, handled with a full appreciation of all strategic values. Between the grades receiving from $150 to $250 per month there is included less than 5 per cent of all the employees (excluding officials), and these aggregate less than 60,000 men out of a grand total of 2,000,000.

Wage increases granted during the year are estimated to aggregate between $600,000,000 and $700,000,000 per annum, and in a large part were retroactive from January 1, 1918. These wages were fixed not upon the theory that the railroads, a permanent industry, should compete in prices paid labor with the transient war industries, many of which paid very high wages in order to attract labor. Rather the effort was made to find a just and equitable basis which would outlive the war and which would give a living wage and decent working conditions to every railroad employee. Efforts have been made to eliminate inequalities, and while this work has not been finished it has been chiefly done.

Conditions of Employment

On February 21 General Order No. 8 was issued, containing among other things, the following: "No discrimination will be made in the employment, retention or conditions of employment of employees because of membership or non-membership in labor organizations." This has had the effect of many railroad employees joining labor unions who previously were not affiliated with them. At the same time, equal consideration has been shown employees who were not members of unions and individual employees have been heard on an equality with representatives of the unions. The principle of the eight-hour day was recognized early and strengthened whenever possible.

Special efforts have been made to better the working conditions of the women in railroad service and a special Woman's Section was established in the labor division to investigate conditions surrounding women so employed and apply remedies where unfavorable conditions were found to exist.

Labor Shortage

The necessity for manning the American military railways in France with trained American railway men, and the induction into other branches of the Army and Navy through voluntary enlistments or through the draft, of many railroad employees, added to the difficulties throughout the year, since at no time in the history of the American railroads has there been a greater need for trained and skilled railway help than during the war period. This difficulty was greatly increased by the influenza epidemic during the last half of the year, which very seriously interfered with the operation of the railroads for several months.

Expenditures for Capital Account

On February 2, 1918, all lines under federal control were directed to prepare and send in budgets of improvements immediately required to increase capacity and efficiency and to promote safety in operation. The budgets submitted in response to this called for expenditures chargeable to capital account—that is, exclusive of large sums chargeable to maintenance—amounting in the aggregate to $1,329,000,000, which upon careful revision was reduced to $975,000,000.

This amount has been increased from time to time by new and unforeseen requirements, and particularly by large orders for locomotives and freight cars, until the improvements definitely authorized to December 1, 1918, amounted to $1,254,396,158. Of this amount $551,925,525 is for additions and betterments; $656,048,745 for equipment, and $46,421,888 for construction of extensions, branches and other lines.

In planning improvements chargeable to capital account other than for war purposes, the rule adopted was that the first consideration should be *safety* in operations, and secondly, *increased capacity* where that was needed; and that any improvement not required for these purposes should be deferred until after the war unless exceptional circumstances should make it necessary earlier. Improvements designed to effect permanent economies have been left for the favoring times and conditions of peace, unless the economy was so great that substantially the entire cost could probably be saved during federal control. Much the largest item was for additional yard tracks, sidings, etc. The second largest item was for shop buildings, engine houses and appurtenances, and the third for additional main tracks, and by the large orders for equipment almost wholly for locomotives and freight cars.

In addition to the locomotives and freight cars under order by the railroad companies at the time the government assumed control additional orders were placed for 1,430 locomotives for 1918 delivery, at an estimated cost of $78,193,200, of which 542 have been delivered by the builders; and also an order for 100,000 freight cars for 1918 delivery at an estimated cost of $289,460,000, of which there has been completed and delivered to date 14,650 cars. An additional order for 600 locomotives for 1919 delivery has also been placed, involving an expenditure of approximately $37,842,268. At the time these orders were placed it was supposed that the war might last much longer than the year 1918. Practically all of this equipment has been assigned to those railroads whose need for additional power and equipment appeared to be the greatest.

The cost of coal and practically all other supplies used by the railroads increased enormously during the year just passed, as compared with the cost during the year 1917. The increased cost of fuel for the first 10 months of the present year was $140,000,000 over the cost for the same 10 months in 1917, and during the same period the cost of cross-ties and lumber increased approximately $65,000,000. The added cost of coal to the railroads increased in spite of the fact that economy in the use of coal was exercised to such an extent that, for instance, on the Chicago & North Western during the month of October the number of pounds of coal per passenger locomotive mile was 110.9 this year, as compared with 124.3 last year, and the number of pounds of coal per passenger train car mile was 19.2, this as compared with 21.3 last year, and yet the cost of locomotive fuel per locomotive mile was 34.9 cents in October, 1918, as compared with 27.9 cents in October, 1917. On the Union Pacific, during the same month the number of pounds of coal per passenger locomotive mile this year was 115.6, as compared with 131.8 last year. On the same line, during the same month, the number of pounds of coal per passenger train car mile was 13.6 this year, as compared with 18.2 last year, and yet the cost of fuel per locomotive mile was 33.2 cents in October, 1918, as compared with 32.6 cents in October, 1917. On the Chesapeake & Ohio the number of pounds of coal per passenger locomotive mile during the same month was 142.6 this year, as compared with 136.1 last year. The number of pounds of coal per passenger train mile on the same road during the same month was 24.4 this year as compared with 24.9 last year, and yet the cost of fuel per locomotive mile was 35.3 cents in October, 1918, as compared with 29.8 cents in October, 1917.

The Increase in Rates

The increases in wages and the greatly enhanced cost of coal, iron and steel and other supplies made necessary the increase of both passenger and freight rates. Flat percentage increases were necessary to obtain the required revenue, but continuing and successful efforts have been made since to eliminate inequalities naturally incident to the adoption of such a plan. These new rates did not go into effect until practically six months of federal control had passed, and therefore only approximately six months' benefits have been gained from them during the past year, whereas increased cost of labor, coal and other supplies has operated during the entire year. Economies in operation and in organization have resulted in enormous savings, but have not fully met the difference between the cost of operating the railroads and the income, for the reason stated. The benefit of these savings will not be fully realized until the operations for the year 1919 are completed.

Increased Cost Necessary

The increases in cost of operation undoubtedly would have been equally operative had the roads remained under private control. If the private owners had operated the railroads during the past year they either would have had to increase the rates as the government did or they would have had to face an enormous deficit.

Financial

From the reports of operations for 10 months, ending October 31, 1918, and with November and December estimated, the net operating income of the roads under federal control will be less by approximately $136,000,000 than the standard return or annual rental which, under the law, the government pays for the use of the railroads. This deficiency is remarkably small in the circumstances, because the increases in freight and passenger rates were in effect for only a little more than six months of 1918, whereas increased wages and increased cost of fuel and all other railroad supplies were in effect for the entire 12 months. If the increases in freight and passenger rates had gone into effect January 1, 1918, or at the same time that the increased wages and cost of fuel and supplies went into effect, it is estimated that there would have been a substantial surplus for the year of at least $100,000,000. It is to be expected, however, during the year 1919 the cost of material and supplies may be reduced, and it is also reasonable to expect that with improved operation under normal conditions, relieved of the intense pressure and excessive cost incident to the war necessity, and with a general improvement in operations and use of facilities and equipment that may be reasonably expected in peace time, many more economies can be effected. Since the object of the government should be at all times to operate the railroads not for profit, but at cost, and to render at the same time the best possible service, I confidently believe that it will be possible during the year 1919, or certainly at the end of the year 1919, to effect a considerable reduction in rates unless the traffic for 1919 should be much less than it was in the year 1918.

Inland Waterways

Hundreds of millions of dollars have been expended by the nation, the states and citizens for the purpose of developing our inland waterways, and for the construction of canals. Thousands of miles of rivers, canals, lakes and bays are ready to assist in moving our products. These waterways, with the exception of the Great Lakes, are not being extensively used. With the assumption of my present task, I appointed a committee to make a prompt investigation and to suggest a definite plan for the additional use of internal waterways, for the economical and expeditious movement of the traffic of the country, so as to relieve or supplement

the railways under the conditions caused by the war. This was the beginning of a program which has been constantly pursued and while the greater urgency for raw materials in war work interfered with the construction of steamers and barges, 160 steel, wood and concrete vessels are now building and 50 steel and wooden craft have been purchased. The total appropriation for old and new floating equipment exceeds eleven and three-quarter millions.

The increased responsibilities of this country in the family of nations will demand greater commercial activity on our part. Transportation is a major problem, for, on account of the extensive area of our country we have a longer average haul to seaboard than other industrial commonwealths. It has seemed to me evident that by developing transportation on the waterways and co-ordinating and articulating them with a unified railway system, we shall bring about a correct solution of the rail-water controversy, which has been in progress for 50 years. This is possible with the railways under federal control. I doubt if any of our rivers or canals will become active factors of transportation if the railroads are turned back to private control. The old methods of railway competition with the waterways doubtless will be revived and the waterway experiment may not be able to survive that competition.

In furtherance of the plans for waterways transportation, a division of inland waterways with two sub-divisions was created: The Mississippi-Warrior and the New York and New Jersey Canal sections.

Mississippi River.—Service on the Mississippi was inaugurated September 28 with 34 vessels. Of these, 23 are leased and 11 were purchased. The service is developing satisfactorily and as tariffs for joint rates with the railroads have just been promulgated, the valley will be afforded traffic privileges not possible in the days of railroad competition. Six steel steamers or towboats, and 40 (2,000-ton) steel barges are under construction for this service. The capacity of the federal fleet between New Orleans and St. Louis will approximate a million tons annually.

Warrior River.—Nine steamers and 24 barges were purchased for Warrior River service. Six steamers and 20 barges are about to be constructed. This fleet will be capable of carrying 600,000 tons southbound and about 150,000 tons northbound. The federal improvements on the Warrior are complete as to six feet of water, and will shortly be completed as to eight feet navigable craft.

New York Barge Canal.—The congestion existing on the railroads in the early part of 1918, and the war emergency made it essential to prepare so far as possible for such use of this important waterway as might be necessary to assist the railroads, and although it was announced officially that the canal was completed, there was practically no private building of equipment for use on the canal, and many of the old boats were being diverted to other uses. During the season the Railroad Administration leased and operated upward of 200 barges and contracted for the construction of 51 steel and 21 concrete barges. Construction was delayed on account of the war requirements for steel. It turned out that the canal had only seven feet navigable depth at the opening and it was not until midsummer that all the boats could be loaded to full capacity for operation, and as the terminals and rail connections were unfinished, an economical operation was not possible. In fact 8½ feet of navigable depth was the maximum in the canal during the season. The rail congestion of last winter was relieved before the canal season opened. The suspension of imports, the decrease in road and industrial building and the deficiency in the grain crops of 1917, affected very seriously tonnages that under normal conditions are available for this waterway. In compliance with very urgent requests of the people of the state of New York a local packet freight service was installed between Troy and Buffalo. As suitable boats were not obtainable and as the terminals were in some cases unfinished and in others inaccessible, it was apparent that the operation would not be profitable, and results justified this view. It is to be noted that although the enlarged canal was in operation all season, no activity was displayed on the part of individuals or corporations to build vessels. The Railroad Administration has repeatedly announced that it does not assume to control, nor does it in any way discourage, the operation of privately operated barges; nor does it fix the carrying rate for independent vessels. When the canal and its facilities are completed, and when modern vessels are available, it will be possible to ascertain the cost of transporting traffic on this waterway. The results obtained during this formative stage, with the unavoidably antiquated equipment, are not a criterion of what can be accomplished with a completed canal and modern equipment. The adjustment of shippers and their facilities to the use of the canal is also a matter of time, which could not progress rapidly with the conditions existing during the present season.

Delaware & Raritan Canal.—The Delaware & Raritan canal connecting the Delaware river with New York harbor from 1913 up to the present year suffered a steady decrease in business. In 1917, 272,734 tons of freight were moved. The limited draft of water and small lock structures prevented profitable transportation operation on this waterway. It became evident last spring that there would be a marked decrease in the use of the canal for transportation of coal, due to the fact that coal was to be shipped via other routes, but there was an unusual demand for transportation of miscellaneous freight between New York and Philadelphia by this route. The canal has for many years been under lease to the Pennsylvania Railroad and came under federal control as part of its transportation system. In July the New York-New Jersey canal section took charge of the floating power equipment of the Railroad Administration on the canal and December 1 the operation and maintenance of the canal was transferred to that section. The Railroad Administration also operated a fleet of packet freight ships during a part of the season. There are a number of private transportation agencies operating on this canal. In spite of the loss of coal tonnage, the total freight movement on the canal will slightly exceed 1917.

Chesapeake & Ohio Canal.—The Chesapeake & Ohio canal, connecting Chesapeake Bay with Pennsylvania and West Virginia coal fields, has been operated at a loss for several years. At the beginning of the season of 1918, it appeared that unless action was taken to support navigation on this canal, the increasing costs would cause it to cease, while the pressure of traffic at that time upon the railroads bringing coal to Washington and vicinity was so great as to make it very undesirable that they have the additional burden of transporting the coal previously carried by the canal. The Railroad Administration therefore for a time assumed the cost of canal tolls on coal, and later on made an arrangement with the only company operating boats on the canal, which insured the maintenance of the service, the Railroad Administration paying the actual cost of the service over and above the freight charges which were paid by the shipper at the same rate as for rail shipments. The Railroad Administration also furnished 10 new barges which were leased to the operating company.

Ohio River.—The Railroad Administration has established an office in Cincinnati, Ohio, for the purpose of cooperating with shippers and vessel owners and studying traffic conditions with shippers and vessel owners. In view of the fact that the projected locks and dams on the Ohio river between Pittsburgh and Cairo are not completed (the movement has not been finished even between Pittsburgh and Cincinnati) it does not seem a proper time to consider any new equipment for this route.

Lake Keuka-New York.—The service formerly operated

on this lake by the Lake Keuka Navigation Company had been discontinued, and in order to move the grape crop of 1918, the Division of Inland Waterways operated equipment of the Lake Keuka Navigation Company during the grape season.

Intracoastal Waterways.—The intracoastal waterway from Philadelphia to Beaufort, N. C., will be susceptible of greater commercial development. The projected improvement between Norfolk and Beaufort will not be completed for some time and it will require at least two years to modernize the Chesapeake & Delaware canal. The improvement ought to be authorized promptly and I hope that the Congress may grant the necessary appropriation and power to deal with the matter. The fleet operating along this route was commandeered to a considerable extent, during the war, but the vessels are being slowly returned to the owners. The fleet seems to be sufficient for normal conditions. The capacity can be considerably increased by the introduction of modern terminal methods. Ultimately, packet freight service on this route may be practicable.

Coastwise Ships

The fleets of vessels of railroad ownership were augmented on April 13, 1918, by the taking over of the vessels of the Clyde, Mallory and Southern steamship companies and the Merchants and Miners' Transportation Company, comprising 64 passenger and cargo-carrying vessels, operating in coastwise service between various ports—Boston, Mass., to Galveston, Tex., inclusive. The operation of the vessels was at times seriously interfered with by German submarines. In supporting the war policy of the nation, the steamships under federal control were used in war work to the maximum extent. The properties of the Clyde, Mallory and Southern steamship companies and the Merchants and Miners' Transportation Company were relinquished from federal control on December 6 as they are no longer necessary to the war purpose.

Cape Cod Canal

The Cape Cod canal was taken under federal control July 25, 1918, and it is earnestly hoped that it will be operated in the future by the government. Formation of shoals had reduced its navigable depth to 17 feet at mean low water when the government took control, but the Railroad Administration immediately provided $250,000 for dredging, piling, bank protection work, etc., and on October 23 the canal was opened for vessels drawing 20 ft. 6 in. of water, and the dredging necessary to restore the original depth of 25 ft. is expected to be completed by February 15, 1919. In spite of the fact that the work on the canal has not been entirely completed there has been an increase of 56.4 per cent in the number of vessels handled and 114 per cent in the cargo tonnage transported through the canal in 1918 as compared with 1917.

Standardization of Locomotives and Cars

Before government control, practically every important railroad had its own specifications for cars and engines. Practically all were different in details. Although the facts are not obtainable, it has been said that there were 2,023 different styles of freight cars and almost as many different styles of locomotives included in the equipment of American railroads prior to the war. Complete standardization of course is impossible but as rapidly as existing rolling stock and engines wear out, it ought to be practicable to replace them by standard types. During the period of federal control progress has been made. Some 12 standard types for freight cars have been agreed upon and it has also been decided that hereafter only 6 different types of locomotives of two weights each shall be purchased. The parts of these various locomotives and freight cars respectively are interchangeable. The importance of this is forcibly illustrated by an instance where a leased locomotive was held out of service until over $4,800 had accumulated, awaiting a part which would cost not to exceed $30. Where peculiar conditions exist, however, and where special types of locomotives are necessary, permission has been given to depart from the standardized type of locomotive.

Civilian Inconveniences

While such a great work was being performed, inconveniences to civilian travelers and some interferences with the transportation of ordinary freight in the United States were unavoidable. The war necessity came first; the civilian needs of America, second. With a limited supply of passenger and freight equipment available, and with a large proportion of this equipment needed for the movement of troops and war supplies, there were not sufficient cars and locomotives remaining fully to meet civilian needs; nor was there time, nor materials, nor labor to build them. This was explained to the country early in the year, and during the period of the war the people generally, when they realized the situation, patriotically accepted it and made sacrifices accordingly.

Whatever inconveniences have resulted are due entirely to war conditions and are in no way related to the fact that the railroads were under government control. Such inconveniences undoubtedly would have been greater under private control, for the supply of equipment was augmented by the ability of the government to shorten routes, to combine facilities, to pool equipment and motive power, and to introduce economies which the roads under private control could not, and would not, have introduced.

I desire to make this point as clear as possible, for it is necessary for the American people to understand the facts of the railroad situation, if this big problem is to be dealt with intelligently. Passenger equipment while crowded during the war, was crowded because much of the equipment had to be used in the transportation of troops; it was not crowded because the government had control of the railroads. As a matter of fact, many thousands of passenger train miles were saved by the ability of the government to achieve results which private owners of the roads could not or would not have achieved. During the period of federal control, every possible economy was exercised in order to save both passenger and freight equipment and make as many cars and locomotives as possible available for the war need first, and for the needs of the civilian population next.

Serving the Public

While putting the paramount war needs of the nation first, nevertheless, every possible effort has been made by the railroads under federal control to serve the public adequately and furnish every possible facility for carrying on the ordinary passenger and freight business of the nation. The railroads are public servants and in time of peace the first consideration should be to furnish adequate service at the lowest possible cost. To keep in touch with the public during the period of federal control and see to it that their needs were given every possible consideration, the Division of Public Service and Accounting was established soon after the railroads were taken over and Charles A. Prouty was made director of the division. With this object in view, traffic committees were early established, upon which the public was given representation. While these committees have no authority to change rates, nevertheless, their advice and recommendations are most helpful. What the shipping public desires above everything is stability of rates and reliability and adequacy of service. In the past thousands of rate changes have been made each month, which were worse than unnecessary. While passenger and freight service was of necessity interfered with during the war, efforts have been made dur-

ing the past year to keep in touch with state railroad commissions and other local bodies to make certain that well-grounded and important complaints should receive prompt attention.

The Future

I have given you a statement of the transportation conditions a year ago, of the transportation achievements under federal control during a year of war, and of the present situation. What remains to be considered is what permanent solution of the railroad problem should be adopted and what shall be the temporary form of railroad control pending a permanent solution. In December, 1917, there were about 180 separate operating railroad companies in the United States with operating revenues of $1,000,000 or more per year each. Seventy-three of these companies had operating revenues of $10,000,000 or more per year each. There were several hundred companies whose respective operating revenues were less than $1,000,000 per year.

Possible Solutions

Broadly speaking, there are three general permanent solutions of the railroad question. The first is to send the railroads back into the private control of the several hundred old companies. The second is to have outright government ownership and control of all the railroads. The third is to reconstruct the railroad map along logical lines so as to wipe out these hundreds of different railroad companies and substitute a comparatively few companies which under strict and close government control can be expected to combine the advantages of government control, including unified control of those things where it is needed with the advantages of the initiative of private management. I am not committed to any particular plan. I wish to lay before you certain reforms which I think are indispensable and without which any so-called solution of the railroad problem will be a mere disappointing makeshift.

I am frank to say I do not believe that these important reforms can possibly be accomplished if we are to have in the future several hundred different railroad companies as we have had in the past, or even a hundred or even fifty different railroad companies. I believe they can all be accomplished either through a comparatively few railroad companies or through single federal control. If the country prefers to continue in existence the hundreds of different railroad companies as in the past I believe it will be necessary for the country to abandon the hope of obtaining most of the fundamental reforms which I propose to point out.

The Terminal Problem

One of the most difficult and important railroad problems in this country is the problem of terminal facilities. It probably means more to the producing and consuming public in the matter of delays, inconvenience and transportation burdens than any other phase of transportation. It is generally understood that the delays and excessive costs do not occur principally on account of insufficiency of facilities on the road, but on account of inadequate terminals and of the heavy terminal costs. It is not unnatural that this should be the case. It is a far simpler proposition to haul a train over a railroad than it is to break up that train in a terminal and distribute its cars to the connecting carriers. For one thing, it is easier to provide adequate track capacity on the railroad itself, most of which runs through the country, than it is to provide adequate track capacity in a terminal which is generally in the midst of a great city. But an even more important point is that when the train is being carried over the railroad between terminals it is being handled exclusively under one management and on a railroad which has been planned with unity of purpose. But the moment a train gets into a terminal where its cars must be separated and delivered to connecting lines, then we have to deal with facilities which have not been planned with unity of purpose and which under private control are not operated under a single management. The ability of one company to get rid of the business depends upon what its connecting companies have provided in the way of terminal tracks and other terminal facilities, and upon the way in which those connecting companies carry on their operations. It is human nature that each company is much more interested in looking after its immediate exclusive interests, both in the facilities which it provides and in the way it operates them, than it is in building and operating its property so as to help its connections.

Generally speaking, the cities of this country and the railroad traffic that passes through them have wholly outgrown the railroad terminal facilities which were provided many years ago without any conception of the growth of the country's traffic. It is difficult to get the land to expand the terminals of any one railroad and each railroad company is jealously trying to prevent some other railroad from getting the advantage in new terminal facilities. Each railroad company wants to plan its new terminals so as to help its own business and so as not to help its rivals. It is true that at times under pressure of critical necessity some of the railroads at some cities try to combine a portion of their terminal plans into a joint terminal enterprise. But it takes years for the railroads to agree on any such matter, and the comprehensiveness of the particular plan is generally interfered with by the selfishness of some particularly powerful railroad which feels that it can preserve certain advantages by refusing to put into the joint plan certain facilities which ought to be put there in the public interest.

The effect is that when it comes to terminal properties we get a clear-cut conflict of interest between the public and any particular railroad company. The public wants terminal facilities comprehensively planned and carried out so as to promote the greatest convenience and economy for all concerned, but each railroad company is anxious to preserve any particular advantage which it already has and to increase that advantge when practicable. This clash of interests between the public and any particular railroad company and between the different railroad companies serving a particular terminal operates to produce deadlocks which to a large extent prevent terminals from being developed so as to meet the business necessities and so as to serve the public to the greatest advantage.

The condition exists, and is largely accounted for by the reasons above given, that the outstanding shortcomings in railroad transportation are inadequacies in terminal facilities. The great unnecessary burdens in the matter of inconvenience, delay and cost for which the producing and consuming public have to pay are largely due to these terminal conditions. There can be no successful solution of the railroad problem which does not provide a solution for these terminal difficulties. The greatest opportunity to reduce railroad costs for the future and to promote public convenience in transportation for the future will be found in the solution of these terminal problems.

Cincinnati—An Example

A concrete illustration will help to emphasize the present difficulties. Cincinnati is an important gateway between the north and the south. Three important railroads—the Chesapeake & Ohio, the Louisville & Nashville, and the Cincinnati Southern—reach Cincinnati by crossing the Ohio river. Four other important railroads—the Big Four, the Baltimore & Ohio (including the old Cincinnati, Hamilton & Dayton), the Pennsylvania, and the Norfolk & Western—reach Cincinnati on the north bank of the Ohio river. The interchange of traffic between these lines at Cincinnati is enormous, and the general public has a vital interest in this interchange being accomplished with the least possible delay and

expense. Yet conditions are such that in times of heavy traffic Cincinnati is badly congested with freight, and the ability of all the railroads mentioned, not only with respect to handling traffic through Cincinnati, but with respect to handling other important traffic, is largely hampered by the inability to get rid of the traffic which must pass through Cincinnati.

Each of the three railroads approaching Cincinnati from the south has a bridge across the Ohio river. The Cincinnati Southern bridge and the Chesapeake & Ohio bridge are so light that they cannot accommodate the heavy locomotives which are used on those roads, so that there must be a delay and cost and congestion due to the necessity for changing engines south of the Ohio river on those two roads. The Louisville & Nashville has the use of a bridge which has only a single track and is therefore entirely too restricted in capacity to handle the traffic. The topographical conditions in Cincinnati are such as to make it exceedingly difficult to find suitable ground upon which to construct terminal facilities, and the densely populated area makes terminal facilities extremely costly. A considerable part of the important terminals in Cincinnati is subject to overflow in times of high water. To a very large extent the traffic which any one railroad brings into Cincinnati is traffic which must be moved beyond Cincinnati by some other railroad, so that more than one railroad generally has an interest in providing proper facilities for all the traffic moving through Cincinnati and all the railroads reaching there have a common interest in avoiding the congestion at Cincinnati which in the past has constituted one of the most serious traffic situations in the country. Yet each of the railroad companies has its separate facilities, and while there have been various particular arrangements of a joint character it still remains true that in all the years that have passed the railroad companies under private management have never been able to get together and put into effect any comprehensive plan which would result in terminal facilities equal to the situation. It seems fair to conclude from the failure of the railroad companies in the past to accomplish this result that they probably never will accomplish it in the future under corresponding methods of private management.

At the present time there are perhaps from 25 to 30 freight houses in and around Cincinnati which, generally speaking, have been provided primarily for the particular use of separate railroad companies and without any purpose of combining all the freight house facilities so as to serve the general public to the best advantage and at the least cost.

It is evident that in view of the common interest which the railroad companies have in the traffic passing through Cincinnati some comprehensive plan ought to be worked out. No railroad company can live to itself alone in a terminal like Cincinnati. No one important structure should be planned simply from the standpoint of a particular railroad company. The entire situation should be dealt with from the standpoint of the general public interest and the selfish interests of any particular railroad company ought to be subordinated to the general interest. Yet under private management there is no way whatever in which the public can properly assert and accomplish its needs and the result both in construction of facilities and in operation is left to the haphazard play of the conflicting ideas of seven or more separate railroad companies and plans of the utmost importance are subject at any time to be defeated by the disagreement of one or more of these companies.

It is estimated that there ought to be spent in the near future about $45,000,000 in the rehabilitation of Cincinnati terminals so as to make them equal to modern public needs, with probably $25,000,000 additional for passenger terminals. Practically every item of this large expenditure involves directly or indirectly the interests of two or more separate railroad companies. In fact, virtually the whole expenditure has to be made in the common public interest and without making the interest of any one railroad company paramount as to any particular item. If this matter is left to be worked out by the separate railroad companies without any controlling public authority to shape up the whole situation for the benefit of the general public, there is no reason to believe that it ever will be successfully worked out. Certainly the railroad companies have had many years in which to work out the problem and they have never done so. If the problem is not adequately solved the result will be that a great burden of delay and inconvenience, uncertainty and cost will continue to rest upon the people of the United States simply because a thing which ought obviously to be done at Cincinnati in the public interest is not done and it will not be done because the power of government which ought to be exercised to promote the public interest is allowed to remain dormant and subordinate to the separate interests and to the disagreements of various privately managed railroad companies.

What is true of Cincinnati is true to a large extent of every important terminal in the country, particularly of Chicago and the terminals around New York harbor. In the aggregate these situations constitute a great burden and menace to rail transportation and a serious obstacle to convenience and certainty to the public in the performance of that transportation. These situations must be met if transportation in this country is to be performed at a reasonable cost and without the intolerable congestions and delays which have periodically arisen in the past.

Nor is there any just reason why railroad companies should fear that such a comprehensive development of terminals is going to interfere with any legitimate separate interests of the railroad companies in the event they shall eventually be turned back into the old form of private control. Any comprehensive plans of terminal improvement which are for the general public good will in the long run turn out to be advantageous to every separate legitimate railroad route in the country. No matter if the railroads do go back into the old form of private control with anywhere from 100 to 200 separate managements, it is inevitable that in the long run and perhaps as the result of long years of hardship upon the public, there must be some comprehensive legislative solution of these terminal problems in the general public interest. The railroads will not be injured, but on the contrary will be benefited, by a prompt public dealing with these matters.

As a simple illustration, it is evident that the fact that the Baltimore and Ohio passenger trains are now taken into the Pennsylvania passenger terminal in New York has not resulted in injuring the Baltimore & Ohio or in causing any injury to the Pennsylvania, of which it has any right to complain. The public has been enormously convenienced. If private control should return it is not to be anticipated that the public would again be subjected to the inconvenience and delay and expense incident to the Baltimore & Ohio going back to the use of its old and inconvenient passenger terminal at Communipaw, N. J.

Transportation Stringency Through Failure to Control Traffic

The situation exists in this country that the transportation needs of the people are national and interdependent, despite the fact that the railroads are local and independent. Practically every community in the country is dependent upon a national and not a local transportation service. It is not true of any community that it can depend wholly, or even principally, upon its local railroad to transport what it produces and what it consumes, because, directly or indirectly, what it produces must in some form go far beyond that railroad and what it consumes must in some form originate beyond that railroad.

Perhaps the greatest single difficulty is that under private management, with each company trying to prevent any traffic going to a rival, the amount of freight loaded has been dependent almost wholly upon the desire and opportunity of the consignor to load a shipment and get a bill of lading for it, without any regard whatever to the ability of the delivering railroad to dispose of the traffic at destination at that time, or of the ability of the consignee to receive the traffic, if delivered. The result has been the indiscriminate throwing into the stream of traffic of everything which consignors wished to throw into it, and this has led to the most acute congestion at or near destination, analogous to an "ice jam" or "log jam" in a river. This consequence has been injurious to the public as a whole, because it has reduced transportation capacity far below what it ought to be, has led to the greatest uncertainty and delay and consequent interruption and injury of business, with direct disadvantages to labor and to the producing and consuming public. It is apparent that this fundamental difficulty has not been effectively dealt with under diversified private management. It is difficult to see how any railroad company would be willing deliberately to prevent the loading of traffic on its own line, when it is able to handle that traffic, simply because eventually the traffic may be a source of embarrassment to some connecting line.

Met by Unified Control

These conditions have been substantially met under unified control by the routing and distribution of traffic over the available lines and by the establishment of the "permit system," whereby traffic involving potentialities of congestion is not allowed to be loaded, except upon showing that it can be delivered to and taken care of by the consignee at destination. During the autumn months of 1918, when traffic was at its heaviest, there was practically a complete absence of transportation stringency, which in the immediate preceding years had amounted almost to transportation paralysis. This condition was due largely to the "permit system." One of the essential reforms therefore is the adoption of some system to control traffic in the common interest.

As far as railroad tracks are concerned, the mileage of road tracks (as distinguished from terminal tracks) appears to be sufficient to take care, generally speaking, of a much larger tonnage than can be handled through the terminals. At times, however, particular railroads may become embarrassed by a surplus of traffic, even though it may be possible to care for the traffic at the terminal. Under unified control, in such conditions, the surplus traffic can be diverted to some other railroad reaching the same destination. Under private control this has not been possible. The company which was able to obtain the routing of the traffic has, generally speaking, not been willing, even though unable to handle the traffic successfully, to let it go to a rival railroad. The public ought to be provided with some system whereby unused railroad capacity may be used in the common interest in times of stress.

One of the most important classes of traffic is the export traffic and this ought to be greater than ever in the future. The transfer of such traffic at the seaport from the railroad car to the ship involves great possibilities for congestion and delay. Under the old form of private management a particular railroad company naturally wishes the traffic to go to its own port, and, even though that port may be momentarily seriously congested, is unwilling to turn that traffic to a rival line whose port may be free from congestion. Undoubtedly, an opportunity exists under unified control, even in peace time, to apportion the traffic among the ports and co-ordinate rail transportation with ocean transportation in such a way as greatly to relieve the strain which at times arises from the inability of the particular railroad company to consider the interests of ports other than its own and to co-ordinate effectively with the ocean transportation. Whatever the solution of the railroad question a way ought to be found to control this matter in the public interest in times of emergency.

Motive Power and Cars

A further transportation factor of great importance is having adequate locomotives in good repair. In the past each railroad company has had its own locomotives and, generally speaking, has used them exclusively upon its own rails. If some of them were temporarily idle there was not generally any way of allowing them to be used temporarily by other railroads which were short of locomotives. In cases where there was no surplus of locomotives anywhere and where additional locomotives were far more needed, in the public interest, in some sections than in others, there was under private management no way under peace conditions of taking locomotives from the line where the public interest needed them least and putting them into service upon the line where the public interest needed them most. There was no way in which locomotives could be mobilized so that they can be used where they will do the public the most good. This, of course, has been accomplished under unified control and will be to an increasing extent.

The availabilty of locomotives depends upon their being in good repair and the ability to repair them depends upon the shop capacity. Under private control each railroad company has had its own shops. If those shops are taxed to their capacity, it is not, generally speaking, convenient to turn additional locomotives needing repair over to the shops of other railroad companies in order to receive the repairs. The result is that shops of some railroads may be partly or largely idle and shops on other railroads may be wholly unequal to the tasks confronting them. Yet, private management has never been able to work out any comprehensive and effective way for "matching up" the demand and supply of locomotive shop capacity. This important matter has been handled with great success under unified control and can be developed so as to be handled more systematically and successfully as time goes on.

Competition

Under private management there has also been an unnecessary use of locomotive power through duplication of train service for purely competitive reasons, whereas under unified control trains can be consolidated so as to release for useful service many locomotives which before had been used merely in transportation rivalries and without carrying loads to their full capacity. When each railroad company is intent upon the traffic which it can obtain for its own line, it is inevitable that the most carefully drawn rules will not be fully carried out and that there will be a temptation, frequently irresistible, for a railroad company to retain cars for its own purposes, when the public interest requires that those cars should be devoted to some other purpose. It is also true that the handling of empty cars, so as to get them in the quickest time to the place where they are most needed, cannot be handled as well under private control, because the transportation of the empty car gives the transporting railroad no revenue and hence it is not disposed to encourage any such transportation, except to the extent that it has had the benefit of the car when loaded and producing revenue. And yet, in many instances, in order to reach the place where it is most needed, the car ought to be hauled by a line which has enjoyed no revenue from the car when it last moved under load. The results of unified management show important advantages resulting from unified control of the car supply. Any permanent solution of the railroad question ought to give the public the advantage in times of stress of the mobilization of locomotives, and locomotive

repair shops, and of the handling of all equipment in the public interest including the emergency handling of empty equipment.

Rates

In the matter of rates, an immense advantage resulting from unified control is that rates can be made only so high as may be necessary to protect the situation as a whole, through paying the total expenses and producing only a sufficient resulting operating income to represent a fair compensation for the property employed. But under separate management, there is the greatest diversity in the prosperity of the railroad companies. Some will prosper on very low rates and some will fail on very high rates. The result is either that rates must be maintained on an average basis which, while producing high profits for some railroads, will still leave other railroads in bankruptcy, or must be made sufficiently high to leave a margin of profit to the less prosperous, with consequently excessive profits to the most prosperous. The former course will result in the less prosperous roads being unable to perform their public service successfully. The latter course will result in the public being burdened with unnecessarily high rates. Under unified control rates which are sufficiently high on an average, to protect the general situation, will insure an adequate service on all roads and will, at the same time, protect the public against rates being made any higher than is necessary to meet the real necessities of the situation. I do not believe there can be any successful solution of the railroad problem which leaves in existence the great disparity in the results of the same rates to different railroad companies, because this will always cause question as to the propriety of any scale of rates and will keep the rate question in constant turmoil.

Result

I believe that even under the handicaps of war conditions a sufficient showing has been made to indicate that all the reforms I have mentioned are desirable as permanent peace measures. Yet it is clear that the general public has not had an opportunity to appreciate this and to weigh the real value of what has been accomplished. There has not yet been an opportunity to give the public knowledge of the facts. In view of the far-reaching importance of any solution of the railroad question which may be adopted, the public is entitled to have, before the present federal control shall be terminated, a reasonably fair test under peace conditions of the advantages to be derived from these reforms.

When Congress comes to take the responsibility of making a final decision as to which is the best permanent solution of the railroad problem, one of the most important considerations to which it must give attention is the question as to which solution will involve the least financial burden for the future upon the American public. This being true it seems to me of the highest importance that Congress should have an opportunity to form an accurate idea as to the cost of unified control of railroad operations under peace conditions. In order to have an accurate idea on this subject Congress ought to have before it at least the operations of the year 1919 under federal control. Of course these figures cannot be ready until the spring of 1920. If Congress undertakes to make its permanent solution of this great problem prior to that time it will do so without any adequate comparison between the cost of railroad operation under diversified private control as in the past, and the cost of railroad operation under unified control during peace time. It is true that the figures for the year 1918 will be available in about two months, but these figures will represent the operations under war conditions when the railroad management was subjected to many difficulties which will not exist under peace conditions, and when a great deal of traffic had to be handled regardless of cost in order to meet the insistent emergencies of war. It also happens that the year 1918 includes the operations of the most severe and costly winter that has ever been experienced in the life of the railroad business in this country, and the cost of clearing up the most serious congestion of traffic in the history of the railroads—a congestion existing at the time federal control was assumed. Therefore, unless a final solution of this problem is deferred until a reliable view of the economies which actually arise out of unified operation can be obtained, the result will be the adoption of a permanent solution in ignorance of one of the most important factors to be considered.

Shipping and the Railroads

The glorious victory for democracy in which America has played such a noble and conspicuous part has given her a commanding position in world affairs. Our own material development makes it more than ever necessary that we shall have access upon just and fair terms to the markets of the world for the disposition of our surplus products. We cannot meet this situation unless we are prepared to go forward immediately. Opportunity does not wait for the laggard, whether that laggard be a nation or an individual. America must go forward immediately and organize her resources effectively for the purpose if she is to enjoy her share of the fruits of the keen and friendly rivalries in commerce in which she must engage with other nations.

Under the provisions of the United States shipping act, the great merchant marine we are constructing is to be under government control for a period of five years from the conclusion of the European war. If our splendid merchant fleet, built with the money of the people of the United States at a cost of more than one billion dollars, is to be used successfully in their interest, it must be operated in effective coordination with the great railroad systems of the United States. They must work together harmoniously and reciprocally. During this great period of world development involving the vital welfare of the American people, it seems to me peculiarly wise that the period of federal control of railroad transportation shall be made concurrent with that of government ship control. Then we shall have a great transportation system on land and sea furnishing the reliable, effective service which will protect the interests of the American people and carry them forward upon a career of prosperity and success unequalled in any previous period in their history.

Conclusion

This is why I have urged that federal control be extended until January 1, 1924. It will be impossible to view the results of even one year of federal control under peace conditions until the spring of 1920, and it will then be too late for Congress to legislate before the end of the 21 months' period. Even if it were possible to accomplish legislation in the next 12 months it would be done without any opportunity whatever to form a reasonable idea as to the advantages of unity in the matters I have mentioned, under peace conditions.

Moreover, the operations under peace conditions with a tenure so short as the 21 months' period cannot possibly constitute a fair test. With such a rapidly approaching termination and with every officer and employee naturally speculating on his relations to the new management, whatever it may be, it will be impossible to secure the best results from the railroad organization and the nearer the termination approaches the more difficult will be the situation.

Indeed the difficulties with operation during the 21 months' period will be so serious that I do not see how the government can be fairly asked to encounter them. It will be asked to continue an operation deprived of all the elements which would help in making the operation a success, and I do not see how it can be seriously urged as the proper

course by any one except those who are anxious at all events to see the railroads restored to the control of numerous different companies just as in the past. It seems to me that any one who wishes a fair and dispassionate study made as to what is the best ultimate solution and as to the extent to which the reforms I have mentioned are in the interest of the American public, and as to the way in which those reforms can best be accomplished, if in the interest of the American public, must be anxious to have a reasonable period of federal control after the war under conditions calculated to make for tranquillity and single-mindedness upon the part of the federal railroad organization. I do not mean that this would be desired in order to accomplish government ownership, but it seems to me it would be desired in order to test the utility of various reforms in the direction of unification which can be accomplished without government ownership, but which cannot be accomplished as I view the situation through an unrestricted return to the old conditions of management through from 75 to 100 different important railroad companies, and several hundred smaller railroad companies.

The 21 months' period will be entirely too short to accomplish any effective results with respect to improvements, and especially the terminal improvements which are peculiarly needed. Indeed with such an early termination of federal control there will be almost a complete stoppage of improvement work except what is obviously needed for the most urgent necessities. The result will be that terminal reforms, which are badly needed in the public interest, and which already have been delayed many years, will be subjected to further indefinite delay. It will also be true that needed railroad construction and extensions will be practically at a standstill.

In the nature of things the concurrence of the railroad corporations cannot be expected in matters of improvements and extensions during the 21 months' period except as to things of the most urgent and obvious necessity and where there is no possibility of conflict with the selfish interest of the particular corporation. This is not surmise because the evidences of it are already appearing—notably in the case of locomotives where budgets were submitted by the corporations calling for their purchase and where even now many of the corporations are challenging the purchase of locomotives made for their account and within the limits of their requests. It is natural that each company will prefer to hold all other matters in abeyance in the hope that it can make its own plans in its own way at the end of federal control. This condition will not exist, however, if a five-year extension shall be granted. During the early part of that extension comprehensive improvements can be carried forward in the public interest and the railroad companies will appreciate the impracticability of holding everything in abeyance for so long a period as five years. Of course as the five-year period nears its termination there would be a disposition on the part of the corporations to postpone matters which had not theretofore been entered upon, but by the time this condition would arise it is reasonable to expect that Congress would have been able to make a permanent solution of the whole problem in the light of an adequate experience with the present opportunities for unified control.

With the five-year extension, it will be practicable for Congress, say within two years from now, to enter upon a permanent solution of this question after Congress and the country shall have had before it the result of a complete year's experience of federal control under peace conditions, as well as a year's experience under war conditions. Congress, with that additional experience, will be able far better than it is at present to estimate at their real value the reforms which I have submitted to you as being fundamental and Congress can then determine whether those reforms are so important as to make it desirable to adopt some other method of railroad ownership and control than that of such a great number of different private companies as has been the case in the past.

Valuation

It must be remembered also that Congress has thought it important to provide for a valuation of railroad property and this valuation has been in progress for several years at large cost. I assume that it will be completed in the next two or three years. There is widespread conviction that no permanent solution whatever of the railroad problem can be made which does not put at rest the present insistent claims as to railroad overcapitalization. The question therefore arises whether Congress can satisfactorily deal with this matter in advance of the completion of the valuation which it has already prescribed, and whether Congress will wish to attempt a final solution of it before it can have the benefit of the valuation for which it has already appropriated such large amounts and to which it has attached so much importance. It is not possible, as I view the complexities of the problem, to effect any marked change in the form of railroad control that is not based upon a completed valuation of their properties.



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Constructing New Warehouses in France

Executives Plan for the Future of Railways

Government Regulation of Privately Operated Roads With Responsibility and Authority Vested in Federal Agencies

THE FOLLOWING PRINCIPLES, which should be incorporated in a plan providing for government regulation of railroads engaged in interstate commerce, were tentatively agreed to at conferences of the standing committee of Association of Railway Executives, at the Bellevue-Stratford Hotel, Philadelphia, December 11-15, 1918, and were presented to the Senate committee at Washington on Thursday of this week.

The fundamental and essential purpose to be accomplished is to furnish the public with safe, efficient and adequate transportation at the lowest cost consistent with such service, and with due regard to the just interests of the owners and employees, and also adequate to the nation's needs even in times of great national emergency or peril.

It should be realized that the commerce to be provided for, whether in peace or war, is not essentially, or in large part, local, but is in its most important and controlling aspect interstate and continental. Manifestly any system which is adopted should be adequate to deal with and supply local needs as well as to meet the larger purposes referred to, and consequently it is necessary to consider whether instrumentalities of commerce whose principal functions and importance are interstate and continental should in matters affecting their capacity to serve on equal terms the entire public, be subjected to many local authorities or to an authority representing all localities.

The interests of the whole people demand, that, in any plan or policy which is adopted, provision shall be made:

(a) For adequate service and facilities to meet not only the present requirements, but the growing and expanding needs of our population and of our domestic and foreign commerce.

(b) For new and additional construction when justified by public convenience and necessity and for the elimination and prevention of waste in unnecessary and injudicious construction.

(c) For the proper co-ordination of the carriers' lines, facilities and organizations and for the consolidation thereof under proper limitations whenever necessary in the public interest to meet and provide for the reasonable demands of our domestic and foreign commerce.

(d) For the prompt and orderly co-ordination of the lines, facilities and organizations of all carriers into a unified and continental system whenever required in the public interest, because of extraordinary national emergency or peril.

(e) For a rate structure which will provide sufficient revenues and create sufficient credit for these purposes.

Principles Recommended

To this end, the following principles should be adopted:

1. Private ownership, management and operation of the American railways should, as a matter of national policy, be continued.

2. The power of regulation of the instrumentalities of interstate commerce, as to all things substantially affecting them, including all rates, state and interstate, should be exclusively in the hands of the national government; but these national functions should be administered through governmental machinery or agencies responsive to the needs of and convenient to the people of the several states to the extent and the manner hereinafter suggested. State commissions should not be interfered with by the federal act except so far as necessary to carry out the purposes herein mentioned.

3. The Interstate Commerce Commission, which has heretofore been the sole federal agency provided by law to deal with such matters should be relieved from its executive and administrative duties, except as to federal valuation and as to accounting, and should act as a quasi-judicial body clothed with authority to pass upon all questions concerning the reasonableness and adequacy of rates and concerning discriminations coming before it on complaint of any party interested, or referred to it as hereinafter provided.

A Secretary of Transportation

4. A department of transportation should be created, the head of which should be known as the secretary of transportation. He should be a member of the President's cabinet and should be vested with the following powers and duties:

(a) To carefully observe the transportation needs and transportation facilities of the country, and, by suggestion and co-operation with the carriers, and, by recommendations from time to time to the Interstate Commerce Commission in respect to the necessity for rates and revenues adequate to provide and maintain the proper service and to create the credit required to meet the needs of the public for facilities, while at the same time protecting the just interests of employees, of owners, of shippers, and of the traveling public, to endeavor to insure the provision of adequate transportation facilities for the real transportation needs of each situation. He should be charged with the responsibility of recommending from time to time to the President such measures and policies as in his opinion would promote the interests of the public and the adequacy of the transportation service;

(b) If he find that a carrier is at any time so congested or otherwise unable to properly handle its traffic, he should have power to distribute such traffic over other lines and routes on such terms as between the several carriers as he may find to be just and reasonable under the circumstances, subject in respect to such terms to appeal to the Interstate Commerce Commission;

(c) If he find it to be practicable and in the public interest, he should have power, in the event of the failure of the interested carriers to agree, to require the use of the terminals of any carrier by another or other carriers on such terms as he may fix as reasonable and just, subject to the right of appeal of any interested carrier to the Interstate Commerce Commission;

(d) In cases of serious national emergency, he should have power to direct that, during the continuance of such emergency, the carriers should co-ordinate their facilities and operations and operate their properties as a unified national system on such terms as he may find to be just and reasonable in the public interest. Proper provision should be made for just compensation to any carrier injured thereby.

(e) If he find it necessary in order to provide adequately for the movement of traffic, he should have power to require any carrier to distribute its cars to other lines on such terms as he may deem just, subject as to such terms to an appeal to the Interstate Commerce Commission.

(f) He should have power to require any carrier to distribute its cars among its patrons in accordance with their needs and the public interest in the same manner and to the same extent as the Interstate Commerce Commission is now by law authorized to do.

5. No new or branch lines of railroad or large and ex-

pensive terminals should be constructed unless a certificate of public convenience and necessity is first obtained from the secretary of transportation.

6. The executive and administrative functions of the Interstate Commerce Commission, except as to accounting and as to federal valuation of railroad properties, should be transferred to the secretary of transportation.

7. The carriers should have the power to initiate rates, schedules of which should be filed with the Interstate Commerce Commission, with the secretary of transportation and with the state commissions of the states in which the rates are applicable and through which the carrier operates; and, if not suspended as hereinafter provided, such rates should become effective 30 days after the same have been so filed, unless a shorter period is in special cases authorized by the secretary of transportation.

It should be made the duty of the secretary of transportation promptly to consider the new rates so brought to his attention, and he shall either:

(a) Approve the same, giving his reasons for such approval, or,

(b) Permit the rates to go into effect without his specific approval or disapproval, or

(c) Disapprove the same, giving his reasons therefor.

In case he disapproves any rate or fails specifically to approve or disapprove it, he may suspend it for a period not exceeding 60 days and refer the same to the Interstate Commerce Commission for consideration and determination.

8. The statute itself should provide the rule of rate-making, and should require that rates be not only what has been called reasonable, but adequate and sufficient to enable the carriers to provide safe, adequate and sufficient service, to protect existing investment and to attract the new capital necessary in the public interest, and, to that end, the statute should, among other things, specifically provide that the level of rates must properly reflect the cost of wages and all other expenses incident to the furnishing of transportation.

9. Rates, whether approved or disapproved by the secretary of transportation, may by complaint be brought before the Interstate Commerce Commission for consideration, which should have power to pass upon the reasonableness and adequacy thereof, subject to the statutory rule in regard to rate-making, and, in any proceedings before it in respect to rates, the commission should give due consideration to any recommendations in respect thereto made to it by the secretary of transportation. Rates approved by the secretary of transportation should be presumed to be reasonable and proper until found otherwise by the commission.

10. In any proceedings before it in respect to rates the Interstate Commerce Commission should have the power to prescribe minimum as well as maximum rates and to determine the relation of rates and differentials whenever necessary or appropriate to establish or maintain a rate structure or a relation or differential found by it to be just and proper.

11. The statute should provide that existing rates, put into effect by the director general of railroads should be continued in effect until changed by the Interstate Commerce Commission as provided by law, or as provided in paragraph 7 hereof.

12. Any carrier should be given the right to complain of rates of another carrier in the same manner and to the same extent as a shipper.

13. The Interstate Commerce Commission, in order that matters within its jurisdiction may be dealt with more promptly and satisfactorily and with a fuller appreciation of all the circumstances and local conditions, should be directed to divide the United States into such number of regions as it may deem wise, and certify the number of regions and their boundaries to the President, who should appoint for each region a regional commission, which should be a board of primary jurisdiction, consisting of one member for each of the states embraced therein. The regional commissions should have authority to hear and determine all complaints in respect of matters within the jurisdiction of the Interstate Commerce Commission arising in their respective regions and to make reports thereon to the Interstate Commerce Commission, such reports during a fixed period to be subject to exceptions by any of the parties, as in the case of reports by masters in chancery. If no exception is filed within the time limit and it is not otherwise ordered by the Interstate Commerce Commission, the orders and findings of the regional commissions should automatically go into effect. If there are exceptions, or the Interstate Commerce Commission considers the issues involved of sufficient importance to so order, a hearing should be had before it on such exceptions, or on the matters made subject to reconsideration by order of the commission, and the order of the commission should have the same effect as now provided by law in respect to its orders.

14. Express rates should be dealt with in the same manner as freight rates. Contracts between express companies and railroad companies for division of express earnings should not become effective until approved by the secretary of transportation.

15. Section ten of the Clayton act should be so modified as not unduly to hamper the proper transaction of business.

16. Existing laws should be so far modified as to authorize upon approval by the secretary of transportation as being in the public interest:

(a) Acquisition by a carrier engaged in interstate commerce of the properties, stocks or securities of another or other carriers; or consolidations and mergers of such carriers;

(b) Agreements between carriers engaged in interstate commerce in respect to rates and practices;

(c) The pooling of cars and other transportation facilities;

(d) The division of earnings in connection with the elimination of unnecessary train service.

All such agreements and arrangements should be filed with the Interstate Commerce Commission and with the commissions of the several states whose traffic is affected as well as with the secretary of transportation and be open to public inspection.

17. Continuity and regularity of transportation are absolutely essential to the public. Both the capital invested and the labor employed in transportation are therefore engaged in a business vitally affecting the public interest, and by engaging therein assume the implied obligation not unreasonably to impair or interrupt the movement of trains. Questions of wages and working conditions affecting individual railroads should be settled, if possible, by officers of the railroads and representatives of the employees. A board should be constituted, under the secretary of transportation, on which the employees, the employers, and the public, should have equal representation, with the duty and authority to investigate and report to the secretary of transportation on the merits of any controversy, which the parties are unable to adjust, arising in the railroad or other transportation service, either in regard to wages or in regard to conditions of service; and, pending such investigation and report and for a reasonable time thereafter, there should be no lockout by the carriers and no concerted action on the part of the employees which would have the effect of interfering with or interrupting the orderly movement of the United States mail or interstate or foreign commerce. The scale of wages and the expense incident to any change in the conditions of service recommended in the report of such board, if put into effect, should be accepted and recognized in the making of rates, as a legitimate expense of transportation.

18. Provision should be made for the funding by the United States of indebtedness of carriers to it growing out of federal control.

19. There should be in the federal government the exclusive governmental power to supervise and authorize the issue of securities by railroad carriers engaged in interstate or foreign commerce or by holding companies controlling any such carrier.

20. A system of federal incorporation should be adopted into which should be brought all railroad corporations engaged in interstate or foreign commerce. Such system should be compulsory and not elective. It should preserve to corporations reincorporating under it, not only all of their contract rights and other assets of all sorts, but also (except as to any feature contrary to an Act of Congress) their existing charter powers, and they should also possess the general powers conferred upon all corporations organized under the federal Act. The system of incorporation should provide a means of consolidation and merger for existing corporations engaged in interstate or foreign commerce, with the necessary power of condemnation; provided the secretary of transportation finds that such consolidation or merger is not contrary to the public interest and approves the same.

The committee of the Association of Executives consists of: Thomas DeWitt Cuyler, chairman; S. T. Bledsoe, general counsel, Atchison, Topeka & Santa Fe; W. R. Cole, president, Nashville, Chattanooga & St. Louis; A. J. Earling, chairman, Chicago, Milwaukee & St. Paul; Howard Elliott, president, Northern Pacific; S. M. Felton, president, Chicago Great Western; A. H. Harris, vice-president, New York Central; Charles Hayden, president, Chicago, Rock Island & Pacific; E. M. Hyzer, vice-president, Chicago & North Western; L. E. Johnson, president, Norfolk & Western; Howard G. Kelley, president, Detroit, Grand Haven & Milwaukee, Grand Trunk Western, and Atlantic & St. Lawrence; Julius Kruttschnitt, president, Southern Pacific; E. E. Loomis, president, Lehigh Valley; L. F. Loree, president, Delaware & Hudson; Wm. Church Osborn, president, Texas & Pacific; Chas. A. Peabody, president, Illinois Central; Samuel Rea, president, Pennsylvania; Bird M. Robinson, president, American Short Line Railroad Association; W. L. Ross, receiver, Toledo, St. Louis & Western; Henry Ruhlender, president and chairman, St. Louis-San Francisco; Frank Trumbull, president, Chesapeake & Ohio; F. D. Underwood, president, Erie; H. Walters, chairman, Atlantic Coast Line; and Daniel Willard, president, Baltimore & Ohio.

I. C. C. Opposes Government Railroad peration

For Return of Properties to Private Management After Reasonable Period of Readjustment or Preparation

EXPRESSING THE CONVICTION that with the adoption of appropriate provisions and safeguards for regulation under private ownership it would not be wise or best at this time to assume government ownership or operation of the railways of the country, the Interstate Commerce Commission, in a statement presented before the Senate Committee on Interstate Commerce on January 7 by Commissioner E. E. Clark, went on record as favoring a return of the railroads to private management after a reasonable period of readjustment or preparation and after reasonable notice of the date. The commission also outlined its recommendations for legislation to provide a broadened, extended and amplified governmental regulation, without which, it declared, no plan of private ownership should be considered. Commissioner Clark also read a dissenting statement by Commissioner Woolley favoring the extension of the period of federal control as recommended by Director General McAdoo.

Commissioner Clark's statement, which was adopted by the Commission in conference on December 21, follows:

Broad Policy Needed

It is unnecessary to dilate upon the vital importance of transportation to the country, its commerce and industries, or to picture the immensities of the transportation business and of the plant which it employs. The questions now presented should be considered in a spirit as big and broad as are the interests to be affected thereby. The legislation to be enacted in answer to those questions should be based upon a policy as broad as the territory to which it applies and the law in which our governmental policy is announced should be as big as the business to which it relates. Governmental regulation of corporations engaged as common carriers should reach the corporate activities wherever those activities may lawfully go in serving the public as interstate carriers. The responsibilities of operation under governmental regulation must be accepted by the carrier corporations and the responsibilities that go with such regulation should be accepted in full by the government.

In our last annual report we said, with regard to the future of the railroads, that whatever line of policy is determined upon the fundamental aim or purpose should be to secure transportation systems that would be adequate for the nation's needs even in time of national stress or peril and that will furnish to the public safe, adequate and efficient transportation at the lowest cost consistent with that service, to that end there should be provision for the following:

Fundamentals of a Proper Transportation Policy

1. The prompt merger, without friction, of all the carriers' lines, facilities and organizations into a continental and unified system in time of stress or emergency. The thought underlying this is that, in the light of recent experiences, the President should be by law authorized in time of national stress or peril to assume possession, control and operation of the transportation systems of the country to such extent as may be necessary to serve and protect the general public safety and welfare. Such action was found to be essential about one year ago. It is hoped that such an emergency will not again arise, but it seems wise to provide for it if it should come, and that all cavil and controversy as to the lawful power to act should be, by statute, set at rest. The Franco-Prussian war led the British government to provide by law in 1871 a plan for taking over for governmental needs the railroads of Great Britain. It did not need or use that power until in connection with the World War which began in 1914. The further thought is that there may possibly arise a national stress or emergency, not the direct outgrowth of a war in which we are engaged, which would warrant and justify the exercise of such a power. If the power is provided by law it does not necessarily follow that it will be used, and it must be presumed that no President would exercise it except upon appropriate or proper occasion.

2. Merger within proper limits of the carriers' lines and

facilities in such part and to such extent as may be necessary in the general public interest to meet the reasonable demands of our domestic and foreign commerce. The thought underlying this is that it might become necessary or be found desirable in the general public interest to permit, encourage or require carriers within limits as to extent, territory and time to merge their lines and facilities or the operation thereof. The exercise of such a power would necessarily be an administrative function.

3. Limitation of railway construction to the necessities and convenience of the government and of the public and assuring construction to the point of these limitations. The thought underlying the first part of this suggestion is that in some instances, for speculative or competitive reasons, railroads have been built in excess of the reasonable demand and in excess of the necessities of the territory built into, as well as of its reasonably prospective traffic. A railroad once built ordinarily must be operated and permitted to earn a living. The public should not be burdened with the maintenance of two or more railroads when one would substantially answer every legitimate purpose. In this connection it would be desirable that in the exercise of its powers the Congress should say that no railroad shall be constructed or extended that is to engage or is engaged in interstate commerce unless, in addition to required authority from the state, a certificate of public convenience and necessity is secured from federal authority. The thought underlying the second part of this suggestion is that a railroad having been permitted, by public franchise and the powers that go with it, to build into a given territory, it should be required to properly serve and develop that territory. And in developed territory it is important to provide for the extension of short branch or spur lines or spur tracks to communities and industries that should be served and that can furnish sufficient traffic to justify such extension.

In some of the states the state officers are authorized to require such extensions, but in such cases they are necessarily primarily concerned with, if not confined to, a consideration of state traffic. Some of the states have not vested such authority in any state official. Ordinarily such extensions would be desired for the purpose of facilitating or making possible the transportation of interstate traffic. The desirability of uniformity is obvious. The exercise of federal authority should not depend upon whether or not the state has acted and should not be different as to the state that has legislated on the subject and the state that has not so legislated. It therefore seems desirable that the Congress should exercise its jurisdiction in this regard in a plenary way and that where such extensions are desired in connection with the movement of presently existing or prospective interstate traffic and the carrier is unwilling to construct them, it may, upon proper showing and after full hearing, be required to do so by the federal tribunal.

4. Development and encouragement of inland waterways and co-ordination of rail and water transportation systems. This means the co-ordination of rail and water transportation systems by establishment and maintenance of through routes between rail and water carriers and reasonable joint rates applicable thereto, divided upon reasonable bases, whenever and wherever such through routes will facilitate or economize in the movement of traffic and serve a real public interest. The law now prohibits a rail carrier from increasing a rate which has been reduced to meet water competition unless some justification for the increase can be shown other than the elimination of water competition. Where there is legitimate water competition and legitimate reason or occasion therefor, neither the railroads nor the water carriers should be permitted to reduce their competitive rates below a reasonable compensatory level for the purpose of stifling the competition. Rates that are on a level lower than is reasonably compensatory are not a public benefit. If they cover all the traffic the carrier's bankruptcy and destruction are inevitable. If it has other traffic it is certain that it will endeavor from that other traffic to recoup its losses under the non-compensatory rates. A well-directed and proper co-ordination of rail and water transportation systems will of itself be an encouragement to the development of inland waterways.

We suggested five plans which we thought doubtless would be proposed for adoption as our future governmental policy and said that additional plans and modifications or combinations of those mentioned might be listed.

Government Ownership of Operation Not Wise

Much can be said on either side as to the relative advantages and disadvantages which accrue from or necessarily attend either government ownership and operation or private ownership and operation. It seems obvious that no plan of private ownership should be considered unless it be under a broadened, extended and amplified governmental regulation. Considering and weighing as best we can all of the arguments for and against the different plans, we are led to the conviction that with the adoption of appropriate provisions and safeguards for regulation under private ownership it would not be wise or best at the present time to assume government ownership or operation of the railways of the country.

The law provides that federal control shall not continue beyond 21 months after the promulgation of a treaty of peace. The wisdom of thus providing a reasonable period after the passing of the imperative necessities of our government in actual prosecution of warfare, within which to readjust or make preparations for readjustment of traffic conditions and to round out or prepare financial arrangements, is hardly open to question. Carriers' properties formerly composing a system are now under the jurisdiction of two or more regional directors or federal managers, the current of traffic has in some instances been materially changed, and financial complications exist. Comparatively few contracts for compensation have been perfected between the transportation companies and the government. Our expression in favor of return to private ownership and operation is therefore not to be understood as favoring a return of the properties in a precipitate way. A reasonable period of readjustment or preparation should be afforded and reasonable notice should be given that upon a given date the properties will be restored to their owners.

The experiences under federal control have still further demonstrated, as had previously been shown in proceedings before and reports of the commission, that there is necessarily a direct relationship between the wages paid to railroad employees and the rates which the carrier companies must and may charge. The largest item of expense in operation of a railroad is that of wages. Manifestly, from a social standpoint as well as from the standpoint of the nature of the employment, and because of the great importance to the public as well as to the railroads of loyal and devoted service on part of the employees, unaffected by excitement of wage controversies, and of uninterrupted operation of the carrier properties, the railroad employees should be adequately compensated. For the same reasons every reasonable provision should be made to insure proper compensation for the employees, a minimum of friction over questions of compensation or hours or conditions of service, and avoidance of interruption to the operation of the properties.

Suggestions for Legislation

In the event, therefore, of a continuance of the policy of private ownership and operation under governmental regulation, we think that the following matters, mentioned in our annual report, require legislative consideration, in connection

with which the following suggestions should be carefully weighed:

1. Revision of limitations upon united or co-operative activities among common carriers by rail and by water. Under the policy heretofore followed by our government all efforts to restrict the full play of competition between carriers have been frowned upon or prohibited. Obviously competition between carriers that is wasteful or unnecessarily expensive lays an added burden upon the rate-payers. Elimination of wasteful or unduly expensive competition in rates or service is desirable and under the exercise by the government of its power to regulate the service and the rates which the carriers may charge and to require an abatement of all unjustly discriminatory, unduly prejudicial or unduly preferential charges, regulations or practices, carriers might well be permitted and encouraged to co-ordinate their activities and merge or consolidate their lines to such an extent as is, after thorough investigation and full hearing, sanctioned by the regulating body. The rates should not be higher than the shipper may reasonably be required to pay and should not be lower than the carrier may reasonably be required to accept. The regulating tribunal should have authority to prescribe not only the maximum which the carrier may charge, but also the minimum. This power would restrain an individual carrier from furthering its own ends at the expense of others by unwise and unwarranted upsetting of reasonable rate adjustments. If the rates and charges are by regulation confined within the reasonably narrow limits between the maximum and minimum reasonable charges, no public interest can be injured by the carriers all maintaining charges within those limits. If, without unduly lowering or restricting the standard of service, economy in maintenance and operation can be secured by co-operative agreement or consolidation, under governmental supervision and approval, of two or more lines, the public is not injured, while the sum available for improvements and betterments of the carrier properties is augmented.

2. Emancipation of railway operation from financial dictation. It would serve no good purpose to recite the many instances in comparatively recent years in which, through financial deals for which it is difficult to find any word of excuse, railroad properties have been bankrupted or saddled with almost overwhelming burdens of indebtedness, which have not increased the amount or value of property devoted to the public service, have not improved the service rendered, and have on the whole had the effect of increasing the charges for service. There should be some way by which under the law these things could be prevented, or, if not prevented, by which the perpetrators could be required to adequately answer for their acts. A transportation line operating by virtue of a public grant, and upon which the industrial, commercial and social life of communities depends, should not be a football of speculation. The records in investigations made and reported upon by us in cases of financial wrecking of railroad companies suggest the advisability of extending the terms of the Clayton act with reference to common or interlocking directors so as to render them applicable to common carrier corporations, even when they are not competitors. Consideration of these questions and a corrective for the abuses referred to lead to:

3. Regulation of issues of securities. The advisability, desirability and propriety of public or governmental regulation of the issuance of securities by public service corporations is conceded generally by thinking and fair-minded men. A proper federal regulation of the issuance of securities by the corporations engaged in interstate transportation and supervision of the application of the proceeds therefrom would go far toward preventing the abuses referred to above. The commission is on record for several years past as favoring such supervision and regulation of the issuance of securities.

4. Establishment of a relationship between federal and state authority which will eliminate the twilight zone of jurisdiction and under which a harmonious rate structure and adequate service can be secured, state and interstate. If the government is to assume, as it should, all of the responsibilities that properly go with an amplified and broadened exercise of its regulatory powers and the regulation is to be adequate, the regulating body must have authority and powers which it has not heretofore had over questions of service and physical operation of the carriers. In this way only can an adequate service be secured and kept in harmony with a reasonable level of rates. The conflict of jurisdiction as between the federal government and the states could probably be resolved through harmonious co-operation if the federal tribunal could be authorized to co-operate with state authorities by utilizing their services in appropriate instances and to an appropriate extent.

5. Restrictions governing the treatment of competitive as compared with non-competitive traffic. This subject is necessarily linked with what has been said relative to revision of limitations upon united or co-operative activities among common carriers by rail or by water. If those limitations are appropriately broad there would seem to be no occasion for different charges, terminal or otherwise, as between so-called competitive and so-called non-competitive traffic, or for many of the old annoying and expensive restrictions surrounding milling and other services in transit.

6. The most efficient utilization of equipment and provision for distributing the burden of furnishing equipment on an equitable basis among the respective carriers. Under broad revision of limitations upon co-operative activities among carriers they could form equipment pools which would add efficiency in the standardization of construction and in the utilization of equipment. Under the extension of authority to the regulating tribunal to require adequate service, carriers that are disposed to shirk their duty could be required to provide themselves with the equipment necessary to the furnishing of an adequate service.

7. A more liberal use of terminal facilities in the interest of proper movement of commerce. Here again a broad revision of the limitations upon co-operative activities among the carriers would naturally bring a more liberal use of the existing terminal facilities and would undoubtedly bring about agreements between competing carriers under which existing terminal facilities would be opened to traffic which (is now and) heretofore has been excluded. If the regulating body is empowered to require adequate service, it could require the enlargement of terminals, if that action were necessary in the public interest, and could require that terminals be opened to traffic in so far as is reasonably and properly in the interests of the commerce of the locality. Where this power was exercised the regulating tribunal would, as a matter of course, determine the reasonable compensation to be paid to the owning carrier for use of its property by the carriers or traffic so using that property.

8. Limitations within which common carrier facilities and services may be furnished by shippers or receivers of freight. The carrier may provide facilities by ownership, lease or hire. If they are leased or hired on reasonable terms from those who are not shippers or receivers of freight, no public interest is affected by the arrangement. If the regulating body has power to require an adequate service it could determine what constitute proper facilities and the extent to which and the instances in which they shall be provided by the carrier. If the regulating body has power to require the most efficient utilization of equipment, it can determine the instances in which and the extent to which special equipment or facilities may properly be demanded of the carriers.

Transportation service and adequate service are demanded by the welfare, the industry, the commerce and the social life

of the whole people. Securing that class of service is more important than is the question of whether it shall be furnished at a slightly higher or a slightly lower charge. An adequate service cannot be provided except from adequate revenues and as a result of adequate expenditures for maintenance, improvement and expansion. Private capital cannot be induced to invest in railroad securities unless it can be reasonably assured of the security of the investment and an appropriate return thereon. It necessarily follows that the patrons of the transportation companies must pay rates that will yield revenues sufficient to justify rendering the quantity and character of service demanded. The charges should not be higher than those that will yield proper compensation for the service performed and appropriate return upon the property devoted to the public use. If through enlightened, broadened and wise regulation that proper balance between revenues, on the one hand, and returns to capital and expenditures in operation, maintenance and improvement, on the other hand, can be established, the public will be well served at reasonable charges, the employees of the transportation companies will be adequately compensated for their work, and the shippers and receivers will secure, at reasonable rates, an adequate service. It would seem to follow necessarily that the securities of the corporations would become stabilized and that when it becomes necessary to issue additional securities under governmental supervision, capital seeking investment would readily respond to the call.

Commissioner Woolley's Dissenting Statement

Commissioner Woolley said:

If the railroads under federal control are to be turned back to their owners, then I subscribe to the memorandum submitted by my colleagues, except wherein it says, "considering and weighing as best we can all of the arguments for and against different plans, we are led to the conviction that with the adoption of appropriate provisions and safeguards for regulation under private ownership, it would not be wise or best at this time to assume government ownership or operation of the railways of the country," with the following two additional recommendations:

(1) With power to supervise the issuance of railroad securities, to prescribe service regulations and to fix the minimum as well as the maximum transportation rates vested in the Interstate Commerce Commission, the commission should also be made the tribunal to which carriers and employees, organized and unorganized, would appeal for adjustment of any differences arising between them; also, it should have authority to investigate from time to time the living conditions of railroad workers, to insure regularity of employment and to fix a minimum wage. Congress should require the carriers, possibly by amending section 10 of the Clayton anti-trust act, to make all purchases of materials, supplies, etc., through competitive bids in the open market, and their correspondence and other documents bearing on transactions of this nature should be subject to inspection by representatives of the Interstate Commerce Commission. This body would then be in a position to act on full information in prescribing reasonable rates, in seeing that there is a fair return on capital invested and in adjusting labor disputes; labor itself would know that its rights were being protected even in cases where its demands might not be approved by the commission. If some such plan is not adopted by Congress, clerks and unorganized labor generally, having no effective means of protecting their rights, will inevitably be the first to suffer upon the least shrinkage of income after return of the roads to private control.

(2) The carriers should be required to set aside fixed portions of their gross annual incomes for depreciation, the percentage to be determined in each case by the Interstate Commerce Commission. This would insure uniformity of method in caring for the properties, and publication of the percentage prescribed in each instance would safeguard the interests of the purchasers of their securities. Chairman Daniels and I are practically in accord on this point.

I believe the period of federal control should be extended, as recommended by Director General McAdoo, for a number of reasons, some of which are:

(1) With the government borrowing more than $20,000,000,000 in a period of two years and with railroad securities, largely speaking, depressed or in a measure discredited, I fail to see where the money is coming from to insure to the United States an efficient and articulate growing transportation system, vitally necessary in the great period of reconstruction just beginning, if the roads are to be returned to their owners for operation. In spite of the clamor from several quarters against further federal control, the fact remains that following the statement of the director general that the roads may be given back at an early date if the period of federal control is not lengthened there came shrinkages in market quotations of many railroad stocks, in some instances as much as 20 per cent.

(2) Some of our great railroad systems have credit sufficient to raise in the open market the new money which will necessarily be required from time to time for the development of their properties. For instance, the Pennsylvania, the Burlington or the Santa Fe may find it possible to float bonds or notes, but I think it will not be seriously contended that a majority of the railroads now under federal control could do likewise. Especially would they find it difficult if so-called "banker management" should be definitely removed, as is in effect recommended by a majority of the commission. It is hardly possible that our great financial houses would under the circumstances be willing or able longer to market large issues of railroad stocks in order to secure additional funds.

(3) A real danger spot is the so-called "weak sisters." That many not already bankrupt might be thrown into the hands of receivers almost immediately upon return to private control is hardly debatable; that most of them are indispensable links in our national transportation system and should be improved and developed is generally admitted. The government is the only possible source of financial help for this class of roads.

(4) Our public utilities with approximately $260,000,000 of bonds maturing in the next six months have been under a heavy strain for some time. If the financial waters should be seriously disturbed through the forcing of the weak members of the present federal control group into bankruptcy, many of these utilities would find it difficult to weather the storm.

(5) Probably for the first time in our history, all classes of railroad labor have received under federal control at least reasonable compensation. The rights of union and non-union workers have been alike considered, with the result that ample living wages have been granted. These workers demand that the recent increases be not withdrawn or reduced. Certain adjustments with a view to establishing proper relationships of wages for given classes of employment may be necessary, but, generally speaking, I think the workers in so demanding have a strong case.

(6) Though the present freight rate structure is undoubtedly the best that could have been devised under competitive conditions and the act to regulate commerce, long and ably administered by the Interstate Commerce Commission, I am firmly of the opinion that there is urgent need of a new system of rate making, and I see no hope of its being achieved except under federal control or with the government owning the railroads. The so-called rate blankets, grouping of communities, basing points, etc., outgrowth of competitive conditions, in my humble opinion make for favoritism and are highly uneconomic. In a word, the freight rate has been frequently used as a sort of protective tariff by means of which favored cities or communities have prospered at the

expense of others. The freight rate should be made, under proper classification, on the basis of a terminal charge plus straight mileage. We are coming to it some day, because it is the only just and logical plan, and I think the sooner it is perfected and adopted the better.

(7) I am aware that our year's trial of federal control has not been an unqualified success; but to my mind the good accomplished far outweighs the shortcomings and is a promise of better things for the future.

(8) The proposal to return the railroads to private control, though widely discussed by railroad men, financiers and shippers, has not yet, so far as I am aware, been productive of any concrete plan which would carry the undertaking safely over the breakers obviously ahead.

Should Government Operation Affect Signaling?

Some of the Opportunities for Improvements Which Might Be Accomplished by Unified Control

By A. G. Shaver
Consulting Signal and Electrical Engineer, Chicago

"Is the United States Railroad Administration going to do anything which will affect railway signaling, and, if so, what can and what should it do?" This is a question which is frequently asked. With regard to the first part of this question, it is well known that the general increase in wages ordered by the director general of railroads applies to some members of the signal department as well as to other railway employees, but there is not yet in evidence any other act of the Railroad Administration which appears to change in particular the status of railway signaling from what it was before the government took over the railroads. It will be the purpose of this article to discuss some of the things which can and should be done.

Automatic Train Control

No one thing in the interest of safe train operation has received more attention in this country than has the problem of automatic train control. The Interstate Commerce Commission has made it the subject of investigation, and for years has persistently made recommendations concerning it in annual reports to Congress. Inventors and promoters of such devices, and there have been plenty of them, have struggled along with little encouragement from the railroads, spending their time and money and developing very creditable apparatus in some cases. They have hoped either that the federal government would make the use of automatic train control compulsory or that the railroads would eventually, of their own initiative, take up the proposition and make installations, much as has been done in the case of automatic block signaling. But such a millennium has not yet dawned for the inventor and the promoter, and the newspapers are still able from time to time to come out with big headlines telling of bad train accidents which possibly could have been avoided had there been in use at the time some adequate system of automatic train control.

With the railroads under federal supervision, the time has arrived when this problem should be worked out. It can be solved under the U. S. Railroad Administration to better advantage than it can by an individual or by any one railroad, or by even several railroads working together. Now that the war is over and resources, talent and all sorts of railroad operating conditions are available, this matter should not be further delayed.

Signal Standards

Splendid work has been done by the Railway Signal Association in the preparation of specifications and standards pertaining to railroad signaling, and these should be made effective on all railroads in so far as possible. These specifications and standards have been prepared usually with the view that the greatest possible latitude would be allowed inventors and manufacturers so that competition and progress should not be stifled, and further that no section of the country should be handicapped by having to use methods and devices not suitable to local conditions and requirements of railway operation. Excepting to compel their use, it is doubtful if the Railroad Administration should take any action on specifications and standards for appliances other than through the Railway Signal Association, working with much the same objects in view as heretofore.

It has always been customary for each railroad to arrange its own practices, rules, standards, etc. While practices and rules have usually been the same in a general way for all railroads, yet in some cases they have been quite different in important essentials. There seems no good reason why signal indications and rules should not be uniformly the same for all railroads, due allowance being made for special situations and conditions.

Signal Department Organizations

Signal department organizations are much alike in that the head of the department usually has the title of signal engineer, the chief division officer is the signal supervisor and the man in charge of the maintenance work on a specified section is the signal maintainer. In other respects signal organizations may, and in some cases do, vary considerably. Under federal control it should be possible to rearrange and change the present organizations, as necessary, that greater efficiency and economy may be the result.

Railway signal engineers as a rule are competent. Possibly they are competent, in the positions which they hold, to a greater degree than is the case with any other class of railway officers. Some have been unable to manage their departments to advantage because of the lack of authority and the various restrictions surrounding their office. As a rule the signal engineer reports to the chief engineer. This seems to be a matter of custom. There is no real logical reason why this should be, since civil engineering and signal engineering are two distinct sciences, bearing little relation to each other, and it is also true that signaling on the railroads is largely an operating matter. The chief engineer is generally not skilled in either railway operation or railway signaling, and the duties pertaining strictly to his profession are numerous and exacting. Because of these facts, it is believed the railroads would get uniformly better results from their signal departments if the signal engineer reported directly to the operating head of the railroad.

The signal department of each well established railroad ordinarily comprises an engineering branch, a construction branch and a maintenance and operating branch. The en-

gineering for railway signaling could well become largely a regional function through which proper co-ordination and co-operation would result in greater efficiency and economy. Many railroads have heretofore, and some still do, let out their signal construction to contractors. On the larger railroads there is no good reason why such work should not all be done with the railroad's own forces. The contractor must make a profit and he must figure liberally for it. On those roads which have been adequately organized to do their own signal construction, experience has shown that the contractor's profit, and more in some cases, has been saved.

Signal construction is in itself something of a science, requiring time and expense to organize forces to function properly. Since some railroads do not have sufficient signals to keep construction gangs at work all the time, signal construction might also be subject to regional and even inter-regional supervision. Signaling for the various roads might be so planned that gangs could work in the south during the winter and in the north during the summer.

Two general practices exist regarding signal maintenance. On some railroads, excepting in the case of large interlockings and complicated signal situations, one man, known as a maintainer, is assigned to a definite section to do patrol duty and whatever work is necessary for the operation and upkeep of the signal system. On other railroads there is a maintainer with one or more helpers, all covering a prescribed territory but each having his particular work to do. The merits of these two practices should be determined and that one put into general use which is found to be the most satisfactory. The latter mentioned practice is the most expensive, but it affords a means for supplying men for maintenance positions through educating helpers for maintainer's duties.

There are interlockings where no conflicting train movements occur for periods of several hours each day. In these cases the routes required might be set up, the tower closed and the towerman excused from duty for such interval; or during such times the towerman might be detailed to maintainer's work. Considerable savings can be made in cases of this kind and in situations of a similar character.

Signal Accounting

High cost of labor and labor scarcity make it more necessary than ever heretofore that the exact cost of things be known. Nothing has handicapped signal engineers more than the inadequacy of signal accounting. Unless accurate cost data is available it is often impossible to tell if work should be done or, if something is being done, whether it is performed economically. Much good service from improved practices and devices is being lost because of ignorance of the cost of practices and devices already in use. Signal lighting is a good illustration. There is no doubt but that if the actual cost of the present oil lighting system for signals were known, in many situations it would be supplanted immediately by one of the better and more up-to-date systems available for this purpose.

While the Interstate Commerce Commission has dictated a system of cost keeping which the railroads must follow, yet as a basis for making comparisons and giving a true idea of signal costs it is insufficient in scope and detail. At the present time a statement by one railroad that its cost for a piece of signaling is a certain figure, does not mean much to another railroad unless details are given as to just what the figure includes. A basis for signal costkeeping should be devised and a system of accounting required such that all necessary information will be available for comparisons, the proper determination as to practices, the use of new devices, etc.

Combinations of Duties and Departments

A western railroad has a crossing alarm in a certain city, but there is no other signaling in the vicinity. The signal maintainer is located over 100 miles away. Twice each month he has to inspect and repair the alarm. Would it not be better to let the telegraph lineman do this work, as he has his headquarters in the same city where the crossing alarm is located? There are many cases of similar character on various railroads where combinations of duties can be made, resulting in better service and a saving in time and money.

At the present time the use of electricity will be found on cars and engines, shop machinery, in lighting yards and stations, in throwing switches, in the telegraph and the telephone, railroad signals, etc., and this use is being rapidly extended. Supervision over all this will be found in several different departments, each working to a large extent independently of the other. The creation of a department of electricity on the railroads, to have general supervision over all matters pertaining to the use of electricity, is a real necessity. It would harmonize methods, make standards, combine duties of employees where advisable, reduce stocks, etc., all of which if properly done would mean as good or better service at less expense.

A Propaganda of Education

A program of education applied to signals may be considered as in two parts: the education of employees regarding signals that they may know how to interpret and act under them (operating department employees); and the education of employees to become skilled in the science of signaling (signal department employees). Some railroads have a very good system of educating enginemen and trainmen regarding signals and especially the more important, unusual and special cases, but many railroads depend almost entirely upon the book of rules and a periodical or occasional examination conducted by an already overworked trainmaster, the result being that few operating department employees know more than that *red* indicates stop, *yellow* caution and *green* clear. For safe, efficient train operation employees must have a better knowledge than these bare fundamentals of signaling, and they can get and retain all they need to know only from being taught by skilled instructors aided by models, pictures and other means now recognized as suitable for such purposes.

In addition to the insufficiency of skilled signal labor, the railroads are now confronted with the necessity for paying considerably higher wages. It is therefore, essential that this labor be as capable and as effective as possible. The important employee of the signal department is the signal maintainer. While the railroads have ordinarily been careful in the selection of these men, yet in the past low wages and scarcity of experienced labor have left them without much choice. As a result, if an investigation should be made at this time, it would probably be disclosed that many men in the service have little knowledge of signaling other than being able to mend broken bond wires and clean battery and trim lamps. Means should be provided to teach these men and to educate a reserve force for vacancies and new positions. Where the safe movement of trains depends upon signals, it is highly important to have signalmen who thoroughly understand their duties.

Analysis and Investigation

Railroads have never been especially strong in analyzing their problems. That is, they do not always go into them with the same thoroughness and application of needed remedies that most manufacturers and large private enterprises do. For example, few railroads, before installing additional tracks, have carefully analyzed their existing plant to determine if the rearrangement of existing facilities and the installation of signals would meet the requirements of the situation, and make the construction of additional tracks unnecessary. There is without doubt second main track in service at the present time, which never would have been installed had a careful study of conditions been made.

The Work of the Division of Operation*

Congestion Eliminated, Facilities Pooled, Car Shortage Overcome, and Standards Adopted for Equipment

By William G. McAdoo
Director General of Railroads.

THE DIVISION OF OPERATION, formerly known as the Division of Transportation, was established on February 9, 1918, and Carl R. Gray, an operating official of wide experience, was appointed director. This division, with the thorough and sympathetic co-operation of the various regional directors, federal managers, and operating officials and employees, has proved most effective in meeting the enormous problems facing the railroads, and their work has assisted enormously in keeping the transportation system of the country in a healthy condition.

In order to understand the operating problems presenting themselves with the inauguration of federal control, it will be necessary to recount some of the potent causes producing the serious conditions of congestion which resulted in the railroads being taken over by the federal government, and I will enumerate the steps which were taken to overcome them.

Difficulties

1. Accumulation of export freight at North Atlantic terminals, which was reflecting itself immediately in an inability to successfully handle domestic freight. There was no co-ordination of rail and overseas transportation. The lack of co-ordination between rail lines and the overseas carriers was overcome by the creation of the Exports Control Committee referred to herein, and export freight was brought forward from the interior only when ocean shipping was available.

2. Shortage of motive power. As a result, engines had been kept in service under pressure of necessity which should have been thoroughly overhauled, and one of the immediate effects of the severe winter weather was to render engines of this class entirely unavailable.

3. Heavy building operations by different branches of the government, the contractors for which ordered materials forwarded far in advance of their ability to receive and unload. There was at one time over 5,000 carloads of piling alone for the Hog Island shipyard in excess of its ability to accept.

4. On account of the feverish demand for materials of all kinds manufacturers purchased raw materials from unusual markets in excessive quantities, with the frequent result that arrivals were badly bunched and unloading was slow and difficult.

5. The necessity for giving priority to shipments of government freight and the lack of a central control, even in a single department, to decide upon the degrees of importance in priority. This had resulted in many instances through the insistence of some energetic officer handling a single class of material in a preference movement being given to freight of minor relative importance.

6. The withdrawal for overseas service of Atlantic coastwise vessels, both of railroad and independent ownership, resulting in a call upon the rail carriers for the transportation of an enormous amount of tonnage which ordinarily moved by water.

Certain general conclusions can safely be drawn from a year's experience of operation of the railroads as one unit. Given average weather conditions, and with the exception of the Pittsburgh gateway, which merits especial treatment, there is no question of the ability of the railroads to transport to destination all of the freight offering, either domestic or for overseas, provided there are facilities for prompt disposition and unloading at destination.

The controlling factor throughout our experience has not been in the road transportation, but at the ultimate destination, and any serious conditions of congestion obtaining on any of the trunk lines en route has been the reflex of the conditions at the terminals themselves. Practically all transportation in the United States has been based primarily upon the desires and necessities of the consignor rather than upon the abilities of the consignee to receive and digest the freight.

The winter conditions, beginning about December 1, 1917, and which were at their worst when federal control began, continued until well into March, and were the most severe known to railroad history, and continued for a longer period of time.

The congested area was, generally speaking, in the territory north of the Ohio and Potomac rivers and east of the Mississippi river and Chicago. Due to the causes above enumerated, as well as to the fact that the movement itself was of unusual volume, there was in this territory, when the railroads came under federal control, 62,247 carloads of freight which was being delayed short of its ultimate destination, in addition to which there were held by the lines at and west of St. Louis 31,421 carloads; at and west of Chicago, 24,836 carloads; at and south of the Ohio river gateways, 14,061 carloads; and at and south of the Potomac river gateways, 15,545 carloads. This congestion was practically cleared up May 1, 1918.

Bituminous Coal

The most serious situation presented itself in the case of bituminous coal. This condition was the result of three factors:

1. An actual shortage of cars at the mines on account of the number delayed under load in the congested area and the limitations upon transportation due to the extraordinarily blizzard weather;

2. The lack of systematic distribution, which the Fuel Administration was arranging to provide; and

3. The dislocation of the New England supply, which was the result of the withdrawal of coastwise steamships, and which presented, on January 1, 1918, the most serious single situation.

The bituminous coal production for the preceding year had been the largest in the history of that industry. The severe weather conditions prevailing in January, 1918, resulted in a decreased production, almost entirely due to car supply, of 65,294 car loads. Immediate and drastic steps were taken to remedy this situation, and, notwithstanding the fact that the weather continued to be unduly severe throughout February and part of March, the railroads got on their feet, and in February produced an increase of 24,366 cars of coal over the preceding February, and for the suc-

*Abstract of the chapter on operating results from the director general's forthcoming report to President Wilson.

ceeding months increases over the respective corresponding months of the preceding year were as follows:

	Cars
March	38,207
April	64,824
May	87,036
June	92,734
July	150,288
August	139,686
September	128,942
October	89,882

or a net increase for the 10 months of 741,666 cars, or approximately 37,083,300 tons.

New England's necessities have been fully met and the largest tonnage of coal ever known—28,153,317 tons—has been moved to the Lake Erie ports and transported to the northwest. A very considerable proportion of the credit for the increase in the coal production must be attributed to the operation of the zone plan, to which special reference is made hereafter.

Food

Another serious condition arising early in the year was the threatened shortage of foodstuffs for the allies. A program had been arranged by the Food Administration, by which approximately 1,160,000 tons of food of all kinds per month was to be forwarded to the allies. Early in February the matter was brought earnestly to the attention of the Railroad Administration by the Council of National Defense, the Food Administration, and the representatives of the allies. Approximately 750,000 tons only had been forwarded in January, and at the then rate of progress only 500,000 tons would have been forwarded in February. The situation was represented to be of the utmost importance and was taken hold of with vigor. Empty box cars were moved in preference from all portions of the East and South into the western grain states, with the result that by March 15 the vessel capacity of the allies had been satisfied and there was available at North Atlantic ports an excess on wheels of 6,318 cars of foodstuffs, exclusive of grain on cars and in elevators. This situation has not at any time since presented any embarrassments and has been fully and satisfactorily met.

Furnace Situation

The severe weather conditions and the resulting car shortages had produced a very serious situation with respect to the blast furnaces in the eastern territory. On January 12, 1918, out of a total of 169 furnaces 17 per cent were out of blast. This situation was accentuated during the month of January, until on February 1, 22 per cent were out of blast. This was given special consideration and a steady improvement was made until June 1. Since then the situation has been practically normal.

Lease of Locomotives

At the beginning of federal control the Baldwin Locomotive Works and the American Locomotive Co.'s plants were occupied in the construction of locomotives for the Russian government, which, on account of the conditions prevailing in that country, it was impossible to deliver. Two hundred of these locomotives were partially constructed and practically all of the material was fabricated. These 200 locomotives were taken over by the War Department and leased to the Railroad Administration and are in service. They were constructed to a 5-ft. gage, as contrasted with our 4-ft., 8½-in. regulation. This difference was taken up by the use of wide tires, and these engines have been giving good service and came at a time when the need of additional motive power was very great.

A temporary lease of 135 light Consolidation locomotives was made with the War Department. These locomotives were for use in France and were returned and shipped overseas during the months of August and September.

Just prior to the inauguration of federal control the Railroads' War Board had transferred to the eastern territory 92 engines from western and 15 engines from southern railroads. In addition, as they came from the manufacturers, 130 new locomotives, which had been constructed for southern, southwestern, northwestern, and central western railroads, were placed in service on eastern lines.

In addition to this transfer of power into the eastern region, there was a relocation of power inside of that region from one road to another, amounting to 215 locomotives.

Transportation

While it is not possible in a report of reasonable length to epitomize in detail the action taken under unified control to simplify and economize methods of transportation, they can be briefly stated as coming under the following general heads:

Unification of Terminals.—This has been general throughout the country at both large and small stations, but has been of the greatest importance at the larger terminals, where terminal managers have been appointed with jurisdiction over the facilities of all lines. Where unnecessary mileage was not involved, a consistent effort has been made to route freight so as to arrive at the specific terminal where it was to be disposed of, and, so far as practicable, interchange switching in terminals has been eliminated.

In Chicago terminals it has been the practice under private control to reconsign practically all coal after arrival. By co-operation with producers, 66 per cent of the coal arriving at Chicago, in August, was consigned direct to consumer from the mines, and crosshauling coal between terminal lines was greatly reduced through the same co-operation, whereby coal was used wherever possible upon the rails of the individual road over which it arrived.

Single track separately owned lines between Pueblo and Denver, 118.5 miles, and between Wells, Nev., and Winnemucca, Nev., 185 miles, have been utilized as double track.

The reports of the regional directors, which follow, will give in detail the information as to unification of terminals and facilities. However, the following are typical examples of what has been done:

The Southern Pacific, Atchison, Topeka & Santa Fe, and Western Pacific each maintained passenger ferry service between Oakland and San Francisco. Santa Fe and Western Pacific passenger trains have been brought into the Oakland Mole of the Southern Pacific. The latter railroad's ferry facilities were ample for the three lines, so it was possible to dispense with the ferry service of both the Santa Fe and the Western Pacific at an approximate saving of $315,000 per annum.

All railroad marine facilities in New York harbor were consolidated under a marine manager, and have been used in common with very satisfactory results.

One hundred and seventeen coal-carrying barges and 18 tugs belonging to the Philadelphia & Reading, Lehigh Valley, New York, Ontario & Western, and Erie were pooled under a single management.

All passenger trains of the Baltimore & Ohio and through passenger trains of the Lehigh Valley were brought into the Pennsylvania railroad terminal in New York City.

Short Hauling of Freight.—Instructions were issued immediately upon the inauguration of federal control providing for the movement of freight by the shortest practicable route. This practice has been consistently followed, except where better grade conditions and less congestion were favorable factors on a somewhat longer line. Agencies were created whereby failure to observe the correct routing was detected and remedied.

It is impossible, of course, to estimate the total saving accomplished in this direction. An instance, however, is available in the case of the Northwestern region, where the correction of improper routing, within a period of five months,

on 34,941 car loads, resulted in a saving of 4,054,455 car miles.

Solid Trains.—The practice was inaugurated of creating solid trains for definite destinations by building up at Chicago, Minneapolis and St. Paul, St. Louis and Missouri river crossings, which resulted in a natural decrease in intermediate terminal switching and the expedition of essential government freight. This has been especially valuable in the transportation of export food of all kinds, meats, grain and grain products, and of munitions and steel for shipbuilding plants.

Elimination of Nonessential Passenger Trains.—The question of duplicate and unnecessary passenger train service has been given the most careful consideration, with the result that a number of trains have been discontinued which fell in one of these classes. Between the important terminals the remaining trains have been so spaced as actually to afford greater variety and extent of service than was possible heretofore where, through competitive conditions, the trains on the several lines practically duplicated each other. The saving per year in passenger train miles by regions is as follows:

Eastern	16,253,914
Allegheny	4,870,000
Southern	1,702,480
Northwestern	23,280,400
Central western	16,772,524
Southwestern	4,411,244

Pittsburgh Gateway.—The extraordinary development of industrial activities in and around Pittsburgh, and the enormous tonnage which is handled locally, makes it very difficult to use this gateway for trunk-line traffic, and this is especially true when the through and local business increases coincidentally, as is usually the case. Physical conditions, which embrace a narrow gorge and a large city, render the solution of this problem exceedingly difficult of local treatment.

It is my conviction that as soon as practicable the trunk-line railroads through Pittsburgh should be relieved by the construction of an entirely new line for freight purposes, connecting them east and west of Pittsburgh, but entirely avoiding the industrial area.

Coal Zone Plan.—The experience of the railroads under private ownership, especially with a demand for coal far in excess of the tonnage produced, was that shippers reached out into markets far beyond the territory in which their particular coal had normally been sold in previous years. The result was a very considerable waste of transportation, in that a much greater car mileage, reasonably estimated as running into millions of car miles, was necessary to supply the country with its normal coal requirements than would have been the case had shippers chosen to content themselves with normal markets.

To meet this situation the Railroad and Fuel Administrations jointly established what has come to be known as the bituminous coal zone plan of distribution. Under this plan the various bituminous coal mining districts east of the Rocky Mountains were separated and each assigned a definite territory wherein it could market its coal. It was further provided that coal from any district could be shipped to destinations beyond the zone allotted to that district only upon permit of the Fuel Administration, which was recognized by the Railroad Administration as constituting exemption from the railroad embargoes which were laid down to give force and effect to the zone plan. The coal-zoning plan, however, did not merely save car miles, and thus permit the production and transportation of several millions more tons of coal than would otherwise have been possible; it furnished, in addition, the means of utilizing coal produced in the plains states, which would not have otherwise been produced.

Marine Department

The following matters have been handled:

1. General supervision of all water transportation under federal control on the Atlantic and Pacific Oceans, Gulf of Mexico, their tributaries, and also the Great Lakes.

The following special subjects have also been handled:

1. Protection of coal supply for the New England states.
2. Protection of pulp-wood supply to insure ample supply of news print paper.
3. Cape Cod canal.
4. Foreign coal supply for New England railroads under federal control.
5. Movement of potatoes from Maine.

This department has had direct supervision over the marine facilities of the Division of Operations.

The original withdrawals of ships from the coastwise service threw upon the railroads a wholly unusual and unexpected tonnage which, unfortunately, moved into and through the most congested areas. It was not possible to utilize privately owned steamship lines for this purpose, because, naturally, they were disposed to seek that class of tonnage which paid the highest rates, and which they could concentrate for a single port. Under federal control the tonnage which would most relieve the rail lines has been turned to the Coastwise Steamship Section.

In the operation of the Coastwise Steamship Section tonnage was diverted from the Southwest as well as from the entire South, and the supply of cotton for New England mills and of raw materials for eastern war industries was successfully accomplished through South Atlantic ports, at a time when rail gateways were partially closed. To relieve the northern trunk lines, seven cargo vessels were operated between Lake Michigan ports and Buffalo, handling a total for the season of navigation of 599,811 tons. The cessation of war activities has lightened the burden upon coastwise railroads to such an extent that the business can now easily be handled by the railroad-owned steamships and the rail lines.

All coastwise lines were operated from April 13, 1918, to September 1, 1918, by the Coastwise Steamship Advisory Committee. On September 1 all coastwise lines under federal control were combined under H. B. Walker, federal manager, with headquarters at New York, making possible the transfer of vessels from one service to another, regardless of ownership, enabling the greatly reduced fleet to effect prompt movement of all business. The operation of vessels was seriously interfered with by German submarine operations on the Atlantic coast, necessitating running without lights and making long detours to avoid submarines and mines.

Movement of Potatoes from Maine

The potato shipping interests in Maine being apprehensive of shortage of transportation for the Maine potato crop during the coming winter, the Division of Operation was requested to organize equipment supply, train, and if necessary, vessel movement. Complete provision has been made, and there is no probability of weather or any other condition preventing prompt and efficient movement of this important food and seed crop. Estimate of total crop is 25,000 carloads.

Mechanical Department

On February 9, 1918, Frank McManamy, chief inspector of locomotives for the Interstate Commerce Commission, was appointed manager of the Locomotive Repair Section, and authorized to co-ordinate the repair of locomotives. On July 1, 1918, he was promoted to assistant director in charge of the mechanical department and his jurisdiction extended to include car repairs, supervision of mechanical standards, and of tests of new devices. Later he was given jurisdiction over the enforcement of federal laws for the promotion of safety for employees.

Methods Adopted for Improving Equipment.—To utilize any of the large manufacturing plants for repairs would very seriously limit their effectiveness in the production of new locomotives, and on account of the competition of high wages paid by the shipbuilding plants and war industries generally there was a considerable shortage of skilled mechanical workers in railroad shops.

Immediate relief could only be secured by working a greater number of hours. On a large number of railroads there were in existence contracts with the mechanical crafts which limited the number of hours per day. The railway employees' department of the American Federation of Labor, which represented the mechanical crafts on such railroads, very patriotically met this situation and voluntarily agreed that they would, during the period of the war, waive their privileges in this respect. As a result of this, railroad shops on many of the important lines were placed on a basis of 70 hours per week, and the remainder on 60 hours per week, which was approximately an average increase of 20 per cent in shop hours. In June all shops were placed on the 60-hour-per-week basis, which continued until the signing of the armistice, when arrangements were made for readjusting the hours, which were reduced on November 25 to nine, and December 9 to eight hours per day.

Co-ordination of Locomotive Repairs.—A check of the repair shops indicated that their combined capacity was ample to take care of all of the locomotives if they were properly distributed. Plans were immediately perfected to send locomotives to the nearest available repair shop, regardless of ownership, and to distribute the work so that each shop could be worked to capacity. This arrangement in many instances actually reduced the distance which defective locomotives were ordinarily sent for repairs, and also reduced the time such locomotives were held out of service. Under this plan, since January 1, we have transferred 2,065 locomotives to the shops of other railroads under federal control, where they had been given heavy classified repairs; otherwise, these locomotives could not have been kept in service.

Comparison of Motive-Power Conditions.—Accurate comparison of motive-power conditions with one year ago is difficult, because of the varying methods of rendering reports prevalent on the different lines, the repairs on some roads being divided into three classes, while on the others they were divided into more than 150 classes. This has been standardized, and the reports of repairs and of the condition of locomotives are now rendered by all roads on the same basis. The improvement in the condition of locomotives is perhaps best indicated by the fact that, notwithstanding the tonnage handled during the year has been the heaviest ever known, there are now stored in good condition and ready for winter service, 1,189 locomotives, while one year ago there was not a single serviceable locomotive in storage. This improved condition is due to the co-ordination of shopwork.

Condition of Freight Cars.—The general condition of freight cars has also shown a substantial improvement since the organization of the mechanical department. The percentage of bad-order cars to revenue cars on line has decreased from 7 per cent in July to 5.3 per cent, which is a decrease of approximately 43,000 in the number of bad-order cars.

Standardization of Equipment.—The standardization of locomotives and cars is an ideal which has long been striven for by the various organizations of railroad officials, and much has been done by them to bring about this result. Complete accomplishment has never heretofore been possible because of an absence of authority to enforce standards which might be agreed upon. This has now been accomplished by the preparation and adoption of standard designs for different types of locomotives which are suitable for all classes of service and by standardization of freight and passenger equipment. This will increase production by eliminating delay waiting for designs and patterns and will facilitate repairs and reduce the number of repair parts necessary to be carried in stock.

It is interesting to note that one of the large locomotive companies, working solely upon engines of individual design, turned out in a five-week period ending August 17, only 104 completed engines, while the same shops for the five weeks ending October 2 produced 163 engines of standardized design. It would not be safe to assume so great an increase in capacity as a regular thing, but that the standardization does very greatly increase the capacity of locomotive shops is unquestioned.

General Condition of Equipment and Terminal Facilities

One of the prime causes for the necessity of government control of railroads and one of the most serious conditions the Railroad Administration was called on to correct when assuming control, was the general bad condition of locomotives and cars.

It was impossible at the time the railroads were taken over to say to what extent the condition of locomotives and cars were responsible for the situation which existed, and as the Railroad Administration had at that time no mechanical department organized to check up shop practices and handling of equipment at terminals and advise relative to outlining plans for improvement, the Interstate Commerce Commission was asked to assist in obtaining accurate information relative to the general situation. The commission promptly placed at the disposal of the Railroad Administration the records and personnel of its Bureau of Locomotive Inspection and Bureau of Safety.

The records of these two bureaus contained much valuable data with respect to general conditions throughout the country and the inspection forces of the commission were assigned to various congested terminals, particularly throughout the East and Middle West, to investigate and make daily reports of the actual condition of locomotives and cars and train movements. These reports showed that in addition to the congestion caused by failure of shippers to unload cars promptly that a serious situation existed on account of the number of bad-order cars at various terminals and also on account of the general defective, run-down condition of motive power, which, together with overcrowded and inadequate shops and roundhouses, had resulted in trains being held at terminals on account of shortage of efficient motive power, and also seriously slowed up movement on the road, often to the extent of blocking several divisions.

The immediate remedy for these conditions was not so much the building of new locomotives and cars as the proper maintenance of locomotives and cars that were in service and more prompt movement of trains.

A survey of the situation indicated that shop facilities were sufficient if efficiently used; therefore, the task of nationalizing the railroad-shop facilities and assigning locomotives to shops where repairs could be made, regardless of ownership, was assigned to the chief inspector of the Bureau of Locomotive Inspection, who, in addition to his duties as chief inspector, was placed in charge of the mechanical department of the administration.

Prompt handling of locomotives was seriously hampered by the condition of roundhouses and the lack of facilities at many points to make running repairs to large modern locomotives. Roundhouses built 20 or more years ago for locomotives in service at that time were still being used to house locomotives more than twice the size for which they were designed. Repairs had to be made either out of doors or in open roundhouses with the temperature below zero. Steam pipes, injectors, air pumps, and even cylinders froze and burst, and in many cases locomotives were actually frozen to the track in roundhouses and could not be moved.

In spite of these conditions, under the plan organized by the mechanical department of the Railroad Administration with the assistance of the railroad officials and the co-operation of the employees in working increased hours regardless of working conditions, the situation immediately began to improve and that improvement has continued up to the present time. It is true that there were difficulties encountered on account of failure to appreciate the need of co-operation between officers and employees. This resulted in 123 instances in labor disputes which threatened to, or did temporarily, tie up certain terminals.

All of these were successfully handled, and following such adjustments there was a noticeable increase in the production of the shops and engine houses where such disputes occurred.

Only two methods for improving the general condition of equipment existed; namely, to increase the shop facilities and forces or to use more efficiently the facilities and forces which were available. Increasing the facilities and forces under war conditions was clearly impossible; this left as the only practical means of improving equipment conditions the adoption of some plan whereby existing facilities and forces could be made to produce greater results.

The average increase in locomotive-shop hours for the entire country amounted to about 16 per cent, and the effect became immediately apparent by the increased number of locomotives repaired per week in comparison with the most accurate records available for the corresponding week of the preceding year.

This increase in shop hours applied to roads where locomotives were in good condition and shop facilities ample, as well as to roads which were not so favorably situated, which enabled a comprehensive program of nationalization of railroad shop facilities over the entire country to be carried out, and locomotives from roads where shop facilities were not sufficient and motive power in bad condition to be sent to shops on other lines for repairs. This distribution of locomotives was so arranged as to reduce, in many instances, distance to the repair shops; therefore, the cost of transporting locomotives to the shops was no greater and all shops under this plan were kept working to their maximum capacity with a full force.

The plan of considering the condition of equipment as a whole and taking steps to improve it by, first, uniformly increasing shop hours on all railroads in the country and utilizing to their full capacity the facilities of all shops which could only be done under federal control is really what improved the condition of the locomotives and cars and enabled trains to be promptly moved from terminals with reasonable assurance that the locomotives would make a successful trip. The result of the policy of nationalizing railroad shop facilities made it possible to repair at other line shops 2,065 locomotives for railroads which lacked sufficient shop space and shop organization, thus improving the general situation without detriment to the railroads that furnished this help.

Standardized Locomotives

In addition to the vigorous action which had been taken to improve the condition of existing equipment, the necessity of adding to the available stock was recognized and designs were worked out for standardized locomotives and orders placed for their construction.

The locomotives were built from standardized designs for various reasons, the principal of which are as follows:

First. To reduce to a minimum the time required to prepare drawings, patterns, and dies, and thus enable deliveries to begin quicker than where separate drawings and patterns would have been necessary for each lot of locomotives allocated to a particular road.

Second. To secure quantity deliveries.

This method of construction has resulted in delivery being made at a quantity rate which could not have been approached had the locomotives been ordered to individual designs. The increase in the rate at which standardized locomotives can be turned out is clearly shown by the following comparison of two of the principal shops of the American Locomotive Co. during a portion of July and August when the locomotives built were of individual design with a similar period in September and October when they were building standardized locomotives. During five weeks, beginning July 20, an average of 13⅕ locomotives per week were turned out at the Dunkirk plant, while during five weeks, beginning September 14, an average of 19⅕ locomotives per week were turned out at the same plant. For Schenectady, during the five-week period beginning July 20, an average of 8 locomotives per week were turned out, while for the corresponding period beginning September 14 an average of 13⅗ locomotives were turned out. It will be seen that the increased production due to the standardized locomotives was about 50 per cent.

Third. It has also provided a supply of equipment, the parts of which are largely interchangeable, which is available for use anywhere in the event of congestion. This removes the necessity of carrying a large stock of repair parts peculiar to the locomotive and avoids delay which results when repair parts must be ordered from some distant owning road.

Standardized Cars

The freight car situation was handled along the same lines as were the locomotives. In addition to the designs for freight cars, for which orders have been placed, designs have been prepared for all-steel box cars of 50 tons capacity, refrigerator cars of 30 tons capacity, general service gondola cars of 50 tons capacity, steel framed stock cars of 40 tons capacity, flat cars of 55 tons capacity, oil tank cars of 7,000 gal. capacity, oil tank cars of 8,000 gal. capacity, oil tank cars of 10,000 gal. capacity, acid tank cars of 7,000 gal. capacity, acid tank cars of 8,000 gal. capacity, and acid tank cars of 10,000 gal. capacity. While no cars have actually been built from these drawings, they are available at any time that the traffic needs show them to be desirable.

Complete plans and specifications of all steel baggage cars, in both of 60-foot and 70-foot lengths, have been prepared, and tentative plans prepared for 70-foot steel coaches, and for steel passenger and mail, passenger and baggage, passenger, baggage and mail cars.

Standard Reports

In the meantime other work was being vigorously pushed to improve conditions and to facilitate keeping of records. First, a system of weekly equipment-condition reports from each railroad was installed, so that the condition of power might be reported and the administration kept informed and locomotives needing repairs assigned to the nearest available shop.

Reclamation Work

To conserve material and avoid the possibility of usable material being sold as scrap, instructions were issued to the effect that proper facilities must be provided and every effort made to reclaim and make repairs to old material instead of using new, and under no circumstances was material to be scrapped until—

First. It was known positively that it could not be satisfactorily repaired, or

Second. That the cost of repairs would be prohibitive.

The total saving resulting from reclamation of scrap material can not be checked up at this time, but when this work is thoroughly developed and reclamation plants provided on all railroads it will amount in the aggregate to millions

of dollars annually in addition to relieving manufacturing establishments and permitting them to use their facilities for war material and with the signing of peace, material that will be needed in reconstruction work.

Standard Practices

Standard practices have been established and circulars of instruction issued for mechanical work covering the following matter, which will result in more efficient and economical operation of locomotives and cars: Repairs and betterments to freight cars, painting freight cars, installing field ranges in cars, locomotive maintenance, care of journal boxes, inspection of ash pans and spark arresters, lubrication of locomotives, repairs to refrigerator cars, and superheating of locomotives.

Rules have also been promulgated for the inspection and testing by the inspection forces of the railroad companies of all stationary boilers used, which will make it possible to save the insurance premiums now paid on such boilers.

Locomotives en route to or from other line shops and new locomotives being delivered by the builders were usually hauled dead in trains. Instructions were at once issued that wherever possible such locomotives should be moved under steam, hauling a train wherever practical. This order relieved the railroads from 500,000,000 ton-miles of transportation annually for material which not only should be self-propelling, but which should, in many instances, be hauling additional freight.

Consolidation of Mechanical Terminal Facilities

Under private operation, at many points complete organizations for the maintenance of a comparatively small number of locomotives or cars were maintained side by side, which resulted in a duplication of work, heating plants, and supervising forces. Wherever a saving could be made without adversely affecting efficiency, such useless facilities were eliminated. Such consolidations have been made at 417 points and the annual saving effected thereby amounts to $2,363,535.95. Additional consolidations are now under way.

In connection with this work extensive investigations were conducted covering shop and engine-house operation, resulting in changes and improvements which have materially increased the output. For example, at one large shop the output of locomotives receiving classified repairs increased over 50 per cent, and increases ranging from 10 to 25 per cent were secured in many shops. It was also possible by rearranging the method of handling work in engine houses to release hundreds of employees that were sorely needed in other departments, and the saving effected in engine-house operation by such reduction in force, while not obtainable for all railroads, on one railroad alone amounted to $1,061,332.68 per annum.

It was also possible by rearranging methods of handling locomotives at terminals to secure greater efficiency from such locomotives, and thus overcome what otherwise would have been a shortage in motive power.

The condition of motive power on all lines under federal control has shown a gradual improvement, and the locomotives in service are in much better condition than they were one year ago, and on some lines, that last spring required extensive assistance from other line shops, the condition of power has shown such a marked improvement that they are now doing all of their own repair work, and, in addition, are repairing locomotives for other lines.

The tabulations furnished by the railroads show an average increase of 20.93 per cent each week in the number of locomotives receiving classified repairs during the period of increased shop hours.

In addition to the improved condition of power in service there are now in white lead 1,021 locomotives in the various regions, divided as follows:

Region	Number
Allegheny	57
Central western	198
Eastern	480
Northwestern	147
Pocahontas	1
Southern	39
Southwestern	99
Total	1,021

These locomotives have received classified repairs and are being held in reserve for winter service. There are also being placed in storage for service during the winter months 150 new standardized locomotives which were recently received from the locomotive builders. With the surplus power in reserve and the new power to be received from the builders to be distributed where it is most needed, there is no doubt but that all lines under federal control will be able to pass through the winter with a sufficient number of locomotives in serviceable condition successfully to handle all business offered.

New Devices for Locomotives and Cars

On account of the vast number of new devices for use on locomotives and cars which were submitted, a comprehensive plan for handling this question was necessary. Detailed instructions were issued by circular establishing rules for the submission of such devices for the consideration of the Railroad Administration and a committee on appliances was created to conduct necessary investigations and to pass upon the value of all devices or appliances thus submitted. Up to date 692 such devices, which cover practically everything used in locomotive or car construction, have been submitted. One hundred and thirty-five of these have been examined, ten of which have been recommended for test under service conditions. These tests will proceed under the direction of the mechanical department, and a record will be kept of the results, so that the value of the devices in question may be correctly passed upon.

Enforcement of Laws for the Promotion of Safety

As provided in General Order 8, it was the purpose to require compliance with all federal laws for the promotion of safety, but while under federal control it would manifestly be no punishment to impose fines; therefore other means must be provided. By General Order 46 this work was placed under the direction of the assistant director of the Division of Operation, in charge of the mechanical department.

Since the issuing of General Order 46, 108 reports of violations of the federal laws for the promotion of safety, totaling 682 separate counts, have been received from the Interstate Commerce Commission and referred to the mechanical department for correction. Although this work has not been completely organized, the Bureau of Safety and the Bureau of Locomotive Inspection of the Interstate Commerce Commission have advised that substantial improvements in practices have been noted at points where such violations have been handled.

Education of Railroad Employees

It has long been recognized that the service rendered by railroad employees is capable of substantial improvement by proper training of employees along industrial lines, and many railroads have in existence plans for furnishing additional training for their employees.

The Railroad Administration is in sympathy with this work and plans are being considered for establishing a system of technical training for railroad employees in connection with the Board for Vocational Education. It is also believed that this work may be profitably extended to employees who have been injured in the service to an extent

that prevents them from following their usual vocation, but who with proper training may be fitted to fill other responsible positions.

Organization

The work of the mechanical department, Division of Operation, has been conducted with a total force of appproximately 60. Of these, 28 are considered as field men whose duties are to conduct investigations concerning shop practices and shop output and to furnish first-hand information relative to the efficiency of the work performed and the general condition of the equipment. They are also used to conduct investigations and handle disputes between shop men and railroad officials which have not reached the point where they should be referred to the Division of Labor.

The office force, in addition to handling ordinary correspondence, receives, checks and compares the reports showing the general condition of equipment, the assignment of locomotives to shops for repairs as well as the assignment of new locomotives received from the builders. It also includes the mechanical engineering staff, which checks up the designs for locomotives and cars, receives reports of failures of standardized locomotives, and corrects faulty construction. The mechanical engineering staff also acts as a clearing house for information concerning standard designs of locomotives and cars, distributes drawings and other data necessary to the proper standardization of equipment and keeps the practices up to the standard.

Department of Engineering and Maintenance

C. A. Morse, assistant director of operation, in charge of engineering and maintenance, was appointed September 1, 1918, and his organization is engaged in compiling information reflecting the physical condition of the railroads under federal control as of date December 31, 1917, and in preparing for the compilation of similar information as to conditions at the end of each year, and at the end of federal control.

This work is being handled through a committee composed of the assistant director of operation, as chairman, with the engineering assistant of each regional director, and an organization has been built up in each region with the engineering assistant of such regional director as chairman, the committee to consist otherwise of the chief engineer or other officer handling maintenance on the various railroads in such region.

Forms are provided upon which each railroad will record essential features in connection with its maintenance, and this report is supplemented by regular inspection reports.

The department is also handling matters in connection with proper standardization of practices in the maintenance of roadway and structures, studying questions of improved appliances and such engineering problems as are directly connected with maintenance and operation.

Car Service Section

The Car Service Section was the first of the agencies created in the Division of Operation. Its primary duty has been the relocation of freight cars upon the railroads throughout the country, and it has been the intimate point of contact between the Railroad Administration, on the one hand, and various branches of governmental activities, on the other.

The authority given to this section has necessarily been very broad, and with W. C. Kendall as manager there have been associated seven assistant managers, whose experience as transportation officers has covered practically all of the regions.

The Eastern Railroads Coal Car Pool, with headquarters at Pittsburgh, an inheritance from independent operation, has been continued under the jurisdiction of the Car Service Section with very satisfactory results. A large part of the increased coal production referred to elsewhere in this report can be directly attributed to the operation of this pool.

The Car Service Section consists of a central organization at Washington, with a Refrigerator and Tank Car Branch at Chicago and an Eastern Railroads Coal Car Pool at Pittsburgh, also a branch at Seattle, Wash., organized originally to supervise car service in the lumber districts of the Pacific Northwest in the interests of government shipments. The central office staff embodies, geographically and otherwise, a car service and transportation experience sufficient to provide comparatively intimate knowledge of conditions likely to arise in any part of the country.

The function of the section is to provide an equitable distribution of the various classes of freight-car equipment, and so to regulate other transportation details as to meet daily emergencies and to maintain a proper balance between the government, the public, and the railroads during the period when extraordinary demands of all kinds have been laid upon the transportation machinery of the country.

To meet the exigencies of the war, primary importance has attached to the requirements of all government activities. Close contact has constantly been maintained with the War and Navy Departments, the Shipping Board, the War Industries Board, the War Trade Board, the Housing Commission, and the Food and Fuel Administrations as well as with the allies' traffic representatives. Through this contact the railroads have been thoroughly and promptly advised of all government needs, which have been met with the least possible disturbance to other industries. Like contact has also been maintained with the Canadian Railway War Board, and necessary car supply has thus been made available for the large volume of commerce between Canada and the United States.

Car relocation.—Under federal control freedom has been exercised in moving empty freight cars of various classes to meet requirements, regardless of their ownership. Within the year fully 850,000 such movements have been made. Practically 700,000 of these have been box cars and the remainder stock cars and flat and gondola cars specifically for lumber tonnage. This does not include the emergency movements of refrigerators or the continuous relocation of coal cars under continuing instructions as required to equalize the empty supply among the various mining districts in the eastern, Allegheny, and Pocahontas regions. Through these means a comparatively easy car situation has been maintained generally throughout the United States for months past.

Beginning June 15 a movement of empty box cars was directed to the grain-producing territory of the Western and Southwestern states, with the intent of establishing a supply sufficient to meet the requirements of the Food Administration. As a result, when the wheat crop was ready to move there were cars available in the territory involved in sufficient quantities to protect every requirement in better shape than ever before, and this supply was regulated by further movement with the northerly progression of the harvest.

To meet the situation in the Southeastern states a continuous movement of empty box cars is kept under way, mainly into the lumber-producing territory. This was maintained until about October 15 sufficiently to fully meet all government and commercial demands. It then appeared that inbound loaded movement into that territory would be sufficient for empty requirements. Shortly thereafter a surplus developed, an altogether unprecedented situation. This section has been materially assisted in car supply by the location there of various army encampments, the necessary movement of supplies thereto having made available box cars for outbound loading.

It is the conviction of those familiar with the subject that only by this liquid distribution of freight cars through cen-

tralized control has it been possible to meet all requirements with reasonable promptness.

Campaign for advance movement.—Beginning in April and continuously thereafter for some months the attention of traffic organizations and shippers generally was called to the advantages possible by shipping raw materials and supplies during the summer months and prior to the anticipated period of heavy traffic normally to be expected about September 15. Full and generous response was made. This not only relieved the heavy tension customarily experienced during the fall months, but will further relieve the railroads during the severe winter months. This will be of material advantage alike to the shipping public and the railroads.

In April special action was necessary in connection with the movement from the Pacific Northwest of aviation fir and spruce for the War Department, ship timbers for the Shipping Board, and other lumber and miscellaneous articles on government account, including railroads, as well as regular commercial business. These arrangements continued until November when the aviation program was discontinued. The record from April 21 to November 20 shows a total movement from this territory of approximately 150,000 cars of lumber, of which 12,700 were for the aviation program, 5,500 for the Shipping Board, 6,700 for other government activities, 11,000 railway material, and commercial more than 115,000. This reflects an average daily movement of 813 cars of lumber from this section.

The movement of live stock, which has been extremely heavy, has been handled with far less complaint than ever before. There was some difficulty for a short time in providing transportation for the western sheep because of the abnormally high market which induced everyone to ship stock at the same time, but the extent to which the railroads met the situation is shown by reports from the markets at Chicago, Kansas City, Omaha, St. Joseph, St. Louis, Sioux City, and St. Paul, where the receipts of sheep for the period August 3 to October 19 totaled 4,486,102 head, as compared with 2,902,981 for the corresponding period in 1917, or an increase of 54.53 per cent. The heaviest week's receipts were those of September 28 when the market report shows 587,014 arrivals.

Coal and coke.—One of the heaviest tasks for the railroads during the past year has been in providing necessary transportation for fuel. This has only been accomplished by effective co-operation between the Fuel Administration and the Railroad Administration. It has been necessary to adopt extraordinary measures, and these as a rule have been cheerfully met by shippers, whose rights were at times very considerably affected. Foremost among these measures was the joint action of the two administrations in zoning the distribution of bituminous coal.

The foundation of successful operation in the steel industry lies in an adequate supply of coke, by-product coal, and steam coal. Every effort had been made during the year to maintain adequate supply of these fuels at such plants, and it is a matter of record at the War Industries Board that practically all of the transportation needs of coke, by-product coal, and fuel coal for the steel industries have been promptly and adequately met.

A step of much importance was taken by the establishment of uniform rules for rating of coal mines by which car supply is directed. These were made effective as of October 10, 1918. Previously roads were using different methods and with varying interpretations. On the uniform basis which now obtains a more equitable distribution of cars as between districts, railroads, and mines is possible than heretofore.

A factor which has an important bearing on the question of coal-car supply is the extent to which this type of equipment is used in handling stone, sand, and gravel for construction and road-building purposes, and curtailment of such noncoal use has been necessary. Cheerful co-operation and assistance has been received from all shippers thus adversely affected.

Car conservation.— Full credit is due the shipper for the patriotic way in which he has responded to requests for conservation of freight-car equipment by heavier loading. During the nine months January to September there was an increase per loaded car of 2.3 tons over the corresponding period for 1917. This has not been accomplished merely by the physical effort of loading more heavily. It has involved on the part of the shipping public not merely additional labor in loading into the car, but also changes in the size of packages, changes in the manner of constructing packages, and changes also in the manner of placing goods, particularly manufactured articles, within the packages. Thus, hogsheads used for the loading of tobacco have been reduced in size to permit double tiering, handles have been removed from baby carriages, grain cradles, and other agricultural implements, wagons, wheelbarrows, and other vehicles formerly shipped in large quantities set up, have been shipped knocked down. Shippers of barreled goods, such as oil, syrup, molasses, tanning extract, and the like, by using dunnage, are also making double tiering possible. In a general way the result sought by the carriers and shippers both has been "making one car do the work of two," but often greater conservation has been accomplished by the double and triple loading of small lots in one car.

Sailing day plan for handling less-than-carload freight.— An important feature of the activities of the Car Service Section is the development of the sailing day plan for handling less carload merchandise freight. During the past two or three years there has been an increasing tendency toward congestion at large centers and at transfer points, due to excessive accumulations of less carload freight. The sailing day plan has been inaugurated for the purpose of assembling less carload shipments to eliminate the necessity for transfer, thus insuring improved service and increased car efficiency. Regional committees have been appointed to supervise the concentration and consolidation of less carload freight from common points via one or more designated routes based on the volume of traffic and direct routing. At points common to several railroads subcommittees have been formed composed of representatives of railroads involved and in many cases including representatives of the chambers of commerce. Up to the present time this work has taken definite form at Baltimore, Boston, Milwaukee, Norfolk, Pittsburgh, Philadelphia, Roanoke, Trenton, and Wilmington, Del. As a specific instance of what can be accomplished, through cars of merchandise are now being loaded from Boston and other eastern points to San Francisco. It is expected that by January 1 next, sailing day plans will be effective at New York, Chicago, and St. Louis, with work in other sections progressing satisfactorily. While it is too early as yet to estimate results, present indications are that the handling of an average of 30 tons per day can be eliminated at each of the 400 transfer points now in operation throughout the United States. The feature of most importance is improvement in service, the expediting of freight, the reduction of loss and damage incident to rehandling, and the elimination of the necessity of embargoes.

Embargoes and permits.—The Car Service Section is responsible for supervision of the embargoes issued by railroads. Inasmuch as such supervision has never before been attempted by a central organization methods and practices have been allowed to develop naturally, and restrictions have been imposed only as a real necessity therefore appeared. The inevitable result is some lack of uniformity. An improvement in distribution was made early in the year, whereby the roads of the country were divided into 26 zones through which embargoes were simultaneously issued to each

road and forwarded to the Car Service Section. Formerly a railroad originating an embargo transmitted it to each of its connections and each connection, in turn, transmitted it to its connections, with a consequent piling up of duplications and delay. These zones have since been revised and reduced in number and further simplifications to conform more closely to regional lines are in prospect.

On January 1st, embargoes in eastern territory were more or less general in scope. As conditions improved and congestion was relieved, the necessity for general embargoes gradually ceased. At present no general embargoes are outstanding, practically all now in effect being local in character, and as a rule due to the condition at individual destinations. Embargoes are still in effect governing the handling of domestic and export freight to and through the North Atlantic ports and should be maintained in the interests of control of war and postwar conditions.

Because of the increasing activities of government departments and of the transportation conditions which prevailed last winter and early spring, individual railroads and various government organizations were attempting to authorize special movements of government and other important freight in violation of existing embargoes. This made necessary a uniform embargo and permit system in order to eliminate existing confusion.

This permit system proceeded upon two lines, one providing general and continuing exemption from embargoes for essential commodities, and the second providing special exemption from embargoes for individual shipments according as the needs of the individual consignee concerned and the public welfare might demand. To effect the general exemptions a list of standard exemptions to embargoes was issued under date of February 11, 1918. This gave, in the order of their importance, great freedom of movement to government freight, fuel, food, and essential commodities and was practicable and readily adopted by all roads where a complete embargo was not necessary. It avoided the necessity for issuing permits for individual movements to a very considerable degree.

Experience soon demonstrated, however, that general exemptions could not adequately meet public needs, and recourse was ultimately had to the plan of permitting special shipments. These permits were controlled and regulated very carefully, and the final tests as to whether or not they should be issued was the need of the destination community for the commodity and the ability of the consignee to accept and unload the goods without car delay. The needs of some government departments were met by authorizing the issue of necessary permits by a representative of the Railroad Administration assigned to the departments concerned. In other cases, particularly where the destination was for war reasons, one habitually congested without such traffic control, committees representing the administration were established to meet the situation. The Car Service Section furnished the medium for such control by permit when provision otherwise had not been made, and generally acted as a clearing house for and check upon all such traffic control representatives and committees.

The "permit system" has fully justified itself. Every effort has been made to utilize it without undue discrimination. To its successful operation is due in considerable measure the great improvement in movement which has been had during federal control.

Among other activities of the Car Service Section are those involving the arrangements for certain important movements as requested by the War and Navy and other government departments. This work developed with the ending of that of the priorities director, since which the Car Service Section has operated as liaison office between these government departments and the various railroads.

Refrigerator-car department.—The refrigerator department of the Car Service Section was organized with headquarters in Chicago July 1, 1918. Under this plan an abnormally heavy movement of perishable commodities has been handled in refrigerator cars with general satisfaction. Assurances have been received from perishable-freight associations and shippers, as well as private and railroad car owners, that the car supply this season as compared with the past seasons has been much more efficient and satisfactory. Serious shortages have been avoided, and the few minor shortages which have occurred have been local and of short duration. Co-operation has been readily extended by the private refrigerator lines, and this has permitted a free interchange of equipment and more general use of seasonal surpluses to meet demands in all territories.

Tank car.—A system of reports has been required from railroads respecting tank-car movements, the purpose being to develop within the organization of the individual road information indicating the number and causes of delays, together with the time involved. This has been salutary in effecting a much-needed improvement in the supply of equipment and the service. Large unit movements of tank-car shipments have been arranged, and without these tank-car requirements could not have been fully met. Apprehension by the oil division of the Fuel Administration that there would be a failure in tank-car supply has proved unfounded. Complaints of delayed movement have been greatly reduced in number. Average miles per tank-car per day show material increases.

Car-record office.—The car-record office of the Car Service Section, established on May 15 for the purpose of affording information to the various government departments relative to the location and movement of cars, has, from its inception to the present time, recorded movement of 1,026,000 cars, or an average of 5,700 daily, and has furnished information as required to the various departments, especially the War Department, which was interested in a far greater number of cars than any other department. Requests have been received and handled for special tracing covering the movement of about 16,000 cars. This office furnished a medium for tracing for all departments and has relieved individual railroads materially. The results of the work have been entirely satisfactory.

Miscellaneous figures.—Ninety thousand cars of grain have been moved under preferential orders given by the Food Administration. Six hundred and thirty thousand cars grain loaded during season (to date). Figures compiled and furnished various offices. Six thousand requests received for expedited placement and movement of cars, chiefly from War Department. Five hundred and sixty thousand cars moved to encampments, shipbuilding, and other points, requiring in many cases close supervision.

Inspectors.—A corps of experienced and competent inspectors is maintained. These men travel throughout the country and keep the section advised concerning such matters as utilization of available capacity of freight cars, the movement and distribution of empty freight equipment, the progress of special movements (as, for example, coal for the Northwest via the Lakes, coal for New England, etc.), delays to loaded cars account lost billing, embargoes, etc., the extent to which employees are kept informed regarding requirements for handling freight cars, etc. They are also used for the prompt development of facts in serious cases of complaint made by shippers. Much valuable information is obtained through their work.

Auxiliary committees.—In the development of the work of the Railroad Administration terminal managers have been placed at various transportation centers charged with responsibility and having authority for co-ordinating the terminals of the various lines in the interest of the public as a

whole. This has made possible the elimination of the large number of Car Service Section committees which were taken over with the railroads at the time federal control became effective and through which the commission on car service (the present Car Service Section) sought to bring about in part by agreement what the terminal managers now accomplish by direction.

Safety

The Safety Section was created February 19, 1918, with Hiram W. Belnap, formerly chief of the Bureau of Safety of the Interstate Commerce Commission, as manager. This section has been most effective in its work and in the creation of uniform practices for the enhancement of safety on the several railroads and has created organizations on those lines where none previously existed. The particular function of this section has been not only to emphasize and educate the employees in the matter of safety requirements provided for by existing laws, but to go much further than this and to locate unsafe practices of every character and point out the remedy.

The death of Mr. Belnap, which occurred on October 12, was a very great loss to the Railroad Administration, but the section has been continued under A. F. Duffy, assistant manager.

Troop Movement

The prompt, efficient, and safe movement of troops has been a first consideration throughout the period of federal control, and nothing has been permitted to interfere with it. From January 1 to the armistice there have been moved a total of 6,496,150 men, an average of 625,434 per month. The maximum was reached in July, when 1,147,013 men were moved.

Four outstanding points may be emphasized:

One million seven hundred and eighty-five thousand three hundred and forty-two drafted men were picked up at 4,500 separate points in larger or smaller units and moved on schedule to their training camps, in many cases upward of a day's journey, and in all cases, were fed in transit. The amount of detail involved in routing, scheduling, moving, and feeding these men can hardly be overestimated.

Four million thirty-eight thousand nine hundred and eighteen men in 9,109 special trains moved an average distance of 855 miles, unquestionably the largest long distance troop movement in history.

One million nine hundred and four thousand and fourteen men were brought into the crowded port terminals for embarkation overseas without interference with the heavy traffic of other kinds already being handled through these ports and in the territory adjacent thereto. During one period of 30 days more than 20 troop trains each day were brought into the port of New York.

During the period there were but 14 train accidents involving either death or injury of enlisted men.

The Troop Movement Section has had exclusive charge of this work since the beginning of federal control and, under a different designation, handled it for the railroads prior to that time.

The report of the section gives in detail the performance during the period of federal control and, for convenience, to cover the period of the war, the data has been expanded to include the period from May 1, 1917, to November 10, 1918.

A perfect understanding existed at all times with the general staff of the Army.

At the peak of the activities incident to the prosecution of the war it was necessary to provide for the daily movement to and from industrial plants and camps of 205,587 persons in each direction. To perform this work, 2,319 passenger-equipment cars were in daily use.

In September, 1918, this section was directed to undertake the handling of such labor movements as were being made under the direction of the Employment Service of the Department of Labor.

Contact was established in each state and large industrial center with representatives of that department, and the work has been carried through successfully since that time. The demands made upon this section by it have not been great; our records show that we were obliged to take action in cases involving only 25,157 persons.

On October 28 this section was directed to undertake the handling of all passenger-equipment cars. In line with the policy of making use of cars of any initial to meet the situation, we have not hesitated to send into the heavy express districts in the East baggage and express cars of all ownerships to meet the requirements of the holiday traffic. This, of course, is a temporary measure inasmuch as no opportunity has hitherto existed for an analysis of the express traffic as a whole.

A study of this situation should undoubtedly be made, primarily to ascertain the normal and seasonal flow of the express traffic and the relationship between the roads handling other than local traffic. This study will be undertaken with a view to accurate knowledge upon which proper recommendation and action may be based in the future.

It will be noted that the creation of the army and sending approximately 2,000,000 men to ports of embarkation involved the transportation of upwards of 8,700,000 men. It is estimated that to demobilize these troops will involve the transportation of not less than 7,250,000. Methods for handling this to the best advantage are gradually being worked out in connection with the proper organizations of the general staff, and while the problems are new and cannot be dealt with upon any precedent it is not anticipated that any insurmountable difficulty will be encountered.

MAY, 1917, TO NOVEMBER 10, 1918

Troops moved:			
(a) Drafted men from their homes	2,287,926		
(b) On regular trains	1,380,564		
(c) On special troop trains	5,046,092		
Total			8,714,582
(d) Average per month	502,764		
(e) Maximum, July, 1918	1,147,013		
Equipment furnished:			
(a) Pullman, standard and tourist	70,413		
(b) Coaches for special troop trains	65,954		
Estimated coaches for draft and regular train movements	69,802		
			206,169
(c) Baggage and express cars for special troop trains	11,709		
Estimated baggage and express cars for drafted men	4,576		
			16,285
(d) Freight cars for special troop trains			23,075
Total			245,529
Special troop trains:			
(a) Number run	11,959		
Estimated number required for drafted men	4,576		
			16,535
Average special troop trains:			
(a) Number cars per train	12.6		
(b) Distance handled per train	875.4		
(c) Number hours per train	44.2		
(d) Number miles per hour	19.8		
(e) Number men per train	421		
Accommodations:			
(a) Number handled in Pullman cars			2,671,074
(b) Number of men handled in coaches			6,043,508
(c) Percentage in Pullman cars			30.6
Accidents involving death or injury:			
(a) Number			16
(b) Number of men killed			39
(c) Number of men injured			335

To accomplish the demobilization and to properly serve the express traffic a continuation of the policy of the common use of coaches and baggage and express cars must necessarily be continued until the occasion therefor is removed.

The work of this section has been performed by the following forces:

In the Washington office, three heads of departments and 27 clerks.

In the country at large six department general agents;

dividing the United States between them, 54 camp general agents and the necessary force of 60 clerks. In addition, there has been on each railroad an authorized official to whom all directions as to troop and other movements were transmitted and who made himself responsible for their proper carrying out. The number of these is 204. To deal with the draft there was placed in the office of the governor or adjutant general of each state a representative of the passenger department of some road serving the territory to deal with the innumerable questions relating to the movements of drafted men. The number of these is 49.

The work which has been performed by this section would have been impossible except for the continuous and cordial co-operation of the War Department and the Railroad Administration.

Operating Statistics Section

This section was created May 6, 1918, and after careful consideration and report upon the subject had been made by a committee of executive and accounting officers selected from railroads in all sections of the country.

The plan for standardizing statistical practice became effective August 1, 1918. Except in two particulars—the computation of net ton-miles from the train reports and the distribution of locomotive-hours—there is no material departure from the practices already established on the majority of the railroad mileage, but it was made uniform throughout. The statistics are available within a reasonable time, considering the magnitude of the figures, and are compiled individually for all Class 1 railroads under federal control and separated into regions. Because the cost of materials and labor has been steadily climbing, comparisons of transportation costs, expressed in money, are valueless, but the comparisons of physical performance afforded by these statistics are most instructive and helpful to the operating officers.

The creation of the Operating Statistics Section on May 6, 1918, grew out of the recommendations of the committee on operating statistics appointed April 11, to report upon what should be done to furnish operating statistics, and to bring about a uniformity in statistical methods and reports.

The functions of this section are:

(1) To decide upon operating statistical standards and to make them effective;

(2) To act as a clearing house for the receipt of the standardized forms, and for the analysis of the operating results, as well as for the dissemination of the figures in detail and in summarized form;

(3) To make such special analyses of the results of any particular road, groups of roads, or regions as may be required, and to report upon other specific subjects referred to it for special study.

The first object has been attained in that practical uniformity in operating statistical practice has been accomplished. Complete figures are now available for all Class 1 roads (those having operating revenue in excess of $1,000,000 per year), under federal control, and the figures are compiled on uniform bases. The new plan has done for operating statistics what the classifications of the Interstate Commerce Commission have accomplished for railroad accounting. It is now possible to compare not only the accounting returns, but also the operating statistical returns of the individual roads without the qualifications and the uncertainties heretofore unavoidable because of variations in statistical practice. The aim of the new plan has been to continue the best in current practice without imposing undue hardship or unnecessary expense. While believed to be scientifically comprehensive, and to give the fundamentally important information, the new plan has not been carried so far toward the ideal as to be impractical or unjustifiably burdensome.

The force of the section has expanded gradually as its work has enlarged. At this date it numbers 21 employees. It will undoubtedly be necessary to add to the force as the work of the section is further enlarged in making a more complete check of the reports and in compiling additional summaries. The effective utilization of the large amount of information for the purposes of administrative control, both centrally and locally, is still in the early stages of development.

As now being published, there are four sets of monthly statistical summaries, which show the following information for individual roads, districts, regions and total:

(1) FREIGHT-TRAIN PERFORMANCE (EXCLUDING MIXED AND SPECIAL TRAINS)

(Statistics in practically all items shown by directions and in comparison with the same period of previous year.)

Average miles of road operated.
Net ton-miles per mile of road per day.
Net ton-miles per train-hour.
Train speed in miles per hour.
Net ton-miles per train-mile.
Per cent of net ton-miles to gross ton-miles.
Per cent of loaded to total car-miles.
Net ton-miles per loaded car-mile.
Gross ton-miles per train-mile.
Per cent of gross ton-miles to rating ton-miles.
Per cent of locomotive miles to train-miles.

All of the basic data from which the foregoing averages are derived are shown on pages 2 and 3 of the monthly summary.

(2) UTILIZATION OF FREIGHT EQUIPMENT (FREIGHT AND MIXED TRAINS)

Average number of locomotives, (*a*) serviceable; (*b*) unserviceable; (*c*) total.

Average number of cars on line daily, (*a*) serviceable; (*b*) unserviceable; (*c*) total.

Per cent of unserviceable to total equipment, (*a*) locomotives; (*b*) freight cars.

Miles per locomotive-day, (*a*) serviceable locomotives; (*b*) total locomotives.

Net ton-miles per loaded car-mile.
Per cent loaded to total car-miles.
Car-miles per car-day.
Net ton-miles per car-day.

(3) NUMBER OF LOCOMOTIVES AND DISTRIBUTION OF LOCOMOTIVE HOURS

(Divided to show separately the data for freight, passenger, switch, other, and total.)

AVERAGE NUMBER OF LOCOMOTIVES ON LINE

Distribution of locomotive-hours, showing for each class of service the hours and per cent of total hours, (*a*) on road; (*b*) at terminals; (*c*) in engine houses; (*d*) stored; and (*e*) total.

(4) CONDENSED INCOME ACCOUNT

A monthly statement has been prepared since August, which shows for each Class 1 road and for each region the principal items of the income account—operating revenues, operating expenses, net operating revenues, net federal income, average "standard return," and per cent of "standard return" earned, both for the month and for the cumulative period of the calendar year.

ADDITIONAL SUMMARIES TO BE ISSUED

It is the intention, beginning with the month of November, to issue monthly summaries of "passenger-train performance" and "locomotive and train costs."

Effective with the returns for the month of December this section plans to begin the work of compiling monthly re-

ports showing the number of cars of less-carload freight, as well as statistics which show the average carload for certain selected commodities moving in carloads. These statistics have recently been compiled by the Association of Transportation and Car Accounting Officers for the Car Service Section of the Railroad Administration.

Telegraph Section

The Telegraph Section was created July 1, 1918, and to this section has been assigned the work of co-ordinating the telegraph and telephone facilities of the railroads under federal control. A great deal has been accomplished in this direction, and the work is steadily progressing.

Consideration is being given to the relations between the railroads and the commercial telegraph companies now also under federal control, and, in conjunction with a committee appointed by the postmaster general, the subject of these relations is being thoroughly gone into.

Instructions have been issued providing for the use of symbols and a brevity code in composing telegrams, and study is being given to testing newly invented telegraph and telephone devices.

Fuel Conservation Section

This section was created May 1, 1918, with Eugene McAuliffe as manager, and representatives who had had practical experience in the use of locomotive fuel, as well as in its production, were assigned to each region. There has been constant co-operation with the Fuel Administration, and a consistent effort has been made to improve the quality of coal purchased for locomotive use, as well as to instruct enginemen in proper and economical firing. The cost of fuel to the railroads, now aggregating about $473,000,000 annually, exclusive of road haul on users' rails, represents the largest single item of operating expense other than labor.

The marked improvement in the measure of supervision and supervising methods established and the specific attention given to the selection and inspection of coal at mines, as well as the economical use of same on locomotives and in stationary plants, has resulted in very material fuel savings on the several railroads, and the revised methods of distribution which have been worked out will result in economy in road hauls.

While deprived of the stimulus of war necessity, work in the Fuel Conservation Section will move along continuously broadening lines, the recent extraordinary increase in fuel costs rapidly bringing this angle of railroad-operating expense into such marked prominence as to warrant continual refinement in purchasing, operating, and maintenance methods; the question of determining the most economical grade of coal for use on the heavier type of locomotives, the best method of obtaining the maximum return in fuel economy for use of the locomotive superheater, the possibilities of the locomotive feed-water heater, and the determination of methods that will reduce the stand-by fuel losses of large locomotives present problems worthy of the most serious consideration.

Exports Control Committee

Mention has been made elsewhere in this report of the lack of co-ordination between the rail lines and the vessels handling overseas traffic. The control of all shipping, both for the United States and for the allied governments reaching American ports, had been given to the Shipping Control Committee, of which P. A. S. Franklin is chairman.

On June 11, 1918, by agreement between the secretary of war, the secretary of the navy, and the director general of railroads, the Exports Control Committee was organized, with George D. Ogden, representing the Railroad Administration, as chairman; Maj. Gen. George W. Goethals, United States Army, representing the War Department; Rear Admiral C. J. Peoples, representing the Navy Department; P. A. S. Franklin, representing the Shipping Control Committee; and D. W. Cooke, representing the allies.

The work of this committee has been intelligently and sympathetically directed, and there has been as a result of its activities a most satisfactory co-ordination between the rail and ocean lines. Freight for overseas from the interior has been allowed to come forward only on permits, and these permits were issued where there was a practical certainty, barring only the exigencies of the war, that ships would be promptly available.

In General

It is not unnatural that with so fundamental a change, and with the large number of officers and men involved, there should have been some uneasiness and uncertainties arise, and we have not been without in the earlier period of federal control some evidences of demoralization in service as a result of these conditions, but the fact that there were so few is a most gratifying evidence of the patriotism and discipline of the officers and men in railroad service.

The Railroad Administration was organized in a period of unprecedented business, aggravated by weather conditions, which as to severity and duration have never been equaled.

The needs of a government at war involving the greatest variety of activities, many of them in localities heretofore relatively unimportant and with an insufficiency of facilities, had to be satisfied.

Fuel for industries and homes, as well as food for the domestic population and our Army abroad and of the allies, had to be provided concurrently with an unprecedented commercial and industrial activity.

The fact that this was done and that the railroads, emerging from the stress of weather conditions in March, were functioning normally by May 1, and have continued to do so, speaks for itself.

Railroad Administration News

The net ton miles of revenue and non-revenue traffic handled by the railroads under federal control during the month of November increased 1½ per cent as compared with November, 1917, according to the monthly report of the Operating Statistics Section. The total train miles decreased 2.6 per cent and the net ton miles per train mile increased 4.1 per cent, while the net ton miles per mile of road per day increased from 5,180 in November, 1917, to 5,255 in November, 1918. The total freight car miles decreased 3.1 per cent and the average number of freight cars on line daily increased 3.1 per cent. The car miles per car day decreased 6 per cent from 26.6 to 25, while the net ton miles per car day decreased 1.6 per cent.

Passenger Traffic in October

Railroads during the month of October handled a passenger traffic amounting to 3,194,955,151 passenger miles, a decrease of 10.7 per cent, according to the monthly report of the Operating Statistics Section. Decreases were shown in all the regions excepting the Allegheny and Pocahontas regions. For the 10 months ended October 31 the number of passengers carried one mile shows an increase of 10.8 per cent as compared with the corresponding period of 1917.

Disposition of Empty Containers

The Claims and Property Protection Section has issued Circular No. 5, prescribing regulations governing the receipt of empty containers as described in classifications, and the disposition of such containers when astray.

Boiler Efficiency Increased by New Type of Firebox

Eighteen Per Cent Greater Evaporation Per Pound of Coal Secured in Tests on C. M. & St. P.

THE CHICAGO, MILWAUKEE & ST. PAUL has recently completed a series of road tests of a locomotive equipped with a new type of firebox. The principal feature of the design consists of two water legs extending longitudinally from the throat of the boiler to the crown sheet. The trials were conducted with one locomotive so equipped and another of the same class with a firebox of the usual type. The results showed that the new design caused a noteworthy increase in the boiler efficiency with a corresponding decrease in the fuel consumption. The performance, as developed by the tests, is summarized in the table below. Locomotive 7142 had the ordinary type of boiler, while engine 7615 had the new type of firebox.

The boiler tests conducted at Coatesville in 1912 proved conclusively that the water evaporated per square foot of heating surface in a locomotive boiler is much greater in the firebox than in the boiler tubes and flues. The maximum evaporation per square foot of tube heating surface is estimated at about 10 lb. per hr., while the corresponding figure for the firebox is 55 lb. per hr. Since these important facts have been demonstrated, the tendency in boiler design has been along the line of increased firebox heating surface. It is a difficult matter to secure more than a very limited increase in the area of the sheets in the usual design of firebox. To overcome this difficulty J. L. Nicholson of the Locomotive Firebox Company, Chicago, recently patented a new design of firebox. The salient features of this design are the water legs in the firebox, known as Nicholson Thermic Syphons.

The syphon is formed from a single sheet rolled to shape and closed by welding along the front edge. The sides are set four inches apart and joined to the crown sheet, extending from a point about 18 in. from the front edge to about 6 in. from the rear. The front edge of the water leg is parallel to the tube sheet; from the back of the crown sheet it slopes downward toward the throat of the boiler. The cross section of the leg is increased at the lower edge to form a segment of a circle six inches in diameter, which joins a 6-in. tube extending into the lower portion of the tube sheet. The syphons thus form a support for the sectional brick arch. Fig. 1 shows the side elevation and plan of the firebox on which the tests were made, equipped with the syphons. Fig. 2 shows another method of installing thermic syphons in locomotive fireboxes. In this case, instead of flanging the neck of the syphon out and welding it into the throat sheet, a separate diaphragm plate is used, the syphon being formed with a separate neck and expanded into the diaphragm plate, also being riveted and welded as shown. This is for the purpose of giving more flexibility to the installation, and also to enable the manufacturers, by eliminating the flanged portion of the neck and making the neck long enough to fit extreme cases, to standardize forms and dies necessary for the manufacture of the syphons.

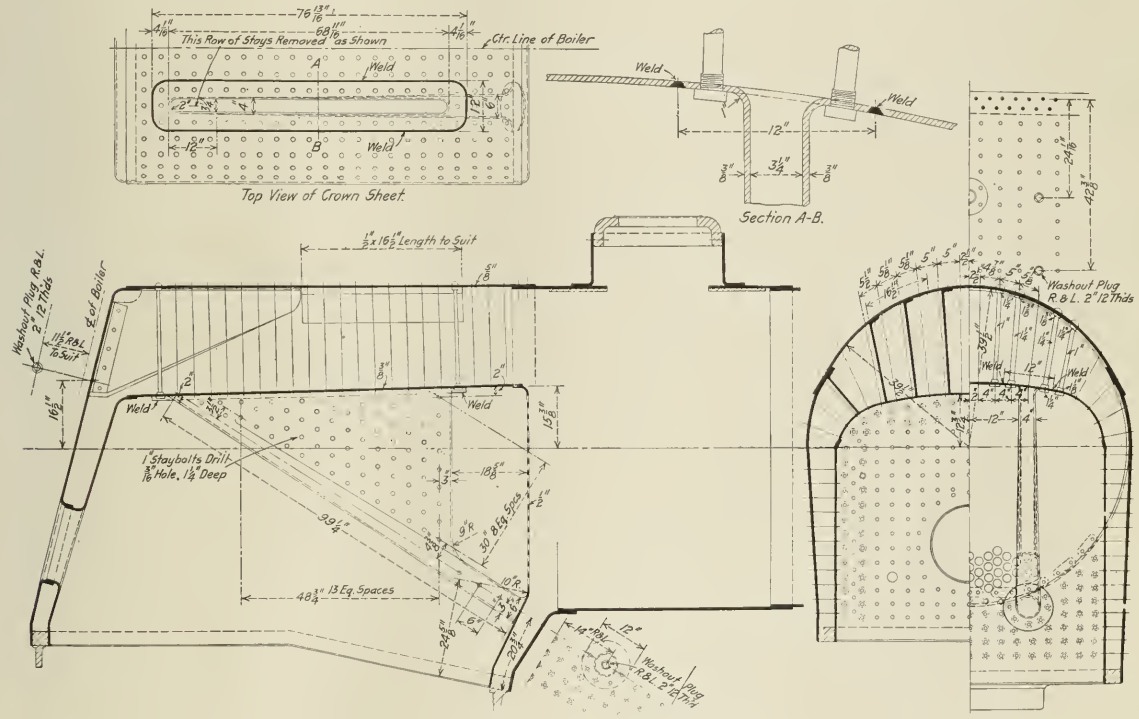


Fig. 1—Firebox of Chicago, Milwaukee & St. Paul Locomotive Equipped with Nicholson Thermic Syphons

The locomotives tested were of the Consolidation type, using saturated steam and equipped with piston valves and Walschaert valve gear. They were alike in all respects except that the firebox of locomotive 7615 was equipped with the Nicholson Thermic Syphons supporting the brick arch, while 7142 had the ordinary type of firebox with a brick arch supported on four 3-in. arch tubes. Both had recently received heavy repairs. The principal data for the two locomotives are given as follows:

General Results of Tests

	Engine 7142	Engine 7615	Decrease, Engine 7615, Per cent
Pounds coal fired per thousand gross ton miles, actual	124.36	93.64	24.7
Pounds coal fired per thousand gross ton miles, equated	124.36	86.63	30.3
Pounds coal fired per locomotive mile	271.9	218.9	19.4
Average tonnage hauled	2,190.0	2,340.0	6.8*
Pounds of water used per thousand gross ton miles	670.72	596.22	11.1
Pounds water evaporated per pound of coal fired	5.39	6.36	18.0*
Equivalent evaporation per pound of coal fired	6.54	7.74	18.3*
Equivalent evaporation per pound of dry coal	7.28	8.60	18.1*
Equivalent evaporation per pound of combustible	8.37	10.49	25.3*
Boiler efficiency	57.65	73.75	27.92*
Front-end temperature	625 deg. F.	550 deg. F.	13.6

* Increase.

Numerical quantities under engine 7142 considered as 100 per cent in the above.

Locomotive Data

	Engine 7615	Engine 7142
Cylinder diameter and stroke	23 in. by 30 in.	23 in. by 30 in.
Diameter of drivers	63 in.	63 in.
Tractive effort	42,800 lb.	42,800 lb.
Weight on drivers	190,400 lb.	189,200 lb.
Total weight of engine	216,900 lb.	215,700 lb.
Total weight of engine and tender	351,450 lb.	350,250 lb.
Boiler type	Straight, radial stay	Straight radial stay
Boiler diameter, first course	75¾ in.	75¾ in.
Grate area	48.8 sq. ft.	48.8 sq. ft.
Tubes, number and outside diameter	414—2 in.	418—2 in.
Tube heating surface	3,143.0 sq. ft.	3,173.4 sq. ft.
Normal firebox heating surface	195.7 sq. ft.	195.7 sq. ft.
Heating surface added by arch tubes	.....	29.3 sq. ft.
Heating surface added by thermic syphons	53.0 sq. ft.	.....
Total firebox heating surface	248.7 sq. ft.	225.0 sq. ft.
Total heating surface	3,391.7 sq. ft.	3,398.4 sq. ft.
Total heating surface ÷ grate area	69.5	69.6
Firebox heating surface ÷ total heating surface, per cent	7.3	6.6
Firebox heating surface ÷ grate area	5.1	4.6

Test Condition and Methods

The test runs were conducted between Milwaukee and Portage, Wis. The distance westbound was 91.8 miles and eastbound 89.1 miles. There was no attempt to control the makeup of the test trains. The tonnage was limited to what the engines could handle on the ruling grade, and trains were run as extras with whatever cars were available. Two trips eastbound and two westbound were made with each locomotive, the same engine crew being used on all the tests. A road foreman of engines acted as cab observer and all other readings were taken by employees of the test department under the direction of G. P. Kempf, engineer of tests. Weather conditions were uniform throughout the tests. A summary of the tonnage and time consumed is given below.

Train Make-Up, Tonnage and Time

1 Eng. No.	2 Test No.	3 Cars hauled over ruling grade	4 Tonnage over ruling grade	5 Adjusted tonnage	6 Gross ton-miles	7 Time over division, hr. min.	8 Time in motion, hr. min.
7615	1-E	49 lds. 5 empt.	2565	2565	228,285	6 54	5 38
	2-W	29 lds. 1 empt.	2027	2166	198,853	6 59	5 14
	3-W	32 lds. 1 empt.	2055	2237	205,410	7 46	5 54
	4-E	34 lds. 35 empt.	2392	2391	212,900	6 17	5 12
	Ave.	36 lds. 10 empt.	2260	2340	211,362	6 59	5 30
7142	1-W	35 lds. 31 empt.	1976	1976	181,400	8 27	6 27
	2-E	47 lds. 7 empt.	2315	2294	204,200	6 38	5 8
	3-W	45 lds. 0 empt.	2006	1990	182,700	7 13	5 39
	4-E	51 lds. 0 empt.	2499	2499	222,400	5 45	5 5
	Ave.	44 lds. 9 empt.	2199	2190	197,675	7 1	5 35

The engines were coaled at the chutes, no attempt being made to select the coal. The amount used was obtained by weighing the tender at the end of each run with all water emptied out of the tank. Sacked coal was used while at terminals and standing or switching on the road.

Samples were taken from the tender during each trip and were later analyzed. The average analysis was as follows:

Analysis of Coal as Fired

Eng. No.	Moisture	Volatile combustible	Fixed carbon	Ash	B. t. u. per pound coal
7615	10.00	35.02	38.75	16.23	10,184
7142	10.21	37.36	40.80	11.63	11,008

The coal consumption and rate of firing are shown in the following table:

Coal Consumption

1 Eng. No.	2 Test No.	3 Total lb. coal fired	4 Average lb. coal fired per hr.	5 Lb. coal per hr. per sq. ft. of grate	6 Lb. coal fired per 100-car mile	7 Lb. coal fired per locomotive mile	8 Lb. coal fired per gross 1-000 ton-miles
7615	1-E	18,400	3,262	66.84	382.8	206.7	80.60
	2-W	20,450	3,903	80.00	689.0	222.7	102.84
	3-W	20,820	3,523	72.19	513.7	226.8	101.35
	4-E	19,505	3,744	76.72	317.6	219.1	91.61
	Ave.	19,794	3,599	73.75	440.6	218.9	93.64
7142	1-W	29,450	4,558	93.40	486.0	320.8	162.12
	2-E	22,100	4,300	88.11	483.9	248.3	108.22
	3-W	25,855	4,568	93.60	638.1	281.6	141.51
	4-E	20,930	4,120	84.42	461.1	235.1	94.10
	Ave.	24,584	4,401	90.18	510.8	271.9	124.36

From an operating standpoint the boiler performance of both locomotives was satisfactory, although it was noticeable that the boiler of engine 7615 was more responsive to the demands made upon it than that of engine 7142. The tables below summarize the boiler performance.

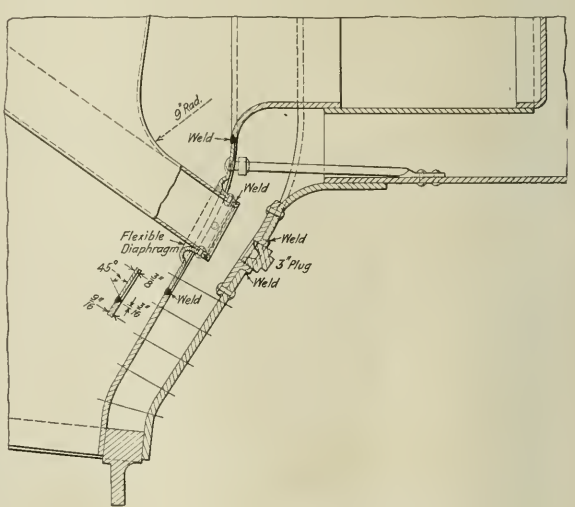


Fig. 2—An Improved Method of Applying the Thermic Syphon to the Throat

Boiler Performance—Coal and Apparent Evaporation

1 Eng No,	2 Test No.	3 Lb. coal fired per hour	4 Lb. water evap'd per hour	5 Lb. water evap'd per lb. coal	6 Lb. water evap'd per sq. ft. heat. surf.	7 Temp. feed water	8 Average boiler pressure	9 Factor of evap.
7615	1-E	3,262	21,782	6.68	6.42	49 Deg.	198.3	1.2187
	2-W	3,903	23,553	6.04	6.94	52 Deg.	199.2	1.2149
	3-W	3,523	22,825	6.48	6.73	52 Deg.	198.9	1.2149
	4-E	3,744	23,589	6.30	6.95	51 Deg.	198.4	1.2159
	Ave.	3,599	22,912	6.36	6.75	51 Deg.	198.7	1.2159
7142	1-W	4,558	23,707	5.20	6.97	50 Deg.	198.8	1.2170
	2-E	4,300	24,554	5.71	7.22	54 Deg.	198.3	1.2129
	3-W	4,568	23,394	5.12	6.88	58 Deg.	196.6	1.2086
	4-E	4,120	23,338	5.66	6.88	52 Deg.	197.6	1.2149
	Ave.	4,401	23,728	5.39	6.98	53 Deg.	197.9	1.2139

BOILER PERFORMANCE—EQUIV. EVAP. HORSE POWER AND EFFICIENCY

Equivalent-evaporation—from and at 212 Deg. F. lb.

Eng. No.	Test No.	Per hour	Per hr. per sq. ft. heat. surf.	Per lb. of coal as fired	Per lb. of dry coal	Per lb. of combustible	Boiler hp.	Boiler efficiency
7615	1-E	26,546	7.82	8.14	9.04	9.42	769.4	67.00
	2-W	28,615	8.43	7.34	8.14	10.22	826.5	73.63
	3-W	27,730	8.16	7.87	8.74	11.09	803.7	77.96
	4-E	28,682	8.45	7.66	8.51	10.77	831.3	77.26
	Ave.	27,858	8.21	7.74	8.60	10.49	807.4	73.75
7142	1-W	28,851	8.48	6.33	7.10	8.26	836.2	58.00
	2-E	29,781	8.76	6.93	7.35	8.95	863.2	61.35
	3-W	28,274	8.31	6.19	6.96	7.85	819.5	53.89
	4-E	28,353	8.34	6.88	7.59	8.56	821.8	58.10
	Ave.	28,803	8.47	6.54	7.28	8.37	834.8	57.65

It will be noted that the average boiler horsepower developed by locomotive 7615 was 807.4, as compared with 834.8 horsepower for engine 7142. This is to be accounted for by the fact that engine 7142 consumed 12.4 per cent more water per thousand gross ton miles. Neither of the locomotives was forced to the limit of the capacity of the boiler. Engine 7615 developed a maximum boiler horsepower of 1,015 on the grade from Milwaukee to Brookfield. This is at the rate of 35,000 lb. equivalent evaporation per hour, or 10.62 lb. per square foot of heating surface per hour.

During one round trip with each locomotive readings were taken of the vacuum in the front end, firebox and ashpan, and also of the temperature in the front end. The results are shown in the table below.

DRAFT AND FRONT END TEMPERATURE

Eng. No.	Test No.	Lb. coal fired per hour	Lb. coal fired per sq. ft. grate per hour	Draft—Inches of water			Front end Temp. Deg.
				Front end	Firebox	Ash pan	
7615	1-E	3,262	66.84	5.2	1.67	.27	520
	2-W	3,903	80.00	5.3	1.66	.29	536
	Ave.	3,582	73.42	5.25	1.66	.28	528
7142	1-W	4,558	93.40	5.3	1.56	.22	610
	2-E	4,300	88.11	5.0	1.27	.17	589
	Ave.	4,429	90.15	5.15	1.41	.195	599

Both locomotives had double exhaust nozzles with 3½-in. tips at the time these readings were taken. On the last round trip with engine 7615 the tips were enlarged to 3-11/16 in. diameter, which reduced the vacuum somewhat. The front end temperatures were obtained by means of a Hoskins pyrometer. It is thought that owing to an improper adjustment of the recorder the temperatures recorded for engine 7142 are too low.

No analysis was made of the front end gases, so it is impossible to tell exactly what changes in combustion conditions were brought about by the changes in the firebox. The reduction in the coal consumption, the increase in the evaporation and the marked absence of smoke indicates that the syphons tend to improve combustion conditions by breaking up the stream of gases and securing a better mixture of the combustible gases and the air.

In considering the increased boiler efficiency secured by the use of the Nicholson Thermic Syphons it should be noted that engine 7615 was working at a lower rate of evaporation than engine 7142 and also at a lower rate of combustion, which made a favorable condition for obtaining higher boiler efficiency. In this connection, however, it should not be overlooked that this was not due to operating conditions favoring engine 7615, as the average tonnage hauled by this locomotive was 6.8 per cent greater than that hauled by engine 7142. Making due allowance for the favorable evaporation and combustion rates, there remains a gain in economy which cannot be attributed entirely to the increased firebox heating surface. There is evidently a further saving due to the increase in the radiating surface in the firebox, to the more intimate mingling of the combustible gases with air in the firebox and to the more rapid circulation through the boiler. It is estimated that the rate of flow through the syphons is so fast that all the water in the boiler passes through them every five minutes. Such rapid circulation will cause the water to remain at more nearly uniform temperature throughout the boiler. This should result in a decrease in the boiler troubles due to unequal expansion and contraction.

The cost of application of the Nicholson Thermic Syphons is low, and it is anticipated that the maintenance charges will be negligible compared with the savings effected. The syphon requires no more attention than any other part of the firebox and when properly applied is practically fool-proof and accident-proof. The first installation has been in service for four months and has given no trouble from mud or scale. The rapid circulation has kept the syphons clean and has apparently resulted in throwing the mud and scale into the back water leg, where it can easily be removed. Up to the present time there has been no evidence of scale in the syphons, and no leak or trouble of any nature has developed at the seams or stays. The Chicago, Milwaukee & St. Paul is now planning to install the syphons on several additional locomotives.

Cleveland Station Ordinance Approved

THE PUBLIC SQUARE union station ordinance submitted to the people of Cleveland for ratification was passed in a special election on January 6 by a vote of about two to one. Under this ordinance the mayor is authorized to enter into a contract with the Cleveland Union Terminal Company which will provide for the construction of a union passenger station for all of the railroads and interurban lines entering the city.

The officers of this company are quoted as saying that work will be commenced on the project in the spring, the complete expenditure for which is estimated at $50,000,000. It is said that all the railroads have agreed to co-operate in carrying out this plan.

All of the railroads entering Cleveland, with the exception of the Pennsylvania Lines, the New York Central and the Nickel Plate, occupy locations in the valley of the Cuyahoga river, a rather tortuous flat extending southeast from the lake just west of the business center of the city. The New York Central occupies tracks and terminals along the lake front, while the Nickel Plate has a parallel location from two to three miles back from the lake with terminals adjacent to the other roads in the river valley. The Pennsylvania Lines enter the city from the south and use the New York Central passenger station on the lake front, to which they have access by a line across the city about two miles east of the station.

The new union station project provides for a passenger station for all steam roads as well as for the numerous electric interurban routes which now occupy the city streets. The proposed site is centrally located to the south of the Cleveland public square at the top of the bluff overlooking the Cuyahoga valley. The bluff is connected with the bluff on the west side of the valley by a viaduct, 1,000 ft. long, just west of the proposed station. The plan provides for access to this terminal by all of the roads with but limited detours from existing lines with the exception of the New York Central, which would reach it over the tracks of the Nickel Plate. The project also includes extensive local freight terminal developments on a site close to the proposed passenger station.

The station project is backed by financial interests headed by O. P. Van Sweringen, of Cleveland, president of the New York, Chicago & St. Louis, who is also identified with the Cleveland & Youngstown Railroad, an interurban line, extending to the east, through the Shaker Heights and other real estate developments. One of the more recent activities of these interests has been the construction of the High Level Freight Terminal at Orange avenue and Broadway, used by

the New York Central, the approach line to this terminal being one link of the entrance to the proposed station.

One of the principal objections raised to this plan preceding the recent election was the fact that it nullifies the plan of the City of Cleveland undertaken as early as 1901 for a union passenger station on the lake front, to form part of a civic center or mall, around which the principal public buildings of the city were to be grouped. The people of the City of Cleveland had already committed themselves definitely to this plan through the purchase of land and the construction of a new court house, a city hall and other buildings, and in November, 1915, the city entered into a contract with several of the railroads for the definite prosecution of this plan, but nothing had been done other than the construction of the municipal buildings above mentioned.

Freight Traffic Statistics for October

THE MONTHLY STATEMENT of freight traffic movement and car performance compiled by the Operating Statistics Section of the Railroad Administration is published for the month of October in a new form, based on data reported on the new standard forms. The figures continue to show an increasing volume of traffic handled. The net ton miles increased 3.5 per cent in October as compared with October, 1917, while for the 10 months ending October 31 the increase was 1.9 per cent. This increase was handled with a decrease in train miles of 2.2 per cent for October and of 2.1 per cent for the 10 months. There was an increase in the average train and car loading and an increase for October in the car miles per car day, although for 10 months there was a decrease of 6 per cent in this item. The increase in empty car mileage continued, amounting to 14.3 per cent for October and 3.9 per cent for 10 months. The net ton miles per car day increased 2.7 per cent for October but decreased 1.4 per cent for the 10 months period. The new tables include a figure for percentage of unserviceable freight cars, 6 per cent for this year as compared with 5.6 per cent for last year for the month of October, while the percentage for 10 months is 5.7 per cent, the same as for 1917. A summary of the report by regions and districts is shown in the table.

The Railroad Administration has also given out a statement of train and locomotive performance in freight service, not including mixed and special trains, for the month of October, showing by individual roads the freight train miles, freight locomotive miles, freight car miles, gross ton miles, rating ton miles, net ton miles, train hours, net ton miles per train hour, train speed, net ton miles per train mile, per cent net ton miles to gross ton miles, per cent loaded car miles to total car miles, net ton miles per loaded car mile, gross ton miles per train mile, per cent gross ton miles to rating ton miles, per cent locomotive miles to train miles, average number of freight locomotives, locomotive miles per day, gross ton miles per locomotive mile, net ton miles per locomotive day, tons of coal consumed, and pounds of coal per locomotive mile and per 1,000 gross ton miles.

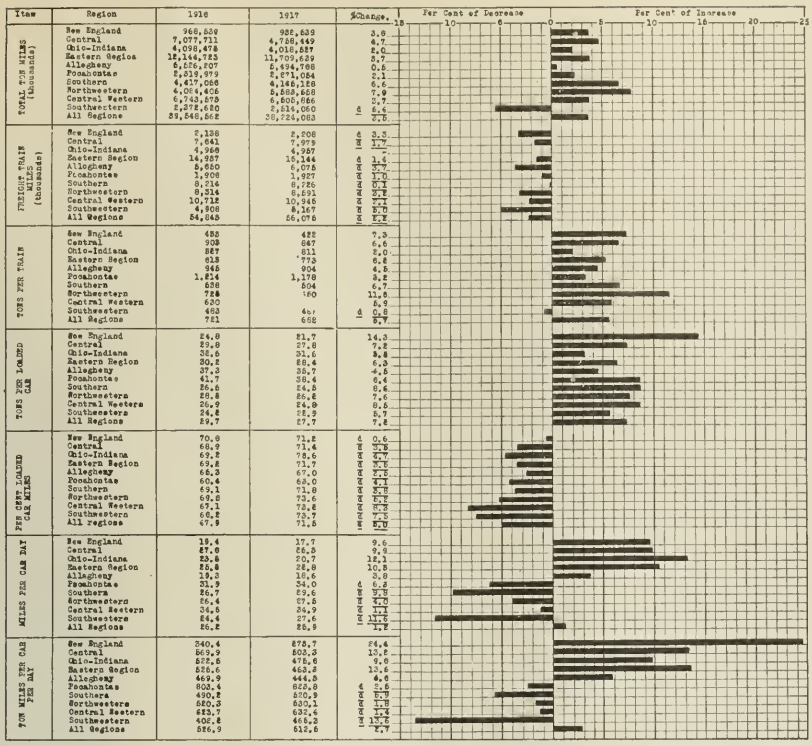
FREIGHT TRAFFIC MOVEMENT AND CAR PERFORMANCE, OCTOBER, 1918 AND 1917.
(Including Freight and Mixed Trains)

Railroad	Average miles of road operated		Net ton miles, revenue and non-revenue (Thousands)			Net ton miles per mile of road per day		Train miles (Thousands)			Net ton miles per train mile		
	This year	Last year	This year	Last year	Per ct. change	This year	Last year	This year	Last year	Per ct. change	This year	Last year	Per ct. change
Total, New England District	8,160	8,151	968,539	932,662	3.8	3,822	3,689	2,138	2,208	d3.3	453	422	7.3
Total, Central District	21,048	21,152	7,077,711	6,758,449	4.7	10,847	10,307	7,841	7,979	d1.7	903	847	6.6
Total, Ohio-Indiana District	14,132	14,133	4,098,473	4,018,527	2.0	9,355	9,172	4,958	4,957	a	827	811	2.0
Grand Total, Eastern Region	43,340	43,436	12,144,723	11,709,639	3.7	9,039	8,696	14,937	15,144	d1.4	813	773	5.2
Total, Allegheny Region (x)	12,833	12,742	5,526,207	5,494,788	0.5	13,891	13,911	5,850	6,075	d3.7	945	904	4.5
Total, Pocahontas Region	4,791	4,770	2,319,979	2,271,054	2.1	15,619	15,357	1,908	1,927	d1.0	1,216	1,178	3.2
Total, Southern Region	37,287	37,322	4,417,055	4,145,128	6.6	3,821	3,584	8,214	8,226	d0.1	538	504	6.7
Total, Northwestern Region	47,191	47,138	6,024,405	5,583,558	7.9	4,118	3,820	8,314	8,591	d3.2	725	650	11.5
Total, Central Western Region	51,490	51,550	6,743,573	6,505,856	3.7	4,274	4,073	10,712	10,945	d2.1	630	595	5.9
Total, Southwestern Region	31,733	32,032	2,372,620	2,514,060	d5.6	2,412	2,532	4,908	5,167	d5.0	483	487	d0.8
Grand Total, All Regions (x)	228,665	228,990	39,548,562	38,224,083	3.5	5,579	5,385	54,843	56,075	d2.2	721	682	5.7

Railroad	Freight car miles (thousands) Loaded			Empty			Total			Net ton miles per loaded car mile		
	This year	Last year	Per ct. change	This year	Last year	Per ct. change	This year	Last year	Per ct. change	This year	Last year	Per ct. change
Total, New England District	39,099	42,995	d 9.1	16,132	17,414	d7.4	55,231	60,409	d8.6	24.8	21.7	14.3
Total, Central District	237,610	242,761	d 2.1	107,324	97,307	10.3	344,935	340,068	1.4	29.8	27.8	7.2
Total, Ohio-Indiana District	125,804	126,987	d 0.9	56,026	48,004	16.7	181,830	174,991	3.9	32.6	31.6	3.2
Grand Total, Eastern Region	402,513	412,743	d 2.5	179,482	162,725	10.3	581,996	575,468	1.1	30.2	28.4	6.3
Total, Allegheny Region (x)	148,002	153,720	d 3.7	78,731	75,701	4.0	226,733	229,421	d1.2	37.3	35.7	4.5
Total, Pocahontas Region	55,643	59,071	d 5.8	36,557	34,739	5.2	92,200	93,810	d1.7	41.7	38.4	8.6
Total, Southern Region	165,943	169,567	d 2.1	74,235	66,377	11.8	240,179	235,844	1.8	26.6	24.5	8.6
Total, Northwestern Region	213,275	212,966	0.1	92,079	76,239	20.8	305,352	289,205	5.6	28.2	26.2	7.6
Total, Central Western Region	250,404	262,396	d 4.6	122,980	96,034	28.1	373,384	358,430	4.2	26.9	24.8	8.5
Total, Southwestern Region	98,001	109,768	d10.7	45,661	39,162	16.6	143,662	148,930	d3.5	24.2	22.9	5.7
Grand Total, All Regions (x)	1,333,779	1,380,131	d 3.4	629,725	550,977	14.3	1,963,506	1,931,108	1.7	29.7	27.7	7.2

Railroad	Average number of freight cars on line daily: Serviceable		Total			Per cent unserviceable		Per cent loaded to total car miles			Car miles per car day			Net ton miles per car day		
	This year	Last year	This year	Last year	Per ct. change	This year	Last year	This year	Last year	Per ct. change	This year	Last year	Per ct. change	This year	Last year	Per ct. change
Total, New England District	85,832	104,693	91,796	109,931	d16.5	6.5	4.8	70.8	71.2	d0.6	19.4	17.7	9.6	340.4	273.7	24.4
Total, Central District	375,324	408,389	400,596	433,177	d7.5	6.3	5.7	68.9	71.4	d3.5	27.8	25.3	9.9	569.9	503.3	13.2
Total, Ohio-Indiana District	234,026	252,795	253,045	272,443	d7.1	7.5	7.2	69.2	72.6	d4.7	23.2	20.7	12.1	522.5	475.8	9.8
Grand Total, Eastern Region	695,182	765,877	745,437	815,551	d8.6	6.7	6.1	69.2	71.7	d3.5	25.2	22.8	10.5	525.6	463.2	13.5
Total, Allegheny Region (x)	352,947	377,694	379,330	398,892	d4.9	7.0	5.3	65.3	67.0	d2.5	19.3	18.6	3.8	469.9	444.3	5.8
Total, Pocahontas Region	87,963	84,022	93,160	88,935	4.8	5.6	5.5	60.4	63.0	d4.1	31.9	34.0	d6.2	803.4	823.8	d2.5
Total, Southern Region	277,266	247,142	290,671	256,711	13.2	4.6	3.7	69.1	71.8	d3.8	26.7	29.6	d9.8	490.2	520.9	d5.9
Total, Northwestern Region	351,034	319,175	373,520	339,788	9.9	6.0	6.1	69.8	73.6	d5.2	26.4	27.5	d4.0	520.3	530.1	d1.8
Total, Central Western Region	328,565	t	348,750	331,767	5.1	5.8	5.7	67.1	73.2	d8.3	34.5	34.9	d1.1	623.7	632.6	d1.4
Total, Southwestern Region	183,817	161,473	190,305	174,279	9.2	3.4	7.3	68.2	73.7	d7.5	24.4	27.6	d11.6	402.2	465.3	d13.6
Grand Total, All Regions (x)	2,276,774	t	2,421,173	2,405,924	0.7	6.0	5.6	67.9	71.5	d5.0	26.2	25.9	1.2	526.9	512.5	2.7

d Indicates decreases. a Less than one-tenth of one per cent. Estimated. x Excludes Huntingdon & Broad Top Mountain, account incomplete information. t Information incomplete.



Percentage of Increase or Decrease in Factors Influencing Freight Train and Freight Car Efficiency, Month of October, 1918, Compared with the Same Month of 1917.

Government Lumber to Be Sold

The War Department has created a special agency, with a director of sales, to dispose of vast quantities of timbers and other wood products which were on hand at various cantonments and building projects throughout the United States at the time the armistice was signed. The sudden ending of the war, when all this work for the government was under way, for a time threatened to create a serious disturbance in the market.

The director of sales will confer with committees representing industries affected by the disposal of different kinds of supplies, in order that business conditions may be disturbed as little as possible under the circumstances.

TEN MONTHS ENDED OCTOBER 31, 1918, COMPARED WITH SAME PERIOD OF PREVIOUS YEAR

Railroad	Average miles of road operated		Net ton miles, revenue and non-revenue (Thousands)			Net ton miles per mile of road per day		Train miles (Thousands)			Net ton miles per train mile		
	This year	Last year	This year	Last year	Per ct. change	This year	Last year	This year	Last year	Per ct. change	This year	Last year	Per ct. change
Total, New England District	8,005	7,994	9,564,404	9,024,400	6.0	3,930	3,713	22,298	22,430	d0.6	429	402	6.7
Total, Central District	21,123	21,172	64,435,073	62,351,207	3.3	10,034	9,687	77,258	80,285	d3.8	824	777	7.3
Total, Ohio-Indiana District	12,934	12,942	33,590,275	33,971.231	d1.2	8,542	8,635	43,345	46,321	d6.4	775	733	5.7
Grand Total, Eastern Region	42,061	42,108	107,589,751	105,346,838	2.1	8,414	8,214	142,902	149,036	d4.1	753	707	6.5
Total, Allegheny Region	14,133	14,235	55,847,760	57,718,424	d3.2	12,999	13,338	62,984	66,743	d5.6	887	865	2.5
Total, Pocahontas Region	4,950	4,865	22,298,005	22,228,634	0.3	14,815	15,029	19,334	19,588	d1.3	1,153	1,135	1.6
Total, Southern Region	37,422	37,356	43,028,278	40,092,412	7.3	3,782	3,530	85,435	80,036	6.7	504	501	0.6
Total, Northwestern Region	46,887	46,722	50,468,398	49,091,997	2.8	3,540	3,456	76,360	78,467	d2.7	661	626	6.0
Total, Central Western Region	51,376	51,259	61,963,654	59,475,175	4.2	3,967	3,817	99,903	102,943	d3.0	620	578	7.3
Total, Southwestern Region	31,861	31,936	24,659,548	25,023,961	d1.5	2,546	2,577	49,312	50,877	d3.1	500	492	1.6
Grand Total, All Regions	228,690	228,488	365,855,394	358,977,441	1.9	5,262	5,168	536,230	547,690	d2.1	682	655	4.1

Railroad	Freight car miles (thousands) Loaded			Empty			Total			Net ton miles per loaded car mile		
	This year	Last year	Per ct. change	This year	Last year	Per ct. change	This year	Last year	Per ct. change	This year	Last, year	Per ct. change
Total, New England District	405,457	438,832	d 7.0	172,885	172,418	0.3	578,342	611,250	d5.4	23.6	20.6	14.6
Total, Central District	2,218,816	2,365,540	d 6.2	1,052,427	1,027,888	2.4	3,271,243	3,393,428	d3.6	29.0	26.4	9.8
Total, Ohio-Indiana District	1,046,388	1,162,946	d10.0	483,019	474,839	1.7	1,529,407	1,637.785	d6.6	32.1	29.2	9.9
Grand Total, Eastern Region	3,670 661	3.967.318	d 7.5	1,708,330	1,675,145	2.0	5,378,992	5,642,463	d4.7	29.3	26.6	10.2
Total, Allegheny Region	1,568,753	1,720,393	d 8.8	854,712	852.467	0.3	2,423,466	2,572,860	d5.8	35.6	33.5	6.3
Total, Pocahontas Region	556,806	583,560	d 4.6	3 2.751	346,869	7.5	929,557	930,429	a	40.0	38.1	5.0
Total, Southern Region	1,681.000	1,681,145	a	767,096	701,686	9.3	2,448,098	2,382,832	2.7	25.6	23.8	7.6
Total, Northwestern Region	1.836,513	1,909,803	d 3.8	771,899	736.667	4.8	2,608,412	2,646,470	d1.4	27.5	25.7	7.0
Total, Central Western Region	2,291,140	2,434,649	d 5.9	1.046,883	994.006	5.3	3,338,023	3,428,655	d2.6	27.0	24.4	10.6
Total, Southwestern Region	990,504	1,078,788	d 8.2	423,025	415,947	1.7	1,413,529	1,494,735	d5.4	24.9	23.2	7.3
Grand Total, All Regions	12,595,377	13,375,656	d 5.8	5,944.696	5,722,787	3.9	18,540,077	19,098,444	d2.9	29.0	26.8	8.2

Railroad	Average number of freight cars on line daily: Serviceable		Total			Per cent unserviceable		Per cent loaded to total car miles			Car miles per car day			Net ton miles per car day		
	This year	Last year	This year	Last year	Per ct. change	This year	Last year	This year	Last year	Per ct. change	This year	Last year	Per ct. change	This year	Last year	Per ct. change
Total, New England District	101,466	103,486	107,129	109,404	d2.1	5.3	5.4	70.1	71.8	d2.4	17.8	18.4	d3.3	293.7	271.3	8.3
Total, Central District	417,409	420,384	441,607	445,997	d1.0	5.5	5.7	67.8	69.7	d2.7	24.4	25.0	22.4	480.0	459.9	4.4
Total, Ohio-Indiana District	206,526	218,060	225,992	235,474	d4.0	8.6	7.4	68.4	70.9	d3.5	22.3	22.9	d2.5	488.9	474.6	3.0
Grand Total, Eastern Region	725,400	741,932	774,727	790,876	d2.0	6.4	6.2	68.2	70.3	d3.0	22.8	23.5	d3.0	456.8	438.2	4.2
Total, Allegheny Region	408,933	390,608	435,823	410,766	6.1	6.2	4.9	64.7	66.9	d3.3	18.3	20.6	d11.2	421.5	462.2	d8.8
Total, Pocahontas Region	83,450	77,458	87,242	81,481	7.1	4.3	4.9	59.9	62.7	d4.5	35.2	37.4	d5.9	844.0	897.4	d6.0
Total, Southern Region	272,533	223,927	286,054	236,758	20.8	4.7	5.4	68.7	70.6	d2.7	28.2	33.1	d14.8	494.5	557.0	d11.2
Total, Northwestern Region	309,732	320,353	330,721	341,247	d3.1	6.3	6.1	70.4	72.2	d2.5	25.9	25.5	1.6	502.0	473.2	6.1
Total, Central Western	317,437	t	335,468	319,425	5.0	5.4	6.0	68.7	71.0	d3.2	32.7	35.3	d7.4	607.6	612.5	d0.8
Total, Southwestern Region	175,371	162,944	181,913	171,195	6.3	3.6	4.8	70.1	72.2	d2.9	25.6	28.7	d10.8	445.9	480.8	d7.3
Grand Total, All Regions	2,292,856	t	2,431,947	2,351,749	3.4	5.7	5.7	67.9	70.0	d3.0	25.1	26.7	d6.0	494.9	502.1	d1.4

Shall American Railways Be Prussianized?*

Frank Discussion of Mr. McAdoo's Proposal With Practical Suggestions for Regulation of Roads

By Alba B. Johnson
President, Baldwin Locomotive Works

IT IS MY ASPIRATION and hope to emulate the wisdom of that sagacious leader who served us so long and so well as President, my honored predecessor and loyal friend, Mr. Post. Some of my official colleagues have commended to me one of Mr. Post's customs, which was to supplement the addresses of distinguished guests at our dinners in New York by some remarks of his own by way of expressing in a special way sentiment or opinion in the railway supply guild. A part of what I might say would have particularly to do with the phases which have just been dealt with so vigorously and clearheadedly by this statesman in business. Other speakers are to follow, eminent travelers, lately home from Europe, and I am sensible of the obligation of a toastmaster to temper ambition with mercy; but in order to preserve the continuity of your thought I ask pardon for saying what I have to say, as briefly as I can, at this juncture.

There is only one time when the optimist looks more foolish than when he is predicting, and that is when his prediction has come out wrong. I am an incorrigible optimist, but a chastened prophet. Nevertheless, it is only veracious to report that for the present at least it is apparently not going to be necessary to repeat the sound money campaign of 1896 in order to prevent the adoption of government railway operation. Suppose you were to call for debate on the question, "Resolved, That American railways should be Prussianized." In their present frame of mind, I believe, a majority of Americans would take the negative. This is much more than merely turning the general unpopularity of a people against one of their particular institutions. There is a peculiarly Prussian and offensively Prussian thing about state railways. They typify the substitution of a government bureau for the individual citizen in performing a function which ought to be regulated, and which cannot be regulated when the government itself performs it. Prussian state railways are a chapter in despotism. Apparently our people generally are in no mood for trial of it here. This seems to apply to the proposed five-year trial. There have in the past been those who advocated trial marriages. The idea has encountered obstacles, one of which, I suspect, is the fear lest when, at the conclusion of the period nominated in the bond of union pro tem, the experimental pair issued forth from the connubial laboratory one of them might prove to have been damaged. There is, I think, some apprehension that even a five-year test might take some of the bloom off Miss Democracy, whom our boys have just been fighting and dying to preserve.

For practical men, therefore, the profitable object at this time upon which to expend thought and energy is the specific problem which must be solved in restoring the roads to individual operation.

Especially to those in our line of business, but in great degree to everybody, a problem of immediate urgency is that of railway improvements during the period while Congress is considering permanent railway legislation. Mr. McAdoo, in suggesting the five-year extension, says that the government cannot operate the roads under the present Control Act, and particularly it cannot carry through a program of additions and betterments. It has seemed to us that if amendments to the Control Act could be drawn which would permit a reasonable annual program of improvements for five years an amendment could be drawn which would accomplish the same purpose annually for two years. One difficulty about additions and betterments under government control is the question of requiring corporations to pay for goods which they did not choose and at prices which they did not negotiate. That issue is now in the courts. Why is it necessary or desirable to await the long-drawn-out processes of litigation? Why cannot all concerned get together in a businesslike way and adjust the situation to a fair and practicable basis? This ought to be possible.

As to price, there has of course been no profiteering by railways. They carried a larger volume of traffic in 1916 and 1917 than previously, but could not and did not raise, as did manufacturers, merchants and labor, the price of what they had to sell. The director general raised rates, but the railroad corporations never had a penny of that; their present income is the standard return based on net income of three years ending 1917. Granted that the government ought to avoid possessing itself of any railway equipment whatever, and that therefore the corporations should be steadily augumenting their plant, the amount charged to them on account of this should be computed by making an appropriate deduction from the prices paid by the government and letting the government absorb the difference as part of the cost of the war.

It may well be asked whether with an enlarging plant the standard income guaranteed to the roads should remain unchanged. Probably the money for improvements would be borrowed from the government. Upon such borrowings interest must be paid. Where is it coming from? It ought to come from increased income made possible by the enlargement of plant. But such increased earnings accrue to the government. Some equitable adjustment is called for under which the proposed obligations to the government may be provided for not only as to interest but as to sinking fund. A part of this provision by the government may be termed cost of the war and a part cost of past regulation.

Design of equipment also complicates this branch of the subject. The standard rolling stock has not been eagerly welcomed by railway corporation officers. Quantity is also an issue and might remain one if an ambitious program were entered upon. He who pays, the railway officers think, should choose what he will buy, how much and when. Why not let the corporations initiate the improvements in budgets to be submitted to the director general for approval? Their obligation could be made plain to plan terminals, extra tracks and other fixed facilities on a basis of joint use and avoidance of duplication. This would be a step toward resumption of operation by the corporations; it would tend to mitigate a too rigid standardization in favor of consideration for local needs, and it would get us accustomed to a formal periodical survey ahead with provision for estimated needs.

Meantime what shall follow the present government control?

* Presidential address at ninth annual dinner of the Railway Business Association, Hotel La Salle, Chicago, Thursday evening, January 9, 1919.

Shall what President Wilson calls the "new element of policy"—an affirmative purpose of transportation development—be passed to the Interstate Commerce Commission to be carried out, including the co-ordination of rates with expenses, or shall a new federal office be created to perform the affirmative function?

The Commission enjoys a peculiar prestige for honesty and freedom from influence. The very defect which is now seen to call for correction, namely, the past attitude maintained by the Commission as a defender of shippers and others as against the roads and nothing more, has given it the character of a popular champion. Castigation of financial practices in the cases of some roads has strengthened this sentiment.

Large numbers of shippers and shippers' bureaus have, through their traffic managers, for several years gone along with the Commission in defining what has been called scientific rate-making and in gradualiy bringing the actual rate fabric into harmony with such definition. This process has involved the relation of one rate to another, as affecting competitive conditions, the distribution of the burden of transportation cost fairly among the several commodities, the development of standard comparisons for measuring reasonableness of particular rates, and the evolution of precedent covering a number of other technical branches of the subject. Traffic managers are complaining that the United States Railroad Administration has rapidly and substantially undone much of this work. The director general in practice makes the rates and the Commission in practice has refrained from reviewing them except in case of discrimination.

War-time experience with division of the rate-making function between two departments of the government has thus complicated the acceptance of a plan under which such division would be perpetuated. Manufacturers and merchants generally, as a matter of judgment in the choice of men for constructive functions, would greet without enthusiasm or confidence the designation of the Interstate Commerce Commission by Congress as the agency to re-establish railway credit. They as shippers will no doubt take the view, as sometimes in the past in large-rate advance cases, that the paramount matter is sufficiency of facilities and service and extension of lines, and that the problems of scientific rate-making, however important in themselves, can only receive such consideration as is consistent with attaining that paramount purpose.

Executives of industrial and mercantile concerns, if they give their energies to this problem, will undoubtedly come to concur in recommending that a new federal officer charged with promoting transportation development shall have power to sanction rates initiated by carriers, subject to review by the Interstate Commerce Commission respecting discrimination, but on no account subject to reviews respecting the adequacy of revenue. The same shippers, on the other hand, will be sure to insist, and ought to insist, that in preserving this great and vital advantage learned from government control, of lodging in one place responsibility alike for adequacy of transportation and adequacy of rates, the development of symmetrical rate structures should proceed with as little interruption as may be.

The Chicago Association of Commerce is studying the larger phases of railroad legislation through a special committee, separate from the traffic department, which has a restricted scope. Why would it not be advantageous for that organization to suggest a similar method to other local bodies throughout the country and establish among them co-ordination of study and of public discussion? Valuable aid can be given to such a concert of shippers by the National Industrial Traffic League. What shippers most need is skilled service in accomplishing, with the least loss of advantages, the rehabilitation of railway credit. The problem upon which the shippers' traffic managers have a competence all their own is that of transferring jurisdiction over revenue adjustments from the Interstate Commerce Commission to another federal functionary and preserving rate relations in the process. The question is not why this cannot be done, but how it can be done.

Whether the new functionary should receive from the Interstate Commerce Commission advice growing out of its past work in that special field or whether he should have a rate bureau of his own, or whether he should share with the Commission the use of a federal bureau of railway economics, I do not undertake to suggest. Whatever the choice, he should have the last word except as to discriminations. To mean anything, the opinion of the shipping interests of the country must be formed by a process of conference in which there is participation both by traffic managers and by the heads of the enterprises and associations who employ them.

Close to the question of power over rates, as affecting revenue, is another question which is not going to be solved by whispering "Hush!" That is the problem of labor cost. Under any program which gave a federal officer responsibility for sanctioning railway budgets and the rates on which to carry them through, one item—the largest item—would be the pay-roll.

What real difference is there between the labor item and any other item so far as concerns the process of getting it sanctioned and the money provided? The government, which is going to permit the required rate schedule, would say to the railway company: "You may build that extension and not this; you may electrify between A and B, but not yet between B and C." Why should not the government say, "You may grant this demand of labor but not that"? It is a part of the budget. The public is going to pay and some representative of the public must consent or refuse or modify.

What representative? Some suggest a court. But no labor court would command the respect that our law courts command unless there were a statute framed for all men that the court shall apply to particular cases; and I apprehend you and I would be hard put to it if asked to draw, at the present time, statutory language setting forth a general rule for the treatment of labor. That is a long way off. But suppose you had a court. It would not be the regulator of the roads on the side of adequacy and growth. The fixing of wages and working conditions is an administrative function which cannot be performed except with responsibility in connection with revenue. The federal officer might have advisers. Mr. McAdoo had. But in the end it was Mr. McAdoo who decided and proclaimed payrolls. He happened to be the manager, because it was government operation. The analogy under private control is that the payroll should be initiated by the manager of the road, and that because of the public character of the enterprise an appeal could be made either by employees or by members of the rate-paying and service-seeking part of the public; then, finally, the whole public, through its government officer, after he had taken advice, would decide and proclaim.

The difference between payrolls and other expenses is that employees can threaten to interrupt service. Suppose Mr. McAdoo had been deciding and proclaiming reductions instead of advances. That attitude and conduct of organized labor toward methods of adjusting disputes will be determined by public opinion in the communities where the employees live and where their work is done. If public opinion in the United States has developed to the point of favoring adjustment through umpires such opinion will become known to Congress, and the result in legislation will correspond. If public opinion is not ready for adjustment through umpires then some other contrivance may be set up, but it will not be a solution. The only real solution is to couple power with

responsibility somewhere and abide by the action of the constituted authority.

A consideration follows this so inevitably that it ought not to have to be stated. The federal officer who determines transportation budgets, including payrolls, and finds the money, should be kept out of politics so far as is humanly possible.

By the same token, private management must be held to strict accountability. I can think of only two things worse for the United States in transportation than to have a Kaiser bureau. One would be private management operating without the restraint of government regulation. Abuses growing out of unrestricted private management we had for a long while. That sort of thing is no more wanted now by railway managers than by the public. The other thing in transportation that I would think worse for democratic America than a Kaiser bureau would be government operation. The Kaiser had at least a continuous tenure of office and a motive for considering the future prosperity of his country. The statesman does not know whether he is going to be re-elected or not. He takes no chances with any remote future. He wants to do something and do it now; and if he makes a mistake he is only one of a houseful, no man of whom we can hold responsible. You can't regulate him, because of course no commission that you could set up would criticise another department of the government. During the past year we have seen an example. The Railway Control Act gave the executive authority to raise the rates, subject to review by the Interstate Commerce Commission. You have noticed how heroically that body has resisted temptation to exercise any such power.

There seems to be in Congress some sentiment for the enactment of provisions which their advocates believe would be in the direction of stricter regulation, but which would actually have the effect of throwing regulation out of the window. There is talk of government directors of railway corporations. Just as surely as Congress puts one government representative on a railroad board we shall see the beginning of the end of regulation. You will never hold private management to accountability if there is a government man in there consenting to everything and a party to everything before it is done. You will never get a regulatory body to criticise an institution which is partly or wholly another department of the government.

Government directors on boards would mean government influence in the selection of managers and in the framing of policy. The American system is that a boy starts at the bottom and without political services or pull works his way upward through a career, perhaps to the top. Instead of that we would have politics.

Why are government directors proposed? Because government guarantee of interest or dividends is proposed. If the government owns railroad securities or guarantees them it will insert its tentacles into the management. But why is there talk of guarantee? Simply and solely because it is feared Congress will run away from its plain duty of providing revenue which will enable the roads to finance themselves independently. If we do not have responsible regulation and the government furnishes its credit the cost must either be assessed after all upon the users in rates or upon all the citizens in the tax levy. If we have responsible regulation we shall not need government guarantees and we shall escape government directors and the government hand on the management.

We in the United States are slow to make up our minds that an annoyance has attained to the stature of an evil and is worth ending. When we once resolve, however, that a problem is due for solution we move on its works with all arms and take it by storm. How many weary years we bore an antiquated banking and currency system! Yet the hour struck, and in a few months of a single year we established the strongest system in the world. The most hopeful sign that the moment is at hand for a transportation solution is that the subject is on the lips of almost every man you meet. Congress has at last grappled seriously with it. The lawmakers are entitled to the fullest co-operation of business men in working out a measure. Let business organizations and men of affairs in every State and community approach the subject with open minds, a spirit of team work, and a readiness to make sacrifice of time and energy, and our railways shall soon once again build up the cities and carry settlement and commerce into the forest and the inaccessible farm land, while they join every centre of American production and trade to the ships that shall carry the Stars and Stripes and American cargoes to the markets of the earth.

Orders of Regional Directors

UNIFORM METHOD OF HANDLING HOG SHIPMENTS.—In Supplement 1 to Circular 224 the Central Western regional director quotes a letter from the Car Service Section containing additional information concerning the uniform method of handling hog shipments to market centers recently inaugurated. The letter is in part as follows:

Hog embargoes now prevail at Cincinnati, Indianapolis, Pittsburgh, St. Louis, Milwaukee, Sioux City, South St. Paul and Buffalo. The Food Administration states that the total hog receipts by cars on a single deck basis should be as follows per week of six working days:

Name of market	No. of cars	Name of Food Admin. chairman
Chicago	4,140	.....
Cleveland	400	W. L. Bryans.
Indianapolis	1,000	W. A. Cowan.
Pittsburgh	325	J. N. Burgess.
Nashville	200	F. L. Murray.
Buffalo	600	S. M. Boren.
Cincinnati	480	Fred C. Edmonds.
Louisville	175	W. D. Carrithers.
East St. Louis	1,000	H. R. Ray.
Peoria	240	.....
Evansville	48	J. F. Recknor.
Toledo	90	J. C. Dresser and W. W. Jones.
St. Joseph	1,000	Warren Nichols.
Omaha	1,200	E. H. Schroer.
Sioux City	600	Y. A. Hartman.
Kansas City	1,300	B. R. Bridgford.
Milwaukee	350	J. W. Holmes.
Cudahy, Wis.	480	.....

The terminal manager or any other designated representative of the Railroad Administration should confer with the chairmen of the sub-committees of the Stabilization Committee of the Food Administration mentioned above, concerning the division which should be made as between Saturday and other days of the week. Ordinarily the Saturday run should be less than on the other week days.

Insurance on Stationary Boilers.—In Circular 154 the Southwestern regional director points out that the railroads, under the instructions of General Order 24, did not renew insurance on stationary steam boilers. He advises that provision has been made for the inspection and testing of stationary steam boilers heretofore performed by the insurance companies, and rules and regulations have been issued by the Division of Operation, Mechanical Department, under Circular 11, for the information of each railroad.

Taking up of Industrial or Other Sidetracks.—The Eastern regional director, file 1800-4-7A390, has issued the following instructions: "Owing to the shortage of rail for new sidetracks, repair purposes, etc., it is understood that instructions have been in effect on some lines to take up industrial tracks or other side-tracks which have served the purpose for which they were constructed, and which are no longer needed, in order to provide material for such purposes. As the emergency which required such action no longer exists, it should be understood that it is not intended that any tracks should be taken up without the consent of the corporation in writing, except, of course, tracks which have been laid since federal control to serve some temporary need."

Joint Superintendents of Telegraph.—The Eastern regional

director, file 801-1A375, transmits the following instructions from the Division of Operation:

"I believe it desirable that the superintendents of telegraph of the different railroads, especially those who jointly represent the telegraph companies, be instructed that so far as concerns their handling of the telegraph lines owned, leased, or operated by the railroads they must not permit any instructions that they may receive from the officials of the telegraph companies to interfere with the instructions issued by representatives of the Railroad Administration. It is, of course, understood that if a superintendent of telegraph feels that a contract provision between the railroad and the telegraph company is being violated, it will be proper for him to call the matter to the attention of the railroad officer to whom he reports, after which he will be guided by the instructions of such officer."

Freight Destroyed or Confiscated in Transit.—The Eastern regional director, file 600-102A377, states that shippers and consignees of freight frequently suffer inconvenience due to the lack of information as to the whereabouts of their property when it is destroyed by wreck, fire or other casualty, or is confiscated by carrier. Please arrange a plan in such cases so that the operating department will immediately notify the freight claim agent, furnishing full waybill reference, name and address of shipper, consignee and a description of the freight destroyed or confiscated. Upon receipt of such advice in the claim office, arrangements should be made immediately to notify the shipper and consignee to enable them to make such arrangements as they see necessary under the circumstances, either by duplication of the shipment or otherwise.

Inspection of Freight at Interchange Points.—Circular 155 of the Southwestern regional director, similar to File No. 600-96A337 of the Eastern regional director, abstract of which appeared in the *Railway Age* of January 3, page 106.

Exchange of Local Transportation.—Supplement 15 to Circular 29 of Central Western regional director, similar to File No. 2100-41A-343 of Eastern regional director, published in *Railway Age* of January 3, page 105.

Free Transportation for Railroad Y. M. C. A.—In Supplement 13 to Circular 29 the Central Western regional director announces that the Division of Operation will issue transportation for the international traveling railroad secretaries of the Y. M. C. A. who may be assigned to territorial districts similar to that of the railroad regions. Railroads are also authorized to continue their past practice in the matter of issuing transportation for state or local secretaries.

Transportation of Corporation Officers and Employees.—In Supplement 14 to Circular 29 the Central Western regional director announces that railroads are authorized to issue 1919 annual or trip passes to corporate officers and employees over the railroads with which they are connected. The usual complimentary passes for wives and dependent members of families of such officers and employees may also be issued over the railroads with which they are connected. Annual passes for directors and such off-line annual or term passes as the officers and employees of the corporations may require, will be issued by the director of the Division of Operation. Off-line trip passes for corporate officers and employees will be requested of and secured by the federal manager.

Doings of the United States Railroad Administration

Director General McAdoo Has Left Washington for Three Months' Vacation in California

WASHINGTON, D. C.

DIRECTOR GENERAL MCADOO left Washington on Tuesday night for three months' vacation with his family at Santa Barbara, Cal., without having heard from President Wilson as to the appointment of his successor. He issued a statement saying he expected the President would designate his successor as director general of railroads within the next few days and that meanwhile he will continue to discharge the responsibilities of the office. Assistant Director General Walker D. Hines will be in immediate charge at Washington and Mr. McAdoo will continue to keep in touch with and direct the affairs of the Railroad Administration at long range. He was accompanied to California by Oscar A. Price, assistant to the director general. As to his future plans, Mr. McAdoo said he expected to take up his residence in New York City about the first of April and to resume the practice of law.

On Tuesday afternoon Mr. McAdoo called a special meeting of his railroad staff and, saying that he expected to be relieved of his office shortly, made a farewell speech, in which he expressed the highest appreciation of the work of his assistants during the year and their loyal support and cooperation. Walker D. Hines and John Skelton Williams spoke in reply.

It is believed in Washington that Congress will take no definite action at the present short session as to the disposition of the railroads, least of all in the direction of Mr. McAdoo's proposals for a five-year extension of federal control, and that as soon as this fact is made certain at the expiration of the present session, the President intends to issue a proclamation that he will restore the roads to their owners after a reasonable period for readjustment. June 30 is suggested as the probable date, because this would conclude a six months' period and would be convenient for accounting purposes. On the other hand, Congress might intervene to prevent a relinquishment of the roads without a longer opportunity to work out a legislative plan.

Most of the members of the staff of the Railroad Administration seem to expect that its affairs will be wound up shortly. No action is being taken, pending the appointment of a new director general, to fill the vacancies in the staff caused by resignations. The Railroad Administration has definitely released to the Treasury Department the space which it had planned to occupy in the new Arlington Building, although it is looking for other quarters than the Interstate Commerce Building, in which its principal offices are now located.

Weekly Traffic Report

The movement of freight and passenger traffic for the week ended January 6 continued without interruption, according to the weekly report made public by Director General McAdoo. The returns of passenger travel since last week show a much greater increase than was ever anticipated. On account of the holiday season there was a slowing up in the movement of freight cars in some sections.

Following is a summary:

Eastern Region.—Labor troubles at the railroad piers and freight stations in the Greater New York district necessitated shutting off all New York freight on January 1; situation slightly improved. Export freight for Boston also shut off owing to labor troubles and lack of vessels. Trainload move-

ment of export provisions from Western cities running about the same, averaging the last half of December 673 cars in 27 trains daily. High class passenger travel exceptionally good, as indicated by large number of extra Pullman cars required.

Allegheny Region.—Regular passenger travel continues very heavy, but has been generally handled in a satisfactory manner. Perishable freight traffic experiencing a let-up after the holidays. Box car loading has decreased, and it may be necessary to store some empty box cars. Production of bituminous coal continues light, and there is a surplus of empty coal equipment.

Pocahontas Region.—Passenger travel continues heavy. Effective January 1 the White Sulphur Springs and Hot Springs sleeping cars were extended through to New York, and the New Orleans sleeper similarly extended. On and after January 6 all Atlantic Coast Line trains will use the new Broad Street Station at Richmond, Va. General freight movement shows decrease, due in part to the holiday season. Slight increase in total coal and coke movement.

Southern Region.—Heavy passenger travel continues; passenger service being extended in various directions. Freight service has been normal, with the exception of accumulations on the New Orleans Public Belt Railroad, and accumulations of empty coal cars at Birmingham, both of which will be shortly relieved. General freight movement lighter than last week, but heavier than similar week of previous year.

Northwestern Region.—Movement of loaded freight cars shows quite a serious decrease as compared with same period last year, due principally to general slowing up of business account holiday season. Grain arrivals at primary markets at Chicago, Minneapolis, Milwaukee and Duluth, 12,800,000 bu., a decrease of 2,700,000 compared with previous week, but an increase of approximately 8,000,000 bu. over same period last year. Live stock loading shows some decrease under previous week, but was larger than last year. Crop conditions continue unusually satisfactory.

Central Western Region.—Business shows quite a decided falling off compared with last year, with large decreases in coal, as many of the mines are shut down on account of lack of orders. Train operations on the Santa Fe, Rock Island and Union Pacific interfered with by snow and low temperature in Colorado and Kansas. Passenger travel reports indicate that holiday travel was well handled, but on the whole the travel was a little less than during the same season last year. Travel to California is heavy.

Southwestern Region.—Freight traffic comparatively light. Steel people in this district anticipating a heavy demand. General impression prevails that export and import traffic will become heavy during latter part of February. Passenger travel is heavy, stimulated by holiday business. Unprecedented storms in Kansas, Oklahoma and Texas had their natural effect on train service, although the situation is rapidly improving.

War Department.—Freight on hand at New York shows increased accumulation by reason of unloading being seriously delayed account inefficient labor, holidays, and restrictions imposed by eight hour day. Transportation conditions throughout the entire country are, taking into consideration usual slowing up during the holidays, generally satisfactory.

Advances to Railroads for the Year 1918

The total sum advanced to December 31, 1918, by the United States Railroad Administration to all railroads and other transportation properties under government control, including loans made to railroad corporations for current needs and payments on account of compensation, advances made for operating requirements, and the payments made on account of the new standardized cars and locomotives aggregate, according to a statement issued by the director general, $689,034,759.

In making these payments the director general drew on the $500,000,000 revolving fund to the extent of $453,454,810. The balance of the money thus advanced, amounting to $235,579,949, was obtained from the surplus operating receipts of certain railroads and from receipts from the express companies.

The total amount deposited with the director general up to December 31, from the surplus receipts of all railroads and transportation companies under federal control amounted to $270,524,961 which included $46,916,416 received from express companies.

The only railroad properties which have made deposits with the director general of sums aggregating as much as $1,000,000 in excess of the amounts returned to these depositing roads and the corporations by the director general, were the following:

Atch., Top. & Santa Fe.	$12,600,000	Duluth, Missabe & N...	$10,400,000
Elgin, Joliet & Eastern..	7,000,000	Louisville & Nashville...	5,510,000
Bessemer & Lake Erie...	4,000,000	Atlantic Coast Line.....	3,800,000
Duluth & Iron Range...	3,400,000	Pullman Car Line.....	2,800,000
Rich., Fdksbg. & Potomac	1,540,000	Atlantic SS. Lines.....	1,500,000
Pere Marquette.....	1,145,000	Central of New Jersey..	1,250,000
Morgan's, Louisiana & T.	1,300,000	Nashville, Chat. & St. L.	1,000,000

The amounts advanced by the United States Railroad Administration to all transportation systems, making the above aggregate of $689,034,759 up to December 31, 1918, are set forth in the following list:

Pennsylvania Railroad..	$90,066,000	Central New England...	$990,000
New York Central.....	72,720,000	Ind. Harbor Belt.....	920,000
N. Y., N. H. & H.....	65,925,000	Texas & Pacific.....	909,250
Baltimore & Ohio.....	35,875,000	Pere Marquette	855,000
Erie	23,600,000	Ann Arbor	801,800
Chi., Mil. & St. Paul....	22,532,000	Toledo & Ohio Central..	770,000
Illinois Central	17,425,000	Monongahela	750,000
Southern Pacific	16,500,000	Rutland R. R.....	741,000
Union Pacific	13,500,000	Wheeling & Lake Erie...	700,000
Southern Railroad.....	11,706,650	Kans. City, Mex. & Orient	700,000
Chi., Bur & Quincy.....	10,650,000	Atlanta, Birm. & Atlantic	659,000
Chi., R. I. & Pacific.....	9,700,000	Bangor & Aroostook....	643,000
Chi. Northwestern	9,000,000	Ft. Worth & Denver Cy.	619,000
Delaware & Hudson....	8,790,000	Gulf, Mobile & Northern.	600,000
Missouri Pacific	8,400,000	Chi., Peoria & St. Louis.	600,000
Seaboard Air Line.....	8,075,000	N. Y., Ontario & Western	575,000
Chesapeake & Ohio.....	8,050,000	Pittsburgh & Shawmut..	528,500
Boston & Maine.....	7,067,000	Lehigh & New England.	525,000
Great Northern.....	6,800,000	Old Dominion S. S. Line	515,000
Philadelphia & Reading.	6,090,000	Chi. Junction	500,000
St. Louis-San Francisco	6,020,000	Gulf, Colo. & Santa Fe.	500,000
Denver & Rio Grande...	6,000,000	Western Pacific	430,000
Northern Pacific	5,500,000	Kansas City Terminal..	400,000
Norfolk & Western.....	5,250,000	Chi., Terre Haute & S. E.	387,913
Wabash	4,645,000	Pittsburgh & West Va.	375,000
Mo., Kans. & Texas.....	4,245,000	Cin., Ind. & Western...	350,000
M., St. P. & S. S. Marie	4,159,000	Georgia R. R.....	309,000
Buff., Roch. & Pittsburgh	4,000,000	Detroit, Toledo & Iron.	300,150
Del., Lack. & Western..	4,000,000	Bklyn. East. Dist. Term.	300,000
Western Maryland	3,558,000	Belt Ry. of Chicago...	290,000
Lehigh Valley	3,500,000	Midland Valley	270,000
Louisville & Nashville...	3,000,000	Trans-Miss. Terminal ..	265,000
Hocking Valley	2,892,000	Mo., Okla. & Gulf.....	255,000
Chi., St. Paul, M. & O..	2,450,000	S. Antonio & Arans. Pass	253,000
Mlps. & St. Louis.....	2,395,000	Ft. Dodge, D. Moines & So.	246,000
Maine Central	2,130,000	Vicksburg & Shreveport.	242,000
Chicago & Alton.....	2,060,000	Am. Refrigerator Tr. Co.	229,000
Chi., Indianapolis & L...	1,925,000	Chi. & Western Indiana.	215,000
Int. & Great Northern..	1,877,215	N. Y., Susque. & West.	200,000
St. L. Southwestern.....	1,770,000	Gulf & Ship Island....	200,000
Chi., Great Western	1,680,660	New Or., Tex. & Mexico	176,100
Grand Trunk	1,621,000	Illinois Southern	160,000
Kansas City Southern...	1,585,000	Mo. & N. Arkansas....	150,000
Term. R.R. Assn. of St.L.	1,545,000	Duluth, S. Shore & Atl.	150,000
Colo. & Southern.....	1,485,000	Ocean Steamship Line..	150,000
Central of Georgia.....	1,450,000	Portland Terminal	150,000
Chi. & Eastern Ill.....	1,449,000	Detroit & Toledo Shore L.	135,000
Virginian Ry.	1,300,000	Cumberland & Pa.....	127,900
Cent. R.R. of N. Jersey.	1,250,000	Detroit, Bay City & West.	120,000
Pullman Company	1,200,000	N. O. Great Northern..	120,000
Atlantic Coast Line.....	1,200,000	Atlanta Terminal	115,000
Los Angeles & Salt Lake	1,175,000	Winston-Salem S. Bound	112,000
Denver & Salt Lake.....	1,118,460	Western Ry. of Ala....	110,000
Norfolk Southern	1,058,000	Mississippi Central	102,500
Florida East Coast.....	1,050,000	Ulster & Delaware.....	100,000
Central Vermont	1,035,000	B. & O. Chi. Terminal..	100,000
Hudson & Manhattan...	1,012,000	Toledo Terminal	100,000
N.Y., Chi. & St. Louis..	1,009,775		

Twenty-six roads receiving in each case less than $100,000....	990,000
Advances to inland waterways and canals.....	4,361,486
Payments on account of standardized engines and cars.....	114,514,400
Total	$689,034,759

Of the sums shown in the foregoing table the amounts advanced to the various systems during the month of December, 1918, were as follows:

N. Y., N. Haven & Hart.	$15,475,000	Southern Pacific Lines..	$4,000,000
N. Y. Central Lines....	12,850,000	Chicago & North Western	3,770,000
Pennsylvania R. R. Lines	12,696,000	Norfolk & Western....	2,750,000
Baltimore & Ohio.....	11,800,000	Missouri Pacific	2,750,000
Erie Railroad	9,700,000	Seaboard Air Line.....	2,465,000
Union Pacific Lines....	8,500,000	Hocking Valley	2,392,000
Boston & Maine.....	4,250,000	Minn., St. P. & S. S. M.	2,107,000
Chic., Burl. & Quincy.	4,100,000	Delaware & Hudson....	2,000,000
Great Northern	4,000,000	Chic., Rock I. & Pacific.	2,000,000

Philadelphia & Reading.	$1,690,000	Chicago, P. & St. Louis.	$400,000
Louisville & Nashville..	1,500,000	St. Louis S. Western..	400,000
Northern Pacific	1,500,000	Buff., Roch. & Pittsburgh	330,000
Del., Lack. & Western..	1,500,000	Atlan., Birm. & Atlantic	320,000
Int. & Great Northern.	1,470,000	Bklyn. E. Dist. Terminal	300,000
Central R. R. of N. Jer.	1,250,000	Central Vermont	300,000
Illinois Central	1,200,000	K. C., Mex. & Orient..	300,000
Denver & Rio Grande..	1,200,000	Monongahela R. R.....	300,000
Western Maryland	1,185,000	Wabash R. R.....	300,000
Los Angeles & Salt Lake	1,175,000	Ft. Worth & Denver City	279,000
Southern Railway Lines.	1,164,000	Bangor & Aroostook....	270,000
Grand Trunk	1,000,000	Missouri, Okla. & Gulf..	255,000
Chesapeake & Ohio.....	1,000,000	Gulf, Mobile & Northern	200,000
Chicago Great Western.	973,000	Gulf & Ship Island.....	200,000
Chicago & East Illinois.	912,000	N. Y., Susq. & Western	200,000
Chicago, Mil. & St. Paul	857,000	Ind. Harbor Belt.....	200,000
Maine Central	830,000	M. K. & T. Lines.....	250,000
Pere Marquette	775,000	Old Dominion S. S. Lines	200,000
Toledo & Ohio Central..	770,000	Virginian Railway	200,000
Central New England..	690,000	Texas & Pacific.....	159,250
Kansas City Southern..	525,000	N. Y., Chicago & St. L.	155,000
Colo. & Southern.....	510,000	Missouri & North Ark.	150,000
Gulf, Colo. & Santa Fe.	500,000	Ocean Steam Ship Line.	150,000
Minneapolis & St. Louis	500,000	Denver & Salt Lake....	127,812
Rutland R. R.....	475,000	Winston-Salem S. Bound	112,000
Term. R. R. Ass'n of St. L.	464,000	Norfolk Southern	110,000
Chicago & Alton.....	425,000	Mississippi Central	102,500
Kansas City Terminal..	400,000	Chic., St. P., M. & Oma.	100,000
Atlantic Coast Line.....	400,000	Detroit & Tol. Shore Line	100,000
Chicago, Ind. & Louisv.	400,000	Det., Bay City & Western	100,000

Seventeen railroads receiving sums amounting in each case to less than $100,000	768,375
Payments on account of standardized locomotives and cars	26,799,274
Total of advances to all railroads in the month of December, including payments made on account of new rolling stock for various companies, as shown above	$168,982,711
Total amount received during December from railroads on account of surplus earnings and including $15,781,541 from express companies, was	33,116,985
Excess of advances to railroads for the month of December, 1918, over and above amounts received as above for same period	$135,865,726

All loans to railroad companies by the Director General have been made at the uniform rate of 6 per cent. per annum interest.

On December 30 and 31 the following railroads repaid to the United States Railroad Administration the following amounts with interest at 6 per cent., which had been formerly loaned them:

Chicago, Milwaukee & St. Paul	$8,000,000
Chicago, Rock Island & Pacific	6,000,000
Baltimore & Ohio	5,450,000
Southern	2,170,000
St. Louis-San Francisco	1,710,000
Total	$23,330,000

Including the amount of these loans thus collected, the total balance remaining in the revolving fund, plus the sum total of balances remaining on hand with the director general from the surplus receipts turned over by certain roads, aggregates the total sum of $102,856,762.

The aggregate amount of loans made by the director general to railroads and other transportation companies, and still outstanding is $171,606,073. This is exclusive of the amount advanced by the director general for the benefit of various roads on account of standardized equipment.

Director General Asserts Authority Over State Rates

Director General McAdoo has taken up the challenge made by various state railroad commissions of his authority to initiate rates applying to intrastate as well as to interstate traffic This question was held in abeyance during the war, but was revived at the annual convention of the National Association of Railway and Utilities Commissioners held in Washington just after the armistice was signed. The director general has heretofore refrained from making a definite statement of his attitude toward the matter, but when his attention was called to the fact that several states have begun litigation, drawing in question the validity of rates initiated by him under the federal control act so far as they apply to intrastate traffic, he issued a statement saying he regretted that the issue should be raised and a contest precipitated between state and federal authority, but that he was acting under the law of Congress as the President's representative and could not subject himself, in that capacity, to the jurisdiction of courts or commissions beyond the provisions of the law.

Considering the purpose for which the statute was enacted, and the extent to which it would be defeated by a division of authority, as well as the terms of the statute itself, there can, in his opinion, be no reasonable doubt that the intention is that during the period of federal control rates may be initiated to apply to both intrastate and interstate business, and that complaints of such rates are exclusively within the jurisdiction of the Interstate Commerce Commission, which can be relied upon to do justice to all interests. Any other construction of the statute might have been fatal to the prosecution of the war, and would now result in creating an indefensible discrimination between interstate transportation charges and state charges, and serious curtailment of the revenue which the Railroad Administration must have in order to perform the duties placed upon it by Congress.

The director general pointed to the fact that the correctness of this position seems to be conceded in many of the states where no question is made as to the power vested in the President to initiate rates applicable to intrastate business, and as to those rates being beyond the jurisdiction of the state authorities.

He expressed the hope that the states which have brought suits based upon the opposing contention may for the present at least hold them in abeyance. If such suits are pressed, he said, the government, although it desires to give the most respectful consideration to the views of the state authorities, has no alternative except to proceed upon the theory that the action of the President's representative in establishing rates is not within the jurisdiction of either state commissions or courts, and that orders prescribing rates instead of those which have been initiated, and injunctions forbidding the application of the initiated rates to state shipments cannot be observed as to railroads under federal control.

If the government is compelled to engage in a legal contest, he said, no other position can be taken, and there is no other course that will protect the general public interest.

Aside from the provisions of the statute which empower the President to initiate rates without distinction as to interstate and intrastate traffic, he said that he could not conceive that any state would be placed at a practical disadvantage, inasmuch as if any such rates are deemed unreasonable or unjust, the state itself, or the commission of the state, or any citizen of the state is free to file a complaint before the Interstate Commerce Commission and have it determined in the light of all of the facts. He reiterated that his concern is not because of any misgiving as to the power of the President under the federal control act, but because of his aversion to the United States government being forced into a contest with any of the states about these matters.

Continued Heavy Car Loading Urged

The Railroad Administration hopes to be able to continue the records for heavy car loading set this year in spite of the fact that it will not have the aid of the power of the Food Administration to force heavy loading of food commodities. The Car Service section recently issued Bulletin No. CS-86, canceling Bulletin No. 41; embodying the United States Food Administration's Rules and Regulations governing the loading of food and feed commodities. The bulletin adds:

"The heavier loading of freight cars, the campaign for which has had the valued aid and support of the several departments of the government, as well as the hearty co-operation of shippers, has been a very material factor in accomplishing the following: 1st—An increased car supply. 2nd—Lessened congestion on the railroads, particularly at terminal points. 3rd—Improved service made possible by such lessened congestion.

"If it be thought that the improved car supply which exists at the present time makes it less necessary to load cars to full capacity, it should be borne in mind that a return to the old practice of light loading would speedily bring about another car shortage and congestion, by reason of the increased number of cars used to carry a given tonnage. Numerous

shippers have volunteered the information that it is their purpose to continue to make the fullest use of equipment, maintaining records established during the war, regardless of tariff minima. They apparently realize the advantages gained, which will prevent useless waste and a return to transportation conditions which formerly prevailed.

"The Railroad Administration will continue its efforts to closely supervise the loading of all commodities, in order that demands for service may be promptly met, and we ask the continued co-operation of all shippers to this end. Reports of all instances of light loading of equipment will be made to the Car Service Section, as heretofore."

The Export Situation

According to the report of the Exports Control Committee for the week ended January 4, made public by Director General McAdoo, there was an accumulation of export freight on hand at north Atlantic, south Atlantic and Gulf ports, due to the slow acceptance of freight by ships on account of the inefficiency of labor during the holiday season and delays to shipping incident to bad weather. The movement of foodstuffs to be sent overseas and used in relief work continued unabated.

The total overseas movement since the signing of the armistice shows a steady increase. It was decided to temporarily suspend loading of all export freight covered by G. O. C. permits destined to Boston, New York and Philadelphia (exclusive of grain to Boston), effective as of the third instant, until further notice.

The total receipts and deliveries at north Atlantic ports for the week ended December 30, was as follows, in carloads:

	(In cars) Received	Delivered
Export freight at North Atlantic ports, exclusive of U. S. government freight, bulk grain and coal....	7,543	5,418
U. S. government freight on railroad operated terminals	3,107	2,862
Total	10,650	8,280

showing an accumulation of 2,370 cars in addition to those reported last week and the week before.

The arrivals of carload export freight at North Atlantic ports (exclusive of bulk grain and coal) during the month of December totaled 50,896 cars, while deliveries were 45,174 cars, resulting in an increase in freight on hand, due to delays to ships on account of severe weather on the Atlantic, necessity for repairs after arrival, and the labor situation.

The total accumulation for all ports, including South Atlantic and Gulf, for week ended December 26, was:

	In cars	In tons
North Atlantic	2,502	67,360
South Atlantic	174	5,460
Gulf	520	24,040
Total	3,196	96,860

This emphasizes the necessity for a strict continuance of the permit system. The average daily delivery of cars of export freight at North Atlantic ports, April to December, 1918, inclusive, was as follows:

Port	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Boston	100	98	76	92	64	26	88	86	90
New York	680	814	845	932	741	712	1,029	1,104	1,141
Philadelphia	105	184	123	128	154	147	150	252	166
Baltimore	124	122	140	156	105	109	113	161	151
Newport News	24	106	104	103	76	147	145	111	79
Norfolk	22	24	63	69	92	107	112	101	92
Total	1,055	1,348	1,351	1,480	1,232	1,248	1,647	1,815	1,719

The estimated tonnage of export freight (including U. S. government freight, but exclusive of bulk grain and coal), disposed of during the month of December, compared with December export tonnage of previous years, is as follows:

With December, 1913,	185.9 per cent increase
With December, 1914,	158.3 per cent increase
With December, 1915,	104.5 per cent increase
With December, 1916,	48.5 per cent increase
With December, 1917,	107.5 per cent increase

Interpretation of Wage Order

Director General McAdoo has issued the following interpretation No. 8 of General Order No. 27:

As there seems to have been a misunderstanding on some railroads as to the application of General Order No. 27, the said order is hereby interpreted to apply to all persons in the employment of the railroads earning less than $250 per month in December, 1915. Where such persons have not been granted the increases provided for in General Order No. 27 such increases will be made applicable retroactive to January 1, 1918, and until superseded by supplements thereto.

New York Central and Other Contracts Signed

Director General McAdoo on January 2 signed the compensation contracts for the various roads comprised in the New York Central system, providing for annual payments as follows: New York Central Railroad, including Toledo & Ohio Central, Zanesville & Western, Kanawha & Michigan, and Kanawha & West Virginia, $58,122,084.92; Cleveland, Cincinnati, Chicago & St. Louis and Muncie Belt, $9,945,738.41; Pittsburgh & Lake Erie, $8,980,219.40; Lake Erie & Western, $1,548,541.69; Cincinnati Northern, $317,628.01; Indiana Harbor Belt, $296,053.57; Michigan Central and Chicago, Kalamazoo & Saginaw, $8,105,727.04; Lake Erie & Eastern, $127,081.06; Detroit Terminal, $186,460.40.

Director General McAdoo, just before leaving for California, also signed the compensation contract of the Pennsylvania Railroad Eastern Lines, including the Baltimore & Sparrows Point, Cumberland Valley, New York, Philadelphia & Norfolk, Union Railway of Baltimore, Barnegat Railroad, Philadelphia & Beach Haven and Rosslyn Connecting. The annual compensation is $53,603,427.

Exchange Transportation

Director General McAdoo has issued Supplement No. 2 to General Order No. 6, extending over the year 1919 the authority to renew contracts between carriers and newspaper publishers providing for an exchange of intrastate railroad transportation for advertising, providing that the rates charged by the publishers shall not exceed their usual commercial rates, that the value of the transportation shall be computed on the basis of normal tariff fare for one way tickets, and that transportation so used shall not be used upon any part of an interstate journey.

Clover Leaf Allocation Suit Not Yet Decided

The United States court at Toledo, in charge of the receivership of the Toledo, St. Louis & Western, has ordered the receiver of the road to accept 350 of the 1,250 standard freight cars allocated to it by the Railroad Administration, but has not yet rendered a final decision on the suit of the stockholders of the road for an injunction. The case was argued on December 30. The order to accept the 350 cars came after that date but was issued pending a final decision on the merits of the case.

Collection of Miscellaneous Rents

P. S. & A. Circular No. 57 provides that miscellaneous rents due to a corporation whose property is under federal control may be collected for it by the employees of the United States Railroad Administration, provided the arrangement is requested by the proper officer or officers of the corporation. In accounting for miscellaneous rents collected at the request of the corporation, the payment of which should be made to it monthly, a charge of 2½ per cent upon the gross collections should be retained by the federal treasurer as compensation for the labor and expense involved. Federal auditors shall account for the amounts retained out of such collections as miscellaneous income.

Proposals for Disposition of the Railroads

McAdoo Argues for Five Year Test—I. C. C. and Railroads Advocate Revision of Regulatory Policy

WASHINGTON, D. C.

DIRECTOR GENERAL MCADOO'S plan for a five years' longer test of government operation of the railroads received some hard knocks during the first week of the hearing before the Senate Committee on Interstate Commerce called to consider proposals for the disposition of the railroads. Mr. McAdoo's prepared statement, which is published elsewhere in this issue, elicited not a word of approval from any member of the committee for the five-year plan, although there was some appreciation of the accomplishments of the Railroad Administration during the past year.

He was followed on Tuesday by E. E. Clark, chairman of the legislative committee of the Interstate Commerce Commision, who presented a statement on behalf of the commission (Commissioner Woolley dissenting), favoring a return of the railroads to private ownership after a reasonable period of readjustment or preparation and after reasonable notice of the date. The commission not only expressed the conviction that "with the adoption of appropriate provisions and safeguards for regulation under private ownership," which it outlined, "it would not be wise or best at this time to assume government ownership or operation of the railways of the country," but it also opposed a return of the properties in a precipitate way and later, in reply to a question, Mr. Clark said Congress ought to withdraw from the President the power he has to return the roads back on an hour's notice, and that Congress ought to say when they shall be turned back. It is understood that a resolution to this effect will soon be introduced in the Senate. The commission's statement and Commissioner Woolley's dissenting opinion are also published elsewhere.

The respect with which the senators listened to such recommendations of the commission as the repeal of the prohibitions against consolidation of competing lines and against pooling, the limitation of unnecessary railway construction and the power to prescribe minimum rates, indicated a growing appreciation of some of the points which have been urged for several years by the railroads and of the difficulties which the railroads have experienced under a system of regulation designed to restrict rather than to encourage and develop. The committee members also manifested some satisfaction that the commission had not agreed with Mr. McAdoo's five-year plan. The commission was very respectful to Mr. McAdoo. Its statement did not even refer to his plan, nor did it express a word of criticism of the Railroad Administration. It merely expressed in unmistakable language the conviction that it would not be wise or best at this time to assume government operation or ownership of the railways. It was not until Senator Watson asked a direct question that Mr. Clark made any reference to the five-year plan, when he said that the commissioners, with the exception of its member who has had the least experience in matters pertaining to railroad regulation, do not think it is a wise plan, and that it would not be desirable to place full authority to run the railroads in the hands of one man.

Opposition to the five-year plan was again expressed by T. De Witt Cuyler, chairman of the Association of Railway Executives, who presented on Thursday a series of principles adopted by the executives of 92 per cent of the country's railway mileage, which they believe ought to form the foundation of the national legislation necessary for the readjustment of the railroads to peace conditions, including provision for the continuance, under private operation, of a large part of the measures taken by the Railroad Administration during the war to co-ordinate and unify railway facilities. The statement of the plan as presented by Mr. Cuyler is printed elsewhere in this issue. He was to be followed by Alfred P. Thom, counsel for the Association of Railway Executives, with a legal argument, while Daniel Willard, Julius Kruttschnitt and S. T. Bledsoe were to present various aspects of the railroad situation.

Mr. McAdoo Questioned by Committee

Director General McAdoo's argument apparently made little impression upon the committee. The questions put to Mr. McAdoo by Senators Cummins, Kellogg and Watson particularly indicated hostility to the idea of a further experiment of government operation and a belief that legislation to improve regulation and to make possible a continuance of some of the advantages of the co-ordination of railroad facilities effected during the past year would present a more satisfactory solution. These Senators and others laid particular emphasis upon the great increase in expenses and the deficit as a result of the year's operations. They also indicated a strong belief that the obstacles which Mr. McAdoo mentioned to successful operation by the government during the 21 months after the war would exist to an even greater extent during a five-year tenure.

Mr. McAdoo expressed a little more strongly than he has heretofore an opinion that a five-year test would lead rather to some plan of private operation under strict centralized control by the government, but persistently declined to consider the possibility of agreeing upon any permanent policy for dealing with the railroads before it will be necessary to relinquish them. Such proposals as a repeal of the anti-trust law and a removal of the various other legal restrictions on the railroads he characterized as merely "palliatives" or "poultices," declaring that what is needed is a comprehensive plan which will consider the entire situation. He would not subscribe to the opinion that a mere removal of restrictions would result in the proper degree of co-ordination, and expressed some doubt as to whether private corporations could be safely entrusted with the degree of freedom of action which he would give to the governmental authority in charge of railroad operations. He said the inability of the railroads to meet the situation in 1917 was due only partly to legal impediments. He was plainly irritated by the line of questions implying criticism of the increase in expenses, attributing them to the conditions created by the war and the necessity for increasing wages.

Mr. McAdoo declared that if the five-year plan is adopted the short lines, which were excluded this year as not being needful or desirable for war purposes, should be included, because the purpose would be to test the whole transportation problem.

Senator Cummins asked Mr. McAdoo whether he proposed to retain the power to nullify laws and to continue to curtail the authority of the Interstate Commerce Commission and state commissions. Mr. McAdoo replied that successful operation could not be obtained without concentration of authority, and that while it might be wise to modify the powers of the President in some details the full benefits of federal control could not be had without retaining them substantially. He declared that the manner in which the rate authority was exercised during the war was

not an indication of the methods to be followed under peace conditions.

Senator Cummins also asked whether the present rate of guarantee to the railroad companies should be continued. Mr. McAdoo said he thought that the country could afford to continue it for a test period. Senator Underwood expressed doubt as to whether the government could keep the railroads for a longer period without paying their value.

When Senator Cummins kept pressing the idea that a legislative solution could be obtained within a year if Congress is allowed time to study it, Mr. McAdoo said he could work out a plan in that time, but doubted whether 600 minds could meet on one. He thought that while the test was being carried on Congress could agree on a permanent plan which would be ready at the end of the period.

Several senators expressed apprehension of grave consequences if the railroads should be returned to their owners too precipitately, on the ground that state rate laws would automatically go into effect and their effect would crumble the interstate rate structure. Mr. McAdoo said he thought the various commissions would recognize the necessity of keeping rates high enough to meet the increased costs, and he scouted the idea that the return of the roads would mean bankruptcy, except in the case of the weaker roads. Senator Cummins said it would be "little less than a crime" to turn back the roads without giving them time to prepare for it. Mr. McAdoo said the roads could be returned in "infinitely better condition on March 1 than they were in March, 1917."

In opposing the idea of continuing government operation through the 21 months' period, Mr. McAdoo said it would be impossible to carry on a program of needed improvements because the corporations, not being particularly friendly to federal control, would not co-operate, but that if assured of a five-year period, and their credit strengthened by a government guarantee, they would realize the necessity of co-operating.

Senator Kellogg brought out the fact that the expenses of the Railroad Administration are not included in the operating expenses of the carriers as reported by the Interstate Commerce Commission. Mr. McAdoo promised to file a statement showing the amount. The senator also pointed out that the corporate expenses were not included in operating expenses in 1918, although they had been previously. Mr. McAdoo said that the operating ratio for several months had been increased by the inclusion of back pay and that for the months of July, August, September and October, since the rate increase, if the back pay is excluded, the operating ratio in 1918 was 67.4, as compared with 67.9 in 1917. He said the force of the central administration at Washington was about 1,100.

Senator Kellogg insisted that the five-year plan would constitute a test of only one system of operation, and would throw no light on other possible plans, while Mr. McAdoo pictured his idea of federal control as a form of protection thrown over the railroads while they were experimenting with various ideas that might later be continued under private management.

"But if Congress turns you down, you have no suggestion to make for legislation to provide proper regulation?" said Senator Watson.

"I have but one suggestion," replied Mr. McAdoo. "I want a test and I must reserve judgment as to a permanent plan until I get further light."

"Suppose the five-year test results in failure," said Senator McLean, "would that demonstrate the failure of government ownership?"

"The five-year test would show something conclusive," replied Mr. McAdoo. "I don't know what."

Senator Kellogg also questioned Mr. McAdoo on the subject of car supply, brining out the fact that only a small percentage of the cars and locomotives ordered in 1918 were delivered. Mr. McAdoo said that effective operation has practically enlarged the supply of cars and that there has been no shortage. Senator Kellogg then filed the following statement from the Interstate Commerce Commission records showing the number of cars and locomotives added and retired each year:

	Freight Cars		Locomotives	
Year	Added	Retired	Added	Retired
1908	17,156	70,776	3,227	1,140
1909	67,925	83,223	1,549	1,333
1910	134,593	75,652	3,073	1,452
1911	125,532	68,031	3,694	1,468
1912	97,972	69,876	2,861	1,858
1913	162,670	96,825	4,381	2,338
1914	150,813	96,985	3,245	1,862
1915	86,012	90,347	1,114	1,507
1916	88,254	109,996	1,475	2,576
	Passenger Cars		Service Cars	
Year	Added	Retired	Added	Retired
1908	2,183	1,630	12,568	5,978
1909	1,786	1,591	7,322	5,341
1910	3,503	1,914	15,033	6,818
1911	1,250	1,701	12,931	6,921
1912	3,080	1,387	10,630	8,800
1913	2,823	1,842	13,014	8,507
1914	3,629	1,854	12,354	8,159
1915	2,664	1,385	10,228	11,787
1916	1,261	2,156	13,086	13,446

Senator Townsend paid a high tribute to Mr. McAdoo's management during the past year, but called attention to the fact that it is proposed to turn the operation of the roads for the future over to an unknown man. When Mr. McAdoo expressed confidence that the right kind of a man would be selected, the senator remarked that "we don't always get them," and said he thought there was no more of a presumption that the right kind of a director general would be chosen than that Congress could enact the right kind of legislation. In concluding his testimony, Mr. McAdoo summed up his argument as follows:

"My judgment is that the American people are entitled to a fair test of federal control under peace or normal conditions. We have spent large sums of money to win the war, and part of that money has been used to gain some experience in the unified operation of the railroads, an experience necessitated by the war and by the incompetency and inefficiency of private control under existing laws and conditions. I am not suggesting that anybody should be blamed because the laws are as they are or because competitive conditions under private control were as they were. I am speaking only of the inefficiencies and deficiencies of the system and not of individuals.

"We have expended a great deal of government money on improvements for the railroads and for equipment during the war period. We may have to carry for some time a part of the cost of these improvements and this equipment before we can liquidate this cost and secure repayment from the carriers.

"As I said in my testimony before this committee one year ago, I felt sure that the government would have to expend large sums of money for the improvement and betterment of railroad properties during the period of federal control and that I was sure that the government would have a better chance to secure the payment of its advances to the railroads while in possession of their properties than when out of possession. Having expended so much money on the railroads and having carried forward this experiment in unified operation to a point where I now think we can enter upon its last stages with obvious benefit to the public interest, it seems to me a pity to throw away all that we have gained and to attempt a hasty solution which may not be a permanent solution at all, but a mere makeshift, and which may injure the best interests of the American people irreparably at a time when we are facing a new world condition which demands that America shall be on the alert and not only look forward but go forward without hesitation or delay.

"It seems to me that it is our plain duty to preserve the mobilized energies and industries of America in the form of railroad control for a five-year period and use our unified railroads during the great time ahead of us and co-ordinate and synchronize their operation with our great merchant fleet, giving to all the ports on the Atlantic, Gulf and Pacific coasts adequate rail facilities to meet adequate shipping in those ports, so that the development of our country may be carried forward homogeneously and symmetrically and every part of our people be permitted to share in the great prosperity which is now opening up to us. If we control the railroads and the ships, we can develop all the ports advantageously, distribute the traffic of the country over all the facilities so as to avoid needless congestion and loss and have a unified system of rail transportation on land and ship transportation on the high seas that will bring a new and greater era of prosperity and happiness to the American people than they have ever before enjoyed."

Director General McAdoo has already found it necessary to revise the estimate presented in his statement before the committee that the deficit for 1918 would be about $136,000,000. In a letter to Chairman Smith of the committee on January 7, he presented a new estimate that the operating income of the Class I railroads would fall short about $196,000,000 of paying the standard return. He enclosed a letter from G. H. Parker, assistant to Mr. Hines, stating that the returns for the month of November have become available to a large extent, and they indicate that the operating income for November will be less by about $28,000,000 than the amount estimated last week. This falling off, he said, is accounted for by a falling off in business resulting in a decrease in revenues to the extent of $6,000,000 and by an increase in expenses due almost wholly to increased wages, including back pay, of $28,000,000. Mr. McAdoo said in his letter that the fact that these estimates are necessarily subject to revision lends additional point to the statement that it is impossible to predict satisfactory conclusions upon the present necessarily incomplete results for even a single year of government control, especially under war conditions.

Commissioner Clark's Statement

Commissioner Clark began his statement by saying it had been adopted by the commission in conference on December 21 and represented the opinion of all the commissioners except Commissioner Woolley. No specific suggestion for legislation regarding wages and working conditions had been included because of the feeling that there was no justification for the commission to suggest that it would be more successful in dealing with the problem than the various agencies for mediation, conciliation and arbitration already provided for by law. It had not included any reference to the depreciation matter because it could see no occasion for legislation on the subject, as the commission now has the power to require carriers to set up depreciation funds. The whole question involves many complications as to what is a proper charge and the commission has directed a very careful inquiry into the entire subject. As to Commissioner Woolley's objection to blanket and group rates, Commissioner Clark pointed out that if the rates from various coal mines in a given district were not grouped, but were graded in accordance with distance, the entire advantage would go to the producer nearest to the consuming market who would make his price to the public only a shade under the price which the more distant mine could make with its higher freight rate, whereas the group system of rates gives equal opportunity to the producers and consumers. He also pointed out some objections to a mileage system of rates, saying that if grain rates were made on a mileage basis a point would be reached beyond which it would be impossible to ship grain.

Amplifying the suggestions made in the prepared statement, Commissioner Clark expressed the opinion that the public interest would be served if the stronger roads were allowed to take in their weaker connections, receiving the benefit of the traffic turned over to the main line as an offset to the possible unprofitable operation of the branch line. He said he and his colleagues could see no possible harm from such absorption of smaller lines by the larger as long as the government may regulate the rates, and that it is a great deal easier to regulate one large, well-developed corporation than a number of poorly organized companies on the verge of bankruptcy. The idea of the commission is that sound public policy would permit the consolidation of even competing lines with the approval of proper public authority after an investigation.

Members of the committee asked many questions, which indicated sympathy with the attitude expressed by the commission. Senator Gore asked for its attitude regarding the right of the shipper to route his freight, to which Commissioner Clark replied that the present law undoubtedly invites uneconomical routing.

In reply to Senator Underwood, Commissioner Clark said that if the anti-trust law should be abolished and pooling permitted it would be necessary to provide for some regulation of service. Senator Underwood also asked how the commission could regulate the securities of corporations organized under state laws, and as to the commission's attitude toward federal incorporation. Mr. Clark said the commission has entertained no doubt of the power of Congress to regulate the issuance of securities because of the effect of the amount of capitalization upon interstate commerce, and that they thought the subject was controlled by the principle announced by the Supreme Court that when Congress speaks, state action must give way. The commission thought, therefore, that proper supervision of the issuance of securities and of the expenditure of money derived therefrom would be a purely regulatory function which it would be proper to give to the commission, and would be sufficient without going into the question of federal incorporation. In reply to Senator Underwood, Mr. Clark also expressed an opinion that it might be well to give the commission power to initiate rates, although its recommendation extended only to the power to prescribe a minimum rate. He said that the initiation of rates by the carriers was very satisfactory to some shippers but very unsatisfactory to others because the power of the shipper with a large tonnage is very great.

Commissioner Clark read into the record a statement showing the capitalization, earnings and percentages of return of the carriers from 1900 to 1916, as a reply to the statements that the credit of the railroads has been destroyed by niggardly regulation. The figures, he said, point to the fact that in the aggregate the increase in revenues has kept pace with increased investment, that the operating income has increased more than the mileage, and that the surplus of the roads has increased marvelously. He expressed the opinion that if the commission were given the power to regulate security issues and initiate rates and some supervision over operation and service, the unsatisfactory conditions would be largely relieved. He thought that if the commission should fix a reasonable level of rates they would be accepted, generally speaking, both by the railroads and by the public with much less litigation than results from the rates initiated by the carriers.

"Then all of the commissioners with the possible exception of Commissioner Woolley are against Mr. McAdoo's five-year plan?" said Senator Watson.

"We don't think it is a wise plan," replied Commissioner Clark.

"And all of the commissioners, with the possible exception of Commissioner Woolley, are opposed to government ownership?"

"Yes," replied Commissioner Clark, "except that one or two of my colleagues say that they would favor government ownership in preference to some plans that have been sug-

gested." "You agree that it would be unwise to cast the railroads back without legislation?" said Senator Watson.

"Yes, unqualifiedly," replied Mr. Clark.

"Are you in favor of the elimination of all competition?" asked Senator Watson.

Commissioner Clark replied that competition in service ought to be preserved, and that the commission had never thought of consolidating the New York Central and the Pennsylvania, for instance, but rather of the consolidation of the shorter and weaker lines into larger systems. He said he had never been able to see the benefits to be derived from the so-called regional system, but thought it would be better public policy if the railroads were to be consolidated into a comparatively few large systems which then ought to be required to develop their territory by the extension of new lines where necessary.

Senator Watson asked if the commission would favor the creation of a cabinet officer to run the railroads.

"We don't think that would be a desirable plan," replied Commissioner Clark. "One man can make up his mind more quickly than a commission, but several minds working together are more calculated to produce the right result."

"Do you think Congress ought to take five years to make up its mind?" asked Senator Pomerene.

"No," replied Commissioner Clark.

Continuing his testimony on the following day, Commissioner Clark went into detailed analysis of the earnings and expenses of the railroads in 1918, 1917 and the three-year test period, showing that the standard return for the test period for the 10 months including October was $779,694,-244, as compared with a net operating income for the corresponding period of 1918 of $605,178,922. The standard return for the full year the commission had calculated at $929,966,992. Mr. Clark said that while railroad conditions were abnormal in 1918 they were also abnormal in 1917, and he doubted if Congress could get any great amount of additional information by extending the period of experimental control for five years. Within one year he thought Congress could gather all the information necessary and enact the necessary legislation. He said that while the Railroad Administration had been able to do many things that could not be done by private management under the present laws, there had never been any demonstration of what private management could do under other laws and he remarked that there was some advantage to the Railroad Administration in having a revolving fund of $500,000,000 "even if it didn't revolve."

Senator Pomerene asked if he saw any reason why the various administrative and legislative reforms could not be carried out even if the roads were turned back to their owners at an early date. The commissioner replied that the reforms could be made but their effect would be less. If the railroads were turned back they would be confronted by limitations of existing laws and be unable to do promptly many things that he was sure they would do if they were permitted. Without legislation, he said, they would be unable to continue many things which federal control has demonstrated to be advantageous, and it seemed to the commission most desirable that the legislation be enacted before the railroads are returned. He thought Congress ought to withdraw from the President the power he has to turn back the railroads on an hour's notice and that Congress ought to say when they shall be turned back. Congress could say that the period of federal control will terminate on a given date far enough ahead to allow legislation to be perfected and this would end the uncertainty.

When Commissioner Clark said that he had seen many a poor railroad turn into a good railroad after having been taken over by a large system, Senator Underwood asked what could be done in the case of an independent railroad that might be left in a precarious position because of the refusal of a connecting line to take it over. Mr. Clark thought Congress ought to allow a wide discretion to the commission in such matters so that the commission might withhold its approval of any consolidation that would leave an independent property stranded.

Senator Cummins, who has a plan for government ownership of railroad property with private operation, under which the government would issue stock or bonds for the railroads paying, say, 4½ per cent, asked the commissioner if he had considered any way in which the capital charge of railroad operation could be reduced. Mr. Clark said he had not arrived at any conclusion that would enlighten the committee. The senator said that if all capitalization were on the basis of 4½ per cent, the public would be saved approximately $250,000,000 a year by removing the necessity for paying a larger percentage on stock. Mr. Clark expressed no opinion on this point, but he agreed with Senator Cummins that private operation is more economical as far as operating expenses are concerned than government operation would be because of the larger incentive for saving, less probability of expenditures for the purpose of meeting the insistence of the residents of certain sections, and because private management is more likely to adopt new methods that will yield economies. Asked for his opinion as to whether the wages of employees should be reduced under private operation, Commissioner Clark said that, speaking generally, his view is that wages have not been advanced beyond a fair point, although perhaps some further adjustments ought to be made. Senator Cummins also asked where the director general gets his authority to set aside state rates, in view of the reservation to the states in the federal control act of police powers. Without answering this directly, Mr. Clark said he knew of no statutory authority for the director general to do anything except that contained in the federal control act and that the commission had always regarded the power to regulate rates as the exercise of police powers.

"Do you think the President ought to continue to have power to initiate rates?" asked Senator Cummins.

The commissioner replied that the only reason for giving him that power was that the government had assumed the payment of compensation to the railroads and ought to be able to earn it, but that he had always believed that the operation of the railroads for war purposes would have to result in the payment by the government of certain sums as part of its war expenses, which ought not to be charged to shippers.

Senator Pomerene introduced into the record some correspondence between Commissioner McChord and Francis H. Sisson, vice-president of the Guaranty Trust Company, in which the commissioner stated that the Interstate Commerce Commission had allowed the railroads in blanket rate cases from July 1, 1910, to July 1, 1917, increases in revenue amounting to $350,000,000 a year.

Representatives of the National Association of Owners of Railroad Securities, the Investor's Protective League, the American Short Line Railroad Association, the National Association of Railway and Utilities Commissioners, and the shippers and the labor organizations were also in attendance at the hearing prepared to testify. How long the hearings are to continue has not been definitely decided. Chairman Smith of the committee, in announcing the hearings, said it was hoped to complete them by January 15, if possible, but Republican members of the committee are in favor of a thorough consideration of the question and legislation at an extra session after March 4.

Chairman Sims of the House Committee on Interstate Commerce on January 7 introduced a bill to carry out Mr. McAdoo's plan providing for an extension of federal control until January 1, 1924, and appropriating a further sum of $500,000,000, which is to be made a part of the revolving fund.

General News Department

A meeting of the standardization committee of the American Gear Manufacturers' Association will be held at the Hotel Statler, Buffalo, N. Y., January 13 and 14.

The National Farmers' Reconstruction Conference, at a meeting held in Washington on Wednesday of this week, adopted resolutions urging Congress to enact without delay legislation providing for Government ownership of railroads. The proposed five-year test was disapproved.

E. T. Owens, Private Company D, Thirty-seventh Engineers, with the American Expeditionary Forces in France, and formerly associate editor of the *Railway Age* and the *Railway Signal Engineer*, is now attached to headquarters and has been assigned the task of writing the regimental history.

Brigadier-General Henry W. Thornton, general manager of the Great Eastern Railway of England, and formerly general superintendent of the Long Island Railroad, has been gazetted Knight Commander of the Order of the British Empire. General Thornton became a British subject in 1916. He is a member of the Railway Executive Committee which, acting for the Government, has operated the railways of the United Kingdom during the war.

A strike of freight handlers at New York City last week, Thursday, depleted the forces at the freight stations by several thousand men; but most or all of the strikers returned to work on Tuesday, January 7, after having been out three or four days. Work was resumed on promise of early attention to the demands of the men by the Federal Railroad Wage Board. While the men were out embargoes were laid on non-perishable freight destined to the New York piers but not including freight to be unloaded from team tracks; and on some commodities the embargo was placed against Boston and Philadelphia freight as well as that destined to New York, the movement of export freight having been seriously affected.

Railway Storekeepers' Association to Hold Business Meeting

The Railway Storekeepers' Association has decided to hold no convention this year but in its stead a business meeting at the Hotel Sherman, Chicago, on January 27, 28 and 29. Among the subjects to be considered at the meeting are, fundamental principles of railway storekeeping; unapplied material; labor and labor saving devices; scrap and scrap handling; the use, inspection and handling of lumber and cross ties; the conservation of materials and of cars, and the accounting for materials in the store's department.

Nominees for American Railway Engineering Association Offices

The nominating committee of the American Railway Engineering Association has selected the following candidates for offices for the ensuing year: President, Earl Stimson, general superintendent maintenance of way and structures, B. & O., Baltimore, Md.; vice-president, J. A. Atwood, chief engineer, P. & L. E., Pittsburgh, Pa.; treasurer, Geo. H. Bremner, district engineer, Bureau of Valuation, I. C. C., Chicago; secretary, E. H. Fritch, Chicago. For directors, the committee nominates Hadley Baldwin, assistant chief engineer, C., C., C. & St. L., Cincinnati, Ohio; C. F. Loweth, chief engineer, C., M. & St. P., Chicago; J. C. Mock, signal-electrical engineer, M. C., Detroit, Mich.; Geo. A. Mountain, chief engineer, Canadian Railway Commission, Ottawa, Canada; J. A. Peabody, signal engineer, C. & N. W., Chicago; H. T. Porter, chief engineer, B. & L. E., Greenville, Pa.; E. B. Temple, engineering assistant to regional director, U. S. R. A., Philadelphia, Pa.; F. L. Thompson, chief engineer, I. C., Chicago; F. E. Turneaure, dean, College of Engineering University of Wisconsin, Madison, Wis. Five members of the nominating committee are named, as follows: J. R. W. Ambrose, chief engineer, Toronto Terminals Railway, Toronto, Canada; D. J. Brumley, chief engineer for corporation, Illinois Central Railroad Company, Chicago; Maurice Coburn, supervising engineer, Pennsylvania Lines, Indianapolis, Ind.; C. F. W. Felt, chief engineer, A., T. & S. F., Chicago; E. A. Hadley, engineering assistant to regional director, U. S. R. A., St. Louis, Mo.; H. E. Hale, group engineer, Presidents' Conference Committee, New York City; A. W. Newton, chief engineer for corporation, C., B. & Q., Chicago; G. I. Ray, chief engineer, D., L. & W., Hoboken, N. J.; Louis Yager, engineer maintenance of way, N. P., St. Paul, Minn.

Additional Enlistment Records

Information concerning the number of railroad men who joined the armed forces of the nation was received from the following roads too late for publication in the annual statistical number of the *Railway Age:*

NUMBER OF MEN IN MILITARY OR NAVAL SERVICE

Name of Road	Number	Name of Road	Number
Gulf, Colorado & Santa Fe	881	Houston Belt and Terminal	48
International & Great Northern (Fort Worth Division)	93	Fort Worth Belt	7
St. Louis-San Francisco of Texas (including Fort Worth & Rio Grande)	44	Texas Midland	14
		Norfolk Southern	243
		Kinston-Carolina	5
		Carolina	1

National Foreign Trade Council at Chicago

The annual meeting of the National Foreign Trade Council will take place at Chicago on April 24, 25 and 26. A large committee on arrangements has been formed to provide adequate accommodations and suitable entertainment for the delegates to the convention. John J. Arnold, vice-president of the First National Bank, Chicago, is chairman of the committee, and the other members include labor leaders, bankers and prominent industrial and commercial men. R. H. Aishton, Northwestern regional director at Chicago, is a member of this body.

Railway Business Association

The Railway Business Association met at the Hotel La Salle, Chicago, Thursday, January 9, with morning and afternoon sessions and an evening dinner. Two hundred railway supply men were in attendance. In his opening address, Alba B. Johnson, of the Baldwin Locomotive Works, president of the association, emphasized the importance of association members leading in the discussion of the national railway problem and in shaping public opinion favorably to the ideas held by the Business Association. He urged the members to promote systematic study of the railway problem by local commercial associations. He thought the members more ready to recommend an extra session of Congress to consider legislation than to recommend a definite plan at the present time. He also discussed the relations of the association to government purchasing methods. The original purpose of the association to promote co-operation between the railways and the public is now enlarged to include relations between the railway buyer and seller. The policy of the association has been to consider individual grievances as outside the scope of the association, but general practices affecting the entire industry within its scope. An association can handle such matters which an individual could not. The committee on government purchasing policies and other standing committees presented reports and resolutions, which were adopted.

The association adopted resolutions opposing the arbitrary

cancellation of contracts, the abolition of contingent fees, the elimination of wholesalers in government purchases, and urging decentralization of testing of new devices, prompter remittances, the calling of Congress in special session to enact railway legislation, if the present Congress fails to act, urging a vigorous policy regarding improvement work and the sharing by the government of the present excess cost of work at the war-time prices, as the railway corporate revenues based on pre-war revenues favor independent federal incorporation, and the exclusive federal regulation of rates favor the creation of a federal department of transportation. The officers of the association elected at the meeting include President Alba B. Johnson, president of the Baldwin Locomotive Works, Philadelphia, and vice-presidents as follows: J. C. Bradley, president of the Pratt & Letchworth Company, Buffalo; Robert F. Carr, president of the Dearborn Chemical Company, Chicago; George W. Simmons, vice-president of the Simmons Hardware Company, St. Louis, Mo.; W. W. Willitts, president of the Adams & Westlake Company, Chicago; W. W. Salmon, president of the General Railway Signal Company, Rochester, N. Y.; K. Taylor, president of the Taylor Wharton Steel Company, High Bridge, N. J., and A. L. Humphrey, president of the Union Switch & Signal Company, Pittsburgh, Pa. M. W. Clayton, of New York, was elected treasurer.

New Airplane Records

Government airplanes arriving at Mineola, L. I., near New York City, on Tuesday, January 7, made new records of speed from the Pacific Coast and from Washington. Major Albert D. Smith, and five others, who started from San Diego, Cal., December 8, and who, therefore, had been on the road just one month, reported having traversed the whole distance in fifty-four hours, actual flying time. The precise route has not been published. The distance by rail would be something like 3,300 miles and the air line distance probably 500 or more miles shorter. This 31-day trip was made without any necessity of repairing or changing motors.

On the same day, Major-General W. N. Kenly flew from Washington to Mineola in one hour, 39 minutes, which is 20 minutes or more under the best preceding time. The distance by rail is about 245 miles.

Eric Stringer made a flight from Dayton, Ohio, to Cleveland, 215 miles, on January 7, in one hour, 15 minutes, or at the average rate of 172 miles an hour. In this case the machine carried a load of 2,500 lb. This was a Martin bombing plane, with two Liberty motors.

An airplane traveling from the government field at Houston, Tex., which arrived in Detroit, Mich., on the afternoon of January 4, is said to have covered the 1,650 miles in 724 minutes, counting only the time actually in the air. The trip had been begun on December 21. Traveling the distance named in 12 hours, 4 minutes, without a stop, would mean 136.74 miles an hour. The last part of this flight was made in temperatures below zero but with no difficulty in keeping the engine running in a satisfactory manner.

The Bonheur Train Accident

Further details are available concerning the fire on a Canadian Pacific passenger train which occurred at Bonheur, Ontario, on December 17. The fire, which destroyed a tourist sleeper, was first discovered by the car porter in the headboard of berth No. 1, occupied by a man with his wife and baby. The porter shouted at once to the passengers, but almost instantly the car was filled with dense suffocating smoke. It is believed that the fire started in this berth through the overturning of a spirit lamp or some other device used to keep food warm for the baby. While the use of such lamps in a railway car is forbidden by the law and there is no necessity for their use, means being provided in tourist cars and dining cars for heating food for children, nevertheless passengers frequently persist in trying to evade the regulation. The number of passengers who lost their lives was 14, two of them children. The number of injured was eight, all of the injuries being slight.

According to the verdict of the coroner's jury the porter exercised poor judgment in running to another car for assistance and would have accomplished much better results if he

RAILWAY REVENUES AND EXPENSES FOR OCTOBER

Item	United States				Eastern District				Southern District				Western District			
	Amount		Per mile of road operated		Amount		Per mile of road operated		Amount		Per mile of road operated		Amount		Per mile of road operated	
	1918	1917	1918	1917	1918	1917	1918	1917	1918	1917	1918	1917	1918	1917	1918	1917
1—Average number miles operated	232,623.76	232,953.40	...	...	59,942.91	59,961.00	...	...	42,616.10	42,677.01	...	...	130,064.75	130,315.39	...	...
Revenues—	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
2—Freight	364,345,144	271,395,058	1,566	1,165	162,180,375	118,148,494	2,706	1,970	53,812,455	40,581,396	1,263	951	148,352,314	112,665,168	1,140	864
3—Passenger	84,715,185	77,280,262	364	332	36,711,132	32,475,023	612	542	15,499,923	12,479,400	364	292	32,504,130	32,325,839	250	248
4—Mail	4,272,807	4,636,813	18	20	1,646,415	1,887,053	27	30	693,996	713,613	16	17	1,932,396	2,036,147	15	16
5—Express	12,680,618	9,212,441	55	39	6,342,417	4,312,418	106	72	1,647,853	1,136,443	38	27	4,690,348	3,763,580	36	29
6—All other transportation	11,773,692	10,037,416	51	43	6,661,096	5,368,406	111	90	1,011,957	861,295	24	20	4,100,639	3,807,715	31	29
7—Incidental	11,168,974	9,741,173	48	42	6,462,653	5,562,554	108	93	1,332,152	1,023,564	31	24	3,374,169	3,155,055	26	24
8—Joint facility—Cr.	524,371	384,885	2	2	275,448	182,630	4	3	119,416	90,501	3	2	129,507	111,754	1	1
9—Joint facility—Dr.	148,532	143,737	1	1	72,307	89,998	1	1	25,745	25,485	1	1	50,480	28,254	...	...
10—Railway operating revenues	489,332,259	382,544,311	2,103	1,642	220,207,229	167,846,580	3,673	2,799	74,092,007	56,860,727	1,738	1,332	195,033,023	157,837,004	1,499	1,211
Expenses—																
11—Maintenance of way and structures	63,660,493	40,490,983	274	174	28,383,913	18,027,320	473	301	9,616,287	6,357,277	226	149	25,660,293	16,106,386	197	123
12—Maintenance of equipment	118,801,741	63,895,847	511	274	59,087,350	30,998,362	986	517	17,607,761	10,014,675	413	235	42,106,630	22,882,810	324	175
13—Traffic	3,462,372	5,701,991	15	24	1,563,655	2,368,050	26	39	676,212	1,040,041	16	24	1,222,505	2,293,900	9	18
14—Transportation	185,133,534	139,351,458	796	598	90,034,671	67,624,599	1,502	1,128	27,749,969	18,967,920	651	444	67,348,894	52,758,939	518	405
15—Miscellaneous operations	3,304,741	3,010,315	14	13	1,609,228	1,408,582	27	23	342,666	281,934	8	7	1,352,847	1,319,799	10	10
16—General	9,588,742	8,409,243	41	36	4,323,996	3,691,717	72	62	1,424,457	1,310,808	33	31	3,840,289	3,406,718	30	26
17—Transportation for investment—Cr.	579,057	802,618	3	3	68,282	73,533	1	1	103,124	160,844	2	4	407,651	568,241	3	4
18—Railway operating expenses	383,372,566	260,057,219	1,648	1,116	184,934,531	124,045,097	3,085	2,069	57,314,228	37,811,811	1,345	886	141,123,807	98,200,311	1,085	753
19—Net revenue from railway operations	105,959,693	122,487,092	455	526	35,272,698	43,801,483	588	730	16,777,779	19,048,916	393	446	53,909,216	59,636,693	414	458
20—Railway tax accruals (excluding "war taxes")	16,396,539	16,621,554	71	71	6,228,510	6,357,050	104	106	2,211,684	2,387,308	52	56	7,956,345	7,877,196	61	61
21—Uncollectible railway revenues	51,929	97,105	...	...	11,519	34,274	...	...	3,919	8,126	...	...	36,491	54,705	...	...
22—Railway operating income	89,511,225	105,768,433	384	455	29,032,669	37,410,159	484	624	14,562,176	16,653,482	341	390	45,916,380	51,704,792	353	397
23—Equipment rents	*1,249,022	*1,937,173	*5	*8	*1,145,659	*2,822,537	*19	*47	*96,436	839,147	*2	20	*6,927	46,217	...	...
24—Joint facility rents (Dr. Bal.)	1,156,077	1,130,782	5	5	584,763	657,602	10	11	187,134	176,627	4	4	384,180	296,553	3	2
25—Net of items 22, 23 and 24	87,106,126	102,700,478	374	442	27,302,247	33,930,020	455	566	14,278,606	17,316,002	335	406	45,525,273	51,454,456	350	395
26—Ratio of operating expenses to operating revenues, per cent	78.35	67.98	...	...	83.98	73.90	...	...	77.36	66.50	...	...	72.36	62.22	...	...

*Debit item.

had immediately used the fire extinguishers which were at hand in the car. The jury recommended that porters be regularly put through a fire drill.

Railway Revenues and Expenses for October

Net operating income of the railways for October as reported by the Interstate Commerce Commission again showed a decrease, the total being $87,106,126, as compared with $102,700,478 in October, 1917; decrease $15,594,352. While the operating revenues increased $107,000.000, the increase in expenses was $123,000,000, and the operating ratio for the month was 78.35, as compared with 67.98 in October, 1917. After having shown a decrease for the first six months of the year, net operating income had increased in July, August and September, under the influence of the higher freight and passenger rates that went into effect in June; but in October the expenses again overtook the increase in revenues. The operating income per mile for October was only $384, as compared with $428 for the month of October in the "test" years ending June 30, 1915, 1916 and 1917.

For the 10 months ending with October the net operating income was $605,178,922, or $228,000,000 less than that for the corresponding period of 1917. While the total operating revenues, $4,032,234,144, were $677,000,000, or 20 per cent greater than in 1917, the operating expenses, $3,247,085,929, were $903,000,000, or 38 per cent greater, and taxes were $8,000,000 greater. The operating ratio was 80.53, as compared with 69.87. The freight revenues increased $461,000,000; passenger revenues $181,000,000, and express revenues $15,000,000, while the mail revenues decreased $5,000,000. Of the increase in expenses, $138,000,000 was for maintenance of way and structures, $333,000,000 for maintenance of equipment, $426,000,000 for transportation and $12,000,000 for general expenses. Traffic expenses decreased $12,000,000. The figures for October are shown in the large table.

Master Car Builders' Rules of Interchange Modified

The Master Car Builders' Association has recently issued Circular No. 25 announcing certain changes in the 1918 Code of Interchange Rules. A second paragraph has been added to rule 8, which specifies that when repairs are made to cars of private ownership equipped with a receptacle for cards, a copy of the billing repair card shall be inserted in the receptacle. A new rule, No. 23, has been formulated which provides for the periodical repacking of journal boxes. Rule 120, with some modifications, has been reinstated, effective January 1, 1919, to provide for the disposition of cars belonging to private car lines and railroads not under federal control which require extensive repairs for which the owners are responsible. The circular also contains two interpretations of Article II of the 1918 rules of interchange.

New York Railroad Club Meeting

C. A. Morse, assistant director, engineering and maintenance department, Division of Operation of the U. S. Railroad Administration, will discuss the railroad question from an engineering and economic point of view at the regular meeting of the New York Railroad Club, which is to be held on Friday evening, January 17, at the Engineering Society's Building, New York.

Master Mechanics' Association Appoints New Officers

At a meeting of the executive committee of the American Railway Master Mechanics' Association, held in Chicago on January 3, W. J. Tollerton, general mechanical superintendent of the Rock Island Lines, was appointed president of the association, to fill the vacancy caused by the resignation of F. H. Clark. C. F. Giles, superintendent of machinery of the Louisville & Nashville, was appointed first vice-president, and C. H. Hogan, assistant superintendent motive power, New York Central, was appointed second vice-president. The position of third vice-president was left vacant and will be filled by election at the time of the next annual meeting.

Traffic News

A steel barge, designed for use on the Erie Canal, the first of 24 barges ordered by the United States Railroad Administration, was launched at the yard of the Ferguson Steel & Iron Company, Buffalo, N. Y., on January 4.

Coal loading for the week ended December 21 amounted to 211,177 cars, as compared with 216,967 during the corresponding week of 1917. The total increase for the year up to December 28 is estimated at 570,077 cars.

Bituminous coal production in the United States during the year just closed, as reported by the National Coal Association, amounted to 587,500,000 tons, an increase of approximately 36,000,000 tons, or nearly 7 per cent, over the production in 1917, which was in itself a record.

J. M. Belleville, general freight agent of the Pittsburgh Plate Glass Company, Pittsburgh, Pa., has been appointed a member of the Eastern Freight Traffic Committee as the representative of shippers, to succeed G. M. Freer. This committee's headquarters is in New York.

Reductions of 25 per cent or more are announced at New York in freight rates to ports in South America, Asia, Australia and Africa. To Para, Brazil, the rate quoted last week was $22.50 a ton; to Buenos Aires, $25 a ton; to points in Japan and China, $45; Singapore, $45; Manila, $40.

Gen. W. W. Wotherspoon, superintendent of public works of the State of New York, in his annual report to the legislature, says that the federal government ought to discontinue its control of the New York State Canals, but he recommends that twelve months' notice be given before actually transferring the control back to the state.

J. W. McClymonds, vice-president and general manager of the Pacific Fruit Express Company, with headquarters at San Francisco, Cal., has resigned from that company to become general manager of the Federal Refrigerator Company, a new car icing concern which is a merger of a number of smaller companies, effective January 1.

The Iowa state railroad commissioners were granted an injunction recently restraining the American Railway Express Company from enforcing the express rates which were increased January 1. The express company is disregarding the injunction on the ground that it is not responsible for the rates as they were initiated by the director general; and furthermore it is declared that state authorities have no jurisdiction over transportation rates under the present scheme of government control. Similar injunctions have been secured by the railway commissions of South Dakota and Nebraska.

A. C. Johnson, chairman of the Western Freight Traffic Committee, Chicago, has issued Supplement 3 to reprint of Circular 3 containing explanatory rules in connection with the application of rates under General Order 28 of the director general: "Please refer to provision in Supplement 1 to reprint of Circular 3 for minimum carload charge and be advised that the minimum charge of $15 should be applied to the movement of each unit of railroad equipment moving on its own wheels, but that in the case of the combination of separately published factors to make a through charge on such a shipment, the required minimum $15 per unit is to be applied to the total charge made by such a combination and not to the separate factors."

R. D. Sangster, transportation commissioner of the Kansas City Chamber of Commerce, has written to C. A. Prouty respectfully suggesting and insistently urging that the Railroad Administration take prompt steps toward the re-establishment of foreign line offices to attend to diversions, the location of cars, the giving of passing reports and tracing, when necessary; as well as the proper quotation of rates, etc. The publication of a list designating representatives of initial lines to take care of foreign lines' interests is declared a

failure It is suggested that consolidated off-line offices might be established, each to represent a certain region. It is desired that the offices of initial Kansas City lines be kept intact and be individually operated.

The sailing day plan for less than carload freight has proved, at Kansas City, very unsatisfactory, according to a complaint presented on behalf of the Kansas City Chamber of Commerce by R. D. Sangster, transportation commissioner of the Chamber. No objection is made to the movement of freight to common points by a single road, instead of accepting shipments over all of the roads every day, but the Chamber protests against the continuance, anywhere, of the rule for shipping freight to a given place on only two or three days a week. It is admitted that, to obtain fair tonnage, it may be proper sometimes to hold a car over for a single day, but the shippers demand that carriers receive the freight into the freight house every day. The protestants believe that Kansas City is discriminated against as compared with shipping points east of the Mississippi River where the sailing day plan is not in effect. It is claimed that peddling cars from Kansas City have been loaded so full that local conductors (at the larger stations) would not unload the freight and then the car would be set out and some of the freight delayed a whole day. This, it is claimed, has resulted in a great increase in the number of loss and damage claims. It is declared unreasonable to place so much emphasis on full car loading over routes where large numbers of empty cars are moving at all times, as for example, the westward movement in a grain producing territory.

Lumber Manufacturers Open Traffic Bureau

The National Lumber Manufacturers' Association has opened a fully equipped traffic bureau in the Southern building, Washington, D. C. This bureau will interest itself in all traffic matters of a national character which affect the lumber industry. Frank Carnahan, for a number of years connected with the traffic departments of the Chicago, Rock Island & Pacific and the Chicago & Alton, is in charge of the bureau.

Central Western Loading Records

Railroads in the Central Western region showed increases in grain and live stock traffic and a decrease in coal during December. These lines loaded D43,013 cars of grain as compared to 39,123 cars during the corresponding month of 1917, or an increase of 9.8 percent. There were loaded 100,145 cars of coal as compared with 132,819 loaded in December, 1917, or a decrease of 24.6 per cent. There was increase of 25.8 per cent in the number of cars of live stock loaded, the comparative figures for December, 1918 and 1917, being 61,170 cars and 48,622 cars respectively.

Mississippi Valley Foreign Trade Convention

The Mississippi Valley Foreign Trade Convention will be held at New Orleans, La., on January 13 and 14. The primary purpose of this meeting is to promote the movement of foreign trade by way of the Gulf ports, the development of steamship lines and improvement of transportation facilities to and from the Mississippi Valley by way of the Gulf. The convention will give the producers and shippers of the Mississippi Valley an opportunity for concert of action and for co-operation in securing additional and cheaper channels of trade and wider foreign markets. It will be suggested to the convention that a Mississippi Valley Foreign Trade Development Bureau be organized for the promotion of foreign traffic through the Gulf ports. The speakers at the meeting will include Hon. Bainbridge Colby, of the United States Shipping Board; R. L. McKellar, secretary of the Exports Control Committee; M. J. Sanders, federal manager of the Mississippi-Warrior Waterways; John J. Arnold, vice-president of the First National Bank, Chicago; Harry H. Merrick, president of the Chicago Association of Commerce; James E. Smith, president of the Mississippi Valley Waterways Association; W. B. Thompson, president of the Dock Board, New Orleans, and Walter Parker, general manager of the New Orleans Association of Commerce.

Supply Trade News

The French Government has conferred upon **Samuel M. Vauclain,** first vice-president of the Baldwin Locomotive Works, the title of Chevalier of the Legion of Honor.

Ernest Baxter has been appointed general sales manager of the Kansas City Bolt & Nut Company, with headquarters at Kansas City, Mo., succeeding **L. L. Middleton,** promoted.

Edward F. Carry has resigned as chairman of the Port Facilities Commission at Washington to return to his office at Chicago as president of the Haskell & Barker Car Company.

Nelson T. Burns, formerly inspector in the mechanical department of the New York Central at New York, has been appointed district salesman for the Vapor Car Heating Company, with headquarters at Chicago, succeeding **Roswell P. Cooley.**

Cyrus J. Holland has been appointed western representative of the Wine Railway Appliance Company, Toledo, Ohio, with offices at 730 Peoples Gas building, Chicago, succeeding the vice-president, **R. F. Tillman,** who has been assigned to other duties, with headquarters in Toledo.

Nathaniel M. Rice has been elected a vice-president of the Pierce Oil Corporation, in charge of lubrication, with headquarters at 420 Olive street, St. Louis, Mo. The managers of the railroad lubricating, stationary engine lubricating and automobile lubricating departments will report to and receive instructions from Mr. Rice. Mr. Rice was formerly connected with the St. Louis - San Francisco, having occupied the position of purchasing agent, and later that of third vice-president. He was born December 28, 1863, at Rome City, Ind., received his early education in the public schools at that place, and in May, 1887, entered railway service as a brakeman on the Gulf, Colorado & Santa Fé. He served in various capacities in the transportation and store departments of the company, and on April 1, 1901, he was made assistant general storekeeper of the Atchison, Topeka & Santa Fé Coast Lines, which connection he held until April 1, 1903, when he became general storekeeper in full charge of material, fuel and stationery, serving the entire system. In November, 1913, he was appointed chief purchasing agent of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., and in September, 1916, was elected third vice-president of the same road.



N. M. Rice

Captain George A. Post, Jr., of the Ordnance Department, U. S. A., has received an honorable discharge from the military service and has returned to the service of the Standard Coupler Company, as assistant to the president, with headquarters at 30 Church street, New York.

The Wellman-Seaver-Morgan Company, of Cleveland, Ohio, has opened a San Francisco office at 415-417 Rialto building, in charge of Norman S. Ross, to handle business originating from California, Nevada, west of the 115th meridian; Lower California, and the counties of Josephine, Jackson and Klamath in Oregon.

Thomas P. Orchard, formerly production manager on the Browning machine gun tripods, with the New Britain Ma-

chine Co., New Britain, Conn., has joined the Service Engineering Company, planning and quantity production specialists, 25 Church street, New York, as sales engineer.

V. I. Smart, formerly professor of railway engineering and transportation, McGill University, and **J. A. Burnett**, formerly electrical engineer, Grand Trunk Railway System, are now associated as consulting engineers, with office at 821 New Birks building, Montreal. The lines handled will be civil, electrical and mechanical engineering.

Horace N. Trumbull, who has recently received his discharge from the Engineers Officers' Training School at Camp A. A. Humphreys, Va., has been appointed advertising manager of the Wellman-Seaver-Morgan Company, of Cleveland, Ohio. Before entering the service, Mr. Trumbull was advertising manager of the SKF Ball Bearing Company, of Hartford, Conn.

Wm. T. Lane has been appointed district sales manager of the Franklin Railway Supply Company, Inc., with offices at San Francisco, Cal. Mr. Lane has spent his entire business career in the railway supply field. For the past seven years he has constantly been in touch with locomotive development. On leaving college he went as an apprentice with the Franklin Portable Crane & Hoist Company. His next position was as draftsman for the Franklin Railway Supply Company, Inc., and then chief draftsman. In 1915, he was made mechanical engineer of this company, which position he held at the time of his new appointment.

S. D. Rosenfeld has been appointed district sales manager of the Franklin Railway Supply Company, Inc., with offices at Houston, Texas. Mr. Rosenfeld has had wide experiences in railroad work and has brought out several inventions that improved locomotive operation. He was born at Lincoln, Nebraska, and received his early education at that place. Upon leaving college he entered the service of the Chicago & North Western, serving in the machine shop and signal department, and then as fireman and engineer. In 1912, Mr. Rosenfeld resigned as locomotive engineer and entered the service of the Franklin Railway Supply Company as mechanical representative, which position he held at the time of his recent appointment.

Fred C. J. Dell has been elected secretary of the National Railway Appliance Company, effective December 24, 1918. Mr. Dell has acted in the capacity of secretary to the president of the company for the past two years, previous to which time he was connected with the American Electric Railway Manufacturers' Association as assistant to the secretary-treasurer. He held that position from March, 1911, to May, 1916, at which time he resigned to assume charge of the detail work of the exhibit committee for the 1916 convention of the American Electric Railway Association. In October, 1916, he was elected secretary of the American Electric Railway Manufacturers' Association, which position he still holds. He received his early training in the office of the vice-president and general manager's office of the Interborough Rapid Transit Company, where he was employed in a clerical capacity for a period of seven years.

The Consolidated Steel Corporation, formed recently to handle the export trade of several independent steel producers, has opened offices in the City Investing building at 165 Broadway, New York. **E. A. S. Clarke**, former head of the Lackawanna Steel Company, is president of the export concern. The other officers are **H. H. Barbour**, vice-president, formerly of the Lackawanna Steel Company; **W. Hesselman**, secretary and controller, and **A. Van Winkle**, treasurer. Mr. Hesselman was controller of the Lackawanna Company, and Mr. Van Winkle was secretary to Mr. Clarke when he was at the head of that concern. The traffic manager is **William Heyman**, formerly foreign freight agent for the Delaware, Lackawanna & Western Railroad. Eight of the independent steel companies are represented in the organization. They are the Bethlehem Steel Corporation, the Brier Hill Steel Company, the Lackawanna Steel Company, the Lukens Steel Company, the Midvale Steel and Ordnance Company, the Republic Iron & Steel Company, the Sharon Steel Hoop Company, the Trumbull Steel Company, the Whitaker-Glessner Company and the Youngstown Sheet & Tube Company. The board of directors of the new export company is made up from the heads of these companies

Reorganization of Grip Nut Company

All of the Hibbard interests in the Grip Nut Company, Chicago, have been purchased by others and the company has been reorganized with the following officers: Francis H. Hardy, chairman of the board of directors; William E. Sharp, president; Chester D. Tripp, vice-president; Herman A. Brassert, vice-president; Truman F. Miller, secretary and treasurer. The directors of the company include Messrs. Hardy, Sharp, Tripp, Brassert and Thomas G. Deering. H. E. Passmore, formerly with the mechanical department of the New York Central and later production manager of the Marble Cliffs Quarries Company, has been appointed sales representative of the Grip Nut Company. William E. Sharp, who has been elected president of the reorganized corporation, began his railway career as an apprentice in the car department of the Erie in April, 1889. In October, 1892, he was promoted to general foreman of the car and locomotive department of the same road, with headquarters at Chicago. He left the Erie in 1898, to become assistant superintendent of the Armour Car Lines. In April, 1901, he was promoted to superintendent of those lines. He resigned that position in 1911 to enter the railroad supply business as vice-president of the Grip Nut Company. He was elected president of the company in September, 1916, and became president of the reorganized corporation in November, 1918.



W. E. Sharp

Westinghouse to Build Electric Locomotives at Essington

Discussing the prospects for the year 1919 at the Essington, or South Philadelphia, Works of the Westinghouse Electric & Manufacturing Company, R. B. Mildon, assistant to the vice-president, recently made the following statement:

"We share the general opinion in the industrial field that business will slow down somewhat owing to the readjustment of the industries from a war to a peace basis; but by spring this phase should be over and then for the next few years we should have a period of prosperity.

"As far as the Westinghouse Works at Essington is concerned, we have enough orders on hand to keep us busy for the next year without considering new business which is now beginning to develop.

"We are at present making nothing here but ship propulsion machinery, but our plans contemplate bringing here all of our turbine and electric generator construction work that is now being handled at East Pittsburgh. Before we can accommodate this additional business, however, we shall have to build several new buildings, including an office building, a shop for making turbine blades, and an electric generator shop. Unless we are mistaken in our expectations, however, this new construction work should begin this spring.

"Looking a little further ahead into the future it is probable that we shall in time erect a building for the construction of electric locomotives. The electric railroad situation is unquestionably very favorable and a large amount of electrification will be undertaken in the next ten years. We co-operate with the Baldwin Locomotive Works in the manufacture of electric locomotives and our location here, so close to the Baldwin plant, makes this the proper place to do our part of the work.

"In other words, we plan to build at Essington all of our large and important apparatus, and as the demand for this class of apparatus is certain to increase rapidly from year to year,

we expect to see our plant expand in the near future to many times its present size."

Dr. Walter V. Turner

Dr. Walter Victor Turner, manager of engineering of the Westinghouse Air Brake Company, died at the Columbia Hospital, Wilkinsburg, Pa., Thursday morning, January 9. In the death of Doctor Turner the world has lost the greatest air-brake expert of the age. Doctor Turner has had a most unique career, having by the fate of destiny entered on a work that has meant so much to American railroading. He was born in Epping Forest, Essex county, England, April 3, 1866. He was in the wool business in that country and came to America in 1888 to develop his education along those lines. He was secretary and manager of the Lake Ranch Cattle Company, Raton, N. M., in 1893. In 1897 this company failed, and Doctor Turner entered the employ of the Atchison, Topeka & Santa Fe as a car repairer. In one month he was made gang foreman and three years later was made chief inspector. Having previously become interested in air-brake apparatus through a bad wreck that occurred in the vicinity of his home, he made a very careful study of its intricacies in his new position, and it was during the first year of his employ that he developed his first air-brake patent. He soon gained a reputation for proficiency in air brakes and was placed in charge of the air-brake instruction car on that road. From general air-brake instructor he was promoted to mechanical instructor for the entire system, during this time having taken out 22 patents, which were sold to the Westinghouse Air Brake Company.



Dr. Walter V. Turner

At the 1902 convention of the Air Brake Association, which was held in Pittsburgh, Doctor Turner was offered a position with the Westinghouse Air Brake Company, but refused. The offer was repeated again at the 1903 convention, and in November of that year arrangements were made between the Air Brake Company and the Santa Fe to loan Doctor Turner to the former. That arrangement was continuously in effect to the time of his death. In 1907 he was made mechanical engineer; in 1910, chief engineer; in 1915, assistant manager, and in 1916, manager of engineering. The first task of Doctor Turner with the Westinghouse company was to develop the *K* triple valve, of which there are now over 2,000,000 in use. By his untiring energy and ingenuity the art of braking trains has developed by leaps and bounds. He has been granted over 400 patents and a hundred or more are still pending. Among his latest inventions the improved empty and load brake and the electro-pneumatic brake stand out pre-eminently. These made possible an increase of 300 per cent in the capacity of the New York subways.

Doctor Turner was also an author, among the more important of his books being "Train Control—Its Development and Effect on Transportation Capacity," which was published in two volumes. He was awarded the Longstreth medal in 1911, and the Elliott-Cresson medal in 1912. He was a fellow of the Royal Society of Arts, England, and a member of the American Society of Mechanical Engineers, the American Electric Railway Association, Franklin Institute (Philadelphia), and the Pennsylvania State Chamber of Commerce. Doctor Turner's death was the result of complications, among them being enlargement of the heart and Bright's disease. He was injured two or three years ago in an automobile accident, to which he attributed his condition. He had been seriously ill since the middle of November. He leaves, besides his widow, a married son and daughter.

Dr. Angus Sinclair

Angus Sinclair, D. E., founder and editor-in-chief of Railway and Locomotive Engineering, New York, died at his home in Millburn, N. J., on January 1, 1919, at the age of 78. Doctor Sinclair was born in Forfar, Scotland. He began his railroad career as a telegraph operator and later was a locomotive engineman on the Scottish Northeastern Railway. He attended evening high school and later for several years was employed in the Customs Department in Montrose, Scotland, and London, England. A love of adventure took him to sea and after some service as a marine engineer he again took up railroad work in America, first in the service of the Erie, and afterward in the West, where he ran a locomotive on the Burlington, Cedar Rapids & Northern. During this period he attended the chemistry classes of the Iowa State University, making a specialty of water analysis, and was appointed chemist of the railroad, combined with the duties of roundhouse foreman. It was during this period that he first gave serious consideration to the problem of fuel economy and smoke prevention on which he has since written extensively.



Dr. Angus Sinclair

In 1883 he joined the editorial staff of the American Machinist, a few years later became president of the publishing company. In 1887 the company, desiring to broaden its field, established the Locomotive Engineer, of which the late John A. Hill became editor. A few years later Doctor Sinclair and Mr. Hill bought this paper, now Railway and Locomotive Engineering, and since Mr. Hill's retirement from the partnership in 1897, Doctor Sinclair has been the sole proprietor and editor-in-chief. In 1908 the faculty of Purdue University, Lafayette, Ind., conferred upon Mr. Sinclair the honorary degree of Doctor of Engineering. About this time he was appointed special technical instructor in the mechanical department of the Erie Railroad.

Doctor Sinclair has also been closely identified with the work of nearly all of the leading engineering societies in America and with some in Europe. He was the senior officer, in point of continuous service, of the American Railway Master Mechanics' Association, having been treasurer since 1900. Previous to that time he had served as secretary from 1887 to 1896. He was also a member of the Master Car Builders' Association, the American Society of Mechanical Engineers, and was instrumental in the establishment of the Traveling Engineers' Association, which was organized in his office in 1892. He was a delegate to three International Railway Congresses, at Washington, D. C., St. Louis, Mo., and Berne, Switzerland.

Doctor Sinclair is the author of a number of works on railroad subjects, some of which have become text books, including Locomotive Running and Management, Combustion in Locomotive Fireboxes, Firing Locomotives, Railroad Man's Catechism, Twentieth Century Locomotives and History of the Development of the Locomotive Engine. His first published work, Locomotive Running and Management, was begun while he was running a locomotive and was made up entirely from personal observation. It has repeatedly been revised by the author and has passed through 26 editions, the last appearing in 1915. His work on Firing Locomotives has been translated into eight languages, including Chinese. In his long and varied career Dr. Sinclair has been a pioneer in the study and development of many practices pertaining to locomotive operation which have now become well established and his influence will long be felt in practical railroad operation.

Railway Officers

Railroad Administration

Central

A. F. Duffy, assistant manager of the Safety Section, Division of Operation, of the Railroad Administration, has been appointed manager of the section, succeeding **H. W. Belnap,** deceased.

Regional

J. A. Lucey, formerly trainmaster on the Minneapolis & St. Louis, has been appointed supervisor of freight loss and damage of the Northwestern region with headquarters at Chicago.

James E. Weller, formerly general western freight agent of the Pennsylvania Lines at Chicago, has been appointed resident traffic assistant for the Allegheny region, with headquarters at Chicago.

T. W. Proctor, assistant general freight agent of the Chicago, Milwaukee & St. Paul at Chicago, and chairman of the Sailing Day Plan Committee of the Northwestern region, has been appointed supervisor of merchandise service of that region with the same headquarters.

Federal and General Managers

E. F. Blomeyer, general manager of the Ann Arbor, with headquarters at Toledo, Ohio, will also have jurisdiction over the Manistique & Lake Superior.

The authority of **George L. Peck,** federal manager, Pittsburgh, Pa., has been extended over the Grand Rapids & Indiana, which has been released from the jurisdiction of **E. D. Bronner,** federal manager.

Operating

J. J. McCullough has been appointed superintendent of the Seattle (Wash.) terminals.

Lawrence A. Downs, general superintendent in charge of the northern lines of the Illinois Central, has been promoted to assistant general manager of that line, the Yazoo & Mississippi Valley and the Chicago, Memphis & Gulf, with headquarters at Chicago, to succeed **A. E. Clift,** promoted. Mr. Downs was born at Greencastle, Ind., on May 9, 1872, and graduated from Purdue University in 1894. Early in 1895 he began railway work with the Vandalia Railroad and from March, 1896, to 1898, was in an engineering party on the Illinois Central. He then served as roadmaster from 1898 to March, 1907, on the Amboy, the Louisville, the Louisiana, the Springfield and the Chicago divisions. In March, 1907, he was appointed assistant chief engineer maintenance of way, remaining in that position until December 6, 1910, when he was appointed superintendent of the Kentucky division. On November 1, 1915, he was promoted to general superintendent of all lines south of the Ohio river, with headquarters at New Orleans, La. On August 1, 1917, he was transferred to Chicago to become general superintendent of the northern lines. He has continued in that position up to the time of his recent promotion.



L. A. Downs

C. McDonough, superintendent on the Great Northern at Everett, Wash., will also have supervision of Everett terminal.

F. C. Dow, superintendent of the Chicago, Milwaukee & St. Paul, is now in charge of the Milwaukee terminal, Tacoma, Wash.

J. W. Allen, superintendent of the Northern Pacific, will in future supervise the operation of Auburn and Tacoma (Wash.) terminals.

J. W. Barrett has been appointed trainmaster on the Salt Lake division of the Denver & Rio Grande, succeeding **J. W. Durkin,** resigned, effective January 1.

Albert E. Clift, assistant general manager of the Illinois Central, the Yazoo & Mississippi Valley and the Chicago, Memphis & Gulf, has been promoted to general manager, with headquarters at Chicago, to succeed **T. J. Foley,** deceased. Mr. Clift was born at Urbana, Ill., on October 15, 1869, and entered railway service with the Illinois Central on December 5, 1888, as a brakeman. He was later a conductor on the same line and on the Cleveland, Cincinnati, Chicago & St. Louis. On February 19, 1893, he returned to the Illinois Central as engine foreman of the Champaign district. From March 7, 1893, to February 22, 1905, he was consecutively yardmaster, conductor on the Chicago district, passenger conductor on the Chicago division, acting trainmaster of the Chicago district at Kankakee, Ill., and trainmaster of the Chicago division. On the latter date he was appointed superintendent of the Freeport division at Freeport, Ill., and on January 16, 1907, was transferred to the St. Louis division at Carbondale, Ill. On June 1, 1910, he was promoted to general superintendent of the southern lines with headquarters at New Orleans, La., and on November 10, 1912, was appointed general superintendent of the northern and western lines at Chicago. He was appointed general manager on August 1, 1917, to succeed Mr. Foley, who was then elected vice-president of operation. With the readjustment of railroad titles under government control Mr. Foley was made general manager and Mr. Clift assistant general manager. As general manager under the present organization, Mr. Clift takes over the duties formerly performed by Mr. Foley.



A. E. Clift

M. W. Clement has been relieved of his duties as superintendent of freight transportation and has been appointed acting superintendent of passenger transportation of the Pennsylvania Railroad, Eastern Lines; the West Jersey & Seashore; the New York, Philadelphia & Norfolk, and the Huntingdon & Broad Top Mountain Railroad, vice **D. C. Stewart,** furloughed.

William Elmer, superintendent of the Schuylkill division of the Pennsylvania Railroad, Eastern Lines, with office at Reading, Pa., has been appointed acting superintendent of the Philadelphia division vice **F. W. Smith, Jr.,** furloughed, and **C. D. Young,** formerly superintendent of motive power with office at Wilmington, Del., has been appointed acting superintendent of the Schuylkill division vice Mr. Elmer. Mr. Young resigned in November as superintendent of motive power to become a lieutenant-colonel in the transportation corps, engineers.

J. J. Pelley, general superintendent of southern lines of the Illinois Central and the Chicago, Memphis & Gulf, with

headquarters at New Orleans, La., has been transferred to Chicago as general superintendent of the northern lines of the Illinois Central, succeeding **L. A. Downs**, promoted to assistant general manager. **J. M. Egan**, superintendent at Fulton, Ky., has been promoted to succeed Mr. Pelley at New Orleans. **J. W. Hevron**, superintendent at Clinton, Ill., has been transferred to Fulton, Ky., to succeed Mr. Egan; **C. W. Shaw**, trainmaster at East St. Louis, Ill., has been promoted to superintendent at Clinton, succeeding Mr. Hevron; **J. D. White**, trainmaster at Carbondale, Ill., has been transferred to East St. Louis, succeeding Mr. Shaw, and **E. D. Holcomb**, chief clerk in the office of the general superintendent of transportation at Chicago, has been appointed trainmaster at Carbondale to succeed Mr. White.

Financial, Legal and Accounting

L. C. McCutcheon has been appointed freight claim agent of the St. Louis-San Francisco, with jurisdiction over freight, loss and damage claims, with headquarters at Springfield, Mo. **G. E. Whitelam** having resigned, the office of superintendent of freight, loss and damage claims is abolished.

F. A. Winkler, acting federal treasurer of the Chicago, Milwaukee & Gary, with headquarters at Rockford, Ill., has been appointed federal auditor to succeed **C. G. Nelson**, who has resigned to go with the corporation. **V. E. Nelson**, disbursement clerk at Rockford, has been promoted to acting federal treasurer to succeed Mr. Winkler.

Traffic

J. J. Cowan, chief clerk to the vice-president and general manager of the Pacific Fruit Express Co., with headquarters at San Francisco, Cal., has been appointed district agent with the same headquarters.

J. T. Conley, general freight agent of the Chicago, Milwaukee & St. Paul at Chicago, resigned effective January 1. He was succeeded by **C. A. Lahey**, whose appointment was announced in the *Railway Age* of January 3.

L. F. Vosburgh, passenger traffic manager of the New York Central lines east of Buffalo, has had his authority extended over the lines west of Buffalo, with headquarters at New York City; and **J. W. Daly**, passenger traffic manager of the lines west of Buffalo, has been appointed assistant passenger traffic manager, with headquarters at Chicago.

J. W. Graham, in addition to his duties as general freight agent of the Toledo, St. Louis & Western, has been appointed assistant general freight agent of the Wabash Railroad with office at Toledo, Ohio; **C. E. Rose**, assistant general passenger agent of the Toledo, St. Louis & Western, has also been appointed assistant general passenger agent of the Wabash Railroad, with office at Toledo, and **D. E. Gilbert**, division freight agent of the Wabash Railroad, with office at Toledo, will continue in charge of all Wabash matters on the Toledo and Peru divisions.

Robert L. Russell, whose appointment as freight traffic manager of the Philadelphia & Reading, with headquarters at Philadelphia, Pa., has already been announced in these columns, was born on July 19, 1867, at Jessup, Md., and was educated in the general schools. He began railway work in October, 1882, with the Baltimore & Ohio at Baltimore, Md. He subsequently served as a general clerk on the Long Island Railroad, and then as general clerk and later as chief clerk in the freight department of the Philadelphia & Reading. He then was appointed freight claim agent of the same road and three years later was promoted to assistant general freight agent. In 1909 he was appointed general freight agent and since July, 1918, served as assistant freight traffic manager until his recent appointment as freight traffic manager of the Philadelphia & Reading, the Central of New Jersey, the Baltimore & Ohio New York Terminals and associated lines.

Engineering and Rolling Stock

H. Stringfellow has been appointed district engineer of the Southern Railroad and associated railroads, with office at Charlotte, N. C., and **F. Furlow** has been appointed engineer of surveys with office at Washington, D. C.

A. Yappen, district carpenter of the Chicago, Milwaukee & St. Paul at Chicago, has been appointed assistant engineer in charge of bridge maintenance, inspection and erection on lines east of Mobridge, S. D., with the same headquarters, succeeding **C. N. Bainbridge**, recently promoted to engineer of design.

N. Bell, formerly master mechanic of the Minnesota and Iowa divisions of the Illinois Central with headquarters at Waterloo, Iowa, who has just returned from military service, has been appointed to the same position, succeeding **O. A. Garber**, who has been transferred to Memphis, Tenn., succeeding **W. H. Watkins**, granted a leave of absence, effective January 1.

William Gemlo, master mechanic of the Minneapolis & St. Louis at Marshalltown, Iowa, has been promoted to superintendent of motive power and rolling stock with headquarters at Minneapolis, Minn., to succeed **G. W. Seidel**, recently resigned to become superintendent of motive power of the Chicago & Alton and the Chicago, Peoria & St. Louis, with headquarters at Bloomington, Ill.

Purchasing

G. W. Alexander, storekeeper of the Central of Georgia, has been appointed general storekeeper, with headquarters at Macon, Ga.

J. H. Nichols has been appointed general storekeeper of the New York, Chicago & St. Louis with headquarters at Cleveland, Ohio.

E. A. Workman, storekeeper of the Baltimore & Ohio Eastern Lines, with office at Keyser, W. Va., has been appointed district storekeeper of the Maryland district, with headquarters at Camden station, Baltimore, Md., vice **O. V. McQuilkin**, deceased.

Charles W. Yeamans, assistant engineer of the Chicago & Western Indiana, has been appointed purchasing agent of that road and the Belt Railroad of Chicago, with headquarters at Dearborn station, Chicago, succeeding **Rov Benson**, transferred to other duties.

Corporate

Executive, Financial, Legal and Accounting

G. R. Martin, vice-president and controller of the Great Northern at St. Paul, Minn., has been elected also president of the Minnesota Transfer Railway Company.

C. G. Nelson, federal auditor of the Chicago, Milwaukee & Gary, with headquarters at Rockford, Ill., has been appointed auditor of the corporation with the same headquarters.

Eugene E. Fairweather has been appointed assistant counsel of the Canadian National Railways with office at Ottawa; **Archibald J. Reid, K.C.**, and **Reginald H. M. Temple**, at Toronto, and **H. F. Alward**, general solicitor and claims agent of the Canadian Government Railway at Moncton, N. B., have been appointed general solicitors of the Canadian National Railways, all with offices at Montreal, Que.

Obituary

M. P. Washburn, formerly chairman of the Southeastern Mississippi Valley Association, with office at Louisville, Ky., died in New York on January 4, at the age of 64.

The London Iron & Steel Exchange, Ltd., has been formed, says the Railway Gazette, of London, by a group of some forty of the leading British firms engaged in the iron, steel and metal industries. It comes into being at an auspicious moment, when the whole tide of industrial activity is being turned from purposes of war to purposes of peace. The secretary's office is at 113, Queen Victoria street, E.C.4, and for the purposes of its business the London Iron & Steel Exchange, Ltd., has secured the great Pillar Hall of Cannon Street Hotel.

EDITORIAL

Railway Age

Why Not Invite Foreign Railway Men?

American railway supply manufacturers now have an exceptional opportunity to introduce their products into the markets of the world. The exhibit which the National Railway Appliances Association will present in Chicago during the week of March 17 will provide the first opportunity for the display of American railway materials since the conclusion of hostilities. Although this exhibit is limited to the materials used in the engineering, maintenance and signaling departments there is great opportunity for the exploitation of supplies of this character in the foreign fields. This condition would appear to justify the officers of the Appliances Association in extending a special invitation to railway officers in foreign countries to attend the exhibit. Although the time is short it will still permit men to come from Europe and South America if the exhibit is brought to their attention promptly. Such an invitation might well be issued jointly with the American Railway Engineering Association, which will hold its annual convention in the same city and at the same time. In fact no more constructive action could be taken in arranging the pogram for that week than to set aside an evening at which representatives of foreign railways could be invited to speak on the conditions and the needs of the railways in their countries.

Announcing a New Department

Among the many activities of the *Railway Age* during the year just past has been the publication of numerous articles intended to encourage the interest of its readers in foreign trade in railway supplies. Emphasis has been placed in these articles on the great need for railway equipment and supplies brought about in many countries by the cessation of imports from the warring nations; and attention has been directed to the favorable position of our own supply industry as regards both making up these deferred demands and filling those that will result from future development as soon as financial and industrial conditions permit. Foreign trade to the rank and file of American manufacturers at least, up to within the past two months, has been more or less of a theoretical matter. Now that the demands of war are over, however, it has become a very practical one and is receiving the attention of every progressive concern that is in any way equipped to sell its goods in other lands. With the development from the theoretical to the practical interest that is being everywhere evidenced in foreign trade, the *Railway Age* this week advances to a new step. It will continue to publish important articles of general interest, but, in addition, it has also established a new section in the General News Section to be headed Foreign Railway News. It will be the purpose of this section to present to the readers of the *Railway Age* a brief summary of happenings on the railways of the world outside the United States, particular attention being paid to those developments of greatest interest to the American reader. The aim of the editors will be twofold (1) to help sustain and encourage the present interest in foreign lands and in foreign trade and (2) to give those practical points of information that will, to the greatest possible extent, help American firms in securing and carrying on foreign trade. The information for the new section will be obtained from many and various sources, but it is the expectation that the greatest value will lie in the original items secured from the paper's correspondents in various countries the world over.

Government Slow Paying Bills

One reason why the railroads are unable to pay their bills promptly, thus causing much embarrassment to some of the supply companies and manufacturers, is because of the slowness of various departments of the government in paying the railroads for transportation. It appears that in many cases this is largely due to red tape and complicated checking methods which would not be tolerated for a minute in any up-to-date business establishment. The Railway Administration is asking for statements from different roads as to the amounts of the bills due and the departments of the government involved, with a view to improving the situation. The story that is going the rounds about an army officer delaying the mustering out of 200 men for five days in order that he might secure a certain rubber stamp may not be true, but without doubt it reflects more or less clearly a condition that really does exist in a much larger way and on an enormous scale. It is time that business men took a more active interest in government affairs, large and small.

The Prevention of Collisions

The collision at South Byron will revive discussion of the automatic train stop. This tragedy once more impresses the lesson that making cars of steel does not cure all of our ills; that enginemen (with first-class reputations) get sleepy on express trains the same as on slow freights, and that the monitorship of the firemen constantly proves itself worthless; in short, that a force of 100 per cent enginemen, even for the few fastest trains, is an iridescent dream. There may be such men, but no superintendent has been able to classify and record them. The discussion of the automatic stop should now take a practical turn, for the Railroad Administration has appointed a strong committee on the subject (as noticed in our Washington news) with a view to the commencement of comprehensive tests. The collision occurred on January 12. The committee was announced on January 14. It is to be borne in mind that automatic stops will not work miracles. The collision record—Fort Washington, Pa., already has added 12 to South Byron's death list—calls for vigorous action in other directions, as is pointed out in a letter, printed in another column, commenting on the collision of last September at Birdsell, Nebr. Moreover, the public is looking to the Railroad Administration not only for a study of the subject—committees sometimes spend an interminable succession of months in their deliberations—but for a lucid and intelligible policy. The frankness which has characterized Mr. McAdoo's attitude toward the public in some directions has been conspicuously lacking in the matter of the prevention of collisions.

The Railway Business Association

THE CONVENTION of the Railway Business Association in Chicago last week was purely a business meeting. No guests not engaged in the railway equipment and supply business were invited to any of the sessions. The subjects discussed and passed upon were all subjects of interest and importance to the members of the association primarily to persons and concerns engaged in making and selling machinery and materials to railways. From this point of view the meeting was a decided success.

The association originally was organized chiefly to bring about closer relations between the railway supply concerns and their customers—the railways—and to help secure fairer and more constructive railway regulation. The adoption of government operation of railways, and certain policies initiated by the Railroad Administration, brought forcibly home to the railway supply people the fact that they had "troubles of their own." The main function and duty of the association have since become those of representing its members in an effort to reduce the number of the troubles they have in common, and of reducing the seriousness of the part of their common troubles which cannot be entirely eliminated.

The developments of the past year suggest the thought that the activities of the association might be, and probably ought to be, increased and intensified in several ways. Whether the railways remain in the hands of the government, or, as now seems probable, are soon returned to private management, the railway equipment and supply concerns will have in future—and, indeed, have now—many problems which they can solve better by organized than by merely individual study and action. They are both manufacturers and merchants; and all are dealing with the same class of customers. They pass together through the same periods of large orders and of small orders; they have similar problems regarding labor and materials; they have similar selling problems. Like concerns of every class, they include many that wish to do business on the highest plane of commercial and ethical principles, and some which are not wholly indisposed to do business on a low plane. Also, like every other class of concerns that makes or sells goods, they have many customers who wish to do business in accordance with sound commercial and ethical principles, and some customers who do not. They meet like difficulties in securing the testing and adoption of new devices, and in getting the devices they sell properly maintained and operated. Under prolonged or permanent government operation they would have not only the problem of getting the government to buy their goods on reasonable terms, but of keeping the government from engaging in competition with them, on the theory that it could make many kinds of equipment and devices cheaper than independent manufacturers would or could afford to sell them. Even under private management they will always have in more or less serious form the problem of convincing the railway managements that it is better for the railways to buy from independent manufacturers than to attempt to make their own equipment and supplies.

The foregoing suggests but a part of the problems which railway supply concerns have in common, and which it might profit them to attempt to solve largely by concerted investigation, discussion and action. The Railway Business Association is the organization by which the various necessary activities should be originated and sponsored. Under President Johnson's leadership it is moving in the right direction. There is reason to believe it could be developed into an organization which would put the entire railway equipment and supply industry on a higher commercial and ethical plane, broaden and improve its markets, and increase its prosperity, while at the same time making the railway equipment and supply concerns of the United States an even more potent force than they have been in the past in improving the art of railroad transportation.

Mr. Hines as Director General

THE RAILWAY OFFICERS and employees, the railway companies and the public deserve to be congratulated upon the appointment of Walker D. Hines as director general of railroads. In fact, we think everybody concerned deserves to be congratulated except Mr. Hines himself.

Mr. Hines accepted a place in Director General McAdoo's cabinet a year ago at a great personal sacrifice. He was one of the most successful lawyers in the country and one of the principal officers of one of the greatest railroad companies. To go to Washington and become assistant director general meant giving up his usual pursuits and accepting a position which would yield him a much smaller income and require of him work of a much harder and more exacting, and, perhaps, less congenial, kind. The policies which have been adopted by the Railroad Administration have been primarily those of Mr. McAdoo. Whatever may be thought as to the expediency or wisdom of those policies, nobody can question that they have been ably and energetically carried out; and to Mr. Hines must be attributed a large part of the ability and energy with which they have been carried out.

Mr. McAdoo has now left the ship. The reasons he has given for leaving it do not constitute a sufficient justification for his action. He devoted a year to destroying the old organizations of the railways and to building up a new unified organization to replace them. Just when the unsettlement and uncertainty in the railroad field were greatest, when the time for transition from a war to a peace basis had come, and there was the largest number of difficult problems pending ever known, he suddenly announced his resignation—and then recommended that his plan of unified government operation should be experimented with for five years more!

Obviously, Mr. McAdoo's retirement, in these circumstances, was found to leave a most difficult and embarrassing situation for his successor to deal with. Mr. Hines has not confided to *us* his feelings in regard to the matter, but we can hardly conceive that he has accepted the director-generalship because he really wanted it. Undoubtedly he has taken it because he has considered it his patriotic duty to do so.

Mr. Hines favors the five-year plan of government operation proposed by Mr. McAdoo. He made a powerful argument in favor of it before the Railway Committee of the Chamber of Commerce of the United States. His argument did not convince us, nor did it the chamber, but everybody who heard or has read it must admire the clarity and force with which it was made. Mr. Hines will show as director general the same public spirit and ability he has shown as Mr. McAdoo's assistant. Should the unexpected happen, and the five-year plan be adopted, he will probably give the railroads as good management as anybody could give them under this plan. We do not believe the man lives who could manage the railways successfully and satisfactorily during the proposed five-year test; but Mr. Hines doubtless could come as near it as anyone. If the expected does happen and Congress decides to turn the railways back to private operation in a comparatively short time, Mr. Hines, with his great knowledge of the railway situation in general, as well as of the existing relations between the government and the railway companies, can be relied upon to represent the interests of the government ably but fairly in connection with the transfer back to private operation.

For many reasons, some of which lie apparent and some of which do not, Mr. Hines' work as director general will be extremely hard and trying. Nobody knows this better than he does, which makes the credit he deserves for having accepted the position all the greater.

The American Railroad Association

THE AMERICAN RAILWAY ASSOCIATION is to be reorganized under the above name, and there is to be amalgamated with it the American Railway Master Mechanics' Association, Association of Railway Telegraph Superintendents, Association of Transportation & Car Accounting Officers, Freight Claim Association, Master Car Builders' Association, Railway Signal Association, and Railway Storekeepers' Association. The *Railway Age* has advocated for a number of years a co-ordination of efforts between the American Railway Association and the other associations which would preserve the identity and initiative of the junior associations, but would promote co-operation, prevent overlapping of activities and give additional power to the recommendations of the junior associations. Except for the loss of name of the junior associations, this appears to be the underlying principle adopted in the formation of the new American Railroad Association. Besides the executive committee of this new association there are to be five sections, dealing with operating, engineering, mechanical, traffic and transportation questions. By transportation is meant such activities as were formerly handled by the Association of Transportation and Car Accounting Officers, per diem rules, etc. By operating is meant such activities as the transportation of explosives, operating rules, prevention of accidents at grade crossings, etc. It is expected that the new organization will be in full working order by March 1. The circular, making announcement of the organization of the new association, makes no mention of taking over the activities of the American Railway Engineering Association, which has preferred to retain its individuality, but it will be noted that one of the sections of the new association is devoted to engineering.

The organization of the new association provides specifically for home rule for the five separate sections. Each section is to formulate its own rules of procedure and its methods of selecting committees and members thereof, and each section elects its own chairman and vice-chairman. This means that there will be no interference with conventions and that the work of the associations can go on much as it has gone on before, except as to the change in name, and, in the case of the mechanical associations, the Master Car Builders and the Master Mechanics will be combined in one section. The recommendations of the different sections will be recommendatory only, but during the period of federal control, the director general may make such recommendations mandatory. In the past, the junior associations have derived great benefit from the fact that scientists and others, not railroad officers, have been active members of the associations. It is very desirable that this practice should be continued, and the organization of the new association provides that any section, with the approval of the executive committee, may permit others than those that are representative members of the railroads to become affiliated members. These affiliated members may serve and vote in committees, and each section fixes the qualifications of affiliated membership for itself. This is obviously a wise, sound provision.

The junior associations are left with all the power that they had before, with home rule and freedom of action, but the nature of the American Railway Association has been radically changed. The officers of the association are not elected by the members of the association, but by the executive committee from among its own membership. The Railroad Administration has 10 out of 19 members of the executive committee; three appointed by the director general and seven regional directors. The members of the association, not having the power to elect their officers, and having only a minority representation on the executive committee, are subordinate in the direction of the affairs of the association to the Railroad Administration. Since the regional directors are, however, all successful railroad men of the highest standing, this should not interfere with the association taking the lead in the development of the science of railroading. On the other hand, when the roads are returned to private operation, it should be a comparatively simple matter to change the organization and by-laws of the American Railroad Association so as to make it an organization embodying the principles for which the *Railway Age* has contended. All that would be necessary would be to make the entire membership of the executive committee a matter of selection by members of the association, and to give it the power to make recommendations of the various sections mandatory.

Solving the Railroad Problem

IN ONE OF HIS WRITINGS Matthew Arnold referred to "the process of wandering between two worlds, one dead, the other powerless to be born." This process, he added, "helps nothing." The railroads are now wandering between two worlds. One undoubtedly is dead. Whether a new and better one will prove powerless to be born remains to be seen.

The railroad problem is the greatest of America's problems of reconstruction. In many respects the railroad situation is so bad that a mind at once thoughtful and timid would be tempted to conclude that the problem it presents cannot be satisfactorily solved within any reasonable time. But the very badness of the situation is its hopeful feature. It has become so bad that everybody at last sees that something really important and constructive must be done. Perhaps "cut of this nettle, danger, we pluck this flower, safety."

We have had experience within recent years with three systems of railroad operation. First, until April, 1917, we had operation subject to government regulation and to laws enforcing competition. Second, from April, 1917, to January 1, 1918, we had operation under the Railroads' War Board, which sought to manage the railways as a single system in spite of government regulation and of the laws to enforce competition, and without government guarantees of net income. During 1918 we had unified government operation, with net income of the companies guaranteed, and operation taken entirely out of their hands. Competition was abolished; and emulation in operating efficiency was discouraged by the requirement that all the parts of the railroad system should be worked primarily for the benefit of the whole and practically not at all to make showings for its many parts. No intelligent and thoughtful person could observe the effects which the methods used under these different systems have had upon the opinion of the various parts of the public, and study the operating and financial results which have accrued, without having his old views of the way in which the railways should be dealt with modified, and getting some new ideas as to the way in which the railway problem should be solved.

Foreign experience also throws light on our domestic problem. We do not know exactly how the government-operated railways of Germany have come through the war; but the available evidence indicates that they have not come through well. The railways of Great Britain, which have been privately operated under government control, have come through

very well. Much of the same thing may be said of those of France. Private initiative has beaten government bureaucracy in every crucial test.

The views of the *Railway Age* have undergone considerable modification, especially as a result of the experience of the United States with government operation during the last year. We did not believe from the start that unified operation subject to highly centralized direction from Washington would work well. We began saying so a year ago, and we continued to say so. In some respects the results obtained have been better than we anticipated; in others, worse. The problem before the statesmen and the people of the United States is to preserve in some way the parts of the present system which have done good and eliminate those which have done harm.

The problem should be looked at almost exclusively from the standpoint of the public. Nothing which is beneficial to the public can in the long run be harmful to any special class or interest. What are the principal ends which any sound solution of the railroad problem will attain for the public?

First, adequate transportation facilities and good service.

Second, fair wages and good working conditions for railway employees.

Third, the most economical operation which is consistent with the two things mentioned above.

Fourth, passenger and freight rates which will be as low as is consistent with all the foregoing, and which will also be equitable as between different shippers and communities.

Reason and experience demonstate that the foregoing ends can be attained only through private ownership and operation, under conditions which will promote and encourage the full exercise of initiative and enterprise in the development and management of the railways. Private ownership and operation merely will not be sufficient. It is easily conceivable that some system of private ownership and operation might be adopted which would be superior in few or no respects to government ownership and operation. For example, it is very doubtful whether the ownership and operation of the railways by a single corporation would have many, if any, advantages over government ownership and operation. The wastes and evils resulting from the excessive competition which formerly prevailed were so great and glaring that they led many persons to decide that the operation of the railroads, even though private ownership was retained, should be turned over to a single monopoly, or to a very few companies, each having a monopoly in its own territory. After a year's experience with absolutely non-competitive operation and service, the sentiment of railway men and the public has crystallized in favor of the adoption of some system under which a measure, and an important measure, of competition will be restored. We think this view is sound. We believe the desire for a reasonable measure of competition in service is one of the principal elements causing the public to desire a return to private operation, and that the public would never be satisfied with any system which did not provide for a considerable amount of competition.

What are the principal conditions it is necessary to bring about in order to enable the railways, under private ownership and management to attain the ends which it is desirable, in the public interest, that they shall attain? Among the principal conditions which it is necessary to bring about are the following:

First, reasonable competition in service and intense emulation in operating efficiency.

This condition cannot be provided except by having in each of the large territorial divisions of the country two or more railways which render service in direct competition with each other and which operate under circumstances which render it practicable intelligently to compare their operating results. We had emulation in operating efficiency and competition in service before government control was adopted. We never can have too much emulation; but competition in service formerly was excessive, and also very unequal, because of the widely differing strengths of the competitors. Too much competition causes wastes which ought to be, and can be, avoided, without impairing the service rendered.

Second, co-operation and coördination in the operation of railways in the same territoy, which, while not interfering with emulation and reasonable competition, will prevent the wastes caused by excessive competition.

If such co-operation and coördination as are suggested are to be brought about some negative and some positive measures must be adopted. The anti-pooling clause of the Interstate Commerce Act, and the Sherman anti-trust law as it applies to railways must be repealed. Binding agreements regarding operation and service must be made or actual consolidations must be effected, under the supervision or actual mandate of public authorities by groups of railways operating in the same sections. In almost every territory there are several roads which are very unequal in physical condition, operating efficiency and financial strength. If the laws to enforce competition were withdrawn, would the various railway companies voluntarily make the agreements, or effect the consolidations needed to preserve needed competition, and at the same time eliminate wasteful competition? Perhaps they would; but that they might not is conceded by the chief executives of the railway companies.

The Association of Railway Executives has presented to the Senate committee on Interstate Commerce a plan for government regulation and control of private operation (*Railway Age*, January 10, page 131). This provides for transfer to a Secretary of Transportation of most of the executive and administrative functions of the Interstate Commerce Commission, the commission to be left "authority to pass upon all questions concerning the reasonableness and adequacy of rates and concerning discrimination." The Secretary of Transportation would be empowered, if the railways did not themselves make the necessary agreements regarding the handling and distribution of traffic, to transfer traffic from congested lines to other roads and to require such common use of equipment and terminals as was necessary. He would have authority to approve of the pooling of cars and other transportation facilities and the division of earnings in connection with the elimination of unnecessary train service, when proposed by the carriers, and to authorize consolidations and mergers when deemed by him to be in the public interest. Under the railway executives' plan, no public authority would have power to require consolidations and mergers. Doubtless, however, if this were authorized many of the weaker lines of the country would be absorbed by the strong roads in their territories. It would seem that the methods suggested by the railway executives would be sufficient to bring about the needed co-operation in railway operation, and to prevent the wastes of competition without eliminating needed competition. The Interstate Commerce Commission also recommends "mergers within proper limits of the carriers' lines and facilities in such part and to such extent as may be necessary in the general public interest."

Third, prompt, impartial and expert determination of questions regarding the wages and working conditions of railway employees.

The plan of the railway executives provides that a board should be constituted under the Secretary of Transportation to deal with such matters, on which the employees, the employers and the public should have equal representation, and that pending the investigations and reports of this board and for a reasonable time thereafter there should be no action by the carriers or the employees which would result in interference with transportation.

This is obviously a fair proposition. Whether, in view of

what occurred in the railway field within the two years before government control was adopted, the railway labor unions will concur in it, seems doubtful. Obviously, however, for the protection of employees, of employers and of the public, some method for settling labor disputes on the railways without lockouts or strikes must be provided by law.

Fourth, the establishment of railway credit on a firm foundation.

The re-establishment of the credit of the railway companies is the most important phase of the great problem with which railway owners, statesmen and public are grappling, and not enough consideration is being given to this phase of the matter. The country needs well rounded expansion and improvement of the facilities of all the existing railways, and construction of some new railways. It would be worse than useless, from the standpoint of public interest, to return the railways to private operation without legislation to insure that they would be able to raise new capital in proportion to the needs for facilities and service of the territories in which they severally operate. Private management can accomplish more for the public than government management with a given amount of capital, but even private initiative and enterprise cannot give the public good and adequate service unless it can raise the means for providing needed facilities.

The financial positions of the many existing railway companies vary widely. Some are strong enough to raise capital by selling their stock. This, of course, is the ideal method, but a company has to earn more money to pay satisfactory dividends on stock than to pay satisfactory interest on bonds. Some companies cannot sell stock, but can still sell at par bonds bearing a rate of interest reasonably measured by what industrial concerns have to pay. Many railway companies cannot raise new capital without paying excessive rates of interest on it, and many can hardly raise new capital at all.

Many persons have attempted to use the average net return earned by all the railways in the past to prove that they were making enough adequately to develop their facilities. We do not believe that the average return the railways as a whole were earning for several years before government control was adopted would have been sufficient to have caused adequate expansion of their facilities even if each of the companies had been getting the average, no more and no less. But, of course, some were getting much more than the average and some much less. The excess over the average which some were earning was not available for the use of those that were earning less than the average, and in consequence while some of the railways were constantly increasing and improving their facilities, others were practically standing still, and the transportation facilities of the country as a whole were not being developed and improved, as was necessary in the public interest, for the public interest demands increase and improvement of facilities in every territory and almost in every community.

The plan of the Association of Railway Executives, and also the suggestions made to Congress by the Interstate Commerce Commission (*Railway Age,* January 10, page 133) deal more or less indirectly with the problem of establishing railway credit. Both propose federal regulation of the issuance of railway securities. This is good as far as it goes. Both the Interstate Commerce Commission and the railway executives say that advances in wages should be recognized in fixing rates. The railway executives would transfer the power of suspending advances in rates from the Interstate Commerce Commission to the Secretary of Transportation, who should be required to act within thirty days, and rates should be referred to the Interstate Commerce Commission before going into effect only if the secretary suspended them. The railway executives also propose that the law shall provide the rule of rate-making, and "shall require that rates be not only what has been called reasonable, but adequate and sufficient to enable the carriers to provide safe, adequate and sufficient service, to protect existing investments and to attract the new capital necessary in the public interest." They would also have the law provide that "existing rates which have been put into effect by the director general of railroads and are based in part upon increased wages should be continued in effect until changed by the Interstate Commerce Commission on complaint."

Important and desirable as all these provisions are, they do not seem to go to the heart of the matter. They would not insure that the average net return which the railways would be allowed to earn in future would be any less inadequate than the average which they were allowed to earn before government control was adopted. Neither their adoption, nor the adoption of the proposals which have been made regarding co-ordinated operation of the railways, would give any assurance that a large part of the railways would not continue to be unable to raise and invest the new capital which the public interest demands.

In other words, none of the plans which have been formally presented to Congress would solve the problem presented by the existence and operation of the so-called "strong" roads and "weak" roads side by side in every part of the country. Of course, if we could be sure that under the new legislation there would be a substantial absorption of the strong roads by the weak roads, the situation would present a different aspect. But no law should, and probably no law could, require this. The plan by the railway executives proposes to authorize the Secretary of Transportation to permit "division of earnings in connection with the elimination of unnecessary train service." It may be if the anti-pooling law were repealed the weak roads would profit by being paid by the strong roads to discontinue unnecessary service. It must be said, however, that the plans of the Interstate Commerce Commission and of the railway executives leave entirely to conjecture what methods, if any, would be adopted to solve the problem of the "weak and strong roads."

It has been largely owing to the need for solving this problem in order to secure a satisfactory and salutary solution of the larger railway problem, that the organization of regional holding companies to acquire stock of railways in whole territories has been proposed. It is doubtful, however, whether any such scheme can secure a friendly hearing now, because public sentiment apparently has crystallized in favor of the restoration of a considerable amount of competition. Another plan which has been suggested is that rates shall be so fixed that the railways as a whole shall be enabled to earn an average return on their property investment of, say, 6 or 7 per cent, that railways which, under this arrangement earn in excess of this amount shall be required to divide the excess with the government, and that the government shall loan the money thus secured by it at a very low rate of interest to the weak roads to enable them to build up their properties.

In our opinion, the best solution would be one under which the strong roads would absorb the weak roads in their territories with the result that competition would not be destroyed, but that the competition which occurred would be almost entirely between strong railway systems. It is probable, however, that if any such solution is ever reached it will have to come after the railways have been returned to private management. Meantime, more consideration should be given by railway corporate officers and public men to the question of what is to be done to protect and rehabilitate the weak roads, physically and financially, both before and after their return to private operation. Unless this problem is solved in some way there will be no solution of the general problem of re-establishing railway credit; and unless railway credit is firmly established no scheme of control, regulation or operation which may be adopted will satisfactorily solve the larger railway problem.

Letters to the Editor

Inefficient Clerks

DIVISIONVILLE.

TO THE EDITOR:

An auditor of one of the large middle west trunk lines in commenting upon the apparent lack of efficiency and organization in division offices complained of payrolls, reports, etc., being late on account of it. He seemed to attribute the cause for the apparent inefficiency mainly to inexperienced clerks and insufficient forces in the various offices. His diagnosis was partly correct, but if he took the time to study the real cause by visiting these offices he would find he was not at the correct conclusion.

The writer, who is employed in a division office and has been for several years, has noted with some apprehension just what the auditor refers to, but from his study and observation he concludes that the greatest cause for lack of efficiency and organization has been the dissatisfaction existing among the older and more experienced clerks on account of inequalities in wage awards and the interpretations placed upon them by the railroad officers. Many striking examples of these inequalities can be cited, but a few of them will show clearly just what the writer refers to. On this division the chief clerk is receiving a salary of approximately $150 a month, while the chief despatcher is now drawing approximately $285; despatchers $265 and roundhouse foremen $260. There may seem to be no comparison of the work performed by a chief clerk with these positions, but it will require as much talent, as much initiative, and as much experience to handle his position as the others. Not so very long ago one of the vice-presidents of this same railroad, in commenting upon the mishandling of a subject by a chief clerk, said that a chief clerk could do more to jeopardize the superintendent's position than any other man on a division, or words with that intent. It would seem then that the salary should be graded accordingly.

On this same division the division accountant is receiving approximately $130 a month and is directly responsible for the entire accounting work. He has had years of experience and training, yet under one of the recent awards he is drawing practically the same amount of pay as a call boy working 12 hours a day (who receives practically $125 a month). The chief timekeeper, handling and allowing all train and enginemen's time, receives $112 a month, or a lower rate than the call boy. Other clerks in the office are receiving on an average $100 a month—the assistant accountant, assistant timekeepers, stenographers, etc.—while unskilled laborers about roundhouses and coal-chutes, track-repairers, etc., are receiving as much, and in most cases more; some as high as $108 a month.

The railroad clerk resents the implication that his work is of little importance or consequence in the operation of the railroad and he has come to the conclusion he is not appreciated. Therefore, he does not take the interest or pride in his work that he formerly did. Why should he exert himself, he reasons, when he can look about him everywhere and see such inequalities? As long as he can see common labor catered to by the management; and see that they secure increases in pay without exertion, initiative or responsibility, he is dissatisfied, and will remain so. His work suffers, for his ambition is devitalized by the knowledge that, if he were to resign, another man could be secured at the same rate. Just so long as these conditions are allowed to continue, then just so long will the clerical work suffer.

A RAILWAY CLERK.

Responsibility for Collisions

CHICAGO.

TO THE EDITOR:

I have read with much interest your condensation of the Interstate Commerce Commission's report on the collision near Alliance, Neb., (*Railway Age*, December 6, page 1018), and also the very condensed expression of your own opinion in the case. It seems to me that there are several more things to be said. As between you and Mr. Borland; or between you and Borland on the one hand, and the Interstate Commerce Commission and Director C. R. Gray on the other, something ought to be done. The responsibility for killing people in collisions seems to be so scattered that it does not rest very heavily on the mind of any one. When are things going to be brought to a head?

The Bureau of Safety has made faithful reports of the conditions discovered in the cases of a good many bad collisions and is to be commended for performing the useful public duty of setting forth cold and disagreeable truths; but what is the commission going to do about it? The publication of a report with the name of Mr. Borland attached to it does not give the public any assurance that the nine commissioners—or even one of them—could be depended upon to back up the recommendations of the bureau chief if he were to go before Congress. Possibly the commission is quiet just now because of the overpowering presence of the Railroad Administration, sitting in the same building. The director general has walked right over the commission whenever he saw fit to do so, and provided he believed it necessary to cut some Gordian knot; but in the matter of slaughtering passengers he does not seem to recognize that there is any knot to be cut. The government report on the Alliance collision, like many other reports, gives little or no satisfactory information about the past records of the men (or officers) who were at fault. Why does not the Washington headquarters of the Railroad Administration let up on courtesy for a brief period and look to "safety first"? I mean safety of passengers. The Administration has evinced a disposition to quiz railroad officers and employees quite sharply in a good many directions; why not make a more extensive use of the quiz in this matter of safety?

For example, a truly illuminating quiz for the superintendent would include such points as the following:

What is your opinion of the engineman who was responsible for the last serious collision on your division? (This answer, if frank, frequently discloses acknowledged weaknesses.)

Was his punishment for former derelictions fair, adequate and consistent?

Do you feel free to administer discipline without fear of the grievance committee?

Assuming that your own knowledge and courage are up to the mark, how about your trainmasters? Do they do their work to your satisfaction? If not what is the cause? Are they paid good salaries? Have you a sufficient number of trainmasters? If not why do you not add to their number? How often does *every one* of your conductors and enginemen have opportunity for a full and free interview with a trainmaster—or with yourself? How many actual interviews of this kind could you report for the last three months?

Can you feel sure of the safety of your train operations without frequent and frank interviews?

What do you do with obstinate passenger enginemen?

How much money do you spend for surprise checking? Do you spend all that you think necessary or desirable? What does your general manager think about surprise checking? How often do you have a full and frank interview with him?

And a hundred others which will at once suggest themselves.

A. F. L.

Labor Conditions During Federal Control

Abstract of Chapter from Director General McAdoo's Forthcoming Report to the President

THE DIVISION OF LABOR of the Railroad Administration was created on February 9, 1918. W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen, was appointed director. It has been the purpose of this division to create a better feeling between employees and officials of the railroads than existed previous to governmental control.

On January 18 General Order No. 5 was issued, creating a railroad wage commission and directing a general investigation of the compensation of persons in the railroad service. This commission devoted several months to the work, submitting recommendations to the director general on which General Order No. 27 was based.

General Order No. 8 was issued on February 21, and directed that safety appliance laws be observed, that excessive hours of service be avoided where possible and that matters of controversy arising under interpretations of existing wage agreements, and other matters not relating to wages and hours of service would take their usual course. This order also provided that "no discrimination will be made in the employment, retention, or conditions of employment of employees because of membership or non-membership in labor organizations."

Unquestionably these initial orders did much to bring about a better feeling on the part of those employees who believed they had not been treated justly in the past.

Adjustment of Labor Controversies

One of the principal purposes of the creation of the Division of Labor was to provide means whereby the controversies that constantly arise between railroad officials and employees would be promptly and equitably adjusted. An inability to adjust these controversies under past practices resulted in strikes, threatened strikes, or a constant unrest among employees to the extent that the efficiency of the service had greatly diminished at the time that the roads were taken over.

It is but fair to say that neither the operating officials nor the employees were entirely to blame for so undesirable a situation. While on some roads there had never been a liberal policy toward employees of certain classes, a study of past relations will reveal the fact that not so many years ago the labor policy of a railroad was developed entirely by the operating officers. At that time, committees of employees, with the knowledge that their immediate operating officers had the authority to grant wage increases, revise wage agreements, and adjust personal grievances, entered into negotiations with their respective officials with an open mind, and with the belief that if evidence and argument could be presented that would prove their contentions, the operating officials of the road would at least grant some relief from the conditions of employment against which complaint was made.

It is alleged by employees that with a concentration of financial control of the railroads operating officials lost all authority over the labor policies upon the respective railroads. With the creation of "general managers' associations" covering a comparatively large territory, came "district movements" by employees for the adjustment of wage matters.

During the two or three years antedating federal control of the railroads an alarming situation was created, in that the employees' organizations as a whole and through federations, found themselves confronted with similar federations on the part of the railroads, the roads being represented by conference committees, and the conference committees being subordinate to "advisory committees." It was alleged by employees that these conference committees were not permitted to grant the demands of employees or even to make favorable compromises without the consent of the advisory committee. The advisory committee, it is alleged, was the agent of the great banking institutions that controlled the financial policy of all the railroads.

Arbitrations have been resorted to in later years with the result that employees reached the conclusion that an arbitration award depended entirely upon the frame of mind of the neutral arbitrator.

It may be truthfully said that at the time the railroads passed under federal control, because of these vexatious contentions, the morale of railway employees had sunk to a low degree. In many instances there was an entire absence of esprit de corps, so necessary for efficient operation.

With an intimate knowledge, on the part of the officers of the division, of the relations between the railroads and their employees during the past years, innovations were proposed, the practicabilities of which were first questioned by some officials and by some employees. It was suggested that at least for all classes of employees who were working under wage agreements, bipartisan boards be created for the purpose of adjusting any differences of opinion which might arise between the employee and the official, upon which there would be equal representation of the railroads and of the employees without the presence of any "neutral" or umpire. It was believed that when partisans were equally divided, and when they realized they were occupying judicial positions, they would abandon their partisanship and earnestly and efficiently exercise the function of a judge. In carrying out this plan three railway boards of adjustment have been created.

All controversies growing out of the interpretation or application of the provisions of wage schedules or agreements in effect, which were not promptly adjusted by the officials or employees on any of the individual railroads under federal control, and all personal grievances or controversies arising under interpretation of wage agreements and all other disputes arising between officials of a railroad and its employees were to be handled in the usual manner by the committees of the employees and the officials of the railroads up to the chief operating officer of the railroad (or some one officially designated by him). If, after this usual process, an amicable adjustment was not reached, then it became obligatory on both the part of the railroads and officials of employees' organizations to submit the matter in controversy to the railway board of adjustment having jurisdiction. Provisions were made for joint submission of facts and brief argument in each case submitted, and if it was deemed advisable, such railway board of adjustment could call for additional information, either oral or written, and when the matter had been entirely investigated a decision would be rendered by the board.

In the beginning fears were expressed that employees would protest against unfavorable decisions, to the extent that the purpose of the creation of the boards would be defeated. A knowledge of the loyalty of employees to their organizations, and a familiarity with the strict discipline enforced by these organizations in matters of agreement, led

those who had intimate knowledge of the situation to know that a decision thus reached would be faithfully observed by the employees.

Methods having been thus provided for classes of employees having agreements on a comparatively large number of railroads, there were yet perhaps a million employees for which no disposition had been made. For the purpose of providing prompt and proper methods of adjusting controversies affecting these employees, an assistant director of the Division of Labor was appointed, whose especial duty was to investigate all complaints, endeavor to bring about amicable adjustments, and practically perform for these employees the work accomplished by the railway boards of adjustment.

In the prosecution of this work, four representatives of the Division of Labor have been appointed, whose duties require them to be almost constantly in the field making personal investigations of matters referred to the Division of Labor by employees. In the selection of persons for the performance of this work regard was had for their past experience and ability in this or similar class of work, with the result that a large number of complaints have been investigated and adjusted.

"Closed Shop" v. "Non-Union Shop"

In many industries a contest has long existed between certain employers and unions of employees over rights of employees to become members of labor organizations, and over alleged discriminations against employees because of their connection therewith. It is claimed by employees, in many instances, that unless all employees in the class in the industry are members of the union, the employer discriminates against the employees who are members or else favors the employees who are not members.

In this contest, and for their own protection, employees have often demanded the "closed shop." On the other hand, certain employers have insisted on maintaining what they have called the "open shop." Theoretically, employers do not discriminate against any employee in the "closed shop" because it is alleged that any employee in the shop may become a member of the union. Theoretically, the employer does not discriminate against the union man in the open shop.

Many roads forbade the employment of employees who were members of certain organizations and had thus maintained non-union conditions, with the result that on a considerable portion of the railroads, for certain classes of employees, committees of employees had never functioned, and wage bargaining had been prevented.

Previous to the assumption of federal control, on these railroads and for these classes of employees, almost continuous dissensions had arisen, with the result that in many instances strikes had been precipitated, many of which were lost by the employees and non-union conditions prevailed. For the purpose of eliminating this constant conflict, which necessarily adversely affected the efficiency of the service, and because the government was now in control, Article V of General Order No. 8, issued under date of February 21, 1918, contained the following:

> No discrimination will be made in the employment, retention, or conditions of employment of employees because of membership or non-membership in labor organizations.

The immediate result of the foregoing order was (1) the assertion on the part of representatives of the employees that they had never contended for a closed shop except as a protection to the members of the union, and that non-union employees would be assured the same rights and benefits and treatment under existing union wage agreements as were accorded to the union employees, and (2) the employees on the railroads where they had never been permitted to become members of the organizations were almost immediately organized into the unions.

Standardization of Wages

With the development of trade unions in all industries has come the demand for the same rate of wages for the same character of work, and the result has been that there is a constant and pressing demand on the part of employees for a standardization of wages.

On the other hand, each individual is of the opinion that so long as some other person is required to work, or is willing to work, at a less rate of wages, it produces a dangerous competitive situation wherein there is an incentive for the employer to dismiss the higher paid man and retain the lower paid man, and thus reduce labor cost. The demand for a standard wage and working day was made apparent at the hearings of the first federal wage commission, but it was not deemed expedient by that commission to attach much importance to this demand.

On the other hand, the wage commission was imbued with the humanitarian idea that the "increased cost of living" had fallen heaviest upon the lowest paid employees, and therefore the percentage of increase for the lower paid man should be greater than the percentage of increase for the higher paid man, and that this percentage should be based upon wages in effect in December, 1915.

It so happened that during the two years of 1916 and 1917 great progress had been made in the standardization of wages through negotiations of employees with railroad companies and consequently many differentials were eliminated. With the application of the graduated percentages of increases provided for in General Order No. 27, which order was based upon the recommendation of the first wage commission, all these differentials were re-established.

General Order No. 27 created a Board of Railroad Wages and Working Conditions. In the report of this board it will be shown that rapid advances toward standardization of wages of all railroad employees have been made, and but for the possible early return of the railroads to private control it could safely be said that the logical conclusion of the work of the present Board of Railroad Wages and Working Conditions would be standardized rates, standardized days, and other standardized conditions of employment for all employees on railroads under federal control.

The Eight-Hour Day

The demand for an eight-hour day has been pressed by employees in all industries. While on a considerable number of railroads some classes of employees had secured the eight-hour day through negotiations, perhaps in no industry of such importance had there been so little recognition by the employer of the eight-hour day as with the railroads.

Practically all of the representatives of employees that appeared before the first wage commission were earnest in their demands for the eight-hour day, but it did not appear to the first wage commission as being practicable during the war period. Nevertheless, in the issuance of General Order No. 27, provisions were made for the "basic eight-hour day," with a pro rata overtime rate.

This plan for an eight-hour day was but the foundation for the real eight-hour day, which it was proposed could be put in effect when the war was ended and our soldiers returned and were seeking employment and the supply of labor was sufficient to reduce the work of employees to an eight-hour period.

Through investigations by the present Board of Railroad Wages and Working Conditions supplementary orders have been issued that have made great advances toward an ultimate eight-hour day for all railroad employees. Where classes had through negotiations, and previous to federal control, secured the eight-hour day to a considerable extent, with time and one-half for overtime, such practice was extended to all employees in that class. Where classes have

not secured the eight-hour day with time and one-half for overtime, great advances have already been made by extending to them the eight-hour day with pro rata overtime for the ninth and tenth hour and time and one-half for all hours worked in excess thereof.

Standard Working Rules

Because of the increased cost of living, increased wages were of far greater concern during the present year to employees than the standardization of working rules. Nevertheless, requests have been filed for standard working rules for several classes of employees to be applicable to all railroads under federal control. Where classes, through negotiations, had secured wage agreements, including rules, the demand was not so persistent, but for the great number of employees who had never been privileged to work under fixed regulations of employment the demand was urgent, with the result that in supplements to General Order No. 27 rules have been established providing for the administration of discipline and the maintenance of the seniority principle for more than a million employees.

Notwithstanding the fact that on a majority of railroads employees connected with the skilled shop trades have had agreements which included working regulations, recently these employees have presented a request for a standardization of working rules on all railroads under federal control.

Employment of Women

The employment of women (and of children) has often been opposed in many industries by employees affiliated with labor organizations upon the theory that women may be more successfully exploited than men, and with the result that in many industries into which women are introduced as employees to any considerable extent the wages will not be increased and perhaps decreased, and that the working conditions will not be favorable.

A large number of women have always been employed by the railroads, but because of war conditions this number rapidly increased, and in many instances women were not paid the same wages as men. To assure the women employees of the railroads of not only fair treatment and wages, but suitable working conditions, the Women's Service Section was created on August 28, 1918. The work done by this section has been very thorough, considering the limited time in which it has been in operation, and a detailed report of its work is attached.

Railway Board of Adjustment No. 1

Railway Board of Adjustment No. 1 was created by virtue of an agreement entered into March 22, 1918, between the regional directors and the chief executives of the four organizations representing engineers, firemen, conductors, trainmen, and yardmen.

As article 6 of the agreement refers to the "Commission of Eight" and transfers the jurisdiction which that body had previously had to the new board, it seems appropriate to embody here a statement explaining the origin and jurisdiction of the Commission of Eight.

When, in March, 1917, the committee of the Council of National Defense, at the request of the President, intervened in the controversy over the demand for an eight-hour day, it was agreed by the railways and the four organizations to accept whatever award the committee should make. The National Conference Committee of the railways represented over 150 railways, and practically each of these roads had elaborate and complex agreements in effect with two or more of the employees' organizations. There were, therefore, in all hundreds of individual contracts, each with its own peculiar provisions, to which the award had to be applied, and it was fully appreciated by each side that in this process innumerable controversies would inevitably develop. Immediately upon the acceptance of the award the conference committee and the executives of the four organizations entered into a further agreement to create a standing commission of eight members, four to be chosen by the National Conference Committee and four by the brotherhoods, to pass upon the application of the award to the agreements on the individual roads.

The board was intentionally composed of an even number from each side, and a majority decision was to be binding. The commission met in May, 1917, and held sessions each month until March 22, 1918, on which date it was superseded by this board. By that date it had practically completed its work. In every instance the action of the commission on all matters before it was unanimous. The above review has been gone into because it is believed that the experience of this commission in being able to reach unanimous agreements had a very direct influence on the action of the regional directors and the heads of the brotherhoods in making their agreement to create another similarly constituted board with enlarged jurisdiction to supersede that commission.

It was recognized at the outset that mutual respect and confidence on the part of its members was a prime requisite for its successful functioning, and four of the members of the Commission of Eight were named for membership, the other four not being longer available because of press of other duties.

Starting with this advantage, the work of this board from the beginning has been marked by mutual understanding and good will and by the absence of friction or any appearance of biased partisanship. In the appended statement it will be seen that up to November 30, decisions had been rendered by the board in 292 cases, and between that date and this writing additional decisions have been rendered bringing the total up to 331. While in accordance with the agreement a majority vote is decisive, in every one of the decisions rendered the action of the board has been unanimous. While the agreement further provides that in the event of a deadlock the case may be referred up to the director general for a decision, no occasion has up to this time arisen to invoke this provision of the agreement.

Board of Adjustment No. 1 held its initial meeting at Washington, D. C., April 8, 1918. It organized by the selection of Charles P. Neill as chairman and L. E. Sheppard as vice-chairman for the ensuing calendar year. Later on Mr. Sheppard had to be withdrawn from the board to devote his time to duties at headquarters as senior vice-president of the Order of Railway Conductors, and W. M. Clark, another vice-president of that organization, was named in his place. F. A. Burgess of the Brotherhood of Locomotive Engineers, was chosen vice-chairman.

In pursuance of its adopted policy of rotating its chairmanship and vice-chairmanship, F. A. Burgess has been elected chairman and E. T. Whiter vice-chairman, for the term beginning January 1, 1919.

The board has been in session the greater part of each month, and at the beginning of its December session had disposed of 309 cases. In most of these cases hearings have been held at the request of one or the other party to the controversy, or of both, to permit of the presentation of oral testimony and argument. There is appended hereto a statement showing the number of cases on the docket of the board at the close of November and the disposition made of these cases.

Number of cases entered upon the docket under General Order No. 13.	408
Number of cases in which decisions have been rendered	292
Number of cases disposed of locally	7
Number of cases withdrawn at hearings	9
Number of cases in which decisions were not rendered, account being without jurisdiction	2
Total number of cases disposed of	307
Number of cases on the docket as of November 30 and not yet disposed of	101
Number of cases for which hearings have been set for December session	51
Number of cases now ready for action of the board	2

Number of cases held up or covering which additional data has been requested	16
Number of cases on docket under General Order No. 27	23
Number of cases on which recommendations have been made	2
Number of cases held to determine jurisdiction	21

Railway Board of Adjustment No. 2

This board was established in accordance with the understanding reached in General Order No. 29, dated May 31, between the regional directors representing the railways which may have, or may hereafter have agreements with the International Association of Machinists, International Brotherhood of Boilermakers, Iron Ship Builders and Helpers of America, International Brotherhood of Blacksmiths and Helpers, Brotherhood of Railway Carmen of America, Amalgamated Sheet Metal Workers' International Alliance, and International Brotherhood of Electrical Workers, and the officers of those crafts.

Regular meetings of the board began on Tuesday, July 2, 1918, and have been held practically continuously from that date.

The board to date has had 147 controversies presented to it for adjustment and has rendered 128 decisions. The board has been obliged to hold up some of the cases pending decisions of the Board of Railroad Wages and Working Conditions, and others pending further information from the parties to the controversies.

In addition, the board has had considerable correspondence both with the railways and the crafts, endeavoring to guide them in the presentation of matters which would properly come before this board, there seemingly having been more or less misunderstanding on the part of both the railways and the crafts as to how the controversies should be properly submitted. At this date there seems to be a better understanding.

The decisions are based on the orders of the director general and agreements between the crafts and the railroads, and as almost every railroad had a different agreement it was necessary to make a careful collection and compilation of the agreements in force.

While much time has been expended in considering some of these controversies, it is felt that on the whole it was well spent, and, so far as the board is aware, its decisions, taken as a whole, have met with the approval of both the railroads and the crafts.

It is further felt that the creation of this board has had a stabilizing effect as between the railway employees and railway employers.

Railway Board of Adjustment No. 3

General Order No. 53 created Railway Board of Adjustment No. 3 under date of November 13, 1918. But one case has been submitted to the board, upon which no action has been taken (December 1, 1918) due to additional information being required.

Women's Service Section

This section was created August 28, with Miss Pauline Goldmark as manager, to "give consideration to conditions of employment of women on railroads under federal control."

In view of the growing importance of women in the railroad service and the diverse problems which follow their introduction in a new field of industry, it was deemed advisable to create this special agency. For the first time women were entering new occupations side by side with men, and it was important to determine whether such work was suited to their strength and aptitudes, or whether it was too heavy or performed under undesirable conditions. If this proved to be the case, then it would be necessary to discontinue their employment in certain occupations and to transfer them to other more suitable fields. Moreover, there was need of more careful provision of the comfort facilities which were often overlooked when women took the place of men. And finally, it was important to insure observance of wage orders giving women the same rate of pay as men for the same class of work.

The first statistics of the number of women employed in the railroad service were collected as of January 1, April 1, July 1, and October 1, and showed the following increases:

NUMBER OF WOMEN EMPLOYED BY THE RAILROADS ACCORDING TO TERRITORY

[First-class roads]

	January 1	April 1	July 1	October 1
Eastern territory	32,049	34,938	45,702	54,466
Southern territory	6,332	6,937	8,724	11,447
Western territory	22,174	23,979	27,944	35,383
Total	60,555	65,854	82,370	101,296

Further classification according to occupations follows:

NUMBER OF WOMEN EMPLOYED BY THE RAILROADS ACCORDING TO CHARACTER OF OCCUPATION

[First-class roads]

SUMMARY OF EASTERN, SOUTHERN AND WESTERN TERRITORY, 1918

	Classes of employees	January 1	April 1	July 1	October 1
1.	Attendants	807	934	1,443	2,390
2.	Bridge tenders	2	6	11	12
3.	Car department	381	421	928	684
4.	Clerical or semi-clerical	47,192	51,468	61,320	73,285
5.	Clearing	3,492	3,666	4,632	5,555
6.	Elevator operators	16	15	34	97
7.	Messenger service	359	430	557	736
8.	Personal service	2,187	2,300	2,480	2,796
9.	Roundhouse work	354	397	923	1,365
10.	Shopwork	1,392	1,443	3,178	5,091
11.	Signal service	36	40	186	220
12.	Station agents, assistants, agent-operaters	379	426	300	377
13.	Supervisors of women employees	52	52	78	113
14.	Switch tenders and other yard work	10	18	17	50
15.	Telegraph operators	1,538	1 693	2,158	2,396
16.	Telephone operators (train orders, blocking, etc.)	1,385	1,322	1,729	2,613
17.	Track work	60	133	817	872
18.	Train service	24	30	71	100
19.	Warehouse and docks (includes trucking)	324	420	792	1,461
20.	Watch women	204	232	293	518
21.	Other service	361	408	423	565
	Grand total	60,555	65,854	82,370	101,296

The variety of occupations is surprising. One of the railroads reports the employment of women in 99 different positions. The following list covers in general the occupations in which women are employed outside the clerical and semi-clerical and common labor:

Turntable operators.
Packers of journal boxes.
Attendants in tool rooms and storerooms.
Telegraphers and telephoners in block-signal work (including interlocking switches).
Lever women in signal towers.
Checkers in freight houses.
Car clerks.
Operators on bolt-threading machines.
Operators on nut-tapping machines.
Operators on car-bearing machines.
Operators on turret lathes.
Operators on angle-cock grinders.
Hammer operators.
Crane operators.
Air-brake cleaners, repairers and testers.
Electric welders.
Oxy-acetylene cutters and welders.
Core makers

Organization of the Women's Service Section

In order to get first-hand information as to actual conditions under which women were working, four field agents were appointed on the staff of the Women's Service Section (Miss Rose Yates, Massachusetts; Miss Edith R. Hall, New York; Miss Helen Ross, Missouri; and Miss Florence E. Clark, Indiana). The field agents are reporting on the exact character of labor required, the suitability of the work, and the environment, including dressing, wash room and toilet facilities. They are also determining whether state labor laws as to hours of work are being observed and whether the correct rates are being paid, insuring equal pay for equal work irrespective of sex. The Women's Service Section presents complaints and questions needing correction to the proper officials and in most instances has secured the necessary changes and adjustments on the presentation of the facts.

Data from Field Inspections

The number of field inspections made by the Women's Service Section amount to 407. This covers the employment of 3,590 women. Inspections have been made in 11 states and the District of Columbia. Practically all the occupations in which women are employed are herein included, so that the data secured in these inspections can be considered representative of general conditions of employment.

Employment of 3,590 Women According to Class and Hours of Work

	Total number women	Hours of work per week			
		48 or less	49 to 54	55 to 60	61 or more
Attendants	118	58	48	8	4
Car department	60	3	32	9	16
Clerical workers	2,140	2,023	76	30	11
Cleaners	411	207	57	20	127
Personal service	130	120	3	3	4
Roundhouse	141	68	6	0	67
Shopwork	335	18	148	161	8
Block operators	123	0	7	47	69
Track work	18	0	0	18	0
Warehouse and docks	84	2	30	50	2
Watch women	5	4	0	0	1
Other service	25	20	3	1	1
Total	3,590	2,523	410	347	310
Per cent	100	70.3	11.4	9.7	8.6

Number of Women According to Age and Night Work

	Total number	Day work	Night work	Per cent
Number of women	3,590	3,267	323	8.99
Number of women under 21	963	914	49	5.08

The 323 women here enumerated as employed at night were not employed for overtime but on regular night shifts, beginning or ending between 6 P. M. and 6 A. M. For the most part these shifts ended at midnight, 12:30, 1:30, 2, 2:30, 3, 5:30, 7, 9, or 10 A. M. Block-signal operators, coach cleaners, and scrub women, as well as clerks in roundhouses, are predominatingly represented among these night workers.

Number of Employees Having No Regular Weekly Day of Rest According to Classes of Work

	Number working 7 days week	Total number of employees	Per cent
Attendants	2	118	1.7
Car department	3	60	5.0
Clerical work	44	2,140	2.1
Cleaners	128	411	31.1
Personal service	71	130	54.6
Roundhouse work	57	141	40.4
Shopwork	...	335	....
Block operators (telegraph and telephone)	123	123	100.0
Track work	...	18	....
Warehouse and docks	1	84	1.2
Watch women	3	5	60.0
Other service	1	25	4.0
Total	433	3,590	12.1

This group of 433 women is scheduled to work 365 days a year. Classified according to hours of labor, they are distributed as follows:

Number of Employees Working Seven Days a Week According to Hours per Week and Hours on Sunday

Number of employees	Hours of work	
	Per week	On Sunday
81	54 hours and under	5½ to 6½
83	56	8
11	60	6
80	63	9
1	66½	9½
1	68	10½
158	70	10
2	77	11
1	80½	11½
15	84	12

In connection with these statistics, it should be said that the excessive length of hours has been brought to the attention of the officials and steps are being taken to reduce them.

Women Removed from Unsuitable Occupations

It became apparent several months ago that the employment of women in certain occupations was objectionable. Their use as section laborers, for instance, was judged by the director general to be unsuitable owing to the heavy work and to the surroundings, women and young girls being employed in gangs with men along the tracks at long distances from any house or station.

Objection was also taken to the employment of women as truckers in depots and warehouses on account of the excessive physical exertion required. In view of the wages now paid it was believed possible to secure men and to transfer the women to some class of work suitable to their strength and with proper regard to their health. The railroads were accordingly asked by the director general to discontinue their employment both as section laborers and as truckers, September 27, 1918. Similarly, the work of calling train and engine crews was not approved for women (November 7, 1918).

Under these orders, on one railroad employing more than 2,000 women, 223 employed as laborers and 193 employed as truckers were transferred to other jobs or dismissed. Another railroad which in August employed 145 truckers has now entirely given up this form of work for women.

Improvement of Comfort Facilities

The sudden growth in the number of women employed has not always been accompanied by proper supervision for health and comfort. It has therefore proved necessary in many places to secure better equipment and improvement of conditions of employment. One special hardship has been the inaccessible location of toilets, sometimes entailing a long walk out of doors. These conditions have been remedied or are in process of being remedied, but there is no doubt that women are still suffering hardships of this kind for which there is no legitimate excuse.

Less serious from the point of view of health but still harmful is the failure to provide dressing and wash rooms. After working in a roundhouse or shop, in the yards, or even after cleaning coaches, a woman should be given a place where she can wash up and change her clothes before going home. The new practice of wearing uniforms, which should be encouraged as a safety measure for all positions except the clerical, makes it indispensable to provide these accommodations. There should be no evasion of the responsibilities of making proper provision for them if they are employed at all.

Steps Taken to Reduce Dangers of Night Work

Recently the Women's Service Section received inquiries whether women might be employed on night shifts as watch women. Owing to seniority rights among railroad employees, the last comers are given the most undesirable hours. The position was taken that older men who may be incapacitated for more active work should be employed on these shifts and the employment of women restricted to the daytime. Where women have been found working in isolated positions at night in roundhouses or telephone offices the moral hazards have made it necessary to secure their transfer, especially when girls are employed, to daytime shifts.

A serious situation was found in one special class of work, namely, block operating in signal towers. An investigation of 198 girls and women so employed shows the following:

Employment of Women as Block Operators, According to Age and Day and Night Work

Number of women	Day work	Night work	Total
Under 21 years of age	15	*51	66
Over 21 years of age	34	98	132
Total	49	149	198

*Five girls 17 and 18 years of age included.

The hours of work run from 52½ per week to 70. One woman was employed 77 hours, but by far the greater number were on duty 63 hours. All work seven days a week, thus averaging 9 hours a day. In order to understand the full significance of these figures it should be explained that most of the operators work in lonely towers and stations at a distance from towns or houses. This is clearly not suitable

work for young women unless they are fully protected at all times. Objection has been made to the employment of girls under 21 as cleaners in the yards at night as involving moral hazards which would not be tolerated.

Opinions Secured as to Women's Abilities in Various Occupations

The opinions of officials as to women's abilities in the various lines of work are important as indicating the future place of women in the railroad service. It appears that whenever women have been given proper instructions they have proved their value in practically all the clerical and semi-clerical occupations. Old prejudices are rapidly disappearing, and they are being recognized by many officials as a permanent addition to the labor force. Many superintendents and chief clerks report that they are careful and conscientious, as well as capable of obtaining a good grasp of the scope of the work.

In the shops, too, there is evidence that women have been equal to the new jobs, not only in processes requiring little skill, but in some of the trades calling for a high degree of intelligence and training. They are, for instance, doing electric welding, having advanced from flat work to welding of all kinds. They are also doing oxy-acetylene burning and welding. In one shop 20 welders are employed. The fact that some are earning the full mechanic's rate is proof of their proficiency.

They are also cleaning and repairing and testing air-brake equipment. In one shop three young women have full charge of all the triple-valve work in emergency repairs. They are giving satisfaction without the help of any man operator. This exceptional achievement is the result of careful training and the selection of the proper type of worker, as well as a real desire to develop women as a new source of labor. They have responded to this treatment, take pride in their work, and are doing it well. The shop foreman says that he would be willing to match the three girls in his shop against any three men in the country, and he considers the tester by all odds the most skilled on the division. Similar opinion was expressed by the superintendent of motive power, by whose order the experiment of placing women in charge of this shop was tried. The federal manager, too, commented favorably on their performance.

Another set of workers who have done well are the box packers. Of one group the master mechanic says that he considered their work entirely satisfactory. The car-shop foreman says that he considers their work just as reliable as that of any man; in fact, more carefully done. "They take more interest and are more impressed with the harm likely to result from neglect."

Regarding women as turntable operators, general satisfaction is expressed by the officials of several roads. One operator, for instance, is reported as keeping herself posted on the order in which the engines are scheduled to go out, and moving the table into readiness in advance of the signal. A foreman said of her that she was far superior to any man they had ever had, in being always on the job, alert to any emergency, and generally intelligent in her work. The district superintendent remarked that for the first time in the history of the road the engines were going out exactly on time.

With respect to common laborers, there is wide diversity of opinion depending upon the kind of women employed. In the lighter job of cleaning the tracks, sweeping cinders, and collecting scrap, many older women who are no longer vigorous have been employed, but admittedly only as a war-time expedient, as they cannot be depended on for long-continued effort. From many quarters there have been complaints of the unsatisfactory character of the work. This may in part be due to the lack of efficient supervision, the women often slacking on their jobs and wasting time.

In certain localities, foreign women of peasant type and especially the colored women have succeeded in doing very heavy lifting and carrying. But on the whole it is true of the women laborers that their work involves too great muscular exertion. Work of this kind should undoubtedly be discontinued not only because, like trucking, it involves possible physical injury, but also because women are not in the long run able to measure up to the work and carry it on effectively. The same criticism is made of women as attendants in parcel rooms on account of the great amount of lifting required.

On the railroads, as elsewhere in industry, the women of the United States when the war began did not feel the obligation experienced in England to leave their wonted occupations and take the places of men. Though some women were undoubtedly influenced by the opportunity for patriotic service, the attraction for the most part lay in the high wages that were offered. About a year and a half ago, before the railroads were put under federal control, women were first engaged on account of the shortage of labor and also because they could be obtained for less pay than men. The wage orders of the Railroad Administration have put an end, however, to this undercutting of men's wages.

It may, in general, be said that a fine class of women have been secured. In most cases they have received wages higher than any previously earned by women except in positions of much responsibility or those requiring special skill. The women are eager to remain with the railroads, as they have shown by their anxiety to retain their positions and share in all the privileges of the service. They appreciate the recognition given by the government to the labor of women, especially the equality of wages assured to them.

"No Accident Week"

THE FOREGOING is to be the watchword for railroad employees throughout the Southern region, says B. L. Winchell, regional director, for the week beginning Sunday, January 19. During this period all officers and employees are urged to pledge themselves to try to prevent injury to their own persons or to their fellow employees. C. M. Anderson, regional supervisor of safety, has started this movement in emulation of a "no accident week," which was carried out on the lines of the Central of Georgia during the first week in December and which proved highly successful.

Every officer and employee is requested to make a pledge, in writing, to the effect that he is going to co-operate with the management and the general safety committee in making no accident week a success.

The Central of Georgia pledge consisted, in substance, of a promise "that we shall be exceedingly careful during the first seven days in December and will do our utmost, not to get hurt, or be the cause of any other persons being hurt." The total number of employees on that road is about 9,000, and, judging by past records, it might have been expected that, in a week, one or more employees would be killed and perhaps a score injured. In the week when the pledges were in force no person was killed, and the only injury was that of one man, in a shop, who in handling an adze cut his finger, and was off duty for one day. One trespasser was injured by being struck by a train at night; but the pledge had to do only with employees.

Each day during the week messages were sent out announcing that the record was clear up to the time of writing. Varied means were taken to keep up the interest of the men, in the effort to make a clear record. About 350 personal letters were written: by general officers to those in the lower grades; by subordinate officers to foremen and to individual employees, and by foremen to employees in various departments whose influence was believed to be specially valuable.

Walker D. Hines, Director General of Railroads

Associated with McAdoo from Beginning of Government Control and in Sympathy With His Policies

WALKER D. HINES, assistant director general of railroads, and formerly chairman and general counsel of the Atchison, Topeka & Santa Fe, has been appointed director general of railroads, succeeding W. G. McAdoo. The appointment, which was cabled by President Wilson, was announced by Mr. McAdoo at Los Angeles on January 11, and Mr. Hines entered upon the duties of his office immediately. The appointment was recommended to the President by Mr. McAdoo, and Mr. Hines announced that he intended to carry out the McAdoo policies. He will receive the same salary, $25,000 a year, which he has received during the past year as assistant to Mr. McAdoo, and which was fixed for the directors of the departmental divisions in the Railroad Administration. One of Mr. Hines' first official acts was the appointment of W. T. Tyler, senior assistant director of the Division of Operation, as director of the Division of Operation, succeeding Carl R. Gray. The position of assistant director general will not be filled for the present.

In announcing Mr. Hines' appointment Mr. McAdoo said:

"Mr. Hines has been my assistant at Washington since the beginning of government control and has a thorough knowledge of the organization and administration of the railroads under federal control as well as of the fundamental problem involved in the railroad situation. His ability and experience admirably fit him for the great trust and responsibility with which the President has honored him. Aside from his obvious qualifications, Mr. Hines is in full sympathy with the policies which have guided the Railroad Administration and with the views of the President on the railroad question. I am sure that Mr. Hines will have the hearty support of the fine army of railroad officers and employees and I can ask nothing better for him than that they shall give him and the country the same loyal and effective service they rendered during my term as director general."

Mr. Hines issued a statement to the public as follows:

"From the first day of government control of the railroads I have been part of Mr. McAdoo's administration and it will be my purpose as director general to carry forward the policies he has so ably put into effect—fidelity to the public interest, a square deal for labor, with not only an ungrudging but a sincere and cordial recognition of its partnership in the railroad enterprise, and fair treatment for the owners of railroad property and for those with whom the railroads have business dealings.

"Until the signing of the armistice the government's first railroad duty was to run the railroads to win the war, but now that the war is won, the government's railroad job is to render an adequate and convenient transportation service at reasonable cost. There can be no greater civic triumph in time of peace than the performance of a successful transportation service for the 100,000,000 producers, consumers and travelers in this country. To participate in the achievement of this great object I invite all the railroad officers and employees with whom I have had the great privilege of cooperating in their splendid war work.



W. D. Hines

"I am a profound believer in the virtue of mutual understanding. Most disputes come from the failure to understand the other fellow's legitimate needs and his legitimate difficulties. I shall do my best to understand the points of view of all the interests affected by the conduct of the railroads or charged with duties on the subject, and I shall also try, frankly and as clearly as I can, to get all those interests to understand the government's needs and the government's difficulties in conducting the railroad transportation service. I ask of all that they will meet me half way in this great work of trying to understand."

He also telegraphed to the regional directors to have placed on all bulletin boards the following statement to railroad officers and employees, to which was added a copy of Mr. McAdoo's statement and of his own statement to the public:

"The President has appointed me director general of railroads, effective at once. I wish my first official act as director general of railroads to be this statement to officers and employees:

"Having been part of Mr. McAdoo's organization from its first day, his policies are my policies and I intend to carry them out and to do so through the existing railroad organizations of the Railroad Administration.

"The responsibilities of the work cannot be exaggerated and there can be no success in it without your confidence and support.

"I shall gain and justify your confidence by prompt and fair treatment, but until you get a chance to know me and judge me by my works, I want you to take me on faith and from the very first day help me to give the government the best possible service and the people the best possible transportation. You and I have been fellow workers in the hard war work of the past year, and I ask you to join me in giving the public even in time of peace the valiant and faithful service that you gave so heartily in time of war."

Mr. Hines was born February 2, 1870, at Russellville,

Ky. He was graduated from Ogden College in 1888 with the degree of B. S. and from the University of Virginia in 1893 with the degree of LL. B. He entered railway service in 1893 as assistant attorney of the Louisville & Nashville, which position he held until 1897, when he was appointed assistant chief attorney. From 1900 to 1904 he was first vice-president of the same road and from 1904 to 1906 he was a member of the law firm of Humphrey, Hines & Humphrey at Louisville. In 1907 he became a member of the law firm of Cravath, Henderson & de Gersdorff. In 1906 he was appointed general counsel of the Atchison, Topeka & Santa Fe and in 1908 became chairman of the executive committee of that road while continuing his private law practice, and he was later elected chairman of the board of directors of the same road. In connection with his law practice Mr. Hines represented numerous important clients in litigation before the Interstate Commerce Commission and the courts.

Mr. Hines served as acting director general for several weeks during the spring while Mr. McAdoo was away from Washington, and he was left in charge at Washington when Mr. McAdoo went to California last week. He is in sympathy with Mr. McAdoo's ideas as to the disposition of the railroads and recently represented him in an address before the transportation conference called by the railroad committee of the Chamber of Commerce of the United States, urging a five-year extension of the period of federal control as the only practical alternative to a prompt return of the railroads to their owners. He feels very strongly that a continuance of the present plan of operation for a comparatively short period, such as 21 months, would be attended with such disadvantages that unless the time is extended the government should relinquish the railroads at a very early date, and he expects to testify to this effect at the hearing before the Senate Committee. As there is little probability that Congress will approve the five-year extension, it is believed in Washington that Mr. Hines' tenure of office will be short and that one of his principal duties will be to wind up the affairs of the Railroad Administration and arrange for the adjustment of the relations between the government and the railroad employees, unless some interim plan is worked out.

Railroad Hearings Before Senate Committee

Alfred P. Thom Begins Legal Argument Against Five-Year Extension of Federal Control

THE HEARING before the Senate Committee on Interstate Commerce on plans for the disposition of the railroads promises to become a protracted proceeding. The committee has thus far heard the views of former Director General McAdoo, the Interstate Commerce Commission, the Association of Railway Executives and a group of western shippers, and expects still to hear from more railway executives, representatives of the security owners, the national shippers' organization and the labor organization. It is understood that Congressional leaders base no hope of enacting any legislation on the subject at this session.

While the testimony introduced thus far and its reception by members of the committee indicates a general desire to bring about an improvement in the methods of railway regulation and a return to private management rather than an extension of government control, there are many differences of opinion as to the details and a general opposition to a return of the roads until a permanent plan can be worked out. Aside from the testimony already presented, something has become known of the attitude of some of the interests that are still to be heard.

S. Davies Warfield, president of the National Association of Railroad Security Owners, which has a definite plan for the return of the roads to their owners, has been working in co-operation with the executive committee of the National Industrial Traffic League, and has let it be known that both bodies are opposed to the ideas of federal incorporation and a secretary of transportation proposed by the railroad executives, but desire the return of the roads as soon as remedial legislation can be enacted and are in favor of a greater degree of co-operation on the part of the railroads than has heretofore been permitted by law. The state commissions are opposed to federal incorporation or a secretary of transportation and desire to retain their authority over intrastate rates and service, but are in accord with the proposals of the Interstate Commerce Commission for a plan for co-operation between state and interstate commissions. The officers of the train service brotherhoods, who are to appear on January 22, have not yet expressed themselves and the classes of employees included in the American Federation of Labor are taking a referendum vote on the question of government ownership.

Mr. Cuyler's Testimony

The plan proposed by the Association of Railway Executives, as published in last week's issue, was outlined by T. De Witt Cuyler, chairman of the association, on January 9. Mr. Cuyler also put in the record a copy of a message which he had sent to Walker D. Hines, assistant director general of railroads, on December 21, regarding the statement made by Mr. McAdoo to Mr. Cuyler and a number of financial men, on December 9, as to the possibility of the early return of the railroads, or, in lieu thereof, of extending the time of federal control for a period of five years. Mr. McAdoo's position had been laid before the standing committee of the executives, who came to the conclusion that the period of 21 months should furnish ample time for the consideration and adoption of any plan that might be a wise one for the railroads and the country, and urged upon the director general the importance of time to consider plans for the future, and that any return of the roads might be deferred until this opportunity has been afforded. The message said that the executives were hopeful that a constructive plan could be submitted either to the present Congress or to the sixty-sixth Congress, and meanwhile urged upon the director general the great disaster that, in their judgment, would ensue to the owners of the roads, the security holders and the public at large if the roads should be returned before time has been given to fully consider the problem.

Mr. Cuyler explained that the plan of the railroads was not a hard and fast plan and, therefore, was not in the form of a bill, but it represented the views of all the principal railroads, except the Southern Railway, which is not a member of the association, and also of the short line railroads, whose association has a representative on the committee. It had been approved at a meeting of the railway executives at Philadelphia on January 5.

Senator Smith asked why the railroads preferred to place the executive and administrative powers in the hands of a secretary of transportation rather than the Interstate Commerce Commission. Mr. Cuyler said this was because the commission was overburdened and because of the thought that a member of the cabinet would have the ear of the President and be in a position to represent to him the transportation conditions of the country. He also thought there would be less fear of political pressure upon a cabinet officer than upon a board. He had no criticism to make of the commission, but thought it could not act with sufficient promptness. The railroads did not propose to abolish the state commissions; their assistance was desired, and it was felt they should act in an advisory way to the regional commissions, but should have no power over rates, on the ground that rates are a matter of national concern. Senator Cummins thought the railroad plan was very similar to that under which the railroads are now operated. Mr. Cuyler said that while Mr. McAdoo now has the power to do everything, the railroads propose to leave the matter of operation in the hands of the railroads and divide the powers of regulation between the secretary of transportation and the Interstate Commerce Commission. Chairman Smith said he was very much in favor of the regional commission plan, but somewhat skeptical regarding a cabinet officer who would be changed every four years, and other Senators expressed a feeling that he would be a politician.

In reply to a question by Senator Townsend as to whether the railroads would maintain the present scale of wages, Mr. Cuyler said that he thought wages should be governed by the law of supply and demand, but he was not qualified to say whether the present wage scale is wisely and economically adjusted.

Mr. Cuyler thought that competition between railroads so that the railroad which gave the best service would get the business would have a greater effect in improving service than the enforcement of orders. He said he realized that this created the condition where some railroads might earn a high return while other roads could not earn enough, but that the best managed railroad ought to derive some reward for its efficiency. Senator Pomerene asked whether it was the impression of the railroads that the Interstate Commerce Commission had not been liberal enough. When Mr. Cuyler replied in the affirmative, the Senator asked how he explained the figures submitted by the commission showing a general increase in net income, dividends and surplus. Mr. Cuyler replied that the increase in earnings was not sufficient to provide for the enormous increase in capital requirements.

The rate situation, he said, was the key, and he thought that there would soon have to be even another increase in rates if the present scale of wages and costs of materials is maintained. Otherwise, there would be a deficit in 1919, and if the government continued to operate the railroads he did not believe rates would ever be reduced. He admitted that he was biased because of his strong feeling that the end of the republic would come if the government ever owned the railroads. Asked about the possibilities of economies as the result of unification, he said that Mr. Kruttschnitt would present that subject more in detail, but that the possible economies were surprisingly small as compared with total expenses.

Senator Underwood said that apparently all minds meet as to the necessity for regulating security issues, and he thought there would not be much objection to removing the prohibitions of the Sherman law and the anti-pooling law under proper regulation, but that if the rates are sufficient, that is all the railroads have the right to ask, and he suggested that it might be better to have the rates themselves initiated by the government under some sort of budget plan. Mr. Cuyler said he would not object to that if the railroads were insured rates sufficient to meet the cost of operation and attract the necessary capital. Senator Cummins suggested that if the government is to practically guarantee a sufficient return on the capital it ought to get the capital at the lowest possible rate, as by issuing government bonds to pay for the railroads and leaving their operation in the hands of private corporations. Mr. Cuyler said he did not believe the American people would invest enough money to buy the railroads and then refrain from operating them, and that it would be difficult to organize private companies to operate the railroads for a limited return.

Mr. Cuyler declared that the railroads were never more efficient than in 1917 before they were taken over by the government, and that whatever collapse of transportation there was resulted from the fact that the laws would not allow the railroads to do what the government has done. Under the same laws, he said, the government would have broken down worse than the railroads did, and he thought the railroads might have done better than the government has done if they had been allowed to do the same thing.

Mr. Cuyler took exceptions to Mr. McAdoo's statement that the railroad companies have not co-operated with the government in the matter of capital expenditures. He said that practically the only exception was in the matter of the allocation of standard cars and locomotives. The government gave a huge car order without consulting the railroads, and then asked them to take and pay for cars and engines entirely unsuited to many railroads. For instance, the Pennsylvania Railroad was asked to take 1,000 55-ton coal cars, when its standard cars were 70 tons. The railroad would be handicapped for 20 years, he said, by uneconomical cars. Many of the railroads had placed orders for cars before the government order was placed, and now the war is over, only 14 per cent of the standard cars have been delivered, and most of the railroads have idle cars. Senator Townsend asked whether the standard car is economical.

"We don't think so," replied Mr. Cuyler.

"I understand that the Interstate Commerce Commission doesn't think so, either," said Senator Townsend.

Senator Smith asked if the railroads had considered the effect of a return of their property to private management in advance of remedial legislation.

"They have considered it very seriously," said Mr. Cuyler, "and fear that the effect would be very disastrous. The roads owe vast sums to the government, payable on demand, although it is not expected that the government would attempt to exercise its right. The government has taken over many of the securities of the roads as collateral; in the case of the New Haven, every dollar's worth of securities it owns. Railroads have received very little of their contract compensation yet from the government, and many of them need the money."

Commissioner Clark Recalled

Commissioner Clark of the Interstate Commerce Commission was recalled for further questioning on January 10, and some time was spent on the question as to whether the commission has delayed the decision of important cases. Commissioner Clark thought that criticism on this score was unjust, except possibly as regards the five per cent rate case, in which the commission covered a very wide range and spent a great deal of time. He said he had frequently read in the morning papers complaints by railroad executives of the delays by the commission and later in the day had listened to arguments of railroad counsel asking for further time to present their case. He referred to the director general's Order No. 28 as an example of the fact that when rates are changed in a hurry a great many revisions and corrections are required. He said the commission had been overburdened and had asked for additional members and the power to organize into divisions, particularly because of the valua-

tion work. Since the plan has been in effect conditions have been so abnormal that its effect has not been demonstrated. If the commission were charged with the duty of supervising capital issues a new division would probably be required. Mr. Clark said he had never favored the plan of regional commissions, which he thought would necessitate a somewhat formidable multiplication of machinery and records, besides defeating to some extent the purpose of securing uniformity. Also, he said, many important rate cases affect such a wide territory that they cannot be localized. He said there was not much conflict between the Interstate Commerce Commission and the state commissions, and he thought a very satisfactory plan of co-operation could be worked out if provided for by law.

In reply to a question by Senator Townsend, Commissioner Clark disagreed with Mr. McAdoo as to the standardization of equipment. He thought a greater degree of standardization than has existed was greatly to be desired, but that complete standardization would be very undesirable because locomotives suited to one railroad were not suited to others on account of differences in grades, bridges, etc. Box cars might well be standardized to a considerable extent. Asked whether government operation was essential to continue the heavier loading of cars, Mr. Clark said that in his judgment the heavier loading was largely due to the co-operation of shippers in their desire to help out the situation as well as the necessity created by the shortage of cars and also to the fact that heavier loading was required in the case of many commodities by the War Industries Board and the Food Administration, but that there has been a progressive tendency toward heavier loading for a long time, and that if it is the government's policy to favor heavy loading in the interest of economy all that is necessary is to let the railroads increase the minimum carload weights.

In connection with the discussion of the earnings and expenses under federal control, Senator Cummins asked Commissioner Clark if he had any information as to the amount of claims against the railroads pending and unpaid on November 1, the date of the latest available statistics on expenses. He said it had been reported to him many times that the Railroad Administration had pursued the policy of refusing to recognize or pay claims, or at least of making it difficult to reach any conclusion, and that if the claims had been paid the operating expenses would have shown a still greater increase. Mr. Clark said the commission had no information as to the amount but would undertake to get it.

Asked whether he considered the completion of the valuation essential before a railroad policy is determined, Commissioner Clark said he was not very sanguine as to when the work would be completed because of the possibility of protracted litigation in connection with the protests of the carriers.

Senator Lewis, a government ownership advocate, created some amusement by asking Commissioner Clark to what extent the opposition of the commissioners to an extension of government control had been influenced by the probability that such a plan would do away with the need for the commission.

"Such a consideration never entered into our deliberations," replied Commissioner Clark, adding that rate-making would probably need some regulation, no matter who made the rates. Senators Poindexter and Cummins replied to Senator Lewis' insinuation by expressing the opinion that the work of the commission would not be decreased even if government operation were continued.

Shippers Want Powers of Director General Abridged

Without proposing any plan for the permanent settlement of the railroad question, Clifford Thorne, C. D. Chamberlin and F. B. Dow, representing a number of shippers' associations, filed a statement with the committee on January 11, urging an amendment of the federal control law to eliminate some of the arbitrary powers possessed by the Railroad Administration by restoring the suspended powers of the Interstate Commerce Commission, striking out the clause which states that the orders of the President may supersede the common law and the statutes of the state and federal governments, and by inserting a provision requiring the director general to pay final judgments rendered against common carriers. The statement expressed the belief that it is not possible for Congress to determine the ultimate disposition of the railroads during the present session, but that Congress should immediately restore the full jurisdiction and powers of the courts and commissions over the common carriers. The statement continued in part as follows:

"During the war there may have been some necessity for the alleged subordination of the Supreme Court, state courts, Congress, state legislatures, and the Interstate Commerce Commission to the will of the one man who happens to be director general of railroads; but that emergency has now passed.

"We do not concede that such a subordination of the judicial and legislative branches to one man occupying an administrative or executive position is constitutional or was intended by Congress, and yet the fact remains that the director general has so interpreted the law in actual practice, and he is now proposing to do so in the future. Test cases are being carried to the Supreme Court, that will finally determine the validity of such orders, but that will consume many months. In the meantime we earnestly implore Congress to clarify the situation by making just a few changes in the phraseology of the railroad control law.

"During the past year we have not had 'government operation of railroads'; it might be described more accurately as a taste of 'railroad operation of the government.' We do not say this with the slightest spirit of hostility or ill-will. We simply state a fact. It is correct to say that the railroads have not had their wishes as to some phases of the contracts or the purchase of railway supplies, etc. But as to operation Mr. McAdoo has delegated practically the whole problem to a staff composed almost entirely of railroad men. Numerous sub-committees have been created in different cities all over the country to hear complaints from shippers about service or rates and to make recommendations to the Washington staff as to what should be done. Without one exception to our knowledge the majority of these committees are railroad men.

"The administration has rendered many orders that have been of great value. This has been especially true as to rates that would develop new business and as to orders that affect the movement of certain commodities in certain portions of the country. The administration has been prompt to make a large number of rate revisions that restored the rate relationships existing prior to June 25. On the other hand, many orders have been issued that are arbitrary and unjust, without granting any opportunity whatever to those concerned to have a hearing before a disinterested tribunal before the order became effective.

"At the present moment the Railroad Administration has under consideration several sweeping, revolutionary changes in rates that are serving as a constant menace to industry, and that will disturb existing rate relationships upon which business has been built up during the past generation.

"General Order No. 57, dated November 26, 1918, directs that claims for loss of bulk grain will be recognized only where there is evidence of negligence on the part of the carrier. This is in direct conflict with the common law, as established in the decisions of the courts of last resort in both state and Nation.

"General Order No. 18 attempts to prescribe the venue

or jurisdiction of the courts, both state and federal. In effect it repeals a part of an act of Congress, one of the provisions in the well-known Carmack Amendment to the interstate commerce act. This is true whenever the claimant does not reside within the jurisdiction of the court where the shipment originated. Some municipal and district courts have held this attempt of an administrator tribunal to repeal an act of Congress and to limit the jurisdiction of our courts, is invalid But Judge Trieber of St. Louis, of the federal bench, has recently sustained the order.

"The Railroad Administration is now considering the advisability of initiating an entirely new set of class scale rates based solely on distance, which shall supplant existing class scales throughout three-fourths of the United States, disturbing, in a wholesale manner, rate relationships upon which business has been established. Commenting upon this, Chairman Daniels of the Interstate Commerce Commission has written to the director general a letter in which he states: 'The substitution of distance as a basis for the class rate scales in these territories would generally and materially alter the long-established relationship of rates to and from competing places.' When business has been so greatly disturbed and the future is so problematical, this is a most unfortunate time to hold over American industry threats of further revolutionary changes of this nature.

"The administration has to a large extent eliminated the tracing of cars by shippers as before the war, even though the shipper owns the car.

"The administration has recently proposed an increase in the charges for intra-plant switching ranging from 30 to 300 per cent in amount. All this is in addition to the 25 per cent ordered last June.

"Many other advances and changes of a similar character are under consideration. The administration has recently announced the policy of granting hearings. That is a step in the right direction; but it is utterly insufficient. If John Smith wants a thousand dollars that belongs to me, I want a hearing before some other person than John Smith, before he gets the thousand. During the next few months it is probably more important, ten times over, than at any time in the past, that the shippers of the country shall have an opportunity to be heard before a disinterested tribunal prior to the time when changes in rates, rules and regulations shall become effective.

"The essential purpose sought to be accomplished in placing the railroads under federal control was to secure adequate transportation under war conditions through unified operation, thus securing an elimination of conflicting operating regulations, to which the carriers were subject at the time. It is no doubt true that a continued improvement of service can be secured through a further development of the operating plans which have been commenced under federal control. Nothing we suggest here is intended to militate against that effort. What we seek to accomplish is merely such a change in the statute as will restore the full effectiveness of the act to regulate commerce and the common law between the shippers and the railroads, under normal conditions, now that the great war emergency has passed."

Commissioner Woolley Wants Mileage Rates

Commissioner Woolley appeared before the committee on January 13 to elaborate his previous statement as to why federal control of the railroads should be continued. He presented a prepared statement, consisting largely of quotations from opinions of the commission, to support his opinion that the present freight rate structure of the United States is "unscientific, illogical and laden with preferences" and that a sufficient time under normal conditions must be granted for testing a plan calculated to do exact justice to the whole people rather than to the shipper and the carrier as classes of the people. He declared that the freight rate is not simply an academic question to be settled with the consent of shipper and carrier, but that it goes to the heart of our social and economic problems, that our commercial development has been dictated by the railroads, and that the effect has been taxation of small towns and rural communities without representation. He declared that only the consumer is interested primarily in the reasonableness of a rate, that the shipper's chief interest is in maintaining the proper relationship of his rates to those of his competitors, and that the carrier's interest under private ownership is in collecting all that the traffic will bear. After citing numerous instances of the evils which he considers result from the present rate system, particularly along the lines of the development of the larger cities and the powerful shippers to the detriment of the smaller communities and shippers, he urged that Congress direct the commission to make the necessary investigation and inaugurate a plan of rates based on a terminal charge based on cost at both the point of origin and the point of destination, plus a uniform line haul charge based on actual short line mileage.

This, he said, would soon produce a wholesome agitation and competition among inland as well as seaboard cities for the reduction of terminal costs. Mr. Woolley also filed as exhibits a table of market quotations of railroad stocks at the time of the beginning of the European War, our entrance into the war, the principal congestion on the eastern railroads in the fall of 1917, President Wilson's recent address to Congress and Mr. McAdoo's proposal of the five-year plan. This, he said, was for the purpose of showing the difficulty that would be experienced in financing the railroads if they are returned to private operation. He also filed a list of the railroads under federal control amounting to 194,026 miles of road owned and 240,719 miles of road operated, with outstanding capital stock amounting to $6,713,790,760 and bonds amounting to $8,833,409,980.

Senator Cummins on cross-examination led the witness through a technical discussion of rate-making problems which brought out clearly numerous difficulties in the way of establishing a uniform mileage scale of rates, most of which Commissioner Woolley met by suggesting that various factors which now cause discriminations in rates "would have to be taken into consideration." Mr. Woolley said that he had agreed with Mr. McAdoo regarding the plan for putting into effect scales of standard mileage rates on class traffic, which he said was a step in the direction of his own plan, but that the Interstate Commerce Commission shortly before the signing of the armistice had decided that conditions were too abnormal to make it an opportune time to enter upon the investigation of such a plan which the director general had proposed. Therefore, Mr. Woolley suggested that Congress ought to initiate such a policy. Senator Cummins pointed out that the plan of mileage rates would completely revolutionize the business of the country, and asked the witness if he realized how it would increase many rates for long distance traffic which are now made to meet competition on the same commodities which may be shipped to market over much shorter distances. He cited as an example the rates on butter from western points to the east as compared with the rates from New England. Commissioner Woolley said he would have the rates looked up.

Senator Smith asked if the rates over lines in sparsely settled territories would not have to be higher than those over lines with dense traffic because of the difference in cost. Commissioner Woolley got around this by suggesting that the terminal costs would be less in the more sparsely settled territory and that such conditions would have to be given consideration, but he thought the difference in cost for the straight line haul would be so slight that the mileage rates could be made about equal in all parts of the country. At any rate he thought if the government controlled the rail-

roads conditions could be equalized better than under operation by competing lines.

At the conclusion of Mr. Woolley's testimony Senator Cummins suggested that Director General Hines be called to testify because of Mr. Woolley's statement that the Railroad Administration proposed to put into effect a mileage system of freight rates. Chairman Smith stated that it had been arranged that Mr. Hines would appear later.

Mr. Thom Opposes Five-Year Plan

Alfred P. Thom, counsel for the Association of Railway Executives, began his argument before the committee on January 14, opposing the plan of a five-year extension of federal control. He first took occasion to reply to Mr. McAdoo's suggestion that there had been a lack of co-operation on the part of the railroad corporations, saying that if there has been any such lack except as to the matter of allocating the standard equipment, the executives had not been aware of it.

"I doubt," he said, "if there has ever been a more stupendous event in the history of commercial affairs than the taking over by the government of some fifteen or twenty billion dollars' worth of property from their owners to be operated by the government. And yet the record of these executives from April 11, 1917, when they were summoned to Washington by the government to co-ordinate the railroads into one harmonious system, has been one of patience, obedience and co-operation. You have seen no complaints and no agitation originating from these executives in the public press, and you at the Capitol have had no approach in any effort to throw one iota of difficulty in the way of successful management by the Railroad Administration. It is the universal consensus of opinion that, except as they were prevented by the obstacles of existing law, these executives did all that was humanly possible. During the whole time of the government's operation of the railroads there has been the same spirit of not pushing to the front any selfish purpose. We think, in no captious spirit, that we owe it to the interests we represent and to the public to express our objection to the proposal to extend the government's control for five years during a time of peace.

"Little has been said about the great danger to the companies from government control. The government has taken not merely our physical property. It is using the credit of these railroads. As a war purpose to accomplish the national ends during the period of great peril, we accepted that as necessary. We challenge the proposal that for five additional years it is necessary for the government to keep not only our property, but also absolute control of our credit; that it shall tell us what debts we must create, what we are to buy and what we are to pay, and that instead of our credit being subject to the control of the owners of the properties, that it be taken away and exercised entirely by government officials."

Mr. Thom then quoted from section 6 of the federal control law which appropriated the $500,000,000 revolving fund with which to pay for cars, locomotives, terminals, etc., and which also provided that the President might call on any carrier to make any expenditures he might designate for war purposes or in the public interest.

"This enormous power," Mr. Thom said, "cannot be over-stated. It may be wisely and considerately exercised or it may be exercised harshly and ruinously. That depends on the sense of fairness and right of the man who exercises the power. We don't know who he will be. We have had one man for a year and now another has been appointed. We have no knowledge of the personality who may exercise this power in future. We do know that the tendency would be to use the credit of the carriers and to spare the credit of the government. The very moment the revolving fund becomes a disappearing quantity and the real financial problem presents itself to the Railroad Administration, that very moment there will be a temptation to use the credit of the carriers for the relief of the government credit.

"We have been charged with having some human nature," Mr. Thom said, "but I have not observed that there is any less human nature in the love of power than in the love of property. The human nature is not all on one side."

Mr. Thom then produced one of the recent monthly reports of the Division of Capital Expenditures, saying that there has been created as capital charge against the railroads by the Railroad Administration a total of $1,254,000,000, of which $477,000,000 had been expended to November 1. He said he did not mean to say that this should not have been done, but that it has involved the purchase of equipment and the making of additions and betterments at war prices which will at once become a disappearing asset.

"We are confronted," he said, "with the possibility that when we come back into possession of these properties two-thirds of that cost put upon us at the present basis of high prices will have disappeared. Now it is proposed not only to do that in time of war, but to repeat it in time of peace for five years."

Referring to the matter of equipment, Mr. Thom said that under the law cars and locomotives may be ordered and paid for either by the government from the revolving fund or on the credit of the carriers. The Senate committee in its report to Congress last spring on the proposed federal control act had stated that the purpose of the revolving fund was to enable the purchase of engines and cars and terminals to become the property of the government to be used wherever they were needed and that their disposition would have to be settled by post-war legislation and that such expenditures as for extensions to army camps, etc., should become the property of the various carriers. The Senate bill had confined the power to purchase equipment and terminals to the government account, but the House bill had added the power to make such purchases on the credit of the carriers, yet the House committee in its report had also stated that section 6 contemplated the direct ownership by the United States of equipment and perhaps of terminals, but not of tracks to camps, shipyards, etc. In spite of these statements, Mr. Thom said, it has been the policy of the administration to buy engines and cars and to make improvements at the expense and on the credit of the carriers and that this is the one point on which there has been a lack of co-operation.

"We have contended," he said, "that it was the purpose of Congress that the revolving fund should be used to pay, at least in part, for these cars, costing three times their normal value, or $3,000 instead of $1,000 each, and these locomotives, costing $80,000 and worth $29,000 to $30,000. If we are required to pay, our indebtedness will have been increased by these amounts, and without active antagonism we have insisted that the fair interpretation of the law was that the government should bear part of this excess cost of equipment which has been bought and allocated to the carriers without consulting them. Some of the railroads thought that they were oversupplied with equipment and ought not to be saddled with any part of this expense. Was not that a fair attitude to present and insist upon? Other carriers insisted that the kind of equipment ordered by the Railroad Administration was not needed and not usable for their purposes because it did not conform to their standards and could not be economically operated for their character of traffic."

Senator Cummins asked whether there had been any indication since the war was ended of a continuation of the same policy. Mr. Thom replied that he thought the administration had recognized the difference between war and peace conditions in putting these expenditures on the railroads. Senator Smith asked if the railroads had not contemplated similar expenditures for equipment. Mr. Thom

said the railroads had contemplated an extensive program of additions and betterments without having reached any definite figure and that the Railroads' War Board was of the opinion that 100,000 freight cars should be purchased but that it had not gone so far as to say which railroads should pay for them. It had assumed that they would go to the railroads whose equipment was most deficient.

Senator Cummins also asked if the railroads could not claim a loss on the equipment on the ground that it represented war conditions, but, Mr. Thom said, the law provided that such expenditures could be ordered when required for war purposes or in the public interest and that the contracts offered to the railroads contained a provision that no loss could be claimed on the ground that the cost was greater than it would have been under other market conditions and that the actual cost should be taken as fair and reasonable. If the law should be amended to provide for a five-year extension, he said, there is no reason why the government could not continue to order the railroads to make whatever expenditures it saw fit and he thought that this attitude on the part of the government was not illogical even if it was a harsh thing to do and was not intended by the Congressional committees. He said if Congress said it was the duty of the railroads to purchase this equipment and pay for the additions and betterments, then the government might naturally take the position that the whole burden of the price should fall on the carriers. He would not say that the amount of the purchases or improvements was excessive, but that there is a latitude of business judgment as to when such things should be undertaken and the railroads could not contemplate without alarm a continuance of such a power for five years. He said he had not been critical of the Railroad Administration and had recognized the great ability shown in conducting the affairs of the railroads during the war but he did not believe it was necessary in time of peace to continue such enormous and possibly destructive powers.

After the armistice was signed, Mr. Thom said, the executives had brought to the attention of the Railroad Administration the desirability of cancelling as many orders and contracts as possible. He had discussed the matter with Judge Lovett and expressed the opinion that no more of the expenditures should be continued than were absolutely necessary. He said that Judge Lovett was receptive to this view and he thought the Railroad Administration had done everything possible to reduce the charge against the corporations but he did not know to what extent.

Senator Smith asked whether the equipment ordered was needed now. To which Mr. Thom replied that no one knows whether a period of idle cars is to be expected or how the needs for equipment will be affected by the diversion of traffic from one road to another. Senator Smith asked whether if the railroads are forced to assume the cost of these expenditures it will not be reflected in the rate structure.

"We don't know," replied Mr. Thom. "That is for another government body to determine, but we do know that every increase in rates antagonizes the shipping public and we can hardly look with unconcern on a policy that makes necessary additional increases in rates."

Senator Smith asked if the railroads had not given the administration a budget of needed expenditures which was the basis of the authorizations. Mr. Thom said they had but that they had not understood at that time that the government was going to depart from the policy of meeting many of the expenditures itself. He repeated that he was not complaining of any abuse of the power in the past but was pointing to its existence which it is proposed to continue under a director general whose personality is not known and under a director of capital expenditures not yet appointed. He said Judge Lovett had agreed with the railroads that after the armistice was signed all obligations should be cancelled that could be and that there should be as few committals against the companies as possible.

"Why did the railroads agree to waive any claim for loss on account of high prices?" asked Senator Cummins.

"What other course was open to us?" replied Mr. Thom. "We had to accept the contract offered us or go to the court of claims and we wouldn't reach a conclusion as to all of the 175 roads in a lifetime. Our position was not a strong one; the three-year average operating income was only a maximum and while we secured some concessions we had to accept many provisions in the contract which we didn't approve."

"Has not the position of the railroads been better than if the government had not taken them over?" asked Senator Underwood.

"I have always believed it was a wise thing for the President to take them over," replied Mr. Thom, "but I am against the extension of the same powers in time of peace."

Mr. Thom pointed out that one of the great elements of value to a carrier is its good will and that in five years this element, with its accompaniment of earning capacity, would be dislocated and destroyed. The organization of the railroads would largely be destroyed, also, he said, and he referred to a statement made by Julius Kruttschnitt before the committee last year that he would rather have his railroad returned without rails and with its organization intact than with rails and without organization. It would be impossible, he said, for the government to return at the end of the five-year period the same thing it took over and the debt to the government might be so great that the only way to pay it would be to let the government take over the property in liquidation. Mr Thom also raised a question as to the constitutional power of the government to retain control of the railroads during times of peace on the basis of an annual rental fixed without relation to the value of the property. Congress could only exercise such a power under the commerce clause of the constitution, he said, and it cannot take over the property for the purposes of an experiment as to what kind of a regulation it intends to adopt at the end of the period.

As illustrating the danger of a too early return of the railroads, Mr. Thom cited the greatly increased operating ratio during the past year, resulting largely from the increased wages, and in spite of the increased rates established by the director general, and asked what reliance the railroads could have on the continuance of the increased rates. It had been strongly argued, he said, and has been decided by one state court that rates fixed by state laws would automatically go into effect on the termination of federal control. As to the interstate rates, he was not certain. Commissioner Clark, who was present, stated, however, that while the rates had been filed in the name of the United States Railroad Administration and W. G. McAdoo, director general, none of the rates were in conflict with any outstanding orders of the commission which could be invoked and that it was the definite view of the commission that if the railroads should be returned to private management the rates on file for roads now under federal control are the only ones on which the carriers could transact business and would continue in effect until changed in the regular course of procedure. Mr. Thom also said that to return the railroads to their owners without a period for readjustment and an opportunity for the enactment of permanent railroad legislation would create such difficult conditions that private management would be discredited and would be "so unjust as almost to be criminal" and he could not believe the administration would do such a thing, but, while he urged that the railroads should be retained under federal control until Congress has had an opportunity to legislate, he declared, in reply to a question by Senator Smith, that the railroad

companies would prefer an immediate return of the roads to a five-year extension of the present plan.

Mr. Thom continued his argument Thursday, discussing the need for improvements in railway regulation such as proposed in the railroad plan by the resolution adopted by the committee in executive session Wednesday. It was decided to limit the various interests to appear before the committee to two spokesmen except in special circumstances.

The American Railroad Association

Reorganization of the American Railway Association Taking in Several Auxiliary Associations

THE DIRECTOR GENERAL of railroads on January 10, 1919, issued Circular 70 stating that during the period of federal control, and in order to provide a responsible channel through which the director general may obtain recommendations for the advancement of railroad practice, the American Railway Association has revised its articles of organization and by-laws and will change its name to the American Railroad Association.

The scope of the association has been enlarged and will cover the former activities of the: American Railway Association; American Railway Master Mechanics' Association; Association of Railway Telegraph Superintendents; Association of Transportation & Car Accounting Officers Freight Claim Association; Master Car Builders' Association; Railway Signal Association; and Railway Storekeepers' Association.

The new organization will consist of five sections, viz.: Section 1—Operating; Section 2—Engineering; Section 3—Mechanical; Section 4—Traffic, and Section 5—Transportation.

Railroads under federal control are members of the association, and are directed to be represented and participate in the activities of each section through their proper officers.

The articles of organization and the by-laws of the newly organized American Railroad Association are as follows:

The name of this organization is the "American Railroad Association."

Its object is the discussion and recommendation of methods for the scientific and economical construction, maintenance and operation of American railroads.

Its action shall be recommendatory and not be binding upon any member. During the period of federal control of the railroads recommendations requiring authoritative action shall be submitted to the director general. If approved by the director general, such recommendations will be either promulgated to the railroads by him, or by his direction, through the American Railroad Association.

Its membership consists of carriers which operate American steam railroads, but no carrier operating less than one hundred miles of road, including trackage rights, or which operates primarily as a plant facility shall be eligible for membership. Each carrier shall be entitled to exercise the right of one membership for each one thousand miles of road, or fraction thereof, operated by it, including trackage rights. The executive committee shall in all cases determine the qualifications for membership under these articles. The executive committee may admit to the association as associate members carriers which, in the judgment of the executive committee, are not eligible for membership.

Each membership is entitled to one vote, which vote shall be cast only by an official of the member voting. Associates shall not be entitled to vote, but otherwise shall have the same standing as members.

A carrier not under federal control may terminate its membership by formal withdrawal after the payment of assessments due; or, if a carrier not under federal control shall fail to pay its dues and assessments for two consecutive years its membership may be terminated by the executive committee.

Its officers consist of a president, a first vice-president, a second vice-president, a general secretary and treasurer. The president and the vice--presidents must be officers of members of the association. The term of each of these officers is two years. During the period of federal control of railroads, representatives of the United States Railroad Administration will be eligible to serve as officers or members of committees of the association. A vacancy in any of the offices shall be filled by vote of the executive committee for the unexpired term. The committees for conducting the work of the association as an organization shall consist of an executive committee of nine elected members, including the president and the vice-presidents and three representatives named by the director general, in addition to the regional directors, a committee on nominations of five members and an advisory council consisting of the chairman and vice-chairman of each section.

It is the duty of the president to preside at all meetings of the association and to exercise a general supervision over the affairs of the association. He shall be *ex-officio* a member of all committees. In his absence the first vice-president, and in the absence of both, the second vice-president shall perform the duties of the president.

It is the duty of the general secretary to keep a full and complete record of the proceedings of each regular and special session, to notify members of the date and location of, and to provide printed copies of the proceedings of each session, and of each meeting of the several sections, to issue all circulars and to compile information for the use of the association and of the various sections thereof. He shall act as secretary of the executive committee, the committee on nominations and the advisory council. He shall either act as secretary of the sections and of the several committees thereof, or in connection with the chairman and vice-chairman of any section he may appoint a secretary thereof, and shall see that the minutes of the sessions of the sections and of the several committees are properly kept, and from time to time shall attend their sessions. He shall be the custodian of the library and of all records of the association, and under the direction of the president and executive committee shall authorize all disbursements on account thereof. He shall select an assistant general secretary and such other assistants as the business of the association may require, subject to the approval of the executive committee and shall perform such other duties as the association or the by-laws may prescribe.

The treasurer shall receive, disburse and account for all moneys received or expended, and shall deposit the funds of the association in such banks or places of deposit as may be approved by the executive committee. He shall make a semi-annual report of the finances in detail to the executive committee, for presentation to the association. He may, with the consent of the executive committee, select an assistant treasurer to act in his absence. During the period of federal control the director general will provide for the auditing of the accounts of the association.

These articles may not be amended except by a four-fifths vote of the members of the association present, and then only after such amendment has been proposed at one regular session for consideration at the next regular session.

By-Laws

1. A regular session of the association will be held on the third Wednesday of November of each year at such place as the executive committee may determine. Special sessions shall be called by the President at the request of the executive committee, or on the written request of ten members. The executive committee may change the date of a regular session when in its judg-

ment the best interests of the association will be thereby conserved.

2. In addition to the executive committee, the committee on nominations and the advisory council, the organization includes the following sections:

SECTION I—Operating.
SECTION II—Engineering.
SECTION III—Mechanical.
SECTION IV—Traffic.
SECTION V—Transportation.

Members may be represented in each section by their officers in charge of matters coming within the scope of the section.

Each section shall be presided over by a chairman and vice-chairman who shall be elected alternately every second year by the representatives of the members of the association in the section.

Each section shall arrange for the selection of a "general committee" to harmonize and co-ordinate the work of such section and for the proper transmission of recommendations of the section and such other committees as may be necessary to facilitate the handling of the matters with which the section is charged, subject to the approval of the executive committee. Any committee of any section may appoint such sub-committees as it may find desirable for the advancement of its work, subject to the approval of the "general committee."

The time and place of holding sessions of sections, the method of selecting committees and the members thereof, and of conducting its business shall be decided upon by the representatives of the members in each section, subject to the approval of the executive committee.

Any section may, with the approval of the executive committee, permit others than representatives of members to become affiliated members of such section and to serve and vote in committees. Qualifications for affiliated membership shall be fixed by each section.

3. Three members of the executive committee will be elected at each regular session, to serve for three years. Three members and two members of the committee on nominations will be elected at alternate sessions, each to serve for two years.

4. It is the duty of the executive committee to exercise general supervision over the affairs of the association; decide upon applications for membership and act as an advisory committee to the president.

It shall select every two years, a president, a first vice-president and a second vice-president from among its members. It shall select a general secretary and a treasurer. It shall offer the names of nine persons and of six persons at the regular sessions of the association on alternate years as candidates for the committee on nominations. The names so offered shall be reported in accordance with the provisions of by-law 12.

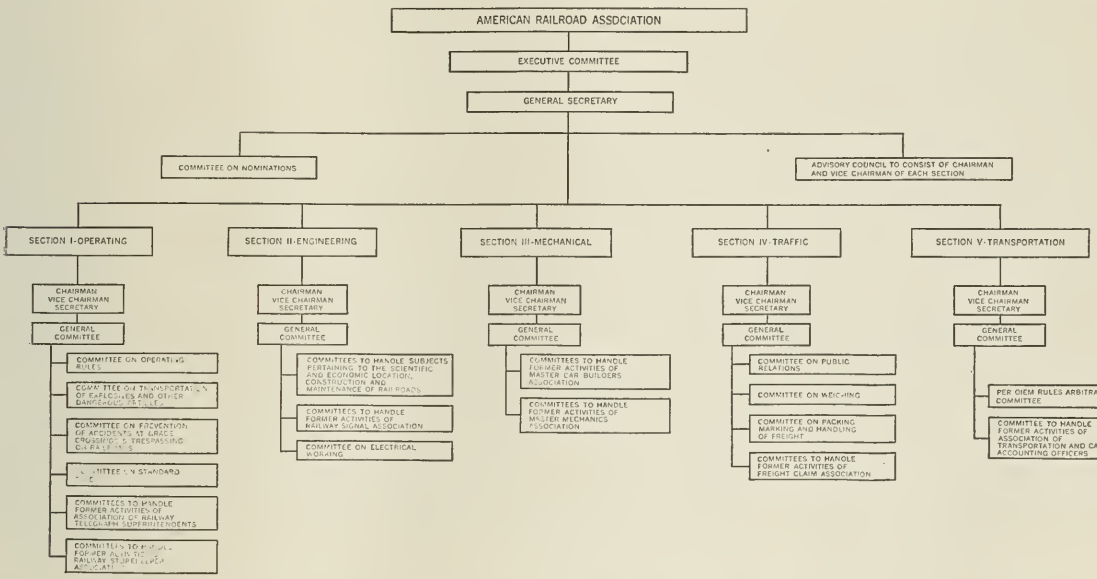
It shall make report at each regular session of the action it has taken and recommendations it may have to suggest on matters of importance to the association.

During the period of federal control it shall submit semi-annually to the director general a budget of the estimated expenses for conducting the affairs of the association during the succeeding period, with recommendation as to the methods to be employed to provide the necessary funds. Assessments may be levied only against railroads under federal control when approved by the director general.

Whenever the committee on nominations shall cease to have a quorum in its membership, the executive committee may make such appointments as may be necessary to fill the vacancies.

5. It is the duty of the committee on nominations to present at the regular session the names of nine persons as candidates for the executive committee.

6. It is the duty of section I—operating, to examine into and report upon questions affecting operating practices, train rules, rules for the operation of interlocking and block signals, rules for



Organization of the American Railroad Association

detouring of trains, protection of grade crossings, practices affected by standard time, and details relative to the advancement of the efficiency of the telegraph and telephone departments of the railroad service.

7. It shall be the duty of section II—engineering, to take action toward the advancement of knowledge pertaining to the scientific and economic location, construction and maintenance of railroads.

8. It shall be the duty of section III—mechanical, to take action toward the advancement of knowledge concerning the principles of construction, maintenance and service of the rolling stock of railroads.

9. It shall be the duty of section IV—traffic, to consider and report upon questions affecting the relations of the operations of railroads and the public.

10. It shall be the duty of section V—transportation, to consider and report upon questions affecting the efficient utilization and interchange of equipment, the handling of railroad business mail and kindred subjects.

11. Any committee, except the executive committee and nominating committee, may, with the approval of the association on the recommendation of the executive committee, increase the committee by appointing a chairman, who need not be an officer of a railroad which is a member of the association.

12. Reports of standing committees and sections, except that of the executive committee, shall be formulated at least thirty days prior to the date of the session at which they will be considered by the association and copies forwarded to the members by the general secretary with the call for the meeting.

13. The chairman and vice-chairman of each section shall constitute the advisory council, which may be called upon by the president or the executive committee for consultation concerning the affairs of the association.

14. A person who becomes a member of a committee shall continue to perform the duties thereof so long as he is an official of a member of the association, whether the original member or another. A vacancy in a committee caused by resignation or disability shall be filled by the vote of its remaining members except as provided in by-law 4.

When a member of a committee shall be absent consecutively from three regularly called meetings of the committee his membership ceases *ipso facto*, and the committee shall act as in the case of a vacancy from any other cause.

15. Any officer of a member will be admitted to the sessions, and may join in the discussions or serve on the committees of the association.

16. Thirty members shall constitute a quorum for transaction of business, but a less number may adjourn from time to time.

17. Each membership will pay an annual fee of $10, and such other sums as may be assessed by the executive committee for conducting the affairs of the association. Each associate shall pay annual dues of $20, but will not be subject to assessments. Annual dues shall be payable on April 1. Assessments when made will be based upon the number of miles of road operated, leased or controlled by each member at the time the assessment shall be payable or on such other basis as may be decided upon from time to time by the executive committee.

18. A member will not be entitled to vote if in arrears to the association.

19. Each member has the privilege of voting for any three candidates for membership on the executive committee, and for any two (or three) candidates for membership on the committee on nominations. The three persons receiving the highest number of votes cast for membership on the executive committee and the two (or three) persons receiving the highest number of votes cast for membership on the committee on nominations, shall be declared elected. All such votes will be by ballot on forms prepared by the committee on nominations. A member may cast a ballot for any member of the association for membership on any committee.

20. A vote in the regular sessions of the association may be taken viva voce, by rising, by roll-call or by ballot, in any of which only members shall participate.

Letter ballots may be ordered to be taken in such manner and under such conditions as the executive committee may from time to time direct.

21. In all ballots for members of committees at meetings of the association, the following form of voting shall be adhered to:

An envelope shall be provided on which there shall be a blank space for the name of the member, the name of the official voting and the number of votes which he casts. In these envelopes the ballots shall be placed by those voting them, and they shall then be presented to the general tellers.

When a ballot is to be taken, the president will announce the names of all required tellers. Three general tellers shall have charge of receiving and recording the ballots cast. When all ballots have been cast these tellers will announce that the polls are closed. They shall then deliver the ballots marked "For ———— committee" to two tellers for each committee to be voted for, and these tellers shall count and announce the vote for members of committees. In ballots taken at the sessions for any other than election purposes, the same form shall be adhered to as nearly as may be practical for the purpose.

When a ballot for membership in committees shall be announced as having eventuated in a tie vote, or be otherwise undecided, upon such announcement the final result shall be determined by the members present.

22. At all regular sessions of the association the regular order, unless otherwise directed by a majority of the members present, shall be as follows:

1. Announcement of members present.
2. Approval of minutes of previous meeting.
3. Reports of committees.
4. Unfinished business.
5. Miscellaneous business.

The election for members of committees, etc., shall be held immediately before the noon recess of the first day's meeting of the session, and be reported to the association after the recess.

23. The several officers of the association and members of committees shall serve for the periods designated in these articles or until their successors are elected and qualified. Any officer may resign by giving notice to the association through its president; any member of a committee may resign by giving notice to its chairman.

24. The proceedings of this association are governed by "Robert's Rules of Order," except as otherwise herein provided.

25. These by-laws may not be amended except by a two-thirds vote of the members present, and then only after such amendment has been proposed at one regular session for consideration at the next regular session.



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Men of the Railway Naval Battery, in Marines Uniform, on Board the New York

The Railroad Situation in Great Britain

Roads Made Remarkable War Record But Great Difficulties In Way of Return to Owners

By Samuel O. Dunn
Editor of the *Railway Age.*

London, England, December 20, 1918.

THE RAILWAY SYSTEMS of Great Britain and of the United States are the two most important systems in the world which have been built and developed, and which are still owned, entirely by private capital. The question what relations each of these railway systems shall in future bear to the state is now under discussion. The question as it affects the British railways has, since the war ended, been a subject of official consideration. A select committee on transport was created some months ago to report to Parliament on "what steps, if any, it is desirable to take to develop and improve the internal facilities for transport within the United Kingdom; to secure effective supervision and co-ordination, and to insure that developments and improvements shall be adequate and suitable to meet the national requirements." This committee made its second report on November 14. The committee was not composed of railway experts, and its recommendations are extremely indefinite; but in one respect, at least, the report is definite. This is, in giving high praise to the British railways for the way they have done their work during the war.

"The success that has attended the operation of the railways throughout the war, which has been superior to that witnessed in any of the other belligerent countries," says the report, "affords conclusive proof both of the adequacy of the arrangements which had been made in advance and of the capacity of those who have been concerned with their execution. There has been little dislocation, notwithstanding that, in addition to a very large government traffic, the volume of civilian traffic, both of passengers and goods, has been heavier than in pre-war days; that large numbers of the staffs have been inexperienced and that considerable demands have been made upon the railways for rolling stock and materials of all kinds for use with the armies abroad."

Nobody who is familiar with the facts will be disposed to question that the British railways deserve all the praise that the select committee bestows upon them. They have handled the situation extremely well. There is no doubt in my mind that, as the committee says, their success "has been superior to that witnessed in any other of the belligerent countries," not excepting the United States. Furthermore, the managers of the British railways assert—and I have found no one who disputes the assertion—that the railways have handled their work at least as well, if not better, than any other branch of the government.

The success of the British railways during the war must be credited almost entirely to private initiative, resourcefulness and ability; because, while the railways have been under government control from the beginning of the war, the actual operation has remained, as before, entirely in the hands of the owners and the managers and officers selected by them. As the select committee says in its report, "The war has considerably modified the position and methods of working of the railway companies though the changes in their organization and practice have been less than is generally supposed. The desire has been to get the work done with as little disturbance of the existing machinery as possible. As a result, the individual organizations of the railway companies have remained intact, and the boards of directors have continued to be responsible for their affairs. The changes which have been introduced and the high efficiency which has been witnessed in the handling of the traffic by the railways during the war have been due far more to a patriotic determination on the part of all concerned to do their utmost to assist the country in a time of national emergency, regardless of corporate or personal interests, than to direct imposition by the government of its will upon the railway companies."

It is well known that when the United States entered the war its railways, under the direction of the Railroads' War Board, which was created by their own managers, made a voluntary effort to carry out a policy of co-ordinated working which would keep the roads out of the hands of the government and at the same time afford to the government and the public the maximum amount of useful service at the minimum practicable expense. Late in the year 1917 the government, deeming that the results secured under this voluntary system were not sufficient, set the Railroads' War Board and the railway companies aside and adopted a policy of government operation, with a government director general in charge. The director general kept most of the managers and officers in the service, but he adopted a policy of drastic unification of the organizations of operation and even of the physical properties. Why have the British railways succeeded in getting better results, on the whole, under the policy that has been followed in this country, than our railways have succeeded in getting under the policy—or, rather, the policies, for there have been two policies—that have been followed in the United States? It is not difficult to answer that question.

The war came very much more suddenly and unexpectedly to Great Britain than it did to the United States. I happened to be in this country in July, 1914, and sailed for the United States about the middle of that month. When I sailed there was not the slightest expectation—unless in the very highest official quarters—that Great Britain was going to be involved in war; but within three weeks the war had come, and, among other developments, the British railways had been taken under government control and were being operated pretty much as they have been since. The principal reason why this change in the position of the railways could be and was made so quickly is indicated in a single sentence in the select committee's report. "The government was not, and is not today, organized to carry on the administration of railway systems by means of the direct control of a government department. It had, instead, long prior to the war, established an organization to cope with just such a situation as subsequently arose, under which, while the supreme control of the system would be taken over by the state, the technical management would remain in the hands of the administrators who were responsible for its working in time of peace."

The legislation under which government control was adopted in Great Britain was passed in 1871, immediately after the Franco-Prussian war had demonstrated to Europe the important part railways must play in modern war. Exhaustive study had been made for years by government officials and railway officers jointly as to just how matters should be handled on the railways in case of war. As a result of this study, when war did come, every railway general manager had in his possession instructions as to just what he should do when the government should take control and mo-

bilization should begin; and it was largely owing to the character of these orders and the celerity and efficiency with which they were carried out, that Britain was able within a few days to land an army in France and take an important part in the conflict in its earliest stages.

The war had been going on in Europe two and a half years before the United States entered it. For many anxious months our government and people had known that we might be drawn into it. The warning voices of many experts—including that of the *Railway Age*—were raised repeatedly in calling attention to the fact that if we became involved our railways would have an important part to play, and that they were, financially, physically and in point of organization, unprepared for it. Our government paid no attention to these warnings. The first step actually taken to get our railways ready was when their chief executives met in Washington in April, 1917, four days after war was actually declared, and created the Railroads' War Board. This meeting was held on the suggestion of the Council of National Defense. That was all the government had to do with it.

Effective as it has been, the organization of the British railways for the war is, and always has been, very simple. The select committee, in its report, briefly describes it as follows: "The management of the railways taken over has been entrusted to a Railway Executive Committee, composed in the first instance of nine, and subsequently of twelve, general managers who were invited by the government to serve upon it. The president of the Board of Trade is *ex officio* chairman of the committee, but the work of the chair is in practice carried out by the acting chairman, who is one of the general managers serving upon the committee. During the war unification of management of the railways has thus been in operation, but it has not been accompanied by unification of the assets of the railway companies concerned."

The president of the Board of Trade, who is a government officer and a member of the cabinet, is Sir Albert Stanley. He is in private life head of the company which operates the London underground railway system, and received his early railway training in America. The acting chairman is Sir Herbert A. Walker, general manager of the London & Southwestern Railway. Each member of the committee has continued to perform his usual duties on his own railway, which correspond roughly to the duties performed by the president of an American railway under private management.

There was a similarity between the war organization of the British railways and that under which the railways of the United States worked when the Railroads' War Board was at their head. But there were some points of difference which were far more important than the points of resemblance. First, the British government from the start guaranteed to each company practically the same net return it earned in 1913, and the executive committee did not have to consider the financial effects of any thing it did upon any individual railway, or upon the railways as a whole. The United States government, while our railways were operating under the Railroads' War Board, did not guarantee the companies any return whatever. Second, the British Railway Executive-Committee was not subject to any legislative restrictions regarding competition or any other matter, but exercised all the power of the government in pooling facilities and traffic, in reducing train service, in saying what traffic could be moved, and in what order of priority, and so on. On the other hand, under the Railroads' War Board, the railways of the United States were left subject by our government to all the old legislative prohibitions against trusts and pooling; were loaded down with traffic priority and preference orders issued independently by innumerable government departments and agents; and had no authority to refuse to handle freight as shippers routed it, or to refuse to take non-essential traffic which they could not handle.

Two other points, it is important to recall, are that the British railways had not been subjected for years to such a system of regulation as that which had made it impossible for the railways of the United States to keep their facilities reasonably adequate to the demands of business, and that they never experienced such terribly severe weather as that with which American railways had to contend during the last two months the Railroads' War Board was in charge and during January, 1918, the first month of government control.

In spite of the fact that they received little co-operation and no legal or financial support from the government, American railways under the Railroads' War Board for several months made a splendid record of increased efficiency in operation. They did not succeed, as the British railroads did, in handling the business without congestion and almost without delays; but they did succeed in handling a vastly increased business, both passenger and freight. When the government took them over it had the choice of adopting practically the same policy Great Britain had followed with such conspicuous success, or of entering upon an extensive programme of reorganization. It took the latter alternative. In order to accomplish complete unification of both the organizations and physical facilities, in which he strongly believed, Director General McAdoo put the railway companies, their directors, chairmen and presidents off the right-of-way, established a large overhead organization in Washington and placed federal managers in place of the presidents. Now the complete reorganization of the railways of Great Britain would be a much smaller and less difficult matter than the complete reorganization of the railways of the United States.

The British railways have less than 25,000 miles of line and 60,000 miles of track, while ours have over 250,000 miles of line and over 350,000 miles of track. Their railways represent an investment of $5,000,000,000, while ours represent an investment of $18,000,000,000. British railways earned before the war about $600,000,000 a year, while ours earned over five times as much. Their railways employ about 700,000 persons, ours about 2,000,000. Theirs operate within a small area, ours within a vast area. Nevertheless, the British did not consider it expedient to attempt a complete reorganization of the railways.

The results of Mr. McAdoo's efforts to reorganize and operate the railways of the United States on an entirely new basis will be for some time a subject of animated discussion; but certain indisputable facts will stand out in this discussion. These will be, that under the Railroads' War Board there was a very large increase in the amount of traffic handled on United States railways; that under the British system there has been a very large increase in the traffic handled; that under government operation in the United States there has been but a small increase in the amount of business handled; and that, disregarding the factor of advances in wages, the increases of operating expenses under government operation in the United States have been relatively much greater than they were under the Railroads' War Board, or than they have been on the British railways under the Railway Executive Committee. Just what the Railroads' War Board would finally have been able to accomplish if the government of the United States had, after the British system guaranteed the net returns of our railway companies, left the Railroads' War Board in charge of their operation—without all the disruption of the organizations which government operation has involved—and used the power of government to help the railway managements instead of to break them down, is largely conjectural; but, after studying operating methods and results both in the United States and Great Britain, there is no doubt in my mind that it was a capital mistake to attempt, as Mr. McAdoo did, completely to reorganize our railways in the midst of a great emergency; nor any doubt that we shall be engaged in dearly paying for his mistake long after the war's end.

While the British railways have not gone through any such revolution as ours have during the last year they emerge from the war in an unsatisfactory and precarious condition. Nobody knows just what their earnings from all their traffic during the war at their regular passenger and freight rates would have been, since no account is kept of traffic handled for the government. Their expenses are known, however, and they have increased greatly. An accompanying table gives the expenses (in pounds) of eleven leading railway companies, doing about 90 per cent of the total business of the country, for the last two years before the war—1913 and 1914—and for the years 1915, 1916 and 1917.

TABLE I—OPERATING EXPENSES OF BRITISH RAILWAYS, 1913-17, INCLUSIVE

	1913	1914	Increase over 1913	1915	Increase over 1914	1916	Increase over 1915	1917	Increase over 1916	Increase over 1913	Percentage increase 1917 over 1913
Great Central	£3,947,203	£4,267,965	£320,762	£4,400,283	£132,318	£4,980,442	£580,159	£5,728,170	£747,728	£1,780,967	45.1
Great Eastern	4,082,732	4,614,322	531,590	4,816,766	202,444	5,120,799	304,033	5,807,918	687,119	1,725,186	42.1
Great Northern	4,523,476	4,772,798	249,322	5,131,087	358,289	5,596,539	465,452	6,047,501	450,962	1,524,025	33.7
Great Western	9,858,258	10,606,062	748,704	11,144,451	537,489	11,823,490	679,039	13,210,438	1,386,948	3,352,180	34.0
Lancashire & Yorkshire	4,230,902	4,694,696	463,794	4,952,473	257,777	5,907,410	954,937	6,626,880	719,470	2,395,978	56.6
London & North Western	10,543,745	11,745,141	1,201,396	12,502,374	757,233	13,655,959	1,153,585	15,587,384	1,931,425	5,043,639	47.8
London & South Western	3,476,379	4,080,475	604,096	4,449,624	369,149	4,941,500	491,876	5,620,504	679,004	2,144,125	61.7
London, Brighton & South Coast	2,174,196	2,471,039	296,843	2,693,048	222,009	2,913,531	220,483	3,206,548	293,017	1,032,352	47.5
Midland	9,416,981	10,188,550	771,569	10,441,179	252,629	11,196,243	755,064	12,514,685	1,318,442	3,097,704	32.9
North Eastern	7,220,784	8,008,277	787,493	8,234,718	226,441	8,916,228	681,510	10,000,244	1,084,016	2,779,460	38.5
South Eastern & Chatham	3,057,948	3,406,378	348,430	3,565,946	159,568	3,713,473	147,527	4,047,145	333,672	989,197	32.4
Total for 11 companies	£62,532,604	£68,856,603	£6,323,999	£72,331,949	£3,475,346	£78,765,614	£6,433,665	£88,397,417	£9,631,803	£25,864,813	41.4
Total for England and Wales	67,965,211									Say £28,000,000	
Total for Scotland	8,001,344										

It will be seen that on the average the expenses of these companies were £28,000,000, or 41.4 per cent, more in 1917 than in 1913. Nor does this tell the whole story. The "war bonuses" granted to railway employees are not included in these figures, and they were reported in May, 1917, to be running at the rate of £47,000,000 a year—roughly, $235,000,000. New agreements made in September raise the "war wages" to £55,000,000 a year—roughly, $275,000,000. It seems safe to estimate that, *including* the war wages, the cost of operating the railways of Great Britain is now $400,000,000 a year more than it was in 1913. But in 1913 their net earnings were but $260,000,000. Passenger rates have been advanced 50 per cent during the war, but freight rates have not been touched.

Even the foregoing does not indicate adequately the problem presented. It would appear that a further enormous addition is to be made soon to the cost of labor on British railways. In August, 1917, a strike was threatened by locomotive engineers and firemen. It was prevented by a promise from Sir Albert Stanley, the president of the Board of Trade, that within one month after the cessation of hostilities he would entertain a request from the employees for a shorter working day, and that the request would be given "immediate and sympathetic consideration" by the government. The employees were not slow to present their request after the signing of the armistice, and on December 6 a statement was issued by the government to the effect that: "(1) The principle of an eight-hour day for all members of the wages staff has been conceded, and is to come into operation February 1. (2) All existing conditions of service to remain unaltered pending the decision of a committee to be set up as soon as possible to review wages and other working conditions of service of railway men in Great Britain."

What is meant by the "principle of an eight-hour day" is not explained, but the programme of the National Union of Railwaymen is very definite on this point. It demands "that eight hours constitute a working day and 48 hours a working week." It will be noted that a committee is to be appointed to investigate all wages and working conditions. The employees demand that "all advances given as war increases be converted into permanent increases." It is estimated that if this should be done the change to a basis of eight hours' work a day and 48 hours' work a week would add about £25,000,000, or approximately $125,000,000, a year to the wages now being paid. This would make the total wages paid annually about $635,000,000, as compared with $235,000,000 before the war. The *increase* in wages since the war began would be $140,000,000 a year more than the total net earnings of the companies were before the war.

Even with the 50 per cent advance in passenger rates which has been in effect for two years the expenses of the railways, in the absence of an advance of freight rates, would undoubtedly be equal to, and would probably exceed, their total earnings from a commercial business equal to that which they had before the war. Whether all the so-called "war wages" will be left in effect, as demanded by the employees, has yet to be determined, but the general impression is that this is substantially what will be done. In that case it is easy to see that for the railways to be turned back to their owners without large advances in freight rates would mean instant ruin for all the companies.

It is felt that some remedy must be found for this situation; that this remedy must be one that will reduce expenses, and the words "standardization" and "unification" have been imported from the United States to accomplish the desired result. I have included a recent report on railway standardization in an earlier letter. The select committee on transport discusses "unification" in its report, and I quote from it at considerable length:

"Evidence has been given by members of the Railway Executive Committee to the effect that if a policy of unification of management, combined with a pooling of assets of the railway companies, were adopted it should be possible to give the public better service and facilities at less cost to the railway system.

"From a purely technical point of view, it appears, therefore, to be desirable that there should be a unification of ownership, not merely unification of management, of the main railway systems, because, while unification of management would undoubtedly be a great improvement upon pre-war conditions, and would assist materially to secure more efficient organization and management, it would not, without unification of ownership, permit of the use of the assets of the combined system to the best advantage nor allow of the provision of new and costly equipment without constantly giving rise to undesirable financial negotiations and difficulties. Whether the state or one large joint-stock concern owned the railways would be immaterial from this point of view; the essential conditions are that there should be single ownership and single management.

"The position of railway shareholders when the present arrangements with the government terminate, under which their pre-war earnings on the basis of the year 1913 are assured to them, will obviously be one of great uncertainty. Dividends on the old scale, assuming that wages remain at a level comparable with that now existing, and the volume of traffic returns to its pre-war dimensions, cannot be earned unless either rates are raised considerably or large economies are effected in working. The former course, notwithstanding that the raising of rates might be fully justified in the circumstances, would certainly be bitterly opposed and be detrimental to the general interests of the community. Large economies, on the other hand, can only be brought about by means of greatly improved methods of administration, and the introduction of labor-saving appliances on a considerable scale. So long as the railway companies remain as separate corporations it will be difficult to apply either method of securing economies to the fullest possible extent.

"There are also other circumstances which will make it difficult from the point of view of shareholders to return to the pre-war situation. War conditions of working, and the complete elimination of competition in the public interest, have in many cases revolutionized old-established practices and habits. Traffic has been encouraged to follow unaccustomed routes, the clienteles of individual companies have been disturbed, their ideas have been changed and the respective good wills of the various companies have consequently been altered. Difficulties such as these seem to require solution by some process of continued unification.

"The above considerations lead to the conclusion that the main railway systems of the United Kingdom should be brought under a unified ownership and managed as one system if the question of the improvement and development of the internal transport facilities is to be considered from the standpoint of efficiency and economy, and with due regard to the interests of the proprietors, the railway staffs and the general community. * * *

"Your committee at this stage of its inquiry is unable to make recommendations as to the manner in which the railway system can be organized most advantageously from the point of view of the general interests of the community, or to advise as to the status and management of other transport agencies. Its conclusions upon the second of these questions must necessarily depend upon the view that may be taken as to the future position of the railways to which, as will be evident from what has been said previously, all other transport agencies must be looked upon as ancillary.

"It is, however, in a position to state the following preliminary conclusions which, though to some extent negative in character, may nevertheless be of assistance to Parliament upon which the responsibility of arriving at a decision must ultimately rest.

"Your committee considers:—

"(1) That the organization of the transport agencies of the country—and particularly of the railways—cannot be allowed to return to its pre-war position.

"(2) That the temporary arrangements for the control of railways and canals during the war would not be satisfactory as a permanent settlement.

"(3) That unification of the railway system is desirable under suitable safeguards, whether the ownership be in public or private hands.

"Any one of the following courses would be consistent with the conclusions stated in the preceding paragraph, but without further evidence your committee is not in a position to recommend which of these methods should be adopted in the first instance:

"(1) Further amalgamations of railway companies as a step towards unification.

"(2) Unification accompanied by private ownership and commercial management.

"(3) Unification by means of nationalization followed by:

"(a) Establishment of a Government department to manage the railways.

"(b) Constitution of a board of management not directly represented in Parliament.

"(c) Leasing of the system to one or more commercial companies."

It will be noted that the committee very carefully refrains from committing itself on the question whether the unification of ownership and management it favors should be accomplished by the government or by private capital. Furthermore, it gives no details as to how mere unification, whether under government or private ownership and management, is to be so accomplished as to effect such large economies as would be required in order to maintain both existing wages and existing freight rates. There is no doubt in my mind that by making the changes in their physical properties and operating methods necessary to enable them to handle freight traffic in larger carloads and trainloads and without transferring it at connections, the British railways could make large economies; but nobody but a complete ignoramus about railway economics could believe that, with all the standardizing and unifying they could possibly do they could effect economies great enough to enable them to make both ends meet, while charging existing freight rates and paying existing and prospective wages.

Some of the most competent students of railway matters in the country are opposed to the complete amalgamation of all the railways. They would prefer to see them divided into about ten systems, each having approximately 2,500 miles, each occupying a region by itself, and coming into competition with other roads only at terminals, and a few intermediate points, each having its own management, and all under some central control which would prevent excess of competition, and bring about a large measure of uniformity of physical construction and operating methods. Under this system, either the government or private companies might own the various railways, but if the state owned them, they would be leased to private companies for operation. The British belief in the value of private initiative, enterprise, ambition and emulation, is by no means dead; and I find that most business men and students of industrial and economic questions regard with dread the possibility of the government becoming the owner and actual manager of the railways.

On the other hand, organized labor, which is much more Socialistic here than in the United States, seems to favor government ownership, not only of the railways, but also of coal mines, steamships, land and many other things.

What the outcome with respect to the railways will be is conjectural. The prime minister, Mr. Lloyd-George, has said in one of his public addresses since the war closed, that the railways must in future be operated under the "inspiration and control of the state." That might mean almost anything. The Labor party is the only one which has definitely committed itself, and it favors government ownership.

Winston Churchill, Minister of Munitions in the Coalition government, in one of his electioneering speeches in the recent political campaign, said in reply to a question that the government had decided on the "nationalization" of the railways —which is the term ordinarily used in Great Britain for government purchase. There is already in existence a Royal Commission on Railways (in addition to the Select Committee on Transport), which was created in October, 1913, and which held some hearings before the war. There was an impression that the hearings of this commission would be resumed, and that a report from it would be awaited, but Mr. Churchill said he did not think the matter would be delayed until the Royal Commission had "wandered over the country making inquiries." He added that "railways in private

hands must be used for immediate direct profits, but it might pay the state to run railways at a loss to develop industries and agriculture."

It has been assumed that Mr. Churchill voiced the views of the Coalition government; and, as is well known, the Coalition government, in the recent elections, won an overwhelming majority in the House of Commons.

The crux of the problem is presented by the fact that the railways cannot be returned to their owners without either a reduction of wages, an advance of rates, or a continuance of the government guarantees. I have no doubt that were it not for this, they would be returned to private management. Probably the final outcome will be one of those compromises for which the British government and people are famous, and which will result, as one of my English friends predicts, in a policy under which "Government Control" will be painted on one side of the cars, and "Private Commercial Management" on the other. That out-and-out government ownership and management will be adopted I do not believe, and at the same time I am sure there will be no return to the old system of highly competitive management.

One thing may be stated with the utmost certainty, and this is, that up to the present time the government has got no farther with its plan for solving the railway problem than to the conclusion that it probably will be necessary to adopt nationalization. How nationalization will be adopted—whether by actual purchase or by perpetual guarantees to the companies; and how the roads shall be managed if they are nationalized; whether as a single unit or several units, whether by the government itself or by a company or companies under lease—these are things which are entirely unsettled in the mind of the government itself. Furthermore, it is by no means certain that if the government introduces a bill to provide for nationalization it will be found easy to get it adopted.

Important as the question of nationalization is, it was not much discussed in the political campaign, and, as already indicated, there is a strong undercurrent of sentiment against it which is sure to make itself felt in Parliament.

The operation of the British railways in this war has been one of the finest demonstrations ever afforded of the superiority of private over state management in a time of emergency. Likewise, the experience of the railways of the United States during the last year has exploded most of the old arguments that government management would be more efficient, economical and considerate of the public than private management. With experience in both countries confronting them, the advocates of government management will find it very hard to make out a plausible case for government management in time of war emergency, and much harder to make a case for it in accordance with the economic considerations which should be given the most weight in time of peace. It is true that under government control in both countries there have been enormous advances in wages, but government operation in the United States has utterly failed to realize the large economies which some predicted it would produce, and on the other hand has resulted in a vast increase of expenses only partly due to advances in wages, which has made necessary larger increases in rates, both passenger and freight rates, than the railway companies ever dreamed of asking for. If Great Britain adopts government ownership it will not be because either reason or experience has convinced the British people that it is desirable, but because they have a feeling that advances in freight rates sufficient to offset the increases of expenses would be impracticable under private ownership, and that it would be both immoral and illegal to return the railways to their owners in a bankrupt condition. If government ownership is adopted without an advance of freight rates the public will immediately be confronted, even if the advance of 50 per cent in passenger fares is not rescinded, with a deficit of not less than $300,000,000 a year. Roughly speaking, this would be equivalent to a deficit of $1,500,000,000 on the railways of the United States. My estimate of a deficit of $300,000,000 on the British railways is based upon the available official facts regarding traffic, earnings, wages, etc., both pre-war and during the war, and takes no account of the enormous capacity of government management for increasing expenses. If government operation in Great Britain should increase expenses other than wages as much in proportion as government operation did in the United States in 1918, or as it did on the Western Railway of France from 1908 onward, the deficit of the British roads under government ownership would soon be at least $500,000,000 a year.

Personally, as a result of my study of the results of government operation almost throughout the world I have no doubt whatever that this would be the outcome. The British government has owned and operated the telegraph system of the country for many years; and it has always operated it at a heavy loss. If the railways incur a deficit it will have to be paid by the British taxpayers, and the amount of the deficit they will have to pay undoubtedly will be larger than the cost to the public of such an advance in freight rates as would be necessary to enable the railways to operate under private management at a profit.

Just how and why the necessity of paying the increased expenses of the railways in increased taxes will impose a smaller burden upon British commerce and industry than would the necessity of paying them in increased freight rates I am willing to leave to be elucidated by the brilliant Mr. Churchill. I have met him and heard him speak, and am sure he can come as near clearing up the mystery as anybody. Meantime I wish, in conclusion, to emphasize the fact which is patent to anybody who has visited this country while the subject has been under consideration, that if the British adopt government ownership it will not be because their economists, statesmen and business men believe in it on principle, but because they and the people generally have got into a way of thinking that an *impasse* has been reached which makes a continuance of private ownership almost impossible. It is a remarkable fact that government ownership of railways never has been adopted in any country as a result of a full of reasoned consideration and discussion of the question by the general public. Fortunately for the United States, no conditions exist in our country which any reasonable person can regard as making a return to private management impossible, or even impracticable, unless statesmanship has become extinct in America.



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At Work on Light Railway Construction

New Locomotive Stoker Tested Out on Erie

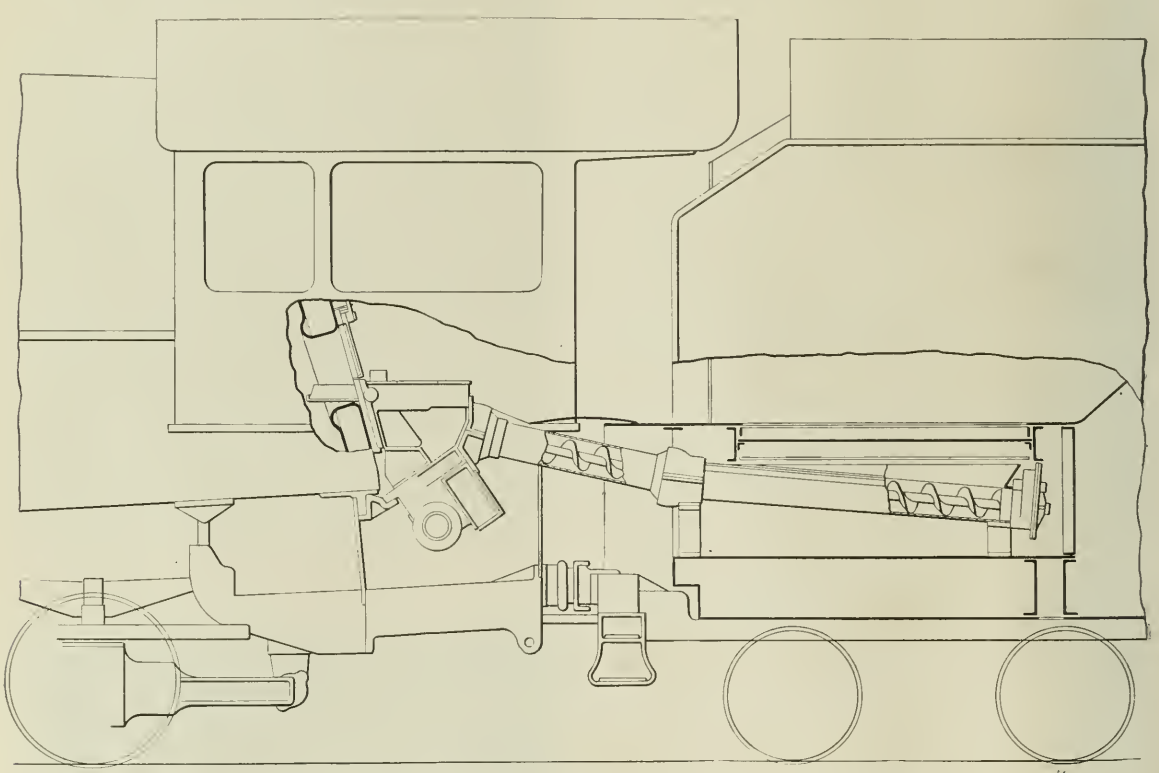
Mechanical Distribution of Coal; Maintains Light Fire and Reduces Cinder and Stand-by Losses

A MECHANICAL STOKER, in which the entire distribution of the coal in the locomotive firebox is effected by mechanically operated shovels without the use of steam jets, has been developed by the Elvin Mechanical Stoker Company, New York. One of these stokers has been in road service on the Erie for the past three months with results which have demonstrated the feasibility of the method of distribution employed and which indicate an economy in the use of coal equal to, if not exceeding that obtainable by hand firing under favorable conditions. The locomotive equipment consists essentially of three parts: the stoker proper, the agitator and feed control on the tender and the screw conveyor between the engine and tender. The equipment is designed to handle the usual grade of prepared stoker coal.

The stoker proper is assembled in a complete unit which is mounted on the back boiler head and braced to the mud ring by cast brackets. The proportions of the machine and its location on the backhead are shown in one of the drawings. The one design is adapted to backheads of varying slopes by the insertion of filler blocks of suitable taper between the stoker and the boiler head. The stoker consists essentially of two distributing shovels operating through the fire door opening and an elevator for bringing the coal from the conveyor to the level of the shovels, with a suitable driving mechanism.

The distributing shovels are mounted on vertical shafts, the lower ends of which carry segmental bevel gears. These gears are driven by bevel segments carried on the upper ends of a pair of centrally pivoted drive arms, the lower ends of which carry steel rollers running in the grooves of a double-faced flat cam. The cam is driven by a worm gear from the main stoker shaft and revolves in a plane approximately parallel to the usual inclination of the backhead of the boiler. Each revolution of the cam completes a cycle of shovel operation; that is, one shovel moves around into the firebox and returns to remain idle while the other shovel performs the same movement.

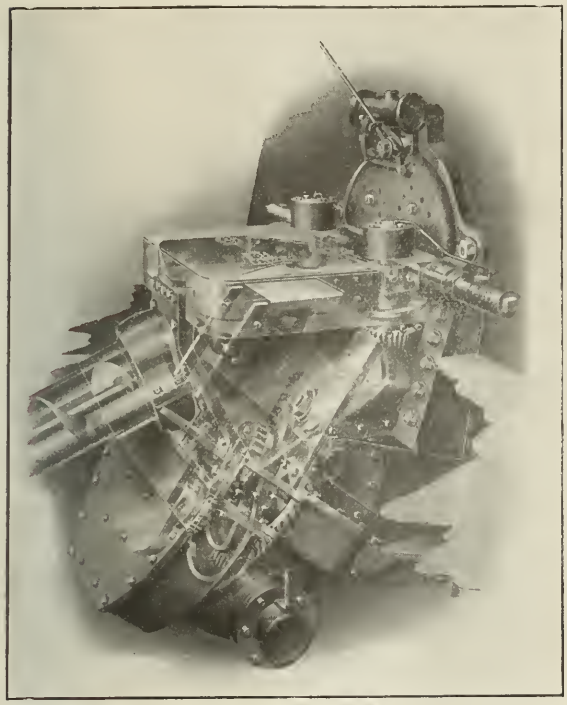
Upon the cam is mounted a spur gear which, through a meshing gear of one-half its diameter, drives the elevator crank shaft. The elevator is thus raised and lowered twice during each revolution of the cam, once for each of the two shovels. The elevator, which moves up and down on an inclination parallel to the cam, has an approximately level top surface measuring 7 in. by 12 in. In its lowest position coal as it is delivered by the screw conveyor falls directly on the top of the elevator. As it moves up a long apron extending downward from its back side forms the front wall of a V-shaped pocket in which the coal accumulates until the elevator again returns to the lower end of its stroke. As the elevator is gear driven directly from the cam, its movement synchronizes perfectly with that of the shovels. The



Elevation Showing the Location of the Stoker Equipment on the Locomotive

crank is set so that the elevator reaches the top of its stroke just as a shovel is swinging over it. A slight inclination of the top of the elevator compensates for the small amount of downward movement which has taken place before the shovel has moved completely across its top. One of the shovels thus picks up the pile of coal from the top of the elevator at each stroke and carries it forward into the firebox.

The upper part of the stoker casing forms a box-shaped chamber known as the shovel box, which is covered by hinged lids. The forward end of this box is open to the firebox and the shovels swing therein. The total height of



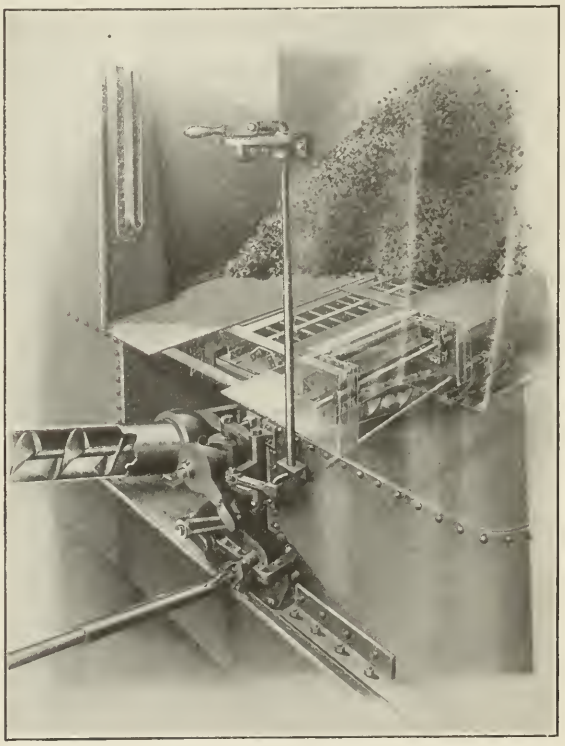
Phantom View of the Elvin Stoker Attached to the Back Boiler Head

the box is 5½ inches over the cover. The stoker thus uses the lower 5½ inches of the firedoor opening and that part of the door opening above the stoker is closed by a butterfly door, which is used for inspection and hand firing if necessary.

The shovels are L-shaped, with a flat bottom and a back, the maximum height of which is 4½ in. This is reduced to a height of 1¼ in. around the end of the shovel, to permit a portion of the coal to be retained in the shovel until the end of the forward throw. As will be seen from one of the drawings the shovels are pivoted at either side of the fire door, and are swung through an arc of about 140 deg. The use of a cam drive has made possible the attainment of the speed variations required in the course of the forward swing of the shovel to accomplish the picking up and distribution of the fuel without shock and with constant uniformity. In action the shovel movement is uniformly accelerating until the charge of fuel has been picked up, or until the shovel has passed over the elevator; then the movement is rapidly accelerated until the shovel tip has entered the firebox when it is rapidly decelerated. During this deceleration the fuel slides forward on the shovel and off the end where the back is reduced in height and at a tangent to the back of the shovel; but as the back is moving in an arc the effect is to spray the fuel throughout the remaining travel of the shovel, and that portion of the fuel held by the 1¼-in. vane is projected parallel to the backhead when the shovel comes to a stop.

The changes in the speed of the forward movement of the shovels have the effect of distributing the fuel uniformly over the entire grate area. The distribution is capable of variation, by changes in speed of the stoker engine; an increase in speed throws a greater amount of the fuel toward the front of the firebox, while a decrease fires heavier to the rear. Irrespective of the speed of the shovels, however, a portion of the fuel is always held by the shovels to fire the back corners of the box. In practice it is found that there is a certain speed which will give the proper distribution under normal conditions and the stoker should be operated at this speed, except when occasionally it may be advisable to fire heavier at the front or rear of the firebox. In practice the speed of firing is about 34 shovels per minute, or a cam speed of 17 r. p. m. The amount of fuel fired is independent of the shovel speed, and the distribution is not affected by the quantity.

All working parts of the stoker, with two exceptions, are run on ball bearings in a dust-proof casing, and are in a constant bath of oil. The oil level is maintained at a point



Phantom View of the Tender Equipment of the Elvin Stoker

above the main worm shaft and the oil is pumped to the highest bearings to return by gravity. The connecting rod driving the elevator being outside the stoker casing proper is provided with graphalloy bearings which require no oil and give long service without attention. The stoker is operated by a No. 3½ Dake reversing engine, which is rated at 7½ h. p. at 100 lb. pressure. The steam line to the stoker is provided with a regulating valve which is set for 25 lb. and is blocked for a maximum of 60 lb. The whole of the stoker mechanism is designed to withstand the maximum power of the engine without failure, and the engine

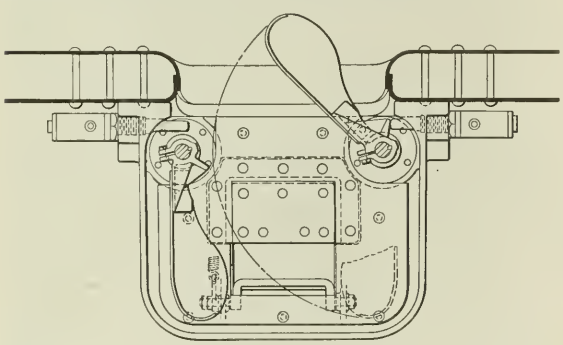
will stall before any part of the mechanism can be unduly stressed.

The conveyor extends from the stoker rearwardly under the coal space of the tank and is in two parts. It is supported rigidly upon the tank, and the portion between the engine and the tank is arranged to swivel to compensate for curvature and to telescope for varying lengths of coupling. The rear end of the conveyor screw is carried in a trough and between engine and tank it is carried in a pipe. The conveyor is driven from the rear through gearing enclosed in dust-proof casings. The drive is taken through worm gearing from the main stoker shaft, enclosed in the stoker casing and running in oil. A universal slip joint shaft transmits the power from the engine to the tender.

Under the floor of the tank and above the conveyor is the feeder which consists of an agitator, a deflector and a feeder plate. The agitator is a grating with a double row of 3⅛ in. openings, and is operated from a rock shaft which also moves the feeder plate. The feeder plate is located under the deflector plate so that when operating full stoke the openings in the plate register fully with openings on either side of the deflector plate, first on one side and then on the other.

A simple mechanism on the rock shaft, which operates the agitator and feed plate, provides for varying the throw of the shaft and the size of the plate openings which register with the deflector plate openings, thus controlling the quantity of coal fed to the conveyor, which runs at constant speed. This device is controlled by a handle operating on a quadrant on the front of the tank, where it is readily accessible to the fireman. The range of feed varies from zero to the maximum, which is 12,000 lb. of coal an hour.

The conveyor is designed to carry the maximum coal feed when running one-third full. This makes the movement of the fuel easy as the action of gravity tends to roll the coal along ahead of the screw, and it reduces the danger of clogging to a minimum. The ease with which the coal is moved



Top View of the Stoker with the Cover Removed from the Shovel Box, Showing the Elevator at the Top of Its Stroke

may be tested by turning the engine over by hand, which can easily be done with the whole device under full load.

The stoker maintains a very thin fire over a greater part of the grate area, which gradually becomes heavier toward the front, rear and sides of the box, where the heaviest fire is needed. The thin character of the fire is clearly indicated by the fact that within a very few minutes after the throttle has been closed and the stoker stopped, the only fire still burning is around the outside of the firebox, while the central portion of the grate is dead. On starting the stoker, however, the thin charges of coal immediately ignite over the entire area of the grate and a uniformly hot fire is maintained as long as the stoker continues to operate. The rapid building up of the fire and the steam pressure following the starting of the stoker has made possible a saving in standby losses, as little need be done, either to maintain the fire or the steam pressure during detention time on the road beyond the minimum necessary to start the train. A characteristic of the distribution of the coal which also tends toward economy is the projection of the lumps forward under the arch while the finest of the coal is retained in the shovels to be deposited in the back corners of the box furthest from the most violent action of the draft. Comparative freedom from large cinders is a noticeable feature of the operation of the locomotive equipped with this stoker.

Test Data

The Erie locomotive to which the Elvin stoker was applied is of the Santa Fe type with the following dimensions:

Size of cylinders	31 in. by 32 in.
Diameter of drivers	63 in.
Weight on drivers	337,400 lb.
Total weight of engine loaded	417,200 lb.
Total heating surface	5,660 sq. ft.
Superheating surface	1,389 sq. ft.
Total equivalent heating surface	7,743.5 sq. ft.
Tractive effort	83,000 lb.
Grate area	88 sq. ft.

A series of tests were made with this locomotive, employing a dynamometer car and accurate means for correctly determining the quantity of coal and water used. These tests were made on the Second district of the Meadville division between Meadville, Pa., and Kent, Ohio, during the month of November last, under prevailing temperatures of 32 deg. F. This division has a ruling grade both east and westbound of one per cent and is generally rolling in character with little to distinguish between the physical characteristics of the division east and westbound. A brief summary of the results of these tests is given in the table.

Average Results of Elvin Stoker Tests on the Meadville Division of the Erie Railroad

Length of run, miles	89.3
Time on road, hr. min.	9:50
Detentions, hr. min.	3:57
Running time, decimal hr.	5.88
Actual M's (1,000 lb.)	4,243
Adjusted M's	5,133
Total actual M's (inc. eng. and ten.)	4,816
Average drawbar pull, lb.	24,362
Average speed, m.p.h.	15.56
Average temp. superheated steam, deg. F.	693
Million ft-lb. of work	11,482
Total coal as fired, running time, lb.	25,679
Coal as fired to do 11,482 million ft.-lb. work, lb.	25,679
Equivalent evap. per lb. dry coal, running time, lb.	8.60
Equivalent evap. per lb. dry coal, combustible, lb.	9.59
B. t. u. per lb. of coal as fired	13,157

It was developed during the tests that practically perfect distribution of the fuel was obtained under all conditions. The fire was maintained at a uniform level without the necessity of using the rake or shaking the grates, notwithstanding the variable operating conditions met on this division. The engine arrived at terminals with approximately six to ten inches of fire on the grates, except a point immediately under the arch at the forward end of the firebox, where the fire was somewhat heavier.

No difficulties were encountered in cleaning the fire at terminals because of the comparative absence of clinker. The results of the tests indicate very favorable evaporation per pound of coal fired. Under ordinary circumstances locomotives of the Santa Fe type on this division require coaling and fire cleaning between terminals. During the tests, however, it was unnecessary on any of the trial trips to clean the fire on the road and the grates were operated only to relieve the accumulation of ashes. On two occasions it would have been easily possible to make a round trip without attention to the fire other than shaking the grates. This condition is in a measure attributed to the absence of moisture which is injected into the firebox with most of the other types of locomotive stokers now in use. The locomotive will handle tonnage trains over this division with the use of less than one tank of coal.

Orders of Regional Directors

WESTERN UNION TELEGRAPH FRANKS.—The Eastern regional director, file 2100-33A400, advises that Western Union telegraph franks for 1918 have been extended to March 1, 1919, or until new franks are received.

Free Transportation for Canadian Immigration Inspectors, etc.—The Eastern regional director, file 2100-10A397, states that free transportation can be issued to Canadian government officers and representatives, such as immigration inspectors and other officers of the Immigration and Colonization Department, also traveling officers of their postal department, revenue collectors and others.

The Northwestern regional director has issued similar instructions in Supplement 38 to Circular 20.

Free Telegraph Service for Express Company.—The Eastern regional director, file 304-11A403, states that Judge Payne has ruled that where the telegraph lines are operated by the railroads the messages of the Express Company can properly be transmitted without charge, as provided in the contract.

Circular 158 of Southwestern regional director conveys the same information.

Rulings—Free Transportation.—The Eastern regional director, file 2100-26A408, states that requests for annual transportation for the year 1919 over short line railroads not under federal control should be made direct on such railroads. Individual railroads may continue the past practice of furnishing American representatives of European railway lines for the year 1919 with such trip transportation as may be required. Requests for annual transportation should be made direct upon the Director of Operation.

Interest During Construction.—The Eastern regional director, file 2700-A409, orders federal auditors to "include in their accounts from January 1, 1918, interest during construction on additions and betterments expenditures out of federal funds at the rate of six per cent per annum. Same to be charged to the account name of corporation, additions and betterments and credited on the federal books to the account, interest on unfunded securities and accounts. Interest to be figured at the end of each month on the balance for the preceding month, excluding therefrom interest on previous balances. Also to arrange for accruing depreciation at the rate of 4½ per cent per annum on the cost of equipment less salvage coming into service subsequent to December 31, 1917, including the equipment assigned by the United States Railroad Administration. Depreciation on other equipment in service taken over from the corporation December 31, 1917, should be accrued to conform to the test period rate and practices."

Time Allowed for Lunch to Shopmen on Eight Hour Shifts.—The Eastern regional director, file 1200-259A394, states that pending further action by the United States Railroad Administration, the following will govern except when more favorable conditions are provided for by agreements in force: Men employed in shops or roundhouses where three shifts are worked and who work one of the three shifts, will be allowed a lunch period of not to exceed 20 minutes, with pay. Those employed in shops or roundhouses or other places where less than three shifts are worked are to have a meal period of not to exceed one hour, without pay.

Payment of Bills Due from the U. S. Government.—The Eastern regional director, file 700-12A399, states that attention has been called to the failure on the part of the different departments of the United States government promptly to pay bills due to the railroads under federal control for transportation of men and property. Federal auditors of Class 1 roads are asked to immediately prepare reports, and send to C. A. Prouty, director, Division of Public Service and Accounting, Washington, D. C., which will show the amount due from the United States government for the transportation of men and material (excluding mails) showing separately the amount due from each department of the government and the amount due on stated account separately from the sums not yet stated to the government.

The Southwestern regional director has issued a similar order, No. 146.

Report on Condition of Addition and Betterment Work.—The Eastern regional director, file 2700-A398, states that under date of December 10 he was advised by the director of the Division of Capital Expenditures that as to entirely new work not yet authorized he is proceeding upon the view that it is not expedient to grant authority therefor unless either (a) there is imperative necessity for the improvement, or (b) the corporation itself desires the improvement and is willing to finance it. The question arises as to whether the same consideration ought not to operate to cause the cancellation or postponement of any authorities already granted in cases where the work has not been started, or if started, is in such shape that it could be suspended without loss. Please advise me as to any projects which have been approved (but which are not started, or if started, can be stopped without loss) for which you believe there is no imperative necessity under existing conditions and give me recommendations as to whether or not the authority should be cancelled or the work postponed or stopped. If there are any cases in which you feel that the corporation desires work to proceed even though the Railroad Administration feels that the carrying out of the project can properly be deferred, please ascertain so far as possible the wishes of the corporate authorities.

Passenger-Equipped Refrigerator Cars.—In a circular dated January 9, the Northwestern regional director announces that when passenger-equipped refrigerator cars are located and disposition instructions regarding them are given by General Superintendent Mervin of the American Railway Express Company, further movement of the cars will be confined to passenger service. This is necessary on account of the serious shortage of express cars and the apparent inability to keep them out of the freight service when moving empty in freight trains.

Location of Air Pumps on Locomotives.—In Order 147, the Southwestern regional director announces that hereafter when air pumps are applied to locomotives care will be taken to locate them so as not to obstruct the vision of men on the locomotives. As locomotives receive class 1, 2, or 3 repairs, railroad officers in charge will see to it that pumps are properly located.

Competition Between Railroads for the Services of Employees.—In Order 148, the Southwestern regional director calls attention to a letter recently written by a vice-president of the American Railway Express Company to the director general, which states that 59 employees of the general accounting department of the express company in Chicago have been hired by various railroads, in none of which cases did the railroad officers ask permission of the express company in connection with the employment. In view of the relation of the American Railway Express Company to the Railroad Administration, it is desired that no employees of the express company be employed by railroads under federal control without first obtaining consent of the proper express officials.

Vacations for Train Despatchers and Yardmasters.—Supplement 10 to Circular 28 of the Northwestern regional director amplifies previous instructions regarding time off and vacations for yardmasters and despatchers. It is the intention that two days off per month be granted for the purpose of providing needed rest, and definite arrangements must be made to carry out this provision in the current month. Whenever due to extremely bad weather or any other emergency, the two days' relief is not granted during the month, extra pay will be allowed at pro-rata rates. It is not intended that train despatchers be required to make trips over the line on their days off. Two weeks' vacation per annum with pay will

be allowed those officers who have served in that capacity continuously one year or more. On roads where more favorable vacation rules or practices are in effect they will be continued. This vacation provision is compulsory and must be provided at the convenience of the officer in charge.

Heating of Troop Trains.—In Circular 159 the Southwestern regional director calls attention to the large movement of returned troops, including sick and wounded, from ports to inland points. Recently a very slow movement of cars, especially of tourist and army hospital cars, has been noted. As a limited number of cars of this class is available, they should be moved as rapidly as possible. This can only be accomplished by their prompt movement empty to the points needed. Attention should also be given to the heating of passenger equipment. The director of the Division of Operation has emphasized that ample fuel should be supplied in all cases, that Baker heaters may be operated when steam is not being supplied at division or other points, but steam should be furnished while cars are in motion, continuously when possible. When deemed necessary by the commanding officers and railroad officers, trains may be made up with passenger equipment ahead of freight equipment. The regional director also calls attention to his Circular 110 and Orders 97 and 104, which contain detailed instructions regarding the heating of troop trains.

Employment of Returned Soldiers.—In a circular dated January 7, the Northwestern regional director quotes correspondence with the United States Employment Service which indicates that large numbers of applications for clerical positions are being received from returned soldiers and sailors. It is suggested to railroads in the Northwestern region that they call upon the Employment Service if in need of clerical help.

Insurance and Inspection of Elevators.—Circular 68, Northwestern regional director, similar to Order 145 of Southwestern regional director, abstract of which appeared in *Railway Age,* January 3, page 105.

Insurance on Stationary Steam Boilers.—Supplement 1 to Circular 68 of Northwestern regional director, similar to Circular 154 of Southwestern regional director, abstract of which appeared on page 158 of the *Railway Age* of January 10.

Free Transportation for Custom Inspectors.—In Supplement 7 to Order 109 of the Southwestern regional director and Supplement 37 to Circular 20 of the Northwestern regional director, it is announced that railroads will continue to furnish transportation to United States custom inspectors and employees for 1919.

Western Union Franks for Corporate Officers.—In Supplement 8 to Order 109 the Southwestern regional director quotes a telegram from the director of the Division of Operation advising that the Railroad Administration is not requesting Western Union telegraph franks for corporate officers. It is assumed that the latter will deal directly with the Western Union.

Standardization of Time Table Changes.—In Order 149 the Southwestern regional director outlines rules governing the issuance of advance notice of changes in passenger train schedules. All changes in the time of passenger trains are to be made on the first Sunday of each month. General passenger departments should be furnished the final proof of time cards not later than the second Monday preceding the date upon which the change becomes effective, so that ample time for the preparation of copy, printing of folders, and supplying agents and the public may be given. General changes on different divisions of the same road should be made effective on the same date.

Freight Car Distribution.—In Circular 70 the Northwestern regional director outlines new rules to cover the distribution of freight cars. Hereafter freight cars will be distributed between roads in the region as directed by the office of the regional director. The Car Service Section will issue orders covering movements between regions only which will be addressed to the regional directors and not to the individual roads. The Refrigerator and Tank Car Bureau of the Car Service Section, located at Chicago, will exercise the same jurisdiction as in the past and will issue distribution orders direct to railroads when necessary. District Manager Roth, Seattle, Wash., will continue to distribute cars locally in that territory. Orders covering the movement of cars between railroads in the Northwestern region will be issued from the regional director's office with the prefix "N. W. R. Car Order," followed by the number. Reports covering the movement of cars on orders will continue to be made daily by wire to the regional director's office quoting the proper reference as under the present instructions covering movements on Car Section Orders. No report will be made to the Car Service section with the exception that cars delivered to the Northwestern region roads through the Chicago gateway will be accepted on the authority of orders issued by the terminal manager at that point, and reports of receipts on such orders will continue to be made to him as well as to the regional director's office. In accordance with this program outstanding orders issued by the Car Service Section have been cancelled.

Corporate Obligations of Terminal Companies.—The Eastern regional director, file No. 601-A366, quotes a telegram dated December 24, 1918, as follows:

> Refeiring to corporate obligations of terminal companies. In all cases where amounts equivalent to said obligations are collected from the using lines by federal treasurers of terminals as joint facility rents pursuant to operate agreements in effect prior federal conrol between tenant companies and terminal companies whose property is used solely for the benfit of the tenant companies and which amounts are charged by the using lines to their joint facility rents accounts. The federal trasurers of the terminals are authorized pending further instructions to advance from time to time including advances direct to fiscal agents or trustees.
> out of funds on hand to the terminal corporations direct or to fiscal agents or mortgage trustees as provisions of operating agreements may prescribe amounts necessary to meet said proper obligations on due dates, the specific receipts of the terminal corporations to be taken for all amounts so advanced including advances direct to fiscal agents or trustees.

Some idea of the scope of the work which is being done by the Alaskan Engineering Commission is conveyed by a report of the acting general storekeeper of the Anchorage division of the Alaska Railroad. On September 30, 1918, $1,564,034 worth of material belonging to the commission was on hand and in addition there was in transit material valued at $1,048,019.



Released British Civilians from Camp Ruhleben on Their Way to the Dutch Frontier

The Railroad Problem and Economics*

"While We Are in the Business of Seeing That Justice Is Done in Europe, Why Not Use Some of It for Home Consumption?"

By Charles A. Morse†
Assistant Director in Charge of Engineering and Maintenance, Division of Operation.

WHAT SHALL BE the future status of the railroads of the United States? There seems to be a universal feeling that before they are returned to their owners there should be some changes in our laws that will permit them to take advantage of the experience of the government during its operation of the property as regards those things that showed a saving in operating expenses.

I feel that it is proper to give the New York Railroad Club some views from the point of view of the engineer and economist, and while I name them separately, they are in fact synonymous terms, for the function of the engineer has been defined as that of making one dollar do what has required two dollars to do heretofore. In other words, the employment of engineers is fundamentally for the purpose of studying a proposed or already completed installation, and so shaping it that its operation will be economical. In making such a study the engineer must familiarize himself with the details of operation. Naturally, in so doing he is constantly confronted with uneconomical methods and, in his effort to correct them, he discovers that customs, laws, agreements, lack of appreciation of common economic principles, or lack of credit are the cause of the lack of economy that exists.

We are now in the position of having been rudely awakened by the war conditions to realize that the transportation facilities of the country are what they have so often been called—but so little realized—the arteries through which must flow the life blood of the nation, and to appreciate that they must not be permitted to be clogged longer by unwise laws, improper regulation, antiquated agreements or customs that permit of discrimination in favor of individuals or corporations. The railroads are today owned by individuals, but operated for the benefit, not alone of the owners, but of the public at large, and in this operation three things are absolutely necessary in order to make a properly balanced equation—justice to the investors, justice to the public, and justice to the employee. Justice does not mean *favor;* it ceases to be justice when it favors any one of the three interested parties.

The public has seemed to feel that the railroads had money to burn, that all they had to do was to go down into their pockets and dig up the money with which to make any improvements that federal, state or municipal authorities might order. All of these necessitate the borrowing of money, with its necessary interest charges to be paid out of operating income, with a constant effort to reduce rates—or no appreciable increase granted in rates, notwithstanding a constant increase in cost of labor and material. The result is plain—there comes a time when, regardless of curtailment of upkeep, which should not have taken place, the earnings fail to pay expenses and interest on the bonds—and they fail.

When a railroad fails it is not permitted to shut up shop. Instead of this receivers are appointed. They go on operating at a loss and the property is finally sold. A heavy expense bill is paid out of the proceeds to cover the cost of the receivership. The stockholders get little or nothing. The bondholders have to take a scaling down of their securities. A new company is formed that buys in the property for less than it would cost to reproduce it. They continue to operate it and after a cycle of years they get up against the same thing that the original company did,—fail, are sold out, securities are shrunk, new company formed, and so on as long as they are obliged to operate under laws such as we have today, and they are regulated as they have been in the past.

Sherman Law Must Be Revised

Is this justice to the investor? Of course it is not! So our equation has failed, and we must correct, if possible, the cause of failure. There has been a law in force for many years that was passed originally to prevent monopoly. This law makes pooling between the railroads unlawful, and forces competition which is uneconomical and extremely expensive. The first thing that the government did when it took over the railroads was to disregard this law, and to pool both freight and passenger business with marked economy.

Before the railroads are returned to private ownership, this law should be revised so as to permit the same operation under private control as was found necessary and economical under governmental operation. Proper provision should be made in the new law to give the public protection from anything that would be against the public interests.

Regardless of which of the various methods may be finally adopted for handling the transportation of the country, it will be necessary to enlarge the duties of the Interstate Commerce Commission in order that it may function efficiently in carrying out the new laws, and in perfecting the various matters that must of necessity be either added to their duties or taken over by some additional organization. Among these are:

Control of capitalization.
Authorization and control of capital expenditures.
Control (probably through a subsidiary body) of wages and working conditions of employees.
Control of fixing of rates, with obligation that in so fixing they sball be such as will after taking care of operating expenses including depreciation and obsolescence, insure a fair return to the stockholder.
Authority to cause the standardization of appliances and methods to the extent that such standardization would cause a reduction in operating expenses.
Authority to study any or all properties with the view of ordering any improvement in their physical condition, such as improvements in grade or alinement, in terminals, bridges or other elements, as such study would indicate would make a reduction in operating expenses sufficient to more than pay interest on cost of improvement.
Authority to so distribute motive power and rolling stock as will tend to reduce the cost of operation.

This would mean that there should be attached to the Interstate Commerce Commission a complete organization such as is required by any large railroad today, except that care should be taken to secure for this organization men of national reputation acquired by actual experience in the various matters, and the compensation of the members of the commission and their assistants should be equal to that paid by the railroads for positions of similar responsibility.

The responsibilities of the commission under this arrangement would make their duties similar in many respects to that of the board of directors of an eighteen or twenty billion dollar railway corporation.

Shipper Trying to Get More Than He Pays For

In connection with arranging for a proper organization to handle transportation, laws should be passed authorizing

* From a paper read before the New York Railroad Club, January 16, 1919.
† Mr. Morse is also president of the American Railway Engineering Association.

the commission to do away with the routing of freight by the shipper. There is no question but that routing of freight by the shipper tends to stimulate better service. As with fixed rates, the only thing that the different railroads have to offer is *service*, and it is a question whether or not service can be kept up to a high standard without this stimulant, but it is an open question whether in the effort to give better service in many cases the cost has not been such that there was no profit in the business.

The abuse of control of routing is noticeable by the purchasing, engineering and maintenance departments. Large shippers of commodities that are used by the railroads themselves try to influence the purchase of their wares by threats to the effect that if they are not favored they will route their shipments via some other railroad. There are even cases where very large shippers of certain commodities form subsidiary manufacturing companies for the production of articles required by railroads and use the business of the parent concern to force the railroads to buy their side line goods regardless of quality or desirability of the goods themselves.

The purchasing agent and the chief engineer are being constantly importuned by the traffic department to use the product of different manufacturers in order to influence the shipment of their products over their railroad. This results too often in the purchase and use of inferior products by the railroad company.

There is no reason why the shipper should be interested in how or by what route his products are shipped. He pays for the transportation from one point to another, and if they are transported promptly he is getting all he pays for. What he is really trying to do when he insists on the routing is to get something more than he pays for. No shipper should be permitted to own cars, as by so doing they aim to secure discrimination in their favor, which the shippers not owning cars do not enjoy.

Expediting freight should also be limited to such expedition as will command an extra charge large enough to pay for the extra cost of such expediting over and above the cost of hauling ordinary freight. There is no business that has interfered with economy in operation as much as expedited freight. Some roads in the desire to get business have made practically all of their freight trains, except the local, expedited trains, with a consequence that low-tonnage trains are noticeable in their reports, and earnings are reduced accordingly.

Contracts with Labor

While the subject of the future organization of the railroads is under consideration, attention should be given to existing contracts between labor organizations and the various railroads.

If the questions of compensation and working conditions are handled by a government board it would probably mean the cancellation of all present contracts, but if this is not done contracts should be revised with the idea of eliminating many features that have crept into these contracts due to the manner in which the contracts were secured in early days from weak roads, and by precedent they have spread to many large roads.

They were agreed to, evidently, by parties not familiar with operating economies or under pressure that they could not resist, and their existence has often prevented the consummation of operating economies. Among the subject referred to are: constructive mileage, agreements against double heading, agreements against turn-arounds, etc.

I have one place in mind where an engine district is 150 miles long; 100 miles of it is on a 0.30 per cent grade, and the west 50 miles is on an 0.80 per cent grade. Upon making the recommendation that the 100 miles be operated as one engine district and that the 50-mile portion be operated as a turn-around with an engine heavy enough to haul the same train that was then used on the 0.30 per cent grade I was told that this could not be done owing to a clause in the train and engine men's contract prohibiting it, this notwithstanding the fact that the turn-around crew would be at home practically every night.

Contracts should not be made that tend to interfere with principles of economy and progress. We are bound to progress and to attempt to prevent it by agreements or contracts is like trying to stop a flood with a broom. Whatever additional work or expense is caused to employees by changes that tend to economy should be paid for, but the public should not be penalized and made to pay higher transportation rates through lack of knowledge of economic principles by parties making agreements.

Neither should economies be attempted at the expense of employees. The whole matter should be approached in a spirit of fairness to all, which means fair pay to employees, fair returns to investors, and the lowest cost for transportation to the public that careful study and economical operation can produce.

Motor Trucks vs. Branch Lines

The perfection of the motor truck and tractor, together with the universal use of the automobile, has introduced a new element into the transportation problem that should be taken into consideration at this time while studying the reorganization of the whole transportation question. Good roads are demanded for the use of the automobile, and a study should be made to see what additional expense would be necessary to so construct them that they would serve for the motor truck and tractor. Where, heretofore,, development of the country for 50 miles on either side of a trunk line of railroad has required the construction of light branch lines, it is a question to be seriously considered whether this policy should be continued or whether good wagon roads should be constructed and the products of the farms and passenger travel should not be handled by motor trucks and automobiles to the main line.

Taken alone and considered as a unit, practically none of these small branch lines pay expenses, but as gatherers of freight and passengers to increase density of traffic on the trunk lines they are sources of profit. As, however, the traffic gathered by them is turned over to the main line with a deficit attached, which has to be overcome during main-line movement, before any profit is made, it would be a decided advantage if this traffic could be delivered to the trunk line by means of the motor truck, tractor and automobile, without this bill of expense attached.

If the good roads had to be constructed and operated for the freight alone, it is a question whether they could be built and operated as cheaply as the light branch railroad, but when we find that the good road is demanded for the use of the automobile and if it is found that the increase in cost to make it heavy enough for the truck, is not too great, and if we take into consideration the fact that the farmer and merchant must deliver their products on good roads to the branch line by truck, thus doing the same handling as if they delivered them to the main line, it looks as though there was a possibility that delivery to the main line, and avoidance of the construction of the branch line, would be economical.

Investigation of this subject may show the desirability, as good roads are completed, of the taking up of many branch line railroads and utilizing the abandoned road bed for improved motor road, thus decreasing the expense of maintenance and operation of our railroads and giving in its place a well located motor road. Such a change would call for increased facilities at stations along the main line for passengers and for handling freight, including storage, trackage, etc.,

but it would mean the concentration of supervision and labor, permitting better housing and living conditions for employees.

Consolidation of Terminals

The terminals of the railroads should be consolidated and operated under one head, thus cutting out the necessity for much duplication of facilities, such as separate freight terminals, including supervisionary and clerical organizations, switch engines, roundhouse and coaling stations, repair shops, and numerous other facilities that are now provided for each road.

The cost of operating terminals should be charged to freight originating or being distributed at that terminal, making the terminal self-supporting, rather than distributing this expense over the freight rates between terminals. It is a well known fact that intermediate lines like the Union Pacific make much greater earnings on the same rates than do the roads feeding them, due to the fact that the bulk of their traffic is collected and distributed by other lines, they receiving it in their terminal yards in train load lots. Much valuable land is occupied by railway terminals in the large cities that would be unnecessary if the terminals were consolidated.

Passenger terminals in large cities should be approached by trains below the surface, and electrically operated, permitting the ground level and above to be utilized for other business purposes, instead of laying waste a large area in the center of a city for passenger terminal use. This plan is well illustrated by the Grand Central Terminal layout in New York.

Freight should be shipped between large terminals by the route over which it can be handled most economically taking into account distance and grade line. The short, low-grade line should be developed to the fullest extent, and maintained at a proper standard to give the greatest operating economy. The same thing applies to through passenger business. If there are two short low-grade lines, one should be devoted to through freight and the other to through passenger business, for the more economical operation of each, other lines operating only local passenger trains.

Branch Line Rates

I have referred to the fact that in most cases the rates received on branch lines do not pay expenses of operation, and that business originating on branches, reaches the main line with an expense bill attached to it. This should not be the case; rates on branch lines should be such that they pay the operating expenses and fixed charges of the branch.

Land values are fixed by distance from market and by transportation facilities available. There is no reason why the balance of the country should contribute to an increase in the value of farm land on branch lines by absorbing a portion of the transportation expenses of the products of lands located on these branch lines. What we should have is the cheapest long distance transportation possible, after giving fair returns on investment, paying fair wages to employees, and taking care of the upkeep of the property. If we can make rates on branch lines that will cause them to be self-supporting, and rates in terminals that will make them self-supporting, we can then reduce the main line rates, the long distance rates, to a figure that will move products for longer distances economically, and will distribute the expenses where they belong, and not be taxing the producer of farm products for the luxurious union passenger stations, the elevation of tracks, the electrification of terminals, the assessments for public improvements and high taxes of the large cities, or requiring him to contribute to the expense of moving the business on branch lines.

Our system of rate-making has grown up from competition, efforts to develop the country, and state laws or state railroad commission orders, made arbitrarily with no regard to the cost of production. If we are going to try at this time to remodel our transportation methods these matters should be given serious consideration.

Centralized Federal Regulation

Many advantages could be secured by nationalizing the railroads and operating them all under the direction of one central organization, sub-divided into zones as seem best suited to prevent too great a centralization. To carry out this plan would necessitate national charters for all railroads, thus bringing them directly under national regulation, and freeing them from regulation by the states.

It has been evident for some time that something would have to be done to do away with the confusion caused by so many states trying to regulate the same railroad. In some cases there are railroads that come under 12 to 15 state railway commissions, in addition to the Interstate Commerce Commission, and each state commission has different ideas, makes intrastate rates, tries to make its own standards and its own regulations, the result being absolute confusion, with no benefit to any one, and with added cost to all.

In order that the central governing body may be able to regulate and control local conditions, there should be an accredited representative of the central governing body located at each state capital, a resident of the state in which he is located, and recommended by the governor of that state. By means of this representative local conditions that require special treatment can be brought officially before the central governing board. The same protection will be then given to the states and at the same time the regulation can be coordinated and controlled by the central regulating organization.

Need of Standardized Practices

By this method it would be possible to classify the railroads according to density of freight traffic and speed of passenger trains, and a standard type of construction and maintenance could be prescribed for each class, including weight of rail, size of ties and number per mile, depth of ballast under ties; frogs, switches, etc., to be used on each type of railroad.

We are ordering new rail today ranging all the way from 60-lb. per yard to 136-lb. per yard. Some roads are scrapping rails below 75-lb. per yard, which could be saved, rerolled or straightened, and used on the roads now buying new 60, 65 and 70-lb. rail.

There are being ordered by the different railroads today 44 different sections of rail between the weights of 70-lb. and 136-lb. per yard. This means that the steel mills must have rolls for this great variety of shapes, and that rail joints must be made to fit all of this list of rail sections, and as there are more different spacings of drilling of rails than there are variations in rail section, each rolling of rail must be drilled to suit the whim of the individual road, and rail joints even for the same section of rail, must have a different drilling for the different roads that happen to use the same section of rail. This could be reduced from 44 sections to not over seven or eight sections, with a great saving.

The same variation exists as to details of frogs, switches and guard rails. The result is that manufacturers must have different dies and patterns for each railroad's requirements, and can only manufacture on orders, whereas if these matters were standardized, the manufacturer could go on with his work regardless of orders, thus stabilizing his working force, reducing his patterns and dies and reducing materially his stock of materials, thereby decreasing cost of manufacture, which means decrease in cost to the railroads and to the public.

Some roads are treating track and switch ties and some are not; some are using tie plates and some are not; some are using Bessemer rail joints and some open hearth oil quenched

joints; some are using wooden surface or pit cattle guards, while others are using steel surface guards in place of either of the others; some roads are treating timber for use in bridges and others are not; and so on indefinitely.

Now it stands to reason that there is a lack of economy on someone's part in this variation in practice. In many cases the road following the less economical method recognizes the economy in the other method, but cannot raise the money with which to follow what is known would give greater economy in the end.

There is an old saying that "The poor man's way is a poor way," and there is no place where it is more applicable than in railroad construction and maintenance.

About 20 years ago it was recognized by some of the leading maintenance engineers and officials of this country that something should be done in the way of studying and standardizing the different appliances and methods in connection with railway maintenance, and there was organized the American Railway Engineering Association. This association has been very active during these 20 years, having had large standing committees studying all phases of maintenance, and they have from time to time gotten out a manual of recommended practice both as to appliances and methods of maintenance, today recognized the world over as authority on American railway methods.

This was recognized by the United States Government during the war, when it had so much railway construction in this country in connection with camps, storage and shipping terminals and manufacturing plants, and in connection with the overseas forces, by purchasing from the Association over 2,700 copies of its manual of approved practice. Notwithstanding the work that has been done by this association, made up of the best practical maintenance engineers in this country, the railroads have not as a rule, adopted its recommendations, simply because it involved a change in their present standards and practices. This means that great economies that could be made for the country as a whole are not carried out, owing to the dislike of individual railroads to make a change; this notwithstanding the fact that the engineers of these same companies are among those recommending the better practice.

As standardizing of methods and materials means economy, and a lower cost of transportation, the national regulating body should have the authority to order standardization and should have advisory boards, to which such matters can be referred, and in whose recommendations they will have enough confidence to order them put into effect.

There should be such advisory boards made up of men of national reputation as experts on: Transportation, traffic, maintenance of equipment, maintenance of way and structures and engineering and economics. They should be appointed because of their experience and ability along these lines. During the past, experts have been employed by the Interstate Commerce Commission on traffic and on maintenance of equipment, but the other subjects which need careful study and consideration have not been represented. If the commission is to pass upon capital expenditures it needs advice on all of these subjects, in order to intelligently pass upon them.

Maintenance a Side Issue

For the year 1916, the expenditure for maintenance of way and structures on railroads reporting to the Interstate Commerce Commission amounted to $408,500,000 out of a total operating expense of $2,230,000,000 or 18 per cent.

It would seem as if the expenditure of this amount of money by the railroads should call for and demand its supervision by specially trained officials, and that it should cease to be a side issue in the organization of the railroads; yet it has, except in the case of a few of the larger railroads, been handled by men who never had any experience in maintenance until they were appointed division superintendents and who have had to get their experience after such appointment, while busily employed with the various other duties of the position. The result is that the railroads and the public, who pay the bills, pay dearly for their education in maintenance.

In most cases maintenance is a side issue to the higher officials under whose authority it is done, with the result that it is handled by some clerk or assistant and does not get the attention that its importance warrants from the higher official.

It would seem that a class of work that requires nearly one-fifth of the total operating expenditures of the railroad is of enough importance to have some one at the head of it, who has the authority to handle the work in the most economical way, and that such official should be required to devote his whole attention to that work.

There is more opportunity to work out economies in maintenance of way and structures than in any other department today for the reason that it has been so long treated as a side issue on so many railroads.

The railroads are recognized as semi-public institutions —in fact, practically as wholly public institutions—and it is agreed that transportation is the greatest factor in the prosperity of the country, and that the cost of transportation affects the cost of practically everything that we eat, wear or use. It is of prime importance, therefore, that transportation should be furnished as cheaply as will permit fair wages to employees of the transportation companies and of a fair return to the owners of the property.

Financing Capital Improvements

The construction of additional railroad facilities should be regulated by a board competent to pass upon the question of the necessity for the construction, and upon the type of construction, including grade line, curvature, weight of rail, strength of bridges, etc.

One of the uneconomical features in connection with railroad construction in this country has been the building of lines by promotors, who boldly claim that they can sell a line constructed with a one per cent grade line for as much money as if it was located with a 0.30 per cent grade. The result is cheaply built, poorly located, and uneconomically designed lines, later purchased and operated by some of the larger systems, with not business enough to warrant reconstruction and grade reduction, hence continual uneconomical operation.

There are many of the large trunk lines of railroad that have not reduced the grades or improved the alinement on their lines, either for lack of credit, or because the financial backing of the property did not understand enough about the economics of railroad operation to realize that such improvements would not only return interest on the cost of improvement but much more and assist in reducing cost of operation to a marked degree. The same applies to second track. We have much main line on important lines, which for economical operation should have a second, third or fourth track constructed.

There should be a board qualified to pass upon these matters, and it should pass upon all capital expenditures of railroads, exceeding some agreed minimum, and then should review and approve the sum of these minimum charges at the end of the fiscal year. They should have authority to make investigations on their own initiative as to whether or not, for economical operation, grades or alinement should be improved or second track or improved terminals constructed,—in fact, on the whole matter of capital expenditures that would produce reduced operating charges, and as the object of this is to insure the more economical operation and maintenance of the property, the government should *guarantee* all bonds issued to procure money with which to carry out any and all expenditures approved by this board.

It must be admitted that it is not *just* to permit the savings of the public to be lost through investment in a public utility whose rates are regulated by the government, and that it is but right that the government guarantee the payment of bonds sold to get money for improvements on these properties. This guarantee would mean that the credit of the railroads, large and small, would be stabilized, and that the railroads would be able to get money at from one to three per cent cheaper than they can get it without this guarantee, and that the public would get the benefit of this saving in reduced cost of transportation, and also by having their savings guaranteed. It might be feasible for these bonds to be handled by the Federal Reserve banks, or by a board attached to them, thus saving a large cost in brokers' fees, which are, in many cases of the poorer roads, very high, to say the least.

The Financial Returns

The stock of the railroad companies should be permitted to earn a fair return, say 7 per cent average for all common stock. This would mean that the better located, improved and managed roads would earn over 7 per cent and other roads less than 7 per cent.

It is necessary to permit a fair margin of earnings for common stock to stimulate and recompense efficiency in operation. As the government now fixes the rates for transportation, it should fix the compensation of employees below the rank of division superintendent, equalizing them in accordance with local conditions on all railroads; and fixing the working conditions so as to prevent, as far as possible, competition between different railroads as to rates of pay and living conditions.

By the organization of a board of adjustment and equalization, this could be very readily handled, and it would prevent the time of superintendents and general managers, as well as other officials, being taken up with wage and working condition hearings, and permit them to devote their whole time to the economical and efficient operation of the property, and to meeting patrons of the roads and becoming acquainted with their needs.

Ignorance as to Economics

Many important trunk lines of railroads in this country have not made the improvements in alinement and grade line that are possible, and on which the decreased cost of train operation and maintenance, that would be effected by such improvements would more than pay interest on the cost of making the improvements.

Lack of funds has been the cause of the failure to make these improvements in some cases, but in many of them it is a case of lack of *nerve,* due to the fact that the management does not know enough about economics of railway operation to realize the benefits, and they doubt the statements of those that do know, even in the face of the fact that neighboring roads that have made these improvements show earnings that are big returns on the investments that they have made in this class of improvements.

If we agree that the public is entitled to as cheap transportation as can be furnished, after giving a fair return on investment and paying fair wages to employees, all improvements to the railroads that will give reduced cost to transportation should be made; and the only way that this can be done is to have a board of engineers pass upon the question of improvements; on their recommendations the work should be ordered done, and the financing of the improvement should be by the sale of bonds guaranteed by the United States.

The same argument applies to motive power and rolling stock; whenever locomotives or cars have reached such a state of obsolescence that it is more economical to scrap them and buy modern equipment, there should be a means of doing this, and not let the cost of transportation be increased through the lack of judgment or lack of means of local railways to do the economical thing.

In connection with the proposition to have the United States guarantee the bonds for improvements to be made by the railroads that are approved by a central governing board, there comes up the question of the relation that these bonds would have to outstanding issues of bonds by the same company. There is not a railroad in the United States today that is not worth the amount of its bonded indebtedness at least, and as a whole they are worth their total capitalization.

A valuation is being made of the railroads as of June 30, 1914, and the valuation is estimated to be completed by the end of 1920, which would be practically at the end of the extreme date of federal control under the act of Congress taking over the railroads. The railroads of the country could not be duplicated today for 33 1/3 per cent more than in 1914, and the investigations so far made have convinced those making them that the valuation as of June 30, 1914, will, if a fair value is given on right of way—for the railroads as a whole—equal their capitalization on that date, so that if this is the case there would be no chances taken by the government if they guaranteed all railroad bonds.

Replace Wastes as We Go Along

While the cost of federal valuation of the railroads has been very great, it has been the means of calling the attention of the railroads as well as the Interstate Commerce Commission to the question of depreciation and obsolescence and the necessity of providing for both in the rates charged for service, and it is to be hoped that in connection with new laws and rules that may result from the present agitation that depreciation rates will be established in connection with maintenance of way and structures, and that rates hereafter will be such as will take care of depreciation as well as operation, maintenance and upkeep.

The public has been feeding for the past ten years on the fat off the bowels of the railroads, and it had gotten down to the tissue, when the railroads were taken under federal control. No institution can live under these conditions, and provision should be made to replace all wastes as we go along and thus keep the railroads in a healthy condition.

There has been more or less discussion by those interested in reducing rates, regardless of fairness to investors, of what is termed the "unearned increment," the claim being made that the railways should not be permitted to earn anything on increased value of right of way or of improvements placed on same, or on increased value due to location, or industrial conditions, disregarding the fact that the investments in railways are of private capital and that at the time they were made they were hazardous, and that money could only be secured by the offering of common stock as a bonus for the purchase of bonds, the value of the common stock, if any, coming from increased value of the property as business developed along its lines.

The lands through which the earlier railroads passed were of no value; the building of the railroad gave them a value, and at the same time gave a value to the land occupied by the railroads, and the development of the country gave an increase in business that increased the earning power of the railroad. The two grew together, and yet they would give the value so made to one of the parties and withhold it from the other, regardless of the fact that the parties from which they would withhold made the increase possible.

We hear a great deal about justice today, applied to the situation in Europe brought about by the world's war. The United States has placed itself in the attitude of the apostle of justice. We are all proud of the fact that it has done so, but while we are in the business of seeing that justice is done every one in Europe, why not use some of it for home consumption—in our treatment of public utilities, and the railroads are our greatest public utility.

Thirty-four Passengers Killed in Collisions

In a rear collision of westbound passenger trains on the New York Central at South Byron, N. Y., seven miles east of Batavia and 43 miles east of Buffalo, on the morning of Sunday, January 12, between 3 and 4 o'clock, 22 passengers were killed and 20 or more injured. The leading train, the second section of No. 17, "The Wolverine," had been stopped for the purpose of having a helping engine attached at the head of the train. The following train, No. 11, the Southwestern Limited, came on at high speed and crushed the rear car, a sleeping car, completely; and the second car from the rear was buckled so that it stood almost on end for a moment and then fell on the rear car, crushing in its roof. The engineman of No. 11 said that his application of the brakes was followed by the parting of the coupling behind the tender so that the brakes on the cars had no effect in slackening the speed of the locomotive.

Both of these trains were made up of steel cars of the latest type. The line is equipped with the latest design of automatic block signals.

The engineman of No. 17 claimed that the block signals were clear; but the signal apparatus was found working properly after the collision, the first signal in the rear was found in the stop position and the second one in the caution position. A statement issued by the road says:

"The flagman of train No. 17 states that a red fusee which he had placed on the track was burning when No. 11 passed him and ran over the fusee and ran into No. 17.

"The engineer on train No. 11 states that the automatic signals were clear when he passed. He also states that he did not see the flagman of No. 17.

"The fireman on a freight engine which stood on an adjacent track says he saw the flagman of No. 17 go back and also saw him signal No. 11 to stop by swinging his red lantern.

"The towerman, who had a view of the scene, also testifies that he saw the flagman of No. 17 signalling No. 11 to stop by swinging his red lantern and setting the red fusee burning. The towerman likewise testifies that the automatic block signals were set against No. 11.

"The engineer on No. 11 had a clear view for a distance of two miles, and it was a cold, clear night. The rear red lights on No. 17 were both burning brightly, and the engineer of No. 11 is unable to give any reason why he did not see these marker lamps. He claims he was wide-awake, but also is unable to say why he did not see the flagman of No. 17 signaling him to stop or the burning fusee."

The statement of Fireman Brill, of train No. 11, is substantially the same as that of Engineman Friedley.

The evidence indicates that the flagman of the standing train had got back about 2,000 feet, and that the fusee placed by him was about 1,500 feet back. Torpedoes placed on the rail by the flagman are said to have been about 800 ft. back. The train had been standing about seven minutes.

Engineman Friedley said that he had slept on Friday night about 12½ hours, his time thenceforward having been spent as shown below:

1—Friday, January 10, 10 p. m., went to bed.
2—Saturday, January 11, 10:30 a. m., rose.
3—Saturday, January 11, 2:45 p. m., registered for train 28.
4—Saturday, January 11, 7:50 p. m., arrived at Syracuse, train 28.
5—Saturday, January 11, 9:50 p. m., registered for westbound train No. 11.
6—Sunday, January 12, 3:42 a. m., collision.

During the two hours spent at Syracuse, in the evening, Friedley ate his supper and was around the enginehouse.

Fireman Brill was off duty at Buffalo from 4 a. m. of the 10th until 3:15 p. m. of the 11th, after which time he was with Friedley.

It will be noted that Friedley had been out of bed about 17 hours, thus making the circumstances of this collision somewhat like those of that at Ivanhoe, Ind., on June 22, 1918, where Engineman Sargent, who was dozing in his cab at 4 a. m., reported that he had been out of bed since 5 a. m. of the day before.

Fort Washington, Pa.

In a rear collision of passenger trains on the Philadelphia & Reading at Fort Washington, Pa., on the Bethlehem branch, five miles north of Jenkintown, and 16 miles north of Philadelphia, on the night of January 13, twelve passengers were killed and twenty or more were injured. Northbound local passenger train No. 381, which had been stopped by an obstruction on the line ahead, was run into at the rear by express No. 319, and the rear car of the standing train was completely crushed.

There was an enclosed-disk automatic block signal a short distance in the rear of the standing train. It is claimed, on behalf of the engineman of Train No. 319, that this signal indicated clear.



Photograph from Underwood & Underwood, N. Y.

Wreck at South Byron, New York, January 12.

The Traffic Department of the U. S. R. A.

Abstract of Chapter on Traffic From the Director General's Forthcoming Report to the President

THE DIVISION OF TRAFFIC was established on February 9, 1918, with Edward Chambers as director. Since competition ceased with the assumption of federal control, the solicitation of traffic and special exploitation of passenger routes were discontinued, and the efforts of the soliciting forces of the railroads were directed in other channels. Consolidated offices have been opened in all of the larger cities, 98 in all. General freight information is also either furnished at the information bureaus or the inquirer directed to the proper department. The consolidated offices are in lieu of and more adequately serve the public than the total of 564 passenger offices which were in existence prior to federal control.

The effect of these consolidated offices has been a much better distribution of the traffic. Passengers finding that sleeping or parlor car space is not available via one route are able to select another without leaving the building. Regardless of what disposition may be finally made of the railroads these consolidated offices should unquestionably remain in existence to the lasting advantage and convenience of the traveling public. Further economies have resulted through the removal of "on-line" commercial freight offices from private to railroad property. In the seven months' period ended July 31, 1918, there was a total saving as a result of this policy of $16,566,633. To this amount a substantial sum has since been added.

For the purpose of conserving transportation energy so that essential food, fuel, war supplies and freight of all kinds might be moved expeditiously and economically, it was decided to eliminate those passenger trains that gave a duplicate service and were run mainly for competitive reasons, and, after careful study, to eliminate a number of other trains where it could be done without too great inconvenience to the traveling public. That the comfort and convenience of the traveling public might be discommoded as little as possible, the policy of staggering trains between commercial centers was adopted. Considerable progress is still being made in reducing passenger train mileage, though the gradual return to normal conditions is resulting in the restoration of some trains.

Consolidation of Terminals

Other reforms include the common use of terminals by railroads formerly in competition and using separate terminals. The most conspicuous example is the use of the Pennsylvania terminal in New York for through trains via the Baltimore & Ohio between Washington and New York. The same principle has been applied as rapidly as possible in the consolidation of freight terminals. The saving of switching costs that has resulted, and the greater rapidity with which cars have been handled and loaded and unloaded, is already apparent. In the changes made the prime purpose has been the convenience and service to the public. The necessary readjustments may have caused some temporary dislocation, but the ultimate results will be increased efficiency and capacity.

Curtailment of Advertising

Time-tables have been simplified and abridged, extraneous and unnecessary matter has been eliminated, and the waste which previously existed in the distribution of time-tables entirely stopped. That unnecessary passenger travel might be restricted during the war both general and special advertising were, to a very large extent, discontinued. The annual estimated saving from these two sources is $7,000,000. During the coming year, because of the changed conditions and the possible necessity of creating passenger travel, general and particularly special advertising will to a large extent be resumed.

Demurrage

In order to effect the prompt release of cars the national code of demurrage rules and regulations was modified and the charges increased to $3 per car for each of the first four days, $6 for each of the next three days, and $10 for each succeeding day. A considerable increase in the supply of equipment was thereby made available.

Shortening Freight Routes

In developing new routes which should be not only shorter but also more efficient and economical than those previously in use, material progress has been made, especially in the West, where the opportunities because of the longer average hauls are much greater than in the East. Not only have the carriers profited through the saving in car, train and engine miles, but the shipping public has benefited because of the fact that the speedier handling via shorter routes has made more empty cars available than would otherwise have been the case.

Co-ordination with Other Governmental Departments

With the object of co-ordinating the railroad service more completely and harmoniously with the other war agencies of the government, representatives of the Division of Traffic, each bearing the title of manager inland traffic, were appointed to co-operate with and direct the traffic of the Food Administration, the Fuel Administration, Oil Division of Fuel Administration, the War and Navy departments, the War Industries Board, and the United States Shipping Board. As a result of their work, the prompt and, wherever necessary, preferred movement of war supplies for the United States and its Allies was made possible. Their complete and practical knowledge of the transportation systems of the country enabled them to direct shipments via the most efficient routes, thus speedily relieving the congestion that had previously existed, while at the same time, through a proper distribution of the traffic, they were able to arrange for its movement in solid and maximum trainloads. The managers of inland traffic, cordially assisted by the chiefs of the various activities together with the patriotic and practically unanimous co-operation of the shipping public, were able to increase the carload minimum on most of the commodities transported and, in many instances, bring about their double loading as well.

It would be difficult to say too much in praise of the services of these gentlemen, and of the very efficient manner in which each of them accomplished his difficult and delicate task.

Passenger Service Matters

As a result of the draft law and high wages, the number of competent ticket sellers was greatly reduced, and several schools for the instruction of men and women as ticket clerks were established. Many women ticket sellers, at the same salaries paid men filling similar positions, are now in the service and are proving satisfactory and efficient.

Rates of approximately one cent a mile for soldiers and

sailors on furlough and of two cents for soldiers and sailors discharged from the service, the latter to cover their movement from point of demobilization to the points to which they are allowed travel expenses by the government have been made effective. During the war a low uniform fare was also established for workmen at all war industry plants to which special trains were run.

Because of the necessity for the further conservation of food and in order that the dining-cars might be utilized to maximum efficiency, the plan was adopted on October 1, of serving table d'hote luncheons and dinners at a uniform price of $1, except upon a few limited trains where $1.25 is charged for dinner. The saving effected in the way of food and the increased number of meals served justified the practice. As a permanent plan, however, the table d'hote system has not yet passed the experimental stage and some modification may be found desirable.

The removal of competition and unified operation has made possible the rearrangement of train schedules so as to permit of many additional connections at junction points, thereby making for greater public convenience. Considerable progress is still being made in this direction. The maintenance of passenger schedules thus giving "on-time" service has been greatly improved, and unnecessary duplicate and lightly patronized sleeping cars are still being eliminated.

Considerable progress has been made in the issuance of permanent tariffs carrying the advanced fares, in connection with which circuitous routes are being eliminated, and tariffs, rules and regulations standardized. The work is rapidly approaching completion. A standard basis of approximately 30 cents a mile has been adopted for the movement of special cars, such as mine rescue, hospital, public health, and fish distributing cars, which are operated by the federal government, the states, and the Red Cross. A basis of standard ticket forms for use on all federal controlled roads has been completely worked out and mileage scrip books, good on all carriers under government operation, are in effect. Standard baggage rules for the entire country have been adopted and put into operation.

General Order No. 28

In order to provide for the increase in wages allowed, the higher prices that were and are being paid for all materials and supplies, and the rising costs of operation generally, General Order No. 28 was issued, effective June 25, 1918, as to freight rates, and June 10, 1918, as to passenger fares and baggage charges, by means of which an average advance of 25 per cent was made in freight rates throughout the country, and passenger rates were raised to a minimum of 3 cents a mile where they were previously lower. Commutation fares were also advanced 10 per cent.

A rule requiring two adult tickets for a drawing room in a sleeping car and other economies have been adopted, so that the general traveling public may not be excluded from the use of Pullman space unnecessarily pre-empted.

The order carried a provision for a further charge of one-half cent a mile for transportation in standard sleeping cars and parlor cars and one-quarter cent in tourist sleeping cars. This increase has since been canceled, the war necessity which created it having ceased to exist.

These advances in rates, made only after a thorough investigation of the conditions as well as a careful estimate of the probable results, were designed to increase the net operating revenues by an amount about equal to the greater cost of operation, thereby leaving sufficient net operating income to insure the standard rate of return as fixed by law, without drawing upon the government's other sources of revenue.

Some criticism has been made of this order. It was only after the federal control act had been passed (March 21, 1918), that any steps could be taken to meet the constantly rising costs. It was a physical impossibility to secure the advances by the substitution of new tariffs with corrected items in less than several years. Our efforts, therefore, were directed toward some plan which would quickly spread that increase as equitably and fairly as possible over the entire country. General Order No. 28 was the result, and experience has shown that it accomplished the end that had to be attained with the least possible disturbance of business conditions.

Sufficient time has not yet elapsed to judge of the final effect of these increases as related to the net operating income, but it is hoped that with the return to more nearly normal conditions reductions may gradually be made.

Freight Traffic Details

Three general freight traffic committees have been appointed with headquarters at New York City, Atlanta and Chicago. Under these are district freight traffic committees, to which either the carriers or shippers may propose changes and by which recommendations are made to the proper general committee. These committees are conveniently located at Boston, New York, Philadelphia, Buffalo, Pittsburgh, Detroit, Cincinnati, Chicago-Eastern, St. Louis-Eastern, Richmond, Louisville, Atlanta, Birmingham, Jacksonville, New Orleans-Southern, Chicago-Western, St. Louis-Western, New Orleans-Western, St. Paul, Kansas City, Dallas, Denver, Portland, and San Francisco. The Division of Traffic, co-operating with that of Public Service and Accounting, has instituted the innovation of having upon each of these various committees one or two members who have been selected with the approval of the Director of Public Service by the general business interests of the section. These shippers' members engage actively in the deliberations of their respective committees and have voice and authority equal to that of the individual railroad members in the reports and recommendations made. Among those who are familiar with the work done, the results accomplished are regarded as very satisfactory.

The adoption of "sailing days" has worked marked economy.

This plan has for its purpose: First, the allocation of all less than carload traffic destined to certain designated common points to those lines which form the shortest routes and afford the most efficient service; and, second, the movement from distributive centers to the smaller, or noncompetitive points, upon all lines under government control, upon specified and convenient days of the week. Its adoption, through the elimination of some, and heavier loading of others, has already resulted in the saving of thousands of cars besides furnishing better service, through the avoidance of transfers. Specific figures showing the total number of cars saved will be supplied in the reports of the regional directors.

For some time considerable uneasiness has existed in the cotton-producing sections of the country over the question of an increased allowance for the compression of cotton in transit. The compresses have contended they could not, under existing conditions, perform the service for the carriers, in such instances as the latter assumed the expense, without some increase in the amount allowed for compression out of the through rate. This difficulty, with the assistance of the War Industries Board, has been adjusted by increasing the former allowance from 50 to 100 per cent, at the same time increasing the minimum loading to 75 bales per car. The issue of through export bills of lading via all ports has been resumed to the great advantage as well as relief of cotton and all other shippers.

After many conferences and by mutual agreement with the interested shippers a circular has been issued as a supplement to the southern classification, which contains specifications of standard containers for fresh fruits and vegetables and loading rules governing the same. This will have the effect of greatly reducing the loss and damage in the handling

of these commodities. A standard package for boots and shoes has also been determined upon by agreement with the shippers.

The adjustment of divisions with the so-called "short lines," including the settlement of many intricate questions, is proceeding rapidly.

Consolidated Freight Classification

At the present time there are in general use some three different freight classifications applying to interstate traffic, while many states have their own particular classifications applying to intrastate traffic. These various classifications contain some 15,000 items. The carload minima vary and they differ in other essential details. Great confusion in ratings and classifications and many overcharges and claims have been the result. To simplify this situation a consolidated classification was prepared upon which hearings throughout all sections of the country as well as at Washington have now been completed by the Interstate Commerce Commission.

The formal recommendation of the latter body has not been received, but it is our hope to place this consolidated classification in effect within a very short time.

Modifications in Charges and Practices

Many modifications in charges and practices have been made by our freight rate department. With the assistance of the Department of Agriculture the freight charges on cattle feed moving into the drouth-stricken districts of the Northwest and Southwest have been reduced, and by means of emergency through rates the shipment of stock cattle from the latter section to the grass and range lands of the east and southeastern sections has been encouraged. At the request of the Food Administration a storage-in-transit privilege has been established on dressed meats, thereby enabling the packers lacking sufficient cold-storage facilities at their plants to keep their products moving without congestion or delay toward the Atlantic seaboard for overseas movement. Similar aid has been given on wheat flour substitutes to the end that the smaller dealers might carry a complete supply, thereby increasing the domestic consumption of such substitutes and releasing increased amounts of wheat and flour to our allies and our own army overseas. Other war measures were: The reduction in manganese ore rates from western mines to eastern furnaces to replace Brazilian ores impossible of procurement; the establishment of through rates on coal in territories where they were not heretofore effective to aid in the economical and efficient distribution of this very essential commodity; the installation of log rates in the spruce sections of the Northwest to facilitate the production of aeroplanes. Rates were also established upon castor beans for castor oil, necessary in the operation of aeroplanes. Many readjustments have also been made, the most noteworthy of which has been the establishment of a uniform scale of class rates for application within Oklahoma, by means of which the rates in that state were placed more nearly upon a parity with those existing in the state adjoining. This scale has proved entirely satisfactory to the Oklahoma railroad commission, as well as the shipping public.

Simplification of Tariffs

A plan is well under way for the simplication and consolidation of freight tariffs which it is believed will not only save approximately $2,000,000 per annum in the tariff printing bill of the railroads, but put the tariffs in a great deal better shape for use.

Under past practices there have been some so-called bureau tariffs containing the rates of all roads in a certain section, but to a large extent each railroad has continued to publish separately the rates between points on its lines or with its connections. This means that where two or more lines serve the same points the publication of the rates is duplicated sometimes as many as 20 times. This has been very expensive and has also frequently resulted in rates or regulations applying over one line different from those over another. New tariff publishing bureaus have already been established at several important points, and freight tariff revision committees have been appointed.

Agricultural Section

The Agricultural Section, with J. L. Edwards as manager, is in close and complete co-operation with the Department of Agriculture and the Food Administration. The chief efforts of the agricultural agents of the carriers have been directed toward aiding the campaigns undertaken everywhere for increased food production. For carrying on the work of the Agricultural Section the 48 states have been divided between two general committees, with special subcommittees, to the end that the agricultural departments of the railroads in each state and in the country at large may co-operate with each other and with the appropriate federal, state and county authorities, including also civic bodies, manufacturers of farm implements and fertilizers, local bankers and business men, that they may harmonize and co-ordinate their efforts.

The experimental or scientific part of the work is now left to the United States Department of Agriculture and the several states. The railroad agricultural agents' work is more along the lines of dealing with the transportation problems involved; encouraging the production of new or different farm products and increasing that of old; bettering their quality and preparation for market; aiding in finding markets; and bringing about improvements in farm methods as approved by competent authorities.

With the coming of peace and restoration of normal conditions, the movement of returning soldiers, industrial workers and others to the farms is expected to assume large proportions. The agricultural representatives of the railroads have co-operated in all sections in getting together the information necessary in the consideration of the plans proposed by the Department of the Interior for reclaiming land for returning soldiers. They have also prepared a great deal of information on the subject of farming opportunities along the several railroads that prompt and intelligent reply may be made to the many inquiries which are coming in from prospective farm settlers in this and foreign countries.

The Express and Mail Situation

Early in the period of governmental operation of the railroads it became apparent that the activities of the several express companies should be co-ordinated with the various railroads under federal control. Each railroad had its separate contract with the express company operating over its line and the percentage of gross revenue which the railroads received from the express companies varied considerably. Other features of the contracts differed materially, some calling for routing of a proportionate amount of competitive traffic over certain railroads, and it was obvious that with the operation of the railroads under a single control, the discontinuance of needless trains of a competitive character and the reduction of train service to meet war conditions, the only way to treat the express situation was to make one uniform contract operative during federal control. Consolidation on the part of the express companies during this period also became essential, and after continued negotiations between the express companies and the director general an agreement was made, effective July 1, 1918, under which the several express companies formed a corporation known as the American Railway Express Company, for the purpose of carrying on the express transportation business upon the railroads under federal control, and also on certain non-federal controlled lines which were essential to round out the express transportation system in the United States.

Under this agreement the express company pays to the Railroad Administration 50¼ per cent of the gross revenue earned on the transportation of express matter as compensation for the rail transportation, this representing the average payment for the past three years to the individual railroads by the various express companies. Following this the express company pays its operating expenses, the balance being subject to a division between the express company and the Railroad Administration on a basis which makes it unnecessary to guarantee any definite amount of net earnings to the express company based upon the previous three years' average of those companies, some of which had made substantial net earnings, while others had shown a deficit. The agreement also has the effect of requiring the express companies to put forth their very best efforts and individual initiative, as their net returns are based upon the results of their successful operation.

The increased cost of labor, as well as of everything else which entered into the expense of conducting the express business, soon made it apparent that the 10 per cent advance in rates granted by the Interstate Commerce Commission, and effective upon July 15 last, was not great enough to cover actual operating expenses and allow the express company any net return. A further advance was therefore ordered to become effective January 1, 1919, which it is hoped will provide sufficient funds to cover the increased wages recommended by the Board of Railway Wages and Working Conditions, as well as permit of some net return to the express company.

Express traffic is now sent by the quickest route, circuitous routes having been eliminated; cars for handling express are used regardless of individual ownership, thus increasing the express car availability by several hundred cars A sufficient number of new express cars have been ordered to provide for the needs of the railroads based upon their average requirements for the past five years, and it is expected that the express business in the near future will be placed upon a firm foundation with a stabilized organization, and with a premium for individual initiative coupled with a degree of federal control, all of which should work to the advantage of the patrons, the railroads, and the express company itself.

The Express and Mail Section, under the direction of F. S. Holbrook as manager, is also working in close co-operation with the Postal Department to the end that the mail service may be efficient and expeditious as possible.

Conclusion

It should be borne clearly in mind that whatever inconvenience the traveling and shipping public have suffered during the past 12 months of governmental operation has been due to the absolute necessity of first devoting our transportation agencies to the vigorous and successful prosecution of the war. Only that part of the motive power and freight and passenger equipment remaining after our troops had been moved to cantonments or from cantonments overseas, and supplied with all the necessaries of life and war, could be devoted to the commercial traffic of the country. The service rendered under such conditions cannot and ought not to be taken as the measure of what might be expected through federal control under normal conditions, or in a time of peace. As a matter of fact, our inconveniences were luxuries as compared with the situation which existed in England or on the Continent.

There remains a great deal of work which has been undertaken and is not yet completed, such as the unification of rules and practices covering the transportation of livestock; the preparation of a consolidated tariff governing the handling of perishable freight; the consolidation and modification of the demurrage, weighing and inspection bureaus in each of the three classification territories to the end that existing discriminations may be removed to the benefit of both the shipper and the carrier and uniformity in practice and rulings established.

One of the most important and fast developing traffic questions relates to the efficient and proper handling of import and particularly export traffic. There is every indication that the efforts of the manufacturers and producers of the United States, with the assistance of our proposed merchant marine, will result in a much more successful invasion of foreign markets and a considerably greater volume of traffic than has heretofore sailed from our harbors. We are therefore giving immediate consideration to the rate situation, service between ports and producing points, unification of port practices and charges, and the elimination of undue competition between ports, with the thought in mind that each producing section shall have its proper standing and be given all the encouragement possible to develop the traffic.

Given the opportunity, it will be our aim to bring these and other important matters to a satisfactory conclusion.

Report on Beloit (Kansas) Derailment

W. P. Borland, chief of the Bureau of Safety of the Interstate Commerce Commission, has issued a report on the derailment of an eastbound passenger train (No. 132) on the Union Pacific, near Beloit, Kan., on January 15, 1918, which resulted in the death of four passengers and the injury of 22 passengers and three employees. It is attributed to a track failure at a bridge undergoing repairs, trains having been allowed to run at full speed when they should have been subject to a limit.

This is a single-track line laid with 60-lb. rails. The derailed train—locomotive and four cars of wooden construction—was running at about 20 or 25 miles an hour. The derailment occurred at the end of a timber trestle, the two coaches falling off the bridge and landing on their roofs in the bottom of the creek. Frozen ground had been excavated and a new bulkhead bent had been placed near the old one at the westerly embankment. Piles 17 in. in diameter had been driven in the new bulkhead, on which was placed a 12-in. cap carrying 16-in. pine blocks, which in turn supported a 7½-in. by 8-in. tie.

The track joint at the point of accident was weakened, the outer splice bar having been partially fractured for some time and part of the flange being missing. A rail badly flange-worn on the gage side also butted against one only slightly worn at this joint. The inner flange of the latter rail had also received injuries from spike wear. These conditions contributed to the weakening of the joint as the slightly worn rail received repeated blows from passing wheels. Both rails were fractured at distances of 28 in. and 45½ in. from the joint, causing the derailment.

The accident was probably caused by the failure of the outer splice bar at the joint, followed by the fracture of the rails themselves. These ruptures were occasioned by an outward thrust. The testimony taken during the investigation showed that the rail was not spiked to the tie over the new bulkhead bent and no slow order was in effect. The report concludes with the statement that each of the elements of weakness which have been enumerated probably contributed toward the accident and that the failure of the track was due immediately to side thrusts on a weakened joint by a train which was going at customary speed, in the absence of a slow order restricting speed on a bridge which was undergoing repairs.

A meeting of the Railroad Administration committee on standards for cars and locomotives has been postponed from January 21 to February 18.



Fig. 1.—New Embankment on the Left, Upheaval of Peaty Soil on the Right. Fig. 2.—Fence Line Has Been Displaced from Position Indicated by the Dotted Line. Fig. 3.—Large Upheaval of Soft Material. Fig. 4.—Displacement of the Highway Indicated by the Dotted Lines.

Railroad Encounters Some Remarkable Sink Holes

Necessity for Adequate Contingent Allowances Is Demonstrated by Experience on Second Track Work

No better demonstration of the justification of the proper consideration of hidden quantities in valuation work is to be obtained than the experience which the Cleveland, Cincinnati, Chicago & St. Louis has encountered during the past summer with some sink holes on the Cleveland-St. Louis line between Union City, Ind., and Ansonia, Ohio, in western Ohio, in connection with double track work now in progress between Winchester, Ind., and Ansonia. While the work is all relatively light in moderately rolling country, difficulty has been encountered in three places when widening and raising the embankments for second track across small depressions, the bottoms of which contain a deposit of peaty loam of varying depths. Deposits of this character are found rather extensively in parts of Ohio.

In some places the stratum of this material is so thin that it is practically all squeezed out from under the embankment with only a moderate settlement, but at the two points shown in the photographs the layer of soft material is so thick that the large quantities of material placed in the embankment thus far have not penetrated to the full depth of the soft stratum. In the case shown in Figs. 1 and 2 the length of the sink hole along the track is only 400 feet., but 9,000 cu. yd. of material has been dumped here in an attempt to widen a 7-ft. embankment for second track. As shown in Fig. 1 the soft material has been forced up just outside the toe of the slope to a height equal to or greater than that of the embankment. Near the track this upheaval has been so violent as to break up the surface, exposing the interior of the soft mass, but some distance back from the track the sod remains in place although somewhat folded or wrinkled. The mass has also been pushed away from the track so that the right-of-way fence has been displaced a maximum distance of 50 ft. This is clearly shown in Fig. 2. Evidences of the disturbance of the ground surface may be detected as far as 175 ft. away from the track.

A minor disturbance was also noted on the side of the track opposite the new embankment, the right-of-way fence on that side being moved some 3 ft. However, the most serious disturbance at this place is the shifting of the old embankment away from the new one, so as to throw the operated track out of line. Just how much the track has been thrown is not known since it has been lined back from day to day. At the other places the operated track has not been seriously disturbed, and the old embankment seems to have reached a stable support.

Fig. 3 shows a larger upheaval found at another sink hole

of larger extent, this having a width at right angles to the track of at least 100 ft., while the disturbance extends back 300 ft. A highway crossing at about the middle of this soft area is indicated by the row of trees shown in the background. At the time that this photograph was taken, operations had been carried on only to the west of this highway crossing. The effect of this condition is shown in Fig. 4. The highway with the trees bordering it on each side has been pushed bodily eastward fully 10 ft.

This work was undertaken with some knowledge of the conditions to be encountered at these places. Borings taken during valuation surveys some time previous showed at least 38 ft. of filled material below the tracks although the apparent height of the embankment was only 7 ft. This has been verified since the work has started by driving a pile, although the test was not carried far enough to ascertain the full depth of the peat. That there has been a gradual settlement of this operated track for years is apparent from the fact that there is an appreciable sag in the grade line across these two sink holes.

The material first deposited was a heavy clay from steam shovel excavation. Upon contact with the water contained in the sink holes, this material became semi-fluid and flowed laterally, its greater specific gravity raising the lighter peaty material with the effects described. Upon realizing this situation, the engineers decided to stop filling with earth and to use only cinders. This plan promises to be entirely successful. At the time of writing, the new track at the worst one of the sink holes is in operation and the disturbance has practically ceased at the others.

Railway Business Association Meets in Chicago

Annual Meeting the Occasion for Discussion of Future of Transportation Industry—Constructive Resolutions Adopted

THE ANNUAL MEETING of the Railway Business Association was held at the Hotel La Salle, Chicago, on Thursday, January 9, as reported briefly on page 167 of the *Railway Age* of last week. Over 200 railway supply men were in attendance at the morning and afternoon sessions, while over 500 were present at the dinner in the evening. The attendance at all sessions was restricted to men in the railway supply industry. The attention of the meeting was largely devoted to the consideration of the changes which have been introduced in the purchase of railway supplies during the past year and to the further changes which will probably result from the early return of the roads to their owners. The constructive character of the meeting itself and of the work done by the committees during the past year is reflected in the strong set of resolutions which were adopted and which are published in full below.

The association has been reorganized during the past year to transfer a large part of the work from the president to several committees. These committees have been active in their respective fields during the past year.

In calling the meeting to order Alba B. Johnson (president of the Baldwin Locomotive Works, Philadelphia), president of the association, discussed the problems confronting the organization and the railway supply industry. The following is an abstract of his remarks:

Mr. Johnson's Opening Address

Quite apart from the opinions which our association may announce touching purposes of legislation and provisions of law, it would seem desirable at this time to consider appropriate ways and means for winning public and political opinion to our way of thinking. Is it not obvious that our best chance of adjusting and conforming our ideas to the needs and the thoughts of the various interests and the various regions and of adapting their requirements to a consistency with our own is through the contact of our individual members with their fellow-citizens? Every accomplishment by our association in the past has been based upon an ascertainment of views in the communities and local discussion to show whether our own general aims could be co-ordinated with the special aims put forward by others. Can we hope to find for the present emergency a more serviceable method?

Taking a leaf from our own book, we would naturally turn to business organizations. Bodies that serve trades and bodies that serve cities both discuss transportation, but as between the two the local commercial association has distinct advantages in this respect. It is miscellaneous, embracing manufacturers, merchants, and men in many lines of business, usually including professional men. Through this complex composition the thought of the organization is diffused among occupations generally. Most business men who are members of trade associations belong also to the organizations in their home cities. What we may hope to promote in city associations with which our members are affiliated is systematic study of the subject and local discussion of the results of such study.

Many organizations will be found committed to a policy of discussing national questions only through the National Chamber. The Railway Business Association itself follows that practice as to questions outside our special scope. Underlying such a self-imposed restriction is the idea of waiting for a National Chamber referendum and then letting organized business speak once for all with full force. Another method is feasible, however, when a referendum might take too long. The *Railway Age* for December 27, discussing ways and means for solidifying public opinion in favor of an extra session of Congress to pass remedial railway legislation, asks, "Might it not be a typically American, business-like and enterprising thing to do for business firms all over the country to write or telegraph the Chamber a full expression of their views on the railroad situation, and especially upon the necessity of calling an extra session of Congress?" Thus, says the *Age*, "the President of the Chamber would have available a mass of evidence which he might present to President Wilson on his return from Europe." Probably representations of constituent bodies rather than of individual business men, or in addition to them, would best befit the character of the Chamber as a federation of bodies accustomed to act on petitions from constituents. Doubtless most of them are ready to speak for an extra session and not ready to recommend provisions of law.

Let us counsel together now, if you will, upon the other major aspect of our activity as an association—the commercial relation of our members with the buyer. What prospect there is of additions and betterments in the coming months, what measures in connection therewith may deserve our consideration, and what practices under government control can be improved. Up to the time of government control the association had rigidly excluded from its scope any matters that arose out of commercial transactions. Our task was to

promote co-operation between the railways and the public. Of relations between the seller and the buyer we took no cognizance. Government control brought in a new buyer, the government itself, and without hesitation we introduced into our activity matters relating to purchasing policies. Where do you think this should lead us? If the roads are after a time to be privately managed, the future will consist of two periods—the remainder of the era of government control and the subsequent era of private control.

Take the first in its order. What is it fair for members to ask and what is it wise for officers to attempt in connection with government purchasing policies? If a member of this association received an order for goods and his competitor, another member, was disappointed, the Railway Business Association would be justified in regarding the outrage as outside of its peculiar province. Yet underlying that order there might be a general condition with which we could and ought to grapple. Suppose, for example, that the makers had been invited to submit to tests and the man who did not get the order was not given that opportunity; or suppose there were tests but the order was given to a maker who had not submitted to test. Certainly our association would deserve and receive the unanimous support of all of its members for pointing out an opportunity to improve that practice in the direction of fairness to all makers and of efficient administration for the public interest.

We may perhaps draw the line by saying that particular exercises of administrative judgment by the authorities would fall outside our scope, but general practices and conditions under which such particular acts are performed would be for us to discuss. The fact that some contract was cancelled would not concern the association. The fact that conditions and standards of administration were such or tending to become such as to encourage arbitrary and demoralizing cancellations would call for recommendations by the association.

An association as such can and does say things to the authorities which an individual business man could not say with the same impressiveness and which he might not be willing to say at all.

When government control shall be ended and our dealings are once more with corporation officials, what will then be the function of the association on the side of commercial policies? It is reasonable that our neighbors will expect us as a guild to make provision for the development and adoption of the highest standards of commercial ethics to be practiced by the seller in all his dealings with railways.

Committee Reports

Verbal reports were presented by A. L. Humphrey (president, Union Switch & Signal Company, Pittsburgh, Pa.), chairman of the committee on Government Purchasing Policies; W. W. Salmon (president, General Railway Signal Company, Rochester, N. Y.), chairman of the committee on The Railways After the War, and H. H. Westinghouse (chairman, Westinghouse Air Brake Company, Pittsburgh, Pa.), chairman of the committee on Finance and Administration.

On the day preceding the meeting about 50 members of the association met with the committee on Government Purchasing Politics to discuss the problems which had arisen during the war. In presenting his report Mr. Humphrey referred to this conference and also described the work of his committee in conducting negotiations with the Central Purchasing Committee and others. He explained the policies governing the action of the committee in the conduct of its work and made suggestions regarding future procedure.

Mr. Salmon, in discussing the work of his committee, touched on the study which has been given to the future of the railways, particularly as it affects their relations with the railway supply industry. He also read extracts from a number of letters written on this subject by members of the Railway Business Association.

Following the presentation of the reports of the committees resolutions were prepared and adopted as follows:

Resolutions

Contracts.—If railroad contracts are to protect the government against declines in the cost of production such contracts should also protect the contractor against increases in the cost of production. Whatever the terms, both parties should adhere to contracts. Arbitrary cancellations of orders due to a falling or rising price market tend to demoralize standards of conduct and impair industrial stability.

Contingent Fees.—Abolition of contingent fees in compensating sales service is against the public interest as applied to railroad contracts. Compensation depending wholly or partly upon obtaining a contract has become established in this industry because it has been found to promote economy in selling cost. A change to a salary basis will tend to increase overhead and sooner or later show itself in higher prices. We urge upon the President of the United States that he make effective as applied to railroad contracts the policy attributed to him in the announcement of exemption for the War Department namely, that "the covenant to be inserted in all war supply contracts against the operation of contract brokers and other illegitimate business agents should not be used in such a way as to be harmful to long-established business customs or to curtail industry."

Elimination of Wholesalers.—It is injurious to the best interest of the roads and of the public for central purchasing agents to eliminate wholesalers, who in the past have performed a valuable service in handling and carrying supplies and in maintaining competition. The disappearance of numerous small dealers will in the long run mean the concentration of business in the hands of a few large concerns and consequently a tendency toward higher price levels.

Mechanical Tests.—It is essential to mechanical progress that the development of railway appliances not yet established in use should be at once resumed with vigor. Tests should be decentralized, so that the several roads may proceed independently as if under private control, and so that the federal managers in their discretion may admit makers of new appliances to eligibility in specifications.

Remittances.—Cordial acknowledgment is due the Railroad Administration for its good offices in bringing about the liquidation of many long over-due accounts for goods delivered to railways. It would be fortunate if one of the achievements of government control might be the installation of methods and conditions insuring prompter remittances. We urge the Railroad Administration to consider: (a) a study of accounting and vouchering as practiced by roads that pay their bills the most promptly and the recommendation of such methods to all of the roads; (b) a study of the problem of providing the several roads with funds out of current receipts with which to meet current bills; (c) the adoption of a standard period for payment, preferably the 30 days of general commerce.

Prompt Remedial Legislation.—If Congress at the present session does not enact remedial legislation providing for modified private control of railways, we favor the calling of an extra session for that purpose, and upon the enactment of such legislation the roads should be returned to their owners.

Additions and Betterments.—During the period of government control additions and betterments should proceed with vigor and foresightedness. Discretion should be permitted the railway corporations in determining the design and amount of facilities which they will acquire. The government should provide for corporate co-operation in projects

for terminals, way and structures so as to promote joint use and an avoidance of needless duplication. The government should make such allowance in terms of purchase that the corporations will not carry the whole burden of war prices while their income is based upon that of 1915-17. Government loans should be funded for such periods and at such rates of interest as will give each carrier reasonable opportunity to discharge all financial obligations to the government.

Reference to the National Chamber.—The President of the Railway Business Association is requested to transmit the resolutions, entitled "Prompt Remedial Legislation" and "Additions and Betterments"—(a) to the Chamber of Commerce of the United States with the recommendation that if the time is too short for a referendum these and similar expressions of constituent bodies be laid before President Wilson upon his return from Europe: (b) to members of the railway supply industry with the suggestion that they favor in business associations of their communities and trades adoption of similar expressions addressed to the President through the National Chamber.

Independent Federal Corporations.—While permitted to co-operate with one another so as to eliminate duplication of service and facilities and to secure the most efficient and economical use of routes, terminals and vehicles, and permitted under federal sanction to effect consolidations if essential, railroad properties should be operated by independent federal corporations as numerous as may be consistent with their financial strength and stability.

Exclusive Federal Rate Regulation.—We favor the adoption by Congress of a policy under which regulation of maximum and minimum rates of carriers engaged in interstate commerce would be federal only.

A Secretary of Transportation.—We favor the creation of a Secretary of Transportation to consider carriers' estimates of future expenditures, including labor costs; to exercise exclusive supervision over security issues, and to fix rates designed to yield a revenue sufficient for future operations and credit.

Presentation to Congress and to Business Organizations.—The president of the Railway Business Association is requested (a) to appear with such other representatives of the association as he may deem expedient before committees of Congress at the earliest practicable moment and testify in favor of the recommendations for legislation affecting railways which have been declared by this convention; (b) to transmit the resolutions of this convention dealing with governmental policy affecting railways to members of the railway supply industry with the suggestion that they bring the expressions before associations in their communities and trades and that through public meetings, through action by committees, or through interviews with officers or leaders in such organizations they endeavor to obtain constructive comments upon such resolutions for the information and guidance of our Association in further developing counsel for Congress.

New Officers

The committee on nominations suggested the following officers for the ensuing year. Its report was accepted and the following officers were unanimously elected: President, Alba B. Johnson, president Baldwin Locomotive Works, Philadelphia, Pa.; vice-presidents, J. C. Bradley, president Pratt & Letchworth Co., Buffalo, N. Y.; Robert F. Carr, president Dearborn Chemical Co., Chicago; A. L. Humphrey, president Union Switch & Signal Co., Pittsburgh, Pa.; G. W. Simmons, vice-president Simmons Hardware Co., St. Louis; W. W. Willitts, president Adams & Westlake Co., Chicago; W. W. Salmon, president General Railway Signal Company, Rochester, N. Y.; Knox Taylor, president Taylor-Wharton Iron & Steel Company, High Bridge, N. J.; treasurer, M. S. Clayton, New York.

The Annual Dinner

The tenth annual dinner of the Association was held in the Hotel La Salle on Thursday evening, President Johnson presiding.

H. H. Merrick, of the Chicago Association of Commerce, was the first speaker, taking for his topic the reconstruction problem as it affects the railways. Mr. Merrick referred to the essential character of the transportation industry and advocated the prompt return of the roads to private operation, pointing out the dangers inherent to government ownership or operation. During the course of his remarks he read extracts from a letter written by Charles G. Dawes, president of the Central Trust Company, Chicago, to William G. McAdoo, suggesting a plan for control of the railways, of which the following is an abstract:

Mr. Dawes' Plan

A federal railroad board would be appointed by the president, with a proper cabinet officer as member *ex officio.* Through this agency, which it is assumed would be granted broad administrative powers, we would have the required governmental control. This board would determine the policy of the Railroad Administration and by its power to approve or disapprove would prevent unjust discrimination as between the public and the railroads, and as between the railroads themselves.

Profiting by the experience of the regional operation of the railroads under the present emergency, federal railroad corporations would be established at such places and in such number as conditions might require. These corporations would follow the usual form of corporations having capital stock; the amount of such capital stock being merely nominal, as such corporations would not, at least in the beginning, be concerned with railroad financing. The purpose of a regional railroad corporation would be to provide the necessary organization into which could be brought all of the railroad companies operating in any particular zone. As in the case of the federal reserve banks, the stock of these federal railroad corporations would be owned exclusively by the railroads, thus compelling participation by all of the railroads in a common organization. The directors of these federal corporations would be elected by the railroads composing the stockholder members, under such restrictions and regulations as would protect all interests involved *and insure a non-political control,* as is true of the federal reserve banks. To these federal railroad corporations would be given broad regulatory powers over all railroad activities. These corporations would have supervision over all phases of railroad operation, including the consolidation of terminals, ticket offices, railroad lines, if necessary, and all the other activities which affect the interests involved, and which need not be mentioned in this connection In addition to the supervisory powers, in my opinion, the functions of these railroad corporations should include power to pass upon passenger and freight rates, with the right to initiate rates when deemed advisable, subject only to revision, approval or disapproval of the Federal Railroad Board, to prevent unjust discrimination. Also, to these federal railroad corporations all future issues of railroad securities could be referred, in much the same manner as has been done with the various capital issues committees during the past year.

The difficulty of co-ordinating federal and state control of railroads in the matter of rates and taxation appears to many to be insurmountable. A similar difficulty was apparent in the federal reserve system in connection with the admission of state banks and trust companies to membership in the federal reserve system. This has been largely overcome and,

at the present time, most of the large state banks and trust companies are members of the federal reserve system, generally with the expressed consent of the state authorities.

The strength of the federal reserve system lies in the ownership of the federal reserve banks by the member banks and the centralization of banking reserves. The strength of the new railroad administrative system would lie in the ownership of the federal railroad corporations by the railroads themselves, and the control of railroad operations by means of the power to protect railroad operations by means of the power to protect railroad revenues and control railroad expenditures.

H. H. Westinghouse, chairman, Westinghouse Air Brake Company, Pittsburgh, spoke briefly on his observations of British and French railway conditions gained on a recent trip to those countries. He dwelt particularly upon the difficulty of the problems which confronted American railway men on their arrival in France, and the remarkable results which they had secured. He paid a high tribute to the work of our men overseas.

Samuel O. Dunn, editor of the *Railway Age,* also spoke on railway conditions in France, and particularly in England, dwelling especially on the part transportation played in the successful outcome of the war. He gave numerous statistics relative to the amount of traffic necessary to the maintenance of our forces and concluded with a discussion of the railway problem in Great Britain and the outlook for future government control in that country.

The dinner closed with an address by Alba B. Johnson on the question, "Shall the American Railway System Be Prussianized?" This paper was published in the *Railway Age* of last week, page 156.

Doings of the United States Railroad Administration

Director General Hines to Ask for Additional Appropriation to Aid in Financing Improvements

WASHINGTON, D. C.

AN ADDITIONAL APPROPRIATION, which may exceed $500,000,000, is to be asked of Congress shortly by the Railroad Administration, according to an announcement by Director General Hines, to assist the railroad companies in financing capital expenditures which, for the year 1919, together with the unexpended balance of the budgets authorized for last year, are estimated to amount to $1,627,000,000. While an investigation is now being made to ascertain how much of the improvements authorized by last year were planned because of war necessities and may be cancelled, it is not expected that this will greatly reduce the amount.

Director General Hines authorized the following: "The Railroad Administration has been charged by the federal control act with two functions which are entirely distinct and which it is very important shall not be confused. One of these functions is to render the public service through operation of the railroads, collecting of the revenues therefor, and paying the expenses and the rental due the railroad companies. The other of these functions is to require the necessary permanent improvements to be made, including purchases of new equipment, and to aid in financing these expenditures for new improvements in order that railroad companies may not be forced to offer large blocks of securities in the market under circumstances which would unsettle financial conditions and which would interfere with government financing. The carrying out of this second function may call for the temporary use of a great deal more government money than is needed for the carrying out of the first function.

"This second function was one of the controlling considerations for taking over the railroads. Very large expenditures were needed to equip them to perform their war work. Any efforts on the part of the railroad companies to borrow such sums would have resulted in the offering of such high interest rates as to interfere with the financing of the government. In many instances it would probably have been impracticable for railroad companies to raise the necessary funds at all. Consequently it was contemplated in the federal control act that the government would temporarily carry the expense of these improvements as far as might be necessary.

"The railroad companies themselves, before there had been any change in their managements, were asked at the beginning of February, 1918, to prepare and send in budgets of necessary improvements. As a result the companies recommended improvements aggregating $1,329,000,000. The Division of Capital Expenditures reduced these proposals to $975,000,000, and they have been since expanded so that the total authorized to December 31, 1918, is $1,277,000,000, of which it is estimated $588,000,000 had been expended up to December 31 and $689,000,000 remains to be expended.

"It is estimated that the minimum additional budgets for 1919 must be $350,000,000. This represents a total of authorized capital expenditures which must be provided for, for the years 1918 and 1919, of $1,627,000,000. While a substantial part of this total may not actually be expended during the calendar year 1919, it is apparent that it will be necessary during that year for the government and the railroad companies to provide, in the aggregate, a very large amount of money for these improvement purposes. If the government is to pursue the policy upon which it entered when the railroads were taken over, and is to provide temporarily the funds for such financing, except so far as they can be satisfactorily financed by the railroad companies, it is obvious that a substantial appropriation must be made. A careful analysis of the situation is on the point of being completed with a view to preparing an estimate for Congress for the necessary appropriation to meet this situation. While it is impossible at present to make an exact estimate of how large an additional appropriation will be needed, it is possible that it may exceed $500,000,000. The moneys advanced by the government to the railroad companies to pay for improvements will be repaid with interest (so far 6 per cent has been the prevailing rate), so the making of an appropriation for such purposes does not mean that the government loses this money.

"It is important to avoid confusing this function of financing necessary railroad improvements with the entirely distinct function of the current operation of the railroads and the payment of the current rental to the railroad companies. The point to be emphasized at the moment is that the necessity for carrying out the government policy as to the function of financing permanent improvements is the reason which will require an early request for a large appropriation."

The loans to the companies will be made in the same way that similar advances have been made during the past year. That is, they will be secured by the deposit of collateral by the railroads and will be at the uniform rate of 6 per cent,

but whereas the loans already made are mostly demand loans this plan may be departed from. The War Finance Corporation has also made advances to railroads in one or two instances and some of the loans made by the Railroad Administration have been repaid.

At the time the appropriation is asked of Congress a statement will be presented of the disposition of the original appropriation of $500,000,000, which, with any surplus earnings, was to constitute a revolving fund for the payment of the expenses of federal control and for other purposes, and from which advances had been made during 1918.

W. T. Tyler Appointed Director of Operation

Director General Hines has announced the appointment of W. T. Tyler as director of the Division of Operation, effective on January 15, when the resignation of Carl R. Gray, previously announced, took effect. Mr. Tyler has been senior assistant director.

Mr. Tyler was born at Janesville, Wis., July 29, 1870. He entered railway service with the Wisconsin Central as messenger in June, 1883, and was later an operator and despatcher on the same road. In 1889 he was employed as a brakeman on the Milwaukee, Lake Shore & Western, now a part of the Chicago & North Western. In the two subsequent years he was brakeman and conductor on the Northern Pacific, and from 1891 to 1900, was consecutively yardmaster, trainmaster and superintendent on the Great Northern. He was appointed superintendent on the St. Louis, Iron Mountain & Southern in 1900, and from 1901 to 1906 was general superintendent. In the eight succeeding years he was successively general superintendent and general manager of the St. Louis & San Francisco. In 1915 he was appointed superintendent on the Northern Pacific, with headquarters at Pasco, Wash., and on February 1, 1917, he became general manager of the St. Louis Southwestern Lines. On May 15, 1917, he was elected first vice-president of the St. Louis Southwestern Lines. On November 1, 1917, he was made assistant to the vice-president, in charge of operation of the Northern Pacific. Mr. Tyler came to Washington as assistant to Mr. Gray on January 22, 1918, and was appointed senior assistant director on July 1, 1918.



W. T. Tyler

Accounting Circulars

P. S. & A. Circular No. 60 directs that the following data concerning overcharge claims adjusted in accounting department be forwarded to the Director of Public Service and Accounting immediately after the close of the accounts for the quarter ending December 31, 1918, and each quarter thereafter: Number of overcharge claims on hand at beginning of month, number presented by claimants during month, number on hand (unpaid) at end of month, and number on hand (unpaid) at end of month which were over 90 days old.

P. S. & A. Circular No. 61 gives instructions for the handling of freight charges on prepaid shipments to prevent their being collected both by the forwarding and receiving agents.

The Export Situation

According to the report of the Exports Control Committee for the week ended January 11, there is a large accumulation of food supplies at all of the terminals at the port of New York. This is due mainly to the strike of harbor boatmen and dockmen. As a result of this disturbance, no shipments but overseas supplies for our troops were moved without interruption.

The increase in the overseas movement is still growing. The total receipts and deliveries at North Atlantic ports for the week ending January 7 was as follows (car loads):

	Received	Delivered
Export freight at North Atlantic ports, exclusive of U. S. Government freight, bulk grain and coal	8,589	6,234
U. S. Government freight on railroad terminals	3,446	3,524
Total	12,035	9,758

showing an accumulation of 2,277 cars during the week.

The total number of cars of freight on hand at North Atlantic ports (as of January 7) was 34,319; last week, 31,930, showing an increase of 2,389 cars.

In view of the unsettled labor conditions in New York harbor, the Allies are arranging to send a greater number of their vessels to South Atlantic and Gulf ports, and cargo will be directed to those ports accordingly.

In view of the changing conditions, the re-entry of steamship lines into commercial export business, and the desire of the steamship lines and exporters rapidly to fill the space released by the foreign governments, a conference was held January 3 with representatives of the allied governments, the Wheat Export Company and the various steamship interests at the port of New York for the purpose of devising ways and means whereby all of the export traffic could be expedited, particularly at New York.

There is a shortage of tonnage of the British and French at Boston, the French having no ships at Boston and quite an accumulation of freight. The British tonnage, as a whole, however, is ample to take care of the freight on hand. The French show a general shortage at North Atlantic and the Gulf ports.

Automatic Train Control Committee Appointed

Director General Hines on January 14 announced the appointment, effective at once, of an automatic train control committee "to make a study of and report upon automatic train control devices now undergoing test upon various lines of railroad, or available for test, with their recommendations for installation, and for the practical test of any device now, or during their investigation, made available for that purpose, which they may consider practicable and reasonably conforming to the purposes to be accomplished." The report of the committee is to include recommendations "upon the requisites of automatic train control, and its conclusions upon the mechanical or economic features of such devices as the committee may find available for practical use." The committee will consist of C. A. Morse, assistant director, Division of Operation, in charge of engineering, as chairman; W. P. Borland, chief of the safety bureau of the Interstate Commerce Commission; C. E. Denney, assistant to the federal manager of the New York, Chicago & St. Louis; H. S. Balliet, signal engineer, electric division, New York Central; Henry Bartlett, chief mechanical engineer, Boston & Maine; J. H. Gumbes, general superintendent, Western Pennsylvania grand division of the Pensylvania Railroad; and R. W. Bell, general superintendent of motive power of the Illinois Central. Mr. Morse has called the first meeting of the committee to be held in Washington on January 23. A committee for this purpose, it was announced, had been formulated and was ready for announcement last summer, with H. W. Belnap, manager of the Safety Section, as chairman, but after his death it became necessary to create a new committee on account of the

Eleven months ended November 30, 1918, compared with same period of previous year

Railroad	Average miles of road operated		Net ton miles revenue and non-revenue (thousands)			Net ton miles per mile of road per day		Train miles (thousands)			Net ton miles per train mile			Average number of freight cars on line daily: Serviceable		Total			% unserv'able	
	This year	Last year	This year	Last year	Per ct. change	This year	Last year	This year	Last year	Per ct. change	This year	Last year	Per ct. change	This year	Last year	This year	Last year	Per ct. change	This year	Last year
Total, New England District	8,019	8,008	10,448,748	9,918,555	5.2	3,901	3,708	24,272	24,584	d1.3	430	403	6.7	99,805	103,403	105,399	109,218	d3.5	5.3	5.3
Total, Central District	21,205	21,263	70,702,887	68,848,684	2.7	3,983	9,694	84,946	88,392	d3.9	832	779	6.8	415,238	421,217	439,529	446,614	d1.6	5.5	5.7
Total, Ohio-Indiana District	13,069	13,075	37,014,140	37,634,868	d1.6	8,480	8,618	47,904	51,279	d6.6	773	734	5.3	209,633	221,070	228,858	238,723	d4.1	8.4	7.4
Grand total, Eastern Region	42,292	42,347	118,165,774	116,402,107	1.5	8,365	8,230	157,123	164,255	d4.3	752	709	6.1	724,675	745,692	773,785	794,558	d2.6	6.3	6.2
Total, Allegheny Region	14,014	14,100	61,028,899	62,747,296	d2.7	13,038	13 324	68,518	72,590	d5.6	891	864	3.1	404,004	389,567	430,822	409,751	5.1	6.2	4.9
Total, Pocahontas Region	4,935	4,857	24,362,314	24,366,254	a	14,780	15,020	21,149	21,447	d1.4	1,152	1,136	1.4	84,348	78,287	88,264	82,345	7.2	4.4	4.9
Total, Southern Region	37,415	37,358	47,382,171	44,240,220	7.1	3,792	3,546	93,210	88,011	5.9	508	503	1.0	272,866	226,748	286,417	239,499	19.6	4.7	5.3
Total, Northwestern Region	46,915	46,769	55,500,020	54,437,495	2.0	3,542	3,485	84,013	86,996	d3.4	661	626	5.6	312,483	318,799	333,393	339,499	d1.8	6.0	6.1
Total, Central Western Region	51,265	51,170	67,940,617	65,640,245	3.5	3,968	3,841	109,573	113,594	d3.5	620	578	7.3	318,051	t	336,064	320,043	5.0	5.4	5.9
Total, Southwestern Region	31,846	31,938	27,008,625	27,548,136	d2.0	2,539	2,582	53,937	56,101	d3.9	501	491	2.0	176,106	164,480	182,656	172,806	5.7	3.6	4.8
Grand total, All Regions	228,682	228,539	401,388,420	395,382,053	1.5	5,255	5,180	587,523	602,994	d2.6	683	656	4.1	2,292,533	t	2,431,400	2,358,502	3.1	5.7	5.7

Railroad	Freight car miles (thousands): Loaded			Empty			Total			Net ton miles per loaded car mile			Per cent loaded to total car miles			Car miles per car day			Net ton miles per car day		
	This year	Last year	Per ct. change	This year	Last year	Per ct. change	This year	Last year	Per ct. change	This year	Last year	Per ct. change	This year	Last year	Per ct. change	This year	Last year	Per ct. change	This year	Last year	Per ct. change
Total, New England District	442,544	479,962	d7.8	187,345	189,212	d1.0	629,889	669,174	d5.9	23.6	20.7	14.0	70.3	71.7	d2.0	17.9	18 3	d2.2	296	272	8.8
Total, Central District	2,437,514	2,603,335	d6.4	1,165,263	1,122,371	3.8	3,602,777	3,725,706	d3.3	29.0	26.4	9.8	67.7	69.9	d3.2	24.5	25.0	d2.0	482	462	4.3
Total, Ohio-Indiana District	1,153,780	1,283,734	d10.1	538,160	523,383	2.8	1,691,940	1,807,117	d6.4	32.1	29.3	9.6	68.2	71.0	d3.9	22.1	22.7	d2.6	484	472	2.5
Grand total, Eastern Region	4,033,838	4,367.031	d7.6	1,890,767	1,834,966	3.0	5,924.605	6,201,997	d4.5	29.3	26.7	9.7	68.1	70.4	d3.3	22.9	23.4	d2.1	457	439	4.1
Total, Allegheny Region	1,704,572	1,863,159	d8.5	920,813	923.265	0.7	2 635,386	2,786,424	d5.4	25.8	33.7	6.2	64.7	66.9	d3.3	18.4	20.4	d9.8	424	458	d6.8
Total, Pocahontas Region	607,724	638,909	d4.9	407,715	380,320	7.2	1,015.439	1,019,229	d0.4	40.1	38.1	5.2	59.8	62.7	d4.6	34.4	37.1	d7.3	826	886	d6.8
Total, Southern Region	1,844,313	1,849,253	d0.3	837,962	769,005	9.0	2,682,275	2,618,259	2.4	25.7	23.9	7.5	68.8	70.6	d2.5	28.0	32.7	d14.3	495	553	d10.5
Total, Northwestern Region	2,016,605	2,119,858	d4.9	855,759	811.392	5.4	2,872,364	2,931,250	d2.0	27.5	25.6	7.4	70.2	72.3	d2.9	25.8	25.9	d0.4	498	480	3.8
Total, Central Western Region	2,509,300	2,685,300	d6.6	1,149,848	1,092,103	5.3	3,659,148	3,777,403	d3.1	27.1	24.4	11.1	68.6	71.1	d3.5	32.6	35.3	d7.6	605	614	d1.5
Total, Southwestern Region	1,081,991	1,190,664	d9.1	460,953	454.005	1.5	1 542,944	1,644,669	d6.2	25.0	23.1	8.2	70.1	72.4	d3.2	25.3	28.5	d11.2	443	477	d7.1
Grand total, All Regions	13,798,343	14,714,174	d6.2	6,533,817	6,265,056	4.3	20,332,164	20,979,230	d3.1	29.1	26.9	8.2	67.9	70.1	d3.1	25.0	26.6	d6.0	494	502	d1.6

d Indicates decreases. a Less than one-tenth of one per cent. e Estimated. t Information incomplete.

loss of his experience in the investigation of various automatic train control devices and of his services.

Freight Traffic Shows Decrease

In a brief item published in last week's issue, page 150, figures showing the freight traffic movement and car performance of the railroads under federal control, as reported by the Operating Statistics Section, for the 11 months ended November 30, 1918, were erroneously stated as those for the month of November. In November the net ton miles of revenue and non-revenue freight *decreased* 2.4 per cent, while the 11 months' period shows an increase of 1½ per cent. Net ton miles per mile of road per day for the month averaged 5,181, as compared with 5,298 in November, 1917, while for the 11 months' period there was an increase. Total train miles in November decreased 7.3 per cent. Net ton miles per train mile increased 5.3 per cent. The percentage of empty car miles showed an increase of 8.6 per cent, while the total car mileage decreased 4.7 per cent. The percentage of unserviceable freight cars on line was 5.6 as compared with 5.4 in November, 1917. The net ton miles per loaded car mile increased 8.4 per cent, while the car miles per car day decreased 4.7 per cent, and the net ton miles per car day decreased 2.4 per cent. The statistics by regions and districts for the 11 months ended November 30 are given in the table.

Payments Between Railroads and Pullman Car Lines Discontinued

P. S. & A. Circular No. 58, issued by the Division of Public Service and Accounting, provides that effective as of November 1, 1918, the Pullman car lines shall discontinue paying to the railroads under federal control any portion of the amounts received from passengers for accommodations furnished, as provided by the terms of contracts between the Pullman Company and railroad companies, provided, however, that any part of such amounts earned prior to January 1, 1918, and payable to the railroad company shall be settled as heretofore. The Pullman car lines shall also discontinue rendering bills against railroads under federal control for mileage of Pullman cars or electric or other lighting of Pullman cars. Railroads under federal control shall discontinue rendering bills against the Pullman car lines for any part of the costs incurred by them for heating, lighting, lubricating, or for ice or water furnished, or rental or other expenses covering terminal or yard facilities operated for the sole or joint benefit of the Pullman car lines. The cost of repairs made by railroads to the equipment of the Pullman car lines, the amount of which is chargeable to the Pullman car lines, shall be billed against that company as heretofore.

All unsettled audited bills covering items of the class enumerated herein shall, if correct, be paid. If any items of the class named have been settled subsequent to the effective date of this circular, such settlements shall stand.

Contracts Signed

The Railroad Administration, on January 9, signed a contract with the Atlantic Coast Line, including also the Washington & Vandemere and the Tampa Southern, providing for an annual payment of $10,185,942; also a contract with the Galveston Wharf Company for $526,069.

Gaines Chairman of Wage Board

F. F. Gaines has been elected chairman of the Board of Wages and Working Conditions, succeeding G. H. Sines, and A. O. Wharton has been elected vice-chairman, succeeding Mr. Gaines, in accordance with the plan of rotation in office every six months decided upon at the time of the organization of the board.

General News Department

Negroes may eat in dining cars on the Texas & Pacific, according to a bulletin which was recently issued. The bulletin says that negro passengers are to be allowed access to the dining cars after all the white passengers have been served.

The Dent bill to validate some 6,600 of the so-called "informal" contracts for war supplies for the United States government, entered into before November 12, 1918, was passed by the House of Representatives on January 9. It was estimated that these contracts would aggregate $1,600,000,000.

The Interborough Rapid Transit Company, New York city, is now running trains through to Hunt's Point avenue on the Pelham Bay Park branch of the Lexington avenue subway, about 2½ miles east from 138th street. The eastern terminus is near the Hunt's Point station of the New York, New Haven & Hartford.

Telegraph wires and other wires on the Putnam division of the New York Central were put out of service, causing delay to a number of trains, on the night of January 14, by the theft of about 3,000 ft. of copper wire. The thieves worked between Dunwoodie, N. Y., and Ardsley, and, apparently, took several hours to do the job.

The governor of Vermont, Percival W. Clement, in his inaugural address, spoke in opposition to further federal interference with railroads, telephones and telegraphs. These public utilities contribute a large share of the revenue of the state of Vermont and the governor reminds the legislators that if the federal government should own these properties the change would cause a great reduction in the income of the state.

Federal ownership and operation of the leading railroad systems is provided for in a bill which has been introduced in Congress by Representative DeWalt of Pennsylvania. The bill provides for a federal department of railroads, headed by a cabinet officer, the creation of five railroad districts with five federal companies to acquire the controlling interest in the larger systems, a federal railroad board to be appointed by the President, and guaranteed government stock.

One million one hundred thousand dollars is the sum estimated by L. M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company, as necessary to be raised to settle the claims for damages incident to the derailment on that road November 1, when more than 90 passengers were killed. The receiver, who has just taken charge of the property, says that the chief difficulty of the management is "lack of cash." He recommends also that ten millions be secured with which to buy 500 new steel passenger cars.

Locomotives in the Northwestern region for the week ended December 28, were 85.25 per cent efficient; that is to say, 8,002 engines, according to the reports, were serviceable out of 9,386, leaving a balance of 1,384 or 14.75 per cent out of service. Locomotives turned out of shops during the week numbered 483; 134 serviceable engines were in storage, and nine were repaired for other lines. The locomotive shops of the Northwestern region employed a total of 34,356 men who worked an average of 48.3 hours in that week.

Governor Alfred E. Smith, of New York, who took his seat on January 1, desires to reorganize the Public Service Commission of the State, for the first district (New York City) by reducing the number of commissioners from five to one; the one commissioner to have authority to regulate public service. A second commissioner would take the duty of supervising the completion of the subways, which are now under construction. A bill has been introduced in the legislature to carry out the proposed change. The single regulative commissioner would appoint four deputies at $7,500 a year. This sum is equal to half the salary of each of the present commissioners.

Development of airplane routes for the transportation of mail, which has been the subject of a study by the Post Office Department, will need an appropriation of $3,000,000; this appears from a statement made last week before the Congressional Committee by Otto Praeger, assistant postmaster-general. Mr. Praeger said that during the last six months the expenses incident to the transportation of mail by airplanes between New York and Washington, six times a week, each way, had amounted to $75,165; and the revenues in that time amounted to $60,653.

The Fuel Administration announces that an owner of coal confiscated by a railroad between April 1 and October 10, 1918, is not deprived by any regulation of the Fuel Administration of any legal right which he may have to recover the purchasing agent's commission which he has paid or become obligated to pay on such confiscated coal; and, that the payment of such commission by a railroad on the settlement for coal confiscated during such period is not prohibited by any such regulation. This ruling supersedes all previous inconsistent interpretations.

The National Railways of Mexico, according to a report from Monterey, are being rehabilitated under plans which are making a fair degree of progress. All bridges on the main lines are now repaired and in use, and many of the stations have been rebuilt in a permanent manner. The roadbed is reported in fair condition. The number of locomotives in service is about 500, of which 100 belong to industries along the line and are used in the freight service of their owners. About 250 more locomotives are awaiting repairs, delay having been incurred in getting the repair parts from the United States. To handle even the minimum volume of traffic about 1,000 locomotives ought to be constantly in use, and the question of acquiring some new ones is now under consideration.

Railroad Honor Men

To the lists, printed last week and the week before, of railroad employees who have served the country in the military or naval service during the war, the following items should be added:

Name of road	Number of men in military or naval service
Ann Arbor	171
Atlanta & West Point and the Western of Alabama	231
Atlanta, Birmingham & Atlantic	247
Colorado & Wyoming	47

Name of road	Number of men in military or naval service
Detroit, Bay City & Western	11
Detroit Toledo Shore Line	14
Fort Street (Detroit) Union Depot Railroad	10
Pere Marquette and Lake Michigan Car Ferry Association	1,497

Conferences With Shop Men at Washington

The Board of Railroad Wages and Working Conditions of the Railroad Administration has called a meeting of representatives of the federated shop crafts and representatives of the various railroad regions to take place at Washington on January 20, for the purpose of creating uniform rules and working conditions and establishing uniform practices in handling grievances on all railroads under federal control. The labor organizations will be represented by a committee composed of 36 men, including one chief executive officer for each of the crafts, with the acting president of the Railway Employees' Department of the American Federation of

Labor as chairman. The railroads will be represented by a committee of 36 men selected by the various regional directors. The two committees will continue in regular session from day to day until they are prepared to submit their conclusions. These will be subject to review by the Board of Railroad Wages and Working Conditions.

Cripple Creek & Colorado Springs

In the table which was published in the January 3 issue of the *Railway Age*, showing mileage of railroad abandoned, there was included under the heading: "Lines Abandoned Permanently and Not Taken Up," 39 miles of the Cripple Creek & Colorado Springs, from Colorado Springs, Col., to Cameron. This piece of road was not being operated at the time our table was compiled, and an officer of the company wrote us that this piece of line had "suspended operation, disposition not certain." We have since learned that a bridge on this line was burned in May, 1918, and the lessee did not replace it, so that the line was not operated. It was incorrect to show the line as having been abandoned, and it is understood that the bridge is to be replaced shortly. The Cripple Creek & Colorado Springs leases the Colorado Springs & Cripple Creek District Railway, on which this piece of mileage is located.

Decrease in Traffic Through Soo Canals

The total amount of freight moved through the canals at Sault Ste. Marie, Mich. and Ont., during 1918, amounted to 85,680,327 tons, or 4,133,571 (short) tons less than passed through these waterways in 1917. There was also a decrease of 3,349 passengers carried through the canals, or 9 per cent. The only commodity handled which showed an increase in tonnage was oil. In 1918, 334,134 tons of oil or 71,645 tons in excess of the amount carried in 1917, were transported through the canals. There were very heavy decreases in the tonnage of some commodities handled. The movement of wheat, for instance, was 34 per cent below that of 1917, while that of other grain was 54 per cent that of the previous year. Manufactured and pig iron showed a decrease of 62 per cent, stone 30 per cent, anthracite coal 14 per cent, lumber 15 per cent, copper 28 per cent and general merchandise 25 per cent.

Labor Recruiting Conference

A conference will be held at the Railway Exchange building, Chicago, on January 20 and 21, to discuss ways and means of recruiting labor for railroads. Sanford H. E. Freund, director of the Clearance Division of the United States Employment Service, will preside. The meeting was called at the suggestion of Dr. P. L. Prentis, special representative of the United States Employment Service at Chicago. Among those who will speak are Mark L. Crawford, federal director of the United States Employment Service; C. A. Griswold, in charge of the labor employment service of the Chicago & North Western; M. G. Kibbe, local superintendent of the Railroad Division of the United States Employment Service at Chicago; James McDermott in charge of the employment of labor on the Chicago, Milwaukee & St. Paul; R. W. Nichols, labor agent on the Elgin, Joliet & Eastern, and W. W. Brown, central director of the United States Employment Service for Missouri. W. G. Bierd, federal manager of the Chicago & Alton, is also expected to speak.

Congestion at Seattle

At Seattle and other ports on Puget Sound the export freight waiting for vessels amounts to 5,780 carloads, according to a report in the Philadelphia Public Ledger. The Seattle Chamber of Commerce is investigating the situation, as the delay in forwarding the merchandise has piled up heavy insurance and other holding charges for which there can be no remuneration. Much valuable time has been lost, according to the Public Ledger, "in the kindergarten conducted by the railroad administration in transfusing sufficient foreign trade knowledge into men accustomed only to bossing railroad switchmen and yardmasters to equip them as authorities in world commerce." It is hoped that before long "these men at least will have learned the names of the various bulk commodities moving across the Pacific. * * * Working for new superiors, with policies to be built up out of nothing and with no predicate before them, these officials have feared to do and feared not to do." Ships have had to wait several days while the railroad men searched for the cars containing the freight for which they held contracts; but, says the report, transpacific rates have doubled and trebled within the last year, and the steamship lines have been quietly endeavoring to hand-pick the tonnage to move at the higher rate and to leave the low-rate merchandise that had been waiting for from ninety days to a year.

Master Boilermakers' Association

The 1919 convention of the Master Boilermakers' Association will be held in Chicago May 26, 27, 28 and 29 at the Hotel Sherman. This will be the first convention since 1916, the association having suspended activities on account of the war. The subjects to be discussed at the convention, together with the committees, follow:

1. Proper method of threading radial stays and tapping the hole in the boiler for them.
   Is it necessary to give radial stays the same lead as the tap with which the holes were tapped?
   Committee: H. J. Raps, chairman, Andrew Hedberg, J. J. Keogh, J. B. Smith, T. J. Reddy.
2. Which is the better time for drilling tell-tale holes, before or after application of the bolts?
   Which is the better method for drilling in either case?
   What is the best style of drill for opening up tell-tale holes in old staybolts?
   Does it pay to use a high speed drill for this purpose?
   What is the best lubricant for the drill?
   Committee: L. R. Porter, chairman, A. N. Lucas, S. M. Carroll, Bernard Wulle. C. E. Erwin.
3. Effect of proper upkeep of ash pan and front end draft appliances on fuel economy.
   Method used in determining proper design for various classes of locomotives.
   Committee: George Austin, chairman, E. J. Nicholson, Fred Bayer, H. F. Weldin, George Hewitt.
4. What is the best method for scaling superheater flues in the boiler?
   What is the best method of rattling flues?
   What is the best method of handling flues in and out of the rattler?
   How many revolutions per minute should the rattler make for 2-in. and for 5¾-in. flues?
   Describe method for safe ending superheater flues.
   Committee: Frank Gray, chairman, W. J. Murphy, Andrew S. Green, John Harthill, J. J. Mansfield.
5. What is the best style grate for bituminous coal?
   Where should the dump grate be located, (a) in road engines, (b) in switch engines?
   What should be the percentage of opening in grates?
   What should be the percentage of draft opening in ash pans compared with area of grates?
   Committee: W. H. Laughridge, chairman, L. M. Stewart, T. P. Madden, C. P. Patrick, C. A. Nicholson.
6. What should be the minimum distance between the grates and the lower part of arch tubes for different classes of locomotives?
   What is the proper distance from the door sheet to the brick arch and from the crown sheet to the brick arch for the various classes of locomotives?
   Committee: C. L. Hempel, chairman, W. F. Fantom, A. E. Brown, E. W. Young, G. B. Usherwood.
7. What is the best method of bracing locomotive tenders? Describe method used.
   Committee: Thomas Lewis, chairman, E. J. Sweeney, J. J. Orr, J. P. Malley, J. T. Johnson.
8. Oxy-acetylene and electric welding.
   Committee: H. J. Wandberg, chairman, B. F. Sarver, L. M. Stewart, T. F. Powers, J. J. Davey.
9. What is the advantage of cutting off stay ends with oxy-acetylene over old method of nippers and chisels?
   Committee: W. S. Larason, chairman, John McGarrigal, J. B. Tynan, E. H. Hohenstein, A. E. Shaule.
10. General discussion.

Chicago Union Station

Construction work on the new Union Station at Chicago is to be resumed immediately. Some contracts are about to be let on certain portions of the work and bids are being requested on other portions. The budgets for the work this year call for an expenditure of five or six million dollars by the Union Station Company and about $3,000,000 by roads entering the Union Station on work incidental to the Union Station facilities. The program includes the depression of track between Van Buren and Twelfth streets to meet the grades outlined in the city ordinances, the rearrangement of tracks to permit the construction of viaduct foundations, the construction of the Harrison street viaduct, the east half of the Burlington freight house, the Polk street viaduct, the Canal street viaduct between Polk and Taylor streets, the

Taylor street viaduct, the elevation of Canal street between Taylor and Twelfth streets and the south half of the Twelfth street viaduct. Work will also be started on foundations for the head house, which are expected to be completed this year. There is some prospect of starting the work of elevating Canal street between Monroe and Jackson. Considerable work has already been completed on the Union Station facilities, most of which consists of the construction of sewers and conduits and the wrecking of buildings within the limits of the facilities. Approximately $30,000,000 has already been spent in the purchase of property and for construction work already done. It is expected the work on the station will now be carried on to completion. It will furnish employment to several thousand men.

Material Handling Machinery Manufacturers

At a meeting held at the Hotel McAlpin, New York, January 15 and 16, an organization was formed to be known as the Material Handling Machinery Manufacturers' Association. The object to be attained was that of bringing together the firms engaged in making machinery designed to handle all kinds of material, raw, fabricated or in packages. The list of members indicates the range of work covered.

James A. Shepard, president of the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., was appointed chairman of the meeting. A luncheon was served on January 16, at which the members were addressed by the Hon. William C. Redfield, Secretary of Commerce; Calvin Tompkins, former Commissioner of Docks, City of New York, and J. W. Frazier, of the U. S. Shipping Board.

After the luncheon, a Board of Governors was elected, consisting of the following:

C. M. Watson, Watson Elevator Co.
William A. Clarke, Manning, Maxwell & Moore.
R. W. Scott, Otis Elevator Co.
F. W. Hall, Sprague Electric Works.
Frederick Stadelman, Wellman, Seaver, Morgan Co.
Lucian C. Brown, Elwell-Parker Electric Co.
J. C. Walter, The Alvey-Ferguson Co.
James A. Shepard, Shepard Electric Crane & Hoist Co.

The firms joining are:

The Alliance Machine Co., Alliance, Ohio.
The Alvey-Ferguson Co., Cincinnati, Ohio.
American Hoist & Derrick Co., St. Paul, Minn.
Box & Co., Inc., Alfred, Philadelphia, Pa.
Brown Portable Conveying Machinery Co., Chicago, Ill.
Cleveland Crane & Engineering Co., Cleveland, Ohio.
Clyde Iron Works.
Elwell-Parker Electric Co., Cleveland, Ohio.
Heyl-Patterson, Inc., Pittsburg, Pa.
Heyward Co., New York.
International Conveyor Corp., New York.
Karry-Lode Industrial Truck Co., Long Island City, N. Y.
Manning, Maxwell & Moore, New York.
Shaw Electric Crane & Hoist Co., New York.
Mead-Morrison Manufacturing Co., East Boston, Mass.
New Jersey Foundry & Machine Co., New York.
Ohio Locomotive Crane Co., Bucyrus, Ohio.
Otis Elevator Co., New York.
Charles A. Rohr, New York.
Rownson, Drew & Clydesdale, Inc., New York.
Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.
Sprague Electric Works, New York.
Edward F. Terry, Manufacturing Co., New York.
Watson Elevator Co., New York.
Wellman, Seaver Morgan Co., Cleveland, Ohio.
Whiting Foundry Equipment Co., Harvey, Ill.

Sixth National Foreign Trade Convention

The National Foreign Trade Council will hold its Sixth National Foreign Trade Convention at the Congress Hotel, Chicago, on Thursday, Friday and Saturday, April 24, 25 and 26. The formal call will be issued shortly by the chairman of the council, James A. Farrell, president of the United States Steel Corporation.

In the past these conventions have drawn an increasingly large number of the prominent business men of the country, representing all forms of industry, commerce, finance and transportation. To these will now be added the representatives of labor. In this way the delegates are supplied with a broad view of the business situation, with specific information to meet their individual needs, and with advice and inspiration for the coming year.

The convention in April will deal with Foreign Trade as a Factor in Stabilizing American Industry—problems involving the conversion of war industries to the needs of peace; development of our foreign trade to provide employment for our soldiers, sailors, and war workers; and the formation of a definite policy dealing with the future of our new shipping.

Traffic News

The terms of monthly commutation tickets, according to an announcement at Washington, must, after February 1, always begin and end with the calendar month.

The Transportation Club of Louisville, Ky., will hold its annual banquet on January 31. B. L. Winchell, Southern regional director, will be the guest of honor and will deliver an address.

The embargo on the delivery of freight to the Denver & Salt Lake, occasioned by a slide which closed the mouth of Tunnel No. 16 on that road about thirty days previously, was cancelled on January 14, when the line was again opened for traffic.

The Canadian Railway War Board has ordered embargoes on nearly all freight destined for Europe, because of congestion of freight at British and French ports. Exports from Canada to Europe have lately amounted to about 500,000 tons a month.

According to the Pittsburgh (Pa.) Post, 40 steel barges are to be built in that city, on contracts recently let by the government for operation on the Mississippi river between St. Louis and New Orleans. It is expected that work will be begun in the spring. The American Bridge Company has the contract for 25 barges and the Dravo Construction Company for 15.

The Canadian Railway War Board announces that freight cars of Canadian roads may now be allowed to go into the United States. During the pressure of the past year this use of Canadian cars has been forbidden. Arrangements have now been made with the United States Railroad Administration whereby Canadian cars will be promptly returned to their owners.

Proposals to divorce the meat packing companies from ownership of refrigerator or livestock cars, stock yards and other transportation and terminal facilities, as provided in bills now pending in Congress on the recommendations of the Federal Trade Commission were supported by the marketing committee of the American National Live Stock Association at hearings held in Washington last week before the House and Senate Committees on Interstate Commerce. It is proposed to require that these facilities be taken over by the Railroad Administration or by the railroad companies.

National Industrial Traffic League

The spring meeting of the National Industrial Traffic League will be held at New Orleans on March 10, 11 and 12. The executive committee of the organization will convene on the first day and the remaining two days will be devoted to the program of the league as a whole. The demurrage rules which have been recodified by the Committee on Car Demurrage and Storage of the League and the Special Committee on Relations of the American Railway Association will be presented for ratification.

Uniform Rates for Storage of Freight

The non-federal railroads—or 177 of them—have issued a new storage tariff for freight—"Uniform storage tariff No. 1"—effective February 15, and have filed it with the Interstate Commerce Commission and 37 state commissions—a good example of economy in printing. This tariff is issued by J. E. Fairbanks, 75 Church street, New York (secretary of the American Railway Association) as agent for all of the roads, and was adopted by special permission of the Interstate Commerce Commission, without reference to present or past storage tariffs, for the purpose of establishing uniformity as between these small roads and those operated by the government, which latter also use the same rules. Forty-eight hours is the standard free time, after which the normal rate, each day, for the first five days, is two cents per 100 lb. (minimum charge 25 cents); after that three cents a day (minimum 50 cents).

Commission and Court News

Interstate Commerce Commission

The term of **James S. Harlan**, member of the Interstate Commerce Commission, who has held that office since 1906, expired on December 31, but the president has not sent to the Senate any nomination of a successor.

The Hocking Valley, the Kanawha & Michigan and the Kanawha & West Virginia have filed petitions for rehearing of the order of the commission in the standard time zone case to the end that the dividing line between the Eastern and Central time zones as fixed by the commission may be so modified as to place those lines of railroad within the Central time zone, or to enable them to operate under the Central standard time. A rehearing has been granted and will be held before Examiner John T. Money at Columbus, Ohio, on January 27. The Toledo Commerce Club has petitioned for a rehearing to the end that the city of Toledo, Ohio, which is located on the zone boundary line between the Eastern and Central zones, shall be considered as within United States standard Eastern time zone. Public hearing will be held before Examiner John T. Money at Toledo, on January 28.

Personnel of Commissions

Captain George F. Daggett has been appointed chief of the Transit Bureau of the New York State Public Service Commission, first district, in place of **J. P. H. DeWitt**, resigned. The chief of the Transit Bureau supervises the operations of transportation lines in New York City, and his salary is $6,000. Captain Daggett has been in military service for the past twelve months, but before that had been in the employ of the commission for about ten years.

State Commissions

The New York State Public Service Commission, First District, in its annual report, presented this week to the legislature, says that during the past year the new track put in use on elevated and subway rapid transit lines in New York City aggregates 63 miles. The cost of these new lines aggregated $103,000,000, not including the cost of cars; and it is anticipated that by the end of 1919 the total length of track in operation on these lines in the city will amount to 600 miles. Securities issued during 1918 by city transit lines and by gas companies in New York City, and authorized by the commission, amounted to $64,220,500. Included in the lines of rapid transit now under construction, and to be completed in 1919 are two additional tunnels between Manhattan and Brooklyn—the Clark street tunnel, and the Whitehall-Montague street tunnel. The Clark street line will be operated by the Interborough Rapid Transit Company and the other by the Brooklyn Rapid Transit Company.

Court News

Arguments were heard before the Supreme Court of the District of Columbia at Washington on January 4 on the application of the Kansas City Southern for a writ of mandamus to compel the Interstate Commerce Commission to take testimony regarding the present cost of condemnation and damage or of purchase in excess of original cost and the present value of lands belonging to the company.

Bonds and Stock Certificates Not Baggage

The New York Appellate Division holds that a sleeping car company is not liable to a passenger for the loss of stocks and bonds contained in a handbag lost through its negligence, as they are not baggage.—Jandorf v. Pullman Co., 171 N. Y. Supp. 321. Decided June 27, 1918.

United States Supreme Court

Courts Must Inquire Into Reasonableness of City Fare Ordinance

The United States Supreme Court on January 13, by a vote of six to three, decided for the plaintiff in the case of the Detroit United Railway against the City of Detroit.

The case came up on appeal from the District Court for the Eastern District of Michigan, which had dismissed proceedings instituted by the railway company to restrain the enforcement of a city ordinance which sought to fix the rate of street car fares in Detroit. The ordinance was passed by the City Council after it had refused the company permission to increase its fares.

It was contended by the company that the rates sought to be established were confiscatory. The city authorities challenged this contention. The district court in dismissing the proceedings did not go into the merits of the case.

In the present decision, by Justice Day, the decree of the district court is reversed with costs, and a new trial is ordered. Justices Clarke, Holmes and Brandeis dissented.

The court holds that a public service corporation is entitled to a reasonable return on its investment and that the district court should have heard the case on its merits and decided whether the Detroit city ordinance would or would not enable the company to get a legal return on its investment. The company sought to increase its fares after the War Labor Board had raised the maximum wage rate for the company's employees from 40 to 48 cents an hour and had recommended an advance in fare to meet the increased operating expense due to the war. It was the contention of the company that the War Labor Board's award added about $2,000,000 annually to its financial burdens and would prevent it from earning a fair return on its investment.

Reed Amendment Sustained

In a suit brought against D. Hill, charged with taking a quart of liquor into West Virginia, the United States Supreme Court, on Monday, January 13, held valid the federal law, known as the Reed Amendment, forbidding the interstate transportation into "dry" states of any or all intoxicating liquor for beverage purposes, even when intended for personal use. This decision overrides the provisions of state statutes permitting limited amounts of liquor to be taken into a state for personal use. The case was remanded for a new trial. Justice McReynolds, in a dissenting opinion, concurred in by Justice Clark, declared the Reed amendment was not a regulation of interstate commerce, but a direct intermeddling with a state's affairs, and beyond federal power.

Webb-Kenyon Law Sustained

To avoid penalties sought to be imposed upon it for illegally carrying intoxicating liquors from another state into Kansas, the Missouri Pacific asserted that as the provision of the federal Constitution exacting a two-thirds vote of each House to pass a bill over a veto means a two-thirds vote, not of a quorum of each House, but of all the members of the body, the Webb-Kenyon Act was never enacted into law, because after its veto by the President it received in the Senate only a two-thirds vote of the senators present (a quorum), which was less than two-thirds of all the members elected to and entitled to sit in that body.

The Supreme Court of the United States, by U. S. Chief Justice White, says, in part, that in consequence of the identity in principle between the rule applicable to amendments in the Constitution and that which controls in passing a bill over a veto, the rule of two-thirds of a quorum has been universally applied as to the two-thirds vote essential to pass a bill over a veto. In both cases the continued application of the rule was the result of no mere formal following of what had gone before, but came from conviction expressed, after deliberation, as to its correctness by many illustrious men. . . . In the absence of an express command to the contrary the two-thirds vote of the House required to pass a bill over a veto is the two-thirds of a quorum of the body as empowered to perform other legislative duties. Judgment against the appellant railroad was affirmed.—Missouri, Pacific v. Kansas. Decided January 7, 1919.

Foreign Railway News

The Argentine Government has refused a request of the railway companies for authorization to institute an all-round increase of 10 per cent in tariffs.

The International Sleeping Car Company announced the inauguration on December 15 of sleeping car services from Paris to Strasbourg and from Paris to Metz, both leaving Paris at 8 p. m.

The Northern Railway of France recently issued a statement showing the systematic destruction of the tracks by the Germans, right up to the signing of the armistice, and pointing out that 1,731 bridges, 330 stations, practically the whole of the telegraph and telephone wires and the water supplies have been destroyed.

Recently published figures prepared by the Division of Statistics of the Bureau of Foreign and Domestic Commerce show that for the calendar year 1917, the United States exported locomotives to the number of 1,840, valued at $31,072,336, railway cars to the value of $25,745,007, and machine tools to the value of $60,170,724.

The Roumanian Government is reported to have set aside a sum of $1,000,000 for the construction of a railway line to connect the northern part of Moldavia and the north of Bessarabia. The new line will join Lipcani, Radantzki and Dangeni. Northern Moldavia possesses great natural resources which have been but little developed hitherto. During the war this district provisioned the whole of the Roumanian army. The government, it is stated, will do everything possible to hasten the completion of this new line.

The Military General Direction of Warsaw has given its assent to the commencement of the preliminary work for a new railway between Memel-Telschi-Schaulen, which, branching off from the Northern German station at Bajohren, will run as a standard gage railway and enclose the whole of the former government of Kovno. The preliminary work, towards which the town and district of Memel and the Eastern German Railway Company have subscribed 120,000 marks, has already proceeded as far as a survey of the line. It is not yet known whether the line will be private or state-owned.

Structural Material Specifications for Latin America

Two more numbers of the Industrial Standards series now being issued by the Bureau of Foreign and Domestic Commerce are ready for delivery: No. 3, Standard Specifications for Open-Hearth Steel Girder and High Tee Rails, and No. 4, Standard Specifications for Low-Carbon Steel Splice Bars. These specifications are printed in Spanish and English, and are published to meet a demand from South American firms for information that will enable them to specify American structural materials. The text is that adopted by the American Society for Testing Materials, and is published in co-operation with the American Society of Civil Engineers and the Bureau of Standards, Department of Commerce. Copies can be purchased at 5 cents each from the Superintendent of Documents, Government Printing Office, Washington, D. C., or from any district or co-operative office of the Bureau of Foreign and Domestic Commerce.

Allies to Take Over the Trans-Siberian

Announcement was made by the State Department Tuesday to the effect that an understanding has been reached in Tokio for joint allied control of the Chinese Eastern and Trans-Siberian Railroads.

Complete details regarding the understanding have not reached Washington and will not be obtainable until the Japanese Ambassador submits the text of the proposed plan.

The official announcement issued by Acting Secretary of State Polk said:

"The State Department has been advised that an understanding has been reached in Tokio regarding the proposed restoration of the efficiency of the Trans-Siberian Railway, including the Chinese Eastern Railway, and that the proposed plan will be submitted to this government through the Japanese ambassador in Washington.

"In brief, the proposal is that there shall be an interallied committee under the presidency of a Russian, this committee to consist of one representative of each of the following nationalities: Russia, China, Japan, United States, Great Britain, France and Italy. Under this committee there will be established two boards —first, a technical board, on which Mr. Stevens will serve, and, second, a military board."

John F. Stevens has been serving as chairman of the Stevens Railway Commission of five members, all of whom, except Mr. Stevens, returned to this country some time ago, which was sent to Russia in 1917. Mr. Stevens has been serving in a supervisory capacity over the members of the Russian Railway Service Corps, composed of American engineers and railway men sent to Siberia to help rehabilitate the Russian railway system.

The Present Position of German Rolling-Stock

In almost every direction, says an article in a recent issue of Engineering (London), Germany finds herself in a most serious plight, and the shortage and disrepair of rolling-stock is not the least important factor. Before the war Germany had about 700,000 freight cars and 30,000 locomotives. The number of the latter, as of the former, has certainly been increased during the war, through seizures in Belgium and France; but on the other hand some 4,000 locomotives may be looked upon as at least temporarily unavailable, being at present stranded in often remote occupied territory. As far as a portion of these 4,000 engines is concerned, it is doubtful whether they will ever return. Some 8,000 locomotives are badly in need of repair. Thus the 5,000 locomotives which have to be handed over, according to the terms of the armistice, represent about one-fourth of those available, and efficient. Apart from this there is some doubt as to whether or not the locomotives of the Alsace-Lorraine State railways are included in the above 5,000 engines. The proportion of increase and decrease as regards freight cars may be taken to be about the same as with the locomotives. The question then remains to what extent German works will be able to make good the compulsory surrender of these 5,000 engines, for of the purchase of locomotives from abroad there can be no question at present. The capacity of the German locomotive factories is at the present moment, with some reserve, put at 2,500 large locomotives per annum. This estimate, of course, is subject to sufficient raw materials and other necessities being available as well as a sufficiency of skilled and trained and willing labor. If it really were possible satisfactorily to overcome these and other difficulties, and also in other ways to return to an ordered state of affairs, and entirely to ensure and rely upon the large left-Rhine production of raw materials for the whole reconstruction period, it would take the German railways two or three years to recover from the blow which their defeat has entailed. During this considerable period German industry would be entirely debarred from export of full-size locomotives and confined to narrow-gage engines, of which it can supply some 1,500 in the year. The position is made additionally difficult, because Germany has to deliver up efficient locomotives, so that those which remain include all those more or less unfit for use. The repair of these, in addition to that of the 8,000 locomotives referred to above, will be very difficult to effect, but as the State railways are compelled to exercise the greatest economy these repairs will probably first be proceeded with.

It is being suggested in Germany that firms which have not formerly gone in for the building of locomotives, of which the majority have been engaged in war work, might with advantage take up the manufacture of locomotives, as the Allgemeine Elektricitäts Gesellschaft already has done.

As regards the building of freight cars the capacity of the German works during the last few months of the war has been put at 50,000 per annum. In case all necessary raw materials which are nearly all produced within the country, be made available and the industry not be handicapped by other adverse circumstances, the above-mentioned capacity might perhaps be increased by 50 per cent. Even then it will take Germany three years to replenish her stock of freight cars. In view of the eight hours movement it is deemed likely that the cost per ton of locomotive and car weight for some considerable time to come will remain at something like the present high figures.

Equipment and Supplies

Locomotive Deliveries

A total of 43 new locomotives were shipped to railroads under federal control during the week ending December 28, as follows:

Works	Road	Number	Type	Individual engine No.
American	*Grand Trunk	9	USRA Mikado	471-9
	*Southern	12	USRA Santa Fe	5229-40
	C. & N. W.	2	Mikado	2477, 2480
	Penna. L. W.	3	USRA 6w. Sw.	8935-37
	S. A. L.	2	USRA 6w. Sw.	1094-5
	C. Ind. & L.	5	USRA Mikado	550-4
	Total	33		
Lima	N. Y. C.	5	USRA Mikado	5183-87
Baldwin	Phila. & R.	1	Mallet	1814
	A. T. & S. Fe	2	Mikado	3225-26
	Penna. R. R.	1	Mikado	2861
	Red River & G.	1	10w. Sw.	103
		5		
	Grand total	43		

*Four U. S. R. A. Mikados constructed for the Grand Trunk were shipped to Buffalo, and five U. S. R. A. Mikados, constructed for the Grand Trunk, were shipped to Cleveland, and four U. S. R. A. Santa Fe, constructed for the Southern, were shipped to Potomac Yards, Va., to be stored as parts of emergency pools.

Locomotives were shipped to railroads under federal control during the week ended January 4 as follows:

Works	Road	No.	Type
American	Oregon Short Line	5	USRA Mikado
	*Southern	9	USRA Santa Fe
	*C. & N. W.	4	USRA Mikado
	Union Pacific	6	USRA 6 W. Sw.
	Seaboard Air Line	2	USRA 6 W. Sw.
	Total	26	
Lima	N. Y. C.	4	USRA Mikado
Baldwin	C. B. & Q.	2	Mikado
	Illinois Central	1	Mikado
	Atlantic Coast Line	1	Mikado
	Lehigh Valley	1	Pacific
	B. & O.	7	USRA Mikado
	Penn. R. R.	1	Mikado
		13	
	Grand total	43	

*Nine U. S. R. A. Santa Fes constructed for the Southern, and three Mikados constructed for the Chicago & North Western were shipped to Potomac Yards, Va., to be stored as parts of an emergency pool.

Locomotive Deliveries in December

The following is a statement of the number of locomotives shipped to railroads under federal control during December:

Works	For week Dec. 1 to 7			For week Dec. 8 to 14			For week Dec. 15 to 21			For week Dec. 22 to 28			For period Dec. 29 to 31		
	Road	No.	Type	Road	No.	Type	Road	No.	Type	Road	No.	Type	Road	No.	Type
American	N.Y.C.	16	USRA Mik.	N.Y.C.	17	USRA Mik.	N.Y.C.	3	USRA Mik.	Gr. Trunk	9	USRA Mik.	Ore. S. L.	5	USRA Mik.
	C.&O.	2	USRA M'nt	Southern	9	USRA S. Fe	Southern	10	USRA S. Fe	Southern	12	USRA S. Fe	Southern	6	USRA S. Fe
	Southern	8	USRA S. Fe	Southern	3	USRA 8-w.S.	C.&N.W.	6	Mikado	C.&N.W.	2	Mikado	C.&N.W.	1	USRA Mik.
	Penn.L.W.	4	USRA 6-w.S.	C.&N.W.	8	Mikado	Gr.T'kW.	16	USRA Mik.	Penn.L.W.	3	USRA 6-w.S.	U.P.	2	USRA 060
	Southern	6	USRA 8-w.S.	T.ofSt.L.	4	USRA 6-w.S.	Penn.L.W.	4	USRA 6-w.S.	S.A.L.	2	USRA 6-w.S.	S.A.L.	2	USRA 060
	C.&N.W.	12	Mikado	P.L.W.	2	USRA 6-w.S.	S.A.L.	4	USRA 6-w.S.	C.Ind.&L.	5	Mikado			
	LongI.	2	8-w. Sw.	LongI.	2	8-w. Swch.	Southern	2	USRA 8-w.S.						
	T.ofSt.L.	2	USRA 6-w.S.	C.&O.	1	USRA M'nt	Penn.L.W.	1	Santa Fe						
							Rutland	1	USRA 8-w.S.						
		52			46			47			33			16	
Lima	N.Y.C.	6	USRA Mik.	N.Y.C.	7	USRA Mik.	N.Y.C.	7	USRA Mik.	N.Y.C.	5	USRA Mik.	N.Y.C.	2	USRA Mik.
Baldwin	C.B.&Q.	1	Mikado	C.G.W.	1	USRA Mik.	West.Pac.	1	USRA Mik.	Phil. & R.	1	Mallet	C.B.&Q.	1	Mikado
	C.G.W.	5	USRA Mik.	Southern	1	Mallet	Ill.Cent.	2	Mikado	A.T.&S.Fe	2	Mikado			
	Southern	1	Mallet	C.B.&Q.	1	Mikado	Penn.R.R.	2	Mikado	Penn.R.R.	1	Mikado			
	L.V.	1	Pacific	W.Pac.	4	USRA Mik.	C.B.&Q.	1	Mikado	Red.R.&G.	1	10-w. Sw.			
	A.T.&S.Fe	1	Mikado	Penn.R.R.	1	Mikado	A.T.&S.Fe	1	Mikado						
				A.T.&S.Fe	1	Mikado									
		9			9			7			5			1	
		67			62			61			43			19	

Grand total 252

In addition to the above the American Locomotive Company shipped 28 miscellaneous domestic locomotives, and completed 10 foreign locomotives; and the Baldwin Locomotive Works shipped 1 miscellaneous domestic and completed 167 foreign locomotives.

Cars Built in Railroad Shops

The Railroad Administration has issued the following statement of new cars constructed in railroad shops during the month ended November 30, 1918:

Class of Cars	Steel	Steel underframe	Steel center sills	Wood	Total
Passenger:					
Dining observation	...	2	...	...	2
Passenger coach	...	1	...	...	1
Passenger baggage	...	1	...	...	1
Baggage	...	1	...	1	2
Milk	...	...	...	1	1
Total passenger equipment	...	5	...	2	7
Freight:					
Stock	...	...	...	70	70
Hopper	...	...	...	133	133
Gondola	...	46	...	23	69
Flat	...	...	...	3	3
Coke rack	...	8	...	6	14
Work cars	...	3	...	...	3
Caboose	...	30	...	5	35
Box	255	20	...	126	401
Total freight equipment	255	107	...	366	728
Total passenger and freight	255	112	...	368	735

Freight Cars

The Ingersoll-Rand Company, Phillipsburg, N. J., is inquiring for one all steel side dump car.

The United States Navy Department, Washington, is inquiring for 4 all steel, 50-ton hopper cars, and 6 all metal push cars.

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., is in the market for 6 second-hand, 30 to 40-ton flat cars of good length.

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., is in the market for several second-hand, standard gage, hand operated, 30 or 40 ton capacity dump cars, with inverted V shape floor.

Machinery and Tools

The Chicago & Alton has issued an inquiry for machine tools, the list including among others the following:

One 16-in. Norton toolroom lathe.
One 16-in. by 8-ft. portable geared head lathe.
Two 24-in. heavy duty lathes.
Two 36-in. heavy duty lathes.
Two 18-in. heavy duty lathes.
One 18-in. crank slotter.
Two 60-in. vertical drilling machines.
One 5-in. forging machine.
Two 32-in. crank shapers.
One 100-in. heavy tire boring mill with two heads.
One 36-in. vertical boring and turning mill.
One 48-in. boring mill with two heads on cross-rail.
One 48 by 36-in. by 10-ft. planer.
One 42 by 36-in. by 16-ft. extra heavy frog and switch planer.
One electric traveling crane and other items.

The Chicago & North Western is expected to issue shortly an inquiry for machine tools.

Supply Trade News

Ensign Irving Burrows has been released from service in the navy and will reopen the San Francisco (Cal.) office of the Blaw-Knox Company within the next two weeks.

Edward D. Hillman, secretary and engineer of the National Railway Appliance Company for the past two years, resigned from that company January 1, and has accepted a position with the new Consolidated Steel Corporation, 165 Broadway, New York.

Joseph B. Weaver, vice-president and general manager of the Harlan & Hollingsworth Corporation, Wilmington, Del., has been appointed vice-president in charge of the manufacturing department of the Pullman Company with headquarters at Chicago.

Kenneth C. Gardner has been appointed assistant manager of sales for the Central district of the Pressed Steel Car Company, with headquarters at Pittsburgh, Pa., vice **Henry P. Hoffstot**, who has resigned to become president of the Koppel Industrial Car & Equipment Company.

A. A. Heller, treasurer and general manager of the International Oxygen Company, has given up his active managerial duties, and **Eugene Schoen** has been appointed general manager for the company. Mr. Hiller, as treasurer, continues in charge of the financial departments of the business.

To the list of specialties for standard cars and locomotives, published in the January 3 issue of the *Railway Age* on page 91, should be added the J-M Slip-Type expander ring for brake cylinders for all cars, locomotives and tenders. These rings are manufactured by the H. W. Johns-Manville Company, New York.

W. Jerry Stanton has resigned as sales manager of the Railway Improvement Company to become special representative of the National Railway Appliance Company, New York. Mr. Stanton was employed by the General Electric Company for a period covering 18 years in the testing, engineering and sales departments.

The Vanadium-Alloys Steel Company of Pittsburgh and Latrobe, Pa., maker of high speed and alloy tool steels, has leased commodious offices and warerooms at 566-568 West Randolph street, Chicago, where will be carried a large stock of "Red Cut Superior" high speed steel in all the standard sizes and shapes of bar stock, also treated bits for tool holders.

W. J. Austin, vice-president and general manager of the Austin Company, Cleveland, Ohio, sailed recently for a tour of France, Belgium, Italy and England. While the trip was undertaken primarily for the purpose of developing the export business of his company, Mr. Austin will study the reconstruction methods employed in those European countries with the expectation of collecting information which can be used to good advantage here. He will return about the middle of February.

Lieutenant T. W. Jenkins, U. S. N. R. F., has been appointed manager of railway sales of the American Rolling Mill Company, effective January 1. Previous to the entry of the United States into the European war, Mr. Jenkins was in charge of sales of castings and forgings for this company. When the war broke out he was given indefinite leave to reenter the navy, from which he had resigned in 1913. Lieutenant Jenkins served as an engineering officer on the navy transports throughout the war. Upon cessation of hostilities he was relieved from active duty to return to the commercial field.

The Guaranty Trust Company of New York announces that in line with its policy to help develop American trade overseas, and to extend the financial facilities whereby American bankers, importers, exporters, and manufacturers may transact direct business with foreign countries, it is about to send two more representatives abroad—one to the Scandinavian countries (Norway, Sweden and Denmark) and the other to Australasia (Australia and New Zealand). These representatives will be pleased to communicate with institutions and firms desiring to make new connections or to increase the business they already command in the above countries. Letters for business relating to Scandinavian countries should be addressed "attention of Mr. N. Falk," and for business relating to Australasia "attention of Captain Lionel Lehmaier."

W. C. Lincoln has been appointed engineer for the National Railway Appliance Company, New York, effective January 1. Mr. Lincoln was originally employed by the American Locomotive Company at Schenectady, leaving that company's service to enter Union University. After graduation and the completion of the General Electric Company's test course, he was assigned to special railway work by that company. Subsequently he took up and completed the engineering extension course, after which he was connected for some time with the consulting engineering department. Mr. Lincoln later entered the railway engineering department and in 1913 was transferred to the General Electric Company's Philadelphia district as commercial engineer, railway department, after which he entered the service of the Railway Improvement Company as electrical engineer.

Lloyd O. Stratton, who has been connected with the Oregon Short Line motor car department as a foreman at Pocatello, Idaho, has been appointed western manager for Mudge & Co. at San Francisco, Cal. Mr. Stratton was born at Guide Rock, Neb., on January 2, 1888, and was educated in the public and business schools at Grand Island, Neb. In August, 1911, he entered the service of the motor car department on the Union Pacific, with which road he remained until April, 1914, when he went to the Oregon Short Line as motor car foreman at Pocatello, Idaho. For the past seven years Mr. Stratton has been identified with the motor car industry and in connection with his recent appointment as western manager for Mudge & Co. he will have charge of the sales and service departments for that company in the Pacific states with office in the Crocker building, San Francisco, Cal.



L. O. Stratton

Capt. A. Fletcher Marsh of the Construction Division of the army has resumed his duties as secretary of the Marsh & Truman Lumber Company, Chicago. Captain Marsh received his commission almost simultaneously with the entrance of this country into the war and was employed to supervise lumber production and transportation in the interests of the army. During the first five months of his service he was stationed in the Atlantic states south of Washington, D. C., where he was employed on lumber production work. He was later transferred to New Orleans, La., and Birmingham, Ala., where he supervised the transportation of lumber to eastern points. Latterly he was located on the Pacific coast, where he engaged in similar work. Lieut. E. R. Ross of the artillery branch of the army, and Lieut. F. L. Bronez of the American flying forces, have also returned to their former positions with the Marsh & Truman Lumber Company. They are both members of the sales organization.

Charles H. Wilson, who has been in active military service in France as a lieutenant of engineers, has been honorably discharged from the army and has resumed his duties as representative of Fairbanks, Morse & Co. He was one of the survivors of the U. S. SS. "Lincoln," which was sunk by

the Boche submarine U-90, 400 miles off Brest, France, while on return trip to the United States. During his service with the American Expeditionary Forces Lieut. Wilson, who was a reserve officer prior to the entry of this country in the world war, was attached to the British tank corps as mechanical officer and was later with the U. S. tank corps. On his return he was assigned for duty in the organization of tank corps units here, afterwards being on duty with engineer replacement troops. Prior to his entry into military service Mr. Wilson was located in Houston, Texas, as southwestern representative for Fairbanks, Morse & Co., with which company he has been associated for 14 years. He will now make his headquarters at the St. Louis office.

The Klaxon Company, manufacturer of the Klaxon horn, announces its entry into the railway intercommunication field. It has taken over the Stentor Electric Manufacturing Company, maker of loud speaking railway telephones, and in the future will manufacture and distribute the Stentor products through its industrial division with office in New York City. During the war all of the intercommunication apparatus manufactured by this company was required by the United States Government. To meet navy requirements for dependable means of communication under severe noise conditions, this company developed a transmitter and a receiver that have given satisfactory service even under gunfire. The Klaxon-Stentor loud speaking railway telephones are equipped with these improved transmitters and receivers. They transmit messages in so loud and clear a tone that they can be heard at a distance from the instrument. The railway train despatcher who has one on his desk need not wear a head receiver. The Klaxon Company is extending its laboratory facilities for experimental and research work and has already put to work several engineers of wide experience in this field. It has engaged the services of one of the foremost authorities on telephony and sound reproduction in the United States and the inventor of the Stentor loud speaking telephones will devote all his time to development work on intercommunication apparatus. The Stentor apparatus was described in the *Railway Age Gazette* of July 31, 1914, page 214.

Trade Publications

Pneumatic Hammer.—A six-page folder describing in detail the construction and operation of the Barr pneumatic high speed hammer has been published by H. Edsill Barr, engineers, Erie, Pa.

Turret Lathes.—The Gisholt Machine Company, Madison, Wis., has issued a 102-page catalogue, TLC-1, describing Gisholt turret lathes. It was the purpose in preparing this catalogue to show particularly what kinds of work these lathes will do. It contains over 100 illustrations, including a number of close-up views of the lathes actually at work, followed by 22 pages of line drawings showing parts which are successfully finished on Gisholt lathes; the time for finishing these parts is given under each drawing. A general description of the machine is also given, together with specifications and dimensions, and the last part of the book is devoted to standard tools for the lathes, boring bars, reamers, tool holders and chucks. The turret on carriage and gap lathes, as well as the motor driven lathes, are illustrated and described.

Car Heating Devices.—The Gold Car Heating & Lighting Company, New York, has issued circulars describing the construction and operation of car heating apparatus which the company has recently developed. These are a vapor valve, No. 1112, designed for application on the inside of the car; packless end valve No. 1126, with automatic drip in the valve itself; packless quick opening single and twin supply valves, Nos. 1140 and 1145, respectively, which open and close on a quarter turn; and pop valve No. 1137, a train line safety valve designed to prevent the blowing off of the steam hose in case of excess pressure, and also successfully used as a safety valve for hot water circulating systems. Circulars have also been issued describing other Gold devices, including a combination gasket tool No. 1077, for use in applying and removing coupler gaskets; a pressure regulator with a large steam capacity for long passenger trains, No. 1014; steam hose coupler No. 804-S, with oscillating gasket; and steam hose coupler gasket G-4, for use in steam hose couplers using non-oscillating gaskets.

Railway Officers

Railroad Administration

Central

Charles B. Eddy, heretofore assistant general counsel to the United States Railroad Administration, has been appointed associate director of the Division of Finance.

Theodore H. Price, who resigned on January 1 as actuary of the Railroad Administration to return to his business in New York, has decided to retain his position with the Railroad Administration, but will devote less of his time to that work.

In the chart of the organization of the Railroad Administration published as a supplement with the issue of December 20, **J. A. Middleton** was erroneously included as manager inland traffic, oil division of the Fuel Administration. **O. M. Conley** succeeded Mr. Middleton in this office on October 1.

T. C. Powell, formerly vice-president of the Queen & Crescent and traffic vice-president of the Southern Railway, and, during the past year, manager of inland traffic, representing the Railroad Administration on the War Industries Board, has been appointed director of the Division of Capital Expenditures, succeeding **Judge R. S. Lovett.** Mr. Powell was also a member of the priorities committee of the War Industries Board.

Federal and General Managers

The Gulf, Texas & Western has been added to the jurisdiction of **J. L. Lancaster,** federal manager, with headquarters at Dallas, Tex., effective January 10.

The Missouri, Oklahoma & Gulf has been placed under federal control and has been added to the jurisdiction of **L. Kramer,** federal manager, St. Louis, Mo.

S. G. Strickland, federal manager of the Chicago & North Western, with headquarters at Chicago, has had his jurisdiction extended to include the Sioux City Terminal Railroad.

E. E. Calvin, federal manager of the Union Pacific, the Oregon Short Line and the Los Angeles & Salt Lake has had his jurisdiction extended over the Gilmore & Pittsburg, with headquarters at Omaha, Neb.

Operating

J. M. Ward has been appointed agent and superintendent of the Lawrenceville Branch Railroad, at Lawrenceville, Ga., vice **W. H. Cheney,** assigned to other service.

C. H. Dyson has been appointed fuel agent of the Baltimore & Ohio—Western Lines; the Dayton & Union Railroad, and the Dayton Union Railroad, with headquarters at Cincinnati, O.

C. T. Mason, assistant superintendent of the St. Louis-San Francisco, at Springfield, Mo., has been appointed assistant superintendent of the Willow Springs and Memphis sub-divisions of the Ozark division, with headquarters at Thayer, Mo., vice **T. F. Gaines,** assigned to other duties.

H. A. Shepard, assistant superintendent of telegraph on the New York, New Haven & Hartford, at New Haven, Conn., has been appointed superintendent of telegraph of that road, the Central New England, the Wood River Branch Railroad, the New York Connecting Railroad, the Narragansett Pier Railroad and the Union Freight Railroad, vice **N. E. Smith,** deceased.

W. E. Brooks, general superintendent on the Missouri Pacific with headquarters at St. Louis, Mo., has been transferred to the Southern district of that road and the Memphis, Dallas & Gulf, with headquarters at Little Rock, Ark., succeeding **J. W. Dean,** deceased. **J. A. Somerville** has resigned as assistant manager of the Car Service Section at Washington and has returned to his former position as general

superintendent of transportation on the Missouri Pacific, the Memphis, Dallas & Gulf, the Arkansas Central, the Natchez & Southern and the Natchez & Louisiana, with headquarters at St. Louis, Mo., succeeding **J. Cannon**, who resumes his former position as general superintendent of the Eastern district of the Missouri Pacific, with headquarters at St. Louis, effective January 11.

Traffic

The Southern Freight Traffic Committee, Atlanta, Ga., announces the appointment of **F. L. Speiden** as agent of the Louisville Traffic Bureau, effective January 8, succeeding **M. P. Washburn**, deceased.

J. H. Lyman, freight service agent of the Chicago Great Western at St. Joseph, Mo., has been appointed general agent, freight department, with headquarters at Minneapolis, Minn., succeeding **R. W. Goodell**, who resigned to engage in another business. **F. H. Byers**, general agent at Leavenworth, Kan., has been appointed freight service agent at St. Joseph, Mo., to succeed Mr. Lyman, effective January 1.

Engineering and Rolling Stock

S. E. Shoup, assistant engineer of the Kansas City Southern, at Kansas City, Mo., has been appointed engineering assistant to the general manager.

J. C. Hill has been appointed division engineer of the St. Louis district of the Missouri, Kansas & Texas, with headquarters at Sedalia, Mo., succeeding **B. E. Wilber**, resigned.

J. B. Lamb, supervisor of the signal department on the Southern Railroad, at Washington, D. C., has been appointed signal and electrical engineer of the Southern Railroad Lines East, with headquarters at Charlotte, N. C., succeeding **W. J. Eck**, promoted.

George W. Ditmore, division car foreman of the Delaware & Hudson, at Carbondale, Pa., has been appointed master car builder of that road, the Greenwich & Johnsonville, the Wilkesbarre Connecting Railroad and the Schoharie Valley Railroad, with headquarters at Colonie, N. Y. The position of assistant master car builder has been abolished.

Clark Dillenbeck, who has been appointed assistant chief engineer of the Philadelphia & Reading, the Central of New Jersey, the New York & Long Branch, the Atlantic City Railroad and the Port Reading Railroad, with headquarters at Philadelphia, Pa., as has already been announced in these columns, was born on June 24, 1866, at Palatine Bridge, N. Y. He was educated in the public schools, later graduating from Canajoharie Academy and in 1888 he graduated as a civil engineer from Cornell University. Mr. Dillenbeck began railway work in May, 1890, as an assistant engineer on the Philadelphia & Reading, and has since served continuously with that road. In January, 1914, he was appointed engineer of bridges and buildings, and now becomes assistant chief engineer of the roads mentioned above.



C. Dillenbeck

F. E. King, district carpenter on the Northern division of the Chicago, Milwaukee & St. Paul, with headquarters at Minneapolis, Minn., has been transferred to Chicago, succeeding **A. Yappen**, promoted as noted in last week's issue. The authority of **F. E. Rice**, who has also been serving as district carpenter at Minneapolis, will be extended to cover the territory recently under the direction of Mr. King.

Purchasing

N. C. Foss, purchasing agent of the Ann Arbor, has been appointed assistant purchasing agent of that road, the Pere Marquette, the Detroit & Toledo Shore Line, the Grand Trunk Western Lines, the Detroit & Mackinac, the Detroit, Bay City & Western, the Port Huron Southern, the Port Huron & Detroit, the Fort Street (Detroit) Union Depot Railroad, and the Lake Michigan Car Ferry Association. He will assist in the purchasing of coal, materials and supplies, and will have headquarters at Detroit, Mich. **M. M. Drake** has been appointed assistant purchasing agent of the above roads, in charge of stores, with office at Battle Creek, Mich.

Corporate

Executive, Financial, Legal and Accounting

Carl R. Gray, whose resignation as director of the Division of Operation of the United States Railroad Administration became effective on January 15, has been re-elected to the railway positions from which he resigned upon assuming his duties at Washington. These include the presidency and chairmanship of the board of the Western Maryland Railway Company and the chairmanship of the Wheeling & Lake Erie. Mr. Gray was also re-elected a director of both of these companies.

A. J. Earling, chairman of the board of directors of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has retired on account of ill health. His resignation took effect on November 1, when **R. M. Calkins** was elected president and took over his duties, but no public announcement of the fact was made until January 10. Mr. Earling is 71 years of age and has spent 52 years, his entire railroad career, with the St. Paul. During the 18 years which ended in September, 1917, Mr. Earling was president of the St. Paul and since that time has been chairman of the board. During his tenure of office as president the mileage of the road increased from 6,337 to 10,510. The road was likewise transformed from a midwestern to a trans-continental line through the construction of the Puget Sound extension. The electrification of a large portion of the trans-mountain section of this line constituted a daring venture in railroad construction. A photograph and an extended account of Mr. Earling's railway career were published in the *Railway Age Gazette* of September 21, 1917.

Obituary

William Riley, formerly general roadmaster on the Chicago & Alton, the Chicago, Indiana & Southern and the Indiana Harbor Belt, died at Chicago on January 10, at the age of 71.

Henry C. Kline, division passenger agent of the Wabash at Chicago, died at his home in that city on January 11, following an illness of two months with influenza. Mr. Kline was 62 years of age and had been connected with the Wabash for 35 years.

John Atlee, division engineer of the Pennsylvania Railroad, with headquarters at West Philadelphia, Pa., fell from the platform of a train at the West Philadelphia Station and was instantly killed, on January 9. Mr. Atlee had been in the service of the Pennsylvania Railroad for 16 years and was 45 years old at the time of his death.

W. H. Higgins, signal engineer of the Central of New Jersey since 1901, with headquarters at Elizabeth, N. J., died on January 15 at his home in Jersey City, N. J., at the age of 61. Mr. Higgins began railway work when about 17 years old with the Pennsylvania Railroad in the telegraph department. He subsequently had charge of the electric lighting and interlocking on that road at Jersey City. In 1901 he went to the Central of New Jersey as signal engineer, which position he held at the time of his death. Mr. Higgins superintended the construction of block signals on practically the whole of the important passenger lines of the Central of New Jersey.

EDITORIAL

Railway Age

Advances to Railroads versus Slow Pay

From time to time the Railroad Administration has made announcement of the "advances" which it has made to the railroad companies. Many of these so-called advances are simply due or overdue rental. The Administration has the excuse that the contracts between the railroad companies and the government have not, except in a comparatively few instances, been signed. But the government has used the railroads for over a year. They are the property of private corporations and justice demands that compensation be paid the owners currently for the use of their property. If the government were promptly to pay a rental of 90 per cent of the minimum amount that would be due under its own interpretation of the prospective contract wih each road in accordance with the provisions of the railroad control act, it would be beyond peradventure on the safe side and the corporations would be in possession of a reasonable part of the money which is due them. The corporations could then in turn meet their obligations. As it is now the Wabash is holding up the payment of the dividend on its prior preferred "A" stock, and the Chicago, Milwaukee & St. Paul is deferring the dividend on both its preferred and common. If the so-called "advances" which the Administration talks about were fully analyzed, it would be found that in a great number of cases the Administration is far behind in its payments to the roads. This situation is analogous to that previously mentioned in these columns which is created by the fact that federal managers are not allowed sufficient sums to pay debts due for railroad supplies. It is all thoroughly bad business and works injustice to the supply companies that are creditors of the government and to the holders of securities of the companies.

Rate Discrimination and the Administration

In the Pacific Lumber case, reported elsewhere in this issue, the director general, through his counsel, at first contended that the Interstate Commerce Commission did not have jurisdiction under the federal control act to pass upon alleged discrimination in rates. By successive steps counsel for the Railroad Administration, however, retired from this position and the Interstate Commerce Commission in its decision squarely rules against this earlier contention of the Railroad Administration. The commission apparently holds that whether the advance in rates alone may be considered as the rate initiated by the director general, or the entire rate including the rate advanced as well as the advance on this rate should be considered as the rate initiated by the director general, the commission still has the power to declare a rate unjust and unreasonable. It is a rather interesting point that the commission brings up as to whether the whole rate or the advance only is the rate initiated by the Railroad Administration. In this particular case the commission did not attempt to decide the question, but it might conceivably enter into other cases which the commission will be called upon to decide during the period of federal control. It is rather amusing to see the evident joy which the commission takes in brushing aside the contention of counsel for the Railroad Administration that war conditions might justify rates which would otherwise be unreasonable. This plea was quite possibly entered before the signing of the armistice, but the decision of the commission was arrived at since that time, and there is quite evident a note of relief on the commission's part that such an argument is no longer valid. Notwithstanding this attitude, however, the commission in the Pacific Lumber case stands squarely on its right to reduce rates on roads under federal control when such rates are unjust because discriminatory.

Driving Brains Out of the Railroad Business

The end of the war and of the responsibilities carried with it have enabled railroad officers, heretofore bound to their duties by patriotic considerations, to think of their own interests. The recent resignation of A. W. Thompson, federal manager of the Baltimore & Ohio, Eastern Lines, illustrates which way the wind is blowing. Mr. Thompson, who is not yet 44 years of age, has been regarded as one of the ablest and most promising of the younger generation of railroad executives. Despite the fact that the railways constitute one of the most important instrumentalities of our economic fabric, and as such should be able to retain their best talent, Mr. Thompson evidently deemed his future in the steam transportation field too uncertain to warrant his remaining in it when a good opportunity in another business presented itself. As president of the Philadelphia Company, a corporation operating several public utilities and industrial properties in the Pittsburgh district, he will no longer have to fear the uncertainties presented by the present situation of the railways or the restrictions upon initiative and ambition imposed by government operation. Mr. Thompson is not alone in leaving the railways for industries which offer more stable conditions and the certainty of compensation more commensurate with ability and energy. For example, C. B. Seger, president of the Union Pacific system, has recently resigned to go to the United States Rubber Company, and D. W. Cooke, vice-president of the Erie, has gone with the Cunard Steamship Company. Other men it is important to keep on the railways are likely to follow their example unless the policy of experimentation with government operation, inaugurated during the war, is abandoned and the railroads are returned to their owners on a basis which will permit their successful operation. Although the Railroad Administration shows a large deficit for the first year of its activities, much has been said of the improvements that have been introduced through unification. On the other hand, too little has been said of the advantages the Railroad Administration has derived from the loyal service of railway officers who have been developed and trained under private management. While the railways can well afford to dispense with some duplications of facilities and service, they can lose their skilled and experienced officers only at a tremendous cost. It is obvious to any one familiar with existing conditions that the railway problem of this country must be settled, and settled soon, if the exodus of brains from the industry is not to assume dangerous proportions.

The Foreign Trade Convention

As briefly mentioned in last week's issue, announcement has been made that the Sixth National Foreign Trade Convention will be held at the Congress Hotel, Chicago, April 24, 25 and 26. The railway supply field has always been well represented at the Foreign Trade Conventions and it is not unreasonable to suppose that with the new interest in foreign trade that is being manifested by the industry and in view of the holding of the meeting in one of the big centers of the supply field—namely Chicago—there will be even a much greater attendance of supply men this year than usual. With these facts in mind, the *Railway Age* feels sure that it would not be out of order to suggest that the American business man's interest in the railways of other lands has now become great enough to permit of the holding of a special group session of the convention, devoted entirely to the export of railway supplies. Such a group session could cover a number of important and timely topics; including, for example, the present trend of railway development in foreign lands; the desirability of the investment of American capital in the railroads of South America, China, etc.; the prospects for trade in railway supplies in various countries the world over; and, by all means, a discussion of the practical difficulties to be surmounted and consideration of the best steps to follow to build up a lasting trade in railway supplies —including not only cars, locomotives, rails, etc., but also specialties and accessories. In view of the large number of railway supply men in Chicago and the interest in this subject manifested by the railway supply men in New York and other cities, a good attendance at such a group session would apparently be guaranteed. The question itself is so broad that it would seem to fit in with the broad ideas that characterize the conventions. The speakers should be readily obtainable and that such a group session would prove of lasting value seems beyond doubt. The secretary of the National Foreign Trade Council, O. K. Davis, 1 India Square, New York, has asked for suggestions. We feel sure that if a sufficient interest in the plan were shown by the many railway supply men who are in the habit of attending the Foreign Trade Conventions, it could easily be brought about.

Save Fuel by Supervising Coaling Stations

THE POSSIBILITIES for saving fuel through careful supervision of coaling stations have in the past received but little consideration. The importance of this matter was strikingly brought out at a recent meeting of the Western Railway Club by J. G. Crawford, who presented data to show that if the plants were improperly operated as much as six per cent of the fuel might be wasted. To secure the best grade of fuel for locomotive service, as delivered on the tender, the coal loaded at the mine must be checked to insure that the lump and screenings are well mixed, the metal bottoms of the coal pockets must be kept bright and each pocket must be completely emptied every few days. If these precautions are observed each engine will receive a fairly uniform grade of well cracked mine run coal. On the other hand, if the chute pockets are not cleaned thoroughly and systematically, the metal bottoms will become rusty, and coal will accumulate with the result that some engines will receive egg coal, others cracked mine run and still others screenings.

The fuel performance under the latter conditions will not be as good as if the engine had received a uniform grade of mine run coal. Tests conducted at the University of Illinois show that two-inch lump coal is 98 per cent as efficient as mine run and that two-inch screenings are 90 per cent as efficient as mine run. It would make no difference whether the two-inch lump and two-inch screenings were obtained by screening mine run at the mine or whether they resulted through separation of mine run at the coaling station. Therefore under the first assumed condition the efficiency of the coaling station would be 100 per cent and under the second condition, assuming that the engines received one-half the time two-inch lump and the other half two-inch screenings, the efficiency would be only 94 per cent, or the average of 98 and 90 per cent.

The amount to be saved by closer supervision of coaling stations will not average six per cent, but nevertheless, on most roads, it will be found to be a very appreciable item. There are other conditions that make it advisable to give close attention to the coaling plants. There will be more delays to trains and more engine failures if some locomotives receive all lump coal and others all screenings, than if each engine receives a uniform grade. Furthermore, the gradual oxidation of accumulations of fine coal which have remained in the chutes undisturbed for some time may cause fires due to spontaneous combustion.

Government Operation Kills Private Initiative

IN HIS PROCLAMATION of December 26, in which he announced his decision to take over the railroads, President Wilson stated that "investors in railway securities may rest assured that their rights and interests will be as scrupulously looked after by the government as they could be by directors of the several railway systems." When he appeared before Congress on January 4 he stated further that "nothing will be altered or disturbed which it is not necessary to disturb. We are serving the public interest and safeguarding the public safety, but we are also regardful of the interest of those by whom these great properties are owned."

The public and the owners of the railways took these statements at their face value. The President stated that he took the roads over solely as a war measure but many measures have been introduced which have borne no relation to the winning of the war and which have been promoted solely to demonstrate certain theories of railway operation held by those in control. Although the war has now been won and the purpose for which the roads have been taken over has been accomplished, new measures continue to be introduced, many of which are in evident conflict with the pledge of the President to protect the interests of the owners of the individual property. As an illustration, one road has made extensive investments in a timber treating plant to insure a supply of treated ties for its lines. Following the inauguration of government control, a large part of the output of this plant has been diverted to other lines, while the owning road has been forced to return largely to the use of untreated ties. Another road found the tie supply failing along its lines several years ago and after extended search developed a new source of supply remote from its then-existing lines. To protect itself it made a long-term contract with a large producer working in this region, built a treating plant located with reference to this source of supply and perfected an elaborate program. This road has recently been notified of the cancellation of its contract by the Central Purchasing Committee and has been advised that the ties produced in this region will be diverted to other roads. No attempt is made to deny the fact that the original road needs the ties, but the statement is made that other lines need them worse. When it is considered that the tremendous decrease

in tie production during the past year has been brought about largely by the ill-advised actions of the Central Purchasing Committee in its attempt to "reform" the tie producing industry and not entirely by the conditions inherent in the national situation, it is difficult to see how such steps are "regardful of the interest of those by whom these great properties are owned."

One of the features which has characterized the successful roads under private operation has been the courage and far-sightedness displayed in making large investments leading to ultimate economies. Having taken the risks incident to these investments, these roads are now denied the advantages accruing from them and are required to share these advantages with other roads which have incurred none of these risks. The only possible result of the continuance of such a policy will be to force the progressive roads to forego such productive improvements and to lower them to the level of the average. The suppression of initiative has been found to be a universal result of government ownership of public utilities elsewhere, and it is rapidly becoming evident in this country.

The Employment of the Expert

THE HIGHER THE RATE of compensation for any given class of employees, the greater the incentive to curtail their employment. Thus with laborers paid double what they formerly received there is a greater demand for labor saving devices. Likewise the award of appreciable advances to supervisory and technical forces on the railroads naturally leads to speculation on the opportunities for curtailing the employment of these higher grade men. To be sure, there will be no tendency toward a return to the old days of railroading when the only supervision considered really necessary was that given by the "old man" himself who also assumed that he had a more intimate knowledge of the technical details of all branches of railway operation than any one else in the organization. There is little question that supervision on the roads should be increased rather than curtailed, and it is common knowledge that the employment of technical assistance on railroads is not nearly as extensive as in most industrial undertakings.

In the case of technical help, however, there is one legitimate means of reducing the size of the staff, namely the employment of the outside consulting expert at such times and for such periods as his services may be required for some special project. This suggestion may be applied to any one of a half a dozen or more different types of special railway employment. Of all classes of special experts employed by the railways the architect is probably the commonest and most frequently considered.

Few large passenger stations are developed without the aid of outside architects. On the other hand, even the smallest roads are organized to design the small roadway and station structures. Briefly, success in the large projects implies a happy combination of skill and imagination in architectural design with an intimate knowledge of the physical operating requirements of the railroad structure. Unless the architect in private practice specializes in railroad work or carries on a sufficient amount of it to become thoroughly conversant with railroad requirements, his designs will require too extensive revision by the railway officers to be entirely successful from either the utilitarian or the aesthetic standpoints. On the other hand, the small railroad can scarcely afford to employ an architect on its staff who has sufficient breadth of vision to handle the larger work. Even if the road should be able to pay an adequate salary to attract the man of ability, the paucity of the larger problems would have a tendency either to drive him to other employment or to cramp his ability to cope with the occasional large project. Such a man would suffer a handicap also through the application of the old adage "familiarity breeds contempt." Being occupied most of the time with minor matters, his superiors will not accord him the necessary independence of action in preparing his designs and will be too inclined to drive rough shod through his plans, ordering changes here and there which may ruin the motif of his architectural treatment entirely.

However, while it is clear that most railroads will find it more profitable to retain the architect in private practice for the more important projects, it is necessary that the nucleus of the building design staff be maintained to conduct the current building work. It would be impracticable to carry on work of this nature with the aid of a firm of outside architects. Familiarity with general policy and intimate knowledge of the property and its needs are matters which enter largely in the preparation of designs for new structures or for remodeling old ones as well as in the successful superintendence of work while in progress. Furthermore, the architect must be in close contact with the maintenance forces in order that he may study the practical working out of the various building standards and be in a position to revise them intelligently with a knowledge of their actual performance.

The problem, therefore, seems to resolve itself into the retention of a staff to conduct the current work, while calling in outside assistance whenever the unusual or monumental structure is to be considered. The conditions on some roads may justify the arrangement for doing a larger part of the work by outside individuals than on others. Whatever the solution of the problem, one principle is established—there is no economy in eliminating the expert when his services are really required. Be he architect, hydraulic engineer or coal dock expert, if he is not employed on salary he must be retained on a fee.

Will Another Advance in Rates Be Necessary?

MR. MCADOO is no longer director general of railways. The effect of the things he said and did while he was director general will, however, long be felt by those who have succeeded to the responsibilities he has left and by the public. It is necessary that one of the last important things he said shall at this time be subjected to sharp scrutiny. Otherwise, the public may be seriously misled and other persons may be held responsible for the results of some very far-reaching things he did.

Testifying before the Senate Committee on Interstate Commerce, Mr. McAdoo expressed the opinion that if government operation were continued the railways, with the present freight and passenger rates, could earn a surplus over the return guaranteed to the companies of $100,000,000 in 1919. He even indicated it should be possible to effect economies during the present year which would render it feasible and desirable to make some reduction in freight rates.

Early this week, however, it was implied in newspaper despatches from Washington that further advances of rates probably will be necessary if the government is to avoid incurring a railway deficit in 1919 even larger than that of 1918. Study of the statistics of railway earnings and expenses for the four months, August to November, inclusive, and consideration of some important new influences which are working, will demonstrate that the fear that either rates must be again advanced, or the taxpayers of the United States must pay a large railway deficit for the year 1919, is only too well founded.

The increase in total railway earnings in the four months August to November, inclusive, as compared with the same months of 1917, was $457,000,000. This was almost wholly due to advances in rates. The increase in operating expenses in the same months was $465,000,000. In consequence, in spite of the advances in rates, net earnings in these months were almost $8,000,000 less than in the corresponding months of 1917. The way in which earnings and operating income declined during this period was very ominous. In August net earnings were $144,000,000; in September, $117,500,000; in October, $106,000,000; and in November only $76,000,000. Operating income is what is left of net earnings after the deduction of taxes and uncollectible revenues. In August operating income was $128,000,000; in September, $101,400,000; in October, $89,500,000; and in November only $57,000,000. It requires over $80,000,000 a month to pay the returns guaranteed to the companies; in November, the last month for which statistics are available, operating income was $23,000,000 less than this amount.

Since the armistice was signed and the war activities of the government have been in process of reduction, a rapid decline of both freight and passenger traffic, and therefore of gross earnings, has been occurring. In consequence, the figures for December may make a worse showing than those for November. It is true that large retroactive advances in wages were charged into the accounts in the months mentioned. But it must also be remembered that in October, November and December there was very little snow and cold weather, which was extremely favorable to economical operation. Furthermore, all the advances in wages granted in 1918 are not reflected in the statistics yet, and large advances in wages are still to be made to the train service employees, which will affect both the expenses and net earnings in 1919.

The facts are, then, that when Mr. McAdoo retired the expenses of the railways already had increased so much more in proportion than their earnings that they were not making enough to pay the guarantees to the companies; that traffic, and, in consequence, gross earnings were rapidly declining; and that owing to things he had done, and which cannot now be undone, the ratio of expenses to earnings was still sharply rising. Theoretically, it should be possible to effect large economies either by reductions of wages or by increases of operating efficiency. Nobody believes, however, that wages will be reduced. They are still being increased. It ought to be practicable to effect economies by increasing the efficiency of labor, which, in many branches of the service, has declined almost beyond computation, and is now at a low ebb. This is especially the case in the mechanical department, the inefficiency in which is reflected in a startling manner in the enormous increases in expenditures for maintenance of equipment. It seems very doubtful, however, whether the efficiency of labor will or can be substantially increased under government operation.

It would appear, therefore, that the only practicable alternatives, if government operation is to be continued, are to advance rates or to impose a railway deficit of $250,000,000 or more on the taxpaying public this year. Undoubtedly economies in operation would be effected if the railways were returned to operation by the companies, but nobody knows how soon these economies could be made or how large they would be, and therefore to return the railways to private operation without giving some kind of government guarantees of net income, temporary or permanent, or first making a substantial advance of rates, would be ruinous to many companies and would subject the country to the perils of a great panic.

Mr. McAdoo has left to those who are now operating the railways, to the railway companies and to the public a heritage of problems and dangers of the most serious kind.

Letters to the Editor

Locomotive Fuel Consumption

WASHINGTON, D. C.

TO THE EDITOR:

May I call your attention to a typographical error in the article from my pen which you published in your Annual Review number of January 3, 1919, page 29, by means of which I was made to say that railway locomotives during 1918 consumed some 650,000,000 tons of coal. By some process known only to your compositor my statement that consumption of fuel had been 165,000,000 was metamorphosed into 650,000,000 tons. JULIUS H. PARMELEE.

To Prevent Rear Collisions

CHICAGO.

TO THE EDITOR:

The two rear collisions to passenger trains that resulted in numerous fatalities which occurred recently prompts me to suggest a simple safeguard which would tend to render such accidents avoidable. All operating officers know how difficult it is to have the flagging rules strictly observed and that rear collisions in many instances are primarily due to a violation of these important rules.

If a rear platform lamp, equipped with a 100 to 150-watt electric light, and having a radial lens of 60 deg. to 90 deg. radius were provided for the rear end of every passenger train, protection would be afforded which is now lacking.

The "tail lights" used on most roads are inferior and not of sufficient size to be seen for any distance. On curves the rear lights are scarcely visible for a distance of more than a few hundred feet. The red light suggested would be visible on tangents for miles, and on curves a distance sufficient to enable a following train to be stopped before a serious accident resulted. My own experience has demonstrated the utility of such a simple protection and with only reasonable flagging protection such a device would make the disastrous rear collisions rare.

L. C. FRITCH.

Shipper Wants Better Treatment

CHICAGO.

TO THE EDITOR:

Now that the railroads have had their rates raised substantially, demurrage and switching rates have been raised, freight accounts placed on a strictly C. O. D. basis and many other conditions have been enforced that are favorable to the carriers, it is unfortunate that railways cannot, or will not, pay their own bills promptly.

Generally speaking, lines that formerly discounted, are taking extensive overtime on material accounts now, while lines that were slow under former management are now dreadfully delinquent. Little attempt on most lines is made to comply with terms of sale, though patrons are absolutely required to respect the new arrangement as respecting the payment of freight accounts. Then, too, little or no improvement has been noticed in the handling of freight claims; there is still the same old fencing, delays, needless correspondence, and none of the roads that we have encountered will pay interest on delayed claims as the director general recently ordered, unless forced to do so by the claimant, in accordance with Mr. McAdoo's order.

The public has stood very patiently for many changes, new procedure, etc., in the transportation field, but now feels that the time has arrived to show the public more consideration, as it is the good old public that, in the end, pays the bills.

A SHIPPER.

Wage Awards and Signal Department

ALTOONA, PA.

TO THE EDITOR:

Among the many irregularities brought about by the United States Railroad Administration's wage adjustment, perhaps none has wrought more injustice than that affecting the signal foremen. Signal department employees from the maintainers to the signal engineer have always been an underpaid class, considering the responsibilities resting upon them; but never before was there a time when the subordinate forces were rated higher than their immediate superiors. This, however, is one of the many inequalities that is being allowed to exist at the present time.

The gross injustice to the signal foremen, of the application of General Order No. 27 with its subsequent supplements, was evident soon after they became effective. In attempting to have the matter corrected, supervisors of signals, division engineers, superintendents, general superintendents, general managers, regional directors, wage boards and even the director-general were appealed to, but so far without any apparent result. At the present time signal foremen on one of the large roads in the Allegheny region are classed under Supplement No. 8 to General Order No. 27 and are paid a monthly salary (provided they work every day) of $140.45. A signal maintainer, rated at 68 cents an hour, under Supplement 4 will receive $182.24 for the month of January, 1919. A section maintainer also paid under Supplement No. 4 working in a minor supervisory capacity, with a five-cent differential over the maintainer though subordinate to the signal foreman, would receive $13.20 more than the maintainer, or a total of $195.44; making a monthly difference between the monthly earnings of the foreman and the section maintainer of $54.99, *in favor of the section maintainer.* This shows the absurdity of the rates when applied to the three positions mentioned and when each person filling the position is employed the net specified number of working days in the month.

When called to work on Sundays and holidays, or for the ninth and tenth hours of the regular working day, the inconsistencies to which the signal foreman and his assistant are subjected is demonstrated by the following:

Signal foreman receives	$0.688 per hour
Assistant foreman receives	0.641 per hour
Section maintainer receives	1.095 per hour
Maintainer receives	1.02 per hour

No person familiar with signal department work would say that the established rates of the maintainers or the section maintainers are excessive in the least, and any attempt to reduce such rates would be nothing short of a miserable travesty on justice, but how long will the Railroad Administration be able to hold signal department organizations together under such conditions? Many experienced men have already left their positions to take up other work. Others have forfeited their foremanships and taken places in the ranks, while others, conscious of their patriotic duty and willing to stand by the government in a crisis, have labored on in the hope that some of the many promises would eventually be fulfilled.

There has been much speculation as to what an adequate increase for the signal foremen should be, but, treating the matter from the standpoint of justice, there should be no difficulty in arriving at a satisfactory conclusion. The recent increase granted the foremen in the locomotive and car departments was based on what their highest paid craftsmen would receive when working a full month, and was made sufficient to take care of any emergencies that may arise. If a foreman in the locomotive and car department, supervising men rated at 68 cents an hour is paid a flat monthly rate amounting to so much more than his craftsmen, why should not the signal foreman who is supervising crafts rated the same as those in shop work, receive an increase equivalent to that of the shop foreman with a fair percentage allowance made for the number of men over whom he has supervision?

A signal foreman stands to lose approximately $1,000 simply because he happens to have sufficient ability to have been advanced above his fellows. If such injustice is to continue, the only thing remaining for the signal foremen is to petition the Railroad Administration for a place in the ranks and if this were permitted, it would be very difficult to fill the foremen's positions, because years of experience are necessary to develop a signal foreman; and as already stated, the existing rate would not justify the subordinate forces in making the change.

CHAS. L. SANDRUS.

Speaking of Resignations

ST. LOUIS, MO.

TO THE EDITOR:

Your editorial entitled "Speaking of Resignations," in the issue of November 29, reminds me that the ancient Greeks and Romans, when they got the characters in a play in such a fix that they could not be extricated by mortal hands, had a "Deus ex Machina" or a sort of God, let down on the stage in a cage, who straightened them out. If you can find a "Deus ex Machina" for the railroads he could be more useful than the I. C. C. and forty-eight other disturbers.

C. D. PURDON,
Consulting Engineer, St. Louis Southwestern.

[Representative Sims has introduced a bill to provide $500,000,000 additional for the Revolving Fund. Maybe it's the "angel" that's needed for the show.]



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Apparently the German Censor Had Not Yet Let Them Know that They Were Licked



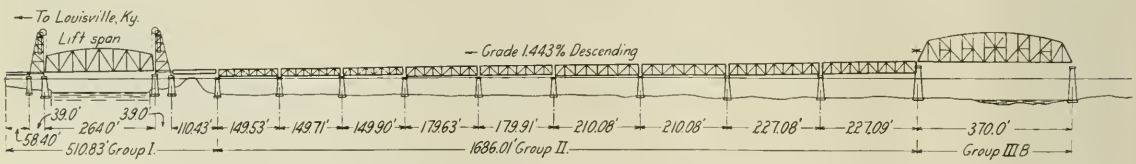
New Lift Span Partially Completed with Temporary Lift Span Still in Place

The Reconstruction of a Notable Railroad Bridge

Ohio River Crossing at Louisville Now Contains Longest Simple Riveted Span in the World

THE RECONSTRUCTION of the Ohio river bridge of the Pennsylvania Lines at Louisville was the foremost railway bridge project under way during the past year. It was the greatest by reason of the length of the structure, which is almost a mile, because of its weight, which aggregates 23,500 tons of structural steel, and because it contains a record-breaking span of 643 ft. 10½ in., the longest simple, riveted truss span in the world. Considerable historic interest also is attached to this project because it marks the passing of a noted structure among American railway bridges, the Louisville bridge built by Albert Fink between 1867 and 1870. Through 47 years this old superstructure carried the increasing loads of railway traffic with but minor swing span of 264 ft. over the Portland canal, with 23 deck spans varying from 50 ft. to 245 ft. 5 in. in length. The two through spans were of the sub-panel Warren type with cast-iron compression members and wrought-iron, eye-bar tension members. The trusses were duplex, there being two complete trusses on each side connected by struts and ties. The deck spans were all of the Fink type with material of the same character as that used in the through spans.

Subsequent to first construction certain changes were made. In 1891, the floor beams of the deck spans, which were of a unique cast-iron arch type, were reinforced by placing steel beams on either side of them. About 22 years ago the truss floor beams of the through spans were equipped

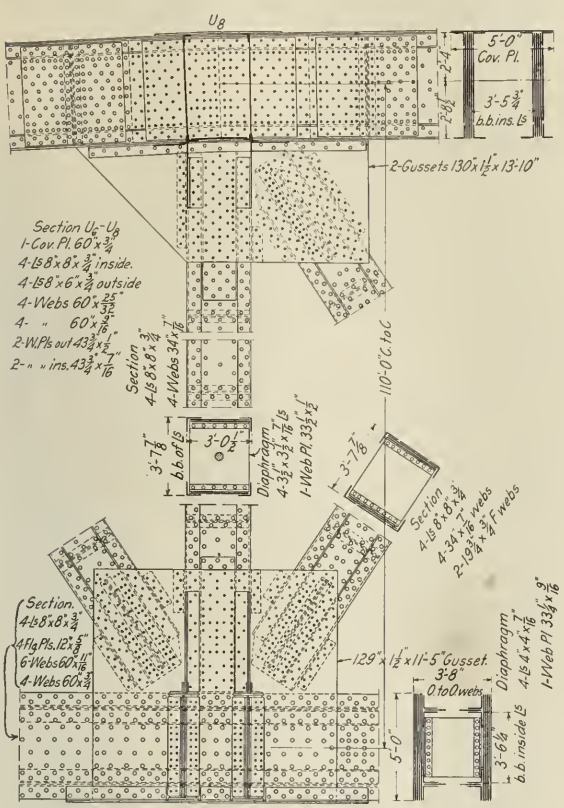


South Half of the Louisville Bridge

strengthening and when removed was in a remarkable state of preservation. But like most other railroad bridges built before the beginning of the new century, it proved inadequate for present loadings and had to be replaced by a new structure of greater carrying capacity and also providing double track. The new bridge, like the old one, is being built by the Louisville Bridge Company, a corporation controlled by the Pennsylvania Company through ownership of 98 per cent of the stock.

The old bridge, as built in 1870, consisted of two through channel spans of 400 and 370 ft., respectively, and a deck with equalizers to effect a more uniform distribution of the load to each of the doubled trusses. In 1902, the drawspan was replaced by a through Pratt truss draw. The wooden stringers were also replaced by steel after 25 to 35 years of service. In 1900 instructions were issued limiting the weight of trains crossing the bridge to 3,300 lb. per lin. ft., with engine axle loads of not over 39,000 lb. The speed was also restricted to from 8 to 20 miles per hour, depending on the makeup of the train. The old substructure, of Bedford stone ashlar masonry on rock foundation, was so well preserved that it has been used to support the new steel with only such

modifications as were necessary to make it fit the new superstructure. The wrecking of the old structure disclosed the high grade of workmanship which had been applied in its



Typical Truss Details of the Indiana Channel Span

fabrication and erection, as demonstrated by the excellent behavior of the spans through their long service life.

The New Structure

The old superstructure has been replaced largely by spans of equivalent length on the old piers, except for several important modifications. The old 400-ft. Indiana channel span and the deck span adjacent to it on the south have been replaced by a single span 643 ft. 10½ in. long center to center of end bearings. Two of the deck truss spans at the north end of the bridge have been replaced by two deck girder spans of 32 ft. and 99 ft. 6 in. respectively. The old center pier drawspan has been replaced by a span of 264 ft., center to center of piers, operated as a vertical lift, while the necessity for flanking this by 39-ft. tower spans introduced a modification in the makeup of the spans immediately adjacent to the draw.

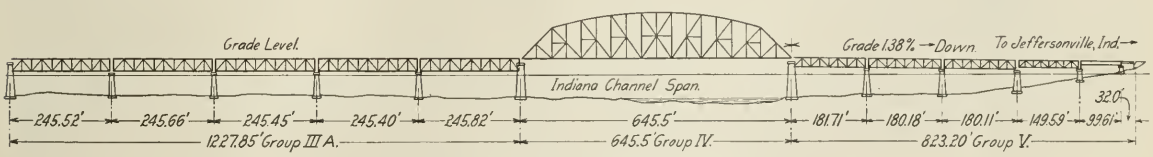
Except for the presence of the lift span, the new superstructure of the Louisville bridge bears a striking resemblance to that of the Ohio Connecting Railroad bridge of the Pennsylvania Lines across Brunot's island near Pittsburgh, which was rebuilt in 1914-15. Both of these bridges contain two through riveted channel spans of the Petit type, separated by a long series of riveted deck Warren type truss spans, and there is a marked similarity in the structural details. There is also an interesting coincidence in the fact that, until the completion of the record span of 644 ft. in the Louisville bridge, the 525-ft. span of the Brunot's island bridge was the longest riveted simple truss span in the United States. The similarity, however, ends there, since the manner of prosecuting the work in the two structures differed widely.

The Indiana Channel Span

As a record structure, a few of the principal dimensions of the 644-ft. span are of interest. It consists of 18 subpanels of 35 ft. 9¼ in. The height of the trusses is 74 ft. at the portals and 110 ft. 6 in. at mid-span, measured center to center of chords. The trusses are 34 ft., center to center, and the total weight of the span is 6,209 tons.

The top chords and end posts are of a double-I section with top cover plates and having 60-in. webs and 60-in. cover plates. The gross sectional areas of the end posts and maximum top chord members are 562.43 sq. in. and 535.09 sq. in. respectively. The bottom chords are of a double-web type with maximum net and gross sections of 487.55 and 587.27 sq. in. respectively. The largest gusset plate, which is at panel point L-4, measures 129 in. by 1½ in. by 13 ft. 10 in. The two webs of the bottom chord are tied together by diaphragms spaced 10 ft. to 12 ft. apart with single lacing of 6-in. by ½-in. bars attached to horizontal plates secured to the webs by means of 8-in. by 8-in. angles. The top chords and end posts are stiffened by diaphragms at intervals of 6 ft. to 9 ft. and the lower edges of the two webs are tied together by lacing bars and tie plates, except that the lacing bars are omitted in the top chords by providing that the spaces between the ends of the tie plates are not greater than three feet.

The floor system, following the design used on the Ohio Connecting Railroad bridge, consists of duplicate floor beams at each panel point, one each to support the stringers in the panel on either side. This makes the floor system at each panel a complete, independent unit, an arrangement that is especially convenient in erection. The end bearing detail of the span is of massive proportions; the bearing pin is 24 in. in diameter and the expansion bearing consists of eight segmental rollers having a diameter of 2 ft. 6 in. and a length of 4 ft. The span rests on a grillage 2 ft. 2 in. deep and 11 ft. long transverse of the piers, which in turn is supported on a grillage covering the entire length of the pier and consisting of eight girders 3 ft. 9 in. deep. The material is high tension steel for main members of the trusses and floor system and medium steel for the gusset plates, bracing and minor details. The rivets are ⅞ in., 1 in. and 1⅛ in. in diameter.



North Half of the Louisville Bridge

The details of the 370-ft. Kentucky channel span correspond very closely to those of the large span. One difference is noted in the fact that the end post occupies only one sub-panel and therefore has a much steeper slope. Some idea of the relative proportions of the new double-track bridge

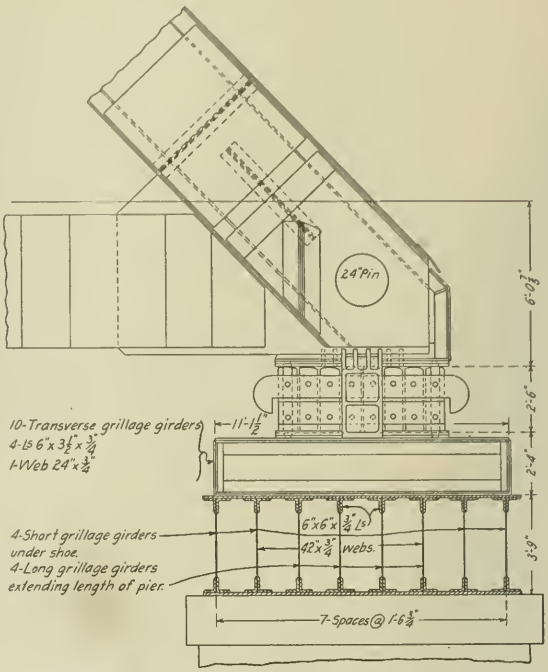
as compared to the single-track structure which it replaces is to be obtained by a comparison of the weights per foot of track of the new and old superstructure for this span, these being 12,272 lb. and 3,050 lb. respectively. The new 644-ft. span weighs 19,650 lb. per ft.

The Lift Span

The lift span is composed of through riveted trusses 260 ft. long, center to center of end bearings, and weighs about 1,320 tons. Towers flanking it on either end afford means for lifting the span a distance of 32.3 ft. to give a clear headroom of 79 ft. above the pool level of the canal. The operating details of this structure conform very closely to those used in the Pennsylvania Lines bridges over the Chicago and Calumet rivers at Chicago. The counterweight towers are 105 ft. high from the top of masonry to the center line of the 15-ft. sheaves from which the span and the counterweights are hung by sixteen 2⅛-in. wire ropes at each corner. The sheaves consist of seven cast-steel rim segments with special steel web members connecting them to cast-steel hubs which are bored for 24-in. diameter shafts. The counterweights are of concrete cast in structural steel frames. Compensation for the weight of the carrying cables is accomplished by means of cast-iron link chains swung between the bottoms of the concrete counterweights and points at mid-height on the towers.

Power is supplied for moving this span up and down by cables attached near the bottoms and tops of the towers and passing over sheaves at the ends of the top chords to drums on hoisting equipment in a house over the center of the span. The hoisting equipment consists of two 150-h.p., 220-volt, 3-phase, 60-cycle induction motors. There are three forms of control, one automatic by means of two solenoid brakes, and two manual through an electric brake and a hand brake. Duplicate control of the structure is provided since it may be operated from a cabin suspended inside of the trusses below the machinery house, and also from an interlocking tower located just south of the bridge which controls not only the movement of the trains that cross the bridge but also the throat of a yard located just south of the canal. Excessive vibration in bringing the structure to bearing on the bridge seat is avoided through the provision for pneumatic buffers consisting essentially of cylindrical plungers passing into cylindrical tubes from which the delayed escape of the contained air through small orifices serves to bring the span to rest gradually.

The grade of the bridge between and including the two channel spans, a distance of 2,242 ft., is level, with approach grades of 1.38 and 1.443 per cent ascending from the north and south respectively. The 1.443 per cent grade extends across the lift span and was taken care of entirely in the attachment of the floor beams to the trusses, so that the bottom chords of the span could be level. There is a possibility that grade separation work in the city of Louisville to the north of this structure will require some future modification of the track grade at the south end of the bridges and as a means of facilitating a change of grade across the lift span, the rivet spacing of the connections of the floor



Outlines of the End Bearing for the 644-Foot Span

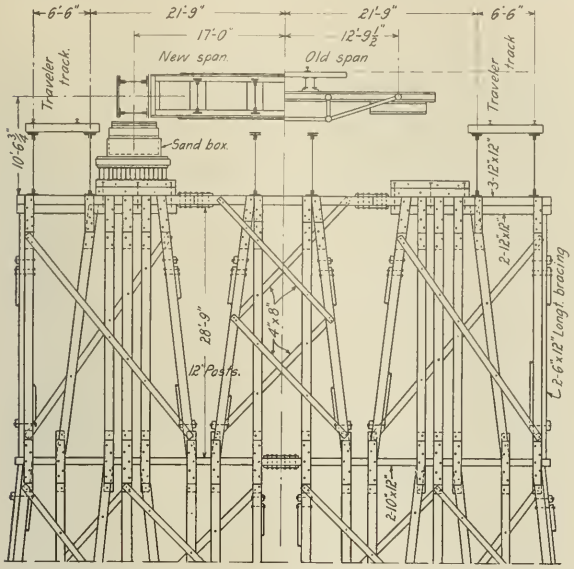


Falsework for the Erection of the Deck Truss Spans

beams to the posts has been made uniform so that the beams may be readily moved up variable distances on the posts.

Erection

The erection of the bridge proceeded slowly because of the masonry changes that had to be carried on simultaneously with the placing of the new steel. The first work to be done



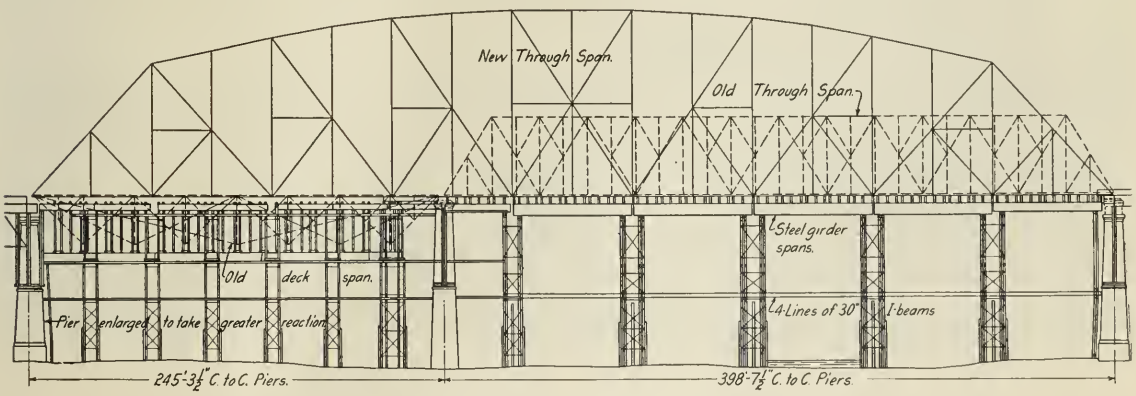
Elevation of the Upper Half of a Bent in the Falsework Used Under the 644-Foot Span

was on Group 5, the deck spans between the Indiana channel and the north abutment; this was started June 1, 1916, and finished October 1, of the same year. The next section was Group 3A, the five deck spans between the two channel spans requiring from September 1 to December 15, 1916.

The old masonry was found to be in excellent condition and, although built for single track, the piers were found to be of adequate length to carry the new double-track structure after being provided with longitudinal steel grillages concreted into new copings. In the case of the piers supporting the old Fink trusses, the bridge seat was located just under the top chords so that in order to erect the new deck trusses it was necessary to cut down these piers to afford space for bearing shoes below the level of the new bottom chords, and since the piers had an appreciable end batter, the new pier tops at the lower level were considerably longer than at the old level. However, this change in the masonry proved to be a considerable obstacle to the work since the rate at which the old superstructure could be replaced by the new was controlled very largely by the speed at which the alterations to the masonry could be made.

The falsework for the deck spans consisted of towers of frame posts resting on the rock bottom of the river and carrying plate girder spans below the level of the bottom chords of the new spans. On these, frame bents were erected to support the bridge floor and the old trusses at the level of the top chords. The old trusses were then taken down and the new ones erected, after which the floor system was replaced panel by panel. In the meantime the old piers were removed down to the new level and the grillages installed and concreted in place.

The erection of the Indiana channel span was by far the most formidable problem of the project, not only because of the great weight of 6,209 tons which had to be maintained on the falsework, but because of the very swift current that flows in the channel under this span. Some idea of the velocity of the water may be gained from the fact that there is a fall in the river of 23 ft. in one mile. Erection on falsework under these circumstances would have been an impossibility but for the fact that the depth of water is only from 8 to 10 ft., with a maximum of about 16 ft. The bottom is bare solid rock. The problem was complicated by the necessity for removing the intermediate pier carrying the south end of the old channel span and the need for strengthening the pier to carry the south end of the new span, since this pier now carries a far greater reaction than under the previous arrange-



Elevation of the Falsework Under the 644-Foot Span

The 370-ft. through span was erected between April 25 and July 10, 1917. The remaining deck trusses were erected between May 10, 1917, and January 20, 1918. The erection of the superstructure of the group of spans centered about the lift span started on March 1, 1918, and was completed on September 10 of the same year, while the work on the great Indiana channel span was started on April 20, 1918, and is now practically complete.

ment. This was accomplished by inclosing it with a three-foot thickness of new stone masonry on all sides. The pier is 100 ft. high from top of footing to base of rail and the reinforcement entailed the use of 1,392 cu. yd. of masonry in the neatwork and 64 cu. yd. in the coping.

The reconstruction of this pier was accomplished by surrounding it with a rock crib to produce a pool of still water. A cofferdam was then built inside of this and worked down

through the loose rock to the bottom of the river, after which it was unwatered and the footing concreted.

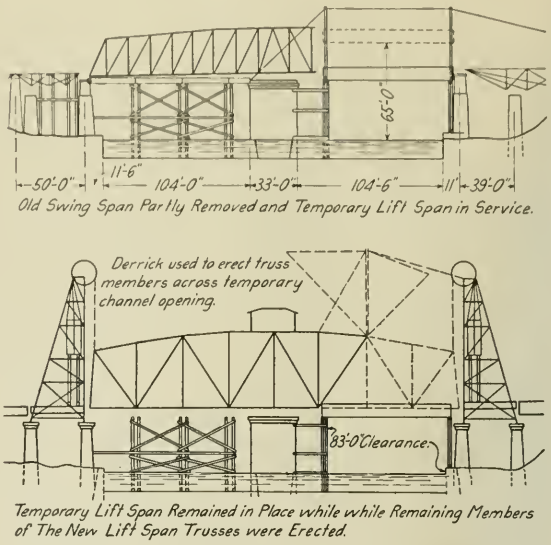
Work on the new masonry was facilitated by building a gallows frame supported on the pier and spanning over the track with sufficient clearance to allow the passage of trains. This was equipped with two derrick booms which were used to handle the stones delivered on cars and set them into place in the pier. Material for concrete work was stored in a bin built on the bottom chord of the new deck span to the south, the material being chuted from cars spotted above. As the old deck span to the north was not placed on falsework during this operation it was necessary to support the end of this span over the pier by means of a 50-ft. girder placed crosswise under the end shoes of the old span and supported on frame bents at the two ends of the pier.

Falsework for the Indiana Channel Span

One of the drawings shows an elevation of the falsework used in erecting the 644-ft. span. It consists of a series of frame bent towers supporting deck plate girders. The portion of the falsework under the old span was complicated by the need of placing these girders low enough to clear the bottom of the old span so that the construction was similar to that used in erecting the deck spans. Under old channel span each falsework tower consisted of four bents containing 16 posts each. The most difficult part of the work was to place these posts in the swift current. To accomplish this a timber frame or box truss was designed to surround the entire lower story of the tower. It was built above water, suspending it from lines depending from a creeper traveler riding on the top chords of the old through truss span. This frame was held at a fixed distance out from the pier or the nearest tower previously erected by struts hinged at the ends so as not to interfere with an up-and-down motion of these box trusses. The trusses were fitted with four posts located at approximately the quarter points of each outside bent so that when the box trusses were lowered these four posts could be brought to bearing on the river bottom. With the frames thus supported, the rest of the posts for the tower were let down into place in succession between guides in this frame. Each post was fitted with a cast iron pyramidal shoe and brought to a solid bearing on the rock by subjecting it to several blows with a steam hammer.

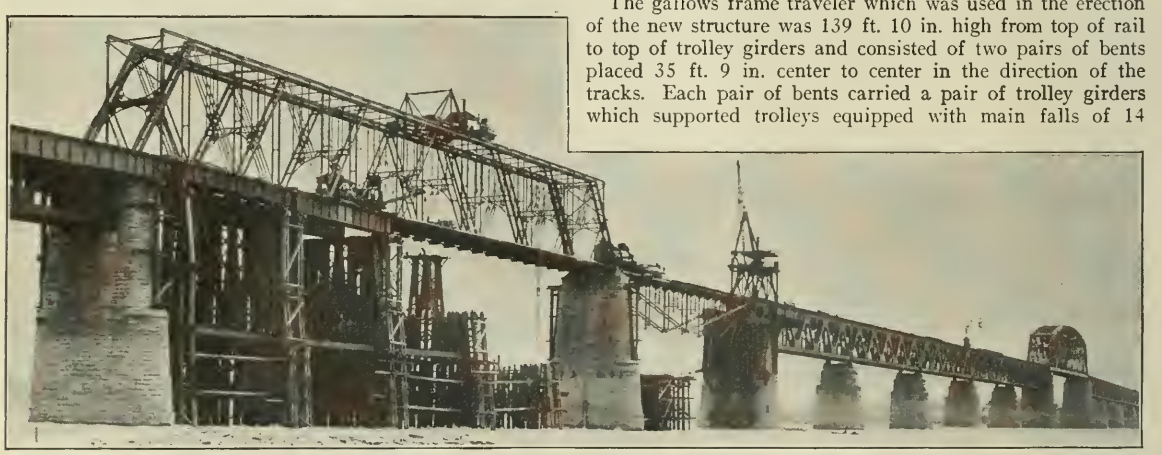
No sway bracing was provided between the towers, but four lines of 30-in. I-beams at a level of 31 ft. above the bottom were spanned from tower to tower and made continuous between the piers to serve as sash bracing. The two inside lines of these I-beams were cross-braced to form a horizontal truss.

An elevation of the top section of the tower bents shows how the posts were grouped to support the various parts of the superimposed live and dead loads. Two girders in the center carried the track used for revenue traffic and for the delivery of new steel. On either side of these, grillages were provided to carry the sand boxes under panel points of the trusses, while on the outside pairs of girders were placed to support the traveler tracks.



Method of Removing the Old Draw Span and Erecting the New Lift Span

The gallows frame traveler which was used in the erection of the new structure was 139 ft. 10 in. high from top of rail to top of trolley girders and consisted of two pairs of bents placed 35 ft. 9 in. center to center in the direction of the tracks. Each pair of bents carried a pair of trolley girders which supported trolleys equipped with main falls of 14 parts of 7/8-in. wire rope and auxiliary falls carrying a single sheave block. The hoisting engines were carried on trailers standing on the traveler track. The heaviest member erected with this traveler weighed 129 tons.



Erecting the Falsework Under the Old Indiana Channel Span

All parts of the old span were removed by a locomotive crane, the members being cut apart with an oxy-acetylene torch. The work was started at the south end, the old deck span being replaced by the new steel first. The new span was detailed to have a camber of 1 ft. 4½ in. as erected (un-

der no stress), which reduced to a camber of 7.32 in. when under dead load after the span had been swung free of the falsework.

The deck spans were replaced under traffic, using a small tower traveler standing astride the operated track and supported on rails 19 ft. 2¾ in. center to center. This was made of frame posts and floor beams taken from the old structure.

Special Problem in the Lift Span

The replacement of the old swing span by the new lift span was a problem of no mean proportions since the work had to proceed with a minimum of interference with the operation of both rail and canal traffic. The solution was to place the south half of the old span on falsework and replace the north half by a temporary lift span consisting of a pair of 88-ft. girders raised and lowered by lines from gallows frames supported on bents adjacent to each side of the north draw opening. A minimum interference with the canal traffic required that the interval from the time that the swing span was rendered inoperative until the temporary lift span was ready for use should be as short as possible. This was accomplished as follows: The lift span was delivered on the bridge on two flat cars and was picked up by lines from the gallows frames so that the cars could be released. The portion of the old floor system under the temporary span was cut away from the trusses, most of it being lashed to the under side of temporary girders which were then lowered into a position to carry traffic. One hundred feet of the north ends of the old trusses was then cut away and removed so as not to obstruct the channel when the lift span was raised.

The temporary lift span was raised and lowered by means of hand crabs, the span was counterweighed by means of rails suspended from the falsework. The operation of opening and closing the span occupied about 20 min.

After the temporary lift span was installed the towers for the permanent lift were erected and the portion of the old span over the south channel and the pivot pier was replaced by the portion of the new span shown in full lines in the drawing. Navigation was then closed and the remaining members of the trusses were placed by the cantilever method, the temporary span being maintained operative between them. When the trusses were completed the traffic over the bridge was stopped and the temporary span removed and replaced by the permanent floor system, whereupon the bridge was restored to rail traffic after an interval of eight hours. The blockade of the canal traffic from the time that the truss members fouled the channel until the new lift span became operative was seven days, but as the river traffic was inconsequential the delay was of little concern.

The erection of the bridge, with the use of the operating track by work trains supplying material for the new structure and removing the material released from the old one, introduced possibilities of serious interference between the construction operations and the conduct of revenue traffic. This was overcome by adjusting train schedules to avoid the movement of revenue trains on the bridge during the workday hours. Some of the trains were diverted to other bridges crossing the Ohio at Louisville; concentration of movements was also arranged at night and during the noon hour.

This bridge was designed and built under the direction of J. C. Bland, bridge engineer of the Pennsylvania Lines West. The Pennsylvania Steel Company, Pittsburgh, Pa., had the contract for the entire superstructure, the erection being under the direction of J. L. Poffenberger, engineer, and J. J. Kelley, general foreman. The masonry changes were made partly by the railroad and partly by separate contractors. The work on the substructure for the lift span, after being partly completed under an independent contract was taken over and completed by the Pennsylvania Steel Co.

Labor Recruiting Conference at Chicago

A CONFERENCE ON WAGES and means of recruiting labor for railroads was held in the auditorium of the Insurance Exchange Building, Chicago, January 20 and 21. It was called by the Federal Employment Service for the purpose of developing, if possible, some means of co-operation between officers of the railroads and the Employment Service and was attended by some 25 railroad officers and representatives of various departments of the Federal Service. Sanford H. E. Freund, director of the clearance division, United States Employment Service, Washington, D. C., presided.

In their opening addresses Mr. Freund and Charles J. Boyd, general superintendent of the Illinois free employment offices, expressed the opinion that while there is a well defined labor surplus at the present time, there is every reason to believe that there will be a decided labor shortage within a very few months, particularly in common labor. The reasons given for this are the rapidity with which men released from the army and war industries have been placed in positions and the fact that this country is now short 2,000,000 men through the failure of immigration in recent years, since it has always been the immigrant who has afforded the supply of common labor in the past. Mr. Freund urged upon the railroad men the necessity for co-operating with the 750 government agencies. He said that competition between the federal bureaus and those maintained by the railroads would be harmful to both and would increase the labor turnover.

In speaking for the railroads, W. G. Beird, federal manager of the Chicago & Alton, admitted that the railroad situation was grave, particularly with respect to unskilled labor. A particularly unfortunate feature in connection with the unskilled labor is that it is less efficient than formerly, so that one of the most important problems is to restore it to its former efficiency. He said that after listening to considerable of the discussion it was his opinion that there was a missing link between the organizations of the Federal Employment Service and the railroads and as a means of securing this necessary connection he believed it should be the sense of the meeting to call upon the United States Railroad Administration to appoint a committee to confer with representatives of the Employment Service to formulate the necessary means of united action.

Representatives of a great many of the different state branches of the Federal Employment Service spoke of the success of their work, quoting figures as to the large number of men to whom they had given employment. They decried the failure of railroad officers to co-operate with them and assumed a rather critical attitude concerning the employment practices of the railroads. Exception was taken to this by Robert H. Ford valuation engineer, Chicago, Rock Island & Pacific, who reviewed the labor problem of the past few years in detail and called attention to the fact that the problem is not solely one of searching out the man without a job and putting him to work, but also of keeping him at work. This means that the working and living conditions must be favorable. Moreover, the floater must be prevented from traveling all over the country at the expense of the railroads. He gave as one reason why the federal service was unable to supply men properly during the past year, that they were too much concerned with supplying men for other employments at higher rates and cited instances of the intense competition of varied independent agencies of the Employment Service with each other. He also quoted from orders of the regional director of the Western region warning railroad officers that applications for men at the Federal Employment offices did not relieve the railroad man of

responsibility for an adequate supply of help to conduct his work properly. He made several recommendations for the improvement of the Employment Service so that it could secure the confidence of the railroads and therefore their co-operation.

The method of soliciting men must be simplified. Common labor is scared away by an excess of examination and red tape. The Employment Service must also accomplish a complete co-operation of all branches of its own organization. The transportation of men back and forth across the country must be stopped. The employment of common labor must be separated entirely from that of skilled labor. The state employment agencies should work for the necessary legislation to remove present abuses in employment and vagrancy. Some form of regional control of the railroad's part in employment activities should be provided.

In discussing the distribution and transportation of labor C. A. Griswold, Chicago & North Western, said that all agencies are imposed upon by persons who wish to obtain transportation to some distant point without expense. He suggested that the solution of this would be to apprehend a few men who have followed this practice and have them arrested and fined. Mr. Griswold was followed by H. E. Ballou of the Chicago, Burlington & Quincy employment agency. He related some of the details of the administration of the employment and distribution of men as carried out by the agency of the single railroad and contended that an objectionable multiplicity of details would obtain when a single agency was supplying men to all of the railroads in the tributary territory. At Chicago he estimated this would represent some 110 operating divisions.

The advisability of centralized supervision of central west territory was discussed by Mr. Freund and W. J. Towne, assistant general manager of the Chicago & North Western, who spoke in place of R. H. Aishton, director of the Northwestern region, whose name appeared on the program. Mr. Freund called attention to the fact that the Federal Employment Service had been organized as a war emergency and that it had been called upon immediately for assistance from all sources. One of the principal difficulties from which it suffered was the lack of any unified organization of labor on the part of the government war activities. Conflicting demands were received from various departments which were so urgent that it was necessary to deal with these various calls as they came without much attempt at co-ordination. Under these circumstances the employment service could not afford the railroads as much assistance as would be possible under a more highly developed organization. Under present circumstances he contended that these objections no longer exist.

Mr. Towne agreed that centralized control of labor distribution was desirable and favored a movement toward that end. Assuming that centralized supervision must come it is desirable to avoid its disadvantages. The system must be made sufficiently flexible to enable railroads to employ labor locally without any formality. The advantages of unification are a standardization of rules and practices and the elimination of duplicate effort. The principal disadvantage is a tendency for a large organization to become slow in operation. In closing he favored the formulation of some kind of a recommendation to the director general of railroads which would outline the course to be pursued.

This took definite form in a resolution presented by Mr. Ford, that it was the sense of the meeting that the director general of railroads, the regional directors and the director general of the United States Employment Service be urged to designate representatives fitted by training and experience, to act on a central committee to co-ordinate activities in recruiting and stabilizing labor to the end that unrestricted competition and duplication of facilities and effort be eliminated.

Mr. Hines Addresses Passenger Men*

MANY YEARS AGO a celebrated wit in Kentucky, in a speech to commercial travelers, said the commercial traveler was the "commercial evangelist," and it seems to me it could fairly be said that you gentlemen are the evangelists of the public service. It is you who have to spread the gospel of the proper sort of public service and who see that that gospel is lived up to. Since it is the cardinal point of my administration that we must serve the public in the best possible way, I turn to you for help. . . . Do not be disturbed by reports calculated to discredit the Railroad Administration. A prominent story published in some newspapers yesterday indicated that there was a serious conflict between the Interstate Commerce Commission and the director general over a question of jurisdiction. There is no foundation for that contention. The fact is that there has never been the slightest difference of opinion between the Interstate Commerce Commission and the director general as to their respective jurisdictions. There has been the most cordial and beneficial co-operation between the commission and the director general. We have found nothing but the most sympathetic understanding of our problems and the most earnest desire to co-operate with us in making a success in discharging the responsibilities which rest upon us. If railroad officers and employees are confronted day by day by such unfounded reports the tendency will be to impair the morale of the railroad organization, and that above all things is what I wish to avoid, and I wish to get your co-operation in avoiding it.

I, as director general, and all my associates in the central railroad administration, have a single-minded purpose, to serve the public to the best of our ability and to face the facts, whatever they may be; and give the public the benefit of those facts, and to secure at all times the understanding and the co-operation of every interest, whether public or private.

Whatever may be the future of the railroad problem every interest affected will be promoted by the continued maintenance of the best possible railroad system, rendering an adequate public service; we are to keep on giving the best public service and of finding ways of improving it. The war and its hardships are over, and the hardships from the standpoint of the passenger service were, of course, very serious. People did not have adequate space, there was no opportunity to give them adequate information in all cases, and in a great many ways they were subjected to serious inconvenience. We must now endeavor to re-establish the same convenient and comfortable form of passenger service which was available before, and we must do everything we can, within reason, to make that service more convenient and more comfortable than before. I have particularly in mind the point of providing adequate information for the public, the point of seeing that the public is treated with courtesy and the point of seeing that there are facilities adequate for comfortable travel; these are points of paramount importance. I hope that you will find it practicable to perform to an increasing degree the careful inspection of stations, passenger trains and dining cars, and do not forget the important point, whether or not trains are run on time.

Do not take as a necessity any unsatisfactory condition you may find. Don't assume that that condition has to be because of federal control of the railroads. View the matter from the standpoint that if the thing is unjustifiable on its merits a way ought to be found to correct it and that the government owes it to the people to correct it; and I want you without hesitation to use your initiative in these matters and to bring to the proper officers of our Railroad Administration the recommendations with the confident belief that they will be considered on their merits and with the most earnest desire to promote the public service.

*Address at the annual convention of the American Passenger Traffic Association, at Washington, D. C., January 22; abridged.

Doings of the United States Railroad Administration

Director General Faced With Big Financial Problems; Complicated By Falling Off of Traffic

WASHINGTON, D. C.

AS AN INDICATION of the condition to be faced by the railroads if they are to be restored to their owners this year, preliminary estimates of earnings and expenses for 1919 which have been considered by Director General Hines and his staff, including the regional directors who spent most of last week in Washington, are said to forecast a deficit of approximately $250,000,000 for the year. Mr. McAdoo in his testimony before the Senate committee on January 3, estimated that with the same volume of traffic as last year the railroads would earn a surplus in 1919 above the guaranteed rental of $100,000,000, and on this he based a prediction that unless the volume of traffic should be reduced, rates might be decreased during the year, certainly by the end of the year. It is now recognized that there is no chance for any decrease in rates. Increases in payrolls far exceeding the estimates which had been made of the effect of the various wage increases ordered during the past year account for a large part of the difference in the estimates, as later figures have become available since Mr. McAdoo made his optimistic assertions just before his departure. An additional increase in pay for the members of the train service brotherhoods, which has been under consideration by the Board of Wages and Working Conditions and which, it is said, may run up to $100,000,000 a year, is another factor which Mr. McAdoo may have overlooked. Mr. McAdoo estimated the previous wage increases at $600,000,000 to $700,000,000, but some of the wage orders had not then been in effect long enough to afford accurate figures as to their amount.

The Railroad Administration is not making its figures public, particularly in view of the uncertainty as to the volume of traffic to be expected, as business has been declining rapidly since the signing of the armistice. The fact that estimates showing a prospective deficit had been made and that the regional directors had recommended that it be met by a further increase in rates or by asking an appropriation of Congress, got into print, however, and elicited a prompt denial from Director General Hines that an increase in rates was being considered.

"There is no foundation," he said, "for the report that the Railroad Administration has given or is giving any consideration to any increase in the present basis of rates." As to the reports regarding the estimated deficit, he said: "The results of operations for the year will be largely dependent upon the volume of traffic. If the volume of traffic should be as large as last year, it is believed the operating income would be sufficient to pay the rental. As soon as any reasonably satisfactory conclusion as to the probable volume of traffic can be formed, the public and Congress will be given the best possible estimate of the prospects for 1919."

It is expected that he will give this estimate when he asks Congress for an additional appropriation for the revolving fund, which, as previously announced, is proposed primarily to enable the Railroad Administration to make advances to railroads for capital expenditures. Mr. Hines said the amount to be asked would probably exceed $500,000,000. The unexpended balance of the capital expenditures authorized in 1918, plus an estimate of $350,000,000 for 1919, would make a program for the year of $1,039,000,000. How much of this would have to be advanced by the Railroad Administration would depend on how much of it is actually carried out and on how much of it could be financed by the railroad companies themselves. If the amount should be reduced or if the companies could take care of a large part of it or could take up some of the loans made to them last year from the revolving fund, a part of the original appropriation of $500,000,000 might be made available for making up the operating deficit, which for 1918 probably considerably exceeds $200,000,000, without taking into account a large amount of unpaid claims and whatever amount it is finally decided the government owes the railroads for deferred maintenance.

Mr. Hines has issued the following statement regarding the revolving fund:

"In view of the constant discussion of the railroad problem which naturally is now going on because of the pendency of the issue before the Congress, and since a great deal of stress is being laid upon the financial condition of the carriers under federal control, it should be helpful to comprehend some outstanding facts regarding the so-called 'revolving fund.'

"It is important to understand that the mere fact of taking over the railroads as going concerns involved the temporary absorption of about $340,000,000 of the government's money, and that if the operation of the railroads for the year 1918 had not involved any loss whatever it would still be true that about $350,000,000 of the revolving fund would be thus absorbed all during the period of federal control.

"On any given date a large amount of cash is in the hands of railroad conductors and railroad freight and ticket agents throughout the country. On the date the government took possession of the railroads this amount was about $140.000,-000. This was of course credited to the railroad corporations and in settlement with them for the first year the government has to pay that amount in addition to the rental. Of course, at the end of government control the railroad companies will pay back to the government whatever amount (probably the same or more) may then likewise be in the hands of conductors and agents.

"It is also true that approximately $200,000,000 of working cash capital has to be kept on hand at all times in the hands of the federal treasuries of the United States Railroad Administration and in the hands of the Central Administration. Since the operating expenses average perhaps $325,-000,000 per month, this working cash capital of $200,000,000 is relatively small. Nevertheless it absorbs for the time being that much of the resources of the Railroad Administration. At the end of federal control this cash will be released and will come back to the government; for the time being it is tied up in the conduct of the business in exactly the same way that the working cash capital is tied up in any other business.

"The result is that in making the first year's settlement with the railroad companies the Railroad Administration will have to use $340,000,000 which in the last analysis must come out of the revolving fund and to that extent the use of the revolving fund represents no suggestion of loss, but purely an inevitable absorption of cash for the time being.

"It must also be remembered that it has been the policy of the government that the Railroad Administration shall finance temporarily a large part of the permanent improvements which have been made and which still must be made by the railroads during federal control. The amount required for these purposes promises to be several hundred million dollars, which likewise will ultimately be returned to the government. It is evident, therefore, that the absorption of the original $500,000,000 appropriation and the

making of a very large additional appropriation will be needed for these essential purposes entirely apart from any question of losses which were incurred in operation during the war conditions which confronted the railroads in the first year of government control."

T. C. Powell Director of Capital Expenditures

As briefly noted in last week's issue, Thomas Carr Powell, recently manager of inland traffic of the War Industries Board and formerly vice-president of the Cincinnati, New Orleans & Texas Pacific and Alabama Great Southern, has been appointed director of the Division of Capital Expenditures, succeeding Judge Robert S. Lovett. Mr. Powell is a man of wide railroad experience, and since the entrance of the United States into the European War has been engaged in important war work for the government. In November, 1917, he was detailed by the Southern Railway to assist Judge Lovett in the work in connection with the office of director of priority in transportation and on July 1, 1918, he was appointed by Mr. McAdoo as special representative of the Railroad Administration with the title of manager inland traffic of the War Industries Board. He was also a member of the priorities committee of the War Industries Board.



Thomas C. Powell

Mr. Powell was born September 5, 1865, at Cincinnati, Ohio, and since 1884 has been engaged in railroad service on lines connected with the Southern Railway System. Starting as mail clerk for the Cincinnati, New Orleans & Texas Pacific, he was consecutively rate clerk, chief rate clerk and chief clerk to traffic manager of the same road. On June 1, 1893, he was appointed assistant general freight agent of that road; on November 1, 1895, chief clerk to the general freight agent of the Southern Railway; on August 4, 1898, general freight agent of that road and the Northern Alabama; on July 1, 1899, assistant freight traffic manager of the same roads; on March 15, 1901, freight traffic manager, and on April 1, 1905, vice-president of the Southern Railway in charge of traffic. On August 1, 1907, he was also elected vice-president in charge of all departments of the Cincinnati, New Orleans & Texas Pacific and the Alabama Great Southern.

Embargoes Under Regional Directors

The Car Service Section and the regional directors have been working out plans for a revision and regrouping of the zone embargo committees so that the issuance of embargoes will be placed to a greater extent under the jurisdiction of the regional directors, who believe that they will thus be able to eliminate the necessity for issuing embargoes in many cases. There are now 20 of the zone embargo committees and it is proposed to regroup the zones to correspond to regional lines, although there will be more than one zone in a region, reducing the number from 20 to about 15. There will be one at each regional headquarters, two for Canada and additional committees at Boston, Cincinnati, Seattle, Dallas, and possibly New Orleans and Wilmington. Under the new plan railroads will not issue embargoes without the approval of the regional director, who may be able to take action to avoid the necessity.

Contracts Signed

The director general has signed a compensation contract with the Great Northern providing for an annual rental of $28,771,360.78. The contract also covers the following subsidiaries: Duluth & Superior Bridge, Duluth Terminal, Great Falls & Teton County, Great Northern Equipment Company, Great Northern Terminal, Minneapolis Belt, Minneapolis Western, Montana Eastern, Watertown & Sioux Falls. In addition co-operative contracts have been signed with the following short line railroads: LaCrosse & Southeastern, Coudersport & Port Allegany, Pittsburgh, Lisbon & Western, Kalamazoo, Lake Shore & Chicago, and Paris and Mount Pleasant.

About 30 contracts are now nearly ready for execution, but new action on them will have to be taken by the directors of the various companies because of the change in the name of the director general so that Mr. Hines can sign them, and it is expected that the bulk of the contracts with the railroads will be executed in the next 60 days.

Max Thelen Director Division of Public Service

Effective on February 1, the existing Division of Public Service and Accounting, which has been under the jurisdiction of C. A. Prouty, will be reorganized into two divisions, the Division of Accounting and the Division of Public Service. Max Thelen, formerly chairman of the California Railroad Commission, and recently supervisor of contracts in the War Department and assistant to Major General Goethals, has been appointed director of the Division of Public Service; and Judge Prouty will continue as director of the Division of Accounting. Judge Prouty had desired to be relieved of some of the numerous duties devolving upon him and in order to continue his valuation work for the Interstate Commerce Commission, decided that it was necessary for him to give up some of his work for the Railroad Administration.



Max Thelen

Mr. Thelen is a man of wide experience in dealing with the relationship between the public and the railroads. After serving as attorney for the Western Pacific from 1906 to 1911, he became attorney for the California Railroad Commission, serving in that capacity until 1915. In 1912 he became a member of the California Railroad Commission, and served as chairman of the commission from January, 1915, to June, 1918. In 1916 he was president of the National Association of Railroad Commissioners. Leaving the California Railroad Commission, he came to Washington in June, 1918, to engage in war work, and was appointed supervisor of contracts in the War Department and assistant to Major General George W. Goethals, director of Purchase, Storage and Traffic of the War Department.

The Bureau of Complaints and Suggestions, which has been operated under the direction of Theodore Price, actuary of the Railroad Administration, is to be transferred to the new Division of Public Service.

Board of Railroad Wages and Working Conditions

The Railroad Administration has made public the chapter from Mr. McAdoo's forthcoming report to the President for 1918 dealing with the work of the Board of Railroad Wages and Working Conditions. The report gives a brief outline of the functions of the board and a list of the supplements and interpretations to General Order No. 27, which have been issued based on its recommendations. In addition, the board now has before it four major investigations, as follows:

1. Wages and working conditions of engineers, firemen, conductors and trainmen in road and yard service.
2. Wages and working conditions of employees engaged on sleeping, dining and business cars.
3. Wages and working conditions of employees in the police department.
4. Wages and working conditions of employees of the American Railway Express Company.

Hearings in all of the above cases have been conducted, and the board is now considering the merits of the claims presented; and it is hoped it will reach a conclusion in the very near future. The report says:

"While very substantial increases in wages and greatly improved working conditions have been granted by recent wage orders, they have generally been less than men performing similar service for industrial concerns engaged in war work are receiving, which differentials are considered warranted on account of the permanency of employment on railroads, while the employment in other government activities was brought about by war conditions, and is more or less transitory. The object has been kept constantly in mind of creating a wage structure which in its essentials would survive the war period."

Interstate Commerce Commission Decides Against Railroad Administration

The Interstate Commerce Commission has again overruled contentions advanced by counsel for the Railroad Administration in a case involving the relationship of rates increased by the director general's General Order No. 28, deciding that the rates on lumber and other forest products from Humboldt Bay points on the Northwestern Pacific north of Willits, Cal., to eastern points are unjust and unreasonable, in violation of section 10 of the federal control act, to the extent that they exceed the rates from California coast group points. The relation complained of existed and the evidence had been taken before the general increase in rates. Counsel for the administration at one time argued that under the federal control act there no longer exists any such ground of challenge to a rate as discrimination and that the commission was without power or jurisdiction to adjudicate the case. This position was subsequently modified and it was admitted that the commission had jurisdiction to determine the reasonableness of rates with reference to their relationship as well as to the measure of the rates, but it was then contended that the commission should take judicial notice of the abnormal condition of the lumber business during the war and that "the importance of rates and rate adjustments has disappeared to a very large extent for the period of the war," because no matter how high the freight rate the shipper did a profitable business.

Commissioner Aitchison in the decision says that "the more abnormal other conditions, the greater would seem to be the need for unswerving fidelity to the standards of justness and reasonableness in transportation charges" and the commission also took judicial notice that the war is at an end.

Because some newspapers featured this decision as indicating a conflict between the commission and the Railroad Administration, Director General Hines issued a statement saying in part:

"It is distinctly unfortunate that several newspapers, in reporting the decision in the Pacific Lumber Company case, have drawn the conclusion that there exists a controversy over the relative jurisdictions of the director general and the commission. It appears to be assumed in these stories that the director general has denied or sought to contest the right of the Interstate Commerce Commission to review rates initiated by him on behalf of the President. As a matter of fact, nothing could be further from the truth. The federal control act places such power of review specifically in the hands of the Interstate Commerce Commission, and the director general, time and time again, has recognized this authority by being represented before the commission by counsel who have argued as to the merits of contested rates.

"At no time since the government took possession and control of the railroads has there been the faintest suggestion of any conflict in jurisdiction between the commission and the director general. The most satisfactory understanding has existed as to the functions of each. At all times the director general has enjoyed the co-operation and assistance of the commission, and assurances to this effect have been most cordially given to the new director general. He is in entire accord with the statements which the commission has made in this case relative to the extent of its jurisdiction and there is no basis for assumption of any controversy on this subject." As indicative of his reliance on the commission the statement includes a letter sent by him to Chairman Daniels of the commission, on January 17, asking for suggestions and co-operation.

Zone and Price Regulations on Bituminous Coal and Coke Lifted

Governmental restrictions on the prices of coke and all coal, except Pennsylvania anthracite, and the zone regulations covering the movement of these fuels by rail will be suspended on February 1, it was announced by the Fuel Administration. Restoration of both zone and price regulations will be immediately liable, should changing price, wage, labor, production, or other conditions demand it, the announcement said. It was estimated that when the President decided last May that the railroads should pay the government prices their fuel bill was increased by $45,000,000.

The accumulation of stocks of bituminous coal sufficient to guarantee consumers a full winter's supply, is one of the basic reasons for the suspension of the regulations. On January 1 the average stocks of bituminous coal for the country were approximately sufficient for seven weeks' consumption and in the regions farthest from the mines 20 weeks' supply was on hand.

Zone regulations worked out by a joint committee of the railroad and fuel administrations were announced in March, 1918, dividing the country into 14 districts, and are credited with having saved the railroads 160,000,000 car miles, by eliminating cross hauls and allotting consumers to the nearest mines. The relation of this saving to the enormously increased production of coal in the United States is obvious. Under the spur of war demand production of bituminous coal in the United States in 1917 increased some 50,000,000 net tons over 1916, and there was a 12,000,000-ton increase in anthracite production. The railroads were required in 1917 to handle more than 60,000,000 tons of coal in excess of their 1916 load.

The Fuel Administration called special attention to the fact that the prices established under the provisions of the Lever act have been maximum prices, based on the cost of production, rather than on quality of coal, and that in the return to normal a different relation between prices in the several fields, based as in normal times on quality of coal, may fairly be expected to obtain.

Walker D. Hines, director general of railroads, has issued a statement denying that the Railroad Administration proposes to pursue a policy of so combining and using its purchasing bureau as to break down coal prices with the result of forcing a reduction in the existing rates of pay for mining labor. It is the policy, he says, to avoid at this time any undue concentration of its purchasing power of coal and to accomplish this purpose by permitting each road to purchase its own coal. It is further the policy to require that all bids made and accepted shall be based on the existing scale of wages; there can be no excuse, therefore, for the making of the claim that coal operators are forced to reduce wages by reason of the Railroad Administration accepting any prices which may hereafter be offered it for coal. It is already fully understood that the railroads are not to use the car supply as a means of affecting prices. The policy on the other points above referred to, is being clarified by the issuance of the following specific instructions to the purchasing agents of the roads:

1. The railroads must not violate existing contracts or cancel contracts where the quality of coal is in accordance with specifications, without special consideration by the Central Advisory Purchasing Committee of the reasons for cancelling.

2. The purchasing agent of each individual railroad shall buy the coal for that road under the supervision of the regional purchasing committee of his region. In all requests for bids, the following paragraph should be inserted:

"It is distinctly understood that all bids are to be based on existing rates of pay for all mine labor, and the price will be subject to readjustment in event existing rates of pay are changed."

On contracts awarded or orders placed, the following paragraph should be inserted:

"It is distinctly understood that the prices named herein are based on existing rates of pay for all mine labor and the prices will be subject to readjustment in event existing rates of pay are changed."

3. For coal which it is necessary to purchase for requirements prior to April 1, 1919, the purchasing agents of each railroad should request that bids be submitted. They shall not undertake to fix the price of the seller's acceptance or make offers therefor, and shall agree only upon a price that shall be contingent upon the pay-for-mine-labor clause in paragraph No. 2. No negotiations for contracts for coal for delivery after April 1, 1919, should be undertaken without first obtaining the approval of the regional purchasing committee.

Conflict Between Authority of States and Director General

Railroad Administration officials do not seem to be worrying much about such action as that by the Ohio Public Utilities Commission which formally rejected the higher express rates initiated by order of Director General McAdoo on the ground that Ohio laws as to the filing of tariffs was not complied with. Mr. McAdoo recently issued a statement in which he made it clear that he was not going to be influenced by attempted state interference with his orders and it is stated that the increased express rates will continue to be collected in Ohio regardless of the action of the commission, just as they have been in a number of western states where the state authorities have refused to recognize the director general's authority over intrastate rates. The attitude of the Railroad Administration is that the law authorizes the President to initiate rates and makes no reference to state rate-making functions.

Director General Asks Rate Committees to Expedite Rate Revisions

Walker D. Hines, director general of railroads, has sent the following telegram to B. Campbell, chairman of the Eastern Freight Traffic Committee, New York City; A. C. Johnson, chairman of the Western Freight Traffic Committee, Chicago, Ill., and N. B. Wright, chairman of the Southern Freight Traffic Committee, Atlanta, Ga.: "In taking up the duties of director general, I desire to express to your committee and the district committees my appreciation of your devotion to the work and intelligent effort on behalf of the Railroad Administration and my predecessor, and to ask your continued support. With the cessation of hostilities, it is both more practicable and more necessary that the important rate matter, coming under your charge, should be disposed of promptly, and that the patrons of the roads should be able to secure a decision with the least delay, and I ask you to do all that is possible in this direction under the present conditions."

Surplus Cars to Be Sent to Western Regions

Plans for the disposition of the large accumulation of surplus freight cars in the east, estimated to amount to 50,000 to 75,000, were arranged at a meeting in Washington last week of the assistant regional directors and the Car Service Section. In the east both box and coal cars have become a drug on the market. Surplus box cars suitable for grain will be sent to the western regions via Chicago, Peoria and St. Louis, to be stored until they are needed and then distributed to the railroads by the regional directors. Some difficulties which have been experienced because of the rejection of cars at the wetern gateways by inspectors on account of their condition were also ironed out at the meeting.

Capital Expenditures for 1918

Total expenditures in connection with improvements and equipment chargeable to capital account for the calendar year 1918 amounted to $573,334,119 for Class I roads, as compared with total authorizations amounting to $1,218,969,505, according to a special statement compiled by the Division of Capital Expenditures. The figure for expenditures represents actual returns for eleven months and an estimate for December. The total includes $265,931,052 for additions and betterments, $289,388,544 for equipment, and $18,014,523 for extensions. Of the equipment $171,000,000 was on purchases by railroad companies and $117,000,000 on purchases by the Railroad Administration, of which $57,930,129 represents cash advanced on undelivered equipment. The total authorizations include $16,522,002 for equipment unassigned and equipment assigned to terminal and switching companies.

Operating Officers May Be Served in Suits

Director General Hines has issued General Order No. 50-a amending General Order No. 50, issued on October 28, providing that service of process in suits for claims for personal injury or for loss and damage may be made upon operating officials, operating for the director general of railroads, in the same way that service was heretofore made upon like operating officials. But the pleadings in such actions may on application be amended by substituting the director general of railroads for the carrier company as party defendant and dismissing the company therefrom. This will obviate the necessity for securing personal service upon the director general which has become of such frequent occurrence as to constitute something of a nuisance.

Committee on Automatic Train Control Organized

The Committee on Automatic Train Control appointed by the Railroad Administration held its first meeting for organization at Washngton on Thursday and, after deciding to appoint an executive secretary, discussed in a preliminary way the requisites which must be met by an automatic train control system. It reviewed the list of requirements drawn up by the American Railway Association in 1914. This subject will be considered further by the individual members of the committee and it is expected to promulgate a list of requirements after the next meeting on February 4.

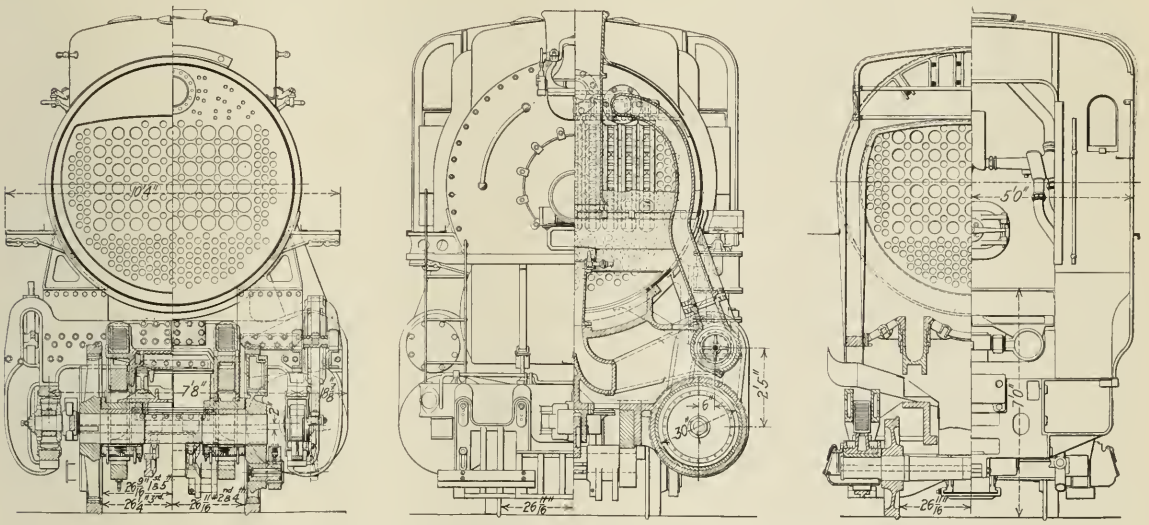
The St. Louis Chapter of the American Association of Engineers was installed at a banquet at the Planters Hotel, St. Louis, on the evening of January 18. About 150 members were enrolled.

Heaviest 2-10-2 Type Built for Pennsylvania Lines

Design Permits Operation on 23 Deg. Curves; Pilot Meets Requirements for Road or Yard Service

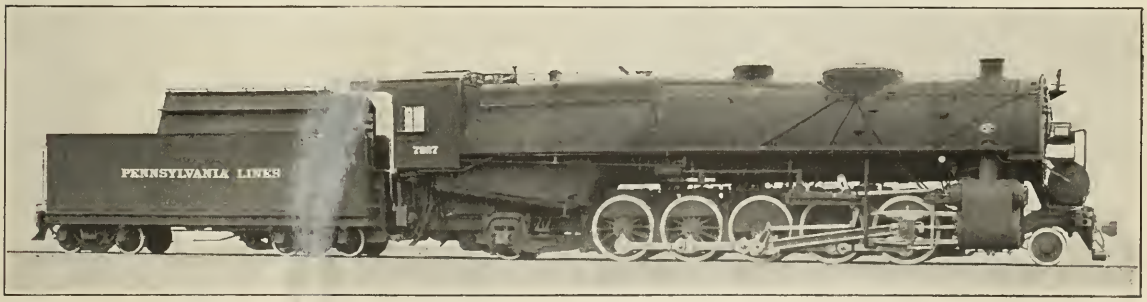
THE PENNSYLVANIA LINES WEST of Pittsburgh have recently received from the American Locomotive Company several locomotives of the 2-10-2 type which are notable for two reasons. The total weight is greater than for any engines of this type previously built and yet they are able to operate on 23 deg. curves. Although these locomotives are extremely heavy they are in service on a division with low grades. All that have been received thus far are in use on the lines running from Conway Yard, near Pittsburgh, Pa., to Ashtabula, O., and Erie, Pa. The larger part of the traffic being handled is ore moving from Ashtabula to Conway, and coal from Conway to Ashtabula. The ruling grade on this line is 0.3 per cent and the engines are handling approximately 85 loaded ore cars, the rating being 7,100 adjusted tons, which amounts to about 6,000 actual tons.

The Consolidation type has long been the standard for freight service on the Pennsylvania Lines West of Pittsburgh. The recent designs developed practically the limit of the tractive effort obtainable with four driving axles. As the traffic conditions demanded heavier motive power, it was felt that the increase in tractive effort which would be secured with the Mikado type would be so slight that it was best to go to the use of five driving axles. This 2-10-2 type, which is known in the company's classification as the N-1-s was therefore designed. Orders have been placed with the American Locomotive Company for 35 of these locomotives and 25 of them are to be built at the Baldwin Locomotive Works.



Sections of Pennsylvania Lines West 2-10-2 Type Locomotive

Locomotives with five coupled pairs of driving wheels and a lateral motion driving box on the front axle cannot traverse curves sharper than 16 deg. In order to enable these engines to pass 23 deg. curves both the front and rear drivers are fitted with the Woodward floating axle. The tires on these wheels are set 53⅛ in. apart and the main driving wheels have blind tires. In order to permit of coupling on sharp curves a pilot drawbar with a long shank is used and the pilot beam casting is cored out where the coupler enters



2-10-2 Type Locomotive for the Pennsylvania Lines West

so that it can swing some distance on either side on the center.

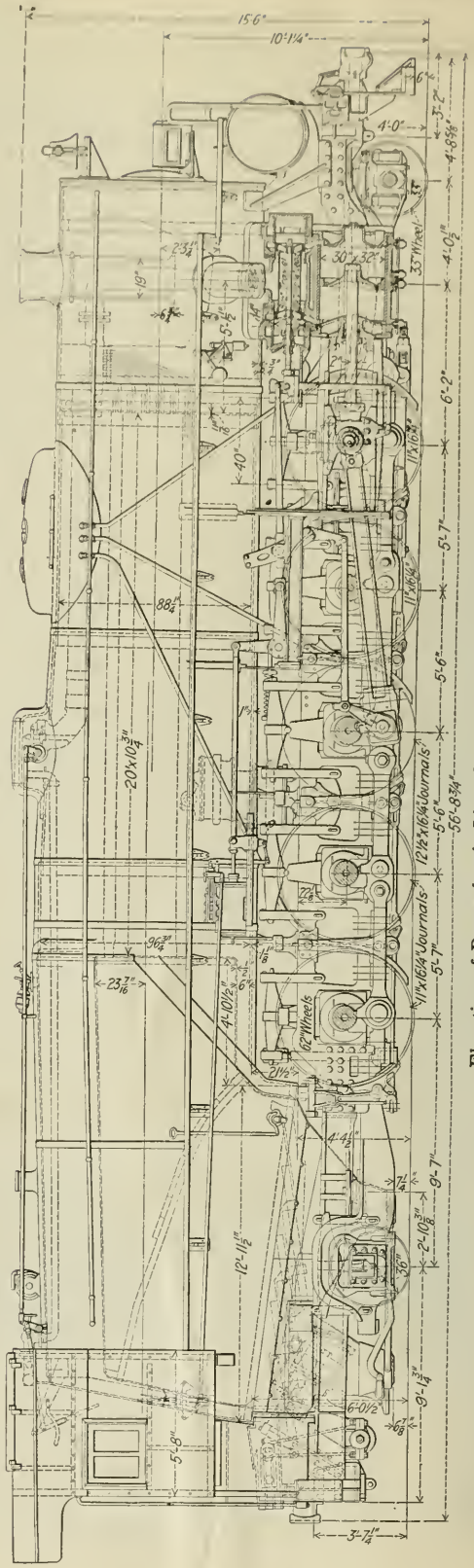
While designed primarily as a road engine, this type is well adapted for use in hump yard service. A unique design of cast steel road and switching pilot worked out by representatives of the Pennsylvania Lines West has been applied which makes it possible to use the engine in either service without the delay incident to removing the pilot and applying footboards or vice versa. Details of the pilot are shown in one of the illustrations.

The equalizing system is a very unusual departure from standard American practice. Instead of the three-point suspension introduced by Eastwick & Harrison in 1838, which has been universally used in this country for many years, a four-point suspension has been adopted. The leading truck is equalized with the front driving wheels, the three center drivers on each side are equalized together and the rear drivers are equalized with the trailing truck.

The valve motion, which is of the Walschaert type, has an extremely long travel. While a full gear travel of 7 in. has usually been considered the maximum that could be attained with this type of valve motion the design used on these engines gives a travel of 8½ in. The long travel is secured without excessive angularity by the use of a long radius rod and a long link combined with an eccentric crank of large throw. A similar arrangement has been in use for some time on a Consolidation locomotive and the results obtained have demonstrated that the theoretical advantage of the long travel is borne out in actual practice. The steam lap of the valve is 1⅛ in. and the lead ¼ in. The 14-in. piston valve has a long spool and the passages to the cylinder are made as short and direct as possible. The cylinders, which are 30 in. in diameter with a 32-in. stroke, have a Z-shaped piston with a cast steel center and a cast iron bull ring. The cylinder lubrication is effected by a two-feed force feed lubricator attached to the left steam chest. A two-feed hydrostatic lubricator, located in the cab, supplies oil to the air pumps and stoker engine cylinders.

The boiler has been designed with a view to securing adequate firebox volume and a large fire area through the tubes. The firebox is fitted with a brick arch and has a combustion chamber approximately 5 ft. long. There are 54 flues of 5½ in. diameter and 196 tubes 2½ in. in diameter. While the total heating surface is decreased by the use of the larger tubes, experiments have demonstrated that as tubes are lengthened beyond a certain point the evaporation does not increase proportionately. The most desirable ratio of length to internal diameter is approximately 100 and by using 2½-in. tubes this ratio is secured. Although the locomotives are now operating with a boiler pressure of 205 lb. the boiler is designed to carry 250 lb. The weight on the driving wheels is sufficient to permit of securing additional tractive effort and still maintain a satisfactory factor of adhesion. The Crawford underfeed stoker is applied to these locomotives. The driving cylinder is placed in inclined position on the left side of the engine.

The location of the main reservoirs presented a difficult problem. It was finally decided to place a 36-in. diameter reservoir ahead of the cylinder saddle. The braces leading from the smokebox to the frame are steel castings which also serve to support the reservoir. A three-rung ladder leads from the pilot beam to the running board. The air piping is arranged under the running board bracket which is designed especially to receive it. Two sets of 13-in. by 12-in. brake cylinders are set between the first and second drivers, both working on the same levers and operating the shoes on all five pairs of driving wheels. An 8½ in. cross compound compressor is used. Among the specialties applied are Pyle National headlight, Commonwealth locomotive cradle and Delta trailing truck, Raggonet power reverse, and Barco flexible joints.



Elevation of Pennsylvania Lines West 2-10-2 Type Locomotive

The principal dimensions and ratios of the locomotives are as follows:

General Data

Gage	4 ft. 8½ in.
Service	Freight
Fuel	Bit. coal
Tractive effort	80,942 lb.
Weight in working order	435,400 lb.
Weight on drivers	351,300 lb.
Weight on leading truck	23,100 lb.
Weight on trailing truck	61,000 lb.
Weight of engine and tender in working order	642,400 lb.
Wheel base, driving	22 ft. 2 in.
Wheel base, total	41 ft. 11½ in.
Wheel base, engine and tender	82 ft. 7¼ in.

Ratios

Weight on drivers ÷ tractive effort	4.34
Total weight ÷ tractive effort	5.38
Tractive effort × diam. drivers ÷ equivalent heating surface*	701.67
Equivalent heating surface* ÷ grate area	89.4
Firebox heating surface ÷ equivalent heating surface,* per cent	5.21
Weight on drivers ÷ equivalent heating surface*	49.1
Total weight ÷ equivalent heating surface*	60.9
Volume both cylinders	26.18 cu. ft.
Equivalent heating surface* ÷ vol. cylinders	273.1
Grate area ÷ vol. cylinders	3.06

Cylinders

Kind	Simple
Diameter and stroke	30 in. by 32 in.

Valves

Kind	Piston
Diameter	14 in.
Greatest travel	8½ in.
Outside lap	1⅛ in.
Inside clearance	⅛ in.
Lead in full gear	¼ in.

Wheels

Driving, diameter over tires	62 in.
Driving, thickness of tires	3½ in.
Driving journals, main, diameter and length	12½ in. by 15 in.
Driving journals, others, diameter and length	11 in. by 15 in.
Engine truck wheels, diameter	33 in.
Engine truck, journals	6½ in by 12 in.
Trailing truck wheels, diameter	36 in.
Trailing truck, journals	7½ in. by 13⅜ in.

Boiler

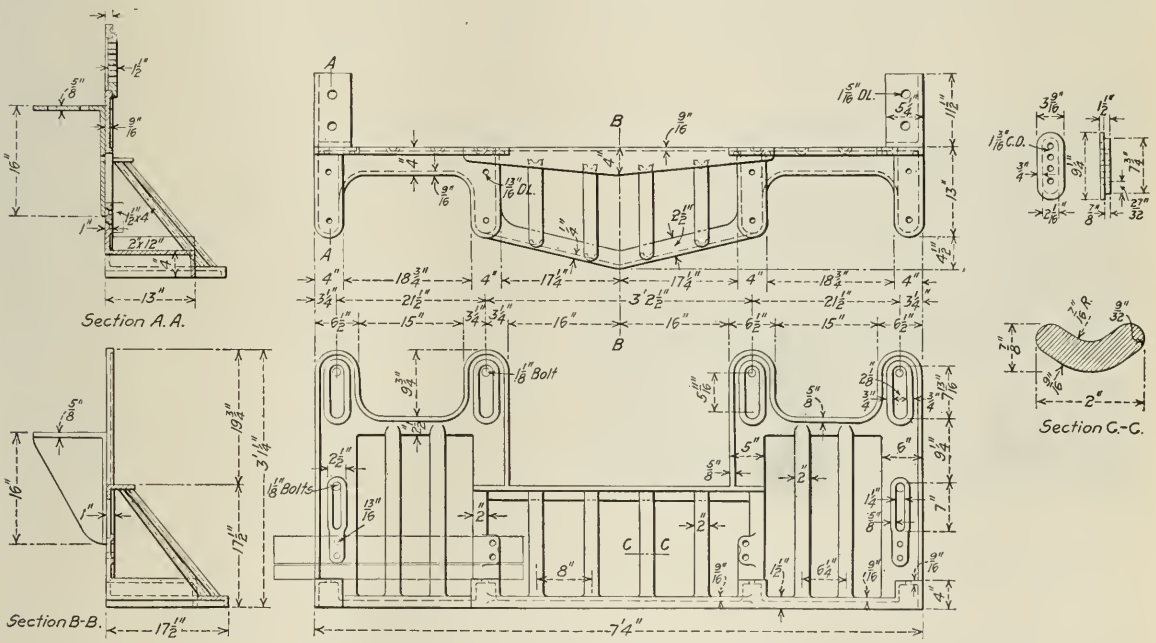
Style	Conical Belpaire firebox
Working pressure	†205 lb. per sq. in.
Outside diameter of first ring	90¼ in.
Firebox, length and width	80 in. by 144 in.
Firebox plates, thickness— Back and sides ¾ in., crown $\frac{7}{16}$ in., throat ½ in., tube ⅜ in.	
Firebox, water space	6 in.
Tubes, number and outside diameter	196, 2½ in.
Flues, number and outside diameter	54, 5½ in.
Tubes and flues, length	20 ft. 10¾ in.
Heating surface, tubes and flues	4,302 sq. ft.
Heating surface, firebox, including arch tubes	423 sq. ft.
Heating surface, total	4,725 sq. ft.
Superheater heating surface	1,618 sq. ft.
Equivalent heating surface*	7,152 sq. ft.
Grate area	80 sq. ft.
Center of boiler above rail	10 ft. 1¼ in.

Tender

Tank	Rectangular water bottom
Frame	Cast steel
Weight	207,000 lb.
Wheels, diameter	33 in.
Journals, diameter and length	6 in. by 11 in.
Water capacity	10,000 gal.
Coal capacity	20 tons

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

†Designed to carry 250 lb. per sq. in. pressure.



Cast Steel Pilot for Both Road and Yard Service

Report on Marshfield Collision

THE INTERSTATE COMMERCE COMMISSION has issued a report, dated November 27, and signed by W. P. Borland, chief of the Bureau of Safety, on the butting collision which occurred on the St. Louis-San Francisco near Marshfield, Mo., on September 17, resulting in the death of twelve passengers and three employees, and the injury of 35 passengers and five employees. Eastbound extra train No. 1260 carrying troops, collided with a westbound freight train, second No. 39. Responsibility for the collision rests on the train despatcher, and the engineman of No. 1260. The despatcher issued an order giving the troop train the right to the road, but did not send a copy to the freight train. He asserted that he transmitted a copy by telephone to the operator at Conway, at 6:08 p. m.; but this operator showed that he was out of the office at that time, and he produced corroborative testimony from a man who had accompanied the operator from his house to the station, after supper, about 6:20 p. m. The engineman of the troop train asserted that automatic block signal 2126 was clear for him, but evidence of other witnesses satisfied the inspector that it was in the stop position.

The despatcher had been in the service of this road only 25 days, but is said to have had several years' experience as an operator on other roads. The engineman had been a fireman since 1905 and an engineman since February, 1918.

American Locomotives Needed for Chinese Railways

By Charles Denby

Special Assistant to Department of State, in Millard's Review

One of the urgent needs of China today is locomotives. The demands upon the railways have far exceeded the expectations of the builders. The locomotives bought in the first instance have proved too small, and it is now clearly realized by the technical advisers of China that they must standardize upon a type that will meet their needs for a long time to come. This question is being earnestly considered at the present time, and the problem arises for American consideration: Will the standardization be along the lines of American design or will it be made to conform to a European model to the detriment of American interests?

Of the 15 lines composing the system of Chinese Government railways only one was built by the Chinese themselves; it is financed by the Chinese government and is operated exclusively by Chinese. The funds for the construction and equipment of the various other railway lines of China were furnished by foreign capital of various nationalities, but not in a single instance has America so constructed and equipped

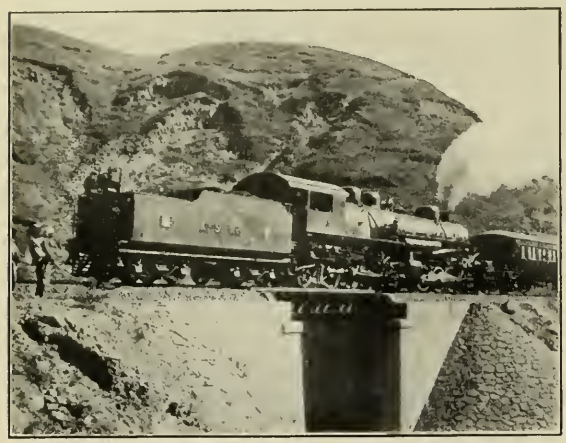


Photo courtesy Bureau of For. and Dom. Commerce

An American Built Locomotive on a Heavy Grade at Nankow Pass on the Peking-Kalgan-Suiyuan

any of these lines. As a result today the Continental (European) design of locomotive is predominant in China. On some of the lines, notably those under English and (hitherto) German influence, not a locomotive other than those built in accordance with the prevailing design common to the nation financing the railway was purchased or even considered, either for initial or subsequent equipment—at least up to the time of the outbreak of the war. Only in the case of the Chinese financed and operated railway have American builders been given a free hand, with the result that an American design was adopted and a thorough standardization of power effected on this line.

The latest statistics published by the Chinese Government railways (June 30, 1915) show that of a total of 6,600 kilometers (about 4,100 miles), including main and branch lines, industrial tracks, sidings, etc., the three principal trunk lines compose approximately 62 per cent of the total. One of these three lines is under English, one under Belgian and French and one under combined English and (hitherto) German influence. Out of a total of 638 locomotives in service on all lines at that time only 15½ per cent were of American design and manufacture, and on the English, Belgian and French lines mentioned, which operated at that time 365 locomotives, or approximately 60 per cent of the total, only 8, or approximately 2.2 per cent, were of American design and manufacture.

Since the outbreak of the war but few locomotives have been purchased and placed in service in China, owing principally, perhaps, to a lack of available funds and to internal disorders in the country. As a result of this and of the constantly increasing traffic, the railways are now urgently in need of power. As is often evidenced in the case of new roads, this particular instance of China shows that traffic has increased far beyond the estimates that were made when the initial equipment for power was under consideration, with the result that in addition to the natural depreciation and abandonment of locomotives on account of age, those left in service are light and not of adequate power for the most part to handle the traffic of today.

In 1917, 24 additional heavy locomotives were placed in service, and in 1918, up to the present, 2 more have been erected and 4 are under process of assembly for the Government lines. Orders have been placed or are about consummated for the further addition of 56 locomotives—all for the urgently needed heavier power. Of this number 38 are to be built strictly in accordance with American design and all are from American builders. In addition to this number there are 2 on order and 21 being considered for private lines; these locomotives are to be of American design and standards.

The question of the standardization of power and rolling stock is just now being most earnestly considered by the Chinese government, but a considerable time may elapse before this scheme becomes an assured fact. One American builder has for the past seven years been anticipating the coming of this event, and since the standardization of power on the Peking-Kalgan line every locomotive sold into China by this builder, whether for government or privately owned railways, has been designed and furnished with this end in view.

Pending the adoption of a standardized power by the Chinese government the greater the number of modern American design locomotives that can be furnished to the railways here the greater will be the opportunity to obtain the adoption of a strictly American design as the standard of power for China. The benefit of this to American interests is incalculable and should not be lost sight of.

Automobile Trucks in Iowa

The Highways Transport Committee of the State Council of National Defense, of the state of Iowa, reports that motor trucks are extensively used on the highways of that state in hauling livestock. In a report prepared for the purpose of showing the importance of having an extensive system of concrete highways in that state it is said that the livestock hauled to packing houses in Iowa—period of time not stated—has aggregated 225,600 head of hogs; 23,408 head of cattle, and 61,402 sheep. It is estimated that this amounts to 35,003 truck-loads, hauled an average distance of 35 miles; and that 6,250 railroad freight cars have thus been made available for other service. A considerable part of this livestock movement has been carried out by trucking companies which take freight and express from the cities to small-town merchants, and carry the livestock on the return trip. There are 61 such trucking companies. There are also in the state 187 trucks running on regular advertised schedules, hauling merchandise and farm products, but not taking part in the livestock traffic.

Government Ownership From a British Point of View

Nationalization Stifles Initiative, Adds to Administrative Costs and Discourages Inventiveness

From Engineering (London), December 13, 1918

THE ANNOUNCEMENT made last week by Mr. Churchill that the government had decided on the nationalization of the railways, renders it incumbent on engineers to exert such influence as they possess to prevent a repetition of the mistakes which have occurred on previous occasions when services hitherto administered by private companies have been taken over by the public. It unfortunately happens in the present instance that the possible advantages of nationalization lie on the surface, and are obvious to the meanest capacity, but it is all important for the future of the transportation problem that this "meanest capacity" shall not have the determining voice in the establishment of the new order of affairs. The dangers to be feared as a result of the suggested action are less patent, and are less likely to be generally appreciated, having relation to mind rather than to matter.

Orators have been eloquent in depicting public companies as caring for dividends merely, and nothing for the public. Nevertheless, in actual practice it has been the Post Office, and not the railway officials, which by their neglect and indifference have continued to provide themes for the pen and pencil of our modern satirists. The supercilious young lady who is occasionally found behind the counter of our postoffices, has had no counterpart in our railway services.

Practice Disproves Theory

How is it that in this country every great service taken over by the public from private companies has failed to realize the anticipations of the advocates of the change? The telegraphs were purchased with assurances of the most prosperous and profitable future. But few years had elapsed, however, before it had to be admitted that these forecasts had been wholly falsified, and that the service was being run at a loss, although the companies, hampered by restrictions from which the nationalized undertaking was free, had been nevertheless worked at a profit. Much the same has happened with the telephones, and it has not been without interest to observe during the past few days in one column of a journal, violent complaints of the inefficiency of the nationalized telephone service, and in another column rosy anticipations of the economies and improvements to be effected by the nationalization of our railways. Still a third instance of how far realization has fallen short of anticipation is afforded by the Metropolitan Water Board.

The telephones, of course, were acquired at considerably below a fair valuation. No credit was given for the imponderables which, as we pointed out last week, often constitute so large a proportion of the value of a growing concern. Mere materials were alone assessed, and no allowance made for the capital necessarily expended in pioneering work and in building up the organization. In America materialism is less rampant than here, and the Interstate Commerce Commission has definitely laid it down that expenditure, even on an experiment or enterprise would prove unsuccessful, may be fairly taken into account in valuing an undertaking. If progress is to be made, novel schemes and devices must be adventured on, and of these a certain proportion are sure to prove failures; yet their cost remains, notwithstanding, a fair charge on the enterprise.

In the case of the Metropolitan Water Board, it has been freely asserted that the price paid was excessive, but, as a matter of fact, the value of the mains alone was nearly equal to the full amount paid. To lay these mains in open country would have cost, under the most favorable conditions, not less than £10,000,000 (about $50,000,000) and the cost of main laying in towns is, as is well known, at least three or four times as much. Hence, the value of the mains alone was nearly equivalent to the full purchase price. To repeat our question, how is it that, in all these several cases, there has been such a wide discrepancy between promise and performance?

Administrative Charges Higher Under Public Control

Undoubtedly the main reason lies in the difference in the organization. The administrative charges tend to be much higher under the public than under the private control. This is, no doubt, contrary to anticipation, and some would assert, contrary to reason. Reason, however, is of itself but an indifferent guide to truth, and the late W. B. Bryan, chief engineer to the board, has stated that the administrative cost of the London Water Board exceeded the aggregate administrative costs of the eight companies which it replaced. According to a recent statement by Harold Cox, a similar result has followed the nationalization of the Swiss railways. He says that the administrative staff is larger than that of the five companies which were absorbed. The real cause of the inefficiency of the public services seems to lie in the fact that these increased administrative charges are all due to an increase in the clerical and statistical staffs, and to a reduction in the departments responsible for creative thought.

An interesting light on this matter is shown by a study of the terms on which the staff of the telephone company was taken over in 1911. Here the rule was laid down that any company official who, by showing initiative and imagination in the company's service, had secured a salary of over £700 (about $3,500) per annum, was, ipso facto (save in special cases), disqualified for the government service. So far from "men of push and go" being required, it was to a large extent the men of "push" who had to "go."

Initiative Stifled in Government Undertakings

In fact, the whole system of organization was changed. As described by a district superintendent a couple of years after the transfer, all initiative and independence of judgment was suppressed. He knew, he said, exactly where certain matters were going wrong, and how they could be remedied, but if he made any move whatever he would be straightway informed "that the matter did not concern his department." Again, small difficulties which, under the company's management, would be settled locally out of hand, had, under the new regime, to be referred to headquarters. The original memorandum received additions at each step of its stately progress from official to official up to the one man who alone had power to settle the affair, trivial though it might be. In many cases, moreover, the memorandum on reaching this official was returned along the same devious path for further data, and had again to retrace its steps to the departmental head before a final decision was taken. The net result was that, instead of the one man who understood the whole of the local conditions settling the matter in half an hour, hosts of officials had all to spend time on it, and weeks might elapse before the final settlement. Obviously, any such system as this must necessarily find em-

ployment for a vast army of clerks, so it is easy to see how the administrative costs are increased.

Executives Swamped with Trifles

The evil of such a system does not end here, one of its consequences being that the head of the department, who ought to have ample leisure for the consideration of important matters of policy, has practically his whole time taken up with trivialities which, in any efficient organization, would have never reached him. In this connection, it may be noted that on certain of the great American railways, it has been the custom to relieve the vice-president of all routine work, so that he and his immediate staff may give the whole of their time to the consideration of new proposals for increasing the effectiveness of the service. In the public services there is nothing analogous to this, and, indeed, the powers even of the heads of departments are often extraordinarily, and indeed ludicrously, restricted.

To sum up, the traditional organization of our public services has been to discourage initiative and independent judgment on the part of subordinates, and greatly to restrict responsible action in the case of heads of departments. As one result, we have not in any public service "*la carriere ouverte aux talents.*" Able young men, who later on should fill the higher administrative posts, get no opportunity as subordinates for the display of any but humdrum qualities, and are thus not sorted out from the general average. As one result, men competent to supervise the many new undertakings which had to be extemporized during the past five years, were found almost anywhere save in the civil services. Indeed, not the least debt of the nation to the railway companies is due to their work during the past years revealing the abilities of the numerous men which the state borrowed to control so many of our war services.

If the question of the nationalization of our railways is to come up for discussion, it is perhaps as well that it should come now, while the memory of this contrast between the results of company organization and public services organization is fresh in the public mind. It should make it easier to resist the attempt to establish a new organization molded on traditional lines, which all experience shows to have proved singularly unsatisfactory.

Nationalization Unsuited to a Democracy

No doubt the German state railways were managed with fair efficiency, even if the staff was mainly parasitic on English or American thought, but an organization which may be effective in an autocratic country is unsuited to a democratic one. Commenting on this point some 18 months ago we observed that while the best public service in a democratic country had never, in the whole course of history, been as good as the best in an autocratic country, yet, nevertheless, there was reason to believe that the worst in a democratic country had never been quite so bad as the worst in an autocracy. Whether this view can still be maintained depends very much on whether the Bolshevist regime in Russia is to be regarded as autocratic or democratic. Our own view is in favor of the first alternative, but some of the most fervent of those who claim to be the apostles of democracy in this country seem ardent advocates of the contrary opinion.

Standardization Versus Invention

Among the advantages claimed for the nationalization of an industry is that the reserve of stores will be greatly reduced by the greater standardization which becomes possible.

The theoretical benefit of such a change is obvious, but experience shows that it may, on occasion, be purchased somewhat dearly. In the case of the telegraphs, the extensive standardization of instruments effected on taking over these undertakings from the companies, destroyed competing centers of thought, and the result was, to a large extent, stagnation. A leading American authority has stated that up till 1870 more than one-half of the important improvements effected in telegraphy originated in Britain, but that subsequently the Postoffice simply imported improvements ready-made from abroad. On the other hand, we continued as before to make the most important contribution to improvements in submarine telegraphy, which remained under private direction and control. An instructive example of the difference between public and private action in this regard is afforded by the history of long-distance telephony. The principle now in use originated as is well known with Oliver Heaviside, but our postal authorities refused to help him to practicalize his ideas. Some abortive experiments were made, it is true, but not under his direction or control, and the scheme was reported to be a failure. Some years later Mr. Heaviside's idea was taken up in America and most ably worked out by Professor Pupin, who in contrast to Mr. Heaviside received the most generous support and reward from the Western Union Telegraph Company, with the result that all difficulties were overcome and the scheme made a practical success. Pupinized cables have, moreover, solved the difficulties of submarine telephony. It will be noted that there are many more systems of state telephones than company-controlled systems, yet this great advance was secured by a company and not by a state service.

The sole chance of maintaining the efficiency of our railway services under state control would be that the essential features of the present organization should not be materially changed. Of course, the ill effects of a change would not be experienced at once any more than they were in the case of the Metropolitan Water Board. In fact, a few years after the transfer the chairman of that board made a grandiloquent speech, in which he enumerated the many improvements which he claimed were due to the board; all these, he said, had been made "without one penny cost to the public." As a matter of fact, up to that date the board was, to all intents and purposes, living on accumulated capital. Every work, whether completed or commenced up to that date, was, in fact, a company scheme worked out before the drastic reduction in the engineering staff. Later on, when really new works had to be undertaken, the weak spot became evident. The staff was inadequate and the few creative minds retained were overloaded with routine.

Nationalization Means Loss of Creative Minds

With the transfer of the railways to the public, there will, undoubtedly, be a strong movement to reduce very largely the higher technical posts. Under mistaken ideas as to the all-importance of abolishing overlapping, independent centers of thought may be suppressed, with the result that our railways may become purely parasitic for ideas on company managed lines in other countries. It is of first importance that this tendency should be resisted, though even if former precedents be followed, the evil effects would not appear at the outset, any more than they did in the case of the Metropolitan Water Board. The best of the old officials—or some of them—would, no doubt, be retained, but if all initiative in subordinates is to be discouraged in accordance with the past traditions of our national services it will be impossible, as the present leading men die off or are superannuated, to replace them with men of equal caliber.

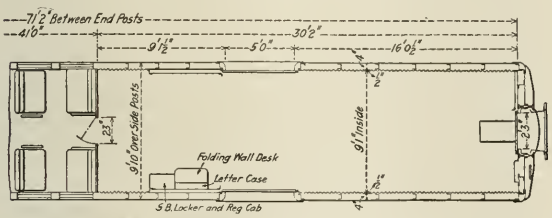
An investigation by the Interstate Commerce Commission of present methods of purchasing railroad ties, car material and crossing planks, and of the possibility of using substitutes for wood ties is proposed in a bill introduced in Congress by Representative Dyer, of Missouri.

Standard Passenger Car Equipment

THE COMMITTEE ON STANDARDS for Locomotives and Cars of the Railroad Administration has approved the general arrangements for the passenger; passenger and baggage; passenger, baggage and mail, and passenger and mail cars, the floor plans of which are shown in the illustrations. No other drawings, nor the specifications have been drawn for this equipment because of the uncertainty as to whether any of these cars will be built. All the cars are 70 ft. in length and are of the same general design. The illustrations show the complete floor plan of the passenger car and half plans of the other cars, as the passenger end of all cars is the same. The designs for these cars will follow in a very general way that of the 70-ft. baggage car, which was published in the *Railway Age* of September 27, 1918, page 585.

The following is a list of the specialties recommended by the committee for the standard passenger carrying cars:

Inside finish: Water and fireproof, ¼ in. mahogany window sills. Three star Agasote below wooden window sill and steel above.



Half Floor Arrangement of U. S. R. A. Passenger and Baggage Car.

Ceiling: Upper deck water and fireproof—three star Agasote ¼ in. thick. Lower deck water and fireproof—Agasote 3/16 in. thick. Deck to be painted with slush paint. Ceiling to be painted light color enamel of approved shade.

Ceiling decoration: Single plain sap green color line on lower and upper deck. Line only varnished over to hold decoration.

Window sash: Brass sash complete with fixtures as shown on Baltimore & Ohio blueprint No. 10,745. All windows to be double sashed except toilet room windows. Sash to raise 18 in.

Deck panels: All swinging deck panels to be equipped with T. U. Company's Eclipse ratchet. No deck sash to be used, swinging panels only at ventilators.

Window glass: American polished plate 3/16 in. thick, except in saloons and lavatories, which are to be equipped with pressed prism design 0-1, with smooth surface outside.

Door glass: American polished plate ¼ in. thick.

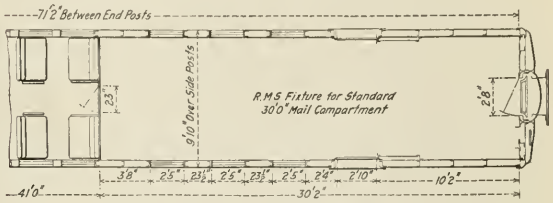
Window shades: Railway standard mercerized on inside, pantasote on outside. Width of curtain goods in windows not more than ¼ in. less than distance between window casing. Color of shade to be selected.

Heating system: Chicago Car Heating Company's vapor system to be guaranteed by manufacturers to register an inside temperature of 70 deg. when the outside temperature is 20 deg. below zero. Holes through center sills for train line sufficiently large to prevent chafing of pipe due to expansion or contraction. Piping so applied as to give ample clearance between all body and truck parts when cars are rounding 170 ft. radius curve. Same to include extra heavy pipe for train line.

Steam hose and couplings: Steam hose to be 1⅝ in. by 24 in. Couplings to be of the S-4 type.

Steam pipe: Train pipe 2 in. wrought iron. Pipe and fittings extra heavy. Piping inside of car 1½ in. standard pipe.

Foot rests or guards: Pullman type, perforated steel.

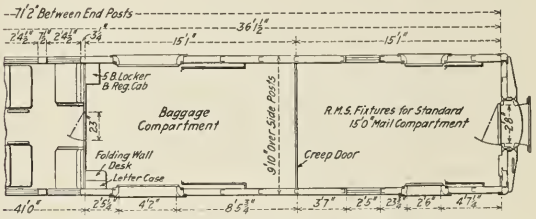


Half Floor Plan of U. S. R. A. Passenger and Mail Car

Wrecking tools and cases: Steel box fitted with No. 6 sledge, axe, saw, fire bucket, hack saw, six hack saw blades, cold chisel and steel bar, located to comply with state laws.

Hardware: To be of the Pullman type.

Floor covering: Floor covering to be of plastic material, thickness to meet linoleum ⅝ in. to the top of chanarch, and then an aisle strip of green or red linoleum laid so that the top will be on the level with the inlay and of suitable color to harmonize with the interior finish of the car, chanarch to be 22 B.W.G. gage galvanized. Brass strips to be placed on either side of the linoleum as shown on Baltimore & Ohio blueprint No. 31.189.



Half-Floor Arrangement of U. S. R. A. Passenger, Baggage and Mail Car

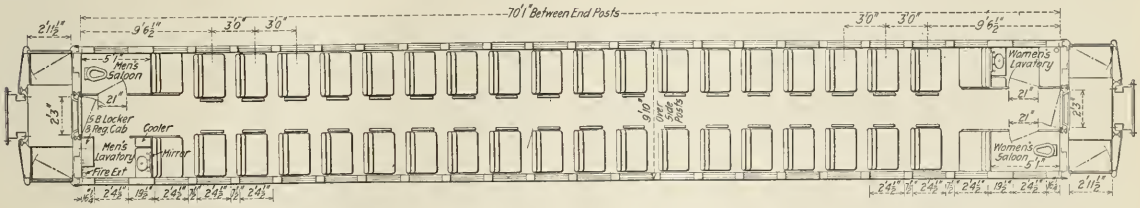
Equipment: One deck sash opener. One step box (Dunbar.)

Basket racks: Three-section continuous type.

Coat and hat hooks: In saloons and lavatories.

Check holder: Fitch.

Platform and end of car: Cast steel integral with body holster as manufactured by Commonwealth Steel Company, or built-up type of approved design.



Floor Arrangement of the U. S. R. A. Standard 70-ft. Passenger Car

Shade fixtures: Rex, all-metal shade roller. Curtain Supply Company, ring type No. 88.

Shade rolls: Rex, all-metal shade roll.

Seats: Hale & Kilburn, walk-over type, high back, with head rest, steel ends, wooden arm rests, No. 197, or its equivalent.

Seat covers: Seat covering to be selected later.

Ventilation: Clere story deck, eight per car. Utilities ventilator 100 per cent, Peerless 90 per cent, Garland-Honeycomb 75 per cent.

Water coolers: White metal, North Pole sanitary drinking fountains with filter attachment, arranged suitably to design of car.

Wash stands: White metal. Plumbing under wash stands to be open with nickel fittings. Wash stands fitted with Adams & Westlake throw-over lever type of faucets and drain fixtures of Pullman standard.

Water supply: Pullman standard air pressure water system. Galvanized steel piping. Cold water only. Metal tank box insulated.

Gates: Each car to be equipped with safety gates, Pullman type, and permanently attached at each end of car.

Steps: Steps to be of steel with metal safety treads of abrasive material and have no nosing.

Draft gear: Miner friction class 5-A-P.

Buffer device: Miner friction, Class B-10, or equivalent.

Diaphragm upper buffer: Fowler upper buffer spring.

Vestibule: Wide type Pullman standard, with Imperial wide face plate.

End doors: Mahogany with finger guards.

Diaphragms: To be of steel. First choice Dunbar, Style C. Second choice, Pullman. Third choice, Rex.

Vestibule curtains: Pullman, first choice; Acme Automatic, second choice.

Vestibule shield: Pullman or Acme revolving type.

Vestibule curtain, hook and handle: Rex, first choice; Robertson Safety, second choice.

Vestibule trimming: Enameled body color.

Vestibule grab handle: All handholds, grabs, to be smooth wrought iron, ⅞ in.

Trap doors and lifting device: First choice to be T. U. Company's National high station platform type, arranged to open up after and outside of vestibule doors. Second choice, Edwards, and third choice, Pullman.

Air brakes: The Universal, common standard, high-speed automatic brake equipment, schedule UC-1-18, shall be used without electric features and with type K-1 automatic slack adjuster placed on brake cylinder. J. M. expander ring. Ten pound spring type retaining valve and one conductor valve.

The air brake shall develop a nominal brake power of 90 per cent of the complete light weight of the car with 60 lb. cylinder pressure, and be capable of 150 per cent braking power in emergency.

All parts of truck and foundation brake gear to withstand stresses in accordance with M.C.B. standards; 1¼ in. extra heavy brake pipe to be used. All pipe fittings except those regularly included in the air brake schedule shall be "Extra quality individually tested pipe fittings for railroad air brake service." All air pipe to be blown out before pipe is assembled.

Hand brakes: Miner or Western Railway Equipment, or Lindstrom improved.

Braking and signal cord: Signal cord, ¼ in. steel cord, braided green. Conductor's cord, ¼ in. steel cord, braided red, both applied along center of car upper deck supported.

Painting: U. S. Standard.

Roof: Steel. To be of material which has been thoroughly sand blasted, painted and sanded on the outside.

Trucks: Cast steel.

Truck wheel base: 11 ft.

Center plates and center pins: Cast steel separable, arranged for application to cone bolster locking center pin.

Side bearings: Frictionless rolled side bearings for six-wheel passenger trucks. Miner first choice, Perry second choice, Woods third choice.

Equalizers: Wrought iron.

Wheels: 36 in. rolled or forged steel.

Pedestals: Cast steel.

Journal boxes: National Malleable Castings Company's pedestal type complete with lids for axles with 5 in. by 9 in. journals.

Journal bearing keys: To be drop forged M.C.B. dimensions suitable for axles with 5 in. by 9 in. journals.

Brake shoe: Diamond *S*.

Floor insulation: To be 1 in. quilted hair felt with paper on both sides.

Insulation, super-structure: Body insulation to be ¾ in. quilted hair felt with paper on both sides applied to inner surface of the side walls and end sheets.

Saloon hoppers: Dayton Company's Eckert No. 8 with porcelain hopper chute as manufactured by Dayton Manufacturing Company, or Pullman Standard (Duner). Hopper in women's lavatory to have double lid and men's lavatory to have single seat with horseshoe opening. Toilet paper holder, Pullman type, to be applied in each saloon.

Designating signs: Pullman style, to show location of each toilet, one illuminated sign to read "Men" in end of car where men's toilet is located. Sign to be placed inside of car on bulkhead. Same method to be used at ladies' end and sign to read "Women."

Orders of Regional Directors

INSURANCE COVERING PASSENGER AND FREIGHT ELEVATORS. Eastern regional director, file 1800-113A418. Same as orders noted on page 206 of *Railway Age,* January 17.

Employees Accepting Positions on Other Railroads at Higher Salaries.—Eastern regional director's file 1200-4-63A412, similar to Southwestern regional director's Order 148. See *Railway Age,* January 17, page 205.

Back Pay to be Included in December Operating Expenses.—The eastern regional director, file 401-7A419, orders that there be included in operating expenses for the month of December, 1918, any amounts of back pay provided for by General Order 27, or supplements thereof, which have not been included in operating expenses prior to that month. If pay rolls have not been prepared as accurate an estimate as possible should be made and included in December expenses.

Endorsements on Administration Passes.—The Eastern regional director, file 2100-29A432, states that it is understood that rubber stamp endorsements are being placed on Administration passes. There has been no authority for this and no endorsements or changes should be made on these passes without first securing the approval of the Director of Operation.

Writing Material on Club Cars.—The Eastern regional director, file 1600-83A433, requests that on such club cars, buffet-library cars, observation cars, etc., as are now in operation or may be restored in the future, a reasonable supply of writing material, together with pens and ink, be provided without charge to the public.

Food Conservation Posters in Passenger Cars.—The Eastern regional director, file 1500-80-1A429, states that on account of the necessity for exporting food to Europe, the Food Administration prefers to have its posters remain in passenger cars for the present.

Discontinue Picking Up of Stored Coal.—The Eastern regional director, file 301-3A426, advises that picking up of stored coal shall be discontinued immediately, except in cases of emergency.

Location of Air Pumps on Locomotives.—The Eastern regional director, file 500-73A424, states that when air pumps are applied to locomotives, care should be taken that they are so placed as not to obstruct the vision of men on the locomotives; as locomotives receive Class 1, 2 or 3 repairs the pumps should be properly located.

Transportation of Corporation Officers and Employes.—Supplement 9 to Order 109 of Southwestern regional director, similar to Supplement 14 to Circular 29 of Central Western regional director, abstract of which was published in the *Railway Age,* January 10, page 159.

Fire and Casualty Insurance on Construction Work.—The Eastern regional director, file 401-5A430, quotes from a letter received from Theodore H. Price, actuary to the Railroad Administration, as follows:

"I am writing to inform you that after careful consideration the Honorable John Barton Payne, general counsel to the Railroad Administration, has decided that inasmuch as the cost of fire and casualty insurance on construction work that is chargeable to capital account is properly to be considered as part of the cost of such work, such insurance should be provided in accordance with the practice of the railroads prior to governmental control. The premiums paid therefor are to be included in the accounting made and accepted for work of this character."

Disregard of Shippers' Routes.—The Eastern regional director, file 600-4-102A438, states that the Food Administration Grain Corporation complains that some railroads are not protecting the lowest rates on shipments which they forward un-routed, and which the railroads for efficiency reasons send via a route over which a higher rate applies, but in such cases are collecting the higher rate, and insisting that it will be necessary for the Grain Corporation to file reparation claims for refund. This is not in accordance with instructions of the regional director, file 3000-124, on the subject of Disregard of Shippers' Route, Article 4, of which reads as follows:

4. When traffic is forwarded by the railroads for efficiency reasons via a route to which a higher rate applies than over the route specified by shipper, the rate via shippers' route must not be exceeded as a charge for the movement over the substituted route.

Elimination of Sunday and Holiday Work.—The Eastern regional director, file 1200-2-29A420, reproduces a letter from the Director of Operations which is self-explanatory:

"If you have not already done so, won't you please immediately arrange for a thorough investigation and study to be made on the roads in your region with respect to the elimination of Sunday and holiday work, in order to carry out the desire of the director general as expressed in Supplement No. 13 to General Order No. 27.

"In order that the director general may know what progress is being made, and that his wishes in the matter are being fully met, I believe it advisable that you have your federal managers make reports from time to time indicating to what extent they have found it possible to either wholly eliminate or reduce to the minimum Sunday or holiday work."

Interest During Construction.—The Eastern regional director, file 2700A417 refers to file 2700A409, (*Railway Age,* January 17, page 205), regarding interest on construction expenditures and rates of depreciation accruals. That portion referring to depreciation on equipment coming into service subsequent to December 31, 1917, should be corrected to read as follows:

"Also arrange for accruing depreciation at the rate of 4½ per cent per annum on the book value or original cost of all equipment first placed in service subsequent to December 31, 1917, including equipment assigned by the United States Railroad Administration."

Director General's Name on Stationery.—The Eastern regional director, file 1500-1-3-8A431, orders that Director General Hines' name appear in place of Mr. McAdoo's on

any stationery which may be ordered in the future; correct by rubber stamp or other suitable means, such stationery as may be on hand, by substituting Director General Hines' name (Walker D. Hines) for that of Mr. McAdoo. It will not be necessary, however, to change any existing supply of tickets or tariffs.

Rental Charge on Locomotives.—In Order 150 the Southwestern regional director announces that the rate for the rental of locomotives to industries and small lines has been set at one-tenth cent per pound of tractive power per day with a minimum of $30 per day, and that this rate of rental will apply in all cases of locomotives loaned to any such industries or small lines. Any engines rented which are covered by a contract entered into prior to the date of Order 126 of the Southwestern regional director, shall continue at the same rate of rental as provided in such an agreement.

The Master Boilermakers' Association.—The Eastern regional director, file 102-1-9A435, states that the Master Boilermakers' Association will hold its convention at the Hotel Sherman, Chicago, Illinois, May 26, 27, 28 and 29, 1919. As this organization has been recognized and encouraged by the railroads on account of its educational value, approval has been given for the holding of the convention. Please arrange for master boilermakers, boiler shop foremen, general boiler inspectors and others employed in a similar capacity to attend, as far as they can be spared without detriment to the service. Each road should follow its usual practice with respect to allowance of time and expenses and furnishing transportation for men who may properly be permitted to attend this convention.

Assessments for Current Expenses of Associations.—In Supplement 3 to Circular 136 the Southwestern regional director announces that no individual railroad under federal control should maintain and pay for more than four memberships in any one traffic club. He asks that statements be prepared showing the number of memberships which each road has in traffic clubs, giving the full name of each organization and its location. In case it is desired to take out additional memberships in traffic clubs where the number is less than the maximum of four, the approval of the regional director should be obtained.

Railway Storekeepers' Association.—The Eastern regional director, file 1500-11A413, quotes a letter received from H. B. Spencer, chairman, Central Advisory Purchasing Committee, as follows:

"A meeting of the Railway Storekeepers' Association will be held at the Hotel Sherman, Chicago, Ill., on January 27, 28 and 29, 1919. The status of the association has been approved by the director general, and this is the first meeting which has been held since the railroads were taken under federal control. In view of the important economies which it is confidently expected to effect through the re-organization of the stores department which has been undertaken, and the desirability of having all of those who are charged with the duty of procuring, handling and distributing the material obtain the benefit of personal discussion of the many questions involved, we would appreciate it if you will request your federal managers to arrange to have as many of their purchasing and stores department officers as possible in attendance at this meeting. It is believed that this will greatly assist in the introduction of uniform practices, which it is the desire to establish as speedily as possible."

Passes for General Chairmen of Committees of Employees' Organizations.—The Eastern regional director, file 2100-13A415, states that it has been decided that it will be the policy of the Railroad Administration to issue annual railroad transportation to the general chairmen of committees of employees' organizations, where the application is properly made and it can be shown that such chairman actually represents the class of employees he claims to represent. This will include also the granting of the necessary leave of absense in the usual manner during the incumbency of such chairman to enable him to carry on the business of his Association. It will be proper to honor requests of this character where annual transportation over the home road only is desired. Requests for off-line transportation should be forwarded to the Director of Operation.

Railroad Business Mail.—In Order 151 the Southwestern regional director announces that federal-controlled roads may carry as railroad business mail, without payment of postage, mail which relates to the business of other railroads under federal control, which is sent by and addressed to officers or employees of controlled lines. This mail should be handled with care, and if particular routing is indicated on the envelope it should be strictly observed. Only mail of special importance should be registered.

Handling Labor Matters with Adjustment Boards.—In Circular 69 the Northwestern regional director calls attention to paragraph 10 of the director-general's Orders 13, 29 and 53 which require certification of the chief operating officers of the railroads to all cases referred to the Boards of Adjustment Nos. 1, 2 and 3. The regional director states that the federal manager or general manager, when there is no federal manager, is the chief operating officer so far as concerns matters referred to boards of adjustment. However, the federal manager may delegate to his general manager or general managers, as he may consider advisable authority to certify such cases to these boards. When he does so, however, he must file with the Division of Labor the names of the officers to whom such authority has been delegated.

Standard Form for Stationery.—In Supplement 5 to Circular 6 the Northwestern regional director announces that it will not be necessary to discontinue the use of stationery containing the name of Mr. McAdoo as director general. Bills of lading and other printed forms will be valid and binding if executed by a duly authorized representative of the present director general, even though Mr. McAdoo's name should appear. It will, however, be proper to eliminate Mr. McAdoo's name from stocks of bills of lading and other contract forms of stationery on hand so as to leave the same reading: "United States Railroad Administration, Director General of Railroads, North & South Railroad." This should be done so far as reasonably practicable on all stationery on hand. This will apply to bills of lading (both bills furnished by the carriers and bills furnished by the shippers) but it is not to be construed as a positive requirement that all bills of lading accepted from shippers must have Mr. McAdoo's name eliminated therefrom. New stocks of all stationery, excepting time-tables, should employ the form: "United States Railroad Administration, Director General of Railroads, North and South Railroads." This will apply to bills of lading and other printed forms partaking of the nature of contracts, as well as to other stationery except time-tables. Working time-tables for employees should use the form "United States Railroad Administration, Walker D. Hines, Director General of Railroads, North & South Railroad." The Eastern regional director has issued a similar order, file 1500-1-3-8A441.

Care of Sick and Wounded Soldiers.—The Eastern regional director, file 1600-87A445, quotes George Hodges, Manager, Troop Movement Section, Washington, D. C., in regard to arrangements made by the war department for the care of sick and wounded soldiers at important transportation centers. As additional medical officers are assigned to this service, advice will be given to the railroads concerned.

"Surgeon general, War Department, has assigned medical officers to various important transportation centers, as Laiison Officers, in connection with transfer of sick and wounded soldiers.

"Co-operation of railroads is requested, and that office or desk space in main terminals be provided, advance information given, expected time arrival such trains, access thereto, information relative to breaking up trains at diverging points, advice relative to feeding arrangements, rendering every facility consistent and accepting helpful suggestions or assistance offered with a view to providing most satisfactory and comfortable handling of sick and wounded. Such officers have already been sent to Richmond, Baltimore, Washington, Salisbury, N. C.; Philadelphia, Chicago, Cincinnati and New York."

Continuation of Memberships, Assessments, Dues, etc.—The Eastern regional director, file 102A444, advises that

participation by carriers under federal control in the expense of memberships, assessments, dues, etc., in associations, organizations, etc., which were authorized for the year 1918, may be continued during the year 1919 on the same basis as heretofore authorized, such expense to be charged to operating expenses, provided if, in your opinion, any of these memberships, assessments, etc., should now be discontinued, that you bring the matter to my attention. As heretofore, proper authority should be secured from this office before expenses of this nature are assumed, where such authority was not extended in 1918.

Billing for Empty Tank Cars.—The Eastern regional director, file 2000-28A442, announces that the office in charge of F. W. Boltz, supervisor oil traffic, has been abolished and hereafter disposition for empty tank cars on hand without billing will be furnished by the owners as heretofore.

Railroad Hearings Before Senate Committee

Julius Kruttschnitt Compares Government and Private Operation of Roads—Mr. Thom's Argument

WASHINGTON, D. C.

ARGUMENTS BY ALFRED P. THOM, counsel for the Association of Railway Executives, and a comparison of the results obtained under the direction of the Railroads' War Board, presented by Julius Kruttschnitt, chairman of the Southern Pacific Company, constituted the testimony before the Senate Committee on Interstate Commerce during the past week. Mr. Kruttschnitt was to be followed by representatives of the brotherhoods of train service employees. It is understood that the House Committee on Interstate Commerce will soon begin a similar hearing on the question of the disposition of the railroads. Mr. Kruttschnitt's statement was as follows:

Inasmuch as the railroads under private management stand charged with having broken down and failed to render the public service expected of them, and with being in deplorable condition, lacking both in equipment and terminals, at the end of 1917, when they passed into the hands of the government, I desire to place information before the committee that will test the correctness of these assertions, and to present additional facts that will convince them, I hope, of the ability of the owners of the properties to serve far more efficiently than they have ever been able to do in the past, if afforded the reasonable assistance that Congress alone can give. Profiting by experience acquired under both private and government operation, the carriers earnestly desire to provide a better system of operation by combining the initiative and beneficial features of competition inherent in private ownership with the benefits developed during the operation by the government unhampered by legal restrictions.

In denying that private operation failed or broke down, I respectfully ask permission to show wherein it did neither the one nor the other, and how with a plant provided by private owners it gave service that has never been equalled in the history of transportation, and that with legislation permitting practices heretofore prohibited it can and will, by combining the good and eliminating the bad features of both federal and private operation, give a service better than any that has ever been given in the past.

It has been frequently stated that the railroads of the country were in a very bad condition on January 1, 1918, when they were taken over by the government. In a despatch from Washington in the New York Sun of December 20, the director general is quoted as saying that existing rates were instituted to pay "the heavy cost of reviving the roads from the paralysis that seized them when the government took control," and also "they were admittedly run down and huge sums were necessary to get them into efficient operation," and in his statement before the Senate committee he says, "There was inadequacy of terminal facilities." "In the fall of 1917, despite strenuous efforts, and yet under a larger degree of co-ordination than had ever before been attempted, to prevent such a situation, a paralysis of the transportation situation again occurred."

The Interstate Commerce Commission's report of December 1, 1916, was quoted to show how bad transportation conditions were in that year. As a result of unified private control the commission's condemnation of 1916 is changed to commendation one year later.

In its report of December 1, 1917, the Interstate Commerce Commission says: "Equipment has been taken from sections where it was less needed to other sections, where military and commercial needs required more equipment than there was available, and such stupendous movements as those of the cantonment construction material and the troop transfers have been made without seriously interfering with the commercial business of the country. While conditions have been extraordinary and while traffic has not always moved as carriers and shippers would have had it moved, the essential needs of the country have to date been cared for."

The difficulties that could neither be escaped nor neutralized were well understood at the time to be impending demands for increased wages to put railroad labor on a parity with labor in other industries, and the necessity for financial help required by many of the railroads. Indeed, these were the reasons that the President gave to the members of the Railroads' War Board in person a few days before he issued his proclamation.

The latest statistics of government operation available to us when this memorandum was prepared covered the nine months ending September 30, 1918. This period began on January 1, 1918, which marked the end of nine months of unified private control and management and the beginning of nine months of government management.

The percentage of freight cars in shop or awaiting shopping was the same in both years.

The percentage of freight locomotives in shop or awaiting shopping was 13.8 in 1917 and 14.9 in 1918.

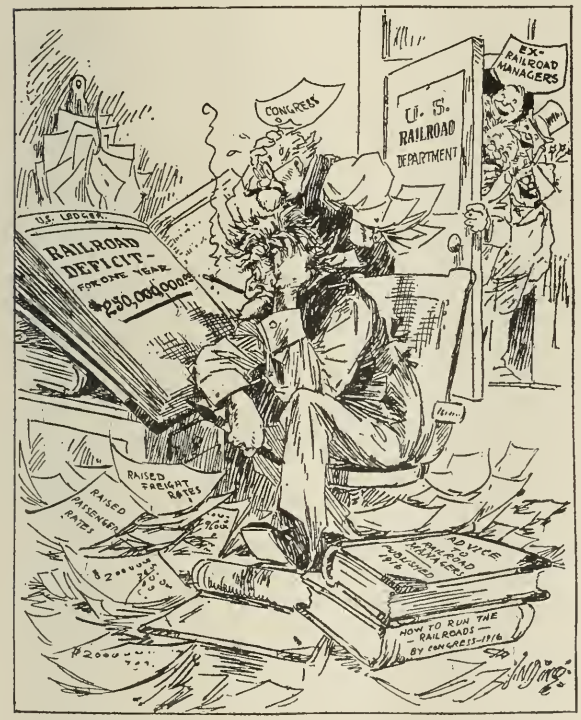
The director general claims to have stored, ready for winter service, 1,189 locomotives, while one year ago there was not one in storage.

At the close of 1917 there remained undelivered 3,400 locomotives and 33,000 freight cars ordered by the carriers, many of which were for the Eastern trunk lines, on which freight congestion was most severe. This shortage was not unexpected, because shortly after the declaration of war we were informed that the Council of National Defense found it necessary to direct builders to give precedence to locomotives for Great Britain, France and Russia; whereupon the Railroads' War Board considered appealing to the council to take account of the needs of our own roads, but the conclusion was reached that agencies conducting the war should not be embarrassed with our troubles, which we determined to surmount as best we could. We believed this was proper in the circumstances, although, as expected, it produced a shortage of locomotives at the end of 1917. The accumulation of 1,189 locomotives represents the deliveries during 1918 on

carriers' orders and on those of the United States Railroad Administration for 1,400 locomotives, only 126 of which, however, had been delivered up to the first of November. Had the severe weather conditions of 1917 replaced the mild weather of 1918 this reserve would have been impossible.

The terminal facilities, main and other main tracks were substantially the same, as there were few additions made in the first nine months of government control.

As of September 30 only 92, or less than one-tenth of 1 per cent, of the 100,000 federal cars had been delivered, and but 126 of the federal locomotives; so that it may be said without substantial inaccuracy that whatever transportation service has been rendered by the federal Railroad Administration has been rendered with facilities provided by private foresight and management, with equipment—counting both locomotives and cars—in better physical condition at the end of nine months of private unified control than at the end of



From the New York Tribune

Not So Goldarned Easy As It Looked

nine months of government control, by continuing practices devised by the carriers and by supplementing them with others which the carriers long had desired to use but were restrained by law from so doing.

If, under these conditions, no greater traffic was handled in 1918 than in 1917, greater ability and efficiency for government administration can hardly be claimed.

The volume of freight traffic measured by tons of freight carried one mile in the nine-month periods was:

1917	330,486,760,286	1.3 per cent greater
1918	326,306,832,131	

and the maximum volume of freight traffic handled in any one month was:

May, 1917	39,273,449,624	1.3 per cent greater
July, 1918	38,761,290,750	

The sole items in which 1918 shows improvement over 1917 are in average tons of freight per car of 29 against 27.3, an increase of 6.2 per cent for the period; but for the month of December, 1917, at the end of nine months of private unified control, the average tons per car was 29.2 tons, and the corresponding figure for September, 1918, after nine months of government unified control, was but 29.7 tons.

The average train load in the two periods was 667 and 678 tons, respectively, an increase of 1.6 per cent, but as the increases in carload was 6.2 per cent a less number of loaded cars per train was hauled.

A press despatch in the New York Times of January 2, 1919, credits to the Railroad Administration an estimate of the operating expenses of 1918 at $3,800,000,000, or $1,000,000,000 more than 1917. This expenditure was made to increase efficiency; nevertheless roads that are alleged to have been run down at the end of nine months of unified private control show:

1. A larger volume of freight traffic handled in nine months under private than in the same period under government control.
2. The largest volume of freight traffic *ever handled in any one month.*
3. Loaded car mileage 7.5 per cent larger than under government control.
4. Greater number of loaded cars per train than under government control.
5. Miles run per locomotive per day 7.2 per cent higher than under government control.
6. Miles run per freight car per day 6.1 per cent higher than under government control.
7. The physical condition of freight locomotives better than under government control.
8. The condition of freight cars equally as good as under government control.

As weather conditions both at the end of 1917 and the beginning of 1918 were unusually severe, the comparison of the two nine-month periods is not unfair.

Whence it follows that increased efficiency under government control is, to say the least, not proven.

Reforms Which Should Be Continued Under Peace Conditions

Mr. Kruttschnitt discussed the list of reforms mentioned in Mr. McAdoo's testimony as follows:

1. The maintenance of the permit system so as to control the traffic at its source.

Unquestionably of great benefit in preventing congestion, but cannot be continued without government authority. Shippers would not submit to dictation of carriers under normal conditions. During the war patriotism controlled them.

2. The maintenance of heavy loads for cars.

The railroads under private management have for years devoted a great deal of attention to this feature and the carload was increased very largely during unified control in the last nine months of 1917, being 29.2 tons in the ninth month of private control compared with 29.7 tons in the ninth month of government control.

3. The pooling of repair shops.

This was done to some extent under private control, and has been continued under federal control.

4. The elimination of circuitous routes, i. e., competitive routes.

This is synonymous with the suppression of competition and is impracticable under private control without special statutory authority. A mere suggestion to do this in 1917 prompted an immediate inquiry by the attorney general as to what was contemplated. The benefit of this practice, which deprives the shipper of choice of routes and competitive facilities and service, is very much exaggerated; the director general says that during a year of federal control 16,863,633 car miles have been saved in the Eastern and Northwestern

regions alone, which is only two-tenths of 1 per cent of the total freight car miles run in these regions.

In recommending the elimination of circuitous routes the interests and convenience of the public served by them do not seem to have been considered. The great preponderance of traffic in our country is long-distance through traffic, competitive with other rail, or water, or part rail and part water routes. If, at its inception, any line projected to develop traffic, following a policy under which our country has been built up, had been prohibited from engaging in through traffic because it was longer than an existing line, it would never have been built, as it could not possibly have existed on the revenue solely derived from local traffic. In other words, it was able to develop and serve local communities by reason of supplementing local with through freight revenue.

If the circuitous route can make satisfactory earnings from the carriage of freight at regulated rates, why should it be denied the right of doing so? The ability to control such traffic evidences a public necessity, for obviously if such a route did not give better facilities and service than the direct route no one would use it, no matter how earnestly persuaded by agents of interested railroads.

The use of circuitous routes in emergencies is often imperative.

5. The unification of terminals.

Under private operation it is not clear that this could be done without infraction of law, but a great deal was done during the life of the Railroads' War Board in the way of extending the common use of terminals.

6. The maintenance of the "sailing day plan."

The general adoption of this plan by the Railroads' War Board followed a publication of its benefits by the Pennsylvania Railroad Company, in the autumn of 1917, the first large system to put it into general use. It is unquestionably beneficial and, as a war measure, the inconvenience of less frequent service was tolerated with great good-temper by the public.

7. The consolidation of ticket offices.

Unquestionably of benefit in places and should be continued with discrimination, if permissive statutory authority can be obtained. In the government suit for unmerging the Union and Southern Pacific Systems, a point to which the prosecuting officers of the government attached much importance as proving infractions of the anti-trust law, was consolidation of ticket offices. As a result of the litigation all consolidations of this character were broken up.

8. The utilization of universal mileage tickets.

Unquestionably a good thing and should be continued under private control and protective restrictions. Apparently no legal obstacles.

9. The standardization of equipment.

Standardization of locomotives is unwise and unnecessary. To obtain maximum efficiency of a locomotive and corresponding minimum of cost of transportation demands close study of the alinement and grade systems, the nature of fuel, strength of bridges, weight of rail, length of turntables, depth of roundhouses and lengths of freight passing sidings on the line on which they are to be operated. As these features are different for each line, no locomotive can be designed to serve all lines with maximum efficiency; hence, if a standard locomotive is to be prescribed for use on all lines a compromise is the only possible solution of the problem, and a jack-of-all-trades-master-of-none locomotive is the result. The owning line must put up with indifferent service in order that some other line may be able in emergencies to borrow a locomotive similar to its own in all respects. The owner must be satisfied with 80 or 90 per cent efficiency for substantially *all* the time in order that a borrower may enjoy similarly lowered efficiency for a very short time. The director general credits standardization with prompter deliveries of locomotives. May it not be due to priority given to material for federal locomotives? Some Southern Pacific locomotives are now 12 months overdue because of preference accorded federal locomotives, and the company itself is very much in arrears in completing locomotives which it is building in its shops because of delays in getting material.

The standardization of passenger equipment is not necessary, as it seldom leaves the rails of the owner.

Standardization of certain classes of freight cars is desirable, but should not be obtained at a sacrifice of transportation efficiency of the owning line by forcing it to use a car unsuitable for its traffic because of excessive deadweight, restricted cubic capacity, etc., etc. Most of the important details of cars have been standardized as a result of the studies of the Master Car Builders' and Master Mechanics' Associations.

Standardization, unless intrusted to officers immediately responsible for net revenue, will lead to the sacrifice of the substance of *certain* economy in operation to the shadow of *uncertain* economy in manufacturing costs.

10. The maintenance of the uniform freight classification introduced by the United States Railroad Administration.

Unquestionably of benefit and can and should be continued under private operation. This monumental work, on which the carriers had been engaged for several years, was completed just before federal control, and the government deserves credit for putting it in use immediately.

11. The maintenance of common timetables between important points.

The railroads have desired for many years to bring this about, but have been prevented by fear of violation of statutes.

12. The maintenance of high demurrage rates and uniform rules.

Desired for many years by the railroads and urgently recommended by the Railroads' War Board during its existence. The permission of the commission to increase demurrage rates was obtained, but its order was modified in a short time to such an extent as to deprive the carriers of its expected benefits.

13 and 14. The establishment of through waybilling freight from point of origin to destination, and rendering unnecessary the rebilling by connecting or intermediate routes.

Unquestionably of great benefit. If the practice means what the language implies it should break up to a large extent, if not entirely, the practice of reconsignment, which has been a most fruitful source of delay and congestion.

15. The elimination of the old practice of paying in mileage or per diem rental for the use of freight or passenger cars of one carrier by another.

This would be possible to a considerable extent by pooling certain classes of cars in general use, but not all of the freight cars of the country, a plan for which could no doubt be worked out with the authority of the Interstate Commerce Commission, which under the Esch bill is vested with control of the carriers' equipment. Carriers should be allowed to enjoy the exclusive use of special equipment designed to suit special conditions and produce minimum costs of transportation.

The necessity for pooling passenger cars does not exist, as in general their use is confined to the owning lines, without inconvenience to the public. When it is necessary they can and should be freely exchanged.

16. The simplification of the old practice of apportioning interline passenger revenue.

As we understand this language, the practice can be followed as well under private as under federal operation; however, it is a matter in which the public is not interested.

17. The utilization of water routes for the relief of crowded rail lines.

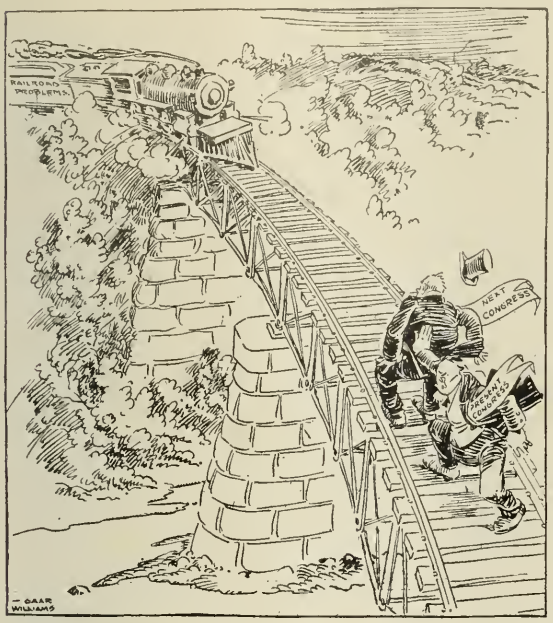
This should unquestionably be done, but past experience has shown that there is no equipment on the water routes to accommodate freight; therefore it is impossible for them to afford relief. Representatives of water-route interests were

met in conference by the Railroads' War Board on several occasions and assured of the co-operation of the carriers, but nothing ever resulted from these conferences because of lack of water-route equipment.

Economies

The director general asserts that reports from five of the seven regions show that on a group of selected principal items, savings totaling $85,576,424 have been effected in 1918. Estimating a pro rata saving for the other two regions would total $119,806,000.

For the first seven months of federal control 47,420,000 passenger miles were cancelled. Inasmuch as the director general says that the elimination of many passenger trains could hardly be expected to persist after the declaration of peace, we estimate the reduction for the entire year at 40 per cent more than that for seven months, making a total of 66,388,000.



From the Indianapolis News.

You Do It

The expense per train mile for 1917 was $2.30. The estimated increase in operating expenses of 1918 over 1917 is 34 per cent, which will raise the cost of a train mile to $3.08. From computations made on Southern Pacific in 1916 of the cost of a passenger train mile according to a rule prescribed by the Interstate Commerce Commission it is shown to be 38.55 per cent of the total train mile cost; whence the cost of a passenger train mile in 1918 would be $1.20 and the cost of the reduction in passenger mileage would be $79,665,000, leaving the economies from all other sources $40,141,000. The saving from suppressed passenger service represents comforts and accommodations of which the public has been deprived.

In his report to the President dated September 3, 1918, the director general claims to have saved:

Per cent of operating expenses		
0.16	$6,115,000	in the salaries paid to officials and to counsel;
0.18	7,000,000	in advertising;
0.11	4,424,000	in consolidated ticket offices;
0.03	1,186,000	in insurance; and
0.32	12,142,000	in the abolition of outside agencies.
0.80		

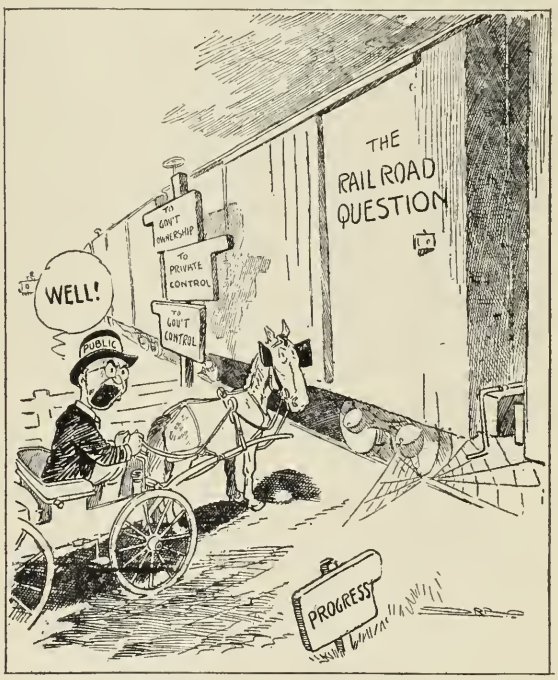
which leaves $9,274,000 to represent economies from all sources other than those specified.

The secretary of the interior evidently does not consider the suppression of advertisements and the consolidation of ticket offices unalloyed benefits, because in his last annual report, after mentioning various drawbacks to tourist travel, he says:

"The consolidation of ticket offices in the large cities also adversely affected national park travel. *With opportunity gone to obtain accurate information* concerning the more or less complicated routes from the east to the western parks, many preferred to spend their vacations in their customary resorts, with whose ways and means they were well acquainted.

"It is earnestly hoped that, with the close of war, these discouragements to travel will be fully removed before the next season. Tourist travel should be heartily encouraged. Furthermore, *the important work accomplished by the railroads* and this department in close co-operation during the last four years in the direction of informing the people of the country concerning the greatness of their scenic possession and recreational areas *should not be lost.* The national park system is one of America's greatest assets and it must not be overlooked in planning the development of American industry after the war."

Compelling the railroads to pay their corporate officers out of corporate funds instead of charging these expenditures to operating expenses, as was done during the test period, diminishes the fixed return of the railroads and to that extent subjects them to the loss of double the amount. Yet the saving from all of these specified sources totals considerably less than 1 per cent or 0.80 per cent.



From the Chicago Tribune

Blocking Traffic

Nearly all of this insignificant amount accrues from withholding comforts and conveniences from the public that they have long enjoyed and which causes numerous complaints and unfavorable criticism, and inspire resolutions of trade bodies favoring the return of the railroads to their owners,

with legislation to enable them to meet existing conditions. The 10,803,053 car miles saved by re-routing freight amounts to but two-tenths of one per cent of the total freight car mileage of the regions in which the economy was effected.

While much stress has been laid on the small economies which we have enumerated, they have been sources of irritation and friction out of all proportion to their amounts, and their perpetuation under private or government operation seems unwise. Rearrangement of local passenger service without over-much consideration of the public's views; indifference to promoting traffic or settling up vacant lands; and neglect of small matters affecting the personal comfort of the traveler that have grown out of competitive conditions and been created by local managements directly responsive to the needs of the community, are some of the reasons given by the patrons of the roads for desiring their return to private management, with such legislation as will enable the owners to receive them back from the government.

The Railroads' Plan

The plan evolved by our committee, after arduous study extending over a period of about six years, that has been presented to you by our chairman, Mr. Cuyler, and expounded by our counsel, Mr. Thom, has been adopted by the Association of Railway Executives, representing about 92 per cent of the railway earnings of the country. In it we ask Congress to make it possible for the carriers to give the public the advantages of conservation of capital by requiring unification of lines and terminals, when required in the public interest, by promoting useful consolidations, and permitting agreements as to rates and practices, the benefits of which have been proven during federal operation, but which the carriers by law have been prevented from supplying.

Its fundamental features, to which details of organization and operating machinery are subordinate, are:

(1) The creation of a department of transportation, headed by a secretary, who would sit at the President's council table, who would relieve the Interstate Commerce Commission of its executive duties; and in whose jurisdiction would be centered rate regulation subject to revision by the Interstate Commerce Commission, and the fixing of wages, and who would use the power of the administration to maintain proper service, to create the necessary credit for the carriers, and to maintain harmonious relations between employers and employees.

(2) The adoption of a fixed policy as to the revenues of the carriers by requiring that the influence of the President, through his secretary of transportation, shall be put behind movements for increased rates which he finds proper, and the establishment of a statutory rule for rate-making, which shall require that rates be not only reasonable but adequate and sufficient to protect existing investment and to attract capital necessary to maintain existing properties up to the standard of the public need, and for the construction of extensions and branches.

(3) To provide for compulsory federal incorporation and for the elimination of the conflict of regulating power between the states and the federal government as to all essential matters, including rates, state and interstate, with as little interference as possible with the state commissions in carrying out the intended purposes.

I wish to record the hearty approval and recommendation of the plan by substantially all of our constituents; as well as my own, and to express the belief that if transmuted into law it will mark an epoch in the transportation history of the United States. Competent critics, both home and foreign, have heretofore characterized the service of the railways of the United States as the best in the world, notwithstanding they have the lowest capitalization, pay the highest wages and collect the lowest tolls from the public. We believe that the character of service that has merited this high praise can be greatly improved by profiting from the experience gained in private and government operations. Our plan is not presented in the shape of a hard and fast bill, but is offered as a suggestion, by no means inflexible, of a way to attain desired ends.

The question of a guarantee was freely discussed in our deliberations, but we do not ask for a guarantee. We recognize that the establishment of a definite guarantee would stifle all incentive to efficient management and would destroy competition as to service and facilities, for if necessary revenue could be obtained without effort what inducement would exist to make an effort?

To obtain the most efficient and economical management those charged with the conduct of the business must be personally interested.

Under our plan, if a rate system be put in effect in a given region that will produce revenue adequate to yield a fair return on roads operated under average conditions and with reasonable efficiency, and to enable them to maintain their credit and pay satisfactory returns to their security holders, some roads below the average which should never have been built, or which were poorly located and are indifferently managed, may be forced to reorganize or sell their properties, while those above the average will prosper; but all without exception will be stimulated by self-interest to create new and increase existing traffic by competition in service and facilities, because by so doing the returns to the owners are increased and at the same time the public is better served.

The carriers desire to be permitted to use all legitimate means to earn sufficient to provide safe, adequate and sufficient service, to protect their existing investments, to attract new capital, and to reflect the cost of wages and all other expenses incident to furnishing transportation.

Under our plan the measure of success of their operation depends on the efficiency and economy of their management, the extent to which their traffic is fostered and industrial development on their lines is encouraged, and recognizing this they accept full responsibility for results.

Mr. Kruttschnitt was asked several questions regarding the matter of equipment purchases. In reply to a question by Senator Smith as to whether the railroad companies had not themselves submitted the budgets to the Railroad Administration, Mr. Kruttschnitt said that the Southern Pacific in sending in its budget had made the statement that it needed no new equipment. It had recently ordered 100 locomotives, some of which were later held back to allow the standard locomotives to be built first, and it was building 5,300 freight cars at its own shops. It was allotted no engines but was allotted 2,000 freight cars at a cost of $3,000 each, which it considered less efficient than the cars it was building for $2,000 each. The difference in cost was largely due, he said, to the fact that less steel was used than in the government cars. The allotment of standard cars was made, he said, in spite of the showing made by the company that for five years it had had a per diem balance in its favor averaging $1,250,000 a year, showing that it had more cars than were needed for its own traffic, and in spite of the fact that it had increased the efficiency of its cars by 84 per cent in two years. After the armistice was signed the railroads had asked the Railroad Administration to cancel the outstanding car order and others involving charges against the corporations but had been told that it was too late to cancel the cars.

Requisites of a Proper System of Regulation

Alfred P. Thom, counsel for the executives, continued until Monday his argument on the legal aspects of the problem, the first part of which was reported in last week's issue. After outlining the opposition to the five-year plan, declaring that an extension during times of peace of the present war control of the railroads would be unconstitutional be-

cause it would give the President power to set aside all laws affecting state and interstate commerce, Mr. Thom took up the requisites of a proper system of regulation. He stated that the free flow of investment capital into railroad development had been checked since 1910 by the declining tendency of net earnings, the rigid state and national regulation of both revenues and expenses, and the lack of any assurance to the investing public that new funds invested in the business would earn a fair return. To a considerable extent Mr. Thom's argument was that which he had formerly presented before the Newlands committee. Mr. Thom took up a table introduced by Commissioner Clark, from which the latter had argued that the railroads had fared well financially in the past ten years, and pointed out that these figures show the following:

1. Every year but one after 1910 up to 1916 showed much lower operating income than in 1910.
2. In every year there was a large increase in the property investment, so that the investment was expanding, while earnings were shrinking.
3. In but one year between 1910 and 1916 were earnings sufficient to pay interest and dividends.
4. The total operating income from 1910 to 1916 was not enough to pay the total interest and dividends.
5. From 1910 to 1916 the funded debt increased $2,200,000,000, while the stock increased only $733,000,000; this three-fold increase in indebtedness resulting from insufficient credit to raise new capital from the sale of shares.
6. In no year from 1910 to 1916 did the carriers earn on their investment as much as 5.35 per cent, a figure which the Commerce Commission had held was less than was necessary in the public interest.
7. The average earnings for the whole period were only 4.94 per cent, or considerably below the danger level marked by the commerce commission.

Discussing state regulation, Mr. Thom said that in every state south of the Potomac and east of the Mississippi rivers the scale of state rates is different, showing an unfair and unequal distribution created by the states themselves, not only as against interstate commerce but as between the states. No question of the violation of state rights is involved, he said. The question is whether or not, in a matter of common interest to all, one state shall determine for itself the proportion of the common burden which it will bear. Of course, he said, if government ownership comes, the entire question will be removed because the national government would control the whole field. He said that state traffic produces 23 per cent of the freight revenues and 15 per cent of the volume, while state passenger traffic represents about 50 per cent of the revenues.

As to the decline of railroad credit, Mr. Thom pointed out that there is no longer any field for speculative investment in railroad securities. He also declared that the prices of outstanding stocks and bonds are not a proper index of railroad credit because the outstanding bonds represent preferred liens and that the credit of a company is determined by its ability to market new securities, particularly stock. The railroads have already passed the danger line as to the proportion of stock and bonds, because more than 60 per cent of their securities are bonds. The Pennsylvania Railroad has not been able to sell a share of stock for five and one-half years, although 75 per cent of its capitalization is in stock and only 25 per cent is indebtedness. The New York Central has about 75 per cent of bonds and 25 per cent of stock and was recently unable to sell its stock after it had been at par for some time, because the proposed offering brought the price below par.

"How can we by any legislation improve that situation?" asked Senator Watson.

Mr. Thom, after emphasizing the fact that he was criticizing systems and not men, declared that the credit of the carriers would be improved if the factors which had made it so uncertain in the past were removed and if it was made possible for the regulating body to act with something like the promptness of a business man in dealing with his own affairs in passing on important questions affecting the carriers, and if political considerations which made it unpopular for a state or the interstate commission to allow an increase in rates could be removed. After reaching the conclusion that the present regulating machinery does not possess the quality of business judgment which the situation calls for, the railway executives have proposed a new plan, feeling that the higher position a man occupies in the government, the more courageous his action and the greater his sense of responsibility is likely to be.

"We recognize," said Mr. Thom, "that we cannot get away from politics when our government is based on politics, but we ask to be regulated by the strongest and most responsible of political agencies. We believe we will find more strength at the President's table than in a bureau, and that his policies will be those of the administration. In our opinion, when a man reaches the dignity and responsibility of a cabinet officer he is less subject to petty political influences and more likely to decide questions of public policy with an eye solely to the public interest. His realization of the public needs and his proposals to meet these needs would have behind them the force of the administration and the successful supervision of transportation would be necessary to the success of the administration. Questions relating to railroad revenues, for example, ought not to be determined by the selfish interests of the railroads or the selfish interests of the shippers, but by the public interest. We believe that transportation is of such vital importance in our national life that it is entitled to its representation in the cabinet, along with a representative of agriculture, a representative of commerce and the representatives of the army and navy."

Mr. Thom added that it was not proposed that the secretary of transportation shall have any direct relation with the great army of employees. Their relations will be with the railroad companies. He did not believe it would be possible for one man to control the votes of the employees, because labor has its own politics. He thought this was demonstrated by the results of the last election because, although a cabinet officer had the most direct relations with all the railroad employees in the country, the other party won. He said he had heard no suggestion that Mr. McAdoo had attempted to use his power to influence the votes of the employees in the election, but he believed that if the secretary of transportation should attempt to do so, the effort would defeat its own purpose.

"We do not believe the American people would accept the idea of a single uncontrolled head of the American transportation system. It would demand a check and under the plan we have offered the Interstate Commerce Commission would be relieved of some of its burdens and would be raised in dignity as a judicial body. It would act as a check both on the railroads and on the department of transportation, while with the suggested regional commissions assisting it in various parts of the country it would be brought much closer to the individual communities, and local questions would be heard by the local commissions before coming up to the central body for review."

Mr. Thom said a great deal can be said in favor of the initiation of rates directly by the Interstate Commerce Commission, but that this plan entailed difficulties because of the inability of a commission to respond readily enough to business needs. Interstate Commerce Commission decisions are now controlled by considerations which do not make for promptness. The railroads urge that Congress shall establish a statutory rule of rate-making, that rates shall not only

be reasonable from the standpoint of the shipper, but adequate to insure proper service by insuring a reasonable return on the investment to attract new capital. While the law now theoretically provides this, in practice the question of adequacy has become minimized and is given less consideration than the desire for low rates. The commission has held in the past, he said, that it is not responsible for providing sufficient income for the railroads, but that it is limited to fixing reasonable rates. Since that decision the commission has advanced some, but it has been hampered by the same idea and while it has always taken wages into consideration it has held in at least one decision that it could not be expected to raise rates sufficiently to pay extravagant wages.

Mr. Thom filed with the committee a discussion of state railroad laws prepared by S. T. Bledsoe, general counsel for the Atchison, Topeka & Santa Fe, showing the numerous conflicts. Mr. Thom developed the point that many states either prohibit the consolidation of railroads or require them to obtain the approval of the state and he declared that it would not be sufficient to repeal the federal laws against such consolidations. Therefore, federal incorporation was necessary to remove the obstacle of state prohibition of a consolidation permitted by the federal government. He said he thought the people had about reached the conclusion that there are too many railroad companies.

After Mr. Thom had concluded his argument, Senator Kellogg asked why a secretary of transportation was necessary and why a railroad administrator not a cabinet member and with a long term of office would not be better.

"Don't you fear," he asked, "that in the face of an election the cabinet officer would hesitate to do anything which might be unpopular?"

"We think the most popular thing he could do would be to furnish good service. We want him to be responsible to the people for adequate service," replied Mr. Thom.

Senator Cummins asked whether the responsibility for net income did not logically go with the control of revenues and expenses and whether the government should not guarantee the return on capital. Mr. Thom replied that there were enormous practical difficulties attendant upon such a plan and that it might be wise to seek something short of a government guarantee. Senator Cummins also remarked that the power which it is proposed to give to the secretary of transportation is essentially different from and much greater than that possessed by the cabinet officers. For instance, the secretary of agriculture does not fix the price of agricultural products.

Mr. Thom replied that the government is exercising a much greater power in the case of transportation than in the case of other branches of activity and that this fact makes it necessary to give the cabinet officer in charge of transportation a different relation. His authority, however, would be reviewable by another body.

As to the principles which should govern the fixing of rates, Mr. Thom said that the duty of the government should not only be to make each rate reasonable, but the rates as a whole adequate, considering the condition of the average roads in each territory. This would leave some of the weaker roads subject to the usual loss of commercial failure, while it would allow the more prosperous roads to earn more than might otherwise be considered necessary. Senator Cummins asked if it was proposed that these roads should make some contribution to the treasury.

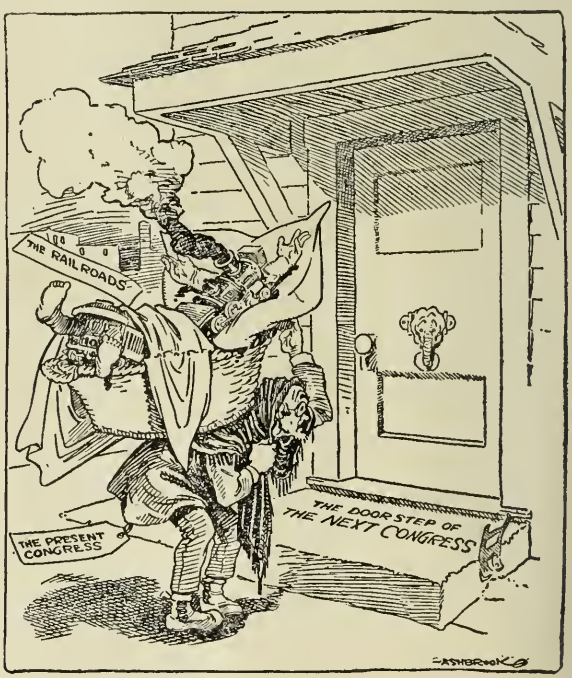
"We have deliberately left that subject open," replied Mr. Thom.

Senator Pomerene suggested the possibility of allowing state commissions to make rates, but subject to review by the Interstate Commerce Commission. Mr. Thom thought this plan impracticable, not only because of the delays which would ensue, but because of the reluctance of a federal body to disagree with a state authority.

Director General Hines has filed with the committee a statement promised by Mr. McAdoo while he was on the stand, the purpose of which was to show that during the first four months ending April 30, 1918, during which the railroad corporations were operating the railroads as agents of the government and through their own officers, because the federal managers had not yet been appointed, the operating expenses had increased by $215,000,000 as compared with the corresponding period of 1917, while the revenues had increased only $108,000,000, and the net operating income had decreased $109,000,000. This was before either rates or wages had been advanced and represented the period of some of the worst winter weather. Mr. McAdoo had suggested this for the purpose of showing that government operation was not responsible for the enormous increase in expenses during 1918.

Federal Railway Companies Proposed

Victor Morawetz, formerly chairman of the Atchison, Topeka & Santa Fe, has filed with the committee an outline of a plan for a federal railway board to organize 10 or 15 federal railway companies with power, with the approval of the federal railway board, to acquire all or any existing lines of railway. Under his plan the federal railway board would have plenary and exclusive power of regulation of the federal corporations and to appoint regional boards of regulation and one central board of regulation. The plan also proposes a government guarantee not to exceed 65 per cent of the estimated operating income, and that interest on debentures should not exceed 40 per cent of this operating income, and for a division of operating income above a certain figure between the stockholders of the railroads and the government.



From the Dayton Journal

Another Case of Intended Abandonment

General News Department

The Pittsburg, Shawmut & Northern had 108 employees and two officers in government service during the war. Of these men 65 were in the infantry, 14 were in the New York state guard, and 11 were with railroad engineers' regiments.

Senator Pomerene (Democrat) and Representative Esch (Republican) have introduced in Congress bills providing for the future regulation of the railroads by greatly amplifying the powers of the Interstate Commerce Commission. The provisions of those bills include regulation of security issues, construction of railroad extensions, train service and operation; and they authorize the Commission to require pooling of traffic and the common use of cars, terminals and other facilities; also to fix minimum rates for transportation.

Track Elevation in Chicago, was the subject of a conference this week, at which representatives of the city and officers of the Railroad Administration exchanged views. R. H. Aishton, regional director, Northwestern region, said that the Railroad Administration would offer no objections to the inauguration or resumption of such work provided the expenditures were kept within reasonable limits. The details of the work to be undertaken, and the financing are matters which, said he, must be disposed of by the individual corporations involved.

Fire Protection for Railroad Properties

This is the title of a manual of 98 pages which has been issued by the United States Railroad Administration, Division of Finance and Purchases, for the use and information of fire protection inspectors. It is bulletin No. 8. This manual has been compiled by Charles N. Rambo, manager of the Fire Loss and Protection Section, of the Division of Finance and Purchases, and includes detailed instructions and advice on every conceivable branch of this subject which is of interest to railroad men.

Condition of Locomotives and Cars in Northwestern Region

In the week ending January 4, locomotives in service on lines in the Northwestern region, numbered 8,004, making the efficiency 85.2 per cent, or about the same as in the preceding week, reported in our issue of January 17. The number of freight cars on the Northwestern lines during the week totaled 370,052, compared with an ownership of 334,615. Bad order cars numbered 20,886 (or 5.6 per cent), as compared with 18,916 (6.5 per cent) for the same week in 1918. Freight cars in outside shops totaled 208. The number of employees in service in car repair shops totaled 21,275 (working 47 hours (average) in the week), as compared with 17,537 in the same week of 1918.

Medals Awarded to Atterbury and Felton

Upon the recommendation of General Pershing, a distinguished service medal has been awarded to Brig. Gen. William W. Atterbury, formerly vice-president of the Pennsylvania Railroad, "for exceptionally meritorious and distinguished services." As director general of transportation in the face of almost insurmountable obstacles he organized and brought to a high state of efficiency the transportation service of American Expeditionary Forces. The successful operation of this most important service, upon which the movements and supply of the combat forces were dependent, was largely due to his energy, foresight, and ability.

S. M. Felton, president of the Chicago Great Western, and until December 31 director general of military railways, was awarded the distinguished service medal by the Secretary of War on January 18, on the recommendations of Gen. Peyton C. March, chief of staff, for "especially meritorious and conspicuous service in supervising the supply of railway material and the organization of railway operation and construction troops."

Revision of M. C. B. Loading Rules

The loading rules of the Master Car Builders' Association as revised for 1918 have been approved by the Railroad Administration and are now ready for distribution. Numerous changes have been made in the present volume. The size of the pages has been increased to 5¼ in. by 7½ in. in order to permit the use of larger and clearer cuts. The general rules for loading material have been grouped in the first section and following these are the complete instructions regarding the handling of various commodities. All the rules governing the loading of each commodity are grouped together so that it is not necessary to refer to various portions of the book. In case railroads desire to provide copies of the rules for shippers, any of the sections will be printed in pamphlet form by the association. The Car Service Section has issued a circular instructing the railroads to refer any questions regarding loading that may arise to the secretary of the M. C. B. Association.

Employees to Be Paid by Check

The Pennsylvania Railroad, and other railroads that had not heretofore adopted the plan, will pay their employees by checks instead of by cash beginning with the month of February, except at some points where difficulty would be experienced by the employees in cashing checks. This plan has been adopted at the instance of the Railroad Administration in the interest of uniformity because most of the railroads have heretofore paid their employees by checks and because the employees favor the change as it will enable them to avoid the inconvenience of waiting for the pay car. The announcement of the change on the Pennsylvania caused a protest on the part of business interests of Altoona because it was proposed to pay in checks drawn on Philadelphia banks. When this was brought to the attention of the Railroad Administration, instructions were issued to have the employees at Altoona paid in checks on Altoona banks.

Railway Supply Companies in War Work

Information concerning war activities has been received from the United States Light & Heat Corporation, Niagara Falls, N. Y., and the Commonwealth Steel Company, St. Louis, which was received too late to be included in the article on that subject published in the annual review number of the *Railway Age*. The United States Light & Heat Corporation devoted 75 per cent of its total plant capacity to war work and utilized 900 employees, representing 75 per cent of its forces, on that work. Parts for armored tanks constituted 60 per cent of the output of the company, parts for gas shells 8 per cent, parts for army trucks 1 per cent, parts for aeroplanes 1 per cent and parts for batteries 10 per cent. The buildings devoted to war work numbered 15. One new plant containing 17,000 sq. ft. of floor space and two additions to existing plants, representing 27,960 sq. ft. were built to provide facilities for war production. The output of peace time products was approximately 50 per cent of the average before the war.

The Commonwealth Steel Company, St. Louis, Mo., constructed tractor frames for tractors of various sizes, special trucks for gun cars and main castings for Pershing locomotives. Various additions to the company's plant facilities, such as the enlargement of foundry and core rooms and the installation of new machinery were necessitated by war demands.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER, 1918

Name of road.	Average mileage operated during period.	Operating revenues			Maintenance of		Operating expenses				Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	141	$151,439	$53,580	$220,799	$28,371	$53,848	$1,336	$92,998	$6,937	$183,525	83.11	$35,277	$11,425	$23,877	—$33,819
Alabama Great Southern	312	618,701	171,761	836,854	65,678	260,435	13,159	399,595	14,876	760,004	90.81	76,849	21,229	55,605	—135,933
Ann Arbor	301	294,643	52,282	365,135	68,403	64,199	146	156,563	9,452	278,843	76.36	86,290	13,100	73,152	—18,020
Arizona Eastern	377	304,363	35,686	361,920	67,225	52,415	846	117,680	6,899	245,228	67.75	116,692	17,091	99,592	—50,948
Atchison, Topeka & Santa Fe	8,646	10,930,440	2,905,347	14,814,205	1,955,004	3,179,484	132,135	4,894,882	252,884	10,383,529	70.09	4,427,736	501,104	3,923,762	—43,890
Atlanta & West Point	93	134,247	82,556	241,412	22,220	45,083	2,552	81,351	6,381	160,908	66.65	80,504	8,400	72,104	30,189
Atlanta, Birmingham & Southern	639	340,172	74,030	461,321	113,324	123,359	4,875	239,850	12,212	493,687	107.01	—32,366	15,700	—48,271	—73,836
* Atlantic & St. Lawrence	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Atlantic City	170	280,458	138,080	440,424	48,614	26,601	417	172,576	758	249,039	56.54	191,385	1,200	179,385	187,709
Atlantic Coast Line	4,839	3,318,632	1,326,872	4,991,597	715,150	1,050,825	47,418	2,195,347	102,519	4,127,886	82.69	863,707	250,000	613,125	—258,778
Baltimore & Ohio	5,145	12,020,717	2,557,705	15,529,392	2,613,573	4,325,107	147,239	7,198,639	529,237	14,908,133	95.99	620,659	382,211	237,650	—1,240,204
Baltimore & Ohio Chicago Terminal	91	.....	13	130,949	24,966	52,330	243	127,289	8,089	216,231	165.13	—85,283	31,876	—117,159	—92,708
Baltimore, Chesapeake & Atlantic	87	90,975	34,596	130,631	9,788	52,685	872	78,094	3,961	145,399	111.31	—14,769	3,900	—18,669	17,160
Bangor & Aroostook	632	359,575	77,160	467,903	40,306	112,225	3,592	186,930	14,866	363,309	77.64	104,594	17,735	86,851	—8,895
Beaumont, Sour Lake & Western	118	108,738	17,609	131,914	20,322	23,513	347	40,941	3,676	88,798	67.32	43,116	1,600	41,516	—4,055
Belt Ry. Co. of Chicago	31	.....	.....	307,527	29,616	45,983	543	209,313	4,986	293,441	95.41	14,086	16,442	—2,356	—63,651
Bessemer & Lake Erie	208	1,023,521	33,183	1,088,107	123,339	397,706	10,582	367,973	20,307	909,808	83.61	178,294	11,444	166,850	—209,637
Bingham & Garfield	36	263,765	4,285	281,725	45,783	52,064	1,825	61,584	3,681	173,948	61.74	107,777	13,999	95,777	—80,257
Birmingham Southern	27	68,015	.....	84,179	2,942	6,237	708	19,303	2,891	32,081	38.11	52,098	3,162	48,936	54,038
Boston & Maine	2,258	3,965,450	1,575,817	6,280,374	1,050,266	1,947,469	40,342	3,226,720	191,882	6,486,946	103.28	206,571	182,385	388,957	—1,141,991
Buffalo & Susquehanna R. R. Corp.	294	166,267	5,689	175,868	37,208	132,133	1,952	68,997	7,372	247,664	140.82	—70,796	4,100	—74,896	—114,339
Buffalo, Rochester & Pittsburgh	584	1,312,534	104,262	1,479,314	243,263	573,640	14,719	712,514	33,375	1,579,205	106.75	—99,889	26,734	—126,624	—284,246
Canadian Pacific Lines in Maine	233	211,437	20,573	246,597	56,932	50,660	1,912	108,925	3,279	220,284	89.32	26,312	21,500	4,812	9,178
Carolina, Clinchfield & Ohio	282	420,198	26,971	455,109	64,040	111,210	3,406	148,293	11,645	338,371	74.34	116,739	14,800	101,939	—57,895
Central of Georgia	1,918	1,182,659	456,564	1,289,004	251,770	363,341	29,226	692,005	54,880	1,391,729	107.96	397,326	58,302	338,615	—179,797
Central of New England	301	433,784	18,332	474,014	168,442	118,987	527	272,800	—211	560,706	118.28	—86,693	17,800	—104,517	—213,751
Central of New Jersey	684	2,836,178	580,432	3,704,189	373,129	1,289,587	16,677	1,857,146	71,441	3,621,022	97.75	83,167	169,973	—86,903	—810,233
Central Vermont	411	314,952	70,233	428,997	92,892	130,593	5,231	252,502	14,897	496,266	115.68	—67,269	15,317	83,596	—107,679
Charleston & Western Carolina	342	193,974	70,512	279,520	28,520	54,203	4,917	123,344	5,923	216,633	77.50	67,887	9,000	53,887	—28,740
Chesapeake & Ohio Lines	2,491	5,464,019	1,422,076	7,263,217	1,032,029	1,267,125	34,251	2,476,716	99,605	4,943,327	68.05	2,319,889	176,816	2,142,883	760,004
Chicago & Alton	1,050	1,583,587	373,321	2,078,050	299,771	535,892	26,756	897,025	41,505	1,806,436	86.92	271,614	53,500	217,855	20,613
Chicago & Eastern Illinois	1,131	1,832,704	338,139	2,320,752	311,227	648,466	20,604	927,222	47,774	1,958,626	84.39	362,126	79,592	282,422	—15,896
Chicago & Erie	269	908,707	127,348	1,104,759	121,520	69,624	11,833	575,368	22,015	802,511	72.64	302,247	—8,416	310,663	193,634
Chicago & North Western	8,090	8,176,554	2,261,814	11,315,957	1,660,276	2,322,925	50,349	5,094,642	229,398	9,419,328	83.23	1,896,630	625,000	1,270,377	—99,076
Chicago, Burlington & Quincy	9,373	9,898,291	2,256,400	13,071,405	1,592,143	2,678,620	75,083	4,993,427	300,275	9,706,342	74.25	3,365,063	451,919	2,913,143	533,405
Chicago Great Western	1,496	1,115,625	362,581	1,594,152	251,746	466,155	21,527	726,323	42,884	1,519,309	95.24	74,804	54,975	18,725	—215,599
Chicago, Indianapolis & Louisville	637	709,080	193,625	984,969	137,583	321,818	12,345	415,367	22,890	910,318	92.42	74,651	36,233	44,372	—101,025
Chicago Junction	12	.....	.....	308,535	52,417	31,365	25	231,841	6,405	322,053	104.38	—13,518	2,156	—15,674	—30,150
Chicago, Milwaukee & St. Paul	10,308	8,879,476	1,726,844	11,571,383	1,607,313	3,798,543	78,633	5,152,196	272,766	10,921,109	94.38	650,271	514,640	135,996	—1,530,022
Chicago, Peoria & St. Louis	247	126,185	21,455	157,032	51,314	67,105	1,847	89,050	9,153	218,469	139.12	—61,437	7,400	—68,837	—110,322
Chicago, Rock Island & Gulf	474	320,897	76,618	423,105	61,873	56,092	5,086	171,251	11,078	306,953	72.54	116,151	9,553	106,571	—18,323
Chicago, Rock Island & Pacific	7,728	6,026,845	2,097,384	8,665,381	1,384,944	2,342,884	85,526	3,783,187	184,005	7,826,830	90.32	838,357	350,370	457,655	—1,642,997
Chicago, St. Paul, Minneapolis & Omaha	1,749	1,645,649	490,209	2,348,527	325,687	403,626	15,964	1,084,599	57,764	1,902,291	80.99	446,236	75,814	370,146	—4,315
Chicago, Terre Haute & Southeastern	374	401,680	19,867	428,763	68,036	145,588	2,273	144,478	8,282	371,653	86.67	57,110	14,500	42,610	—10,964
Cincinnati, Indianapolis & Western	321	201,461	37,935	263,107	52,685	85,357	4,012	130,498	12,015	284,844	108.26	—21,737	10,868	—32,605	—51,083
Cincinnati, New Orleans & Texas Pacific	337	917,052	372,714	1,356,590	155,456	492,771	22,380	545,501	27,340	1,249,363	92.09	107,226	38,250	68,969	—134,527
Cincinnati Northern	251	246,530	14,930	268,960	36,209	68,693	1,871	97,553	4,665	208,991	77.70	59,969	7,567	52,383	11,099
Cleveland, Cincinnati, Chic. & St. Louis	2,396	4,452,118	1,165,218	6,134,343	602,731	1,255,219	19,195	2,539,465	100,835	4,528,029	73.81	1,586,314	1,173,560	1,412,319	662,440
Colorado & Southern	1,100	1,012,419	130,780	1,246,540	134,748	249,383	6,940	399,323	34,800	828,674	66.47	417,866	47,000	370,834	—9,328
Colorado & Wyoming	42	26,712	889	90,899	9,748	13,548	575	40,871	3,856	68,597	75.46	22,301	4,500	17,802	—613
Cripple Creek & Colorado Springs	116	59,263	4,370	65,284	4,550	10,424	1,093	22,983	2,735	41,784	64.00	23,500	6,925	16,575	—27,226
Cumberland Valley	163	548,457	56,167	648,617	52,041	86,417	6,652	181,803	11,198	328,604	50.66	309,963	10,958	299,005	161,601
Delaware & Hudson Co.—R. R. Dept	902	2,574,164	186,494	2,933,494	414,581	819,163	16,177	1,345,374	90,110	2,699,537	92.02	233,857	58,275	176,012	—5,322
Delaware, Lackawanna & Western	955	4,626,437	1,030,850	6,264,230	690,103	1,140,453	34,291	2,518,618	107,967	4,535,339	72.40	1,728,891	234,660	1,494,223	312,450
Denver & Rio Grande	2,651	2,454,172	333,251	2,935,940	454,617	710,196	12,739	1,073,421	20,184	2,302,006	78.19	633,484	90,000	343,304	—28,728
Denver & Salt Lake	255	150,160	21,714	177,453	96,448	123,018	906	204,247	6,074	440,694	248.34	—263,241	9,000	—272,241	—285,459
Detroit & Mackinac	381	78,327	17,718	108,396	34,693	73,626	3,296	73,299	6,199	191,114	76.31	—82,718	8,000	—90,718	92,493
Detroit & Toledo Shore Line	61	173,501	.....	178,116	16,041	17,251	373	56,835	1,699	92,031	51.66	86,085	7,250	78,825	19,898
Detroit, Toledo & Ironton	457	299,943	11,959	326,846	73,493	136,763	2,418	188,123	8,435	409,232	125.21	—82,386	8,500	—90,296	—54,479
Duluth & Iron Range	284	406,432	19,960	449,886	103,169	125,012	673	221,032	16,412	459,405	102.11	—9,519	16,735	26,255	—346,172
Duluth, Missabe & Northern	412	1,280,844	32,471	1,377,248	156,164	118,262	2,651	318,522	47,876	644,853	46.82	732,396	67,563	664,832	—178,620
Duluth, South Shore & Atlantic	601	296,749	81,541	404,106	73,982	51,877	4,613	177,068	8,621	321,299	79.50	82,807	19,000	63,805	17,411
Duluth, Winnipeg & Pacific	175	149,482	21,496	175,410	20,566	22,897	3,339	61,679	8,179	116,704	66.53	58,707	9,062	49,643	36,623
East St. Louis Connecting	3	.....	.....	99,321	11,323	23,650	281	74,471	3,567	113,336	114.11	14,015	2,013	—16,029	—106,680
El Paso & Southwestern Co	1,027	1,062,596	154,298	1,261,595	112,232	107,859	9,053	346,741	23,316	695,655	55.14	565,940	262,162	303,778	1,790
Elgin, Joliet & Eastern	808	1,695,069	95	2,014,854	88,287	374,085	5,924	717,368	24,627	1,209,323	60.02	805,532	50,773	754,756	376,024
Erie	1,989	6,505,844	1,091,387	8,232,526	951,495	1,665,458	48,530	4,652,440	170,563	7,531,505	91.48	701,021	17,182	683,596	110,090
Florida East Coast	764	417,303	161,428	686,078	139,279	161,662	5,729	350,387	19,278	679,805	99.08	6,214	38,889	—33,028	—183,158
Fonda, Johnstown & Gloversville	88	27,264	61,296	92,557	12,080	9,203	670	34,532	7,979	64,466	69.65	28,091	5,900	22,191	—4,677

* Included in Grand Trunk Western. † Included in Grand Trunk Western. ‡ Included in Baltimore & Ohio R. R.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER, 1918—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Ft. Smith & Western R. R. Co.	253	$83,220	$24,493	$115,582	$17,722	$28,024	$3,600	$39,073	$6,084	$94,731	81.95	$20,852	$4,500	$16,352	—$40,004
Fort Worth & Denver City	451	611,244	144,646	781,879	65,011	141,854	3,043	309,132	24,889	545,916	69.81	235,963	19,800	216,159	—23,627
Fort Worth & Rio Grande	235	54,042	32,191	95,234	17,270	27,631	2,052	51,444	5,649	104,046	109.25	—8,812	3,019	—11,832	—21,437
Galveston, Harrisburg & San Antonio	1,382	1,132,779	399,478	1,852,920	235,794	363,601	21,991	775,211	52,926	1,463,455	78.98	189,465	56,183	132,695	—531,629
Galveston Wharf	13	.....	.....	65,895	1,427	557	125	28,112	278	56,640	85.95	9,255	11,800	—2,545	20,381
Georgia	328	479,809	172,407	699,505	64,850	86,073	7,032	279,391	15,860	453,378	64.81	246,128	5,950	240,178	73,712
Georgia, Southern & Florida	402	205,544	93,040	349,746	58,786	89,031	4,720	139,399	7,838	300,989	86.06	48,758	16,956	31,704	—25,730
Grand Rapids & Indiana	569	432,813	140,685	633,873	79,488	150,627	9,729	288,489	22,150	551,938	87.07	81,934	28,827	53,105	—11,657
Grand Trunk Western	1,002	1,498,938	222,409	1,864,402	210,211	379,793	13,288	779,169	46,912	1,445,790	77.54	418,613	48,159	370,451	156,906
Great Northern	8,261	8,251,486	1,215,791	10,155,811	1,424,170	1,815,735	63,651	4,048,568	158,183	7,609,844	64.93	2,545,967	574,969	1,970,860	29,143
Gulf & Ship Island	307	129,729	36,249	186,756	53,218	31,759	3,482	72,097	8,440	169,305	90.65	17,454	9,594	7,857	—47,191
Gulf, Colorado & Santa Fe	1,917	1,250,659	318,008	1,657,676	242,706	227,303	9,658	638,586	43,692	1,151,578	69.46	506,098	69,646	436,374	—46,251
Gulf, Mobile & Northern	424	166,819	33,542	211,219	51,577	66,549	4,003	104,847	8,840	235,821	111.64	—24,602	10,842	—35,452	—82,109
Hocking Valley	349	915,142	86,766	1,071,034	136,200	315,874	6,073	425,104	21,065	903,830	84.38	167,204	54,025	113,179	—76,691
Houston, East & West Texas	190	133,192	39,098	188,206	26,252	22,160	895	75,317	—3,591	128,214	68.12	59,992	6,354	53,571	7,143
Houston & Texas Central	887	441,477	184,713	704,683	117,378	125,334	8,303	282,675	17,732	551,352	78.24	153,331	35,408	117,783	—221,724
Illinois Central	4,782	6,845,419	1,753,001	9,196,391	1,281,951	2,348,948	59,537	3,715,252	218,091	7,677,791	83.48	1,518,600	392,132	1,125,286	—418,567
Indiana Harbor Belt	116	.....	.....	518,485	88,038	133,497	1,242	347,452	16,429	586,659	113.14	—68,174	2,134	—70,307	—124,767
International & Great Northern	1,159	853,348	238,203	1,174,600	217,623	278,814	9,144	501,908	35,830	1,047,275	89.16	127,326	30,000	79,326	—317,486
Kanawha & Michigan	176	365,873	103,524	486,525	69,726	123,546	2,004	184,708	13,143	393,127	80.80	93,398	18,835	74,563	7,995
Kansas City, Mexico & Orient	272	70,616	3,473	77,315	27,236	41,544	789	54,967	6,178	130,708	169.05	—53,393	6,250	—59,643	—60,259
Kansas City, Mexico & Orient & Texas	465	99,992	7,916	112,448	23,173	41,992	644	60,723	6,029	132,561	117.88	—20,113	5,000	—25,113	—30,406
Kansas City Southern	774	1,102,857	160,547	1,374,999	184,817	395,206	17,741	671,763	41,296	1,307,802	95.11	68,197	51,198	16,918	—405,562
Kansas City Terminal	24	.....	.....	105,754	19,153	31,190	....	50,936	—652	101,667	96.13	4,086	10,616	—6,534	—31,814
Lake Erie & Western	900	751,157	45,723	841,434	90,107	229,644	9,364	372,715	24,242	723,272	85.95	118,162	26,239	91,714	—13,888
Lehigh & Hudson River	96	188,204	4,299	199,773	26,082	35,099	1,466	84,445	6,640	153,732	76.95	46,042	6,000	40,041	—37,700
Lehigh & New England	221	306,233	1,369	337,903	52,314	66,417	2,529	105,835	7,381	234,457	69.38	103,445	8,601	94,844	1,506
Lehigh Valley	1,436	5,077,444	422,061	6,014,373	899,246	1,486,916	34,750	2,523,348	112,597	5,078,875	84.44	941,498	161,471	779,962	140,390
Los Angeles & Salt Lake	1,168	889,630	232,634	1,208,262	160,280	255,579	20,225	405,985	24,594	893,896	73.98	314,366	49,924	264,330	—2,833
Long Island	398	549,796	962,905	1,691,535	339,007	350,258	13,710	858,637	35,092	1,611,752	95.28	79,784	89,871	—10,246	—258,725
Louisiana & Arkansas	302	104,397	30,953	136,903	32,485	14,779	2,899	58,155	5,363	113,679	83.03	23,223	10,750	12,473	—22,143
Louisiana Western	207	224,440	91,377	344,195	34,191	57,406	4,634	115,742	10,597	224,394	65.19	119,801	14,676	105,006	—84,018
Louisville & Nashville	4,995	5,663,883	2,058,308	8,187,716	1,230,572	2,020,709	98,485	3,684,269	174,071	7,236,087	88.38	951,629	303,063	647,877	—1,595,397
Louisville, Henderson & St. Louis	199	175,000	71,000	257,750	33,464	42,692	6,285	82,323	6,528	171,528	66.54	86,223	11,500	74,716	36,965
Louisiana Railway & Navigation Co.	356	196,018	71,078	288,190	41,429	52,176	3,371	153,000	6,756	257,456	89.33	30,735	14,000	16,735	—50,173
Maine Central	1,216	983,507	335,698	1,447,229	208,211	388,728	9,614	758,458	37,181	1,405,274	97.10	41,955	63,482	—21,527	—177,175
Maryland, Delaware & Virginia	82	73,480	26,371	102,509	10,764	32,631	434	71,395	2,019	117,245	114.37	—14,736	1,900	—16,636	2,072
Michigan Central	1,861	4,473,521	1,367,576	6,382,961	858,752	1,019,156	46,251	2,619,034	86,787	4,702,927	73.67	1,680,034	168,000	1,511,673	333,843
Midland Valley	387	251,547	61,049	328,219	59,204	62,141	1,341	140,127	13,208	276,020	84.09	52,198	7,101	45,084	—35,127
Mineral Range	100	93,164	1,698	96,894	10,133	26,638	400	44,461	870	76,503	78.95	20,391	3,300	17,091	5,104
Minneapolis & St. Louis	1,646	798,432	152,533	1,006,802	194,546	255,072	6,459	485,720	32,021	973,989	96.74	32,813	60,241	27,551	—129,213
Minn. & International Ry	195	51,185	25,124	80,213	13,623	15,552	462	40,257	3,135	73,025	91.04	7,185	4,011	3,171	—8,447
Minn., St. Paul & Sault Ste. Marie	4,243	2,798,742	485,449	3,478,413	499,179	681,079	24,201	1,675,594	68,987	2,959,549	85.08	518,863	193,339	325,372	—551,971
Missouri, Oklahoma & Gulf	332	119,723	15,866	141,822	32,641	43,683	1,353	76,042	8,464	162,352	114.48	—20,530	9,000	—29,548	—65,181
Missouri Pacific	7,108	6,218,197	1,520,425	8,249,835	1,265,359	1,683,785	68,258	3,180,890	198,945	6,394,451	77.51	1,855,383	279,286	1,574,565	—115,334
Mobile & Ohio	991	965,370	162,780	1,188,431	136,975	450,933	23,175	558,604	37,610	1,208,300	101.67	—19,869	43,376	63,318	—191,067
Monongahela	108	279,045	20,065	315,572	83,906	63,436	488	99,803	5,429	253,063	80.19	62,508	11,950	50,557	21,781
Monongahela Connecting	5	.....	.....	222,079	30,216	47,118	541	123,736	6,424	208,035	93.67	14,044	2,422	11,623	19,864
Morgan's La. & Tex. R. R. & S. S. Co.	400	589,267	133,635	798,866	75,454	159,308	6,412	292,476	16,436	552,118	69.11	246,747	23,627	213,047	—119,419
Nashville, Chattanooga & St. Louis	1,248	1,431,044	587,009	2,073,269	302,431	459,782	11,133	910,417	42,573	1,731,881	83.53	341,489	33,334	308,069	39,053
Nevada Northern	168	218,209	13,739	239,976	31,253	31,300	1,050	61,171	6,676	131,591	54.83	108,385	19,698	88,686	—18,014
Newburgh & South Shore	7	.....	.....	149,734	21,923	22,063	.....	66,717	3,578	114,282	76.32	35,653	8,121	27,532	53,596
New Orleans & North Eastern	203	335,536	98,501	490,965	73,224	157,526	8,010	257,836	10,867	514,062	104.70	—23,096	19,067	—42,181	—148,405
New Orleans Great Northern	284	147,826	38,248	190,958	36,177	37,972	1,040	69,639	6,869	149,016	78.03	51,943	8,026	43,915	6,290
New Orleans, Texas & Mexico	191	115,484	25,194	148,080	32,873	33,951	822	56,431	5,642	131,514	88.81	16,566	21,500	—4,934	—72,234
New York Central	6,079	19,467,737	5,682,207	28,014,171	3,010,126	5,218,346	261,138	10,750,610	591,839	20,176,303	72.02	7,837,868	1,200,421	6,635,091	3,436,234
New York, Chicago & St. Louis	572	2,015,710	108,744	2,189,445	254,115	361,340	18,775	930,096	50,527	1,618,380	73.91	571,065	100,000	471,065	287,006
New York, New Haven & Hartford	1,992	4,057,295	3,460,008	8,630,784	2,005,515	2,018,535	47,423	4,343,112	328,441	8,801,486	101.97	—270,705	272,000	544,082	—2,013,283
New York, Ontario & Western	567	502,274	91,197	750,650	127,236	261,748	6,516	412,315	18,099	925,914	123.34	—175,265	35,000	—210,265	—307,940
New York, Philadelphia & Norfolk	121	562,745	129,109	740,538	85,005	229,927	7,717	316,620	11,486	666,331	89.97	74,207	20,992	53,215	—58,233
New York, Susquehanna & Western	135	333,141	54,590	426,557	34,077	39,318	392	252,099	6,677	332,594	77.97	93,993	16,233	77,760	24,481
Norfolk & Western	2,087	6,748,155	904,932	7,910,911	852,030	2,121,380	6,594	2,677,597	45,169	5,725,770	72.39	2,185,141	200,000	7,984,987	22,594
Norfolk Southern	907	365,151	119,592	513,104	115,770	98,329	6,304	217,568	21,084	459,706	89.59	53,398	15,800	37,599	—21,521
Northern Pacific	6,576	8,189,352	1,257,321	10,028,583	1,133,848	1,346,206	50,024	3,303,171	170,887	6,011,548	59.94	4,017,035	683,072	3,333,503	1,488,309
Northwestern Pacific	507	265,492	127,142	433,635	81,153	69,904	5,934	197,608	10,969	367,686	.....	65,949	21,956	43,992	—64,743
Oregon Short Line	2,347	2,526,750	347,795	3,044,868	417,148	360,922	13,716	928,687	85,015	1,852,089	60.83	1,192,779	157,754	1,034,800	—77,937
Oregon-Washington R. R. & Nav. Co.	2,068	1,619,542	363,276	2,141,428	421,772	308,347	25,119	917,590	88,684	1,791,172	83.64	350,255	123,466	226,662	—196,999
Panhandle & Santa Fe	772	411,708	72,182	503,942	86,522	208,634	2,969	206,148	16,652	513,816	101.95	—9,874	18,639	—28,746	—225,338
Pennsylvania Company	1,754	7,147,188	1,261,720	9,206,041	1,543,305	2,700,736	79,840	3,686,575	152,147	8,212,785	89.26	987,256	308,393	678,644	—175,884

§ Does not file.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER, 1918—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of—										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Pennsylvania Railroad	5,342	$21,911,614	$8,302,484	$32,915,931	$5,945,141	$8,830,335	$208,430	$14,456,222	$736,278	$30,623,544	93.04	$2,292,387	$885,196	$1,406,908	—$1,846,639
Peoria & Pekin Union	19	34,864	5,791	130,213	16,769	44,577	14	93,364	3,298	158,422	121.66	—28,209	9,500	—37,709	—35,771
Pere Marquette	2,233	2,315,023	341,556	2,865,398	389,239	499,726	20,167	1,807,354	68,898	2,070,204	72.24	795,193	57,629	737,446	291,631
Philadelphia & Reading	1,127	5,765,177	613,816	6,810,740	695,097	1,896,554	53,091	3,138,715	123,479	5,906,549	86.72	904,190	135,583	768,607	—654,872
Pittsburgh & Lake Erie	224	2,421,173	186,776	2,802,700	413,601	569,824	12,949	926,014	41,575	1,965,078	70.11	837,622	73,900	763,719	218,626
Pittsburgh & Shawmut R. R, Co.	94	92,941	3,592	99,409	28,602	26,502	786	40,086	1,866	97,844	98.42	1,565	19,580	21,145	6,416
Pittsburgh, Shawmut & Northern	204	64,773	4,959	74,558	22,804	88,011	841	37,745	6,893	156,294	209.62	—81,736	1,800	—83,536	—70,727
Pittsburgh & West Virginia	63	120,137	9,362	141,068	47,242	31,159	1,406	61,378	5,423	155,843	110.47	—14,775	14,924	—29,699	—62,871
Pittsburgh, Cincinnati, Chic., & St.. Louis	2,386	5,335,578	1,536,711	7,638,773	1,047,796	2,594,945	102,363	3,410,218	168,735	7,376,348	96.56	262,426	256,763	4,067	—1,073,825
Port Reading	21	195,971	.....	262,928	20,208	77,469	18	108,619	1,264	207,578	78.94	55,350	10,000	45,350	—83,805
Richmond, Fredericksburg & Potomac	87	292,939	471,950	819,712	39,309	118,069	3,854	244,882	11,343	423,326	51.68	396,486	15,981	380,483	189,850
Rutland	415	192,236	88,215	341,702	78,244	99,256	7,657	193,286	12,115	390,464	114.27	—48,762	18,142	—66,904	—127,428
St. Joseph & Grand Island	208	154,696	30,151	196,286	47,855	41,231	1,471	129,104	8,940	228,742	116.53	—32,456	8,607	—41,068	24,986
St. Louis, Brownsville & Mexico	548	244,189	101,934	380,090	68,975	97,708	1,262	119,034	11,865	278,845	73.36	101,245	9,944	91,301	9,593
St. Louis Merchants Bridge Terminal	9	.....	413	305,267	41,523	46,239	752	216,264	6,238	311,015	101.88	—5,748	8,659	—14,720	—94,882
St. Louis-San Francisco	4,761	4,451,307	1,547,674	6,451,898	934,597	1,403,781	50,686	2,499,320	173,169	5,047,862	78.23	1,404,036	191,789	1,208,581	—96,336
St. Louis Southwestern	968	846,003	207,935	1,107,542	171,138	343,990	12,608	331,458	32,545	891,151	76.13	216,391	42,094	174,043	—278,504
St. Louis Southwestern of Texas	814	366,926	123,497	520,091	138,347	229,474	5,866	247,023	19,990	640,090	123.07	—119,999	19,531	—139,582	—281,112
St. Louis, San Francisco & Texas	134	94,469	12,544	110,748	25,444	19,758	1,753	56,177	6,524	109,656	99.01	1,092	1,648	—558	8,754
San Antonio & Aransas Pass	1,020	300,928	111,098	434,933	74,646	132,280	3,272	147,530	17,113	371,688	86.14	60,244	13,979	46,258	—42,747
Seahoard	3,563	2,211,065	906,959	3,362,067	645,202	794,269	56,349	1,599,872	80,009	3,202,644	95.25	159,423	128,211	30,753	—563,429
South Buffalo Ry. Co.	35	45,298	.....	135,588	17,703	18,197	395	71,743	1,526	109,563	80.80	26,026	1,400	24,626	25,778
Southern	6,982	7,007,724	2,608,669	10,466,666	991,651	2,678,631	90,849	4,993,748	233,668	9,045,715	86.42	1,420,950	361,685	1,058,323	—1,462,618
Southern in Mississippi	278	90,035	44,858	148,181	13,765	17,518	1,938	74,893	4,015	112,128	75.66	36,052	9,000	27,052	—3,531
Southern Pacific	7,050	9,655,339	2,812,198	13,430,018	1,512,180	3,267,163	95,590	5,076,849	343,258	10,498,874	78.17	2,931,144	620,051	2,309,490	—713,343
Spokane, International Ry. Co.	156	59,714	11,266	73,543	12,413	8,165	1,542	28,219	4,539	54,740	74.43	18,803	3,202	15,563	—33,805
Spokane, Portland & Seattle	554	598,492	106,360	767,075	177,696	122,168	3,881	241,288	19,143	565,705	73.74	201,370	59,300	142,131	—78,473
Staten Island Rapid Transit Co	23	93,747	62,433	181,243	29,827	37,840	1,065	99,751	9,559	178,042	98.23	3,201	14,000	—10,806	—12,456
Tennessee Central	293	172,679	86,372	270,573	64,669	67,535	794	125,083	6,287	264,367	97.71	6,205	5,450	755	26,726
Terminal R. R, Ass'n of St. Louis	36	.....	3,805	353,003	66,815	52,024	775	154,384	3,816	281,039	79.61	71,963	37,617	34,299	9,487
Texarkana & Ft. Smith	81	105,046	15,118	139,958	13,923	29,474	42	34,122	8,658	85,964	61.42	53,994	2,939	51,043	—815
Texas & New Orleans	469	454,763	155,043	676,170	117,434	244,048	6,053	183,531	12,803	581,910	86.05	94,261	21,569	72,677	—107,044
Texas & Pacific	1,946	1,862,020	582,391	2,602,899	374,689	399,726	20,546	1,242,253	69,512	2,124,674	81.62	478,226	93,804	384,220	—223,262
Toledo & Ohio Central	435	578,856	61,785	739,464	125,681	196,908	5,097	419,566	21,163	770,773	105.51	—40,309	30,502	—70,811	—178,787
Toledo, Peoria & Western	247	80,039	35,443	133,392	31,036	36,872	2,362	74,987	5,411	150,668	112.95	—17,277	8,500	—25,776	—19,221
Toledo, St. Louis & Western	454	666,752	60,941	766,088	144,887	147,272	3,438	244,847	9,205	345,502	45.09	220,586	26,000	194,586	68,795
Trinity & Brazos Valley	368	74,549	14,458	93,178	43,428	46,884	1,597	61,310	7,389	160,608	172.36	—67,429	2,256	—59,585	—97,852
Ulster & Delaware	128	34,787	36,245	87,131	18,428	21,426	1,328	44,505	4,205	90,949	104.38	—3,818	4,600	—8,418	—3,931
Union Pacific	3,612	6,968,896	1,363,250	8,954,345	370,736	1,652,736	44,762	2,433,904	213,054	5,483,041	61.23	3,471,304	273,642	3,197,291	399,211
Union R. R. of Penn	35	.....	.....	613,871	21,872	103,837	399	310,477	7,680	444,265	72.37	169,605	5,443	164,162	221,939
Utah Railway	98	112,900	256	113,866	25,877	18,783	171	20,376	5,294	70,500	61.91	—43,366	2,881	40,483	.....
Vicksburg, Shreveport & Pacific	171	156,050	73,943	248,586	50,225	62,051	101,226	103,450	7,231	230,228	92.61	18,357	9,843	8,505	—96,270
Virginian	518	978,969	47,709	1,107,501	186,623	239,180	5,542	456,312	17,387	907,916	81.97	199,585	57,300	162,269	—155,229
Wabash	2,519	3,210,240	690,979	4,290,770	543,813	886,178	47,856	2,003,964	100,229	3,598,429	83.86	672,341	109,613	562,512	—310,972
Washington Southern	35	84,309	330,024	459,830	25,870	58,626	2,158	122,172	5,440	216,742	47.13	243,088	7,448	235,609	115,441
West Jersey & Seashore	359	339,306	412,311	827,664	270,064	196,180	6,579	520,328	21,504	1,018,604	123.06	—190,940	39,741	—230,892	151,342
Western Maryland	707	1,240,714	77,155	1,384,844	366,569	404,821	18,188	634,948	35,701	1,475,580	106.55	—90,737	43,200	—133,936	—417,424
Western Ry. of Alabama	133	155,186	71,901	242,232	22,833	50,246	2,531	80,951	6,339	165,862	68.47	76,369	7,000	69,369	42,549
Western Pacific	1,011	639,744	72,926	760,122	222,304	139,779	11,556	216,182	15,260	619,382	81.48	140,738	40,114	100,522	—72,267
Wheeling & Lake Erie	511	989,269	36,562	1,128,869	208,822	291,244	4,796	474,731	26,661	1,009,115	89.30	119,754	58,300	61,454	—248,679
Yazoo & Mississippi Valley	1,382	1,705,668	376,775	3,173,895	282,007	393,905	14,619	726,846	48,077	1,457,715	45.92	716,181	63,759	652,329	89,159
ELEVEN MONTHS OF CALENDAR YEAR 1918															
Alabama & Vicksburg	141	$1,416,655	$558,160	$2,208,248	$235,046	$529,565	$41,268	$913,928	$80,798	$1,817,884	82.32	$390,363	$122,278	$267,844	—$173,892
Alabama Great Southern	312	5,717,474	2,146,357	8,380,726	676,412	2,056,920	141,846	3,285,131	157,721	6,359,919	75.88	2,020,857	231,946	1,785,823	—130,453
Ann Arbor	295	2,488,019	510,790	3,215,738	538,578	696,322	46,843	1,497,197	102,618	2,887,377	89.78	328,367	144,100	183,390	—402,538
Arizona Eastern	37	3,330,912	506,668	4,083,942	739,466	576,561	24,314	1,094,862	173,201	2,659,303	65.11	1,424,639	187,151	1,236,531	—531,524
Atchison, Topeka & Santa Fe	8,644	103,881,052	33,827,723	148,372,063	18,495,704	30,409,851	1,548,267	50,211,694	2,579,121	102,978,603	69.41	45,393,459	6,148,028	39,226,688	—2,810,766
Atlanta & West Point	93	1,108,773	937,784	2,283,116	233,306	415,767	38,611	765,559	71,277	1,555,691	68.13	727,425	92,360	635,051	255,358
Atlanta, Birmingham & Southern	639	3,184,610	748,724	4,234,205	963,906	1,126,220	90,359	2,192,197	138,869	4,511,170	106.56	—277,965	172,700	—451,496	—384,207
*Atlantic & St. Lawrence	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Atlantic City	170	1,712,981	2,024,945	3,943,609	387,818	416,473	12,851	1,817,708	12,918	2,648,567	67.16	1,295,042	127,800	1,167,242	417,493
Atlantic Coast Line	4,818	33,923,299	14,867,088	51,372,447	6,112,848	9,956,698	576,327	20,990,624	1,056,709	38,982,441	75.70	12,480,000	2,295,000	10,178,841	908,127
Baltimore & Ohio	5,145	118,166,510	27,652,036	158,832,636	22,730,790	45,047,628	1,834,490	71,339,059	3,621,960	146,577,539	91.05	13,253,097	4,446,280	8,790,170	—15,932,637
Baltimore & Ohio Chicago Terminal	91	.....	4,897	1,645,426	276,881	572,164	12,049	1,452,764	32,634	2,428,836	147.61	—783,410	327,661	—1,111,183	—857,303
Baltimore, Chesapeake & Atlantic	87	817,669	431,996	1,301,306	117,125	345,713	12,877	759,950	33,045	1,268,710	97.49	32,596	33,127	—531	117,899
Bangor & Aroostook	632	3,458,885	735,826	4,425,604	728,142	1,078,638	42,680	1,796,321	139,205	3,833,949	86.63	591,657	195,085	396,385	—751,641
Beaumont, Sour Lake & Western	118	949,933	320,373	1,319,108	195,659	192,636	15,427	433,290	45,392	882,403	66.89	436,705	22,000	414,652	17,840

* Included in Grand Trunk Western.

REVENUES AND EXPENSES OF RAILWAYS

ELEVEN MONTHS OF CALENDAR YEAR 1918—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Belt. Ry. Co. of Chicago	31	.....	.....	$3,594,965	$377,932	$743,692	$4,236	$2,271,860	$83,194	$3,480,915	96.82	$114,052	$180,632	—$66,580	—$928,325
Bessemer & Lake Erie	208	$11,908,911	$357,308	12,554,752	1,107,759	3,178,480	121,646	4,063,293	212,655	8,466,529	67.44	4,088,224	230,186	3,858,036	355,723
Bingham & Garfield	36	3,059,652	43,756	3,189,969	440,737	507,487	14,658	633,317	52,194	1,688,599	52.93	1,501,370	109,836	1,391,534	—35,305
Birmingham Southern	27	1,098,871	10,383	1,313,942	101,407	243,446	10,268	527,804	43,144	926,069	70.48	387,873	58,317	329,556	329,585
Boston & Maine	2,258	39,858,652	17,398,752	64,176,642	8,495,910	12,410,566	431,483	33,468,784	1,659,198	56,858,627	88.59	7,138,015	1,937,386	5,380,629	—4,708,345
Buffalo, Rochester & Pitts	584	15,003,047	1,204,387	16,872,925	2,502,686	5,436,352	174,472	7,514,121	355,952	16,006,842	94.86	866,083	294,077	571,768	—1,961,783
Buffalo & Susquehanna	262	1,969,958	62,347	2,059,798	376,689	748,049	20,951	815,623	80,356	2,041,660	99.11	18,138	45,100	—26,962	—321,420
Canadian Pacific Lines in Maine	233	1,684,257	249,728	2,090,835	504,305	490,754	27,285	1,287,994	30,774	2,399,690	114.77	—248,855	116,500	—365,355	—578,988
Carolina, Clinchfield & Ohio	282	3,864,887	380,723	4,316,468	578,206	1,061,658	90,172	1,394,779	139,958	3,261,876	75.56	1,054,591	162,800	891,787	—574,578
Central of Georgia	1,918	11,831,829	5,249,753	18,790,848	2,830,264	3,704,575	347,467	7,182,773	571,491	14,641,868	77.92	4,148,980	707,608	3,435,806	—73,305
Central of New England	301	5,052,231	271,954	5,555,319	1,063,952	986,239	18,460	2,726,511	105,037	4,917,128	88.51	638,191	195,800	442,131	—1,108,401
Central of New Jersey	684	30,739,681	7,121,943	41,230,781	3,492,257	9,279,547	271,019	18,323,937	803,083	32,378,058	78.52	8,852,722	1,883,586	6,964,283	—1,865,988
Central Vermont	411	3,470,549	770,999	4,735,741	734,383	1,065,766	84,577	2,808,246	140,986	4,844,847	102.30	—109,106	190,997	—300,269	—836,898
Charleston & Western Carolina	343	1,928,918	631,113	2,696,075	393,573	427,492	45,827	1,192,801	56,925	2,116,618	78.51	579,457	99,000	480,296	—153,986
Chesapeake & Ohio Lines	2,482	50,462,889	12,216,901	66,631,160	8,719,415	14,793,574	453,250	23,773,412	1,134,912	49,197,399	73.83	17,433,782	1,745,000	15,686,450	2,189,527
Chicago & Alton	1,050	15,690,791	5,085,304	22,202,145	3,070,178	5,435,607	301,433	9,200,386	449,559	18,558,844	83.59	3,643,301	658,543	2,982,268	—1,643,458
Chicago & Eastern Illinois	1,131	19,165,481	3,624,005	24,527,096	3,092,283	7,811,983	254,847	9,772,940	579,761	21,584,284	88.00	2,942,812	860,758	2,078,072	—1,501,397
Chicago & Erie	269	8,213,873	833,752	9,902,470	1,589,552	1,770,583	149,518	4,944,188	245,780	8,729,280	88.15	1,173,191	357,668	815,477	—941,101
Chicago & North Western	8,090	30,777,237	25,490,734	116,619,479	17,354,375	24,059,490	891,856	52,398,733	2,405,752	97,737,971	83.81	18,881,508	4,930,000	13,925,741	—8,722,075
Chicago, Burlington & Quincy	9,373	95,142,504	25,694,541	131,533,451	17,938,836	26,991,836	1,125,449	51,143,720	3,089,060	101,603,639	17.24	29,929,811	5,415,865	24,513,916	—8,981,549
Chicago, Great Western	1,496	11,750,926	4,344,165	17,431,465	2,850,550	4,648,714	362,079	7,550,752	452,864	16,010,665	91.84	1,420,800	610,033	805,948	—2,037,900
Chicago, Indianapolis & Louisville	657	6,899,705	2,214,597	9,971,983	1,151,983	2,652,017	177,436	4,120,999	268,447	8,377,304	84.01	1,594,695	347,936	1,245,973	—918,774
Chicago Junction	12	.....	.....	3,096,606	557,193	489,956	6,535	2,260,840	78,776	3,393,321	109.58	—296,715	—23,013	—319,728	—633,142
Chicago, Milwaukee & St. Paul	10,305	87,289,780	21,303,388	120,559,910	15,562,810	35,131,334	1,154,108	54,874,877	2,743,011	109,646,103	90.94	10,913,808	5,671,295	5,198,096	—16,244,731
Chicago, Peoria & St. Louis	247	1,638,457	239,541	1,988,183	346,143	709,212	40,792	1,065,091	75,190	2,236,434	112.48	—248,250	83,403	—331,654	—583,715
Chicago, Rock Island & Gulf	474	2,819,357	993,197	4,065,467	569,227	631,800	79,666	1,549,209	119,157	2,967,992	72,98	1,097,475	141,102	955,431	—105,221
Chicago, Rock Island & Pacific	1,789	60,527,032	24,530,707	91,445,672	13,062,883	22,226,033	1,104,534	38,532,407	2,106,881	77,445,407	59.28	14,000,265	3,845,248	10,146,219	—6,407,049
Chicago, St. Paul, Minn., & Omaha	1,749	15,369,037	5,671,777	22,583,987	2,721,406	4,653,559	229,801	10,581,941	58,532	18,923,299	83.79	3,660,687	1,197,538	245,842	—1,640,566
Chicago, Terre Haute & Southeastern	374	4,288,664	231,872	4,614,463	576,154	1,564,226	40,326	1,661,004	93,374	3,968,604	86.00	645,859	159,560	486,264	—157,160
Cincinnati, Indianapolis & Western	321	2,127,891	485,208	2,868,440	440,463	851,006	67,942	1,371,289	120,795	2,854,936	99.52	13,504	113,049	—99,544	—487,682
Cincinnati, New Orleans & Tex. Pacific	337	9,339,290	3,692,145	13,923,756	1,286,241	4,132,796	245,103	5,381,112	271,549	11,374,271	81.68	2,549,485	419,500	2,129,219	—1,362,932
Cincinnati Northern	247	2,284,800	172,461	2,546,184	393,315	698,461	33,584	947,248	50,007	2,119,884	83.26	426,301	120,431	305,779	—218,750
Cleveland, Cincinnati, Chic. & St. Louis	2,392	45,638,897	13,926,465	65,093,855	6,555,645	12,599,848	819,232	25,547,774	1,087,496	46,962,583	72.14	18,130,971	3,297,814	14,826,134	3,291,888
Colorado & Southern	1,100	8,954,941	1,885,523	11,579,116	1,350,416	2,518,002	92,455	4,098,007	388,486	8,502,002	73.42	3,077,115	317,000	2,359,224	—724,942
Colorado & Wyoming	42	313,696	24,048	1,032,503	115,536	176,942	1,877	449,078	47,009	700,441	67.83	242,063	43,444	198,609	—184,139
Cripple Creek & Colorado Springs	116	727,880	107,551	855,288	78,388	109,935	10,920	285,193	32,191	516,627	60.40	338,661	80,060	258,591	—229,249
Cumberland Valley	163	4,308,510	667,510	5,321,515	495,822	797,622	57,760	1,826,672	127,731	5,310,783	62.21	2,010,732	100,859	1,909,234	—44,199
Delaware & Hudson Co., R. R. Dept	902	27,826,098	2,620,175	32,188,160	3,355,681	8,668,332	238,424	15,221,074	966,196	28,631,712	89.94	3,556,448	790,371	2,764,409	—2,858,231
Delaware, Lackawanna & Western	959	45,917,673	10,185,388	62,730,353	4,830,936	12,038,537	617,422	26,002,702	1,112,271	45,093,866	71.88	17,636,487	2,581,266	15,035,950	—1,179,406
Denver & Rio Grande	2,607	22,257,823	4,579,673	22,482,682	4,127,661	7,287,716	250,169	10,174,510	639,194	22,837,916	80.18	5,644,766	1,135,000	4,506,658	—2,645,435
Denver & Salt Lake	255	1,637,855	286,744	1,993,650	680,315	777,162	10,764	1,148,580	46,236	2,663,058	133.57	—669,407	99,000	—768,417	—722,614
Detroit & Mackinac	381	1,008,064	293,990	1,399,193	252,226	379,069	25,895	628,885	61,135	1,347,213	96.28	49,981	89,444	—41,045	—210,912
Detroit & Toledo Shore Line	61	1,764,475	.....	1,794,797	132,262	215,777	16,795	599,373	43,237	1,007,275	56.12	787,522	121,880	665,632	—137,058
Detroit, Toledo & Ironton	460	2,783,141	131,085	3,090,747	652,142	900,978	43,218	1,679,547	128,651	3,404,537	110.15	—313,790	97,900	—411,860	—618,797
Duluth & Iron Range	284	8,433,954	208,720	8,859,779	1,104,004	1,033,520	8,146	2,141,322	144,561	4,431,564	50.02	4,428,214	508,360	3,919,316	1,193,320
Duluth, Missabe & Northern	413	20,047,862	399,227	21,303,126	1,760,798	1,579,186	31,430	3,624,758	471,933	7,483,383	35.13	13,819,743	1,322,613	12,497,130	5,058,905
Duluth, South Shore & Atlantic	601	3,275,919	927,439	4,490,929	896,509	676,995	72,740	2,102,884	99,643	3,894,489	86.71	596,440	218,271	378,144	—268,735
Duluth, Winnipeg & Pacific	175	1,280,394	242,875	1,564,080	235,431	263,262	31,151	755,971	69,107	1,357,577	86.71	206,503	87,725	118,770	—268,460
East St. Louis Connecting	3	.....	.....	1,038,035	136,178	234,133	3,323	793,693	44,428	1,212,159	116.76	—174,123	24,269	—198,394	442,247
El Paso & Southwestern Co	1,028	10,808,088	2,178,447	13,568,195	1,284,146	2,250,523	146,106	3,820,801	326,949	7,908,578	58.28	5,659,617	952,016	4,707,313	—601,377
Elgin, Joliet & Eastern	806	16,002,879	123	18,647,486	1,650,843	4,657,054	74,523	6,792,718	272,011	13,442,773	72.08	5,204,713	558,501	4,646,209	851,214
Erie	1,989	61,459,196	10,603,860	79,679,001	10,198,137	25,815,281	793,381	40,187,245	1,908,596	79,341,795	99.57	338,206	2,209,708	—1,877,270	—10,151,705
Florida East Coast	764	4,611,440	2,295,742	8,019,537	1,055,623	1,370,194	102,784	3,417,506	194,678	6,039,033	75.30	1,980,504	396,863	1,581,780	—1,309,541
Fonda, Johnstown & Gloversville	88	324,625	650,313	1,023,981	105,860	88,664	6,845	354,378	75,050	630,798	61.60	393,183	52,300	340,883	—40,745
Ft. Smith & Western R. R. Co	253	812,941	272,476	1,175,197	187,183	311,731	33,807	420,543	62,747	1,021,038	86.88	154,159	51,000	103,065	—46,112
Fort Worth & Denver City	454	5,045,542	1,810,088	7,150,198	706,423	1,620,936	52,361	2,846,769	250,793	5,505,848	77.00	1,644,350	229,690	1,414,465	—654,831
Fort Worth & Rio Grande	235	629,734	350,615	1,050,974	196,424	244,553	19,367	489,131	55,392	1,004,867	95.61	46,107	33,281	12,158	—66,707
Galveston, Harrisburgh & San Antonio	1,370	13,496,261	4,727,113	19,423,431	2,130,518	3,437,762	268,678	7,154,951	568,763	13,632,839	70.19	5,790,592	618,465	5,168,901	—1,130,151
Galveston Wharf	13	.....	.....	938,123	12,230	12,985	3,757	323,031	6,248	628,357	66.98	309,766	133,300	176,465	—125,210
Georgia	328	3,820,436	1,862,605	6,078,975	452,490	811,373	83,791	2,392,782	150,646	3,893,018	64.04	2,185,957	67,113	2,116,698	940,539
Georgia, Southern & Florida	402	1,963,538	977,856	3,273,228	496,329	854,776	52,882	1,394,413	108,277	2,921,735	89.26	351,493	152,131	198,504	—193,137
Grand Rapids & Indiana	569	4,435,687	1,658,611	6,649,119	864,758	1,633,506	108,726	3,013,357	224,725	5,862,040	88.16	787,079	261,146	525,095	—412,191
Grand Trunk Western	1,019	13,179,829	2,482,552	17,165,004	2,344,488	4,413,565	268,137	8,470,044	457,651	16,011,280	93.27	1,153,723	582,933	566,682	—975,461
Great Northern	8,258	69,219,317	14,307,657	90,812,866	15,604,251	16,890,214	743,724	38,654,351	1,575,564	74,149,035	81.65	16,665,831	5,574,866	11,083,161	—10,739,227
Gulf & Ship Island	309	1,625,250	552,728	2,365,580	470,314	418,149	40,251	192,920	108,133	1,831,311	77.41	534,269	114,164	419,600	—212,321
Gulf, Colorado & Santa Fe	1,935	11,923,721	4,467,172	17,454,600	3,046,548	3,022,294	218,126	6,294,324	563,299	13,084,082	74.96	4,370,518	766,357	3,600,133	—320,013
Gulf, Mobile & Northern	405	1,708,022	378,033	2,198,940	378,444	494,737	50,177	889,752	100,952	1,914,157	87.04	284,782	124,227	160,528	—431,782
Hocking Valley	349	10,784,945	941,666	12,456,617	1,366,187	3,421,718	78,152	4,564,058	227,770	9,653,679	61.44	2,862,938	564,225	2,233,599	—430,770
Houston, East & West Texas	190	1,336,053	442,615	1,891,187	274,586	253,354	17,708	806,372	37,727	1,389,853	73.49	501,536	69,816	631,322	—169,591

† Included in Grand Trunk Western. ‡ Included in Baltimore & Ohio R. R. ¶ Now included in Grand Trunk Western.

War Contract Legislation

Proposed legislation to validate the so-called informal war contracts amounting to approximately $1,750,000 is still in a shape unsatisfactory to the various committees of business men representing the manufacturers of war work material who have been in Washington in the effort to have Congress approve a measure which would at an early date supply a remedy for the uncertain conditions now existing. The Senate committee on military affairs has reported, as a substitute for the Dent bill passed by the House, the War Industries Board bill, but with a section giving the right of appeal from the decisions of the War Department to both the contractor interested and to the Department of Justice to a claims appeals commission. This, according to statements issued by Joseph H. DeFrees, chairman of the War Service Executive Committee, and by H. H. Dinneen, secretary of the Association of Manufacturers of War Materials, would open the way not only to delay in payment on informal contracts, but on formal contracts as well, of which the War Department now has full jurisdiction and which are being settled.

"Our interest," said Mr. Dinneen, "is in having a reasonably clear and adequate bill passed and passed quickly. The business of this country has no fear of any kind of an investigation, but it is unwilling that relief which is now imperative should be fettered with cumbersome provisions. Labor is going out by the thousand in all of the cities which rallied to the support of the government in the four Liberty Loans and within the next ten days thousands more will go out in these centers. Millions upon millions of dollars are tied up in war work. The government does not want war products, and in the present state of affairs the government cannot in many instances settle with contractors, hence the contractors cannot get out of war work for which the government has no use and cannot return to peace work. The consequence will be that labor will necessarily be unemployed until government adjustment is possible."

Revenues and Expenses for November

Railway operating expenses for the 11 months ending November 30, 1918, were over a billion dollars greater than for the corresponding period of 1917, according to the monthly bulletin of the Interstate Commerce Commission.

Railway operating income in November again fell short of the so-called standard return guaranteed to the railroads by the government, amounting to $60,012,222, or $258 per mile, as compared with $78,914,790, or $339 per mile in November, 1917, and $378 per mile, the average for the month of November in the test years ending with June of 1915, 1916 and 1917. Operating revenues increased $82,000,000, while expenses increased $102,000,000, partly on account of back payments of increased wages.

For the 11 months ending November 30, the operating income was $688,442,509, or $253,000,000 less than for the corresponding period of 1917, and the net operating income was $662,407,625, or $248,000,000 less than for 1917. While the operating revenues for the period increased $760,000,000, the operating expenses increased $1,005,000,000, while taxes increased $8,000,000. The commission's compilations, covering 180 Class 1 roads and 15 switching and terminal companies, are as shown in the table.

Central Railway Club

At the January 10 meeting of the Central Railway Club, V. C. Randolph, fuel supervisor, United States Railroad Administration, presented a paper on fuel conservation, showing moving pictures of good practices in firing and methods to be avoided, which were taken on the Minneapolis, St. Paul & Sault Ste. Marie.

Frank C. Pickard, master mechanic of the Delaware, Lackawanna & Western, was elected president of the club, and in commenting on the railroad situation he called attention to the work done by the government controlled railroads during the past year. There were 8,700,000 troops moved, with a maximum of 1,147,013 during the month of July. Throughout the year 20,897 troop trains, averaging 12 cars per train, were handled. In speaking of finding positions for the discharged military men he said: "There are a lot of people who have been pessimistic about finding employment for the returning soldiers, but personally I do not feel that way. Prior to the war 1,200,000 emigrants from European countries were brought into this country and our great industrial system absorbed them with hardly a ripple on the surface. We have got to do what we can in our local communities to start building. But little has been done during the past four years because of the material and the men which were needed elsewhere. We have not had time to repair the machines in our shops and our buildings have been neglected—all that will tend to create employment. Think of what the establishment of the eight-hour day will mean. That alone will

RAILWAY REVENUES AND EXPENSES

Item	November				Eleven months ended November 30			
	Amount		Per mile of road operated		Amount		Per mile of road operated	
	1918	1917	1918	1917	1918	1917	1918	1917
1—Average number miles operated	232,554.00	232,990.09	.....	.....	233,166.22	232,551.86	.....	.....
REVENUES:	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
2—Freight	321,800,828	254,560,948	1,384	1,092	3,141,024,307	2,612,463,804	13,471	11,234
3—Passenger	81,674,106	70,133,132	351	301	938,631,613	746,231,429	4,025	3,209
4—Mail	4,244,238	4,510,568	18	19	48,894,646	54,278,193	210	233
5—Express	10,685,847	9,033,837	46	40	113,231,264	96,657,267	486	416
6—All other transportation	10,329,041	9,680,770	44	41	113,944,412	105,652,382	489	454
7—Incidental	10,582,086	9,099,165	46	39	113,612,264	95,608,126	487	411
8—Joint facility—Cr.	591,732	411,261	3	2	5,432,870	3,937,231	23	17
9—Joint facility—Dr.	136,897	156,055	1	1	1,596,896	1,461,388	7	6
10—Railway operating revenues	439,770,981	357,273,626	1,891	1,533	4,473,174,480	3,713,367,044	19,184	15,968
EXPENSES:								
11—Maintenance of way and structures	62,442,702	38,707,203	269	166	584,334,115	421,925,611	2,506	1,814
12—Maintenance of equipment	101,886,188	65,100,019	438	279	999,251,659	630,128,139	4,286	2,710
13—Traffic	3,310,530	5,306,550	14	23	45,343,729	59,531,990	195	256
14—Transportation	183,473,652	142,138,460	789	610	1,850,511,350	1,383,587,362	7,936	5,949
15—Miscellaneous operations	3,265,945	2,920,115	14	13	35,549,848	30,874,641	152	133
16—General	9,891,832	8,286,864	43	35	101,994,264	88,058,679	437	379
17—Transportation for investment—Cr.	451,756	720,033	2	3	5,140,989	7,187,310	22	31
18—Railway operating expenses	363,819,093	261,739,178	1,565	1,123	3,611,843,976	2,606,919,112	15,490	11,210
19—Net revenue from railway operations	75,951,888	95,534,448	326	410	861,330,504	1,106,447,932	3,694	4,758
20—Railway tax accruals (excluding "War Taxes")	15,907,573	16,586,098	68	71	172,339,663	164,361,496	739	707
21—Uncollectible railway revenues	32,093	33,560	...	...	548,332	584,926	2	2
22—Railway operating income	60,012,222	78,914,790	258	339	688,442,509	941,501,510	2,953	4,049
23—Equipment rents	*1,626,811	*992,910	*7	*4	*12,948,556	*18,693,847	*56	*80
24—Joint facility rents (Dr. Bal.)	1,262,076	1,157,132	5	5	13,086,328	12,450,578	56	54
25—Net of items 22, 23 and 24	57,123,335	76,764,748	246	330	662,407,625	910,357,085	2,841	3,915
26—Ratio of operating expenses to operating revenues, per cent.	82.73	73.26	.....	.....	80.74	70.20	.....	.....

* Debit item.

take thousands of men. One large system recently advertised for 8,500 men."

In addition to an Interchange Rules Committee of the club he suggested the formulation of a Locomotive Operation Committee, to be composed of road foremen of engines, or supervisors of locomotive operation as they are sometimes called; a Locomotive Shop Committee, to be composed of shop superintendents, general foremen, erecting shop foremen, machine foremen and gang foremen; a Car Shop Committee, composed of similar men, and a Transportation Committee, to be composed of superintendents, assistants, trainmasters, etc.

The report of the secretary-treasurer showed a balance of $1,360.58, of which $500 is invested in Liberty Bonds. The total number of members January 1 was 702, which with 74 new members added at the January meeting, makes a total of 776.

The following officers were elected for the ensuing year: President, Frank C. Pickard, master mechanic, D. L. & W.; vice-presidents, H. T. Malcolmson, superintendent, T. H. & B.; L. C. Fitzgerald, shop superintendent, Erie, and M. W. Hassett, master mechanic, New York Central. H. E. Myers, master mechanic, Lehigh Valley, was elected to the executive committee. The retiring president, W. H. Sitterly, general car inspector, Pennsylvania, was added to the list of past presidents, who are also members of the executive committee.

Western Society of Engineers Elects Officers

The annual dinner of the Western Society of Engineers was held in the Hotel Sherman, Chicago, on January 22. At this meeting the announcement was made of the election of A. S. Baldwin, vice-president of the Illinois Central, as president of the society; Kempster B. Miller, consulting engineer, first vice-president; William M. Kinney, general manager of the Portland Cement Association, second vice-president; J. L. Hecht, mechanical engineer of the Public Service Company of Northern Illinois, third vice-president, and C. R. Dart, chief bridge engineer of the Sanitary District of Chicago, treasurer, and E. T. Howson, western editor of the *Railway Age*, trustee. The election of the following chairmen of sections was also announced: Electrical Engineering Section, J. R. Cravath, consulting engineer; Bridge and Structural Engineering Section, G. A. Haggander, bridge engineer, Chicago, Burlington & Quincy; Hydraulic, Sanitary and Municipal Engineering Section, Linn White, chief engineer of the South Park board, Chicago; Mechanical Engineering Section, Fred J. Postel, supervising engineer of the Department of Public Works and Buildings of the state of Illinois, and Gas Engineering Section, H. H. Clark, engineer of the Public Service Company of Northern Illinois.

Railway Business Association

President Alba B. Johnson of the Railway Business Association has announced the completion of the general executive committee for the current year. The committee consists of the president and vice-presidents, who were elected at the annual meeting and have already been announced, and 27 executive members, a third of whose terms expire annually. The nine appointments for three years ending January, 1922, are as follows:

W. E. Clow, president, James B. Clow & Sons, Chicago.

W. H. Cottingham, president, Sherwin-Williams Co. Cleveland.

Howard A. Gray, manager, railroad sales department, Joseph T. Ryerson & Son, Chicago.

E. J. Kearney, secretary and treasurer, Kearney & Trecker Co., Milwaukee.

E. B. Leigh, president, Chicago Railway Equipment Co., Chicago.

Herbert I. Lord, Detroit Lubricator Co., Detroit.

Burton W. Mudge, president, Mudge & Co., Chicago.

W. G. Pearce, president, American Brake Shoe & Foundry Co., New York.

W. E. Sharp, president, Grip Nut Co., Chicago.

The appointments of the standing committees will be announced later.

Traffic News

The Southern Pine Association will hold its annual meeting at the Hotel Grunewald, New Orleans, La., on February 25 and 26.

The Panama Railroad Company has issued Freight Tariff No. 30 which gives class and commodity rates from New York to Central American and Mexican ports.

The Traffic Club of Chicago held a smoker and vaudeville in its club rooms at the La Salle Hotel on January 23. Samuel O. Dunn, editor of the *Railway Age*, who recently returned from Europe, delivered an address concerning his trip abroad, which dealt largely with European railroad conditions.

More Sleeping-Car Lines to the South

Seven more of the sleeping car lines to the South are to be at once restored; these are in addition to the 15 through lines restored on January 1. The new lines are: Pennsylvania Railroad, leaving New York at 8:08 a. m., a car to Key West via the Atlantic Coast Line. Pennsylvania Railroad, leaving New York at 2:04 p. m., a car between New York and Pinehurst via the Seaboard Air Line. Additional cars between New York and Palm Beach via the Seaboard Air Line, as well as cars between New York and Augusta, Aiken and Asheville via the Southern Railroad, will leave New York at 1:12 p. m. An additional car will also be run between New York and Atlanta via the Southern Railroad, leaving New York at 3:38 p. m. Corresponding additional sleeping car lines will be run northward.

The cars from White Sulphur Springs and Hot Springs over the Chesapeake & Ohio, and the New Orleans car via the Southern and Norfolk & Western which now run north of Washington over the Baltimore & Ohio are to be transferred to the Pennsylvania Railroad train leaving Washington at 9:05 a. m.

Entraining and Detraining (With Abbreviated Trains) in New Jersey

Tight skirts on women passengers have upset schedules on the railroads only slightly less than a blizzard. The Pennsylvania, which reduces all that has to do with the operation of trains to a scientific accuracy, has found that since the women have begun wearing tight skirts the average train stop is seventeen seconds longer than when skirts were short and loose.

Taking or leaving a train anywhere is no easy task for the tight-skirted woman, but in New Jersey it is serious business, for trains are equipped largely with old Pullmans converted into day coaches. Formerly a porter put a stool under the bottom step, but there is no stool or porter now and the women have to fairly throw themselves into the arms of the brakemen in detraining. In entraining the situation is even worse.—*Philadelphia North American.*

City Drays Only 10 Per Cent Efficient

Ten trucks are needed to do the work of one in lower Manhattan, thereby overcrowding the streets tenfold. This is shown by a "time study" made by the engineering staff of the New York-New Jersey Port and Harbor Development Commission. A two-horse truck operating from a lower West Side dry goods store, delivering both from and to the store, was taken as typical. An engineer for the commission stayed with this truck six days, recording routes and distances covered, loading on each trip, time consumed in transit, loading, unloading and waiting in line at piers and other points.

During the week the truck often carried light loads or traveled empty; waited at the store for orders at piers for the

chance to load or unload; made repeated trips to the same point without carrying full loads; and on the streets was constantly held up by other trucks similarly underworked. Its loads while it was loaded averaged 60 per cent of capacity, but half the time it moved empty. It traveled 28 miles in all, making only one mile the fourth day. Of 46½ hours it was out it was idle 22½ hours, loading or unloading 11½ hours and moving only 12½ hours.

This means, says the report, that three trucks fully loaded all the time could with the same delay have done as much as ten were doing. With the idle time eliminated and loading and unloading time reduced to the lowest terms, one truck could do the work of the three. If there are 1,000 trucks of this type and 900 are unnecessary, the commission estimates that the annual waste is about $2,000,000.—*New York Journal of Commerce.*

New Body To Promote Foreign Trade

The Mississippi Valley Foreign Trade Convention, held at New Orleans, La., on the 13th and 14th, as announced in the *Railway Age* of January 10, resulted in the organization of the Mississippi Valley Association, the first annual meeting of which is scheduled to take place at Chicago in April in conjunction with the convention of the National Foreign Trade Council. The new association, which represents manufacturing, trade and banking interests in 20 states which constitute the heart of this country, proposes to advance the welfare of the Mississippi Valley in all matters pertaining to commerce, industry and finance, with an aggressive program for the development of foreign trade as a primary objective. It also has as one of its main purposes the development of domestic trade along north and south lines, both water and rail, to relieve the congestion of east-and-west avenues of traffic.

The officers of the association, elected to serve until the first annual meeting in Chicago, are: President, John M. Parker, Federal Food Administrator, New Orleans; treasurer, R. S. Hecht, president of the Hibernian Bank of New Orleans, and secretary, A. E. Pradillo, foreign trade manager of the New Orleans Association of Commerce. Eleven committees were appointed to carry out the purposes of the organization.

In its declaration of principles, the Mississippi Valley Association recommended the adjustment of freight relationships, parities, differentials and divisions to permit nature's economics to assist in the development of the north-and-south channels of trade and the use of the Gulf ports wherever they can best serve the needs of the Valley. To this end the Federal Government was petitioned to assign vessels to give adequate and regular service between Gulf ports and markets of the Valley and to adjust ocean freight rates to and from Mexico, the West Indies and other Latin American countries so as to give shippers through gulf ports the relative rates to which their geographical position naturally entitles them. The merchant marine, Mississippi Valley waterways development, the establishment of free ports, and the extension of the Federal reserve banking system in foreign countries in the interests of foreign trade were also endorsed.

Armour Refrigerator Cars in Brazil.—The Armour plant at Santa Anna, Brazil, for which Montevideo is to serve as a shipping point, is already in operation, and will, when completed, have a capacity of from 1,000 to 1,500 head of cattle per day. For the transportation of its products to Montevideo a contract has been signed with the Central Uruguay Railway, which fixes rates for 10 years. Meat will be carried in 75 refrigerator cars, which are to be built at the expense of Armour & Co. in the railway shops at Peñarol, near Montevideo. Standardized parts for these cars will be imported from the United States. The cars are to be the property of the railway, which will gradually amortize their cost to the Armour company during a period of 10 years. The run from the Santa Anna plant to the cold storage plant at Montevideo will require about 17 hours. Tracks will be laid to the Montevideo plant and meat will be unloaded directly from railway cars to the plant. The latter is, in turn, situated at the dock, so that meat can be loaded directly on ocean steamers.—*Commerce Reports.*

Commission and Court News

Interstate Commerce Commission

The Commission held a hearing last week on the question as to whether the net operating income of the Pullman Company to be certified by the Interstate Commerce Commission as a basis for its income during the period of federal control should include an item of $333,807, representing the average income of the Northern Pacific from sleeping cars operated under a partnership agreement by the railroad and the Pullman Company. The cars were sold to the Pullman Company on April 1, 1917. The Pullman Company claims extra compensation because of its ownership of property whose earnings were not included in its income during the test period. This also involved a question whether there should be a corresponding reduction in the compensation of the Northern Pacific, which has already been fixed and the contract signed. The Northern Pacific argued that whatever the decision on the Pullman Company's claim, its own compensation should not be reduced because, while its compensation represents the earnings of property not now held by the road, the commission cannot make a correction in its net income which was properly accounted for, and because it had not been allowed its claim for extra compensation amounting to seven million dollars for property acquired since the expiration of the test period.

Court News

The Supreme Court of South Dakota has issued a temporary injunction prohibiting the American Railway Express Company from putting into effect new express rates ordered by the Director General of Railroads.

Application of General Orders Limited

In an opinion delivered recently by Judge D. J. Munger, in the United States district court at Lincoln, Neb., it was held that the application of General Orders 18 and 18-A of the director general of railroads was limited by Section 10 of the Federal Control Act, which provides that the laws then existing governing the relationship of the railways as common carriers would remain in effect except when they were inconsistent with the terms of that act or of other acts applicable to federal control or with an order of the president.

The plaintiff, in the case decided by Judge Munger, was injured on the Chicago, Rock Island & Pacific in the state of Kansas and brought suit for damages against the railway company in the state of Nebraska. General Orders 18 and 18-A provide that all suits against carriers while under federal control must be brought in the county or district where the plaintiff resided at the time of the accrual of the cause of action or in the county or district where the cause of action arose. Inasmuch as the plaintiff resided in Kansas at the time of the accident and his injuries were received in that state, the defendant argued that his suit should have been brought there. The opinion of the court, however, was that orders of the president relating to the carriers' duties and liabilities other than as common carriers, were not authorized by Section 10 of the Federal Control Act. The cause of action in the case at hand was not one arising against the railroad company as a common carrier but involved laws relating to it merely as a corporation.

The opinion of Judge Munger is contrary to that of United States Judge Jacob Trieber, of the Eastern District of Arkansas, sitting in the Eastern Division of the Eastern District of Missouri, and delivered some months ago. In this case, the facts of which are similar to those of the one argued before Judge Munger, it was held that there is nothing in the general orders of the director general which deprives the plaintiff of his right to maintain an action against the defendant, but for reasons of public necessity in a time of war, restrictions on the manner of bringing suit were made which, in the opinion of the president and the director general, were necessary to prevent seri-

ous interference with the physical operation of the railroads in the prosecution of the war. He stated that the act and the general orders may well be sustained upon the ground that the welfare of the people is the paramount law.—Friesen v. Chicago, Rock Island & Pacific Railway Company.

Crossing Accidents—Contributory Negligence

The South Carolina Supreme Court holds that where it appeared that an automobilist would have run into the side of a train through his own fault regardless of whether there were gates or a watchman at a crossing, he cannot recover, even though the railroad was negligent in not having a watchman or gates.—Gilson v. Atlantic Coast Line (S. Car.) 96 S. E. 519. Decided July 20, 1918.

Claim for Damages to Shipments

The Illinois Appellate Division holds that the receipt and investigation of a claim for damages by a railroad after the expiration of the four months after delivery limited in the bill of lading for presenting it does not constitute a waiver of the defense afforded by the provision, especially where the claim does not give the date when the shipment was received. —Pennsylvania v. Piorwaty, 207 Ill. App. 176.

United States Supreme Court

The Supreme Court of the United States on January 20, in a decision in a suit begun by the Baltimore & Ohio, held that the Interstate Commerce law, as amended in 1910, does not prohibit the free exchange of utility service between telegraph and telephone companies and railroad companies, even where service from one line to points on another is involved.

The decision sustains the lower court in setting aside Interstate Commerce Commission rulings of March 28, 1916, which held that such service must be paid for by each party on the basis of the published tariff rates.

The proceedings originally were instituted by the Baltimore & Ohio against the Western Union Telegraph Company; the Chicago, Great Western against the Postal Telegraph and Cable Company, and the Postal Company against the Tonopah & Tidewater Railroad, to compel compliance with the provisions of certain contracts which involved exchange of service which the commission had prohibited.

Application of Carmack Amendment Act

In June, 1900, the Missouri, Kansas & Texas issued bills of lading to shipper's order covering 27 carloads of grain to be shipped from Kansas City, Missouri, to Galveston. No grain was in fact delivered to it for shipment; but before the fraud was discovered, the alleged shipper transferred the bills of lading to Hutchings, Sealy & Co., who made advances on them. The advances were not fully repaid, and in 1905 they brought suit against the railroad in a state district court of Kansas. The railroad defended on the ground that since the bills of lading had been delivered in Missouri, the transaction was governed by the Missouri law and that under that law the railroad was not liable. For more than eight years the record in the case contained no suggestion of a federal question, the case having meanwhile been passed upon twice by the Supreme Court of Kansas (M., K. & T. v. Hutchings, 78 Kan. 758; Hutchings v. M., K. & T., 84 Kan. 479). Thereafter, in 1913, the railroad presented the claim that the transaction was governed by the federal law; and that, by it, the defendant was not liable. The Supreme Court of Kansas, apparently as a matter of state practice, declared that the contention came too late to be considered; and entered judgment for the plaintiff (98 Kan. 225).

The Supreme Court of the United States holds that the federal question was not seasonably raised; and that it is also unsubstantial. Prior to the Carmack Amendment the rights of the parties were governed by state law; and the Carmack Amendment does not apply, as the cause of action, if any, arose six years before the passage of that act.—M., K. & T. v. Sealy. Decided January 7, 1919.

Foreign Railway News

The Jamaica legislature is reported to have voted $250,000 for the purchase of railway and other material in France and elsewhere, which may be available as a result of the cessation of the war.

The Chilean Congress has voted $60,000 for the preparation of plans for the construction of an extension of the Transandine Railway from its terminus at Los Andes to Santiago, which will greatly shorten the distance between these two places.

Figures recently compiled by the British Department of Labor show that there were in Great Britain at the end of 1917 seven unions in the railway transport field. These had a total membership at that time of 498,263, showing an increase of 17.2 per cent over the figure of 424,960 at the end of 1916.

Japanese iron and steel manufacturing stimulated by the war (says a Japanese contemporary) made recently a tremendous progress and development. The necessity of self-support in iron and steel is now completely realized by both the government and the people, and the government giving material assistance encourages the rise of steel industry in Japan. According to the report of the Department of Agriculture and Commerce the private organizations engaged in iron and steel manufacturing at the end of June, 1918, is figured at 247, and the capital invested is estimated to be about $175,000,000. This means that since the outbreak of war capital investment in the Japanese steel industry is more than tripled.

Railway-owned freight cars in the United Kingdom were, before they were put into common user, as it is called, returned to their owners in due course; records being taken by the Railway Clearing House as they went off and returned to the owning line. Under common user this became unnecessary, as the freight cars are somewhere or other in the country. With the introduction of the English Channel train ferry, freight cars go to France, whence they may not return. So that there may be no loss, the number of every such car is taken by the Clearing House, also particulars of the consignment and to whom addressed. No effort is, however, made to follow its journeys in France; it suffices to record its return when it comes back.

Railway matters in what was once Austria-Hungary and is now no one precisely knows what may be most simply described as confusion worse confounded, says a correspondent writing from Berne, Switzerland, to the Railway Gazette (London). A record of accidents, robberies, more and more restricted time-tables, and a rolling stock and officials obviously incapable of performing the tasks devolving upon them. In Hungary matters seem no better than in Austria, and owing to the crowds of returning soldiers, repatriating themselves apparently without any sort of order being maintained or anyone being present to say when a train is carrying its full complement of travelers and no more persons must go on board it, an already very bad state of things has become of late still worse.

The State Railways of Siam are suffering from a severe shortage of rolling stock and railway construction material on both the Northern and Southern lines, says a recent American consular report from Bangkok. On each of these lines passenger fares were raised 20 per cent., due to the advance in prices of railway material received from abroad and to increased maintenance expenses. Imports of this material in Siam have almost ceased during the last two years. The official customs returns for the fiscal year ended March 31, 1918, quoted by the consul show that Siam imported "railway material" during the year to the value of only $11,411, as compared with $137,183 in the year ended March 31, 1917, and $590,464 in 1913-14. "Railway cars, trucks, etc.,"

were imported to the value of $24,964 in 1917-18; $92,487 in 1916-17, and $84,873 in 1913-14. Locomotives were not separately shown.

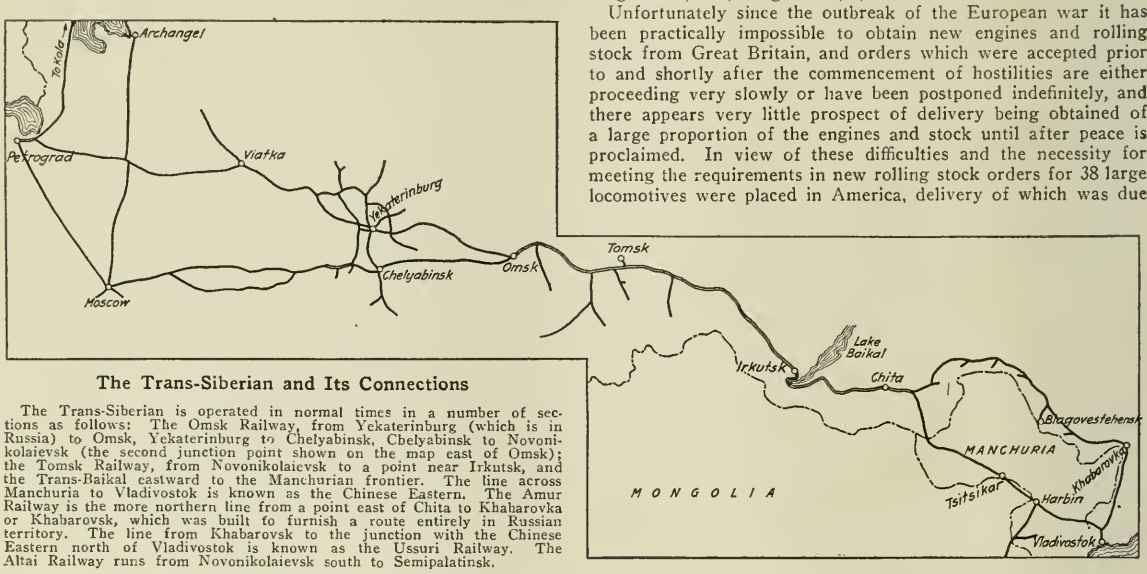
Railway Strike in Cuba

Telegraphers, conductors, agents and brakemen of the United Railways of Havana, Cuba, struck on January 16 to enforce demands for increased wages and betterment of working conditions, but returned to work Wednesday of this week, following intervention of President Menocal. News despatches say that the men received an increase in wages and recognition of their union.

Allied Control of the Trans-Siberian

The agreement for Allied control of the Trans-Siberian Railway, says a despatch from Vladivostok, dated Monday, gives the Americans control of the line from Porgranichana to Omsk, a distance of 3,000 miles; the British will have charge of the line from Omsk to the fighting front; the French will control the Khabarovsk line and the Japanese the line from Blagoviestchensk to Chita.

The administrative positions are to be filled by Russians and Americans in equal numbers. There are to be Russians only on the working staff. John F. Stevens, head of the American Railway Commission to Russia, is to be chief administrator of the railway, with the Russian General Horvath as co-director. Americans are to guard the line. Cars and engines are being supplied from the United States, the despatch continues. Great workshops are being opened in Vladivostok, and every effort is to be made to speed up operations.



The Trans-Siberian and Its Connections

The Trans-Siberian is operated in normal times in a number of sections as follows: The Omsk Railway, from Yekaterinburg (which is in Russia) to Omsk, Yekaterinburg to Chelyabinsk, Chelyabinsk to Novonikolaievsk (the second junction point shown on the map east of Omsk); the Tomsk Railway, from Novonikolaievsk to a point near Irkutsk, and the Trans-Baikal eastward to the Manchurian frontier. The line across Manchuria to Vladivostok is known as the Chinese Eastern. The Amur Railway is the more northern line from a point east of Chita to Khabarovka or Khabarovsk, which was built to furnish a route entirely in Russian territory. The line from Khabarovsk to the junction with the Chinese Eastern north of Vladivostok is known as the Ussuri Railway. The Altai Railway runs from Novonikolaievsk south to Semipalatinsk.

Associated Press despatches from Tokio on Tuesday, also, indicate a degree of dissatisfaction with the arrangement on the part of the Japanese. In the lower house of the Japanese parliament today, the despatch said, the opposition interpellated the government concerning control of the railways in Siberia. The interpellation asserted that Japan was the leading power in the Orient and that joint control of the Chinese Eastern and Trans-Siberian Railways disregards Japan's special position, and that practical control of the railways by Americans affronted the dignity of Japan, considering Japan's greater military effort in Siberia.

Viscount Uchida, the foreign minister, in reply, said the question of control of the railways was yet undecided and it was impossible to publish details. He added that the attitude of the United States throughout the negotiations was most friendly toward Japan.

The Locomotive Problem in South Africa

JOHANNESBURG.

One of the outstanding difficulties the Administration of the South African Railways has had to meet as a result of the war has been that of motive power. The difficulty, under war conditions, of keeping locomotives in order has been especially acute in a country like South Africa, which has been accustomed to depend largely on oversea sources for its rolling stock and locomotives. However, by improving water supplies, and by resorting to various expedients, the Administration has succeeded in keeping about 75 per cent of its locomotives in commission.

The following figures showing the number of new engines, freight and passenger cars which have been placed in service on the South African railways from January 1, 1914, to October 31, 1917, will indicate what steps the Administration took to keep up its supply of equipment.

	Locomotives	Passenger train cars	Freight train cars
1914	95	155	1,193
1915	94	85	1,628
1916	15	67	1,132
1917	19	18	194

The following engines and cars were still on order or authorized on October 31, 1917: Locomotives, 143; tenders, 24; passenger cars, 238; freight cars, 2,471.

Unfortunately since the outbreak of the European war it has been practically impossible to obtain new engines and rolling stock from Great Britain, and orders which were accepted prior to and shortly after the commencement of hostilities are either proceeding very slowly or have been postponed indefinitely, and there appears very little prospect of delivery being obtained of a large proportion of the engines and stock until after peace is proclaimed. In view of these difficulties and the necessity for meeting the requirements in new rolling stock orders for 38 large locomotives were placed in America, delivery of which was due about June, 1918. Everything possible, however, is being done to meet the requirements of traffic.

Italian Railroads Carried 1,500,000 Men a Month.

A review of the work accomplished by the railroads in Italy during the war, shows that during the period of mobilization about 90,000 cars were used monthly, and on the Venetian lines at times there were as many as 380 trains a day in use. In 39 months of warfare there were transported 27,000,000 men and 6,000,000 cars of merchandise for military use. In a record month there were transported 1,500,000 men and 220,000 cars of freight. These figures are exclusive of the regular train services which were maintained. On certain lines, by skilful operation, it was possible to move 150 trains a day, to receive as many as 400 trains a day in certain stations, and on the lines in the Venetian district at times there were 500 trains a day running.

The service done by the railroads in Italy is all the more remarkable, says the Italian News Bureau, when the serious handicap, because of the many men who left to join the mili-

tary forces, is considered. In all, 13,000 railroad employees left for military service; 507 of them have been killed in combat and 116 either are unaccounted for at sea or died in prison camps.

Motive Power Shortage of the Malay States

The report of the operations of the railways of the Federated Malay States for 1917, recently issued by the general secretary shows that that system is another of those which has suffered severely from a shortage of locomotives and repair parts during the year in question.

The total train mileage was 3,491,741, an increase of 65,809. The number of passengers carried was 12,037,941, a decrease of 2,703,125. Freight traffic increased by 26,373 tons, the total carried being 1,293,404 tons. Live stock increased by 22,382 head, the number carried being 144,809. The falling off in passenger traffic was due to the increase of fares, which had effect from March 1, 1917. Passenger traffic had been increasing to such an extent that the department was unable to cope with it. The number of trains could not be increased owing to the impossibility of obtaining more locomotives. Some of the engines ordered from England, which it is understood were completed to the extent of 80 per cent., could not be delivered, and attempts to secure them from foreign countries were unsuccessful. The engine difficulty was not entirely due to the shortage of engines. There was also a great difficulty in obtaining materials for repairs to locomotives. Freight traffic, however, was fully maintained by the restriction of passenger traffic.

During the year the railway system of the Federated Malay States was linked up with the Siamese system, so that it is now possible to make the journey overland from Penang or Singapore to Bangkok, the capital of Siam.

Railway Notes from China

Special Correspondence from Peking (delayed)

Considerable satisfaction is felt with the mandate appointing Hsuing Shi Ling, former premier and latterly special commissioner in charge of flood conservancy, as director-general of the Grand Canal reconstruction project. This is a joint undertaking of the American firm of Siems, Carey & Company with Japanese investors. Of the $12,000,000 loan some $500,000 was advanced several days ago, and the work of culling from the voluminous reports which have been accumulated on this subject during the past 200 years the essential data applicable to present conditions will be commenced shortly. Although the Grand Canal parallels the Tientsin Pukow line at places, it is believed that the improved canal will act as a feeder to the railroad rather than as a competitor. That is the direction which the traffic on other waterways is beginning to take.

* * *

On July 15 were held the closing ceremonies of the First General Traffic Conference of the Chinese Government railways. The conference had been in session for three weeks. It was composed of two members from each of the fifteen lines now in the government system, together with representatives from the ministry of communications. This conference was held in furtherance of the idea of unifying operating and traffic rules much after the same fashion as the accounting classifications had been unified. While each of the lines built with foreign capital originally represented interests essentially competitive, if not hostile to each of the others, there is a disposition now even on the part of the foreign influence represented on these lines to co-operate with the Chinese Government conservatively in the welding of the separate lines into an actual government system. While a great many subjects of interest more academic than practical took up considerable time at the conference, two important decisions were reached. One of these is for a bureau to be created in the ministry of communications for the supervision of inter-line traffic. The other is regarding a scheme which looks toward the ultimate pooling of rolling stock. In the effort to relieve in part the present car shortage the ministry proposed to poll all of the present stock. This aroused strong opposition from the lines with relatively adequate supplies of cars. Since inter-line business at present comprises well under 10 per cent of the total business, these lines were able to make out a very persuasive case against the loss of their equipment to lines which had not been so forehanded. Hence the compromise was hit upon of permitting the ministry to purchase future orders as far as it might wish and be able to do so, these new cars to be held in a central pool and be used by the individual lines for through business and locally, as deemed expedient. The rental to be paid the ministry and the regulations for interchange, inspection and repair are yet to be formulated. Acting upon this plan, the present mortgage securities remain untouched, the control of each individual management over cars in strictly local service remains unimpaired, but with the increase of business the ministry is in a position to assume control of this important function which bears so heavily on the subject of regaining Chinese control over enterprises within what have been looked upon as foreign spheres of influence.

The Damage to Belgian Railways

A special correspondent of the Times (London) gave recently some interesting details of the damage done by the Germans to the Belgian railways. He also said, however, that things were so far restored when he wrote that three trains were running daily each way between Ostend and Bruges.

"The most extraordinary triumph, however, of Belgian grit and the resourceful skill of the army railway engineers," he said, "is the establishment of a single-track connection with Bruges and Brussels via Eecloo, Ghent, Termonde and Malines. Throughout the greater part of this route, especially the Eecloo-Termonde section, the permanent way, sidings, culverts, bridges, signals, station buildings, and other railway works have been wrecked out of all recognition by the retreating Germans. A clue to the method by which this devastation was wrought may be seen in the large unexploded land mines lying singly or in pairs in the ditches and hedges every 50 or 100 yards along the easternmost sections of the track. Some are rusty and mud-covered; others still preserve their grey war paint, with green and black lettering. As these lie most thickly just before Termonde, many were probably dug up again by the Germans themselves after the conclusion of the armistice.

"But from Eecloo through Ghent, especially the important suburbs of Ghentbrugge and Ledeberg, to Schellebelle, where the lines to Termonde and Alost diverge, the mines have done their work with an effective, in many cases with a malevolent destructiveness which is hard to parallel anywhere in the war area. The whole permanent way is rent and pitted, the rails are broken and splintered like rotten wood, or twisted like wire into every imaginable contortion, in some places sticking upright, in others sprawling apart, and in others again flung into the adjoining fields. The tall iron lattice-work signal masts have fallen on the tracks all bent and broken, and the equally tall iron electric light standards have also been brought down everywhere, while for long sections the double telegraph poles have been felled with some instrument of precision. The whole track is littered with shattered fishplates, tieplates, nuts, bolts, screws, insulators, and seemingly inextricable festoons of wire. Signal-boxes, engine-houses and goods depots are either reduced to heaps of powdered brick or mere sieves. The bridges over the Scheldt and other rivers and canals for the most part lie in broken sections in the water, whence they emerge endwise, while the overhead road bridges have subsided bodily across the track, and in some cases the macadam roadway dips down at an angle of about 45 deg.

"Through this pathless waste, working day and night, the Belgian Engineers have carried their single track to Bruges and Brussels. . . . The success of this plucky experiment, coupled with the equally successful reopening of the connection with Paris, deserves every commendation. It is satisfactory to learn that German prisoners are being sent to the Yser district to work on the railway, and it is hoped that their labor will be largely employed wherever else the German genius for destruction has been active. In view of the well-known German propensities, the strictest inquiry should be made into the plea of 'military necessity' behind which German destruction of the Belgian railways is cloaked."

Equipment and Supplies

In the *Railway Age* of December 27, page 1175, there was a statement to the effect that part of the firedoors for the latest order for 600 locomotives for the Railroad Administration would be ordered from the National Railway Devices Company. More recent advices are to the effect that all of the firedoors for this order will be obtained from that company instead of only a part. The National Railway Devices Company also furnished a part of the firedoors for the U. S. standard heavy Mikado type locomotives ordered by the government in its first orders of 1,430 standard locomotives. This will correct the table showing the list of Specialties for Standard Cars and Locomotives in the Annual Statistical Number of the *Railway Age*, page 91.

Locomotive Deliveries

The following locomotives were shipped to railroads under federal control during the week ending January 11:

Works	Road	Number	Type
American	*Oregon Short Line	10	USRA Mikado
	Belt Ry. of Chicago	5	USRA Santa Fe
	Seaboard Air Line	2	USRA 6-w. Sw.
	Union Pacific	4	USRA 6-w. Sw.
	Boston & Albany	5	USRA Santa Fe
	Chicago & N. W.	3	Mikado
	Mobile & Ohio	2	USRA 6-w. Sw.
	Total	31	
Lima	New York Central	3	USRA Mikado
Baldwin	Great Northern	2	Mikado
	A. T. & S. F.	1	Mikado
	Baltimore & Ohio	4	USRA Mikado
	Atlantic Coast Line	1	Mikado
	Philadelphia & R.	1	Mallet
	Philadelphia & R.	1	Consol.
	Lehigh Valley	1	Pacific
	Total	11	
	Grand total	45	

*Five U. S. R. A. Mikados, constructed for the Oregon Short Line, were shipped to Cleveland, Obio, to be stored as part of an emergency pool.

Freight Cars

The American Railway Equipment Company, Pittsburgh, Pa., is inquiring for 25 steel 50-ton gondola cars.

The National Aniline & Chemical Company, Inc., Marcus Hook, Pa., is inquiring for one 50-ton hopper car and for one 40-ton gondola car.

Rural Railways Planned for England.—The Ministry of Reconstruction, according to the London Daily Mail, is embarking upon a great scheme of rural development by the construction of a large number of light railways to connect the country districts with the main railways. The cost will be borne in part by the county authorities and in part by the government. Upon completion the lines will be leased to the operating companies under adequate guarantees. Enormous quantities of material used by the British army in France will be utilized, reducing the cost of construction to about $12,000 a mile. The first rural railway has been begun at Giggleswick, Yorkshire.

Paris-Piraeus Train Service.—Plans are taking shape for the inauguration in May, 1919, of a through train from Paris to Athens, and on to Piraeus, the port of Athens, about seven miles away. This train will leave Paris at noon on Saturdays and will proceed via Milan, Venice, Trieste, Agram, Belgrade, Nish, Skopia, Platy, and Larissa, arriving in Athens Tuesday morning. It will carry Anglo-Indian and other far eastern mails and passengers, and will in this way vastly increase the importance of the port of Piraeus, which in future will be the starting place of steamers for the Far East, in place of Brindisi and other Italian ports. It will be difficult to overestimate the salutary political and commercial results of this train, which will from one viewpoint have the effect of bringing Greece hundreds of miles nearer Western Europe in distance and several days nearer in time.—*Commerce Reports.*

Supply Trade News

The Aspromet Company, Pittsburgh, Pa., announces the opening of a sales office in the Schmulbach building, Wheeling, W. Va. The new office is under the direction of **E. A. Short.**

Harry F. Worden, sales manager of the Bryant Zinc Company, with headquarters at Chicago, died in that city on January 14, after a short illness brought on by an attack of acute indigestion.

E. Logan Hill, secretary of the United States Shipping Board Commission on Port and Harbor Facilities, has resigned and become associated with Heyl & Patterson, Incorporated, contracting engineers, Pittsburgh, Pa. Previous to his appointment as an officer of the Shipping Board, Mr. Hill was assistant general manager of the Erie Railroad. He will be located at the Heyl & Patterson, Incorporated, New York sales office, 90 West street, which is particularly interested in the application of the company's cranes to wharves, cargo handling and other special purposes.

Ten million dollars' worth of equipment owned by the United States Spruce Production Corporation, with headquarters in Portland, Ore., is to be sold, and sealed bids for it will be received up to and including February 15. The equipment, which consists of everything from picks and shovels to complete railroads and mills, is in excellent condition and much of it was never used because of the abrupt ending of the war. The equipment has been stored at Vancouver, Wash., where it may be inspected on application to the Sales Board, which has its offices in the Yeon Building, Portland, Ore.

E. D. Jackson, formerly assistant to the chief engineer of the Baltimore and Ohio, has been appointed general manager of the Chipman Chemical Engineering Company, Inc., New York. Mr. Jackson entered the service of the Baltimore and Ohio in January, 1903, as a rodman on the Pittsburgh division and remained in the employ of that company until December 15, 1918, when he resigned to accept his new position. Mr. Jackson was born in Front Royal, Va., July 1, 1882, and was educated in the public schools of that town and at the Virginia Military Institute at Lexington, Va., from which he graduated in the course of civil engineering in 1902. With the Baltimore & Ohio he filled the various positions on the engineering corps to that of assistant division engineer while at Pittsburgh, from which he was transferred to Baltimore to the office of the assistant engineer. In 1909 he was appointed division engineer of the Chicago division, with headquarters at Garrett, Ind., remaining there until early in 1910, when he was again transferred to Baltimore in the capacity of assistant engineer in the office of the general manager, having charge of the development of the standard track work system. In 1913 he was transferred to the Philadelphia division as division engineer, and in 1914 returned to Baltimore as assistant to the engineer maintenance of way and later as assistant to the general superintendent of maintenance of way and structures.



E. D. Jackson

Automatic Straight Air Brake Company

Automatic straight air brake equipment, developed by the Automatic Straight Air Brake Company, New York, is now being manufactured by the American Car & Foundry Company, for both passenger and freight cars. It is reported that within 60 days the installation of these brakes will begin on freight and passenger cars in regular service.

In the annual report of the Bureau of Safety of the Interstate Commerce Commission, the following reference is made to the Bureau's tests of the A. S. A. equipment, a part of which were described in the *Railway Age* of July 26, 1918, page 173:

"The automatic straight air-brake system mentioned in last year's report, which was submitted by the Automatic Straight Air Brake Company, New York, N. Y., has been subjected to thorough tests during the year. The brake apparatus was first installed on a 100-car test rack in New York City and an elaborate series of tests was made. These tests demonstrated that the apparatus was sufficiently developed to warrant its trial under service conditions on a road having heavy traffic and mountain grades, and after the rack tests had been completed the brake apparatus was installed on 100 steel hopper cars on the Virginian Railway. These cars were loaded with coal. Standing and running tests were made with trains of 50 cars and 100 cars each, various arrangements of cars equipped with the present types of brakes and the new brake apparatus being used in these trains.

"The purpose of these tests was twofold; namely, to determine whether the automatic straight air-brake apparatus would operate synchronously with brake apparatus in common use and to determine whether the new brake could be depended upon properly to control long trains on heavy grades as well as in general service. In these tests synchronous action with brake apparatus now in common use was obtained under a number of varied conditions and circumstances, and the flexibility of the system in controlling long trains, as well as smooth operation and the absence of severe shocks, were amply demonstrated. Many of the intended functions of the brake were substantially accomplished. The more important of these are (1) providing uniform brake cylinder pressure, irrespective of piston travel; (2) compensating for brake cylinder and brake pipe leaks; (3) greater availability of the emergency feature; (4) a graduated release feature, permitting flexibility of control; and (5) prompt serial action both upon application and in release."

Trade Publications

Small Tools.—Catalogue No. 40, listing taps, dies, screw plates and reamers manufactured by the Greenfield Tap & Die Corporation, Greenfield, Mass., has been issued by this company. It contains 288 pages in which sizes, prices, dimensions and illustrations are given in convenient form.

Steam Mine Hoists.—The Lidgerwood Manufacturing Company, New York, has issued Bulletin No. 19 containing 32 pages descriptive of the line of steam mine hoists manufactured by that company. Two pages are devoted to general specifications and all of the others to illustrations, descriptions and tables of sizes, weights and dimensions of individual types of this equipment.

Tool Steels.—The Carnegie Steel Company, Pittsburgh, Pa., is now offering to the trade a new line of carbon tool steels made in five grades containing different proportions of carbon, which are intended for utilization in the manufacture of tools where heretofore alloy steels have been used. A catalogue has been issued describing these steels and presenting practical information for the steel user without going into an extended discussion of the theories of heat treatment. It contains a chart in colors of heat and temper colors which is a direct reproduction by color photography from test pieces heat treated to the temperatures shown. It affords a direct comparison by the blacksmith in the shop whereby it is possible to eliminate the effect of different lighting conditions. Pages devoted to reproduction of labels of the fine grades also specify the various uses for each grade of steel and facilitate the selection of the proper grade for any particular use.

Financial and Construction

Railway Financial News

Alabama Great Southern.—A dividend of 4 per cent has been declared on the preferred stock, payable February 21 to holders of record January 21, and also a dividend of 4 per cent on the common stock, payable January 31 to holders of record January 20. The previous declaration was 3 per cent on both classes of stock on June 14 last year.

Boston & Maine.—The stockholders have voted by a large majority in favor of the reorganization plan previously endorsed by the company directors and by Director General McAdoo.

Brooklyn Rapid Transit.—Judge Julius M. Mayer, of the United States District Court, has formally appointed former Secretary of War, Lindley M. Garrison, permanent receiver of this company.

New York Central.—At the annual meeting of the stockholders, the following directors were elected: William K. Vanderbilt, Chauncey M. Depew, Frederick W. Vanderbilt, George F. Baker, William Rockefeller, William K. Vanderbilt, Jr., Harold S. Vanderbilt, Ogden Mills, Edward S. Harkness, Charles B. Seger, Samuel Mather, and Frank J. Jerome.

Pennsylvania.—The New Jersey Public Utilities Commission has approved the application of this company to issue its general mortgage bonds to the amount of $50,000,000.

Toledo, St. Louis & Western.—The January 1 interest payment on an issue of $9,575,000 prior lien 3½ per cent bonds of this company due in 1925, has not yet been paid, apparently because the receiver's controversy with the Railroad Administration over the allocation of freight cars on the company's lines had not yet been settled. In a communication sent to the holders of the bonds the Farmers' Loan and Trust Company, as trustee of the mortgage, says that the receiver, finding himself without funds at the date of maturity of the interest, sought to raise the necessary funds through an issue of receiver's certificates. This step was vigorously opposed by the trust company, which in its circular said: "The result of the whole complicated situation was that the court authorized the receiver to endeavor to settle his controversy with the government by accepting a very much smaller number of cars, and pending the negotiation in that direction the court adjourned the receiver's application for receiver's certificates. We are expecting any day to hear from the receiver that he has settled his controversy with the government, as he was very hopeful about it, and in case the controversy is settled he is also hopeful of obtaining necessary financial assistance from the government pending the negotiation of a just compensation contract to cure this default in interest and to finance the receivership in the immediate future."

Railway Construction

Central of Georgia.—This road has authorized the construction of a rectangular timber engine house and four concrete cinder pits at Birmingham, Ala. The building will be constructed to house four large Mallet locomotives. The work will be done by Illinois Central forces.

Illinois Central.—This road has awarded a contract to the William Graver Tank Works, Chicago, for filtering and sterilizing equipment for a filtration plant to be constructed at Baton Rouge, La. The contract for the construction of the building has not yet been let and possibly this work will be done by the railroad's own forces. (December 20, 1918, page 1139.)

Southern Pacific.—This road has been authorized to construct shop buildings at Sacramento, Cal., to cost about $79,500. The largest structure to be erected will be a steel foundry which will cost $45,000. A steel and concrete repair shop will be constructed at a cost of $29,900. The projected work also includes a parcel post building to cost $4,600.

Railway Officers

Railroad Administration

Regional

H. N. Rodenbaugh, staff officer, engineering, in the office of the Southern regional director, has been appointed engineering assistant to the regional director, with office at Atlanta, Ga.

T. W. Proctor, whose appointment as supervisor of merchandise service in the Northwestern region, with headquarters at Chicago, was announced in the *Railway Age* of January 10, was born in London, Eng., in 1870. He attended Ardingly College, England, the University of Brussels, Belgium, and the Hanson School, Brussels. He entered railway service as a bill clerk in 1884. Later he was employed by the Burlington, Cedar Rapids & Northern, now a part of the Chicago, Rock Island & Pacific, as bill clerk at Cedar Rapids, Iowa. Subsequently he became chief clerk, yard switchman and rate clerk. In 1901, he went with the Chicago, Milwaukee & St. Paul, with which road he has held the following positions: Clerk and traveling claim agent in the freight claim department; soliciting freight agent in the traffic department at Minneapolis, Minn.; traveling freight agent at Kansas City, Mo.; assistant general agent at Chicago; general agent at Chicago; assistant general freight agent at Minneapolis, and assistant general freight agent at Chicago. The latter position he held at the time of his appointment as supervisor of merchandise service in the Northwestern region.

Central

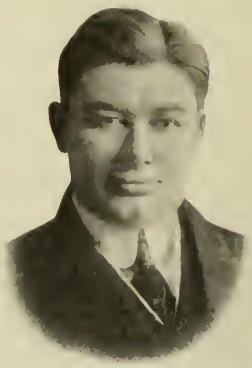
Joseph H. Young, formerly president of the Norfolk Southern and later federal manager of the Virginian and the Norfolk Southern, has been appointed senior assistant director of the Division of Operation, succeeding **W. T. Tyler,** who has been appointed director of the division, following the resignation of **Carl R. Gray.** Mr. Young was born on January 17, 1864, at Salt Lake City, Utah, and was educated at the University of Utah. He began railway work in 1882 with the Utah Central as office boy and warehouseman, and after having been agent, operator, bill clerk, ticket clerk, train agent, traveling passenger agent and general agent on various roads, was appointed general superintendent of the Utah Central in 1889. He was later superintendent of the Utah division of the Oregon Short Line, in 1902 general superintendent of the Rio Grande Western, in 1904 general superintendent, and later general manager of the Colorado & Southern, at Denver. On May 1, 1907, he became general superintendent of the St. Louis & San Francisco, was later general superintendent of the Southern Pacific, president of the Alaska Steamship Company and vice-president of the Copper River & Northwestern. In 1912 he was elected president of the Spokane, Portland & Seattle and other Hill lines in the northwest and later became president of the Norfolk Southern, from which position he was appointed federal manager of the Virginian and the Norfolk Southern.



J. H. Young

Federal and General Managers

A. W. Thompson, federal manager of the Baltimore & Ohio eastern lines and formerly vice-president of the Baltimore & Ohio Company, has resigned, effective on February 1, and is leaving the railroad service to become president of the Philadelphia Company, which operates a large number of public utility companies in Pennsylvania, including natural and artificial gas, electric light and power, and street and interurban railway companies, having a property investment of nearly $150,000,000.



A. W. Thompson

Mr. Thompson was born on May 8, 1875, at Erie, Pa., and graduated from Allegheny College in 1897 with the degree of civil engineer. He had spent portions of each year during his college training in a drafting room of the Erie Railroad and on location work for the Pittsburgh, Bessemer & Lake Erie as rodman. From June, 1897, to February, 1898, he worked as a draftsman, and in 1898 entered the service of the Pittsburgh & Lake Erie as a transitman on location and construction. He became connected with the Baltimore & Ohio in 1899 as chief of party on surveys and was later assistant division engineer, division engineer, division superintendent and chief engineer maintenance of way, of the same road. In 1910 he became chief engineer of the Baltimore & Ohio and Baltimore & Ohio Southwestern, and later in the same year he was appointed general manager. In 1912 he was elected third vice-president in charge of operation. Later, although his experience had been in the engineering and operating departments, he was elected to the new office of vice-president in charge of traffic and commercial development. On January 1, 1918, his jurisdiction was extended over the operating and engineering department, and in May he was appointed federal manager of the Baltimore & Ohio eastern lines having charge of the operation of the property for the United States Railroad Administration during the time when the Baltimore & Ohio was called upon to handle a very large share of the heavy traffic in war materials and supplies, including the traffic originating in the Pittsburgh district, in a section of the country where the volume of war traffic was the greatest and the difficulties of operation correspondingly increased. Mr. Thompson has also taken a prominent part in the affairs of the American Railway Engineering Association and of the American Railway Association, of which he was first vice-president and later acting president.

Mr. Thompson is leaving the railroad field in which he had demonstrated such marked ability to take up a new line of work which presents large possibilities. The Philadelphia Company operates under a very broad charter which enables it to engage in a varied line of activities. The electric division furnishes light and power for practically all of the city of Pittsburgh and its suburbs having 4,000 miles of high tension power lines covering a radius of 50 miles. One of its subsidiaries owns one of the largest power plants in the United States. The natural and artificial gas properties include 3,500 miles of pipe lines and distribute in the Pittsburgh district 48,000,000,000 cubic feet of gas per year. The traction and interurban division operates over 800 miles of traction lines in Pittsburgh and vicinity.

Effective January 11, the jurisdiction of the following Texas & Pacific officers is extended over the Gulf, Texas & Western: **Phil Carroll,** general manager; **J. B. Payne,** traffic manager; **George Thompson,** general solicitor; **A. J. Biard,** federal auditor; **E. F. Mitchell,** chief engineer; **R. L. Irwin,**

purchasing agent, and **W. L. Holder**, land and tax commissioner; headquarters at Dallas, Texas.

R. N. Begien, assistant to Federal manager of the Baltimore & Ohio Eastern lines, with headquarters at Baltimore, Md., has been appointed Federal manager of the Baltimore & Ohio Western lines, with headquarters at Cincinnati, Ohio, succeeding Charles W. Galloway. Mr. Begien was born on March 15, 1875, at Boston, Mass., and was educated in the engineering department of Harvard University. For three years he served as a member of the Nicaraguan Canal Commission in Central America, following which he went to Ecuador, South America, where he spent a year in railway engineering work. Then he returned to the United States to enter the engineering department of the District of Columbia. Mr. Begien began his career with the Baltimore & Ohio on August 1, 1902, as an assistant engineer at Somerset, Pa., and in June, 1908, he became division engineer at Philadelphia. He was promoted to assistant to chief engineer of the Baltimore & Ohio under A. W. Thompson on May 1, 1910, and when Mr. Thompson became general manager Mr. Begien continued as his assistant, becoming assistant to the third vice-president on May 1, 1912. In December of the same year he was promoted to assistant general superintendent, with headquarters at Baltimore, and in July, 1913, was appointed general superintendent of the Baltimore & Ohio Southwestern. In July, 1916, he was appointed chief engineer of the Baltimore & Ohio system, with headquarters at Baltimore. On April 1, the following year, he was appointed general manager of the Eastern lines, and in July, 1918, he became assistant to Federal manager (operating) of the Baltimore & Ohio Eastern lines and New York Terminals, the Western Maryland, the Cumberland Valley, the Cumberland & Pennsylvania and the Coal & Coke, with headquarters at Baltimore, which position he held at the time of his appointment as mentioned above.



R. N. Begien

Charles W. Galloway, federal manager of the Baltimore & Ohio, western lines, with office at Cincinnati, Ohio, has been appointed federal manager of the B. & O., eastern lines and associated lines, with headquarters at Baltimore, Md., to succeed A. W. Thompson, resigned. Mr. Galloway was born on December 11, 1868, and began railway work in 1883, as a messenger in the telegraph department of the Baltimore & Ohio. He subsequently served as clerk, stenographer, and secretary to different officers on that road, and from September, 1897, to July, 1899, as trainmaster on the Baltimore division. He was then consecutively assistant superintendent, superintendent of the Cumberland division, superintendent of the Baltimore division, and superintendent of transportation. He served as general superintendent of transportation of the Baltimore & Ohio and the Baltimore & Ohio Southwestern at Baltimore from July to September, 1910, and then was transferred to Cincinnati, Ohio, as general superintendent of the Baltimore & Ohio Southwestern. From April, 1912, to July, 1916, he was general manager of the Baltimore & Ohio, with headquarters at Baltimore, and then was elected vice-president of the Baltimore & Ohio Southwestern, general manager of the Western lines of the Baltimore & Ohio system, and general manager for the receivers of the Cincinnati, Hamilton & Dayton. He subsequently was appointed federal manager of the Baltimore & Ohio, western lines, and now becomes federal manager of the B. & O. eastern lines. The associated lines are the Cumberland Valley, the Western Maryland, the Coal & Coke, the Cumberland & Pennsylvania, the Wheeling Terminal, the Gettysburg & Harrisburg, and the Philadelphia & Reading, between Shippensburg, Pa., and Harrisburg, Pa.



C. W. Galloway

Operating

R. A. Mason has been appointed terminal trainmaster of the Baltimore & Ohio, Western Lines, with office at New Castle Junction, Pa., vice **L. M. Bowser**, resigned.

B. M. Edwards has resigned as manager of the Bennettsville & Cheraw and the office of manager has been abolished. **C. G. Rogers** has been appointed superintendent, with office at Bennettsville, S. C.

Charles Wesley Shaw, whose promotion to superintendent of the Springfield division on the Illinois Central, with headquarters at Clinton, Ill., was announced in the *Railway Age* of January 10, was born on April 12, 1868. He began his railway career on February 3, 1886, as a brakeman on the St. Louis Southwestern. The following year he entered the service of the Illinois Central as a switchman at Cairo, Ill., and subsequently served as yardmaster at Mounds, Ill., and freight conductor on the Chicago division. On April 15, 1894, he was transferred to the bridge and building department at Cairo, where he remained until April 1, 1900, when he became a brakeman on the St. Louis division. In the fall of that year he was promoted to freight conductor on the same division. Four years later he was appointed assistant trainmaster, and on April 10, 1907, became acting trainmaster on the Champaign division. In August of the same year he was promoted to trainmaster on the St. Louis division, and on July 15, 1911, he resigned to become trainmaster on the Illinois Southern. The following year he returned to his former position as trainmaster on the St. Louis division of the Illinois Central, which position he held until January 1, 1919, when he was appointed superintendent of the Springfield division at Clinton, Ill.



C. W. Shaw

W. D. Pearce, supervisor of bridges and buildings of the Yellowstone division of the Northern Pacific, at Glendive, Mont., has been appointed trainmaster, with office at Forsyth, succeeding **T. J. Regan**, transferred in the same capacity to Dickinson, N. Dak., vice **John Wynn**, promoted.

H. A. Culp, trainmaster of the Southern Pacific lines south of Ashland, with headquarters at Yuma, Ariz., has been appointed assistant superintendent of the Shasta division, with office at Dunsmuir, Cal., vice **W. B. Kirkland**, resigned, and **W. T. Small** succeeds Mr. Culp as trainmaster of the Tucson division, with office at Yuma.

C. A. Plumly has been appointed superintendent of telegraph of the Baltimore & Ohio, Eastern Lines; the Coal and Coke; the Wheeling Terminal Railroad; the Western Maryland; the Cumberland Valley and the Cumberland &

Pennsylvania, with headquarters at Baltimore, Md., vice Charles Selden, retired. Mr. Selden will still retain the duties and title of general inspector of transportation.

Financial, Legal and Accounting

Edward Beecroft has been appointed assistant federal treasurer of the Elgin, Joliet & Eastern, with headquarters at Chicago, Ill.

E. Marvin Underwood, general solicitor of the Seaboard Air Line and Macon, Dublin & Savannah, has been appointed general solicitor also of the Georgia, Florida & Alabama, with office at Norfolk, Va.

C. S. Stebbins, assistant to auditor of the Union Pacific, with headquarters at Omaha, Neb., has retired from railroad service after having spent 42 years with that road, which he joined in 1870, as secretary to the chief engineer and general superintendent. With the exception of a few years following 1887, Mr. Stebbins was employed continuously by the Union Pacific in various capacities in the passenger and accounting departments. In 1911 he was made assistant to the auditor of that road, which position he held until his recent retirement at the age of 70 years.

Traffic

P. W. Talbot has been appointed acting division freight and passenger agent of the Midland Valley Railroad, with headquarters at Muskogee, Okla., vice Eugene Mock, who has been temporarily assigned to serve with the St. Louis District Freight Traffic Committee.

Purchasing

Charles W. Yeamans, who was appointed purchasing agent of the Chicago & Western Indiana and the Belt Railroad of Chicago, with headquarters at Chicago, as announced in the *Railway Age*, of January 10, was born at Akron, Colo., on August 12, 1886. He began railway work on May 1, 1905, as a clerk in the engineering department of the Chicago, Burlington & Quincy, with headquarters at Chicago. Two years later he was promoted to chief clerk to the engineer of track elevation. On May 1, 1910, he resigned to go with the Chicago & Western Indiana in charge of the field construction office, with headquarters at Chicago. During the construction of Clearing yard between 1913 and 1915 he was material agent, having full charge of the ordering of materials; their inspection and distribution. Later he became chief clerk in the engineering department, and on May 1, 1918, was appointed assistant engineer in the construction department, which position he held until December 1, when he received his appointment as purchasing agent as mentioned above.



C. W. Yeamans

G. W. Alexander, whose appointment as general storekeeper of the Central of Georgia, with headquarters at Macon, Ga., has already been announced in these columns, was born on February 21, 1886, at Senoia, Ga., and was educated in the high schools. He began railway work in 1905, as a receiving clerk in the freight agent's office of the Central of Georgia, at Atlanta. In 1907 he was appointed ticket agent at Bremen, and then to 1909 was mechanical clerk to the general foreman at Cedartown. From 1909 to 1912 he held different clerical positions in the division storekeeper's office at Macon, and later was appointed division storekeeper at Cedartown. He subsequently served as division storekeeper at Savannah, and from 1914 to April, 1918, as division storekeeper at Macon, in charge of Macon, Southwest and Chattanooga divisions on the same road. In April, 1918, he became assistant to the Southern Regional Purchasing Committee of the United States Railroad Administration, with headquarters at Atlanta, Ga., and now returns to the Central of Georgia as general storekeeper as above noted.

Corporate

Traffic

George H. Shaw, having resigned as general traffic manager of the Canadian Northern Railway System and D. A. Story having retired as freight traffic manager of the Canadian Government Railways; George Stephen, freight traffic manager of the Canadian Northern, at Winnipeg, Man., has been appointed freight traffic manager, with office at Toronto, Ont., of the Canadian National Railways, under which name all of the above roads are now being operated. The following appointments have been made on the Canadian National Railways:—H. H. Melanson, passenger traffic manager of the Canadian Government Railways at Moncton, N. B., is now passenger traffic manager with jurisdiction over all lines, with office at Toronto; A. T. Weldon, general freight agent at Moncton, is now assistant freight traffic manager with jurisdiction over all lines from Matapedia, Que., and Edmundston, N. B., and east thereof, with office at Moncton, N. B.; Guy Tombs, assistant freight traffic manager at Montreal, is now assistant freight traffic manager with jurisdiction over all lines west of Matapedia and Edmundston, to but not including Port Arthur and Armstrong, Ont., with headquarters at Montreal; W. G. Manders, general freight agent at Winnipeg, Man., is now assistant freight traffic manager, and S. Osborne Scott, assistant general passenger agent at Winnipeg, is now general passenger agent, both with jurisdiction over lines Port Arthur, Armstrong, Ont., Duluth, Minn., and west thereof, and with offices at Winnipeg; A. Brostedt, district freight and passenger agent at Vancouver, B. C., has been appointed assistant general freight and passenger agent with jurisdiction Lucerne, B. C., and west, and office at Vancouver; J. M. Horn, assistant general freight agent at Winnipeg, has been appointed general freight agent, J. M. Macrae has been appointed assistant general freight agent, and R. Creelman, general passenger agent at Winnipeg, has been appointed assistant passenger traffic manager, all thru, with jurisdiction over lines Port Arthur, Armstrong, Duluth and west, with offices at Winnipeg, Man.; R. L. Fairbairn, general passenger agent, has been appointed general passenger agent, with jurisdiction over lines Quebec, and west to Port Arthur and Armstrong, with office at Toronto; R. E. Perry, assistant general freight agent at Moncton, has been appointed assistant general freight agent in charge of publication of tariffs and divisions for lines east of Fort William and Armstrong, with office at Montreal, and W. Hately has been appointed assistant general freight agent in charge of publication of tariffs and divisions for lines west of Port Arthur, Armstrong and Duluth, with headquarters at Winnipeg, Man.

Engineering and Rolling Stock

W. Walker, acting division engineer on the eastern lines of the Grand Trunk, with office at Montreal, Que., has been appointed division engineer, eastern lines, succeeding Major F. L. C. Bond, promoted.

Railway Officers in Government Service

C. V. Gallagher, formerly assistant general freight agent of the Minneapolis, St. Paul & Sault Ste. Marie at Chicago, who was given a leave of absence last spring to enter the transportation department of the Food Administration Grain Corporation, Chicago, has been promoted to assistant general traffic manager of the Grain Corporation.

Col. F. G. Robbins, assistant general manager, Service of Supply, of the Transportation Corps, A. E. F., with headquarters at Tours, France, has been transferred to the office of the chief of engineers of the army, with headquarters at Washington, D. C. Before entering military service, Col. Robbins was general superintendent of the Erie at Chicago.

EDITORIAL

Railway Age

Copies Delayed in Mails

We are receiving many complaints from subscribers that the *Railway Age* is not being delivered to them promptly. In many cases, requests are received for additional copies to replace those which have not been delivered at the time of writing, but which are later delivered by the post office after an unreasonable delay. The paper is being printed and mailed on its regular schedule, and if you do not receive your copy promptly or regularly, take the matter up with the postmaster at the same time that you write to us.

Government Operation of the Mail Service

A director of a division of the Railroad Administration has registered a complaint against our circulation department because of the repeated delays in receiving his copies of the *Railway Age*. Writing on January 25, he said that his paper for January 17 had not yet arrived, although another copy of the same issue for another officer of his division had just been received. Another office in Washington received its copy of the January 17 issue on January 25 and our own Washington office received its copies on January 22, although a copy sent by special delivery arrived on January 18. As all of the copies for Washington are mailed from New York at the same time each Friday, while their delivery in Washington frequently straggles through the succeeding week, we are strongly of the opinion that the difficulty lies in the postoffice department rather than in our circulation department, and this impression is confirmed by the much greater length of time that is now required to get letters delivered. Yet we have not heard of any suggestion that the government take over the operation of the postoffice for a five-year test.

More Enormous Theoretical Savings

The chapter of the director general's annual report on public service and accounting closes with the statement that "it can be affirmed with certainty that, were the railroads of this country actually unified under one control, there would be an enormous saving in accounting expenses." Under the heading "General Expenses," the Interstate Commerce Commission includes the salaries of general officers and the salaries and wages of officers and employees in the accounting and legal departments. Until the complete reports are filed with the Interstate Commerce Commission, it is not possible to separate general expenses into the primary accounts, but those who argue that unified control is desirable claim very large savings in almost all these primary accounts. As a matter of fact, salaries of executive officers during the past year of government operation have, in a great number of cases, been charged against the company and are not, therefore, included in general expenses. Furthermore, the salaries and the expenses of the regional directors and of the central administration are not charged to the general expenses, pro rata or otherwise, of individual railroads. While therefore there may not be any less actual expenses under this heading, it would seem probable that there would be a very considerable reduction in the amounts charged to individual roads under this class of primary accounts in general expenses. The same ought to be true of the primary accounts covering legal expenses charged to general expenses. There are left, then, the accounting and miscellaneous expenses. Presumably, the word "enormous" is not used in a relative sense in the director general's report, for accounting expenses have averaged but from 3 to 5 per cent of total railroad operating expenses. A saving of a few million dollars for the country as a whole is apparently what is meant here by enormous. But what are the facts for the first eleven months of the calendar year? The general expenses of the larger railroads total $101,994,264, as compared with $88,058,679 for the same roads for the first eleven months of 1917. If there actually have been large reductions in the amounts charged to general expenses, then there has been an "enormous increase" in accounting expenses. The accounting department report gives six reasons why the saving in 1918 was "nothing like it might be and would be under permanent unified operation." Three of these reasons amount to the fact that the separate entities of the roads had to be maintained, and the other three are explanations of extraordinary expenses entailed in the *installation* of federal operation. It's the same old story—theoretical "enormous" savings with actual increased expenses.

Administration Really Needs $750,000,000

The new director general, Walker D. Hines, in his letter to Carter Glass, Secretary of the Treasury, reprinted elsewhere in this issue, sets forth, lucidly and convincingly, the need for an addition of $750,000,000 to the present revolving fund of $500,000,000. As Mr. Hines shows, this billion and a quarter is in the nature of working capital, and to date the actual loss to the government from the operation of the railroads has been only about $200,000,000. Assuming no loss in 1919, the books of the Railroad Administration when closed at the end of 1919 would show cash on hand or debits against the railroad companies of something over one billion dollars. The additional $750,000,000 asked for now appears to be a minimum of what will be required. Even this amount has to be supplemented by the financing on the part of the railroads through their own credit of approximately $291,000,000. If there is a loss in net operating income in 1919, as compared with the aggregate of rentals due the companies, it will not necessarily mean that the administration will need a larger revolving fund, but only that a greater part of the fund will have to be written off as loss and a smaller part will represent debts of the railroads to the government. It is significant that in stating the administration's needs for working capital, Mr. Hines prefaces his figures with the statement that "when the government shall have settled its accounts," etc. At present, in the absence of adequate working capital, the Railroad Administration is holding off its creditors. Without action from Congress this is the only course open for the administration, but it is a course which no soundly run business would voluntarily adopt, and Congress should act immediately to provide the Railroad Admin-

istration with adequate working capital so that a sounder business attitude can be adopted toward the administration's creditors.

Why Hang It on the Railroads?

One of the developments of the war was the United States Employment Service. Established in the early part of 1918 as a branch of the Department of Labor and fostered to meet the needs of the war industries, its organization spread rapidly over the country so that there are now about 750 branch employment agencies covering practically all parts of the United States. As it was realized that open competition by the various war industries for the inadequate supply of labor would lead to no good, it was proposed to institute a form of control whereby labor could be allocated to the various industries much as was done with materials, although not to the same degree. Certain serious difficulties interfered with the success of this plan, the chief being that the laborer himself must be given some choice in the matter. In the actual prosecution of the work all industries, including the railroads, were requested to place their orders for labor with the Federal Employment Service and certain restrictions were placed upon the solicitation of labor by individuals, but under stress of war necessity individual initiative emphatically asserted itself. The great war industries did not depend upon the Federal Employment Service, but instituted their own means of solicitation and advertising, and the federal service also carried on a program of special recruiting for some of the more urgent demands, which resulted in some open competition between various divisions of the service itself. The railroads also were compelled to look out for themselves and opened up employment offices of their own in the large cities.

With the market reduction of industrial and commercial activities following the signing of the armistice, the enormous burden placed upon the United States Employment Service has been largely removed and the officers of this organization who had always felt that the railroads did not make sufficient use of the federal agencies turned their attention to a plan whereby all solicitation of labor for the railroads would be done by the federal service. This resulted in the labor conference, recently held in Chicago, where railroad officers were told of the advantages of the centralized control of labor solicitation and recruiting.

That there is considerable question as to the practicability of centralizing the solicitation of men for employment on the railroads to the degree proposed by the United States Employment Service is clear from the discussion brought forth at this conference. The position of the employment service is obvious. The removal of the enormous war demand for labor has left it with a big organization, the present demands upon which are not sufficient to justify its perpetuation on the present scale. Obviously, if it be given responsibility for the supply of labor to the railroads this will go a long way toward justifying its continued existence. Through a resolution passed by the conference, the question of co-operation between the United States Railroad Administration and the United States Employment Service has been put up to the director general and the regional directors of the railroads. Whatever action is taken in pursuance of this resolution, the matter should be considered solely with reference to the welfare of the realroads and their employees. The effect of the policy adopted upon the future of the United States Employment Service in its present form should receive no consideration. Why give the employment service a monopoly of the furnishing of labor to the railways, mainly in order that the employment service may continue to exist? In other words, why hang it on the railroads? Haven't they troubles enough, already?

Re-Establishing Railway Credit

The fact cannot be too strongly emphasized that the pending railroad problem is essentially that of devising means of re-establishing and maintaining railroad credit. The problem of credit, in turn, is fundamentally that of adopting some plan under which the railways can be returned to the permanent management of their owners with a reasonable certainty that they will be able to raise the large amounts of new capital which will be required for the adequate development and increase of their facilities. The problem of devising means of securing the most economical operation consistent with good service is interlocked with that of re-establishing credit, but to some extent the two can and ought to be considered separately.

The railways can be enabled to raise adequate new capital only by insuring that, under good management, they will be given opportunity to secure sufficient net income to pay a reasonable return both upon their old and their new capital.

It is contended by some persons, including members of the Interstate Commerce Commission, that before government operation was adopted the railways were allowed to charge rates that yielded reasonable profits. Elaborate statistics are cited to prove this. The incontrovertible facts are, however, first, that for several years before government operation was adopted the expansion of railway facilities was rapidly declining; and, second, that the facilities became inadequate to the demands of the country's business. Some take the view that the companies became unable to raise sufficient new capital because of abuses in their financial management. But the abuses, so far as they were real, were confined to a comparatively few companies, while the decline in the expansion of facilities was general. The growing inability of the railways as a whole to raise adequate capital was due mainly to a faulty policy of regulation; and the legislation under which they are restored to private management must, if adequate expansion of their facilities is to be renewed, establish principles and methods which will insure that they will be able to pay a more certain, and many of them a larger, return.

Various plans for accomplishing this have been suggested. One is that the government shall guarantee a fixed percentage of return for all roads on some basis of valuation. The conclusive argument against this is that it would destroy all incentive to enterprise and efficiency. No plan under which the owners of each individual property will not lose by inefficiency in its management and gain by efficiency will foster good management.

Another proposal is that the government, on some basis of valuation shall guarantee each company a minimum and a maximum percentage of net return. If the minimum is not earned the deficit shall be paid from the public treasury, and any excess earned over the maximum shall be paid into the public treasury. This plan would not destroy the incentive to efficiency, and might not seriously impair it if the maximum allowed was fixed reasonably high. Its most objectionable feature is that some roads almost certainly would not earn the minimum, that the government would have to make up their deficits, and that this would create financial relations between the government and these railways which would foster agitation for government ownership of them. Governments have made guarantees of net earnings to railways in many countries. Wherever the railways have failed to earn the guaranteed amounts there has been agitation for the governments to acquire them, and in most cases this agitation has been successful.

The plan proposed by the Association of Railway Executives sets forth that "the statute itself should provide the rule of rate-making, and should require that rates be not only what is called reasonable, but adequate and sufficient to

enable the carriers to provide safe, adequate and sufficient service." That this ought to be the rule, and that it is desirable to have it established by law, seems clear. But serious differences of opinion might arise regarding the way in which it should be interpreted and applied. In spite of the decline in the development of the railways which has been constantly and rapidly going on for almost ten years, the bodies that have regulated them are still contending, in effect, as already noted, that they have been so regulated that they could have adequately expanded if they had been disposed to. Just how these bodies think they can rationally argue that people with capital carefully refrained from putting it into an industry the returns earned in which made it an attractive industry in which to invest we do not understand.

The principle by which most of the rate regulating bodies actually have been guided has been that of reducing and keeping rates as low as could be done without having them declared confiscatory by the courts. The Association of Railway Executives suggests that a large part of the control of rate-making be transferred to a Secretary of Transportation, with the thought that a purely administrative official would act, not on the principle of near-confiscation, which has guided most of the regulating commissions, but on the principle of public expediency. We believe it is sound doctrine that the administrative and judicial functions now performed by the Interstate Commerce Commission should not be delegated to the same body, but many persons fear that a Secretary of Transportation would be influenced by considerations of politics as well as considerations of public expediency.

Another plan which is being advocated is about as follows:

Divide the railways of the country into, say, ten geographical groups, the boundaries to be determined by operating and traffic conditions. Provide by law that the rates in each territory shall be so fixed as to enable the railways of that territory as a whole to earn an average net operating income on the aggregate book cost of their road and equipment of, say, 5½ per cent. Some roads in the group would earn less than this average; some more. When a railway earned in excess of, say, 6¾ per cent, the excess, under this plan, would be divided, part being retained by the company, part being paid as a bonus to its employees, and part being paid into the public treasury.

The book cost of road and equipment is not an entirely satisfactory basis on which to compute the total net operating income allowed to be earned, but it is the best at present available, and has been used in important rate advance cases. This plan would have several advantages. First, it would not establish entangling financial relations between the government and the railway companies. Second, since it would not arbitrarily limit the net return which any individual company could earn it would not destroy the incentive to efficient management. Third, it would nullify the old argument that rates must not be fixed high enough to enable the average road to earn an adequate return for fear the stronger roads would earn an excessive return.

From the standpoint of roads which long have been earning a high percentage of return, however, this plan would be objectionable and perhaps unjust. Furthermore, the fixing by law of specific average and maximum rates of return which the companies would be allowed to earn might in the long run prove to be unwise. Nobody knows exactly what average return is needed by the companies now; and the return required might diminish, or might substantially increase, because of national or international financial developments for which they were not responsible. But, after all, human action, including legislation, should be based on probable and not merely possible developments. People do buy bonds which run 20 years or more and pay a fixed rate of interest, in spite of the fact that the general rate of interest may decline or advance; and it ought to be possible to estimate fairly accurately the average and maximum returns the roads as a whole should have.

It seems to us that the best solution of the pending problem of railway credit consistent with leaving unimpaired the incentives to efficient management would be found in legislation embodying the following principles: First, the railways should be encouraged, under proper government supervision, to so co-ordinate their operations as to limit the obvious wastes of competition while preserving as much competition as is necessary to promote emulation in operation and in improvement of service. Second, "the statute itself should," as the Railway Executives' plan says, "provide the rule of rate-making, and should require that rates be . . . adequate and sufficient to enable the carriers to provide safe, adequate and efficient service." Third, the statute, as an auxiliary guide in rate regulation, should specify a minimum average rate of return on property investment—not less, surely, than 5½ per cent—which the railways as a whole, or groups of railways, must be allowed by regulating authorities to earn, and perhaps fix a maximum return, any earnings in excess of which must be divided on some basis between the company earning them and the government. Fourth, some federal regulating authority should be given power to supervise the issuance of securities and the making of expenditures chargeable to capital account. Provisions such as these are, we believe, required to re-establish railway credit on the basis on which the public welfare demands that it shall be placed.

Fancies and Facts Regarding Government Operation

PUBLIC OPINION seems to be running strongly against government ownership and operation of the railways and public utilities now in the hands of the government, but the question cannot be considered settled until these properties shall have been returned to the management of their owners. The former director general of railroads, Mr. McAdoo, continues to advocate a five years' extension of the present system and to make predictions regarding the results that would be gained. Many of the railway employees who under government operation have received advances in wages exceeding their fondest dreams are bombarding members of Congress with propaganda for a continuance of government operation. The doctrinaire proponents of public ownership are still arguing for it, and making as glowing predictions as ever about what it would accomplish. Some of them admit that the country's first year's experience with government operation has been rather disconcerting, but they attribute the disappointing results to war conditions and say there would be a great improvement under peace conditions.

In these circumstances, it is desirable to recall some of the predictions which emanated from exactly the same persons just before and just after government operation was adopted. On December 9, and again on December 14, 1917, just two weeks before government operation was adopted, S. W. Brookhart of Iowa, a protege of Clifford Thorne, advocated government ownership of railways at a hearing of the Newlands Joint Congressional Committee in Washington. He estimated the savings in operating expenses that would be effected at $400,000,000 a year. Clifford Thorne had previously made a similar estimate in an address before the National Association of Railroad Commissioners. After government operation was adopted a newspaper of wide circulation estimated in an editorial that the savings effected under government operation would be at least $1,000,000,000 a year.

On January 19, 1918, and again on January 21, three

weeks after government operation was adopted, Director General McAdoo gave his views to the Senate Committee on Interstate Commerce in Washington. He did not express such boundless optimism regarding the results of government operation as Mr. Brookhart, Mr. Thorne and others had expressed. He did, however, make the following statements:

"*So I hope that very large economies may be practiced.* How far they will be offset by increased cost of material and increased cost of labor, I do not know, *but perhaps one hand will wash the other.* If it does, and you maintain the present status, perhaps the government would not have to meet any deficiency against guarantees it may give. In any case, *I hope that the deficiency will be inconsiderable, and I hope as well that we may have a surplus.*" (Senate Committee Hearings, page 823.) * * * "I hope there will be no deficiency. *I hope that such economies can be effected as will prevent deficiencies,* and I even hope that a surplus may result from government operation. Of course, that is a hope; I do not know." (Senate Committee Hearings, page 840.) * * * "We are taking the railroads over under a guarantee of about $100,000,000 less than they earned in the last fiscal year of the period (on the net operating income of which the compensation of the railways was based), and, in addition to that, excess profits taxes are to be paid out of that guaranteed income. *If the government, with its powers of coördination and common use of facilities, with the unquestioned economies that may be practiced under its control of the situation, and with an advantage of* $100,000,000 *over the proposed guaranty, as shown by the last fiscal year's earnings, has not made a fair trade upon the merits of the proposition for a temporary use of these properties, then I am frank to say I do not know what would be fair.*" (Senate Committee Hearings, page 849. All the italics are our own.)

Mr. McAdoo made these statements knowing he was going to operate the railways under war conditions. It will be seen that he did not refer to any possible advance of rates, either freight or passenger.

Now, what was the actual outcome? There was only a small increase in the amount of traffic handled during the year. Nevertheless, the advance in operating costs in the eleven months ending with November, 1918, so "offset," and, indeed so utterly overwhelmed and annihilated the "economies" effected, that operating expenses in these eleven months on the Class 1 roads were $1,004,924,864 greater than in the same months of 1917. When the December figures are available they will show that the increase in expenses on the Class 1 roads during the year was at least $1,100,000,000, and when the figures for all roads are available they probably will show a total increase in operating expenses of at least $1,250,000,000.

The increases in expenses came so fast that, contrary to his obvious expectations, Mr. McAdoo was obliged to make large advances in both freight and passenger rates. These advances in rates yielded increased earnings of about $600,000,000 in the six months July-December, inclusive, during which they were in effect. The increases in expenses wiped out the $100,000,000 margin with which, as Mr. McAdoo told the Senate committee, he began; wiped out the $600,000,000 increase in earnings due to advances in rates; and left the government with a deficit of $200,000,000 from the year's operations. Taking into account the increased earnings derived from the advances in rates and the deficit incurred, it will be seen that Mr. McAdoo missed his guess as to the final outcome of the year by at least $800,000,000. As to the sage Mr. Brookhart from Iowa, when we add the reduction in operating expenses which he anticipated to the advance in operating expenses which actually occurred, we find that he missed his guess by over $1,600,000,000. And as to the newspaper of wide circulation, which estimated that reductions in operating expenses of $1,000,000,000 would be effected—it missed its guess by more than $2,000,000,000!

In view of the disparity between the predictions of the advocates of government operation of railways and the actual results of the country's first year of government operation, we should think that the public might be disposed in future to pay less attention than it has in the past to the views and prophecies of the advocates of government operation, and to give more heed to the information furnished to it and the opinions expressed to it by persons who know something about the railroad business.

New Books

American Society for Testing Materials Standards; 908 pages, illustrated, 6 in. by 9 in. Bound in cloth and half leather. Published by the Society, office of secretary, University of Pennsylvania, Philadelphia, Pa. Cloth $9, *half leather* $10.

This volume contains, in their latest revised form, the 128 standards which this Society has adopted. These standards will be published triennially, the 1918 edition being the first. The specifications are divided into the following primary groups: Ferrous metals (including specifications for rails, splice bars, track bolts, track spikes, structural steel for locomotives and for cars, spring steel, staybolt wrought iron, foundry pig iron, etc.). Non-ferrous metals, including cement, lime, gypsum and clay products. Miscellaneous materials, including paints, methods of analyzing broken stone and sand, sampling and analysis of creosote oil, etc. By combining all of the specifications of this important association in one volume they are placed in convenient form for the testing engineer and others having to do with the preparation and enforcement of specifications for materials.

Concrete Engineers' Handbook. By George A. Hool, associate professor structural engineering, University of Wisconsin, and Nathan C. Johnson, consulting concrete engineer, New York. 885 pages, 6 in. by 9 in. Bound in flexible leather. Published by McGraw-Hill Book Co., Inc., 239 W. Thirty-ninth street, New York. Price, $5.

The title page of this book names six others as being collaborators in its preparation. The book is naturally divided into two sections—that for the use of the builder and that for the designer. The first portion includes a section on materials, covering cement, aggregates, water and reinforcement; a section on general methods of construction covering the proportioning of the concrete, field tests, waterproofing, mixing, finishing, forms, etc. One section covers the construction of concrete floors, walks and roadways. Another discusses the properties of cement mortar and concrete. In the second portion of the volume will be found a section on the properties of reinforced concrete, one on beams and slabs, another on columns, another on bending and direct stresses, while, with reference to the designing of specific structures there are sections on moments of building frames, buildings, girder bridges, hydraulic structures, miscellaneous structures, etc. Separate sections are also devoted to foundations, retaining walls, concrete floors and abutments for steel bridges. The subject of estimating is also treated under a separate head. Much of the information given has appeared in earlier text books written by Mr. Hool, but the manner of presenting the information in this volume is clearly that of the handbook. In the portion devoted to the constructor are illustrations of various proprietary reinforcements with tables of their properties, illustrations of construction equipment, etc. The designing section contains some very complete designing tables and charts. One section which will be found especially valuable for certain purposes is that on the moments of rigid building frames.

Storekeepers Meet for the First Time Since 1916

Papers and Reports on Stock Books, Scrap Handling, Use and Inspection of Lumber, and Accounting

THE FOURTEENTH CONVENTION of the Railways Storekeepers' Association was held at Hotel Sherman, Chicago, on January 27, 28, and 29. Because of the war, the organization did not convene in 1917 or 1918 and consequently the meeting this week is the first since the thirteenth annual convention which was held at Detroit, Mich., on May 15, 16 and 17, 1916.

President W. A. Summerhays, assistant purchasing agent of the Illinois Central, delivered the opening address. He stated that while the association had not met for 32 months it had not remained idle. The executive committee held frequent meetings to establish the policy of the association as conditions changed. In order that interest in the organization might not lapse, each member of the executive committee and the third vice-president held informal district conferences of members of the organization from all parts of this country and Canada. During the period elapsing since the last convention the executive committee made a thorough canvas of the membership of the association with the result that 278 non-paying members were dropped. This loss, balanced against an addition of 95 new members, left the association 573 active, paid-up members on January 1, 1919. While this is the first time in the history of the Storekeepers' Association that its membership has decreased, the present enrollment includes only those sufficiently interested in the purposes of the organization to pay their dues.

Mr. Summerhays also briefly outlined the war activities of the association. He stated that each member of the executive committee and former Presidents J. H. Waterman (Chicago, Burlington & Quincy), J. G. Stuart (C. B. & Q.), and W. F. Jones (New York Central Lines), as well as Secretary J. P. Murphy (New York Central), offered their services in connection with the instruction of prospective officers in the quartermaster and ordnance departments of the army at the schools established at the leading universities of the country. A committee headed by D. C. Curtis (C. B. & Q.) was appointed by the executive committee of the association to work with the quartermaster general of the army in his campaign for the reclamation of material and supplies at the army cantonments and supply depots, as well as at the front overseas.

Mr. Summerhays called attention to the fact that the Railroad Administration had approved the purposes and activities of the Storekeepers' Association and had issued instructions to include in its membership representatives of the store organizations on all railroads under federal control. It also commended the association for establishing standards of store department practices.

The work of the association, officers and committees in preparing for the 1919 meeting was unusually difficult. The tremendous upheaval in manufacturing and commercial lines caused by the shortage of labor and the heavy demand for munitions for shipment overseas made the maintenance of a reasonably regular supply of materials for railroad needs a serious problem.

W. H. Clifton, lumber agent of the Baltimore & Ohio, Baltimore, Md., submitted a circular of instructions issued by the Baltimore & Ohio System for the selection of the site and the design of lumber yards, for the handling of lumber in the yards, precautions to avoid decay, and fire protection.

Fundamental Principles That Should Govern the Supply Department

H. C. Pearce, general purchasing agent of the Seaboard Air Line, read a paper outlining fundamental principles that should govern the organization and operation of a railroad supply department. He said in part:

The real purpose of the supply department is to provide materials and supplies suitable for the service for which they are required, when and where needed, at the lowest net cost. . . .

Our railroads generally have four sources of supply: (1) material on hand and on order, (2) material which can be reclaimed, (3) material made in its own manufacturing plants, and (4) material which must be purchased from outside manufacturers.

The supply officer should not make a purchase requisition until he has exhausted all other sources of supply, and the chief supply officer must have behind him an organization that will be a guarantee that when a requisition for the purchase of material is placed, it accurately describes what is most suitable for the purpose needed, and all other resources have been exhausted, or, if it is for the purpose of taking advantage of the market, that it will be used in a certain length of time and will not become obsolete. The purpose of the supply department of our railroads must not be compared or considered the same as mercantile establishments. A mercantile establishment is for the purpose of disposing of its goods at a profit. A railroad supply department is for the purpose of supplying the needs of the railroad at the lowest net cost, conserving its assets as represented by materials and supplies in every way possible.

I think it will be apparent that if the purposes outlined are sound, there should be no divided responsibility between the officer that is responsible for the expenditure, and the officer that requests the requirement and does the accounting.

PERSONNEL

Personnel is reflected in an organization from the top to bottom. Character, energy, and loyalty are absolutely essential to the up-building or maintaining of any organization. But, this is not alone sufficient. There must be developed a broadness of conception and action that will enable them to overcome obstacles in formulating and carrying out their plans, so essential for final results.

FACILITIES

Adequate facilities for properly housing and economically handling materials must be provided and maintained. Expensive buildings are not so much needed as ample space, platforms, tracks, cranes, and other labor saving devices for handling.

TRANSPORTATION

One of the greatest needs for the proper operation of the supply department is adequate transportation facilities, and this has generally been neglected. Supply trains (not supply cars) should be used to connect up the storehouse with the users on the line. This is the only way supply officers have of knowing that materials and tools are giving proper service, and what is actually needed to do the work, and the only way that users of the material can be assured of receiving what they need, and come in personal contact with the sup-

ply department. For this reason, the supply train is fundamental to any supply department organization.

Store Delivery

Delivering material to the users is the connecting link between the storehouse and the men that use the material in the shops. It is the only way that storekeepers can know that proper materials and tools are being provided, and only in such quantities as are actually required. It places the storehouse employees in personal contact with the work, eliminates friction between employees of different departments, foremen, etc., and makes the continuous chain, and is, therefore, fundamental.

Sectional Arrangement of Material

The sectional arrangement of material is based on grouping material of the same general class in sections, and placing it in charge of one man, who will be responsible for ordering, checking, inspecting and putting it away, as well as packing and delivering for shipment; or, in other words, handling it from the time it is ordered until it is issued. The section storekeeper is the one man that should know more about the quantity, quality and use of material in his section than any single individual on the railroad. He unconsciously identifies all material in his section and its location with the description and quantity as shown in his stock-book, and vice versa. Materials should be grouped for economical handling and not for accounting purposes.

Stock Books

The stock book is the catalog and bible of the storekeeper combined. It must accurately and technically describe each and every item. It must show the average monthly consumption of the previous year, the amount on hand the first of each month by actual count, the amount used and received by months, and is the basis of all estimates of advance requirements for materials.

Reclamation

I have often been asked the difference between reclamation and repairs. Theoretically, there is little. Repairs is putting a thing in shape to perform further service. Reclamation is the reclaiming of something that has been discarded as unfit for further service. In theory, nothing should be removed until it has performed its full service, and everything so removed should be repaired and put back into service where it is. In practice, however, this is not done. Enormous quantities of materials are removed before they have performed their full service; large quantities of materials are not repaired that could be repaired and made to give better service; so that reclamation must necessarily include the recovery of all useful materials, no matter for what reason it was discarded. Both reclamation and repairs are fundamental to the supply department for the reason that they furnish a source of supply and reduce the net cost for materials.

Accounting

The accounting for all material should be done by the supply department for the reason that they must know at all times what their receipts and expenditures are in order to control their business. The only way material can be accounted for accurately and economically is on the ground, and the fact that the supply department is responsible for all materials and supplies from the time the requirements are made until used or disposed of as salvage, makes the matter of accounting not only fundamental, but absolutely necessary.

The Stock Book and Store Department Efficiency

U. K. Hall, general storekeeper of the Union Pacific, read a paper on the stock book and its importance in stores work, an abstract of which follows:

The store departments on our railroads were created for the purpose of furnishing material when and where needed, with a due regard to the amount of capital invested, to conserve material, and to utilize to the best possible advantage, all material once secured. In order to carry out these functions, we must above everything else have an organization and such records that will give us at all times a complete knowledge of all the items on hand and on order and such a record that will quickly determine any article, surplus or not moving.

The stock book is the one form or operation above all others that will tend to achieve this end. By its use the storekeeper will have at all times such a knowledge of every item on hand and on order, and a perfect control of them. This condition is brought about by a count once each month of all items in stock (and by all items is meant not only material and supplies for the maintenance of equipment, but maintenance of way and all other departments). The total of these supplies and the quantity already on order as well, are recorded in appropriate columns, thereby showing at a glance the exact condition of stocks.

The benefits of this stock book in its relation to store department efficiency are so numerous that it is difficult to enumerate them all. Some of the fundamental purposes, however, other than this complete record and knowledge of all material on hand and on order, are as follows: It brings quickly to light, at least once a month, all articles in stock that are not moving. On checking items monthly, any storekeeper noting any article that is not being disposed of naturally starts an investigation, with the result that, providing the material is not held for some specific purpose, it is transferred to some point where it can be put into actual use.

It gives a complete record of every article in stock, so that the storekeeper is in a position at any time to follow the movement and consumption of any article or group of articles, month after month, and therefore is enabled to maintain his stock intelligently. All items of material received from sources other than purchases should be entered, such as material reclaimed, picked up from scrap, received from the shops, etc. The stock book will then give a complete debit list of all items received throughout the year.

By having the stock book written up in the general storekeeper's office according to a sectional arrangement—on the basis of storing together items used for the same general purpose and storing material as far as practicable in the order of the items thus entered—the same general scheme of storing material in all branches of the department is insured. Accordingly, when it is found necessary or desirable, as it always is, to transfer employees from one store or location to another, they are thoroughly familiar, immediately upon their arrival, with the new conditions. This tends to bring about what might be called a standardized system of stores.

By writing these books in the general storekeeper's office from a master copy it does not mean that the same sized book must be used at all points, but the items as selected for the smaller stores should be taken from the first or master copy used in the larger stores, thus insuring also a uniform description of all articles from all stores.

Well kept stock books allow the general storekeeper, traveling storekeeper, or store inspector, scientifically and accurately to check the material situation at any point visited.

When section storekeepers, helpers and attendants know that material has to be counted once a month they are far more careful as to how the material is sorted, stored or piled, as actual monthly counts cannot be made unless material is kept in such a condition as to allow a prompt and correct count and such care therefore brings about far more desirable working conditions.

To obtain the very best results from the use of stock books, all entries of material on hand, on order, and quantities required, should be made by the section storekeepers or stock men (subject to such check by the local or general storekeeper as desired), as they are in constant touch with the entire situation affecting the material in their respective sections and they are also thrown in daily contact with the users of the material as well.

Some roads use a stock card or ledger on which is entered all of the receipts and issues. Such a system is objectionable, however, because its accuracy depends upon the issuance of material by numerous parties, helpers, as well as office clerks, and it merely shows the condition that is supposed to exist. The only system that can be absolutely depended on is one where the material is actually counted and the results found at once entered, thus showing the conditions as they actually are and not as they are supposed to be.

As the use of the stock book develops, greater benefits can be obtained by installing in the general storekeepers' office a consolidated stock book, in which copies showing the result of the stock taking at all stores are entered. Thus by checking the purchase requisitions against this record the general storekeeper is at all times in possession of knowledge that material ordered is not on hand anywhere on the line in sufficient quantities to make the purchase unnecessary. Such a system is without question warranted on any road having a large number of district, division or even large local stores. Without its use such roads are constantly making purchase requisitions for articles already on hand.

Some roads at the present time realize the needs of a better system for the control of their stocks but hesitate to install the stock book system because they fear the cost of operating it. We all know, however, that first expenditures often result in ultimate large economies and in no operation of the stores department organization does this so aptly apply as to such stock records.

The use of the stock books is so practicable that when a road has put them into use no inducement can be brought to bear to have the practice discontinued. Without them the general storekeeper or any supply department official is merely groping in the dark in depending upon the skill of any individual in the upkeep of his stock, whereas, by the scientific use of stock books a system is built up that is not dependent upon any one or any number of individuals, but prepares a record that is on hand at all times and which will always reveal the true conditions existing.

Inspection, Use and Handling of Lumber and Crossties

M. E. Towner, manager, Forest Products Section, United States Railroad Administration, gave a review of the organization of the Forest Products Section, Central Advisory Purchasing Committee of the United States Railroad Administration, in its relation to the War Industries Board and the lumber manufacturers. The development of the new standard specifications for crossties which reduced tie requirements to five sizes was dwelt upon in some detail, as were also the principles evolved by the Central Purchasing Committee for the purchase of ties by the railroads. This subject was also considered from the standpoint of its relation to the conservation of lumber, prices and payments and particularly to the relation of the tie contractor to the Central Purchasing Committee, a matter which has been a subject of no little contention for some time. Considerable space was also devoted to the matter of tie treatment and the economies which have been secured through the proper application of preservative processes.

The subject of lumber and lumber purchases was also treated in some detail and the following is abstracted from the portion of the paper devoted to lumber specifications and grades:

Lumber Specifications and Grades

The stores department will be much interested in the ordering of lumber properly specified for the use intended, and the widest possible variance is now the practice, as comparing what one road obtains as against what another finds proper for a given service. The quite general practice of ordering "special cutting" or special sizes as at present employed, results in relative high first cost and manufacturers in considering the bids of one road we know of in yellow pine, add $5 per 1,000 ft. to their railroad schedule. Another road is referring to grades which have not been published nor even manufactured for seven years. What this road gets is known, and they pay for it. One road on hardwoods has cut its items down over 150.

Much lumber, purchased particularly through some sources, is placed at mills at from one to three grades below original order, and it is known to what destination this lumber can be safely shipped. Lumber shipped to one point on a road is often different in grade than that shipped to another point on the same road. Accepting lumber below grade at an arbitrated price, only results in accumulating off stocks, and results in using and handling expense. The shipper of standing also very soon knows what road is trying to "put it over" by improperly degrading at destination, and such road loses rather than gains by such a practice.

The "keeping the lumber coming plan" is less apt to bull the market, nor does it tie up as much money in lumber stock. During the war period, the Railroad Administration declined to purchase all of its yellow pine and fir lumber through the War Industries Board, only placing through that Board—Director of Lumber and Pine Bureaus—such orders as would come from the mills commandeered as to output, the other requirements being purchased on bids by railroad purchasing forces, at not above government fixed prices.

Under present conditions, purchasing forces place their business through competitive bid, copies of orders for yellow pine being sent to J. H. Lauderdale, special representative at New Orleans, and for fir to O. H. Wood, special representative, Seattle, Washington. Through this practice the representatives as stated, can get behind the deliveries, assist in better distribution of orders, prevent overloading of some mills, and overlooking of others, and keep the purchasing agents advised as to market conditions.

Accounting

The report of the accounting committee was read by J. H. Waterman (C., B. & Q.), chairman. It follows in part:

The committee has considered the accounting in values only which is all that is involved in obtaining the values of such material both in stock and as used and in compiling reports for the general accounts. In order to properly account for material, the following general rules should be observed.

General Supervision and Accounting

1. All material stocks wherever located should be carried in the accounts of the store department which will have supervision over all and will handle the accounting.

2. All material purchased for or returned to stock will be held in the store department accounts until issued for immediate or current use or reported as used.

3. Detailed accounting should be performed at the local, division or district store or in the general storekeeper's office, under the general supervision of the auditor.

4. The departments making requisitions on which material is to be furnished by the store will show correct accounts chargeable. Store department accountants should be thoroughly famil-

iar with I. C. C. instructions and see that they are observed.

5. The compilation of primary operating, construction and all other accounting reports will be handled by the store department as a matter not only of convenience but of economy and efficiency.

6. To make proper comparisons, all railroads should use the same material classification. The Railway Storekeepers' Association has approved a standard classification which, with a few modifications, we recommend be put into effect as soon as practicable.

7. We recommend that a standard loose-leaf price book be used. Actual prices should be used as far as practicable, but where they are not practicable, the average or last price should govern.

Accounting for Material Received

8. All bills payable should be checked against the receiving records and certified as to the receipt of the goods in proper condition.

9. Make all proper deductions from bills payable on account of transportation charges paid by the railroad and chargeable to the shippers to equalize the F. O. B. points or terms of delivery.

10. Check all deductions on account of cash discounts.

11. Make all proper deductions on account of credit memoranda received from dealers for the return of empty containers, etc. If necessary, such credit memoranda may be covered by regular bills collectible instead of deducting the amounts from original bills payable.

12. Make all necessary and proper deductions on account of shortages, erroneous shipments, loss and damage, non-compliance with specifications, inspection and test failures, etc., chargeable to the shippers and agreed upon by the departments' concerned.

13. Make all proper additions on account of over-shipments, errors in weight, etc., which may be agreed upon between the purchasing and store departments.

14. Verify all computations and make any necessary corrections on account of errors.

15. Classify the items and amounts on bills according to the Railway Storekeepers' Association classification and take into the material accounts. Bills payable will then be forwarded for voucher.

16. All freight bills, express due bills and other documents representing transportation charges paid by the railroad should be classified and taken into the material accounts. If to be paid by the shippers, they should be deducted from the bills, or credit taken by rendering bills collectible in accordance with terms of purchase. If to be borne by the railroad they should be included in the cost of the material based on F. O. B. points.

17. Transfer requisitions from other divisions or stores for material and supplies transferred from one stock account to another, should be taken into account as classified; after which they should be passed to the storekeeper for check against the receiving records and certification as to the receipt of the goods.

18. Transfer requisitions should be verified as to computations.

19. All overages, shortages, errors in computation and other differences should be taken up after transfer requisitions have been taken into account, adjusted by counter or additional transfer requisitions, if necessary, in the succeeding months' account.

20. Material issued from stock to the shops in connection with shop orders for the manufacture of other material or articles, should be transferred from the original classes to the class "Material in course of manufacture."

21. All released new, second-hand, and scrap material should be turned over to the store department and material accounts charged currently on basis of agreed prices, resulting in corresponding credits to operating expenses and other accounts.

Accounting for Material Issued

22. Values of material and supplies issued for immediate use will be compiled by the store department by primary operating and other accounts, segregated and designated as required by the I. C. C. and auditing department instructions.

23. Transfers of material and supplies to other store stocks will be accomplished through the medium of transfer requisitions, values to be based on current stock prices.

24. Such transfer requisitions against other stores will be classified and credited to the accounts of the shipping store.

25. Charges from shops to the material accounts for labor expended on "Material in course of manufacture" on shop orders, should be taken into store accounts under the class "Material in course of manufacture," and accounted for the same as other debits to material accounts. Upon the completion of the order the total cost of the manufactured article should be in turn transferred from class "Material in course of manufacture" to the proper class.

26. Material and supplies sold to individuals and companies on the basis of sale orders from the purchasing department should be accounted for by the rendition to the auditing department of bills collectible based upon the prices and terms of delivery quoted on the sale orders.

Classified Statement of Material Received, Issued and on Hand

27. All debits and credits being classified in accordance with Railway Storekeepers' Association classification of material, a monthly statement should be compiled by the storekeeper showing amount on hand first of month, the receipts, the issues, and the balance on hand at end of month, by material classes.

28. This statement will show values only, except where the management desires to have the quantity shown.

29. The balance on hand in the accounts of an accounting store should represent the balance on hand first of month, plus the values of the purchases, including freight charges, and receipts from other sources, less the issues and transfers to other stores and material sold.

30. The material accounts should be held open after the end of each month a sufficient length of time to permit entering in that month's accounts, all bills payable for material and supplies received, and all requisitions covering material and supplies issued during the same month, in order that the accounts may reflect, as near as possible, the actual value of stock on hand.

General

31. Loss and damage to material in transit between stores should be accounted for by the consignee store taking into account the transfer requisitions and disposing of the value by obtaining relief in accordance with existing rules of freight claim and auditing departments.

32. Loss and damage by fire or other causes to stock at stores, unless covered by insurance claim, should be taken up by the accounting store in accordance with auditing department instructions.

33. When material becomes obsolete, the account that would have been affected by the use of such material should be charged with the difference between the stock values and the amounts received from its sale.

34. Store department prices should consist of cost prices less any discounts, plus any proper transportation charges and cost of inspection.

Inventories

35. Inventories of all material and supplies, including scrap should be taken periodically, at such times as prescribed by the auditing department.

36. The method of arranging and taking inventories should be in accordance with the instructions given in Part X, Sectional Book of Standard Rules, of Railway Storekeepers' Association.

37. The prices applied to inventories should be current prices.

38. Material and supplies in transit between stores at the time inventory is taken, should be listed on separate sheets of the inventory, as an exhibit to be added to the amount of material and supplies on hand.

39. Material and supplies on hand when inventory is taken and included therein, or which may have been issued prior to taking of inventory and charged out, but for which purchase bills payable have not been rendered and taken into account, should be listed on a separate sheet of the inventory from the open items on the record of material ordered and received, to be deducted from the gross amount of material on hand.

40. Transportation charges that may have been included in the cost of material and charged out prior to completing the inventory, or included in the cost prices on the inventory, but

not taken into account prior to closing the inventory, should be listed on a separate sheet to be deducted from the gross amount of the inventory.

41. These statements should be prepared by classes of material and added and deducted from the appropriate classes on the summary of the inventory.

42. The net amount of the inventory, after necessary additions and deductions are made, should be the basis for adjustment of the material and supply accounts, which will be handled in accordance with auditing department instructions.

The report was signed by J. H. Waterman, chairman, (C., B. & Q.), U. K. Hall (U. P.), H. E. Ray (A. T. & S. F.)

Good Work of Association Recognized

George G. Yeomans, member of the Central Advisory Purchasing Committee of the Railroad Administration, delivered an address in which he commended the association for its excellent work, and urged close co-operation with the central administration at Washington to the end that further efficiency may be effected in the conduct of railroad stores departments generally. He stated that the Railroad Administration had seen fit to recognize and adopt the standards for tinware which were originated by the Railway Storekeepers' Association. Likewise, the association's classification of scrap materials, revised in conjunction with a committee of the American Iron and Steel Institute, has been approved and adopted as standard by the Railroad Administration. The classification of material and the book of rules setting forth the best elementary methods of railway storekeeping, which are the work of the association also, have been made standard practice, and, finally, the advantages of relieving the users of material from the responsibility attendant upon its procurement, care and distribution, have been recognized and the purchasing and stores departments on the railroads under federal control are being organized to that end under the direction of the Division of Finance and Purchases.

One of the most astonishing features of the present situation, he said, is the lack of definite information concerning the material which is in the possession of a large majority of the railroads.

Three elements enter into all information upon which any successful business must be founded. It must be recent, it must be reliable, and it must be readily available. If any of these three elements are lacking the information is valueless. In this connection Mr. Yeomans strongly urged the conscientious and intelligent use of the stock book, which is now being introduced by regional stores supervisors on those roads on which it was not in effect. He pointed out that the stock book has been recommended in rules laid down the Storekeepers' Association, and that there is, therefore, no excuse for an indifferent or unsympathetic attitude by members. He asserted that the railways of this country spend more than one billion dollars every year for the material that they use, and of this amount it is safe to say that at least 5 per cent is spent because of the lack of proper information.

Unapplied Material

The committee on unapplied material presented recommendations on the systematic upkeep and control of materials and supplies not now under the immediate supervision of a representative of the stores department. The report brought out the fact that of the entire material stock on our railroads which is now about six hundred million dollars, approximately forty per cent is distributed or scattered along the line of roads and that in many instances no complete stock record is being kept of such unapplied or unused line stock. Following the introduction to the report which was read by W. D. Stokes, assistant general storekeeper, Illinois Central, a number of pictures were reproduced on a screen to illustrate how a large part of the line stock is scattered on some of our railroads. These illustrations indicated the obvious need of some systematic upkeep and control of such material.

The discussion of the report by several members of the association finally resulted in its being referred back to the committee with instructions to eliminate from the report all recommendations which might conflict in any way with the association's standard book of rules or its recommendations on accounting.

The Operation of a Large Army Supply Depot

The management and operation of a huge supply depot was outlined to the members of the association by Brig. Gen. A. D. Kniskern of the United States Army. He traced the rapid development of the United States supply depot at Chicago from one of very small size, which was used largely for the storage of canned and cured meat, to a depot of exceedingly large size handling all manner of supplies which had to do with the personal needs, comfort and care of our soldiers as well as the payment of the men. His work not only had to do with the handling of stores but also the purchasing of supplies.

General Kniskern asserted that the tonnage handled under his supervision in November was 71,250,000 tons inbound and 104,729,000 outbound, involving the use of 200 cars per day. His organization consisted of 169 officers, 1,200 clerks, 9,000 civilian employees and 250 enlisted men. An invitation was extended to the members of the Railway Storekeepers' Association to visit the large new supply depot on Wednesday afternoon and arrangements were made to transport the party to and from the depot by army automobile trucks.

Other Papers

J. G. Stuart, general storekeeper of the Chicago, Burlington & Quincy, read a paper on the Conservation and Reclamation of Materials which included many excellent recommendations based on actual experience. Discussion brought out the fact that it was quite essential to know whether the cost of reclaiming material was less than the cost of the same material new. In mending broken and worn parts of material by means of the acetylene or electric arc welding apparatus the discussion brought out the fact that it was essential that those employed in making the weld should be thoroughly trained in the art in order to accomplish the best results.

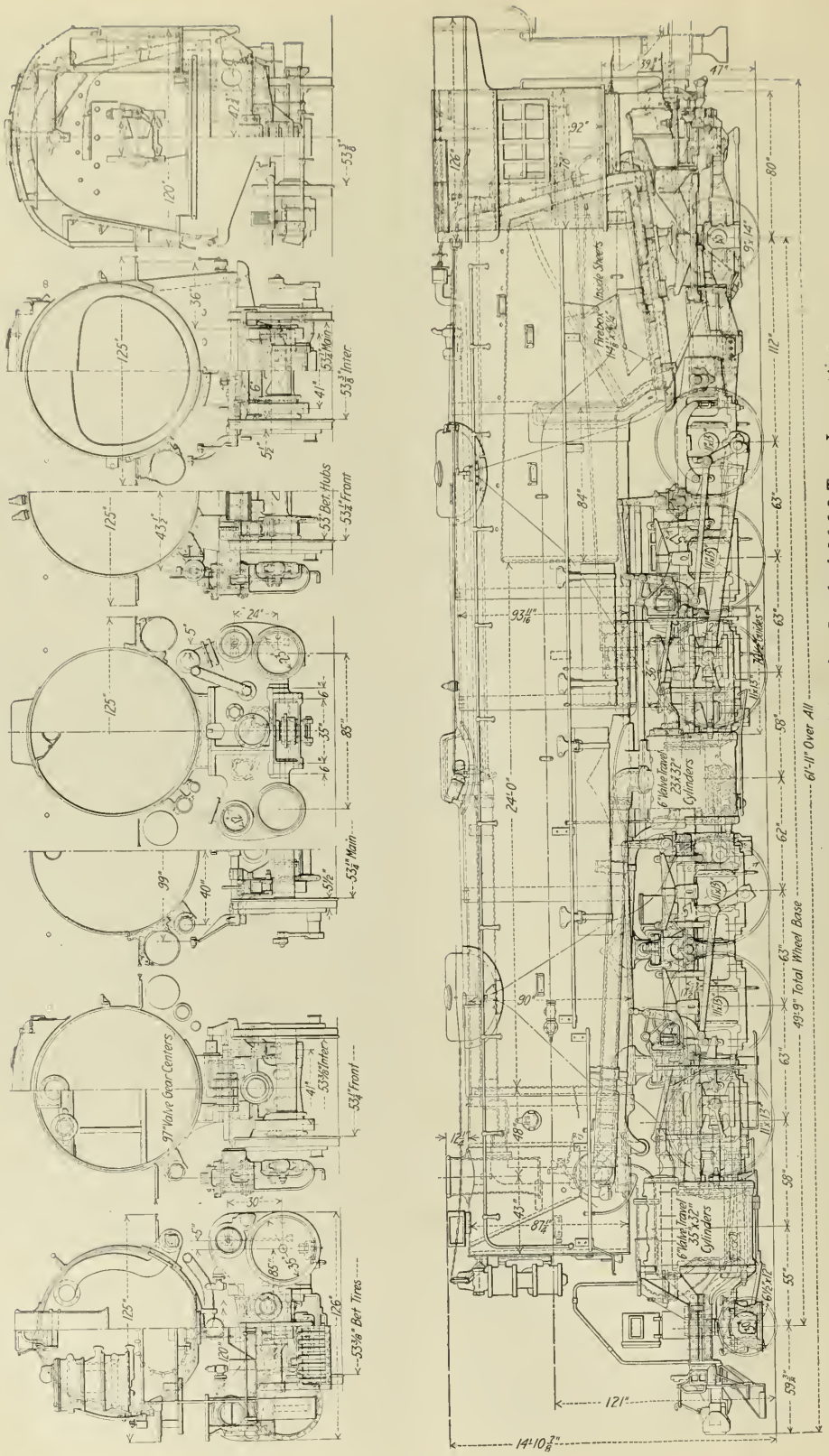
W. F. Jones, general storekeeper of the New York Central, read a paper on Scrap and Scrap Handling which covered much the same field as Mr. Stuart's discussion.

H. E. Ray, general storekeeper of the Atchison, Topeka & Santa Fe read a paper on The Conservation of Freight Cars which was an amplification of a report by the Committee on Conservation of Equipment of the association which was published in the *Railway Age Gazette* of March 23, 1917.

A paper on Labor and Labor Saving devices, Trucks and Tractors was presented by D. C. Curtis, Chicago, Burlington & Quincy. The discussion developed information as to the savings made in using power trucks for the transportation of material in storehouses and between points varying from a distance of 200 feet to several miles. In one instance $100 a day was saved in transporting store supplies from one storehouse to another one four miles distant; two trucks were used. The fact was emphasized that good roads are essential in order to obtain maximum economy.

Other Business

The attendance at the meeting was about 700, including 462 registered members. The following officers were elected: President, H. S. Burr, superintendent of stores, Erie; first vice-president, E. J. Roth, manager stores section, U. S. Railroad Administration; second vice-president, H. E. Ray, general storekeeper, Santa Fe; third vice-president, E. J. McVeigh, general storekeeper, Grand Trunk; secretary-treasurer, J. P. Murphy, general storekeeper, New York Central.


Elevation and Sections of the Railroad Administration Standard 2-6-6-2 Type Locomotive

The U. S. Standard Light Mallet Type Locomotive

2-6-6-2 Wheel Arrangement with Weight on Drivers of 358,000 lb. and Tractive Effort, Compound, of 80,000 lb.

THE FIRST OF THE standard Mallet type locomotives designed by the United States Railroad Administration has recently been turned out by the Schenectady works of the American Locomotive Company, for delivery to the Chesapeake & Ohio. The locomotive is of the 2-6-6-2 type and is the lighter of the two standard Mallet types, of which orders for 50 were placed in 1918, 30 of these being of the lighter type and 20 of the heavier type.

The locomotive has a weight on drivers of 358,000 lb., 2,000 lb. less than the maximum permissible within the axle load limit of 60,000 lb. The cylinders are 23 in. and 35 in. in diameter by 32 in. stroke and the locomotive is designed to deliver a tractive effort of 96,000 lb. simple and 80,000 lb. compound. In the table will be found a comparison of the principal dimensions and data for a number of Mallet locomotives of the 2-6-6-2 wheel arrangement, of which the standard locomotive is the heaviest both on drivers and in total weight.

COMPARISON OF RECENT MALLET LOCOMOTIVES OF THE 2-6-6-2 TYPE

Name of road	U.S. Std.	B.R. & P.	N. & W.	C. & O.
Year built	1919	1914	1912	1911
Builder	American	American	American	American
Tractive effort, lb.	80,000	80,000	72,800	72,800
Total weight, lb.	448,000	429,000	405,000	400,000
Weight on drivers, lb.	358,000	355,000	337,000	337,500
Diameter drivers, in.	57	57	56	56
Cylinder diameter and stroke, in.	23 & 35 x 32	23½ & 37 x 32	22 & 35 x 32	22 & 35 x 32
Steam pressure, lb. per sq. in.	225	200	200	200
Heating surface, total evap., sq. ft.	5,443	4,935	5,003	5,064
Heating surface, equivalent,* sq. ft.	7,381	6,473	6,485	6,430
Grate area, sq. ft.	76.3	72.2	72.2	72.2
Tractive effort × dia. drivers ÷ equivalent heating surface*	617.8	704.5	628.6	634.0
Firebox heating surface ÷ equivalent heating surface,* per cent	5.6	6.0	5.3	6.1

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

The boiler has an outside diameter at the first ring of 90 in., increasing to 95 9/16 in. at the fourth ring just forward of the firebox. The dome is located on the second ring from the front, 110 15/16 in. from the combustion chamber tube sheet. It is placed over an opening in the boiler shell 31 in. in diameter, is 9 in. high and has an opening 25 in. in diameter. The dome cap used on this boiler is interchangeable with those used on all other types of standard locomotives. The shell seams are located on the top center line of the first course, on the right side 11 9/32 in. above the center line of the boiler for the second course, on the left side 11½ in. above the center line for the third course, and on the right side 37⅛ in. above the center line for the fourth course.

The firebox has a combustion chamber extending forward into the barrel of the boiler 84 in. from the throat sheet, making the tubes 24 ft. long. It is fitted with a Security brick arch carried on five arch tubes and is fired by a Standard stoker. The fire door is of the Shoemaker power operated type and the grates are operated by Franklin power grate shakers. The boiler is fitted with the Locomotive Superheater Company's Type A superheater with 45 units.

In general the detail design of the frames follows that of all the other standard type locomotives which have been built. The top rails for both high and low pressure units are 6 in. wide, with a maximum thickness of 5 in. over the pedestals and a minimum thickness of 4½ in. The lower rails have a maximum and minimum thickness of 3½ in. and 3 in. respectively. The high pressure frames are designed with splice joints at the rear for attachment to a Commonwealth frame cradle which includes in one casting the frames, rear deck plate and trailer equalizer fulcrums. The high pressure cylinders are supported on a single front rail which is cast integral with the main frames.

The low pressure frames are designed to receive the articulation joint, which is of the Baldwin universal type, hinged for movement about a horizontal axis transverse to the center line of the locomotive and provided with a ball joint pin connection at the high pressure unit end. The low pressure cylinders are supported by double rails, both of which are bolted to the main frame. The frames of both units are spaced 41 in. from center to center, while the cylinders have a spread of 85 in. Owing to the size of the low pressure cylinders the face of the lower rail bolting flange is only 20½ in. from the center line of the locomotive, thus requiring an offset in the front frame rail. This is provided by bolting the front rail to the inside face of the lower rail extension of the main frame and reducing the lateral thickness of this section to 3 in. where it is joined under the cylinder to the front rail. The section of the extension under the cylinders is 11 in. deep, while that of the front rail has a vertical thickness of 7 in. The upper front rail is bolted and keyed to the top of the main frame over the front pedestal. The section of the main frame here is 13 in. deep with horizontal slots cored for the splice bolt nuts which come directly over the pedestal. The front rail has a section 6 in. wide by 5½ in. in thickness.



Railroad Administration Standard 2-6-6-2 Type Locomotive

The cylinders and valve chambers throughout are bushed with Hunt-Spiller gun iron. In the design of the high pressure cylinders is incorporated the Mellin intercepting valve which completely controls the admission of steam, either exhaust from the high pressure cylinders or steam direct from the boiler, to the low pressure receiver pipe. Piston valves are employed with both the high and low pressure cylinders.

These valves are 12 in. in diameter and have a maximum travel of 6 in. The valves for the low pressure cylinders are double ported while those for the high pressure cylinders are the same as are used on the 0-6-0 type switchers. The front valve chamber heads on the 2-6-6-2 type locomotive interchange with those on all other standard types and the back heads are interchangeable with those in use on the 0-6-0 type switching locomotive.

The high pressure piston specifications call for either rolled or cast steel of dished section, while for the low pressure pistons the center of which has a diameter of 30¾ in., exclusive of the bull ring, cast steel only is specified. Hunt-Spiller gun iron bull rings and packing rings are used on both high and low pressure pistons. The design of the crossheads is the same in detail as that employed on all previously built standard locomotives, and is interchangeable with that on the 0-6-0 switchers. Paxton-Mitchell packing is fitted both on the valve stems and piston rods. Steam distribution is controlled by the Baker valve gear and the Chambers back head type throttle. The locomotive is fitted with a Lewis power reverse gear.

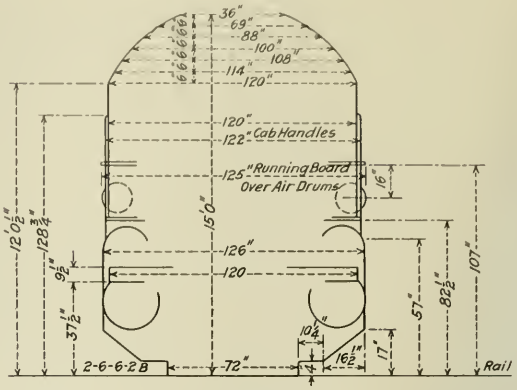
The driving journals throughout have a diameter of 11 in. and are 13 in. long. The driving boxes are interchangeable on all journals, except that the crown brass for the main journals is finished with a clearance of 1/100 in. instead of 1/32 in. The same driving box is also used on the heavy Mountain type locomotive, with the exception of the main journals, and on the main journals of the light Mikado type locomotive. The axles of the 2-6-6-2 locomotive are the same as those having the same journal sizes on the heavy Mountain type. The engine truck is of the constant resistance type and the trailer truck is of the Cole-Scoville type.

The tender tank has a water capacity of 12,000 gallons and a coal capacity of 16 tons. It is carried on a Commonwealth cast steel frame, and is one of the three standard types which have been designed to meet the requirements of all of the standard locomotives. The trucks have cast steel side frames and are of a design which is used on all the standard freight locomotives. The Unit Safety drawbar and Radial buffers are used between the engine and tender.

Wheel base, total	49 ft. 9 in.
Wheel base, engine and tender	89 ft. 5 in.

Ratios

Weight on drivers ÷ tractive effort, simple	3.7
Total weight ÷ tractive effort, simple	4.7
Tractive effort, compound × diam. drivers ÷ equivalent heating surface*	617.8
Equivalent heating surface* ÷ grate area	100.3
Firebox heating surface ÷ equivalent heating surface,* per cent	5.6
Weight on drivers ÷ equivalent heating surface*	48.5



Clearance Diagram for the Standard Light Mallet Type Locomotive.

Total weight ÷ equivalent heating surface*	60.7
Volume equivalent simple cylinders	21.7 cu. ft.
Equivalent heating surface* ÷ vol. cylinders	340.5
Grate area ÷ vol. cylinders	3.4

Cylinders

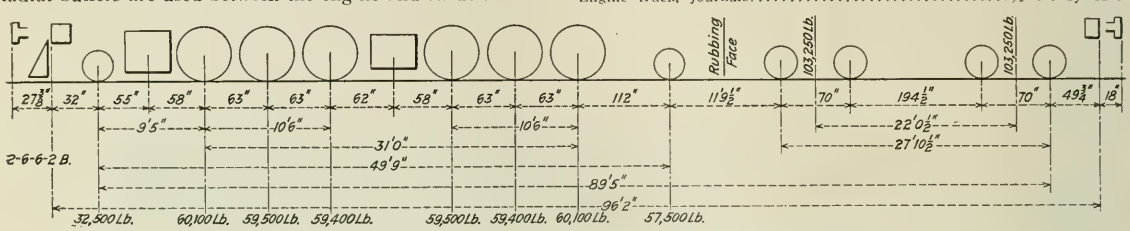
Kind	Compound
Diameter and stroke	23 in. and 35 in. by 32 in.

Valves

Kind	Piston
Diameter	12 in.
Greatest travel	6 in.
Outside lap	1 in.
Inside clearance	H. P., ¼ in.; L. P., ⅛ in.
Lead in full gear	⅛ in.

Wheels

Driving, diameter over tires	57 in.
Driving journals, main, diameter and length	11 in. by 13 in.
Driving journals, others, diamcter and length	11 in. by 13 in.
Engine truck wheels, diameter	30 in.
Engine truck, journals	6½ in. by 12 in.



Weight Distribution of the Standard 2-6-6-2 Type Locomotive

Among the specialties with which these locomotives are equipped are four Coale three-inch open safety valves, No. 13 Nathan non-lifting injectors, Nathan bull's-eye lubricators, Ashton steam gages, Okadee flanged blow-off cocks and Barco flexible pipe joints.

On the diagrams, prepared by F. P. Pfahler, chief mechanical engineer, Division of Operation of the Railroad Administration, will be found the clearances and actual wheel load distribution for these locomotives. Other dimensions and data are as follows:

General Data

Gage	4 ft., 8½ in.
Service	Freight
Fuel	Bit. coal
Tractive effort; compound	80,000 lb.
Tractive effort; simple	96,000 lb.
Weight in working order	448,000 lb.
Weight on drivers	358,000 lb.
Weight on leading truck	32,500 lb.
Weight on trailing truck	57,500 lb.
Weight of engine and tender in working order	654,000 lb.
Wheel base, driving	31 ft.
Wheel base, rigid	10 ft. 6 in.
Trailing truck wheels, diameter	43 in.
Trailing truck, journals	9 in. by 14 in.

Boiler

Style	Straight top
Working pressure	225 lb. per sq. in.
Outside diameter of first ring	90 in.
Firebox, length and width	114⅛ in. by 96¼ in.
Firebox plates, thickness	Sides, back and crown, ⅜ in.; tube, ½ in.
Firebox, water space	Sides and back, 5 in.; front, 6 in.
Tubes, number and outside diameter	247—2¼ in.
Flues, number and outside diameter	45—5½ in.
Tubes and flues, length	24 ft.
Heating surface, tubes	3,478 sq. ft.
Heating surface, flues	1,549 sq. ft.
Heating surface, firebox and arch tubes	416 sq. ft.
Heating surface, total	5,443 sq. ft.
Superheater heating surface	1,292 sq. ft.
Equivalent heating surface*	7,381 sq. ft.
Grate area	76.3 sq. ft.

Tender

Tank	Water bottom
Frame	Cast steel
Weight	206,500 lb.
Wheels, diameter	33 in.
Water capacity	12,000 gal.
Coal capacity	16 tons

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

Business Association Addresses Mr. Hines

Emphasizes Importance of Keeping at Work Industry Having 3,000 Concerns with 1,750,000 Employees

PRESIDENT ALBA B. JOHNSON of the Railway Business Association on Monday of this week addressed to Director-General Hines an extended communication in which he has requested the director-general to acquaint Congress with the extent to which the proposed capital outlays for 1919 would keep at work employees now or recently on the payrolls of railway supply industries and to recommend to the appropriation committees of the Senate and House an enlargement of the budget for improvements. In his letter Mr. Johnson has shown that the railway supply industry of the country includes from 2,000 to 3,000 firms, having in normal times about 1,750,000 employees and has emphasized that the withdrawing from the market at present price scales with the maintenance of wage scales as requested by the Secretary of Labor will mean but one thing—unemployment and resulting ill-effect on the industry itself as well as its extensive related industries. The Railway Business Association in presenting the letter to its members has suggested further, that the members and others interested can aid in the accomplishing of the recommended policy by Congress if they will propose embodiment of reference to it in resolutions of business organizations urging an extra session and prompt action relating to transportation.

The communication to Director-General Hines follows:

Pursuant to action taken by the Railway Business Association, a national organization of manufacturing, mercantile and engineering concerns which deal in railway accessories, at its annual meeting in Chicago, January 9, it devolves upon me as president of the association to address you upon the subject of additions and betterments during government control.

We have noted with gratification and hope the following paragraph contained in your letter of January 24, addressed to the secretary of the treasury:

To Stabilize Industry

"It is highly important that adequate funds for these purposes should be provided so as to give the Railroad Administration a reasonable margin for encouraging the making of such railroad improvements as may seem justifiable from the railroad standpoint, especially since such improvements will aid in stabilizing the general industrial situation."

You indicate a purpose of effecting additions and betterments during government control with assent of the railroad corporations.

An Intermediate Step

Events have shown that an intermediate step by the government is essential if general industrial conditions are to be stabilized through railway additions and betterments subject to corporate assent. That step is an adjustment of the cost so that the corporations having income based upon that of 1915-17 will not be charged with equipment or other construction acquired at war price levels. Railroad purchases have been cut to the bone. Cancellation of railroad orders has been general. Unemployment in the railway supply industries has already become serious and is spreading. Shops have begun to close down. Soldiers are coming home in quest of positions, and in the midst of a universal desire to re-employ them they are confronted with diminishing instead of enlarging opportunities for work.

On the other hand manufacturers are faced with a demand by organized labor and by a large part of the public, including the Secretary of Labor, to maintain our organizations and wage-scales. Obviously with the Railroad Administration withdrawing from the market at the current price level and the Secretary of Labor appealing to us to maintain the wage-scale which determines that price level something must give way; and what is now giving way is employment.

The Railway Business Association at its annual meeting in Chicago, January 9, adopted the following resolution:

Additions and Betterments

"During the period of government control additions and betterments should proceed with vigor and foresightedness. Discretion should be permitted the railway corporations in determining the design and amount of facilities which they will acquire. The government should provide for corporate co-operation in projects for terminals, way and structures, so as to promote joint use and an avoidance of needless duplication. The government should make such allowance in terms of purchase that the corporations will not carry the whole burden of war prices while their income is based upon that of 1915-17. *Government loans should be funded for such periods and at such rates of interest as will give each carrier reasonable opportunity to discharge all financial obligations to the government."*

While properly ordering your course from the administrative point of view, may you not appropriately lay before Congress the dilemma in which the equipment industry is placed and suggest that Congress recognize the wage and price situation as an outgrowth of the war which requires a part of the cost of railway additions and betterments to be absorbed not by the corporations, whose income has stood still, but by the federal treasury?

Government and Unemployment

General business depressions in the past have been accentuated and prolonged by the cessation of railway purchases, while general business prosperity has been enlarged and protracted by resumption and continuance of railway buying. One of the advantages claimed for government ownership and operation of railroads has been that in time of unemployment the public credit would permit the prosecution of projects giving employment to men otherwise idle. If there ever was a time when the use of public credit was justified for maintenance of employment, it is now when an army of young men is being demobilized in the midst of industrial depression. Yet the government itself through the Railroad Administration is postponing every expenditure that can be postponed.

Returning Soldiers

It is announced that soldiers not yet re-employed in civil life will be retained in army service until they find work. This will involve continuance of soldiers' pay and families' allowances as well as maintenance of the soldiers in camp. The government thus commits itself to expenditures for the object of relieving or mitigating the privations incident to readjustment. Would not there be even completer justification for government expenditure to employ men in the production of railway facilities? Even though the high industrial wage scale compels a higher range of prices than the railway corporations ought to be asked to pay, and though the government therefore must defray the excess over normal costs, the man placed or kept upon the payroll would

be engaged, unlike soldiers at camp, in producing instrumentalities of industry and commerce. The country will live to deplore any present neglect of provision for future traffic needs. Losses due to restricted transportation facilities in a period of great activity might easily be greater than the cost of stabilizing employment now by carrying through a budget of additions and betterments approaching in extent the provision made in some years of the past.

A Million and Three-Quarters

We speak for a group of industries estimated to have employed when times were good about one and three-quarters enlargements of plant. They have been employing greatly increased numbers of men and women. They are now equipped with plant and people in substantially larger numbers than the estimate given above ready to work upon the production of railway supplies if ordered.

Railway purchases ramify into almost every conceivable commodity. The group of industries which our association serves is believed to number between 2,000 and 3,000 concerns whose product wholly or to an important extent is consumed by railways or by other concerns making goods for railways. These companies maintain principal or branch plants in practically every state in the union, in some cases several in a state.

This is not all. The influence of railway purchases extends far beyond those engaged in a whole or in part in the railway supply industry. A cessation of railway additions and betterments puts a blight upon a great many other people. It cuts off the greatest single market for iron and steel, lumber and practically every basic staple. It puts a brake upon the great building and construction industry, which suffers when our people cease to build factories, and hence there is no building of homes for employees. It stops the consumption of machinery and other equipment and supplies for mills. By playing havoc with the industrial payroll in many communities where these railway supply plants are located, it knocks the bottom out of retail trade and hence reacts unfavorably upon the whole community and upon industries everywhere which furnish goods for domestic consumption.

Many Millions Affected

We have already remarked that concerns, the whole or a large part of whose product was for railways, including everything from raw material to finished products, have employed about as many men as the railways employ—or upwards of one million and three-quarters. We have seen that those looking to these industries for livelihood largely increased in number since that estimate was computed. With those dependent upon them the number directly affected aggregates many millions. Add to these the people of the manufacturing communities who are engaged in trade and in making articles which are bought for consumption by those on the industrial payroll, not to mention the stockholders in all these industrial and commercial institutions, and it is evident that the rise and fall of activity in railway supplies is a barometer of the whole national prosperity.

What Production Is Proposed

As trustees for the stockholders and employees we, the managers of these industries, invite your consideration of certain details of fact.

Stating the conclusion first and the fact afterwards, that conclusion is that the proposed provision for additions and betterments in 1919 expressed in dollars is substantially less than the new capital put into railway improvements even in the years immediately preceding the war, not to speak of years when net earnings were more favorable; and that upon the level of labor and material cost now prevailing the proposed estimate of money would produce very greatly smaller numbers of equipment and construction units and hence employ proportionately fewer people in the industries than would have been the case in past years.

From the annual statistical numbers of the *Railway Age*, we take the following tables, in each year going back to the date in which that periodical began to tabulate the figures:

Miles of New Track Built (Linear and Multiple)

Year	Miles	Year	Miles
1912	4,211	1916	1,441
1913	4,466	1917	1,656
1914	3,127	1918	1,537
1915	1,354		

Freight Cars Built

(From 1902 to 1907, Inclusive, including Passenger Cars)

Year	Domestic	Foreign	Total	Year	Domestic	Foreign	Total
1899..	117,982	1,904	119,886	1909*.	91,077	2,493	93,570
1900..	113,070	2,561	115,631	1910*.	176,374	4,571	180,945
1901..	132,591	4,359	136,950	1911*.	68,961	3,200	72,161
1902..	161,747	2,800	162,599	1912†.	148,357	4,072	152,429
1903..	153,195	1,613	152,801	1913†.	198,066	9,618	207,684
1904..	60,955	1,995	60,806	1914†.	.....	.....	104,541
1905*.	162,701	5,305	165,155	1915†.	59,984	14,128	74,112
1906*.	236,451	7,219	240,503	1916†.	113,692	21,309	135,001
1907*.	280,216	9,429	284,188	1917†.	119,363	32,038	151,401
1908*.	75,344	1,211	76,555	1918†.	81,767	42,941	124,708

Locomotives Built

Year	Domestic	Foreign	Total	Year	Domestic	Foreign	Total
1896....	866	309	1,175	1908*...	1,886	456	2,342
1897....	865	386	1,251	1909*...	2,596	291	2,887
1898....	1,321	554	1,875	1910*...	4,441	314	4,755
1899....	1,951	514	2,475	1911*...	3,143	387	3,530
1900....	2,648	505	3,153	1912†...	4,403	512	4,915
1901....	.....	.....	3,384	1913†...	4,561	771	5,332
1902....	.....	.....	4,070	1914†...	1,962	273	2,235
1903....	.....	.....	5,152	1915†...	1,250	835	2,085
1904....	.....	.....	3,441	1916†...	2,708	1,367	4,075
1905*...	4,896	595	5,491	1917†...	2,585	2,861	5,446
1906*...	6,232	720	6,952	1918†...	3,668	2,807	6,475
1907*...	6,564	798	7,362				

*Includes Canadian output.
†Includes Canadian output and equipment built in company shops.

Terminal construction and improvement seems not to be recorded statistically but the tendency through a period of years would be suggested by the figures for miles of track built.

A Significant Comparison

Would you not think it advisable to acquaint the appropriation committees of Congress with the extent of proposed additions and betterments in 1919 expressed not in dollars but in units of equipment and plant? A comparison of what is projected with actual additions and betterments in past years would enable Congress to measure the extent to which a $750,000,000 addition to the revolving fund would in your judgment "aid in stabilizing the general industrial situation." By such a comparison, taking into consideration the current altitude of industrial wages and of prices for material depending upon the wage-scale, Congress would be placed in position to authorize if this is its purpose such railway improvements during government control as would meet future traffic needs on the one hand and employ labor on the other.

A Question of Legislative Policy

Undoubtedly you will regard this as a legislative question; a policy which Congress should decide and which if authorized it would be your function to administer. Nevertheless the proposal of a five-year extension of government control must necessarily have contemplated some arrangement by which the corporations could acquire title to new property upon terms equitable to them. May we not suggest that you recommend such adjustment for adoption forthwith?

The Canadian National Railways on Prince Edward Island, which are narrow gage, are having a third rail laid on about sixty miles of the more important sections of the lines on the island with a view to running freight cars from the continent through to the principal places on the island. Standard gage freight cars are taken to the island by a car ferry between Cape Tormentine, N. B., and Borden, P. E. I.; but freight for inland points on the island has to be transferred at Borden into narrow gage cars.

Use of Treated Timber in Car Construction*

Influence of Decay on Life of Wooden Car Parts; Methods of Treating and Results Secured

OVER TWO BILLION feet of lumber and timber are used annually for the maintenance of railway freight equipment and for the construction of new cars. This represents an annual outlay for material alone of approximately $60,000,000. To this must be added, of course, an even greater expenditure for labor, steel and other material. With a view of ascertaining the service which untreated wood has given in this character of construction and with the desire also to learn to what extent it has given added service in specific cases through wood preservation, and to what extent economy would be developed by the general adoption of the practice of wood preservation, and further, as the subject is of very pertinent interest at this time, the committee felt it advisable to make this study a subject of special investigation, both through the medium of a questionnaire to all car builders and by means of personal study.

The preliminary investigation developed that there was very little information available on this subject. As it was felt that it was a matter of great importance, and that it should be gone into thoroughly and fully, a questionnaire was prepared and sent to the members of the Master Car Builders' Association.

The questionnaire covered the following information, which, it was felt by the committee and collaborators, was necessary to a thorough fundamental study of the subject:

For Car Construction—(a) Availability, cost and quality of lumber and timber. (b) Suitability and economy of wood. (c) Factors affecting the physical and mechanical fitness of wood. (d) Importance of the assistance it may be possible to render the nation and railroads by augmenting the car building program by the extensive use of wood.

TABLE 1 SUMMARY OF REPLIES TO QUESTION NO. 1

Percentage of Maintenance Due to Decay Grouped According to Expressions of Respondents (Number of Replies Given)

Type of cars	75 per cent and over	50 to 75 per cent	25 to 50 per cent	Less than 25 per cent	Indicating Considerable loss due to decay	Refuting influence of decay	No Reply	Total Questionnaires tab.
Ref	11	7	8	3	18	5	9	61
Stock ..	4	11	9	9	14	2	12	61
Gond. ..	2	9	12	12	13	3	10	61
Flat. ...	1	14	7	17	8	4	10	61
Box	0	7	7	25	9	3	10	61

Note—Approximately 77½ per cent of those replying indicate that decay is decidedly an important contributing factor.

Eighty-eight questionnaires were returned representing about 75 per cent of the most important railroad systems of the country. Of these, 61 were analyzed and the replies summarized in tables published in the appendix, 21 were discarded for lack of information, and six were too late to be included in this report.

Results of Investigation

Question 1. To what extent, in general, does decay influence maintenance of all-wood and composite freight cars? (i. e., general observations from practical experience desired.) (a) Refrigerator cars? (b) Stock cars? (c) Gondolas? (d) Flat cars? (e) Box cars?

Over 75 per cent of the replies indicate that decay influences the maintenance of wooden freight equipment to a considerable extent, and only 9 per cent have given it as their opinion that decay is not a contributing factor. The indications are that conditions favorable to decay vary with the type of car, it being most predominant in refrigerator and stock cars, less in gondola and flat cars, and least in box cars.

Question 2. What portions of these various types of cars are most affected by decay? (i. e., where is decay the direct cause for replacements and repairs, or indirectly the cause of mechanical failure due to the weakening of certain parts resulting from attack by decay?) (a) Underframe (name parts)? (b) Superstructure (name parts)?

TABLE 2.—SUMMARY OF REPLIES TO QUESTION NO. 2 (a)

a—Underframe—Parts repaired or replaced due to decay previous to the expiration of the mechanical life. Number of replies referring to each part are given.
Points of contact are chiefly referred to, i. e., mortises, tenons and enclosed areas

Type of Cars	Sills in general	End sills	Side sills	Intermediate sills	Center sills	Floors or decking	Nailing strips, Composition Cars	Draft timbers or sills	Body Bolsters	Hoppers	Cross ties
All types....	24	10	9	4	5	11	1	3	2	..	1
Refrigerator..	12	3	9	1	..	11	..	3	3	..	..
Stock	8	4	8	1	..	12	..	..	..	..	..
Gondola	9	4	4	3	1	10	..	..	..	1	..
Flat	9	2	3	2	..	9	1	..	..	..	..
Box	2	3	10	..	..	..	..	..	..	..	..

Note—Sixty questionnaires analyzed. Two gave no reply to Q. 2-A.

(a) Over 95 per cent of the replies specify sills and about 90 per cent state that floors or decking of refrigerator, stock and open cars are replaced because of decay. The predominating opinion is that the points of contact are chiefly affected and weakened to such an extent as to cause mechanical failure of the entire parts. (b) Posts and braces, roof boards and siding at the points of contact, appear to be most affected. Other parts mentioned which are subject to failure due to decay are: Running boards, saddles, side and end plates, ridge poles and purlines.

Question 3. What species of wood do you employ for the following parts of refrigerator, stock, flat, gondola and box cars? (a) Draft timbers? (b) End sills? (c) Side sills? (d) Intermediate sills? (e) Flooring? (f) Posts? (g) Siding? (h) Lining? (i) Ridge poles? (j) Purlines? (k) Carlines? (l) Side and end plates? (m) Roof deck?

The prevailing practice is to require oak for draft timbers, end sills, posts and braces. Douglas fir and Southern yellow pine are generally used for all other purposes. The pine predominates owing to the nearness of the plants to the source of supply. In new construction, steel is very largely used

TABLE 3.—SUMMARY OF REPLIES TO QUESTION 2 (b)

b—Superstructure—Parts repaired or replaced due to decay. Number of replies mentioning each part given.

	Posts and Braces	Roofs, decks or roof boards	Ridge pole and Roof nailers	Hatches and ice boxes	Running boards and saddles	Side plates	Siding	Sheathing inside and end	Stakes	Purlines	Top plates
All types.....	31	14	4	..	5	7	9	2	..	1	3
Refrigerator ..	8	7	..	6	..	2	1	3	..	..	1
Gondola	..	..	..	..	..	..	5	..	2	..	..
Stock	9	4	..	..	..	2	1	..	..	..	..
Flat	..	..	..	..	..	..	..	..	..	..	..
Box	8	9	..	..	..	..	2	1	..	..	1

Note—Sixty questionnaires analyzed. Three gave no reply.

* From a report presented at the convention of the American Wood Preservers Association held in St. Louis on January 28 and 29.

in center sills, and to some extent for side sills and for draft rigging.

Question 4. What service records have you which are available for the study of this subject? (a) Natural life of untreated car materials (name parts).

Ninety-three per cent of the answers stated "No record." The remainder report as follows: Sills, five to eight years; roofs, four to six years; flooring (stock cars), four to six years; posts and braces, six to eight years.

Question 5. Have you used treated timber in car construction? If so, state kind and character, species and treatment.

Eighty-five per cent answer "No." Fifteen per cent reply "Yes," representing 10 railroads which have used coal tar preservatives, creosote oil, paint and other proprietary products.

Question 6. What has been the experience with treated car material, if any? Please state this in detail, by reference to part and character of service.

Eighty-five per cent of the answers stated "No experience." The balance report varying experience referred to in later questions.

Question 6-A. Does the handling of creosoted material in the shops present any labor problem?

Replies from the few firms having experience indicate that labor objects to handling freshly creosoted timber. (The committee feels that this is not a serious objection as it can be overcome by proper practices.)

Question 7. What service records can you give of treated car material?

Ninety-five per cent of the replies give no information, but 5 per cent of the replies give the following records: Reply No. 48. Treated refrigerator car sills in service from three to seven years. Reply No. 30. Treated log car sills in service eight years. Reply No. 26. Treated stock car sills and flooring in service six years. All of the above treated material is still in good condition.

Question 8. If creosoted sills are employed for refrigerator, box, stock and gondola cars, can all stenciling be applied to the body of the car?

Fifty per cent of the replies state "Yes" and 15 per cent state "No." The remainder do not reply.

Question 9. If creosoted sills are employed for flat cars would it be practical and economical to use metal numerals and signs to replace stenciling?

Over 60 per cent state it is practical. Opinion is evenly divided as to whether it is economical.

Question 10. If stock cars are built of creosoted lumber throughout, would it be practical and economical to use sign boards on both sides for all stenciling?

Over 95 per cent agree that it is both practical and economical.

Question 11. Would it be satisfactory practice to use creosoted sills, sub-flooring and roofing for refrigerator cars? If not, why?

Opinion appears to be evenly divided as to whether creosoted material may be expected to contaminate lading, but one firm with several years' experience states that such practice is satisfactory.

Question 12. What is the mechanical life of the various types of cars, as follows: (1) Wood? (2) Composite (steel underframe)? (3) Composite (steel center sills only)? (a) Box? (b) Refrigerator? (c) Stock? (d) Flat? (e) Gondola?

It is evident from the character of replies to this question that the respondents had in mind the mechanical life of the car as meaning the full period of its usefulness, from the time of construction to the time the car is "wrecked" or dismantled, as being unprofitable, disregarding the outlay of repairs expended on it or the extent to which reconstruction was necessary at any time. In this case the committee feels a more reasonable definition of "mechanical life" would be the period required in which the expenditure for repairs, with interest, equaled the original cost of the car.

Question 13. Would the use of creosoted timber in underframe and superstructure materially increase the period of mechanical usefulness of all types of cars, or any particular type?

Eighty per cent of replies say "Yes," and 20 per cent say "No."

Question 14. To what extent would the use of creosoted sills, flooring, posts, roofing, etc., reduce repairs?

Over 80 per cent of the replies indicate that treatment would reduce repairs. The percentage of saving varies from less than 25 per cent to more than 50 per cent.

Question 15. Have you had experience with brush treatment of sills (mortises, tenons, ends, etc.) with coal tar or creosote?

About 65 per cent report having experience with brush treatment. Ten different products were used.

Question 16. Have you had experience with treating car material by the open tank system (hot and cold treatment) or by dipping (short immersion) using creosote oil? (a) If so, what procedure was followed in the treatment and what preservative was used? (b) What were the results obtained, and what is your opinion of the value of such treatment?

Less than 10 per cent report experience. Only one employs the standard open tank process and states that "Such

TABLE 4—SUMMARY OF REPLIES TO QUESTION NO. 3

Number of references to various species for different parts given

Part	White oak	Red oak	Oak general	So. Y. Pine	Fir Douglas	Maple	Norway Pine	White Pine	Hemlock	Fir Noble	Hickory	Red gum	Spruce	Cotton Wood	Tamarack	Cypress	Mal iron or steel	Total ref's to parts
Draft Timber ....A	7	1	47	2	1	2	..	..	..	..	..	1	..	..	..	..	9	70
End sills ....B	8	..	44	8	5	1	..	..	..	..	..	..	..	..	..	..	..	66
Side sills C	..	..	3	46	15	..	..	..	..	..	..	..	..	..	..	..	2	66
Inter sills ....D	..	..	2	46	15	..	..	..	..	..	..	..	..	..	..	..	1	64
Flooring ....E	..	..	5	46	14	2	1	..	..	..	..	..	..	..	2	1	..	71
Posts ....F	5	2	37	19	14	1	..	1	..	1	1	1	1	..	..	..	..	83
Siding ....G	..	..	..	43	16	..	..	2	..	1	..	..	..	..	..	1	..	63
Lining ....H	..	..	..	41	12	..	5	1	3	..	..	..	2	1	1	..	..	66
Ridge poles I	..	..	1	44	14	1	..	1	..	..	..	..	1	..	..	..	..	62
Purlines ....J	..	..	2	44	14	1	..	1	..	..	..	..	1	..	..	..	..	63
Carlines ....K	1	1	26	28	11	3	3	1	..	..	..	..	1	..	..	..	..	75
* S. & E. plates....L	2	..	29	39	12	2	1	1	..	..	..	..	..	..	1	..	..	87
Roof deck ....M	..	..	..	43	13	..	1	5	1	..	..	..	..	..	..	2	..	65
Total references to species..	23	4	196	449	156	13	11	13	4	2	1	2	6	1	4	4	12	901

* End plates usually specified oak. Side plates, pine or fir.

reatment very greatly increases the life of the materials reated."

Question 17. Have you employed car lumber creosoted by standard pressure processes? (a) If so, what species? (b) What specifications for treatment and preservative were followed? (c) What have been the results, and what is your opinion of the value of such treatments? (d) Have you used any other method of treating for the purpose of retarding decay? (If so, mention material used with results.)

But one firm reports experience with pressure treatment, having used with satisfactory results, both straight creosote and the Card process.

Question 18. To what extent would your shop practice be affected by the introduction of treating processes and what method of preservative treatment would be the most practical, efficiency thereof considered?

The majority feel that shop practice would be affected to a greater or less degree by the adoption of wood preservation, indicating that the introduction of preservative treatment would necessitate at least some changes.

Miscellaneous Data

Question 1. What experience have you had with the use of "new" species of wood in car building? (e. g., have you used Sitka spruce, noble fir, Western white fir, or other species which are not common?)

The replies showed the new species used for various parts of cars were as follows: Roofing—Western hemlock, redwood, cypress, Sitka spruce, noble fir. Siding—cypress, Sitka spruce, noble fir. End sills—gum. Lining—noble fir. Decking—noble fir. Sheathing—Port O cedar. Posts and braces—Sitka spruce.

Question 2. To what extent have you used hardwoods such as oak, maple or birch, for flooring in cars subject to excessive mechanical wear? (a) Do you consider the extra life of hardwood parts justifies the expense?

Oak and maple are generally used in ore cars and to some extent in flat and gondola cars. A few firms report use of birch, hickory and beech for such purposes, and a few use pine or fir in these types of equipment. (a) More than 70 per cent of replies indicate that extra cost of hardwood parts is justified by greater life.

Question 3. What is the average amount of car stock kept on hand at your shops or yards? (a) Is this stock stored in sheds? (b) What is the percentage of loss from warping, weathering and decay? (c) What difficulties do you have in getting car stock true to grade and properly seasoned? With what species have you had this trouble?

Reports indicate that smaller shops carry from 60 to 90 days' stock whereas those which consume over 40,000,000 ft. per year carry a 12 months' supply of soft woods and an even longer supply of hardwoods. The practice of carrying a year's supply in order that the wood may become properly seasoned before use is to be commended very highly. It is essential that wood be thoroughly seasoned where it is to be given preservative treatment. (a) Replies indicate that the general practice is to store dressed lumber, kiln-dried stock and high-grade hardwoods in sheds. (b) Three-quarters of

TABLE 17—SUMMARY OF REPLIES TO QUESTION 15

Tabulation of replies, number who used some sort of brush treatment—what product and whether satisfactory

Brush treatment used 37		No treatment used 21	No statement 3	
Number of replies	Products used		Satisfactory	Unsatisfactory
8	Creosote		8	0
2	Coal tar		2	0
1	Carbolineum		1	0
18	Paints		13	5
5	Wood tar preservatives		4	1
2	Proprietary asphalt waterproofing products		2	0
1	Carglue		1	0
37			31	6

1 per cent on the average is the loss from warping, weathering and decay. (c) Replies indicate that in recent years increasing difficulty has been experienced in securing satisfactory grades of oak and other hardwoods.

Question 4. What efforts are made toward salvage of old car lumber at repair shops?

A general effort is apparent throughout the industry to salvage all material that can be worked over at a profit. The following instances of use for salvaged lumber are given: Old siding and lining cut into roof repairs, grain doors, coal doors, yard and snow fences. Old car sills cut into sill splices, cross-ties, engine wood, shims, car stakes, narrow gage ties, cripple posts, running board saddles, blocking, framing posts. Old roofing cut into yard fencing.

Question 5. What is the comparative life of single sheathed and double sheathed box cars of similar weight and capacity?

Three firms report the double sheathed box car has up to 25 per cent longer life than single sheathed. Four firms report single sheathed up to 50 per cent longer life than double sheathed. Four report that the life of the two classes of car is practically identical. The remainder report no figures available.

The report was signed by H. S. Sackett (C., M. & St. P.), chairman; K. C. Barth (Barrett Manufacturing Company), chairman sub-committee on Car Construction; Lowry Smith (N. P.), F. V. Dunham (Southern Pine Association), W. W.

TABLE 14—SUMMARY OF REPLIES TO QUESTION 12

WHAT IS THE MECHANICAL LIFE OF THE VARIOUS TYPES OF CARS?
Sixty-one Questionnaires Analyzed to November 5, 1918
Mechanical Life as Stated by Questionnaire

	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	22	25	26	28	30	35	40	No reply
Box Cars																								
Years life																								
Wood	..	2	3	1	..	5	..	4	1	..	4	3	..	4	..	13	1	3	..	..	4	..	..	13
Composite, steel underframe	..	..	..	2	..	2	..	..	..	1	2	..	1	2	..	4	..	6	1	..	4	..	1	35
Composite, steel center sill	..	..	1	..	1	1	..	1	..	..	3	..	..	3	..	4	1	4	..	..	..	..	..	42
Refrigerator Cars																								
Years life	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	22	25	26	28	30	35	40	No reply
Wood	1	4	1	1	..	5	..	1	..	1	7	2	..	2	..	2	..	3	..	..	1	..	..	30
Steel underframe	..	1	1	..	1	..	1	5	1	..	..	..	..	..	1	1	..	1	1	..	5	1	..	41
Steel center sill	..	1	1	1	..	2	..	2	..	1	..	1	..	..	..	2	..	2	..	1	..	..	..	47
Stock Cars																								
Years life	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	22	25	26	28	30	35	40	No reply
Wood	1	3	1	4	1	4	..	2	1	..	2	2	..	1	2	10	1	3	..	..	..	..	..	23
Steel underframe	..	1	..	..	1	2	..	2	..	..	2	..	..	..	1	4	..	2	1	..	2	2	1	40
Steel center sill	..	1	..	1	..	3	..	1	..	..	2	1	..	1	..	4	..	1	..	..	..	..	..	46
Flat Cars																								
Years life	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	22	25	26	28	30	35	40	No reply
Wood	1	3	..	4	..	9	..	..	..	3	6	1	2	2	..	7	..	4	..	..	1	..	..	18
Steel underframe	..	1	..	1	1	1	..	1	..	..	8	1	..	2	..	2	..	4	1	..	3	1	..	34
Steel center sill	..	1	..	1	..	1	..	3	..	2	1	..	..	..	1	3	1	1	..	..	..	1	..	45
Gondola Cars																								
Years life	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	22	25	26	28	30	35	40	No reply
Wood	3	2	..	2	..	9	..	1	..	1	9	1	2	1	..	7	..	2	..	..	2	..	..	19
Steel underframe	..	1	..	2	..	2	..	..	..	2	2	1	..	1	..	4	..	3	1	..	3	1	..	38
Steel center sill	..	1	..	1	..	2	1	1	..	2	1	..	..	2	..	3	..	1	..	..	1	..	..	45

Note.—Where the reply stated a term of years, i. e., "from 6 to 8 years," an average of the two figures was used in summary, i. e., 7 years.

Lawson (T. & N. O.), V. R. Hawthorne, acting secretary Master Car Builders' Association, and S. W. Allen, United States Forest Products Laboratory.

Discussion

J. H. Waterman, superintendent of timber construction, Chicago, Burlington & Quincy, reported that large quantities of timber had been treated and used in the construction of stock cars during the period from 1911 to 1914, inclusive. Recent investigation at all car repair yards on the system indicated that there was no record of any of these cars having been repaired to date, because of the decay of the treated timber. This treated timber was used for floorings and sills; the average life of untreated timber for these purposes is three or four years.

L. K. Sillcox, master car builder, Chicago, Milwaukee & St. Paul, at Milwaukee, urged the treatment of car roofing timbers and the material in stock cars.

J. H. Milton, superintendent of the car department, Rock Island Lines, favored the treating of longitudinal sills, posts and decking for gondola and stock cars, but opposed the creosoting of timber for box and refrigerator cars, because of danger of injury to the lading.

American Association of Passenger Traffic Officers

THE SIXTY-THIRD ANNUAL CONVENTION of the American Association of Passenger Traffic Officers was held at Baltimore on January 22, following a short session at Washington at which Walker D. Hines director general of railroads, delivered the address which was published in last week's issue. Little business was transacted at the meeting, as most of the subjects which have usually been included in the association's docket are now being handled by the Railroad Administration. Many of the changes in the handling of passenger traffic which have been adopted during the past year, such as the standardizing of ticket forms, baggage rules and other practices, the rule against making Pullman reservations in advance of purchase of ticket and the surcharge for Pullman passengers, which was later withdrawn, originated with the association, which was not, however, able to put them into effect generally because its decisions were only recommendatory. The principal purpose of the meeting was to get the passenger officers together to meet the director general and to give them a better understanding of some of the purposes and policies of the United States Railroad Administration.

O. P. McCarty, president of the association, delivered a brief opening address in part as follows:

"On account of the participation of the United States in the world war and the taking over of the railroads by the federal government the question of abandoning the sixty-third annual convention of this association was seriously considered, but your officers, after conference with the United States Railroad Administration, decided in favor of holding it.

"It is very gratifying to me, and I am quite sure equally so to all of you, that we are able to hold our annual meeting, and to have such a representative attendance.

"This is the oldest railroad organization in the United States, and during its 63 years' existence not a single annual meeting has been missed.

"In its early history it was a legislative body, holding two sessions per annum, at which interline passenger fares were compiled, and rules and regulations concerning the conduct of passenger traffic and allied subjects were considered and adopted. The joint rate sheets of those times were about the size of pages of the present tariffs, and but four to eight pages covered all the leading points and destinations required for the entire rate fabric of all the railroads.

"In those days the general ticket agents disposed of the miscellaneous subjects on the convention docket, and then adjourned for five or more days until the rate committees' report was completed and ready for submission. Upon the growth of the passenger traffic, the machinery of the association, with two meetings a year, was found too slow, and territorial associations were formed, with more frequent sessions, and the rate making divided into groups covering important districts or cities. Following these changes but one session a year of the general association has been held.

"Under these changed conditions our association is not, strictly speaking, a legislative body with authority to take final action, but through its committees has initiated many reforms, which when referred to the territorial organizations with the endorsement of this association, have been favorably acted upon.

"The interchange of views between members brought together at these annual meetings is educational, and through its committees the association has been of valuable assistance to the territorial committees, and we believe will be to the regional passenger traffic committees as now organized, aside from the social and fraternal benefits. We believe the association has a wide field of usefulness in the future as in the past, and the subjects listed in the dockets should be carefully selected and seriously considered.

"The activities of this association have been exercised through great epochs in the history of our country—notably: the Civil War, the Spanish-American War, and the world war, recently brought to a close. In all of these crises the United States responded nobly to the call, in blood, in money and sacrifices, to maintain the honor and glory of the flag.

"The railroads performed their share with patriotic zeal, and by furnishing the transportation needed contributed largely to the winning of these wars; furthermore, the prompt assembling of troops at the border no doubt prevented a Mexican invasion.

"To meet necessities growing out of the war the railroads were taken over December 28, 1917, and have been operated by the government from that date. Changes in operating and traffic methods were inaugurated for the better movement of troops, war materials, etc.; economies were effected in the consolidation of ticket offices, elimination of outside agencies, reduction in train service, curtailment of advertising, etc. A material advance in passenger fares was also made.

"Some of these changes would have been made by the carriers if they had not been prohibited by federal or state laws. The public have been benefited and service improved in some instances, but when the contrary was the case they have submitted graciously and loyally to a war necessity.

"The officials and employees of the railroads, including those in the passenger departments, have patriotically and faithfully performed the tasks assigned them under the new regime, and whether the railroads are to be operated in the future by the government or by the owners they can be relied upon to loyally do their part. In conclusion let us hope that permanent world peace will come out of the horrors of the past four years."

Officers for the ensuing year were elected as follows: President, W. J. Black, passenger traffic manager, Atchison, Topeka & Santa Fe; Vice-president, W. A. Russell, passenger traffic manager, Louisville & Nashville; secretary, W. C. Hope, passenger traffic manager, Central of New Jersey, New York City; chairman of executive committee, L. F. Vosburgh, passenger traffic manager, New York Central. The other members of the executive committee are T. C. White, G. D. Hunter, Cal E. Stone, Gerrit Fort, Alexander Hilton, J. J. Brown, and W. G. Black.

Head of State Lines Opposes Government Operation

Sir William Hoy, South African Official, Says It Causes Political Meddling and Costly Transportation

GOVERNMENT OPERATION of railways is generally a failure; state ownership with private operation combines the advantages of railway nationalization and private enterprise in the field of transportation. Such is the substance of the opinions of Sir William Wilson Hoy, general manager of Railways and Harbors of the Union of South Africa, as presented in a hearing before the State Mining Commission of that country.

While the subject of the investigation was the proposed nationalization of mines, Sir William Hoy's testimony was presented for the purpose of outlining the experience of South Africa and other countries under government and private operation of railroads. His testimony was especially interesting because of his long experience as a manager of government operated railroads. Although he admitted that differences in conditions—political, geographical and economic—produce varying results under like schemes of management, experience in practically all countries shows that politics persist in creeping into state railway organizations regardless of the statutory or other safeguards applied; that the morale of officers and employees is lowered and discipline seriously disturbed; that exorbitant wage demands are encouraged, over-centralization stimulated and rigidity of policy fostered. While initiative and efficiency are generally found in private enterprises, they are rarely evident in government organizations.

Sir William Hoy's remarks before the commission were in part as follows:

South African Experience with State Rail Service

The efficiency of officers and men on the South African railways is of a high standard. In capacity, experience, ability and resource they compare favorably with any similar body of men in any railway service or in any private organization. The Union possesses a staff of railwaymen of which any may be proud.

Nevertheless, South African experience indicates that certain disadvantages attach to state services, and that much of the time and energy of the staff are taken up with matters with which no private management would be required to deal. Staff control and discipline in a state concern are so bound up by regulations as to create greater difficulties in handling the staff than are experienced under private management—*vide* the experience of Belgium, where it is said that political considerations have so entered into discipline matters that heads of departments prefer to shut their eyes to many faults rather than risk having punishments they inflict cancelled by the intervention of politicians.

It is difficult under a semi-judicial system efficiently to control a large body of men of different grades, such as is employed in a railway service. The service and discipline regulations on the South African railways are elaborate and cumbersome. While there are excellent motives behind these regulations in the direction of preventing injustice and insuring impartial consideration of discipline cases, I am satisfied that fair treatment can be secured to the staff without such elaboration.

In large private railways there is practically the same stability of employment as on a state railway, except that anything in the nature of "slacking" is liable to result in dismissal. In state concerns, however, it is not easy to deal with the man who while not doing an honest day's work carefully steers a course which just keeps him within the regulations. This class of man is fortunately small, and will be found in any concern, but he is better able to indulge his bent in a state than in a private organization. In short, there is not in state concerns the same elasticity in the control of staff as in private organizations.

On the other hand, with regard to promotion and reward for good work, considerations of seniority play a greater part in a state than in a private concern in governing promotion. A private manager can promote a capable man without regard to seniority, but a state concern has to step guardedly in such matters. It is extremely difficult to demonstrate in concrete fashion that one particular man is more efficient than another, however superior he may be. If seniority be made the sole factor in determining promotion one of the main incentives to efficiency disappears, and the service suffers accordingly. Fortunately, the statutory provisions governing promotion on the South African railways prescribe that preference shall be given to the efficient. On private railways some appointments and promotions are the result of patronage, and even favoritism, and I consider that in the Union railway service an able man has opportunities quite as good as, if not better, than he would have in private employ.

There is a regrettable tendency for individuals in state employ to bring parliamentary influence to bear in regard to alleged grievances; and in this they are frequently encouraged by legislators anxious to make political capital out of such cases. Minor complaints are, therefore, frequently debated in Parliament purely on political grounds. It is obviously impracticable and undesirable for the machinery of Parliament to be utilized to perform the functions of appeal boards already in existence. Parliament has not the time, even if it did have the complete evidence, to do justice either to the men or to the administration.

The same applies to many other details which, on a private railway, would not be considered sufficiently important to place before the general manager.

Matters in themselves trifling assume unwarranted importance by reason of their entry into the arena of politics, and thus occupy much of the time of the principal executive officers, which should be devoted to constructive work. Moreover, undue influence on the executive authority is attended with a broader disability, in that it operates against adequate decentralization—the essence of efficient organization.

Efficiency of Government Lines and Private Roads

What Constitutes Efficiency in Railway Management?—Considerable vagueness frequently exists as to what actually constitutes efficiency in railway management. It is misleading to judge a railway's efficiency by particular details, and I conceive that such must be determined by the following broad consideration, viz.:

(a) The maximum possible development of agricultural, industrial and commercial activity by means of cheap and well designed tariffs, and by efficient and expeditious service;

(b) The full development of passenger traffic by means of cheap fares, comfort and speed of traveling.

The principal means of insuring relatively cheap railway transportation is by economical construction, maintenance and general working. Waste or extravagance in capital or current costs ultimately results in higher tariffs. Increased railway tariffs diminish traffic and retard industrial development.

Much also depends on the general efficiency of the service provided, and on the manner in which the tariffs are designed with relation to different classes of traffic. Increased

traffic decreases the expenditure per unit. Badly designed tariffs diminish the volume of traffic, which involves increasing tariffs on the remaining traffic, for the reason that a decrease in traffic increases the expenditure per unit. Operating expenses do not diminish in the same ratio as traffic, owing to the large proportion of fixed charges included in railway costs.

Conflict of Opinion on Advantages of State Versus Private Railways.—There is much room for diversity of opinion as to the relative advantages of state versus private railways. So much depends on the peculiar conditions of the country concerned. Prior to 1885, Italy alternated between state and private management. In 1885 she definitely changed from state to private management, and in 1905 reverted to state management. In 1844 the British Parliament passed an act dealing with the state purchase of the railways sanctioned subsequent to 1843, and in 1865 the British Royal Commission reported in favor of the continuance of private management. Japan, after experience of private and state railways, side by side, decided to nationalize the whole of her railways.

Experience in India.—The Indian Government, after elaborate research, has today found it difficult to arrive at a satisfactory solution of the problem. The Railway Board of India, in a memorandum summing up the main arguments put forward on the general question, says (in part):

> As regards efficiency, it is said that this necessarily varies, and good and bad examples of working can be quoted under both systems, but a general survey affords no ground for holding that a state system has the advantage. It is added as a definite disadvantage of a state system that its working is liable to be affected in many ways by political influence, and experience shows that the consequence may be very serious. * * *.
>
> Doubts are expressed further whether in the working of rates for the development of its country, state would be as efficient as private companies, and experience is said to show that state control invariably produces a rigidity in the rate system which interferes with the attainment of the maximum economic advantage to be derived from the interchange of commodities, and prevents the full development of trade which is secured by the freer and more elastic treatment of rates by independent railway administrations.
>
> In addition upholders of the existing system claim that it has positive advantages. They say that the present allocation of different parts of Indian system of railways to semi-independent administrations produces a healthy competition and spirit of emulation, which would be lost if all were brought under state management. They claim that the financial burden of maintaining and extending the whole railway system to India is clearly too great for the government to bear alone.
>
> A policy of state-management for all the railways in India would inevitably tend to centralization; in this respect again the government would be overburdened, and it would be well advised, according to this view, to be content, as at present, with a general control, and, for the direct management of railway affairs, to retain the services of the companies.

The railway system in India is a composite one; the majority of the railways are owned by the state, but all except three state lines are managed by companies who have a small share in the properties they administer. Other railways are privately owned, some of them having been built by government aid under subsidy or guarantee. Others again are owned by district boards and native states.

Statistical Comparison of State and Private Operation.—It is extremely difficult, if at all practicable, to secure reliable concrete comparisons of the actual results of working state versus private railways. Large profits are possible under wasteful management if favorable conditions exist, e. g., dense traffic and satisfactory grades and curves. On the other hand, small profits, or even no profits, may be earned by a highly efficient railway unfavorably situated with regard to traffic, grades and curves, and costs of labor and materials. No railway unit of expenditure or revenue gives a reliable comparison between one railway and another, as so much depends upon:

(a) Costs of fuel, material and labor;
(b) Physical character of country, which determines train loads;
(c) Density and nature of traffic;
(d) Average length of haul;
(e) Industrial and railway policy;
(f) Competition with alternative means of transportation; particularly water ways; and
(g) Different values of money in different countries.

The Main Disadvantages of State Control

The practical experience of state ownership in different countries demonstrates that it is attended with powerful disadvantages. As to how far the disappointing results have been due to the peculiar local conditions of the countries concerned, to what extent they were preventable, whether equally powerful evils in other directions would have occurred under private ownership, I am not prepared to say. The results plainly indicate that, unless adequate safeguards are devised, grave abuses and disadvantages attach to state ownership. . . .

Undue Political Influence on Staff Conditions, Tariffs and General Facilities.—Where a large body of men, such as a railway staff, is employed directly by the state, there is a danger of their enlisting the efforts of legislators to secure better wages, shorter hours, improved conditions, etc. . . . The enforcement on the management, by parliamentary influences, of changes in staff conditions, demoralizes the entire railway service, impairs discipline, prevents good relations between the staff and the management, destroys economical operation, and in every way is to be gravely deplored.

Employees Resort to Political Influences.—There is a tendency on state railways for individual employees who feel aggrieved to resort to political influence. The results are harmful alike to employees and management. Efficiency and economy are in the interest of the employees, as waste, extravagance, and inefficiency diminish railway profits, and this ultimately reacts on the staff. Economical and efficient operation soon disappears if the authority and discipline of the management are undermined by undue external influences.

Situation in Australia.—These evils were so pronounced in the early days of the Australian railways that the state found itself compelled to appoint railway commissioners with statutory powers, securing them as far as possible from the exercise of political influences. Conditions on the Australian railways are still unsatisfactory. The Commissioner of Railways for Western Australia in his 1910, 1912 and 1913 reports shows that as a result of undue political influence matters are drifting to an *impasse.* Labor is piling up unreasonable demands, which have been granted by the government directly to the labor societies without consultation with the commissioner. Traders and particular interests employ similar methods to secure unwarranted facilities. The net revenue of all the Australian railways decreased heavily before the war. Since the war there have been heavy deficits, notwithstanding increased rates.

Difficult to Resist Unreasonable Demands.—There is also a danger under state ownership of the management being forced to provide facilities to particular sections in such matters as train service, accommodations, etc., which are not warranted. Similarly, alterations in tariffs in favor of particular localities or interests are often clamored for, which are not in the general interest. Unless the management is vested with reasonable independence it is difficult to resist such demands. . . .

Over-Centralization and Rigid Uniformity on State Lines.—There is undoubtedly a tendency toward over-centralization and rigid uniformity on state railways, and also of excessive rigidity in matters of audit-supervision of expenditures, contracts and revenue. These elements result from the necessity for great scrupulousness on the part of a government to avoid the possibility of suspicion of partiality or abuse. My own view is that these restrictions are carried too far. Over-centralization destroys initiative and resource, and if carried to excess, tends to cripple a large organization.

There is nothing inherent in state organization to prevent adequate decentralization, but the tendency certainly is toward over-centralization.

General Conclusions

The wide conflict of practical evidence renders it extremely difficult to decide as to the relative advantages and disadvantages of state and private railways. On the whole, it would seem that the problem is one to be determined according to the geographical position and the industrial, economic, political and social conditions of the particular country concerned, rather than according to the merits claimed for either system in other countries.

The success or otherwise of state railways is influenced largely by the extent to which the management is freed from political influence. It is thus manifest that the problem is governed by many elements other than the purely economic.

After mature consideration of the problem in all its aspects, I am inclined to the view that railways should be laid out, constructed and owned by the state and that with regard to the working, they should either be leased to a private concern, subject to adequate control as to the general tariff policy, etc., as in Holland and India, or matters of policy should be so divorced from executive control that state management would be freed from interference, political or otherwise, and afforded the same facilities for efficient working as a private company.

Experience shows that politics do creep into all state managements—irrespective of the statutory or other safeguards applied, as in the case of Australia and Italy—and that the only managements immune from interference are the autocracies of Germany and Hungary.

A leading French economist, dealing with the Western Railway taken over by the French Government in 1909, says:

"They have increased enormously the office staff; doubled, indeed trebled, the number of employes; . . . an increase of effective force of 5,280 units; when the traffic does not warrant more than a quarter or a third at the most of that increase. . . . They have raised the larger part of the salaries, *but there is still only a dissatisfied personnel.*

"The democratic government, having a varying personnel, practicing favoritism, *favoring want of discipline* and habituated to prodigality and want of unanimity, is incapable of conducting with method, surety and economy, a complicated industrial task. We are having it fully demonstrated. . . . *The same men in the service of the state cannot be as valuable as in the service of independent companies, because they are subjected to many more hindrances, much more suspicion, much more red tape and are especially restrained in their initiative.*"

Doings of the United States Railroad Administration

Director General Hines Asks for an Additional Appropriation of $750,000,000

WASHINGTON, D. C.

THE "REVOLVING FUND" of the Railroad Administration needs an additional appropriation of $750,000,000, according to an estimate sent by Director General Hines to the secretary of the treasury on January 24 for submission to Congress. Of this amount, $381,806,904 is required to settle the accounts of the Railroad Administration for 1918, including the operating deficit estimated at $196,000,000, and the balance of $368,193,096 represents the portion of the capital expenditures for the year 1919 which it is estimated will have to be financed temporarily by the government, including $20,000,000 for the Boston & Maine reorganization and $12,840,000 for inland waterways.

The estimate was transmitted by the secretary of the treasury to the speaker of the House of Representatives with a statement that over $550,000,000 of the amount is to be returned to the government eventually. The $200,000,000 not to be returned represents the operating deficit of the railways for 1918, together with that of the inland waterways, amounting to $500,000, which are to be charged off as a loss to the government as a part of the cost of the war, thereby relieving the shippers of anxiety lest they should be called upon to meet it with higher rates.

The item of $491,000,000 for capital expenditures plus the $286,000,000 for equipment ordered last year makes a total of $777,000,000, which is less than $100,000,000 greater than the $689,000,000 "carry-over" for last year, but the latter item may be considerably reduced, as it is now the policy not to undertake this kind of work except after having secured the consent of the corporations, and whatever amount of this work is to be undertaken this year will be added to any new authorizations for 1919 to make what amounts to a new budget for 1919. The $491,000,000, Mr. Hines has explained, is made up of an estimate of $200,000,000 for new equipment, including possibly some passenger cars and special types of cars not ordered last year, such as stock, refrigerator, general service and caboose cars, for which designs have been prepared, and $291,000,000 for additions and betterments, although it is likely that more than these estimates will be expended for additions and betterments and less for equipment. Mr. Hines' estimate submitted to Congress gives a figure of $290,000,000 invested by the government in additions and betterments in 1918. This represents an estimate of the amount which the railroads will not have taken care of when a settlement between them and the administration is made as of December 31 of the $588,000,000 expended for capital improvements in 1918, and indicates that the companies will have paid for $278,000,000 of the total. Mr. Hines expects to explain the financial situation of the Railroad Administration more in detail when he appears before the Senate Committee on Monday and he may also appear before the appropriation committees.

The Director General's Estimate

Mr. Hines' letter to the secretary of the treasury is as follows:

I have the honor to submit herewith a supplementary estimate in the sum of $750,000,000, to be immediately available and to remain available until expended, and to be added to and considered a part of the "revolving fund" provided for in Section 6 of the act approved March 21, 1918.

The necessity for this appropriation grows out of the following facts:

When the Railroad Administration shall have settled its accounts for the year 1918, the result will be substantially as follows:

1. The Railroad Administration had cash on hand at the end of the calendar year 1918..... $247,100,000
   This represents approximately the working cash capital partly in the central treasury at Washington, but principally in the hands of the federal treasurers of the Railroad Administration throughout the country. This represents much less than one month's operating expenses, and approximately this amount is necessary to enable the Railroad Administration and the various railroads under its control to meet without delay their payrolls, vouchers and other cash requirements.

2 The Railroad Administration had on hand as of December 31, 1918, approximately the following additional current assets:

Agents' and conductors' balances	$154,000,000	
Advances temporarily made to railroad corporations on open account for which in effect materials and supplies are held collateral	100,000,000	
Total	$254,000,000	
Less outstanding current liabilities	162,047,865	
Balance		91,952,135

This net balance of these current assets will become again available in cash at the end of federal control, but pending federal control is inevitably tied up as a part of the working cash capital of the Railroad Administration.

3. Loaned New York, New Haven & Hartford Railroad Company 51,475,000

This amount will be eventually paid with interest, but the greater part of it, and perhaps all of it, will not be paid until after the end of the calendar year 1919.

4. Invested in necessary additions and betterments actually made during the year 1918 over and above the amount which the companies can immediately repay out of their rental and out of the balances due them on open account for the calendar year 1918 290,918,283

This amount will eventually be paid with interest to the Railroad Administration. The rapidity with which it can be paid is dependent upon financial conditions and the ability of the railroad corporations to borrow this money in the open market without undue disturbance of financial conditions, and without undue interference with the financing of the government.

Total 681,445,418

It will be observed that while all this amount of cash is temporarily tied up in the government's conduct of the railroad business, it is expected that the entire amount will be eventually repaid, but temporarily it cannot be repaid as above indicated, and therefore provision has to be made for carrying it.

5. In addition, the Railroad Administration will have paid the operating loss for 1918, i. e., the difference between the standard return due the railroads and the net operating income derived by the government from railroad operations, this difference amounting to 196,000,000

This loss was due largely to the fact that increased rates were effective for only six months approximately, while increased expenses were effective to a very large extent for the entire twelve months, due partly to the unprecedented weather last winter (the railroads having shown an operating loss of over $100,000,000, for the first four months of 1918 as compared with 1917, although no increased wages were included in those months, and while the corporations themselves were still operating the railroads as agents of the director general) and partly to conducting business at whatever cost was necessary to meet the needs of war. This represents the only item in the entire expenditure for the calendar year 1918 (except a portion of the next succeeding item), which is a loss to the government, and ought frankly to be charged as part of the cost of the war, and should be regarded as an exceedingly low cost for the result accomplished.

6. In addition, the Railroad Administration has expended during the year 1918 in connection with inland waterways .. 4,361,486

Of this amount $500,000 represents operating deficit during the year 1918. It must be remembered that this operating deficit was incurred in the early and formative stages of governmental operation upon the inland waterways, and cannot be regarded as indicating in any way that similar losses are to be expected when the operation shall be fully developed. The balance, or $3,861,486, represents boats and other property acquired by the government for operation of inland waterways, and of course can and will continue to be so employed.

Grand total	$881,806,904
Amount of revolving fund	500,000,000
Amount to be provided to settle all accounts for 1918	$381,806,904

In order, therefore, to settle in full the accounts of the Railroad Administration for the calendar year 1918, it will be necessary to provide the additional sum of $381,806,904 which together with the revolving fund of $500,000,000 appropriated in the act of March 21, 1918, will meet the transactions of the Railroad Administration for the year 1918, all of which have been outlined above. It must of course be understood that the figures used are necessarily only approximate at this time, because the accounts of the year 1918 have not been completely stated and cannot be prior to March 1 at the earliest.

For the calendar year 1919, financial provision must be made for the following:

1. To finance expenditures contemplated on inland waterways	$12,840,000
2. To financing Boston & Maine reorganization	20,000,000
3. To financing equipment ordered in 1918 and to be delivered in 1919	286,000,000
4. To financing other necessary capital expenditures for additions and betterments, including equipment	491,000,000
Total	$809,840,000
Less portion of companies' rental which can be devoted to capital expenditures	150,000,000
Balance to be provided	$659,840,000

The last item above mentioned of $491,000,000 represents a forecast of capital expenditures which will need to be made during the calendar year 1919 including these which were authorized and not entered upon or not completed during the calendar year 1918. Under existing conditions it is the purpose generally speaking to avoid the making of new capital expenditures without the assent of the corporations, but with such a vast transportation system it is believed that the expenditure of $491,000,000 will be required during the year and will be substantially assented to by the corporations themselves.

A very large part of these expenditures must be provided for in the first few months of 1919, and we are compelled to allow for the situation that during the period prior to the next Liberty Loan campaign and during that campaign it would not be desirable or practicable for railroad corporations to do a large part of their own financing.

Under these circumstances I am of opinion that $750,000,000 is the minimum appropriation which will enable the Railroad Administration to carry as above explained the money that is necessarily tied up in the government's conduct of the railroad business and to provide for financing by the Railroad Administration of the portion of the necessary capital expenditures which it must be assumed it will be necessary for the government to carry temporarily for the protection of the general financial situation as well as for the protection of its own financing. Such appropriation will meet the requirement of $381,806,904 to settle the accounts for 1918 and in addition will provide $368,193,096 toward meeting the above mentioned capital expenditures for 1919.

This matter has been very carefully considered with my associates in the Railroad Administration and we are satisfied that at least this much provision ought to be made for temporary assistance for these important purposes. It must be emphasized again that the money so provided will eventually be returned to the government with interest.

It is highly important that adequate funds for these purposes should be provided so as to give the Railroad Administration reasonable margin for encouraging the making of such railroad improvements as may seem justifiable from the railroad standpoint, especially since such improvements will aid in stabilizing the general industrial situation.

Whether government control shall continue until the end of the 21 months' period or shall be terminated in the next few months, it is equally necessary that the appropriation above recommended be made. If the control continues for the 21 months' period, it is my belief and the belief of my associates in the Railroad Administration that we cannot count upon the railroad companies financing during the calendar year 1919, any greater portion of their capital expenditures than it is above assumed they will finance. On the other hand, if control should be terminated in the next few months, it will still be true that a very large part of the capital expenditures for 1919 will have been made, and besides, the possession of an adequate fund to facilitate the transfer back to private control and to give temporary aid in financing will be highly desirable. Of course I must deal with the matter exclusively upon the basis of the law as it now stands, and without reference to conditions which might be brought about in the event of a further extension of federal control.

The reason for the submission of the supplementary estimate at this time is that the accounts of the Railroad Administration are kept upon the basis of the calendar year, and therefore it was not practicable to make any reasonable estimate until after the end of the calendar year.

Co-operation with Corporate Officers Desired

T. C. Powell, director of the division of capital expenditures, has issued D. C. E. Circular No. 16, giving the following instructions to the regional directors:

There appears to be some apprehension in the minds of a few corporate officers of the railroad companies that certain proposed capital expenditures may not be justified by present conditions. As you are aware, it has been the policy of the director general to confer freely through the regional directors with the railroad companies with respect to expenditures involving a charge to capital account in order to secure, if possible, their consent to the work.

Supplement 1 to D. C. E. Circular 1, issued January 22, 1918, provides, in section 7, that copies of all D. C. E. Forms 3, 4, and 6 should be sent to the president of the railroad company, in order to comply with the terms of the standard contract between the director general and the railroad companies, and upon receipt of such notice that it was proposed to proceed with the work, an opportunity was afforded the railroad companies to express their approval or otherwise.

Supplement 1 to D. C. E. Circular 10, issued October 7, 1918, provides:

> "The federal manager (or general manager) and regional director should invite and carefully consider suggestions from, and should confer with officers of the company owning the property to be improved respecting any work contemplated in advance of or during the preparation of the budget, or at any time, but are to be governed by their own judgment as to the work to be recommended, definite notice to the company of the work actually to be undertaken being provided for in connection with D. C. E. Forms 3, 4, and 6. The suggestions and conference herein contemplated are not to comply with any legal requirement but to get the benefit of the judgment of the company officers and to provide additional opportunity for meeting the wishes of the company wherever reasonably practicable."

It is now the desire that this close co-operation with the officers of the railroad companies be carried to the point of securing the definite approval of the railroad companies with respect to any new work before such work is commenced, and that in submitting D. C. E. forms to this office each form shall bear notation to the effect that the work has the approval of the railroad company.

In all cases where the federal manager believes the work should be done and the railroad company withholds its approval, a full report should be promptly made of the objections or disagreements that cannot be overcome.

D. C. E. Circular No. 17 gives additional instructions. The federal managers are now engaged in preparing a statement of all work authorized or commenced prior to January 1, 1918, designated as the "Carry-over," which statement is to be prepared and distributed as outlined in D. C. E. Circular No. 14, and this statement should show in detail each job or project involving a charge to capital account in excess of $1,000.

A copy of this statement is to be sent to the president of the company for whose line the work is being done, and it is now the wish of the director general that the railroad companies be consulted and that their approval be obtained for each item of uncompleted work as contained in the "Carry-over." This, irrespective of the fact that the railroad companies may have already approved some items of the work or protested others.

In order to accomplish this the regional directors are asked to arrange for a conference with the corporate officers for the purpose of going over these "Carry-over" items before any further important obligation is entered into, so that unexpended balances in connection with work which is not approved by the railroad companies, will be reported in column 13 and an appropriate explanation made in column 15, "Remarks."

These instructions do not apply to equipment purchased by the United States Railroad Administration and allocated to the several roads, cost of which should be entered in column 14.

"Carry-overs" should bear the approval of the regional director, and when concurred in shall bear also the approval of the proper corporate officer of the railroad company.

Items of the "Carry-over" statement recommended by the regional director but not approved by the corporate officers shall be submitted promptly after forwarding the "Carry-over" for further consideration by the division and be considered as new items not yet approved for 1919, except that no item of work involving safety of operation shall be delayed.

State Commissions to Be Conciliated

Now that the war is over and it is feasible to give more detailed consideration to the rights, prerogatives and feelings of various interests affected by transportation policies, and less to the necessity of taking prompt action, the Railroad Administration hopes to be able to establish more harmonious relations with the state railroad commissions, which have been somewhat ignored during the past year, and many of which have resented it. Director General Hines on January 25 issued a statement on the subject which indicates that the appointment as director of the Division of Public Service of Max Thelen, formerly chairman of the California Railroad Commission and president of the National Association of Railway Commissioners, is a step in that direction. Mr. Hines said:

"Since I have become director general I have been giving careful consideration to the development of the policies of the Railroad Administration along lines adapted to peace conditions. One of these questions which I began to consider at once was the question of relationship with the various state commissions, fully believing, now that the nation's transportation functions are no longer primarily war functions, that it is of great importance to invoke to an increasing extent the aid of the state commission. C. A. Prouty, director of the Division of Public Service and Accounting, is in entire accord with this view. When it became necessary to comply with his request and relieve him of the public service part of his work Max Thelen was selected as director of the newly created Division of Public Service because he, too, was known to be a strong believer in this policy. Mr. Thelen expects to assume his duties February 1, and immediately thereafter, I hope, with his assistance, to be able to get a clear and helpful understanding with the state commissions on this highly important subject."

The circular announcing the creation of the Division of Public Service states that its "scope will primarily be to deal with the relationship between the public, including shippers, and the Railroad Administration, and the railroads under federal control."

Chicago Suburban Fares Increased

The Railroad Administration has announced that the 10 and 25-ride commutation tickets heretofore sold in the Chicago suburban service, will be withdrawn on February 1 and a 26-trip family ticket good for the purchaser or any member of his family, limited to six months, will be sold at the rate of 2 cents a mile. Unused rides of tickets of the old form purchased after this announcement has been made will not be honored after January 31, but will be redeemed. Any tickets sold at an earlier date will be honored throughout the month of February, after which the unused rides will be redeemed. The rates for monthly commutation tickets will not be changed. The reason officially assigned for the increase is that it is necessary for the protection of the Aurora, Elgin & Chicago and that the former rates were below the

present cost of service. This was outlined in an official statement as follows:

"Some time ago the Public Utilities Commission of Illinois gave the Aurora, Elgin & Chicago Railroad, an electric line not under federal control, authority to advance its commutation fares to the statutory maximum rate of 2 cents per mile. As this road competes with roads under federal control, it found itself unable to take advantage of this permission, as such action would merely result in turning its traffic over to its competitors, whose rates would continue to be lower than 2 cents per mile. By reason of the sharp increase in its operating costs, the electric road was in financial straits. It appealed to the War Finance Corporation and the Railroad Administration in Washington. An investigation ensued in which it developed that the multiple trip ticket rates charged by the steam roads were below the present cost of the service and were also much lower than those charged for like service elsewhere—the rates in New York City, for example, being substantially higher than those in Chicago. Following this investigation, the Railroad Administration authorized the Chicago roads under federal control to advance their fares as stated above."

Railroad Administration Takes New Building

The Railroad Administration, in order to obtain additional office space to relieve the crowded condition under which it has been working ever since its organization, has leased a new building at Eighteenth street and Pennsylvania avenue, Washington, across the street from the Interstate Commerce Building, in which its principal offices are located.

The administration now occupies space in four outside buildings. The offices of the new Division of Public Service will be located in the new building.

Consolidated Classification Committee Appointed

The Division of Traffic has appointed a consolidated classification committee consisting of R. C. Fyfe, chairman, Western Classification Committee, chairman; R. N. Collyer, chairman, Official Classification Committee, and J. E. Crosland, chairman, Southern Classification Committee. The headquarters of the committee will be at Mr. Fyfe's office in Chicago.

All requests for changes in or additions to the classifications should continue to be made either through the traffic officers of the railroads or direct to the chairmen of the classification committees, who will make investigations as heretofore and submit their recommendations to the consolidated classification committee for docket and hearings.

Wage Increases Estimated at $810,000,000

Additions to the payroll of the railroads in 1918, largely as the result of wage increases ordered by the director general, are now estimated at approximately $642,000,000, or about 37 per cent. This, however, is the total increase in the payroll and is affected to some extent by the change in the number of employees. All of the increases, however, were not in effect for the full year and the total on a yearly basis is estimated at $810,000,000, not including the prospective large increase for the railroad train service employees.

Capital Expenditures to November 30

A total of $516,515,394 had been expended in connection with work chargeable to capital account to November 30, 1918, according to the monthly report of the Division of Capital Expenditures. This represents 40.4 per cent of the total authorization for the calendar year, which amounted to $1,278,814,998. Of the expenditures, $242,260,135 was for additions and betterments, $254,060,941 for equipment and $20,194,318 for extensions.

Boats for New York Canal Authorized

The Railroad Administration has authorized the construction of 20 steel power boats for the New York Barge canal. These will be combined power and cargo boats with a capacity of 500 tons.



A Dining Car with a Place in History

In this dining car on the morning of November 8, 1918, Marshal Foch received the German delegates and read to them the terms upon which he would grant an armistice to the beaten armies of the Kaiser. The car was at the railway station of Rethondes, 45 miles northeast of Paris, at the northern edge of the Forest of Compiegne. In this same car at 5 a. m., November 11, the armistice was signed. The photograph was taken a few hours later when the Marshal's train arrived at the railway station in the city of Compiegne. Photo copyright by Press Illustrating Service.

The Influence of Zinc Ties on Track Circuits

Signal Engineers on Various Railroads Relate Their Experience with This Problem

THE LAST CONVENTION of the Railway Signal Association developed an interesting discussion on the influence of the presence of ties treated with zinc chloride on the operation of track circuits. Attention was called to the tendency for the more extended use of zinc chloride at the present time owing to the decreased supply of creosote available. It was also pointed out that difficulty has arisen occasionally in the operation of signals through the fact that zinc-treated ties have a lower electrical resistance than untreated or creosoted ties.

The discussion was started by F. W. Bender, assistant signal engineer on the Central Railroad of New Jersey, who stated that for 16 years that road had operated a certain track section, 6,522 ft. long, for the operation of a block signal, using four cells of battery connected in multiple series. A derailment occurred recently on this track section which destroyed 2,580 ties. These were replaced with ties freshly treated with zinc chloride after which a relay could not be made to pick up with the usual number of cells. In order to operate it 16 cells in multiple-series were required. It was found that the leakage due to these ties increased the current flow at the battery end to 4.2 amperes in dry weather and that after a rain this reached a maximum of 9 amperes.

Ten of the zinc-treated ties were tested by placing them on insulators and it was found that their resistances were 2,200. 1,700, 401, 400, 388, 329, 326, 260, 220 and 125 ohms, respectively. The readings from which these resistances were calculated were made between two points 4 ft. 8½ in. apart. It was also found that the zinc-treated ties were generating currents of their own; a difference of potential of 20 millivolts being recorded between two points on the ties 4 ft. 8½ in. apart. Further tests showed that the track circuit section would have to be cut into 930-ft. lengths to insure satisfactory operation. Before the zinc-treated ties were installed in this particular section, the cost of the battery material averaged $3.75 a month, whereas the cost of battery material after the zinc-treated ties were installed varied between $75 and $100 a month.

J. A. Peabody, signal engineer of the Chicago & North Western said that many zinc-treated ties had been put in the track on that road years ago, and that little or no effect was noted during cold or wet weather, but that difficulty occurred on hot, dry days. After studying conditions for some time it was discovered that this effect had practically disappeared within one year's time and that if not over 12½ per cent of the ties were renewed in any one track circuit in one year, little trouble would be experienced in track circuit operation. Accordingly such a rule was put into effect.

With a view to gathering additional specific data on this subject letters were addressed to the signal engineers of practically all railroads in the United States using zinc chloride ties to any extent, asking for reports on their experiences in maintaining signals operated in tracks containing an appreciable number of ties treated with this preservative. The replies received served to confirm some of the points previously mentioned as well as to bring forth a number of new ones.

E. E. Worthing, signal engineer of the Southern Pacific, Louisiana lines, related an experience with track circuits on a stretch of 10 miles of second track in Texas laid with new zinc chloride ties, which confirms the view presented above—that a track section laid out of face with new ties of this kind will invariably cause trouble, but that this difficulty becomes less as time goes on, particularly after rains have washed away some of the preservatives near the surface of the timber. He is quoted in part below:

"We have two track circuits in service between mile posts 212 and 214, each approximately ½ mile long. This is new track and new Burnettized ties are used throughout, 18 to the rail with 9½-in. by 10-in. flat bottom tie plates, single spiked with ⅝-in. by 6-in. standard spikes. The ties had been in the track about six months when the track circuits were put in service, the ballast was clean and well clear of the rails. Shortly after the track circuits were put in we had a light, slow rain one night for about 10 hr. It was hot and clear the following morning but both track circuits failed and did not pick up until late that evening. I took a series of readings at the batteries and at the relays at noon. One battery was discharging 800 milli-amperes to the track. A series of readings at the relay gave 30 milli-amperes. The other track circuit was discharging 900 milli-amperes to the track; the reading at the relay was 40 milli-amperes. Four-ohm relays were used.

"We have recently had a much harder rain on these two track circuits, lasting for about the same number of hours throughout most of the night. Both track circuits held up and caused no trouble. I am inclined to think that the latter rain, which started off with a very heavy down-pour, washed off the zinc sulphate.

"Several years ago I made some tests of ties treated with a solution containing about 1.3 per cent chloride of zinc. After the ties had been soaked a test was made between sections of rail spiked in the usual manner and the ties were found to offer as low as 300 ohms resistance. All the trouble that I have had on this account has been on track where a great number of ties had been changed at one time."

In corroboration of this view the following statement is given by J. C. Mill, signal engineer of the Chicago, Milwaukee & St. Paul:

"There is no doubt that zinc chloride is a first class conductor of electricity and the use of ties so treated causes an excessive leakage of track currents, which can only be offset by shortening the track circuit limits. The extent of this shortening also depends upon other general track conditions, drainage, etc., therefore we have not established an arbitrary length of track circuit for our A. C. signaling. When our A. C. signaling was first installed some four years ago, we had circuits as long as three miles, which, of course, were immediately effected by the insertion of zinc treated ties. This also applied to shorter circuits. We have followed the policy of cutting our track circuits wherever trouble was experienced with the result that we have shortened and cut many track circuits since their first installation.

"From our experience and observation we are of the opinion that the effect of the zinc treated ties is very marked when ties are first installed, but that after the ties have been in service for a year or so the bad effect gradually wears off. This is probably due to the zinc chloride leaching out of the ties and being washed away by the weather."

That the experience is less severe in some quarters than in others, probably through the influence of relative humidity or precipitation, is indicated by the following statement by W. E. Boland, signal engineer of the Southern Pacific, Pacific system.

"We have been using zinc treated ties almost exclusively for some years and our experience is that they do not seri-

ously affect track circuit operation. Unquestionably they have some slight adverse effect but it is not sufficient to cause trouble when other track conditions are good.

"We have tried several times to determine just how much effect the Brunettized ties have on track circuits, but there are so many other conditions affecting the current value at the relay that it is practically impossible to make any such determination."

Further information with particular regard to measures taken by the signal engineers to overcome difficulties with the operation of signals is contained in the following statement by C. A. Dunham, signal engineer of the Great Northern, covering experiences on that line and also in territory south of the Ohio river.

"During 1902 and 1903 we installed signals (on the Illinois Central) on about 120 miles of new second main track south of the Ohio river. The old track had non-treated ties and the new track was laid on zinc-treated ties. All ties were white oak and both tracks were ballasted with crushed rock. The longest track circuits were 5,200 ft., with most of them about 4,000 to 4,500 ft. in length. We had no trouble on the old track with the non-treated ties, but we had trouble, and lots of it, on the new track. The remedy was to cut two track sections into three, which gave us track circuits which then approximated 3,000 ft. in length. After this had been done the service was satisfactory. During 1913, on 120 miles of track in North Dakota, the trouble was greater, largely because the ballast was gravel, and consequently the drainage was not so good as with the crushed rock. The remedy was again to cut the track sections down to about 3,000 ft. After this was done the service was greatly improved; in fact, we have been able to get along all right, and we shall, no doubt, continue to do so permanently.

"My advice would be to limit track circuits to not to exceed 3,000 ft., and preferably to about one-half mile, where the tracks are laid on zinc-treated ties. I think you will find that zinc-treated ties as ordinarily placed in the yearly renewals will not make any serious trouble, and even when all of the ties are finally treated you will not have trouble, provided you do not install long track circuits."

Railroad Hearings Before Senate Committee

Shippers Want Commission's Power of Rate Suspension Restored—Opposed to Government Operation

THE SENATE COMMITTEE on Interstate Commerce is still hearing various plans for the disposition of the railroads at the termination of the period of federal control, which indicate an overwhelming opposition to any extension of the present system beyond the time required to pass the remedial legislation regarded as necessary. The principal concern of the shippers who have been heard during the past week is the almost unlimited power over rate-making possessed by the director general, and they are making a strong effort to have Congress at least repeal Section 10 of the federal control law, which takes away from the Interstate Commerce Commission the power of suspension of rates initiated by the director general.

The committee at one time had decided to limit the number of witnesses to be heard, but apparently has changed this policy and intends to hold protracted hearings. When counsel for the railroads offered to file statements by Daniel Willard, president of the Baltimore & Ohio; Howard Elliott, chairman, Northern Pacific, and Samuel Rea, president, Pennsylvania, the committee decided it would prefer to have these executives testify at a later date. Representatives of the brotherhoods of train service employees were expected to follow Mr. Kruttschnitt, but they asked that their appearance be postponed. Walker D. Hines, director general of railroads, has arranged to appear before the committee on Monday, February 3. S. Davies Warfield, president of the National Association of Owners of Railroad Securities, had expected to introduce his plan on Thursday of this week, but his appearance was postponed. A number of additional shippers are to be heard and numerous members of state railroad commissions have been in Washington during the week prepared to testify.

Standard Equipment

Julius Kruttschnitt, chairman of the Southern Pacific, whose statement was published in last week's issue, testified again on January 23 and was questioned regarding the standardization of equipment. Replying to inquiries by Senator Kellogg, Mr. Kruttschnitt said he understood that each of the members of the committee appointed by Mr. McAdoo to prepare plans for standard engines had given his opinion that the idea was impracticable, but that the committee had gone ahead as directed and in reporting stated that they had done the best they could with the idea. At one time E. H. Harriman had proposed to standardize locomotives on the Union Pacific-Southern Pacific system, but the plan had been found impracticable. Had the corporate officers been left in charge, he said, they would not have undertaken standardization. Every locomotive builder had plans for the kinds of engines needed by nearly every company and locomotives could have been built from those plans much more expeditiously than from new ones of the standard designs.

Asked whether the Southern Pacific needed the 2,000 cars allotted to it by the Railroad Administration, Mr. Kruttschnitt said that the judgment of the officers of the road was that it did not, but it was told that in the opinion of the director of the division of operation it did need the cars, although in 1917 the Southern Pacific had handled a larger traffic than it handled in 1918 and with less cars and engines. Traffic was diverted from the Southern Pacific in 1918 by the Railroad Administration. Senator Gore recalled that Mr. Kruttschnitt had testified a year ago that he feared the disruption of his organization and asked what had been the experience.

Mr. Kruttschnitt said it was too early to state just what the effect had been, but that the Southern Pacific system under the Railroad Administration has been operated under the direction of three regional directors' organizations and that some of its lines had been turned over to the management of the Missouri, Kansas & Texas.

Clifford Thorne, representing the American Petroleum League, National Live Stock Shippers' League, National Council of Farmers' Elevator Association, Grain Belt Meat Producers' Association, and the Western Refiners' Association, took the stand on January 24 and brought out a number of facts which he said have created intense hostility against the Railroad Administration on the part of shippers, but against which open protest has been generally withheld until the war was over.

Clifford Thorne's Statement

Mr. Thorne's statement follows:

Government operation is so distasteful among the shippers of the United States, that, were a popular vote taken today, it would be defeated overwhelmingly.

If the members of Mr. McAdoo's staff had deliberately planned to double-cross the director general, and thereby to make government operation so unpopular that it would tend to kill any possible movement toward government ownership, they could not have adopted any more effective methods than those which actually have been adopted. I do not think for an instant that these railway officials have attempted to double-cross Mr. McAdoo, for they are honorable men. Unquestionably the emergency demands of the war were largely responsible for the existing situation.

There are some good things which Mr. McAdoo and his associates have accomplished, that must be saved out of the wreckage. To do this intelligently and efficiently will require several months of discussion, and the careful drafting of laws that will make some very important changes in our present statutes. During this interval the shipper wants protection against a business organization having powers that are autocratic and despotic in character.

In the midst of the intensely interesting and instructive discussion which you have listened to during previous days, about the forty or more reforms that have been proposed by the Interstate Commerce Commission and by the railway companies, I desire to challenge your attention if possible, to a single proposition: It is of paramount importance to the stability and progress of American industry that you shall immediately restore the full powers of our courts and commissions over the railroads of the United States.

This can be accomplished in a very simple manner, by striking out a few lines and inserting one or two sentences in section 10 of the railroad control law. Our proposition can be settled now. And unless this is done, the shippers of the country will suffer incalculable injury.

We believe that all other discussion might well be temporarily suspended for a few days so as to make possible the immediate consideration of this issue. Unless you decide to do this, nothing will be accomplished by the present Congress. For shippers, railway representatives, state commissioners, labor spokesmen, and reformers generally, can talk for the next six months continuously about the many propositions which have been suggested to you already by the railroad executives and by the Interstate Commerce Commission, to say nothing of those yet to come. You, yourselves, can reach no conclusion on this fundamental question inside of six months. The transportation problem forced upon us at this time will inevitably become one of the leading issues, if not the greatest before the American people during the coming 12 months. This subject will be discussed from every conceivable angle, on the platform, in the newspapers and magazines, and in the halls of Congress.

It is essential that this amendment shall be in effect during this interval, for, otherwise, during the next few months many sweeping, wholesale changes in rates, rules, and regulations now pending will be consummated; and these changes have no connection whatsoever with the war against the kaiser.

In the light of past experience, we earnestly beg of you to accept the word of no man as to the manner or the extent that these powers will be exercised in the future. When this law was before you, Congress was told that the power to control rates during the time of federal possession ought not to be exercised and would not be exercised except in such cases as might be necessary "in the public interest." You were told that, "It would be very unwise for the federal government to undertake through the director general of railroads—who merely represents the President in this control—to pass upon all the rates in the country, either *de novo*, or as questions may arise concerning them." And yet the fact remains that one of the first acts of the director general was to pass upon all the rates in the country, and at the present time the director general is passing upon rates from one end of the nation to the other, and making orders that will not affect to the slightest degree, the successful prosecution or the war against autocracy in Europe.

The temptation was too great for a staff composed almost wholly of railroad men.

The director general of railroads has exercised, and is now proposing to exercise arbitrary, despotic powers, in defiance of the common law and the statutory law of the country. The director general has decided, and is now proposing to decide, controverted issues between the shippers and the railroads involving millions of dollars, without any semblance of a hearing before a disinterested body. The director general is now considering wholesale disturbances of rate relationships upon which business has been built up and established during the past generation, without any hearing before a disinterested tribunal before the new rates become effective. All this has created uncertainty and confusion amongst the shippers of the country, which is intolerable.

We most earnestly petition the present Congress to amend section 10 of the railroad control law as follows: First, restore the suspension powers of the Interstate Commerce Commission, which will insure us a decision by a disinterested tribunal before any more sweeping revisions shall become effective; second, strike out the clause which attempts to make the orders of the President superior to state and federal law and the common law; and, third, insert a clause requiring the director general to pay final judgments against common carriers under his control, and charge the same to operating expenses, where so chargeable prior to government operation.

The present law which attempts to authorize the former chairman of the board of directors of the Atchison, Topeka & Santa Fe Railway Company, speaking for the President, to repeal statutes which have been solemnly enacted by Congress and by the several states, and to reverse the decisions of courts of last resort, is an abortion. This is supposed to be a republic, and not a monarchy.

While we feel very keenly the injustice of some of the propositions now pending, fairness to Mr. McAdoo and to the railroad men and to the shippers constituting his official family demands that we state in unqualified language that prompt relief on many matters has been granted in a most estimable and praiseworthy manner. This entitles them to very great credit, and I would be the last one to question their integrity, or their motives, or their ability. They are gentlemen of the very highest type.

Before beginning his prepared statement, Mr. Thorne replied to the statement that freight rates are lower in this country than in other countries, declaring that he had analyzed the rates on 50 commodities for representative hauls in Great Britain which had been selected by W. M. Acworth and that on four-fifths of them the rates were lower than the rates in Official Classification Territory in this country. He declared that the fact that per ton mile earnings are lower in this country is not a correct measure of the rates because in this country the terminal expense is spread over longer hauls.

As an illustration of his statement that the director general and his staff have attempted to disregard or repeal laws, he cited the circular issued regarding methods of settlement of claims for loss and damage in grain shipments. He said that a joint committee of railroad men and shippers is now preparing a set of recommended rules on this subject, but meanwhile millions of dollars of claims are tied up and the Railroad Administration will not recognize them unless the shipper can show negligence on the

part of the carrier. This, Mr. Thorne said, is contrary to law.

Senator Kellogg said he had received many complaints that the Railroad Administration has not paid many loss and damage claims and Senator Cummins said he had also received many complaints. Mr. Thorne said he had no reliable information, but that scores of shippers had written to him that they were unable to obtain settlements of their claims and that more unpaid claims were awaiting adjustment than ever before in the history of the railroads.

Mr. Thorne also cited the general order which provides that suits should not be brought against the railroads except in the jurisdiction in which the cause of action arose or where the plaintiff resided. This, Mr. Thorne said, repeals the Carmack amendment, which made it possible for shippers to bring suit for loss and damage against the originating carrier and that this is particularly true whenever the claimant does not reside within the jurisdiction of the court where the shipment originated. He also referred to the order that suits shall be brought against the director general. Senator Kellogg interrupted by reading a provision in the federal control law that actions at law or suits in equity may be brought by and against carriers as heretofore provided by law and that no defense shall be made thereto upon the ground that the carrier is an instrumentality or agency of the federal government.

"That part of the law has been repealed by the President," remarked Senator Cummins. "The President doesn't know he has repealed it, but Judge Payne has repealed it for him."

Mr. Thorne read instructions issued by General Counsel Payne regarding the settlement of claims on livestock, which provided that carriers should not pay claims for failure to get cattle to market on time provided they arrived on the day scheduled. Another instruction by Judge Payne to the regional directors said the carriers need not pay on account of verdicts "based on prejudice or passion." These and other orders and instructions Mr. Thorne cited as evidence that the director general has assumed authority to decide the rules of evidence and the jurisdiction of courts. He declared that whether or not legislative power can be delegated to the President, it is certain that an administrative tribunal cannot be given power to reverse laws. Other orders to which he objected were General Order No. 15 requiring industries to pay for and maintain industry tracks, but that they shall be owned by the carriers, and General Order No. 34 providing that perishable freight shall be sold whenever in the judgment of the agent it may be necessary to do so. Mr. Thorne declared that while the exercise of arbitrary powers might have been necessary during the war they are certainly not justified during the period while we are technically at war before peace is officially proclaimed.

Mr. Thorne said he had been told that the Interstate Commerce Commission records show the number of claims filed in November to have been 59 per cent greater than in November, 1917, and that the increase for 11 months was 54 per cent. He asked Commissioner Clark, who was present, whether this was correct and Mr. Clark said the increase is in the amount of claims paid.

Turning to the question of revision of rates, Mr. Thorne said that the so-called 25 per cent increase resulted in increases of from 100 to 275 per cent in some instances and practically effected an increase of several hundred per cent in some cases where the state classification was superseded by the interstate classification with a higher minimum weight and that between 2,000 and 3,000 complaints against General Order No. 28 had been filed with the Railroad Administration on the day it became effective. Regarding local traffic committees established by the Railroad Administration, Mr. Thorne said they had done admirable work in a great many cases in effecting readjustments of rates, but that frequently it was necessary to travel to three or four committees to secure an adjustment in a rate covering a wide territory. His principal objection, however, was that the same men that had been fighting the shippers for years in rate cases before the commissions were now the judges before whom they must appear to try rate cases, and that a majority of the committee members are railroad men. He said they will not always furnish dockets to shippers and that while theoretically there is an appeal to Washington, practically most of their decisions stand. He thought the committees ought to be continued, with perhaps an equal membership of shippers, but that the commission's power of suspension ought to be restored.

He said that while the Railroad Administration asked the advice of the Interstate Commerce Commission on the proposed standard scales of mileage class rates and the commission has recommended that consideration be postponed, there is nothing to prevent the Railroad Administration from putting it into effect at any time and the power should be taken away before something like that is done as the shippers want a hearing before the commission before any such scale goes into effect. The scale does not disturb the long distance interstate rates, he said, but interterritorially it revises, and in a large number of cases upward, all state scales in the South and West. It is a safe assumption, Mr. Thorne said, that there will be no more need of the emergency power to make large increases in rates and that the further changes in rates to be expected are those which are of far greater importance to the railroads than to the shippers. He thought the rate increase would considerably exceed $900,000,000 because the average in the case of freight rates greatly exceeds 25 per cent. As to the proposal of the railroads that the suspension period be reduced to 60 days, he said this would be no more fair than to require a reduction asked by the shippers to go into effect within 60 days if the case were not decided in that time.

Texas Shippers Urge Return of Roads

R. C. Fulbright, Houston, Texas, appearing on behalf of the Texas Association of Commerce, the Southwestern Industrial Traffic League and the Texas Industrial League, rather surprised the committee by presenting an entirely different line of argument from what has usually been made in Washington by the representatives of Texas. He not only urged the return of the railroads to their owners but advocated a unified system of railroad regulation and curtailing the powers of the state commissions to a point where they could not discriminate against interstate commerce. He advocated the plan of regional commissions as branch offices of the Interstate Commerce Commission and declared that the fight in Texas between state and federal authority was at an end. He presented copies of resolutions adopted by the Southwestern Industrial Traffic League similar to those passed by the other two organizations, except that the Texas Association of Commerce resolution contained no recommendation for the establishment of regional commissions. The resolutions declared that the shippers were opposed to the principle of government ownership and operation as being destructive of American initiative and against the interests of the American people and that they believe it is for the best interest of the people that the railways and express companies now operated by the federal government be returned to their owners and competitive conditions restored as soon as adequate reconstructive legislation can be accomplished. They advocated the enactment of such laws as will secure a unified system of control of railroad and express rates, fares, regulations and practices, both interstate and intrastate, under the authority of non-partisan commissions so far removed from political control as possible and the establishment of regional regulative bodies to be composed of non-partisan members familiar

with traffic and transportation conditions in the regions for which they act.

Disapproval was expressed of the plan for the appointment of a secretary of transportation, because, Mr. Fulbright said, of the desire for non-partisan and non-political regulation and because of the belief that such a plan would keep the railroads in politics. The idea was also opposed because it would give one man too great power and the shippers have not been pleased by the exercise of great power over rates by the director general. The resolutions also favor the regulation of the issuance of securities by state and national laws and legislation providing for assistance by the national treasury for railway improvements and extensions, such assistance to be granted by a regulative body. While favoring the maintenance of healthy competition, the resolutions declared that the interstate commission should have power to prevent competitive waste by eliminating circuitous routes and controlling service and to compel diversion of traffic and control routing to prevent or eliminate congestion at ports or terminals. Pooling of equipment and unification of terminals under federal control were also favored. The resolutions also advocated giving power to the Interstate Commerce Commission to make minimum rates, the adjudication of wage disputes before a non-partisan body, with legislation guaranteeing an uninterrupted functioning of transportation facilities, the preservation of the police powers of the several states and such other powers as are not inconsistent with the program outlined in the resolutions.

Finally, pending the accomplishment of a program of reconstructive legislation, it was earnestly recommended that Congress immediately restore to the Interstate Commerce Commission the power of suspension of rates promulgated by the Railroad Administration, and the Railroad Administration was called upon to take such steps as can be appropriately taken towards restoring the organizations of the various systems and lines of railway so that upon the return of the properties to the owners the lines can proceed at once with the performance of all of their functions as adequately and efficiently as under private competitive conditions and upon a fair earning basis.

If the commission's power is not restored, Mr. Fulbright declared, it would be in the power of the Railroad Administration to change every rate in the country without a hearing and Congress should settle this important question before taking up the more complicated problems. He thought a definite date should be fixed for the return of the roads. He said he was not attempting to criticise all of the acts of the Railroad Administration because it had done many good things, but he thought it had taken advantage of its power to try to put into effect without hearing many advances in rates formerly denied by the commissions, and such hearings as were held by the various rate committees, he said, were one-sided. It is true, he said, that government operation has not had a fair test due to the war conditions, but certainly the shipping public has ascertained that it does not desire either government ownership or government operation. The incentive to perform many important services for the shipping public, such as the tracing of freight, the assistance given in furnishing rate quotations, the eagerness on the part of the carrier to make a good showing in its transportation service and the recognition of such economic necessities as transit privileges, are almost, if not wholly, removed when competitive conditions disappear. Furthermore, he thought, railway competition tends to preserve commercial competition more equally and thereby assures the more uniform development of the country. In this connection, he gave it as his opinion that the morale of the men having responsibilities in the railroad organization has been at the lowest ebb during the past year that he has ever known.

He did not think the state commissions should disappear, because there should be a certain amount of regulation conducted by a body which is close at hand to which the public can go and get prompt action. If the regulatory power is centralized at Washington it becomes encumbered with such a tremendous volume of questions and cases that it is impossible to give prompt action. If the unified system could be worked out by co-ordination of the state and interstate commissions it would be preferable, but he failed to see how this can be effectively accomplished without some changes in the basic law. The principle which was decided in the Shreveport case, he said, is now generally recognized by the shipping public in his territory as a just principle. The authority of the state commissions can be preserved to do all things they are now authorized to do so long as they do not constitute a discrimination or burden against interstate commerce. He thought the time of fighting between state and federal rate-making powers has passed and that the state commissions are almost without exception ready to co-operate with and co-ordinate their activities with the federal body. The commerce act should be amended to clearly authorize the Interstate Commerce Commission to hold joint sessions with and to co-operate with the state commissions as fully as in its judgment is right and proper, and it is far more important that such a plan should be tested than to experiment with government operation for the next few years. He was in accord with the suggestion that some of the administrative functions of the Interstate Commerce Commission be turned over to some other body.

The shippers feel, Mr. Fulbright said, that the general increase of 25 per cent in rates has come to stay, with proper readjustments, at least for several years, and they also believe that the general level of wages brought about by the increases of the past year should be maintained while the cost of living is so high and only adjusted through such boards as may be constituted to handle such questions. He thought that a large part of the sentiment among employees in favor of a continuation of federal control is due primarily to the fear that the return of the railroads to private control would mean the sudden taking away of the increase in wages. He did not think that was the intention of the railways.

Plan for Financing Weak Railroads

E. J. Rich, formerly general counsel for the Boston & Maine, appearing for the Associated Industries of Massachusetts, presented a plan designed to establish credit for the weak roads in some other way than through increase in rates, in part, as follows:

If a weak railroad desires to raise money for improvements it should apply to the government for a guarantee of the principal and interest of the loans which it seeks to float. This would enable it to raise money perhaps on a 4½ per cent basis. In consideration of this guarantee there should be appointed by the President upon the board of directors two public directors, who should be ex officio members of all important committees. They should have no greater voting power than the other directors, *except* that all appropriations for improvements, the financing of which called for government guarantee, should be approved by them.

Under such a system, he said, little loss would fall upon the government. The railroad which has been earning only perhaps enough to pay its fixed charges and operating expenses would have no credit and could raise no money, but nevertheless would earn enough money to pay the interest charges on the new money raised. It could so improve its facilities as perhaps to reduce its operating charges and thus increase its financial solvency, with the result perhaps that eventually it might be able to finance itself without government guarantee.

Nevertheless, there might be loss, and the general treasury of the government ought not to be called upon to make up the loss. The plan would therefore provide that any railroad might earn, under an adjustment of rates permitted by

the Interstate Commerce Commission, and retain for its shareholders or put into the property, say, 9 per cent of the capital stock; that any surplus above this amount should be divided perhaps equally with the government. The railroads whose financial condition is such that they can readily raise money ought to be compelled to do so without government guarantee.

The Interstate Commerce Commission should receive a mandate from Congress to permit the establishment of a basis of rates which would prevent loss by the government on the interest charges. This should be the minimum basis, and to the extent of establishing a minimum basis the Interstate Commerce Commission should have as full powers as it now has in establishing a maximum basis.

Bonds guaranteed by the government would probably run for a long term of years and could easily be renewed indefinitely so long as the interest is paid. Therefore, no burden would eventually fall upon the government on account of its guarantee of principal. If for any reason it might be called upon to meet this guarantee on the principal of short term securities the fund accumulated from surplus earnings would undoubtedly be sufficient to take care of such payments.

The Interstate Commerce Commission, Mr. Rich said, has been very much criticised in ceratin quarters, and perhaps justly so. It has not always been alive to the nature of the transportation problem, which, after all, is a problem of adequate service. But it has established itself in the confidence of the public. Neither the integrity of the commission nor of a single member since its organization in 1887 has ever been impugned in the slightest degree; there never has been a charge made that it has been influenced by partisan political considerations. These are tremendous assets for any public body to have, and it would be a misfortune if the country were deprived of the services of a tribunal whose traditions for integrity and freedom from politics are so high.

The Interstate Commerce Commission, therefore, should be the supreme regulatory body. The burdens of regulation, however, are so great that they cannot be borne by the nine members of the commission. Many matters of great moment are necessarily entrusted to subordinates of limited experience and ability. Furthermore, the commission should be brought nearer to the people in their localities. Therefore, regional commissions, whose members should be appointed by the President, should exercise large powers and should have practically final jurisdiction in purely local matters, with an appeal to the commission in matters whose influence extend beyond the region, and in other matters of large moment.

Additional Data From Mr. McAdoo

Mr. McAdoo has filed with the committee some additional statements asked of him at the time he testified. One of these compares the earnings and expenses of the railroads for the four months, July to October, after the increased rates were made effective, with the corresponding period of 1917, excluding back pay and including the expenses of the Railroad Administration. The amount of back pay in these four months was $116,000,000 and the expenses of the Railroad Administration, which are not included in the returns of the railroads to the Interstate Commerce Commission, amounted to $1,939,220 for the four months. With these adjustments the operating revenues show an increase of $493,388,566, the expenses, an increase of $326,851,321 and the net operating income an increase of $174,361,696. The operating ratio was 67.52, as compared with 67.94 in the corresponding period of 1917.

Another statement showed that the back pay charged to the June account was $133,043,201 and that $116,272,076 additional was charged in the period July to October. The total increase caused by General Order No. 27 and Supplement No. 4, both of which were retroactive to January 1, is given as $230,731,277 for the months January to May, inclusive, and $18,584,000 back pay on Supplement No. 4 for the month of June is included in the $116,000,000 back pay charged in the period July to October.

Mr. McAdoo also submitted a statement of the number of officers and employees of the Railroad Administration with the payroll for December, as follows:

Central Administration

Number of officers and employees at Washington	1,193
Number of officers and employees outside of Washington (including 106 central administration traveling representatives, supervisors and inspectors)	227
Total officers and employees	1,420
Total pay roll for December, 1918	$280,600

Regional Administration.

Number of officers and employees	1,079
Total pay roll for December, 1918	$252,500

Note.—All figures are based on pay roll for second half of December, 1918.

Central Administration.
(Officers and employees by divisions, December, 1918.)

	Officers	Employees
Division directors	7	....
Director General's Office	2	173
Assistant Director General's Office	3	20
Division—		
Finance and Purchases	6	88
Operation	31	526
Public Service and Accounting	5	162
Law	9	61
Traffic	18	124
Capital Expenditures	2	41
Labor	3	52
Inland Waterways	1	11
Actuary	2	28
Board of railroad wages and working conditions	6	39

Bill to Prevent Early Return of Roads

Senator Cummins on January 27 introduced in the Senate a resolution to prevent the President from relinquishing control of the railroads to their owners before the expiration of the 21 months period provided by the federal control law unless Congress otherwise directs. The purpose is to compel the government to retain its present control until time has been afforded for the enactment of legislation to improve the system of regulation and to prevent the disastrous consequences which many believe would ensue if the railroads were returned suddenly, with a high scale of wages and other expenses. It is not considered, however, that the passage of such a resolution could affect the situation materially if the President is disposed to relinquish the railroads because he could issue a proclamation setting a future date for the termination of federal control before the resolution could be passed or he could wait until it is passed and veto it.

In discussing the bill in the Senate, Senator Cummins said that as Mr. Hines has stated that his policies will be those of Mr. McAdoo, it may be assumed that it is the purpose of the director general to return the roads at the end or very soon after the end of the present session of Congress unless Congress extends the period for five years. It was his opinion that Congress would not extend the period, but that all the members of the Senate committee believe they can work out a permanent policy for the readjustment or reorganization of the relationship between the railroads and the government within a few months and that within a year Congress will be able to agree upon some enduring, general, permanent system for the control of the railways. He thought there should be a special session of Congress, but even if there is not, if the commerce committees of the House and Senate are permitted to continue their work during the interim and are ready to report at the next regular session Congress could begin the year with all the differences composed.

"If we do not pass this bill," he said, "or something of the nature, and the President is guided by the advice of his director general and returns these properties in their present condition and under existing circumstances, the United States will see a cataclysm in finance as well as in railroad operations such as it has never witnessed before."

Chapters from Railroad Administration Report

Activities of Divisions of Public Service, Accounting and Law and Bureau for Complaints and Suggestions

ADDITIONAL CHAPTERS from Mr. McAdoo's report to the President for the year 1918, which is being issued in installments, have been given out by the Railroad Administration, covering the activities of the Division of Public Service and Accounting, the Division of Law, and the Bureau for Suggestions and Complaints.

Public Service and Accounting

The activities of the Division of Public Service and Accounting, conducted under the supervision of C. A. Prouty, director of valuation of the Interstate Commerce Commission, include those which relate to the service rendered the public and the accounts of the director-general and of the individual railroads. The report says that as railroads must necessarily be operated by railroad men, who bring to their work the views which they had formed in the past, and as railroad operations under government control are relieved to a considerable extent from regulatory restraints, Mr. McAdoo felt that there should be in the federal administration itself some department which should stand charged with the public interest. The report then outlines the work and organization of the various traffic committees, composed of railroad men and shippers, which have been formed to consider rate questions, either locally or by reference in important cases to Washington. Every authority for a change in rates issues from the Division of Traffic in Washington and no change can be made until that change has been submitted to the Division of Public Service. If not approved, it is suspended until it can be discussed and, if necessary, taken to the director general for final determination. The report says that in the past thousands of rate changes have been made each month which were worse than unnecessary, because they produced confusion, and when no rate is changed except for some substantial reason the number of such changes will be enormously reduced and it will become possible to publish tariffs in a much more satisfactory way than at present.

The report also explains the necessity for impairment of service during the time of war, but states that this condition has been changed by the cessation of hostilities and that every effort will be made to ascertain what service the public properly requires and to render that service when possible.

An attempt is being made to work out a plan of co-operation between the state commissions and the Railroad Administration to give information as to defects in service, accompanied by suggestions as to how they should be corrected.

The accounting section of the report states that if all railroads were owned and operated by a single corporation or by the government a large part of the accounting work would disappear. Under the Railroad Administration some of these costs have been eliminated and others to a very great extent curtailed. Car hire has been eliminated. The accounting for car repairs has been much simplified. Joint facility expenses have been distributed upon an arbitrary basis and many millions of dollars have been saved, but the saving has been nothing like what it might be under permanent unified operation. The contracts with the carriers also require an accounting as to the expenditures in the upkeep of the properties because of the requirement that they shall be returned in the same condition as when received. A very considerable amount of accounting work is involved in comparing the expenditures and the prices with those of the test period. A considerable amount of expense has been involved by the opening of a new set of books at the beginning of federal control and by the accounting necessary in connection with the orders for equipment which contain a proviso that if anything can be saved as compared with the maximum price fixed in the contracts either on materials, labor or overhead, the government shall have the benefit of the whole or a part of the saving and in the case of cars, the material is paid for by the government. A large amount of extra accounting has been made necessary in order to determine revenue from proposed rates and the effect upon revenues of various changes which will be unnecessary when conditions become stabilized. The report also says that the greatly increased wages which accountants are to-day receiving, as well as the inferior quality and reduced efficiency of some of those who are employed, has increased the cost, but that were the railroads of the country actually unified under one control there would be an enormous saving in accounting expenses.

Law

The Division of Law, with John Barton Payne as general counsel, has had general supervision over all legal activities of railroads under federal control, and over the preparation of contracts and other work relating to claims and property protection. A list is given of 30 railroads with which contracts have been executed, many of them including a considerable number of subsidiaries, parties to the main contract. The report also gives the classification of the 2,161 short line railroads relinquished from federal control on June 29, as follows:

637 plant facilities.

726 circular roads (roads which do not file reports with Interstate Commerce Commission, but submit information in circular form.)

264 electric lines.

15 switching and terminal roads.

519 class I, II, and III roads.

Since that date 15 additional roads have been relinquished by agreement. Total, 2,176 roads relinquished.

Sixty-six roads have since been restored to federal control, leaving 2,110 relinquished. (Jan. 2, 1919.)

At the time of relinquishment it was announced that a policy of co-operation with relinquished roads would be maintained, assuring fair divisions of joint rates, adequate car supply, and the preservation of routings so far as consistent with the national needs. This policy finally, after hearings afforded the interested lines, ripened into a co-operative contract, which was announced on October 30.

Applications for this contract have been received from 90 of the relinquished roads, although a large number of the lines are satisfied with the policy voluntarily put into effect at the time of relinquishment. Seven co-operative contracts have been executed. Meanwhile joint rates and divisions are being adjusted on a fair and equitable basis with all the short lines preparatory to the execution of co-operative contracts if desired.

A committee on compensation and contracts, consisting of two representatives of the Division of Law, one of the Division of Operation, and one of the Division of Public Service and Accounting, was appointed on July 15 to hear petitions of relinquished short lines to be restored to federal control on a co-operative or compensation basis and

to hear petitions of federal controlled roads for special compensation.

There have been petitions from 79 relinquished short lines and reports on 74 rendered.

The following is an analysis:

Co-operative contract recommended	30
Standard return recommended	26
Special basis recommended	6
No contract recommended	6
Contract without compensation recommended	3
Contract on basis scrap value recommended	1
Electric lines that did not come under the proclamation	2
Unreported	5

With the exception of nine cases, all of the committee's recommendations were approved, five contracts having been executed, one on basis of standard return, three co-operative, and one on special basis. Of the nine recommendations disapproved, eight were for contracts on basis of standard return in lieu of which the co-operative contract was suggested for five, three no contract, and one road for which the committee recommended a contract whereby the government would operate the road without payment of compensation, payment of "fixed charges" was suggested. Contracts are being prepared for all of these roads except three, which have declined on basis tendered.

Petitions for special compensation have been presented by 38 roads. Recommendations have been made in 17 cases, 10 for complete rejection and 7 for partial allowances. In 3 of the rejected cases the roads desire a rehearing which will be granted. One road has withdrawn its claim, one is a matter for the Interstate Commerce Commission to dispose of, leaving 19 to be reported on as soon as heard and necessary information is received. In addition to the above, 25 new claims have been filed.

The Division of Law has also passed upon all legal matters connected with advances to railroad companies on account of the standard return or by way of loan.

The policy has been to make full use of the existing organizations, avoiding unnecessary disruption—and at the same time reduce the amount of legal expense to a minimum consistent with efficiency of service. The general plan adopted was—

(*a*) To separate, and assign to the appropriate accounts, expenses relating to corporate matters—and therefore chargable to the corporations—and those incident to the ordinary operation of the properties.

(*b*) Appoint, as to each road, a head of the federal legal staff, with the title of general solicitor, who, under the general counsel at Washington, acts as adviser to the federal manager and is charged with supervision of the legal department.

(*c*) Dispense with the services of lawyers not actually engaged in the performance of necessary legal work.

(*d*) Eliminate duplication of employment, in view of unity of operation, and readjust salaries to conform with anticipated changes in the amount of litigation under federal control.

The separation of corporate and operating expenses has been accomplished, usually, by the assignment to the corporations of one or more members of the general office force, New York counsel, and others employed primarily in corporate matters.

Where several roads are grouped under the same federal manager, the practice has been to appoint one general solicitor, with jurisdiction co-extensive with that of the federal manager; and in determining appointments and salaries the recommendations of managers and regional directors have first been obtained and considered.

The eliminations include legislative counsel, special agents, counsel employed at Washington in departmental matters, statutory agents of individual roads for service of notices of the commerce commission, counsel located at points remote from the line of road, etc.—as to all of whom it was felt that their employment is unnecessary under government operation.

With unity of operation, it has been possible in some cases to consolidate the legal work, and thus accomplish more effective results at a lower cost. Reductions in salaries were confined largely to trial counsel who engage in general practice, the belief being that the restrictions of the federal control act and orders of the director general relating to suits would cause some diminution of actual litigation. The "fee basis" of employment has been discouraged and definite annual salaries substituted as a rule.

The total expenditures on account of salaries in the legal departments of the various carriers approximated $7,150,000 when federal control was assumed. Present expenditures approximate $4,935,000, a saving of approximately $2,215,000.

Under date of March 26, 1918, a section for the protection of railroad property and property of shippers in transit was established in the Division of Law to enforce rigorously the federal law against theft and to take all necessary measures in co-operation with carriers to prevent loss from this cause.

A Freight Car Claim Section was established August 1, 1918, with jurisdiction over all matters pertaining to loss and damage freight claims and their prevention, for the purpose of having administrative jurisdiction over all such matters on railroads under federal control, to study the causes and to take such remedial steps as appeared necessary to prevent such claims and conserve the food products and materials heretofore lost and wasted by reason of improper packing and loading and negligence in the handling of the various commodities.

Prior to this there had been no uniformity in the jurisdiction over the claims departments, and because of the varying practices governing them it was decided to place the jurisdiction under the legal department; therefore, coincident with the establishment of the Freight Claim Section, the loss and damage freight claims and the prevention of causes of such claims were placed in charge of freight claim agents reporting to the general solicitors of the respective railroads.

Another source of large expenditures, running into the millions of dollars, are personal injury, right of way, stock and fire claims. Therefore it was deemed advisable to create in the Division of Law a section co-ordinating these three branches of the railroad service.

Effective September 1, 1918, there was created a section entitled "Claims and Property Protection Section," to have jurisdiction over freight claims and prevention, property protection, and personal injury claims. It is not intended this section should be more than an administrative section to study causes, establish policies and co-ordinate with the forces of the carriers as existing when the roads were taken under control. Later the secret service was transferred to the Division of Operation.

The following statistics reflect the activities, as far as reported to the Washington office, of the police agencies of the carriers:

Period from April 1 to November 30, 1918	
Arrests for thefts	10,530
Convicted	6,069
Pending	2,075
Employees arrested	3,241
Value goods recovered	$667,578.54
Sentences one year or over	1,095
Fines imposed	$150,509.63

Under corporate control each individual railroad had its own method of investigating and disposing of loss and damage freight claims. Therefore, in order to bring about uniformity and simplicity in the presentation, investigation, and disposition of loss and damage claims, General Order No. 41, "Regulations Governing Disposition of Interroad Freight Claims for Loss and Damage," was issued.

Consideration having been given to the vast amount of

freight refused and unclaimed by the consignee after its arrival at the billed destination, it was deemed advisable, for the purpose of clearing the congestion and keeping the channels of commerce open, also of conserving food products and materials by preventing waste and deterioration, to provide a uniform method of disposing of this class of freight promptly.

The method of claim handling having been simplified and General Order No. 34-A issued to clear the railroads of congestion due to the freight remaining on hand, refused or unclaimed, attention was next given to the subject of claim prevention. This, perhaps, is now the most important duty of the Freight Claim Section. The enormous amount of money (running well into millions) expended annually for loss and damage freight, which in the end has no economic value, is a situation that must be corrected by taking such remedial steps as are necessary toward the prevention as well as the settlement of claims. Therefore a careful study has been given to a method of prevention, and a nation-wide campaign is now being arranged in an effort to prevent this waste.

Promptly after the establishment of this section, numerous complaints began to arrive regarding the nonsettlement of loss and damage claims. Therefore attention was drawn to the provisions of General Order No. 41, which eliminated unnecessary interline investigation, bringing forward each month claims of greater age than four months. An inventory was made of all such claims with a view to giving them special attention.

One of the most important classes of claims to be met with in the claim departments is that of loss and damage to fruits and vegetables. There is a large amount of money expended annually in loss and damage claims on this commodity, besides the loss of millions of dollars' worth of food products. Therefore it is hoped to establish uniform practices in shipping and protecting these commodities and simplifying the adjustment of damages where negligence exists.

Because of conditions existing under corporate control, it was customary at most of the interchange points for each line to have inspectors for the examination of freight, making an inspection and record as to ventilation, refrigeration, etc., and many commodities were inspected as to loading, bracing, stability of packages, and general condition of the freight. This necessitated the employing of a number of men doing the same work. In order to bring about co-ordination of the various inspections by the different railroads at such interchange points, such duplication of inspections has been discontinued.

The greatest amount paid out by railroads for losses and damages growing out of any one individual class of claims was that of grain, and there being no uniformity of practices in the preparing of cars, recording of loss, or disposition of claims for loss and damage, General Order No. 57 was issued, setting forth "Rules governing the inspection, selection, and co-operating or rejection of cars for bulk grain loading, the recording of the loss of grain from car by leakage (if any) during transit, and the disposition of claims for loss and damage of grain." Because of the varying practices in the loading, shipping, recording leakage, if any, and the disposition of claims, there have been numerous controversies on this class of claims, and this order should have the effect of establishing uniform practices as to the coopering and loading of cars, as well as the disposition of claims, and should result in a substantial saving to the shipping public as well as the railroads.

In the payment of personal-injury claims the amounts paid have been influenced in the past to a large extent by the decisions of the courts and juries in the respective states where the injury occurs, and therefore the steps toward prevention must be taken by the individual railroads in preventing the accidents or the causes of such injury in so far as possible.

In order to bring about uniform practices and economy in this regard a committee, known as the Executive Committee of the General Claim Agents' Association, has been appointed for the purpose of studying the general situation throughout the country and to make recommendations to unify the practices on the various railroads.

This division is served with all "notices and processes" issued by the commission which may affect the director general and any of the roads under federal control. The information thus received is at once communicated to the general solicitors of the roads immediately involved.

As of July 1, there were on the docket of the commission approximately 1,000 formal complaints against carriers operating roads now under federal control, of which 481 had theretofore been heard and submitted but could not be decided because of the change of status. There were also pending 29 general investigations instituted by the commission.

The commission amended its rules of practice so as to allow rate complaints that had been filed prior to the initiation of rates in June to be supplemented, instead of compelling the parties to file original complaints. Two hundred and sixty-seven supplemental complaints have been filed and answered, and the new complaints are being answered as filed. The data for answer is ordinarily obtained from the general freight traffic committees appointed by the Division of Traffic.

Since July 1 counsel for the Railroad Administration have participated in the hearing of 180 cases before examiners in various parts of the country, and in the oral argument of 40 cases before the commission. The commission has disposed of 130 complaints, but none of its decisions have in any material way affected the initiated rates.

There are upon the commission's docket at this time about 1,000 complaints, old and new, of which about 350 have been submitted for decision. Many of these cases cover large demands for reparation growing out of transactions that occurred prior to federal control. Many others are important in their relation to supposed discriminations and to regulations and practices. Through the committees appointed by the Division of Traffic, counsel endeavored to bring about a settlement by conference of the controversies and differences which have led to the formal complaints, and a number of cases have been disposed of in this way.

Of the 29 general investigations above mentioned, 11 have been disposed of by the commission without any detriment whatever to the Railroad Administration, and some of the others are now under hearing, the director of the Division of Traffic having informed the commission that he will, by presenting the pertinent facts, assist it in reaching conclusions, and that he will consider any recommendations it may make.

Suggestions and Complaints

In June Theodore H. Price was appointed actuary to the Railroad Administration, serving without salary. His duties, in addition to the analysis and study of the statistical records and the preparation of reports thereon, have included the organization and conduct of the Bureau for Suggestions and Complaints established on September 3, under the immediate direction of Ballard Dunn, assistant actuary.

Up to December 24 this bureau had been in operation some 16 weeks, during which time it had received in all 10,424 "initiatory letters" containing 11,666 suggestions, complaints, and commendations. As each of these letters has been answered, and as a thorough investigation of the things complained of and a thorough consideration of the suggestions made has involved much additional correspondence, a total of over 40,000 letters has been handled by the bureau. The aggregate of the salaries paid to the force of correspondents and employees conducting this work averages less than 4 cents a letter.

A careful classification of all the "initiatory letters" has been kept, and those commending employees for courtesy and

loyalty exceed the complaints of discourtesy by nearly two to one.

In all some 1,328 communications have been received as against only 714 letters complaining of individual discourtesy or incompetence. This is a record, the report says, of which the army of railroad men as well as the women who have recently been mustered into the service may well be proud. The commendations received have in every case been noted upon the records of the employees mentioned and will be given due consideration at the appropriate time. In addition to the 1,328 letters commending individual employees that have been received, 128 communications commending the railway service rendered by particular lines have been addressed to the bureau.

The other letters received by the Bureau for Suggestions and Complaints relate chiefly to what may be described as the organic defects of the service which were correctible under existing conditions are being remedied as rapidly as possible.

The classification that has been made of all the initiatory letters received and the number falling into each class follows:

CLASSIFICATION OF INITIATORY COMMUNICATIONS RECEIVED BY BUREAU FOR SUGGESTIONS AND COMPLAINTS FROM SEPTEMBER 3 TO DECEMBER 24, 1918 (INCLUSIVE)

THINGS COMPLAINED OF AND SUBJECTS DISCUSSED

Train service	417	Express	60
Pullman service	141	Passenger	36
Diner service	329	Baggage	87
Treatment of negroes	137	Damage to property	195
Boat and ferry service	6	Claims, Pullman	34
Sanitary conditions	98	Ticket arrangements:	
Freight service	92	Railroad	287
Car supply	62	Pullman	103
Cash payment of freight charges	16	Parlor car	4
Freight classification	23	Baggage	44
Embargoes	34	Refund	279
Waybills	18	Congestion at ticket offices	52
Express service	72	Overcharge:	
Baggage service	23	For tickets	217
Delays to freight	350	For freight	49
Delays to express	76	For express	8
Delays to baggage	91	For baggage	55
Delays to live stock	41	On dining cars	10
Ignorance of rules	115	Bills of lading	39
Clerical mistakes	20	Demurrage	28
Freight rate discrimination	99	Protest against store-door delivery	1
Unfair passenger rates	45	Commendation of service	128
Unfair baggage rates	6	Newspaper criticism	2
Unfair Pullman rates	10	Commendations for courtesy and loyalty	1,328
Special rates	79	Discourtesy and incompetence	714
Criticism of operation	1,092	Dishonesty of employees	161
Wages, hours, etc	931	Time-tables, folders and guides	57
Safety	74	Economy suggestions	140
Garnishment	63	Tipping	8
Boat lines, operation and schedules	6	Inventions	19
Insufficient help	2	Passes for employees	101
Train schedules	644	Abuse of official authority	47
Station facilities and service	320	Discharge of employees	80
Station mail handling	6	Reinstatement of employees	16
Consolidation of stations	73	Refusal to honor United States transportation	9
Consolidation of offices	14	United States soldiers	15
Consolidation of lines	9	Injuries	50
Rerouting	36	Jobs	22
Improvements suggested:		Politics by employees	6
Equipment	150	Pension system	101
Physical	62	Miscellaneous	384
Industrial	119	Draft exemptions	13
Service	81		
Claims:			
Freight	595	Total	11,666

Since the signing of the armistice and the gradual reversion to or toward the normal that has followed, the number of complaints received shows a sharp decline averaging now hardly more than 100 a day as against a daily average of from 300 to 400 when the bureau was first established.

A Forest Products Section has been organized in the southwestern railroad region, under the Regional Purchasing Committee. C. O. Deabler, lumber buyer of the Missouri Pacific, and recently assistant to the manager of the Forest Products Section at Washington, is chairman of the Section. Dr. Hermann Von Schrenk is a member of the committee. It will supervise the tie and lumber purchases in the southwestern region.

Orders of Regional Directors

CONTINUATION OF MEMBERSHIPS, ASSESSMENTS, DUES, ETC.—Circular 136 of the Southwestern regional director, similar to file No. 102-A-444 of Eastern regional director, abstract of which appeared in *Railway Age*, January 24 (page 257).

Standard Form for Stationery.—Circular 164 of Southwestern regional director, similar to Supplement 5 to Circular 6 of Northwestern regional director, abstract of which appeared in *Railway Age* of January 24 (page 257).

Writing Material on Club Cars.—Circular of Northwestern regional director, dated January 21, similar to File No. 1600-83A433 of Eastern regional director, abstract of which was published in the *Railway Age* of January 24 (page 256).

Relations with Relinquished Short Lines.—In Supplement 1 to Circular 49 the Northwestern regional director states that short line railroads complain that they are not receiving a fair share of the business which is competitive with federal controlled roads. In order to get at the bottom of these criticisms the Northwestern lines are requested to prepare statistics on the business interchanged with connecting short lines in 1918, as compared with 1917, and also with 1916 if the figures are available, explaining in connection therewith any change in the character or volume of traffic, or the amount of short line earnings. The regional director states that the Railroad Administration is under obligations to treat the relinquished roads fairly; to this end it may be necessary in some cases to divert traffic arbitrarily in order to give them such a proportion of the competitive business as they would have received had there been no change in the control of connecting trunk lines. Northwestern lines are expected to suggest such changes in rates, divisions and routing as will best accomplish this purpose.

The Southwestern regional director issued similar instructions in Order 152.

Leave of Absence and Transportation for Representatives of Unions.—In Supplement 1 to Circular 69 the Northwestern regional director announces that leave of absence will be granted, when requested, to employees serving on committees of employees' organizations when it can be shown they actually represent the class of men for whom representation is claimed. In Supplement 40 to Circular 20 he adds that annual railroad transportation will be issued to general chairmen and members of committees of employees' organizations. When transportation is desired on other than home lines application should be made to the director of the Division of Operation. Annual Pullman transportation should also be requested from the Division of Operation.

Transportation for Express Company Employees.—In Supplement 1 to Order 132, the Southwestern regional director announces that upon the request of the respective vice-presidents of the American Railway Express Company, federal managers are authorized to furnish trip transportation to the families of employees when traveling at the request of or in the interest of the express company.

Handling Railroad Administration Mail.—In Supplement 1 to Circular 8 the Northwestern regional director announces that mail which relates to the business of railroads under federal control and which is sent by or addressed to officers or employees of lines of that class or to representatives of the Railroad Administration, may be handled as railroad mail on all railroads under government control.

Medical Attention for Sick and Wounded Soldiers.—In a circular dated January 22 the Northwestern regional director announces that the surgeon general of the War Department has assigned medical officers to the various transportation centers as liaison officers in connection with the transfer of sick and wounded soldiers. In connection with this movement there will be a medical officer of the United States Army in charge who has the instructions to report to the

proper medical officers of the army at Chicago full information respecting the party in his charge. These messages will be filed ordinarily six hours prior to the arrival time at Chicago. Railroads will co-operate in the prompt handling of this advance information and will give the army representatives all the information desired respecting the expected time of arrival of trains or cars, access thereto, information relative to breaking up trains at diverting points and other information regarding arrangements for the satisfactory and comfortable handling of the sick and wounded.

Director General's Name on Stationery.—Eastern regional director, file 1500-1-3-8A449, quotes a message from Edward Chambers, director, Division of Traffic, as follows

The director general's name is to be used on time-tables for public distribution without unnecessary repetition on same time-table. It should be shown in the heading and affixed to such notices as require his name to give them effect. The style to be used in such cases is "United States Railroad Administration, Walker D. Hines, Director General of Railroads." The reading for tariffs will be "United States Railroad Administration, Director General of Railroads," followed by name of railroad. In new stocks of ticket forms and baggage checks contained in circular P-10, show only "United States Railroad Administration," followed by the name of the railroad in the same manner as shown throughout in the circular. Existing stocks of tickets bearing name of Mr. McAdoo as director general may be used. Please notify interested departments and tariff bureaus.

Services Performed by Counsel.—The Eastern regional director, file 1500-103A448, states that the following advice has been received from the general counsel of the Division of Law: "Counsel who are regularly retained and paid by the Railroad Administration may be called upon to handle matters arising in connection with any other road under federal control without additional compensation. If a large amount of additional work is imposed, application for additional compensation will be considered." Applications for authority to allow additional compensation, in accordance with the ruling quoted above, should be submitted to the regional director in cases where federal and general managers consider it equitable that the same be paid.

Leave of Absence to Employees to Attend Legislative Sessions.—The Eastern regional director, file 1203-13A446, states that, "I am advised that some railroad officers have declined to grant leave of absence to employees to enable them to attend legislative sessions for the purpose of handling legislative matters, the claim being made that this course is required by orders of the director general. The director general's orders do not require such course, and such leave should be granted in the usual way as heretofore."

Pilot for Trains Making Detour Movements.—The Eastern regional director, file 1200-272A461, states that it is reported that in a recent case of a detour movement a 14-car passenger train was detoured over a mountain railroad with a yardmaster who did not know the road as a pilot for the engineer. In all cases of detour movement a pilot who does know the road shall be furnished to the engineer, and when possibly available for such service an engineer shall be provided.

Cleaning and Disinfecting Stock Cars.—The Eastern regional director, file 500-81A459, quotes from a letter from W. T. Tyler, director, Division of Operation, as follows:

"The Department of Agriculture calls attention to the fact that considerable difficulty is being experienced at many points in the enforcement of that part of Bureau of Animal Industry Order No. 245, governing the movement of live stock, which reads as follows:

Cars * * * which have been used in the interstate transportation of cattle, sheep, swine or other animals affected with any contagious, infectious, or communicable disease shall be cleaned and disinfected under bureau supervision, in accordance with these regulations, and the final carrier shall be responsible for such cleaning and disinfection.

"The number of violations which have been reported to the Department of Agriculture indicates that some vigorous measures are necessary in order to insure a more strict compliance with these regulations."

Ventilation of Coaches.—The Eastern regional director, file 2000-4-99A457, quotes from a report from the Committee on Health and Medical Relief of the Division of Operation, with reference to the ventilation of coaches, as follows:

The Committee on Health and Medical Relief has received a great many complaints with reference to the ventilation of coaches. A large number of these complaints are made in connection with the temperature of the cars while standing in passenger stations, and from my own personal experience the complaint is, in a large number of instances, justifiable. The cars are either so hot that they are unbearable, or they are unnecessarily cold, due to the probable fact that they have been placed in the station only a short time before it is time for the train to leave the terminal. It would appear to me that some effort at regulation should be made, so that the temperature of these cars would be comfortable. I appreciate that the general subject of the ventilation of cars is a difficult one, and the committee is now gathering information with a view of seeing whether it cannot establish a more satisfactory plan than has yet been devised. In the meantime, I believe conditions could be very much improved by using a proper standard of temperature for the cars, and that as a guide, the cars be equipped with thermometers for control. Further, that instructions be given that the temperature of the cars be kept as near to 68 as possible. The committee will advise you fully of its final conclusion with reference to the subject of ventilation after it has completed its survey.

Special Car and Special Train Movements.—The Southern regional director has issued the following Supplement No. 1, to Circular Letter No. 77: "Former practice of securing specific authority from the director general for movement of private cars in trunk line territory has been discontinued. Please act accordingly in connection with all revenue movements of private cars on regular tariff basis."

Car Inspectors Needed.—The Eastern regional director, file 1200-271A453, states that C. B. Young, manager, Inspection and Test Section, 610 Southern Railroad building, Washington, D. C., is in need of car inspectors at plants building cars for the United States Railroad Administration and asks that railroads forward him the names of men at present in their employ who would make good inspectors on car construction, and who could be spared temporarily for the work.

Hearings Before Senate Committee

At Thursday's hearing before the Senate Committee on Interstate Commerce (see the article on page 306), C. E. Elmquist, president of the National Association of Railway and Utilities Commissioners, opposed an extension of federal control of railroads beyond the end of this year, but urged that Congress at the present session should adopt remedial legislation for the protection of the public by repealing the section of the control act which allows the director general to initiate rates without suspension, and to disregard other laws regulating carriers. He objected to the continuance during time of peace of the powers granted for war purposes. L. B. Finn, chairman of the Kentucky commission, appearing as a self-constituted unpaid representative of the unorganized public, declared private ownership cannot meet the transportation demands of the public, but condemned the Railroad Administration as dominated by men who had predicted failure of government control and declared against extension of the present plan.

The Railroad Administration has approved the continuation of work on the Chicago Union Station, amounting to $5,000,000, for this year, to be financed by the railroad companies, who are also expected to expend about $2,000,000 additional for incidental work on their own properties.

Railway Passenger Service During Federal Control*

By Gerrit Fort

Assistant Director, Division of Traffic, U. S. Railroad Administration.

We may profitably engage in a little retrospective discussion about the past year and about the relations of the passenger men to what we have done that may help us to decide what ought to be done in the future. The necessary work of standardizing passenger practice under federal control has been unavoidably carried out largely by territorial traffic committees. It has not been the intention, however, of anyone who has been responsible for passenger affairs to ignore or minimize the importance or the value of the work of the passenger traffic manager or the general passenger agent. Your responsibilities have been increased. Today you are in the truest sense public servants and have a high duty to perform in seeing that the public receives adequate and comfortable passenger service.

I want to indulge here in one or two "don'ts." Don't minimize the importance of your position by saying you are obliged to do this or that thing because you are ordered to do so "by Washington." Don't get the idea that you are to be hampered by rules and regulations that will prevent your taking care of the public just as well under government control as you did under private operation. I am not referring to the reductions in passenger train service or lessened conveniences which were inevitable concomitants of the war and which the American public took very cheerfully, but to those little personal attentions which the passenger men gave so well in the past. Anything that could be done lawfully in the past can be done in the future. You ought to be just as solicitous for the comfort and welfare of the public under government control as under private management.

At the outset of federal administration there were those who seemed to regard the traffic men, freight as well as passenger, as more or less necessary evils and I must confess that there were times when I thought dark days had fallen upon the passenger fraternity, but it is remarkable how quickly the public gave voice to the sentiment that it would miss direct contact with traffic representatives and that sentiment is very thoroughly understood by the Railroad Administration. The consolidated ticket offices have been successful to a large extent in meeting the public needs, and, while they may still have some shortcomings, I have a rather definite conviction that these offices represent an added public convenience and that if and when the railroads are returned to private control the consolidated ticket office will remain as a permanent institution.

The present table d'hote meal in dining cars was put into effect primarily as a war measure. The suggestion was first made by the food administrator, Hoover, that the standardization of meals on the dining cars would be a desirable means of conserving food. The question was reviewed by the director general and his staff and it was decided, as quick action was necessary, to constitute an Inter-Regional Dining Car committee, chosen by the regional directors, which would be thoroughly representative of the dining car department of the railroads, and call for their recommendations. Jointly with a representative of the Food Administration these gentlemen produced a report in which they recommended the adoption of the present table d'hote luncheon and dinner and a simple a la carte menu for breakfast. That is the genesis of the present table d'hote dining car meal. There has been considerable complaint about it, but we believe that this has resulted from faults of administration rather than from faults of the system itself for the reason that there has been quite as much written praise of the service as complaint.

The criticism seems to come from two extremes of travel. First, from those gentlemen who regard a meal on a dining car as a sort of gustatory function and to whom the cost of the meal is a secondary consideration. Now, while the railroads ought to give their patrons well prepared, substantial food at reasonable prices, they should not undertake to rival the Ritz-Carlton or the Blackstone. The other complaints come from people to whom the payment of $1 for a meal may be a real hardship. To this class some relief should be afforded by furnishing supplementary service in the way of sandwiches, coffee, etc. There are already a number of railroads which are providing that sort of service in the coaches and the amplification of this service is something you ought to consider. I believe that between the classes I have mentioned is a vast army of travelers to whom a substantial meal at a reasonable fixed price appeals. It is not the intention to discard the present system until it has had a fair trial, which we believe it has not received up to the present time. Therefore, I want to bespeak your co-operation and support in seeing that the table d'hote plan does receive a fair trial.

Another thing that has been the subject of more or less criticism is the present regulations in regard to the making of Pullman reservations and the redemption of unused Pullman tickets. I want to remind you that some time before the railroads passed under federal control the rules substantially as they exist today were considered at a mass meeting held in Chicago and received at that time but one or two negative votes out of a very complete representation. Of course, at that time the refusal of one important line to join in the regulations was sufficient to defeat their adoption. The present rules assure everyone a fair deal, conserve the use of Pullman space, prevent speculation and, while there may be occasional cases causing inconvenience, perhaps hardship to individual passengers, in the main the rules are a public benefit. Modifications of the rules with a view to liberalizing them may be, I think are, necessary, but surely the passenger men who came so near to adopting these rules on their own initiative ought not to try to defeat them, but on the contrary ought to give them their full support and see to it that they are carried out in good faith.

Practically nothing has been adopted by the Railroad Administration in the way of reforms and changes in passenger practice that has not originated with the practical men who are serving on the territorial passenger committees and who were carefully selected by the regional directors as representative men, representative of you as well as of the public. If you sum up all the good and evil resulting to passenger traffic under federal operation, I think you will find the balance is overwhelmingly on the credit side and you should strive to retain that big balance. I hope these reforms are going to be permanent if the railroads return to private ownership. And remember that if we want to retain them we must not irritate the public by enacting petty rules which will stamp all of us as bureaucrats. Let us maintain the big things we have done and not give the public the idea that we are taking advantage of a temporary condition to establish rules that are inconvenient to the public and to take away from it privileges that it has enjoyed for a great many years.

*Address at annual convention, American Association of Passenger Traffic Officers, Baltimore, Md., January 22, 1919.

Sir John A. F. Aspinall, general manager of the Lancashire & Yorkshire Railway, of England, since 1899, has resigned that office, and he at once takes a place on the board of directors, having been elected to the board in December. He is succeeded as general manager by Arthur Watson, C. B. E.

Annual Report of the Exports Control Committee

THE EXPORTS CONTROL COMMITTEE has issued a review of its activities since its creation by order dated June 11, 1918, of which the following is a summary:

With the opening of headquarters in Washington, D. C., July 1, 1918, meetings have been held regularly each Wednesday for the purpose of determining—

(*a*) The probable amount of freight which must be exported for the prosecution of the war.

(*b*) How this war freight can best be routed through the various ports.

(*c*) How much of other essential export traffic has to be handled.

(*d*) The amount of local traffic necessary for each port.

The committee has also been charged with responsibility for—

(*a*) Selection of the port to which specified freight shall be transported for transshipment overseas for the use of the War and Navy departments, the Allied governments, and others.

(*b*) The distribution of the combined amount of all exports, as between the various ports, so as to facilitate its handling at and avoid congestion in any one port.

With a view to co-operating with the several interests, an office and working force were established at New York (headquarters of the Shipping Control Committee), which has afforded opportunity to keep in close touch with the heavy volume of war supplies moving through North Atlantic ports. This arrangement has also provided the means for obtaining necessary information, as well as prompt unified action upon matters involving the Shipping Control committee, Freight Traffic committee-North Atlantic ports, United States Food Administration New York Office, Traffic Executive and individual Allied government organizations.

So far as rail transportation is concerned, in order to facilitate and control the movement of war and food supplies to the seaboard to connect with vessels, handled under convoy system during the period of war, it has been necessary and desirable to continue the railroad shipping permit system which was inaugurated through the Freight Traffic committee-North Atlantic ports for northern range ports, and the Southern Export committee, Atlanta, Ga., for South Atlantic and Gulf ports, and much credit is due these committees for the efficient handling of the detail work involved.

Threatened congestion at Pacific coast ports necessitated the organization of similar committee at San Francisco, known as the California Export committee, controlling movement through California ports, and the North Pacific Export committee at Portland, Ore., controlling movement through Puget Sound ports.

In order to ascertain the amount of freight which must be exported for prosecution of the war and also distribute the combined amount between the several ports, arrangements were perfected for securing necessary data as to the cargo and ocean program of the United States government, Allied governments, and commercial interests. This data has been compiled weekly in detail, thus presenting the committee a graphic picture of the overseas situation and enabling it to quickly note the high spots in need of attention. A compilation was also made of facilities at all ports available for the prompt and efficient handling of exports.

For the purpose of routing freight from interior to the seaboard via most direct line and to eliminate so-called crosshauls, the Exports Control Committee Zone Routing Chart No. 1, showing groups of origin, together with natural seaboard assignments, was issued and placed in the hands of officials responsible for the routing of freight, with request for observance, except in cases of extreme emergency. This chart had the effect of conserving rail transportation and distributing the total export among the several ports, diverting considerable tonnage to South Atlantic and Gulf ports which was formerly routed through northern range ports.

The primary object of the permit system is to establish intimate contact with the individual or agency at the seaboard responsible for prompt acceptance of the property upon arrival at destination. In the case of export, it was found necessary to recognize only the steamship line (not the shipper) in filing application for railroad shipping permit, and in conjunction with the Delinquent Bureau meritorious performance is assured, otherwise favorable consideration of future applications, when presented by delinquents, necessarily must be held in abeyance, pending clarification of the record.

At the ports of New York, Philadelphia and Baltimore it was found necessary to apply the permit system to domestic carload traffic for twofold purpose: First, to prevent forwarding to the seaboard export traffic under the disguise of domestic; secondly, in conjunction with the Delinquent Bureau, to insure expeditious unloading upon the part of consignees, thus keeping the terminals, necessarily used jointly for export and domestic, free from congestion.

Another requirement of the domestic permit system is that it provides for initial shipment to a particular station delivery, which has effectually stopped former practice of consigning cars to the Metropolitan district, to be held upon arrival at the Jersey shore awaiting orders for a specific delivery, frequently involving expensive switching and an average loss of 48 hours transportation. To a considerable extent the same situation obtains at Philadelphia and Baltimore by reason of having the permits specify delivery desired, thus insuring continuous movement upon arrival at the outer yards of the terminals.

Intensive loading is also made a requirement of the domestic applications in order to reduce the car units on the terminals to a minimum, and as indicative of the efficacy, during December, current year, as compared with corresponding period previous year, the average tons per car for all roads serving the Metropolitan district increased 19.3 per cent.

Record movement of wheat developed early in July, due to large crop and fixed price by the government, which, together with a heavy movement of Australian and Argentine wheat to Atlantic ports for transfer to Allied vessels, threatened to congest seaboard elevator facilities. At the request of this committee the Food Administration established a branch office in New York to handle applications for permits on grain in connection with the Freight Traffic committee-North Atantic ports, thus regulating the flow to all ports so as not to exceed elevator storage capacity, but in sufficient volume to meet vessel requirements. It was also arranged to divert the Australian wheat to Gulf ports and transfer the Argentine wheat to Allied vessels in original sacks without burdening elevator facilities. The efficacy of the plan has been demonstrated by the fact that at no time has there been any material congestion at the seaboard due to grain movement, although the volume has been exceedingly heavy.

The constantly increasing volume of war supplies through northern range ports suggested that relief should be accorded by moving commodities originating in the South and Southwest, such as cotton and tobacco, through South Atlantic and Gulf ports. This program was followed to the extent of diverting considerable tonnage, principally account of the Allies, to the latter ports, although naturally the amount of cotton and tobacco so handled was limited to the measurement space thus available. For the purpose of fully utilizing measurement space at the more northerly ports arrangements were perfected for movement via coastwise steamers,

which in the case of cotton would have approximated 3,000,000 bales during the current season had the restrictions against all-rail movement to North Atlantic ports not been removed following the signing of the armistice.

The Traffic Executive was created by the several Allied governments to co-ordinate the work of shipping abroad all the freight necessary for war and commercial purposes. With the constantly increasing movement of overseas traffic essential for prosecution of the war, including the heavy volume of food requirements, it became imperatively necessary that all interested agencies, both inland and ocean, should keep in close touch, the one with the other, to insure maximum efficiency and consequent beneficial results.

At the recommendation of this committee the manager of inland traffic, United States Food Administration, was made a member of the Traffic Executive, Allies, and representative of the Traffic Executive became associated with the Food Administration, New York office, thus helping to make the rail and ocean movement as nearly continuous as possible. The benefit of this arrangement has been far-reaching, particularly during later months when the question of food supplies has been paramount.

Co-ordination of the several governmental agencies interested in inland and ocean transportation has been developed through weekly conferences with the Food Administration, inland traffic service of War and Navy departments, and the several departments of the Railroad Administration at Washington; also weekly conferences with Traffic Executive, Allies, United States Grain Corporation, Shipping Control Committee, Freight Traffic committee-North Atlantic Ports, and American Iron & Steel Institute at New York, all of which has served to accomplish many objects otherwise perhaps unattainable.

In view of the abnormal traffic burden imposed upon the rail lines to, and terminal facilities at Hampton Roads, it was felt desirable to relieve the situation by diversion of freight, particularly coal, to other ports. Accordingly, the ports of Norfolk and Newport News, including grain elevator at the latter point, were assigned exclusively for the handling of United States Army freight. The Navy department provided storage facilities at Charleston, S. C., for 150,000 tons of bunker coal, to be moved from Pocahontas and New River districts, and the Allied governments also arranged for handling of Clinchfield and New River coal to Charleston, S. C., account return cargo for grain vessels from the Argentine.

The prospects of a Siberian campaign, with consequent heavy overseas movement through Pacific coast ports, already more or less congested account shortage of ocean tonnage, necessitated the adoption of permit system of control to insure maximum transportation without confusion. The two committees organized, North Pacific Export committee for Puget Sound ports and California Export committee for California ports, began operating under general embargo effective September 13, 1918, since which time the situation with respect to San Francisco has been practically normal. The conditions at Seattle and Tacoma have required close attention, due to violations of the embargo and lack of ocean space through diversion of Japanese vessels to other ports account inability to secure return cargoes from the Orient under import restrictions. Efforts are now being made to relieve the situation by more liberal policy upon the part of the War Trade Board in the issuance of import licenses and the assignment of vessels by the Shipping Board to lift any undue accumulations.

Movement of Russian freight account of the newly organized War Trade Board of the United States Russian Bureau (Inc.) is being handled satisfactorily under an arrangement whereby emergency permits are issued at Washington in the office of the Exports Control Committee upon application of the bureau.

It has been the policy of the committee to divert all the tonnage possible to South Atlantic and Gulf ports in order to relieve the already overburdened Northern range ports, the longer ocean voyage to be equalized by the quick turnaround. The results accomplished have been very gratifying, particularly willingness of the Allied governments to utilize southern ports, thus permitting the War department to concentrate on northern ports in connection with troop movement.

Changed conditions, brought about by signing of the armistice, necessitated prompt action to avoid congestion at the seaboard, War department freight in transit on November 11 alone approximating 20,000 cars. Instructions were issued to hold eastbound overseas freight (except subsistence, forage and clothing) at interior junction points, to be diverted to interior storage or moved to ports as needed. Current production was also taken care of at interior government storage located at New Cumberland, Middletown, Pa., Columbus, Ohio, and South Schenectady, N. Y. Storage has also been arranged for some 50,000 tons of sundry materials to be returned from abroad account of the Navy department.

In the case of Allied government freight, production of munitions, barbed wire, etc., was immediately stopped and arrangements perfected to store cars en route or at the ports in private storage, also storage furnished by the United States government. Other freight, including airplane lumber, has been promptly cleared upon arrival at the seaboard.

Owing to the absence of suitable storage facilities for high explosives en route to or on cars in vicinity of ports account of the United States and Allied governments, and the serious menace through holding on cars, it was recommended that this material should be taken out to sea and thrown overboard, which disposition is now being arranged.

With the cessation of hostilities, it soon became apparent the overseas movement would be as great, if not greater, than preceding months, as indicative of which the British program for December aggregated 2,540,776 tons, or almost 1,000,000 tons in excess of any previous month during the war. The character of tonnage also changed, flour, grain and other food supplies comprising the major portion of the program. The necessity for prompt movement of this large volume of freight will continue so long as a substantial army force is maintained on the other side, and with the advent of winter weather, it is the opinion of this committee that transportation conditions will require continuance of the present permit system of control to insure proper distribution and avoid congestion.

The allocation of 10 per cent of all space on liners by the British government for commercial shipments, with prospects for early release of additional space, together with removal of restrictions on export and import traffic by the War Trade Board, will have the effect of greatly stimulating export trade and every effort is being put forth to foster this program without interfering with the essential food movement, although it is apparent that some supervision must be maintained over commercial traffic until such time as normal conditions may be resumed.

To continue the construction of the government railroad in Alaska for the fiscal year beginning next July, the sum of $4,000,000 will be asked of Congress by the Alaskan Engineering Commission, according to a statement in the Alaska Railroad Record. The principal items in the estimates of the commission are $1,286,526 for construction in the Anchorage division; $718,340 for the Seward division; $880,304 for the Fairbanks division; $712,220 for operation in the Anchorage and Seward divisions, and $329,890 for operation in the Fairbanks division. Provision is made in the estimates for the continuation of the construction of a dock at Anchorage and the purchase of 4,000 tons of rail at $70 a ton.

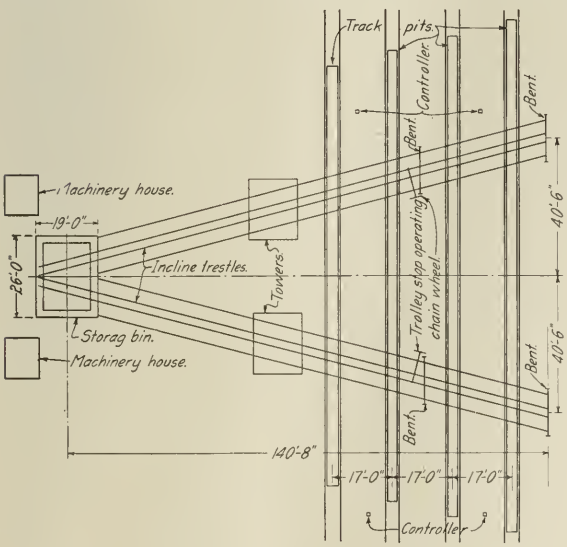


General View of the Cinder Handling Plant

A New Type of Locomotive Cinder Handling Plant

Pittsburgh & Lake Erie Facilities at Youngstown Include Incline Hoistway to a Storage Bin

A UNIQUE CINDER HANDLING PLANT was recently completed for the Pittsburgh & Lake Erie at Hasleton Yard, Youngstown, O. It is a development of a type of cinder handling equipment applied to earlier plants of smaller capacity by the builders, the Roberts & Schaefer



Layout of the Track Pits, Trestles and Storage Bins

Company, Chicago, for the Pittsburgh & Lake Erie at College, Aliquippa, Monessen and Newell, Pa.

The character of the plant is shown in the photograph. Cinders are received from the ash pans of the locomotives in steel buckets resting in concrete pits between the rails. The buckets are hoisted out of the pits and up an incline and are dumped into the top of a concrete storage tank. The plant serves four tracks, each of which is equipped with a concrete pit 125 ft. or more in length. These pits are of a sufficient width and depth to accommodate buckets of 55 cu. ft. capacity, 3 ft. 8 in. wide and resting on four-wheel trucks so as to give an over-all height of about 3 ft. 10 in. These trucks run on a 3-ft. 1¼-in. gage track, so that the buckets are spotted readily under the locomotive ash pans to receive the cinders and are then rolled to the points of hoisting. Each bucket is provided at each end with a cast steel lug or trunnion to engage hook-shaped sockets on a steel bail attached to the hoisting equipment so that the bucket may be picked up out of the pits readily when loaded and set down in the pits and released when empty.

The hoisting arrangement, which is in duplicate, consists of two inclined trestles extending over the four cinder pit tracks. These trestles cross the tracks on a skew and converge toward the storage bin as they ascend to the dumping equipment at its top. Each of these trestles is fitted with a 2-ft. 2⅝-in. gage track to carry a trolley operated by a hoisting line passing over an idler pulley at the upper end of the incline and down to a hoist in a house at the foot of the storage tank. The trolley, hoisting line and bail are arranged in such a way that the trolley remains in a fixed position over the pit as the bail with the bucket attached is being hoisted, until the bail comes in contact with the trolley, after which the latter moves up the incline to the top, where the bucket is tripped over in its trunnions and empties into the bin. On the return trip to the track pits, the trolley may be stopped over any one of the four tracks by pivoted wheel blocks, any pair of which may be interposed at the will of the operator, with the aid of an operating bar controlled by a hand chain.

The movement of the trollies in hoisting is controlled by

controllers located convenient to the track pits, but Cutler-Hammer automatic controllers and Palmer limit switches prevent overwind of the hoisting cables when the trolley reaches the upper end of the trestles.

The plant is located only 250 ft. from a 900-ton capacity coaling station, also built by Roberts & Schaefer Company, which serves the same four tracks that are equipped with the track pits for the cinder plant. The cinder storage tank is served by the track that leads over the track hopper of the coaling station so that coal cars dumped at the track hopper may be dropped back to the cinder bin to be loaded with cinders. Since the completion of this plant contracts have been awarded for similar facilities on the New York Central at Youngstown, Ohio, and Minerva.

Valuation Progress

A STATEMENT of recent developments in connection with federal valuation work has been issued by Frederick H. Lee, secretary of the Presidents' Conference Committee on Federal Valuation, under date of January 2. Among recent developments referred to in this statement are the fact that the Kansas City Southern has filed a petition and order for a writ of mandamus with the Supreme Court of the District of Columbia to compel the Interstate Commerce Commission to receive testimony as to the cost of reproduction of its lands, the commission having overruled a similar motion made by the railroad on November 15, 1918.

The rule before the Supreme Court was made returnable on December 10, but postponement of the argument was granted until January 4.

A plan is being developed whereby the completion reports required by the Division of Valuation under Order No. 3 are to be retained in the files of the carriers and only quarterly and annual returns made to the division. It is not the intention of the Bureau of Valuation at the present time to request any reports under this order, but the carriers will be required to keep the data in their files.

Notice has been given of a hearing before Commissioner Meyer, of Chicago, beginning January 20, on the valuations of the Elgin, Joliet & Eastern, the Chicago, Lake Shore & Eastern and the Joliet & Blue Island properties.

I. C. C. Rulings

Certain tentative interpretations have been made by Division 1 of the commission of the decisions in the Texas Midland and the Winston-Salem Southbound as follows: Where carriers agree as to the ownership of railroad crossings, the property should be inventoried to the owner or owners. Where no agreement is reached the conclusion of the commission as announced in its decision in Valuation Docket No. 5, Winston-Salem Southbound case, should be followed. This we also understand to be in conformity with the present practice of the bureau. The rule announced in the Winston-Salem Southbound case is as follows:

"It has been the practice of the bureau of valuation to apportion the estimated costs of reproduction in accordance with any agreement as to the ownership of property of this character which the interested carriers may make. Failing such agreement, the cost of reproduction estimates of the junior carrier omit, in the case of under-crossings, anything for the assumed reproduction of structures used entirely for the passage of the trains of the senior companies; but the cost of reproduction estimates of every junior carrier includes the estimated cost of reproducing the property exclusively used by it. One-half of the estimated cost of reproducing property commonly used by both carriers, such as crossing frogs, is carried into the tentative valuation of the southbound company. Such practice has been followed in the tentative report in this case."

Time tables, tariffs, etc., should not be embraced in the reproduction inventories nor shown in the statement of property of carriers.

Abandoned property should not be included in the reproduction inventories.

If the ownership of interlocking plants is known, they should be inventoried to the owner or owners. In the absence of such knowledge they should be apportioned among the using carriers according to use.

Where property off the right-of-way is a necessary part of the property of the carrier devoted to the public use it should be inventoried to the carrier; otherwise it should be included in non-carrier property owned. This rule would probably mean that the viaducts and rip-rap on the Kansas City Southern should be included in the reproduction inventories for that carrier.

The appraiser in the field shall determine whether the particular street, alley or highway is in fact a street, alley or highway, dependent upon the facts in connection with each individual piece of land and without regard to the number of inhabitants of the settlement in which they are found. In the case of exclusively used streets they shall be included in the land report as land owned and used for common-carrier purposes in instances where the carrier can show title or produces an order of vacation or satisfactory proof that such an order was entered; otherwise they shall be excluded. In the case of partially used streets or alleys nothing shall be included in the land report on account of such areas unless it affirmatively appears that the carrier owns it. In those instances where it is included the value to be stated will be determined in view of the conditions of its use. Highways which are used by carriers shall be included in the land report as land owned and used for common-carrier purposes unless it affirmatively appears that the carrier does not own the land, but the land section shall make no extended investigations to determine ownership.

Progress

During the year the valuation work and inventory of the Bureau of Valuation has progressed quite steadily. No tentative valuations have been served by the commission during this period, but now that many elemental questions which have been in controversy have been decided by the commission in the valuations of the Texas Midland and the Winston-Salem Southbound it is thought that other carriers will be served in the near future. A considerable number of carriers have, however, been furnished with copies of inventories in preliminary form and conferences are being held between the representatives of the carriers and the Bureau of Valuation in order to adjust so far as possible any errors or omissions and other differences so that such items may be corrected in advance of the service of a tentative valuation and thus reduce the number of issues to be raised by protest.

The expenditures of the Bureau of Valuation for the year ending June 30, 1918, were $3,384,444.31; leaving an unexpended balance of $115,913.73. According to the terms of the bill carrying the last appropriation for valuation, this unexpended balance was to be carried forward and used in connection with the $3,500,000 made available for the year ending June 30, 1919. The total expenditures on behalf of the Bureau of Valuation from the beginning of valuation work to June 30, 1918, have been $12,251,517.43. A total of $4,111,373.06 was expended in connection with valuation work by the carriers reporting to the Presidents' Conference Committee during the year ending June 30, 1918 (four companies not reporting), making a total amount for the five years ending June 30, 1918 (with the above omissions), of $24,578,521.93.

General News Department

The proposed dismantling of the Colorado Midland has been stayed by the Railroad Administration as the result of agitation by shippers and state officers of Colorado, who ask the government to take over and operate the road. Representatives of the shippers and of the Colorado Public Service Commission have been assured by the Railroad Administration that practicable recommendations will receive earnest consideration.

The American Association of Engineers, which has a railroad committee studying the railroad wage problem as affecting civil, mechanical and electrical engineers employed by the railways, will set aside for the use of this committee one half of all receipts from new railroad members during the month of January. This money will be used to make a study of the wages paid to technical engineers in railway employ and to make representation of the results to the Board of Railroad Wages and Working Conditions, the regional railroad directors and others. The railroad committee is composed of W. H. Finley, president of the Chicago & North Western; E. H. Lee, president of the Chicago & Western Indiana, and W. W. K. Sparrow, corporate chief engineer of the Chicago, Milwaukee & St. Paul.

Roy U. Conger, of New York City, a manufacturer of airplane parts, has bought from the British Government 350 airplanes and a large quantity of engines and accessories, heretofore used in Canada for training aviators for the military service, and proposes to use the machines in the operation of commercial routes in Canada. This statement, taken from the New York Sun, is based on transactions closed at Toronto, Ont., on January 29. Mr. Conger is said to be perfectly confident that the use of airplanes for transporting passengers, mail and parcels can be made profitable in Canada; and presumably also in the United States. This air equipment is said to have cost ten million dollars; and an offer of $400,000 had previously been refused because of a probability that the airplanes would be sold subsequently at auction and would fall into the hands of irresponsible persons.

The Engineering Societies' Employment Bureau, New York City, desires that state and municipal authorities, corporations and individuals who need the services of professional engineers communicate their wants to the Bureau, 33 West Thirty-ninth street. This bureau is maintained by the four national Societies of Civil, Mining, Mechanical and Electrical Engineers. In behalf of engineers who have been serving in the army or in government capacities during the war, it is the desire of the Engineering Societies to get in touch with contemplated engineering projects as early as practicable. By resolutions adopted unanimously (by the 650 members present at its annual meeting) the American Society of Civil Engineers has recorded "its profound conviction that public works should be carried forward to the fullest extent consistent with sound judgment, not only for fundamental economic reasons, but for humanitarian reasons."

Arthur H. Johnson, signal and telegraph engineer of the London & South Western, has resigned from that office on account of failing health; and the directors of the company have granted him a pension. Mr. Johnson began his career in England, but he is well-known in America, having been for several years connected with the Union Switch & Signal Company, and later with the Johnson Railroad Signal Company. He was also for about three years signal engineer of the Erie Railroad. When he left that road he returned to England and was engaged in manufacturing with W. R. Sykes, the well-known inventor of the Sykes controlled manual block signaling apparatus. While there he entered into a contract with the New Zealand Railways and spent several years in New Zealand in establishing the signal and telegraph department of the railways of the islands. He had been with the London & South Western nineteen years. Mr. Johnson is the author of numerous valuable writings on signaling subjects, notably a review of the history of signaling on English railways, presented before Harvard University in 1894, and reported in the Railroad Gazette in August, September and October of that year.

Railway Honor Men

J. A. Edson, federal manager on the Kansas City Southern and other lines, reports that 1,067 officers and employees of the roads under his managership served in the army and navy during the war. The distribution of these men is as follows: Kansas City Southern, 594 men; Midland Valley, 80; Houston East & West Texas, 64; Vicksburg, Shreveport & Pacific, 88; Missouri & North Arkansas, 108; Kansas City, Mexico & Orient, 133.

Fatal Troop-Train Collision in France

A press despatch from Paris, January 25, reports 18 American soldiers killed and 30 injured in a collision between a troop train and a freight at Nanoirs.

Probably Sent at Government Rate

No wonder Mr. McAdoo couldn't live on $12,000 a year. Here he is without a job, and he sends a thousand-word telegram to the waterways convention about 5-year government control of railroads.—*F. P. A. in New York Tribune.*

Want Railroads Returned to Owners

The Lumbermen's Association of Chicago, at its annual meeting, on January 20, adopted a resolution calling for the return of the railroads to private operation as promptly as possible, with suitable remedial legislation. The association also endorsed the resolutions of the Railway Business Association, and favored an extra session of Congress to secure prompt action.

Disapproval both of government ownership and government operation has been voiced also by numerous organizations all over the country, among which are the National Live Stock Association, which took action at Denver on January 24, and the San Francisco Chamber of Commerce.

A large meeting of Texas shippers, held at Dallas on January 25, took similar action. The New York Evening Post during the past week has published letters from careful correspondents reporting similar views in St. Paul, St. Louis, Memphis, Philadelphia and Boston; and a letter from Kansas City reports business and farming interests as in a critical mood, having found railroad service unsatisfactory.

"Safe Practices"

The sixteenth number of the Safe Practices Bulletin of the National Safety Council is a ten-page illustrated monograph on safe clothing for men and women in industry. These excellent brochures contain a large amount of useful information, gathered from varied sources and clothed in lucid and vigorous language. Some members of the Council, to encourage the wearing of suitable clothes, provide women employees with the first suit free of charge.

Pamphlet No. 17 is entitled "Yards" and deals with all kinds of outdoor operations in the yards of industries.

No. 18 is on Power Presses. The ingenious recent devices for preventing workmen from injuring their hands or feet in these ponderous machines are innumerable. One picture shows a large press, in a shop of the Ford Motor Company, where each of two men must press an electric push button with each hand before the machine can be operated.

These pamphlets are provided, at a cost of ten cents each, by the National Safety Council, 208 South LaSalle street, Chicago.

Simplification Run Mad

In Mr. McAdoo's list of "advantages" of unified operation of the railways is mentioned the "elimination of the old practice of paying mileage or per diem rental for the use of freight or passenger cars of one carrier by another." Thus the roads which have let their cars go to other lines have no way to get them back, no matter how badly they need them. Government ownership would not obviate the necessity for some sort of distribution of cars and some way of maintaining such distribution. There is a fundamental weakness in the entire theory of running the railways "for the good of the whole country." It would mean reducing railway service in general to the minimum. It would mean only occasional freight trains on the smaller lines. It would mean the denial of proper passenger train facilities for hundreds of interior towns not located on the lines chosen for through passenger traffic. The general tendency would be to retard development of the rural sections. Merchants might as well talk of running their stores only during the rush seasons. We might as well plan street car service only during the rush hours. It would be as feasible to have telegraph offices only in the large centers of population, or to keep hotels open only during conventions. No business can live exclusively on cream. There are long periods when nearly every business runs at a loss, but it must take care of its regular patrons' needs.—*St. Louis Globe-Democrat.*

A Message from the Ex-Director-General

Although retired to private life, W. G. McAdoo, former director-general of railroads, is still actively pushing his plan for a five-year extension of Government control of the railroads. In a telegram to an inland waterways meeting at Defiance, Ohio, last Monday, he said:

"The confusion of counsel about the railroad problem, made daily more evident by the great variety of conflicting views and opinions now being presented at Washington, makes it more and more clear that the course of wisdom, sagacity and prudence is to extend Government control of the railroads for five years, that our inland waterways be developed to the largest possible extent during that period, and that these inland waterways and rail facilities be co-ordinated with our great merchant marine in an endeavor to get for American business enterprise a fair participation in the benefits of world commerce.

"The powerful and sleepless forces of reaction are solidly arrayed against this plan. They will defeat it unless the American people are aroused to the situation. The time is short. The matter is vital. My earnest suggestion to you and your associates is that you press upon the attention of the Congress the importance of the five-year control in order that the things you want to accomplish may be brought about."

National Rivers and Harbors Congress

The railroad problem has an important part in the tentative program which has been issued for the fourteenth convention of the National Rivers and Harbors Congress to be held at Washington on February 5, 6 and 7. The subject for discussion on Thursday, February 6, is "What Shall Be Done With Our Railroads?" Charles F. Nesbit, of Washington, D. C., will discuss this question on the side of government ownership; Samuel O. Dunn, editor of the *Railway Age*, will discuss the return to private ownership, and William Jennings Bryan will discuss a dual plan of ownership. Other topics for discussion are: "Shall waterways as well as railways be placed under control of the Interstate Commerce Commission, which shall have power not only to establish through rail and water routes, but to fix both maximum and minimum rates?" "Shall railways be allowed to continue to make extremely low rates to points on waterways, while maintaining much higher rates to inland points?" "Should railway rates be the same for equal distances to both inland and waterway points?" "Should railway rates be lower to waterway points than to inland points, providing the difference in rates for equal distances is not more than 20 or 25 per cent?"

The program also includes addresses on "What the Government Is Doing for Water Transportation," by G. A. Tomlinson, director of the Division of Inland Waterways of the United States Railroad Administration; on "Transportation," by Major Gen. William M. Black, chief of engineers, U. S. Army, and on "The Essential Unity of Transportation by Water, by Rail, by Road, on Land and on Sea," by William C. Redfield, Secretary of Commerce. Walker D. Hines, director general of railroads, is also expected to address the Congress.

The June Mechanical Convention

J. D. Conway, secretary of the Railway Supply Manufacturers' Association, on January 23, sent out circular No. 1 extending an invitation to manufacturers of and dealers in railway supplies to exhibit at Atlantic City in June, and giving full details as to the exhibit arrangements.

In his circular, Mr. Conway says:

"This is the first exhibition that has been held for three years. The railroad associations have expressed their earnest desire that our association should make a full exhibit, and the United States Railroad Administration gives its unqualified approval of it. Invitations are being extended in the name of the three associations to all foreign trade bodies in this country, and, through the embassies at Washington, to all foreign governments (except the Central Powers), inviting them to send delegates or representatives to attend the conventions and examine the exhibits. The opportunity presented by an exhibition at this time for both the domestic and foreign demand is exceptional."

Wood Preservers' Meeting

The fourteenth annual meeting of the American Wood Preservers' Association was held in St. Louis on Tuesday and Wednesday of this week with a registration of over 250, the largest attendance on record. An unusually large percentage of railway men were present.

On Wednesday afternoon the tie problem was discussed, with John Foley, of the Forest Products Section at Washington, and others speaking. Chicago was selected as the meeting place for the next convention.

J. B. Card, president of the Central Creosoting Company, Chicago, was elected president of the association; A. R. Joyce, Joyce-Watkins Tie Company, Chicago, first vice-president, and C. M. Taylor, superintendent of the Port Reading Creosoting Plant, Port Reading, N. J., second vice-president. F. J. Angier, superintendent of timber preservation, Baltimore & Ohio, was re-elected secretary-treasurer.

On Thursday and Friday following the meetings, the tie producers of the country held conferences looking to the organization of a national association. There were long discussions on the centralization of purchases by the government.

American Society of Civil Engineers

Fayette Samuel Curtis, of Boston, Mass., president of the Old Colony Railroad, has been elected president, for the year 1919, of the American Society of Civil Engineers. Other officers named were H. S. Crocker, Denver, Col., and Leonard Metcalf, Boston, Mass., vice-presidents; A. S. Tuttle, New York, treasurer; G. H. Clark and Jacob S. Langthorn, New York; Charles C. Elwell, New Haven, Conn.; Willard Beahan, Cleveland, Ohio; John W. Alvord, Chicago, Ill., and Carl E. Grunsby, San Francisco, Cal., directors.

REVENUES AND EXPENSES OF RAILWAYS

ELEVEN MONTHS OF CALENDAR YEAR 1918

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of									
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Houston & Texas Central	931	$5,649,722	$2,002,432	$8,240,926	$1,059,252	$1,437,932	$113,386	$3,674,728	$204,919	$5,887,851	71.45	$2,353,077	$396,463	$1,950,132	—$1,429,885
Illinois Central	4,777	72,936,745	18,457,021	98,190,218	14,669,219	23,293,661	787,623	39,158,169	2,361,832	80,817,657	82.37	17,372,561	4,689,688	12,669,441	—5,828,726
Indiana Harbor Belt	116	.....	.....	5,061,456	1,062,523	1,214,003	20,523	3,302,792	145,737	5,745,597	113.52	—684,141	110,535	—794,678	—1,794,649
International & Great Northern	1,159	8,102,439	3,305,678	12,298,539	1,829,463	2,741,718	149,830	5,323,762	408,888	10,440,172	84.88	1,858,367	330,000	1,526,327	—1,647,385
Kanawha & Michigan	176	4,252,198	1,018,491	5,472,767	633,995	1,379,582	30,976	1,712,226	118,462	3,875,246	70.81	1,597,521	219,674	1,377,847	581,873
Kansas City, Mexico & Orient	272	986,344	144,433	1,189,851	226,991	500,734	36,533	620,006	78,869	1,463,113	122.97	—273,262	68,870	—342,134	—281,368
Kansas City, Mexico & Orient & Texas	465	915,554	136,621	1,111,526	247,582	420,541	28,754	603,608	57,004	1,357,489	122.12	—245,964	55,000	—301,663	—250,991
Kansas City Southern	774	10,868,907	1,999,583	13,863,378	1,570,308	2,618,646	264,967	5,420,095	429,065	10,233,220	73.81	3,630,158	627,122	3,000,805	—863,370
Kansas City Terminal	24	.....	.....	1,138,953	152,611	249,306	....	578,948	10,261	996,094	87.45	142,858	197,676	—56,999	—114,807
Lake Erie & Western	900	7,576,699	567,118	8,570,884	1,141,474	2,188,536	134,995	3,901,182	236,644	7,594,270	88.60	976,614	312,739	663,027	—1,067,845
Lehigh & New England	231	3,384,203	15,539	3,655,167	486,535	706,454	55,081	1,241,607	91,350	2,580,798	70.61	1,074,370	95,409	978,961	—239,487
Lehigh & Hudson River	96	1,971,930	41,487	2,104,599	303,276	400,821	17,830	975,157	61,712	1,758,796	83.57	345,804	65,600	280,185	—408,569
Lehigh Valley	1,441	49,076,480	5,722,911	59,692,726	7,010,091	15,287,463	608,680	27,659,912	1,090,505	51,804,238	86.78	2,888,489	1,776,176	6,110,449	—3,320,357
Long Island	398	5,183,986	13,299,623	20,552,913	2,461,286	2,838,682	122,185	8,827,209	453,738	14,853,511	72.26	5,699,402	988,579	4,707,558	346,104
Los Angeles & Salt Lake	1,167	8,963,446	3,325,658	13,247,833	1,674,630	2,743,696	251,725	4,589,254	279,456	9,791,534	73.91	3,456,499	677,050	2,778,085	—1,150,537
Louisiana & Arkansas	302	1,120,069	338,422	1,525,579	324,074	282,563	34,399	603,160	60,576	1,304,774	85.52	220,806	119,673	100,979	—203,210
Louisiana Western	207	2,612,258	1,125,448	3,973,791	313,193	582,415	62,292	1,031,566	109,560	2,121,673	53.39	1,852,118	152,284	1,697,083	107,267
Louisville & Nashville	5,026	64,859,294	21,944,037	91,748,391	11,520,943	21,321,916	1,255,585	35,723,376	1,607,064	71,720,748	78.17	20,027,642	2,814,935	17,200,584	—1,798,345
Louisville, Henderson & St. Louis	199	1,800,986	699,528	2,595,702	365,221	373,350	63,696	933,634	56,058	1,796,033	69.19	799,669	57,648	741,745	76,909
Louisiana Railway & Navigation Co	356	1,969,202	672,813	2,803,660	453,505	469,743	48,551	1,262,546	85,454	2,319,800	82.74	483,868	154,000	329,625	—139,571
Maine Central	1,216	9,777,724	4,010,598	14,985,764	2,431,423	3,171,395	127,298	8,169,448	358,652	14,304,187	95.45	681,577	733,485	—52,159	—2,720,090
Maryland, Delaware & Virginia	82	611,709	345,769	983,622	85,592	243,835	10,840	647,012	19,699	1,005,677	102.37	—23,356	17,479	—40,834	132,543
Michigan Central	1,861	41,367,403	14,521,888	61,951,200	7,061,301	11,453,230	688,356	25,548,073	1,044,680	46,620,922	75.25	15,330,278	1,790,800	13,533,030	—2,362,331
Midland Valley	386	2,405,056	649,681	3,181,241	499,252	538,326	24,391	1,161,322	118,193	2,341,484	73.60	839,757	78,599	760,970	3,687
Mineral Range	100	994,045	24,801	1,047,741	181,784	246,868	4,339	561,186	12,028	1,006,204	96.03	41,537	36,869	4,668	—24,426
Minneapolis & St. Louis	1,646	8,509,550	1,850,971	10,960,670	1,968,521	2,717,879	142,938	5,205,862	285,317	10,319,358	94.14	641,318	573,429	64,359	—2,159,235
Minn. & International Ry	195	617,825	257,670	923,397	192,016	185,063	4,916	468,737	36,224	886,957	96.05	36,440	50,302	—13,914	—242,086
Minn., St. Paul & Sault Ste. Marie	4,239	23,948,250	5,729,010	32,025,114	4,930,627	6,657,180	338,000	14,314,315	771,190	27,131,778	84.72	4,893,336	1,991,921	2,901,119	—6,073,056
Missouri, Okla. & Gulf	332	1,307,972	273,623	1,658,930	380,273	516,666	23,278	873,579	98,095	1,896,716	154.33	—237,756	97,960	—337,492	—582,727
Missouri Pacific	7,231	57,398,651	17,800,713	81,498,804	12,905,091	17,020,571	1,001,308	32,935,486	1,941,127	66,066,643	81.06	15,432,160	3,065,533	12,351,620	.....
Mobile & Ohio	1,106	10,863,143	1,860,949	13,499,826	1,761,946	4,274,463	337,368	6,105,474	399,000	12,880,608	95.45	619,856	474,857	142,170	—2,421,887
Monongahela	108	2,608,284	207,510	2,915,936	652,177	307,032	12,391	985,149	58,412	2,015,161	69.10	900,775	49,516	851,253	144,087
Monongahela Connecting	5	.....	.....	2,245,461	301,412	381,718	4,816	1,191,054	62,430	1,941,429	86.46	304,032	25,473	278,558	139,028
Morgan's La. & Tex. R. R. & S. S. Co	400	5,265,756	1,692,132	7,511,098	779,615	1,298,482	86,525	2,613,332	175,079	4,978,944	66.28	2,532,155	320,218	2,209,440	—136,439
Nashville, Chattanooga & St. Louis	1,238	13,317,258	5,438,724	19,864,025	2,314,967	4,452,168	408,578	8,344,813	442,155	16,024,020	80.66	3,840,005	366,674	3,471,915	650,818
Nevada Northern	168	2,258,479	168,977	2,488,027	261,503	301,152	9,356	596,339	62,685	1,233,295	49.52	1,255,732	183,115	1,067,005	135,149
Newburgh & South Shore	7	.....	—246	1,318,919	169,935	242,054	.....	597,351	32,732	1,041,071	78.93	276,848	77,800	199,048	276,805
New Orleans & North Eastern	303	3,934,559	1,356,442	5,902,664	656,375	1,323,228	89,589	2,475,611	127,586	4,706,938	79.74	1,195,727	300,713	894,404	—231,918
New Orleans, Great Northern	284	1,541,801	411,146	2,040,349	294,523	369,688	29,464	697,501	80,269	1,474,898	72.28	565,451	89,842	475,245	—70,724
New Orleans, Texas & Mexico	191	1,301,168	435,078	1,787,889	334,576	363,914	26,806	561,202	66,548	1,358,801	76.00	429 088	88,900	339,803	—78,678
New York Central	6,079	172,412,190	62,141,006	267,308,435	30,622,089	56,066,791	2,558,114	111,468,045	6,222,571	210,373,215	78.70	56,935,220	11,706,750	45,204,759	—3,944,445
New York, Chicago & St. Louis	572	17,791,141	1,720,891	20,151,020	2,336,480	3,759,579	352,896	8,944,884	508,998	15,742,783	78.12	4,408,236	502,500	3,905,581	1,017,916
New York, New Haven & Hartford	1,992	46,704,584	35,812,869	93,686,061	12,436,956	18,811,111	432,887	42,877,434	2,760,699	78,888,546	84.20	14,797,516	3,019,000	11,764,275	—7,833,150
New York, Ontario & Western	567	6,564,911	2,060,589	10,071,606	1,388,433	2,449,509	96,172	4,807,903	229,802	8,971,819	75.55	1,099,188	272,848	824,890	—1,292,239
New York, Philadelphia & Norfolk	121	5,170,785	1,145,446	6,867,317	617,999	1,589,775	106,692	3,075,404	120,907	5,673,149	82.59	1,194,168	180,387	1,013,687	—233,691
New York, Susquehanna & Western	135	3,092,254	563,951	4,015,791	2,105,222	643,231	22,791	2,285,137	83,071	3,439,307	85.64	576,484	165,233	411,148	—188,502
Norfolk & Western	2,084	63,177,246	9,221,018	75,175,346	8,674,878	19,514,145	496,377	26,221,148	1,203,685	56,281,286	74.86	18,894,060	2,704,000	16,180,411	—4,098,970
Norfolk Southern	907	3,510,282	1,359,440	5,186,947	964,529	1,084,074	75,677	2,332,933	320,497	4,679,511	90.21	507,436	173,941	333,303	—990,836
Northern Pacific	6,556	70,445,089	15,812,364	93,841,867	13,140,708	14 843,349	722,762	33,763,347	1,662,757	64,546,676	69.52	28,295,191	6,152,629	22,137,274	—4,914,153
Northwestern Pacific	507	2,790,039	1,961,742	5,268,093	739,665	625,641	54,016	1,979,951	116,420	3,533,530	67.07	1,734,563	241,517	1,443,013	85,807
Oregon Short Line	2,323	23,540,721	5,426,547	31,089,992	4,126,305	4,598,221	232,709	9,012,469	922,663	19,437,959	62.52	11,652,033	1,735,294	9,913,709	—1,457,411
Oregon-Washington R. R. & Nav. Co	2,066	16,037,403	5,735,071	23,422,333	3,633,789	3,470,543	346,761	9,191,688	918,848	17,976,373	75.14	5,945,952	1,358,126	4,585,583	—1,029,929
Panhandle & Santa Fe	738	3,969,947	1,169,425	5,397,403	998,613	1,591,117	43,870	2,035,501	162,314	4,799,529	88.92	597,873	199,022	397,315	—2,026,147
Pennsylvania Company	1,754	63,979,731	14,360,792	86,575,711	13,300,720	22,734,862	889,825	38,514,766	1,822,847	77,843,193	89.91	8,732,518	3,210,761	5,520,974	—7,091,415
Pennsylvania Railroad	5,342	215,916,088	87,201,986	333,169,367	44,999,021	89,633,916	2,706,793	150,240,621	7,399,114	299,733,146	89.96	33,436,221	9,631,829	23,778,334	—28,806,047
Peoria & Pekin Union	19	248,175	66,716	1,183,792	146,745	273,177	321	869,468	42,837	1,332,548	112.56	—148,756	104,269	—253,025	—283,976
Pere Marquette	2 239	20,154,804	3,800,536	26,265,439	5,494,057	5,655,517	322,913	11,095,378	683,719	23,300,793	81.09	4,964,646	637,838	4,325,412	—833,735
Philadelphia & Reading	1,126	60,722,798	7,634,447	73,140,301	6,465,741	17,538,390	454,376	33,593,480	1,281,226	59,487,398	81.33	13,652,903	1,500,256	12,152,371	—5,658,801
Pittsburgh & Lake Erie	224	26,197,510	2,074,268	30,230,269	4,029,421	6,166,301	167,659	9,212,639	456,903	20,077,967	66.41	10,152,301	812,900	9,339,392	2,050,872
Pittsburgh & Shawmut R. R Co	94	1,170,999	41,860	1,227,382	300,146	340,115	12,322	482,464	35,478	1,170,525	95.36	56,857	16.109	40,748	—192,599
Pittsburgh, Shawmut & Northern	204	1,034,956	57,668	1,125,208	315,747	594,082	13,384	596,031	75,579	1,594,823	141.73	—469,615	19,954	—489,568	—307,879
Pittsburgh & West Virginia	63	1,481,532	101,470	1,722,803	450 631	463,346	14,061	650,212	75,578	1,748,939	101.51	—28,135	135,020	—181,164	—513,543
Pittsburgh, Cincinnati, Chic. & St. Louis	2,393	54,563,767	17,116,788	79,888,416	9,861,747	23.126,119	1,010,313	34,902,694	1,868,020	71,447,224	89.43	8,441.192	2,619,175	5,819,103	—8,019,012
Port Reading	21	1,713,134	.....	2,342,016	219.339	264,559	393	1,123,606	13.160	1,621,043	69.21	720.973	107.667	613,307	108.278
Richmond, Fredericksburg & Potomac	87	2,595,967	3.215,918	6,422,496	331,760	731,259	45,250	2,175,372	111,114	3,449,274	53.70	2,973,223	149,553	2,823,151	1,073,601
Rutland	415	2,452,519	1,044,354	4,199,930	699,307	954,702	112,889	2,104,432	110.284	3,984,362	94.86	215,568	196,166	19,375	—765,777
St. Joseph & Grand Island	258	1,910,613	341,828	2,405,054	477,404	432,025	24,012	1,254,627	95,429	2,289,361	95.17	115,693	94,672	20,978	124,223
St. Louis, Brownsville & Mexico	548	2,657,152	1,086,621	4,041,504	607,891	745,225	64,370	1,179,276	141,594	2,738,289	67.75	1,303,215	109,389	1,192,805	—51,782
St. Louis Merchants Bridge Terminal	9	.....	4,721	3,370,304	455,468	489,662	8,925	2,169,290	67,592	3,190,937	94.67	179,367	92,856	86,142	—628,054
St. Louis-San Francisco	4,761	41,390,718	18,589,633	63,778,876	9,112,229	14,457,968	346,018	24,474,090	1,740,932	50,243,836	78.77	13,535,039	2,454,106	11,060,754	—5,182,082
St. Louis, San Francisco & Texas	134	1,061,254	142,972	1,272,409	178,307	238,512	20,274	579,916	67,547	1,084,556	85.23	187,853	18.153	169,456	75,643
St. Louis Southwestern	968	8,963,294	2,242,380	11,716,401	1,393,568	2,458,578	242,988	3,434,988	370,606	7,922,088	67.61	3,794,313	467,780	3,324,904	—977,718
St. Louis Southwestern of Texas	814	3,995,435	1,647,651	6,037,564	1,329,281	1,761,291	114,076	2,774,826	252,538	6,231,253	103.21	—193,689	214,819	—409,046	—990,444

§ Does not file.

REVENUES AND EXPENSES OF RAILWAYS

ELEVEN MONTHS OF CALENDAR YEAR 1918—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss)	Increase (or decr.) comp. with last year.
San Antonio & Aransas Pass	3,583	$2,603,190	$1,113,311	$4,000,350	$666,633	$1,309,801	$70,850	$1,920,007	$183,639	$4,048,217	101.19	$47,887	$161,416	$(213,303)	$(586,144)
Seaboard	3,561	20,271,786	11,933,920	35,313,321	4,592,295	8,081,453	713,831	15,216,243	972,533	29,806,279	84.41	5,507,642	1,342,541	4,156,603	—2,541,945
South Buffalo Ry. Co	35	532,764	.....	1,437,511	162,899	178,123	3,652	765,185	19,523	1,129,383	78.56	308,129	55,460	252,674	—52,618
Southern	6,982	69,445,586	37,277,145	115,846,924	12,529,774	22,445,310	1,391,459	44,121,089	2,379,807	83,537,618	72.11	32,309,306	3,426,247	28,843,955	4,855,568
Southern in Mississippi	278	767,233	450,322	1,323,951	290,238	162,550	25,346	680,134	47,314	1,205,582	91.05	118,370	99,000	19,353	—20,876
Southern Pacific	7,049	92,505,560	35,850,175	139,986,982	16,407,138	24,308,830	1,365,788	54,139,181	2,867,446	101,368,144	72.41	38,618,837	6,486,680	32,091,464	—8,706,812
Spokane, International Ry. Co	162	735,370	145,669	912,904	150,282	94,994	16,423	302,338	44,398	605,201	66.29	307,702	36,249	271,379	—30,455
Spokane, Portland & Seattle	554	5,425,669	1,820,638	7,768,437	1,039,872	900,159	61,555	2,357,710	205,812	4,603,135	59.28	3,163,302	750,806	2,411,944	—172,134
Staten Island Rapid Transit Co	23	792,714	757,730	1,755,587	305,612	252,025	14,556	878,290	87,405	1,537,888	87.59	217,699	124,000	93,671	—118,019
Tennessee Central	293	1,770,710	870,327	2,766,718	594,160	580,261	27,879	1,146,909	76,972	2,426,200	87.69	340,518	73,076	267,089	—77,740
Terminal R. R. Ass'n of St. Louis	36	.....	36,116	3,567,267	631,176	543,698	9,274	1,634,264	52,044	2,901,336	81.33	665,931	363,841	302,001	—868,624
Texarkana & Ft. Smith	81	898,448	170,698	1,154,061	140,529	144,126	19,242	432,597	49,697	783,812	67.91	370,249	89,914	280,327	—131,592
Texas & New Orleans	469	4,561,275	1,696,942	6,818,626	845,773	1,898,672	65,553	2,382,306	135,624	5,505,300	80.74	1,313,327	239,753	1,071,129	—955,026
Texas & Pacific	1,946	15,961,069	6,684,613	24,241,738	3,281,493	4,457,231	281,506	10,441,563	710,138	19,355,161	79.84	4,886,577	983,690	3,897,162	—1,333,970
Toledo & Ohio Central	435	7,832,142	6,663,111	9,050,777	1,447,250	2,255,063	75,419	4,169,387	182,128	8,151,930	90.06	898,848	326,371	572,447	—1,031,860
Toledo, Peoria & Western	247	967,240	415,213	1,481,009	273,077	432,853	27,875	715,627	58,609	1,508,006	101.82	—26,996	101,254	—128,200	—150,114
Toledo, St. Louis & Western	454	6,408,147	858,260	7,568,077	1,248,198	1,605,645	112,904	2,828,563	116,795	5,903,496	78.01	1,664,581	248,200	1,416,211	—268,385
Trinity & Brazos Valley	368	781,167	150,041	1,040,606	310,663	454,990	19,813	554,157	87,418	1,427,041	137.13	—386,435	67,474	—454,067	—194,042
Ulster & Delaware	128	501,160	266,774	950,582	162,792	169,000	14,442	531,816	48,052	93,208	98.06	19,374	50,600	—31,288	—200,295
Union Pacific	3,633	66,210,922	16,520,902	89,710,832	9,570,346	14,682,545	697,929	24,541,244	2,281,703	53,566,685	59.71	35,144,148	3,100,062	33,040,036	7,707,393
Union R. R. of Penn	35	.....	.....	6,432,149	562,719	1,788,187	3,206	3,403,759	68,979	5,826,695	90.58	605,455	84,336	521,112	406,057
Utah Railway	98	1,275,410	6,456	1,289,140	164,499	162,220	1,861	246,968	61,469	637,017	49.41	652,123	36,825	615,298	.....
Vicksburg, Shreveport & Pacific	171	1,365,538	707,133	2,365,305	326,641	564,355	43,206	896,321	81,507	1,959,300	82.83	406,005	106,170	299,518	—284,117
Virginian	518	9,725,063	569,347	11,019,095	1,339,455	2,375,819	64,054	4,310,011	173,218	8,250,327	74.87	2,768,768	431,730	2,536,993	—1,597,554
Wabash	2,519	31,251,241	9,161,210	43,689,430	5,418,027	8,795,659	668,457	20,298,352	997,129	36,382,454	83.27	7,306,976	1,232,996	6,071,844	—3,923,139
Washington Southern	35	951,406	2,049,603	3,560,681	232,395	364,520	20,140	1,154,590	54,829	1,849,575	51.94	1,711,106	69,346	1,641,676	583,071
West Jersey & Seashore	35	3,099,248	60,924,438	9,808,432	2,113,661	1,772,248	85,356	4,762,784	215,816	9,004,618	91.80	803,813	450,947	349,715	—814,282
Western Maryland	707	11,960,678	921,568	13,656,724	2,494,450	4,310,195	219,099	6,540,571	368,045	14,067,579	103.00	—410,855	475,200	—886,055	—4,096,066
Western Pacific	1,011	8,405,705	1,306,549	10,194,320	1,771,074	1,415,910	172,412	3,217,045	236,983	6,953,117	68.33	3,221,203	497,315	2,722,151	—216,386
Western Ry. of Alabama	133	1,288,869	844,308	2,313,038	272,310	472,292	41,249	774,179	70,679	1,669,141	71.77	652,897	77,000	575,811	254,220
Wheeling & Lake Erie	571	11,146,337	434,265	12,640,717	1,899,920	2,925,513	77,914	5,068,293	280,946	10,276,713	81.29	2,364,004	589,217	1,774,187	—1,117,693
Yazoo & Mississippi Valley	1,382	15,370,263	3,851,754	20,078,207	2,736,776	4,181,328	172,434	7,319,398	507,632	14,884,810	74.13	5,193,598	689,043	4,501,945	167,426

Traffic News

Receipts of live stock at Kansas City in the calendar year 1918 amounted to 161,812 cars, as compared with 138,186 cars in 1917, an increase of 15 per cent. The total shipments from Kansas City in 1918 were 55,123 cars, as compared with 48,772 cars in 1917, an increase of 12 per cent.

Traffic Hearings on Sand and Gravel Rates

The central district freight traffic committee opened a hearing at the Hotel La Salle, Chicago, Thursday, on the proposed mileage scale rates for sand, gravel, stone and slag in territory east of the Illinois-Indiana state line, west of Pittsburgh and Buffalo and north of the Ohio river. There was an exceptionally large attendance, the feeling running high among shippers, who claim that the new scale will mean a heavy increase over the present rates and will thereby retard road building and other construction work, which is highly essential to prevent a serious unemployment problem. In the morning session the chairman of the meeting stated that the purpose of the scale was to replace the present hodge-podge of sand and gravel rates, with a scheme which will exact the same charge for the same service throughout the territory. In reply to an allegation that the scale meant a large increase in rates, he stated that the committee had applied the proposed scale and present rates to business on Pittsburgh, Chicago, Cincinnati and St. Louis for one month in 1916, when the sand and gravel movement was normal, and found that the application of the new scale meant a reduction in revenues rather than an increase.

Fibre Container Makers Organize New Body

At a meeting of manufacturers of corrugated and solid fibre containers, held in Chicago on January 16 and 17, an association, to be known as The Container Club, was formed. It will take over the activities of the Corrugated-Fibre Association, both of which have been disbanded.

At a meeting of the War Service Committee of the War Service Board, of the container industry, held in Atlantic City, N. J., on December 17, it was voted to disband the board on January 1 because it was organized only for the purpose of serving the government and the industry in its relations with the government for the period of the war. The discussion that ensued resulted in the organization of the Container Club. Among the purposes of the club, as outlined in its by-laws, are the development and maintenance of a proper standard of quality of fibre shipping cases and of the raw materials entering into their manufacture, co-operation with the carriers by a strict system of inspection with the object of eliminating the use of unsafe containers and those not complying with the railroad classification rules; co-operation with shippers in devising the most suitable containers for various commodities and the best means of packing and sealing them; the prosecution of research work to secure the standardization of fibre shipping cases and the materials from which they are made, and the further development of the uses of fibre containers with special attention to promoting their sale in foreign countries.

The main office of the club will be in the Transportation building, Chicago.

The following is a list of the officers: Geo. W. Gair, vice-president, the Robert Gair Company, Brooklyn, N. Y., president; Sidney Frohman, president the Hinde & Dauch Paper Company, Sandusky, Ohio, vice-president; J. P. Hummel, president the Hummel & Downing Company, Milwaukee, Wis., vice-president; G. H. Wood, president the River Raisin Paper Company, Monroe, Mich., vice-president; Frederick A. Norris, vice-president, the Thompson & Norris Company, Brooklyn, N. Y., vice-president.

The charter membership of the association includes 25 companies located in all parts of the country.

Commission and Court News

Court News

Jurisdiction of Actions for Freight Charges

Where a bill of lading for an interstate shipment required the owner or consignee to pay the freight, the Circuit Court of Appeals, Ninth Circuit, holds that an action by a connecting carrier to recover freight due is governed by the Carmack Amendment, and under the Judicial Code is within the jurisdiction of the federal District Court, regardless of the amount involved.—New York Central v. Mutual Orange Distributors, 251 Fed. 230. Decided May 6, 1918.

Void Contracts to Establish Stations

The Kansas Supreme Court holds that a contract made in consideration of the giving of subscription notes whereby a railroad company agrees permanently to establish and maintain on the subscriber's land a passenger and freight station, stockyards, side tracks, and other shipping facilities, and to refrain from ever establishing or maintaining similar structures or facilities within competing distance of the subscriber's land, is void as against public policy, even if the provision not to establish other stations were omitted.—Baird v. Salina Northern (Kan.) 173 Pac. 1069. Decided July 6, 1918.

Interpretation of Tariffs

In an action by a railroad company to recover balances due as freight for shipments of cattle, the Circuit Court of Appeals, Ninth Circuit, holds that in a case where no through rate or through route is authorized by the tariff between the two points of a shipment the rate which would be applicable would have to be made up by a combination of the rates published in the tariff sheets. In determining the rate to be charged, all parts of the tariff filed should be considered, and if a plain meaning can be gathered therefrom, effect should be given to it.—Portland Cattle Loan Co. v. Oregon Short Line, 251 Fed. 33. Decided May 6, 1918.

Delivery at Private Siding

The Supreme Court of the State of Washington holds that the fact that a railroad may put goods on a siding does not make it other than private within a bill of lading provision that the carrier shall incur no liability for goods received from or delivered on private sidings, except when attached to train, where such place of delivery was fixed by the bill, with the making of which the terminal carrier had nothing to do. Such a provision is reasonable and valid. Where, under a nonnegotiable bill of lading, property was delivered on a private siding, the terminal carrier had a right to act upon the basis that the shipper, who was also consignee, still held the bill of lading, and the property could be placed on the siding without receipt of the bill of lading and without notifying the consignee.—Branchi & Sons v. Montpelier & Wells River, 104 Atl. 144. Decided May 6, 1918.

Right to Bridge Road—Government War Work

A railroad sued two county boards to restrain interference with the construction of a bridge over a plank road, the bridge being a necessary link in a railroad duly laid out on both sides thereof. The county boards were in possession of the plank road. The right of the railroad to lay its track and to carry it across the plank road by an overhead bridge was absolute; and it was apparent that it would suffer an irreparable injury if the use of its road were delayed for want of a bridge. Even if it did not, the New Jersey Court of Chancery holds that the public necessity at the present time is paramount and should outweigh questions of private consideration; and the court should see to it that public work for the government, in its aid, is not hampered or impeded. Injunction was granted.—United New Jersey R. & C. Co. v. Freeholders of Hudson & Essex (N. J.) 104 Atl. 98. Decided May 23, 1918.

Excessive Damages

Where a plaintiff's husband was killed instantly, was 29 years old, and left no children, and was earning about $125 a month, with prospects of increased earnings, the Arkansas Supreme Court held a judgment for $22,500 excessive, and to be reversed unless remitted to $15,000.—St. Louis S. W. v. Owings (Ark.) 204 S. W. 1146.

A lineman 32 years old was riding on a gasoline car weighing about 400 lb. and carrying tools which weighed about 100 lb. The car was derailed and rolled over him. He received a Pott's fracture of the fibula, and sustained a breaking or tearing away of the ankle ligaments, injury to the soft structures, etc., subjecting him to pain. The Iowa Supreme Court holds that a verdict for him of $5,900 was excessive by $900.—Brier v. Rock Island (Iowa) 168 N. W. 339. Decided June 27, 1918.

Employers' Liability Act Decisions

The Kentucky Court of Appeals holds that an employee injured while on the tracks on his way to repair the dwelling house of the general manager was not at the time employed in interstate commerce within the act.—Walden v. Cumberland (Ky.), 203 S. W., 854. Decided June 11, 1918.

The Kentucky Court of Appeals holds that a signal maintainer, who was furnished by his employer, an interstate carrier, with a tricycle to make his rounds, was engaged in interstate commerce when returning to his home after leaving the last signal.—L. & N. v. Mullins' Admr. (Ky.), 203 S. W., 1058. Decided June 14, 1918.

Where the employee of an interstate common carrier was injured while engaged in lifting rails from the ground and placing them on a car to be taken to another point on the line, and there used in maintaining or repairing the track, the Kentucky Court of Appeals holds that the question of whether he was engaged in interstate commerce when injured should have been submitted to the jury.—Probus v. Illinois Central (Ky.), 203 S. W., 862. Decided June 7, 1918.

Use of Waste Materials from Manufacturing Plants

The federal District Court for the Western District of Pennsylvania holds that it is not a defense to a suit by a railroad company to recover its established rates for transportation of slag, ashes and other refuse delivered on private sidings "for wasting for the plant," that some of the material may have been used by the company for ballast. The court said: "The service for which the plaintiff was entitled to recover the rates charged was the transportation of the materials away from the several plants of the defendants, so that they would be rid of them. What use the plaintiff would make of the materials after it had rid the plants of the defendant of them is, under the tariff, wholly immaterial. * * * Even if there should be a disposition on the part of the court to hold that the plaintiff is not entitled to the full rate per car for refuse used by it for ballast or fill along its line, the court could not do so, because it would then be assuming a control over the rates which is not within our jurisdiction." Rates of a railroad company which conform to its published tariffs cannot be contested in the courts as unreasonable.—Baltimore & Ohio v. Carnegie Steel Co., 251 Fed. 682. Decided January 31, 1918.

Keeping a Look-Out When Making Yard Movements

Whether it is negligence or not for the servants of a railroad company to run an engine backwards or push cars ahead of an engine without stationing some one on the tender or foremost car to signal its approach to a person who may be on the track, is a question which is controlled by the circumstances under which the engine or train is operated. Sometimes it has been held negligence per se, but in most cases it has been held a question of fact for the jury. When, as in the present case, a train is being moved over a bridge

where it is manifestly dangerous for people to walk, and proper signs are placed so as to warn people of the danger of trespassing thereon, and only active persons who court danger attempt to cross the bridge, it would not be expected that a lookout would be stationed to prevent accidents. A night watchman was found dead on the track on a bridge, having evidently been run over by a train. If he stopped on the bridge for any purpose, there was no evidence that he could be observed by an outlook on the car immediately in front of the engine, and there was positive evidence that he was not on the track where he could be seen from the approaching train. The Iowa Supreme Court held the evidence would not support a finding that any negligence of the railroad was the proximate cause of his injury, and judgment for the plaintiff was reversed.—Sippel v. Missouri Pacific (Neb.) 168 N. W. 356. Decided June 15, 1918.

Interstate Commerce—Tariffs

As a joint rate cannot be made between an interstate railroad company and a carrier by water transporting property between the United States and a nonadjacent foreign country; the Circuit Court of Appeals, Ninth Circuit, holds that, in view of rule 71 of the Interstate Commerce Commission, provisions in the tariffs of a railroad company filed in accordance with the Act to Regulate Commerce, §6, for absorption of switching charges and state tolls on traffic destined to or originating in foreign countries, apply only to state tolls on land carriage, and not to tolls and charges imposed by the water carrier.

It is also held that while an interstate railroad company is subject to the act to regulate commerce, and the provisions of the tariffs filed pursuant to that section must be strictly observed, yet the Interstate Commerce Commission is without jurisdiction over ocean carriage of export and import traffic destined to or coming from nonadjacent foreign countries. Pacific Mail S. S. Co. v. Western Pacific, 251 Fed. 218. Decided May 6, 1918.

United States Supreme Court

Validity of Provision of Notice of Claim

In an action for damages in transit to cattle carried from California to Phoenix, Arizona, one ground of defense was non-compliance with a provision in the contract for notice of loss or damage within ten days after the unloading of the animals. The shipper alleged actual knowledge at the time of unloading by the railroad of injuries sustained by the cattle in transit, and subsequent continuous negotiations between the shipper and the railroad's agents for more than three months relative to damages sustained. The trial court refused to direct a verdict for the defendant and charged the jury that if they believed the defendant or its agents or employees did know that five or more of the cattle died while in transit, and that the defendant was negotiating with the plaintiff for a settlement of his claims, and that the defendant knew the cattle had been injured as alleged in the plaintiff's complaint, the plaintiff was released from giving notice within ten days as required by the contract. The Circuit Court of Appeals, Ninth Circuit, affirmed a judgment entered upon verdict for the shipper, 233 Fed. 956.

The Supreme Court of the United States, considering the principles and conclusions approved by its opinions in St. Louis, I. M. & So. v. Starbird, 243 U. S. 592 and Erie v. Stone, 244 U. S. 332 (announced since the judgment below), is of opinion that upon the facts disclosed the stipulation between the parties as to notice in writing within ten days of any claim for damages was valid. The court also thinks those opinions make it clear that the circumstances relied upon by the shipper were inadequate to show a waiver by the carrier of written notice as required by the contract. It holds that the trial court's instruction was erroneous, and that the railroad's request for a directed verdict should have been granted. Judgment for the plaintiff is, therefore, reversed.—Opinion by U. S. Justice McReynolds, U. S. Justice McKenna and U. S. Justice Clarke dissent.—Southern Pacific v. Stewart. Decided January 13, 1919.

Foreign Railway News

Coal Shortage in Germany Is Acute

The coal shortage throughout Germany is so threatening, says an Associated Press despatch, that for the moment all other questions are overshadowed.

At present, according to the despatch, the daily production in the Ruhr district is fewer than 10,000 tons, against 24,000 during the war and 33,000 in peace times. Upper Silesia is producing 2,000 carloads, as against 11,000 in war times and 14,000 under peace conditions. The reserves are virtually exhausted.

The situation is aggravated further by lack of enough railway rolling stock to transport even the small quantities mined. Of 2,100 cars required in the Ruhr district on Saturday only 1,000 could be obtained. The Minister of Railways has had the greatest difficulty in securing locomotives for the transport of coal from Silesia to Berlin, getting only a fraction of the total needed. In addition to the depletion of the supply of rolling stock through deliveries to the Allies the situation has been further complicated by labor conditions.

Siberian Railroad Loses $40,000,000 a Month

The Trans-Siberian Railroad is losing $40,000,000 a month, according to Ivan Mikhailoff, Minister of Finance of the All-Russian Government at Omsk, in discussing the Government's program for financial rehabilitation with the Associated Press recently.

M. Mikhailoff strongly supported the government's decision to accept the allied proposal for the management of the Trans-Siberian Railway, saying that if sufficient power is put into the work results will be sure to follow.

He pointed out that the reorganization of the railway would be immediately beneficial by increasing custom receipts. He said that Russia would furnish money to meet the running expenses of the work, but the plans of John F. Stevens, head of the Railroad Commission, will entail the purchase abroad of a large amount of material. To make payments on such purchases, Russia, he said, would request a loan from allied nations.

He said that the monthly expenditures jumped from $78,500,000 in August to $200,000,000 in December. The receipts in December were $39,500,000, against $10,000,000 in August. Deficiencies are being met, he said, by the issuance of treasury bonds. The budget for 1919 calls for $300,000,000 monthly to meet the expenses attendant upon enlarging the territory under control. He said that $50,000,000 would be appropriated for railroad work.

In the opinion of people at Omsk, the Associated Press despatch says, the hand of the government has been strengthened by the acceptance of the Foreign Ministry by Sergius Sazonof and the final conclusion of the agreement between the United States and Japan by which Mr. Stevens became chairman of the technical commission in charge of the rehabilitation of the Trans-Siberian Railway.

French Railroad Expansion in Africa

A French committee for the development of African railroads has recently approved a program for the construction of 18,000 miles of track during the next 15 years, says an item in the Wall Street Journal, quoted from l'Economiste Européen.

It is proposed first to extend a certain number of existing lines in Algiers and Tunis toward the highland and build rail communications in Morocco, as proposed by General Lyautey. This latter project has been under consideration by a committee of the French Chamber for the last 18 months.

The next step proposed is to connect northern Africa with the southwest coast on the one hand and with equatorial Africa on the other hand. This will be accomplished by a

trans-Saharien road reaching the Niger at Bourem and Lake Chad via Nguigni-Massenya.

The important projects, however, comprise a rail route between Marrakech and Dakar on the African west coast which will facilitate communication with South America, one between Abechert and El Obêid which will connect with the Egyptian Soudan system, one between Zemie and Fort Florence which will touch the Cape to Cairo railway and one between Zemie and Stanleyville in the Belgian Congo. These lines will be connected with branch lines, particularly in the French territory of the African west coast and in Central Africa. The mileage projected for the former is 7,000 and for the latter 6,000 miles. It will tap the rich regions of the Niger and of Lake Chad and provision Europe and especially France with cereals, wool, cotton, oil products, skins, meat, minerals, sugar, coffee, wood, etc., of which France had to import about $1,200,000,000 in 1914. The cost of this rail program has been estimated at $800,000,000.

Railway Notes from China

Special Correspondence from Peking (Delayed)

Considerable uneasiness has been caused by persistent rumors that the net earnings of the Peking-Mukden line had been mortgaged to Japanese interests as security for a political loan. The rumor also had it that the loan would probably be large enough to redeem the present British loan and hence would oust the British management. The net earnings of this line are annually about $8,000,000, hence the property is worth acquiring.

Three Japanese railway projects indicate further development recently. The most important is the line from Tsinan to Shunteh. This is the old German concession in connection with the line from Tsinan to Tsingtao. The Japanese having taken over the latter, now elect to exercise the former. It appears, however, that this line is not fully satisfactory to Japanese interests. While it would divert a very considerable agricultural traffic to the port of Tsingtao, some time would be required to develop the route. The promoters now demand permission to swing the line further south to a connection with the Takou line. The latter line already has a coal traffic sufficient to pay all charges upon its own line, and if most of this could be captured by the line from Tsinan—as it probably could—the new line would pay from the start. All the business picked up locally would be "velvet" and a tremendous tonnage would be turned over at Tsinan to the Tsingtao line, which now is in need of something of the sort. However, the British have the right to build all extensions to the Takou line, and, hence, no decision has been reached, so far as is known.

From Kirin (in Manchuria) to the coast is another line for which an agreement has been signed, so it is reported. The Kirin Chanchun line is already under Japanese operation. Its extension is merely a solidifying of Japanese control over Manchuria. The Ta Hsing company which owns silver mines in the vicinity has petitioned for permission to build a light railway to be known as the Chientao-Tientu Railway from its mines to a junction with the new line.

Japanese interests are attempting to secure an agreement to build a line from Nanchang to Foochow on the Fukien coast, opposite Formosa. The Nanchang Kiukiang line, a private railway, is in financial difficulties, and the proposal is to take over this line and its difficulties and make a through line from the Yang Tse river to the coast via this route. Chinese officials who grant this concession will do so reluctantly for the aggressions of Japanese in Fukien have already been the subject of violent protest. The British also are bound to oppose, for it would constitute an invasion of the British sphere of influence in the Yang Tse valley.

Railway Notes From South Africa

Johannesburg.

Sir William Hoy's latest report on the working of the South African Railways covers the period of fifteen months ended on March 31, last, and constitutes a sort of economic survey of South Africa. As usual it is a valuable and interesting document for the general manager not only deals with railway and harbor activities, but follows the custom of surveying the industrial and agricultural situation generally. In his introductory remarks the general manager points out that in future the report of his department will be published for the financial year (ending March 31) instead of for the calendar year as has been the case hitherto.

The figures of primary importance for the twelve months ended March 31, 1918, the report goes on, are as follows:

Total capital expenditures on March 31, 1918, £93,431,626; total earnings, £14,315,860; gross working expenditure, including depreciation, relaying and strengthening, £10,817,639; surplus of earnings over gross working expenditure, £3,216,525; net loss (after including miscellaneous receipts and charges) carried to revenue distribution account, £181,752; passengers carried, 51,178,883; goods, minerals and coal, 13,936,502 tons; total open mileage of South African Railway lines, 9,514 miles; total mileage, 11,450.

The magnitude of the enterprise which the general manager controls is shown by the fact that the combined staff numbered on March 31, last, 72,477 individuals, of whom 35,259 were whites.

The period covered by this report has been remarkable for heavy crops and unprecedented prices for agricultural products. Local industries and manufactures have grown in number and variety and developed in production. The steady advance in prices, the continued shortage of freight, and the increasing difficulty of obtaining commodities hitherto imported have stimulated local production and led to a gratifying expansion in every direction. Considerable interest has also been created in, and in a small way steps have been taken to exploit the immense field for enterprise in the working up of raw materials and the manufacture of by-products hitherto almost entirely neglected in South Africa. Referring to the influence of the war on South African conditions, Sir William Hoy says: "In every way the appalling effects and ever widening influences of the war are becoming intimately borne in upon the people of South Africa. Neither agriculturally, commercially, nor industrially has South Africa had reason to complain, and though minor and temporary inconveniences have inevitably resulted from war conditions, the union has not only enjoyed complete freedom from anxiety with respect to the prime necessities of life, but may be said to have participated in a term of unexampled prosperity. Prices have been high, but on the whole, money has been plentiful, and trade brisk. War expenditures on a considerable scale still augment the purchasing power of the community and while it is perhaps adventurous to speculate as to the future, in view of the many accepted theories already overthrown, guard should be taken against being lulled into a false security."

Record Figures.

A steady and gratifying progress is reflected by the revenue and traffic returns, which show record figures under all traffic, in which there has been a phenomenal increase, notwithstanding the withdrawal of excursion and concession tickets as from October 2, 1917; the number of passenger journeys increased by four and a quarter millions, and revenue from passengers by £318,210. Revenues from goods and mineral traffic increased by £217,283, a highly gratifying result when it is remembered that during the past fifteen months restrictions on imports have been imposed with increasing severity, that a larger proportion of the available shipping has been required in the war zone and that in consequence there has been a decrease of 67,535 tons, or 21 per cent in the volume of high-rated commercial seaborne traffic carried to the competitive area. Increased local traffic has not only compensated for this loss, but has expanded to such an extent as to reflect an increase of 248,977 tons in the gross tonnage of goods traffic handled as compared with the previous twelve months. The total revenue increased by £729,382 compared with the corresponding twelve months of the previous year, an increase of 5.37 per cent. In comparison with 1909—the year prior to union—railway earnings have increased by £3,860,041, or 37 per cent, passenger traffic by 22,987,748 passenger journeys or 81.6 per cent; goods and mineral traffic by 2,719,742 tons, or 52 per cent; and the volume of revenue earning goods, mineral and coal traffic by 5,001,036 tons, or 56 per cent.

Equipment and Supplies

Locomotive Deliveries

The following new locomotives were shipped during the week ended January 18:

Works	Road	Number	Type
American	*Oregon Short Line	4	USRA Mikado
	Boston & Albany	5	USRA St. Fe
	Ter. R. R. of St L	4	USRA 6-w. Sw.
	*Dul., Miss. & Northn	7	USRA St. Fe
	Penn. L. W	1	USRA St. Fe
	Mobile & Ohio	2	USRA 6-w. Sw.
	Pittsb. & W. Va	2	USRA 6-w. Sw.
	Chesap. & Ohio	4	USRA Mallet
	Chic. & N. W	1	USRA Mikado
	Total	30	
Baldwin	Litch. & Mad	2	Consol.
	Sou. R. R	1	Mallet
	Penn. R. R	2	Mikado
	B. & O	8	USRA Mikado
	C. B. & Q	1	Mikado
	Phila. & R	1	Consol.
	Atch., Top. & St. Fe	1	Mikado
	Total	16	
	Grand total	46	

*Four U. S. R. A. Mikados, constructed for the Oregon Short Line were shipped to Cleveland, Ohio, and seven U. S. R. A. Santa Fe constructed for the Duluth, Missabe & Northern were shipped to Columbus, Ohio, to be stored as parts of emergency pools.

Freight Cars

The Canadian National Railways have ordered 750 box cars, 300 general service cars, and 250 ballast cars from the National Steel Car Company; 500 stock cars and 150 refrigerator cars from the Canadian Car & Foundry Company; and 500 flat and 550 general service cars from the Eastern Car Company, and 50 colonist cars from the Pullman Company, and 100 colonist and 30 baggage cars from the Canadian Car & Foundry Company.

The Disposition of Surplus Government Material

Announcement was made in Washington Wednesday giving the details of the plan of organization of the Office of Director of Sales of the War Department as follows:

Under the director of sales, C. W. Hare, is an assistant, E. C. Morse, who serves as chairman of the Board of Sales Review comprising the following members besides Mr. Morse: Lt. Col. A. LeMar, Maj. W. M. Crunden, Col. Fred Glover, L. H. Hartman, G. F. Woods, Capt. A. L Mercer, Capt. T. S. Schultz. Each of these members of the board is a division sales manager with the exception of Capt. Schultz, who is legal member on the board.

The announcement gives the names of seven divisions, the first of which, headed by Colonel LaMar, will handle machine tools, including all metal and woodworking tools, railway equipment, steam shovels, locomotive cranes, gantry cranes, hand tools, forging equipment, iron and structural workers' power tools and machinery.

A meeting was held in Cleveland, Ohio, on January 22 to discuss with the crane manufacturers the surplus crane situation. The meeting was attended by Lt. Col. LaMar, head of the machine tool division, by Maj. W. W. Houston, representing the director general Military Railways, and by representatives of the crane manufacturers. Colonel LaMar suggested to the latter the adoption of the same agreement as had been made recently with the machine tool builders.

The crane manufacturers expressed the belief that an effort should be made to induce the railroad administration, the navy and other government departments to take over as many of the government-owned surplus cranes as can be used before any effort is made to induce the manufacturers to take the cranes back.

After considerable discussion, they decided not to approve or disapprove, at this time, the government proposition as adopted by the machine tool builders, manufacturers for consideration, is as follows:

The list of the cranes, which was placed before the crane

24 9-ton cranes, type "29," 8-wheel, 40-ft. boom (9 equipped with French draft rigging and 16 M. C. B.), manufactured by The Osgood Company; price paid $1,400.

47 15-ton cranes, type "H," 8-wheel, 48-ft. boom, M. C. B. standard appliances, price paid $18,250; 14 of above to be equipped with magnet and generator and single sheave block, price paid $19,900; manufactured by Brown Hoist Company.

10 15-ton cranes, 8-wheel, 45-ft. boom, M. C. B. standard appliances, manufactured by Bucyrus Company; price paid $20,680.

2 15-ton cranes, 8-wheel, 50-ft. boom, French draft rigging, manufactured by Link Belt Company; price paid $18,566.

1 15-ton crane, 8-wheel, 48-ft. boom, French draft rigging, manufactured by Brown Hoist Company; price paid $17,075.

3 15 ton cranes, 8-wheel, 45-ft. boom, M. C. B. standard appliances, manufactured by Ohio Locomotive Crane Company; price paid $19,800.

5 15-ton cranes, 8-wheel, 40-ft. boom, French draft rigging, manufactured by Orton & Steinbrenner; price paid $15,566.

10 15-ton cranes, type "E," 40-ft. boom, M. C. B. standard appliances, 7½-kw. generator sets, manufactured by Industrial; price paid $21,453.

34 15-ton cranes, type "E," 40-ft. boom (12 to have M. C. B. standard appliances and 22 to have French draft rigging), manufactured by Industrial; price paid $19,870.

2 20-ton cranes, type "G," 8-wheel, 40-ft. boom, French draft rigging, manufactured by Industrial; price paid $22,402.

4 20-ton cranes, type "G," 8-wheel, 50-ft. boom, French draft rigging, manufactured by Industrial; price paid $21,730.

3 15-ton cranes, No. 8, 8-wheel, 50-ft. boom, French draft rigging, manufactured by Browning; price paid $19,415.

1 20-ton crane, No. 8, 8-wheel, 46-ft. boom, French draft rigging, magnet and generator; price paid $22,135.

1 20-ton crane, No. 8, 8-wheel, 50-ft. boom, French draft rigging; price paid $18,985.

5 20-ton cranes, 8-wheel, 50-ft. boom, M. C. B. standard appliances, manufactured by Joliet Bridge & Iron Company; price paid $21,000.

2 20-ton cranes, 8-wheel, 50-ft. boom, French draft rigging, manufactured by Browning; price paid $19,080 and $19,420.

7 25-ton cranes, type "H," 8-wheel, 50-ft. boom, French draft rigging, manufactured by Industrial; price paid $24,718.

8 25-ton cranes, type "H," 8-wheel, 45-ft. boom, pile driver attachment (4 equipped French draft rigging and 4 with M. C. B. standard appliances), manufactured by Industrial; price $28,012.

3 30-ton cranes, model "F," 8-wheel, 50-ft. boom, M. C. B. standard appliances, sister hocks, manufactured by Ohio Locomotive Crane Company; price paid $25,700.

2 35-ton cranes, type "L," 8-wheel, 40-ft. boom, French draft rigging, wrecking tools with spare parts, manufactured by Industrial; price paid $27,240.

9 35-ton cranes, type "L," 8-wheel, 45-ft. boom, magnets and generators, outriggers (2 equipped with French draft rigging and 7 with M. C. B. standard appliances), manufactured by Industrial; price paid $34,132.

3 15-ton cranes, type model "C," M. C. B. standard 15-ton capacity, 8-wheel, 45-ft. boom, manufactured by Ohio Locomotive Crane Company; price paid $19,800.

18 50-ton wrecking cranes, type "P," M. C. B. coupler and trucks, pump and fire hose lighting equipment (17 are without booms and can be equipped with long booms for erecting purposes, 3 equipped with curved boom), manufactured by Industrial; price paid $32,865.

9 15-ton cranes, 2.4 M. (7 ft. 10½ in.) gage, hinge of boom 17 ft. above track, 48-ft. 3½-in. boom, self-propelling, double drum, manufactured by Variety Iron; price paid $20,300.

15 10-ton cranes 2.4 M. (7 ft. 10½ in.) gage, hinge of boom 17 ft. above track, 48-ft. boom, self-propelling, double drums, manufactured by Brown Hoist Company; price paid $16,884.

6 5-ton cranes, 2-boom, electric cargo unloaders, 65-ft. booms, span of gantry 44 ft. center to center of rails, operated by 3-drum electric hoist, manufactured by Clyde Iron Works; price paid $30,100.

The tentative agreement between the government and the machine tool builders, which the crane manufacturers were asked to consider, is as follows:

"1st. The inventory of all machine tools and equipment which is being made will be expedited to the greatest possible extent.

"2nd. As soon as it is known that a quantity of machine tools is available for disposal, the manufacturers of these tools will be given an opportunity to purchase them at a price and on terms of settlement which will be satisfactory to all parties concerned.

"3d. In case it is impossible for the manufacturer to purchase his product outright, an effort will be made to arrange for the marketing of the product in an equitable manner, securing for the government and the manufacturer alike the best possible terms.

"4th. In case both these methods of disposition fail, the material will be offered for sale to the general public in a manner prescribed by law.

"In the settlement of plant contracts which involve the sale of large groups of various kinds of tools and equipment, an effort will be made to prevent the sale for resale of any equipment, as it is realized that great injury could be done by indiscriminate sales of this character."

Supply Trade News

Major O. C. F. Randolph, who was discharged from the United States Army Engineering Corps December 13, of last year, has taken charge of sale of buildings to railways for the H. K. Ferguson Company, of Cleveland. Major Randolph is a graduate of the University of Illinois, and since leaving college has been in the bridge department of the Michigan Central and with the Timken Detroit Axle Company as construction engineer. He was also for a while the construction superintendent for the Austin Company, and left them to join the army in July, 1917, as second lieutenant in the 16th Railway Engineers. In France he was in charge of important building work on railroad and hospital construction, and was in this country organizing a sapper regiment at the time the armistice was signed.

High Honor Conferred Upon Dr. J. A. L. Waddell

The highest honor in the entire world that can fall to the lot of any scientific man has just been conferred upon an American engineer, when on December 17 at Paris *L'Institut de France* elected Dr. J. A. L. Waddell, consulting engineer of New York and Kansas City, a Corresponding Member in the *Academie des Sciences.* Such membership is the most highly coveted distinction among the scientists of Europe, for the organization is both old and exceedingly select.



Dr. J. A. L. Waddell

L'Institut de France is composed of five academies, the principal one of which is the *Academie des Sciences.* That organization is restricted to a full membership of 66, all of whom must be citizens of France; and in addition there are 116 corresponding members scattered all over the world.

The *Academie* is divided into two groups—Mathematical Sciences and Physical Sciences. The former is subdivided into five sections, viz., those of Geometry, Mechanics, Astronomy, Geography and Navigation, and General Physics; and the latter into six sections, viz., those of Chemistry, Mineralogy, Botany, Rural Economy, Anatomy and Zoology, and Medicine and Surgery. Each of these eleven sections, excepting that of Astronomy which has sixteen, is allowed ten corresponding members, who may be residents of France or of any foreign country, so that a scientific specialist, however great his renown, must await not merely a vacancy in the *Academie*, but one in the particular section to which he belongs. The full membership of 66 is equally divided between the eleven sections. By this means an equal balance is always maintained, and there can be no undue preponderance of any single scientific branch, or of any group of such branches.

For a year past there has been a vacancy in the list of corresponding members in the Mechanical Section, owing to the death of General Zaboudski of Russia, who was assassinated during an uprising of the populace at Petrograd. After considering the matter for several months, the *Academie* finally chose Dr. Waddell to fill the vacancy, basing their selection upon the value to practical science of his numerous books, papers, and addresses on both the theory and the practice of engineering, as well as upon his contributions to the development of technical education. One of his books was translated into French, and was published some three years ago by the French Government.

The *Academie des Sciences* was inaugurated in 1795; and during the succeeding 123 years there have been only 18 corresponding members chosen from the United States, Dr. Waddell making the nineteenth. Of these 18, three are still living, viz., the astronomers Dr. Edward Charles Pickering of Harvard University and Dr. George Ellery Hale of Washington, D. C., and the geographer, Dr. William Morris Davis of Cambridge, Mass.

Duntley-Dayton Company Organized

On January 1 the Duntley-Dayton Company took over the entire output of the Dayton Pneumatic Tool Company, of Dayton, Ohio, and announced its entry into the pneumatic tool field. W. O. Duntley, former president of the Chicago Pneumatic Tool Company, is president of the new concern and his son, Capt. C. A. Duntley, is vice-president. Capt. Duntley has not yet been relieved of his command in the 27th U. S. Field Artillery. The Dayton line of pneumatic tools has been on the market for many years. A new plant, equipped with modern machinery, has just been completed to take care of the business of the company. In addition to handling the output of the Dayton Pneumatic Tool Company, the Duntley organization is putting out a complete line of portable electric drills and grinders, as well as a full line of accessories, such as hose and hose couplings, rivet sets and chisel blanks. W. O. Duntley is one of the pioneers in the pneumatic tool business and has been closely connected with the industry for the past 25 years. He has a number of pneumatic and electric tool inventions to his credit, the Duntley electric drill being, perhaps, the most widely known. The offices of the Duntley-Dayton Company are located in the Westminster building, Chicago; the eastern offices are at 295 Fifth avenue, New York, and the Philadelphia branch in the Commercial Trust building.



W. O. Duntley

Trade Publications

Mallet Articulated Locomotives.—Record No. 91, published by the Baldwin Locomotive Works, Philadelphia, Pa., is devoted to a non-technical description of Mallet articulated locomotives, illustrated with two sectional drawings. Instructions are given for the proper handling of these locomotives, as well as formulas for calculating their tractive effort. The booklet also contains a number of illustrations of various locomotives of this type, both for foreign and domestic roads, with their dimensions and general data.

The Road to Peace.—The book which the Lakewood Engineering Company, Cleveland, Ohio, has issued under this title is one of the most attractive and striking trade publications which has been issued by any company in the railway supply field for some time. The booklet, which is 13 in. by 11 in. in size, is a story of the use of light railway equipment behind the battle fronts in France. Its left hand pages are devoted to photographs showing the light railway sections in manufacture and transit, the actual laying of the track and its use by light railway equipment. The right hand pages tell the same story in words. Special attention is given to an important shipment in the St. Regis from Cleveland via the lakes and the Welland Canal, etc., to the other side. Tribute is paid to the engineer regiments which carried on the work. One of the most interesting pictures shows a group of the French "Blue Devils" who were invited to see the Lakewood plant where the light rail was made.

Financial and Construction

Railway Financial News

BALTIMORE & OHIO.—This company has arranged with Kuhn, Loeb & Co., Speyer & Co., and the War Finance Corporation for the extension until July 1, next, of $22,500,000 note obligations, which mature February 1. The bankers, it is understood, either hold or represent the bulk of the notes, while the War Finance Corporation will supply the funds necessary to pay off the unextended portion. When the notes matured on October 1, last, they were extended to February 1 by the road's bankers and the Railroad Administration, which drew upon the $500,000,000 revolving fund. This source of assistance has been practically exhausted for the time being, and as a result the War Finance Corporation was called upon to lend its aid. The maturing notes were originally divided into $10,500,000 three months' notes, $8,000,000 discount notes and $4,000,000 of bank loans. The present is the third renewal arrangement, the first having been made July 1, 1918.

CHICAGO, ROCK ISLAND & PACIFIC.—A settlement of this company's litigation with the Colorado & Southern growing out of contracts entered into in 1906 and 1914, whereby it agreed to purchase from the Colorado & Southern a half interest in the Trinity & Brazos Valley Railway, has been effected. The statement issued at the offices of the Rock Island Company says: "A settlement has been agreed upon whereby the Colorado & Southern will accept in cash 60 per cent of the amount due on the contract, which under the final decree in the Rock Island receivership would be payable in full in 6 per cent preferred stock at par, such as was paid to all other general creditors of the Rock Island. This will involve the payment of some $4,000,000, and the Rock Island will own outright a half interest in the Trinity & Brazos Valley Railway and will have a permanent outlet to the Gulf ports, which will be of great value in the event of the return of the roads to private operation. The total cost of the Trinity & Brazos Valley road is now in excess of $11,000,000."

In 1915 the receiver for the Rock Island disaffirmed the contracts and the Colorado & Southern brought suit for their enforcement.

COLORADO & SOUTHERN.—See Chicago, Rock Island & Pacific.

CUMBERLAND VALLEY.—See Pennsylvania Railroad.

PENNSYLVANIA RAILROAD.—The directors of this company and the Cumberland Valley Railroad took preliminary action on January 22 toward the complete absorption of the Cumberland Valley by the parent company. Stockholders of the Pennsylvania Railroad will be asked to ratify the merger at the annual meeting March 4.

TRINITY & BRAZOS VALLEY.—See Chicago, Rock Island & Pacific.

WAYCROSS & WESTERN.—Press despatches state that Judge Evans in the United States District Court at Macon, Ga., has confirmed an order under which that part of the Waycross & Western extending 16 miles from Cogdell to Milltown is to be junked. The stretch of railroad from Cogdell to Waycross is to be continued in operation for a period of five years under the terms of the order. The purchasers, the Empire Construction Company, paid $73,000 for the rail and ties when delivered at Waycross. The Waycross to Cogdell portion of the railroad is sold as a going concern for $120,000 and the purchasers agree to operate this part of the road for five years under a contract with the Knox Lumber Company.

Railway Construction

PENNSYLVANIA RAILROAD.—A contract has been given to E. H. Vare, Philadelphia, Pa., for building a new machine shop, and new stalls in the roundhouse at Todd's Cut, Wilmington, Del.

Railway Officers

Railroad Administration

Central

J. C. Turner has been appointed representative of the Division of Labor. Mr. Turner will be assigned to conduct investigations and to represent the Division of Labor of the Railroad Administration in other specific matters to which he may be assigned, affecting employees of the railroads under federal control.

G. H. Atkins and C. B. Heinemann, traffic assistants to the director of the Division of Public Service and Accounting, have been appointed assistants to the director of the new Division of Public Service, with office at Washington. The Short Line Section, of which E. C. Niles is manager, has also been transferred to the new Division of Public Service.

Brice Clagett, heretofore private secretary to the director general, has been appointed assistant to the director general. H. A. Taylor, heretofore assistant to the assistant director general, has been appointed general assistant to the director general. G. H. Parker, heretofore assistant to the assistant director general, has been appointed financial assistant to the director general.

E. H. DeGroot, Jr., assistant manager of the Car Service Section, has been appointed assistant director of the Division of Operation in charge of office matters, succeeding J. H. Keefe, who has resigned to return to the Atchison, Topeka & Santa Fe. J. A. Somerville, assistant manager of the Car Service Section, has resigned to return to his former position as general superintendent of transportation of the Missouri Pacific.

Regional

J. P. Walker has been appointed terminal manager of the Charleston Terminal Company and the North Charleston Terminal Company, at Charleston, S. C. In addition to his other duties the terminal manager will have jurisdiction over all departments on his terminals, reporting to the regional director.

Federal and General Managers

The jurisdiction of Elisha Lee, federal manager of the Pennsylvania Railroad, Eastern Lines, and associated lines, with headquarters at Philadelphia, Pa., has been extended over the Barnegat Railroad and the Philadelphia & Beach Haven Railroad.

J. E. Gorman, federal manager of the Rock Island Lines, Chicago, has had his authority extended over the Des Moines Terminal Railroad. J. A. Wagner, general manager of the Des Moines Union, the Des Moines Western and the Iowa Transfer, Des Moines, Iowa, has also had his jurisdiction extended over the Des Moines Terminal.

Operating

E. B. Russell has been appointed assistant to federal manager of the Baltimore & Ohio, Western Lines; the Dayton & Union Railroad, and the Dayton Union Railroad, with headquarters at Cincinnati, Ohio, vice F. A. Deverell, promoted.

W. B. Kilgore, road foreman of engines of the Baltimore & Ohio, Western Lines; the Dayton & Union Railroad, and the Dayton Union Railroad, with office at Dayton, Ohio, will also assume the duties of trainmaster, Wellston subdivision, vice W. E. Duffey, transferred.

F. P. Pelter, superintendent of the Memphis division of the Southern Railroad, with office at Memphis, Tenn., has been appointed general superintendent of the Georgia Southern & Florida; the Hawkinsville & Florida Southern, and the St.

Johns River Terminal, with office at Macon, Ga., vice **W. F. Kaderly,** promoted.

O. K. Cameron, superintendent of the Mobile division of the Southern Railroad, with office at Selma, Ala., has been appointed superintendent of the Memphis division, with office at Memphis, Tenn., vice **F. P. Pelter,** promoted, and **M. E. Madden,** trainmaster, with office at Macon, Ga., has been appointed superintendent of the Mobile division, with headquarters at Selma, Ala., vice Mr. Cameron.

John Madden Egan, whose promotion to general superintendent, Southern lines, of the Illinois Central and the Chicago, Memphis & Gulf, with headquarters at New Orleans, La., was announced in the *Railway Age* of January 10, was born at Amboy, Ill., on September 1, 1880. Mr. Egan has been in the service of the Illinois Central for the past 25 years. He entered railway service in August, 1893, as a messenger on that road at Chicago. In 1894, and for the three years following, he was agent at One Hundred and Fourth street, Chicago. From 1898 to 1901, he was employed as rodman in the maintenance of way department, following which he became assistant engineer in the maintenance of way and construction departments. In 1903 he was appointed road supervisor; from 1904 to 1911 he was roadmaster on the Freeport and the Nashville and Tennessee divisions. On June 6, 1911, he was appointed superintendent of the Mississippi division at Water Valley, Miss., and five years later he was transferred to the Tennessee division at Fulton, Ky., which position he held until his promotion to general superintendent at New Orleans.



J. M. Egan

Financial, Legal and Accounting

L. W. McCoy has been appointed assistant federal auditor of the Bessemer & Lake Erie, with headquarters at Pittsburgh, Pa.

L. S. Smith, local treasurer, at Dallas, Texas, for the Texas & Pacific, has been appointed acting federal treasurer of the Gulf, Texas & Western and the Weatherford, Mineral Wells & Northwestern, succeeding **W. M. Edgar** in the latter position. Mr. Smith's headquarters will be in Dallas, Texas.

William C. Fitch has been appointed freight claim agent of the Southern Pacific (lines south of Ashland, Ore.), the Western Pacific, the Tidewater Southern and the Deep Creek, having general charge of loss and damage freight claims and the prevention of causes of such claims, succeeding **M. E. McKirahan,** assigned to other duties.

F. E. Sawyer has been appointed assistant federal auditor of the Terminal Railroad Association of St. Louis; the St. Louis Merchants Bridge Terminal Railroad; the Wiggins Ferry; the St. Louis Transfer Railroad; the East St. Louis Connecting Railroad; the Interstate Car Transfer; the Alton & Southern Railroad; the St. Louis National Stock Yards Railroad; the East St. Louis National Stock Yards Railroad, and the St. Louis, Troy & Eastern, with headquarters at St. Louis, Mo., vice **F. M. McDonnell,** resigned to engage in other business.

Engineering and Rolling Stock

Andrew Hanson has been appointed supervisor of bridges and buildings of the Yellowstone division of the Northern Pacific, with office at Glendive, Mont., succeeding **W. D. Pearce,** promoted.

P. T. O'Neill has been appointed division master mechanic of the Chicago, Milwaukee & St. Paul, with headquarters at Spokane, Wash., succeeding **Fred Lowert,** who has been transferred to the St. Paul shops at Tacoma, Wash. Mr. O'Neill was formerly superintendent of motive power of the Idaho & Washington Northern at Spirit Lake, Idaho, and after that line was purchased by the St. Paul he was appointed general foreman at the Spirit Lake shops and later general foreman at the Tacoma (Wash.) shops.

William Gemlo, whose promotion to superintendent of motive power and rolling stock on the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., was announced in the *Railway Age* of January 10, was born at Glasgow, Canada, on September 28, 1868. Mr. Gemlo began railway work with the Minneapolis & St. Louis as a locomotive fireman in September, 1888, and served in that capacity until October, 1896, when he was promoted to locomotive engineer. In June, 1907, he was appointed roundhouse foreman, and two years later traveling engineer. In October, 1913, he was promoted to master mechanic at Marshalltown, Iowa, which position he held until his recent appointment as superintendent of motive power and rolling stock, with headquarters at Minneapolis, as mentioned above.



W. Gemlo

T. E. Kirkpatrick, signal supervisor on the western division of the New York Central, with headquarters at Elkhart, Ind., has been appointed supervisor of the signal repair shop at Elkhart. **T. G. Inwood,** assistant signal supervisor on the western division, with headquarters at Elkhart, succeeds Mr. Kirkpatrick, effective January 15.

George W. Ditmore, whose appointment as master car builder of the Delaware & Hudson, with headquarters at Colonie, N. Y., has already been announced in these columns, was born on February 17, 1878, at Jermyn, Pa., and was educated in the high school of his native town. He began railway work on June 1, 1897, as a journal packer at Carbondale, Pa., on the Delaware & Hudson, and later served as car repairer. One year later he was promoted to car inspector and served in various other capacities in the car department. In March, 1902, he was appointed an interchange car inspector at Green Ridge yard, Scranton, Pa., and then served as foreman of car inspectors and repairers at the same place and at Buttonwood, Wilkes-Barre, Pa. On December 1, 1913, he was transferred to Carbondale as shop foreman, and about four years later he was promoted to division car foreman of the Pennsylvania division. Since November, 1918, he served as assistant master car builder until his recent appointment as master car builder of the same road, as above noted.



G. W. Ditmore

W. F. Kaderly, general superintendent of the Georgia Southern & Florida, the Hawkinsville & Florida Southern and the St. Johns River Terminal, has been appointed superintendent of motive power of the Southern Railroad lines east, with headquarters at Charlotte, N. C., succeeding **E. C. Sasser,** resigned.

E. E. Ramey has been appointed superintendent of fuel and locomotive performance of the Baltimore & Ohio, Eastern lines; the Coal & Coke; the Wheeling Terminal Railroad; the Western Maryland; the Cumberland Valley, and the Cumberland & Pennsylvania Railroad. The position of supervisor of fuel consumption has been abolished.

F. G. Jonah, formerly chief engineer of the St. Louis-San Francisco System and recently colonel in the railroad engineeers, engaged in service on light railways with the American Expeditionary Forces in France, has returned, and is now chief engineer of the Missouri, Kansas & Texas and the Frisco Lines north of the Red river, with headquarters at St. Louis, Mo. **V. K. Hendricks,** now chief engineer of these lines, becomes assistant chief engineer.

Junius Beverley Lamb, whose appointment as signal and electrical engineer of the Southern Railroad, Lines East, with headquarters at Charlotte, N. C., has already been announced in these columns, was born on December 1, 1885, in James City county, Va., and was educated at William and Mary College, and at the Virginia Polytechnic Institute. He began railway work on July 1, 1906, with the Southern Railway as an electrician engaged on construction work and has been in the continuous service of that road ever since. From January, 1907, to November, 1909, he was electrical and signal foreman on construction work and then served as signal and electrical supervisor on construction and maintenance work. In November, 1914, he was appointed assistant signal and electrical engineer, which position he held until his appointment as signal and electrical engineer of the Southern Railroad, Lines East, as above noted.

Corporate

Executive, Financial, Legal and Accounting

F. E. Connors, assistant to the vice-president of the Atchison, Topeka & Santa Fe, Chicago, resigned on January 21, and has been appointed receiver for the Spokane & Inland Empire, with headquarters at Spokane, Wash.

J. C. Williams, general manager of the Akron, Canton & Youngstown, has been elected vice-president and general manager, and **A. L. Graner,** auditor and assistant treasurer, has been elected auditor and treasurer; both with offices at Akron, Ohio.

Operating

Walter Pratt has been appointed manager of sleeping, dining, parlor cars and hotels of the Canadian National Railways, with jurisdiction over all lines, and with office at Toronto, Ont.

Traffic

J. H. Mahan has been appointed traffic manager of the Nevada-California-Oregon, with headquarters at Alturas, Cal.

Major W. M. Kirkpatrick has been appointed assistant freight traffic manager of the Canadian Pacific, in charge of the western lines, with office at Winnipeg, Man. He was assistant freight traffic manager of the eastern lines at the time he entered military service in September, 1915.

The following appointments have been made on the Canadian National Railways, effective January 24: **P. Mooney,** assistant general freight agent of the Canadian Northern, at Toronto, Ont., has been appointed assistant general freight agent and **J. E. LePage,** division freight agent of the Canadian Government Railways, at Quebec, has been appointed division freight agent, both with offices at Quebec, and with jurisdiction over Quebec City, Levis, East of O'Brien and Garneau to Chicoutimi and Quebec, and the Quebec & Saguenay Railway; Mr. Mooney has been appointed also assistant general passenger agent; **S. G. Tiffin,** assistant general freight agent of the Canadian Government Railways, has been appointed assistant general freight agent, with office at Montreal, Que., and with jurisdiction over Kingston and East of North Bay, Ont., to Garneau, Matapedia, Que., and Edmunston, N. B.; **James Orr,** general freight agent of the Canadian Northern, lines east of Port Arthur, at Montreal, has been appointed assistant general freight agent, and **G. R. Fairhead,** district freight agent of the Canadian Northern at Hamilton, Ont., has been appointed division freight agent, both with offices at Toronto, Ont., and with jurisdiction from west of Kingston to Windsor, Ont., Toronto to Port Arthur, Armstrong, Ont., and O'Brien, Que., and **G. M. Thomas** has been appointed district freight agent, with office at Hamilton, Ont.

Obituary

J. V. Young, signal engineer of the Boston & Maine, with office at Boston, Mass., died at his home in Reading, Mass., on January 10, at the age of 56. Mr. Young had been in charge of the signal department of the Boston & Maine since July, 1895, and was a prominent member of the Railway Signal Association.

Waldo B. Cronk, vice-president and general manager of the Caraquet & Gulf Shore, with headquarters at Bathurst, N. B., and vice-president of the Kent Northern, died on January 27, in Toronto, Ont., at the age of 56. He began railway work in 1878, on the Chicago & North Western and subsequently held various positions on different roads including the Chicago, St. Paul, Minneapolis & Omaha, the Baltimore & Ohio, the Chicago, Rock Island & Pacific, the Canadian Pacific, and the Grand Trunk Pacific.

George Sherwood Hodgins, of the editorial staff of Railway and Locomotive Engineering, died at his home in New York on January 18, at the age of 59 years. A graduate of the Upper Canada College and the School of Applied Science, affiliated with the University of Toronto, he afterwards served an apprenticeship in the Kingston Locomotive Works. After some experience in a division master mechanic's office on the Canadian Pacific, he was advanced to various positions on the road, and latterly was locomotive inspector on the entire system. He was recalled to the Kingston Locomotive Works as mechanical engineer. Later he entered the service of the Pressed Steel Car Company as general inspector of the output of that plant, and was also for some years inspector for the Richmond Locomotive Works. During these earlier years he had contributed to a number of railroad publications. In 1900 he entered the field of practical journalism as editor of the Railroad Digest. In 1902 he joined the staff of "Railway and Locomotive Engineering" as associate editor, and in 1908 became managing editor, which position he held till 1911, when he was called by the Canadian Government to make a comprehensive report on the shops, appliances, tools and equipment necessary for the Trans-Continental Railway. On the completion of that work in 1915, Mr. Hodgins joined the staff of the Railway Periodicals Company as managing editor of the Railway Master Mechanic and Railway Engineering and Maintenance of Way. In 1916 he returned to Railway and Locomotive Engineering and remained on the staff as editor until his death, besides contributing to popular science magazines.



G. S. Hodgins

EDITORIAL

Railway Age

A Worth While Investment

It is an old saying, but none-the-less true, that it takes money to make money. The railways can with comparatively small expenditures make improvements which will save coal and there should be no hesitancy in doing this. It is a very grave error not to make improvements which it is known will more than pay for themselves in the savings they make. At a certain railroad terminal up to two years ago, two stationary boilers, each of 175 h.p. capacity, were employed for steam heating purposes—heating stations and other buildings as well as coaches and sleeping cars standing on cleaning and repair tracks. During extreme winter weather two and sometimes three locomotives were coupled to the steam line and used as an auxiliary to the boiler plant. A careful investigation of the condensation losses occasioned by carrying the steam pipes underground without proper insulation and drainage was made, with the result that the pipes were taken out of the ground and placed outside and proper insulation applied. The reduction in condensation losses accruing from this change was so marked that even under the extraordinarily adverse weather conditions that obtained last winter it was found that ordinarily one of the two stationary boilers would carry the load, the second boiler being cut in only under the most extreme weather conditions. Here is a case where a little horse sense saved the use of two and sometimes three locomotives in the cold weather months when they are badly needed by the operating department. Consider how much fuel costs today and then examine closely for similar "leaks." The results will be surprising.

Locomotive Orders for Export

The placing of orders for 104 locomotives for export to the South African Railways, the Railroad of the Province of Santa Fe in Argentina, the Federated Malay States Railways and to Portuguese East Africa, as detailed in the Equipment and Supplies column of this week's issue, will be received in the supply field with no small degree of satisfaction. These orders come at a time when there is practically no domestic business in sight. What is equally as important, the orders serve to bear out what the *Railway Age* and others have been saying about the world-wide shortage of equipment and about the favorable position of the United States to supply it. It is rather a co-incidence that in the new Foreign Railway News column of the *Railway Age* in the issue of January 24, statements were given concerning the shortage of locomotives on the railways of South Africa and those of the Federated Malay States. These lines have now come to the United States to help them out of their difficulties, and it would be surprising if many others do not follow. The supply field, if the indications are correct, is now ready to make practical use of its outstanding position as a possible exporter of railway supplies and to carry on the work that will enable it to help make up for the shortage of railway supplies and material in those countries that have been unable to import them from the warring countries of Europe. It is to be expected that it will make the most of its opportunities and will strive to make permanent the large trade in railway supplies that is sure to come to us from these countries. The fact that the United States Railroad Administration is not in a position to place orders for equipment for domestic uses at the present time does not make for optimism, but inasmuch as every cloud has a silver lining, it in some ways may be a blessing in disguise by way of putting the supply field in a better position to build up a permanent foreign trade and to readjust itself to the changed after-the-war conditions.

Just Debts Should Be Paid

The testimony of Director General Hines before the Senate Committee on Interstate Commerce on Wednesday throws some light on one reason why the railways have fallen so far behind in their payments to the railway supply companies for materials and equipment. In reply to questions from Senator Kellogg the director general stated that the war department owes the roads $81,888,000. This is quite a tidy sum and if paid to the railway companies would enable them to discharge some of the indebtedness which is of long standing and has proved most embarrassing to their creditors among the railway supply companies. Railway men and railway supply companies have tried to do their full part in the trying period through which the nation has passed. They surely want to take their full share in the Victory loan next spring. This they can not do properly unless their financial condition, or rather their cash situation, is very greatly improved before that time.

Railway Supply Companies Suffer

There is no question but what the railway supply companies have been a most important factor in helping to develop efficient and economical railway operation. Now, at a time when it is exceedingly important that the United States enjoy industrial prosperity, these companies are being threatened with disaster. They probably employ almost as many workers as the railways themselves, and on the basis of four dependents to each worker, a very considerable percentage of the entire population of the country will be affected directly and indirectly. E. B. Leigh, of the Chicago Railway Equipment Company, has insisted that the industrial prosperity of the country follows the prosperity of the railway supply interests. The present situation is being caused by the policy of the Railroad Administration in cutting down purchases to a minimum. The heads of the Railroad Administration are carrying a tremendous responsibility and doubtless they are fully aware of this situation, but how can they buy materials and equipment if they have no money for this purpose? It would seem that the Railroad Administration is financially embarrassed and that the only solution is for Congress to come to its rescue and provide sufficient funds to at least put the roads in as good physical condition as they were when they were taken over by the government. It has been intimated that the purchasing department of the administration is holding off to secure the benefit of lower prices. If this is true, then this policy is at variance with that of other departments of the federal government and is open to severe censure, particularly at this time when it is so important that work be furnished to soldiers and sailors returning to civilian life and to workers who have, until recently, been engaged in war work. Some

idea of the conditions now existing in the railway supply field may be obtained from the expressions from different supply companies which will be found in another part of this issue.

The Tie Situation

AN ADEQUATE SUPPLY of crossties is essential to the proper maintenance of tracks. Renewals can be curtailed only to a limited extent before the track is weakened. The deterioration of ties is continuous and in large measure independent of traffic. Therefore, any curtailment of the tie supply strikes at the very vitals of roadway maintenance, and is cause for alarm on the part of track men.

There has been a shortage of ties on many railways during the past year, although this has been overcome in a considerable measure by increased production along others. The tie industry has suffered from the shortage of labor and other disturbing factors common to all industries during the last two or three years. Federal control of the railroads and the concentration of purchases in one committee have also brought about many changes, including the promulgation of standard specifications for ties and for treatment, the elimination of competition between roads in the purchase of ties, their distribution to meet the greatest needs, etc. These measures have been more or less revolutionary in character and have naturally aroused considerable opposition, particularly where they have disturbed long existing practices and relationships. This opposition has also contributed to the decreased production of ties.

Because of the unsettled state of affairs in the industry two meetings which were held last week at St. Louis were of more than usual importance. On Tuesday and Wednesday the American Wood Preservers' Association, an organization of railway and commercial timber treating men interested in the preservation and use of ties, met to discuss the situation. On the two following days over 100 representative tie producers met to consider their problems. A large part of the men of each organization availed themselves of the opportunity to attend the sessions of the other association and to gain the viewpoint of its members. With representatives of the railways, the Railroad Administration and the manufacturers meeting together, much progress was made in the elimination of the misunderstandings which have prevailed and which have retarded accomplishment of their common objective, the production of an adequate number of crossties.

The Forest Products Section of the United States Railroad Administration has adopted certain policies which have been ill-advised, but it has adopted others which have been highly constructive and which should be retained permanently, regardless of the ultimate form of control of the railroads. The preparation of standard specifications for ties is of benefit alike to the user and the producer, for it describes the different grades of ties in a definite manner. Uniformity of inspection is also of common benefit, as will also be a standard form of contract which it is understood the Railroad Administration now has in preparation. It is significant that one of the large tie producers, in a paper presented before his associates, urged that these and other constructive measures which have been adopted by the Central Purchasing Committee should be retained permanently. It is to be hoped that other producers will take an equally broad view of the matter, and that they will co-operate with the Railroad Administration in the development of a broad, permanent policy of production and purchase, which will insure the production of an adequate number of ties of the proper quality and at a price fair to the manufacturers and the roads.

Mr. Hines' Statement on Government Control

THE DIRECTOR GENERAL of railroads, Walker D. Hines, presented to the Senate Committee on Interstate Commerce on Monday his reasons for favoring either an early abandonment of government control or a continuance of it for five years more. He believes it would be better for the railways and the public for the roads to be returned to private control within a short time than for them to be returned, as now required by law, 21 months after peace is signed. He also believes, however, that an extension of government control to January 1, 1924, would be preferable to an early restoration of private control.

It is impossible not to admire the force and ability of Mr. Hines' argument. It shows the mastery of facts and conditions, and the power of logical presentation, which are so characteristic of him. Furthermore, unlike Mr. McAdoo, he is frank in stating his position on the ultimate disposition of the roads. He is opposed to reviving the system of regulation and of competitive operation which formerly prevailed. He does not advocate a five-year extension to give opportunity for an experiment but to give time and opportunity for a sound solution of the whole problem. He is opposed to government ownership, and says so.

Mr. Hines bases his argument against continuing government control merely for 21 months largely on the ground that, with economic and political conditions so unsettled, and with the prospect of so early a restoration of private control, it would be impracticable during this period to secure efficient operation. Strong as his presentation is in the main, we think that at this point it is weak. He does not mention the distinction between *operation* and *control*. He assumes the former must be continued as long as the latter. Unless it is decided to continue the present system indefinitely the railways undoubtedly should speedily be returned to the *operation* of the companies. We do not believe the present system of *operation* could be made a success under any conditions; and as long as uncertainty exists as to this system's tenure of life it will become increasingly inefficient. But there is nothing in the law to forbid the director general, acting for the President, to restore the actual *operation* of the railways to the companies now, while continuing government *control* throughout the 21 months' period.

Withdrawal of control would involve withdrawal of the guaranties of net operating income. Mr. Hines contends the financial dangers of immediate withdrawal of the guaranties are greatly exaggerated. But the official statistics show that with present rates and expenses the net operating income of many railways is not sufficient to pay their fixed charges and normal dividends. Mr. Hines takes the view that if an early return were decided on it would not be made precipitately, and that it is not to be assumed that the Interstate Commerce Commission and other regulating bodies would not adopt such measures as were necessary to protect the solvency of the companies. If his premises are correct, his conclusion that an early abandonment of control would be better than postponement of its abandonment for 21 months is sound. It is the financial problems presented that cause opposition to an early withdrawal of control. If the Railroad Administration, the regulating commissions and the officers of the companies would get together and solve these financial problems at once, it would be far better entirely to return the railways to the companies within a short time than to defer doing so for practically two years.

However, Mr. Hines favors the five-year extension. He does not believe a satisfactory solution of the railroad problem can be reached until after at least two more years of government operation, and until after the presidential election in 1920, and, apparently, until after the inauguration

of the next president in 1921. He contends it is not fair to advocates of government ownership to use the results of 1918 as a test of government operation, and that before a final decision on our future railway policy is reached they are entitled to see the results of government operation under normal conditions of peace. But if the advocates of government ownership are entitled to have the results of government operation under ideal conditions as a basis for argument, the advocates of private ownership are entitled to have the results of private operation under ideal conditions for the same purpose. Now, for many years the advocates of private ownership have been trying to get a system of regulation under which private operation could be conducted with maximum efficiency and economy, but they have never been able to get it. Not only were they not able to get it in time of peace, but they were not even able to get it in time of war. The conditions under which the railways were operated by the companies in 1917 were fully as abnormal as those under which the government operated them in 1918. The United States was at war nine months in 1917 and there were only 10 months of war in 1918. There was no substantial reason why the results gained in 1918 should not have been at least as good as those of 1917, except that wages were much higher in 1918 than in 1917; and Mr. Hines himself points out that the increase in expenses was due only partly to advances in wages. As a matter of fact, the Railroad Administration had the benefit in 1918 of the work of reorganization and co-ordination that was done under the Railroads' War Board in 1917. In addition, it was freed from all the governmental restrictions by which the railways were embarrassed in 1917, and exercised practically unlimited governmental power. We do not agree, therefore, that the results gained in 1918 afford no satisfactory test of government operation. If, allowing for the advances in wages, they are not strictly comparable with those gained in 1917, this is really because the Railroad Administration had many advantages in 1918 that the Railroads' War Board and the railway companies did not have in 1917.

Now, which should be regarded as more conclusive—comparative results gained under normal conditions, or comparative results gained under conditions which rendered it imperative that the roads should be operated with maximum efficiency for the protection of the very life of the nation? We believe that a test of the latter kind should prove more instructive than a test of the former kind, and, we did have in 1917 opportunity to see private operation, and in 1918 government operation, put to the supreme test. Mr. Hines believes that if the five-year extension were adopted there would be, at least after the present unsettled industrial conditions have passed, an increase of efficiency under government operation. There are very strong reasons for doubting this. In time of peace the influence of politics would almost certainly be more strongly applied to government management; and this probably would neutralize any improvements in methods that might be made.

Mr. Hines presents with great force the conditions which demand the adoption of a very comprehensive and constructive policy for the solution of the railway problem and the reasons why it should not be attempted to solve the problem within the next two years. It seems to us, however, that his whole argument makes a much stronger case for the early calling of an extra session of Congress to pass the needed legislation this year than for a five-year extension of control. During this five years, either the government, or the companies, or both, would—or should—finance additions and betterments requiring the raising of four or five billion dollars of new capital. It is very doubtful if the companies would or could do all this financing, since they would not be allowed to control the outlay. The government surely would have to raise a large part of the capital, and might have to raise most of it. At the end of the time the railway companies would owe it a very large debt. Furthermore, after five years more of government operation the present organizations of the individual railways would be so changed as to be unrecognizable. Obviously, the difficulties to the return of the railways to private operation would then be very great, if not insuperable. We probably should have government ownership forced upon us, whether the nation wanted it or not.

Mr. Hines' argument must be admitted to be a very strong one. We believe, however, it makes a much better case for an early return of the railways to private *operation,* and for constructive legislation at an early special session of Congress which will enable government *control* to be withdrawn by the end of the present year, than for five years more of government control and operation.

The Need of a National Reconstruction Program

TWO MONTHS HAVE PASSED since the armistice was signed and American industries are as much in the dark today regarding the future and what it will bring forth in a business way as they were on that date. As a nation we blindly refused to benefit by the experiences of our Allies during the three years of conflict before we entered the arena of hostilities. Are we going to delay similarly in preparing for the problems of peace—in many ways more difficult than those of the war itself?

With the termination of the struggle the demand for war materials ceased and those railway supply concerns and others who have been engaged in their manufacture are necessarily laying off thousands of employees. At the same time other thousands of men are being released from the army and navy. The combination of industrial retrenchment and increased labor supply can only result in unemployment and this, unless met by prompt and energetic measures, will lead quickly to business stagnation, depreciation of commodity values and serious labor troubles.

What is our national policy in this situation? Obviously the problem calls for governmental attention and solution. Private individuals or corporations cannot be expected to inaugurate large projects in order to provide employment in this period of high labor and material costs. It remains for the national, state and local governments to undertake improvement work until such time as the industries can be restored to a peace basis. Much work of a public nature must necessarily be done during the next few years. As much as possible of this should be undertaken now as a reconstruction measure and as a source of employment until the industries can build up their business. It will cost more to complete this public work now but the added cost will be borne by the public which will receive the benefits through added activity. Great Britain has already inaugurated a number of different reconstruction methods, including the payment of weekly wages to the unemployed until work can be secured for them. What are we going to do?

Let us look at the manner in which the Railroad Administration is meeting this problem as a possible indication of the attitude of the government. Until now it has been directed by a cabinet officer, an advisor of the President in the framing of national policy. It is the largest employing branch of the government with nearly 2,000,000 persons on its payroll directly and probably an equal number dependent on the railway supply companies from whom it purchases its equipment.

Has the Railway Administration work to be done? Oh-

viously it has. It is under contract to return the roads to their owners at the expiration of the period of federal control in as good condition as when they were taken over. They should be fully maintained, both to keep them in good condition to render service, and to give as much employment as reasonably can be provided during the present period of unsettled business, whether they are to be returned to private control or not. Now, it is obvious that they have not been fully maintained during the past year, when only slightly more than half of the normal quantities of rails and other track materials have been used in renewals. The purchase and installation of materials of this character necessary to make good the deferred maintenance of 1918 and to supply the normal requirements of 1919 would give employment to the normal number of men on the railways and to large numbers of men in railway supply plants. Since the Railroad Administration must take up this deferred maintenance why should it not start this program now by placing orders for the necessary materials so that they will be available when spring work opens up?

There is also a large amount of deferred maintenance in the equipment department. Information gathered by the *Railway Age* indicates that there is a very large number of freight cars which are in such a condition that they ought to be scrapped, and still a larger number that must have heavy repairs before they can be efficiently and economically used in service. The fact that there is now a large nominal surplus of cars is no good reason why needed repairs to cars should not be made, and why new cars to replace those that should be retired should not be bought. Proceeding with the work now will give employment to labor at a time when the welfare of the nation demands it shall be given, and probably it will not be long until all equipment in good order that can be used will be required in service.

Past experience has demonstrated the necessity for the roads to continue programs of improvement during periods of declining traffic if they are to be prepared to handle successfully the business of the busy years that follow. No better indication of the present inadequacy of railway facilities is to be had than the experience of a year ago. A large part of the improvement work is chargeable to capital account and thereby to the corporations. Like other business concerns, they are inclined at present to defer much of this work, regardless of its necessity, because of its present high cost, although without doubt they would co-operate willingly in the inauguration of many of these improvements if they could be carried on at normal cost to them. Furthermore, the fact that the corporations are not now in control of the management of the properties, and that how long government control will be continued, and the terms upon which the roads will be returned to private operation, are unsettled, makes the corporations extremely reluctant to co-operate with the Railroad Administration in inaugurating an extensive programme of additions and betterments. But there is no good reason apparent why the Railroad Administration should not adopt a policy of making up deferred maintenance, or why the government and the companies should not agree to make every outlay for additions and betterments which would be valuable to the individual railways if government control were abandoned and to the government if it were continued; and a large majority of needed expenditures for additions and betterments would be of this character.

It is true material as well as labor costs are at present very high; but if needed expenditures are postponed until costs come down, many of them will be made too late to be of value when an increase of business comes. The Railroad Administration as well as the railroad corporations is showing an unwillingness to carry on maintenance and improvement work at present prices of materials. The Administration's present tendency seems to be to curtail expenditures generally. Federal purchasing agents are showing a disposition to reduce purchases to the minimum. Only a few days ago the purchasing agents in one region were instructed by the chairman of the regional purchasing committee to exchange materials as far as possible in order to avoid the necessity of going into the market for any supplies other than those branches of government service are appealing to the patriotism of manufacturers and employers of labor to assist in providing work for our munition workers and returning soldiers, another government department, the Railroad Administration, is promoting unemployment.

It has been said that while attempting to settle the problems of other countries, we may be neglecting some of our problems at home. One of our most important national problems today is the development of a unified reconstruction program which will place our industries on their feet and in a position to utilize the large merchant marine which is now being built to enable us to compete for foreign trade in the markets of the world.

New Books

Proceedings of the American Railway Master Mechanics' Association. Edited by V. R. Hawthorne, secretary. 528 pages, 33 plates, 6 in. by 9 in., bound in cloth. Published by the association, 746 Transportation building, Chicago. Price, $5.

The fiftieth volume of the Master Mechanics' Association Proceedings, which has just been issued, covers the activities of the organization during the years 1917 and 1918. A large part of the book is devoted to an account of the convention of 1918, which includes several valuable committee reports. The report on the shop manufacture and repair of semi-elliptical springs covers the subject very thoroughly. The report on the design and maintenance of locomotive boilers is devoted principally to a discussion of the field for autogenous welding in boiler work. The committee on fuel economy and smoke prevention outlined briefly the problem of fuel economy on railroads and made specific recommendations concerning the methods of handling storage coal. The committee on train resistance and tonnage rating submitted data secured from train resistance tests and engine tests. Several important changes were made in the specifications, standards and recommended practices of the association. The development of feedwater heaters is covered very thoroughly in an individual paper by J. Snowden Bell.

Structural Engineers' Handbook, Second Edition. By Milo S. Ketchum, dean of the College of Engineering, University of Colorado. 6 in. by 9 in. 928 pages, illustrated, bound in flexible leather. Published by McGraw-Hill Book Company, Inc., 239 W. Thirty-ninth street, New York. Price, $5.

The first thousand of this second edition brings the total issue of this book to 13,000 copies since the first edition appeared in 1914. This is probably a better testimony to its value than can be given in any other form. It is essentially a manual for the structural designer and detailer combined with a handbook on structural steel sections, 531 pages being devoted to the first portion and 397 to the latter. The crowning achievement of this book is the attractiveness of its illustrations and typography. The drawings represent an enormous amount of work and painstaking care. The scope of the volume is indicated by the subjects of the several chapters which cover such matters as roof trusses and mill buildings, office buildings, highway bridges, railway bridges, retaining walls, abutments and piers, timber bridges and trestles, steel bins, steel grain elevators, steel head frames and coal tipples, erection, engineering materials, structural mechanics, and design of steel details. In the new edition details of steel windows and doors, data on cement and gypsum tile roofs and moments in stiff frames constitute the principal new material.

The Railway Supply Industry Is Hard Hit

Representative Concerns Tell of Difficulties Caused by Administration Purchasing Policy

THE RAILROADS, for several years, have gotten along with a minimum amount of material and new equipment. When the exceptionally heavy traffic developed a few years ago and additional equipment was necessary, it was impossible to obtain it, first, because so much equipment was being sent to France and Russia and later, after this country entered the war, because of this reason and also because of priority orders which diverted material to ships and munitions. It has been impossible to keep the facilities and equipment in good condition and a very large amount of deferred maintenance has accumulated.

When the armistice was signed it was felt in many quarters that the transition from war to peace conditions could be very greatly helped by placing large orders for railway material to take up this deferred maintenance and to put the roads back into the condition in which they were prior to the war. For various reasons the Railroad Administration has cut down on purchases to the very minimum and this is working a great hardship on the railway supply companies, many of which had assisted the government by the manufacture of munitions and other war materials. Now, instead of being able to take care of the boys who are coming back to them from the army and navy they are finding it necessary to cut down their forces and many of them face an entire shutting down of their plants if railroad purchases are deferred much longer.

With a view to securing exact information as to the present situation the *Railway Age* sent a night letter to a number of representative companies on Monday evening, February 3, asking for a statement concerning what the policy of deferring maintenance and renewals, not to speak of betterments, means "to your organization and labor, now and in the future." It was not intended to make a canvass exhaustive, and only comparatively few names were selected at random from the large number of supply companies. A number of representative replies follow:

American Castings Company
Birmingham, Alabama

After sixteen years of hard work against considerable odds, we have built up a railroad supply commodity known throughout the railroad maintenance and construction field as National Lock Joint cast iron culvert pipe. About 95 per cent of our business is obtained from railroad construction and railroad maintenance. In 1917, our business had reached a state of development and steady production that was very satisfactory. When the United States government declared war, followed immediately by taking over of the railroads under federal control, the result in our business was almost instantaneous. The reason for this was plain; under government control, the railroads were ordered to discontinue new construction except in cases of military necessity; maintenance budgets were cut accordingly.

Fortunately for us, at the outset we received an order from the director general of military railways for a large amount of our product, to be used in the construction of military railways in France; this kept us going full tilt for about 8 or 10 months. When this order was completed we were thrown back on our regular source of supply for business, and we found that that source had vanished, and it still remains at the vanishing point.

The railroad problem still continues unsettled; no provision has been made as to who shall pay for new construction. Now that the necessity of conserving material and labor has been removed, the question of railroad construction and railroad betterments, or maintenance, still continues throttled and absolutely dead. We understand the situation or reason of this is largely attributary to the fact that no provision has been made by the government as yet to determine who shall pay for new construction and railroad betterments—whether such an expenditure shall be borne by the United States government, or private owners of the different lines.

Regardless of whether the railroads are to remain under government control for five years or for 21 months, the policy of the government in regard to railroad construction and improvements should be settled; otherwise we can expect no railroad construction and very little railroad betterments. That being the fact, manufacturing plants which are depending on that source of supply must necessarily go out of business.

Owing to the above-mentioned facts, taken in connection with the high cost of material and labor, we have found it impossible to operate, and have closed down, discharged our employees, and are now waiting and hoping for relief. That relief can only come through a revival of railroad construction and betterments, and a continuance of the maintenance program as it existed prior to 1917, or, in other words, before the roads were taken over by the government.

Railroad purchases have a vital influence on general business; they are a big factor in determining the question of good or bad times in general business. For this reason, it is hoped that a speedy solution can be reached, and that some relief for this unbearable situation may be had.—*B. D. Dimick, President.*

American Flexible Bolt Company
Chicago

I believe publicity is desirable regarding the extreme difficulty of holding the working organizations of manufacturers of railway materials together with the present purchasing policy of the Railroad Administration. Cessation of war work leaves patriotic concerns who have used their means in expanding facilities holding back and unable to now run as eleemosynary institutions. Patriotic labor does not want charity. Railroad materials orders are not charity, but will solve manufacturers' and workers' difficulties in the present crisis.—*C. A. Seley, President.*

American Steam Gage & Valve Manufacturing Co.
Boston, Mass.

The present government policies as regards purchasing new equipment, as well as for maintenance and renewals, mean to us no return on a very considerable investment, as well as unemployment for workmen skilled in this work. During the war period we were fortunately able to handle other work to partially offset the loss of orders due to government purchasing policies, but now that the substitute work is ceasing the real situation looms more clearly and causes us much concern. We cannot believe that those in authority realize the serious situation that has been created, and we feel that only quick action on their part will avert serious embarrassment to our industry.—*H. B. Nickerson, Secretary.*

American Steel Foundries
Chicago

On account of lack of orders, it has been necessary to close down our plants at Sharon, Pa., and East St. Louis, Ill., involving directly 2,240 men and indirectly many more, as on account of the uncertain outlook we have been obliged to cancel or suspend orders for raw materials, etc. These plants normally run exclusively on railroad work. Unless there is a resumption of railroad buying for maintenance, renewals and betterments within the next 60 days, it will be necessary to close down and curtail operations at other plants involving 5,000 more men. Many of the 1,112 of our men in the army and navy now returning are expecting their old jobs, and it is our intention to take them back, but the policy of the roads of deferring maintenance and renewals is making this difficult, if not impossible, in many cases. Pending the settlement of the general plan as to how the railroads are finally to be operated, some fair arrangement should be made to enable them to continue necessary purchases at least for repairs and maintenance, proper provision being made for amortizing the amount by which present costs exceed normal average costs. A wise settlement of the railroad question would do more to help the industrial situation during this period of readjustment, necessarily involving a great deal of unemployment, than any other single action that could be taken by Congress at the present time.—*R. P. Lamont, President.*

American Tool Works Company
Cincinnati, Ohio.

The government's policy of deferring purchases at this time is most deplorable. It sets an example which, if followed by various industries, will demoralize business, shatter organizations and throw thousands of men and women out of employment. During the industries' transition from a war to a peace basis, a period of readjustment with very light extensions or replacements of equipment is inevitable. Instead of aggravating this condition, which its present policy is unquestionably doing, the government should endeavor to assist industries over this period by encouraging sorely needed renewals, maintenance and betterments. This is the time to help, not to hinder, industries. The task of reverting to a peace basis involves much more difficult problems than the preparation for war activity. The unqualified response of our industry to the government's call for war production surely entitles it to some consideration now that conditions are reversed.—*J. C. Hussey, Western Sales Manager.*

Ashton Valve Company, The
Boston, Mass.

In my judgment the greatest menace to the United States of America at this time and the immediate future is the lack of employment, fast assuming alarming proportions. Our gallant boys left good positions to fight the battle of freedom, and unstintingly we placed the combined resources of the nation behind them. If we were justified in spending approximately twenty billion dollars to wage this war, are we not equally justified in expending such further sums as are warranted and necessary for constructive peaceful purposes and to provide positions for our soldiers returning with the expectation of immediately assuming their former occupations?

Under government control of the railroads, the railway supply manufacturers have not received the average business obtainable heretofore under private management, and were forced in many cases to divert their plants to production of other war necessities. The need for such having passed, unless such manufacturing plants are enabled immediately to resume their ordinary production, stagnation of business and unemployment will necessarily follow. I, therefore, believe Congress should immediately take cognizance of the situation, authorize and direct resumption at once of all suspended improvements on the railroads. If prompt action is taken I believe that this will greatly relieve the trying situation confronting the business and labor interests of our country.

Any unnecessary retrenchments or action on part of the government officials hastily to readjust prices will cause business confusion and force wage reductions, leading to strikes and unemployment, and will not only rock but swamp the boat.—*J. W. Motherwell, Vice-President, Chicago.*

Chicago Railway Equipment Company
Chicago

The policy of deferring betterments, maintenance and renewals cannot but be paralyzing to the railway supply industry and to the employment of labor. Its baneful effect, however, is much broader and far-reaching. For years, as you know, I have claimed and graphically demonstrated beyond question that railway purchases measure general business prosperity, and that we have not had and could not have general business prosperity without this essential factor excepting when some other great element could or did take its place. This did occur during the war when munitions and other war work were the substitutes. With these withdrawings, we are again back to our normal dependency upon railroad purchases. The great problem of industrial conditions and labor employment can be solved more quickly and effectively by resumption of railway purchases than in any other manner. Thus it is not a question of the railway supply industry alone, but the welfare of the whole country —manufacturer, merchant, laborer, farmer, or of whatever occupation.—*E. B. Leigh, President.*

Columbia Nut and Bolt Company
Bridgeport, Conn.

Our railroad business during the past three years has been about 25 per cent of what it ought to be during normal times. Our shop equipment being particularly adapted for the manufacture of nuts for railroad use, you can readily see that a curtailment of purchases by the railroads affects us vitally and does not permit us to maintain our full organization from a labor standpoint. We believe that if the railroads were turned back to private ownership, they would see the necessity of making much needed repairs as well as purchasing new equipment which seems to have been lost sight of under government management. A change of policy would certainly be beneficial to the railroad supply interests.—*Fred Atwater, Treasurer.*

Crane Company
Chicago

We can only say that our sales to the railroads for January, 1919, were 50 per cent less than January, 1918.

Dearborn Chemical Company
Chicago

A great opportunity for continued employment of labor at the present high but fair rate of wages is now offered Congress by so concentrating its energies on the railroad problem so as to determine an early solution of it. Pending the adoption of a permanent plan, Congress should insist on the Railroad Administration proceeding at once with a broad program for maintenance improvements and betterments, Congress providing adequate financial provision for it.

Even though government operation continues but a short time these improvements, so necessary to satisfactory public service, should go rapidly forward, as provision will be made for completion or continuance of such work on the adoption of any permanent plan of control or operation. It is most important that the thousands of workmen employed in industries making railway equipment material and supplies be kept engaged. A proper program of expenditure to improve public service will not only keep these men employed but will in addition provide in the railway manufacturing industries employment for thousands of our returning soldiers.—*Robert F. Carr, President.*

Detroit Lubricator Company
Detroit, Mich.

We feel that because of the effort most manufacturers are making (which cannot be kept up indefinitely) to keep their employees occupied by making stock, which later may depreciate in value, the Railroad Administration should do its part to bridge over the present low spot through a liberal policy of maintenance and betterment. If, on account of all doing their share, business can be accelerated, the railroads as the country's second largest industry will get a proportionate return. It is a good business to be fair to the railroad owners, and we believe that betterments should be charged against them only at what would represent the cost under normal conditions.—*H. I. Lord, Vice-President.*

General Railway Signal Company
Rochester, N. Y.

The total railway sales made by this company in the months of November and December, 1918, and January, 1919, amount to 34.3 per cent of such sales for the corresponding three months of 1917-1918 and 34.5 per cent of such sales for the corresponding months of 1916-1917. In order to retain in our employ as many of our men as possible we have been and are manufacturing stock in excess of normal requirements, but despite this artificial and necessarily temporary expedient, and though we have made no reduction in wage rates, our railway department pay rolls have decreased approximately 20 per cent in the last month. Obviously, each month's prolongation of present purchasing policies will necessitate farther and greater reductions of forces in our railway departments and will inevitably result in greatly increased cost of production.—*W. W. Salmon, President.*

Glazier Manufacturing Co., The
Rochester, N. Y

No matter how optimistic we may be, there is no use in fooling ourselves; we must acknowledge the truth; times are not good, and a great many are idle who might be working if conditions would allow. There is certainly need for a great deal of railroad material, but conditions must be righted. The question is, therefore, how best to bring this about.

When we got into the war, committees of representative men were appointed to guide various industries and formulate plans for increasing production, etc., with the big idea in mind of winning the war. Now that the war is won, isn't it just as important to formulate definite plans for winning peace and prosperity in the United States? We hear much about a League of Nations, and protection for races of people all over the world. Let's have a League of Business Interests at home, whose duty it shall be to look after the rights of labor and business here in the U. S. A. By the rights of labor, I mean the *opportunity* to work at fair wages, not merely raising the wage scale and then removing the opportunity to work. There can be no prosperity in the United States unless the railroads are prosperous. There has been much talk, but no action. The time has come for action.—*Oscar F. Ostby, Vice-President.*

H. G. Hammett
Troy, N. Y.

I view with great apprehension the present and immediate future outlook concerning business conditions facing the manufacturers of materials used by railroad companies. My entire output is used by the railroads and largely in the construction of new locomotives. The delay of the U. S. Railroad Administration in placing orders for new locomotives has resulted in my being compelled to reduce the number of employees by about 20 per cent; and if large orders are not forthcoming within a very short time a complete shutdown of my plant will inevitably follow.—*H. G. Hammett.*

International Pulverized Fuel Corporation
New York

Since 1908 the annual additions of new locomotives and cars and of terminal and equipment repair and power facilities have been entirely insufficient during each year. The equipment has also depreciated from obsolescence and inadequacy, due to the lack of additions, of reinforcements and refinements for the purpose of providing the proper safety, efficiency and economy in operation and maintenance. For the next ten years, the United States railways will require annually an average of 5,000 locomotives, 3,500 passenger cars, and 200,000 freight cars to replace obsolete and dismantled equipment, and to provide additional equipment, if the service is to be properly maintained. In addition, about 25,000 locomotives, 20,000 passenger cars, and 500,000 freight cars now in existence should be reinforced and improved.

Nothing will do more to stabilize and be of greater avail in the present period of uncertainty and unrest than immediate provision for the definite, diversified, distributed and productive employment of labor and material in the rehabilitation and reconstruction of the steam roads.—*J. E. Muhlfeld, President.*

Kerite Insulated Wire & Cable Company, Inc.
New York

The works of this company are located in the Naugatuck Valley in Connecticut, which has been not only during the war but is normally a large industrial center. Owing to the fact that a waiting policy is being pursued in regard to the placing of business, which, under normal conditions, would keep the greater part of these plants in operation, the question of unemployment is becoming serious. It will, of course, unless some other policy is adopted, become rapidly worse, with the result that large numbers of men will be without work and without proper means of support. It seems to us that if a way can be found which does not conflict with other broad and important phases of the situation, it would be most advisable to carry forward at this time any work for which there is legitimate need in the way of maintenance and betterment. It seems to us that in the bigger sense it is to be urged both from an economic and social point of view.—*R. D. Brixey, President.*

Mudge & Co.
Chicago

We have not laid off any of our men, feeling it our patriotic duty as employers to keep our labor actively employed at this time if at all possible to do so. It has been necessary for us to place a large amount of goods in stock anticipating renewed buying. We may have been able to justify our-

selves in this where other companies could not because our business is seasonal and we have had more than we could handle in the spring of the year for several years past. Also, we have felt an optimistic confidence that Congress and the Railroad Administration would soon realize that their present policy means the shutting down of many railway equipment plants and unemployment of a large number of men and would take some active steps to alleviate this very serious condition. Unless some new policy is soon pursued it will be necessary for us to close our shop because we will not be able to bear the financial burden which has been made doubly hard because the railroads are backward in paying their accounts due, as we understand it, to the inability or failure of the Railroad Administration to settle their accounts.—*Burton W. Mudge, President.*

National Railway Appliance Company
New York

I have viewed with growing concern the apparent introduction of the policy of retrenchment in the matter of purchases by the railroads of the country which cannot help but bring disaster upon one of the most important branches of industry—the railroad supply trade. If this policy is continued, it will simply mean that we will be forced to lay off salesmen; cut down our office force, and a decided retrenchment will have to be inaugurated in the factories controlled by the companies we represent, which will mean the laying off of well-paid workmen with all the unfortunate results that a condition of this kind brings in its trail.

Something has got to be done, possibly by Congress, possibly by a change in the policy of the director general of railroads. Whatever is done or whatever change is made, *must come soon, unless the unfortunate results which I have touched upon are brought about.* There is no question that extensive repairs to equipment should be made as it is fast becoming in a deplorable condition. Large expenditures for betterments and extensions are decidedly needed, all of which, if attended to, would create business for a line of industry which is now sadly in need of work and which must have speedy relief.—*B. A. Hegeman, Jr.*

The P. & M. Company
New York

A delay in placing orders for material needed by the railways during the coming year is undoubtedly disturbing the labor situation greatly. We appreciate that possibly the railways do not wish to make large contracts at this time in the expectation of a price reduction, but a policy of purchasing a month to month supply would help the situation greatly. In the case of our company there are less than 20 per cent of the men employed in the manufacture of our material compared with a year ago.—*F. A. Poor, President.*

Parkesburg Iron Company
Parkesburg, Pa.

Prior to 1918, or before the United States Railroad Administration controlled the policy of the railroads in this country, the percentage of our output, which consists exclusively of charcoal iron boiler tubes, ran, for a number of years, from 70 to 80 per cent of railroad orders. During 1918 the percentage of our output shipped to railroads in this country was under 20 per cent, and at the present time we have practically no orders on our books from them.

Fortunately, during the past year we have been able to run to capacity, largely on tubes for marine boilers, but as this demand is necessarily slackening, we anticipate depression and the necessary laying off, in the near future, of men in our plant, as well as in others, whose primary purpose is to furnish railroad supplies, unless the United States Railroad Administration very promptly authorizes the transportation systems of this country to repair and replace their motive power as in the past. We believe that by so doing the government will prevent a serious business depression, with its attendant distress and hardship to labor.—*George Thomas, 3rd, Treasurer.*

Pettibone Mulliken Company
Chicago

Stop the present deferment of railway purchases! If continued a few weeks longer it will cause us to shut down, throwing all of our men out of employment. In view of the necessities of the railways, especially as to track and terminals, we believe every effort should be made to place such orders at once in order that labor may be employed and the transportation facilities of the country maintained. This is especially important at this time when returning soldiers are looking for work. Every effort should be made to give them occupation and to maintain present labor in employment.—*A. H. Mulliken, President.*

Rail Joint Company
New York

If the Railroad Administration has decided to defer maintenance and renewals and betterments, I feel that it is against the judgment of their practical men who certainly realize the seriousness of such a stand not only to the country at large but to the roads themselves. There is considerable idle capacity in mills and shops which furnish material now required by the roads. Unless orders are placed at once for at least their next three to six months' requirements, additional capacity will be idle with a resultant number of men.

No one can look for any considerable reduction in prices with the present scale of wages, and it is apparent the Administration has no desire to disturb them. Buying immediately will permit the manufacturers to retain the men now employed; will allow taking on a certain number of present unemployed; and permit the roads to perform on a more economical basis the necessary work already scheduled over a period of months than if later an attempt is made to crowd matters and catch up with their schedule.—*V. C. Armstrong, President.*

Railway Car Manufacturers' Association

Representing:

American Car & Foundry Company.
Bethlehem Shipbuilding Corp. (Harlan Plant).
Bettendorf Company.
J. G. Brill Company.
Cambria Steel Company.
Haskell & Barker Car Company.
Keith Car & Mfg. Company.
Laconia Car Company.
Liberty Car & Equipment Company.
Magor Car Corporation.
McGuire-Cummings Mfg. Company.
Mt. Vernon Car Mfg. Company.
Osgood Bradley Car Company.
Pacific Car & Foundry Company.
Pressed Steel Car Company.
Pullman Company.
Ralston Steel Car Company.
Standard Steel Car Company.
St. Louis Car Company.

At the annual meeting of the Railway Car Manufacturers' Association, your telegram to its various members, inquiring as to the effect of the present policy of the Railway Administration in deferring maintenance, renewals and betterments was discussed, and it is the opinion that this policy, if continued, will prove disastrous to the car building, railway supply and kindred interests, and to the workmen employed by them.

When the armistice became effective, all car builders and suppliers of railway materials were engaged to a very considerable extent in producing war materials, and more particularly railway equipment for overseas shipment to the American Military Railways. These orders for the military railways have been curtailed and suspended to such an extent that the industry has been compelled to materially curtail production, necessitating the laying off of a very considerable portion of its working forces.

Under average conditions car builders and suppliers of

railway materials have always received a fair amount of orders from domestic railways, not only for new railway cars to replace those worn out and destroyed and increased equipment required to meet the country's growing needs, but also very considerable orders for maintenance materials. The industry now finds itself without orders of this class on its books, and can only look to the Railway Administration for relief, which of course will not be forthcoming if the present policy continues. This affects not only the car builders and suppliers of railway material themselves, but also kindred interests engaged in supplying materials to them and will have a far-reaching effect and result in serious non-employment in all lines in any way associated with the railroad supply business.

Some of our members report that they have now been compelled to completely close down some of their departments and materially curtail production in all others, and consequently lay off a considerable number of men through the lack of orders for miscellaneous repair and replace parts.

In our judgment, during the transition from war to peace conditions, the welfare of our industry and of every community in which any part of it is located is dependent on full maintenance of purchases by the railways, not only for present needs, but also to supply the deficiency which deferment during the period of the war has caused.

Roberts and Schaefer Company
Chicago

We felt for some time, and are now more impressed with the importance of the fact that our national Congress is not, as a unit, appreciative of the hardships that the railroads, in all their several branches, are undergoing. Owing to lack of funds, because the government is failing to supply funds, and because the railroads are exceeding their appropriations, it has become almost impossible for contractors to continue their construction work. We have large contracts for one of the wealthiest and best operated railroads in this country, and yesterday we received word to discontinue work or postpone construction until such time as an appropriation could be made for one of the largest contracts we have with them. Furthermore, the writer was advised last week that they might find it necessary to hold up construction work on several more contracts.

We hear from several sources that railway employees are being laid off in every department of railroad organizations; this, because of the very great decrease in income since shortly after the signing of the armistice. Furthermore, there is absolutely no business being given out by the railroads, nor has there been any for three months. If we are to enjoy the prosperity that everyone has been talking of, there must certainly be improvements and betterments in the railway system of this country.—*J. J. Roberts, Treasurer.*

Sherwin-Williams Company, The
Cleveland, Ohio.

Business is now suffering from a lack of confidence on the part of buyers. The longer buyers hold off, the greater this lack of confidence will be. We believe that if the large business interests would show sufficient confidence in the future and authorize needed expenditures, there would soon be a decided improvement in business. There is a great deal of unfinished work to be done, and by postponing it we are only delaying the return of prosperity. It seems to us it would be good policy on the part of the government to authorize the expenditure of money in every legitimate way, and thus set an example to others.

It is common knowledge that there is great need for a generous expenditure of money on all railway equipment and railway property of all kinds. The manufacturers of railway supplies are suffering from the policy of the Railroad Administration in deferring maintenance and renewals, which results in a large number of plants running on part time, and in some places plants have been closed. The Railroad Administration, by proper and generous expenditures of money, will not only preserve the great railway properties, but will do a great deal to help keep business going and labor well employed. We sincerely hope we will soon see the policy of retrenchment changed to one of expansion.—*W. H. Cottingham, President.*

Vapor Car Heating Company, Inc.
Chicago

With the rapid return of men looking for jobs on the one hand, and the necessity of laying off men and reducing forces, both labor and clerical, on the other hand, it seems to me that we are "working both ends against the middle." Most railway supply concerns have maintained the large forces—labor, clerical and technical—required to meet the railroad wants during war activities, until its maintenance now represents an actual loss.

It has been hoped that high class labor forces and the general clerical and technical organizations required to conduct a railway supply business could be kept intact to prevent the falling away of the organization, because it is perfectly well understood by those familiar with the physical condition of the railroads that large and immediate purchases are necessary to put the railroads into a normal condition again.

It is a fact that the roads are not taking steps toward rehabilitation or even normal maintenance—railway supply companies are laying off labor instead of hiring it, and at the very time when the general good of the country most demands the quick and profitable employment of every man possible.

The present condition of affairs is serious and as I see it there is nothing but trouble immediately ahead unless the present policy of restricting the railroads' purchasing activities is changed by some action on the part of Congress that will relieve the present uncertainty as to what the railroads can do in the way of taking care of themselves.

The present wage schedules of labor as employed by the railway supply companies should be very satisfactory to the employees, but if no jobs are available what does it profit the man who wants to work?—*E. H. Gold, President.*

Westinghouse Air Brake Company
New York

As our industry is wholly dependent upon orders for material connected with the maintenance and extension of railway facilities, it will be injured to the extent that a policy of deferring purchases for railway maintenance, renewals and betterments results in a less than normal expenditure by the railroads for such purposes. Necessarily, the pursuit of such a course will greatly accentuate the difficulties of unemployment, at a time when it would seem as if every incentive should be afforded to existing enterprises to increase, rather than to reduce, production—particularly those contributing to the maintenance and building up of our transportation system, which is a vital element of our national existence that cannot live upon a starvation diet at any time and is especially in need of a constructive and strengthening policy, rather than the reverse, at this time. There is, no doubt, merit in the proposal to start new governmental enterprises for the purpose of giving employment to those who are seeking it, but no greater assistance in that direction can be rendered than to enable established industries to completely untilize their productive facilities.—*H. H. Westinghouse, Chairman.*

Shall We Lay Off More Men?

By a Supplyman

RAILWAY SUPPLY LABOR is being discharged by the thousands, at a time when their work was never so greatly needed.

Who developed the air brake?

Who made the safe brake beam and brake shoe?

Who brought the locomotive superheater to its present status?

Who made the safe vestibule for cars?

Who developed the life-saving car coupler?

Who developed car-heating and car-lighting?

Who made boilers safe with flexible staybolts?

Who has made our railroads safe by signalling?

Who made good the steel freight car and steel car wheel?

Who dug up, perfected and developed the fire brick arch for locomotives?

Who brought to the present degree of perfection the locomotive stoker, the improved truck, safety valves, power reverse gear, bell ringers, sanders, automatic fire doors, headlights, safety devices and factors for improving economy and increasing efficiency of the locomotive?

Is there one of the major or any of the minor developments in this incomplete list that has been brought to usable shape by anyone but supply men?

These developments usually owe their success to an inspiration on the part of someone who is devoting his life to the interests of the public in connection with improvements which are made for better, cheaper, more comfortable and safer transportation.

These supply interests who have done such monumental constructive work for the locomotive, the car, the track, and for signalling are entitled to the closest, warmest and most thorough co-operation from the railroads and from the government, particularly in these times when transportation is personally vital to every soul in the country and because but for transportation we would be like China today.

The Railroad Administration appreciates what would happen to vast numbers of miners in case coal should be purchased for the railroads without reference to the wages of the miners. The Administration has ruled for protection of the miners' wages. This is done with one hand while the other hand rules that the roads shall include nothing in their budgets in the way of supplies or for locomotive or car improvements, or safety devices—the purchase of which can possibly be avoided.

Why is this? Why is the Railway Administration putting so many men out of work, throttling an industry to which the country owes so much? Why do not the authorities examine the number of men in the country who are affected by this policy? They bulk about as large as the number of railroad men themselves. Why is the immense railroad supply industry not used for the benefit of the people? Why are their plants laying off men? They should be kept at work because the cost comes back in savings in so short a time. This costs nothing because of the savings to be made by the railroads.

It is time that those who have the power to fix this situation should take a look at what they are doing and fix it quickly.

I was told today that an important railroad committee is not announcing the dates of its meetings for fear the supply men will be in the city at the time. Of course they will. That committee, however, can not afford to overlook those supply men in working out the railroad problem of today. They are among the most valuable assets the railroads have or ever had. They are the best asset the traveling and shipping public ever had for they make travel safe and economical. Here again let us ask what the locomotive would be today and how much coal would it burn but for these very supply men, or where the car would be as to safety and efficiency but for them?

Is it possible, that knowing these facts, railroad officials and government officials do not appreciate what inspiration, what courage, what strength of purpose and persistence against obstacles are required to develop a locomotive, car, or track improvement for American railroad service?

The improvements have only just begun—a new era has opened—an era which should mean the doom of wastefulness. The public can not afford for one minute to forget what the supply men can do for them in this emergency.

Railway supply labor is being laid off by the thousands when their work was never so greatly needed.

Shall we be able to put them back to work or shall we lay off more men?



This Locomotive Made in America for the French Government Was Captured by the Germans, Used by Them, Recaptured, and Has Since Been Used by the Americans

Tie Producers Discuss Conditions in Industry

Consider New Specifications and Methods of Purchase Brought About by Centralized Control of Railroads

Over 100 producers of railroad crossties from all parts of the country met at the Hotel Statler, St. Louis, Mo., on January 30 and 31 to discuss the conditions now existing in that industry and to perfect a national organization. This meeting was called by the Tie and Timber Division of the St. Louis Chamber of Commerce to consider the problems resulting from the centralization of purchase of railroad crossties in the hands of the United States Railroad Administration. Representatives of the Forest Products Section of the United States Railroad Administration were present and participated in the discussion of several of the papers.

The meeting was called to order by A. R. Fathman (Western Tie and Timber Company, St. Louis), temporary chairman, and E. E. Pershall (assistant to the president of the T. J. Moss Tie Company, St. Louis), temporary secretary. A permanent organization was formed under the name of the National Association of Railroad Tie Producers with permanent headquarters at St. Louis, Mo. The officers elected were: President, John W. Fristoe, president T. J. Moss Tie Company, St. Louis; vice-president, C. C. Gresham, vice-president Ayer & Lord Tie Company, Chicago; secretary, Robert Hussey, vice-president Hussey Tie Company, St. Louis; treasurer, Robert E. Lee, Hobart-Lee Tie Company, Springfield, Mo. Eleven regional vice-presidents were also elected.

The Tie Situation

During the convention reports were called for from representative manufacturers in the different tie producing regions. One manufacturer stated that the production in Ohio and Michigan was now only 20 per cent of that of one year ago. Production in the Pocahontas region for 1918 was reported to have been 50 per cent of normal. In the Southern area the production ranged 25 per cent to 50 per cent of normal, although deliveries were in excess of this amount because of the large number of ties in stock early in 1918, 75 per cent of the 1918 deliveries coming from this stock. In the Southwestern region a shortage of crops has resulted in the maintenance of production to approximately a normal figure, but with the improvement in crop conditions the output will be reduced greatly. In the oak and cypress regions of Louisiana and Texas the production was reported to be approximately 75 per cent of normal. In the Central Western region the 1918 production was estimated at 20 per cent of normal, but the outlook is now more favorable for a normal production during this year. In Wisconsin the production is now approximately 100 per cent of normal owing to the fact that many saw mills have begun to make ties for the first time. In Minnesota, where ties are hewn, the production is approximately 40 per cent of normal. In the Pacific Northwest the excessive demand for labor in the ship building yards contributed to a heavy curtailment in tie production, but conditions are now approaching normal.

Specifications and Centralized Purchases

M. E. Towner, manager of the Forest Products Section of the Central Advisory Purchasing Committee, United States Railroad Administration ,spoke before the convention on Thursday afternoon. The following is an abstract of his remarks.

One of the first considerations in railroad construction or maintenance is the crosstie. Necessarily it must be and has been described in the form of a specification, which advises the producer what the railroads must have and is supplemented by instructions which guide the inspection forces in their interpretation of the specifications.

The specification and its application are the result of study on the part of the railroad engineering and purchasing forces to determine (1) the crosstie which will furnish the best bearing surface in meeting the varied conditions of the roadbed, and, (2)which will best subscribe to the possibilities of production. Not until unified operation of the railroads became effective could unified specifications be adopted and such adoption only took place after a most thorough canvass of the standards necessary to meet traffic conditions effectively, with consideration given to possibilities of production. That simplification was accomplished is shown by the fact that the 30 odd sizes and shapes have been reduced to 5 with the inclusion of every kind of wood generally used for crossties and provision for such others as may suit local conditions.

Principles of Purchase

1. No railroad under control of the director general may purchase ties on any railroad under his control with which such road connects. The elimination of competition between railroads is generally agreed to be sound in purpose and practice.

2. Any railroad under control of the director general may purchase ties on any railroad not under his control with which such railroad connects. Such purchase is made with full consideration of the interests of the producing roads.

3. The price shall be fixed on the various lines by the individual railroad companies, subject to approval by the regional purchasing committee, and at such figures as will cause the production of a sufficient number of ties to meet the requirements of all the railroads, The question requires close study, accurate action and fairness to the producer as well as the user, or to all factors involved in the actual production of crossties. The general lumber market itself as represented in the use of woods which go into crossties must of necessity be considered although the lumber market does not in all cases affect tie prices. Labor, materials, conditions of supply and demand, etc., must and have entered into consideration. In the main, crosstie prices as offered by the Railroad Administration at the present time are fully in accord with the factors above mentioned. There are two producing factors: (a) Those who own, manufacture and market their product direct to the user; and (b) Those who not only buy stumpage but through financing encourage the production of and make possible the marketing of the product.

4. Every railroad should endeavor to secure the maximum output of ties on its lines, so that its own requirements can be met with the minimum amount of transportation. This question is one of organized effort and all roads should be guided by the same principles in the application of specifications, grading rules, office organization, and with field forces obtaining an accurate knowledge of the yearly line productivity, and conservation of resources. Owners or contractors, particularly those who have built up a considerable investment in stumpages and equipment which can be used advantageously, must be carefully and fully considered.

5. Ties made on railroads which produce more than are needed for their own use, should be transferred under the supervision of the regional committees to railroads on which

a shortage exists. This injunction is being carried out and as the possibilities of productivity are better described and known, the demands involved in the proper allocation of tie requirements for importing roads will be better met.

Conservation

The conservation of growing timber must be given the closest consideration. This not only means reforestry in the planting of trees but also the conserving of growing trees by not cutting to the point of extermination in productive fields, which practice, unfortunately, has been followed in certain territories to a very large extent, particularly in the production of ties which are known to be too small. It is the intent of the specifications to discourage the cutting of trees which should not be cut but allowed to grow. It is a fact that on many railroads, particularly in the east, the tie productivity has fallen to a low point due to the cutting of timber and any production might be quickly eliminated by the non-importation of crossties and the continued cutting of the smaller trees. Another element of conservation results from the use of all that comes out of a tree for it will unquestionably be found that either the steam railroads, the electric roads, or the industrials can find ready use for all crossties legitimately produced along the lines as above indicated. Further, the steam railroads can probably assist all concerned by taking up all ties offered.

It has been stated that the Administration aims to eliminate the contractor, but such a statement did not originate in the mind of the Railroad Administration.

If the plan eliminates anyone it can only be said that such elimination is on account of the practice followed which should not have been fostered, even if the railroads had been a party to any particular development. It is not being found that contractors with actual property investments are being eliminated, and as the problem is worked out it is shown that possibilities of crosstie production are being bettered, and better contact is being established between the user and the producer, using this term in its broadest sense.

This is not an elimination of individuals and companies from a business of years' standing, but rather a co-ordination and harmonizing of the necessary organizations in such a manner as shall produce and market a product with the least expense and the best return to all concerned. The railroads, whether under administration or individual control, must prepare themselves to be a greater factor in the production and handling of crossties.

The Railroad Tie Contractor

The Necessity For and The Functions of The Railroad Tie Contractor was the subject of a paper presented by Walter Poleman, president of the Western Tie and Timber Company, St. Louis, of which the following is an abstract:

The Interstate Commerce Commission reports that in 1914 there were 256,547 miles of main tracks, and 98,285 miles of yards and sidings in operation in this country, a total of 354,832 miles, to say nothing of the many miles of industrial tracks. Approximately 3,000 ties are required for each mile, giving the stupendous total of 1,063,496,000 crossties required for the main tracks, yards and sidings of the railroads of this country.

The average life of the untreated white oak tie, I think it is safe to say, is about eight years, which means that one-eighth of the present number of ties now in the roadbeds are replaced annually. In other words, there are required for replacement alone 132,937,000 ties per year, and we have not taken into account the ties necessary for new construction or for industrial tracks.

The financial figures are equally as appalling as are the quantity figures. At the present price fixed by the Railroad Administration of 90 cents per tie for a No. 3 white oak tie at the point of production in Missouri, it means about $120,000,000 worth of ties annually for replacement alone. This figure alone would be amazing, but when you add to this a sum of money equally as large, if not larger, representing invested capital in timber, equipment, labor organizations and working capital to finance small producers, you are beginning to have some conception of the industry we are engaged in.

Since government control, there has been a decided tendency on the part of those in charge of the administration of railroads, to deem it unnecessary (or unlawful) for the government to contract for its supply of railroad ties, but to take the view that they should leave the matter of producing and furnishing the necessary ties to the voluntary efforts of any Tom, Dick and Harry. In fact, there seems to be a very strong tendency to discourage the production of ties on a large scale; to antagonize the tie organizations in every manner possible, with a view of decentralizing the industry to the greatest extent possible, upon the apparent theory that the best results can be obtained by breaking up the business into the greatest possible number of small and unreliable units.

Up to the present time, the general public, the government and the railroads have not felt the effect of this attitude, because the contractors had large quantities of ties in their yards, along the railroads and in the forests, already manufactured, when the government assumed control of the roads. This supply has now been practically exhausted. If the present prevailing conditions continue it will be impossible to obtain even a small percentage of the demand.

The cancellation by the railroads and Railroad Administration of all contracts and the complete revolutionizing of the industry has brought production almost to the point of stagnation. When the forces and organizations which have heretofore been depended upon to produce the ties have been completely disintegrated, it will be not only a long and expensive process to reorganize them, but in the meantime the lives of the traveling public may be endangered because of insufficient ties properly to maintain safe and sound roadbeds.

In order to supply the great demand for railroad ties, there must be some kind of a financial organization to keep the wheels of production moving. This is the function of the tie contractor. He must have and maintain his organization of expert timber cruisers and buyers. He must locate the small scattered and cut over land and timber tracts where most available to railroad and water transportation. He must find labor and locate it in camps, which he must provide for, to work the timber, haul the ties to the railroad right-of-way or float them down the streams. He must provide finances to the small timber owners to take care of the mortgage indebtedness, and must finance the farmer and small producer while he is manufacturing the ties. If production is left to voluntary efforts, promiscuously, of course there will be some small production, but it will be impossible to secure the necessary large production.

It is only through the organized efforts and financial assistance of the tie contractor, that the production of ties can be increased among those men, because there are many owners of small and scattered tracts of timber who are not tie makers themselves, and who are not financially able to employ and pay the makers of ties. The contractor is obliged to send his men into the timber, inspect the ties so produced, brand them and advance sufficient money so that the tie makers may be paid, in addition to paying the owner of the timber for the value of the stumpage.

Then, too, without the organization and finances of the contractor, it would be impossible to manufacture the principal portion of the yearly supply of ties during the winter season, when labor is more plentiful, especially farm labor, and when large quantities of ties must be kept in the woods

because of impossible hauling conditions. This, of course, means that some one is obliged to keep his money tied up in finished ties for several months.

In addition to this, when tie makers cannot be found in sufficient number to keep up the necessary production, saw mills must be erected and installed, which means a heavy outlay of capital besides the attending hazards of losses not only of profits but of capital invested, and also the assumption of losses due to fire and flood.

There is an old saying that "what is everybody's business, is nobody's business." I believe this saying is still true, and I am convinced that if the production of ties is left to the voluntary efforts of the individual, the railroads, within a few months, will find themselves in very desperate straits.

Comparison of Methods for Purchasing Ties

J. W. Fristoe, president of the T. J. Moss Tie Company, St. Louis, Mo., presented a paper on the "Comparison of Methods for Purchasing Railroad Ties," of which the following is an abstract.

The methods and practices obtaining in the production, purchase, and sale of crossties, prior to government control of railroads, is now a portion of our industrial history, of value to us at present largely as a standard of comparison, and as a fund of experience from which we may develop certain deductions for possible future guidance. These former fundamental considerations between the tie producers and the railroads were as follows:

(1) Negotiations and contracts were made between individual corporations or firms and the railroad companies for specific numbers of ties for delivery in a specified period, and at some agreed price.

(2) The production of ties was pursued by a large number of concerns, of varying degrees of financial standing, with no definite trade customs, and without any industrial organization.

(3) The larger, more efficient, financially stronger, and responsible tie producers became known as "contractors," as the better purchasing agents of our large railroad corporations recognized that first principle of a sound contract, that of entering into an agreement with a co-contractor who was entirely responsible for his obligations.

(4) These so called tie contractors, collectively, shouldered the responsibility of supplying the railroads with crossties, switch ties, and similar railroad material. Their producing operations could be roughly divided into three methods, all, or any one of which were being used by any individual operator:

(a) The contractor would purchase timber lands or timber and under the supervision of experienced foremen, and with his own payroll, would manufacture, haul, load and ship the crossties to his customer, or,

(b) He would purchase the timber, or assist in purchasing the timber for a sub-contractor, who would have the ties manufactured and hauled to a transportation line. In practically every instance the contractor would be compelled to carry the larger part of the financial burden by advancing, as above, the cost of the timber, the cost of manufacturing the ties, and waiting for his pay until such time as the ties would be hauled to a transportation line, or,

(c) The contractor's investments in timber, in saw mills, in mules, and in labor, generally stimulated the production of cross ties in the territory where he was operating, but in addition, through personal solicitation and financial help, a large number of small farmers and settlers were induced to convert their surplus timber into ties, the contractor inspecting the ties in the woods, advancing the cost of making, and waiting for his pay until such time as those ties could be hauled to a transportation line.

Effect of the Present System

One of the first acts of the Administration affecting the industry was the order prohibiting the purchasing of ties at prices in excess of those paid on December 31, 1917. The effect of this order, while temporary to be sure, could not have been intended to inspire confidence in the minds of the contractors, in view of the rapidly rising cost of tie production. The tie contractors were told at this time by the Central Advisory Purchasing Committee, the Forest Products Section of that committee, and the Regional Purchasing Committees, that they should continue in the production of ties, as no legitimate tie producer would have any reason to expect anything but fair treatment at the hands of the United States Railroad Administration, and that all operations should continue as heretofore; that the railroads were in dire need of ties, and that the contractor had nothing to fear.

However, this order was followed by the publication of new specifications and methods of purchase, and when these were announced the tie industry became most thoroughly alarmed, doubtful, and hesitant. The action taken by the Administration of establishing arbitrary prices, specifications, and method of purchase, was only justifiable as a war measure and has worked an injury and serious damage to those very concerns that the railroads had seen fit to develop.

The effect of this attitude was to create radical changes in the very fundamentals of operation that had been in effect for a considerable period in the past, and some small measure of these drastic changes can be determined by the realization that if the railroads prior to the war had attempted to decide, by common agreement, with power invested exclusively in themselves, that they would agree nationally on the prices and methods of purchase, there would have been grounds for legal recovery of damages to such concerns as the tie contractors, and possibly federal prosecution of those very railroad officials connected with such an agreement, under the Sherman Anti-Trust law.

One of the fundamental considerations of our national commerce has been the cost of transportation, and when the prices of ties are established without regard to freight rates, they are established without regard to the intrinsic value of the material in question; without consideration to established and preeminently correct methods of valuation of all standing timber; and without cognizance of the fact that the producer is constantly competing in the purchase of stumpage with the lumber men and other wood using industries.

The answer to establishing a proper price, neither too high or too low, on all of the various kinds and grades of ties, in the numerous and extensive tie producing territories, is not a matter that can be decided upon by any arbitrary power, no matter in what man or group of men this power might be invested. The real truth, as to the proper price to pay for a commodity, has been taught us nationally, in the foundation of our American business relationships, and has been strictly guarded in times of peace by federal legislation, and that truth is the law of supply and demand.

Valuable Experiences for Future Guidance

The winning of the war now brings us together to face the problem of a period of reconstruction. We would be dull indeed were we not to profit by many experiences to which we have been subjected. We have the opportunity of eliminating detrimental practices of the past and retaining constructive policies. We should weld these good parts into a symmetrical plan of general operation. A selection of these good points of both systems used in the purchase of crossties is herewith presented:

In the past we obtained (1) quantity production, (2) low prices, (3) direct contact between the individual railroad and its direct source of supply, and (4) a stimulation of

the industry due to individual initiative, contract obligations, and business reputations.

At present we are obtaining (1) standard specifications, (2) a standardization of inspection and (3) a material improvement in the grade of ties, under a system where a premium is paid for quality.

On the foregoing principles there may not be entirely unanimous agreement, but it is safe to assume that a substantial majority of all the interests affected would readily subscribe to an arrangement that would embody these various points of merit. Therefore, it is asked that the following plan be considered:

Specific Suggestion

Let us assume:

(1) That all railroads register their annual crosstie requirements with a central purchasing committee, and that all railroad ties be purchased and inspected in accordance with nationally standardized specifications.

(2) That all railroad ties shall be inspected by regional inspectors, in accordance with standard rules for the application of the specifications.

(3) That the individual roads shall enter into contracts directly with the tie producers for such portions of their requirements as the railroad administration may consider justified from time to time.

(4) That all contracts shall be awarded only after fair and open competition has developed the lowest price per tie obtainable from responsible bidders.

(5) In the event of a contractor being delinquent in the specified deliveries for certain kinds of ties, the United States Railroad Administration may prohibit his acceptance of any additional business for the same kind of ties.

(6) That the purchase of all railroad ties by the United States Railroad Administration shall be effected through a nationally standard form of contract.

(7) Reports from regional inspectors, purchasing agents of individual roads, and the regional purchasing committee, shall necessarily be forwarded to the central purchasing committee. These reports shall provide a fund of information regarding conditions surrounding production in the various regions, and in regard to the various kinds of timber, shipments, and prices, so that the central purchasing committee can, through the regional purchasing committees, intelligently and effectively instruct the individual railroads relative to the kinds of timber, number of crossties being produced, and as to the opportune time and manner to purchase future increments of their requirements.

The *basic reasons* and *advantages* of a method of purchase of this character may be outlined as follows:

(1) The system is founded upon the proper business relationships according to our American standards.

(2) The proper price for crossties would be established and changed from time to time by business conditions.

(3) The purchasing departments of the entire United States Railroad Administration would be provided with first hand and all proper knowledge in regard to production, shipments, and prices of railroad crossties.

(4) The production would again have the stimulant of a contract obligation, individual initiative, a premium on foresight, reward for efficiency, and a desire for volume of business.

(5) The suggested arrangements are susceptible of practical application either under governmental ownership or governmental control.

(6) In cases of emergency, the regional purchasing committees could draw upon any road's contracted supply of ties, with despatch, and without any negotiation with the seller.

(7) The regional purchasing committee would be permitted to perform the highest functions in the field of purchasing, leaving their minds free for the consideration of the exceptional conditions.

(8) The economies in transportation, as far as the length and cost of haul are concerned, would automatically adjust themselves in the majority of instances.

(9) The method of purchases, as above outlined, is in substantial accordance with arrangements now effective relative to numerous railway supplies.

(10) The people of the country would positively, definitely, and beyond any doubt know that expenditures for railroad crossties were being made in accordance with the best American business standards.

(11) The business would be conducted on the basis of absolute fairness and business equality between buyer and seller, without dictation by any arbitrary or artificial power, and in specific and direct relationship to the law of supply and demand, upon which the entire structure of our American commerce is predicated.

Discussion

In the discussion of this paper Mr. Poleman asked Mr. Towner how over-production can be controlled with the present purchasing methods involving the elimination of contracts and the centralization of purchases. Mr. Towner replied that many roads have always secured their ties from small producers along their lines, working without contracts. There is now an over-production in one area of more than 8,000,000 ties beyond the requirements of the roads in that vicinity. The Purchasing committee has told the producers in that region to curtail their production beyond a certain date but if a surplus still exists at that time, the committee will endeavor to take the ties off the producers' hands. The central purchasing committee already knows the requirements of every road for 1919 and has estimates of the production in each area. Every producer will be notified in ample time to avoid any overproduction which may be threatened.

Cost of Producing Railroad Ties

The factors entering into the increased cost of producing ties under the new specifications were brought out in a paper by John H. Johnson of B. Johnson & Son, Richmond, Ind., which is abstracted below:

You are, of course, familiar with the present plan of posting circulars in conspicuous places in all railway stations, offering to purchase ties of anybody, naming the prices to be paid and giving the specifications—the man who hauls in a wagon load of ties to receive the same price for his ties as the man, firm or corporation who has an expensive organization built up after years of experience, who has large investments in saw mills, teams, timber, etc., and who devote their entire time and attention to the business of producing ties. In our experience, we have known of railroads deciding to buy their ties by the method named above, in spite of the fact that we had a good organization on the line and were getting ties in sufficient quantities to meet the needs. In fact, we procured more ties in some years than were needed, enabling us to ship the surplus off the producing line. The result of trying to buy by circular was a complete demoralization of the business, and it did not take a year's time to demonstrate that this plan was a mistake. The only reason for making a change in the manner of buying the ties, was the hope of buying them cheaper. We could not buy the necessary timber, as the owner knew the established price for the ties and he figured he must have a certain price for his timber accordingly. In a great many cases he would not make it into ties himself nor would he sell at a price which would permit the contractor to buy and manufacture, the result being that ties were not produced. Nor could we get the amount of labor usually procured, for the price of ties was published to the public at

large and the tie maker figured he should have a good share and he demanded more than we could afford to pay. As a result of this idea of "direct from the producer to the consumer" the production was practically eliminated.

We have found that it is a very difficult matter to try to change the methods of the tie maker or saw mill man. He has always been educated to make two grades of ties. Specifications handed him were simple and he could easily understand and apply them. Also it was not difficult for the man who had to ride the woods and make an inspection of the ties to apply the same simple specifications as to grades. This also applied to the railroad inspector who finally inspected the ties. But along came the new specifications with five grades and prices—and we must confess it has been very difficult to get the man away back in the country to understand them. He is not the only man either who does not, for one inspector for the railroads inspects one way and one another, interpreting the specifications differently. It seems to us that, of all times to make a change in specifications (if it had been necessary to have made any change at all) the time chosen was inopportune, as the demands for all forest product was unusually great and it has been very difficult to put into satisfactory use the new specifications.

One serious problem is the buying of timber at prices that will justify our making it into crossties. It has always been our policy to make our timber into ties and not take the best for some other product of a higher grade and price and then cut the cull timber into ties. We have preferred to adhere strictly to the tie business and have found it more to our advantage. The price of timber stumpage has been increasing as the demands of the country developed. We find the publication of the new government prices has greatly stimulated the price of standing timber and we cannot blame the owner of the timber for raising his price when he sees the published price of ties. On account of the way the new specifications are being applied in a great many instances, it would pay the owner of timber to let his timber stand or cut it into something other than ties.

One of our timber men estimates that 40 percent could not be made into ties to stand the technical application of the new specifications at the present prices. The price of the low grades of ties is too low to justify bringing out the 40 percent left in the woods. I am sure we will all agree that everything should be done to prevent any waste of timber and we believe a better price paid by the railroads for what are called "serviceable rejects" will make it worth while to make into ties such timber as is suitable therefore. It is our judgment that there should not be such a wide difference in prices between the Grade 1, 6 in. by 6 in. tie which is practically our old second class tie, and Grades 2 and 3. If the price of the lower grades could be increased it would be a great help in the production of ties. The prices of all ties have been too low to compete with the prices of lumber. The class of timber that is necessary to make the kind of tie desired must be high grade which is now worth more when manufactured into lumber.

We believe all of these conditions have a bearing on the cost of producing railroad ties under the new specifications. They have caused us to pay as much as ten cents per tie more to get it made with the axe and the cost has been even greater when sawed, ranging from 15 to 20 cents more per tie. It is costing from 50 to 60 cents for the labor alone to get 6 in. by 8 in. by 8 ft. ties from the tree to the railroad now, whereas formerly we could get the work done for from 35 to 45 cents. Some of our very best tie makers have left good jobs where the timber was good because it was difficult for them to make a tie to comply with the new specifications. The fact is, that the old-time tie maker is getting to be a thing of the past and it is becoming necessary more and more to produce ties at saw mills.

There are three other things which I would like to mention as having much to do with the cost of producing ties: (1) prompt inspection after they are delivered to the railroad; (2) the prompt placing of cars in sufficient numbers to avoid carrying such a large quantity on hand as has been necessary so many times, involving the investment of a great deal of money, and (3) the payments made by the railroad companies to the contractor or producer of ties.

Disposition of Small Timber

The disposition of small timber under the new specifications was discussed by Howard Andrews, of the Nashville Tie Company, Nashville, Tenn., in a paper presented on Friday afternoon. Mr. Andrews prefaced his paper with the remark that the new specifications have eliminated the use of much small timber formerly converted into ties. He did not question the advisability of this practice from the standpoint of the railways, but did question its advisability from the standpoint of timber conservation and its effect on the ultimate source of supply of tie timber. He referred to time within his memory when roads such as the Erie were able to secure all of the ties they needed along their right-of-way, but that the country is now depleted of tie timber as far south as the Ohio River. Mr. Andrew's paper is abstracted as follows:

An examination of the Administration specifications shows that the smallest tie accepted must be one that if hewed or sawed to squared edges would measure 6 in. by 6 in. Such a tie, however, generally is one such as was formerly known as a 6 in. by 8 in. tie, being 6 in. thick, 8 in. through the body, and with a 6 in. face or surface under the rail. I know from experience that under former conditions many railroads in the country would have accepted such a tie as No. 1, 6 in. by 8 in., or at least as No. 2, 6 in. by 8 in. Under the present conditions the production of this 6 in. by 6 in. or "grade 1" tie is being discouraged by the Railroad Administration, both in price and in other ways, whereas under former conditions this was one of the standard sizes of ties in use.

What is now called a 6 in. by 8 in. tie by the Railroad Administration, being a tie that will show squared edges of these dimensions, would formerly have readily made what was the standard 7 in. by 8 in. tie, being a tie 7 in. thick, 8 in. through the body, and with a 7 in. face, or surface under the rail. Either the new specification "grade 3" 6 in. by 8 in. tie, or the old time standard 7 in. by 8 in. tie would come from the same stick of timber. I believe the advantage is all with the old tie, which has more bulk and weight, and therefore is more desirable under the rail. It is also more economical in manufacture, as so much is wasted in chips by the axeman in cutting the square edge 6 in. by 8 in. tie, and these chips would be of value if left on the tie and used in the track under the rail. It may be argued by the Railroad Administration that the tie man may have the option of leaving these chips on the tie, and that he does not have to cut them off, but no extra pay is given for these chips. Inasmuch as most ties are hauled by wagon a considerable distance before reaching the railroad, it is to the tie man's advantage to cut off and waste these chips, rather than overload his wagon on a long haul with something he does not get pay for. It is my contention that any effort to secure a square-edged tie is an economic waste, as the value of the tie is governed more largely by the thickness and width through the body than by the width of face under the rail, although the width of face, of course, is some consideration. I think there is no question that a tie, say 6 in. thick, 8 in. through the body, and with a 7 in. face is of more value than one that is hewn or sawn to strict 6 in. thickness and 7 in. wide, square edges, etc., yet the Railroad Administration pays the same for both ties.

The Grade 1 tie means a stick of timber that will cut

the equivalent of a square tie, 6 in. by 6 in., and this means a stick 9 in. in diameter at the smallest end. I understand that it is one of the theories of the Railroad Administration that by commanding a larger tie they will conserve the timber of the country by preventing the cutting of smaller trees.

The timber that it is necessary to conserve, and which should be utilized into ties and accepted and used by the railroads in such proportions as are practical, is the upper part of every tree that is cut down. The Railroad Administration specifications now admit of the acceptance only of ties made from sticks of timber at least 9 in. in diameter, although previously it was possible to market ties made from sticks 8 in. in diameter at the small end, which made a tie perhaps a little less than 6 in. thick, but 8 in. through the body, and with 5 in. or more of face under the rail. While I do not know that it is advisable to use a small tie for heavy service, I am sure that such a tie made from an 8 in. stick of timber, could be used in large quantities and with satisfactory results in spur tracks, branch lines, etc. I have been told that it is common for the largest railroads in the country to use the best 7 in. by 8 in. ties in unimportant spur tracks and sidings, where a smaller tie would not wear out or rot any sooner than a large one.

Eliminating the possible conservation of the small trees which might be effected by the use of large ties only, I am convinced that the production of ties to meet the Administration specifications means a waste of from 20 per cent to 50 per cent in timber. Every tree that is cut down will produce one or more ties from sticks 8 in. in diameter, and under 9 in., which are not accepted when the minimum tie must come from a 9 in. stick. When these smaller ties are not made, there is nothing to do with the upper parts of the trees but to let them lay in the woods and rot. I know of no other disposition to be made of the timber, except such as may be cut into cord wood for the farmer's fire. Cord wood cannot be cut and shipped to the larger cities in competition with coal as fuel. A loss of 20 per cent to 50 per cent in timber means a corresponding reduction in the number of ties coming from a certain acre, and makes necessary a higher price for such ties as are marketed, unless the timber owner is willing to accept 20 per cent to 50 per cent less for his timber.

We must remember that specifications, no matter how satisfactory they may be from the railroad viewpoint, will not affect the size of the trees that the ties are to be made from, nor will they affect the growth of timber for future use. We must cut according to our cloth.

Discussion

In the discussion of this paper, Mr. Towner stated that the Forest Products Section has given careful consideration to the utilization of the small ties, and has taken the matter up with trolley lines and industries where small ties can be used equally well. The government has accepted over 500,000 ties too small to come within the standard specifications within the last seven months, and is trying to secure disposition for them. It will try to use all small ties coming from the tops of trees, but will not willingly accept ties cut from small trees, as this practice is in conflict with conservation.

Mr. Andrews urged that conservation must include measures looking toward (1) timber preservation, (2) the discovery of use for small ties by the steam roads, as the traction lines cannot absorb all of them, (3) the finding of use for ties with small defects. He stated that the timber he is now working on will produce from 25 per cent to 40 per cent more ties if smaller ties are accepted.

Walter Poleman asked what, if any, discretionary powers are given to inspectors to consider the larger end of the tie, or to average its diameter to reduce the minimum diameter accepted. Mr. Towner replied that the value of the tie is limited by the diameter at the point of rail bearing at the smaller end and that no allowance is now made for excess size in the remainder of the tie.

Mr. Poleman also called attention to the fact that large quantities of timber are now being made exclusively into mine props. Mr. Towner stated that the Forest Products Section now has this question up with several state forestry departments, and is endeavoring to encourage the use of other timbers for this purpose to conserve the tie supplies.

The price paid for usable rejects (ties not complying with the specifications) has been a source of contention. Mr. Towner stated that the price for such ties has been left entirely in the hands of the regional purchasing committees and largely to the disposition of the individual roads. Attention was called to instances where purchasing agents had refused to accept ties complying with the specifications unless the usable rejects were also turned over to them. Mr. Towner stated that it was not the policy of the purchasing committee to force a producer to turn the usable rejects over to the railroads if he could dispose of them to better advantage elsewhere.

Orders of Regional Directors

Pilot for trains making detour movements.—Order 154 of Southwestern regional director, similar to File 1200-272A461 of Eastern regional director, abstract of which appeared in *Railway Age* January 31, (page 315).

Freight Car Distribution.—In Supplement 1 to Circular 70 the Northwestern regional director announces that for the purpose of relieving the present surplus of box cars in eastern territory and to get cars into western territory that are suitable, or can quickly be made suitable, for loading, orders are now being placed by the Car Service Section for inter-regional movement which provide for the delivery of: (a) box cars in good order and cars that can be made fit for grain by light running repairs or coopering; (b) bad order or rough freight box cars belonging to the receiving road or belonging to other roads in the same region (bad order cars belonging to other than the receiving roads may be either repaired by them or delivered to the owning lines). Cars received on these orders which, in the opinion of the receiving line, should not have been delivered will not be rejected or returned except by authority of the terminal manager at the junction point or the chief interchange inspector if the terminal manager delegates this authority to him. When cars are accepted through gateways where no terminal manager is in charge the receiving road will accept all cars offered and will report promptly to the regional director's office all improper deliveries.

Deadheading Household Goods for Railroad Employees.—In Circular 166 the Southwestern regional director announces that the household goods of employees may be moved deadhead, and this may be done over two or more federal-controlled lines if that is necessary.

Transportation over Short Line Railroads.—In Supplement 10 to Order 109 the Southwestern regional director states that federal managers should make requests direct on non-federal controlled "short line" railroads for such annual transportation as they consider necessary for their officers and employees.

Insurance on Construction Work.—In Supplement 2 to Circular 68 the Northwestern regional director states that fire and casualty insurance should be secured on construction work when the cost is chargeable to capital account, the premiums to be included in the cost of the work.

Inspection of Coal.—In Supplement 14 to Circular R.P.C. 3 the Northwestern Regional Purchasing Committee announces that on account of the discontinuance on January

31 of inspection by the Fuel Administration of coal loaded at mines it will be necessary for the railroads themselves to undertake the inspection of fuel. As pointed out by the Fuel Conservation Section of the Railroad Administration, the decrease in commercial and railroad demands for fuel makes it no longer necessary to purchase coal of marked inferior quality. At the present higher initial mine costs for coal, increased fuel transportation and labor costs, the difference in heat values of coal having varying thermal efficiency represents, in dollars and cents, a wider margin of loss when inferior coal is accepted than during past periods when prices and handling costs were considerably lower.

The Eastern regional director has issued similar instructions, file 1500-3-28A464.

Fire Inspection Service.—The Eastern regional director, file 1800-34-6A472, states that a meeting of superintendents or supervisors of fire protection will be held in the New York Central Board Room, Grand Central Terminal, New York, at 10:00 a. m. Friday, February 21, to discuss the various problems in connection with fire prevention, and to analyze fire losses that have been sustained.

Shop Supervision.—The Eastern regional director, file 1200-2-30A474, quotes from a letter received from W. T. Tyler, director, Division of Operation, dated January 27, as follows:

> It is stated that in some of the shops where a change has been made from piecework to hourly or daily basis, the piecework checkers, usually clerks or office men, have been put in the position of foremen at foremen mechanics' rates. I suggest the advisability of cautioning federal managers against leaving any opportunity for criticism in connection with this matter.

Extension of Railroad Mail Service.—The Allegheny regional director, in Circular 125, states that it has been decided that it is permissible for railroads under federal control to carry as railroad business, without payment of postage, mail which relates to the business of other railroads under federal control and which is sent by and addressed to officers or employees of railroads under federal control.

Filing Time on Railroad Messages.—The Eastern regional director, file 2001-5A475, quotes from a letter received from Martin H. Clapp, manager, Telegraph Section, Washington, D. C., as follows:

> I do not think that it is desirable that the filing time be transmitted and shown on received copy of all the messages sent by the different railroads. It is, however, desirable to have the filing time sent and shown in connection with all messages sent to and from the telegraph office of the Railroad Administration at Washington.

Meetings of O. S. and D. Representatives.—In Supplement 2 to Circular 66, the Northwestern regional director states that a considerable saving has been effected in claims for lost and damaged freight at an important terminal in the region through periodical meetings of railroad representatives for the purpose of matching up shipments of freight found over without billing. He directs that similar weekly meetings be inaugurated at all other common points. Where terminal managers are employed, these meetings will be held under their direction. A brief report showing the number of shipments of freight "over and short" on each railroad, and the number eliminated should be sent from each station involved to the regional supervisor of freight, loss and damage.

Consignments to Shippers' Order.—Under date of January 27, the Northwestern regional director calls attention to Rule 38 of the Western Classification, which provides that the issuance of bills of lading for shipments consigned "to order" will not be permitted unless the name of the person, firm or corporation to whose order the shipment is consigned is plainly shown after the words "to order." Likewise the issuance of bills of lading for freight consigned to shippers' order at one point involving the notification of a consignee at another point is not permitted, except when consignees are located at prepay stations or interior points, in which case the freight must be consigned to an open station to be designated by the shipper. The regional director states that this rule shall apply to all shipments regardless of whether the tariffs governing are subject to Western Classification rules.

Attitude Toward Bills Introduced in State Legislatures.—The Eastern regional director, file 1201-12A473, states that the following instructions have been received from the director general relative to the attitude that should be assumed by railroads under federal control toward bills affecting railroads and the Administration:

> With respect to legislation in any way affecting the interests of labor, it is to be understood that the Administration has no such legislation to propose, nor will it lend its assistance in any form to measures affecting a repeal of existing laws affecting the interests of labor. Following out the policy which has been suggested by the director general to representatives of labor, it is understood that such representatives will bring such operating proposals affecting the interests of employees, as they consider to require action, to his attention for administrative action rather than advocate the passage of state legislation to accomplish their purpose. Should legislation of this character be proposed, however, it should be brought at once to the attention of the director general. (Of course any legislation of a "social" character proposed by representatives of labor and having no relation to railroad operation will not be dealt with at all by or on behalf of the director general, through regional directors, federal managers, or otherwise).
>
> With respect to other proposed state legislation affecting railroads under federal control, you are authorized to take such action as may, in your judgment, be advisable in the way of bringing to the attention of the legislatures, or of legislative committees, the facts relating to the subject of the proposed legislation, the effect thereof on railroads under federal control, if enacted, and such reasons in connection with the enactment thereof as you believe should be presented. Questions so handled before legislatures or legislative committees should be dealt with by representatives of the Railroad Administration authorized to talk for the Railroad Administration and the Railroad Administration only. Whenever any steps are taken in that direction or in the way of committing the Railroad Administration to any attitude with respect to proposed state legislation, the director general should be immediately notified.

Duties Assigned to Board of Railroad Wages and Working Conditions.—The Eastern regional director, file 1200-274A477, advises of special provisions which are to be made for conferences between representatives of the regional directors and representatives of the employees involved in the matter of rules and working conditions for various classes of employees upon roads where such employees do not have agreements or schedules: "Instead of holding extensive hearings and themselves sifting out the testimony and framing rules, it is considered highly desirable both for the sake of conserving the board's time and securing a more mutually acceptable set of rules and working conditions, to have representatives of the regional directors and representatives of the employees involved meet and, so far as they may be able to do so, agree upon such rules, referring to the board for consideration the rules, if any, upon which they are not able to agree (as well as, of course, those upon which they are able to agree) and from this report the board will make its recommendations to the director general."

Agreement Between Director General and Express Company.—In Circular 165 the Southwestern regional director refers to the agreement between the director general and the American Railway Express Company which provides that the express company will transport without charge over lines under federal control all packages of money, valuables, papers and shipments of materials and supplies ordinarily forwarded by express, which are used in the operation of any of the controlled roads. In this connection the question recently arose whether it was the intention, under this law, that business should be handled dead-head for one line moving over another. The answer is in the affirmative. The express company will also transport without charge shipments of tickets and supplies to agents of the Pullman Car Lines.

Rerouting Carload Freight.—In Order 153 the Southwestern regional director outlines the practices which are to be observed by railroads in rerouting carload freight. Instructions provide for notation on waybills by the agent changing the routing and the sending of a postal card to the consignee advising him of the diversion. The order also

gives detailed advice as to the method of handling charges when freight is rerouted.

Distribution of Empty Freight Cars.—Circular 172 of the Southwestern regional director, similar to Circular 70 of the Northwestern regional director, abstract of which appeared in *Railway Age* of January 17 (page 206).

Cleaning and Disinfection of Stock Cars.—In Order 155 the Southwestern regional director states that the Department of Agriculture has called attention to the fact that considerable difficulty is being experienced at many points in the enforcement of that part of the Bureau of Animal Industry order No. 245 concerning the cleaning and disinfection of cars which have been used in the interstate transportation of live stock affected with contagious, infectious or communicable disease and asks that steps be taken to bring this matter to the attention of all concerned.

Clauses to Be Incorporated in Contracts.—In Supplement 10 to Circular 11 the regional purchasing committee states that the following clause included in Supplement 9 to Circular 11 of the regional purchasing committee should hereafter be eliminated from contracts and orders: "(A) If during the life of this agreement any competent government authority shall for the first time establish a price on the articles hereby contracted for, the price so fixed shall be paid for all material delivered under this agreement after the date when such price becomes effective."

Plan of Security Owners for Return of Roads

Minimum Rate of Return, Corporation to Finance Readjustment, Co-ordination of State and Interstate Regulation

A COMPREHENSIVE PLAN for the return of the railroads to private operation and for their future regulation was presented before the Senate Committee on Interstate Commerce on January 31 by S. Davies Warfield, president of the National Association of Owners of Railroad Securities. The principal feature of the plan, which has been adopted by committees of the association, proposes an act of Congress providing that such rates for freight and passenger service shall be established as will produce a minimum return (6 per cent suggested upon the combined property investment of the roads in each of the three classification territories), excess earnings above this amount to be distributed under the control of the Interstate Commerce Commission, part of it for the benefit of the employees and part of it for improvements. It is also proposed to create a National Railways Association, directed by trustees composed of the nine members of the Interstate Commerce Commission and eight railroad men, to assist in financing the return of the roads and to continue or adopt co-operative methods of operation. The plan also provides a system of regulation by the Interstate Commerce Commission and six regional commissions with a co-ordination of federal and state authority.

In outlining the association's plan before the committee, Mr. Warfield took issue with the suggestions previously made for federal incorporation of railroads and for the creation of a secretary of transportation and vigorously opposed both government ownership or government operation for the five-year period proposed by Mr. McAdoo. In support of the plan Mr. Warfield left wtih the committee letters of approval from Elihu Root, Hugh L. Bond, Jr., John G. Milburn, John S. Miller, Luther M. Walter, Forney Johnson, and B. H. Inness Brown, counsel for the association. The constitutionality of some of the suggestions from others previously appearing at the hearings, notably federal incorporation of railroads, was denied by these same legal authorities. Some of the important organizations of shippers of the country, Mr. Warfield said, support many of the ideas he advanced and for the first time the committee could find itself confronted with a plan approved by spokesmen for the security owners and the shipping interests.

An abstract of Mr. Warfield's statement follows:

Methods Open to Congress

We understand that three methods are open to Congress in respect to the railroads:

1. To carry out the provisions of the federal control act under which their control and operation was taken over by the government for the sole purpose of war.

2. To extend the period of federal control and operation for five (5) years for purposes clearly not those for which they were taken.

3. Government ownership—a question embodying a complete reversal of national policy, of vital moment to every interest in the country.

The third proposition we assume is not at this time being seriously considered by your committee, no matter what may be the opinion of some in respect thereto. Certainly the results of federal control and operation thus far obtained cannot give comfort to advocates of government ownership. The exigencies of the present situation require immediate action in respect to property that was taken for war under agreement with the owners for its return as outlined in the federal control act.

The second proposition is disposed of in the settlement of the first. Extension of the time of federal control and operation beyond the time specified in the act for the return of the railroads would take them to a point where they *cannot be returned at all.* Congress placed the federal control act on the statute books. Your committee knows the purpose the Congress had in mind when this was done. And Congress will decide whether it is defensible to seize property for war purposes and when those purposes have been served to use the vast investment therein to carry out individual theories of railroad operation and for experimental purposes. The financial structure of all credit is involved in the decision of your committee, apart from the question of common honesty involved, for Congress did not authorize the investment of fifty million people in these properties to be seized for one purpose, and then put to another. Your act not only specifically names the time within which the railroads shall be gotten ready for return to their owners and for such return, but it also provides for the physical condition in which you expect and require them to be returned.

We believe that the railroads of the country should be returned to their owners under private operation as early as practicable, but not before legislation can be enacted that will assure adequate facilities and service at reasonable rates under proper control and regulation by governmental bodies and protection to the investment in the properties.

We urge that this legislation be enacted early in the 21 months allowed by the federal control act to prepare for their return, since each month of continued so-called uni-

fication and diversion of traffic takes the railroads further away from normal methods of meeting the business requirements of reconstruction. They are fast losing their individuality and we ask during the present session of Congress such temporary legislation, at least, as shall cause the immediate restoration of the normal requirements of the railroads, such as their traffic and other departments. The longer this is delayed the more difficult does it become to carry out the intention and provisions of the federal control act.

We ask that you will provide for a gradual liquidation of the indebtedness of the railroads to the government. The government's loans to the railroads, outside of advances of annual compensation or rental, largely represent expenditures made at the sole discretion of the director general for war and other purposes over which the railroad corporate managements have had no control, and often made without their approval. You may recall that the contract executed between the government and the telephone company gives 20 years during which repayment of obligations, similarly created, may be made. A large part of the loans made to the railroads by the government represents the compensation the railroads are entitled to receive under the federal control act, as rental. In many cases this rental has been called an advance, notes given therefor and collateral required therewith.

As the first step in the return of the railroads, the one plant contemplates that the present freight and passenger rates, state and interstate, and the present scale of wages shall remain in full force and effect until and unless changed in the operation of the plan.

The plan, stripped of operating details, is based upon the following fundamentals, and they are embodied therein:

Fundamentals of Plan

1. A minimum rate of return on the property investment in the railroads, *fixed* by act of Congress, through rates adjusted as occasion may demand, in order that the securities of the railroads may be stabilized and their credit established on a basis necessary to secure the money to provide to the shippers and travelling public adequate facilities and service;

2. Recognition that a fixed return through rates that will enable the average railroad to receive an adequate return on its invested capital is not possible without giving to the more favorably situated railroads more revenue than the public will sanction, or more than would represent a fair return on its property. The earnings of railroads in excess of a fixed reasonable rate of return to be applied as provided in the following section.

3. A distribution, under the control and jurisdiction of the Interstate Commerce Commission, of a percentage of the fund above provided, that railroad employees shall receive the benefit of profit sharing, by insurance, or by such other legal methods as may be determined upon; likewise a distribution of a percentage thereof among the railroads earning it, and under the plan, and in furtherance of incentive and initiative by establishing operating efficiency standards; for certain improvements to railroad property, under restrictions, not to be capitalized in rate making; and for other purposes defined in the plan;

4. A corporation, created by act of Congress, operated without profit to the railroads, and under federal control, directed by trustees composed of the nine Interstate Commerce Commissioners and eight railroad men, to finance in the present emergency, such equipment as may be purchased by it from the Railroad Administration and allocated to the railroads, and to furnish an immediate means for assisting in financing the return of the roads; continued as a permanent means for mobilizing and purchasing equipment to be leased to the railroads; to provide a management or agency to continue or put into effect the joint use of terminals, unification of facilities, re-routing of freight by pooling or otherwise, and to continue or adopt such methods of operation as may have been found to be successful and expedient during federal control; to furnish a standing, trained and efficient means for immediate mobilization of the railroads for war purposes without additional legislation.

5. Federal regulation extended through the Interstate Commerce Commission as at present established, co-ordinating therewith subsidiary commissions as regional commissions, the members thereof selected equally from the two leading political parties appointed from and sitting in the six traffic territories as at present defined, giving to such bodies the determination of rates and regulations. The right of appeal is given to the Interstate Commerce Commission, which may be designated Commission of Appeal.

6. Continuation of rate committees composed of representatives of both railroads and shippers in defined territories, to primarily consider and pass upon all changes in rates requested by either railroads or shippers and before being filed with the regional commissions or Interstate Commerce Commission.

7. Co-ordination by the Interstate Commerce Commission, of the work of the state commissions, as far as the limitations of law, and the legislation provided under the plan will permit, with that of the regional commissions. The adjustment of intrastate rates to the requirements of interstate commerce as prescribed through interstate rates is vested in the federal commissions.

8. Regional commissions act as boards of conciliation for the settlement of wage differences between the railroads and their employees. In default of settlement such commissions shall appoint two arbitrators, the employees naming two, the four so selected naming the fifth, if required. Appeal may be taken to the Interstate Commerce Commission; the findings not to be compulsory unless mutually agreed beforehand. A fixed return being provided under the plan, expenditures for wages or other elements entering into expenditures are supervised by the commissions.

9. Future issues of railroad securities supervised by the regional commissions and the Interstate Commerce Commission.

Other Plans That Have Been Proposed

Having stated the fundamentals of our plan, it becomes necessary, before entering into the details thereof, to discuss some of the propositions that have been submitted to your committee from other sources. Their fundamentals are:

1. Compulsory federal incorporation of railroads;
2. Provision for a new cabinet officer, to be known as the secretary of transportation;
3. Regional railroad companies;
4. Withholding from the government the initiation and determination of rates, at the same time asking that such rates shall provide sufficient revenues.

1. Compulsory Federal Incorporation

Compulsory federal incorporation necessitates, in the opinion of many able lawyers, the sale of existing railroad companies now organized under state charters to companies to be organized under federal charters. Such federal charters would be authorized by act of Congress, always subject to amendment at any time, and would likely contain a recapture clause under which the government could acquire the railroads on its own terms by probably taking from them the right of appeal to the courts for an adjustment of their affairs. No railroad is justified in surrendering legal rights its present status gives it for advantages alleged to be attained by federal incorporation, and thereby leave open any such avenue of menace to property rights.

The power of Congress to make federal incorporation com-

pulsory is doubtful on constitutional grounds. Endless litigation would ensue in which the states would participate to contest the abrogation of their right to exact the performance on the part of railroads of certain obligations assumed by them as conditions imposed in return for franchise rights that had been granted to them by the states. Furthermore some of the states own stock of railroads and would likely join with other stockholders in resisting any such proposal.

2. Cabinet Officer—Secretary of Transportation

In addition to federal incorporation it has been proposed to create an additional cabinet member who shall be secretary of transportation. The powers proposed to be conferred upon this official are autocratic to an extent beyond those given by the Congress, even in times of war, to the cabinet officer who became director general of railroads. For Congress did fix a standard return as rental for railroad properties, whereas it is now suggested that the "unifying" and other powers now possessed by the present director general, be conferred upon this new official almost without limit. The return the owners of the securities shall receive on their investment is left entirely unprovided for, excepting to express in generalities that sufficient revenues shall be provided. The powers proposed to be given to the secretary of transportation, who largely supersedes the Interstate Commerce Commission in many respects, are sufficient to practically disable the railroad structure if the office should be filled by a man untrained in the technical necessities of the case. The provision that this official shall have under him a board to decide labor disputes, no matter from what interests such board is selected, is to confer an opportunity for political favors and control dangerous in the extreme. Furthermore, this board would not be responsible for the control of rates, from the proceeds of which the employees of the railroads are paid. It is highly necessary that the governmental agency charged with the responsibility of finding the money to operate the railroads, through rates, should supervise the questions of labor in respect to its fair compensation, and to provide the money wherewith, as a part of the railroad structure, it is to be paid. We live under a partisan form of government. A proposal to turn these properties over to a newly appointed cabinet officer with the political power possible under such proposal would seem to substitute a political form of control for a non-political regulatory body, like the Interstate Commerce Commission.

It would be unfortunate to create a situation under which these great properties might be carried into politics by placing them under a cabinet officer, subject to change every four years, and in the present case in two years. It would make the railroads the political center of the presidential campaign soon to open.

The railroad problem is altogether too extended, not to require that the responsibilities of working it out shall be lodged with a body of trained men, such as the government now has in the Interstate Commerce Commission, and the railroads now have among them.

3. Regional Railroad Companies

It has been proposed to organize five regional railroad companies and cause the railroads operating in the respective regional districts to exchange their stocks for the stock of the district or regional company. Then it is thought a rate can be made that will work out a fair return on the regional company's stock, or on the investment in the property of the regional company. The objections to the regional plan may be stated:

(a) The area of each of the five regional districts suggested would be more than the area of England and France combined. England and France are densely populated and their railroads serve most of the area required to be served, whereas in this country a large portion of the area of many of the regional districts suggested will be found not to be fully served by railroad facilities; the concentration incident to this plan must necessarily check agricultural and industrial development to be had chiefly through individual initiative and incentive in railroad construction, operation and management.

(b) Negotiations leading to the exchange of stocks of all of the railroads into the stock of the regional companies would be endless. It would result in a court settlement before it could be accomplished—long drawn out litigation and years of turmoil during which the railroad shippers, the traveling public and the security owners would all suffer.

(c) It draws the railroads closer to the general principles involved in government ownership. It saps initiative and incentive by combining into five areas, several of them largely undeveloped, all railroads under five managements which the plan proposed provides shall be largely governmental; why not, therefore, follow the plan devised by many advocates of government ownership, by forming one large company and take over the railroads? Practically the difficulty of bringing about one complete consolidation of all the railroads is no greater than that of five regional consolidations; the latter having all the disadvantages of limitation of service and facilities incident to concentration and reaches the point where further contraction would make little difference. It would result really in five government ownerships instead of one, with the money supplied by private means.

4. Withholding from the Government the Initiation and Determination of Rates

It seems hardly necessary to point out that when the government is asked to provide *sufficient revenues* to the railroads, the initiation of rates necessary to produce such return, if really given, should rest with the regulatory body responsible to the Congress and to the public for such revenues. The general proposition that rates must be "reasonable" and "fair" and "provide sufficient revenue," etc., has been discussed and protested before the Interstate Commerce Commission and elsewhere, ever since there has been a commission,—nobody has contested it, so far as known. But to *measure it in terms* is altogether a different matter. It is difficult to measure it, yet necessary, for results have not been satisfactory where it has been left for uninstructed men to decide the limitations of the words "reasonable," "sufficient" and "fair." The plan that suggests that the railroads initiate rates, to remain in effect unless and until suspended, does not define any method to produce the "sufficient revenues" which it asks for. Even under these conditions, if such return is to be expected, the body to *produce the return* should have full control over rates. But our plan goes further and provides for a *fixed* return and the method to produce it. To expect the Congress to define, by act, the *measure* of such rate of return and *instruct* the Interstate Commerce Commission to put the same in effect and see that it is continued, and then ask that the railroads shall *initiate and establish the rates* through which such defined return is secured, would certainly not be a reasonable proposition under such circumstances.

The security owners are more concerned in a method of fixing the "sufficient revenue," "reasonable" or "fair" percentage of return, than in seeing given to the railroads the *initiation* of rates, the control of which properly belongs to the regulatory body that would be charged with the adjustment of rates necessary to produce such a return. We feel that the feature of initiation can properly be exchanged for the suggested definite return.

Railroad Hearings Before Senate Committee

Hines Says Roads Must Be Returned Unless Time Is Extended —Security Owners and Brotherhoods Present Plans

WASHINGTON, D. C.

TWO NEW PLANS for the disposition of the railroads have been presened before the Senate Committee in Interstate Commerce during the past week. The most comprehensive one was that submitted by S. Davies Warfield, president of the National Association of Owners of Railroad Securities, which is published elsewhere in this issue, proposing a law to provide that rates shall be sufficient to produce a minimum return of 6 per cent upon the combined property investment of the roads in each of the three classification territories. The most novel one was that proposed by Glenn E. Plumb on behalf of the four brotherhoods of train service employees, providing for government ownership of the railroads and operation by a single corporation, one-third of the directors to be chosen by the employees, one-third by the officers and one-third by the President of the United States; earnings above fixed charges to constitute a trust fund to be declared as a dividend to the employees in proportion to their wages. The plan also has the support of other labor organizations. The brotherhoods also opposed the McAdoo five-year plan.

Walker D. Hines, director general of railroads, in addition to advocating the five-year extension of federal control and declaring that the railroads must soon be returned to their owners unless the extension is adopted, also outlined briefly a permanent plan which he thought might be worked out during the five years, for grouping the railroads into 6 to 12 corporations with a minimum guaranteed return and a profit-sharing plan for earnings above the guarantee.

Mr. Hines took up one at a time the various orders which have been objected to by Clifford Thorne and others as examples of the exercise of arbitrary power. He said that while it was necessary to put the 25 per cent increase in rates into effect without consulting the interests affected, the various revisions in rates since that time have been conducted in such a way as to give the shippers ample opportunity to present their case. The Division of Public Service and Accounting had been appointed to represent the interests of the public and all changes in rates were referred to it before being put in effect by the traffic department. In important cases, such as the increase in express rates, the consolidated classification and the proposed scale of mileage rates, the advice of the Interstate Commerce Commission had been sought and increases in intrastate rates had been submitted to state commissions. General Order No. 57, regarding the handling of grain claims, he said was intended to bring about a uniformity in practice pending the adoption of more permanent rules and represented the settled practice of a large part of the railroad mileage. He thought most of the criticisms of this order were unfair and misleading.

With reference to charges that the administration has been slow in paying freight claims, he said that under war conditions there naturally had been a large increase in claims, yet all the information he could get showed that claims had been handled better than they had been handled by railroads in the past. He presented a report from 16 representative roads showing an increase of 151,000 in the number of claims presented in 1918 and an increase of 206,000 paid.

Mr. Hines also referred to the criticism against General Order No. 18, requiring that suits be brought at the place of residence of the plaintiff or where the cause of action accrued, saying that this was intended to deal with a phase of the damage suit industry which had reached the proportions of a great evil and as a war measure to eliminate the necessity of taking large numbers of railway employees away from their work to travel long distances to appear as witnesses. He mentioned the particularly large number of damage suits filed in Minnesota where conditions are so favorable to securing large verdicts against railroads that damage suit lawyers send agents all over the country to induce the filing of suits in that state. He mentioned a statement furnished by the Illinois Central of suits filed against it in Minnesota for claims aggregating $1,360,000 on causes of action arising in other states where 13 of the plaintiffs resided in Kentucky, 18 in Illinois, 6 in Tennessee, 9 in Iowa and 1 in Mississippi. He also had a statement furnished by the Chicago, Milwaukee & St. Paul of 38 suits filed against it in Minnesota by non-resident plaintiffs for causes of action arising in other states and one of 52 personal injury suits against the Southern Pacific filed in El Paso for injuries sustained by non-residents of Texas in various states.

Mr. Hines said that while this order was a war measure it represented a fair exercise of the President's power under peace conditions, although perhaps the order ought to be revised in the light of new conditions. The general order against garnishment of wages of railroad employees, he said, represented the practice of all government departments. Regarding judgments against railroads, he said it was the policy of the administration to pay final judgments for causes accruing since the government took possession of the railroads, but that the administration has no authority to compel corporations to pay judgments for liabilities arising prior to government control and some corporations may have taken advantage of the situation.

An abstract of Mr. Hines' statement follows:

The purely executive function of operating the railroads to render the public transportation service is the primary responsibility which confronts the President. His operation of the railroads may incidentally be a protection to railroad owners or a convenience in reaching a legislative solution; but it is primarily and directly and daily and hourly the rendition of the public transportation service. From this standpoint, there are very grave difficulties in the way of successful operation throughout the 21 months' period, and unless these can be obviated through a reasonable extension, I believe Congress will decide that there is every reason in favor of the earliest discontinuance which can be effected in a reasonable and orderly way.

The emergency which necessitated the taking of the railroads has ended, or certainly will have ended when peace shall be formally declared. Certainly there will no longer be the need for unified governmental control for the transportation of troops and war supplies. The only remaining public need will be the ordinary need of rendering an adequate transportation service in time of peace. This does not in itself call for governmental intervention except to the extent that there may be temporary peculiar circumstances involved in the aftermath of the war.

If we assume that the proclamation of peace shall be made between now and July 1 next, it results that under the present federal control act government control cannot continue after April 1, 1921, and may end earlier than that date. With such a nearby limit there will be increasing uncertainty on the part of officers and employees every month that passes, growing out of their inevitable thought as to what can and will be their relations with the new manage-

ments. The results cannot be otherwise than a cumulative influence unfavorable to the most successful operation. It is obvious that when a transfer of management must take place in the near future, the sooner it takes place the better for the certainty and efficiency of the management.

Under any circumstances administration of the railroads in face of such a near approach to a change in management would be difficult. But the difficulty promises to be greatly accentuated by several different factors. One is the natural relaxation of virtually our whole population from the patriotic tension. The very fact that virtually the entire population responded so magnificently to the sacrifices demanded by the war and to the inconveniences which came from unusual war control of the ordinary industrial activities makes all the greater the insistent desire to be relieved from any sort of inconvenience and to complain against the continuance of anything that can be connected with inconvenience during the war period. Of course, the Railroad Administration gets the full benefit of this changed attitude.

Again, we are involved in an effort on the part of Congress to find a permanent solution of the railroad question. This, of course, results in every advocate seeking to find in the present government control a reason to support the solution which he advocates. Since nobody advocates perpetual continuance of the present form of control the result is that every advocate of any sort of solution is tempted to point out that the present control is unsuccessful, even as a temporary condition, because any such argument helps in his estimation to support his contentions. In the aggregate the momentum of criticism in this direction constitutes a distinct additional psychological factor which makes for difficulty of successful operation under the present form of control.

Again, the country will be entering within the next 12 months upon a presidential campaign which will culminate in November, 1920. I do not see how it will be possible, despite the firm purpose of the Railroad Administration to afford an absolutely non-partisan administration, to avoid the Railroad Administration becoming the subject of a great deal of political discussion and criticism. I do not complain of this condition. But, nevertheless, it promises to make for unsatisfactory railroad service under the present form of government control.

Now it happens that all these unpromising factors are so related in point of time that if the railroads remain under federal control throughout the 21 months' period and that be not extended, these factors will converge in such a way as to produce a cumulative effect which will be very definitely adverse to the successful rendition of the public service.

Additions and Betterments

Another highly important practical reason is the situation as to additions and betterments. It is highly important that a railroad shall continually be improved and developed through the making of additional capital expenditures. Not only is this important in order to improve the public service, but it is doubly important now that a large railroad additions and betterment program should be carried out in order to stabilize industrial conditions while we are passing through the period of readjustment. But with a change of control so near, the opportunity for carrying out an adequate program is largely lacking. Of course, the Railroad Administration will be glad to go forward with the betterment work to whatever extent it can get the assent of the corporations, but with control to end so soon it will not feel justified except in urgent matters in proceeding where that consent is not obtainable, and that consent will not be forthcoming in many important matters when the corporations feel that they will so soon be back in charge of their properties and that they can then proceed to develop them exclusively according to their own ideas. Indeed the corporations may well feel that they would rather wait in the hope of getting lower prices even though in the meantime business suffers severely by the cessation of industry.

Temporary Continuance Not Necessary

The next phase of the matter is the argument that the President must retain possession of the railroads for the protection of the companies pending permanent legislation. The argument seems to be that an early return of the railroads before the adoption of legislation would result in a chaotic condition which would involve disaster to the credit of the railroad companies. If we admit that the re-establishment of private operation under the laws as they already exist would be an evil, it is hardly a wise and prudent remedy to insist upon continuing a form of railroad operation which is not calculated to give satisfactory service to the public and which promises to become increasingly difficult with every month. To avoid confusion I wish to make it clear that there is no such basis whatever for the assumption that I have proposed to recommend the relinquishment of the railroads under circumstances which would create widespread bankruptcy. Indeed, I think the argument that has been made that an early relinquishment will create such widespread bankruptcy and consequent chaotic financial conditions defeats itself, because it is evident that no department of the government wishes to produce any such condition. My belief, however, is that unless there should be a very serious falling off in business the situation will readjust itself in a comparatively few months so that a return of the railroads on a basis of the rates established by the Railroad Administration will be entirely admissible so far as the general financial situation is concerned.

Relinquishment Will Not Be Precipitate

My own thought is that whenever an appropriate time shall approach, due notice of the step will be given and the relinquishment will be made in an orderly way, so as to afford a reasonable opportunity for the transition. The further question remains as to whether there is anything in the legal situation as to the rates or anything in the arrangement of the indebtedness of the railroad companies to the government which would make it unjust to the railroad companies to make a relinquishment prior to the end of the 21 months' period without new legislation. To illustrate this let us look at the carefully thought-out proposals of the Interstate Commerce Commission. I should think it would be fair to assume that those proposals would come nearer to receiving congressional approval than any other definite plan for a permanent solution that has been offered. Let us assume that in six months the plan as outlined by the commission should become a law and that immediately the railroads should be turned back to their respective companies. I cannot see that the transition would be any less difficult or any more free from uncertainty than if the transition were made without additional legislation. There is nothing in that plan which will *per se* and instantaneously make conditions different from what they would be under the existing laws. For example, that plan does not propose to deprive state commissions of the power to deal with intrastate rates. It merely contemplates harmonious action with state commissions and that is entirely feasible under existing laws. Indeed, the commission now has a tremendous and far-reaching power over intrastate rates by reason of Section 3 of the interstate commerce act as construed and applied in the Shreveport case, and as a result of which the commission has actually prescribed the intrastate rates in a large portion of Texas. Of course, the provisions of the plan about merger of railroads, the limitations of railroad construction or any other feature will have no instantaneous effect upon the operating expenses or upon the operating revenues. With respect to those immediately pressing problems the commission can do under existing law whatever it could do under

the proposed law and it is perfectly safe to assume that the commission will be actuated by a desire to protect the situation.

My own deliberate prediction is that if the commission's plan shall be adopted, we will then find the companies imploring the government to continue to operate the railroads for a while in order to provide an entirely adequate period of readjustment. I believe that any legislation adopted prior to the end of the 21 months' control will leave the railroads just as much disturbed over an instantaneous transfer back to private management as they will be disturbed over such a transfer without any additional legislation.

Rate Structure Would Not Fall

It is not true that immediately upon relinquishment of the railroads there must be a return to the old rates. The Interstate Commerce Commission is on record that so far as interstate rates are concerned this could not possibly occur, and the existing interstate rates would continue in operation. The assumption has been suggested that such termination would result *ipso facto* in the re-establishment at least of those intrastate rates which have been created by statutes or constitutional provisions. There seems to be no reason for making such differentiation. If intrastate rates established by statute should *ipso facto* come immediately into application, the same condition would seem to be true of rates established under statutory authority. Indeed, the same result would seem logically to follow as to the interstate rates which had been filed by the railroads while under federal control in accordance with the interstate commerce act. It would seem that the rate structure initiated by the President would either fall as a whole or would remain in operation as a whole until some orderly modification should be made in pursuance of law.

It is not to be assumed that Congress intended that instantly upon the termination of federal control the railroads, in addition to being deprived of any compensation from the government, should also be deprived of any reasonable opportunity to sustain themselves through charging the only rates which have been fixed and reviewed in the light of existing conditions and the only rates which can possibly carry out the policy of Congress for certainty and publicity and for reasonable equality of basis as between interstate and intrastate rates.

Even if the courts would construe the congressional legislation as being so fragmentary in character as to admit of this extraordinary consequence, it would still be true that the Interstate Commerce Commission under its general powers could preserve the existing interstate rate structure and could set aside on the ground of discrimination the far lower intrastate rates which were in effect prior to the war. Therefore, we can only assume a chaotic condition by assuming the Interstate Commerce Commission would omit to perform its functions. I believe that unless the companies through a mistaken policy themselves create a needless state of alarm, a reasonable and orderly transition back to private management could be made in the next few months without additional legislation as well as under any that is likely to be obtained. It is true that companies could not at once begin mergers and pooling, etc., but those steps are not indispensable to immediate protection. What is indispensable is the preservation of a rate structure adequate to meet expenses and pay a fair return, and I firmly believe this could and would be successfully accomplished without additional legislation.

Another feature which appears to be urged in this connection by the railroad companies is that they will be enormously embarrassed in their financing by an early return of the railroads. Here again it seems to me that the railroads are creating an unnecessary alarm. It would be entirely feasible to make such reasonable terms as to the repayment of their indebtedness to the government as to save them from financial embarrassment. If the commission's plan should be adopted they would have substantially the same financial problem that they would have if they were turned back without legislation. I can see that the adoption of the commission's plan would probably give some slight additional encouragement to railroad investment, but still they would have exactly the same problem of paying the indebtedness which they owe the government. As a matter of fact I anticipate that as conditions improve the companies will be able to finance to a greater and greater extent, and to diminish rather than increase their indebtedness to the government.

Advantages of Five-Year Extension

As to the actual rendition of the public service, the adoption of a five-year limitation instead of a two-year limitation will, in my opinion, make all the difference between satisfactory service and unsatisfactory service to the public. The five-year provision will postpone for at least three years the state of uncertainty and ferment which is already beginning. It will give the President for the next two or three years a stability of control which will go far toward fortifying the rendition of the public service against the state of the public mind that has inevitably developed at the end of the war. Likewise it will remove the necessity for pressing the permanent solution of the railroad question into the crowded period which will precede the next presidential election. There will be more time to get our bearings, more time to get the sober thought of the people as to what ought to be the permanent solution.

The discussions have assumed very largely that a five-year extension contemplates that no action toward a permanent solution will be taken until the end of five years; that everybody interested in legislation will sit down and do nothing and calmly await the expiration of the five years before undertaking to shape legislation. I do not think this ought to be the case or will be the case. I believe the study of the permanent solution will proceed in an orderly way, and I shall be very much surprised if at the beginning of the next presidential term the question shall not be taken up and promptly disposed of. It seems to me the natural development will be that during the first year of the next presidential term this great question will be settled and then a transfer can be made from the present federal control to the permanent form of management which may be adopted.

I think a three-year extension would accomplish a great deal to remove the difficulties, because even three years would segregate and spread out and in part dissipate the unfavorable psychological factors which under the 21 months' plan promise all to converge so as to do the maximum damage to the public service; and also the three-year extension would give opportunity for legislation immediately following instead of immediately preceding the presidential election. But I believe the five-year extension would be much better because it would give added stability.

Extension Does Not Mean Government Ownership

Viewed in this practical way I do not believe there is anything substantial in the argument that an extension of the time would necessarily mean government ownership. If a period of 21 months after the war will not mean government ownership, I do not see how a period of not exceeding five years would mean government ownership. The operating organization of every important railroad is preserved intact and the railroad could be turned back tomorrow or in five years from now and still its operating organization would be available to carry on the business without interruption under private management. Of course, in terminals there have been some consolidations of management, but undoubtedly they ought to continue under private control, and I do

not see any practical difficulty on this score unless the particular companies shall wish to put their separate interests above the general public interest, and in that event it will be an advantage to the public that the established terminal organization is a consolidated organization so as to make it more difficult for a separate and selfish development of the terminals. The only thing that will make against the resumption of private management at the end of five years or any intervening period between the 21 months and five years will be that as a result of unified control viewed under normal conditions, the public will reach the conclusion that a greater degree of unified control is in the public interest than can be accomplished through the medium of the large number of railroad corporations which in the past have controlled the railroads of the country. If the public does reach this conclusion undoubtedly we ought not to return to the old system and the public will have profited by having been given an opportunity to study the advantages of unified control. On the other hand, if the public feels that the advantages are less than the advantages of the multifarious railroad managements it will be entirely practicable to go back to the old forms of control.

We know that a large body of the people have a settled conviction that this question cannot be successfully disposed of except through government ownership. The arguments of the government ownership advocates are temporarily at a discount by reason of a reaction from all forms of government control. Now, is it the part of statesmanship to recommend a hasty settlement of this question in a period when the permanent convictions of a large part of the public are for the time being suffering a partial eclipse by reason of a purely temporary state of mind? A feeling prevails already that this question is being pushed now by the railroad executives because they feel that the "going" is especially good and that they had better make private management hay while the anti-government ownership sun continues to shine. I think it is a fair prediction that before any legislation can actually be shaped there will be a reassertion of the permanent views of that part of the public which insists on a greater degree of social control of the railroads and that this is going to defeat the adoption of any permanent program in the next two years. If this shall be the case there will be an outcry for an extension and in all probability the time will then have to be extended.

Government Operation Should Be Tested Under Normal Condition

I further believe that those who advocate government ownership and operation are entitled to have their case considered on its merits and not embarrassed by a necessarily misleading showing of the conditions of the present federal control. At this time, the only year of federal control has been a year of war; a year of heavy costs and of serious public inconvenience. There is a strong disposition to assume, therefore, that government operation under any circumstances means correspondingly heavy costs and serious inconvenience. Since government operation has been entered upon and since it is desired that it be continued to facilitate a satisfactory legislative solution, then my recommendation is that it be continued long enough to furnish a fair example of what can and what cannot be accomplished under government ownership in time of peace. So far we are not in a position to analyze fully even the results of the war year—the year 1918.

The year 1919 will be a period of readjustment. When the armistice was signed the railroads had been geared up as a war machine. Many things which were done to obtain the quickest and most effective results at whatever cost might be necessary can in peace time be done on a more economical basis. These things, however, cannot be changed overnight. For example, it was indispensable to place cars where they were most needed and to repair them wherever they happened to be when they needed repairs. Cars can be repaired more economically in their home shops than in shops of other railroads because the home shops are especially adapted to repair the cars belonging to the home road. In the course of a few months it is believed this condition will make a material showing in the reduction of the cost of car repairs. But this is one of the processes of readjustment which cannot be done instantly and which will help to make the year 1919 a year of transition and, therefore, even its results will not be a normal showing of what can be accomplished under federal control.

Moreover, the year 1919 is a critical year from the general industrial standpoint. It is a year when the problem of unemployment will be exceedingly grave. Every government agency should deal with that problem in a comprehensive way so as to promote the general welfare and not exclusively with reference to making immediately the very greatest reduction in its own costs. This factor ought to govern largely the methods of the Railroad Administration, and in order to aid in stabilizing general industrial conditions the Railroad Administration ought not to enter upon processes of retrenchment so radical as to accentuate the general industrial difficulties.

I think this more deliberate policy is due to labor. On every hand there is a disposition to charge existing high costs to the increased wages. Practically all these arguments carry in some form the thought that these rates of pay are too high and ought to be reduced at the earliest possible opportunity. I believe these conclusions are unfair and that a method of dealing with this subject ought to be adopted which will give an opportunity to demonstrate their unfairness. A very large part of the heavy operating costs of the past year was not due at all to the high rates of pay, but to other factors brought about by the war. One was the abnormal cost of repairing cars to which I have referred. Another was the extraordinary turnover of labor due to labor being withdrawn for military purposes and labor being tempted into other lines of industry where much higher wages were paid. This led to less efficiency than could be expected of men who remain with reasonable permanency in the railroad work. The scarcity of railroad labor also made it necessary at times to employ labor which was far below reasonable standards of efficiency. It was also necessary in the times of war pressure to require a great deal of overtime work which called for time-and-a-half pay. All these various factors are being piled up together and charged to the present rates of wages. There is every evidence that the most cordial co-operation will be afforded by labor in rendering value received for the wages paid, but these conditions cannot be translated into reports of operation except by the lapse of time.

Another factor deserving serious consideration is that of the inland waterways. Under government control of the railroads the first beginnings have been made in developing what is actually practicable in the way of the economical utilization of some of the principal inland waterways. I believe it highly important that there should be a fair test of this subject and I do not look for a sympathetic test if the railroads are turned back to private control in advance of an adequate test. Undoubtedly this will be brought about if there is a reasonable extension of government control. I do not see how it can be successfully brought about otherwise, because I think mere legal provisions for co-operation will not accomplish the purpose unless the railroads wish to co-operate, and frankly I do not believe that under private management the railroads will wish to co-operate with the waterways in developing any traffic which the railroads themselves can handle without loss.

The extension of federal control would have a beneficial effect in stabilizing industrial conditions at the very time such stabilization is most badly needed. Railroad improve-

ments can be carried forward on an extensive scale and they not only afford indirect employment for a great many additional railroad employees, but they afford indirect employment for thousands of other employees. Here, then, we have the factor of rapidly increasing unemployment and we also have the potential factor of the great stabilizing influence of railroad improvement activity. If the period of government control be limited to the 21 months, the amount of railroad improvement will be minimized because of the shortness of the time within which to plan and do the work, the uncertainty of railroad credit, and the disposition of the railroad companies to defer improvements until the comparatively near date when they will again be in control. If the period be extended to five years steps can at once be taken to enter upon a much more comprehensive program, and I believe that the greatly increased credit of the railroad companies which will result from this additional certainty will enable us to get their active co-operation in financing an extensive program.

Views as to a Permanent Solution

On account of my responsibilities as director general of railroads I believe it will be excusable in me to lay before you my personal views as to the permanent solution of the railroad problem. I have been driven to the conviction that there must be a radical reconstruction of the whole scheme of private ownership and management if we are to avoid government ownership. While I think the advocates of government ownership ought to have a fair opportunity to have their case decided on its merits and in a normal piece-time atmosphere, I have said this because of my belief in fair play and because I do not think any solution which fails to give the fullest opportunity for the consideration on its merits of every phase of the subject can be conclusive or permanent. But I do not personally believe in government ownership. I believe there can be a form of radically reconstructed private ownership with such close government supervision, including government representation on the boards of directors, as will give the public and labor all the benefits of government ownership and at the same time will preserve the benefits of private and self-interested initiative and will avoid the political difficulties which perhaps are inseparable from government ownership.

I do not believe the plans now before the committee will meet the fundamental difficulties. I believe that a far more radical treatment will be needed and that this treatment cannot be accorded in the crowded period of the next two years.

There can be no solution through the operation of the railroads by the numerous existing corporations with their widely varying financial structures. The deep-seated suspicion of the public and of labor that there is serious overcapitalization largely negatives all representations as to the propriety of any given level of railroad operating income. To perpetuate existing capitalizations means to perpetuate suspicion and unrest and will defeat any plan despite the other good qualities the plan may have.

No plan can be permanently successful which leaves railroad operations with a large number of different corporations, some strong and some weak. So long as this condition continues it will result that on any given basis of rates and wages some railroads will prosper to a great degree and others will fail. Whatever level of rates is adopted the public will be at a disadvantage either through impaired service on the poor roads or through being charged more than is necessary on the strong roads. The contrast will lead to continual discontent and dispute as to what basis of rates is correct and will largely tend to defeat any scheme of regulation.

The plan of private management proposed necessarily involves the idea that if one or many railroad companies happen to be exceptionally prosperous the entire exceptional profits remain with the company. This condition will make the public always fear or suspect that it is being exploited for the benefit of private capital and will lead to continual insistence upon the railroads being operated exclusively for the public benefit. Also, similar suspicions will always encourage unrest on the part of labor. If any plan of private management is to be successful it ought to provide for the participation of the government and perhaps of labor in the profits in excess of some comparatively moderate return.

This country has settled down to the definite conception that railroads ought not to receive more than a reasonable return and also that they ought not to receive less. Practically, the standard is impossible of application under the proposed plan of private management. No matter how carefully rates may be fixed they are more likely to vary either above or below a fair return than to produce the fair return and no more and no less. A prosperous year may produce too much and before the rates can be changed the exceptional prosperity may have disappeared. Of course, one company may get more than a fair return and another less. If the government adopts the proposed plan it will be doing a vain thing. It will be proceeding on the idea that it is insuring the performance of an adequate transportation service for a fair return, but it will be providing machinery that never will and never can provide the desired fair return. The logical thing to do is for the government itself to ascertain what the fair return ought to be and to guarantee that to the railroads, and then if it wishes the benefit of the increased efficiency which may probably be expected from private initiative it can permit a moderate participation in any profits in excess of that return.

Government Should Guarantee Fair Return

It is recognized that it is indispensable that capital invested in railroads shall yield a sufficient return to attract additional capital. But the proposed plan involves the whole subject in so much confusion and uncertainty as to make the prospect of obtaining additional needed capital highly unfavorable. If the fair return principle be adopted in theory but fail in practice, the result will be either that the public will suffer serious inconvenience through railroad credit being impaired so that the necessary new capital cannot be raised, or the public will suffer serious loss through being compelled to pay a great deal more for transportation than is necessary. The real object can be obtained by the government itself assuring once and for all a fair return. Of course, a definite assurance of this character will necessitate a much lower total compensation than would have to be provided through the haphazard plan of a theoretical fair return administered through impossible machinery. Therefore, there would be a large saving to the public in a definite government guaranty and an enormous benefit in the way of creating a real and reliable credit instead of one involved in the greatest uncertainty.

The proposed plan of private management does not meet any of these fundamental needs. If adopted all these needs will remain unsatisfied and will operate with cumulative effect to produce a failure of the entire regulatory scheme and in a short while the whole railroad subject will have to be dealt with again. Indeed, the very fact that the proposed plans still leave the public suspecting that unjustified capitalization is enjoying a return, and still admit of instances of some corporations deriving apparently excessive returns even on their existing capitalization, will go a long way towards defeating the concessions which it is proposed to make in favor of the railroad corporations, and the conception will probably become increasingly clear that the desired certainty of sufficient return will not be assured. Again, the proposals of the present plans for pooling of traffic under certain conditions and for unification of terminals and facilities and for combined control of cars and traffic in time of emergencies are going to prove largely illusory. It is ex-

ceedingly difficult to see how any compulsory plan along these lines can be worked out and in practice it will mean there will be no unification except when rival companies can decide that it is distinctly to their own interest to unify or except in very extreme emergencies. It will be difficult to induce a strong enterprise to dilute itself by merging with the weak one.

It may be said that my observations necessarily lead to government ownership and operation. I do not think so. I believe that all the objects which I think must be achieved can be accomplished through the creation of a comparatively few railroad companies which will have capitalization equal only to the real value of the property, and which will have a moderate guaranteed return with the right to participate moderately in any additional profits. In this way I believe it would be entirely practicable to preserve whatever advantages there may be in private management and at the same time meet the difficulties which I have already pointed out.

I do not believe that the radical changes which in my judgment are indispensable can be made without prolonged study and debate. I am, therefore, forced to the conclusion either that there will be no comprehensive legislation in the next two years or that any legislation adopted will be so much like the present system as to offer no hope for a permanent solution.

A great deal has been said about the claims of the railroad security holders to a reasonable degree of protection. I know of nothing which would more satisfactorily protect their situation than a five-year extension because that will be ample to cover not only the period of industrial readjustment but also the period of legislative readjustment. I think any plan which still leaves the question whether the railroads will or will not get a fair return subject to all the fundamental difficulties which I have pointed out would leave the position of the security holders in doubt and uncertainty. Indeed, there will be serious question whether any legislation will be adopted in the 21-months period. I cannot imagine how this can be otherwise than prejudicial to the legitimate interests of railroad security holders.

There has been much criticism of the Railroad Administration by the representatives of the railroad executives. I do not believe that any issue now before this committee can be helpfully illuminated by any discussion of the details of these matters, although, of course, I am prepared to deal with any of them which the committee thinks important. There was no purpose whatever on the part of the Railroad Administration to take any action other than that reasonable and appropriate to meet the necessities of the war situation. In the staff of the Railroad Administration there were assembled men whose life-long experience had been with the railroad corporations as well as others whose life-long experience had been in the representation of the public or of labor. The conclusions reached were not based on hostility to the owners of the properties or on a desire to treat them otherwise than fairly or on any desire whatever except to do what was regarded as reasonably necessary and appropriate to meet the war purposes.

Senator Kellogg disagreed with Mr. Hines' statement that the rate structure would continue after the termination of federal control and pointed out that a state in the northwest had as recently as January 30 passed a law establishing scales of intrastate rates lower even than those in effect before the increase ordered by the Railroad Administration. Mr. Hines said that such a statute was clearly invalid during the period of federal control and that the rate structure established during that period would apply until organized action was taken to change it. Senator Kellogg said the railroads would have to go into the courts to prevent the states from asserting their own rates, but Mr. Hines thought the Interstate Commerce Commission could protect the situation.

The senators expressed much more interest in Mr. Hines' suggested plan for a permanent solution than in his argument for the five-year plan. Senator Townsend asked why such a plan could not be adopted in less than five years. Mr. Hines said that it involves such fundamental changes that it is extremely improbable it could be adopted within the 21-months period and he thought that an interim control by the government was necessary while the plan was being worked out. Senator Townsend asked if the five-year plan would in any way test the suggested permanent plan or demonstrate anything except the plan under which the administration is now working. Mr. Hines said that the present plan would test to some extent the regional idea because the roads are now operated in seven regions, but that it was necessary primarily to improve the service and stabilize conditions while permanent legislation was being considered. He said he had thought of six or twelve regional corporations for the permanent plan and that this would be better than a single corporation because it could give the benefit of different ideas and methods. Senator Robinson asked whether Congress should not proceed to work out the permanent plan now. Senator Pomerene asked Mr. Hines if Congress could continue a war measure into times of peace for the purpose of working out a policy. Mr. Hines said that he thought this would be a perfectly valid exercise of the power to regulate commerce and promised to submit a brief on the subject.

Senator Pomerene asked why Congress should not legislate at once on a permanent plan compelling the railroad companies to carry out the desired requirements. Mr. Hines said that it was necessary first to meet the fundamentals of the case and provide for a complete reorganization of the railroad companies. While he admitted that a start could be made on such a plan within a year or two, he thought it would be better to take a little more time and work it out on a permanent basis than to attempt to do it too quickly. He said the public sentiment toward the railroads is made up, not by the results for the railroad system as a whole, but by looking at particular railroads. One man looks at a railroad that has not enough money to enable it to give good service, and another looks at a railroad that is making large profits and both men are dissatisfied.

Senator Underwood asked if a plan under which the Interstate Commerce Commission should make up each year a budget of the expenses for each group of railroads and make rates sufficient to provide the expenses and produce a fair return would not stabilize railroad securities. Mr. Hines thought such a plan would receive less support unless it were preceded by a reorganization of the railroads into fewer companies with government representatives on the boards of directors. Senator McLean said that most of the advocates of the five-year plan are advocates of government ownership who believe that it would be impossible to return the roads to their owners after five years. Mr. Hines said that the difficulties incident to a return of the roads were exaggerated.

In reply to questions by Senator Kellogg, Mr. Hines gave some additional information about the financial relations of the Railroad Administration and the railroad companies. Senator Kellogg said that in order to understand the present situation it was important to know these relations, and asked how much the government had loaned to the railroads from the revolving fund. Mr. Hines said that the accounts had not yet been settled in full, but that when the railroads received their rental, and a portion of it is applied on payments for capital expenditures, it was estimated that the railroads would owe the government $290,000,000 on account of additions and betterments. Senator Kellogg persisted in getting a division of the advances made by the Railroad Administration as between actual loans and payments on account of rental. Mr. Hines said the rental for the Class I roads was estimated at $890,000,000, and up to December

31, the administration had specifically paid on account of rental or compensation to the companies $253,277,000, and had loaned out of the revolving fund $125,817,750 in addition to about $69,000,000 loaned out of operating receipts, and that after making some other deductions and adjustments the government owed the railroads $381,000,000.

Senator Kellogg asked how much the War Department owed the Railroad Administration for transportation. Mr. Hines said that up to December 31 this amounted to $53,202,000 on bills rendered and approximately $28,000,000 not definitely stated, making a total of $81,889,000. He said it takes approximately five or six months and sometimes longer to get these bills through the War Department. Senator Kellogg also asked for a complete statement of the loans from the revolving fund, the loans from operating revenues, the amounts the government owes the railroads, and the amounts actually paid to the railroads in 1918, which Mr. Hines promised to furnish.

In reply to another question of Senator Kellogg's Mr. Hines said that maintenance of way and structures during the past year fell short of the government's contract obligation but that complete adjustment between prices and wages for the year and for the test period had not yet been made. The indications are that maintenance of equipment will show ahead of the government's obligation.

The Brotherhood Plan

In presenting the brotherhood plan, on February 7, Mr. Plumb first outlined objections to the proposal for the creation of a secretary of transportation. To create such an office, he said, authorized to enforce a governmental policy that shall secure adequate returns on the capital invested in the railroad industry, would be subverting the entire purpose of the government. It would be regulating the people in the interest of capital. If it be done for the railways we would soon be asked to have a regulating department to secure adequate returns for capital invested in the steel business or the packing business.

Mr. Plumb based the objection to an extension of the five-year period solely on the order issued by the director general prohibiting political activity on the part of railroad employees. "We earnestly protest," he said, "that this demanded deprivation of the political rights guaranteed to us by the Constitution is a sufficient reason in itself why the five-year extension asked for by the director general should not be granted. We most vehemently object to being in any way barred from the full participation in the affairs of this nation in which we are so vitally interested. We must have the same opportunity to organize for the accomplishment of a legitimate political end that our adversary enjoys. We must have the same freedom to contribute all our resources to procure legitimate political action and we must have the same right to select as our representatives in the United States Senate or any other legislative body those who share in our convictions and whom we deem best able to give expression to our political beliefs."

Advocating government ownership of the railroads, Mr. Plumb said the demands of the investor are fully met when be obtains complete security with adequate returns. The security offered by a government bond is the best possible security and the government can finance its undertakings on a rate of return from 25 to 50 per cent below the rate demanded when the same undertaking is financed by private corporations. Consequently, the difference between the cost of the capital invested in properties under government ownership and a like amount of capital invested under private ownership is an unnecessary expense, other things being equal, and unless fully compensated for by other economies made possible under private ownership which are not possible under government ownership, should determine this question in the interests of the public as well as in the interests of the investors. Government ownership with a fixed rate of return, he said, would remove the security owners from politics and if all the railroads were owned by the government as one single system all the difficulties now arising by reason of diverse ownership and of conflicts between state and federal authority would be eliminated.

As for operation, Mr. Plumb said: "It seems to be the consensus of opinion that private operation is to be preferred to government operation for almost every reason. First, to take the roads out of politics; second, to promote efficiency, and, third, to prevent carelessness in regard to expenditures which frequently, almost habitually, accompany government operation." If the government owned the properties and financed their acquisition, construction, equipment and working capital, then the operating corporation would not be required to furnish any capital whatsoever. Its operating ability would constitute its sole capital. It should be organized under a federal law. It should be required to operate the properties under the full regulatory power of the government, to which it should account for all of its operations and expenditures. It should be required to meet all costs of operation and fixed charges upon capital employed which had been guaranteed by the government. A certain agreed percentage of the net results of operation should belong to this corporation. The stock of this corporation should be held in trust for the benefit of the employees. The earnings of the corporation should constitute a trust fund to be declared as a dividend upon the amounts paid to the labor which it employs, every employee receiving that proportion which his annual wage bore to the total annual compensation of all employees. The affairs of the corporation should be administered by a board of directors, of which, possibly, one-third should be elected by the employees, one-third by the appointed officers and one-third by the President.

Under the old system of private ownership and operation, Mr. Plumb said, the hope of increased returns actuated only those individuals who might reasonably be expected to share in those returns. All other employees were merely actuated by fear that they might lose their jobs or might face a decrease in wages. Hope of a share in the profits would promote a morale among employees that has never been approached in any industrial enterprise. A wage board and boards of adjustment similar to those organized by the Railroad Administration should be organized to investigate disputes regarding wages or conditions of employment, and their decision should be binding and final. This would provide a means for settling all wage questions in such a manner that the occasion for strikes or lockouts would be effectually removed.

Mr. Plumb also suggested a method for providing for an automatic reduction in rates. Assuming that the capital invested amounted to $18,000,000,000, the fixed charges at 4 per cent would be $720,000,000. Assuming the gross operating revenue as $4,000,000,000 and an operating ratio of 70 per cent, the net operating revenue would be $1,200,000,000, which would pay the fixed charges and leave $500,000,000 which should be divided equally between the government and the corporation, labor receiving $250,000,000 for a dividend on the payroll. Provision could be made that whenever the share received by the government exceeded 5 per cent of the gross operating revenue, the Interstate Commerce Commission should adjust the scale of rates in such manner as to absorb the 5 per cent. This system, he said, would soon reduce the level of rates to a point where the net revenue would not exceed the requirements of the service and where the surplus net revenue not absorbed by rate reduction should be available either for extensions or improvements without increase in fixed charges or with a reduction in the outstanding capital so that the ultimate effect would be complete retirement of all capital and the reduction of rates to the lowest point essential to paying the cost of operation.

Mr. Plumb devoted a large part of his argument to the question as to the amount of capital upon which the railroads are entitled to compensation. He declared that the investment actually, honestly and prudently made measures the full extent of the property interests which railway corporations may possess and that all values in excess of this amount are retained for the public and which the public could not be compelled to buy. He proposed that the government acquire the stocks of the companies at their present market value, which he estimated at $5,000,000,000, by exchanging government bonds for them.

State Commissions Ask Legislation at Special Session

Charles E. Elmquist, president of the National Association of Railway and Utilities Commissioners, appeared on behalf of the state commissions on January 30, declaring that remedial legislation for the protection of the public should be enacted before March 4, but that a final solution of the railroad problem cannot, and in justice to all interests should not, be adopted by this Congress. He said that centralization of all power over the railroads in the hands of one individual during actual warfare is dangerous, but in times of peace it becomes a positive menace which should be removed at once and he, therefore, recommended the repeal of section 10 of the control law to take from the President "the alleged right" to set aside state or federal laws or the orders of commissions applicable to common carriers and to restore the suspension powers of the interstate Commerce Commission. While the state commissions are of the opinion that the federal control act did not deprive them of jurisdiction over state rates, he said not one of them made any attempt to exercise their authority during the war, but for the purpose of avoiding litigation now they want the law made specific.

As to the five-year plan Mr. Elmquist said the railroads were taken over for war purposes only. They have performed that function well. The real purpose of government control having been accomplished, good faith and square dealing demand the return of the roads to their owners at a time when it will not embarass the country or seriously cripple the transportation machine and under such legislative safeguards as the people may approve. December 31, 1919, would afford ample time for this purpose if a special session of Congress is called to consider the railroad problem. Congress should either amend the federal control act or adopt a joint resolution fixing the date for the return of the properties. The state commissioners oppose the five year plan, Mr. Elmquist said, for the following reasons, among others:

1. It continues the present guaranteed compensation of practically a billion dollars per annum for five years, as well as the prospect of the present high operating cost.

2. It continues in time of peace an alleged war power to set aside state and federal laws, to initiate rates, to fix wages, route traffic, and consolidate properties and terminals.

3. It continues the uncertain and chaotic condition of rates and practices whereby shippers are denied the right to be heard before rates go into effect and it purports to suspend laws for the regulation of common carriers.

4. It thrusts prominently into the public forum a discussion of government ownership before the valuation of the railroads has been completed by the government and before it is possible to know what they are worth.

Mr. Elmquist argued at length as to why the states should continue to regulate local rates and service and opposed the establishment of a central bureau at Washington to handle such matters, but he thought a satisfactory plan of co-operation could be worked out between the state commissions and the interstate commission. He also declared that the railroads need not fear that the commissions will fail to recognize the changes in conditions which have required higher rates in case they are again brought under the jurisdiction of state regulation.

As to the various plans for changes in regulating methods for the future, Mr. Elmquist favored the prompt merger of the railroads into a unified system, in times of stress or emergency under provisions to be established by Congress, and the merger within proper limits of carriers' lines and facilities to such extent as may be necessary in the public interest to meet the reasonable demands of commerce with the approval of the Interstate Commerce Commission. He also favored the consolidation of terminal facilities whenever the public interest will be promoted thereby, but believed that this question could very properly be passed upon by state authorities. He favored the limitation of railroad construction to the necessities and convenience of the public under regulation of the federal authorities in addition to that of local authorities. He favored the control of securities by the federal government, but under a plan which would require copies of applications to be filed with state authorities, thus enabling them to submit evidence and recommendations. The state commissions also, he said, would favor any proper plan which may be devised for bringing the regulation of interstate carriers closer to the people. If Congress considers it advisable to do so, they then believe it could best be done by increasing the membership of the Interstate Commerce Commission and by requiring one or more members of that body to hear and try all cases in the affected localities. In the absence of such a plan, it might be advisable to make of each state commission a regional commission to act for the federal commission in all proper matters.

The proposal for a secretary of transportation was opposed on the ground that it would make the railroads the football of politics and would make the administration responsible for rate and wage increases and decreases, the quality of service and anything else that might affect the public or the railroad interests. Federal incorporation was opposed because of its legal complications and because it would force the sovereign states to go to Congress for the preservation of the right of taxation and the exercise of police powers. Consolidations of railroad systems and terminals, he said, would place a higher power in the hands of a few men and would be inimical to the public interest unless the federal and state control is made commensurate with the danger involved. If the public policy is to be reversed, the authority of public officers over rates, service, capitalization and expenditures should be enlarged.

Views of Other State Commissioners

Mr. Elmquist was followed by L. B. Finn, chairman of the Kentucky Railroad Commission, who had views widely at variance with those of the state commissioners generally. Mr. Finn favored government ownership of the railroads, but severely criticized many of the actions of the Railroad Administration during the past year. The Railroad Administration, he said, had proved nothing except that it should not be continued, but he placed the blame on the railroad men who had played so prominent a part in its organization. He admitted that he thought a large share of the public was now opposed to government ownership because of the things done by railroad men during the past year, which he ascribed to an effort on their part to discredit public ownership.

R. Hudson Burr of the Florida Railroad Commission also presented an individual statement. He said he concurred with the statements made by Mr. Elmquist, but had some additional criticisms of his own to make of the acts of the Railroad Administration, which he said reflected what might be expected if government control were continued. He said that General Order No. 28, if the provision requiring state rates to be raised to the level of the interstate rates before the percentage increase was completed had not been withdrawn, would have caused increases ranging up to 650 per cent because the interstate rates which it was proposed to take as a basis were mainly paper rates. He also objected

to many other features of the rate situation, which he said had been handled by officials in Washington not familiar with state conditions. Thousands of shipments, he said, have moved under rates which represent overcharges because the traffic officials of the Railroad Administration did not know what the rates were and the administration failed to make reparation. He said that government operation has brought about a great increase in the efficiency of employees and has greatly lessened the morale of the whole railroad organization by removing the incentive to efficiency and the friendly rivalry between railroads, and by removing the actual power too far from the scene of operations. "Division superintendents have become clerks to regional directors who receive their instructions from Washington," he said. "The individuality of the railroads has gone, engulfed in a questionable experiment which Mr. McAdoo admitted would require five years more to prove its success while the public suffers poor service, inattention and increased rates." He did not criticize the railroad men, he said; they were merely human when they were willing to let the other fellow take the responsibility for the success or failure of new theories instead of standing up for what they believed to be right. He opposed the proposed scales of standard class rates, which he said would release the transportation charges on the bulk of the traffic in his state more than 100 per cent over the rates provided by General Order No. 28.

Annual Reports of the Regional Directors

Estimates of the Economies Effected and Examples of Co-Operative Action Under Unified Control

THE RAILROAD ADMINISTRATION is making public one at a time reports covering the operations during the past year submitted to Mr. McAdoo by the regional directors. Following is an abstract of the reports of A. H. Smith for the Eastern region, N. D. Maher for the Pocahontas region, and B. F. Bush for the southwestern region.

Eastern Region

The economies effected in the Eastern region during the year ended December 31, 1918, so far as they can be stated in figures, aggregate $23,248,000, as follows:

		Estimated saving per annum
(*a*)	Unification of terminals and stations	$4,172,000
(*b*)	Elimination of passenger service	12,190,000
(*c*)	Reductions in organization, as contrasted with the same under corporate control	3,677,000
(*d*)	Miscellaneous economies, the result of causes other than above	3,209,000

There has been a marked increase in eastbound freight traffic with a corresponding decrease in westbound, increasing the empty car mileage, and this, with adverse weather and other well-known conditions has resulted in a high percentage of expenses. The saving in passenger train expenses above noted was made by eliminating 16,253,914 passenger train miles. The decrease in the mileage of Pullman cars amounted to 41,229,702 car miles. Passengers carried one mile increased 4.7 per cent. Troops carried in special trains numbered 3,308,496, and the miles run by these trains aggregated about 2,000,000. The troops carried across New York harbor by the railroad boats numbered nearly 2,000,000.

The Eastern Regional Purchasing Committee is standardizing materials and blanks and making a uniform organization of the stores departments. Since the ending of hostilities, stocks of material have been reduced. Rerouting of freight has saved approximately 7,800,000 car miles, an estimated money saving of $470,000. This saving, however, has been partly offset by rerouting of freight to avoid congestions which lengthened the haul of such traffic. Shipping days have been generally introduced, and 1,232 additional through cars have been scheduled weekly. It is estimated that freight transfer houses will be relieved annually of 1,780,000 tons of freight by this greater economy in loading. The average load per car, in the Eastern region, for the first ten months of the year, shows an increase of 2.8 tons. Telegrams are now sent by the Morse system on 3,200 miles of telephone circuits, thus avoiding the expenditure of $160,000 for the construction of new wire lines.

The Freight Traffic Committee is revising freight tariffs wherever possible, so as to secure the loading of freight cars to their full capacity, and is saving $1,000,000 a year by consolidation of tariffs and other economies in that line. The Passenger Traffic Committee is saving $351,344 annually by curtailment of advertising and economy in timetables. Consolidation of freight service, the combining of single track roads into double track operation, and reductions in local train service will show a saving of $664,000 yearly.

The number of cars of freight diverted to avoid congested routes and terminals during the year was 75,000. From the Pittsburgh gateway freight was sent East over the Buffalo, Rochester & Pittsburgh, the New York Central and the Reading. Freight for New England has been sent by the Boston & Maine so as to relieve Maybrook and Harlem River, and freight from Pennsylvania for New England has been sent over the Delaware & Hudson.

Carload freight from the West has been diverted from the Michigan Central and the Grand Trunk to the Pere Marquette. Westbound freight has been diverted to boats at Buffalo to relieve the rail lines.

The movement of the great volume of export traffic at New York City has been facilitated by unified operation of all the railroad-owned boats, the discontinuance of free lighterage and the direct loading of a large number of steamers at railroad piers. Reconsigning and diversion bureaus have been established to meet the demands of shippers for current information concerning the movement of their shipments.

The locomotives received during the year aggregate 896, and the total number in service on November 1, was 10,346, or 297 more than at the same date in 1917. Stored locomotives in serviceable condition, 654. On November 30, the roads in the Eastern region had in service 748,304 freight cars, or 28,304 more than they owned; percentage of bad order cars, 6.1 per cent.

The general situation at present is normal on all the railroads in the Eastern region. A decrease in traffic is expected, together with a reduction in gross earnings, notwithstanding the increased rates. The regional-director commends the officers and employees of the road for their "tireless efforts and extreme loyalty."

Pocahontas Region

The annual saving by economies in the Pocahontas re-

gion, as shown by the results of 1918, amounts to $2,336,946, as follows:

(a)	Unification of terminals and stations	$1,495,603
(b)	Elimination of passenger service	23,400
(c)	Reductions in organizations, as contrasted with the same under corporate control (including abolishment of fast freight lines and closing other off-line offices)	791,615
(d)	Miscellaneous economies, the result of causes other than the above	26,328
	Total visible savings in money (annually)	$2,336,946

The movement of troops and war supplies through Hampton Roads was in great volume and of the utmost importance. The development of the port by the government involved a vast volume of traffic, and much new railroad track had to be laid. There was effective co-operation between the government and the railroads, and in general all demands were satisfactorily met, although there was some delay due to congestion. The extra burden on the railroads was unprecedented, and the different lines had to assist each other alternately. From June 1, to December 20, the coal loaded into vessels at the Hampton Roads piers amounted to 16,500,000 tons, an increase of 1,500,000 tons over the same period of 1917. The three principal roads in the Pocahontas region loaded, between June 1 and December 20, and moved, 727,194 carloads of revenue coal and coke, as compared with 701,410 cars during the same period of 1917. There was a similar increase in ordinary freight, the total being 1,741,793 carloads. One road, being relieved by diversions of general traffic, was enabled to open new coal mines and move 46,000 more cars of coal than in the same period of last year. Eastbound freight has been diverted from the Norfolk & Western to the Virginian to avoid heavy mountain grades east of Roanoke; and it is expected that 8 or more freight trains daily will be sent eastbound between Roanoke and Crewe over the Virginian, with a corresponding movement of 4 westbound empty trains of the Virginian over the Norfolk & Western. Passenger train service was curtailed early in the year, but it has now been put back into normal condition, and the train mileage is slightly in excess of that operated prior to the period of federal control.

The pooling of coal and of coal cars made practicable a uniformly sufficient supply of cars at the coal mines, resulting in increased production. The report describes at considerable length the arrangement for redistribution of the coal traffic to economize mileage and time. Where the Chesapeake & Ohio and the Virginian both served a single mine, one service was discontinued. The locomotives assigned to this region from roads elsewhere made possible the movement of a largely increased volume of business. The tremendous activities at Hampton Roads made it necessary to send freight for the north shore over the Chesapeake & Ohio, and for the south shore over the Norfolk & Western, so as to economize floating equipment. The heavy passenger traffic on the Chesapeake & Ohio incident to the establishment of camps and ammunition plants necessitated assigning to that road many passenger cars and locomotives from other roads.

Southwestern Region

Unification of terminals has been accomplished at 168 places, making an annual saving of $1,434,000; and further economies may yet be made. Enginehouse and car-repair facilities have been consolidated at 54 other places, promoting efficiency. Joint operation of switching facilities, both for interchange and for serving industries, has been introduced at 47 places, at a saving of $228,000 yearly and releasing numerous locomotives for other service.

Military camps in the Southwestern region were numerous, and passenger traffic was exacting. A number of light traffic passenger trains were taken off, but a reasonable regular service was maintained. These economies made 57 engines and 203 passenger cars available for military or other traffic, and the total annual estimated saving was $3,661,333. Some passenger schedules which had been too fast, because of competition, were made slower. Marked economies were effected by sending freight by the most direct routes. In the pay of officers having salaries of $3,000 or more, about $1,155,000 was saved, 758 officers doing the work formerly done by 907 officers. Consolidation of offices saved $2,600,000 in the year. Consolidated ticket offices were established at seven prominent cities, saving $71,000. About $500,000 was saved by economy in advertising and timetables.

Shortage of labor was acute, the forces being depleted in October, mainly by influenza, about 7 per cent. Of the 12,000 men off, 900 were skilled mechanics and 150 were trainmen. However, business was kept going fairly well. On October 31, no fewer than 18,000 employees, or 10½ per cent of the entire forces were absent from duty on account of the epidemic.

The supply of freight cars has been maintained to a quite satisfactory degree. Rerouting of lumber in Texas saved 2,660,000 car miles per annum. The sailing day plan is satisfactory to consignees, especially at small places, but some of the larger shippers are yet to be convinced. Shipments of sulphur from points in Louisiana and Texas in the month of October, averaged 135 cars a day. The general condition of locomotives is good; 84 per cent available for service, and most of the balance need only light repairs. The number of freight cars awaiting repairs, 5,800, is 2.8 per cent of the total. Of the passenger train cars, 92 per cent are available for service. The number of new locomotives received in the year was 97, and 26 others have been built but are in use on eastern roads. New cars put into service numbered 51 passenger and 1,225 freight; 800 of the freight cars having been built in the railroads' shops. Traveling firemen and fuel supervisors, by careful attention to their duties, have saved a large quantity of fuel. The stores department has been uniformly organized. Stocks of supplies have been kept in satisfactory condition. Hardwood ties have been difficult to secure, and soft woods, with more tie-plates than formerly, had to be resorted to. The tie situation is now improving. The telegraph departments have been uniformly reorganized.

Tracks, bridges and other structures have been safely and adequately maintained, although, due to shortage of material and labor, some of the branch lines have not been maintained to the full standard which is desirable. The main lines of railroad, however, are in condition equal to that prevailing at close of calendar year 1917. Buildings generally on all of the roads have been maintained to proper standard, and the usual program of repairs and painting has been to a large extent carried out. Practically all of the right-of-way on main lines, and for the most part on branch lines, has been trimmed, and fences and cattle guards maintained to a proper state of efficiency.

Unprecedented drouth prevailed throughout the summer, but the weather since September has been ideal. The harvests have been good, and the amount of wheat sown is probably 20 per cent greater than ever before.

The New Circumlocution Office—"Dickens wrote about a place he called 'The Circumlocution Office'," said a railroad lawyer returning to his hotel in Washington from a visit to the law division of the Railroad Administration, where he had been trying to get action on a compensation contract. "If he were alive today he would change the name of the place he wrote about and call it 'The Expedition office' and write a new story to fit the old title. And I know where he would lay the scene of his new story, but I'd better not say."—Wall St. Journal.

Doings of the United States Railroad Administration

Total Receipts Less Than One-Fourth Total Disbursements on the Railroads for Month of January

WASHINGTON, D. C.

THE RAILROAD ADMINISTRATION made advances in the month of January to and for the account of various transportation systems to an aggregate of $98,269,808, according to a statement issued by Director General Hines. This amount includes both loans and advances on account of compensation to railroad corporations, and advances made to the federal managers to meet operating needs. These payments aggregated $67,250,696. Payments made during the month on account of the new standardized cars and engines amounted to $30,071,471. Payments to inland waterways and canals amounted to $947,641.

The director general received from the operating managements during the month, a total of $13,996,455, and from the express companies he received in January $10,327,183, making the total receipts from all transportation lines for the period, $24,323,638.

As the total disbursements for the month of January, as shown above, were $98,269,808, the excess of disbursements over receipts for January, 1919, was $73,946,170.

The aggregate payments and advances by the director general to the railroad corporations and federal managers, including payments on standard equipment ordered for the one year and one month ending January 31, 1919, were $787,304,567. Of this amount the director general has gotten back various loans made to different railroad companies for amounts aggregating $57,030,000, leaving the net advances by the director general to January 31, $730,274,567.

The Railroad Administration also received up to January 31, surplus operating receipts of various railroads amounting to $237,605,000, and from the express companies a total of $57,243,599.

The excess of all disbursements to and for account of transportation systems for the period of one year and one month to January 31, 1919, over receipts, including $57,030,000 received from collection of loans, was therefore $435,425,968.

The aggregate of loans made by the director general to railroad and other transportation companies, and still outstanding is, $151,254,767. This is exclusive of the amount advanced for the benefit of various roads on account of standardized equipment. There is also still due to the director general by various roads on account of the amounts advanced to the builders of the standardized cars and engines, the further sum of $144,585,871.

The total balance remaining in the revolving fund on January 31, plus the sum total of balances remaining on hand with the director general from the surplus receipts turned over by certain roads, aggregates $61,332,738.

The only railroads from which the United States Railroad Administration has received, in the period of one year and one month to January 31, as much as $1,000,000 or more in excess of the amounts paid to the railroad properties are:

Duluth, Missabe & Northern	$10,400,000
Atchison, Topeka & Santa Fe	9,200,000
Elgin, Joliet & Eastern	7,500,000
Atlantic Coast Line—Louisville & Nashville	7,360,000
Northern Pacific	5,000,000
Bessemer & Lake Erie	4,000,000
Duluth & Iron Range	3,400,000
Pullman Lines	2,800,000
Union Pacific	2,200,000
Richmond, Fredericksburg & Potomac	1,900,000
El Paso & South Western	1,000,000

In a table the statement also shows in separate columns the amounts advanced by the director general to all transportation lines in the period of one year and one month to January 31, including advances made on account of compensation and loans direct to the corporations, also advances to the federal managers to meet operating needs, but not including amounts received by the corporations before the appointment of the federal managers, on account of compensation, or expended, for construction and additions, from operating receipts.

The table includes 31 roads receiving in each case less than $100,000, a total of $1,336,600; advances to inland waterways and canals, $5,309,127, and payments on account of standardized engines and cars, $144,585,871.

Of the total amount advanced to various railroad companies since January 1, 1918, the following loans to the companies named have been paid or reimbursed:

New York Central Railroad Co.	$13,500,000
Illinois Central Railroad Co.	10,000,000
Chicago, Milwaukee & St. Paul Ry. Co.	8,000,000
Chicago, Rock Island & Pacific Ry. Co.	6,000,000
Baltimore & Ohio Railroad Co.	5,450,000
Michigan Central Railroad Co.	4,000,000
Clev., Cin., Chicago & St. Louis Ry. Co.	3,000,000
Southern Railway Co.	2,170,000
Chesapeake & Ohio Railway Co.	2,000,000
St. Louis-San Francisco Railway Co.	1,710,000
Buffalo, Rochester & Pittsburgh Ry. Co.	1,200,000
Total	$57,030,000

Overtime Not Considered as Salary

Interpretation No. 9, relating to general order No. 27, gives a decision on the following question: If an employee covered by the provisions of general order No. 27 and subsequent wage orders issued by the director general in connection therewith, whose salary is $250 or less per month, is required to work overtime, and in a given month his total wage, including overtime, amounts to more than $250, is it the intention to restrict his earnings per month to $250?

The decision is that overtime is not to be considered as salary.

Earnings and Expenses for December

A partial summary of railroad earnings and expenses for December, given out by the Interstate Commerce Commission this week, indicates that the operating deficit of the railroads for 1918 will exceed the estimate of $196,000,000 made by the Railroad Administration and that the net operating income for the year will probably fall short of $700,000,000. Reports of 175 roads, operating 214,013 miles, for December show operating revenues of $414,537,000, operating expenses of $375,282,000 and operating income, modified by equipment and joint facility rents, of $23,085,847. This is a decrease for these roads of $34,604,000 as compared with December, 1917, or nearly 60 per cent, and as the same roads earned practically all of the operating income in December, 1917, the returns for the 19 additional roads are not expected to change the result materially. The net operating income of 180 Class I roads and 15 switching and terminal companies for the 11 months ending November 30 was $662,407,000. Adding to this the $23,000,000 for December gives a total of $685,000,000. The standard return guaranteed by the government amounts to $890,000,000 for the Class I roads and about $905,000,000 including the switching and terminal companies. The operating revenues of the 175 roads for December were $98,000,000, or 31 per cent, greater than for December, 1917, an amount which approximates the advance in rates, so that traffic apparently fell off nearly as badly as in December, 1917. Operating expenses were $136,000,000 greater, or 57 per cent. This includes a con-

siderable amount of back pay, as instructions were issued to clean up as much as possible of the back pay for 1918 in the December accounts.

Requisites for Automatic Train Control Devices

The Railroad Administration Committee on Automatic Control at a meeting in Washington on February 4 adopted the following definition and requisites for the design and construction of automatic train control devices:

Definition: Automatic Train Control: An installation so arranged that its operation will automatically result in either one or the other or both of the following conditions:

First: The application of the brakes until the train has been brought to a stop.

Second: The application of the brakes when the speed of the train exceeds a prescribed rate and continued until the speed has been reduced to a predetermined rate.

Requisites for the Design and Construction of Automatic Train Control Devices

1. The apparatus so constructed as to operate in connection with a system of fixed block or inter-locking signals, and so inter-connected with the fixed signal system as to perform its intended functions:
   (a) in the event of failure of the engineman to obey the fixed signal indications, and,
   (b) so far as possible, when the fixed signal fails to indicate a condition requiring an application of the brakes.
2. The apparatus so constructed that it will perform its intended function if an essential part fails or is removed; or a break, cross, ground or failure of energy occurs in electric circuits, when used.
3. The apparatus so constructed as to make indications of the fixed signal depend upon the operation of the track element of the train control device.
4. The apparatus so constructed that proper operative relation between those parts along the roadway and those on the train will be assured under all conditions of speed, weather, wear, oscillation and shock.
5. The apparatus so constructed as to prevent the release of the brakes after automatic application, until the train has been brought to a stop, or its speed has been reduced to a predetermined rate or the obstruction or other condition that caused the brake application has been removed.
6. The train apparatus so constructed that, when operated, it will make an application of the brakes sufficient to stop the train or control its speed.
7. The apparatus so constructed as not to interfere with the application of the brakes by the engineman's brake valve or to impair the efficiency of the airbrake.
8. The apparatus so constructed that it may be applied so as to be operative when the engine is running forward or backward.
9. The apparatus so constructed that when two or more engines are coupled together or a pusher is used it can be made operative only on the engine from which the brakes are controlled.
10. The apparatus so constructed that it will operate under all weather conditions which permit train movements.
11. The apparatus so constructed as to conform to established clearances for equipment and structures.
12. The apparatus so constructed and installed that it will not constitute a source of danger to trainmen, other employees, or passengers.

The committee was guided to some extent in its work by a review of a list of requisites for automatic train stops adopted by the American Railway Association in May, 1914, and a list of desirable characteristics for automatic train control systems proposed by the Block Signal and Train Control Board of the Interstate Commerce Commission. G. E. Ellis, who has been signal engineer in the Bureau of Safety of the Interstate Commerce Commission since 1915, and who had previously been in charge of the installation of signals on the Kansas City Terminal, has been appointed executive secretary of the committee, which has established an office at 607 Southern Railway Building, Washington. The committee will hold its next meeting in Washington on February 14, and intends to press as rapidly as possible its investigation of the various automatic train control devices. It will probably include in its investigation some 40 or 50 devices which were passed on by the Block Signal and Train Control Board of the Interstate Commerce Commission which were not condemned by that board.

Homeseekers' Bureau

As was recently noted in these columns the Railroad Administration has established a Homeseekers' Bureau whose function is to furnish information to returning soldiers and war workers generally regarding available land in all parts of the country which can be used for farming, stock-raising, dairying and kindred pursuits. The railroads are preparing to distribute a folder setting forth facts with references to climate, production, markets, schools, churches and other data needed by homeseekers in their quest for available land upon which they propose to settle.

The information thus obtained is being distributed at ticket offices in the demobilization camps, at the booths of the War Camp Community Service and at the various Y. M. C. A. headquarters.

The railroad agricultural agents, as members of the Homeseekers' Bureau, have been organized into state groups and they are now assembling reliable information on soil production, markets, transportation facilities and approximate size of the farms that can be procured. In this work, the Railroad Administration is co-operating with the state agricultural colleges and the state boards of agriculture. Hundreds of inquiries have already come to those in charge of the Homeseekers' Bureau seeking information about farm opportunities, and they are being answered as promptly as they can be assembled.

To Keep Tabs on Back Pay

For the purpose of keeping a closer check on the amount of back pay, Director Prouty of the Division of Public Service and Accounting has instructed that, effective with the closing of the accounts for the month of January, federal auditors shall monthly prepare and forward to him a statement on letter sized sheets showing the amount of back pay applicable to prior months' expenses included in operating expenses for the month for which the report is made. In reporting such back pay, there are to be shown the name of the month, or months, in which the amount was properly includible and the amount applicable to each such month. Class 1 Roads are to forward these reports not later than the 26th of the month following that for which the report is made; other lines under federal control are to submit their reports not later than the last day of such month.

Credit for Payment of Freight Charges

The Division of Public Service and Accounting has issued P. S. & A. Circular No. 64, as follows: In order that conclusion with respect to the extension of credit for the payment of freight charges may be promptly reached, the following arrangement will immediately become effective at points where more than one railroad is involved: Application for forty-eight-hour credit under bond may be made to agent of any carrier. The agent will secure the approval or disapproval of the agent of each other carrier named in the application, and submit the papers to the federal treasurer of his line. The federal treasurer shall grant the credit or decline to do so in accordance with general instructions and the exercise of his best judgment. He may ask for the advice of the federal treasurers of other carriers, but must himself assume responsibility for the final decision, which will be binding upon all interested lines.

Piece Work Being Abolished

In accordance with instructions issued by Director General McAdoo just before he left Washington the shop employees on the various roads are voting on the question of the abolition of the piece-work system. As a result of the vote piece work has been discontinued on the Pennsylvania lines, east and west, Philadelphia & Reading, Baltimore & Ohio, Delaware, Lackawanna & Western, Cumberland Valley, Long Island and other roads, and the men on the New York Central, Norfolk & Western and Chicago, Burlington & Quincy have voted similarly. A large proportion of the men had demanded the discontinuance of piece work and it is said that a strike would have been threatened if Mr. McAdoo had not issued the instructions.

C. & O. of Indiana Transferred

Effective February 1 the Chesapeake & Ohio Railroad of Indiana was transferred from the Eastern region to the Pocahontas region.

Wood Preservers Hold Successful Convention

Annual Meeting Brought Out Much Practical Information About Present Problems of Timber Treatment

THE MATERIAL SITUATION with respect to ties and preservatives occupied a prominent place in the program of the fifteenth annual meeting of the American Wood Preservers' Association, which was held at the Hotel Statler, St. Louis, Mo., January 28 and 29. Because of the present acute shortage of ties the meeting was restricted to two days to enable the members to attend a meeting of tie contractors which was called by the Tie and Timber division of the St. Louis Chamber of Commerce for Thursday and Friday of the same week, at which a permanent national organization of tie producers was effected. The members of each organization were invited to attend the sessions of the other, thus enabling all to become conversant with the problems of both industries. The two organizations were the guests of the Tie and Timber division of the Chamber of Commerce on Wednesday evening, at which Ralph B. Dennis, recently vice consul for the United States in Russia, spoke of the Bolshevik movement and its relation to American industrial problems.

The attendance at the sessions of the American Wood Preservers' Association was the largest in the history of the organization, over 150 railway and timber-treating men being present at the opening meeting, and over 250 registering during the convention. This large attendance was brought out by the practical nature of the program presented and the variety and acuteness of the problems which have arisen during the last year. It was also due, in large measure, to the encouragement which the Railroad Administration extended to railway men desiring to attend. Owing to the absence of President J. B. Card (president Central Creosoting Company, Chicago), who is in active service in the army of occupation in Germany, the meeting was presided over by A. R. Joyce (Joyce-Watkins Company, Chicago), vice-president.

The report of the secretary-treasurer showed a cash balance on hand of $951.96, the largest for six years. The membership on December 31, 1918, was 282, a decrease of seven during the year. Thirty-two members of the association were reported in military service.

The Material Situation

The session on Tuesday evening was devoted to the consideration of the present preservative material situation and the outlook for the near future.

Galen Wood, chemist, Port Reading Creosoting Plant, Port Reading, N. J., spoke on sodium fluoride and its possibilities as a preservative. This material has only recently been brought to the attention of American timber treating engineers, although it has been used successfully in Europe for some time. It is about twice as toxic as creosote or zinc chloride. It has been proven non-corrosive after three years' use in the mines of the Philadelphia & Reading Coal & Iron Company, where it has displaced zinc chloride because of its freedom from electrolysis troubles. A disadvantage of sodium fluoride up to the present time has been the difficulty of determining a method of chemical control and of ascertaining the depth of penetration into the timber, but recent experiments indicate that this problem is being solved. The present cost of sodium fluoride is one and one-half times that of zinc chloride, although its greater toxicity places it about on a parity as far as preservative cost is concerned. Manufacturers are now ready to make the expenditure necessary to increase the output and thereby reduce the unit cost when satisfied that there is a sufficient demand.

The zinc chloride situation was described by J. H. Jordan of the Grasselli Chemical Company, Cleveland, Ohio, who traced the development in the production of this material in this country since its manufacture was first started in 1893. After pointing out the difficulties in securing the necessary materials during the past year he stated that these difficulties have now largely disappeared and that the industry is prepared to meet all demands.

The outlook for an increased supply of domestic creosote was discussed by M. C. McIlrevy, vice-president of the Barrett Manufacturing Company, New York, E. B. Fulks, vice-president of the American Tar Products Company, Chicago, and W. H. Lewis, vice-president of the F. J. Lewis Manufacturing Company, Chicago, who brought out the fact that there is an annual tar production of approximately 500,000,000 gal. available in the United States. Between 50 and 60 per cent of that made last year was burned as fuel, while about 60,000,000 gal. of creosote oil was distilled. While the production of tar has been greatly increased recently, the greater demand for this material for fuel has offset this increase so that there has been no greater amount available for distillation. Even though the fuel demands should decrease and enable the output of creosote to be increased, this is now dependent on the ability to dispose of the pitch for roofing materials, etc. Little hope was held out for an increased supply of creosote or lower prices during the next year.

The possibilities of increasing the importation of creosote from foreign countries was discussed by G. A. Lembcke, of Bernuth, Lembcke & Company, Inc., New York, who stated that although the importation of oil from Europe had been almost entirely arrested during the war, England had raised the ban on the exportation of creosote shortly after the signing of the armistice. The greatest difficulty at the present time is that of ocean transportation. Mr. Lembcke estimated that approximately 25,000,000 gal. of foreign oils will be available for use in the United States during 1919.

The transition from creosote oil to zinc chloride in the treatment of crossties during the last two years was described by Dr. Hermann von Schrenk, consulting timber engineer, St. Louis. This change was made necessary by the shutting off of the importation of oil from Europe. Dr. von Schrenk traced the early development of timber preservation with zinc chloride and its gradual displacement with creosote, beginning about 15 years ago. The conditions of the last three years made it necessary to revert to zinc chloride. He expressed no fear of unsatisfactory results following this transition where proper precautions have been taken in the selection and seasoning of timber for treatment, in the injection of the preservative to insure thorough penetration and in the drying and seasoning of the timber after treatment. He indicated his preference for creosote under most conditions when available but stated that zinc chloride had its proper place as a timber preservative, even under normal conditions, and that the results now being obtained will warrant its continued use on a more extensive scale than prevailed before the war.

Service Tests

A report on service tests of ties was presented by J. H. Waterman, superintendent of timber preservation, Chicago, Burlington & Quincy, Galesburg, Ill., and was confined to a description of the results which the Burlington has obtained from 26,000 ties in lots of 1,000 and 10,000 ties in smaller groups in experimental sections on 20 operating divisions in 8 states. Mr. Waterman placed special emphasis on the necessity of large ties free from decay before treatment and properly treated as fundamental to proper service. The test sections were established under general instructions from the vice-president and are inspected annually in September or October by the superintendent of timber preservation, together with the division superintendent, the section foreman and a representative from the office of the engineer maintenance of way. While the local officers have entire authority to determine when a tie shall come out, the cause for this removal is determined by the superintendent of timber preservation. The results which are being obtained are indicated by the following data:

Process	Total placed	Total removed to date	Per cent removed account decay	Per cent removed account other causes
Straight creosote	3,264	98	0.7	2.3
Card	15,817	1,119	1.6	5.4
Burnettized	2.488	297	6.5	5.3
Untreated	3.270	2,945	85.7	4.3

Development of Uniform Practices

The development of uniform practices in procuring and preserving crossties was described by John Foley, associate manager of the Forest Products section of the United States Railroad Administration. He stated that the preparation of a standard specification for crossties was the first step in attempting to secure uniform quality at equitable prices as prices could not be discussed until uniform standards had been prepared.

Previous to the preparation of these specifications each region was asked to formulate a specification which it could recommend. These specifications were then combined into one composite specification by the central office at Washington. It is necessarily a compromise, leaving out many disputed points. These specifications were prepared to govern purchases rather than maintenance practices. Individual roads have the authority to buy as usable rejects all ties not grading up to No. 1 ties in the specifications. It was assumed in the preparation of the specifications that the railroads knew what their requirements demanded and that it was the problem of the tie manufacturers to meet this demand. The specifications were prepared to cover a wide variety of sizes and of timber while the purchasing committees in the different regions have further authority to accept other timbers suitable locally.

The Railroad Administration has advocated the treatment of ties and has necessarily limited the commercial plants to the sale of treatment rather than of ties. The handling of the treatment by one road for another has made necessary the standardization of treating methods which has led to the preparation of specifications for treatment by the different processes commonly employed which are now being put into effect. The Forest Products Section has also assumed charge of the distribution of creosote to insure its equitable use and has distributed approximately 12,000,000 gal. to date.

Report on Terminology

The committee on Terminology presented a number of definitions of laboratory equipment and other apparatus commonly used about a timber treating plant. It also defined the various types of marine borers that are destructive to untreated timber as follows:

Xylotrya.—Wood-boring mollusks which lay their eggs free in the water. These hatch to form small free-swimming bivalve larvae, which attach themselves to timber by a foot and then bore into the wood and form calcareous-lined galleries, averaging 3/8 in. in diameter and 3 in. to 6 in. long, although they may reach 1 in. in diameter and over 12 in. long. The entrance to the wood is no larger than a pin-hole, enlarging within the timber to keep pace with the growing animal. The galleries are closely intertwined and very numerous.

Teredo.—This genus of wood-destroying mollusks is very similar to Xylotrya and cannot readily be distinguished from it by the layman. Its habits and effect on the wood are quite similar.

Limnoria.—Wood-boring crustaceans of small size, with mouth parts arranged for gnawing or biting. The bodies are flattened and provided with numerous legs. They bore holes about 1/32 in. to 1/16 in. in diameter and 1/2 in. deep perpendicularly into the surface of the wood, leaving very thin partitions between adjoining galleries. They work in salt water, and are common and destructive.

Chelura.—Crustaceans of small size, resembling fleas, which attack wood much the same as limnoria, the galleries being about the same size, but running in all directions. They were first called "sea fleas" or "red wood lice." They work in salt water and are much less common than limnoria.

Sphaeroma.—Also small crustaceans, quite similar to limnoria, but somewhat larger, being about 1/8 in. to 1/4 in. long, and excavating a gallery 1/8 in. to 3/16 in. in diameter. The body is somewhat rounded instead of flattened as in limnoria. They work in either fresh or salt water and are much less common than limnoria.

Protection Against Marine Borers

L. F. Shackell of the University of Utah, Salt Lake City, presented the results of a detailed study of the efficiency of various grades of oils in protecting timber against the attacks of marine borers. He reviewed numerous experiments to determine the resistance of the borers commonly encountered to the various grades of creosote oils. As a result of his studies he presented the following conclusions:

(1) When a highly poisonous substance (such as quinoline or acridine) is dissolved in a high-boiling neutral coal-tar distillate in which it is very soluble, the apparent toxicity of such a solution as measured by the killing time for marine borers will be very much less than that of an equivalent concentration of the poison when dissolved in water, in which it is only very slightly soluble. But this point is of the utmost importance for it means that the high-boiling tar bases, which are very slightly soluble in water, but highly soluble in high-boiling coal-tar creosotes will take an exceedingly long time to leach out of treated wood. Such high boiling bases are probably the most important factors in preventing attacks by borers. (2) The aim in a marine treatment, then, should be to make it in practice a toxicity test with the longest possible killing time (i.e. the oil should show the *lowest* possible *apparent* toxicity) consistent with

maintaining the dislike of the borers for the flavor of the treated wood. (3) Compounds boiling up to 210 deg. C., should be eliminated from oils destined for marine treatments. (4) The tar acids (above 210 deg. C.) though highly toxic, by lowering the surface tension of the oil in which they are dissolved, tend to accumulate at the surface of control between oil and water, and, though but slightly soluble in the water, become dissipated in a comparatively short time. A very low maximum, if not complete elimination of tar acids, should be specified. (5) Wood distillation products and preparations using petroleum oils or products therefrom as bases, are entirely unsuitable for marine wood preservation.

Other Papers and Reports

The Apparent Relation Between Rainfall and the Durability of Zinc-Treated Ties was the subject of a paper presented by C. H. Teesdale and S. W. Allen of the Forest Products Laboratory, Madison, Wis. The record of 48 test tracks were plotted on a rainfall map of the United States. The test tracks were divided into two groups, (1) those where less than 25 per cent of the ties have been removed after a service of eight years or longer and (2) those where 50 to 100 per cent have been removed. Similar maps were prepared for minimum service periods of ten and twelve years.

A line dividing that portion of the United States receiving more than 40 in. average rainfall from that receiving less than this amount was found to extend through Galveston, St. Louis, Pittsburgh, Albany, and Eastern Maine. The data indicated that in a general way in those areas north of this line crossties treated with zinc chloride may be expected to give over 8 to 10 years' service. The authors ventured the further conclusion that this line of demarkation might safely be moved southward to include all of the region north and west of the Ohio river drainage area, although sufficient data were not available to support this.

Nelson C. Brown, foreign trade commissioner, spoke on the field for the exportation of lumber to the European countries. He emphasized that the native forests in the warring countries have largely been destroyed by the lumbering operations necessary to meet wartime requirements as well as the devastation of the conflict itself. The United States forces alone were operating over 60 portable saw mills in France at the time the armistice was signed, engaged primarily in the manufacture of crossties, while our government had contracted for over 400,000 ties from Spain alone up to last September. Even before the war the countries of Central Europe had derived a large part of their requirements from Russia and this source of supply has now been cut off because of the chaos existing in that country. Based upon 15 months' study of European conditions, Mr. Brown predicted a wide opportunity for the sale of American timber products in Europe.

C. M. Taylor, superintendent of the Port Reading Creosoting Plant, Port Reading, N. J., presented a discussion on the need for a chemist at each treating plant to establish proper control of the treatment. Present day conditions are making it necessary for the plant superintendent to devote so much attention to executive problems incident to the handling of labor, fuel and shipping that he is unable to give sufficient personal attention to the details of the treatment itself. Mr. Taylor stated that a chemist concentrating on the technical supervision of the treatment itself can reduce the waste of preservatives, insure compliance with specifications and conduct the experimental work necessary to meet changing conditions. By studying power plant operations he can also effect economies in the use of fuel, boiler waters, etc.

The work of the car service section of the United States Railroad Administration in increasing the efficiency of freight car movements was described in a paper prepared by E. H. DeGroot, Jr., assistant manager, Car Service Section, Division of Operation, United States Railroad Administration, and presented by J. A. Somerville, general superintendent, Missouri Pacific, and formerly assistant manager of the Car Service section.

On Tuesday afternoon Joseph W. Hays, combustion engineer, addressed the convention on the subject of fuel economies and pointed out numerous defects in stationary power plants which contribute to the average waste of 25 per cent of the fuel consumed. Mr. Hays analyzed conditions ordinarily leading to these losses and indicated methods for their detection and elimination.

The committee on Plant Operation presented several forms for the recording of data relative to plant performance. It also submitted information concerning the yard arrangement and methods of stacking ties to secure the economical use of storage tracks.

A report on the use of treated timber in car construction was presented by the committee on the purchase and preservation of treatable timber. An abstract of this report and of the discussion on it was published in the *Railway Age* of January 31, page 295.

The committee on Non-Pressure Treatments, submitted as information specifications which have been prepared and are now in use by a number of companies using timbers treated in this manner.

Other Business

The election of officers resulted as follows: President, J. B. Card, president, Central Creosoting Company, Chicago; vice-president, A. R. Joyce, Joyce-Watkins Company, Chicago; second vice-president, C. M. Taylor, superintendent, Port Reading Creosoting Company, Port Reading, N. J.; secretary-treasurer, F. J. Angier, superintendent timber preservation, Baltimore & Ohio, Baltimore, Md. Chicago was selected as the location for the next convention of the association.

Resolutions were adopted by the Association expressing its approval of the work of the Forest Products Section of the United States Railroad Administration in distributing creosote and also urging the resumption of work on the investigation of timber preservation problems by the Forest Products Laboratory, Madison, Wis.

The Committee on Publications recommended the discontinuance of Wood Preserving, the quarterly publication of the Association, until such time as the members could give it better editorial support. The Committee on Promotion and Education submitted a report recommending the appointment of a committee to canvass the commercial treating companies, the manufacturers of preservatives, the lumber producers and other concerns interested in the promotion of timber preservative, wtih the purpose of raising a fund sufficient to undertake promotion and educational work, tending to increase the use of treated timber. The Association concurred in this recommendation and a committee consisting of Carl G. Crawford, general manager, American Creosoting Company, Louisville, Ky.; C. M. Taylor, superintendent, Port Reading Creosoting Plant, Port Reading, N. J.; and E. T. Howson, western editor of the *Railway Age*, Chicago, were appointed.

W. B. Scott, federal manager, reports that 1,416 officers and employees served in the military or naval service of the United States during the war, as follows: Southern Pacific Lines in Texas and Louisiana, 964 men; Gulf Coast Lines, 98; San Antonio & Aransas Pass, 263; San Antonio, Uvalde & Gulf, 41, and Galveston Terminals, 50.

Train Accidents in December[1]

THE FOLLOWING is a list of the most notable train accidents that occurred on the railways of the United States in the month of December, 1918:

Collisions

Date	Road	Place	Kind of accident	Kind of train	Killed	Inj'd
12.	Pennsylvania ..... } Lake Erie & W... }	Redkey	xc	P. & F.	0	1
†25.	St. Louis-S. F.....	Norge, Okla.	rc	F. & P.	5	23
†29.	A. C. L.....	Bainbridge	bc	P. & F.	2	3
30.	.....	Peoria, Ill.	bc	P. & F.	1	20

Derailments

Date	Road	Place	Cause of derailment	Kind of train	Killed	Inj'd
*3.	N. Y. C.....	Frankfort	d. coupl'g	F.	2	1
4.	C. C. C. & St. L....	Farmland	boiler	F.	..	4
†6.	Atl. Coast L.....	Elrod	unx	P.	3	82
9.	Penn.	Emporium	b. rail	P.	0	1
23.	Wabash	Attica	acc. obst.	P.	..	27
23.	Balt. & Ohio.....	W. Newton	.....	P.	3	..
23.	West'n Md.	Cumberland	.....	F.	1	..
28.	N. Y., Chi. & St. L..	Edgerton	b. rail	P.	..	4

The trains in collision at Redkey, Ind., on the 12th, were a westbound passenger of the Pennsylvania Lines, and an eastbound freight of the Lake Erie & Western, the passenger train running into the side of the freight at the crossing of the two roads. One of the two passenger engines was overturned. The engineman of this engine was injured. The collision was due to an error of judgment on the part of the passenger engineman in making the stop for the crossing.

The trains in collision at Norge, Okla., on the 25th, were westbound passenger No. 407 and a following freight, the freight running into the rear of the passenger and crushing three coaches. Five passengers were killed and 23 injured. The passenger train had been brought to a stop because of trouble with freezing pipes. The collision was due to insufficient flagging. The negligent brakeman, having been found guilty by a coroner's jury, was placed under arrest in Grady County.

The trains in collision near Bainbridge, Ga., on the 29th, were eastbound passenger No. 182, and a westbound freight. One passenger and the engineman of the passenger train were killed, and three trainmen were injured.

The trains in the collision at Peoria, Ill., on the evening of the 30th, were a westbound passenger of the Lake Erie & Western, and an eastbound freight of the Toledo, Peoria & Western. Both locomotives were badly damaged. The engineman of the passenger train was killed and eleven passengers and three employees were injured. The collision appears to have been due to negligence on the part of the passenger train, at the meeting point, in not making sure that the freight had cleared the main track.

The derailment near Frankfort, N. Y., on the evening of the third, involved two freight trains, one eastbound and one westbound. A car in the eastbound train was derailed by the failure of a drawbar and fouled the westbound track. The westbound freight was thrown off the rails by this obstruction, and the engine fell into the Mohawk River. The engineman and fireman were killed, and one other trainman was injured. Fourteen loaded cars were wrecked and were destroyed by fire.

The train involved in the accident near Farmland, Ind., on the night of the 4th, was eastbound freight No. 92, second section. The locomotive, a new one, United States Standard, was wrecked by the explosion of its boiler and a number of cars were thrown off the track. The fireman and one brakeman were seriously scalded, and the engineman and the conductor less severely injured.

The train derailed near Elrod, N. C., on the night of the 6th, was a southbound passenger. Three passengers were killed and 73 passengers, 3 employees and six other persons were injured, of whom 67 were only slightly injured. Cause of derailment undetermined.

The train derailed near Emporium, Pa., on the ninth, was a northbound express. The train, drawn by two locomotives, was running at full speed, and all of the passenger cars (all of the train behind the baggage cars, except one sleeping car), were thrown off the track by a broken rail. Only one person—a passenger—was reported seriously injured.

The train derailed near Attica, Ind., on the 23rd, was westbound passenger No. 53. The locomotive fell down a bank and one coach was wrecked. Twenty-four passengers and three trainmen were injured. The engine was thrown off the track by some obstruction, believed to be a brake rod.

The train derailed near West Newton, Pa., on the 23rd, was eastbound passenger No. 66. The locomotive and first three cars were overturned; the engineman and two express messengers were killed and the fireman and four other persons were injured.

The train derailed near Cumberland, Md., on the 23rd, was an eastbound freight. Twelve cars were wrecked and the line blocked ten hours. One trainman was killed.

The train derailed near Edgerton, Ind., on the 28th, was a westbound special passenger carrying troops. Four passengers were injured. The cause was a broken rail.

Canada.—In a train of the Canadian Pacific at Bonheur, Ont., on the 17th, 14 passengers were killed by a fire which broke out in a tourist sleeping car and spread so rapidly that it was impossible for the passengers to escape, although the train was not in motion.

On the Canadian Government Railway, December 31, near Edmundston, N. B., a westbound special train, loaded with troops, ran off the track and one car fell down a bank and lodged in a lake. Six or more soldiers were killed and a large number injured. After the derailment a heavy snowstorm arose, making rescue work very difficult.

Electric Car Accidents.—Of the electric car accidents reported in the United States in the month of December, only two appear to have resulted fatally. At Norristown, Pa., on the 13th, a trolley car was struck by a locomotive at a crossing and two persons were killed and 11 injured. It is said that the trolley pole jumped off the wire when the street car was on the railroad tracks. At 142nd street, New York City, on the 8th, a two-car train of the Interborough Rapid Transit Company was derailed and ran against the iron pillars at the side of the track. The motorman was killed and four other employees were injured. Apparently the train contained few or no passengers.



Arrival of the German Delegates to the Peace Conference

[1]Abbreviations and marks used in Accident List:
rc, Rear collision——bc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc. ——boiler, Explosion of boiler on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

Lining and Floor Racks for Cars Handling Perishable Freight

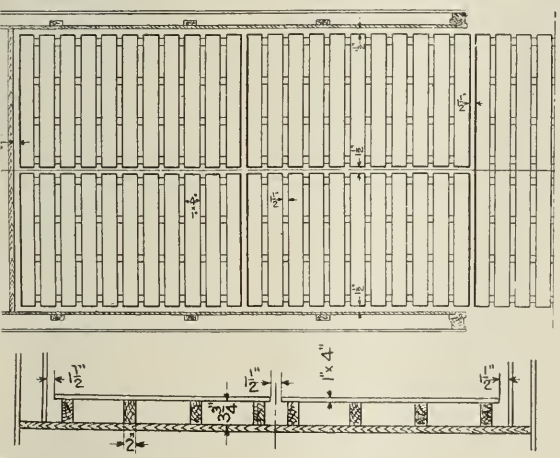
THE CAR SERVICE SECTION of the Railroad Administration issued Circular CS-43 (revised), dated January 30, covering the use of refrigerator and box cars to be used in the transportation of perishable freight.

Refrigerator Cars.—(1) Railroads will supply refrigerator cars for shipment of fruits and vegetables to the extent of their ability. A certain percentage of this class of cars belonging to the various railroads is already equipped with false floors or floor racks. It is contemplated eventually to equip in this manner all such cars owned by roads under federal control, and also cars of the following refrigerator lines: Pacific Fruit Express Company, Santa Fe Refrigerator Despatch, American Refrigerator Transit Company and the 'Frisco Refrigerator Line.

2. It will not be practicable for the railroads to equip a sufficient number of cars to fully meet the requirements of the present season. Therefore if refrigerator cars owned by federal-controlled roads, or cars belonging to any of the above-named refrigerator lines, not equipped with floor racks, are offered for loading fruit and vegetables, shippers, if they so desire, will be privileged to construct and place in cars suitable racks of standard type, in accordance with specifications shown on accompanying print. Racks when so placed will become a permanent part of the car.

3. Railroads will reimburse shippers for the value of floor racks placed as above described at the rate of fifty cents per linear foot of rack. This reimbursement will be made by the road on which load is first placed in car following installation of floor racks.

4. Any *lining* desired by shippers in refrigerators in



Arrangement of Floor Racks for Cars Handling Perishable Freight

addition to floor racks must be placed by them at their own expense, and in such manner as not to damage the car or insulation.

Box Cars.—(5) When railroads are unable to meet the demand for refrigerator cars for above-named shipments, if shippers elect to make use of box cars, and if in their opinion such cars require lining, they (the shippers) will be given the privilege of equipping the cars with such lining entirely at their own expense.

6. In the interest of promoting shipments and conserving food supply, it is suggested that the lining of box cars, when done, conform to the following standard furnished by the Bureau of Markets, United States Department of Agriculture, which, it is believed, will give the best results:

"False floors, side and end walls shall be installed providing an unobstructed space for air circulation down between the car and walls and false end walls, and from there under the false floors to the doorways. This ventilating space must be kept clear of hay, straw, manure, shavings, and everything except the necessary false-floor supports. There shall be a space between the car side walls and the false side walls of not less than four inches at the top and six inches at the bottom.

"Each doorway shall be tightly boarded not less than 24 in. from the floor upward, the boards being nailed to the inside of the door frame to keep out cold winds."

7. For the same reason it is further requested that shippers make it a practice to use box cars for the shorter hauls, reserving refrigerator cars for loading to the more distant points. Railroads will supply refrigerator cars preferentially as compared with box cars, for the longer runs.

8. Box cars that may be lined by shippers will be furnished with a board on either side, of uniform dimensions (24 in. by 30 in.), with lettering of suitable size, reading as shown in the illustration.

RETURN TO

.....
(Insert name of shipper.)

AT

.....
(Name of station.)

..... RAILROAD
(Name.)

UNITED STATES RAILROAD ADMINISTRATION

Instruction Card for Return of Cars

9. These boards will be furnished by the railroads. Lined box cars so boarded will be returned free, with lining, to point of origin of load, and should be waybilled to such point, consigned to party or firm whose name the board bears. They may be loaded all or a part of the way on return trip with any suitable freight. They must not be loaded out of direct line, and care should be exercised to avoid damage to lining in loading or unloading.

10. It must be understood that cars thus lined and boarded are subject to demurrage, either while awaiting loading or unloading.

11. The privilege of equipping box cars as above will extend from November 15, 1918, to April 1, 1919. In the event of failure to return lining to shippers within three months from the last-named date, roads on which it was originally placed in cars will refund to party furnishing same the sum of twenty-five dollars per car in full payment for the value of the lining, but only when installed in conformity with the specifications named in paragraph 6. In the case of box cars the term "lining" will be understood as including false floor as well as lining of side and end walls.

12. Roads on which cars are equipped should keep an accurate account, showing date, number and initial of car and name of shipper to avoid any misunderstanding in making settlement in case of loss.

13. After April 1, shippers will be required to promptly remove from cars any lining which belongs to them. Failing to remove such equipment, the work of removal will be performed by the railroads, but the latter will not be responsible to owners for the material or its value after removal.

14. Provisions herein contained which relate to reimbursements to be made to shippers become effective coincidently with the effective date of tariff provisions of the various railroads authorizing such reimbursement.

General News Department

A second collision, resulting in fatalities to American soldiers, is reported from France. At Montieramey, near Troyes, on February 3, a troop train collided with standing locomotives. Eight United States soldiers were killed and 30 were injured.

A collision, in Mexico, on Tuesday, January 28, is reported as having resulted in the death of 25 persons, including five women and three children. It occurred at Laguna, 160 miles from the Texas border, a passenger train running into the rear of a freight.

Scrip books, containing $90 worth of coupons, are to be sold at $97.20, including war tax, at all Railroad Administration ticket offices in the larger cities. These books will be good on all government railroads, for passage and for extra baggage, the same as the books sold for $30 and $15.

The Louisiana & Northwest Railroad, 121 miles long, extending from Natchitoches, La., northward to McNeill, Ark., and the only route to Homer, La., the center of new oil fields, is to be sold. This is in accordance with an order issued in the federal court at Shreveport, La., by Judge George W. Jack.

Engineers, in Chicago, representing railroad corporations, held a meeting on January 28, at the club rooms of the Western Society of Engineers to formulate plans for a series of meetings at which they will discuss problems which have developed in their relations with the Railroad Administration. The present program includes a meeting on the first Thursday of each month, also an informal luncheon once a week. An executive committee was elected with G. W. Hand, chief engineer of the Chicago & North Western, as permanent chairman, and D. J. Brumley, chief engineer of the Illinois Central, and A. W. Newton, chief engineer of the Chicago, Burlington & Quincy, as members.

Anchorage, Alaska, through its chamber of commerce, asks Congress to appropriate funds to be expended by the Alaskan Engineering Commission for the construction of wagon roads as feeders for the Government Railroad. It is pointed out that there are more than 300 homesteads in the territory through which the railroad passes and on which large crops of potatoes, cabbages, oats, barley and other foodstuffs have been raised during the last two years, but which crops had no means of getting to the railroad and to market. It is declared that sufficient potatoes were raised in the valley of the Matanuska river alone to supply all of the towns along the Alaskan Coast if roads and ships had been available.

The Daylight Saving Law is not liked by the farmers—or at least not by a large majority of those, in various parts of the country, who have been questioned by the Literary Digest. In the summer the farmer has to begin work at daylight whatever may be the time by the clock, and the principal difference in the situation under the new law, in most cases, seems to be that hired men, beginning their work the same as before, wish to lay down their tools, at night, as soon as the whistle blows in neighboring factories. If this factory signal comes an hour earlier than under normal conditions, it tends to cheat the farmer out of an hour's work. Some farm work cannot be profitably begun in the morning until after the dew has dried off; and by long custom the farmers' habits have been adjusted to the situation as guided by the sun; and the false clock is a hindrance rather than a help.

The directors of the Canadian National Railways expect to ask the government for about sixty million dollars for betterments this year including roadway, cars and engines and considerable construction work in the west. The proposed extensions are branch lines, most of which have been graded but not finished. The Great Waterways Railway, of Alberta, which is now a provincial undertaking, about half built, is in the market. It is understood that the government of Alberta would be glad if the federal authorities could take over the line and nationalize it. The government of British Columbia, likewise, has a railway to sell and few bidders. It is the Pacific Great Eastern, heavily financed by the province. The government of New Brunswick has the St. John Valley Railway. This is now operated as a part of the national system, but the provincial government is said to be quite willing that in place of operation the Dominion government should buy out the line entirely.

New Railroad Y. M. C. A. Buildings

Two new Railroad Y. M. C. A. buildings were opened during January. One of these was at Maybrook, N. Y., on the New York, New Haven & Hartford; the other one was at Coxton, Pa., on the Lehigh Valley, this being the first Railroad Y. M. C. A. building on that line. Special exercises were also held at Elsdon, Illinois, on the Grand Trunk, in connection with the completion of the second addition to that building, made necessary by the constantly increasing growth of the association.

Proposed Salaries for Engineers

The American Association of Engineers has submitted to the United States Railroad Administration a schedule of proposed salaries for technical engineers employed by the roads. This schedule is a result of the work of a railroad committee of this association appointed to study this problem when it became evident that the complications involved were delaying its definite solution by the Railroad Administration. In the case of chief engineers, assistant chief engineers, chief draftsman, superintendents of motive power and assistant general superintendents of motive power the schedule makes no specific recommendation; the salaries should be "commensurate with the duties performed." With each position this list contains a note indicating the duties, responsibilities and scope of authority of the position.

Position	Railroads having over 5,000 miles of track	Railroads having less than 5,000 miles of track
District engineer	$425	$375
Assistant district engineer	350	300
Division engineer	375	350
Resident engineer	275	275
Assistant engineer	275	275
Engineer of bridges	400	350
Valuation engineer	400	350
Assistant valuation engineer	350	275
Mechanical engineer	400	325
Electrical engineer	325	275
Assistant electrical engineer	275	250
Signal engineer	400	350
Assistant signal engineer	300	275

	Permanent work, one year or more	Temporary work, less than one year
Instrumentman	200	225
Rodman	125	150
Tapeman	100	120
Designer	250	275
Draftsman	160	200
Junior draftsman	115	160
Tracer	110	130

American Electric Railway Association

The first mid-year meeting and dinner of the association since the entry of the United States into the war will be held in New York City, March 14. The meeting will be held in the morning and afternoon, in the Engineering Societies building, 29 West 39th street. The dinner will be held in the evening in the grand ball room of the Waldorf-Astoria. The program of the meeting will include: (1) a report from the Committee on Readjustment; (2) "The state of the Industry (a symposium), (a) Modern Regulatory Plans and

Theories—paper by an electric railway executive; (b) Capital and Electric Railways—paper by a banker; (c) From the Regulator's Viewpoint—addresses by three public service commissioners. The program for the dinner is yet to be announced.

Some Small Percentages

Freight traffic in the United States in the year 1918, as measured by net ton miles, increased 1.8 per cent over 1917, according to the monthly report of the Operating Statistics Section of the Railroad Administration. This freight was handled with 2.5 per cent less train miles and 2.1 per cent less car miles. There was an increase of 2.9 per cent in the average number of freight cars on line. Net ton miles per car per day increased 0.1 per cent.

Five Business Cars for Sale by Interstate Commission

The Interstate Commerce Commission has for sale five business cars with their contents. These cars were purchased from the Pullman Company in 1914 and 1915, and were standard Pullman cars of wooden construction, overhauled and refitted to serve the purpose of office or business cars for use of field parties in the Bureau of Valuation. Sealed proposals for the purchase of these cars will be received at the office of the chief clerk and purchasing agent of the Interstate Commerce Commission, Washington, and there opened at 10 a. m. on Tuesday, February 25, 1919.

Thieves Punished

Dishonest express messengers, to the number of 11, were sentenced in court at Boston on January 30 to imprisonment from three months to eight months, according to the magnitude of their crimes. These men had been messengers for the American Railway Express between New York and Boston, on trains 48 and 49, and some of them had been stealing merchandise for several months. One man was charged with stealing $1,216 worth of merchandise, and others smaller amounts; but the attorney for the prosecution said that a total of $53,000 had been paid out in claims for losses which, it is believed, were due to the pilfering of these men.

At Elmira, N. Y., on January 18, in the United States Court, a conductor and a baggage master were sentenced to the Maryland State Penitentiary for six years and five years, respectively, for stealing goods from a freight car of the Lehigh Valley.

Six railroad employees, including two railroad police officers, one conductor and three brakemen, were found guilty of stealing freight in a trial before the Court of General Sessions at Wilmington, Del., on January 31. The men were charged with conspiracy, and the stealing was carried on in the early part of 1919. Goods in great variety, stolen from freight cars, were found in the culprits' homes.

Public Sentiment on the Railroad Question

The New York Evening Post, which has investigated conditions in many cities, prints, this week, letters from its correspondent, dated Seattle, Pittsburgh and Cincinnati, all reporting a strong sentiment in business circles unfavorable to government control or operation of railroads. At Cincinnati, labor leaders who were consulted favored Mr. McAdoo's proposal to extend government operation for five years.

The Merchants' Association of New York city, adopting the report of a committee, calls for the restoration of railroads, telegraphs and telephones to private ownership, but not until such time as Congress has made suitable investigation and has passed such laws as will permit and promote maximum utilization of facilities and maximum efficiency in service; and provide for a fair return upon the capital employed.

The lower House of the Iowa Legislature has adopted resolutions of a similar tenor. The discussion on the resolution brought out severe criticism of the management by the government of the railroads and the telegraph and telephone systems.

The American Fruit & Vegetable Shippers' Association, in a four-day convention at Chicago, has adopted resolutions favoring the return of the railroads to private ownership and the adoption of laws to protect the interests of the carriers and the shippers.

Traffic News

All of the observation cars on passenger trains of lines west of Chicago, which were taken off during the war, have now been restored.

Total coal loading for the week ending January 18 amounted to 206,835 cars, as compared with 185,883 for the corresponding week of 1918. Loading for the following week is estimated at 194,378 cars, as compared with 215,329 in 1918.

The Akron Traffic Association held its annual meeting on January 20, and Alvin Hill, traffic manager of the Robinson Clay Product Company, was elected president. The secretary is H. L. Sovacool. The annual dinner was held in the B. F. Goodrich Company's banquet hall.

The Oklahoma Corporation Commission, in a decision rendered on January 30, has ordered railroads to refund one cent a mile in all cases where a cash fare of four cents a mile is collected. The roads have been collecting four cents a mile whenever passengers were not provided with tickets.

The Rate Men's Club, an organization of rate men on railroads in this country and Canada, held its annual meeting and banquet at the City Club, Chicago, on Wednesday evening, February 5. S. J. Duncan-Clark, war correspondent of the Chicago Evening Post, was the speaker of the evening.

Coal loading for the week ending January 11 was 213,715 cars, as compared with 225,642 for the corresponding week of 1918, according to a Railroad Administration report. Grain loading for the week ending January 18 was 29,613 cars, as compared with 16,911 for the corresponding week of 1918. The total for the three weeks ending January 18 was 75,086, as compared with 57,070.

A suit questioning the right of the Hocking Valley to charge three cents a mile in Ohio in violation of the state law fixing passenger rates at two cents was instituted in the Franklin county court at Columbus, Ohio, by the prosecuting attorney of the state. The petition asks that trustees be appointed to take charge of and distribute the money which has been paid to the railroad in excess of two cents a mile.

Recent press reports state that the Agricultural Committee of the Chamber of Commerce at Spokane, Wash., has appointed a special committee to investigate order No. 57 of the Railroad Administration, which deals with claims for loss on grain shipments. A member is quoted as saying "that the order is meeting with a general protest from shippers and traffic organizations because it prevents shippers from substantiating claims for grain losses."

The American Railway Express Company is appealing to its employees and, through the newspapers, to the public, for aid in raising the standards of packing, wrapping and marking goods, so as to check the waste that results from lost and damaged shipments. "Four minute" speeches are to be delivered by local express officers, and "better-service campaign committees" will be formed in the express organizations in every city. Meetings of the different classes of express employees are to be held on every Tuesday during the "drive."

The North and West Committee and the South Committee of Railroad Agricultural Agents appointed by the Agricultural Section of the Railroad Administration have subdivided their respective territories and appointed sub-committees in each state. These sub-committees have completed the assembling of information on soil production, market transportation facilities and the approximate size of available farms in their territories, and this information is now being distributed to returning soldiers and home-seekers. Folders setting forth facts with reference to climate, production, markets, schools and churches in 19 states have been prepared, and will be distributed at ticket offices, demobilization

camps and at the booths of the war camp community service; also at Y. M. C. A. headquarters.

The Special Committee on Relations, of the American Railway Association, and the Committee on Car Demurrage and Storage, of the National Industrial Traffic League, held a meeting in New York on February 5 to further consider a proposed recodification of the national car demurrage rules. The National Industrial Traffic League for two years has complained that in their present form the rules cause confusion and loss of time because of the necessity of referring to the numerous qualifications and exceptions which modify their application.

Need of Relief from Drought

Representatives of 17 counties in southwestern Kansas met at Dodge City, Kan., on January 22 to petition the director general of railways to grant to that territory preferential freight rates, such as have been granted the drought-stricken areas of Texas, Oklahoma and Montana, and to issue orders expediting the shipment of foodstuffs into that territory. The petition states that grain and feed crops have been practically a total failure during the past two years because of the lack of rain and that the commercial credit of the farmers and stockmen is practically exhausted. The petition also states that the present feed supply is sufficient for about two weeks only, making necessary the immediate shipment to that section of large quanties of feed.

Rates on Sand and Gravel

The hearing of the Central District Freight Traffic Committee at Chicago on a proposed mileage scale of rates for sand, gravel, stone and slag in Central Freight Association territory was concluded January 30. Considerable testimony was offered by individual shippers purporting to show that the application of the mileage scale will mean an increase in rates which will seriously impede construction work, and it was urged further that the present rates, which were increased last summer under General Order No. 28, be reduced. Resolutions passed by the Ohio and Indiana legislatures opposing the new scale were also read. H. C. Barlow, traffic manager of the Chicago Association of Commerce, opposed the principle of the mileage scale as applied to sand and gravel, believing that zone rates such as exist in northern Illinois and southern Wisconsin are better adapted to those commodities. It was pointed out repeatedly in the hearing that a prompt settlement of sand and gravel rates is essential to enable contractors to make intelligent bids on work contemplated for the coming spring and summer.

Chicago Commutation Fares Not Increased

The proposed increase in commutation fares to and from Chicago which was to become effective February 10, has been indefinitely postponed by the Railroad Administration. The advance was authorized to enable the Aurora, Elgin & Chicago, an electric line, to take advantage of authority recently granted to charge two cents a mile for its service. That road has been in serious financial difficulty and the Public Utilities Commission of Illinois recognized its need for additional revenues.

According to a statement given out by the railroads the Utilities Commission was consulted before any action was taken regarding the proposed advance for the steam lines, and went on record as preferring action by the Railroad Administration in the matter. In spite of this, however, the attorney general of Illinois filed a petition in the federal court at Chicago for an injunction to restrain the railroads from making the increase. Various suburban organizations have been assisting him in this fight. In view of the postponement of the advance, the attorneys for the Railroad Administration have asked the attorney general to agree to a continuance of any action on his part pending a full review of the matter by an appropriate tribunal. The Chicago & North Western, the Chicago, Burlington & Quincy and the Illinois Central, which are the largest suburban carriers, have spent 40 years in building up business on their lines. Their activities have not been confined to the operation of trains, but have included the development of many of the suburban communities. The proposed advance in rates might drive considerable numbers of suburban passengers to competing electric roads.

The petition for an injunction to restrain the director general from advancing the fares was not granted. When the case came up before Judge Landis, in the Federal Court at Chicago, the attorney for the Illinois Public Utilities Commission requested indefinite postponement, and this request was granted.

Maximum Anthracite Prices and Other Restrictions Suspended

Maximum prices on anthracite coal, together with all other coal and coke regulations except three, have been suspended by the Fuel Administration. The only restrictions not suspended, as to coke and all coal, are: Those requiring that contracts be made subject to maximum prices if reinstated, subject to cancellation by the Fuel Administration and subject to requisition or diversion of coal by the Fuel Administration. Those prohibiting reconsignments of coal. Those requiring shipments of coal to tidewater to go through the Tidewater Coal Exchange. The order includes the suspension of price and zone regulations on coke and bituminous coal which went into effect February 1. The administration's control of the oil industry already has been mostly suspended, so that the Fuel Administration's controls are now relaxed to the present limit of safety.

Western Roads Resume Resort Advertising

A comprehensive advertising campaign to stimulate tourist travel in the West was launched at a meeting of advertising agents of federal-controlled lines at Chicago on February 4. The plans prepared at this meeting will be put into effect under the direction of the Western Lines Advertising Committee in collaboration with the Bureau of Service, National Parks and Monuments and R. S. Yard, chief of the Educational Division of the National Park Service, United States Department of the Interior. The advertising committee which has jurisdiction in the territory served by the Western Passenger Traffic Committee is composed of W. H. Simpson (chairman), assistant general passenger agent of the Atchison, Topeka & Santa Fe; C. R. Custer, advertising agent of the Chicago & North Western, and W. D. Braddock, advertising agent of the Rock Island. This supervisory body will be assisted by 18 subordinate committees made up of railroad advertising representatives who are familiar with the parks and resorts.

This is the first unified effort of railroads in this country to increase passenger travel. The work undertaken falls under two general heads, the attractions of western summer tourist regions and those of the national parks and monuments. Five separate publications will be issued to cover the first class of resorts, and will be entitled "Colorado and Utah Rockies," "California for the Tourist," "Pacific Northwest and Alaska," "Wisconsin, Minnesota and Iowa Lakes," "Arizona and New Mexico Rockies." Each booklet will be profusely illustrated.

The national parks and monument series will consist of 13 booklets, namely: "Yellowstone National Park," "Glacier National Park," "Yosemite National Park," "Grand Canyon of the Colorado in Arizona," "Rocky Mountain National Park," "Mount Rainier National Park," "Hot Springs National Park," "Crater Lake National Park," "Mesa Verde National Park," "Sequoia National Park," "Hawaii National Park," "Zion Canyon National Monument" and "Petrified Forest National Monument." The Bureau of Service of National Parks and Monuments will assist the railroad committees in preparing this literature.

Unlike the folders published heretofore by individual lines, these booklets will make no mention of the railroads serving the various resorts and parks except on the maps. As the pamphlets are intended primarily to serve the needs of the tourist they will include no agricultural or industrial data or detailed population statistics.

The Western Passenger Traffic Committee is preparing tourist rates to these points which will be approximately on the same basis as those of last year. It is believed that the long distance rates, such as from Chicago to San Francisco, will be about 1 1/3 times the regular one way fare, whereas the rate to nearby resorts will be in the neighborhood of 90 per cent of the regular round-trip charge.

Foreign Railway News

New Zealand, in the first nine months of 1918 imported "railway and tramway plant" to the value of $215,017, as compared with $136,277 in the same period of 1917, and $404,007 in the first nine months of 1916.

The Peruvian Congress has authorized the construction of a railway from Paita to the Maranon River, with a couple of branch lines. As a guarantee to the capital invested there is to be a subsidy of 7 per cent per annum for 39 years, the maximum amount of capital being fixed at £6,000,000.

The Spanish Government, in a royal decree, dated December 26, has authorized the railways of the country, all of which are privately owned, to advance their tariffs 15 per cent. The increase is allowed under a lengthy set of conditions, and is intended to cover increased costs of fuel, etc., but primarily increases in wages.

Railways in Siam have apparently suffered severely during the war, because of their inability to procure steel equipment necessary to maintain their efficiency. Advices are that they are in the market for iron framework, wheels and other parts. Eight Siamese students connected with the State Railways are about to visit the United States to study railway methods here.

The government of Holland is expected to place orders in the United States in the next few months for some 30,000 to 40,000 tons of steel for the Dutch East Indies. Railway supplies are greatly needed in the Dutch East Indies, the chief demand being for rails, bars, shapes and reinforcing products. Holland's own needs, which are great, will probably be supplied almost entirely from European sources.

Two Chilean engineers are expected to arrive in this country in about three weeks to continue here their investigations concerning the electrification of the first section of the line of the Chilean State Railways between Valparaiso and Santiago. The government plans to submit the project to an international competition to secure the best system, following somewhat the same plan as was used in connection with the new shops at San Bernardo, near Santiago.

The first Paris-Brussels train for 50 months started at 7 o'clock on the evening of December 27. There were 1,014 passengers, mostly officers and employees on the Belgian railways going to take up their pre-war jobs. The journey was scheduled for 27 hours, and the train traveled by way of Calais, Bruges and Ghent. The first train from Paris to Brussels by the more direct route through Maubeuge arrived at Brussels February 4. It is reported that direct train service is expected to be opened in about three weeks.

"The railways of this country are at present much in the public mind," says the London Daily News. "Traveling during the war has been expensive and uncomfortable. It is expensive and uncomfortable still, and no indication has been given as to when passenger fares are to be reduced or satisfactory services instituted or the normal conveniences of travel restored. But these, closely though they touch the welfare of the individual passenger, are no part of the vital railway problem. That problem consists in the attitude and intentions of the state towards the railways."

The great scarcity of coal in Italy has made it necessary to use wood and lignites for fuel in locomotives. The boilers and fire boxes of the locomotives have had to be changed to suit the new fuel, and employees re-educated to a considerable extent. The use of substitutes for coal as fuel has been urged on all manufacturers, and prizes have been offered for noteworthy economies. In addition to that, two companies, with an initial capital of $1,200,000 each, have been formed for the development of lignite or brown-coal mines in Italy. One will operate mines in northern, the other in southern Italy.

The Federated Malay States legislative council has approved the construction by the government of a causeway, carrying two lines of railway and a roadway 20 feet wide, across the Johore Straits. The Admiralty has given its consent to the scheme. It has also been decided to build a dock on the Johore side of the straits capable of taking the largest craft using those waters. These decisions are of first-class importance because they mean the linking up of Singapore with the mainland of the Malay Peninsula, greatly facilitating transport to and from the Malay States through Singapore.

Three officers of the Victorian railway department have left Melbourne on a visit to America and Canada "for the purpose mainly of making inquiries and securing all the information necessary to enable an electric furnace to be installed at the Newport workshops for the production of high-grade steel castings." A statement to this effect was made by the Premier, who said that the proposed furnace will enable high-grade steel castings to be manufactured at Newport at less than one-half their present cost to the department, and render practicable the use of steel castings in substitution for iron forgings. The installation of the furnace would necessitate the erection of a new foundry to form part of the general scheme of rearrangement of Newport workshops, which was proposed prior to the outbreak of the war.

The exports of railway material from the United Kingdom for the eleven months ending November 30, according to the Board of Trade returns, were as follows, the corresponding figures for 1917 being given in parenthesis: Locomotives, $5,225,125 ($7,700,125); rails, $2,351,965 ($3,392,505); carriages, $2,734,025 ($825,085); wagons, $1,521,530 ($2,036,800); wheels and axles, $1,639,220 ($695,945); tires and axles, $2,802,000 ($2,561,440); chairs and metal sleepers, $696,620 ($346,450); miscellaneous permanent way material, $2,652,395 ($2,312,610); total permanent way material, $5,762,195 ($6,086,535). The weight of the rails exported was 25,475 tons (38,390 tons), and of the chairs and sleepers, 8,711 tons (5,396 tons).

Greek Railway Development

The Athens newspaper Hestia stated recently that negotiations are being conducted in Paris by an important group of French capitalists with a view to the construction of new railway lines in Greece. Representatives of those interested will shortly go to Greece to undertake preliminary investigations. The first line to engage their attention will be that from Drama to Kavalla.

Troops Live in Box Cars

When operating through the thinly populated forest and tundra region along the railway leading from Archangel to Vologda, the American troops fighting the Bolsheviki on the north Russian front are living, when free from trench and blockhouse duty, in tiny Russian freight cars, says the Associated Press. In this they are imitating the Russian soldiers, who, since the revolution, have commandeered freight cars wherever they found them and remodelled them for dwellings.

When the box cars are fitted up with stoves they are known as "topluchkas." They are not particularly warm in zero weather, but a welcome change from the cold trenches in the snow.

Agricultural Light Railways in the United Kingdom

A first step seems to have been taken in the government plans outlined by the British Premier, and referred to freely during the election campaign, for the construction of light railways serving the agricultural districts. Proposals have, it is reported, been drawn up by the Ministry of Reconstruction and approved by Dr. Addison, indicating some of the localities where such railways are needed. Legislative sanction will, of course, be required, but it is understood that the cost is to be borne partly by the local county authority and partly by the government, the lines being leased to operating companies with guarantee as to wages and fares. The operation of the Belgian system of light railways is to be

taken as a model. So far as new construction is concerned a large quantity of material has been released from transport requirements on the French and Belgian fronts, and should be available within a short period, materially reducing the cost. The lines, it is stated, will be run by the side of country roads, linking up the neighboring towns.

Train Ferries for the Irish Channel

Some important developments in the traffic between Ireland, England, South Wales and the French ports may be expected to take place during the current year, in which use will be made of train ferries for the sea passage. Last November a syndicate was formed under the title of the Irish Packing Company, Limited, for the purpose of developing the Irish dead meat export trade on lines which have been so successful in the United States, Australia, New Zealand and Argentina. The plans of the company include in part a service from Dublin and Waterford by train ferries in order to save the double transshipment of the meat and to facilitate its passage to the English market. Berths for the accommodation of train ferries are to be provided at the Alexandra Basin, Dublin, and at Fleetwood, by arrangement with the Lancashire & Yorkshire Railway, and subsequently at Waterford, from which place a train ferry service will be maintained to and from Southampton, and to a port in South Wales to be subsequently decided upon. The project is receiving the support of the Irish-office, and already negotiations have been started with the War Department for the purchase of three of the train ferries which have been so successfully used by the army between England and France.

To Improve Mexican Railroads

A despatch from Monterey, Mexico, says that in order to bring about a betterment of the railroad service of the country the Department of Communications and public Works of the National Government has appointed a commission to take charge of the improvement and maintenance of the several lines. This commission also is charged with the function of exercising similar jurisdiction over the highways and telegraph systems of the country. Its first work will be to make a complete survey of all of the railroads to determine the exact needs in the way of physical betterment, particularly that of new rails, lowering of grades, and the adding of rolling stock. This work will be done by a corps of engineers.

The shortage of equipment is becoming so acute on some of the divisions of the National Railways of Mexico that freight and passenger traffic has been almost entirely suspended. All trains on the Monterey-Tampico division have been taken off except a mixed freight and passenger train that is to make a trip between the two important terminals three times a week.

New Line, Rome-Constantinople Direct, Planned

A plan for the building of a trans-Balkan railroad which would connect Italy directly with the East by a system of ferries across the Strait of Otranto, which is at the heel of Italy and forms the outlet of the Adriatic into the Mediterranean Sea, has been submitted by G. Buonomo, an Italian engineer, and published by the Italian Institute for Commercial and Colonial Expansion.

Italy has always advocated the building of a railroad direct from Constantinople, through Salonica to Avalona, for her own commercial expansion and for the unity of the Balkans, but the governing nations have always opposed it.

Such a railroad would shorten the distance between the principal commercial and industrial centers in Italy and Balkan cities by several hundred miles. From Avalona on the Balkan side to Otranto on the Italian side, a ferry would have to be established to make the line from the Balkans to Italy complete. Over this route the distance from Rome to Constantinople could be traversed in 48 hours, and it would be decreased from 1,905 miles, the present length of the trip via Cevignano, to 1,260 miles, the length over the new proposed line via Avalona.

Allied Guard Planned for Trans-Siberian Railroad

More definite information concerning the agreement between the powers concerning the operation of the Trans-Siberian Railroad is still lacking. An Associated Press despatch from Vladivostok, February 2, however, says that the feature of the plan for operating the Trans-Siberian Railway, which is in process of elaboration at conferences between John F. Stevens, the American Ambassador (to Japan), Roland S. Morris and representatives of the Allies, is that the line shall be guarded by American and Allied troops.

Mr. Stevens is reported to have said that only under that condition will he undertake the task of rehabilitating the railroad. Ambassador Morris is said to support him. The ambassador is clothed with plenary powers to conclude the plan of operation, which, it is expected, will be perfected within a month.

The necessity for an Allied guard has been accentuated by the project of the early repatriation of the Czecho-Slovak troops, preparations for which already are completed. The removal of invalids and wounded is now going on.

The corps of railroad operatives organized by Mr. Stevens, which has been waiting for a year to begin work, is under orders to be ready at an hour's notice to proceed to points already assigned in the scheme of operation.

A War Loan Special in Burma

The United States is not the only place that has made use of War Loan Specials in bond campaigns. During the second India War Loan last August and September, the Burma railways ran such a train over their lines with marked success. The train was made up of highly decorated cars, had band and pwé (theatrical) parties on board and bands and pwé parties at every station. The Burmese are not great investors, but the striking appeal made by the train attracted



The Burma War Loan Special Is Assisted by a Chinese Boys' School Fife and Drum Corps

them and brought out a very large sum of money, some of which had been hoarded, and showed signs of not having been in circulation for many years. The arrival of the train at a station was the sign of a holiday, people coming with their families to take part in the festivities from every point within 20 miles distance. The train traveled during daylight only, stopping at every station. It was on the road 28 days, stopped at 202 stations and, in addition, spent three days at Rangoon. In all it covered 1,058 miles.

New International Routes

There seems to be every prospect of quite a number of the new international railway routes proposed during the war materializing at a very early date, says the Railway Gazette of London. According to the most recent information the first of these is likely to be a through service between Paris and Bucharest, operated by the Entente, and in a measure succeeding the notorious and short-lived "Balkan Zug." This service has been the subject of study by a Franco

Roumanian mission in Vienna, and is expected to be inaugurated during the current month. The route will be Paris, Berne, Zurich, Arlberg, Innsbruck, Vienna, Budapest and Bucharest, and is, therefore, mainly through territory which for over four years has been enemy country. During the war there have been a number of proposals for the provision of new international services entirely avoiding German and Austrian territory, and one of these will be the revived Orient Express from Paris to Constantinople. Prior to the war this ran via Strasbourg, Munich, Vienna, Budapest and Sofia. On the outbreak of war the Germans seized a good deal of the rolling stock belonging to the International Sleeping Car Company, and the "Balkan Zug" was really nothing but the Orient Express in a German disguise. The new Orient Express, which will not touch German territory, will use either the Simplon or Mont Cenis route to Milan, and run thence to Constantinople via Venice, Trieste, Agram, Nish and Sofia, with a Nish-Athens portion via Uskub and Salonica. The International Sleeping Car Company also plans to extend the service to Bagdad and Jerusalem and to link up with its existing services in Egypt, via Kantara.

Labor Difficulties in Great Britain

London despatches of Tuesday last indicate that labor matters on the railways of England and Scotland are in a very unsettled state. The London tubes are not running owing to a strike of motormen on some lines and of power house employees on these lines and others; and the secretary of the Associated Society of Locomotive Engineers and Firemen has announced that all drivers on railways having electric divisions are being called out. The despatches say, however, that a strike of stationmasters, ticket clerks, etc., has been averted by the recognition of the Railway Clerks' Union. Representatives of the union had an interview Tuesday with Sir Robert S. Horne, Minister of Labor, and Sir Albert H. Stanley, president of the Board of Trade. The matter of the grievances of the men was also discussed by a special cabinet meeting. The president of the Board of Trade, speaking of the trouble in the tube railways, said:

"Under the arrangement made in December last the government granted railway men an eight-hour working day, excluding meal times. This was accepted by the unions concerned. The unions then submitted further demands, including increased wages and improved conditions of service apart from the eight-hour day. These matters are to be considered at the meeting next week between the members of the railway executive committee and the men's unions. Meanwhile, existing conditions of service apart from the eight-hour day are to remain unaltered. Despite this agreement with responsible unions, certain employees of the Underground and the London and Brighton railways have taken it upon themselves to strike and demand that meal times shall now be included in the eight-hour day. This demand, if granted, would mean that these men would work only seven or seven and a half hours daily. If this arrangement was extended to other railways it would reduce the working day to as low as six and a half hours in some cases. It is quite clear that what is now demanded by the small section of the men who are on strike is contrary to what has been agreed with the unions."

The present labor trouble on the railways seems to be part of the strike fever now prevalent in the United Kingdom, but it also goes as far back as the threatened strike of drivers and firemen in August, 1917. At that time, Sir Albert Stanley wrote to the Associated Society of Locomotive Engineers and Firemen as follows: "I pledge the government, the War Cabinet, and myself personally, to continue the present control of the railways for a time after the cessation of hostilities, * * * and that any reasonable request for a shorter working day will have the immediate and sympathetic consideration of the government."

The signing of the armistice, being construed as the "cessation of histilities," the society promptly demanded the redemption of the pledge and was joined by the National Union of Railwaymen. Both threatened trouble if prompt action were not taken. The Board of Trade, working without association with the railways themselves, thereupon entered into the following agreement in the early part of December, this being the agreement mentioned by Sir Albert in his statement above:

(1) The principle of an eight-hour day for all members of the wages' staff has been conceded, and is to come into operation February 1.
(2) All existing conditions of service to remain unaltered pending the decision of a committee, to be set up as soon as possible, to review wages and other conditions of service of railwaymen in Great Britain.

J. H. Thomas, who was a party in the negotiations, has stated that the eight-hour principle is not established for the purpose of enabling overtime to be worked.

The National Union of Railwaymen, promptly following the announcement of the agreement, brought out these further extreme demands:

Hours.—That eight hours constitute a working day and 48 hours a working week.

Wages.—That all advances given as war increases be converted into permanent wages.

Guaranteed day and guaranteed week.—That a guaranteed day and a guaranteed week be established on all railways.

Overtime.—That double time be paid for all overtime.

Sunday duty.—Between 12 o'clock midnight Saturday and 12 o'clock midnight Sunday to be paid for at rate of double time. Sunday duty to be independent of the guaranteed week.

Night duty.—6 p. m. to 6 a. m. That night duty be paid for at the rate of time and a half.

Piecework, tonnage and bonus systems.—That all piecework, tonnage and bonus systems be abolished.

Mileage system.—That on those systems where locomotivemen at present work under a mileage clause 120 miles to constitute a day's work on passenger trains and 96 miles on goods trains; all mileage over and above this to be paid for at an equivalent rate.

Rest.—That the period of rest between turns of duty be not less than 12 hours.

Hybrid grades.—That hybrid grades be abolished.

Standard rates of pay.—That conditions of service for railwaymen be standardized upon all railways in the United Kingdom.

Management of railways.—That there be equal representation, both national and local, for this union upon the management of all railways in the United Kingdom.

Fourteen days' holiday with pay.—That 14 days' holiday with pay be allowed.

These demands are apparently being pushed with a degree of force befitting their drastic character. At a conference held in London on January 26, a strong feeling was expressed regarding the government's "continued neglect to deal adequately" with the men's grievances and threats were made of a strike unless matters were settled by February 9.

The trouble on the electric lines is additional to the negotiations with the National Union of Railwaymen, and in general, the situation, to an American reader at least, seems as complicated as it is fruitful of trouble.

There is also trouble with the shopmen. These were not included in the eight-hour day agreement, but were covered by another, made between them and the railways, following a similar agreement in the engineering trades in general, which gave the shop workers a reduction of their working week "to 47 hours on the 'one-break' system to come into effect on January 1, 1919, it being further agreed that other working conditions should be meantime maintained and present weekly time rates shall apply to the reduced working hours," etc.

This agreement has also caused trouble just as that with the drivers and enginemen. Trouble was experienced during January, on the Lancashire & Yorkshire and the London, Brighton & South Coast, over the introduction of the 47-hour week on those roads. On the former, the men at the Formby power-house on the Liverpool and Southport electrified line wanted to be treated as engineers and not as shopmen; as shopmen they did not get the 47 hours until February 1. The trouble on the Brighton road is caused by the men at Lancing shops, who live at Brighton, desiring to be paid for their traveling time.

Later despatches on Thursday say that the strike of the enginemen and firemen on the electric lines has been extended to the steam suburban and to a lesser degree to other services on the London, Brighton & South Coast and the London & Southwestern, and that members of the National Union of Railwaymen were out on the Great Western at Plymouth. Traffic into and out of London is being handled in so far as possible by the tramways and busses and by motor trucks driven by military men. The large numbers who have had to walk have been much inconvenienced by snow and slush.

Equipment and Supplies

Locomotive Deliveries

Forty new locomotives were shipped to railroads under federal control during the week ended January 25, as follows:

Works	Road	Number	Type
American	C. & O.	7	USRA Mallet
	Mobile & Ohio	4	USRA 6-w. Sw.
	*Duluth, Missabe & Northern	3	USRA Santa Fe
	*Oregon Short Line	1	USRA Mikado
	Chic., R. I. & Pac.	4	USRA 6-w. Sw.
	C. & O.	3	10-w. Switch.
	C. & N. W.	1	Mikado
	Total	23	
Baldwin	Lehigh Valley	3	Pacific
	B. & O.	6	USRA Mikado
	A. T. & S. Fe	3	Mikado
	Illinois C. R. R.	2	Mikado
	Atlantic Coast Line	1	Mikado
	Phil. & Reading	1	Consol.
	Penna. R. R.	1	Mikado
	Total	17	
	Grand total	40	

* Three U. S. R. A. Santa Fe constructed for the Duluth, Missabe & Northern, were shipped to Columbus, Ohio; and one U. S. R. A. Mikado constructed for the Oregon Short Line was shipped to Cleveland, Ohio, to be stored as parts of emergency pools.

Locomotives

Robert Hudson, Ltd., Leeds, England, have ordered two Mogul type locomotives, weighing 37,000 lb., and with 11 by 16 in. cylinders, from the American Locomotive Company, for service in Portuguese East Africa.

The Federated Malay States Railways have ordered 12 locomotives from the Baldwin Locomotive Works.

[A reference to the shortage of rolling stock on these railways appeared in the Foreign Railway News Section of the *Railway Age*, issue of January 24, page 275.]

Chinese Orders.—The report, given in some of the newspapers and other places, to the effect that the Baldwin Locomotive Works has recently received orders for 34 locomotives from railways in China, is not true, as the orders were placed some time ago, and in one case at least were put on the books nearly two years ago. The report in question outlined the orders as follows: South Manchuria Railway, 12; Pekin-Mukden, 14; Lunghai-Peinlo, 4, and the Shantung Railway, 4.

The South African Government Railways have ordered 40 Mountain type locomotives from the American Locomotive Company. and 30 of the same type from the Baldwin Locomotive Works. Of the 40 ordered from the American Locomotive Company, 20 will have a total weight in working order of 200,000 lb., and 22 by 28 in. cylinders, and 20 will have a total weight in working order of 195,000 lb., and 22 by 26 in. cylinders.

The Province of Santa Fe Railroad of Argentina (Cie Française des chemins de fer de la Province de Santa Fé) has ordered 20 Pacific type locomotives from the American Locomotive Company. These locomotives will have a total weight in working order of 105,000 lb and 16 by 20 in. cylinders.

[The Province of Santa Fé Railroad is controlled by French capital, its head offices being in Paris, and its South American headquarters being at Santa Fé. It operates about 1,200 miles of meter-gage lines and owns about 160 locomotives and 5,643 freight cars.]

Freight Cars

The Holland-St. Louis Sugar Company, Decatur, Ind., is inquiring for two small side dump cars.

The Ferro Construction Company, Chicago, is inquiring for one 48-ft., 110,000-lb.-capacity steel flat car.

The Pussey-Jones Company, Gloucester City, N. J., is inquiring for one 25-ton drop-bottom coal car.

Supply Trade News

J. H. Regan, assistant secretary of the Pressed Steel Car Company, has been transferred from the New York to the Chicago office of that company.

W. R. Colklesser has been appointed purchasing agent of the Gadsden Car Works, Richmond, Va., vice **W. F. H. Finke**, resigned to accept service with the United States Railroad Administration.

J. D. Corby has resigned as St. Louis district manager of sales for the Chicago Pneumatic Tool Company and has assumed the active management of the Corby Supply Company, of St. Louis.

Alden R. Ludlow, formerly vice-president of the Liquid Carbonic Company of Chicago, assumed his new duties as second vice-president and sales manager of the Air Reduction Sales Company, Inc., New York, January 1.

Huntly H. Gilbert, who left the service of the Pressed Steel Car Company and Western Steel Car & Foundry Company at the start of the war, to enter the army as captain in the Ordnance Department at Washington, and later was commissioned major and transferred to the Rock Island Arsenal, has re-entered the service of the above named companies, as assistant manager of sales, western district, located at 425 Peoples Gas building, Chicago.

Arthur F. Braid has been appointed sales manager of the metal and alloy department of the Metal & Thermit Corporation. Mr. Braid went to the company seven years ago as a traveling salesman, and after a few years of service in this capacity was appointed assistant superintendent of the Jersey City plant, in charge of the manufacture of carbonfree metals and alloys. When the United States entered the war, he assumed active charge of the metal sales at the New York office of the company.

Randolph S. Reynolds, secretary of the Curtain Supply Co., Chicago, died of pneumonia on January 20. Mr. Reynolds was with the Curtain Supply Co. since 1912. Prior to that time he was with the Western Steel Car & Foundry Co., at Anniston, Ala., and the Pressed Steel Car Co. at Pittsburg, Pa., having been connected with their purchasing departments from 1905 to 1912. He left the Pressed Steel Car Co. in 1912 to accept a position with the Curtain Supply Co. and later was made assistant to general manager, and on April 30, 1918, was elected secretary to succeed **Holmes Forsyth**, who on that date became president.

Railway Supply Dinner

The Chicago Railway Equipment Company gave its twenty-sixth annual dinner at the Union League Club, Chicago, on the evening of February 4. There were present the officers and directors of the company and also a large number of leading men in the railway supply and other industries. The president of the company, E. B. Leigh, was toastmaster, and the speakers were Samuel O. Dunn, editor of the *Railway Age;* William C. Cornwell, editor of the Bache Review; A. H. Mulliken, president of Pettibone, Mulliken Company, and James A. Emery, general counsel of the National Council of Industrial Defense.

Mr. Dunn's subject was "The Railway Problem." He pointed out several measures which should be adopted in order to make it feasible to return the railways to private operation and make private operation a success. He especially emphasized the need for legislation to re-establish railway credit, and upon this point said:

I wish to call attention particularly to the relatively small difference in railway earnings which is required to make all the difference between adversity and prosperity, stagnation and expansion, in the railroad industry. On December 31, 1917, the

property investment of our railways, as reported by the Interstate Commerce Commission, was $19,000,000,000. Let us call it twenty billions in order to make simple the calculations I shall base upon it. If the railways earn 4½ per cent net operating income on this amount, $900,000,000 a year, we know from past experience that the industry will be extremely unprosperous and stagnant. This is approximately the average that was earned in the five years 1911 to 1915, inclusive, when railway expansion almost came to a stop. One billion net operating income would produce 5 per cent. The industry would still be stagnant with this rate of return. On the other hand, if the net operating income amounted to $1,200,000,000, or an average of 6 per cent for the railways as a whole, I believe the result would be reasonable prosperity in the industry and a revival of the expansion.

Since no intelligent person would contend that the railways should be restricted to less than 5 per cent, we are justified in saying that the settlement of the problem of railway credit hinges mainly upon the determination of the question whether they shall be allowed to earn more than 5 per cent, and, if so, how much more. If they were allowed to earn 6 per cent, their net operating income would be only two hundred millions a year more than if they were allowed to earn only 5 per cent.

Now, relatively, how much difference in the burden of rates to be borne by the public would this difference of $200,000,000 a year make? A year ago, the railways were paying about $2,000,000,000 a year in wages. Now they are paying about $2,800,000,000, and when the pending advances to the train service employees are granted, this will be increased to $2,900,000,000. Therefore, the difference in net operating income required to make the difference between railway stagnation and expansion would be but 7 per cent as great as the total wages now being paid, and only one-fifth as great as the advances in wages which have been made within the past year. A year ago the total earnings of the railways were running at the rate of $4,300,000,000. Today they are running at the rate of $5,400,000,000. Therefore, the difference in net operating income required to make the difference between railway stagnation and expansion would be less than 2 per cent as great as the current earnings, and only one-fifth as great as the increase in earnings which has occurred in the last year.

If the public is willing to pay in increased freight and passenger rates an advance of almost a billion dollars in wages in order to satisfy railway labor, surely it ought to be willing to pay one-fifth that much in order to make the difference between adversity and prosperity, stagnation and expansion in the railway industry. As a matter of fact, it would not cost the public a dollar to re-establish the credit of the railway companies by assuring them a reasonable net return, and then returning the roads to private operation. In my opinion, if this were done, the managements would soon effect economies by making needed improvements and by adopting better operating methods, which would save the country vastly more than $200,000,000 a year in operating expenses.

Mr. Cornwell discussed the subject of "Industrial Readjustment." He laid special stress upon the menace to industry, and especially to American labor, that is presented by the prevalent unrest and increasing unemployment. The situation is aggravated by the necessity for transferring industries from a war to a peace basis. The government has available, he pointed out, a means of reducing the dangers of the transition period to a minimum. The railways directly and indirectly give employment to a large part of the people, and there is no doubt as to the need for a large expansion of railway facilities. The adoption by the government of an extensive program of rehabilitation of railroads and enlargement of their facilities would do more to tide industry over the transition period and reduce unemployment to a minimum than any other policy that could be adopted.

Mr. Mulliken, in a brief talk, emphasized the necessity for an educational campaign to show labor the dangers of socialism and bolshevism, and referred to a movement which is being inaugurated by business men in Chicago and New York to carry on an educational campaign upon this subject.

Mr. Emery, in his talk, pointed out that every exertion of the human body or mind for industrial purpose is properly comprehended within the term "labor," and that all industrial progress has been due, not merely to the physical exercise of labor, but to improvements in industrial organizations, machinery and methods which have increased efficiency of production. Whatever tends unduly to impair the rewards of management and of capital will interfere with industrial progress and ultimately destroy every industrial progress from which labor benefits far more relatively than do employers and capitalists.

Financial and Construction

Railway Financial News

CHICAGO, ROCK ISLAND & PACIFIC.—Speyer & Co. and Hayden, Stone & Co. are offering $4,500,000 three-year 6 per cent collateral trust gold notes, due February 1, 1922. The notes are secured by $7,500,000 of the company's first and refunding mortgage 4 per cent bonds, the bonds being pledged at 60. The trust agreement will provide that the collateral security shall, at all times, be equal at market price to not less than 120 per cent of the face amount of the notes outstanding. The proceeds of the notes will be used for the settlement of the claims, long in litigation, of the Colorado & Southern Railway growing out of contracts relating to the securities of the Trinity & Brazos Valley Railway and the Galveston Terminal Railway Company, and the use of their properties.

FORT SMITH, SUBIACO & EASTERN.—Judge F. A. Youmans of the United States District Court at Fort Smith, Ark., has confirmed the sale of this road to the Commonwealth Trust Company of St. Louis, Mo., for $50,000. Protests against the sale were filed on behalf of stockholders who contended that the bid was inadequate as the company had $200,000 worth of property. Claims aggregating $460,000 have been filed and hearing on these claims will be held on March 3.

INDIANAPOLIS & FRANKFORT.—See Pittsburgh, Cincinnati & Chicago & St. Louis.

NEW YORK CENTRAL.—John Skelton Williams, director of the division of finance of the Railroad Administration, is asking bids from bankers on an issue of between $8,000,000 and $10,000,000 New York Central equipment trust certificates.

PENNSYLVANIA.—An official announcement states that the stockholders at the annual meeting, on March 11, will be asked to authorize an increase of $75,000,000 in the company's indebtedness, to be made at such times as may be prescribed by the directors. The purpose is to provide for present and future requirements, including obligations maturing during the year, and reimbursing the government for additions, improvements and equipment expenditures made in connection with government control and chargeable to the company. Through unissued balances remaining from previous authorization, the directors at present are empowered to increase the indebtedness by approximately $46,000,000. The additional $75,000,000 will bring the total authorization to $121,000,000.

PITTSBURGH, CINCINNATI, CHICAGO & ST. LOUIS.—The stockholders at a meeting in Pittsburgh on February 3 authorized an increase in the indebtedness of the company by the issuance of $35,000,000 of debenture gold bonds. They also authorized the purchase of the Indianapolis & Frankfort Railroad for $6,000,000, which gives the company a direct line of its own between Louisville and Chicago. The contract with the government for the operation of the company's railroad during the period of federal control was not ready for action, and the stockholders adjourned to meet on February 17, 1919, to take up that question.

SOUTHERN RAILWAY.—Halsey, Stuart & Co. and the Continental and Commercial Trust and Savings Bank of Chicago, are offering at 99¼, yielding over 6¼ per cent, $25,000,000 three-year 6 per cent notes, due March 1, 1922.

Railway Construction

THE PENNSYLVANIA RAILROAD, WESTERN LINES.—Work is now being undertaken on a number of new buildings and other facilities incident thereto in connection with a large car repair plant in the east yards at Terre Haute, Ind. The following buildings are under construction or contemplated: Office building, women's locker room, men's locker room, paint shop, freight car repair shop, storeroom building, planing mill, extension to power house and material and scrap bins.

Railway Officers

Railroad Administration

Central

Charles F. Patterson, heretofore counsel for claims in the Division of Law, has been appointed assistant general counsel, with office at Washington.

Ballard Dunn has resigned as assistant actuary of the Railroad Administration in charge of the Bureau for Suggestions and Complaints to become connected with the United States War Risk Bureau. Mr. Dunn was formerly special representative of the Union Pacific.

Regional

J. C. Roth, representative of the Car Service Section at Seattle, Wash., has been appointed car service assistant to **L. C. Gilman,** district director at Seattle. Mr. Roth's duties will be to supervise all car supply and car distribution matters on the roads in the Puget Sound district, to secure reports from the roads concerning car service and transportation matters, to issue orders covering the local distribution of cars of all classes between railroads in the territory, to supervise the terminal situation at all principal points, to keep in touch with the operating conditions in the district and to secure reports indicating the movement of cars in and out of the district, to gather information as to probable requirements for cars of all classes for loading and to continue, as at present, to act as zone embargo chairman.

George J. Ray, chief engineer of the Delaware, Lackawanna & Western, with office at Hoboken, N. J., has been granted leave of absence, and has been appointed engineering assistant to the regional director of the Eastern Region, with headquarters at New York. He will also perform such other special duties as may be assigned to him. Mr. Ray was born on March 24, 1876, at Metamora, Woodford county, Ill., and was graduated from the University of Illinois in 1898 with the degree of batchelor of science, and in 1910 received the degree of civil engineer from the same university. In 1916, Lafayette University gave him the honorary degree of doctor of science. In May, 1898, he began railway work as a chainman on the Illinois Central and subsequently served consecutively as rodman, inspector, instrumentman and assistant engineer. From March, 1901, to March of the following year he was supervisor of track, and then for one year was roadmaster on the same road. On March 15, 1903, he went to the Delaware, Lackawanna & Western as division engineer, at Scranton, Pa. From September, 1908, to January 1, 1909, he was with T. Burke, railroad contractor, at Scranton, and in January, 1909, he returned to the service of the D. L. & W., as chief engineer. His appointment as engineering assistant to the regional director of the Eastern Region became effective on February 1.



G. J. Ray

Federal and General Managers

The jurisdiction of **C. W. Galloway,** federal manager of the Baltimore & Ohio, Eastern lines, and associated lines, with headquarters at Baltimore, Md., has been extended over the Morgantown & Kingwood.

The jurisdiction of **Charles H. Hix,** federal manager of the Norfolk & Portsmouth Belt-Line Railroad and the Hampton Roads Railroad Terminals, with headquarters at Norfolk, Va., has been extended over the Virginian Railroad.

W. A. Winburn, Federal manager of the Central of Georgia, the Louisville & Wadley, the Sylvania Central, the Wadley Southern and the Wrightsville & Tennille, has been appointed Federal manager also of the Augusta Southern and the Georgia & Florida, with office at Savannah, Ga.

H. C. May has been appointed federal manager of the Chicago, Indianapolis & Louisville and the Cincinnati Indianapolis & Western, with headquarters at Chicago, both roads having been released from the jurisdiction of **E. M. Costin,** federal manager. Mr. May's photograph appeared in the *Railway Age* July 18, 1918, on page 125. Previous to his appointment as federal manager, Mr. May was general superintendent of the Chicago, Indianapolis & Louisville.

Leroy Kramer, federal manager of the St. Louis-San Francisco, the Missouri, Kansas & Texas and the Missouri, Oklahoma & Gulf, has extended the authority of the following officers of the Katy & Frisco over the last named line: **C. N. Whitehead,** general manager; **C. Haile,** traffic manager; **W. F. Evans,** general solicitor; **J. G. Livengood,** general auditor; **G. E. Scott,** purchasing agent, and **S. G. Hoag,** industrial commissioner. The headquarters of these officers will be at St. Louis, Mo.

Operating

J. W. Rector has been appointed chief despatcher of the Southern Railroad Lines, Richmond division, vice **Joseph Byrd,** granted leave of absence on account of sickness.

F. A. Stine has been appointed superintendent of dining car and restaurant service of the Delaware, Lackawanna & Western, with office at Hoboken, N. J., vice **J. L. Smith.**

Financial, Legal and Accounting

W. P. Dewar has been appointed acting Federal treasurer of the Missouri, Oklahoma & Gulf, with headquarters at Muskogee, Okla.

Henry M. Piper, paymaster of the Boston & Maine; the Montpelier & Wells River; the Barre & Chelsea; the St. Johnsbury & Lake Champlain, and the York Harbor & Beach, with office at Boston, Mass., was at his own request relieved of his duties on February 1, after 38 years' service with the Boston & Maine; **Nathaniel G. Hill** has been appointed paymaster to succeed Mr. Piper.

B. Newhouse, assistant federal auditor of the Minneapolis, St. Paul & Sault Sainte Marie, has been appointed federal auditor, vice **C. W. Gardner,** resigned to accept service with the corporation; **J. F. Heberle** has been appointed assistant federal auditor to succeed Mr. Newhouse, and **B. E. McCune,** auditor of disbursements, has been appointed assistant auditor; all with headquarters at Minneapolis, Minn.

Traffic

The title of **Nat Duke,** general freight agent of the Delaware, Lackawanna & Western, has been changed to freight traffic manager, and the title of **G. A. Cullen** has been changed from general passenger agent to passenger traffic manager, both with headquarters at New York. **J. L. Smith,** superintendent of dining car and restaurant service, with office at New York, has been appointed division passenger agent, with headquarters at Newark, N. J.

W. G. Crush, general passenger agent of the Missouri, Kansas & Texas of Texas (excluding the Trinity branch and the Beaumont & Great Northern), Houston & Texas Central and the Union Terminal of Dallas, has been appointed passenger traffic manager of all roads under the jurisdiction of **J. S. Pyeatt,** to succeed **J. L. West,** who has resigned to engage in other business. **J. S. Hershey,** general freight agent of the Gulf, Colorado & Santa Fe, the Texas Midland and the Houston Belt & Terminal, has been appointed freight traffic manager of all roads under the authority of Mr. Pyeatt.

Messrs. Hershey and Crush will have their headquarters at Dallas, Tex.

Engineering and Rolling Stock

J. L. Carver has been appointed engineer of tests of the Illinois Central and the Yazoo & Mississippi Valley, with headquarters at the Burnside shops, Chicago, to succeed **M. W. Kramer,** deceased.

J. H. Knowles has been appointed chief engineer in charge of construction and maintenance of way and structures of the Western Pacific, the Tidewater Southern, and the Deep Creek, to succeed **T. J. Wyche,** who has resigned.

C. J. Kelloway, signal engineer of the Atlantic Coast Line, with office at Wilmington, N. C., has been appointed superintendent of signals, in charge of construction and maintenance of signals and interlocking plants on the Atlantic Coast Line, the Winston-Salem Southbound and the Tampa Southern.

J. M. Kinkead, supervisor of the Pennsylvania Railroad, at Altoona, Pa., has been appointed division engineer of the Trenton division, with headquarters at Trenton, N. J., succeeding H. H. **Garriques,** who has been transferred as division engineer to the Philadelphia Terminal division, at West Philadelphia, Pa., succeeding John Atlee, deceased.

G. M. O'Rourke, track supervisor on the Illinois Central, at Carbondale, Ill., has been promoted to roadmaster on the Indiana division, with headquarters at Mattoon, Ill., to succeed **F. B. Oren,** who has been transferred to the Illinois division, with headquarters at Champaign, Ill. Mr. Oren succeeds **W. C. Costigan,** who has been assigned to other duties.

Louis L. Tallyn, division engineer of the Delaware, Lackawanna & Western, at Scranton, Pa., has assumed the duties of chief engineer with the title of acting chief engineer during the absence of **G. J. Ray,** chief engineer, who is serving as engineering assistant to the regional director of the Eastern Region. Mr. Tallyn was born at Benson, Ill., and was educated in the University of Illinois, where he received the degree of B. S. in C. E. He began railway work on June 1, 1901, as instrumentman on the Chicago, Burlington & Quincy, and the following year he became transitman on the Illinois Central. From 1903 to 1904 he served as division engineer on the Chicago, Cincinnati & Louisville, now the Chesapeake & Ohio of Indiana, and then entered the service of the Delaware, Lackawanna & Western as assistant engineer. He remained in that position until 1910 and then became superintendent of water service. Since 1911 he served as division engineer until his recent appointment as acting chief engineer of the same road, as above noted.

Purchasing

The jurisdiction of **W. J. Diehl,** general storekeeper of the Mobile & Ohio, with headquarters at Mobile, Ala., has been extended over the Gulf, Mobile & Northern.

C. L. Nash has been appointed division storekeeper of the Mobile & Ohio, with headquarters at Tuscaloosa, Ala., succeeding **T. S. Edgell,** who has been transferred to other duties.

Corporate

Executive, Financial, Legal and Accounting

W. W. Collin, Jr., assistant general counsel of the Pennsylvania Lines West, representing the corporation, has resigned to become a member of the law firm of Borders, Walter & Burchmore.

Cecil Edward Friend, who has been appointed controller of the Canadian National Railways, with headquarters at Toronto, Ont., as has already been announced in these columns, was born on October 12, 1871, at Brighton, England, and was educated in private schools. He began railway work on December 1, 1893, with the Canadian Pacific as private secretary to the traffic manager, at Winnipeg, Man. In October, 1896, he became stenographer and the following June was appointed chief clerk and accountant in the office of the superintendent of the Canadian Northern, at Winnipeg. He later served as auditor, and from July 1, 1910, as general auditor at Winnipeg, on the same road, until his appointment as controller of the Canadian National Railways, with office at Toronto, Ont., as above noted.

Operating

The jurisdiction of **T. J. Lowe,** fuel agent, of the Canadian National Railways, with headquarters at Winnipeg, Man., has been extended to include all Western lines.

W. E. Leith has been appointed superintendent and general freight and passenger agent of the Sewell Valley Railroad Company, with headquarters at Rainelle, W. Va., vice **R. E. Shinn,** deceased.

F. S. Elliott, chief operating officer of the Spokane & Inland Empire, with headquarters at Spokane, Wash., resigned on February 1, and the position of chief operating officer has been abolished. **J. F. Gannaway,** assistant superintendent, with office at Spokane, has been appointed superintendent.

Traffic

J. O. Apps, general baggage agent of the Canadian Pacific, with office at Montreal, Que., has been appointed general agent, mail, baggage and milk traffic, with office at the same place.

The general manager for the receiver of the Manistee & North-Eastern announces that **F. A. Mitchell** has resigned the office of general traffic manager, and that office has been abolished. **D. Riely,** general freight and passenger agent, with office at Manistee, Mich., will in future handle all matters pertaining to traffic.

S. Osborne Scott, whose appointment as general passenger agent of the Canadian National Railways, with jurisdiction over lines west of Port Arthur, Ont., Armstrong and Duluth, Minn., was announced in the *Railway Age* of January 24, was born at St. Andrews, Man., in 1881. He graduated from the University of Manitoba in 1901, and immediately entered the service of the Canadian Northern as a junior clerk in the audit department. In 1903 he became a clerk in the traffic manager's office at Winnipeg, Man., which position he held in 1907, when he took charge of the ticket stock, baggage and advertising. In 1910 he was appointed traveling passenger agent, with headquarters at Toronto, Ont., but later was removed to Winnipeg as chief clerk in the passenger department. From 1911 to the date of his recent appointment as general passenger agent he has been assistant general passenger agent. His new headquarters will be at Winnipeg.



S. O. Scott

The following appointments have been made on the Canadian National Railways, effective January 25: **James Morrison,** assistant general passenger agent of the Canadian Northern, lines east of Port Arthur, has been appointed assistant general passenger agent, and **J. E. LeBlanc,** district passenger agent of the Canadian Government Railways, has been appointed district passenger agent, both with offices at Montreal, Que., and with jurisdiction over Garneau, Levis and west to North Bay, Smiths Falls and Brockville; **H. C. Bourlier** has been appointed assistant general passenger

agent, with office at Toronto, Ont., and with jurisdiction over Brockville, Smiths Falls and west to Port Arthur.

James Edward, division freight agent of the Grand Trunk, with office at Ottawa, Ont., has been appointed division freight agent, with headquarters at Montreal, Que., vice **G. T. Pettigrew,** resigned to go into other business. **R. J. S. Weatherston,** division freight agent at Stratford, succeeds Mr. Edward and **Vivian G. Snell,** commercial agent at Moncton, N. B., has been promoted to division freight agent, at Stratford, to succeed Mr. Weatherston.

J. M. Macrae, whose appointment as assistant general freight agent of the Canadian National Railways, lines west of Port Arthur and Armstrong, Ont., and Duluth, Minn., was announced in the *Railway Age* of January 24, was born at Stornoway, Scotland, in 1884. He entered the service of the Canadian Northern at Winnipeg, Man., in 1906, in the accounting department. In 1907 he went with the Canadian Pacific as a stenographer in the office of the assistant freight traffic manager, remaining with that company as tariff clerk, assistant chief clerk and chief clerk in the freight traffic department until 1911, when he entered the service of the Imperial Oil, Ltd. (Canadian subsidiary of the Standard Oil Company), in charge of traffic matters in western Canada. In 1912 he re-entered the service of the Canadian Northern as district freight agent at Saskatoon, Sask., remaining in that capacity until the date of his promotion to assistant general freight agent.

R. Creelman, assistant passenger traffic manager of the Canadian National Railways, lines west of Port Arthur, Armstrong, Ont., and Duluth, Minn., with headquarters at Winnipeg, Man., whose appointment was announced in the *Railway Age* of January 24, began railway work with the Grand Trunk in 1890. He was consecutively junior clerk, ticket clerk (Toronto, Ont., office), ticket clerk (depot office) and chief clerk to the district passenger agent until 1900, when he went to the Canadian Pacific as rate clerk in the passenger department at Winnipeg. He became chief rate clerk for the Canadian Northern in 1901, and in 1902 became city ticket agent for the Northern Pacific at Winnipeg. Re-entering the employ of the Canadian Northern in 1906, as traveling passenger agent with headquarters at St. Paul, Minn., he was subsequently commercial agent, with headquarters at St. Paul, assistant general passenger agent at Winnipeg, and in 1911 was appointed general passenger agent, which position he held until his recent appointment as assistant passenger traffic manager of the Canadian National Railways.



R. Creelman

Walter Hately, whose appointment as assistant general freight agent of the Canadian National Railways, with headquarters at Winnipeg, Man., has already been announced in these columns, was born on March 5, 1887, at Brantford, Ont., and was educated in the public schools of his native town and at Collegiate Institute. He began railway work in March, 1904, with the Grand Trunk as a clerk in the local freight office at Hamilton, Ont., and in August, 1908, he became an accountant in the superintendent's office at Toronto. From September of the following year to October, 1913, he was a clerk in the freight tariff bureau of the same road at Montreal, and then served for two years as a clerk in the freight tariff bureau of the Canadian Northern, at Winnipeg. From October, 1915, he was chief of the tariff bureau of the Canadian Northern, until his recent appointment as assistant general freight agent of the Canadian National Railways, in charge of publication of tariffs and subdivisions for lines west of Port Arthur, Ont., Armstrong and Duluth.

Engineering and Rolling Stock

A. L. Graburn, assistant superintendent of rolling stock of the Canadian Northern, with office at Toronto, Ont., has been appointed general fuel agent of the Canadian National Railways, with office at Toronto.

Purchasing

E. H. O'Neil, general superintendent and purchasing agent of the Manistee & Northeastern, with office at Manistee, Mich., has resigned and the office of general superintendent has been abolished. **W. D. Manchester** has been appointed purchasing agent to succeed Mr. O'Neil.

Obituary

John B. Frost, superintendent of transportation for the Oliver & Snyder Steel Company, Union Town, Pa., died January 30, age 67. Mr. Frost served for 25 years with the Baltimore & Ohio in various capacities and has been head of the Oliver & Snyder transportation department for the past 18 years.

David B. Keeler, vice-president of the Fort Worth & Denver City, the Fort Worth & Denver Terminal, the Wichita Valley, the Wichita Falls & Oklahoma, the Stanford & Northwestern and the Abilene & Northern, died on February 1, at Fort Worth, Tex., after an operation. He was 70 years old. Mr. Keeler began railroad service in 1871 with the Denver Pacific, remaining with that road until 1875, when he became agent for the Colorado Central at Golden, Colo. Subsequently he held various positions with the Colorado Central and St. Louis Pacific and in 1890 he became assistant general freight agent of the Union Pacific at Denver, Colo. In 1899 he entered the employ of the Fort Worth & Denver City as general freight and passenger agent, being elected vice-president and traffic manager in 1899, and vice-president in 1906. In 1907, he was also elected vice-president of the Wichita Valley.

Francis La Bau, traffic assistant to the regional director, Eastern Region, died on February 1, at his home in Tarrytown, N. Y. He was born on December 13, 1859, at Rahway, N. J., and was educated at the Moravian Institute, Nazareth, Pa. He began railway work in 1879, as local waybill clerk on the Pennsylvania Railroad at Philadelphia, Pa., and subsequently served in various positions in the same office until 1882, when he became a clerk in the division freight office of the United Railroads of New Jersey division. He then served consecutively as secretary to the freight traffic manager of the New York, West Shore & Buffalo, and as chief clerk to the traffic manager of the West Shore. From 1891 to January, 1893, he was assistant general freight agent of the same road and was then promoted to general freight agent. In July, 1904, he became assistant freight traffic manager of the New York Central & Hudson River and the West Shore. In May, 1907, he was promoted to freight traffic manager of the New York Central. From December, 1914, to August 1, 1917, he was freight traffic manager of the lines east of Buffalo. He was then appointed traffic manager of the same lines, and since June, 1918, served as traffic assistant to the regional director, Eastern Region, with office at New York.



Francis La Bau

EDITORIAL

Railway Age

Morgan and the Southern Railway

Since incorporation, the Southern Railway has been financed under the auspices of J. P. Morgan & Company. The company's stock had been held in a voting trust until June 30, 1914, and Morgan & Company were the dominant factors in this voting trust. Last week, however, when the Southern Railway sold $25,000,000 notes to refund notes which fall due March 1, the underwriting was done by a Chicago syndicate, headed by Halsey, Stuart & Company. Morgan & Company gave out a short statement to the effect that the Chicago syndicate did it with their (Morgan's) blessing. The notes were offered to the public at 99¼, and run three years at 6 per cent, making the interest yield slightly over 6¼ per cent to the investor. Everybody knows that there is no love lost between John Skelton Williams, controller of the currency, and the National City Bank, the National City Company and Morgan & Company. Probably Mr. Williams was only too glad to see someone go in and underbid Morgan & Company for Southern Railway financing. Now comes the test, however, as to whether or not these notes can be sold at the price at which Halsey, Stuart & Company have to offer them to make any profit on the bid which they made to the railway company. If any set of bankers, either in New York or in the west, are misjudging the bond market and are unduly pessimistic as to the price at which railroad securities can be sold, it is for the public good that someone else should have the courage of his convictions and prove the more pessimistic bankers wrong. The sale, sometime ago, of $50,000,000 bonds by the Pennsylvania, through Kuhn, Loeb & Company, was eminently successful. If this sale of Southern Railway notes should prove anything like the same sort of success, it would be a most encouraging sign for the railway situation in general.

An Army Practice Applied to the Railroads

As pointed out in an article on the activities of our railway forces in France, published elsewhere in this issue, the military organization of our transportation corps has necessitated the maintenance of a personnel bureau the duty of which is to keep a careful record of the education, experience and performance of every enlisted man and officer in the service. Those who have had experience under this plan are convinced of its value in helping discover weaknesses in the organization and in making possible the ready application of remedial measures. The question has arisen in the minds of some of our railway officers in France whether the personnel bureau scheme could not be profitably adopted by the railroads of this country. Under existing conditions here it is too often the case that, while weaknesses become evident, they are not traced to their sources. Under the method used in France the discovery of inefficiency in any department has led to a careful examination of the individual records of officers and employees in that branch to see if the source of the trouble could not be found. In this connection it is pointed out that the work of the personnel bureau might be vitiated if it were subordinated to any one railroad department. The independence of its activities is essential to its success, and accordingly it is proposed that the bureau be directly under the authority of the chief executive—federal manager, general manager or president, as the case may be. The objection may be raised, and perhaps not without reason, that it will be difficult to establish successfully any fair method of rating the work of railroad men. Many of their activities are not sufficiently tangible to render unnecessary the exercise of a wide range of discretion on the part of supervisory officers. Certainly, however, the desirability of the establishment of personnel bureaus is well worth considering.

Freight Traffic Statistics for 1918

While several of the monthly reports of freight traffic movement and car performance issued by the Operating Statistics Section of the Railroad Administration have shown gains in efficiency, the report covering the full calendar year 1918 does not make an especially strong showing for government control as compared with that of the year before. While the volume of traffic as measured by net ton miles of freight handled shows an increase of 1.8 per cent and the net ton miles per mile of road per day increased from 5121 to 5210, the report also shows that this was done with an average increase of 2.9 per cent in freight cars on line. While car efficiency has been increased by heavier loading, credit for which must be shared with the shippers and the Food Administration, the full gain in this item is not reflected in the train loading figures and the average mileage per car per day fell below the record for 1917. While the tonnage per car was increased from 27 to 29.1 or 7.8 per cent, the increase in the average tonnage per train was increased only from 653 to 682, or 4.4 per cent. The miles per car per day fell off from 26.1 to 24.9, or 4.6 per cent, and the net ton miles per car day decreased from 495 to 490, a reduction of 1 per cent. The increase of 1.8 per cent in net ton miles was handled with a reduction of 2.5 per cent in train miles and of 2.1 per cent in car miles, but the decrease of 5.6 per cent in loaded car miles was to a considerable extent offset by an increase in the empty car mileage of 6.1 per cent, the percentage of loaded to total car miles having been reduced from 70.2 to 67.7. The percentage of unserviceable cars also shows a slight increase, from 5.6 per cent in 1917 to 5.7 in 1918. While the railroad system under federal control has handled a slightly larger traffic in 1918 than was handled in 1917, at an increase in expenses of $1,200,000,000, the report of the Operating Statistics Section shows that the principal aspect of increased efficiency was in heavier car loading and to a lesser extent in the train leading.

Abolition of Piecework

By paragraph five of General Order No. 8, issued February 21, 1918, which reads: "No discrimination will be made in the employment, retention or conditions of employment of employees because of membership or nonmembership in labor organizations." Director General McAdoo opened the door for labor unions to enter the railway field on all sides and to thoroughly develop and perfect their organizations. This has been done. By supplement No. 4 to General Order No. 27, issued in midsummer, he tended to discourage the railway

employees from working piecework by granting a material increase in the hourly wage, with no adjustments in the piecework rate. The difference between the piecework rate and the hourly wage was so great that only those of exceptional ability and agility could, with the unadjusted piecework rate, earn more than was paid under the hourly rate. Those who could not compete with the increased hourly rate naturally saw the futility of exerting themselves for no monetary gain and their output accordingly declined. There were, however, quite a few who still were able by their diligence and skilfullness to earn sufficiently more than the increased hourly rate to make piecework attractive to them. To make the victory for the hourly rate complete Director General McAdoo on December 31 issued instructions that the question of whether or not the piecework system should be abolished entirely be put to a vote of the employees themselves and that the railroads under government control be governed by the will of "a substantial majority." The returns are nearly complete. With the men now so thoroughly organized and with such a small number of employees able to make piecework pay under the discriminatory rates, there is but one answer. Efficiency and output have been sacrificed to further what organized labor believes to be to its interest, whereas, the truth is, the complete abolition of piecework will result in a decline of efficiency which will be harmful to all concerned and most of all to labor itself.

Don't Lose Your Punch

"WHAT'S THE USE; what's the use." This is the drone-like murmur that can be heard on approaching any government-run institution. This attitude is a slow poison and an ambitious man might as well acquire a drug habit as to surrender himself to its deadening embrace. Since the signing of the armistice railroad men have been exposed to this poisonous influence in a doubly dangerous way. Added to the dulling influence that accompanies all bureaucratic regimes, there is the added uncertainty, for the railroad man, in regard to his future employer. There is only one way to overcome this, and that is to fight, and fight hard against it. Fall back on your self-respect, refuse to let petty injustices weigh on your mind, stand out for what you know to be right!

This applies all down the line; to the mechanical and engineering departments as well as to the operating department. If the mechanical department is being supplied with "standardized material" which is uneconomical and does not give satisfactory service, the foreman and the master mechanic should bring this fact forcibly to the attention of superior officers. The same is true in the engineering department as regards supervisors and division engineers. In the operating department if materials or conditions are unsatisfactory and uneconomical, complaint must be made to higher officers. The true state of affairs can only become known to federal managers, regional directors and the central administration by each officer down the line vigorously and fearlessly protesting against conditions which, in his judgment, are wrong.

Surely, the American railroad man is not going to lose his punch because of a touch of government operation and a temporary combination of adverse circumstances. The master mechanic, the division engineer, the trainmaster and superintendent are having a hard row to hoe, but it is no harder and not as deep and broad as that which the federal manager has to hoe; and it is the falsest sort of philosophy to give up to a feeling of "What's the use." If conditions are wrong, each man has got to put his shoulder to the wheel to right them, and it is helping neither the federal manager nor the central administration to refrain from protesting against materials or conditions which are uneconomical and unsatisfactory.

Early Action Regarding the Railways Needed

TWO RAILWAY PROBLEMS confront the country. One is the problem of the ultimate disposition of the railroads. This cannot be solved during the present session of Congress. The other is the problem presented by the policy of drastic retrenchment which is now being followed, and which if persisted in will have a very bad effect upon the industry and workers of the nation during the period of transition from a war to a peace basis. This problem can and should be solved almost immediately. The policy of retrenchment being carried out applies not only to additions and betterments, which would require capital expenditures, but also to maintenance and renewals, which would be chargeable mainly to operation.

With the reduction of traffic and earnings which has occurred and is still continuing, the Railroad Administration is justified in effecting every economy which will not unduly impair the service rendered or cause deterioration of the physical properties or prevent making up deferred maintenance.

It is plain that the railroads are overmanned in many departments. The public should not be compelled to pay in the form of rates or taxes the wages of men or the cost of materials which are not needed. But both the present and the future welfare of the public demands that all the men shall be employed, and all the materials shall be bought and used that are needed to offset deferred maintenance and to put the properties in condition to handle not only present, but future business.

The Railroad Administration is not following a policy of rigorous retrenchment because it really desires to. It is following it mainly because the government, as an operator of railways, is practically bankrupt. The revolving fund of $500,000,000 which was provided by Congress last year is almost exhausted, and the railways are not earning enough and operating income to pay the guarantees of standard return to the companies. In consequence, the Railroad Administration is getting into sore need of funds. With its deficit rapidly growing, it cannot carry out an adequate program of maintenance, much less an adequate program of additions and betterments, unless and until Congress provides it more money. Director General Hines has asked for a new revolving fund of $750,000,000. This will be needed whether government operation is continued or the railways are returned to private operation. The legislation necessary to provide it should be passed at the present session of Congress. It is difficult to see how, unless this is done, the policy of retrenchment in maintenance can be discontinued until Congress meets again.

If the policy of retrenchment is continued unabated it will have serious effects, not only upon the railroads, but upon other industries. The *Railway Age* in its issue of February 7, page 337, published letters from twenty-seven railway supply concerns clearly indicating what will be the effects upon the railway supply industry unless the Railroad Administration soon begins to place larger orders. A continuance of the present policy means calamity to the railway supply industry and its employees. Furthermore, the railway supply industry is so large and extends so widely over the country that if it is compelled to close its plants and discharge its men, the effects will be felt by concerns and their employees in almost every other line of industry. Congress should not adjourn without providing a new revolving fund for the Railroad Administration, and the sooner this is done, the better it will be for the entire nation.

With respect to additions and betterments, which require capital expenditures these cannot be made without concerted action by the Railroad Administration and the companies that own the railways. While the future of the rail-

ways is so completely undetermined, neither the Railroad Administration nor the companies will be disposed to enter upon large projects for extensions and permanent improvements. Congress cannot at its present session pass legislation finally to settle the railroad question. The time is too short. It will soon have before it, however, enough data, arguments and plans to reach as complete and constructive a solution as it would have if it continued to consider the subject for five years, or even for ten years. This being the case, the legislation needed for a permanent solution could and should be passed during the present year. That is, it could be if an early special session of the next Congress should be called soon after the adjournment of the present Congress. Therefore, the course which should be taken by the government in dealing with the present railway situation is clear.

First, the present Congress should promptly pass legislation providing the Railroad Administration with a new and adequate revolving fund.

Second, the new Congress should be called together in extra sessions soon after March 4, and should as speedily as practicable draft and adopt the legislation which is clearly needed and which the nation obviously wants, providing for the early return of the railways to the management of their owners under conditions which will render it practicable for the companies to operate their properties efficiently and economically, and to enter immediately upon a program of additions and betterments which will tend to equip the railways satisfactorily to handle the commerce of the country when business again becomes normal.

Every citizen, every business concern, every commercial organization, that is anxious to promote the public welfare, both during the present period of transition and during the period of great opportunity for American business which will follow it, should urge upon the Administration and Congress the need for action along these lines.

Enormous Increase in Expenses

THE STATISTICS of railway earnings and expenses for December 1918, as reported by the Interstate Commerce Commission, show that the downward trend of railway net operating income continued through that month. As pointed out by the *Railway Age* in an editorial in its issue for January 24, page 236, net operating per month income steadily declined from $128,000,000 in August to $57,000,000 in November. In December, for 175 large roads, it was only $23,000,000.

The bad showing in December was due almost entirely to an increase of operating expenses. In December, 1917, the weather and other operating conditions were as bad as were ever known, and yet the operating expenses of the railways included in the Commission's report were only $238,582,000. In December, 1918, the weather conditions were as favorable to economical operation as were ever known, and yet the expenses were over $375,282,000, making an increase over December, 1917, of $136,700,000.

Undoubtedly this enormous increase in expenses was partly due to the fact that large retroactive advances in wages were charged into the December accounts. On the other hand, there are still large wage advances to be made to the train service employees and the Railroad Administration is not making adequate expenditures for maintenance which would be chargeable to operating expenses. The December figures alone would indicate that operating expenses are increasing at the rate of over $1,600,000,000 a year. It is to be feared that when all necessary adjustments in the accounts are made, and advances in wages now pending are granted, it will be found that for handling a corresponding amount of traffic, operating expenses are running at the rate of $1,500,000,000 a year more than those of 1917

The statistics for December are accompanied by statistics showing the results of the same roads for the twelve months of 1918. The 175 large roads included, having a mileage of 214,000 miles, had an increase in earnings during the entire year of $824,000,000, or 21.6 per cent; an increase in expenses of $1,090,000,000, or 40 per cent; and a reduction of operating income of $265,000,000, or almost 30 per cent. Of the increase in total earnings, over $600,000,000 must have been due to advances in rates. Without the advances in rates the Railroad Administration would have had a deficit at the end of the year exceeding three quarters of a billion dollars.

In spite of the enormous increase in expenses, officials of the Railroad Administration continue to point out economies which have been effected. These economies are real, but most of them cannot be permanent. For example, R. H. Aishton estimates the economies he has effected during the year, first as director of the Western Region and later of the Northwestern Region, at $34,000,000. It is a notable fact, however, that Mr. Aishton's statistics show that over $23,000,000 of these economies were effected by reductions of passenger train service, most of which cannot be continued permanently.

On the whole, the available statistics indicate that the present system of government operation of the railways would have proved enormously more expensive than private operation, even in the absence of any advances in wages.

A Billion Dollar "Germ"

A. B. GARRETSON, president of the Order of Railway Conductors, testifying on behalf of 14 railroad labor organizations, claiming to represent 1,900,000 employees, told the Senate committee that the three other brotherhood executives and many of the heads of the other organizations had been opposed to government ownership on principle all their lives, but had been converted by the experience of the past year under government operation of the railroads. He said that government operation had not had a fair trial as to its efficiency during its first year but that the employees had seen in it the "germ" of what might be made of it after a fair trial. Therefore the representatives of the 14 organizations had unqualifiedly endorsed the plan proposed last week on behalf of the brotherhoods by their counsel, Glenn E. Plumb, which has been characterized as a plan for "government ownership and brotherhood operation."

The particular aspect of government operation during the past year which has been most visible to the employees has been the increases in wages awarded them by Mr. McAdoo, which are now estimated at between $800,000,000 and $900,000,000 a year and which will be increased by possibly $60,000,000 to $100,000,000 by the latest demands of the brotherhoods. If this is merely the "germ," the future possibilities looming up in the minds of the leaders of the brotherhoods and of the ten other organizations affiliated with the American Federation of Labor with whom they have joined forces must be rather interesting. Some of the roots and branches which might be developed from such a germ were described in the statement presented before the committee last week by Mr. Plumb. He proposed that the government buy the railroads by issuing its bonds in exchange for the outstanding securities, furnish all the working capital, and turn the operation over to a corporation administered by a board of directors, one-third to be chosen by the classified employees, one-third by the President of the United States—presumably by and with the advice and consent of the brotherhoods and the American Federation of Labor—and one-third by the appointed officers. After the plan got under way the officers would be appointed by this board of directors and no remarkable gift of vision is required to discern another germ in this part of the scheme.

Mr. Garretson spoke of furnishing transportation not for profit but at cost, but he said that no effort had been made to settle on all the details of the plan. Mr. Plumb's plan contemplated profits, to be divided one-half to the government and one-half to the employees in the form of a wage dividend. With the employees electing and assisting to elect the directors, who would appoint the officers, we can readily see how Mr. Garretson's ideal of transportation without profits might be attained, but Mr. Plumb presents a sample array of figures from which, by assuming an operating ratio of 70 per cent, he produced a profit, after payment of fixed charges, of $500,000,000 to be divided equally between the government, which would furnish all the capital, and the employees, who would have been paid their wages. This would leave $250,000,000 for a wage dividend, which, divided among 2,000,000 employees, would give an average of $125 to each.

After the precedents set by Mr. McAdoo in the way of two or three increases in a year with back pay we fear that Mr. Plumb's assumed figures are too modest to satisfy his clients, but as a germ the idea has great possibilities.

New Books

Proceedings of the International Railway Fuel Association, edited by J. G. Crawford, secretary, 200 pages. Illustrated, 6 in. by 9 in. Bound in leather. Published by the association, 702 East Fifty-first street, Chicago. Price, $1.50.

The convention of the International Railway Fuel Association held in Chicago in May, 1918, was a notable event. The association met at a time when the fuel situation was most serious and the addresses delivered at the convention represent the ideas of some of the most distinguished men who were called on to deal with that problem during the war. These addresses are published in full in the proceedings of the association which have just been issued. There is hardly a phase of the railroad fuel problem that is not covered. The viewpoint of the miner is presented by John P. White. The mine operators are represented by Harry N. Taylor. The work of the Fuel Administration is outlined by P. B. Noyes and M. L. ReQua; of the Railroad Administration by R. H. Aishton, Eugene Auliffe, F. McManamy, E. H. DeGroot and W. S. Carter. There are also addresses by the president of the association, E. W. Pratt, Robert Quayle, Thomas Britt and several returned soldiers.

Modern Management Applied to Construction, by Daniel J. Hauer, consulting engineer. 6 in. by 9 in., 194 pages, illustrated. Bound in cloth. Published by McGraw-Hill Book Company, Inc., 239 W. 39th Street, New York City. Price, $2.50.

This is a new book on scientific management and, whereas most of the previous treatments of this subject have referred primarily to manufacturing and building construction, this book treats the subject from the standpoint of the construction contractor handling grading work, building bridge masonry, etc. The subject is handled in a style that is entertaining, primarily because of the frequent use of examples and hypothetical conversations. This has been applied most aptly in the initial chapter defining scientific management, and the one following on the old versus the new management. The author's justification for the application of scientific management is covered in a chapter entitled "Finances and Efficiency." In handling the subject from the standpoint of the construction contractor, it is divided under the separate heads of plant design, motion study, modern management, cost keeping and bookkeeping, organization, and the effect upon the workmen. The final chapter deals with the organizations of the large war construction projects.

Letters to the Editor

A Suggestion for a Seniority Index

Portsmouth, Ohio.

To the Editor:

When employees' records are kept and used in connection with the promotion of employees on a seniority or service basis, a numerical index often takes considerable burden off the office and makes the work more pleasant and easier.

By assigning a certain number to each employee immediately on entering the service, each successive employee being assigned the next higher number, an automatic seniority index will be obtained for daily use in the assigning or placing of employees in proper positions according to their respective seniority, and for use in other ways as may be necessary.

For the information of the employees themselves the usual seniority list arranged in date order showing the names of employees should be kept, each employee should be informed of his service number and he should use it in turning his reports into the office when bidding for a new position.

In this way one employee will only be burdened with one number (or seniority record) instead of one employee burdened with all seniority records, making for greater accuracy and speed to the benefit of all concerned.

The necessary care should be exercised to see that a correct number is assigned in the first place, and that no change is made in numbers after once assigned, unless there is an absolute necessity therefor.

The lower number would of course indicate the man longest in the service. If a class of promotion made it necessary to distinguish that service with some mark, in order to avoid changing any employee's number, a letter may be affixed or prefixed to the number, a certain letter indicating a certain class of service, and so on.

As employees leave the service for any cause their numbers then become obsolete as far as the working seniority list is concerned and these numbers should not be assigned to any other employee again, but should be retained to cover the employee to whom first assigned, or discarded entirely.

In order to keep the number record accurate at all times, a small book should be used, showing names of employees consecutively in the order employed, with the number assigned at the time of employment, which will indicate at all times what number is assigned to any certain employee, and what is the next number to be assigned. The alphabetical index which is already used in most offices, should, of course, carry opposite the employee's name his assigned number. These two records are easily kept and assure correctness of assignment.

I believe that this method will be found to be a great convenience and a time saver. It should prove of special value in view of the fact that recent awards of the Railroad Administration to various classes of railroad employees gives to each class a seniority standing, and many positions will no doubt be hereafter filled more or less on that basis. The numerical index provides a ready and accurate reference in determining the relative standing of one or any number of employees. If it is desired to designate numbers from one central office to cover several subdivisions, the addition of a letter prefix or suffix will admit of that without change or confusion, and permit the use of only one series of numbers—that is, commencing with number 1, or any desired number, and progress in consecutive order indefinitely. Paul Jones.

Further Light on Work of Railway Men in the War

Transportation Corps Shows Marked Adaptability in Solving Problems Under Strange Conditions

TOURS, France, January 5, 1919.

NOTHING HAS CONTRIBUTED MORE to the success of the transportation efforts of the American forces in France than the adaptability of the officers and men in charge of this work. In a strange country, unfamiliar with the language, on a railway system utilizing operating methods foreign to their experience, the Americans handled a rapidly increasing flow of troop and freight traffic with such evident efficiency that they won the unqualified praise of the French with whom their activities were co-ordinated. Whether engaged exclusively in the movement of American trains, or assisting the French either by bolstering up their weakened railway organizations or by operating lines in the danger zone near the front, the transportation officers and men from the United States proved ready and able to meet every emergency which confronted them.

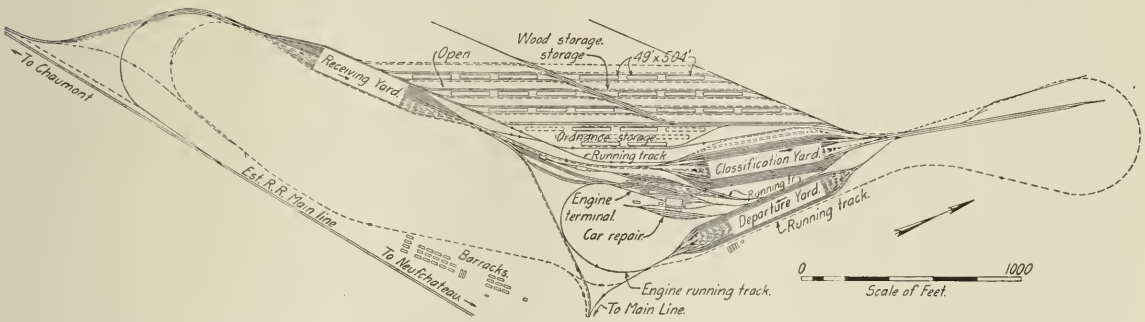
Contrary to the general impression that the railway forces constituted one unit of the American Army, they formed three classes: (1) those who operate on the railways of France independently of the existing French organizations; (2) those who were merged with the French transportation forces and became substantially French employees, and (3) those regiments which operated lines close to the fighting front under the direction of the French military authorities. The first class constitutes a complete railroad organization superimposed upon and co-ordinated with the French organizations which operate trains over the same lines. The second class was a contribution to the French railway personnel which was seriously depleted by the drain of the war upon the man power of the railroads of France. In this connection, it is interesting to note that bitter experience taught the French, as well as the English, the folly of permitting their transportation organizations to be crippled by the loss of officers and employees drafted into military service. Tardy efforts were made to recall these men to their civilian occupations and, while a considerable number were returned to service, the initial loss was by no means made up.

The third class of American railway forces consists of regiments which first arrived in France and were employed in operating trains from regulating stations to light railways close to the front. There were three of these units out of the first nine regiments organized in the United States, which worked under the direction of the French military authorities. While these contingents remained a part of the American army, they were not, like the other two classes of railway men, in the Transportation Corps commanded by Gen. W. W. Atterbury. This article pertains wholly to the work of the first two classes of railroad forces, and not to the third just mentioned.

The Housing of Railway Troops

It is not generally known in the United States that the American railway troops, while engaged in work similar to that in which they were employed in civilian life, nevertheless are subject to the same discipline and the same living conditions as the other army contingents. All railway men work in uniform, live in barracks—most of which were built by themselves—and are organized according to the military plan, with various ranks ranging from general down to private. Each railroad employee has been provided with a special design of cap with a visor, similar in appearance to the headgear of automobile chauffeurs, and also with a 21-jewel Hamilton watch.

The problem of providing these men with sanitary and properly equipped barracks, and with food and water, as well as with adequate medical care, has been by no means simple, especially in view of the fact that the railway offi-



Regulating Station at Liffol Le Grande. Full Lines Show Portion of Yard Completed on November 15

cers in charge had no experience in such undertakings in civilian life. They were confronted always with the difficulty of anticipating assignments of men to new locations sufficiently in advance to provide suitable living quarters.

The Personnel Bureau

Another duty imposed upon those in charge of the railway forces by army regulations was the maintenance of a personnel bureau. This organization keeps a careful record of every man in the service, which includes information concerning his education, a detailed statement of all the positions he ever held, his military rank and the promotions he has received, if any, and also a rating of the quality of his work. Equally careful records of the officers are maintained, each of which is given a quarterly standing according to his efficiency, intelligence, leadership and general value to the service. The distinct advantage of this classification is that it makes the source of weaknesses in the organization evident by an examination of the records and therefore greatly facilitates the intelligent application of corrective measures. Though all railway troops were organized into military units and were given various ranks according to that scheme of organization, it does not always happen that one's

military grade conforms to his importance as a railway man. Sometimes, for instance, an engineman would be a private while the fireman on the same train would have the rank of sergeant. Irregularities of this kind, however, did not interfere with the conduct of the work of the transportation troops.

The Work of the Railway Troops

The American Expeditionary Forces first loaned railway men to the French operating organizations in the middle of April, 1918. About May 1, 1918, the American railway organization commenced the operation of its own trains over the French roads under trackage rights. Some idea can be gained concerning the relative number of men in the two services from recent statistics regarding the distribution of engine and trainmen under the general manager of the Service of Supply of the Transportation Corps. While the engine and trainmen operating in exclusively American service numbered 4,531, those engaged in French service numbered 2,222.

Because of the difference between French and American operating methods no officers or men have been permitted to engage in actual railway work until they have received a course of instruction from French railway officers, who have grounded them thoroughly in roundhouse and shop practice, train rules, the signal systems, etc. No man was discharged from this course of instruction without passing a successful examination and receiving a certificate as evidence that he has done so.

When the Americans first began to operate trains they used French and Belgian locomotives and both French and American cars. Later, when the American locomotives arrived, some were loaned to the French and the others were utilized by the Americans to take care of existing needs. This mixing of equipment continued up to the time of the signing of the armistice, and while American cars were equipped with air brakes, it was not until late in the fall that it was possible to make up trains entirely of American cars and thereby make full use of the air brake system. This circumstance was due to a large extent to the fact that the French railroads were continuously confronted with a serious shortage of cars and it was necessary to avoid any waste movements of equipment. In fact, at times it was necessary to cover open cars with tarpaulins and thereby put them into service ordinarily performed by box cars. The readers of the *Railway Age* have previously been advised that the French had no car record system until a car record bureau was established by the American railway organization. To facilitate car tracing, the French turned over to the Americans a number of wires, which the signal corps of our forces adapted to our needs. At first telephone service was established for this purpose, but later telegraph lines were opened and utilized.

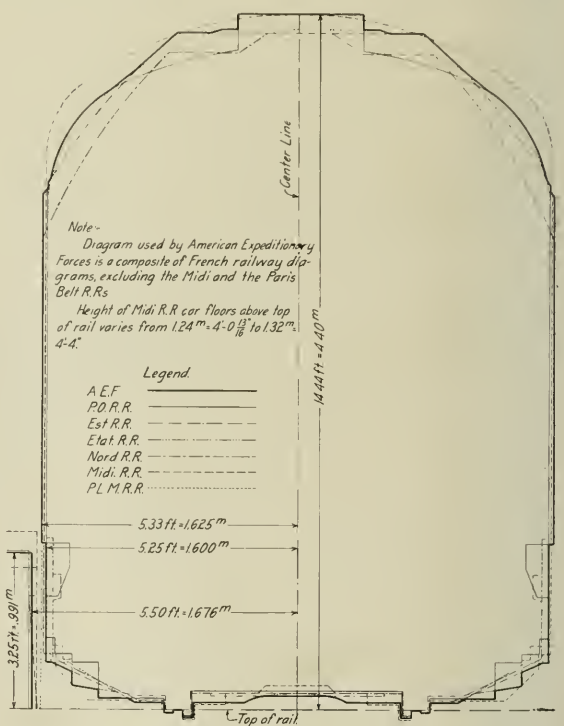
When the Americans commenced the operation of their own trains they were assigned certain stalls in French roundhouses for the use of their locomotives. Later, however, the Americans erected their own engine houses, generally, at other locations. The difference in the sites of the engine terminals was determined by the difference in the length of the engine runs of the two operating organizations. In general, two American engine runs equaled three French runs.

As has been previously pointed out in the *Railway Age,* the Americans conform with the French operating methods. In the absence of a train despatching system in France, the chef de gare, or station agent, controls the operation of trains. With him is associated a Railroad Transport Officer representing the American forces, who looks after the interests of our army. As the tonnage on French rails increased, the opeating difficulties under this scheme became more evident, at least from our point of view. Trains were moved in what the French term "marches." This plan calls for the departure of trains so many minutes apart according to the volume of traffic. If a train fails to leave at the scheduled time of departure, it is not permitted to move until it is assigned to another marche.

To assist the American forces in their work under these strange conditions, the officers of the American organization prepared a book of rules adaptable to all French lines, which was corrected and approved by French railway officers. Left-hand operation, which is the rule on French roads, did not simplify the problem of adaptation to French methods.

Handling American Traffic

The transportation burden assumed by the American railway forces became increasingly great with the progress of the war. The American supplies received at the ports in February, 1918, totalled 192,239 short tons, while those handled in November aggregated 921,972 tons, or an increase of 379 per cent. In all cases possible the traffic received from vessels has been moved from the docks to adjacent storage points or other available storage facilities on the railways serving the ports. Under war conditions military officers determined the priority in the movement of supplies from these bases, in accordance with which traffic was worked up into solid train lots and moved to regulating stations, where the jurisdiction of the Service of Supply of the Transportation Corps ended. At these stations a regulating officer reclassified the freight received, with other supplies stored there, and it was taken by military trains to the light railways at the front.



Composite Diagram of Clearances of American and French Equipment

American trains had equal rights with French trains on all lines, the priority of one train over another depending entirely on military necessities. A few recent statistics regarding the movements on different parts of the lines operated by the Americans are indicative of the volume of American traffic at the conclusion of the war. Between Saumur

and Tours, a distance of 39 miles, the average daily eastbound movement was 23 American supply trains, 27 French trains and one American troop train. The tonnage rating of American engines in this stretch was 2,400. Between Coutras and Perigueux, a distance of 47 miles, on a line serving the Gironde river group of ports, the eastbound movement consisted of 20 American supply trains daily, one American troop and 14 French trains. The tonnage rating of American engines between these points was 1,500. Between Pont Vert and St. Germain du Puy, a 7-mile line which has been aptly characterized "the neck of the bottle" because it connects roads from most of the ports with lines which led to the front, there was a daily eastbound movement of 36 American supply trains, 5 American troop trains and 38 French trains. The tonnage rating on American engines from Pont Vert to Bourges, 3 miles, was 1,570, and from Bourges to St. Germain du Puy, 4 miles, it was 3,000.

The Relations Between the French and American Railway Men

The relations between the French and American railway troops, both officers and men, have been consistently cordial. On the whole, the American railway private is more intelligent than his brother of the trenches and has been exceedingly industrious and cheerful under the exacting demands of army discipline and the onerous duties which he was called upon to perform. The French are free to admit that our railway men work faster than theirs, but at the same time state that they are more careless. It is a fact that at one point while the French turned an average of 65 engines a day, that record was increased by the Americans to 140 engines daily. It may be fairly said that the French are more thorough in their work but are less resourceful and less inclined to deviate from long standing and traditional practices. On the other hand, it is admitted by American railway officers that American operation did increase the number of railway accidents as compared with the number experienced under French operation.

While the French equipment at first seemed ludicrously light as compared with American rolling stock, observation and study of conditions in France has added strength to the conviction that small equipment is best suited to the transportation needs of France. In general, traffic is handled in smaller quantities than in the United States, and the average haul is considerably below that of American roads. Light equipment has the further advantage of making possible an ingenious method of switching which is in practice in French yards. When it is desired to set out a car from a freight train, the car is moved to a small turntable located in the main track, uncoupled from the cars to which it is attached, turned at right angles and moved by electric power to a turntable on a parallel track, where it is turned and moved to the desired point on that track.

Although American railroad men were disposed at first to disparage French equipment, they are unanimous in their commendation of the condition of French roadbeds. They are built more substantially than American roads, are ballasted with rock and provided with excellent drainage. It might have been anticipated that the heavy American locomotives and cars would play havoc with the French lines which were constructed for much lighter equipment. On the other hand, however, the French lines stood the test very well, and showed no signs of wear under the strain, except to a small extent during the rainy season of the past autumn.

Maintenance of way in France was entirely in the hands of the French except in yards used by Americans. This was due to the fact that the French had large numbers of German prisoners, and some civilians, available for manual labor, and also to the military difficulty of assigning to this work small American contingents, which could not be utilized except under the supervision of commissioned officers and after being provided with suitable living quarters in advance. In yards used by the Americans, however, all maintenance work was done by American troops, ranging from roadmasters down to section men.

The experience of the American railway men in France has proved an education both for them and the French forces with whom they were associated. The mutual respect of the transportation forces of both countries for the methods and practices of the other was very materially increased.

It is safe to predict that in the future American railroad supply manufacturers will receive a more ready hearing in France than formerly, and will be able to market their products without conforming to specifications with mathematical exactitude. In fact, it is probable that American devices in a modified form will find their way to the French market in increasing numbers.

Sailing Day Plan Applied to Company Freight*

By H. E. Ray

General Storekeeper, Atchison, Topeka & Santa Fe.

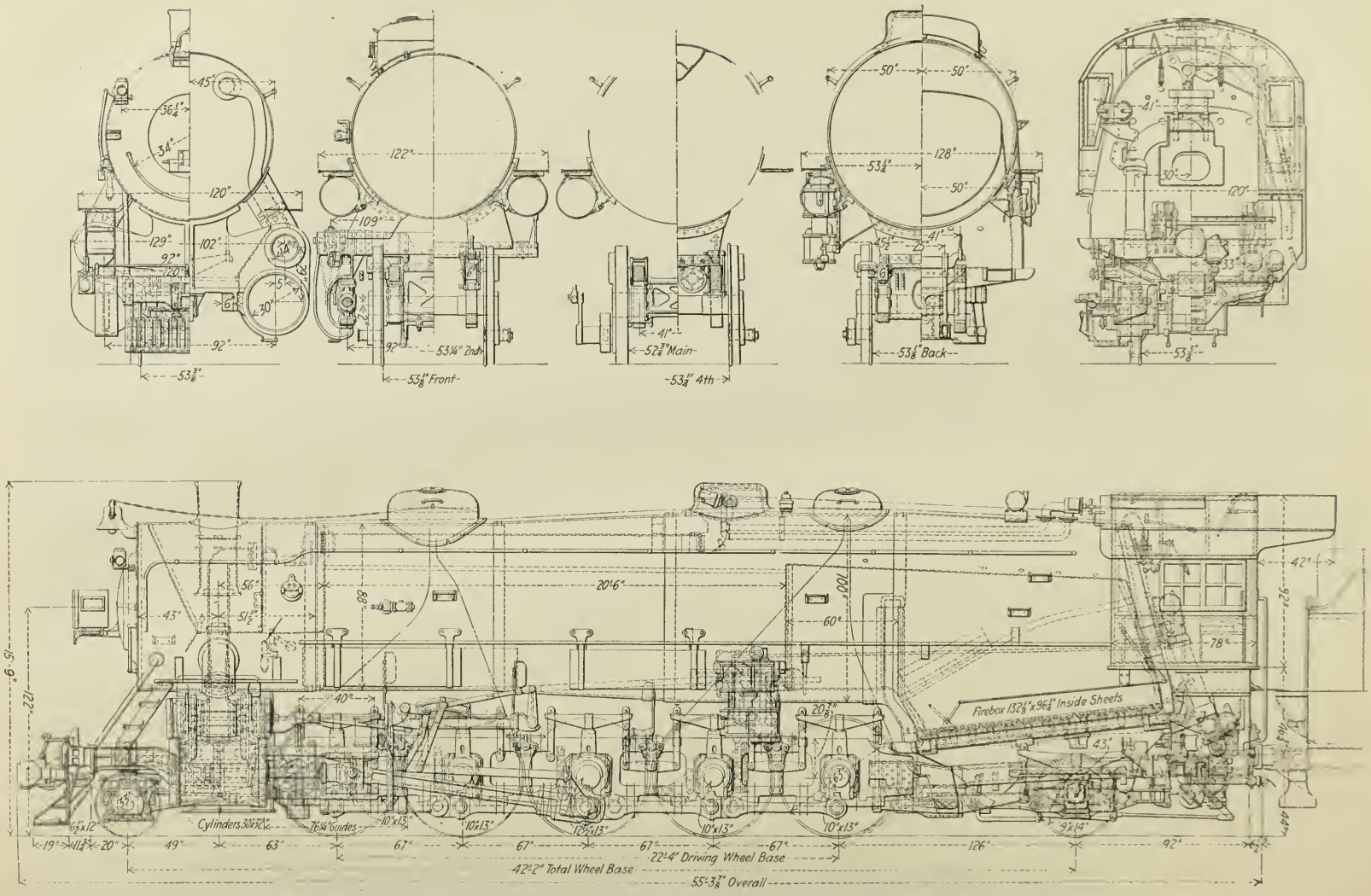
THERE HAS BEEN MUCH interest in the plan of handling commercial freight on certain sailing days; that is, instead of shipping every day to local points a certain sailing or shipping date for that particular point would be adhered to, with the result that straight carloads would be made rather than mixed carloads of less than full tonnage.

As a matter of fact, it is just as applicable, if not more so, to the handling of company freight. No doubt most storekeepers, particularly those employed on larger roads, have made it a practice of handling supplies for their various division stores on certain days, shipping to each point possibly once a week, by holding up the various items for a particular store until the sailing date arrived, at which time a full carload for that particular point has probably accumulated. It has been found that handling company freight in such a manner has enabled the main or general store to utilize the full capacity of the cars to a much better advantage than if it attempted to ship daily to all stores.

I have found from personal experience that it pays to have a man on the general store platform, whose sole duty it is to look after the cars as they come in, line them up for unloading, see that they are properly switched and properly reloaded. Under his direction the materials going out to division stores are so combined that they can be forwarded with the least expenditure of car service; his duties also include checking the unloading, which enables him to so speed up this feature that the resultant delay to the car is only a legitimate one. Such a man will earn his salary many times over in avoiding delays to equipment and in seeing to it that such cars as are loaded are filled to their capacity.

At large central stores the problem of properly utilizing and consequently conserving freight cars is not so difficult as it is at the smaller stores where on account of the relatively small amount of business it is sometimes difficult to combine daily business so as to utilize the cars properly. It is at the division stores that a great deal of our future work will have to be done if we reach the full measure of success in this important feature. The division storekeeper is very prone to utilize a car for a comparatively small amount of material simply to get it off his hands.

*From a paper entitled, Conservation of Freight Cars, presented before the Railway Storekeepers' Association at Chicago, January 28.



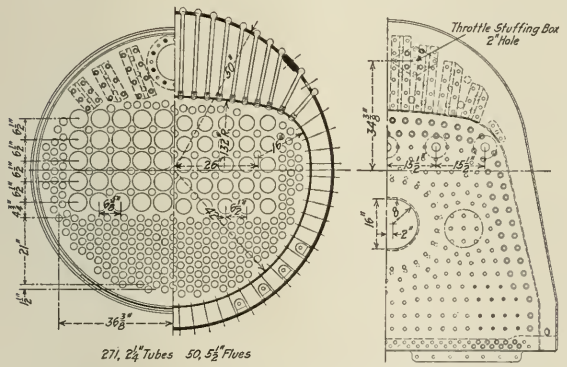
Elevation and Sections of the United States Railroad Administration Standard Heavy 2-10-2 Type Locomotive

The Standard Heavy Santa Fe Type Locomotive

Heaviest Single Unit Freight Locomotive Among the Designs of the Railroad Administration

THE FIRST LOCOMOTIVE of the Railroad Administration's standard heavy 2-10-2 type was recently completed at the Brooks Works of the American Locomotive Company. This locomotive was designed on the basis of driving axle loads of 60,000 lb. and has a total weight on drivers of 293,000 lb. The total weight of the locomotive in working order is 380,000 lb. and it is capable of exerting a calculated maximum tractive effort of 74,000 lb.

The design of this locomotive possesses no unusual



Back Boiler Head, Front Tube Sheet and Section Through the Combustion Chamber

features, the type of details throughout being similar to those used in the construction of other standard locomotives which already have been described, interchangeability of parts between the various types having been effected wherever

motive included among the Railroad Administration's standards it is of interest to compare it with a number of other heavy locomotives of the same type. By an inspection of the table it will be seen that it can by no means be ranked

A COMPARISON OF HEAVY 2-10-2 TYPE LOCOMOTIVES

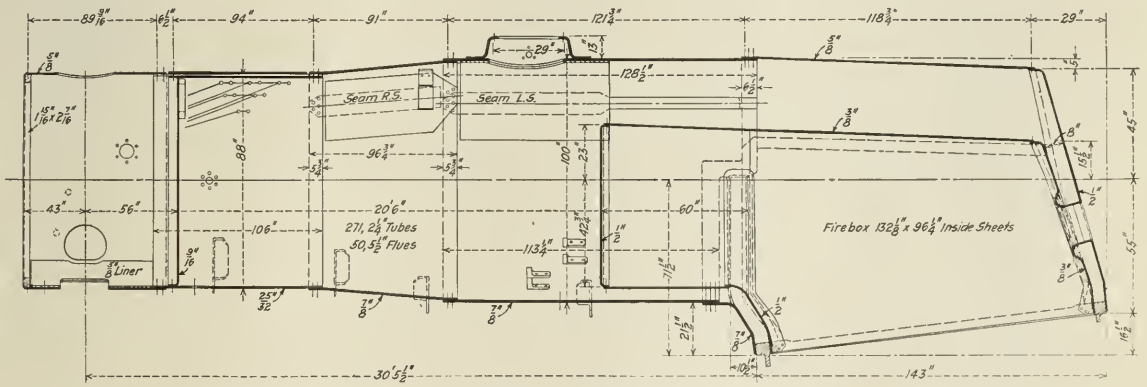
Road	U.S.Std.	Pa. Lines	D. & R. G.	Erie	N. Y.O. & W.
Year Built	1918	1918	1916	1916	1916
Tractive effort, lb.	74,000	80,900	81,200	83,000	71,200
Total weight, lb.	380,000	435,400	428,500	401,000	353,500
Weight on drivers, lb.	293,000	351,300	337,500	335,500	298,500
Diameter of drivers, in.	63	62	63	63	57
Cylinder diameter and stroke in.	30x32	30x32	31x32	31x32	28x32
Steam pressure, lb., per sq. in.	190	205	195	200	190
Heating surface, total evap., sq. ft.	5,156	4,725	5,369	4,959	4,498
Heating surface, equivalent*, sq. ft.	7,001	7,152	7,362	6,870	6,009
Grate area, sq. ft.	88.2	80.0	88.0	94.8	80.2
Tractive effort x diam. drivers ÷equiv. heating surface*	665.9	701.7	695.0	760.0	677.0
Firebox heating surface ÷ equiv. heating surface, *per cent	6.3	5.2	5.0	5.0	5.4
Grate area ÷ volume cylinders	3.3	3.1	3.2	3.4	3.5

*Equivalent heating surface—total evaporative heating surface + 1.5 times the superheating surface.

among the heaviest or most powerful 2-10-2 locomotives which have been built, although there have probably been none of better balanced design from the standpoint of boiler capacity.

The boiler barrel is of the telescopic type, with an outside diameter at the first course of 88 in., increasing to a maximum diameter of 100 in. There are three courses, the middle one of which is conical; the third course is 113¼ in. in length and is long enough to carry the dome ahead of the combustion chamber.

The firebox includes a barrel combustion chamber, the tube sheet of which is 60 in. ahead of the throat sheet, thus providing for tubes 20 ft. 6 in. in length. The firebox is fitted with a brick arch carried on five tubes and is fired by a Hanna mechanical stoker. Other equipment includes



The Boiler of the Standard Heavy 2-10-2 Type Locomotive

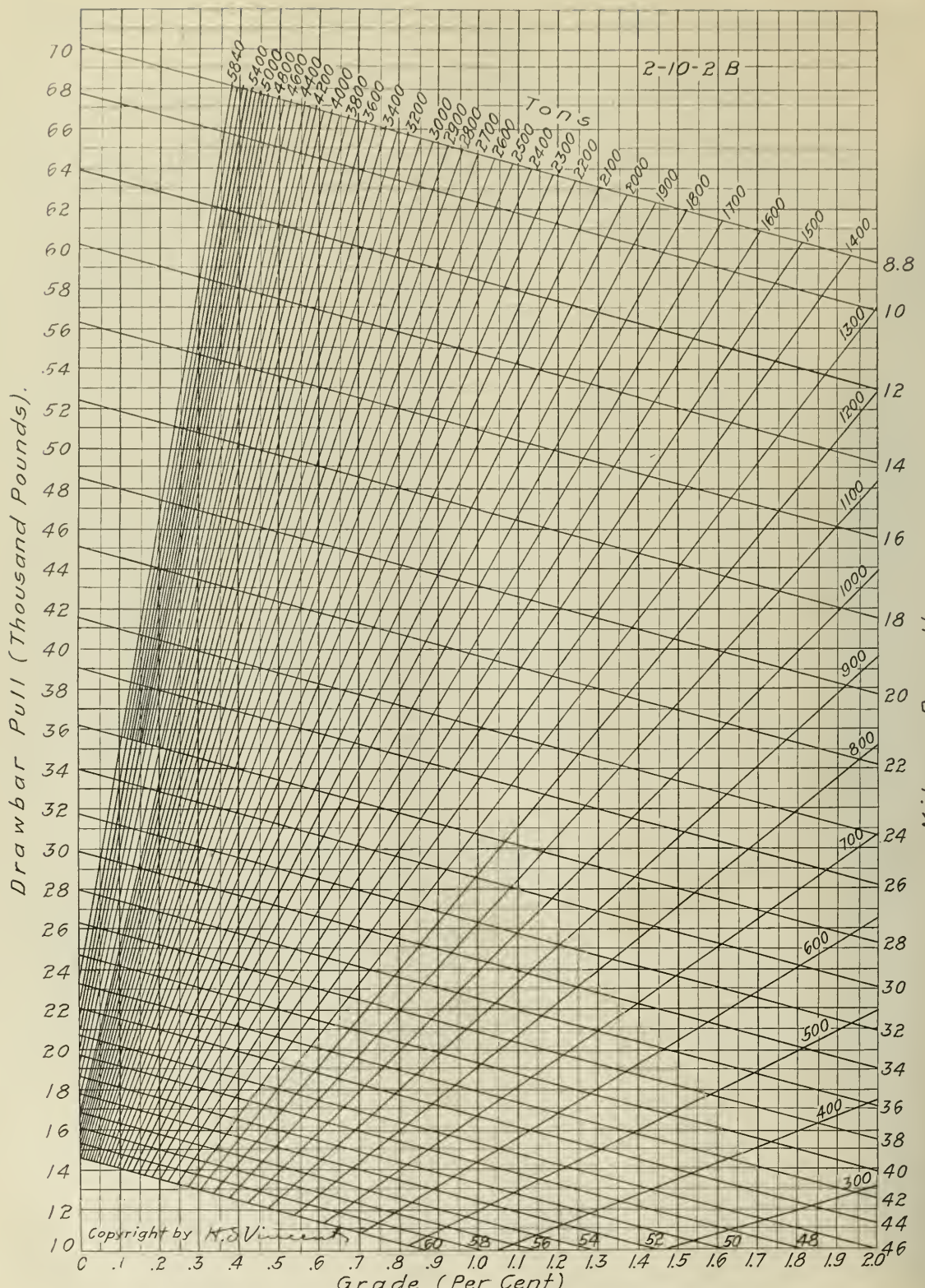
stresses and dimensions would permit. The relation of boiler capacity to the cylinder demand, calculated in accordance with Cole's ratios, shows ample boiler capacity both as to heating surface and grate area. The steam generating capacity is 104 per cent of the cylinder demand at a piston speed of 1,000 ft. per minute; the size of grate also shows up favorably, the ratio being 102.3 per cent.

As this is the heaviest single unit type of freight loco-

Franklin Railway Supply Company's firedoor and power grate shaker.

The tube sheet is laid out for 271, 2¼-in. tubes and 50, 5½-in. flues for a 50-unit type *A* superheater. The tubes are spaced ¾ in. apart while the flues are one inch apart.

The general features of the frame design are identical with those of other single unit standard locomotives. The cylinders are carried on a single front rail cast integral with

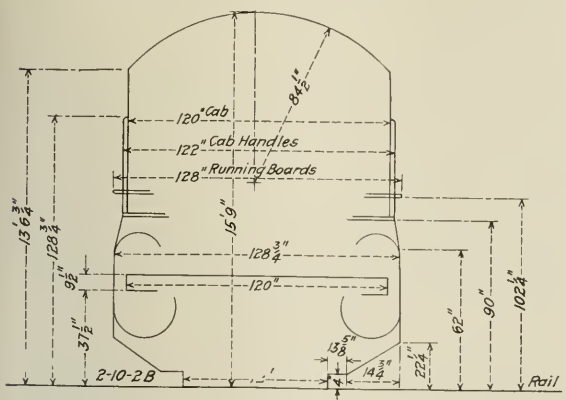


Tonnage Rating Chart of the Standard Heavy Santa Fe Type Locomotive

the main frame, and a Commonwealth cradle casting is spliced to the main frames just back of the rear driving pedestals.

The frames are six inches wide and have a maximum depth of top rail of 8¾ in. over the pedestal jaws. The minimum depth of the top rail is seven inches. The maximum and minimum depths of the lower rail are 5½ in. and 5 in., respectively. The front rail under the cylinders is six inches wide and tapers from a depth of 12¾ in. at the rear and 11½ in. at the front of the cylinder fit.

The driving axles have journals 10 in. in diameter by 13 in. in length with the exception of the main, the diameter



Clearance Diagram of the Standard Heavy 2-10-2 Type Locomotive

of which is 12½ in. The axles and driving boxes having the 10-in. journals are interchangeable with those of the same journal size on other types of locomotives. This includes the light 2-10-2 type and both the light and heavy Mikado type locomotives. The engine truck under these locomotives is of the constant resistance type and is identical with that used on the 2-6-6-2 Mallet type locomotive. A number of the engine truck details, including the center pin, pedestal, pedestal crosstie, swing bolster, swing frame and link are also identical with those used on the trucks for both Mikado type locomotives and the light Santa Fe type.

Spiller gun iron is used for cylinder and valve chamber bushings and piston and valve bull rings and packing rings. The steam distribution of these locomotives is effected by the Southern valve gear and the locomotive is fitted with the Lewis power reverse gear.

Among the principal specialties with which these locomotives are equipped are Chambers backhead type throttle, Ashton 3½-in. open safety valves, Hancock No. 13 nonlifting injectors, Everlasting blow-off cocks, Detroit six-feed lubricators, Barco flexible pipe joints and Radial buffers and Unit safety bar between the engine and tender.

The tonnage rating diagram was prepared and is copyrighted by H. S. Vincent. The curves of hauling capacity are constructed for a car resistance of four pounds per ton. The chart may be used for any other car resistances by converting them into terms of grade as follows:

1 lb. car resistance	=	.05 per cent grade
1 deg. curve uncompensated	=	.04 per cent grade

For example, find the tonnage capacity of the locomotive at 20 m. p. h. on .6 per cent grade combined with five-degree uncompensated curve and with a train resistance of five pounds per ton.

The combined resistance in terms of grade is:

$$.6 + (5 \times .04) + (1 \times .05) = .85 \text{ per cent.}$$

At the intersection of the ordinate for .85 per cent grade with the drawbar pull curve for 20 m. p. h. we find 2,100 tons as the capacity of the engine.

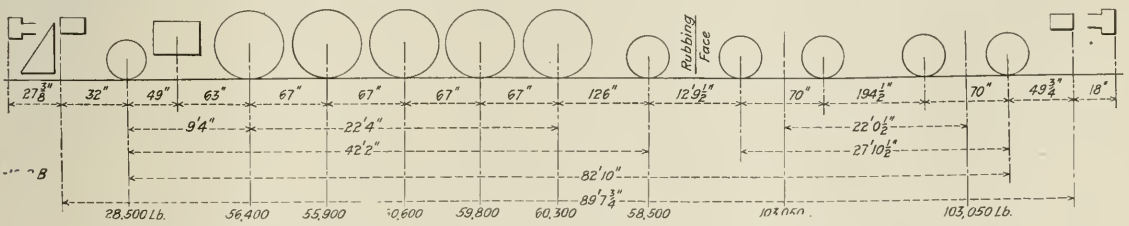
The clearance and wheel loading diagrams were prepared in the office of F. P. Pfahler, chief mechanical engineer of the Division of Operation of the Railroad Administration. The weights shown on the wheel loading diagram are actual. Other data and dimensions for this locomotive are as follows:

General Data

Gage	4 ft. 8½ in.
Service	Freight
Fuel	Bit. coal
Tractive effort	74,000 lb.
Weight in working order	380,000 lb.
Weight on drivers	293,000 lb
Weight on leading truck	28,500 lb.
Weight on trailing truck	58,500 lb.
Weight of engine and tender in working order	586,100 lb.
Wheel base, driving	22 ft. 4 in.
Wheel base, total	42 ft. 2 in.
Wheel base, engine and tender	82 ft. 10½ in.

Ratios

Weight on drivers ÷ tractive effort	4.0
Total weight ÷ tractive effort	5.1



Wheel Loading Diagram of the Standard Heavy 2-10-2 Type Locomotive

With the exception of the radius bar these details are also used on the light Mallet locomotive.

The trailer truck is of the Cole-Scoville type and as a whole is not interchangeable with any other class of locomotives. The frame, however, is identical with that used under the light Santa Fe type, both Mikados and the light Mallet locomotives.

The cylinders are 30 in. in diameter with a stroke of 32 in. and are fitted with pistons of single plate dished section similar in design to those used on all the standard locomotives. The valve chambers are designed for the use of 14-in. piston valves. As on the other standard locomotives Hunt-

Tractive effort × diam. drivers ÷ equivalent heating surface*	665.9
Equivalent heating surface* ÷ grate area	79.4
Firebox heating surface ÷ equivalent heating surface,* per cent	6.1
Weight on drivers ÷ equivalent heating surface*	41.9
Total weight ÷ equivalent heating surface*	54.3
Volume both cylinders	26.4 cu. ft.
Equivalent heating surface* ÷ vol. cylinders	265.2
Grate area ÷ vol. cylinders	3.3

Cylinders

Kind	Simple
Diameter and stroke	30 in. by 32 in.

Valves

Kind	Piston
Diameter	14 in.
Greatest travel	7 in.
Steam lap	1⅛ in.
Exhaust clearance	Line and line
Lead in full gear	3/16 in.

Wheels

Driving diameter over tires	63 in.
Driving journals, main, diameter and length	12½ in by 13 in.
Driving journals, others, diameter and length	10 in. by 13 in.
Engine truck wheels, diameter	33 in.
Engine truck, journals	6½ in. by 12 in.
Trailing truck wheels, diameter	43 in.
Trailing truck, journals	9 in. by 14 in.

Boiler

Style	Con. wagon top
Working pressure	190 lb. per sq. in.
Outside diameter of first ring	88 in.
Firebox, length and width	132⅛ in. by 96¼ in.
Firebox plates, thickness	Sides, back and crown ⅜ in.; tube, ½ in.
Firebox, water space	Sides and back, 5 in.; front, 6 in.
Tubes, number and outside diameter	271-2¼ in.
Flues, number and outside diameter	50-5½ in.
Tubes and flues, length	20 ft. 6 in.
Heating surface, tubes	3,258 sq. ft.
Heating surface, flues	1,469 sq. ft.
Heating surface, firebox	429 sq. ft.
Heating surface, total	5,156 sq. ft.
Superheater heating surface	1,230 sq. ft.
Equivalent heating surface*	7,001 sq. ft.
Grate area	88.2 sq. ft.

Tender

Tank	Water bottom
Frame	Cast steel
Weight	206,100 lb.
Wheels, diameter	33 in.
Journals, diameter and length	6 in. by 11 in.
Water capacity	12,000 gal.
Coal capacity	16 tons

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

Orders of Regional Directors

SETTLEMENT OF FREIGHT CLAIMS.—A. H. Smith, regional director, eastern region, by file 2000-63A490, advises federal managers of the grievance of a large shipper who says that the amount of money which his firm has tied up in claims is out of all reason, and unprecedented. Traffic Department representatives have recently been directed to take an active interest in seeing that claims receive proper and effective consideration, and prompt advice is now requested as to what is being done to relieve the situation.

Fish Fry Free.—The regional director of the eastern region advises federal managers of revised regulations shown in the latest baggage tariff for the free transportation of small shipments of live fish in cans and fish eggs in crates on request of federal or state authorities.

Shortening of Hours of Station Forces.—The regional director, eastern region, by file 1600-88A494, cautions against undue shortening of hours of station forces so as to result in closing stations at the time of arrival of passenger trains or in preventing proper care of freight unloaded from local freight trains. Where it is contemplated to close stations during certain hours that they have heretofore been open sufficient advance notice must be given to patrons with full information as to the arrangements for handling business, so that the public may accommodate itself to the change and no occasion be given for complaint as to lack of essential service.

Assessments for Public Improvements.—The eastern regional director, by file No. 2700-A492, notifies federal managers that the Division of Capital Expenditures no longer requires notice of certain expenditures for public improvements. Authority for railroad expenditure in connection with street or road construction or other public improvements will now be governed by Supplement No. 1 to General Order No. 12, but all cases involving such expenditures in excess of $1,000 must be brought to the attention of the regional director, before entering into any commitment, in time to make it possible, if it should be decided to do so, to take any steps provided for by statute in connection with the proceedings through which such improvements are ordered or the cost thereof assessed, so that the matter may be considered without embarrassment resulting from legal steps that have already been taken.

Freight Car Distribution.—Circular No. 421 provides that the distribution of freight cars between railroads in the southern region will be handled through the office of the regional director. The Car Service Section at Washington will issue orders covering movements between regions only. An exception will be made in the movement of refrigerator and tank cars, orders covering which will be issued as heretofore direct to railroads by the Refrigerator and Tank Car Bureau of the Car Service Section located at Chicago.

Inspection at Interchange Points Covering Loading.—Circular No. 422 issued by the southern regional director says that there has been some duplication of inspection at interchange points covering loading, bracing, stability of packages and general condition of freight offered in interchange. Such inspection and records must be made only by the receiving railroad.

Sale of Relayer Rail.—The eastern regional director February 5 announces the abrogation of the rule that relayer rail weighing over 60-lb. per yard should not be sold without first being reported to the Regional Purchasing Committee for disposition. It will now be proper, when advantageous prices can be obtained, to be determined by the purchasing agent, to sell surplus S and Y rail (fit for sidings and yard tracks), and poor quality relayer rail, weighing less than 80 lb. per yd. Any rail weighing 80 lb. or over which may be graded as relayer or good quality siding and yard rail should be reported to the regional director before being sold. All such rail should be used on the home line for repair work as far as practicable.

Agents' and Operators' Wages.—A. H. Smith, regional director, eastern region, by file 1200-4-56A483, furnishes federal managers with a memorandum of a long list of questions decided at a conference on January 27 relating to the requirements of Supplement No. 13 to General Order No. 27 as affecting agents and telegraphers.

Maintenance of Industrial Side Tracks.—A. H. Smith, regional director, eastern region, file 401-14A487 explains to federal managers the policy of the administration concerning General Order No. 15, containing the provisions governing the maintenance of industrial side tracks. In general the maintenance of the tracks from the clearance point to the right of way line is to be paid for by the industry. Special cases should be referred to the regional director.

Transportation of Corporation Officers and Employees.—Order 109 Supplement 11, cancelling Supplement 9, of the Southwestern regional director, similar to Supplement 14 to Circular 29 of the Central Western regional director, abstract of which appeared in the *Railway Age* of January 10 (page 159).

Information Regarding Movement of Troops or Troop Trains.—In Order 159 the Southwestern regional director removed the restrictions on furnishing information concerning movement of troops or troop trains published in Order 112 issued on November 12, 1918.

Earnings of Passenger Trains.—In Order 157 the Southwestern regional director asks that reports be made of passenger earnings for all trains with sub-divisions where the train consist is changed materially. This report should be for the second calendar week in each month, beginning with Sunday, and starting with February. The report is intended to supersede other forms of reports of passenger train earnings now made.

Locomotive Rental Charges.—Supplement 1 to Circular 3 of the Northwestern regional director similar to Order 150 of the Southwestern regional director abstract of which appeared in the *Railway Age* of January 24 (page 257), with the following appended: Joint inspection must be arranged by interested roads upon delivery and return of old locomotives and upon delivery to owner of new locomotives. The government inspection of acceptance from builders will constitute the only inspection necessary on de-

livery of new locomotives. Repairs will be made in all cases by borrowing roads who will keep up running repairs and make repairs due to damages or wrecks.

Transmitting Railroad Initials in Address and Signature of Off-Line Telegrams.—Order 156 of the Southwestern regional director states that when sending messages to points on other railroads, not directly connected with the originating railroads, the initials of railroads to which messages are destined will be placed in the address and the initials of railroads from which messages originate will be placed immediately after the signature. Railroads sending messages to the Railroad Administration at Washington and to officials of the organization of regional directors, other than the Southwestern regional director, will also place their initials immediately after the signature.

Railroad Business Mail.—Order 158 of the Southwestern regional director amplifies instructions contained in order 151 of the Southwestern regional director, abstract of which appeared in the *Railway Age* of January 24 (page 257), and appends the following statement, "This does not permit handling mail for or from roads not under federal control, except to direct first line connection and care must be taken not to route any U. S. R. A. business mail across non-controlled roads."

Annual Reports of the Regional Directors

Estimates of the Economies Effective and Examples of Co-operative Action Under Unified Control

THE RAILROAD ADMINISTRATION has made public the annual reports of the regional directors for the Allegheny, Southern and Northwestern regions, in addition to those published in last week's issue.

Northwestern Region

The annual report of R. H. Aishton, regional director for the Northwestern region, to the director general of railroads, gives the following recapitulation of economies effected during the year by unified operation:

	Savings per annum		
	Western Region to June 30	Northwestern Region after June 30	Total
Unification of terminals and stations:			
Consolidations	$1,769,987.00	$1,350,434.40	$3,120,421.40
Joint switching	785,190.00	198,510.00	983,700.00
Miscellaneous economies	660,000.00	124,871.60	784,871.60
Reduction passenger-train mileage	22,355,235.00	925,165.00	23,280,400.00
Reduction duplicate freight-train mileage	1,806,636.00	463,916.00	2,270,552.00
Estimated savings, salaries, general office forces	.....	781,439.18	781,439.18
Closing off-line freight and passenger traffic offices	.....	1,744,335.00	1,744,335.00
Consolidation, city ticket offices	.....	310,730.16	310,730.16
Estimated saving in advertising (except newspaper)	.....	445,934.10	445,934.10
Estimated saving in newspaper advertising	.....	510,899.02	510,899.02
Grand total	$27,377,048.00	$6,856,234.46	$34,233,282.46

An abstract of the report follows:

Operation

Terminal managers were appointed for the more important traffic centers, but at Seattle only was the supervision of owning roads discontinued and the terminal placed under the jurisdiction of one man. We believe this arrangement will finally prove entirely satisfactory. Ninety passenger and 136 freight stations have been closed.

At Chicago, greater use has been made of the Elgin, Joliet & Eastern and the Indiana Harbor Belt, resulting in better handling of local business in the downtown districts. Heretofore, 19 different railroads, in some cases, served one plant largely for competitive reasons. Wherever possible, switching at one plant is now done only by one line.

The sailing day plan is in effect at every important station in the Northwestern Region. Through cars run from Illinois, Minnesota, Wisconsin, North and South Dakota and Iowa, and from certain Pacific coast points. The operation of pick-up cars on certain days at division points has resulted in a saving of 15,000 cars per month for the region. At Chicago, this plan is under the immediate supervision of the terminal manager.

There has been a reduction of 23,280,400 miles a year in passenger train mileage. The saving per train mile is estimated at $1.00. Competition prevented a like saving before the government took over the roads.

Based on an estimate of $2.00 per freight train mile, there was a saving made through elimination of duplicate freight service of $2,270,552.

The saving of $781,439 in salaries of general officers is made by transferring these salaries to the corporation payrolls.

Traffic

The closing of off line passenger and freight offices saved $1,744,355 and, in my opinion, it will finally prove as satisfactory for local roads to furnish information, etc., as for off line traffic officers to do so. The consolidation of ticket offices saved $310,730 and I am entirely satisfied that it will never be changed.

Co-operative Action

An organization was formed at Kansas City to co-operate with the oil people, resulting in an increase in tank car mileage per day of from 57 to 117. There was an increase in tank car loading, January 1 to June 30, 1918, of 28,569 cars, of which 19,500 was in the period April 30 to June 30. This was accomplished by moving tank cars in solid trains of 25 or more and totally disregarding routing. When the government took over the roads, there was an extreme car shortage in the west, whereas now we can furnish a car for every load offered. The work of the Car Service Section has been most satisfactory. Re-routing of traffic resulted in a reduction of 9,963,633 car miles.

The consolidated purchasing department has not been in operation long enough to determine its ultimate success.

Intensive car loading has been greatly helped by the Food Administration, but now that administration has ceased its activities.

A manager was placed in charge of the upper Lake Michigan and Lake Superior ports to supervise the handling of ore, grain and coal and to co-operate with a committee representing vessel and ore interests. Re-routing by this organization made a saving of 3,577,434 miles. The steaming of ore was almost entirely eliminated; saving, it is estimated, $197,000.

Budgets of the roads in the Northwestern Region for 1918 amounted to $24,180,740, but were reduced by $19,658,887, and, despite labor shortage and influenza, 70 per cent of the improvements authorized was completed on December 15. Co-operation with municipalities resulted in

the postponement of public improvements which would have cost $19,332,593, which includes $924,195 savings made by the unification of terminals.

Since the last wage award, there has been a rapid improvement in maintenance of equipment work, and standard equipment will eliminate the necessity of carrying large quantities of material. A very careful analysis and study of the entire railroad situation under unified control has shown that there are very wasteful practices in effect under separate operation.

Allegheny Region

C. H. Markham, regional director for the Allegheny Region, has submitted a report, of which the following is a summary:

	Men released for other service	Saving per annum
(*a*) Unification of terminals and stations, 875...	1,562	$4,037,526
(*b*) Elimination of passenger service, saving train miles per annum, 7,683,432.....	658	5,914,203
(*c*) Reduction in organizations contrasted with same under corporate control:		
Saving due to the elimination of corporate organizations	.....	1,828,071
Unifications and discontinuance of operating and traffic offices.....	692	1,168,866
(*d*) Miscellaneous economies, the result of causes other than the above:		
Advertising discontinued	.....	450,640
Road unifications	290	1,710,954
Grand total (*a*), (*b*), (*c*), (*d*).....	3,192	$15,110,260

(*e*) Recapitulation of co-operative action, the results of which are in the direction of efficiency but intangible as to economics:	Number	Cars diverted
Freight traffic diversions.....	251	317,604

The above figures include unifications made on the roads in this region prior to the formation of the Allegheny region.

The Allegheny Region was the center of most intensive war work activity. Baltimore & Ohio freight trains between McKeesport and New Castle were routed over the Pittsburgh & Lake Erie, one locomotive handling the same tonnage over this road as five locomotives over the Baltimore & Ohio, between the same points. Westbound coal from the lower Connellsville region and the Fairmount district was routed over the Monongahela, Pittsburgh & Lake Erie, and the Pennsylvania, releasing the Baltimore & Ohio for eastbound business. Baltimore & Ohio business from West Virginia and from Pittsburgh was routed by way of the Rutherford gateway and by the Philadelphia & Reading, thus keeping the business out of Baltimore and Philadelphia. Anthracite coal from Pottsville and Shamokin was moved to Baltimore and Washington by way of Harrisburg instead of Philadelphia.

The Western Maryland and the Baltimore & Ohio lines between Cumberland and Connellsville were operated as one division, as were also the Cumberland Valley, Western Maryland, and Philadelphia & Reading between Cherry Run and Harrisburg. The Huntington and Broad Top Mountain was operated as part of the Juanita division of the Pennsylvania. The Philadelphia & Reading, New England coal fleet was operated from Port Reading instead of Port Richmond, saving 185 miles of water movement with an increase of only 70 miles road haul.

Appointment of terminal managers in charge of operations of all lines at Baltimore, Philadelphia, and New York, and the permit system regulating the flow of traffic in accordance with ability to handle at seaboard destination, have been of great value.

From June to October there were over 900 passenger cars exclusively assigned to the transportation of war workers, and during the same period nearly 9,000 troop trains were moved in the region. During the period there were many unifications of terminals and stations made, among the most important of which to the traveling public was the use of the Pennsylvania terminal at New York by Baltimore & Ohio and Lehigh Valley for through trains.

As illustrating the density of freight traffic, in October, 1918, the region had 5.6 per cent of the average mileage of federal controlled railroads in the United States while it transported 14 per cent of the total net ton-miles of all such railroads. The results of operation are not available for November and December, but for the period from June to October, inclusive, the region handled 1,233,396,959, or 4.4 per cent more tons one mile and transported 447,002,496, or 14.7 per cent more passengers one mile than in the corresponding period the previous year.

Considering the large increase in business and the fact that many experienced employees entered the military and naval service or were engaged at munition plants or other lines of war work, their places being taken by less experienced employees, both passenger and freight business was well handled. I am pleased to say that we have had the hearty co-operation of all the officers and employees of railroads in the region, and to this I attribute in a large measure the success in handling the business.

During December, 1918, weather conditions in Allegheny region were favorable to operation, and the railroads were able to furnish ample transportation to handle an increase in both freight and passenger traffic compared with December, 1917.

Anthracite coal loading increased 1,456 cars, or 2.9 per cent; bituminous loading increased 35,944 cars, or 17.7 per cent; all coal loading increased 37,400 cars, or 14.8 per cent, compared with December, 1917. Total revenue freight loaded increased 64,803 cars, or 8.9 per cent; and total revenue freight received from connections increased 108,913 cars, or 17.2 per cent, compared with same month last year.

Tidewater coal dumped was 2,158,491 tons, increase of 471,117 tons, or 21.8 per cent, compared with December, 1917.

At close of month there were stored 12,000 open-top and 10,000 closed cars for which there was no demand. Including this surplus, cars in Allegheny region equaled 99 per cent of ownership, compared with 115 per cent June 1, 1918.

With the exception of movement controlled by permits, the region continued clear of embargoes on carload freight, and no embargoes at transfer platforms against l. c. l. freight.

Report of blast-furnace operations December 31 shows no furnaces out due to transportation deficiencies.

Passenger travel was heavy, due to holidays and the large number of soldiers and sailors on furlough and discharged. Generally speaking, the travel was satisfactorily handled. Extra coaches and parlor cars, and in many cases extra sections of passenger trains, were operated to handle the holiday travel. Passenger-train schedules were maintained with reasonable regularity, considering the volume of traffic handled. United States mail and express were satisfactorily handled. Troop movements continued light. Due to cessation of hostilities, 24 trains serving war industries were withdrawn during the month.

The bad-order car situation compares favorably with November, 1918, although repairs were retarded, due to a week of rainy weather in early part of the month. Locomotive output also compares favorably with previous month. Railroads received 14 locomotives built in their own shops and 19 from locomotive builders, leaving 383 locomotives (including Pennsylvania lines west) to be received to complete 1918 program.

Thirty-four unifications of facilities were effected during the month, resulting in an annual saving of $326,243.

Ability to recruit labor forces, along with open weather, enabled satisfactory progress being made on addition and betterment work. Completion of engine-house and yard im-

provements is being pushed, and a large portion of these facilities are already completed.

Southern Region

B. L. Winchell, regional director of the Southern region, has submitted his report, of which the following is a summary:

C. H. Markham was director general from January 18, to June 1. Prior to January 18 the roads in the Southern region dealt directly with the Washington administration.

The financial outcome of the regional operation for the year (December estimated) was as follows:

Railway operating revenues	$547,777,171	
Railway operating expenses	423,276,752	
Net revenue from railway operation		$124,500,419
Railway tax accruals, less war taxes	19,270,592	
Uncollectible railway revenues	100,990	
		19,371,582
Railway operating income		$105,128,837
Equipment rents, net (Cr.)	665,804	
Joint facility rent, net (Dr.)	1,286,101	
		620,297
Net railway operating income		$104,508,540
Estimated average annual standard return		$92,183,911
Excess above standard return		12,324,629
Percentage relation of net railway operating income to standard return		113.4
Summary of certain savings		
Unification of terminals and stations		$2,182,260
Elimination of passenger trains		1,625,941
Reduction in organizations as contrasted with the same under corporate control		2,925,073
Miscellaneous economies the result of causes other than above—		
1. Saving in advertising expenses	$402,938	
2. Reduction in freight-train service	312,309	
3. Consolidation of general office forces and elimination of special departments, etc	253,728	
4. Telegraph and telephone unification	76,260	
5. Sundries	197,406	
		$1,242,641
Total of above		$7,975,915

By the co-ordination and connecting up of telegraph and telephone service of the various roads, the use of commercial telegraph companies' wires for railroad messages has been greatly reduced and the service improved.

Based on the actual re-routing of freight during one week, it is estimated that there is an annual saving from this source of approximately 41,452,216 car miles or 40,560 cars (on a basis of 28 miles per car per day) or of $81,120,000 in investment (based on $2,000 per car). The saving in operation at five cents per car mile would be $2,072,610.

Average car loading in the nine months to August, 1918, was 25.5 tons as against 23.8 tons for the corresponding period in the previous year.

Safety work is being pressed with vigor.

Number of accidents to employees of railroads in the Southern Region during the months of August, September, October and November, 1918

	Killed	Injured.
August	43	2,067
September	36	1,787
October	26	1,441
November	31	1,269

This shows a reduction of 27 per cent in fatalities and 38 per cent reduction in injuries, November compared with August.

There was a saving through elimination of $1,618,107 passenger train miles, of $1,625,941. (It is estimated that passenger train service costs about $1 a mile.) The percentage of increase or decrease in average train load, April to October, inclusive, in 1918, as compared with the same months in 1917, are as follows:

April	increase	0.8 per cent
May	decrease	7.2 per cent
June	decrease	5.7 per cent
July	increase	2.1 per cent
August	increase	5.4 per cent
September	increase	4.0 per cent
October	increase	6.7 per cent

In the 10 months ended December 31, there were 4,796,833 cars loaded, compared with 4,955,006 in 1917, and 2,796,832 cars received from connections, compared with 2,602,986 in 1917, an increase in total cars of 135,682.

In the Southern region 23 consolidated ticket offices took the place of 75 separate offices, and the expense of operation of the consolidated ticket offices was $200,167 as compared with an expense of $197,667 for the separate offices in 1917, an increase in expenses of $2,500. There was an increase in the sales of tickets in 1918 of $1,041,903 or 10.93 per cent. The expenses of depot ticket offices in 1918 was $338,474, as compared with $208,885 in 1917, and there was an increase in ticket sales of $14,827,283, or 55.12 per cent.

Passengers carried one mile totalled 4,847,029,611 for the ten months ended October 31, 1918; an increase of 1,402,351,278 over the corresponding ten months of 1917, or 40 per cent.

Statement showing for class I roads in Southern Region the increase in freight and passenger revenues (accounts 101 and 102) by six months' periods, January to June and July to December, inclusive, 1918, *over* 1917 *(December estimated).*

	This year	Last year	Increase	Per cent
Freight:				
First period	$155,552,228	$138,703,792	$16,848,436	12.1
Second period	203,577,951	147,860,322	55,717,629	37.7
Total	$359,130,179	$286,564,114	$72,566,065	25.3
Passenger:				
First period	$66,081,693	$42,802,295	$23,279,398	54.4
Second period	82,022,350	57,922,426	24,099,924	41.6
Total	$148,104,043	$100,004,721	$47,378,322	47.4

Few of the public, except large employers of labor, can have any fair conception of the difficulty of railroad operation during the past year with such a considerable proportion of untrained men in the service, replacing those skilled operatives who responded so loyally and so freely to the call to arms.

Now that the war pressure is somewhat relieved, the feeling will be more or less generally and naturally held that the transportation troubles of the roads are over. It should be made plain to everyone that but few of the many train and enginemen, shop, bridge, track and station forces, superintendents and trainmasters, general managers, general superintendents, and other skilled and valuable factors in the successful operation of our railroads have as yet been released from the colors and actually back in our service.

We need them to "carry on" in our best manner.



Three American Majors and a German Representative in the Freight Yards of Coblenz Inspecting a Trainload of German Field Pieces Surrendered to the Yankees Under the Terms of the Armistice

The Railway Supply Industry Is Hard Hit

In last week's issue the *Railway Age* published a large number of communications from railway supply companies, sent in reply to a night letter from the editors asking for a statement as to what the policy of deferring maintenance and renewals, not to speak of betterments, means "to your organization and labor, now and in the future." The following letters sent in reply to the telegram were received too late for publication in last week's issue.

Barco Manufacturing Company
Chicago.

We are being seriously affected in our business by the attitude of the Railroad Administration toward improvements and railroad expenditures. If their policy continues we will be running our shop on half time, and probably not that much.

The motive power has not yet been brought to a proper state of efficiency, but it has reached the point where it is giving the public and the railroad officials some satisfaction. Under the apparent policy of the Railroad Administration our motive power and tracks will be a national disgrace inside of three months, with the shops, roundhouses and working conditions as they are, and with the railroads laying off men and refusing to buy material.

It is astonishing that the administration should demand that manufacturers re-employ returned soldiers and keep their factories busy when they refuse to keep active the only industry that they control, and the largest industry in the world—the railroads.

Money invested in the railroads at this time will be a national benefit for generations to come. The Railroad Administration should play fair with the public, the railroads, the railway supply industries and their employees.

There will be no substantial reduction in prices unless the supply industries are busy.—*F. N. Bard, Vice-President.*

Boss Nut Company
Chicago.

Our railway department operated at less than one-half its capacity during the year 1918 as compared with 1917. Shop force in this department reduced to about 60 per cent of 1917 average. To continue operations profitably it will be necessary to reduce our sales force and other selling expense, which we have not done up to the present time.—*J. A. MacLean, Vice-President.*

Onondaga Steel Company, Inc.
Syracuse, N. Y.

In conversation yesterday with a prominent engineer connected with one of the steel mill equipment manufacturers of the Pittsburgh district we were informed that the steel companies had several months before the armistice was signed placed orders with them for rolls and equipment designed especially for the reconstruction period.

Today the steel corporation and other large producers are fully equipped for the enormous demands that they have every reason to expect should be made on them.

Our own efforts have been along this line, not only in equipment but in organization as it is particularly difficult to build up the personnel of a tool steel mill.

Every department calls for a high degree of expert knowledge. Even the common labor in a mill producing exclusively high-speed steel must be trained to a knowledge of the value of the material produced and the care necessary in handling it, as a few pounds waste means many dollars loss.

We steel people who have dug into our own pockets—thus giving proof of our faith in the country and its capacity for reconstruction—feel that we have every right to demand of our leaders in Washington a similar policy as applied to our railroads.

We depend upon the railroads and railroad equipment people for 40 per cent of our business, and if they cannot take the attitude of faith and confidence in the future shown by the manufacturing public we must face not only a 40 per cent reduction in our working force—but an added reduction because of the railroads being unable to handle adequately the business of the country. Consequently, the inability of other lines of business to carry on as they had every reason to plan.

Come on, you railroads! Your country needs you—*S. S. Buckley, President.*

Reading Steel Casting Company
Reading, Pa.

The sudden ending of the war has made necessary a curtailment of production of iron and steel products. In turn it has been necessary for the manufacturers to lay off a great many employees regardless of the fact that it is practically impossible for these employees to obtain work elsewhere. If the Railroad Administration continued its purchases for maintenance, renewals and betterments at this time it would be possible for the industries to continue the employment of practically all the men on their payroll during the war period.

We are firmly of the belief that the greatest destroyer of social unrest is steady employment. The best way to maintain steady employment in the steel and iron industry is for the railroads to continue their purchase of material for maintenance renewals and betterments.—*J. Turner Moore, President.*

Joseph T. Ryerson & Son
Chicago.

This policy of deferring maintenance and renewals cannot but work havoc with our railroad business if continued long enough. Just now our mill is full of work on orders placed sometime ago which we were unable to get out before on account of lack of raw material and fuel, but we will finish up these orders in the course of time, and as there is no new business coming in the result will be a shutdown of the mill affecting the employment of some 300 men, as the entire output of this particular mill goes to the railroads. This action, however, will not be necessary for some months under the present condition of our order books. The immediate effect of the government's policy, however, is that we have stopped buying pig iron and fuel for future requirements, as we cannot buy raw materials without the prospect of their sale.

In our warehousing department the effect is immediately apparent in lack of orders which will, no doubt, cause some reduction in our working force and stoppage in the purchase of steel, for the percentage of this business which ordinarily goes to the railroads. As stated before, there is no immediate lay-off of men contemplated, but unless there is a resumption of buying within the next 30 to 60 days results cannot help but be serious.—*Howard A. Gray, Manager Railroad Sales.*

The American Train Despatchers' Association has organized a local assembly at Chicago, with O. J. Schwartz, train despatcher on the Chicago & North Western, as chairman, and W. A. Kraemer, also a train despatcher on the North Western, secretary and treasurer. About 150 chief train despatchers and despatchers were present at the first meeting. The second annual convention of the association will be held in Chicago, June 17 to 20, inclusive.

Railroad Hearings Before Senate Committee

Labor Organizations Unite for Government Ownership—Want Share in Management and Profits

WASHINGTON, D. C.

FOURTEEN RAILROAD LABOR ORGANIZATIONS, claiming to represent nearly 1,900,000 employees, have endorsed the plan proposed last week by Glenn E. Plumb, representing the four brotherhoods, providing for government ownership of railroads and operation by the employees on a profit-sharing basis, A. B. Garretson, president of the Order of Railway Conductors, testified before the Senate committee on February 10. The plan as outlined by Mr. Plumb was described in last week's issue. It provides for operation by a single corporation, administered by a board of directors, of which one-third would be chosen by the President, one-third by the classified employees and one-third by the appointed officers, profits above the fixed charges necessary to pay interest on the bonds to be divided between the government and the employees, who would receive a wage dividend in proportion to their wages. Mr. Plumb also opposed the plan for a five-year extension of the present federal control but said that this opposition would be withdrawn if the general order issued by Mr. McAdoo restraining political activities on the part of railway employees should be revoked, and both he and Mr. Garretson presented several arguments for the five-year plan.

Mr. Garretson appeared before the committee as the representative of all the 14 organizations that have agreements with the Railroad Administration, the Brotherhood of Locomotive Engineers, the Brotherhood of Locomotive Firemen and Enginemen, the Order of Railway Conductors and the Brotherhood of Railroad Trainmen, which he said represent 400,000 men, and also the following organizations affiliated with the Railroad Employees' Department of the American Federation of Labor, which he said represent 1,500,000 men: International Association of Machinists; International Brotherhood of Blacksmiths and Helpers; International Brotherhood of Boilermakers, Iron Shipbuilders and Helpers; Amalgamated Sheet Metal Workers' International Alliance; International Brotherhood of Electrical Workers; Brotherhood of Railway Carmen; Brotherhood of Railway Clerks, Freight Handlers and Station Employees; Switchmen's Union of North America; Order of Railroad Telegraphers and United Brotherhood of Maintenance of Way Employees and Shopmen. All of the members of these organizations are not employed on railroads, some being employed in contract shops. The organizations affiliated with the American Federation of Labor have recently taken a referendum, which resulted in an almost unanimous vote for government ownership and the executives of the 14 organizations held a meeting in Washington last week for the purpose of agreeing on a plan to be presented to the committee and of drafting a proposed bill.

Converted by Results of Past Year

Mr. Garretson said that these 14 organizations represented almost the entire body of railroad employees, with the exception of a few small unions, the men who have not been in service long enough to be eligible to membership, and those who have not joined the unions. The Plumb plan, he said, has the unqualified endorsement of the representatives of the organization as far as its principle is concerned, but there has been no endorsement of any given detail of the plan. Because of the diversity of opinions as to the various phases of any scheme, he said, there has been no attempt at agreement on the mechanics of the application of the plan. Three of the executives of the four brotherhoods, W. S. Stone, Timothy Shea and W. G. Lee, had always been opposed to government ownership. Mr Garretson said, while he had been an advocate of it, and many of the heads of the other organizations had also been against government ownership, but they had been converted to government ownership as far as railroads are concerned by the experience of the past year of government operation as contrasted with the old conditions under private management. The plan has not had a fair trial as to its efficiency because the government took over the roads at a time when they were in bad condition and operated them under the abnormal war conditions, and the wonder is, he said, that the Railroad Administration succeeded as well as it did, not that it failed in some particulars, but the employees had seen in the year's operation "the germ of what might be after a fair trial".

"The real question before Congress," Mr. Garretson asserted, "is not the adoption of a comprehensive plan for the operation of the railroads but a declaration of policy for the future as to whether the railroads are to be administered as an appanage of the government or as a private enterprise. We are of the strong belief that they can best be administered through a direct government agency furnishing transportation not for profit but at cost. If you make the government responsible for any deficits you have gone far towards government ownership, and the government should be entitled to share in the profits. All of the plans presented here that demand a government guarantee of returns recognize the principle of government ownership. If government regulation creates a deficit on some roads and it is proposed to have the government make it up by a guarantee it is only consistent to go to government ownership and put all the earnings in one jackpot."

Mr. Garretson elaborated on his idea that any plan of guarantee comes very close to government ownership, saying that all the plans come to the same thing, a proposal that the government stand the deficits and the corporations keep the profits. He said the idea of a guarantee necessarily carries with it supervision of operation to ascertain that operation is on an efficient basis and that the government cannot effectively equalize conditions on different railroads unless it can avail itself of the surplus earned by some railroads, and he declared that the removal of the speculative element in railroading would kill all hope of competition or efficient operation. He also insisted that under any plan of guarantee a valuation would be essential.

Mr. Garretson traced the history of railroad consolidations into the present large systems and said that now the director general proposes a further consolidation into six to 12 regional systems. The next logical step, he said, is consolidation of all the roads under one head because if six consolidations would be a good thing, one would be still better and such a consolidation would never be permitted to be handled by a private corporation. Returning to his idea of transportation at cost, Mr. Garretson declared that a public utility serving the common necessity should furnish its service at cost without any increase of the cost to pay a profit. The basic purpose of a corporation is to make a profit and the tendency is toward constantly increasing rates. Under the plan proposed by the brotherhoods there would not only be a saving in interest rates but the balance over fixed charges would be divided equally between the government and the employees so that the government's share could be used as a sinking fund, which would eventually retire the bonds so that the public would get its transportation at cost. He did not refer to the share which would be divided among the employees as a profit, but as an

"incentive to efficiency." Senator Underwood pointed out that we have had a test of one year of government operation and that it had cost more to operate the roads than under private management. He asked if Mr. Garretson could explain why this was the case. Mr. Garretson did not directly answer the question, but said he had pointed out to Mr. McAdoo four days after he became director general that government operation would not have an honest test if faced with a time limit and uncertainty as to whether the railroads would be returned. Railroad officials, he said, have been trained to look to Wall Street for preferment and until they have become absolutely convinced that their future lies with the government instead of Wall Street the operation will not be successful. He made no direct charge against the railroad officers, but referred to a "passive resistance," manifested "not in what a man does, but in what he does not do." He illustrated the position of the railroad officials by the story of the donkey-driver who encouraged his animal by suspending a cabbage in front of his nose just out of his reach, saying that when the railroad officials realize that the cabbage is held by the government they will give just as honest service to the government as they ever did to Wall Street.

Mr. Garretson said that many newspapers had described the brotherhood plan sarcastically as meaning a proposal that the employees run the railways. He said he was willing to discuss this question seriously as a legitimate business proposition and without sarcasm. Other interests, he said, are willing to propose a government partnership in the losses, but are silent as to partnership in the profits, whereas the employees are willing to go into partnership with the government and are willing to take the officials into partnership also. He asked whether it would be better for the government to enter into partnership with corporation seeking a profit or with the men who do the work and who only ask wages and a share of the profits. There have been thousands of profit-sharing schemes, Mr. Garretson said, but this is the first true profit-sharing scheme ever presented to any industry.

As to the desirability of the plan for a five year extension, Mr. Garretson said the representatives of the 14 labor organizations have varying opinions. Personally, he thought there were arguments both for and against it. If the extension would defer a final conclusion as to the railroad problem it would be a calamity, but if the period were used for studying and laying out a permanent plan of action it would be desirable. Congress should first, however, lay down a policy as between government ownership and private management. If the policy is to be private management the machinery is in existence and can be oiled up and refurbished in three or four months. If the policy is to be government ownership much time will be required to develop the new machinery. But, he said, it is not desirable that the railroads be returned until there has been a decision as to what the policy is to be because the return will doubtless be attended with the same chaotic conditions which existed for a time after the railroads were taken over and the public will suffer. Mr. Garretson argued that one advantage of government ownership would be the opportunity to eliminate seasonal unemployment. He said the world owes every man a living and society has to support the burden in one way or another. If free transportation or transportation at cost could be furnished to move labor from regions where there is a surplus to others where it is needed, unemployment could be done away with to a large degree.

In concluding his statement, Mr. Garretson uttered a warning that any attempt to reduce the wages established during the past year would arouse the army of discontent in a way that would shake the social structure. He said he was not in sympathy with Bolshevism, I. W. W.-ism, Socialism or Anarchism, but he recognized some of the causes of which they were the result and which must be relieved.

Replying to questions by Senator Cummins, Mr. Garretson said that never before has a profit-sharing plan been proposed which provides for any equitable division of profits among all who participate in the enterprise. The idea of profit-sharing carries with it the idea of limitation on unreasonable profits and the problem of industrial unrest can never be settled until this question is settled. He declared that wage increases alone would not solve the problem because a wage increase merely gives to a favored class at the expense of those who do not get corresponding increases, not at the expense of the employer, and that increases in wages may leave labor worse off than before if the purchasing power of money is thereby decreased. He said he had made a study of the family budgets of 2,500 conductors, which showed that in 1910 or 1912 when a freight conductor's rate was $4.18 a day they had $11 less surplus at the end of the month than in 1890 when a freight conductor's pay was $3 a day.

He said that wages should be fixed by a tribunal so constituted that no one element should determine its own wages, as the official class had been able to fix its own compensation, and he advocated a plan similar to that put in effect by the Railroad Administration when it constituted boards of adjustment composed of an equal representation of employees and officials. The board that deals with brotherhood affairs he said had settled 300 cases without a dissenting vote, but whereas the present boards do not deal with wages and the director general is in effect an umpire, the Plumb plan provides for similar boards to fix wages with an appeal in case of a disagreement to the board of directors of the proposed national corporation.

Right to Strike Reserved

Senator Cummins asked if under government ownership the employees would insist on their right to strike. Mr. Garretson replied that the relation between the government and the employees should be the same as between the employees and any employer and that the rights of citizens should not be affected by government employment. The right to strike must necessarily be retained, he said. Any body of men will always obey the law until a stage of irritation has been reached that carries them beyond control, when they will exercise their right to overturn existing arrangements in the same way that men have always acted. He referred to the Canadian Lemieux Act as proof that the enactment of a law that it is known will be broken is the height of unwisdom, saying the time will always come when men will break a law which they think violates their inherent rights.

Mr. Garretson concluded his testimony on Wednesday and was excused from appearing on Thursday because the brotherhood leaders had an appointment for a conference with the director general and his staff, on the proposed increase in wages now under consideration by the Board of Wages and Working Conditions, but he may be recalled later.

Opposition to Five-Year Plan Based on Political Order

While reading his prepared statement last Friday outlining the plan for Government ownership proposed by the brotherhoods, Mr. Plumb indicated that the opposition to the five-year plan would be withdrawn if General Order No. 48 restraining political activity on the part of the employees is modified, and in discussing conditions on the assumption that the order would be modified he presented several arguments in favor of the five-year plan as providing a period of stability during which a permanent plan could be worked out. He said, however, that if a permanent plan can be worked out in less time, the present system of Federal control should be terminated without running for the full five years. While Mr. Plumb was discussing the political order, Senator McLean interrupted to ask: "If the order should be revoked, would you still be against the five-year plan?"

"That is our only objection to the five-year plan," replied Mr. Plumb. "The purpose of an extension is to allow time for a political solution of a great social issue, and under this order we would be precluded from full participation in the

working out of that solution. We cannot afford to leave to the financial interests complete freedom while we were limited in participation. If we were not debarred from participation in the final solution, then I am frank to say our objection to the five-year plan would be eliminated. Mr. Hines' arguments are very cogent. We agree that 21 months is not sufficient for a complete solution."

"Have you or your associates had any intimation that this order will be revoked?" asked Senator McLean.

"I have no such intimation," replied Mr. Plumb, "but Mr. Hines has impressed me and my associates with his supreme fairness toward every question and it, therefore, seems to me there is hope for the elimination of this objection. However, Congress should get busy at once, and if it is possible to get a solution in one or two years, the extension should be made subject to that possibility and the present system should not be continued longer than is necessary. If there can be a period of stabilized conditions while Congress is working on this problem it would be in the interest of the public and labor is particularly interested. The railway executives did not say that the wage level is too high, but none would say the status would be preserved and one said that wages should be governed by the law of supply and demand. As between a great monopoly and a body of organized employees, that don't mean supply and demand at all. It merely means a trial of strength. If we can protect the status while the solution is being worked out, that would be very desirable.

Mr. Plumb concluded his prepared statement near the end of the session and was not questioned at length. Senator Underwood pointed out that efficiency does not depend entirely upon the employees, but "comes from the top down" and goes with the appointing power. Mr. Plumb admitted the force of this statement, although he had emphasized the skill and industry of the employees, but he said that the labor plan proposed to retain efficient executives but did not want to continue in office inefficient men who may happen to be in control of capital.

Senator Cummins said that we must think now and then of those who pay the bills for railroad service as well as those who receive the money, and he asked how the Interstate Commerce Commission in fixing rates would determine how much surplus to allow to retain the interest of labor. Mr. Plumb suggested that the present level of wages and rates be taken as a starting point and said that labor would get nothing by way of a dividend until by efficiency it produced enough to pay it and that the Government would receive a surplus to be used as the basis for a reduction in rates before there would be any profits for labor to share. He said the commission would be dealing with a mathematical problem in fixing a general level of rates, but that it would sit practically as a tax-fixing body in distributing the rates as between classes and commodities. Senator Cummins also asked Mr. Plumb if he had considered the probability that if Federal control is extended for five years it will be accepted as disposing of the subject for the time being and that Congress will not be likely to take up the permanent solution until shortly before the expiration of the period. Mr. Plumb agreed that that might be so, but thought that the danger of loss to capital in letting the situation become more complicated will be a force that will impel them to seek an early solution and that the public will feel it is paying too much and will demand a quick settlement. Also, he said, labor will lend all its force toward a quick solution which would remove the uncertainty, but he felt that 21 months might be too short a time in which to accomplish permanent results. Senator Cummins declared he was of the deliberate opinion that if the time is extended for five years nothing will be done of a decisive character until immediately before the expiration of that period. Now, he said, is the psychological time to work out a permanent plan. Everybody is interested in the question, all the various interests are proposing plans, and if this opportunity be allowed to pass the whole inquiry must be made all over again. Mr. Plumb said that the proposed five-year extension of the present system does not approximate any plan which is being suggested and that the sooner a definite, permanent plan can be agreed on the better, but by no means, he said, should the roads be permitted to be turned back until a permanent plan is adopted, whether one or five years is required.

Southern Shippers Opposed to Five-Year Plan

Charles E. Cotterill, general counsel of the Southern Traffic League, presented a statement of policy adopted by the league after a referendum of the 46 chambers of commerce which composed its membership opposing Government ownership or any extension of Federal operation beyond the period now provided by law and favoring the return of the railroads to private control and operation subject to Government regulation as speedily as may be practicable. The league favored preserving under private control and operation such economies of transportation as may have been developed under Federal control to the extent that the service may be improved without inflation of charges or undue inconvenience of the public or the impairment of wholesale competition. The league opposed any governmental guarantee of income, and, while favoring the principles of fair return upon the investment, opposed any system of rate construction designed to accomplish this without due regard to other factors properly to be considered in the making of just and reasonable rates and also the unrestrained assertion of Federal authority in the regulation of traffic that is purely domestic to the several States.

Mr. Cotterill said his clients could not appreciate the argument that Congress should enact a radically new system of legislation before returning the railroads to their owners. They felt some requirements ought to be adopted, but saw no reason why the railroads could not be returned as soon as the practical obstacles to their return can be overcome. He said the present period of Federal control has been one continual wrangle between the Administration and the shippers, during which they have had to call on their representatives in Congress several times for protection, and they wanted this condition terminated. He referred particularly to the proposal of the Administration to substitute the interstate basis for State rates before applying the 25 per cent increase, which had been withdrawn on account of the opposition of the Southern shippers, and to the proposals of the Administration to put into effect a uniform mileage scale of class rates. He said the shippers were not interested in State rights but that the jobbing business of the South was seriously menaced by the efforts to abolish the State rate basis and that the Director General has said he would put the mileage scale into effect, although the Interstate Commerce Commission has recommended against its being taken up at this time. Mr. Cotterill severely criticised some of the acts of the Railroad Administration and the effects of the elimination of competition and presented numerous arguments against the policy of Government ownership.

"We doubt the value of the sociological experiment of Government ownership and operation of our railways," he said. "Were our mileage one-fourth as great and the traffic one-fourth as large, Government ownership might be a success, but with the vastness of our railways and their operations before us we would be gravely concerned over any prospect that the Government itself might enter into such a domain and take over our greatest industrial activity. Under private initiative our railways have developed into the greatest transportation system in the world, which might not have been the case had the Government owned the railways from the beginning."

Regarding the plan of Federal control, Mr. Cotterill said:

"From the standpoint of physical operation it may be conceded that during the past year a very difficult war situation was met in a very effectual way. But it must be remembered that, after all, it was the railway men themselves who achieved those operating results, the only difference being the disregard of all legal restrictions formerly placed upon the railways and the advantage of compulsory co-ordination of their activities.

"But it has been an expensive enterprise for the shipping public. If cost be disregarded it would be possible to build and operate our railways in an ideal way. There is no way by which to calculate the precise additional cost of Federal operation during the past year, but the fact remains that it increased almost beyond comprehension. We take no broad exception to the wage increases that were allowed; but we cannot avoid the remark that the rate of pay accorded negro railway labor in the South has exceeded all bounds of reason and has brought about a very unhealthy condition. Perhaps that phase of the matter must be regarded as a necessary incident of the war.

"Had the Railway Administration confined itself to the fulfillment of its immediate purposes as a war tribunal, perhaps there could be no criticism of its past record. But the shippers of the South have had to contend with a very difficult situation arising from the fact that the Railroad Administration did not confine itself to war activities but instead entered upon and indulged in all sorts of innovations and revolutionary changes which threatened to work great hardship upon them, and in many cases did so.

To be more specific, the director general built up an organization and surrounded himself mainly with former railroad officials and employees. In the nature of things the director general personally did not and could not know the full consequences of all that was proposed in his name. To us in the South it seemed at times as if the former railway officials, anticipating the eventual return of their railroads, were taking advantage of Mr. McAdoo and of the situation generally, to put into effect cherished ideas of reform which, without the very great power of the director general, could never be made effective."

C. W. Bunn, general counsel of the Northern Pacific, testified before the Senate Committee on Thursday, advocating a plan by which the Interstate Commerce Commission be given power to review State-made rates to bring them into harmony with interstate rates. S. Davies Warfield also presented a supplemental statement regarding his plan which was presented last week. G. M. Freer, president of the National Industrial Traffic League, and N. L. Amster, president of the Investors' Protective Association, were to follow on Friday.

The committee has decided hereafter to hold hearings only on Tuesdays and Thursdays. The House Committeen on Interstate and Foreign Commerce proposes to begin hearings soon on the railroad question.

Rivers and Harbors Congress

FEDERAL SUPERVISION of water transportation under a department of transportation or a bureau of the Department of Commerce and extension of the jurisdiction of the Interstate Commerce Commission over rail and water rates together with improvement of all navigable streams upon which commerce could be established were recommended to Congress in a declaration of principles adopted by the National Rivers and Harbors Congress at its fourteenth annual meeting in Washington last week. Co-ordination of rail and water facilities and the elimination of destructive competition between them were also favored.

Walker D. Hines, director general of railroads, addressed the meeting on the subject of the co-ordination of rail and water facilities and urged extension of the present system of federal control for the purpose of giving it a better opportunity to work it out. "I cannot reconcile myself," he said, "to the view that a great national highway like one of our waterways can properly be regarded as economically useless. The government has devoted a great deal of attention and money to the improvement of these waterways, but so far there has been a missing link which was of vital importance to supply. It is not sufficient merely to provide a waterway. It is equally important to provide the means for an interchange of traffic between the waterway and other means of transportation. I have been tremendously interested ever since I came into the Railroad Administration in seeing how we could make a practical, sympathetic and helpful experiment with a view not only to furnishing the desire to have the railroad feed the waterway so as to get a really economical and beneficial use of the waterway, but with a view also to finding a practical method of effecting this rehandling of the traffic between the railroad and the waterway so as to get a really economical result. The Railroad Administration has attempted to do that, and I am directing that work with a definite belief and conviction that with these great national waterways we can and must find a way to make them an economic success." But, he said, this will take time, and if the administration is facing a relinquishment of the railroads in a short time, it will be hampered in working out the problem of waterway development. Mr. Hines said nobobdy expects the present form of federal control to continue indefinitely, and he did not suppose that anybody wants it to continue indefinitely.

Discussion of railroad questions occupied a considerable part of the program of the meeting. Secretary of the Navy Daniels said that the railroads had broken down under their increased burden after the United States entered the war, "while the waters have run idly to the sea," and that they had broken down because they were built on a program based on the destruction of water traffic. He declared that not a ton of the raw materials which lend themselves to water transportation should be carried by rail if water transportation was available. Senator Ransdell of Louisiana, president of the National Rivers and Harbors Congress, urged the appointment to the President's cabinet of a secretary of transportation whose duty would be to regulate railway, waterway and highway transportation. Major General William M. Black, chief of engineers, United States Army, also urged the creation of a secretary of transportation, charged with the development and co-ordination of all the transportation agencies of the nation. He said the Railroad Administration is a railroad administration with a waterway appendix because its officials are almost all men trained in the railroad viewpoint.

The question of government ownership versus private ownership of the railways was discussed by Luther M. Walter, general counsel for the National Association of Owners of Railroad Securities, who opposed both government ownership and the proposed extension of federal control, and advocated the plan for railroad regulation proposed by that association before the Senate committee; by William Jennings Bryan, who advocated a dual plan of state ownership of branch lines and federal ownership of trunk lines of railroad; and by Samuel O. Dunn, editor of the *Railway Age*, who declared that private operation under wise and fair regulation would be far more beneficial to the public than the result of government operation would be.

The Traffic Club of St. Louis, Mo., recently adopted resolutions declaring that the extension of government control of railroads is prejudicial to public interest. The resolutions were ordered sent to Missouri representatives in Congress.

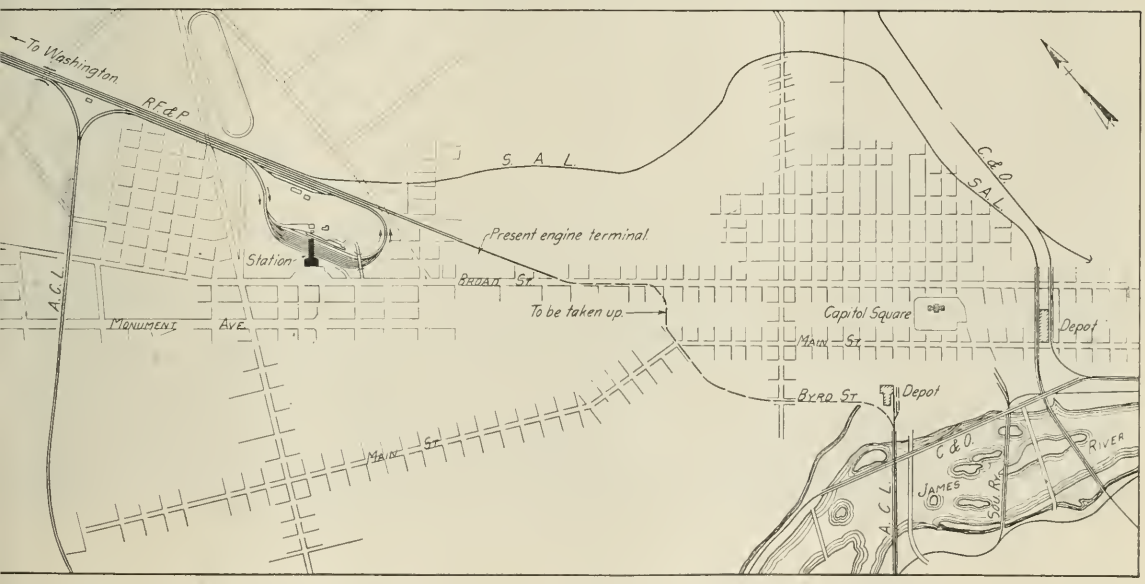


The Station from Broad Street

A New Passenger Station Completed at Richmond, Va.

This Project Involves a Terminal With Facilities for Two Roads and an Improved Main Line

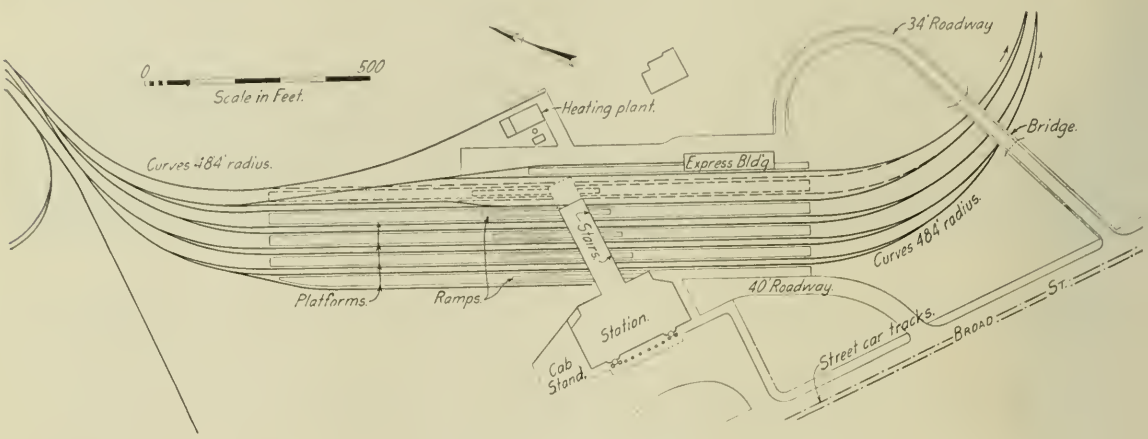
THE OLD UNION PASSENGER STATION facilities in Richmond, used jointly by the Atlantic Coast Line and the Richmond, Fredericksburg & Potomac, having become inadequate and incapable of expansion to meet present day requirements, the Richmond Terminal Railway was organized early in 1916 for the purpose of providing an improved and modern passenger layout for the use of these two railroads. The project embraces a new station and auxiliary buildings, a complete and interesting terminal track layout and the development of an improved main line through the city for passenger traffic which eliminates the objectionable operating features of the old line and numerous crossings at grade with important thoroughfares and lengthwise occupancies of other streets. The contracts for the terminal construction were let early in 1916 and the new terminal was opened to traffic on January 4 of this year.



Map of Richmond Showing the New Station Site in Relation to the Old Station

As may be seen on the map of Richmond, the old facilities for passenger service were situated at Byrd street in the heart of the business section of the city on the lower level along the James river. The land available for railway purposes

in this district is limited on the south by the James river and on the north by the abrupt rise from the low ground along the river to the higher level of the city. The property adjoining the site is built up solidly with industrial and business plants, making the acquisition of additional property for railway purposes difficult and expensive, even if the location was desirable otherwise, which was not the case. The old station, while serving as a through station, was of the stub-end type, constructed in this manner because of the Potomac and the tracks of the Petersburg Connecting Company, which operates between Byrd street and Elba stations. In this section and north to Broad street the single track lies in and across important thoroughfares, an arrangement which is unsatisfactory both to the city and to the railroads. These objectionable features, coupled with the urgent necessity for amplified freight facilities on the lower level of the city with the area now occupied by the passenger layout necessary to the development of the freight project, led to the



Track Layout at the Station

limitations of the site. It was served with six stub-end station tracks, each having a capacity for six cars only, the limited track capacity being also occasioned by the topographical features of the location.

Because of its type, reverse movements were necessary in getting trains in and out of the old station, and as the through trains using the terminal often carried 16 to 18 cars, two cuts were necessary in getting one train into the station. This, of course, required a liberal time allowance in the schedule for the station stop, and in the event of trains arriving at the station off their schedule and on the time of other trains, delays and congestion resulted.

The approaches to the old site also embrace objectionable features. From the south the approach is over the Atlantic Coast Line's single track bridge over the James river, while from the north it is via the Richmond, Fredericksburg & decision to locate the new terminal in a different section of the city.

The location chosen is in the western end of the city in a rapidly growing residential section on land purchased some years ago by the Richmond, Fredericksburg & Potomac. This site is convenient to the hotels and retail section of the city, thus fulfilling the needs of the transient public, and is particularly convenient to the newer residential sections.



The Track Layout and Platforms

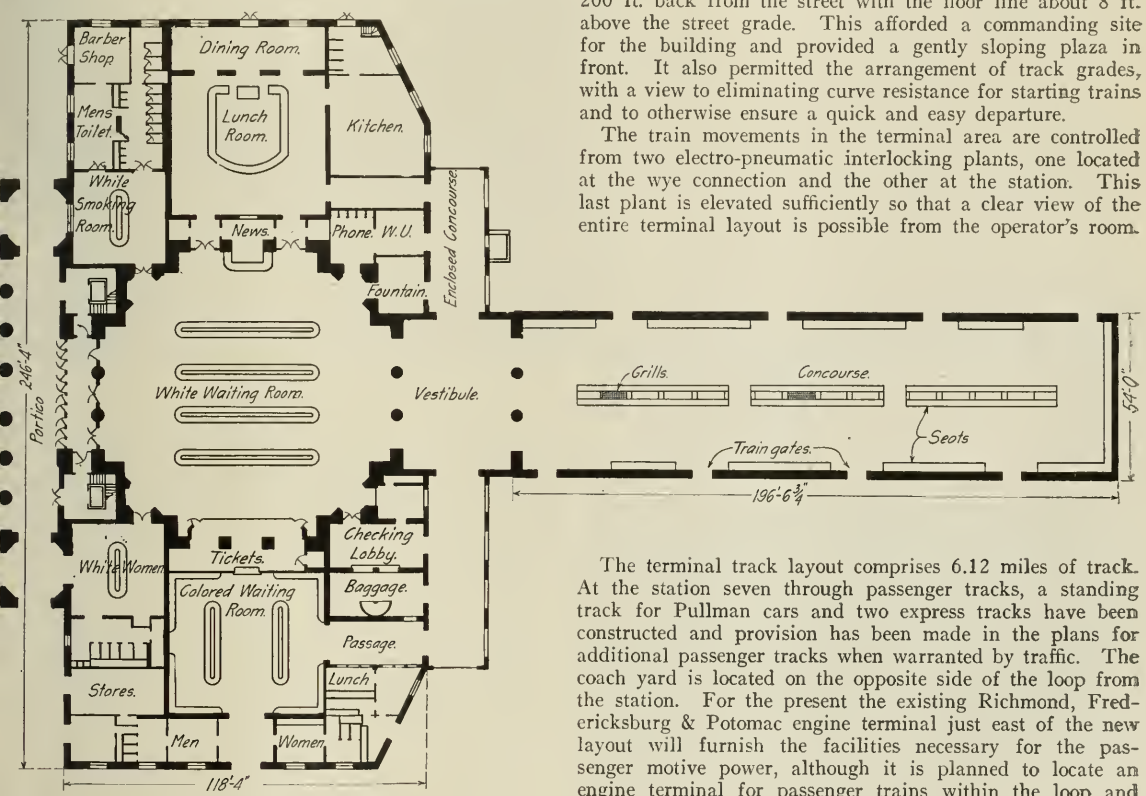
To utilize this site as a terminal it was necessary to develop a new line for passenger traffic.

The New Passenger Line

Again referring to the map of Richmond it may be seen that the old through passenger line entering Richmond from the south embraces the Atlantic Coast Line main tracks over the James river into the old station and those of the

Petersburg Connecting Company and the Richmond, Fredericksburg & Potomac to the north leaving the city on the west. For freight purposes a single-track line had previously been provided around the south and west of the city, leaving the Atlantic Coast Line main line at a point about two miles south of the old station and joining with the Richmond, Fredericksburg & Potomac main line at the point where those tracks leave the city. Under the new plan through passenger trains will follow this route and, incident to the terminal project, this belt line has been double-tracked and otherwise improved. The Atlantic Coast Line main line into the old station will be operated only for freight service.

The new terminal layout is located approximately one-half mile east of the junction of the Richmond, Fredericksburg & Potomac main line with the belt line. Between this



First Floor Plan of the Station

unction and the new location two of the tracks of the Richmond, Fredericksburg & Potomac main line will be utilized s a part of the new passenger line, there being five tracks etween these points. That portion of the Richmond, Fredricksburg & Potomac main line east of the new layout will e abandoned as main line, but retained in service to reach he existing engine terminal, yard facilities and industries ust east of the new terminal, while between Broad street and he old Byrd street station the line will be abandoned enirely, thus doing away with the occupancy of the city streets y the passenger track.

While the new station facilities are located outside of and re comparatively remote from the new traffic line, the station rack layout is so planned that reverse movements are elimnated. The tracks are arranged in a loop, as shown in the nap of the station grounds on which the direction of traffic s indicated by means of arrows.

Trains from the south approach the station over the northbound main track of the belt line and the wye track shown on the map, entering the station layout from the west. Southbound trains enter the station from the same end by means of a second approach track leading off the Richmond, Fredericksburg & Potomac main line. All trains will leave the station from the east, passing around the loop. The movement of northbound trains is direct, and southbound trains will use the second track of the wye connection mentioned above to reach the southbound main track of the belt line. From the foregoing it will be noted that all trains enter the station headed in the same direction—east. Thus baggage will be handled at one end of the platforms only.

In planning the layout the platforms and tracks were located at an angle with Broad street. The station was placed 200 ft. back from the street with the floor line about 8 ft. above the street grade. This afforded a commanding site for the building and provided a gently sloping plaza in front. It also permitted the arrangement of track grades, with a view to eliminating curve resistance for starting trains and to otherwise ensure a quick and easy departure.

The train movements in the terminal area are controlled from two electro-pneumatic interlocking plants, one located at the wye connection and the other at the station. This last plant is elevated sufficiently so that a clear view of the entire terminal layout is possible from the operator's room.

The terminal track layout comprises 6.12 miles of track. At the station seven through passenger tracks, a standing track for Pullman cars and two express tracks have been constructed and provision has been made in the plans for additional passenger tracks when warranted by traffic. The coach yard is located on the opposite side of the loop from the station. For the present the existing Richmond, Fredericksburg & Potomac engine terminal just east of the new layout will furnish the facilities necessary for the passenger motive power, although it is planned to locate an engine terminal for passenger trains within the loop and move the freight engine terminal to Acca, about four miles to the north on the main line of the Richmond, Fredericksburg & Potomac.

Curves with a radius of 484 ft. have been installed at both ends of the loop. This is the maximum curvature in the layout, the curve at the west end of the main line having a radius of 1,194 ft.

The track layout includes 52 frogs, 44 in the main line and 8 in the coach yard. In the main line the frogs are of the manganese insert type and in the coach yard of bolted open-hearth construction. The frogs in the main line are all special, ranging from No. 8 to No. 15 and, in spite of the difficulty of design occasioned by the curves, only six types were used, thus effecting material savings in manufacturing costs.

The natural surface of the ground at the layout is generally higher than the track grades established and 150,000 cu. yd. of material was moved in the preparation of the site of which 145,000 cu. yd. was occasioned by the depres-

sion of the tracks and 6,000 cu. yd. by the station building excavation. About 40,000 cu. yd. of the material was utilized in the fill required in the station plaza and the remainder in filling the low ground at the connection with the Richmond, Fredericksburg & Potomac main line at the north end of the loop. This last embankment was placed in such a manner that a complete loop track can be constructed without further grading.

The material moved in these operations was chiefly clay with gravel pockets in places. In making the excavation the top soil was stripped by teams and piled for use in the parking scheme. All of the excavation except 25,000 cu. yd. removed by teams was handled by a steam shovel and moved to place in the fills by means of narrow-gage equipment. The embankment for the plaza in front of the station was also placed by teams.

The presence of gravel pockets in the clay made necessary an elaborate system of sewers. The main sewers of the plot which connect with the city sewers are all of brick and include 584 ft. of 4-ft. 6-in. sewer; 1,000 ft. of 3-ft. 6-in. sewer, and 500 ft. of 3-ft. sewer. The lateral sewers range from 8-in. terra cotta to 24-in. These are specially built to collect the surface water, the back filling in the trenches being of coarse material.

In planning the improvement one of the important objectives has been to secure pleasing surroundings and the plan of landscape treatment is of particular interest. The greater portion of the site was formerly the location of the Hermitage golf grounds and a baseball park, free from extensive building improvements, a site which lent itself readily to landscape treatment. Because of the large area occupied simple methods of treatment in the landscape plan were essential. It is proposed to establish and maintain fine turf on the oval in front of the station and between Broad street and the entrance roads to the right and left. The oval area will be left in simple lawn, because it seems most desirable to have a simple green foreground for the building, that will not be broken by beds of flowers and shrubs. The turf areas to the right and left of the entrance road are to be bordered with flowering shrubs such as spraeas, wigelias, altheas, golden bell, and the like, faced down with borders of hardy perennials.



The Lunch Room and Restaurant

To the north of the station a sloping triangular area, that is above the cut slopes at the railroad tracks, will be covered with ground-cover plants including Japanese honeysuckle, Japanese bittersweet and Chinese wisteria. To the south of the station between the tracks and the express and baggage road, the comparatively level ground covered by simple turf, is surrounded by flowering shrubs in which dogwoods and redbuds predominate.

The semi-circular loop which extends from the overhead express road bridge down to the express building is a simple shrub flower garden. The level ground is turfed. Back of this will be a belt of winter or yellow jesamine, redbuds, dogwoods and other flowering shrubs with certain hardy perennials, giving a succession of bloom through much of the season. The embankment approaches to the bridge over the tracks are covered with Armour privet which in this climate is practically evergreen.

The great central part of the loop, formerly used as golf grounds, is already in good grass and the extensive rough ground area in the northern part of the loop is covered with a dense planting of black locust, edged around with flowering shrubs of great variety, which will require no maintenance and will produce a striking effect.



The Train Shed and Platforms

All of the railway banks and the slopes of the cuts, which are very flat, are thickly planted with Japanese honeysuckle and Armour privet, forming a mass covering, requiring little attention and being practically evergreen. Lombardy poplars are planted in clumps or rows in many places to screen off factory buildings in the near and middle distance. This landscape work was done by Warren H. Manning, landscape designer, of Boston, Mass.

The Station

The plans for the station building were prepared by John Russell Pope, architect, of New York City, and the construction work has been carried out under his supervision. The building is a fireproof structure of steel and concrete with exterior walls of Indiana travertin limestone. The face of the building is 200 ft. north of the street line, permitting a broad plaza with sweeping curves and grass plots. The structure is 240 ft. long, 118 ft. wide and three stories high on the plaza front. Facing the interior courts an additional story is obtained in the east and west wings. These three upper floors are used for railroad business offices.

The entire main floor is given over to the uses of the traveling public. The waiting room for white people, with its lofty domed ceiling extending up entirely through the building, occupies all the space included within the central motif. The concourse, 50 ft. wide and over 200 ft. long, joins the domed waiting room through the concourse vestibule on the north, extending at the same level as the waiting room over the seven tracks. The concourse vestibule is 50 ft. by 50 ft. in plan. Access to the tracks is obtained through enclosed stairways on the east for outgoing, and ramps on the west for incoming passengers. The platforms are covered by canopies that extend far over the cars and are supported by single Ionic columns of cast iron and of massive proportions. The ramps, stairs and platforms are in harmony with the central structure. Enclosed passages flank the building on the northeast and northwest, giving

direct access to the concourse from the cab stand on the west and the plaza and colored section on the east.

The main entrance to the station faces Broad street and consists of two groups of seven doors each, leading from the portico through the vestibule directly into the waiting room for white people. The vestibule is planked by two entrance hallways, also opening from the portico, served by two doors each. Stairways and elevators run from each of these hallways to the office floors above.

The plan of the main floor and concourse is of particular interest. Entering the waiting room through the portico and vestibule, outbound passengers must keep to the right to reach the information bureau, the ticket office and the baggage checking room. These facilities are reached in the



Interior of the Concourse

trip to the concourse in the sequence mentioned and are arranged in a straight line, allowing the passenger to reach his objective in the minimum time. On the left in the west wing are the smoking room, men's toilet and barber shop, followed by the restaurant, lunch room, telephone and telegraph offices and soda fountain. The rest room and toilet for women are on the right of the main waiting room. A large portion of the main floor of the east wing is given over to the waiting room, restaurant, rest room and toilets for colored people. Their entrance is from the east passage to the concourse.

The ticket office and baggage checking rooms separate the white and colored waiting rooms, thus permitting both sections to be served by the same respective offices. At the extreme southeast corner of the main floor are two shops for rental purposes.

The baggage is handled on the basement floor of the station, with a separate drive from Broad street. A spiral chute and elevator for hand baggage extend between the main baggage room and the checking room on the main floor. The baggage trucking platform is independent of the platforms used by passengers, and, as the traffic through the station is all in one direction, the greater part of the trucking will also be in one direction. Cross-overs are provided from the baggage platform to the passenger platform.

The basement level will also provide space for a United States mail room, a rest room for trainmen and conductors, the office of the station master, storage for the restaurant and other auxiliary facilities. The mechanical room contains the main electrical switchboard, ventilating apparatus, and a refrigerating machine for cooling the drinking water circulated throughout the building.

In design, both the exterior and interior are simple and dignified. Classic architectural orders, the Doric outside and Ionic inside have been used. These have simple moulding and almost no ornaments. The only exception is the carved setting for the tower clock in the front pediment, typifying progress and industry, and the two seals. The latter are also used again in a modified form on the walls of the concourse.

Plain coursed limestone walls and Napoleon gray marble wainscoting are used in the white waiting room and concourse. All other rooms on the main floor have wainscoting of gray Tennessee marble and plaster walls. The latter are tinted in pleasing tones of gray.

The ticket grills and all other interior metal work are a soft greenish gray, harmonizing with the walls and wainscoting. All floors are of marble terrazza with marble slab borders.

A feature of special interest is the great illuminated sphere representing the world. It is suspended from the center of the domed ceiling of the main waiting room, and supported within a double ring ornamented with the signs of the zodiac. The entire fixture is made of wrought metal and glass and is eight feet in diameter.

Auxiliary Facilities

The express building, which is 40 ft. wide and 200 ft. long, is located across the tracks from the station. This is served by two tracks, one through and the other stub, separated by a platform 12 ft. wide and 350 ft. long. A ramp platform is provided east of the building.

The road leading to the building, which is 34 ft. wide,



A Corner of the Waiting Room

widens into a 40-ft. driveway at the house. This drive leads off of Broad street east of the station and is carried over the track layout by means of a reinforced concrete bridge in the design of which special attention was given to the appearance of the structure in order that it might harmonize with the surroundings.

The express building is of brick on a concrete foundation with seven doors on the driveway side and 14 on the track side. Wilson steel rolling doors are provided throughout. The platform is protected by a canopy and the drive is sheltered by the overhanging roof. The office is 15 ft. by 19 ft. with toilet facilities located in the south end of the building. With the exception of provision for these fa-

cilities the entire building is free from partitions. Two Howe scales, one 7 ft. by 9 ft., of 5,000-lb. capacity, and one 4 ft. by 5 ft., of 500-lb. capacity, are provided.

The heating plant, which adjoins the express facilities, is a two-story building 40 ft. wide by 90 ft. long with space provided on the second floor for lockers and other facilities for the mechanics. The brick stack for this plant, which was built by the Alphons Custodis Chimney Construction Company, is 11 ft. 3 in. in outside diameter at the bottom, 5 ft. inside and 110 ft. high. It is supported on a concrete base 4 ft. deep, octagonal in shape and 18 ft. 6 in. in diameter. The foundation rests on twenty-four 15-ft. Raymond concrete piles which were driven with a steam hammer.

The remaining buildings in the layout in addition to the interlocking plants previously mentioned, are the supply, the oil and the ice house. These are located adjacent to the coach yard tracks.

The plans for the improvements were made by Harry Frazier, consulting engineer, of Richmond, Va., who was also in general charge of the work. C. C. Strong was the resident engineer. The J. H. Parker Company, of New York, was the contractor for the main building.

Doings of the United States Railroad Administration

Director General Has Meeting With Executives to Discuss Senate Hearings and Other Matters

WASHINGTON, D. C.

THE POSSIBILITY of facilitating the return of the railroads to private management by turning over their operation to the railroad corporations as agents or representatives of the government for a short period prior to the actual termination of federal control was discussed by Director General Hines at a meeting of the Association of Railway Executives at Washington on February 7, which was attended by about 75 railway executives. The meeting was called for the purpose of giving the executives an opportunity to discuss among themselves the progress of various plans for remedial railroad legislation which have been presented before the Senate Committe on Interstate Commerce and also for the purpose of discussing with Mr. Hines various questions relating to the relations between the Railroad Administration and the railroad companies. The plan of making the corporations the agents of the government as they were during the first three or four months of federal control before federal managers were appointed was discussed only tentatively, but it has been considered by many who have considered the problem as a practical way of effecting the transition from federal control to private management, in the event the President decides to relinquish control at an early date, as he has said he would do if no prospect for early legislation on a permanent plan appeared, and as Director General Hines has said he would recommend. This would give the corporations an opportunity to reinstate their organizations, so that they would be in a position to resume management on their own account at the termination of federal control. The transition would be made while the central organization of the Railroad Administration was still in charge and while the government guarantee of compensation was still in effect.

Mr. Hines was questioned as to what period of time he contemplated in saying that the railroads must be returned in a reasonable time unless the five-year extension is approved by Congress. Mr. Hines said he had no definite period in mind, but that it would be his idea to recognize the conditions existing in the railroad business and allow sufficient time and give sufficient notice to enable the changes to be made in an orderly manner.

Another subject discussed was the position of the Railroad Administration regarding the allocation of cars and locomotives. Mr. Hines took the position that there would have been less objection to accepting the standard equipment if the war had not terminated so suddenly, but pointed out that it was ordered at a time when everyone expected the war to continue longer than it did. He said the railroad control act provided two ways of purchasing equipment, but that if the government had purchased it for its own account it would have been faced with a difficult problem in disposing of it by lease or by sale after the termination of federal control. He said the railroad companies would probably have had to buy about the same amount of equipment if they had been in charge of the railroads and that the administration felt it was fully justified in the plan it had adopted of purchasing the equipment and requiring the companies to accept and pay for it at its cost to the government.

Report of Exports Control Committee

Considerable improvement in the movement of overseas traffic for the week ended February 4 over the previous week is shown in a report of the Exports Control Committee. There were 9,180 cars of export freight received at North Atlantic ports for the week and 10,131 cars delivered to boats. The total number of cars on hand at North Atlantic ports on February 4 was 32,343, while for January 28 there were 38,201, a decrease in accumulations of 988 cars.

Commercial export freight is moving freely to New York, the steamship lines displaying a desire to get cargo as fast as possible. Further space in British vessels will soon be available for commercial cargo. Permits are being granted covering commercial freight to Newport News to meet steamers due this month. The total commercial freight on hand for the week ending January 30 at North Atlantic ports increased 12,500 tons. There was a decrease of 2,800 tons at South Atlantic ports; an increase at Golf ports of 2,600 tons making a gross increase of commercial freight on hand at all ports of 12,300 tons over the previous week.

Effective on March 1 the Exports Control Committee will be abolished, but part of its work, including the development and co-ordination of export traffic, will be continued under the direction of C. E. Spens, who has been appointed assistant director of the Division of Traffic, in charge of export and import traffic matters.

Bill for $750,000,000 Appropriation to Be Reported

The Appropriations Committee of the House expects to report within a few days a bill for the appropriation of an additional $750,000,000 for the revolving fund of the Railroad Administration asked for by Director General Hines. Whether it will be reported as a separate bill or as a rider to a general appropriation bill has not yet been decided Director General Hines has held several conferences with a subcommittee of the appropriations committee, explaining the reasons why it is needed and fortifying them with material for use in case opposition develops on the floor of the

House or in the Senate later. Some Congressmen are known to hold the opinion that the amount asked is too much, while others who are opposed to the Railroad Administration might seek to oppose it as a means of embarrassing the administration, but the general feeling seems to be that the amount will be granted.

Freight Traffic Movement for 1918

The Operating Statistics Section of the Railroad Administration has issued a report covering freight train and car performance for December and the calendar year 1918, some of the figures of which were briefly noted in last week's issue. Net ton miles of freight handled for the year amounted to 434,997,928,000, an increase of 1.8 per cent as compared with 1917. By heavier loading this traffic was handled with a decrease in train miles and car miles but the average number of freight cars on lines shows an increase of 2.9 per cent and the mileage per car per day decreased from 26.1 to 24.9, while the net ton miles per car day show a decrease from 495 to 490, or 1 per cent. The percentage of serviceable cars was 5.7 in 1918 as compared with 5.6 in 1917. The average tonnage per car increased from 27 to 29.1 or 7.8 per cent, but the tonnage per train was increased from 653 to 682, or only 4.4 per cent. The figures by regions are given below.

Salaries to Be Reported

Accounting Circular No. 71 directs federal auditors to prepare and submit a statement showing the names and salaries at January 31, 1919, of the below designated officers who exercise jurisdiction on the reporting railroad: Federal or general manager, principal assistant to the federal or general manager, federal auditor, federal treasurer, officer in charge of traffic department. If any of the above classes of

Freight Traffic Movement and Car Performance

(Including Freight and Mixed Trains)

TWELVE MONTHS ENDED DECEMBER 31, 1918, COMPARED WITH PREVIOUS YEAR

Region	Average miles of road operated		Net ton miles Revenue and non-revenue (Thousands)			Net ton miles per mile of road per day		Train miles (Thousands)			Net ton miles per train mile		
	This year	Last year	This year	Last year	Per cent change	This year	Last year	This year	Last year	Per cent change	This year	Last year	Per cent change
Total, New England District....	8,029	8,020	11,335,694	10,678,807	6.2	3,869	3,650	26,285	26,683	d 1.5	431	400	7.8
Total, Central District	21,270	21,337	77,030,930	74,343,598	3.6	9,925	9,553	92,887	95,890	d 3.1	829	775	7.0
Total, Ohio-Indiana District§ ...	13,181	13,187	40,081,126	40,579,743	d 1.2	8,331	8,431	52,406	55,678	d 5.9	765	729	4.9
Total, Eastern Region§	42,480	42,544	128,447,750	126,602,148	2.3	8,284	8,088	171,578	178,251	d 3.7	749	705	6.2
Total, Allegheny Region§	13,915	13,988	65,969,467	67,004,485	d 1.5	12,987	13,090	74,112	77,829	d 4.8	890	861	3.4
Total, Pocahontas Region	4,922	4,950	26,166,344	26,291,023	d 0.5	14,564	14,852	22,822	23,151	d 1.4	1,147	1,136	1.0
Total, Southern Region	37,406	37,355	51,335,131	47,960,424	7.0	3,764	3,518	100,791	95,918	5.1	509	500	1.8
Total, Northwestern Region ...	46,936	46,800	60,352,804	58,900,071	2.5	3,523	3,449	91,605	94,503	d 3.1	659	623	5.8
Total, Central Western Region..	51,257	51,175	73,531,399	71,718,754	2.5	3,931	3,840	118,686	123,825	d 4.2	620	579	7.1
Total, Southwestern Region	31,813	31,921	29,195,033	29,865,019	d 2.2	2,514	2,563	58,330	61,103	d 4.5	501	489	2.5
Grand total, all regions.....	228,729	228,633	434,997,928	427,341,924	1.8	5,210	5,121	637,924	654,580	d 2.5	682	653	4.4

Region	Freight car miles (thousands)								
	Loaded			Empty			Total		
	This year	Last year	Per cent change	This year	Last year	Per cent change	This year	Last year	Per cent change
Total, New England District....	479,212	514,891	d 6.9	203,136	202,110	0.5	682,348	717,001	d 4.8
Total, Central District	2,651,606	2,798,852	d 5.3	1,288,518	1,197,576	7.6	3,939,924	3,996,428	d 1.4
Total, Ohio-Indiana District§ ...	1,254,741	1,375,990	d 8.8	594,021	563,665	5.4	1,848,762	1,939,655	d 4.7
Total, Eastern Region§	4,385,559	4,689,733	d 6.5	2,085,475	1,963,351	6.2	6,471,034	6,653,084	d 2.7
Total, Allegheny Region§	1,835,678	1,973,283	d 7.0	1,009,074	984,060	2.5	2,844,752	2,957,343	d 3.8
Total, Pocahontas Region	650,725	683,191	d 4.8	439,615	405,820	8.3	1,090,340	1,089,011	0.1
Total, Southern Region	1,993,810	1,995,917	d 0.1	914,786	832,748	9.9	2,908,596	2,828,665	2.8
Total, Northwestern Region ...	2,187,170	2,280,420	d 4.1	939,211	867,383	8.3	3,126,381	3,147,803	d 0.7
Total, Central Western Region..	2,708,856	2,904,234	d 6.7	1,241,166	1,175,872	5.6	3,950,022	4,080,106	d 3.2
Total, Southwestern Region	1,166,505	1,288,823	d 9.5	498,699	487,672	2.3	1,665,204	1,776,495	d 6.3
Grand total, all regions.....	14,928,303	15,815,601	d 5.6	7,128,026	6,716,906	6.1	22,056,329	22,532,507	d 2.1

Region	Average number of freight cars on line daily								Net ton miles per loaded car mile		Per cent loaded to total car miles			Car miles per car day			Net ton miles per car day		
	Serviceable		Total			Per cent Uns'vic'ble													
	This year	Last year	This year	Last year	Per cent change	This year	Last year	Per cent change	This year	Last year	This year	Last year	Per cent change	This year	Last year	Per cent change	This year	Last year	Per cent change
Total, New England District....	98,470	103,317	104,004	109,026	d 4.6	5.3	5.2	23.7	20.7	14.5	70.2	71.8	d 2.2	18.0	18.0	...	299	268	11.6
Total, Central District	415,115	421,749	437,586	446,855	d 2.1	5.6	5.6	29.1	26.6	9.4	67.3	70.0	d 3.9	24.7	24.5	0.8	482	456	5.7
Total, Ohio-Indiana District§ ...	211,317	223,069	230,312	240,922	d 4.4	8.2	7.4	31.9	29.5	8.1	67.9	70.9	d 4.2	22.0	22.1	d 0.5	477	461	3.5
Total, Eastern Region§	722,902	748,135	771,902	796,813	d 3.1	6.3	6.1	29.3	26.8	9.3	67.8	70.5	d 3.8	23.0	22.9	0.4	456	432	5.6
Total, Allegheny Region§	399,594	388,213	426,341	408,476	4.4	6.3	5.0	35.9	34.0	5.6	64.5	66.7	d 3.3	18.3	19.8	d 7.6	424	449	d 5.6
Total, Pocahontas Region	84,722	78,795	88,776	82,887	7.1	4.6	4.9	40.2	38.5	4.4	59.7	62.7	d 4.8	33.6	36.0	d 6.7	808	869	d 7.0
Total, Southern Region	274,130	229,575	287,740	242,233	18.8	4.7	5.2	25.7	24.0	7.1	68.5	70.6	d 3.0	27.7	32.0	d 13.4	489	542	d 9.8
Total, Northwestern Region ...	315,509	316,883	336,436	337,437	d 0.3	6.2	6.1	27.6	25.8	7.0	70.0	72.4	d 3.3	25.5	25.6	d 0.4	491	478	2.7
Total, Central Western Region..	318,129	E 302,165	336,192	320,865	4.8	5.4	5.8	27.1	24.7	9.7	68.6	71.2	d 3.7	32.2	34.8	d 7.5	599	612	d 2.1
Total, Southwestern Region	176,811	166,291	183,399	174,598	2.9	3.6	4.8	25.0	23.2	7.8	70.1	72.5	d 3.3	24.9	27.9	d 10.8	436	469	d 7.0
Grand total, all regions.....	2,291,797	E 2,230,057	2,430,786	2,363,309	2.9	5.7	5.6	29.1	27.0	7.8	67.7	70.2	d 3.6	24.9	26.1	d 4.6	490	495	d 1.0

d Indicate decreases.
a Less than one-tenth of one per cent.
E Estimated.
t Information incomplete.
x Report note received.
§ B. & O., Western Lines, Pennsylvania Western Lines, and P. C. C. & St. L. included in Ohio-Indiana District.

The following roads come under the jurisdiction of two regional directors although included only in one region in this statement:

Road	Region in which included	Other regional director having jurisdiction
Baltimore & Ohio	Allegheny	Southern.
Chicago, Rock Island & Pacific	Central Western	Southwestern.
Illinois Central	Southern	Central Western.
Toledo, Peoria & Western	Central Western	Eastern.
Southern Pacific (Pacific System)	Central Western	Northwestern.
Wabash	Eastern	Central Western.

officers are also engaged in directing departments of other railroads and are not carried on the payroll of the respondent that fact should also be stated.

Locomotive and Car Deliveries in 1918

According to figures made public by Director General Hines, there were 2,022 locomotives shipped to railroads under federal control during the year ended December 31, 1918. Of this number, 744 were constructed under orders of the Railroad Administration, while 1,410 were contracted for prior to government operation. In the total were 200 Russian decapods, constructed for the Russian government, but never delivered owing to the situation which arose in that country. Of the total number of locomotives delivered during the calendar year 1918, 540 were assigned to the Allegheny region, 375 to the Central Western region, 902 to the Eastern region, 236 to the Northwestern region, 105 to the Pocahontas region, 361 to the Southern region, and 103 to the Southwestern region.

For the calendar year 1918 there were 700 passenger cars delivered to Class I railroads, while for the same period 40,850 freight cars were delivered. Of the freight cars built during the year 15,230 were U. S. R. A. standard cars. Of the total number of freight cars delivered, 8,683 were built in railroad shops.

Piece-Work Being Abolished

In addition to the roads mentioned in last week's issue on which the piece work system is being abolished by vote of the employees it has been decided to doscontinue piece work in the shops of the Michigan Central, Lehigh Valley, Erie, Chesapeake & Ohio, and Central of New Jersey. The Railroad Administration is following a policy of reducing the shop hours at many places where there is a surplus of labor in preference to laying off men, and the Pennsylvania shops at Harrisburg and Altoona, and shops on the Baltimore & Ohio, Hocking Valley and other roads in the Eastern region have been placed on a 40-hour a week basis. While the number of employees has been reduced at various shops on many roads, there is still a shortage of men on a large number of roads, and efforts are being made to transfer men from places where there is a surplus to where there is a demand for them. It is stated that places are being made for all returning soldiers and that in some cases they are replacing inexperienced men who were employed during the war.

Not in Position to Finance Extensive Improvements

Director General Hines explained the attitude of the Railroad Administration toward railroad improvements involving large capital expenditures at a conference at Washington on February 8 with a group of Chicago aldermen and business men who had called upon him to urge the importance of the immediate carrying on of railroad improvements in the city of Chicago outside of those involved in the Union Station project, which have already been provided for. Mr. Hines said he did not think there is anything in the country of greater importance at this time than to resume the improvement work which was held up by the war. Not only do the public need the improvements, but it is of the highest importance to give labor the employment, he said. The Railroad Administration will do everything in its power to co-operate in promoting that policy, but when it comes to what the Railroad Administration can do it is confronted with uncertainty. If there is no extension of federal control anything the administration plans for the railroads could not be carried out because there would be a change of management before the plans could be carried out. But the Railroad Administration, even in the face of that uncertain situation can and will use whatever moral suasion it can to get the railroad corporations to consent to going ahead with improvements, and whenever it can finance the work it will be glad to go ahead with it. But, in the face of the uncertainty, the government is not in position to enter upon an extensive program of financing itself. Mr. Hines took advantage of the occasion to urge upon his callers the argument for a five-year extension in order to enable the Railroad Administration to take the initiative in a confident way in such matters.

* * *

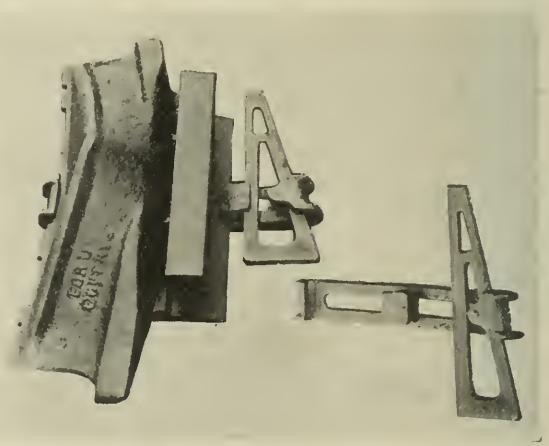
The Car Service Section in Circular CS-53 has issued the following instructions: When the terms of Division of Operation Circular 20 or Revisions thereof, movement of freight equipment to the home road is requested by proper mechanical department officer such equipment shall be promptly billed and moved to owners via direct routes. The full routing, including junctions, must be shown, billing to carry the following notation: "Billed via short route. Authority Division of Operation Circular 20, revised, and Car Service Section Circular CS-53. Not to be diverted." The originating line will be held responsible for proper short routing via Federal controlled roads.

* * *

Director-General Hines has instructed the regional directors that a la carte dining car service may be resumed March 1, when it can be done without congestion in dining cars. Where table d'hote service is continued the price is to be $1.25 and the meals are to be worth the price.

An Attachment for Car Replacers

All operating men are familiar with the difficulties experienced in holding a car replacer in position while endeavoring to return derailed wheels to the track, and various means have been suggested for eliminating the necessity for spiking the replacer to the tie, as this is a



The Replacer Clamp in Position and Detached

rather difficult and time-consuming operation when attempted underneath a car. The photograph shows the latest development for overcoming this difficulty with a clamp to hold the replacer against the rail by means of a wedge. This device consists essentially of a long slotted bar with a grip on each end, a perpendicular one on one end to take hold of the replacer and a beveled one at the other end to engage the wedge. A movable block is free to slide back and forth in the slot and is used as a filler between the rail flange and the inner side of the wedge. A rivet passing through the large opening in the center of the wedge, keeps it from becoming detached and lost when not in use and offers no interference with the tightening or loosening of the wedge. This device is manufactured by the Reading Specialties Company, Reading, Pa.

Railway Business Association's Recommendations

Conditions for Transportation Progress—Centralization of Authority and Responsibility—Independent Railroads

THE COMMITTEE ON RAILWAYS AFTER THE WAR of the Railway Business Association, of which W. W. Salmon, president of the Railway Signal Company, is chairman, has filed with the Committee on Interstate Commerce of the United States Senate a statement of which the following is an abstract:

The part which our industry performs in the national economy is to furnish the physical facilities with which transportation is carried on. We look with disfavor upon any project for a transportation system which would end American leadership in mechanical progress in this field. One of the conditions of such progress is that the discoverer, the inventor, or developer of improvements, no matter how poor or obscure, may carry his device, project or system from one railway to another until he finds a road willing to make a test of it.

This essential condition becomes less favorable as the number of railways decreases and would actually or in effect be a single system in which design, specification and purchase are centralized, since the discoverer or developer whose plea for trial is rejected by the one man or the one board representing such a unified railway system would have none other to whom or to which he could go. It is well to remember that certain of the discoveries and inventions which have contributed most vitally to the economy and safety of railway operation have been refused a trial by leading personages in transportation history.

The above observations apply also to commodities now more or less generally used and to staples not patented. Quality of output and of service improves if new concerns coming into the field can make a place for themselves by demonstration of some kind of superiority over the older companies. The selection of goods and of dealers is an administrative act, an exercise of judgment, in which able and honest men may and do differ. It is therefore in the public interest that the rejection of tenders by one road shall not close the door and that if rejected by one road there may be many roads to which a maker or dealer may go until one is found willing to give him a trial in the course of which he may demonstrate the quality and the character which in time will attract buyers who at first were indifferent and hostile.

Standardization

It is common to inquire whether the standard locomotive or the standard car produced under government control is a good locomotive or a good car. It is also frequently asked whether it was wise or unwise for the railroad administration to attempt standardization under the conditions as they existed. From our point of view these are past questions which all concerned can well afford to ignore. The problem which should seriously concern us is the future. Whatever merits the standard locomotive and the standard car may have, these vehicles are made up of ingredients which were developed under a system of independent competing railroads. There is nothing to indicate that under unified purchase mechanical progress would continue. It is our judgment that it would not. We believe that if standardization had been adopted 10 or 15 years ago the standard locomotive of today or one as good could not have been constructed. We are convinced further that if central standards should be adopted now either under government control or through co-operation among railroads, 10 or 15 years from now the locomotive of that day will be little if any in advance of what we have now.

One of the conditions under which manufacturers of equipment can best perform the service which the public rightfully expects of us is that in whatever adjustment Congress adopts the individual railroad shall remain clothed with full discretion as to design, specification and purchase, and that there shall be as little consolidation of lines as may be consistent with the financial strength and stability of the several roads.

Government Leases for Operation

In advocating the preservation of numerous independent railway organizations we would lay stress upon the word "independent." Various recommendations are under public discussion which, in our judgment, would tend to defeat such independence.

One of those recommendations is that while leasing railroads to private operating companies the government should own the properties.

As furnishers of railway necessaries, we assure you of our conviction that dealing with a railroad owned by the government would be dealing with the government, even though the government were to go through the form of delegating operation to a company nominally private. We would expect production of equipment to be centralized in due course. We would look upon such an arrangement as the beginning of the end of mechanical progress, and as the signal that inventors and developers of invention had better seek other occupations.

Government Guarantee

Another recommendation which is before you is government guarantee.

Guarantee, like ownership, portends government directors on railroad boards. The guarantor as well as the owner has a stake in supervision over expenditures. The hour when you sanction government guarantees, that hour you place the hand of government on the management and give every employee an occupational interest in elections.

Strong and Weak Road

Another recommendation from which we apprehend injury to the railway system and to the public is that excess income collected in a fund for improvements upon weak roads should be administered by the Interstate Commerce Commission, or some other branch of the government. Here once more we would have the hand of the government in management.

This particular proposal aims to solve a problem which must be solved in any workable adjustment. That problem, as it has been defined in questions asked of witnesses, particularly by Senator Cummins, is the dilemma where a strong and a weak road serve common termini. They take the same rates. They serve points not common. One of them is so impoverished that an increase in rates sufficient for it to give reasonably adequate service would merely enrich the other road, which is giving reasonably satisfactory service on existing rates.

The question has been asked whether the credit of the weaker lines will ever be strengthened with consent of any government authority so long as the result would be the unnecessary enrichment of the stronger competing roads. The proposal is to establish a fund from excess income. This is in essence a proposal to mobilize railway credit and diffuse the surplus income of roads which have any over the traffic needs of populations at present ill served.

Our point is this: If such diffusion of surplus income is to be employed, Congress should exhaust every other expedient before deciding that such a fund is to be administered by the

government itself. Can we not agree that any such arrangement should be under regulation? But if the government is to perform the function, who will do the regulating?

In this aspect the question is not dissimilar from the phases previously set forth in this brief.

Why not let or make the railroads themselves administer their own improvement fund? By a provision for co-operation among the corporations for this and perhaps for other purposes Congress would at a stroke rid the government of a cloud of embarrassments and complications. The simplest method, and the method growing most naturally out of experience, would be for the statute to lay down the duty which the common carriers are to perform in this particular and authorize some governmental agent to see that the law is carried out.

A broader question, of which the weak-and-strong-road problem is a part, is that of adequate revenue.

Many Millions Affected

"We have already remarked that concerns the whole or a large part of whose product was for railways, including everything from raw material to finished products, have employed about as many men as the railways employ—or upwards of one million and three-quarters. We have seen that those looking to these industries for livelihood largely increased in number since that estimate was computed. With those dependent upon them the number directly affected aggregates many millions. Add to these the people of the manufacturing communities who are engaged in trade and in making articles which are bought for consumption by those on the industrial payroll, not to mention the stockholders in all these industrial and commercial institutions, and it is evident that the rise and fall of activity in railway supplies is a barometer of the whole national prosperity."

The occasion for addressing this communication to the Director General was that unemployment has been rapidly spreading in our industry and apparently the proposed expenditure for additions and betterments in 1919 was to be very much less in what the dollars would buy and in the employment which those dollars would give to working men than actual outlays of previous years when enlargement of railway plant had been regarded as woefully insufficient. That particular question is before the Appropriation Committees of the Congress.

Facilities at Highest Cost

Provision of facilities by fits and starts is the most expensive possible process. By that process a very much larger amount of plant and size of organization in the railway supply industries is required than if the production could be equalized through all the years of every decade. Somebody has to pay for the idle weeks. Who is it that pays? On the one hand the public, either in rates unnecessarily high or in service unnecessarily poor. On the other hand our employees pay in a loss of working days which is never more than partly made up in the wage-scale and in demoralization which is never made up.

By deferring orders for equipment and improvements to a time when traffic is becoming large and earnings are on the mend, the railways enter the market at the one time when everything they buy will be at top prices. To spread the production equally over the years would make it possible to do business with a smaller industrial plant and would mean the acquirement of the facilities at a lower average price.

The provision of transportation facilities could be carried on more advantageously to all concerned if the railway companies were placed in position such that when traffic is large they may accumulate a surplus and in time of light traffic employ such surplus in the confidence that the rate and revenue policy of the government will be adequate and stable through an indefinite future.

To us it has long been obvious that regulation affecting revenue must be unified. Our resolution on this point is as follows:

Exclusive Federal Rate Regulation

"We favor the adoption by Congress of a policy under which regulation of maximum and minimum rates of carriers engaged in interstate commerce would be federal only."

This resolution involves two changes in the existing situation. It proposes that the regulatory authority shall have power to order rates raised, which is not now a power granted under the Interstate Commerce Act. The other feature is that Congress shall formally announce its supremacy over all rates of all instrumentalities of interstate commerce.

Congress, we believe, should not alone declare rate regulation federal only, but should define the aim of federal rate regulation so as to include the development of transportation facilities and create such administrative functionaries as will assure the accomplishment of that purpose.

Those for whom I speak advocate the creation of some functionary other than the Interstate Commerce Commission for the task of restoring railway credit. The committee of which I am chairman, not having been in the confidence of the railway executives, put into type for consideration of our general executive committee a questionnaire to be sent to the railway supply industry. One of the propositions upon which the recipient could vote yes or no was as follows:

"Congress should adopt a policy of federal rate regulation under which a separate functionary would consider carriers' estimates of future railway traffic needs and, subject to abatement of discriminations by the Interstate Commerce Commission, would fix rates designed to yield revenue sufficient for future operations and credit."

At a meeting when this document was considered it became known that a similar idea was contained in the plan at that time, December 18, in process of concurrence by the railway executives. Our questionnaire went out as originally drawn, and upon the proposition above quoted those replying cast 280 votes in favor and 6 against.

When the results of this questionnaire and the details of the railway executives' plan were before us at our annual meeting in Chicago in January, it was decided to adopt in our tentative draft of suggestions to Congress the expression, "Secretary of Transportation."

Even if the function of promoting transportation development were one which could be effectively performed by a commission, this particular commission was born and bred to another type of task. If men of the requisite calibre could be found willing to accept a one-ninth part of the power so to serve the public it might take years before men chosen for development instead of restriction would come into control unless a ripper bill were passed. But how many men in the United States who have demonstrated executive capacity would accept appointment in what is virtually an appointment to attempt executive accomplishment through an agency which by its composition is adapted rather to deliberation than to action.

The new functionary proposed by us would be expected, as set forth in the resolution adopted by our association, "to consider carriers' estimates of future expenditures, including labor costs; to exercise exclusive supervision over security issues and to fix rates designed to yield revenue sufficient for future operations and credit."

The International & Great Northern will move its general offices from Houston, Texas, to Palestine on May 1. Arrangements are now being made for office and housing facilities at Palestine.

General News Department

Views of business men on the relation of the government o the railroads, as gathered by the New York Evening Post, ontinue uniformly to show opposition to government own- rship or operation. At St. Paul, the correspondent finds ommercial interests "thoroughly alarmed over the state of ffairs in the transportation world."

Coal loading for the week ending January 25 amounted to 95,529 cars, as compared with 222,582 for the corresponding veek of 1918. Loading for the following week is estimated at 78,641 cars, as compared with 207,499. Grain loading for the ive weeks ending February 1 amounted to 119,871 cars, as com- ared with 97,033 for the corresponding period of 1918.

Three long established coastwise steamship lines have been liscontinued, the reason given being inefficiency of labor nd high cost of operation. These lines are the Clyde Line, New York to Wilmington; the Clyde Line between Phila- lelphia and Norfolk, which has been in business half a cen- ury, and the Mallory Line between New York and Mobile.

The sailing day plan, which was introduced in Chicago some ime ago to apply on l. c. l. traffic to destinations on western ines, will be extended next month to include all eastern lines s well. The plan not only includes the movement of mer- handise on specific shipping days, but also the consolidation f business over certain lines for designated destinations to se- ure full car loads.

Curtailment of expenses, in all departments where curtail- nent is practicable, is reported as having been ordered by he railroads in the anthracite coal region and also on the ennsylvania Railroad at Altoona. Shipments of anthracite re now only about one-half the regular movement a few veeks ago. At Altoona considerable numbers of shopmen vere notified that their services would no longer be required.

The Engineering Experiment Station of the University of llinois, Urbana, Ill., announces that eight research graduate ssistantships will be open to graduates of approved Ameri- an and foreign universities and technical schools at the con- lusion of the current academic year. These positions carry n annual stipend of $500 and freedom from all fees except he matriculation and diploma fees. Applications will be eceived until March 1.

The bill for leasing coal, oil, gas, etc., deposits on the public omain, as reported to Congress by the conference committee n February 11, includes a provision that no railroad or other ommon carrier shall be permitted to take, or acquire hrough lease or permit, under the act, any coal lands or eposits of coal in excess of such area or quantity as may be equired and used solely for its own use; and may be per- nitted to take, under the provisions of the bill, not to exceed ne lease for each 200 miles of its line.

Protests against the dismissal of women employed as heckers in the parcel rooms of the Union Station at Wash- ngton have been made by the Women's Trade Union League n a statement filed with the director general, which indicated belief that a general order for the dismissal of women orkers had been issued. At the office of the Railroad Ad- inistration it was explained, however, that the women had een removed from the baggage work because the work was oo heavy for them, on the strength of a report made by in- pectors of the Women's Service Section.

The American Railway Engineering Association has cre- ted a committee on standardization whose function will be to o-operate with the other committees of the association in lacing the recommendations of the association in effect on the ailroads and among the manufacturers of engineering and main- enance equipment. The personnel of the committee consists n the main of the chairmen of those committees of the asso- iation which are interested in the preparation of standards.

The conferees appointed to reconcile the differences between the bills as passed by the House and the Senate to validate the "informal" war contracts for munitions and supplies have reported an agreement eliminating the section proposed by the Senate which was seriously objected to by the repre- sentatives of the manufacturers because it provided for a review of settlements made by the War Department by rep- resentatives of the Department of Justice. This provision the manufacturers feared would result in interminable delays.

Alaska railroads need an additional appropriation of $13,- 800,000 to carry them to completion; and this sum has been asked of Congress by Secretary Lane of the Department of the Interior. This includes $4,000,000 of the $35,000,000 originally estimated as the cost of the construction of the road, and a deficiency appropriation of $9,800,000, representing the unex- pected increase in the cost of labor and materials. It is now estimated that the road can be finished for $44,800,000 in three seasons more of work.

Ohio Mine Workers, declaring that the representatives of the Railroad Administration are using every possible effort to reduce the price of railroad coal to less than the price set by the President for the duration of the war, have sent a resolution to Congress, and it was presented in the House on February 6 by Representative Sherwood. The resolution declares that if the policy of reducing the price of railroad coal is adopted it will cause many of the mines to close. The miners ask the authorities at Washington to insist that the railroads pay the price fixed by the government.

"No-Accident Week" in the Southern Region

The campaign on the railroads of the Southern Region which was begun by the safety supervisors of the roads in that region with a view to seeing how low the list of deaths and injuries of employees could be carried for a single week, January 19-25, resulted in a record showing three employees killed and 85 in- jured, as compared with ten killed, and 394 injured in the cor- responding week of 1918.

This movement, as was noted in the *Railway Age* of January 17, page 186, was ordered by the regional director in emulation of the "no accident week" on the Central of Georgia in De- cember, when, among the 9,000 employees of that road, none were killed and only one was injured, and that very slightly.

Of the fifty railroads participating in the regional campaign, 32 show safety records of 100 per cent. Eight reported only one injury and only four reported over ten each. Of all the 85 persons injured, only four cases have been reported as "serious." Four-fifths of the accidents are classed as "avoidable."

Of the 230,000 employees on the roads in the Southern Region about 90 per cent signed the pledge to do their best to make no-accident week a success. However, the one road, a small one, which had the lowest percentage of signatures to pledges, reported 100 per cent safety for the week.

Classifying the roads according to the proportion of injuries to employees to the total number of persons in service, the road standing at the head of the list is the Nashville, Chattanooga & St. Louis; one employee injured to 10,356 in service. Of the other five roads employing more than 10,000 persons each, the standing is as follows: Illinois Central, one in 4,400; Southern Railroad, one in 3,412; Louisville & Nashville, one in 2,908; Atlantic Coast Line, one in 1,874; Seaboard Air Line, one in 1,486. The roads reporting fatal accidents were the Atlantic Coast Line, the Southern and the Blue Ridge, one each.

Chamber of Commerce Transportation Conference

The transportation conference called by the Railroad Commit- tee of the Chamber of Commerce of the United States, held its second meeting at Washington on February 13.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER, 1918

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Alabama Great Southern	312	$653,717	$209,836	$915,859	$58,347	$266,802	$5,835	$394,280	$1,504	$743,597	81.19	$172,263	$32,651	$139,591	43,358
Alabama & Vicksburg	141	187,323	64,790	262,609	34,323	62,092	1,714	118,286	8,316	227,234	86.52	35,375	15,917	19,439	—37,023
Ann Arbor	301	294,363	56,790	370,169	56,908	76,749	350	164,531	9,348	308,052	8,321	62,117	131,000	48,869	39,306
Arizona Eastern	398	326,794	44,530	393,432	70,918	26,145	1,793	122,004	—2,062	77,204	19.57	316,229	6,657	309,496	156,931
Atchison, Topeka & Santa Fe	8,629	9,917,029	3,218,068	13,997,069	542,229	4,690,384	127,517	6,372,303	250,948	11,933,712	85.26	2,063,296	578,898	1,481,647	—1,873,574
Atlanta & West Point	43	144,009	103,631	265,304	20,866	46,565	2,131	101,510	9,555	174,664	65.82	90,640	1,266	89,372	74,553
Atlanta, Birmingham & Atlantic	639	340,051	161,821	469,176	101,986	126,289	5,818	278,645	12,986	526,285	112.17	—57,109	22,082	—79,398	—126,279
Atlantic & St. Lawrence	Included in Grand Trunk Western.														
Atlantic City	170	179,746	113,135	308,661	47,233	32,692	308	170,125	2,017	252,459	81.78	56,222	16,695	39,527	60,648
Atlantic Coast Line	4,840	3,460,417	1,699,995	5,619,882	908,628	948,154	43,829	2,196,167	103,298	4,221,838	75.12	1,398,045	200,000	1,197,279	—837,749
Baltimore & Ohio	5,145	10,880,807	3,024,911	15,358,812	3,044,273	3,856,034	130,003	1,507,031	407,085	15,014,641	97.75	344,171	337,867	5,122	—1,384,136
Baltimore & Ohio Chicago Terminal	91	.....	9	116,060	43,181	64,172	803	152,411	5,672	270,862	233.38	—154,807	31,876	—186,684	—121,647
Baltimore, Chesapeake & Atlantic	87	86,104	46,410	135,134	15,427	61,394	986	78,060	4,359	160,225	118.56	—25,091	4,800	—29,891	—7,464
Bangor & Aroostook	632	337,006	77,210	437,617	65,215	83,883	3,245	242,676	7,859	405,567	92.67	32,049	18,333	13,681	—42,531
Beaumont & Sour Lake	118	69,597	24,773	98,865	21,981	22,393	527	31,539	3,753	80,232	81.15	18,633	10,901	7,734	—37,945
Belt Ry. Co. of Chicago	31	.....	.....	304,799	35,698	45,698	571	204,441	8,316	294,496	96.61	10,304	16,443	6,139	—3,684
Bessemer & Lake Erie	208	779,431	37,778	862,812	31,361	284,360	7,494	367,115	19,798	740,710	81.21	162,102	11,440	150,662	240,202
Birmingham Southern	27	68,282	.....	83,312	5,461	8,565	711	70,726	5,230	88,692	106.45	—5,380	36,885	—42,266	—43,490
Boston & Maine	2,258	3,226,791	1,649,639	5,734,750	1,522,387	1,764,608	49,325	4,035,546	168,314	7,572,145	132.03	—1,837,394	253,014	—2,090,531	—2,220,053
Buffalo & Susquehanna R. R. Corp.	297	178,399	7,690	189,868	47,842	91,692	2,387	73,986	10,086	225,994	119.03	—36,126	2,320	—33,806	—61,693
Buffalo, Rochester & Pittsburgh	587	1,434,902	130,711	1,606,733	321,075	529,892	13,452	665,666	37,843	1,570,365	97.73	36,368	503	35,761	—101,953
Canadian Pacific Lines in Maine	233	261,586	43,425	318,436	41,983	91,100	1,664	219,059	3,661	357,468	112.25	—39,043	21,452	—60,495	—27,743
Carolina, Clinchfield & Ohio	282	437,276	34,870	494,763	78,316	106,825	3,943	162,302	12,335	363,685	73.51	131,079	32,701	98,378	50,137
Central of New Jersey	684	2,648,173	631,373	3,559,887	575,926	1,139,473	30,705	2,134,704	98,558	3,991,212	112.11	—431,322	16	—447,758	91,273
Central New England	301	442,511	24,993	507,837	107,384	76,113	2,157	271,951	20,315	484,759	95.45	23,078	—7,330	32,389	—54,973
Central Vermont	411	329,131	76,286	453,097	84,796	257,711	5,053	578,908	16,852	743,692	164.13	—290,595	7,936	—298,533	—313,313
Charleston & Western Carolina	343	225,570	81,887	219,894	28,863	30,099	4,259	131,807	5,756	206,784	94.03	119,027	9,000	110,027	—19,008
Chesapeake & Ohio Lines	2,484	5,257,484	1,412,992	7,089,616	981,245	1,384,959	31,169	2,416,331	105,803	4,945,603	69.75	2,144,013	175,000	1,968,543	575,051
Chicago & Alton	1,050	1,559,066	482,172	2,156,517	452,241	560,972	15,088	1,038,270	40,692	2,128,585	98.70	37,932	54,459	—16,646	—85,413
Chicago & Eastern Illinois	1,181	1,646,251	406,666	2,225,996	466,757	919,858	4,719	1,028,764	48,903	2,501,276	112.36	—275,280	79,542	—354,943	—553,685
Chicago & Erie	269	902,330	119,754	1,137,353	237,310	167,860	12,142	565,523	26,255	1,011,843	88.95	125,576	—29,151	154,661	85,576
Chicago & Northwestern	8,090	6,853,559	2,510,127	10,676,199	2,136,246	2,774,680	59,601	6,435,044	249,778	11,760,601	110.15	—1,084,402	567,481	—1,652,784	—3,455,905
Chicago, Burlington & Quincy	9,373	9,350,334	2,358,364	12,639,318	2,057,550	2,735,150	84,347	5,681,482	307,435	10,463,977	82.78	2,175,342	95,729	2,063,255	—2,213,298
Chicago, Detroit & Can. Grd. Trk. Jct.	Included in Grand Trunk Western.														
Chicago Great Western	1,496	1,137,109	412,656	1,685,460	278,642	481,937	24,683	930,237	44,466	1,772,432	105.16	—86,872	61,058	—148,376	—449,820
Chicago, Indianapolis & Louisville	6,570	702,845	247,926	1,045,275	151,606	299,843	12,756	427,119	23,817	914,481	87.48	130,795	45,650	85,145	—15,854
Chicago Junction	12	.....	.....	339,178	69,530	53,848	289	268,726	6,381	398,775	117.57	—59,595	6,141	—65,736	—71,277
Chicago, Milwaukee & St. Paul	10,272	9,333,877	1,988,644	12,334,545	3,344,170	2,938,653	99,548	5,866,057	283,811	12,550,003	101.74	—215,458	514,640	—730,323	—1,791,048
Chicago, Peoria & St. Louis	242	124,755	25,620	159,283	79,008	75,719	3,510	132,590	13,903	304,730	191.31	—145,447	7,400	—152,847	—131,013
Chicago, Rock Island & Gulf	474	254,429	79,762	354,541	79,851	97,483	6,107	163,566	12,041	360,105	101.57	—5,564	5,929	—12,581	—106,293
Chicago, Rock Island & Pacific	7,729	5,585,400	2,287,587	8,423,885	1,689,974	2,556,362	73,256	4,111,423	179,002	8,653,167	102.72	—229,283	457,614	—687,630	—2,451,464
Chicago, St. Paul, Minn. & Omaha	1,789	1,528,776	567,030	2,245,995	334,970	402,543	18,173	1,138,853	55,055	1,960,500	87.31	285,095	90,866	193,501	—6,084
Chicago, Terre Haute & Southeastern	374	355,537	23,595	386,493	85,358	149,634	6,127	152,197	9,226	404,446	104.64	—17,952	14,500	—32,457	—105,777
Cincinnati, Indianapolis & Western	321	191,613	46,302	268,713	71,543	84,900	4,903	123,063	11,150	296,128	110.20	—27,415	10,868	—38,284	—33,269
Cincinnati, New Orleans & Tex. Pacific	337	1,005,347	466,505	1,554,886	108,267	529,554	9,611	552,943	30,764	1,229,769	79.09	325,117	80,520	244,155	233,436
Cincinnati Northern	251	244,260	16,860	266,795	35,589	70,083	2,193	109,546	5,644	223,054	83.60	43,741	9,439	34,298	—20,106
Cleveland, Cincinnati, Chic. & St. Louis	2,395	4,296,336	1,432,663	6,310,415	742,396	1,294,489	63,344	7,681,681	114,374	4,932,706	78.16	1,377,710	241,103	1,135,877	233,123
Coal & Coke	Included in Baltimore & Ohio.														
Colorado & Southern	1,100	1,160,001	134,150	1,376,711	132,950	264,225	6,535	430,232	34,936	874,989	63.55	501,722	47,000	454,578	125,120
Colorado & Wyoming	42	22,356	924	90,736	8,748	3,891	133	47,625	3,951	64,349	70.92	26,388	4,500	21,888	2,876
Cripple Creek & Colorado Springs	116	63,394	5,849	72,017	2,334	5,605	873	25,552	2,324	36,649	50.88	35,369	6,925	28,441	—12,524
Cumberland Valley	163	493,214	81,464	596,025	72,054	102,978	7,375	202,459	13,666	399,722	67.06	196,305	15,663	180,639	—3,937
Delaware & Hudson Co. R. R. Dept.	902	2,278,828	183,881	2,601,704	381,841	867,731	16,248	1,335,001	86,766	2,722,072	104.63	—120,368	58,616	—178,984	—171,930
Delaware, Lackawanna & Western	955	4,379,726	1,019,426	6,009,723	721,606	1,299,065	46,666	2,610,665	106,836	4,831,818	80.40	1,177,905	359,947	817,955	763,248
Denver & Rio Grande	2,651	2,376,678	342,605	2,869,532	508,040	753,086	14,176	1,086,499	62,197	2,955,559	102.99	—413,973	62,000	351,868	41,694
Denver & Salt Lake	255	39,003	15,582	61,859	80,607	68,022	691	73,888	3,292	226,501	136.61	—164,642	9,000	173,645	—137,137
Detroit & Mackinac	381	120,288	31,357	159,841	21,199	38,305	625	38,871	2,244	141,245	88.36	18,395	10,341	8,255	—1,612
Detroit & Toledo Shore Line	61	196,495	.....	204,228	17,676	6,659	358	63,747	2,352	90,032	44.08	114,198	7,157	107,060	45,258
Detroit, Grand Haven & Milwaukee	Included in Grand Trunk Western.														
Detroit, Toledo & Ironton	457	287,476	14,116	322,594	72,533	109,454	2,198	195,887	11,385	390,603	121.08	—68,010	5,400	—73,410	—1,043
Duluth & Iron Range	292	82,336	23,756	119,151	59,391	100,737	402	138,527	15,972	313,178	262.84	—194,026	6,117	—200,312	—7,091
Duluth, Missabe & Northern	410	166,886	44,322	242,145	142,146	143,077	2,823	163,998	20,953	474,350	17,577	—231,905	17,151	—249,057	—89,180
Duluth, South Shore & Atlantic	601	231,015	84,814	332,958	95,134	71,110	4,286	185,212	8,576	368,531	110.91	—35,574	5,652	—46,934	—43,284
Duluth, Winnipeg & Pacific	175	119,828	23,573	147,986	23,493	23,858	2,483	72,169	6,032	127,815	86.36	26,170	8,633	11,537	14,335
East St. Louis Connecting Ry	3	.....	.....	80,347	6,203	13,430	180	80,992	2,565	103,371	128.65	—23,024	2,000	—25,024	15,138
El Paso & Southwestern Co	1,027	977,887	156,310	1,222,273	132,173	220,877	9,521	344,389	21,997	720,442	58.94	501,831	258,885	242,946	—170,342
Elgin, Joliet & Eastern	809	1,705,669	.....	2,037,562	121,932	421,612	6,380	762,298	30,232	1,342,503	65.88	695,059	40,556	654,503	253,334
Erie	1,987	6,224,505	1,085,383	8,176,460	577,403	2,647,024	51,717	4,843,085	176,823	8,322,919	101.79	—146,519	121,969	—269,955	236,775
Florida East Coast	765	451,274	282,647	84,685	121,002	170,091	6,724	381,442	17,614	703,670	8,309	118,015	23,522	94,464	—81,953
Ft. Smith & Western R. R. Co.	253	84,452	30,011	171,660	13,719	29,400	3,479	46,114	6,499	99,437	57.92	22,223	2,816	19,089	—21,674

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER, 1918 (CONTINUED)

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of—									
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.				
Fort Worth & Denver City	454	$565,869	$177,522	$800,144	$86,451	$120,382	$1,573	$297,821	$22,625	$530,775	66.33	$269,369	$2,196	$267,166	$77,259
Ft. Worth & Rio Grande	235	48,679	39,830	100,059	21,781	23,374	426	51,407	1,272	98,260	98.20	1,799	2,579	—783	—13,635
Fonda, Johnstown & Gloversville, R. R. Co.	88	29,609	64,585	99,157	11,384	8,675	598	58,741	— 13,308	66,091	66.65	33,065	322	29,843	—3,724
Galveston, Harrisburgh & San Antonio..	1,382	1,212,520	547,140	1,850,416	250,439	361,718	8,116	709,722	530,587	1,352,290	73.13	497,126	3,823	490,673	—711,382
Galveston Wharf	13	.....	.....	111,715	11,325	1,761	134	28,912	1,093	59,332	53.11	52,383	5,128	47,255	5,117
Georgia	328	376,183	222,877	637,529	61,079	85,927	8,303	296,506	15,778	465,754	73.05	171,774	5,950	165,796	—15,328
Georgia, Southern & Florida	402	239,386	149,880	421,573	71,041	80,152	4,105	161,345	9,919	327,803	77.75	93,770	19,299	74,409	13,690
Grand Rapids & Indiana	569	369,973	140,187	558,607	73,206	156,984	10,079	349,669	21,870	612,905	109.72	—54,297	12,128	—66,425	—238,148
Grand Trunk Western	1,002	1,640,605	347,002	2,211,029	234,308	128,777	9,248	801,171	49,611	1,228,772	55.57	982,257	18,748	963,506	718,125
Great Northern	8,257	7,718,128	1,764,763	9,848,200	1,786,868	3,864,421	35,265	4,397,915	161,306	10,249,534	103.98	—397,234	51,237	—448,933	—1,609,091
Gulf & Ship Island	307	112,439	52,743	182,480	54,133	37,637	4,734	95,756	9,014	201,821	110.59	—19,341	21,924	—41,282	56,356
Gulf, Colorado & Santa Fe	1,917	920,953	411,086	1,430,498	376,319	453,910	10,833	864,468	46,013	1,745,847	122.04	—315,349	87,339	—403,200	—739,922
Gulf, Mobile & Northern	464	159,928	48,365	219,352	53,097	62,711	6,051	109,416	10,703	241,953	110.30	—22,601	16,408	—39,017	—17,381
Hocking Valley	350	558,668	97,177	699,244	124,259	296,291	5,270	348,799	20,926	795,113	113.71	—95,869	85,635	—10,234	—13,890
Houston, East & West Texas	190	127,265	59,473	196,528	52,297	35,602	670	82,867	4,991	176,426	89.77	20,102	3,113	16,908	—61,235
Houston & Texas Central	887	939,465	210,367	801,059	143,892	62,999	3,464	289,331	17,520	509,180	63.56	291,894	15,656	275,981	—176,260
Illinois Central	4,782	6,334,742	2,086,243	9,130,043	1,631,886	3,321,638	67,919	4,056,427	225,516	9,366,754	102.59	—236,711	346,922	—584,368	—2,093,283
Indiana Harbor Belt	116	.....	.....	529,779	153,920	125,424	1,930	556,213	14,653	652,114	123.09	—122,335	11,589	—133,967	—24,179
International & Great Northern	115	757,276	291,577	1,178,349	274,237	341,734	9,324	534,843	40,160	1,202,831	102.07	—24,482	60,000	—84,484	—487,939
Kanawha & Michigan	177	300,715	99,971	423,367	23,742	130,089	1,853	164,162	12,027	331,874	78.38	91,493	8,260	83,234	26,742
Kansas City, Mexico & Orient	465	60,892	10,935	77,132	41,663	42,699	1,248	62,658	7,899	156,168	202.47	—79,036	9,031	—98,068	—95,176
Kansas City, Mexico & Orient of Texas	272	53,890	10,960	69,824	32,397	39,617	1,333	60,350	7,872	141,569	202.75	—71,745	4,286	—76,032	—76,234
Kansas City Southern	774	989,150	241,960	1,387,027	275,835	396,328	6,565	615,804	266	1,291,780	93.13	95,248	67,326	27,863	—288,919
Kansas City Terminal Co	24	.....	.....	108,877	22,335	35,101	.....	56,081	2,339	116,936	107.40	—8,059	6,624	—14,683	—81,277
Lake Erie & Western	900	675,730	59,217	773,021	133,743	247,668	11,981	430,124	24,047	845,742	109.40	—72,722	27,327	—106,687	223,592
Lehigh & Hudson River	96	361,289	4,133	372,252	31,287	45,248	1,298	110,280	6,209	194,323	52.20	177,929	6,000	171,977	146,274
Lehigh & New England	224	294,904	1,669	334,728	31,749	51,534	2,700	135,907	11,356	203,322	60.74	131,405	8,000	123,405	52,399
Lehigh Valley	1,436	4,044,686	512,024	5,894,043	807,940	1,716,847	46,302	2,863,851	94,229	5,541,788	94.02	352,255	98,062	253,933	108,742
Long Island	398	529,738	946,392	1,662,531	433,566	335,144	12,587	1,018,543	46,791	1,863,972	112.11	—203,442	81,281	—284,770	—308,740
Los Angeles & Salt Lake	1,168	884,271	291,866	1,269,545	209,033	308,974	190,080	479,818	29,731	1,080,353	85.09	189,191	40,939	149,972	243,890
Louisiana & Arkansas	302	96,560	43,923	146,072	49,622	27,084	3,110	70,522	5,333	155,678	106.57	—9,606	23,932	—33,605	—61,845
Louisiana Western	207	242,391	115,562	374,371	34,503	60,642	3,977	116,314	9,749	226,853	60.59	147,517	17,434	129,950	—68,202
Louisville & Nashville	4,996	6,620,429	2,540,032	9,644,401	1,605,579	2,020,072	110,474	3,899,851	171,680	7,836,273	81.25	1,808,179	507,286	1,300,084	—404,942
Louisville, Henderson & St. Louis	199	200,424	51,375	262,761	57,347	40,694	7,436	95,384	7,909	208,786	79.45	53,975	15,000	38,929	21,761
Maine Central	1,216	927,501	361,244	149,414	310,422	447,523	9,216	918,462	38,533	1,725,558	120.71	—296,145	70,444	—366,615	—421,062
Maryland, Delaware & Virginia	82	73,984	40,525	117,702	11,263	48,060	795	72,076	2,589	134,784	114.51	—17,082	2,319	—19,400	—12,956
Michigan Central	1,861	4,582,187	1,379,696	6,568,887	643,778	928,407	56,634	2,665,945	105,120	4,449,150	67.73	2,119,737	108,990	2,009,731	336,334
Midland Valley	387	237,516	75,587	323,540	69,457	56,457	1,438	136,834	18,601	280,807	86.79	42,732	6,179	36,500	5,430
Mineral Range	100	91,280	1,538	95,794	17,911	21,500	257	54,270	1,084	95,057	99.23	736	3,131	—2,395	4,738
Minneapolis & St. Louis	1,646	816,642	198,122	1,067,625	160,303	271,695	7,953	586,933	24,684	1,051,739	98.51	158,886	74,870	—59,086	—443,026
Minn. & International Ry. Co	195	32,431	25,007	68,697	11,869	18,726	842	40,669	3,834	75,941	110.54	—7,244	3,205	—10,479	—22,098
Minn., St. Paul & Sault Ste. Marie	4,243	3,148,842	527,841	3,905,178	328,309	634,901	21,329	15,144	57,700	2,558,830	65.52	1,346,349	193,339	1,152,973	795,836
Missouri & North Arkansas	365	90,985	31,058	131,189	47,996	36,687	872	57,644	5,368	148,568	113.24	—17,379	5,575	—23,164	—35,112
Missiuri, Kansas & Texas System	Does not file.														
Missouri, Okla. & Gulf	332	95,834	18,859	121,728	30,211	42,188	1,665	64,901	11,952	151,084	124.11	—29,356	4,527	—33,553	—53,736
Missouri, Okla. & Gulf of Tex	Does not file.														
Missouri Pacific	7,108	5,897,973	1,734,678	8,113,594	1,726,945	1,557,253	70,044	3,586,528	195,103	7,165,095	88.30	748,499	78,759	866,764	—549,863
Mobile & Ohio	991	1,035,144	238,933	1,541,075	154,679	454,292	24,675	591,609	—39,225	1,282,564	83.22	90,511	50,378	40,076	—132,495
Monongahela	108	260,680	24,316	292,821	88,821	31,211	617	129,117	6,189	255,955	87.41	36,866	13,475	23,391	—25,365
Monongahela Connecting	5	.....	.....	228,302	38,894	81,466	511	138,119	6,902	265,892	116.47	—35,590	13,425	—51,015	—170,896
Morgan's La. & Tex. R. R. & S. S. Co	400	631,601	162,956	841,009	124,254	121,254	6,009	330,515	15,738	590,784	70.24	241,225	32,956	208,241	—94,671
Nashville, Chattanooga & St. Louis	1,248	1,238,963	540,255	1,893,377	277,974	322,398	23,339	436,911	38,232	1,599,544	84.48	293,834	33,056	260,655	102,055
Nevada Northern	168	200,040	212,497	218,304	22,630	28,153	1,388	52,833	6,406	111,461	51.05	106,844	18,326	88,517	31,216
New Orleans & North Eastern	203	349,833	125,139	572,053	60,462	134,593	2,841	274,047	10,201	485,478	84.86	86,576	8,878	77,698	—95 311
Newburgh & South Shore R. R. Co	7	.....	45	134,837	29,699	8,186	.....	60,589	3,530	102,004	75.64	32,834	20,508	12,327	—106,396
New Orleans, Great Northern	284	92,661	54,462	156,966	39,903	52,968	4,231	111,550	9,828	218,981	139.51	—62,015	19,643	—81,658	119,319
New Orleans, Tex. & Mexico	191	53,613	38,543	97,734	33,773	44,077	812	52,398	5,288	138,338	141.54	—40,604	11,688	—52,296	—88,591
New York Central	6,079	17,701,568	6,239,824	27,382,879	3,471,941	5,628,392	285,517	11,640,523	632,563	22,039,489	80.45	5,352,389	257,610	5,094,301	—2,408,578
New York, Chicago & St. Louis	572	2,332,656	116,392	2,505,362	279,178	413,241	15,651	989,136	48,595	1,746,973	69.72	758,388	127,520	630,856	506,763
New York, New Haven & Hartford	1,992	4,016,704	3,567,048	8,608,151	1,088,578	2,153,302	42,345	5,142,647	326,752	8,857,978	129 02	—249,827	197,376	—448,953	—1,323,385
New York, Ontario & Western	568	525,232	107,894	823,999	169,050	314,486	5,953	492,392	20,823	1,002,705	121.68	—178,706	24,277	—202,983	—313,530
New York, Philadelphia & Norfolk	121	578,143	133,554	765.177	96,915	184,874	8,818	286,520	12,310	610,284	79.75	154,893	75,637	39,256	83,919
New York, Susquehanna & Western	135	218,229	60,113	337,629	9,487	83,842	1,729	252,855	6,853	354,763	105.07	—17,134	9,945	—27,096	16,054
Norfolk & Western	2,087	5,575,014	1,016,581	6,828.688	849,780	1,758,856	40,332	2,518.143	106.181	5,298,011	77.58	1,530,677	200.000	1,330,427	—176,448
Norfolk Southern	907	366,842	161,937	566,697	103,343	229,122	5,601	236,619	18,141	594,050	105.00	—27,352	20.000	—47,353	—146,681
Northern Pacific	6,501	8,089,255	1,333,780	10,066,392	1,086,175	1,873,612	56,921	3,738,620	156,184	6,969,626	69.24	3 096.766	347.089	2,749,354	904,357
Northwestern Pacific	507	243,260	149,130	434,304	141,882	56,910	21,691	221,348	13.042	440,237	101.36	—5,933	21,960	—27,894	—139,771
Oregon Short Line	2,347	2,400,403	459,135	3,046,862	475,714	515,232	14,167	1,616,273	98,506	2,171,528	71.27	875,334	292,750	582,410	—554.259
Oregon-Washington R. R. & Nav. Co	2,069	1:658.662	504,218	2,347,623	523,740	158,631	32,477	908,323	89,486	1,741.235	74.17	601,388	153,420	447,431	233,891
Panhandle & Santa Fe	772	305,689	83,761	412,254	93,427	175,848	2,902	267,814	13,213	552,346	133.98	—140,092	—4,462	—135.632	—230.650

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER, 1918 (CONTINUED)

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Pennsylvania Company	1,754	$6,649,154	$1,571,202	$8,954,611	$1,689,217	$2,435,298	$70,168	$4,217,795	$241,069	$8,707 064	97.23	$247,547	$269,864	—$22,322	—$347,750
Pennsylvania Railroad	5,403	23.567,970	8,123,091	34,245,328	6,684,977	9,511,213	216,674	16,196,442	747,534	33,891 378	98.96	353,950	979,302	—629,156	—2,641,095
Peoria & Pekin Union	19	35,413	6,735	122,602	30,546	42,648	302	104,119	4,679	182,293	148.68	—59,691	9,500	—65,191	—69,807
Pere Marquette	2,233	2,045,544	433,261	2,689,573	296,331	488,377	21,859	1,138,241	69,399	2,014,759	74.90	674,815	—78,959	703.667	303.213
Philadelphia & Reading	1,126	6,032,289	1,049,017	7,629,262	850,961	1,815,704	41,387	3,551,171	121,746	6,401,973	83.91	1,227,290	218,481	1,008,755	486,704
Pittsburgh & Lake Erie	224	2,316,003	216,912	2,762,004	344,807	872,195	19,595	1,004,978	45,152	2,287.217	82.81	474,787	71,377	403.374	57.731
Pittsburgh & W. Va	63	53,212	10,978	77,343	63.089	36,780	938	67,213	5,568	183,556	237.32	—106,213	15,905	—122,118	—215,035
Pittsburgh & Shawmut R. R	95	109,638	5,506	116,225	47,641	37,498	944	43,435	2.741	132,259	113.80	—16,034	—1,520	—14,514	—18,446
Pittsburgh, Cincinnati, Chic. & St. Louis.	2,387	4.752,679	1,907,377	7,336,472	1,249,967	2,357,191	43,428	3,874,382	88,921	7,684,311	104.74	—347,840	259,893	—607,892	1,038,896
Port Reading	21	214.889	.....	295,203	51,443	3,243	18	114,955	1,716	171,374	58.05	123,829	5,030	118,798	—18,776
Richmond, Fredericksburg & Potomac	87	340,828	347,693	741,875	38,676	81,537	5,238	236,460	11,183	374,977	50.54	366,938	14,496	352,481	—132.296
Rutland	415	170,740	122,722	340,659	75,120	118,835	7,585	188,034	13,228	402,819	118.24	—62,160	25,691	—87,865	—190.337
St. Joseph & Grand Island	258	134,121	33,915	183,524	73,884	31,668	2,186	146,277	11,163	269,630	146.93	—86,146	17,972	—104,119	—89.820
St. Louis, Brownsville & Mexico	548	275,948	105,336	407,424	77,334	73,584	1,431	125,320	13,708	291,378	71.52	116,045	14,574	101.432	—1,733
St. Louis Merchants Bridge Terminal	9	.....	2,166	250,284	33,610	14,283	769	226,096	4,316	279,076	111.50	—28,291	8,695	—37,487	—86,940
St. Louis-San Francisco	4,761	3,921,888	1,769,348	6,033,729	1,085,806	1,332,789	20,269	2,442,950	141,930	5,008,128	83.42	1,025,599	281,568	741,140	—268,143
St. Louis, San Francisco & Texas	134	70,249	10,591	93,936	15,440	18,861	1,527	57,459	1,475	94,762	100.87	—825	1,413	—2,245	26,023
St. Louis Southwestern	969	1,067,335	207,306	1,318,752	306,369	237,391	11,701	380,742	33,276	968,701	7.345	350,052	51,629	298,294	—169,394
St. Louis Southwestern of Texas	314	339,791	138,532	516,044	197,127	231,710	8,084	252,784	29,527	718,573	139.24	—202,530	35,834	—238,415	—425.965
San Antonio & Aransas Pass	732	244,477	101,193	369.984	90,388	62,803	5,294	185,517	18,270	362,093	97.86	7,892	16,554	—8,701	—96,010
Seaboard	3,563	2,066.433	1,241,762	3,609,185	593,842	1,027,213	55,406	1,270,681	90,402	3,540,514	98.09	68,671	176,894	—59,044	—598,977
South Buffalo	35	49,745	.....	125,584	27,626	17,738	308	74,885	2,760	123,319	48.19	2,266	17,103	—14,837	—21,157
Southern	6,983	6,737,697	3,291,513	10,727,373	1,038,536	2,124,699	101,993	651,403	279,906	8,272,808	77.11	2,454,566	315,897	2,132,669	—901,816
Southern in Mississippi	278	109,734	75,533	195,545	23,756	27,539	2,892	83,838	5,513	143,538	73.40	32.007	10,000	42,005	—30,331
Southern Pacific	7,050	9,453.016	3,474,477	13,961,660	2,311,924	3,857,166	92,942	5,477,873	327,751	12,284,753	87.98	1,676,906	640,641	1,035.634	—656,439
Spokane, International Ry. Co	156	77,748	19,252	98,701	10,177	8,515	1,428	29,659	4,130	53,327	54.02	45,374	13,059	32,314	—11,914
Spokane, Portland & Seattle	554	526,475	151,690	728,508	257,310	75,643	3,924	231,512	21,337	591,139	81.14	137,369	59,200	78,155	—97,063
Staten Island Rapid Transit Co	23	93.452	63,845	179,164	35,055	32,777	799	94,805	9,100	162,537	90.72	16,626	17,771	34,397	22,714
Tennessee Central	393	166,183	67,690	245,094	75,753	92,092	929	111,611	5,941	286,326	11,682	—41,232	5,450	—46,696	—63,404
Terminal R. R. Ass'n of St. Louis	36	.....	3,874	315,142	110,661	9,401	766	164,430	3,247	291,776	92.58	23,366	36,988	—13,622	—32,047
Texarkana & Ft. Smith	81	100,001	19,869	127,061	1,064	12,462	478	37,751	4,047	54,746	43.09	72,316	2,939	69,376	20.088
Texas & New Orleans	469	391.507	202,635	626,973	184,930	162,852	3,138	274,351	11,250	648.202	103.38	—21,230	16,328	—37,636	—237,951
Texas & Pacific	1,946	2,035,016	765,204	3,053.094	329,369	673,352	12,922	1,453,248	55,106	2,545,219	83.37	507,875	102,944	404,090	—606,333
Toledo & Ohio Central	435	864.225	73,941	975,780	103,202	239,949	3,606	398,193	14,856	762,193	78.11	213,586	33,739	179,848	181,831
Toledo, Peoria & Western	247	107,906	48,319	164,583	26,320	45,381	2,287	80,742	5,377	160,107	97.28	4,476	17,734	—13,258	10,951
Toledo, St. Louis & Western	454	658,248	41,114	738,051	117,319	131,679	4,016	259,267	8,385	520,642	70.54	217,409	26,000	197,409	178,346
Trinity & Brazos Valley	368	102,014	23,449	122,125	32,765	44,077	1,924	68,718	8,193	155,677	127.47	—33,552	2,199	—35,751	—37,939
Ulster & Delaware	128	23,631	13,138	55,862	17,621	17,827	1,355	42,532	3,647	83,436	149.36	—27,573	4,821	—32,451	—19,924
Union Pacific	3,614	6,468,879	1,534,164	8,732,532	1,196,630	1,730,712	38,727	2,791,554	224,685	6,311,126	72.27	2,244,407	346,259	2,074,344	—222,582
Union R. R. of Penna	35	.....	.....	646,765	53,017	140,545	603	324,697	9,586	528,447	81.78	117,718	2,910	113,807	262,016
Utah Ry.	98	118,709	423	120,096	13,465	28,506	150	19,669	5,722	67,514	56.22	52,582	2,882	49,700	36,311
Vicksburg, Shreveport & Pacific	171	211,977	102,225	323,799	48,199	70,101	2,825	132,802	7,572	264,457	81.67	59 741	26,417	33,320	—72,290
Virginian	518	753,568	62,301	887,349	192,953	300,192	4,975	505,007	20,100	1,027,591	115.80	—140,241	37,300	—177,541	—346,121
Wabash	2,519	3,247,001	832,148	4,556,981	686,326	702,106	43,421	2,191,277	102,113	3,742,156	82.11	814,826	95,594	719,015	110,166
Washington Southern	35	160,800	264,189	466,354	38,454	36,996	1,434	139,226	7,550	224,518	48.14	241,837	7,399	234,425	38 547
West Jersey & Seashore	359	357,800	380,609	791,112	397,480	148,578	6,548	521,779	23,102	1,101.242	139.20	—310,130	32,426	—342,564	245.689
Western Maryland	707	1,567,507	83,103	1,745,628	366,621	403,359	15,433	612,569	46,569	1,458.869	83.57	286,759	43,200	243,126	—159,362
Western Pacific	1,011	781,966	66,947	891,643	263,072	219,089	15,291	408,226	17,211	938,501	105.25	—46,858	103,661	—150,540	—428,990
Western Ry. of Alabama	133	136,930	96,998	245,165	19,661	53,165	2,127	99,899	6,784	184,598	75.29	60,567	6,737	53,830	—12,669
Wheeling & Lake Erie	511	824,023	51,322	951,456	192,944	276,473	6,165	487,262	24,118	989,139	103.96	—37,683	72,800	—110,523	—256,920
Yazoo & Mississippi Valley	1,282	1,703,820	604,524	2,398,801	316,474	596,008	15,141	863,964	50,744	1,846,728	76.98	552,074	123,257	428,773	—154,182

TWELVE MONTHS OF CALENDAR YEAR 1918

Alabama & Vicksburg	141	1,603,977	622,950	2,470,856	269,368	591,657	42,983	1,032,214	89,115	2,045,118	82.76	425,738	138,195	287,283	—210.915
Alabama Great Southern	312	6.371,191	2,356,194	9,296,635	734,759	2,323,722	147,681	367,941	172,742	7,103,515	76.40	2,193,120	264,596	1,925,413	—87,595
Ann Arbor	295	2,782,381	567,580	3,585,908	595,485	773,071	47,193	1,661,728	111,967	3,195,423	89.11	390,484	157,200	232,258	—364,230
Arizona Eastern	377	3,657,706	551,198	4,478,691	668,548	602,706	26,107	1,216,865	171,139	2,736.506	61.10	1,742,185	193,808	1,547,345	—373,276
Atchison, Topeka & Santa Fe	8,643	113,798,081	37,045,790	162,369.130	19,037,933	35,100,235	1,675,784	56,538,997	2,830,069	114,912,376	70.77	47,456,755	6,726,927	40,708,335	—4,684,340
Atlanta & West Point	93	1,252,802	1,041,403	2,548,440	254,172	456,332	40,742	867,069	78,832	1,730,355	67.89	818,085	93,566	724,444	329,931
Atlanta, Birmingham & Atlantic	639	3.524,660	850,546	4,703,381	1.065,892	1,253,009	96,176	2,470,841	151,849	5.038,455	107.12	—335,074	194,782	—530.894	—1,010,486
Atlantic City	170	1,892,728	2,138,080	4,252,270	435,051	449,165	13,158	1,987,833	14,934	2,901,005	68.22	1,351,264	144,495	1,206,769	478,139
Atlantic Coast Line	4,820	36,483,716	16,567,983	56,992,329	6.567,499	10,904,847	620,156	23,186,791	1,160,007	42,663.304	74.85	14,329,027	2,495,000	11,827,096	—186,646
Baltimore & Ohio	4,997	129.047,317	30,676,947	174,191,448	25,775,063	48,903,661	1,964,493	78,846,090	4,029,045	160,592,180	92.19	13,599,268	4,784,146	8,795,292	—17,316,776
Baltimore & Ohio Chicago Terminal	91	.....	4,888	1,761,486	320.062	636,336	12,851	1,605,175	102,358	2,699,703	153.26	—938,217	359,537	—1,297,866	—978,951
Baltimore, Chesapeake & Atlantic	87	903,773	478,406	1,436,440	132,551	407,107	13,863	838,009	37,404	1,428.935	99.47	7,505	37 927	—30,422	810.259
Bangor & Aroostook	632	3,795.890	813,036	4,863,223	791,357	1,162,521	45,925	3,038,997	147,064	4,239,517	87.18	623,706	213,418	410.066	—794,173
Beaumont & Sour Lake	118	1,019,530	345,147	1,417,974	217,640	215,029	15,934	464,828	49,185	962,635	67.89	455,338	32,901	422,384	79,894
Belt Ry. Co. of Chicago	31	.....	.....	3,899,765	413,402	789,390	4,607	2,476,300	91,511	3,775,409	96.81	124,356	197,075	—72,719	—932,009
Bessemer & Lake Erie	208	12,688,342	395,086	13,417,564	1,139,121	3,462,841	129,140	4,450,407	232,453	9,167,238	68.32	4,250,326	241,627	4,008,698	595,926
Birmingham Southern	27	1,167,152	10,383	1,397,254	106,868	252,010	10,979	598,530	46,374	1,014,762	72.62	382,492	95,121	287,371	287,861

REVENUES AND EXPENSES OF RAILWAYS

TWELVE MONTHS OF CALENDAR YEAR 1918 (CONTINUED)

Name of road.	Average mileage operated during period.	Operating revenues			Maintenance of		Operating expenses				Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Boston & Maine	7,258	$43,085,444	$19,048,390	$69,911,393	$10,018,497	$14,175,174	$480,808	$37,504,330	$436,924	$64,430,772	92.16	$5,480,621	$2,190,399	$3,290,098	—$6,928,399
Buffalo & Susquehanna R. R. Corp.	265	2,135,357	70,036	2,249,666	424,531	839,733	23,733	889,609	90,443	2,267,654	100.79	—17,988	42,780	—60,768	—384,432
Buffalo, Rochester & Pittsburgh	585	16,437,948	1,335,097	18,479,659	2,823,761	5,966,244	187,924	8,179,786	393,795	17,577,208	95.10	902,451	294,580	607,528	—2,063,737
Canadian Pacific Lines in Maine	233	1,945,843	293,153	2,409,261	546,289	581,854	28,949	1,507,053	34,436	2,697,159	111.94	—287,898	137,952	—423,850	—606,730
Carolina, Clinchfield & Ohio	282	4,302,163	415,593	4,811,231	656,521	1,168,483	94,115	1,557,081	152,294	3,625,561	75.35	1,185,670	175,501	990,165	—524,440
Central of New Jersey	684	33,387,854	7,753,316	44,790,671	4,068,182	10,419,020	301,724	20,458,641	901,641	36,369,271	38.36	8,421,400	1,899,983	6,516,526	—1,774,715
Central New England	301	5,494,741	296,947	6,063,156	1,171,535	1,062,351	20,617	2,998,462	125,352	5,401,887	89.09	661,269	186,470	474,519	—1,163,374
Central Vermont	411	3,799,680	847,285	5,188,837	819,180	1,323,477	89,611	3,187,154	159,638	5,588,538	107.70	—399,701	198,932	—598,802	—1,150,211
Charleston & Western Carolina	342	2,154,489	713,001	3,015,887	422,436	457,591	50,036	1,324,607	62,681	2,317,402	76.83	698,485	108,000	590,323	—172,994
Chesapeake & Ohio Lines	2,479	55,720,373	13,629,892	73,720,797	9,700,660	16,178,533	484,418	26,189,743	1,240,715	54,143,002	73.44	19,577,795	1,920,000	17,654,994	2,764,579
Chicago & Alton	1,050	17,849,857	5,567,436	24,358,662	3,522,418	5,996,530	316,522	10,238,655	490,251	20,677,429	84.87	3,681,233	713,002	2,965,623	—1,728,871
Chicago & Eastern Illinois	1,131	20,811,732	4,030,671	26,753,092	3,559,040	8,745,842	269,567	10,801,204	629,665	24,685,560	90.02	2,667,532	940,350	1,723,130	—2,055,082
Chicago & Erie	269	9,116,203	953,506	11,039,823	1,836,863	1,438,442	161,660	5,509,711	272,034	9,741,123	88.23	1,298,701	328,518	970,138	—855,525
Chicago & Northwestern	8,090	87,630,796	28,000,861	127,295,679	19,490,621	26,834,170	951,457	58,833,777	2,655,530	109,498,572	86.01	17,797,106	5,497,481	12,272,957	—12,177,981
Chicago, Burlington & Quincy	9,373	104,492,837	28,052,905	144,172,769	19,996,386	29,726,987	1,209,796	56,825,203	3,396,495	112,067,616	77.73	32,103,153	5,511,594	26,577,201	—11,194,846
Chicago Great Western	1,496	12,888,035	4,756,821	19,116,925	3,129,185	5,130,651	386,761	8,480,989	497,329	17,783,098	93.02	1,333,827	671,092	657,571	—2,543,520
Chicago, Indianapolis & Louisville	557	7,602,550	2,462,523	11,017,274	1,303,589	2,951,160	190,187	4,548,118	2,921,264	9,241,784	83.88	1,725,490	391,453	1,333,253	—932,496
Chicago Junction	12	.....	.....	3,435,784	626,723	543,805	6,844	2,529,566	85,157	3,792,094	110.38	—356,310	29,155	—385,464	—704,419
Chicago, Milwaukee & St. Paul	10,302	96,623,658	23,492,031	132,894,455	18,906,980	38,669,987	1,244,656	60,740,935	302,684	121,196,105	91.20	16,698,350	6,185,936	467,774	—18,035,779
Chicago, Peoria & St. Louis	247	1,763,212	265,161	2,147,466	425,157	784,931	44,301	1,197,682	89,092	2,541,164	118.33	—393,698	90,803	—484,501	—714,727
Chicago, Rock Island & Gulf	474	3,073,785	1,072,939	4,420,008	649,079	729,283	85,773	1,712,774	131,198	3,378,098	75.29	1,091,911	147,031	942,850	—211,514
Chicago, Rock Island & Pacific	7,794	66,112,432	26,818,294	99,869,557	14,750,856	24,782,395	1,177,790	42,643,829	2,245,883	86,098,574	86.21	13,770,982	4,302,863	9,458,589	—8,838,512
Chicago, St. Paul, Minn. and Omaha	1,749	16,897,813	6,238,807	24,829,981	3,056,376	5,056,102	247,973	11,720,793	636,587	20,884,199	84.10	3,945,782	1,288,404	2,651,913	—1,646,625
Chicago, Terre Haute & Southeastern	374	4,644,202	255,467	5,000,956	661,512	1,713,859	46,452	1,813,201	102,599	4,373,050	87.44	627,906	174,000	453,808	—262,937
Cincinnati, Indianapolis & Western	321	2,319,500	531,510	3,137,153	512,005	935,907	72,845	1,494,352	131,946	3,151,064	100.44	—13,911	123,917	—137,828	—520,951
Cincinnati, New Orleans & Tex. Pacific	337	10,340,639	4,158,650	15,478,642	1,394,508	4,662,350	204,715	5,490,054	302,313	12,604,040	81.42	2,874,602	500,020	2,373,374	—1,129,496
Cincinnati Northern	247	2,529,069	189,321	2,821,980	428,904	768,544	35,777	1,056,794	55,650	2,342,938	83.02	470,042	129,871	340,076	—238,857
Cleveland, Cincinnati, Chic. & St. Louis	2,392	49,934,633	15,359,128	71,403,970	7,298,040	13,894,337	882,576	28,229,455	1,201,871	51,895,289	72.67	19,508,682	3,538,917	15,962,011	3,025,012
Colorado & Southern	1,100	10,114,942	2,019,673	12,955,827	1,483,365	2,782,227	98,991	4,928,240	423,422	9,376,990	72.37	3,578,837	564,000	3,013,802	—599,823
Colorado & Wyoming	42	336,053	24,972	1,123,240	124,283	180,833	2,010	496,703	50,960	854,790	76.10	268,451	47,944	220,497	—181,262
Cripple Creek & Colorado Springs	116	791,225	113,402	927,306	80,722	115,540	11,752	310,745	34,516	553,276	59.66	374,030	86,984	287,031	—241,773
Cumberland Valley	163	4,801,725	749,152	5,917,543	567,875	900,600	65,135	2,029,151	141,397	3,710,506	62.70	2,207,037	116,522	2,089,873	—48,136
Delaware & Hudson Co. R. R. Dept.	902	30,104,926	2,804,056	34,789,864	3,737,523	9,536,063	254,673	16,556,675	1,052,963	31,353,784	90.12	3,436,080	848,987	2,585,426	—3,030,162
Delaware, Lackawanna & Western	955	50,297,399	11,204,813	68,740,076	5,552,541	13,337,602	664,088	28,613,367	1,219,107	49,925,685	72.62	18,814,392	2,941,212	15,853,906	—416,159
Denver & Rio Grande	2,611	24,634,502	4,922,280	31,357,214	4,635,701	8,040,802	264,345	11,260,010	701,392	25,293,475	80.67	6,058,739	1,197,000	4,858,526	—2,603,741
Denver & Salt Lake	255	1,676,857	302,327	2,055,509	760,922	845,184	11,456	1,222,468	49,528	2,889,559	140.57	—834,049	108,000	—942,062	—859,650
Detroit & Mackinac	381	1,128,353	325,347	1,550,034	273,426	437,374	26,521	687,756	63,383	1,488,458	96.02	68,576	99,785	—32,790	—212,524
Detroit & Toledo Shore Line	61	1,960,970	.....	1,999,026	149,937	222,436	17,154	663,120	45,589	1,097,306	54.89	901,720	129,038	772,673	—91,798
Detroit, Toledo & Ironton	459	3,070,617	145,201	3,413,341	724,676	1,010,432	45,418	1,875,434	140,036	3,795,141	111.18	—381,800	103,300	—485,270	—619,840
Duluth & Iron Range	285	8,517,290	232,475	8,978,930	1,163,395	1,134,257	8,548	2,279,849	160,532	4,744,742	52.84	4,234,188	514,477	3,719,004	1,186,229
Duluth, Missabe & Northern	411	20,214,748	443,550	21,545,271	1,902,945	1,722,262	34,255	3,788,755	492,886	7,957,433	36.93	13,587,838	1,339,765	12,248,073	4,969,724
Duluth, South Shore & Atlantic	601	3,806,934	1,012,275	4,824,187	991,643	748,106	77,026	2,288,096	108,218	4,263,021	88.36	561,166	223,923	337,209	—312,519
Duluth, Winnipeg & Pacific	175	1,400,222	266,469	1,712,066	258,925	287,120	33,634	828,140	75,138	1,485,093	86.74	226,674	96,359	130,307	—254,081
East St. Louis Connecting Ry.	3	.....	.....	1,118,382	142,381	247,563	3,503	874,685	46,993	1,315,530	117.62	—197,147	26,269	—223,418	—457,385
El Paso & Southwestern Co	1,028	11,785,974	2,334,758	14,790,468	1,416,320	2,471,400	155,628	4,165,189	348,947	8,629,020	58.34	6,161,448	1,210,901	4,950,259	—771,718
Elgin, Joliet & Eastern	806	17,708,548	128	20,685,049	1,772,775	5,028,666	80,903	7,555,016	302,242	14,785,277	71.47	5,899,772	599,057	5,300,713	1,104,549
Erie	1,989	67,683,701	11,689,243	87,855,461	10,775,540	28,462,305	845,099	45,030,329	2,085,419	87,663,773	99.74	191,687	2,331,677	—2,147,226	—9,914,981
Florida East Coast	764	5,062,714	2,578,389	8,841,222	1,176,625	1,540,285	109,506	3,798,948	212,292	6,742,703	76.26	2,098,519	420,396	1,676,243	—1,391,494
Ft. Smith & Western R. R. Co.	253	897,393	302,487	1,296,857	200,901	341,131	37,287	466,657	69,246	1,120,475	86.39	176,382	53,816	122,155	—67,786
Fort Worth & Denver City	454	5,611,412	1,987,611	7,956,342	792,875	1,741,319	53,934	3,144,590	273,418	6,036,624	75.87	1,913,719	231,886	1,681,631	—577,572
Ft. Worth & Rio Grande	235	678,414	390,444	1,151,033	218,205	267,927	19,793	540,538	56,665	1,103,127	95.83	47,906	35,829	11,405	—80,313
Fonda, Johnstown & Gloversville R.R. Co.	88	354,234	714,898	1,123,137	117,243	97,337	7,444	413,120	61,742	696,889	62.04	426,246	5,157	370,226	—44,469
Galveston, Harrisburg & San Antonio	1,371	14,708,781	5,274,253	21,273,847	2,335,957	3,799,480	276,789	7,864,672	621,821	14,986,130	70.44	6,287,718	622,288	5,659,579	—1,841,534
Galveston Wharf	13	.....	.....	1,049,838	142,698	18,892	3,609	351,943	25,148	687,690	65.50	362,148	138,428	223,720	—120,093
Georgia	328	4,196,619	2,085,482	6,716,503	513,568	897,299	90,093	2,689,287	166,425	4,358,772	64.89	2,357,731	75,063	2,282,494	930,211
Georgia, Southern & Florida	402	2,202,925	1,127,735	3,694,801	567,370	934,928	56,928	1,555,758	118,196	3,249,538	87.94	445,263	171,429	272,913	—179,446
Grand Rapids & Indiana	569	4,805,660	1,798,798	7,207,727	937,963	1,790,490	118,804	3,363,026	246,596	6,474,945	89.83	732,782	273,273	458,671	—650,338
Grand Trunk Western	1,017	14,820,434	2,829,554	19,376,033	2,578,796	4,542,157	277,385	9,271,215	507,448	17,240,052	88.97	2,135,981	601,682	1,530,188	—257,336
Great Northern	8,258	76,937,445	15,672,420	100,661,067	17,391,119	20,754,685	778,989	43,002,266	1,336,870	84,389,570	83.83	16,271,498	5,626,103	10,639,228	—12,348,313
Gulf & Ship Island	307	1,737,689	605,471	2,548,060	524,448	455,786	44,986	888,676	117,147	2,033,132	79.79	514,927	136,088	378,318	—26,867
Gulf, Colorado & Santa Fe	1,934	12,844,674	4,878,258	18,885,098	3,422,867	3,476,115	228,958	7,158,792	609,313	14,829,929	78.52	4,055,169	853,696	3,196,933	—1,059,935
Gulf, Mobile & Northern	407	1,867,949	426,399	2,418,292	431,541	557,449	56,228	999,168	111,455	2,156,111	89.15	262,182	140,635	121,511	—471,163
Hocking Valley	349	11,343,613	1,038,843	13,155,861	1,490,446	3,718,009	83,422	4,912,857	248,697	10,448,792	79.42	2,707,069	483,590	2,223,365	—444,660
Houston, East & West Texas	190	1,463,318	502,089	2,087,716	326,883	288,957	18,377	889,239	42,716	1,566,079	75.01	521,638	72,928	448,224	—230,833
Houston & Texas Central	928	6,189,187	2,212,798	1,208,145	9,041,981	1,203,144	1,500,932	109,922	3,364,059	6,397,011	52.94	2,644,970	406,118	2,236,113	—606,145
Illinois Central	4,778	79,271,487	20,543,263	107,320,261	16,301,104	26,615,299	855,542	43,214,596	2,587,348	93,184,411	84.03	17,135,850	5,036,610	12,085,072	—7,922,009
Indiana Harbor Belt	116	.....	.....	5,591,235	1,216,444	1,339,427	22,427	3,659,004	160,410	6,397,712	114.42	—806,477	122,124	—928,646	—1,818,827
International & Great Northern	1,159	8,859,715	3,597,255	13,476,888	2,103,699	3,083,452	159,104	5,858,605	449,047	11,643,003	86.39	1,833,885	396,000	1,441,843	—2,135,525

REVENUES AND EXPENSES OF RAILWAYS

TWELVE MONTHS OF CALENDAR YEAR 1918 (CONTINUED)

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Kanawha & Michigan	176	$4,552,914	$1,118,461	$5,896,134	$657,736	$1,509,671	$32,828	$1,876,389	$130,489	$4,207,119	171.35	$1,689,015	$227,934	$1,461,081	$608,615
Kansas City, Mexico & Orient	272	1,040,234	155,394	1,259,675	259,368	540,350	37,866	680,357	86,741	1,604,682	127.38	—344,007	73,157	—418,165	—357 [illegible]
Kansas City, Mexico & Orient of Texas	465	976,445	147,557	1,188,657	289,245	463,240	30,003	666,266	64,904	1,513,658	127.34	—325,001	64,031	—389,731	—[illegible]
Kansas City Southern	774	11,858,056	2,241,542	15,250,406	1,846,144	3,014,974	211,532	6,035,899	429,332	11,525,000	75.57	3,725,406	694,447	3,028,667	1,[illegible]
Kansas City Terminal Co	24	.....	.....	1,247,830	174,946	284,407	.....	635,029	12,599	1 113,030	89.19	134,799	212,475	—79,857	—[illegible]
Lake Erie & Western	900	8,252,429	626,336	9,343,905	1,275,217	2,436,194	146,976	4,331,306	260,091	8,440,012	90.32	903,893	340,066	562,339	—1,[illegible]
Lehigh & Hudson River	96	2,333,219	45,620	2,476,851	334,563	446,070	19,127	1,085,436	67,921	1,953,119	78.85	523,732	71,600	452,113	—[illegible]
Lehigh & New England	230	3,679,107	17,208	2,989,895	518,284	757,988	57,862	1,347,515	102,706	2,784,125	93.11	1,205,775	103,408	1,102,366	—187,000
Lehigh Valley	1,442	53,921,165	6,234,935	65,586,769	7,818,030	17,004,251	654,982	30,523,764	1,189,734	57,346,025	87.43	8,240,744	1,874,237	6,364,382	3,211,614
Long Island	398	5,713,725	14,246,016	22,213,444	2,894,843	3,173,826	134,773	9,845,758	500,529	16,717,484	75.25	5,495,961	1,069,859	4,422,788	37,364
Los Angeles & Salt Lake	1,167	9,847,716	3,617,524	14,517,378	1,883,663	3,052,669	270,805	5,069,072	309,187	10,871,687	74.88	3,645,690	717,990	2,926,[illegible]	1,394,426
Louisiana & Arkansas	302	1,216,629	382,346	1,671,651	373,697	309,652	37,511	673,682	65,909	1,460,451	87.36	211,199	143,605	67,[illegible]	—265,[illegible]
Louisiana Western	207	2,854,649	1,241,013	4,348,162	347,697	643,106	66,269	1,147,881	119,309	2,348,527	54.01	1,999,635	169,708	1,827,032	39,065
Louisville & Nashville	5,023	71,479,723	24,484,069	101,392,792	13,126,522	23,341,988	1,366,060	39,623,246	1,778,745	79,556,971	78.46	21,835,821	3,322,221	18,500,[illegible]	—2,[illegible]
Louisville, Henderson & St. Louis	199	2,001,211	730,904	2,858,463	422,567	414,044	71,132	1,029,018	63,966	2,004,819	70.13	853,644	72,648	780,674	98,669
Maine Central	1,216	10,705,228	4,371,841	16,415,178	2,741,845	3,618,917	136,515	9,087,910	397,184	16,029,745	97.65	385,432	803,928	—418,773	—3,141,152
Maryland, Delaware & Virginia	82	685,693	386,294	1,101,323	96,855	291,895	11,636	719,088	22,288	1,141,761	103.67	—40,437	19,797	—60,234	119,588
Michigan Central	1,861	45,949,560	15,901,585	68,520,087	7,705,080	12,382,737	738,990	28,214,019	1,149,799	51,070,072	74.53	17,450,015	1,899,790	15,542,761	2,[illegible]
Midland Valley	387	2,642,575	725,267	3,504,779	567,709	594,384	25,829	1,298,176	136,194	2,622,291	74.82	882,489	84,778	797,470	9,090
Mineral Range	100	1,085,325	26,340	1,143,534	199,695	268,367	4,626	615,416	13,118	1,101,262	96.30	42,292	40,000	2,272	—19,687
Minneapolis & St. Louis	1,646	9,826,142	2,049,093	12,028,300	2,128,724	2,989,574	150,891	5,792,794	310,001	11,371,096	94.53	657,204	648,298	5,173	—2,602,261
Minn. & International Ry. Co	195	650,256	282,677	992,094	203,886	203,789	5,758	509,467	40,058	462,898	97.05	29,196	53,508	—24,393	—264,184
Minn., St. Paul & Sault Ste. Marie	4,239	27,097,097	6,255,850	85,930,293	5,255,935	7,292,081	359,329	15,821,329	828,889	29,690,608	34.55	6,239,685	2,185,260	4,054,092	—5,277,220
Missouri & North Arkansas	365	855,842	442,478	1,404,131	402,590	303,225	24,927	621,892	68,641	1,420,776	101.18	—16,645	67,974	—89,553	—315,516
Missouri, Oklahoma & Gulf	332	1,403,706	292,478	1,780,546	410,484	561,854	24,944	938,481	110,047	2,047,800	115.00	—267,254	102,487	—372,156	—5,9,102
Missouri Pacific	7,221	63,486,625	19,535,391	89,612,397	14,612,086	18,577,820	1,071,351	36,522,014	2,136,230	73,231,738	81.72	16,380,659	3,144,291	13,218,384	.....
Mobile & Ohio	1,096	11,903,288	2,099,882	14,840,901	1,916,624	4,728,755	362,044	6,697,083	438,226	14,131,172	95.21	709,729	525,234	182,246	—2,554,382
Monongahela	108	2,869,965	241,825	3,208,757	740,998	338,242	13,008	1,114,266	64,602	2,271,116	70.78	937,641	62,991	874,644	118,[illegible]
Monongahela Connecting	5	.....	.....	2,473,764	340,306	463,185	5,326	1,329,173	69,333	2,207,322	89.22	266,442	38,898	227,544	—31,788
Morgan's La. & Texas R. R. & S. S. Co.	400	5,897,357	1,854,187	8,352,107	903,869	1,419,815	92,534	2,943,846	190,817	5,578,728	66.79	2,773,379	353,174	2,417,681	—231,110
Nashville, Chattanooga & St. Louis	1,239	14,554,220	59,789,701	21,757,403	2,592,941	4,774,566	431,918	9,281,724	480,387	17,623,564	81.00	4,133,838	399,730	3,732,570	752,873
Nevada Northern	168	2,458,519	181,474	2,706,332	284,133	329,305	10,744	649,171	69,091	1,343,756	49.65	1,362,575	206,442	1,155,523	—166,365
New Orleans & North Eastern	203	4,292,393	1,401,582	6,474,718	716,837	1,457,821	92,429	2,749,654	137,788	5,192,415	80.19	1,282,302	309,591	972,102	—327,229
Newburgh & South Shore R. R. Co	7	.....	—246	1,453.757	199,633	253,240	.....	657,939	36,262	1,144,075	78.69	309,682	98,308	211,374	170,415
New Orleans Great Northern	284	1,634,463	465,608	2,197,315	334,426	422,636	33,695	809,051	90,097	1,693,879	77.08	503,436	109,484	393,588	—190,043
New Orleans, Texas & Mexico	191	1,355,288	473,622	1,888,624	368,350	407,991	27,618	613,601	91,836	1,497,140	79.27	388,485	100,589	287,506	—167,[illegible]
New York Central	6,079	190,113,757	68,380,430	294,691,313	34,094,030	61,695,183	2,843,631	123,108,568	6,855,134	232,403,705	78.86	62,287,609	11,964,360	50,299,060	—6,553,0[illegible]
New York, Chicago & St. Louis	572	20,123,797	1,831,291	22,656,381	2,615,657	4,172,820	368,548	9,734,020	557,593	17,489,757	77.19	5,166,624	647,530	4,518,937	1,507,178
New York, New Haven & Hartford	1,992	50,721,288	39,379,916	102,294,212	13,525,533	20,913,413	47,523	48,020,080	3,087,451	87,746,523	85.77	14,547,688	13,216,375	11,315,322	—9,156,535
New York, Ontario & Western	567	7,140,143	2,168,484	10,895,005	1,557,482	2,763,995	102,125	5,300,294	250,625	9,974,524	91.55	920,481	297,124	621,908	—1,605,768
New York, Philadelphia & Norfolk	121	5,748,929	1,278,999	7,632,494	714,914	1,774,650	115,511	3,361,924	133,216	6,283,433	82.32	1,349,061	256,024	1,092,943	—149,77[illegible]
New York, Susquehanna & Western	135	3,310,483	624,063	4,353,420	414,709	727,073	24,519	2,537,992	89,924	3,794,070	87.22	559,350	175,345	383,886	—172,615
Norfolk & Western	2,083	68,752,260	10,237,599	82,004,034	9,524,729	21,272,931	536,709	28,739,291	1,309,866	61,579,297	75.09	20,424,737	2,904,000	17,510,838	—4,275,418
Northern Pacific	6,584	78,534,344	17,146,144	102,908,259	14,226,887	16,716,958	779,683	37,501,968	1,818,941	71,516,302	69.49	31,391,957	6,499,718	24,586,620	—4,009,795
Northwestern Pacific	507	3,033,300	2,110,872	5,702,398	881,548	682,551	58,707	2,201,299	129,463	3,973,768	69.68	1,728,630	263,477	1,465,119	—53,964
Oregon Short Line	2,326	25,941,123	5,885,682	34,136,854	4,602,020	5,113,453	246,877	10,028,742	1,021,169	21,609,487	63.30	12,527,367	2,025,043	10,496,119	—2,015,668
Oregon-Washington R. R. & Nav. Co	2,066	17,696,064	6,239,290	26,264,957	4,157,529	3,629,174	379,238	10,100,012	1,008,328	19,717,609	75.07	6,547,348	1,512,046	5,033,013	—796,033
Panhandle & Santa Fe	741	4,275,636	1,253,186	5,809,657	1,092,040	1,767,965	46,772	2,303,316	175,527	5,351,875	92.11	457,782	194,560	261,682	—2,256,798
Pennsylvania Company	1,754	70,628,885	15,931,995	95,530,322	14,989,937	25,170,160	959,992	42,732,560	2,063,917	86,550,257	90.59	8,980,065	3,480,625	5,498,652	—6,743,664
Pennsylvania Railroad	5,403	239,481,059	75,325,078	367,414,695	51,693,998	99,145,128	2,922,867	166,437,063	8,146,648	353,624,524	96.24	33,796,171	10,611,131	23,149,178	—31,447,052
Peoria & Pekin Union	19	283,588	73,451	1,306,395	177,291	315,825	623	973,387	47,515	1,514,841	115.96	—208,447	113,769	—322,216	—353,783
Pere Marquette	2,238	22,200,348	4,237,796	28,955,012	3,790,387	6,143,894	344,773	12,233,619	753,118	23,315,552	80.52	5,639,460	697,135	4,940,823	—618,778
Philadelphia & Reading	1,126	66,755,088	8,683,464	80,769,564	7,316,702	19,354,094	495,762	37,144,651	1,402,973	65,889,372	81.57	14,880,192	1,718,737	13,161,126	—5,172,177
Pittsburgh & Lake Erie	224	28,513,514	2,287,179	32,992,272	4,374,228	7,038,496	187,254	10,217,617	502,055	22,365,184	67.97	10,627,089	884,277	9,742,766	2,108,603
Pittsburgh & Shawmut R. R. Co	94	1,280,637	47,367	1,343,608	347,788	377,617	13,266	525,899	38,219	1,302,785	96.96	40,823	14,589	26,234	—211,045
Pittsburgh & W. Virginia	63	1,534,745	112,398	1,800,146	513,720	503,125	14,995	717,425	81,149	1,932,495	107.35	—132,348	170,924	—303,272	—735,106
Pittsburgh, Cincinnati, Chic. & St. Louis	2,394	59,316,445	19,024,165	87,224,888	11,111,714	25,483,309	1,053,741	38,777,076	1,956,942	79,131,535	90.72	8,093,352	2,879,068	5,211,211	—9,057,908
Port Reading	21	1,928,023	.....	2,637,218	270,773	267,802	410	1,238,561	14,877	1,792,417	67.96	844,802	112,647	732,105	89,502
Richmond, Fredericksburg & Potomac	87	2,936,796	3,563,012	7,164,372	370,436	812,796	50,488	2,411,832	122,297	3,824,211	53.37	3,340,161	164,050	3,175,562	949,432
Rutland	415	2,623,260	1,167,126	4,540,589	774,427	1,073,536	120,475	2,292,467	123,512	4,387,180	96.62	153,408	221,856	—68,490	—866,114
St. Joseph & Grand Island	258	2,044,734	375,743	2,588,579	551,288	463,692	26,198	1,400,905	106,591	2,559,031	98.85	29,546	112,644	—83,141	34,403
St. Louis, Brownsville & Mexico	548	2,933,099	1,191,951	4,448,927	685,225	818,809	68,801	1,304,595	155,302	3,029,667	68.09	1,419,261	123,963	1,294,235	—53,516
St. Louis Merchants Bridge Terminal	9	.....	6,887	3,620,589	489,078	503,945	7,694	2,395,386	71,410	3,470,011	95.84	150,576	101,351	48,655	—714,944
St. Louis-San Francisco	4,761	45,312,606	20,358,980	69,812,604	10,198,036	15,790,756	566,284	26,917,040	1,882,662	55,251,965	79.14	14,560,638	2,735,673	11,801,893	—5,450,225
St. Louis, San Francisco & Texas	134	1,131,502	153,562	1,366,345	193,748	257,373	21,801	637,374	69,022	1,179,318	86,31	187,027	19,531	167,246	101,705
St. Louis Southwestern	968	10,030,629	2,449,686	13,035,153	1,699,967	2,695,968	254,047	3,815,730	403,843	8,890,788	68.21	1,144,364	519,409	3,623,198	—1,147,113
St. Louis Southwestern of Texas	814	4,335,225	1,786,182	6,553,608	1,526,408	1,993,011	122,160	3,027,610	282,665	6,949,827	106.05	—396,218	250,652	—647,461	—1,416,409
San Antonio & Aransas Pass	132	2,847,667	1,214,504	4,370,334	757,021	1,272,604	76,143	2,105,524	201,909	4,410,329	100.91	—39,995	181,554	—223,276	—687,680
Seaboard	3,561	22,338,219	13,175,582	38,923,106	5,186,137	9,108,666	769,236	16,986,925	1,062,935	33,346,793	85.67	5,576,313	1,469,435	4,096,959	—3,140,922

REVENUES AND EXPENSES OF RAILWAYS

TWELVE MONTHS CALENDAR YEAR 1918 (CONTINUED)

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.)	Maintenance of—Way and structures.	Maintenance of—Equipment.	Traffic.	Transportation.	General.	Total.				
South Buffalo	35	$582,509	.....	$1,563,096	$190,525	$195,862	$3,960	$840,070	$22,284	$1,252,702	80.14	$310,394	$32,500	$277,891	$31,462
Southern	6,982	76,183,282	$40,568,659	126,574,297	13,568,311	24,570,010	1,493,452	48,772,492	2,659,714	91,810,425	72.53	34,763,872	3,742,144	30,976,625	3,933,752
Southern in Mississippi	278	876,967	525,755	1,519,496	313,994	190,089	28,238	763,972	52,826	1,349,119	88.78	170,377	109,000	61,259	—160,206
Southern Pacific	7,049	101,958,575	39,324,653	153,948,642	18,719,062	28,165,936	1,458,731	59,617,053	3,195,202	113,652,898	73.82	40,295,743	7,127,320	33,127,096	—9,363,250
Spokane International Ry. Co.	162	813,118	164,921	1,011,605	160,459	103,509	17,850	331,997	48,529	658,522	65.09	353,076	49,308	303,693	—42,369
Spokane, Portland & Seattle	554	5,952,144	1,972,329	8,496,944	1,297,182	975,802	65,480	2,589,222	227,149	5,196,274	61.15	3,300,671	810,006	2,490,099	—269,097
Staten Island Rapid Transit Co.	23	886,166	821,574	1,934,751	340,667	274,803	15,355	973,096	96,505	1,700,426	87.88	234,325	141,771	92,526	130,647
Tennessee Central	293	1,936,893	937,968	3,011,813	669,934	672,353	28,807	1,258,519	82,913	2,712,527	90.06	299,286	78,527	226,393	—141,144
Terminal R. R. Ass'n of St. Louis	36	.....	39,990	3,882,410	741,837	553,099	10,039	1,798,694	55,290	3,193,112	82.24	689,298	400,829	288,380	—900,671
Texarkana & Ft. Smith	81	998,448	190,566	1,281,122	141,594	156,639	18,764	470,348	53,744	838,558	65.45	442,564	92,853	349,703	—111,504
Texas & New Orleans	469	4,952,782	1,899,578	7,445,600	1,030,702	2,061,523	68,689	2,656,657	146,874	6,153,503	82.65	1,292,097	256,082	1,033,493	—1,192,977
Texas & Pacific	1,946	17,996,085	7,449,816	27,294,833	3,610,862	5,130,583	294,428	11,894,810	765,244	21,900,380	80.24	5,394,452	1,086,634	4,301,252	—1,940,303
Toledo & Ohio Central	435	8,696,367	740,253	10,026,558	1,550,452	2,495,012	79,056	4,567,579	196,984	8,914,123	89.00	1,112,434	366,110	732,295	—850,029
Toledo, Peoria & Western	247	1,075,145	463,531	1,645,593	299,397	478,233	30,163	796,368	63,987	1,668,113	101.36	—22,520	118,988	—141,508	—139,164
Toledo, St. Louis & Western	454	7,066,396	899,377	8,306,127	1,365,517	1,737,524	116,920	3,087,830	125,179	6,424,138	77.34	1,881,990	274,200	1,607,620	—90,039
Trinity & Brazos Valley	368	884,528	173,489	1,164,137	343,428	453,405	21,737	622,714	95,603	1,536,887	132.01	—372,750	69,673	—442,516	—184,678
Ulster & Delaware	128	524,791	279,912	1,006,444	180,413	186,828	15,797	574,318	51,699	1,014,644	100.81	—8,199	55,421	—63,739	—220,219
Union Pacific	3,624	72,679,802	18,055,066	98,443,365	10,766,976	16,413,258	736,706	27,332,798	2,506,389	59,877,810	60.82	38,565,555	3,446,321	35,114,379	7,484,812
Union R. R. of Pennsylvania	35	.....	.....	7,078,314	615,736	1,928,731	5,807	3,728,456	78,565	6,355,141	89.78	723,172	88,247	634,919	668,073
Utah Ry.	98	1,394,119	6,879	1,409,236	177,964	190,726	2,011	266,638	67,192	704,531	49.99	704,704	39,707	664,998	661,181
Vicksburg, Shreveport & Pacific	171	1,577,515	809,357	2,689,104	374,341	634,456	46,031	1,029,125	39,079	2,223,357	82.68	465,748	132,586	332,837	—356,406
Virginian	518	10,478,630	637,648	11,906,444	1,532,407	2,676,011	69,029	4,815,019	193,319	9,277,917	77.92	2,628,527	469,030	2,159,451	—1,943,675
Wabash	2,591	34,498,242	9,993,358	48,246,411	6,104,353	9,497,765	711,877	22,489,629	1,099,242	40,124,609	83.16	8,121,802	1,328,591	6,790,910	—3,752,972
Washington Southern	35	1,112,206	2,313,790	4,027,035	270,848	401,516	21,573	1,293,816	62,380	2,074,093	51.50	1,952,942	76,744	1,876,111	548,819
West Jersey & Seashore	359	3,437,048	6,465,047	10,599,543	2,511,140	1,920,826	91,905	5,284,564	238,913	10,105,860	95.34	493,684	483,374	7,150	—1,059,970
Western Maryland	707	13,528,180	1,004,671	15,402,352	2,861,071	4,713,553	234,532	7,153,140	414,615	15,526,447	100.81	—124,096	518,400	—642,929	—4,255,429
Western Pacific	1,011	9,187,872	1,373,496	11,065,963	2,034,146	1,634,999	187,703	3,625,271	254,193	7,891,618	71.31	3,124,345	600,876	2,571,610	—645,376
Western Ry. of Alabama	133	1,425,799	941,306	2,558,203	291,971	527,456	43,377	874,078	77,463	1,844,474	72.10	713,464	83,737	629,641	266,889
Wheeling & Lake Erie	511	11,970,359	485,488	13,592,172	2,092,844	3,201,985	84,079	5,555,555	305,064	11,265,852	82.88	2,326,321	662,017	1,663,663	—1,374,613
Yazoo & Mississippi Valley	1,382	17,074,084	4,486,278	22,477,009	3,053,250	4,777,336	187,575	8,183,363	558,377	16,731,537	74.43	5,755,471	812,300	4,930,718	13,244

Traffic News

A meeting of chamber of commerce and industrial traffic commissioners and managers was held at the Hotel Statler, Cleveland, Ohio, on February 10, for the purpose of organizing the Ohio State Traffic League. Memberships in the new association will be limited to traffic representatives of commercial organizations and industries in the state of Ohio.

The Western Freight Traffic Committee will hold a hearing in the Transportation building, Chicago, on February 18, on proposed increased minimum weights on a considerable number of commodities in carloads, the minimum weights of which have been fixed heretofore by the U. S. Food Administration. As the Food Administration regulations have been withdrawn, it is believed by the railroads that the minimum weights now shown in tariffs should be increased.

The Traffic Managers' Committee of the Omaha (Neb.) Chamber of Commerce, consisting of about 75 industrial traffic men, held its annual election on January 30. C. E. Childe, traffic manager of the Chamber of Commerce, was elected chairman and W. F. Crosby, traffic manager of M. E. Smith & Co., was elected secretary. Resolutions were adopted opposing government ownership and operation of the railroads and the express company and advocating the return of these properties to their owners as soon as the passage of necessary legislation will permit. The chairman was instructed to urge upon the Railroad Administration the re-establishment of foreign line traffic offices and to protest against the limited "sailing days."

Disposal of 1918 Wheat Crop in Sight

In a statement made before the Agricultural Committee of the House of Representatives on February 5, J. H. Barnes, president of the Food Administration Grain Corporation, predicted that the wheat crop of 1918 will not complicate next year's problems by any material carryover or surplus. Roughly, the total crop of 1918 was 918,000,000 bu.; deducting 100,000,000 bu. for seed and 470,000,000 bu. for home consumption, a balance of 348,000,000 bu. remains available for export. Of this balance 180,000,000 bu. had already been shipped abroad by February 1. For the remaining 170,000,000 bu. the Grain Corporation has commitments, definite and estimated, for 165,000,000 bu. to be supplied to European allies, the Commission for Relief in Belgium, neutrals, and European relief.

Two Solutions of the Railroad Problem Proposed

Resolutions recently adopted by the Illinois Manufacturers' Association and the Traffic Club of Cleveland offer detailed recommendations regarding the solution of the railroad problem in this country. Both organizations are opposed to government operation or ownership and ask the prompt return of the railroads to a condition of regulated competition. While the Illinois Manufacturers' Association recommends that the Interstate Commerce Commission be relieved of executive and administrative duties, except those relating to accounts and the valuation of railroads, and that its activities be confined to judicial functions, the Cleveland Traffic Club asks for an enlargement of the commission and for equal representation of industries and railroads in its membership; it also would extend the jurisdiction of the commission to cover disputes regarding wages and working conditions of railroad employees.

The Illinois manufacturers propose the creation of a department of transportation, the head of which would be known as the secretary of transportation and they also advocate the creation of regional commissions, composed of one member from each state, which would hear and determine all complaints for causes arising in their respective regions and would make reports thereon to the Interstate Commerce Commission as in the case of reports by Masters in Chancery. The Cleveland Traffic Club, on the other hand, is opposed both to regional commissions and a secretary of transportation.

Foreign Railway News

The railways of France on October 1 next, says a Havas despatch, are to be again put on a peace footing except for certain minor restrictions.

The Spanish Minister of Public Works is introducing in the senate a bill for the construction by the state of an electric railway from the French frontier to Algeciras in the extreme south of Spain, direct.

The Federal railway authorities in Australia have had offered for their consideration no fewer than 126 different devices to meet the break of gage difficulty, but none has found favor. They are of the following types: Sliding wheel, 23; double or multiple wheels, 40; telescopic and divided wheels, 9; adjustable truck frame, 3; changing truck, 7; transference of bodies, 13; treble or multiple rails, 6; unclassified 25.

The railways of India on March 31, 1914, had 170,444 freight cars. The number laid up for repairs at present is about 10,290, or about 6 per cent, of which 1,860, or about 1 per cent of the total, were laid up for want of materials. The number is lower than in normal times, owing to the efforts the railways were making to keep every available freight car on the road. The number of cars sent overseas was 4,251; all of these except 56 were of metre or 2 feet 6 in. gage.

Sleeping Cars for Japanese "Thirds."—It appears that there is a good deal of overcrowding on the long-distance railways in Japan, and even on an important trunk line like the Tokaido passengers suffer considerable inconvenience. In order to improve the condition, the Imperial Government Railways have designed a type of sleeping cars for third-class passengers and the scheme is included in the budget for next year. According to the Railway Times of Tokyo, the sleeping car is an ordinary day coach, the seats of which are convertible into lower berths while the upper berths are attachable at night. On the upper beds, which are located along the direction of car, passengers can sleep in the usual Japanese manner, and on the lower, which are located crosswise, they can lie on their sides and can stretch their feet. The fare will be about 1 yen (50 cents) per day, including the extra fare for the high-speed train, and it is hoped that fairly good rest may be enjoyed by third-class passengers, which is the most important class in local passenger traffic.

The British Military authorities, says a Reuter despatch, have taken over the administration of the Bagdad Railway, while the French have taken charge of the Oriental Railways of European Turkey. M. Huguenin, the Swiss general manager of the Bagdad Railway, has been relieved of his functions and is proceeding to Western Europe. As regards the railways in the Aidin Vilayet, the British have assumed control of the Aidin Railway, which is a British concern, while the French have taken over the Kassaba Railway, which is a French enterprise. The newspapers announce the arrest of Fesmei Bey, ex-Deputy for Diarbekr, who is accused of having taken an active part in the massacre of the Armenians.

Railway Improvements in Jamaica

The approaching termination of the war sees Jamaica's government and progressive business interests taking up projects of public benefit and service which have been delayed by the existing circumstances, writes Vice-Consul Davis B. Levis from Kingston.

A foreshore railway to link up the government railway system with several miles of the harbor front, with its many warehouses and piers accommodating the seagoing traffic of the island, is one of the important measures considered in addition to the floating-dock project lately reported. .

The proposal of the government to issue a $1,500,000 loan to be expended for public improvements, such as new branch railway lines, public roads, etc., is expected to be consummated shortly. . . .

The projects named should afford trade opportunities for American manufacturers of steel products, railway equipment, road building and other machinery, hardware, implements, cement, lumber, and building materials.

Plenty of Rolling-Stock in Germany

The London Times' special correspondent at Berne telegraphed to his paper recently that in view of the German "shrieks" about shortage of rolling-stock it is interesting to learn from a leading German railway magazine of December 4 that, in spite of the congestion of the railways with military trains, the transport of food and coal is being carried on without difficulty.

Belgium Asks for Return of Locomotives

The State Department at Washington has received through the American Legation at Brussels a request from the Belgium government asking the United States to lend it 400 locomotives and 2,000 cars in addition to returning all of the 359 locomotives which were placed at the disposal of the American Expeditionary forces. The communication from Minister of Railways Renkin, sets forth the urgent need for additional rolling stock in Belgium to replace that commandeered or destroyed by the Germans. The American army has returned 187 of the Belgian locomotives, but the remaining 172 still are in use by the Expeditionary forces.

A Railway Line from Vigo, Spain

The Spanish press, says Consul Edward I. Nathan, writing from Vigo, Spain, has recently been publishing articles concerning an alleged project of American financiers to build a direct railroad line from Vigo (on the Atlantic Ocean) to Irun on the Franco-Spanish frontier on the Bay of Biscay side, and to run steamers from New York to Vigo. The advantage of this port arises from its geographical position which permits the distance from ocean travel between Europe and the United States to be considerably shortened. While there is at present a railroad line from Vigo to Irun, it makes many deviations and the service is far from adequate for heavy passenger traffic. The projected line to Irun will be only about 450 miles in length and with a good roadbed and heavy locomotives this distance could be covered by express trains in 10 hours. The project is a revival of plans that had been previously considered, but which the Spanish authorities had not acted upon.

A Sidelight on the Swiss Railway Situation

The Federal Railways of Switzerland are reported to be showing a big deficit in spite of increased fares and a great curtailment of train services, including, toward the end of 1918, the total abolition of Sunday and express traveling. Private railway and steamboat companies, despite government aid, also are in sad straits. The war has brought home to Switzerland her dependence upon foreign countries for coal and most kinds of raw materials. She hopes and expects to remedy this weakness by electrifying her railways, developing her internal waterways and securing cheap access to the North Sea, Mediterranean and Adriatic by way of the Rhine, the Rhone and the Po. This, of course, requires the co-operation of the other countries concerned, but they are fully alive to the importance of water transport.

The Rhine is already navigable from Basel, where new docks and wharfage are under construction. Connection between Geneva and Lyons is being promoted, as also the linking up of the Rhine and Rhone systems.

Railway Extension in Peru

As briefly noted in last week's issue, the Peruvian Congress has passed a law authorizing the construction of a railroad from Paita to the Maranon river, with a branch to Ferrenfe and another to Hualgayoc. The government guarantees to the capital invested a subsidy of 7 per cent per annum for 39 years, fixing as a maximum on which this subsidy is to be paid the amount of $30,000,000. Further details concerning

this project are to the effect that the subsidy shall be obtained from the duties and taxes which the grantees must pay as follows: (a) Import and export duties on articles consumed either directly or indirectly by the concessionaire in the mines or mountain lands, which have been granted to him for exploitation. (b) Taxes on the profits and revenues which are obtained from the exploitation of the railroads and other associated enterprises, as well as the direct exploitation of mines and mountain grants. (c) Revenue stamps and registry fees on the contracts made. (d) Taxes on the mines which are conceded by the law. If in any one year these duties and imposts do not amount to the interest agreed upon, the State shall not be responsible for the difference; but, on the other hand, if the taxes should exceed the interest, the grantee must pay the excess. The subsidy mentioned above shall be paid until the line is finished, only in the proportion corresponding to the number of kilometres opened to public traffic. The guarantee for the carrying out of this contract or bid for the construction of this work shall be the sum of $50,000 in cash or its equivalent in bonds of the internal loan, which will be refunded as soon as 100 kilometres (62 miles) of the railway have been completed. This railway shall enjoy all the benefits and concessions conferred by existing laws on railways and by the law of March 7, 1889, on docks.

Siam's Purchases of Railway Material

Practically all of the railway material used, both for the Siamese government and for private railways, is imported from foreign countries. The government railways now open to traffic consist of 588 miles of standard gage lines and 838 miles of meter gage lines, the former being known as the Northern and the latter as the Southern line. The total length of the four private lines open to traffic is 66 miles, namely, the Paknam Railway of 12 miles, the Tachin Railway of 20 miles, and the Meklong Railway of 21 miles, meter gage, and the Phrabad Railway, 12 miles, 2 ft. 6 in. gage.

The supplies imported for these railways and landed at the port of Bangkok are listed by the customs under the heads of "railway material" and "cars and trucks for railways or tramways and parts thereof."

The origin and value of the imports into Siam of railroad material and cars and trucks for railways, etc., from foreign countries during the four fiscal years ended March 31, 1917, was as follows:

Imported from—	1913-14	1914-15	1915-16	1916-17
RAILROAD MATERIAL				
United States	$228,382	$106,705	$25,796	.....
United Kingdom	124,199	195,861	74,212	$117,519
Belgium	28,008	86,783	.....	.....
British North Borneo	.....	.....	3,574	18,582
Denmark	8,931	.....	.....	.....
Germany	111,897	85,176	115	.....
India	7,433	.....	10,981	.....
Netherlands, India	.....	.....	4,746	.....
Singapore	70	489	3,768	1,082
Total	$508,920	$475,014	$123,192	$137,183
CARS AND TRUCKS, ETC.				
United States	$3,033	$1,952	.....	$2,943
United Kingdom	16,353	86,071	131,957	188,780
Belgium	660	14,767	.....	.....
France	478	.....	.....	.....
Germany	60,970	1,529	.....	.....
Singapore	50	.....	25	764
Total	$81,544	$104,319	$131,982	$192,487

The customary method of buying railway material for the government railways has been through public tender, while for the private railways the supplies are bought through their respective directors.

It is reported that the Northern line of the government railways is sometimes as much as 400 wagons short per day, and that the usual shortage daily is 200 wagons, while on the Southern line the shortage occasionally reaches about 100 wagons. The need for rolling stock is likely to become still more acute as new sections on both lines yet remain to be opened up for freight traffic.

The old Siamese system of weights and measures is still in general use, although it was decided some time ago to adopt the metric system.

There are no local government restrictions on the imports of railway material except the three per cent ad valorem duty which is paid at the port of landing by the importer and levied on the invoice value of goods, including cost of packing, freight, insurance, and all other charges up to the time of the arrival of the goods in port.

Communications may be addressed to the respective railways, the offices of which are all located in Bangkok.

Sixth National Foreign Trade Convention

James A. Farrell, chairman of the National Foreign Trade Council, has issued the formal call for the Sixth National Foreign Trade convention to be held in the Congress Hotel, Chicago, on Thursday, Friday and Saturday, April 24, 25 and 26.

Foreign Trade Essential to American Industry will be the theme of the convention.

A tentative program is announced as follows:

First Day, Thursday, April 24

Convention called to order at 10 a. m. by James A. Farrell, chairman of the National Foreign Trade Council.

Organization of convention—Election of presiding officers, secretaries, etc.; address of president of convention; appointment of general convention committee. Session topic: America's Need of Foreign Trade, from the viewpoint of production, finance, labor and imports.

Afternoon session, 2.30 p. m.—Session topic: Post-War Foreign Trade Problems, a series of addresses dealing with general foreign trade matters.

Evening session, 8 p. m.—Group sessions.

Group I. Commercial Education for Foreign Trade.

Group II. Foreign Trade Merchandising, in co-operation with the American Exporters' and Importers' Association.

Group III. Financing Foreign Trade, in co-operation with the American Bankers' Association.

Group IV. Advertising for Foreign Trade.

Second Day, Friday, April 25

Morning session, 10 a. m.—Session topic: The American Merchant Marine, in which will be considered American shipbuilding, provision of cargoes, establishment of trade routes and return cargoes, inland waterways, American and foreign navigation systems and the formation of an American maritime policy.

Afternoon session, 2.30 p. m.—Group sessions.

Group V. Foreign Credits, in co-operation with the National Association of Credit Men.

Group VI. Direct Selling, in co-operation with the American Manufacturers' Export Association.

Group VII. Export Combinations, describing the Webb Law in actual operation.

Group VIII. Ocean Service, in co-operation with the American Steamship Association.

Friday evening, 7 p. m.—Banquet, Congress Hotel.

A number of speakers of national prominence will present several highly important foreign trade subjects.

Third Day, Saturday, April 26

Morning session, 10 a. m.—Reports of group sessions, report of general convention committee, miscellaneous business adjournment.

The work of organizing the convention is being handled by O. K. Davis, secretary of the National Foreign Trade Council, 1 Hanover Square, New York. Requests for hotel reservations should be addressed to H. H. Merrick, chairman of the Hotel Committee, Chicago Association of Commerce, 10 South La Salle street, Chicago.

This year the convention has assembled a large amount of valuable technical information, which is available to all delegates who wish to use it. This information will be furnished by the volunteer trade advisors of some of the most experienced business houses and by the representatives of the government trade agencies. A number of prominent business men of long experience in every branch of foreign trade have offered their services as volunteer advisors. The information they can give is based on personal experience, and as such is doubly valuable. In addition, the Department of State will co-operate by assigning to the convention some members of the Consular Service, who will just have returned from Europe, Latin America and the Far East. The Department of Commerce will send

a number of its experts from the Bureau of Foreign and Domestic Commerce. The Shipping Board will be represented. The Pan-American Union will be present to give information on Latin-American relations. These men are thoroughly familiar with their respective fields and can supply a great fund of valuable information if called upon.

Chicago Committee

The Chicago Executive Committee is in charge of all local arrangements. It is composed of the following: John J. Arnold, chairman, vice-president First National Bank; Charles A. Munroe, vice-chairman, Chicago Industrial Club; M. A. Graettinger, secretary, Illinois Bankers' Association; John R. Washburn, treasurer and chairman of Finance Committee, Continental and Commercial National Bank; Harry H. Merrick, chairman of Hotel Committee, president Chicago Association of Commerce; George R. Meyercord, chairman of Publicity Committee, Illinois Manufacturers' Association; H. G. P. Deans, chairman of Entertainment Committee, vice-president Merchants' Loan & Trust Company.

Acting Secretary of State Polk Announces Acceptance of Trans-Siberian Plan

Acting Secretary of State Frank L. Polk on Wednesday announced that the United States Government had now accepted formally the proposal of the Japanese Government for a plan to secure the restoration of railway traffic in Siberia.

"The agreement," said Mr. Polk, "is the result of discussion begun last August, before the signing of the armistice. It has been accepted because it offers an effective means to assist the Russian population of Siberia, which has been suffering for many months from a gradual collapse of railway transportation. Not only have the people lacked many necessities of daily life, such as shoes, clothing and agricultural machinery, but they have been wholly unable to return to their normal occupations of marketing their own considerable stores of dairy products and grain.

"In May, 1917, John F. Stevens was sent to Siberia, and a few months later was followed by the Russian Railway Service Corps, composed of American railway engineers, who were to assist the Russian railway administration, and thus contribute in carrying out the expressed purpose of the United States to aid Russia in tangible form. The arteries of life in Russia, as elsewhere, are the railways. The problems, especially in Siberia, are similar to those in America, where the long haul is almost the rule and certainly not the exception.

"Under the plan of operation which is now to be effected, the Siberian railway system, which includes the Chinese Eastern Railway, is to be supervised by an interallied committee, the chairman of which is to be a Russian. In addition to Russia, Japan and the United States, the countries asked to be represented on the committee are Great Britain, France, Italy and China. The technical and economic management of the railways will be in the hands of the technical board, under the presidency of Mr. Stevens. A military board will co-ordinate matters affecting military transportation arising from the presence in Siberia of military forces of the United States, the Allies, and Russia.

"The purpose of the agreement is to assist the Russians in Siberia in regaining their normal conditions of life and has been reached upon a definite understanding that the railways are to be operated for the interests of the people of Siberia. The United States and Japan have expressly voiced their disinterested purpose not to infringe on any existing rights either of Russia or, where the Chinese Eastern is concerned, of China. The associated governments have been unanimous as to the urgency of the situation.

"The understanding was broached before the conclusion of the armistice, but the problem of aiding the people in Siberia remains the same and has become even more urgent. Russian railway officials have repeatedly urged the assistance of Mr. Stevens and expressed their cordial and special desire that they should be helped. Their co-operation is relied upon as a vital factor for success in assisting their fellow countrymen."

Locomotive Deliveries in January

The Railroad Administrator Has Issued the Following Statement of Locomotives Shipped to Roads Under Federal Control for the Month of January

Works	For period January 1 to 4			For week January 5 to 11			For week January 12 to 18			For period January 19 to 25			For period January 26 to 31		
	Road	No.	Type	Road	No.	Type	Road	No.	Type	Road	No.	Type	Road	No.	Type
American	Southern	3	USRA Santa Fe	O. S. L.	10	USRA Mikado	O. S. L.	4	USRA Mikado	C. & O.	7	USRA Mallet	C. & O.	3	USRA Mallet
	U. P.	4	USRA 6-w. Sw.	B. Ry. of C.	5	USRA Santa Fe	B. & A.	5	USRA Santa Fe	M. & O.	4	USRA 6-w. Sw.	C. R. I. & P.	4	USRA 6-w. Sw.
	C. & N. W.	3	Mikado	S. A. L.	2	USRA 6-w. Sw.	T. R. R. & S. I.	4	USRA 6-w. Sw.	D. M. & N.	3	USRA Santa Fe	M. & St. L.	2	USRA Santa Fe
				Union P.	4	USRA 6-w. Sw.	D. M. & N. L.	7	USRA Santa Fe	D. S. L.	1	USRA Mikado	Penn. L. W.	1	Santa Fe
				B. & A.	5	USRA Santa Fe	Penn. L. W.	1	Santa Fe	C. R. I. & P.	4	USRA 6-w. Sw.	C. & E. I.	2	10-w. Sw.
				Chic. & N. W.	3	Mikado	M. & O.	2	USRA 6-w. Sw.	C. & O.	3	10-w. Sw.	C. & E. I.	5	USRA Santa Fe
				Mobile & O.	2	USRA 6-w. Sw.	Ptsb. & W. Va.	4	USRA 6-w. Sw.	C. & N. W.	1	Mikado	C. B. & Q.	1	USRA Santa Fe
							C. & O.	4	USRA Mallet				H. V.	1	Mallet
							C. & N. W.	1	Mikado						
		10			31			30			23			20	
Lima	N. Y. C.	2	USRA Mikado	N. Y. C.	3	USRA Mikado	Litch. & M.	2	Consol.	L. V.	3	Pacific	B. & O.	8	USRA Mikado
Baldwin	C. B. & Q.	1	Mikado	G. N.	2	Mikado	Sou. R. R.	1	Mallet	B. & O.	6	USRA Mikado	G. N.	1	Mikado
	Ill. Cent.	1	Mikado	A. T. & S. Fe.	1	Mikado	Penn. R. R.	2	Mikado	A. T. & S. Fe	3	Mikado	Ill. Cent.	1	Mikado
	A. C. L.	1	Mikado	B. & O.	4	USRA Mikado	B. & O.	8	USRA Mikado	Ill. Cent.	2	Mikado	A. T. & S. Fe	1	Mikado
	L. V.	1	Pacific	A. C. L.	1	Mikado	C. B. & Q.	1	Mallet	A. C. L.	1	Consol.	P. & R.	1	Consol.
	Penn. R.	1	Mikado	Phil. & R.	1	Mallet	Phila. & R.	1	Consol.	Phila. & R.	1	Consol.	Penn. R.	1	Mikado
	R. & O.	7	USRA Mikado	Phil. & R.	1	Consol.	A. T. & S. Fe.	1	Mikado	Penn. R. R.	1	Mikado	R. F. & P.	2	6-w. Sw.
				L. V.	1	Pacific									
		12			11			16			17			15	
		24			45			46			40			35	

Grand total—190.

In addition to the above the American Locomotive Company shipped 2 miscellaneous domestic locomotives and completed 59 foreign locomotives; and the Baldwin Locomotive Works shipped 90 miscellaneous domestic locomotives and completed 25 foreign locomotives.

Equipment and Supplies

Locomotive Deliveries

The following new locomotives were shipped to railroads under federal control during the week ended February 1:

Works	Road	Number	Type
American	C. & O.	3	USRA Mallet
	Chic., R. I. & Pac.	6	USRA 6 W. Sw.
	Mobile & Ohio	2	USRA 6 W. Sw.
	Penn. L. W.	1	Santa Fe
	C. & O.	3	10 W. Sw.
	Chic. & E. Ill.	5	USRA Santa Fe
	C., B. & Q.	2	USRA Santa Fe
	Hocking Valley	1	Mallet
	Chic. & N'w.	1	Mikado
	Grand Trunk	2	USRA 6 W. Sw.
	Total	26	
Baldwin	B. & O.	8	USRA Mikado
	Great Northern	1	Mikado
	Ill. Cent. R. R.	2	Mikado
	Atchison, Top. & St. Fe.	1	Mikado
	Phila. & Reading	1	Consols
	Penn. R. R.	1	Mikado
	Richm. Fbg. & Potom.	2	6 W. Sw.
	Southern	1	Mallet
	Total	17	
	Grand total	43	

Freight Cars

CHICAGO, MILWAUKEE & ST. PAUL.—The Bettendorf Company, Bettendorf, Iowa, has received an order from the Chicago, Milwaukee & St. Paul for 1,000 steel center sills for use in the construction of 1,000 40-ton capacity box cars which the St. Paul is planning to build in its Milwaukee shops. The delivery is to be made between February 15 and March 1.

CANADIAN NATIONAL RAILWAYS.—The order for 3,000 freight and 180 passenger cars given in the *Railway Age* of January 31 was shown slightly incorrect. The order is correctly given as follows:

750 box cars
00 stock cars
from the National Steel Car Co.
00 stock cars
50 refrigerator cars
50 ballast cars
from the Canadian Car & Foundry Co.
00 flat cars
50 general service
from the Eastern Car Company.
50 colonist cars from the Pullman Co.
00 colonist
30 baggage
from the Canadian Car & Foundry Co.

Passenger Cars

THE HERSHEY CUBAN RAILWAY advises that it is in the market for a number of light passenger cars for branch line service, either storage battery or gasoline, with a seating capacity of from 30 to 50 passengers. H. L. Hill is manager of the company, with headquarters at Prado 33, Havana, Cuba.

Trade Publications

THREADING MACHINES.—The complete line of threading machines for bolts, nuts and pipe, manufactured by the Greenfield Tap & Die Corporation, Greenfield, Mass., is described and illustrated in Catalogue 41, which also gives the specifications for the machines and detailed information regarding parts for threading machines.

INSLEY DERRICKS.—The Insley Mfg. Company, Indianapolis, Ind., has issued bulletin No. 110 containing 20 pages descriptive of the steel guy and stiffleg derrick manufactured by that company. The booklet is illustrated with wash drawings of complete derricks and various details of them. Tables are also presented, giving principal dimensions and properties of this equipment.

Supply Trade News

Lieut.-Col. R. P. Lamont, division chief of ordnance department, with headquarters at Washington, resumed his duties as president of the American Steel Foundries at Chicago, February 1.

William G. Denney, treasurer of the Standard Truck Car Company, Chicago, died on February 7, at his home in Millerton, N. Y., at the age of 65 years. Mr. Denney had been with the Standard Car Truck Company since its organization.

The Browning Company, Cleveland, Ohio, has reopened a Chicago office in the Peoples Gas building in charge of **R. C. Forbes.** The Chicago office has been closed for the duration of the war, as the company's entire output was taken over by the government.

The Barber-Greene Company, announces the following appointments: **W. A. Buell,** sales engineer, formerly conveyor engineer of the Goodyear Tire & Rubber Company; **H. W. Cudding,** auditor, formerly general auditor of the Lyon Metallic Manufacturing Company.

Fred M. Egolf, who has been associated with the Acme Railway Supply Company and the Acme Steel Goods Company, has been appointed western railway and marine sales representative of the Glidden Company, Cleveland, Ohio, with headquarters in Chicago.

Lieut. W. W. Glosser, of the Production Division of the Air Craft Board, who has been in France for the past year, has been appointed general sales agent of the Madden Company, with headquarters at Chicago. Before entering military service, Lieut. Glosser was sales representative of the P. & M. Company at Cleveland, Ohio.

The Chicago Pneumatic Tool Company, Chicago, has established a branch office at St. Louis, Mo., under the management of **H. W. Buker,** who succeeds **J. D. Corby as** district manager of sales. A stock room and service station will be maintained at St. Louis, as well as the district office. Announcement of Mr. Corby's resignation appeared in the *Railway Age* of February 7 (page 376).

P. C. Cady, office manager of the mechanical department of the New York Central at New York, has been appointed assistant secretary of the International Railway Supply Company, New York, which is the purchasing agent for the American Railroad Company of Porto Rico and the Trinidad Government Railways, and also the export department of the Pyle-National Company. His appointment becomes effective February 15. Mr. Cady has been in railroad service since 1893, when he entered the mechanical department of the Lake Shore & Michigan Southern at Cleveland, Ohio.

E. S. Nicholas has been appointed traveling engineer for the American Arch Company, with headquarters at Detroit, Mich. Mr. Nicholas was formerly boilermaker foreman of the Missouri Pacific shop at Kansas City. **M. R. Smith** has been appointed traveling engineer, with headquarters at St. Louis, Mo. Mr. Smith was formerly master mechanic at Coxton, Pa., on the Lehigh Valley. **H. Darby** has been appointed traveling engineer of the company, with headquarters at St. Paul, Minn. Mr. Darby was formerly motive power inspector at the Transcona shop, Winnipeg, of the Grand Trunk Pacific. **J. D. Brandon** has been appointed traveling engineer of the company, with headquarters at Montreal. Mr. Brandon was formerly general foreman at the Brightwood shops, Indianapolis, of the Big Four. **E. T. Mulcahy** has again assumed his duties as traveling engineer of the American Arch Company after having been honorably discharged from the United States Army. Mr. Mulcahy's headquarters will be at Denver, Col. Before coming with the American Arch Company Mr. Mulcahy was connected with the Union Pacific at its Cheyenne shops.

Financial and Construction

Railway Financial News

BOSTON & MAINE.—A petition has been filed with the Massachusetts Public Service Commission seeking authority to consolidate its leased lines with the company in accordance with reorganization plans agreed upon by a majority of the stockholders. A hearing was set for February 21.

CHICAGO & NORTH WESTERN.—This road has applied to the Public Utilities Commission of Illinois for authority to issue first mortgage gold bonds of 1987 in the aggregate amount of $1,000,000.

ILLINOIS CENTRAL.—Kuhn, Loeb & Co. are offering at 97½ and interest, to yield about 5¾ per cent, $16,000,000 15-year 5½ per cent secured gold bonds.

NORTHERN CENTRAL.—The stockholders on February 4, authorized an increase in the company's indebtedness of $8,216,000. The amount expended, and not yet funded, at the close of 1918, was about $5,000,000. Allowance is made in the present provisions for future requirements.

OCKLAWAHA VALLEY.—This 50-mile road operating between Ocala, Fla., and Palatka, was sold at public auction on February 3, under an order in chancery on a suit brought by the bondholders. The complainant bought the property for $225,000 for dismantlement.

SOUTHERN RAILWAY.—See editorial elsewhere in this issue.

Railway Construction

CHICAGO, ROCK ISLAND & PACIFIC.—T. S. Leake & Co., Chicago, have been awarded a contract for the construction of a frame stucco railroad Y. M. C. A. building at Hulbert, Ark. The building will be 80 ft. by 80 ft. and two stories high, costing approximately $40,000.

The Rock Island has also awarded a contract to the Railroad Water & Coal Handling Company, Chicago, for the construction of a 150-ton coal chute at Ola, Ark., to cost approximately $10,000.

FRANKFORT & SHELBYVILLE ELECTRIC.—Preliminary surveys are now being made to build an electric line from Shelbyville, Ky., to Frankfort, about 22 miles. Two steel bridges, one 150 ft. long and the other 90 ft. long will be required on the proposed line. F. H. Frankland, president and chief engineer, 35 Nassau street, New York City.

ILLINOIS CENTRAL.—The Railroad Water & Coal Handling Company, Chicago, has been awarded a contract for the installation of pumping facilities at Dalton Springs, Ky. The work includes the construction of a pump house and the installation of two 25-hp. oil burning engines, a 100,000-gal. tank and a 10-in. discharge line.

NORTHERN PACIFIC.—Bids for the construction at Brainerd, Minn., of a two-story, reinforced concrete and brick passenger station and office building, 40 ft. by 160 ft., costing approximately $65,000, are to be received in February or March. It is planned to start work on the building in the spring.

SAND SPRINGS.—This road, which now connects Tulsa, Okla., and Sand Springs, will be extended to Pawhuska within the next year. No contracts for the work have been let as the road expects to complete the extension with its own forces.

BUILDING MILITARY CAMPS.—Stone & Webster, Boston, Mass., have published a 12 in. by 14 in. album of photographs and plans of the cantonments and camps built under the direction of that company during the period of the war. In addition to matter descriptive of the camps there are several large folded inserts containing panoramic views and maps. Floor plans are also given of the buildings occupied by officers and enlisted men.

Railway Officers

Railroad Administration

Central

D. E. Brown, heretofore manager of the Accounting Section of the Division of Public Service and Accounting, has been appointed assistant director of the Division of Accounting.

J. G. Walber, secretary of the Bureau of Information of the Eastern Railroads and a member of Railway Board of Adjustment No. 1, has been appointed labor assistant to the director of the Division of Operation, with office at Washington, D. C.

C. E. Spens has been appointed assistant director, Division of Traffic, in charge of export and import traffic matters, with office at Washington. In addition, Mr. Spens will continue his present duties as manager of inland traffic, United States Food Administration. Mr. Spens was vice-president in charge of traffic of the Chicago, Burlington & Quincy.

George F. Atkins, Jr., heretofore assistant to the director of the Division of Public Service and Accounting, has been appointed assistant to the director of public service, in charge of rates. **E. C. Niles** has been appointed assistant to the director of public service, in charge of service. Mr. Niles also retains his duties and title as manager of the Short Line Section. **Eugene H. Lamb** has been appointed acting chief of the Bureau for Suggestions and Complaints. This bureau will report to the assistant to the director of public service, in charge of service.

Regional

E. H. Banker has been appointed executive assistant to **H. A. Worcester,** district director of the Ohio-Indiana district of the Eastern region, to succeed **Hugh McVeagh,** who has been appointed assistant to **E. M. Costin,** federal manager of the Cleveland, Cincinnati, Chicago & St. Louis; the Cincinnati Northern; the Central Indiana; the Detroit, Toledo & Ironton; the Central Union Depot, and the Cincinnati, Indianapolis Union. Mr. McVeagh's headquarters will be in Cincinnati, Ohio.

Federal and General Managers

The jurisdiction of **George W. Stevens,** federal manager of the Chesapeake & Ohio; the Ashland Coal & Iron; the Sandy Valley & Elkhorn, and the Long Fork Railroad, has been extended over the Chesapeake & Ohio Railroad of Indiana, which road has been released from the jurisdiction of **E. M. Costin,** federal manager.

Operating

A. C. Hartley has been appointed supervising safety agent of the Michigan Central; the Chicago, Kalamazoo & Saginaw and the Detroit Terminal Railroad, with headquarters at Detroit, Mich.

D. O'Connell has been appointed chief special agent of the Southern Pacific, the Western Pacific, the Tidewater Southern and the Deep Creek, with headquarters at San Francisco, Cal., to succeed **P. J. Kindelon,** deceased.

T. R. McCampbell has been appointed supervising safety agent, with headquarters at Indianapolis, Ind. of the Cleveland, Cincinnati, Chicago & St. Louis and other roads under the jurisdiction of **E. M. Costin,** federal manager.

W. D. Baker, federal auditor of the Norfolk & Portsmouth Belt Line, at Norfolk, Va., has been appointed assistant to the federal manager of the Virginian Railroad; the Norfolk & Portsmouth Belt Line; the Norfolk Terminal Railroad, and the Hampton Roads Rail Terminals.

A. D. Rosecrans, trainmaster of the Arizona Eastern, has been appointed acting superintendent of the Globe division, with office at Globe, Ariz., vice **J. W. Williams,** resigned;

H. **Weitzel,** master mechanic, at Phoenix, has been appointed rainmaster, with office at Globe, vice Mr. Rosecrans.

J. B. **Stewart,** general superintendent of the Bangor & Aroostook and the Van Buren Bridge, with office at Bangor, Maine, has resigned to go to another position and **W. K. Hallett,** superintendent, succeeds Mr. Stewart as general superintendent; **F. A. Andrews,** trainmaster at Millinocket, has been appointed superintendent of the Southern division; both with offices at Bangor. **George W. Mayo** succeeds Mr. Andrews.

Charles A. Plumly, whose appointment as superintendent of telegraph of the Baltimore & Ohio, with office at Baltimore, Md., has already been announced in these columns, was born on October 15, 1876, at Big Run, Ohio, and was educated in the elementary schools. He learned telegraphy in the office of his father who was agent and operator at Stewart, Ohio, and in November, 1887, he began railway work on the Baltimore & Ohio Southwestern, serving as an extra operator during week ends and summer vacations. In June, 1903, he was appointed train despatcher at Chilicothe, and in September, 1907, was made chief despatcher at the same place. On July 31, 1910, he was appointed division operator at Cincinnati, Ohio, and in March, 1912, became trainmaster at Seymour, Ind. In January, 1913, he was appointed assistant superintendent of telegraph, at Cincinnati, and the following June became assistant to the general superintendent at the same place. On January 1, 1914, he was appointed inspector of transportation at Cincinnati, and since September, 1914, served as assistant superintendent of telegraph, at Baltimore, until his recent appointment as superintendent of telegraph of the Baltimore & Ohio, eastern lines; the Coal & Coke; the Wheeling Terminal Railroad; the Western Maryland; the Cumberland Valley, and the Cumberland & Pennsylvania.



C. A. Plumly

Financial, Legal and Accounting

T. L. Shelton, auditor of station accounts of the Southern Railroad, has been appointed assistant auditor of the Southern Railroad and other roads the accounts of which are audited in the Washington office, in charge of government transportation accounts, and **T. H. Seay** succeeds Mr. Shelton, both with offices at Washington, D. C.

W. G. Sims has been appointed auditor, and **D. F. Callahan** has been appointed federal treasurer, of the Wichita Union Terminal, with headquarters at Wichita, Kan. The jurisdiction of **L. J. Hensley,** federal auditor of roads under the jurisdiction of **J. A. Edson,** has also been extended over the Wichita Union Terminal.

J. A. Robinson, assistant auditor of the Southern Railroad, and temporarily assigned as auditor of its subsidiary railroads, with office at Atlanta, Ga., has resigned to accept service elsewhere, and the jurisdiction of **H. W. Oliver,** auditor of the Georgia Southern & Florida Railroad, has been extended over operating accounts of the Blue Ridge Railroad; the Tallulah Falls Railroad; the Danville & Western; the Hartwell Railroad, and the Lawrenceville Branch Railroad, with office at Atlanta, Ga.

Traffic

E. L. Whitney, chief clerk to the resident traffic assistant of the Eastern region at Chicago, has been appointed division freight agent of the New York Central, with the same headquarters, succeeding **James L. Clark,** deceased.

F. R. Dalzell, assistant general freight agent of the Gulf, Colorado & Santa Fe, with office at Galveston, Tex., has been appointed general freight agent of the Gulf, Colorado & Santa Fe, the Texas Midland and the Houston Belt & Terminal Railroad, with headquarters at Galveston, Tex.

Engineering and Rolling Stock

J. L. Starkie has been appointed assistant chief engineer, with headquarters at Dallas, Tex., of the Gulf, Colorado & Santa Fe, and other roads under the jurisdiction of **J. S. Pyeatt,** federal manager at Dallas.

W. S. Wilson, supervisor of subdivision No. 12, Pittsburgh division of the Pennsylvania Railroad, at Trafford, Pa., has been appointed division engineer of the Allegheny division, with office at Oil City, Pa., succeeding **C. M. Wisman,** who has been granted a furlough; **C. W. Montgomery,** supervisor at Gallitzen, has been transferred as supervisor to Altoona Yards, succeeding **J. M. Kinkead,** promoted; **W. S. Johns, Jr.,** supervisor at Bowie, Md., has been transferred as supervisor to Trafford, succeeding Mr. Wilson; **F. H. Bently,** supervisor at Titusville, Pa., has been transferred as supervisor to Gallitzen, succeeding Mr. Montgomery; **C. F. Miller,** assistant supervisor, succeeds Mr. Bentley, and **T. M. Woodward,** supervisor in the office of the division engineer, Philadelphia division, at Philadelphia, has been appointed supervisor, with office at Bowie, Md., succeeding Mr. Johns.

Corporate

Traffic

Henry Hilare Melanson, who has been appointed passenger traffic manager of the Canadian National Railways, with headquarters at Toronto, Ont., as has already been announced in these columns, was born on March 9, 1872, at Scoudouc, N. B., and was educated at the public schools and St. Joseph's University. He began railway work in November, 1889, with the Intercolonial as a clerk in the mechanical department at Moncton. In August, 1892, he was transferred to the general passenger agent's office and subsequently served as chief clerk in the same office. He was appointed general baggage agent in 1901 and in 1909 became assistant general passenger agent. In August, 1913, he was promoted to general passenger agent and since June, 1917, was passenger traffic manager until his recent appointment as passenger traffic manager of the Canadian National Railway System as above noted.



H. H. Melanson

Operating

H. C. Riddle has been promoted to trainmaster of the Montana, Wyoming & Southern, with office at Belfry, Mont., succeeding **W. E. Ogden,** resigned.

Andrew McCulloch, chief engineer of the Kettle Valley, has been appointed acting general superintendent, with offices in Penticton, B. C., to succeed **J. W. Mulhern,** resigned.

R. Wilson, auditor of the Pacific Great Eastern, with headquarters at Vancouver, B. C., has been appointed acting manager to succeed **G. L. Courtney.** Mr. Wilson's office will be in Victoria, B. C.

The Canadian National Railways have made the following appointments in addition to those previously announced: **D. R. Campbell**, assistant general manager of the Pacific district of the Canadian Northern, with headquarters at Vancouver, B. C., has been appointed general superintendent of the Pacific district, Canadian National, with offices at Vancouver, B. C. **W. T. Moodie**, division engineer at Winnipeg, Man., on the Canadian Northern, has been appointed superintendent of Division No. 1, Central district, Canadian National, to succeed **J. E. Nelson**, who has been appointed superintendent of the Pacific district, Canadian National, with headquarters at Kamloops Junction, B. C. **W. I. Munro**, chief despatcher on the Canadian Northern at Winnipeg, Man., has been appointed acting superintendent of Division No. 2 on the Prairie district of the Canadian National, to succeed **T. J. Brown**, assigned to other duties.

Engineering and Rolling Stock

A. M. Bouillon, resident engineer on the Grand Trunk Pacific, at Regina, Sask., has been appointed assistant engineer, with headquarters at Prince George, B. C.

Andrew McCowan, supervisor of car works of the Canadian Northern system at Winnipeg, Man., was appointed master car builder of the Canadian National Railways, western lines, with the same headquarters, at the time of the recent assimilation of the former road by the latter. Mr. McCowan was born at Perth, Scotland, on December 5, 1867, and was first employed by the Perthshire Carriage Works (Scotland), as an apprentice car builder, between 1881 and 1887. He began his railroad experience in May, 1888, as a carpenter on the Canadian Pacific at Montreal, Que. In March, 1890, he was promoted to car foreman, and seven years later he was appointed shop foreman at Farnham, Que. From September, 1903, to April, 1910, he was car foreman at Cranbrook, B. C., and on the latter date left the Canadian Pacific to become general car foreman of the Canadian Northern at Winnipeg, Man. He was promoted to supervisor of car works, western lines, in September, 1915, and in May, 1916, had his jurisdiction extended over the entire system.



A. McCowan

The following appointments were recently made on the Canadian National Railways: **Thomas Turnbull**, assistant chief engineer of the Canadian Northern, has been appointed engineer maintenance of way of the Canadian National, western lines, with headquarters at Winnipeg, Man. **A. V. Redmond**, division engineer of the Transcontinental division, Canadian Government Railways at Cochrane, Ont., has been appointed district engineer of the Central district, Canadian National, with headquarters at Winnipeg, Man. **H. L. Vercoe**, special engineer at Winnipeg, Man., on the Canadian Northern, has been appointed district engineer, Prairie district, Canadian National, with offices at Saskatoon, Sask. **T. W. White**, assistant engineer in the bridge engineer's office of the Canadian Northern at Winnipeg, Man., has been appointed district engineer of the Western district, Canadian National, with headquarters at Edmonton, Alta. **R. M. Mitchell**, right of way agent of the Canadian Northern, has been appointed right of way agent of the Canadian National, western lines, with headquarters at Winnipeg, Man. **H. G. Reid**, assistant superintendent of rolling stock Canadian Government Railways at Transcona, Minn., has been appointed general master mechanic Canadian National, western lines, with offices at Winnipeg, Man. **H. A. English**, master mechanic, Central district of the Canadian Northern, has been appointed master mechanic of the Central district of the Canadian National, at Winnipeg, Man. **L. G. Roblin**, general master mechanic, Canadian Government Railways, western lines, with offices at Cochrane, Ont., has been appointed master mechanic of the Prairie district, Canadian National, with offices at Saskatoon, Sask. **T. J. Lowe**, fuel agent, Canadian Northern, western lines, has been appointed fuel agent, Canadian National, western lines, with headquarters at Winnipeg, Man. **J. A. Sutton**, fuel and tie agent, Transcontinental division of the Canadian Government Railways, has been appointed district fuel agent of Divisions No. 1 and 2 of the Central district, Canadian National, western lines, with headquarters at Cochrane, Ont.

Obituary

Walter T. Aylesbury, formerly superintendent of car service of the Terminal Railroad Association of St. Louis, died at Bartlesville, Okla., on February 4, after an illness of two months. Mr. Aylesbury was long associated with the Chicago, Burlington & Quincy and was in the employ of the Terminal Railroad Association for 16 years, terminating his connection with that road in 1918.

Lieut.-Col. Hiram J. Slifer, commander of the 21st regiment of railway engineers, American Expeditionary Forces, died in France on February 3, of pneumonia, and was buried on February 5, at Sorcy, Meuse. Lieut.-Col. Slifer was born in 1857, and, after graduating from the Polytechnic College of Pennsylvania, entered the employ of the Mexican National Construction Company. Subsequently he was assistant engineer of the Philadelphia division of the Pennsylvania, principal assistant engineer of the Milwaukee, Lake Shore & Western, division engineer on the Chicago & North Western, superintendent of the Iowa division of the same road at Boone, Iowa, general superintendent of the Eastern district and later the Central district of the Chicago, Rock Island & Pacific, railway expert and business manager of the construction department of J. G. White & Co., at New York, general manager and assistant to the president of the Panama Railroad & Steamship Lines at Colon, Panama, and general manager of the Chicago Great Western at Chicago. In 1912 he became a consulting civil engineer, specializing in railroad practice, with headquarters at Chicago. His death was due indirectly to a railway accident in France. A gas motor inspection car on which he was riding to inspect road beds which the Germans had mined and blown up, jumped the track near Buzancy, throwing Lieut.-Col. Slifer down an eight-ft. embankment and into a small stream. He was carried to a nearby field hospital, and then was transferred to a base hospital at Neufchateau where he suffered an attack of bronchial pneumonia. He was later sent to a convalescent camp at Cannes. In a letter to a friend he stated that he intended to rejoin his regiment on January 16, at Conflans. Until the announcement of his death by the Adjutant General at Washington, no further information concerning the colonel's condition had been received. He enlisted in August, 1917, as a major in the Twenty-first Engineers (Light Railways) and was commissioned lieutenant-colonel in October, 1917, sailing for France in December of the same year.



Lieut.-Col. H. J. Slifer

EDITORIAL

Railway Age

Natural Light in Roundhouses

One of the obstacles to efficient roundhouse operation is poor lighting. From the very fact of its shape and occupancy an enginehouse is difficult to illuminate satisfactorily by natural light. With locomotives 80 ft. or more in length and having large, high boilers occupying most of the available clearance the problem today is much more difficult than it was with the short, low engines of 30 years ago. Even with the outer wall almost entirely of glass and with generous window areas in the doors, or in transoms over them, light in the aisles between engines is far from adequate, and resort must be had to the use of both stationary and extension-cord lamps. With stalls 100 ft. or more in length obviously some intermediate source of light is necessary, and in most cases an attempt is made to obtain additional daylight by the use of monitors, clerestories, etc. But many designers despair of success in this, saying that the additional glass is of little use since those who use the buildings cannot or will not keep it clean. The roundhouse of the Duluth, Missabe & Northern, described on another page of this issue, illustrates a new idea in the lighting of such buildings. A saw-tooth roof is introduced with one unit over each stall. In a sense the application is unscientific since saw-tooth roof construction, as ordinarily used, implies north exposure for all the glass, to avoid direct sunlight while securing an abundance of diffused light. However, this objection is negligible in a roundhouse; the removal of a heavy fall of snow would seem to be a more practical difficulty. But considering the opportunities for improvement in the lighting of roundhouses over its present stage of progress the success of this saw-tooth roundhouse will be watched with interest.

Six Months' Earnings and Expenses Under Existing Rates

A very interesting and important question is, whether present freight and passenger rates are high enough to yield earnings which will cover present wages and other expenses and taxes and leave enough net operating income to pay the guaranteed standard returns of the railway companies if government control is continued, and fixed charges and reasonable dividends if the railways are returned to private operation.

Very large increases of operating expenses occurred in the first six months as well as in the last six months of 1918. On the other hand the advanced passenger rates were in effect only during the last six months of the year. A considerable advance in freight rates was made on the eastern lines in March, but the 25 per cent advance in freight rates on all lines was in effect only during the last six months of the year.

All the advanced rates having been in effect only during the last six months of the year, it is interesting and instructive to consider the effects which the increases in rates and in wages and other expenses had during these six months. Statistics which have just become available show that the net operating income of large roads having 233,000 miles of line was almost $4,000,000 greater in the last six months of 1918 than in the last six months of 1917. The statistics of earnings, expenses, etc., of these roads during these two periods are as follows:

Six Months Ended December 31.

	1918	1917
Total operating revenues	$2,831,549,935	$2,152,533,078
Total operating expenses	2,190,940,218	1,504,200,501
Net operating revenue	640,609,717	648,332,577
Taxes	94,391,854	97,378,400
Uncollectible railway revenue	303,972	381,920
Railway operating income	545,913,891	550,572,257
Equipment rents (debtor)	1,378,857	9,864,885
Joint facility rents (debtor)	5,817,169	5,978,913
Net operating income	538,717,865	534,728,459
Operating ratio	77.38	69.88
Mileage operated	233,383	233,263

The Railroad Administration incurred a deficit of over $200,000,000 in 1918. These statistics show it was all incurred in the six months of the year before the rates were advanced. Superficially, this looks encouraging. It might be inferred that with a net operating income of almost $539,000,000 in the last six months of 1918 the railways could be operated by the government in 1919 without incurring a deficit, or could be returned to private control at once without any danger of serious trouble resulting. There are, however, several important facts, consideration of which make it very doubtful if this conclusion can be drawn.

First, there has been an increase of property investment since 1917 and the increase in net operating income in the last six months of 1918 was not sufficient to pay five per cent on this increased investment. Second, over two-thirds of the net operating income earned in the last six months of 1918 was earned in the first three months of this period. Because of rapidly increasing expenses the net operating income reported declined steadily month by month from $137,000,000 in July to $25,000,000 in December. Third, other large advances in wages are still to come. The impending advance in the wages of train service employees is estimated at $60,000,000 to $100,000,000 a year, which would make a difference of $30,000,000 to $50,000,000 in net operating income in six months. Fourth, traffic and gross earnings are declining. Now, the net earnings—difference between total earnings and expenses—in the last six months of 1918 were $7,700,000 *less* than in the last six months of 1917, the increase in net operating income being due entirely to a decline of equipment rents, which is mainly a bookkeeping matter. The ratio of expenses to earnings in the last six months of 1917 was less than 70 per cent, while in the last six months of 1918, in spite of higher rates, it was over 77 per cent. Therefore, it would require a relatively much smaller increase of expenses or decline of earnings seriously to deplete net operating income now than it would have required toward the end of 1917; and yet we know how quickly the advance of operating expenses in the first six months of 1918 almost completely swept away the net operating income.

The net operating income earned in the last six months of each year usually is larger than in the first six months, and the railways under private operation should now earn at least $1,150,000,000 net operating income a year in order to meet their fixed charges, pay reasonable dividends and have an adequate surplus to invest in necessary but unproductive improvements. Relatively, the net operating income earned in the last six months of 1918 was too small. It

was only 19 per cent of the total revenues, while the net operating income of the last six months of 1917, although absolutely smaller, was almost 25 per cent of the total revenues. When net operating income is less than 20 per cent of the total earnings of the railways, their financial affairs will be in a state of unstable equilibrium, and any sharp reduction of earnings or increase of expenses is likely to have serious results.

Considering all the pertinent conditions, it cannot be concluded that the net operating income of the last six months of 1918 makes a showing that is satisfactory. The margin between total income and outgo must be made wider, whether we are to have government or private operation. Possibly it can be made wide enough by reductions of expenses. But any reductions of expenses made should be real, and not nominal. In other words, they should not be accomplished by more deferring of maintenance at a time when the deferred maintenance already accumulated is so large as it is now. Furthermore, they should not be accomplished at the cost of further deterioration of the service. The war is over, and there is now an entirely justifiable public demand for the restoration of many of the conveniences, comforts and luxuries of service which the public cheerfully gave up during the war, but which it now wants restored. If the margin between income and outgo is to be widened by reduction of expenses, this should be done by more efficient operation, and by that alone. Whether much more efficient operation actually can be secured under the present system of centralized government management is very doubtful. If more efficient operation cannot be secured the margin between income and outgo should be widened by advances in rates.

Labor and Government Ownership of Railways

Representatives of several large unions of railway employees have presented to the Senate Committee on Interstate Commerce a plan for government ownership of railways. A. B. Garretson, head of the Order of Railway Conductors, told the committee that many railway employees who formerly were opposed to government ownership have been converted to it by a year's experience of government operation. If the question were referred to all the railway employees of the country many, and perhaps most of them, would vote against government ownership. It is unquestionably true, however, that government operation has caused many of them to favor government ownership.

The views of most people on important questions of politics and economics are strongly influenced by the way they believe the decision will affect them. Probably most of the railway employees who, within the last year, have decided to favor government operation have done so mainly because of the large advances in wages they have received. But in advocating government ownership they are not acting in accordance with their own permanent interest.

While the results of government operation are causing many railway employees to favor government ownership, they are causing a vastly larger number of persons who formerly were in favor of, or undecided about, government ownership, to become vigorous opponents of it. They also are being influenced largely by what they regard as their selfish interest. The advances in wages have been the principal cause of the enormous increase in railway expenses which has made it necessary greatly to advance freight and passenger rates, and has resulted in the government incurring a railway deficit. Those who pay railway rates and taxes dislike increases in them as much as railway employees like advances in their wages. The advances in wages have not been accompanied by increases but, on the whole, by decreases in the efficiency with which railway employees have done their work. Those who ship freight and travel on passenger trains know this. The enormous increase in operating expense shows it. Therefore, the public believes that many railway employees have taken advantage of war conditions and government operation to get as much money as they can and to give as little in return as they can. The public thinks that while a policy which has these results may be good for railway employees, it is not good for the public. In consequence, the employees need feel no surprise that the plan for government ownerships which their representatives have proposed, is being very coldly received. The public's coldness toward it will increase the more the plan is examined.

The plan contemplates the purchase of the railways by the government—in other words, by the public—and payment by it of the interest on the bonds issued to make the deal. A board of nine members would be created to operate the roads, three to be appointed by the President of the United States, three by the railway officers and three by the railway employees. Under permanent government operation, the word "officer" would be merely a euphemism for an employee of high rank. Therefore, the proposal is that the employees should take over and run the public's railroads.

It is said the employees would have an incentive to operate the railways efficiently under their plan because it is proposed that all net earnings in excess of the amount required to pay interest on the government's investment should be divided equally between the employees and the government. But, obviously, there never would be any surplus. Wages are, and always will be, the major part of expenses. The plan of the unions contemplates that salaries and wages shall be fixed by boards composed of equal numbers of officers and employees—that is, in effect, entirely by the employees. Suppose, now, that on a given scale of wages a surplus of $100,000,000 a year would be earned. In that case, the employees would get a bonus of $50,000,000. Suppose, on the other hand, that the wage board should advance wages $100,000,000. In that case, the employees would get the entire $100,000,000. Would they get it? Or would there be a surplus? Will a duck swim?

But, it may be said again, at least the Interstate Commerce Commission would fix the freight and passenger rates. But it would have no control over wages or other expenses. Therefore, if it held the rates down while wages and other expenses advanced, the result would be that the taxpayers would have to pay a railway deficit—as they did under government operation in 1918 and probably will under government operation in 1919.

The plan of the railway labor unions has no chance of adoption. It is significant chiefly as a naive expression of the employees' desire to retain and even increase their present high wages, and as an illustration of the false economic philosophy which prevails widely among working people and even among business men. The desire of the employees to keep their present wages, and even increase them, is eminently human. It is easy to understand and sympathize with it. But they have no more right to high wages than other people doing equally hard and useful work, and how can it be made economically possible to maintain the present high wages in the railway and other industries, much less increase them? The thought which seems to be in the minds of many working people is that wages can and should be advanced at the cost of capital. But the *advances* in the wages of railway labor within the last year exceeded the largest amount of interest and dividends ever paid to capital upon the entire capitalization of the railways of the United States in any year. Labor cannot take from capital more than capital has. Most of the advances in wages which have been made are being paid, not by the rich capitalists, but by the "common people" in higher freight and passenger rates.

And yet there is a way by which almost unlimited advances in the wages of labor may be made possible. Furthermore, there is absolutely only one way in which this can be made possible. This is by increasing the efficiency of production. If the efficiency of railway labor had been increased last year as much in proportion as the average wage per employee was, the advances in wages would have caused no increase in operating expenses at all. But it may be said that the efficiency of railway labor does not depend entirely on the employees—that it also depends upon the officers. Sometimes the representatives of labor say this, and sometimes they say the opposite. Mr. Garretson implied in his testimony before the Senate committee last week that the decline of operating efficiency had been due to the officers. Another representative of labor estimated that if labor's plan were adopted, the employees would cause a reduction in operating expenses of a billion dollars a year.

If the employees could do that in future under government operation, why didn't they do it in 1918 when the country was at war, and needed an increase of efficiency in all lines as it probably never will again? And, on the other hand, if the efficiency of operation in 1918 depended upon the officers, why would it not in future?

The decline in the efficiency of operation and the increase of expenses in 1918 occurred largely because neither officers nor employees worked as efficiently as they formerly did under private operation. The officers could not, and never would be able to, work as efficiently under government as under private operation, because government operation denies them opportunities and incentives which private operation affords them. The employees have not worked, and could not work, as efficiently under government as under private operation, because the efficiency of the employees depends both upon the ability of the direction they receive from the officers and upon their own willingness and industry; and government operation does not afford them as competent direction or stimulate their industry as much as private operation. As has been tacitly conceded by the very spokesmen of labor who have appeared before the Senate committee, the amount of wages that railway labor can and will be paid in the long run will depend upon the efficiency with which the railways are operated. The rendering of railway service is merely a part of the entire industrial process of production. Upon the efficiency of production depends the amount of things of all kinds that are produced. Now things—food, clothing, houses—are the real wages of labor, and in the long run the only way in which labor can get more and better food, more and better clothing, better houses to live in, is for more and better food, clothing, houses, etc., to be produced.

Since the efficiency of railway operation will be greater under private than under government management, and since—in the long run—the wages of labor depend upon the efficiency of production, it necessarily follows that labor, in advocating government ownership and management, is acting directly contrary to its own permanent interest. Before the war the railways of the United States, under private operation, were paying relatively higher wages than any system of government railways in the world. Railway labor knew this, and it was one of the main reasons why a majority of railway employees were opposed to government ownership. During the war under government operation railway employees have been given huge advances in wages; but this proves nothing as to the relative advantages to the employees of government and private operation in time of peace. In advocating a policy the direct tendency of which would be to reduce the industrial efficiency of the United States, railway employees are advocating a policy the effect of which would be not to maintain or advance their wages, but to keep them down. Labor has everything to gain and nothing to lose by industrial efficiency; and therefore it is hard to understand why it so often favors policies which would reduce industrial efficiency.

Adequate Depreciation Rates Should be Established

IN THE PRESENT DISCUSSION of railroad matters little attention has been given to the important question of providing adequate depreciation rates both for equipment and for structures. Commissioner Woolley, in his supplement to the statement of the Interstate Commerce Commission, expressed the opinion that the carriers should be required to set aside fixed portions of their gross annual incomes for depreciation, the percentage to be determined in each case by the Interstate Commerce Commission. This is an acknowledgment of the inadequacy of the present depreciation accounts, but why Commissioner Woolley should wish to change the method now in use and base the depreciation funds on the gross incomes rather than on the cost of the equipment and the structures is not quite clear.

C. A. Morse, speaking before the New York Railroad Club, advocated the establishment of freight and passenger rates sufficient to take care of depreciation as well as to meet the cost of operation and maintenance, for the purpose of replacing all wastes concurrently and thus keeping the railroads in a healthy condition. Some of the worst trouble experienced during the war was due to the fact that obsolescence and depreciation had not been properly cared for. It is from this viewpoint that the problem should be approached at the present time.

In the Interstate Commerce Commission system of accounting no fixed percentage has been specified for the depreciation reserve. In fact, until 1915 no provision was made for accumulating a depreciation fund for structures. It has been charged that the commission had no definite purpose in mind when the depreciation account was established, but included it merely as a convenience for roads that wished to use it. At the present time, depreciation rates on locomotives and cars vary from two per cent to six per cent. Very few roads have depreciation accounts for shop equipment, road equipment or structures.

The low rates of depreciation, and the entire absence of depreciation reserves in some cases cause many roads to charge a large percentage of the cost of retirements to operating expenses. While the more prosperous carriers have been able to meet these heavy charges and have kept the properties in efficient condition by frequent replacements, the poorer roads have continued to use old and uneconomical equipment as they were not financially able to make extensive renewals and have postponed improvements in the hope that future years would bring larger earnings.

Accrued depreciation not taken up in the depreciation account is a liability that will ultimately be reflected in the earnings of the carriers and in the efficiency of operation. If too low a rate is carried and renewals are inadequate, the net revenue will be high. It requires courage on the part of railroad officers to increase the depreciation rate, while net income is stationary or decreasing. The remedies for the evils resulting from inadequate depreciation rates is to be found in the fixing of depreciation rates within narrow limits by the Interstate Commerce Commission.

The Railroad Administration has taken the first step towards standardizing depreciation rates by specifying that 4½ per cent per annum shall be used for all equipment placed in service during 1918. If a fixed rate could be applied not only to equipment but also to roadway and structures, the carriers' accounts would more nearly reflect the true financial condition of the roads and the railroad industry would stand on a sounder economic basis.



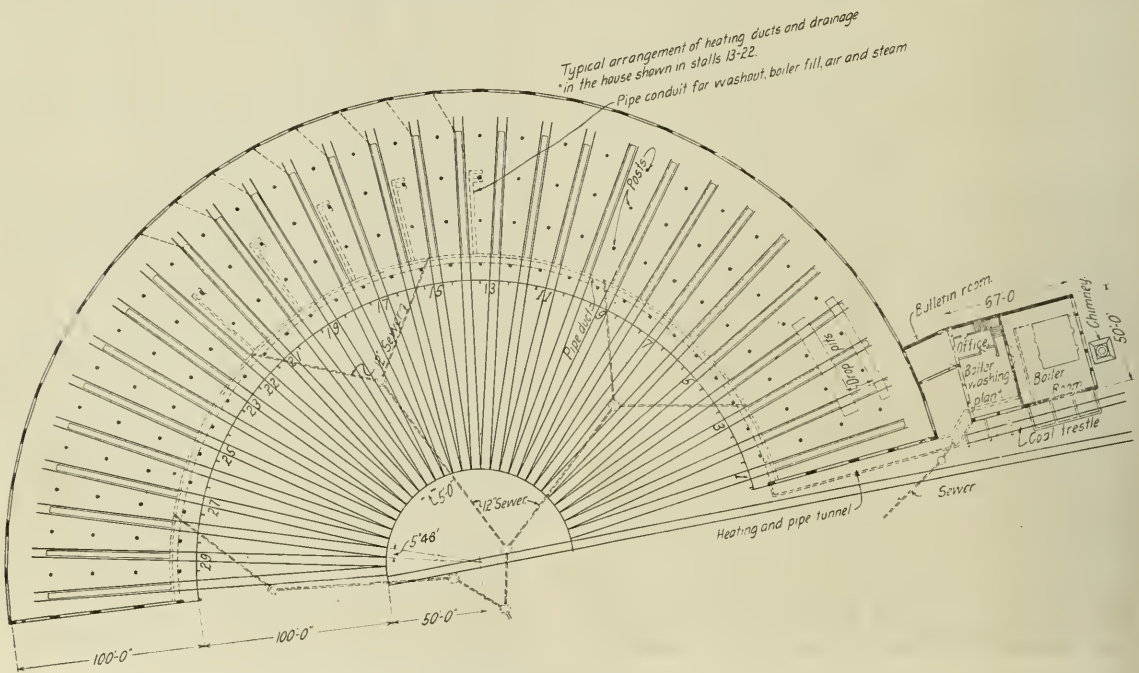
The Exterior of the Roundhouse

An Unusual Concrete Roundhouse at Proctor, Minn.

Saw Tooth Roof Applied to Circular Building; Cantilever Beams Support Walls Over Entrance Doors

By Wm. E. Hawley
Assistant Engineer, Duluth, Missabe & Northern, Duluth, Minn.

A NEW TYPE of reinforced concrete roundhouse has been completed and put into operation by the Duluth, Missabe & Northern at Proctor, Minn. The building, which was designed by the writer, introduces several novel features in roundhouse construction. Briefly these are saw-tooth roof construction applied to a circular building, the elimination of all beams which can form dead gas and smoke around the circle; unit construction of each stall so that the forms may be used over again in the construction of additional stalls, and cantilever construction to support the roof at the front entrance to the stalls, thereby reducing the column thickness at doors to mere I-beams to carry the door guides and give maximum clearances at the door entrances. With these features an effort was made to include the best



Ground Plan of the Roundhouse

pockets on the underside of the roof; large ventilation areas over each stall throughout their length; large lighting windows over each stall; all roof drainage towards the rear and conducted by interior downspout pipes so as to remove the concentration of water at entrances to stalls; steep roof slopes which remove the importance of absolutely tight roof coverings; expansion and contraction provisions in each stall in order that expansion and contraction will not accumulate points of previous designs of roundhouses of other railroads to give permanence and satisfactory operating service.

The importance of good, ample daylighting, electric lights at night, fresh air ventilation, smoke removal, resistance to corrosion and fire, complete piping service, and substantial construction were kept in mind during the designing. The results have fully justified the choice made although the first cost might have been kept lower by a simpler and less gen-

erous plan. As the railroad uses large and well equipped shops for the heavier engine repairs, it is not necessary to provide for any but the lighter repairs, upkeep and cleaning in the roundhouse. Excepting the saw-tooth roof windows and louvers, wood slat roller doors, and conduit covers of floors, fire resistant materials were used throughout. Wood was used for windows and doors because of its resistance to gases.

The plans were laid out for a 60-stall roundhouse with an entrance track and an exit track when the development of the terminal is completed, but only 30 stalls were built with the first construction. At the center of the layout there is a 100-ft. turntable designed for a 304-ton Mallet or a 233-ton Mikado type locomotive. The table is of the through plate girder type on a 500-ton center, designed by the American Bridge Company.

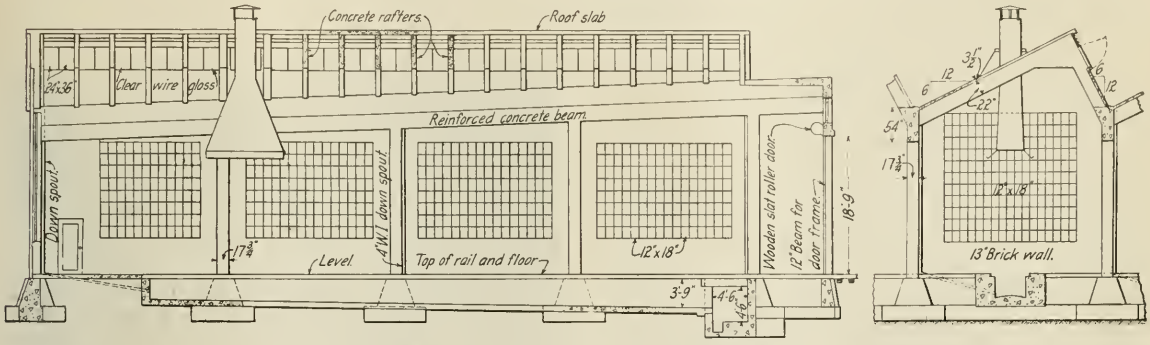
The inside face of the inside curve of the roundhouse is on a circle of 150-ft. radius and the inside face of the outside curve on a circle of 250-ft. radius. The angle between stall tracks is 5 deg. 44 min., giving 15-ft. center to center of door I-beams and 25-ft. center to center of columns on the outer circle with a stall length of 100 ft.

The 30 stalls are divided as follows: 20 with pits 64 ft. long, 7 with pits 71 ft. long and three with pits 71 ft. long, crossed by one driver and one truck drop pit. All pits have concrete side walls 30 in. thick, giving good jacking foundations. Concrete was used to pave the bottom of the pits.

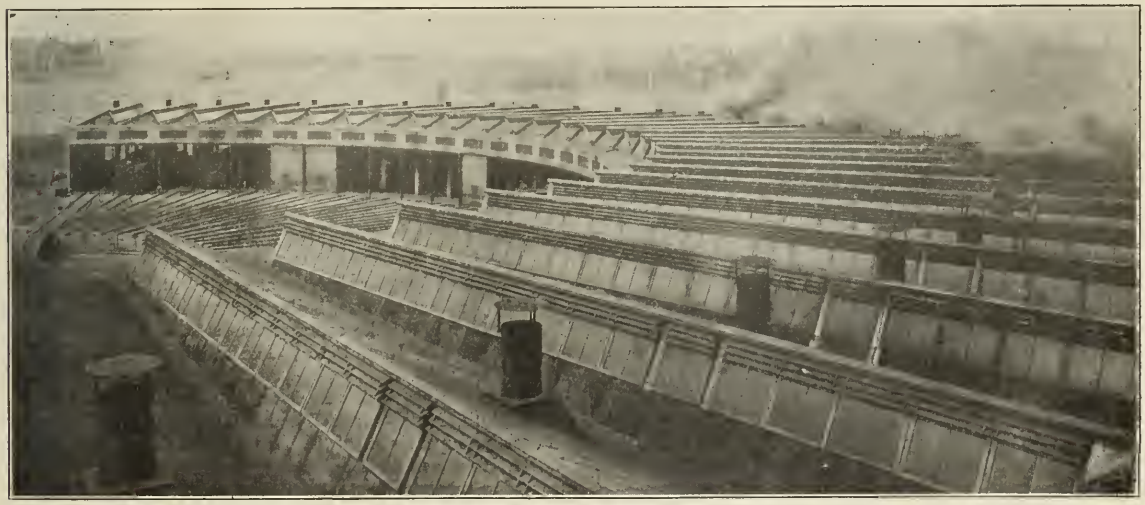
A pipe tunnel 4 ft. 6 in. by 4 ft. 6 in. with a lower extension or drainage channel 16 in. by 16 in. extends around the building at the inner end of the pits and connects with a tunnel leading to the boiler room. Branch conduits are constructed between every pair of stalls to provide for branch piping. The floor consists of six inches of concrete.

The foundation was a clay hard pan and required no piling. Four-inch drain tile, and 6-in. and 12-in. vitrified sewer pipes were installed to carry off the seepage and roundhouse waters. The drain channel in the pipe tunnel was laid without any grade and serves the purpose of catching cinders and waste matter, the water overflowing through screens to the sewers. Roof drainage is carried inside the building by 4-in. wrought iron pipes to the pits and discharged therein.

Between each stall there are five columns 17¾ in. square supporting the main roof girder beams. These columns are reinforced with four steel rods ¾ in. in diameter, wrapped with American Steel & Wire Company triangle mesh No. 23 (old style) in 48-in. widths, cut 62 in. long, using the ¼ in. wires as circumferential reinforcement. The main roof girder beams are 17¾ in. wide by 54 in. deep, reinforced with 11 steel rods 1⅛ in. in diameter and American Steel & Wire Company triangle mesh No. 23 (old style), laying the longitudinal wires down the sides and across the bottom of the beam for sheer reinforcement.



Longitudinal and Cross Sections of one of the Stalls



View of the Special Roof Construction

At the entrance end of the stall a cantilever beam 9 ft. 9 in. long, as an extension of the main roof beam, supports the front roof and front walls over the doors. Each of these front walls over the doors is in effect two cantilever beams balancing against one another and leaving expansion and contraction joints over the center of each stall door. The roof slab over this part has expansion joints and this provision with expansion slots in the main girder beams for roof rafters gives a complete line of expansion and contraction for the roof of each stall. As the building has an outside perimeter for 30 stalls of over 750 ft., it was deemed advisable to distribute contraction and expansion by providing for it in each stall. The adoption of the above cantilever construction, in addition to allowing narrow door posts, also reduces the damage which might be done because of anything on engines fouling the doors. It also brings one main column foundation wholly inside the building, away from uneven frost conditions.

The roof is supported by a simple set of concrete rafters, reinforced with ¾ in. diameter rods and designed rigid enough to carry strains to the expansion joint at the valley between roof slopes. By using rafters and providing ventilation slits at the top, all dead air and gas pockets were eliminated, a feature which is not secured in beam and joist designs for roofs. This design is expected to remove the trouble of corrosion of imbedded steel by locomotive gases and consequent shortening of life of structure. This design with the ample ventilation provided at the top has also eliminated the condensed moisture problem which has developed in other types of concrete roundhouses.

The large ventilation provided throughout the length of the saw-tooth roofs has improved the smoke conditions in the building and no difficulty has developed from the glass becoming covered with soot. The roof windows can all be swung out and washed by a man working in the valleys of the roof.

The roof is a 3½ in. concrete slab, reinforced with No. 23 triangle mesh laid with length wires spanning from rafter to rafter. The covering on the saw-tooth roof slopes is one layer of three ply Black Diamond prepared roofing and one layer of 3 ply double sanded Amazon roofing nailed to 1 in. by 2 in. sleepers brush treated with Barrett grade one liquid creosote oil. The roofing was laid and sealed with hot Barrett specification pitch. The roof valleys and flat roofs at the entrances to stalls are covered with 5 ply Barrett specification tarred felt and pitch with gravel. Sheet lead was used to make connections to downspouts and the outside metal flashing was galvanized sheets of No. 20 gage of Keystone copper bearing steel.

Standard roundhouse wooden slat roller doors were furnished by the J. G. Wilson Corporation. All small service doors in the roundhouse, office, boiler, boiler wash room, and locker room are Dahlstrom steel doors and frames. All windows except the saw tooth roof sash are Fenestra steel sash, glazed with ¼-in. wire glass. Ample ventilation sections are installed in each of the large windows. Dickinson cast iron smoke jacks of standard design are suspended from eyebolts placed in the concrete roof rafters.

The engine drop pits are provided with Watson Stillman hydro-pneumatic pit jacks using 45-ton 60 in. lift for the driver pit and 15-ton 54 in. lift for the front truck pit. Movable I-beam support the rails over the cross-pits. The National boiler washing system is installed throughout with blow-off main, washout and filling mains. The space for the boiler washing plant, steam boilers, and steam and vacuum pumps is provided in an adjacent building which also has office, locker, wash and toilet rooms for the employees.

All engine pits are heated by coils of five lines of 2-in. pipe of 140 lineal feet in each run, giving 440 sq. ft. of radiation surface per pit, and in 30 stalls, 13,013 sq. ft. of radiation. In addition there is distributed in cast iron wall radiation, 7,776 sq. ft., making a total radiation of 20,789 sq. feet for the building. The Webster system of steam circulation, using live steam under reduced pressure and vacuum pumps to maintain circulation, is used for this heating system.

All electric wiring is installed in pipe conduits and cast iron boxes placed in the concrete. Forty-watt Mazda lights are placed on each of the interior columns about 15 ft. above the floor with shallow reflectors to give distributed light along the sides of the engines. Suitable outlets are also provided to give chances for extension cords and hand lights for working under the engines.



Interior of the Roundhouse

The following is a part estimate of the material and work for one stall:

Approximate earth excavation	300 cu. yd.
Concrete in substructure	150 cu. yd.
Concrete in superstructure	97 cu. yd.
Steel rods in superstructure	10,586 lb.
Triangle mesh in superstructure	2,921 lb.
Concrete floor, 6 in. thick	1,300 sq. ft.
Brick wall, 13 in. thick	204 sq. ft.
Steel sash and glass	344 sq. ft.
Downspouts, 4 in. W. I. pipe	103 ft.
Steel beams and connections	1,400 lb.
Small steel angles, bolts, plates, etc	2,090 lb.
Roofing	22 squares
Drain and sewer tile.	
Electric conduit, wiring and fixtures.	
Pipe radiation	440 sq. ft.
Cast iron wall radiation	180 sq. ft.

The first preliminary work was started in December, 1915. Bids for the roundhouse, boiler and wash house were called for in May, 1916; the contract was signed on June 10 and work started in July, 1916. The contract was finished in November, 1917.

The designing work was done in the engineering office of the Duluth, Missabe and Northern by William E. Hawley under the supervision of H. L. Dresser, chief engineer and W. H. Hoyt, assistant chief engineer. The construction contract for the buildings was let to MacLeod and Smith of Duluth and was supervised by F. C. Baluss, engineer bridges and building of the railway. The National Boiler Washing Company installed the boiler washing system, and D. R. Black Company of Duluth had the contract for the heating system.

A fire at the Seaboard Air Line terminal, near Savannah, Ga., on February 14, destroyed large quantities of cotton, turpentine, rosin, nitrate of soda, and other freight, together with 30 or more freight cars; estimated loss $4,000,000.

Railroad Appropriation Bill Before the House

Needed to Enable Railroad Administration to Discharge Its Obligations—Director General Hines' Testimony

WASHINGTON, D. C.

THE HOUSE COMMITTEE on appropriations on Monday reported favorably a deficiency appropriation bill appropriating the $750,000,000 asked by the Railroad Administration to enable it to discharge its obligations as an addition to the $500,000,000 revolving fund provided in the federal control act and "subject in all respects to the same authority for, and restriction of expenditure as the said $500,000,000. On Tuesday a unanimous consent agreement was reached providing for the consideration of the bill in the House after the fortification bill is passed on, which will probably be this week.

Senator Cummins has announced that when the bill gets into the Senate he will propose as an amendment the bill he had previously introduced to take away the power of the President to relinquish railroads in less than 21 months after the proclamation of peace unless Congress specifically authorizes it.

The director general has estimated that the bill will provide $381,000,000 necessary to settle accounts with the railroad companies for 1918 and $368,000,000 for advances to railroads and waterways for capital expenditures in 1919, including $286,000,000 to pay for equipment ordered by the Railroad Administration last year, $20,000,000 for financing the Boston & Maine reorganization, $12,800,000 for inland waterways and a margin of $50,000,000. New capital expenditures for this year are estimated at $491,000,000, which includes $290,000,000 for additions and betterments and $201,000,000 for equipment—of which $109,000,000 is for equipment ordered by the railroads before 1918 and $92,000,000 is for new equipment of special types, such as cabooses and passenger cars, and for rehabilitation of existing equipment. It is proposed to deduct $150,000,000 from the compensation of the companies to be used for capital expenditures and it is estimated that they will be able to finance themselves about $290,000,000 in addition to meeting about $200,000,000 of maturities for this year.

Before reporting the bill the committee made public the printed report of the hearings in executive session before its subcommittee on deficiency appropriations, giving the testimony of Director General Hines, Secretary of the Treasury Glass, and Eugene Meyer, Jr., a director of the War Finance Corporation, which includes some interesting facts regarding the financial operations of the Railroad Administration heretofore unpublished.

May Be Deficit for 1919

The possibility of another deficit for 1919 was admitted by Mr. Hines in his testimony on February 5, in reply to a question by the chairman of the committee as to whether it is likely the railroads will be able to earn the guaranteed rental. "That is a particularly difficult question this year," Mr. Hines said, "on account of the unusually disturbing factors as to the volume of business and also because we are going through these processes of readjusting operating expenses. The outlook is that in the first six months there will be a considerable falling off in business. On the other hand, the outlook is for an extraordinarily large crop which could readily make an unusually large business in the fall. I should say that, everything considered, it looks now as if we could not reasonably expect any substantial surplus over the rental. We may find a moderate deficit under the rental, but I do not think it will be enough to affect the estimate one way or another for the appropriation. That may be very much upset unfavorably if there is a very radical falling off in business. On the other hand, it may turn out very much more favorably if there is in the latter part of the year a substantial increase in business."

In explaining the $200,000,000 deficit for 1918, Mr. Hines said the expenses were abnormal for various reasons aside from the increases in wages "made because of the competition in other lines of industry." He mentioned the expense of cleaning up the congestion, the inefficiency of inexperienced labor, the large amount of overtime, and the necessity for repairing cars in foreign line shops. He said it was impossible to segregate the parts of the wage increase due to overtime and the inefficiency of labor, but he filed a statement estimating the payroll for 1918, excluding the increases, at $1,822,793,000, and the increases at $583,552,000, or 32 per cent. The statement is as follows:

STATEMENT SHOWING ESTIMATED PAY ROLL CHARGES, EXCLUDING INCREASES DUE TO INCREASE IN RATES OF PAY FOR THE YEAR 1918, AND SHOWING ESTIMATED INCREASES DUE TO CHANGES IN RATES OF PAY AND COLLATERAL INCREASES MADE NECESSARY THEREBY

Operating expense account	Estimated pay roll charges, excluding increases	Total estimated increase	Per cent total increases over rates of December, 1917
Maintenance of way and structure..	$321,791,000	$96,290,000	29.9
Maintenance of equipment.....	433,594,000	201,898,000	46.6
Traffic expenses	24,508,000	3,620,000	14.8
Transportation	972,480,000	266,334,000	27.4
General expense	70,420,000	15,410,000	21.9
Total, all operating expenses.....	1,822,793,000	583,552,000	32.0

The statement does not include the effect of increases covered by supplements 12 and 13, which were promulgated in December, 1918, with regard to which reliable data are not available.

A previous estimate had placed the increase in payroll for the year at $642,000,000. Mr. Hines said he was satisfied that if federal control had not intervened there would have been a serious strike to force higher wages. He thought the real cost of the increased wages would be reduced in the future by rearrangement of the work so that a large part of the men will not have to work on Sunday as under the new wage scales they are paid for their time.

Another statement estimated the increase in revenues on account of the increased rates during the last half of the year at $145,731,178 in passenger revenue and $414,773,352 in freight revenue, a total of $560,504,530. G. H. Parker, assistant to the director general, estimated the standard return for all roads under federal control at $928,000,000 and for the Class I roads and large terminal companies at $900,904,552. The expenses of the Railroad Administration, which are not included in the returns of the Interstate Commerce Commission, were given as $3,528,946.

Mr. Hines said that for 1918 it had been estimated that $214,000,000 could be taken from the guaranteed rental to be used for capital expenditures without impairing the payment of interest and dividends, but that for 1919 it was estimated that only $150,000,000 could be so deducted, because of the probable increase of war taxes the companies must pay. Chairman Sherley asked why the government should appropriate money to loan to railroads while allowing them to continue paying dividends. Mr. Hines replied that if the administration should deduct against dividends there would be a general feeling that it involved a disregard of a very strong moral obligation on the part of the government and that the suspension of dividend payments would cause a state of disturbance. He expressed the opinion that by the

end of the year the companies, with comparatively few exceptions, will be able to finance themselves.

"Is that predicated on the belief that the increased rates will remain permanent?" asked the chairman.

No Prospect of Reduced Rates

"The question whether those rates can be reduced will be dependent largely upon the volume of business and the extent to which readjustments of operation will reduce operating cost notwithstanding the increased wages," said Mr. Hines. "I certainly do not make any prophecy that those rates are likely to be reduced in the near future, but on the basis of these rates my judgment is that when this year is passed the companies will be able to finance their additions and betterments; that this appropriation, while it is badly needed now and without it there would be very unfortunate consequences, will put the situation in shape where, even if federal control continues, it will take care of itself this year."

Appropriation Needed to Pay Bills

If Congress fails to make the appropriation, Mr. Hines said, the consequences, aside from the fact that the government would not be meeting its obligations, would be as follows:

"In the first place, not being able to settle with the railroad companies, they would be at once thrown into confusion in carrying on their own affairs with their bondholders and their stockholders, and it would be a most disturbing factor. It would be so at any time, but particularly so at a time immediately preceding the raising of another government loan.

"In the second place, it would very greatly interfere with the payment for this equipment, which is being constructed right along and being delivered very rapidly, the bills for which are due as equipment is delivered, and it would very seriously upset the ability of these manufacturing enterprises to make their settlements with their employees and to make their settlements with people from whom they have bought materials, and it would set in motion a general tightening of the situation which would be most prejudicial to the general interests of the government at any time.

"Now, there is another very important consequence, and that is this: If we got no appropriation or got an inadequate one, in addition to having to stand off the railroad companies on what we owe them, and the equipment companies on what we owe them, we would at once have to cut right down to the bone what we should expend for additions and betterments. Now, that would be at a time when the general government policy, evidently, is in favor of enlarging rather than cutting down the amount of work done, so as to help stabilize the industrial situation. It is perhaps not very bad yet, but it promises to get worse.

"There promises to be more unemployment, and to have that situation, which inevitably is unfavorable, accentuated by the Railroad Administration having to contract instantly and cut everything it does right down to the bone would be an exceedingly unfavorable factor. On the other hand, the prompt making of this appropriation would create a feeling of encouragement, and they would realize that the Railroad Administration was thereby put in a position to go ahead with a reasonable amount of improvement work and furnish additional employment and to develop a purchasing power which would be in the public interest.

"Even if the government should release the railroads this fall, and I doubt very much if there could be a relinquishment earlier than that," he said, the expenditures which he had indicated would be required in the interest of safety and obvious public convenience.

The Contract Situation

The number of standard contracts signed, Mr. Hines said, was 34 and 44 more were about ready to sign, while 23 others had been drawn and were in process of consideration. He said that as far as he knew, practically every company whose road has been taken over is relying on the making of the contract and the Railroad Administration is assuming the standard return will be paid to all of them. He submitted a statement of the contract situation as of January 26, showing that 101 contracts, providing for $599,190,646 of compensation, had been drawn by the Division of Law, 30 had been executed by both parties, 38 had been approved by the Division of Law and circulated among members of the administration staff for their opinion, 19 had been approved and sent to the companies to print and 14 had been drawn, but were awaiting the determination of special claims, etc. Since the statement was compiled four more had been signed. Of the total, 51 were with Class I roads, besides which probably 20 or more Class I roads were parties to the contracts as affiliated companies. In addition 13 short line contracts had been executed. The compensation provided for by the 34 signed contracts amounts to about $360,000,000.

No contracts had been executed, Mr. Hines said, which include any allowance for compensation in addition to the standard return, except in the case of the Missouri & North Arkansas, which had a very heavy abnormal loss in one of the three years of the test period and which had been allowed $161,230 in addition to its standard return of $13,146. No contract had been executed for less than the standard return. Eighty-two companies had made claims for excess compensation, amounting to $75,538,832 and claims amounting to $1,316,538 had been tentatively allowed. The director general filed the following statement of the claims for additional compensation:

SUMMARY OF SPECIAL CLAIMS FOR COMPENSATION, IN ADDITION TO THE STANDARD RETURN, FILED WITH UNITED STATES RAILROAD ADMINISTRATION TO FEBRUARY 6, 1919

Status	Number of claims	Amount of claim	Amount of allowance
Allowed in part	11	$6,419,875.82	$1,316,538.71
Denied	30	22,593,184.45	.....
Withdrawn	5	321,635.38	.....
Pending	36	46,204,136.44	(1)
Total	82	75,538,832.09	.....

[1] Not yet determined.

RECAPITULATION OF CLAIMS ALLOWED TO FEBRUARY 6, 1919, IN EXCESS OF STANDARD RETURN

Chicago, Milwaukee & St. Paul	$440,082.39
Missouri, Oklahoma & Gulf, approximate	250,000.00
Missouri & North Arkansas	161,230.00
New York, New Haven & Hartford, estimated	150,000.00
Kansas City, Mexico & Orient	140,026.61
International & Great Northern	129,259.18
Cumberland & Pennsylvania	19,885.50
Salina Northern	15,000.00
Van Buren Bridge Co.	11,055.03
Trinity & Brazos Valley	(1)
Gulf, Texas & Western	(1)
Total	$1,316,538.71

[1] No compensation.

CLAIMS FILED TO FEBRUARY 6, 1919

Denied:	
New York Central	$5,339,941.20
Chicago, Rock Island & Pacific	5,193,045.34
St. Louis-San Francisco	4,971,520.73
Great Northern	1,426,320.00
Minneapolis & St. Louis	1,073,680.75
Boston & Maine	809,624.34
Union Pacific	595,079.00
Chicago, Indianapolis & Louisville	470,808.12
Northern Pacific	437,579.28
Chicago, Terre Haute & Southeastern	392,856.95
Louisville & Nashville	341,776.40
San Antonio, Uvalde & Gulf	216,054.32
New Orleans, Great Northern	155,192.21
Norfolk & Western	189,700.09
Philadelphia & Reading	128,059.50
Waterloo, Cedar Falls & Northern	123,410.94
Louisiana & Arkansas	120,695.30
Ann Arbor	109,721.01
Bangor & Aroostook	107,170.24
Hudson & Manhattan	89,224.00
Lehigh & New England	57,520.45
Kansas City Southern	57,447.11
Toledo Terminal Co.	47,000.57
Port Reading	42,288.86
Galveston Wharf Co.	32,479.41
Vicksburg, Shreveport & Pacific	28,780.00
Detroit, Bay City & Western	18,000.00
Galveston, Houston & Henderson	9,458.00
Catasauqua & Fogelsville	8,107.52
Atlantic City R. R.	642.81
Total	$22,593,184.45

Withdrawn:	
Elgin, Joliet & Eastern	$115,756.01
Nashville, Chattanooga & St. Louis	78,230.47
Atlantic Coast Line	44,361.84
Ocean Steamship Co.	43,818.97
Central of Georgia	39,468.09
Total	$321,635.38
Pending.	
Missouri, Kansas & Texas System (3 claims)	$5,559,539.61
Southern	4,771,398.97
Missouri Pacific	4,383,736.12
Baltimore & Ohio	3,685,022.00
Western Pacific	3,344,916.01
Chicago & Eastern Illinois	3,244,463.00
Wheeling & Lake Erie	2,828,314.63
Wabash	2,731,368.00
Seaboard Air Line	2,538,726.00
Western Maryland	1,883,478.94
Carolina, Clinchfield & Ohio	1,758,227.53
Erie	1,547,698.39
Gulf Coast Lines	1,487,722.75
New York Connecting	1,469,758.80
St. Louis Southwestern	1,335,185.29
Fort Dodge, Des Moines & Southern	154,164.39
St. Louis Terminal Association	696,593.66
Evansville & Indianapolis	622,504.69
Illinois Central & Y. & M. V.	524,736.84
Norfolk Southern	476,595.43
Old Dominion Steamship Co.	325,000.00
Chicago Great Western	171,513.49
Atlanta, Birmingham & Atlantic	134,823.16
New York, Susquehanna & Western	98,461.02
Minneapolis, St. Paul & Sault Ste Marie	86,084.99
Port Townsend & Puget Sound	74,863.06
Ulster & Delaware	71,722.32
Farmers Grain & Shipping Co.	53,647.33
Escanaba & Lake Superior	46,311.99
Wrightsville & Tennille	38,407.17
Pacific Coast	35,222.28
Wildwood & Delaware Bay	15,562.75
Louisville & Wadley	5,760.60
Piedmont & Northern	2,605.23
Total	$46,204,136.44

Mr. Hines also filed with the committee a list of the Class I railroads that have been relinquished and are not being operated by the Railroad Administration, as follows: Arizona & New Mexico Railway Co., Bingham & Garfield Railway Co., Canadian Pacific Lines in Maine, Colorado & Wyoming Railway Co., Colorado Midland Railroad Co., Cripple Creek & Colorado Springs Railroad Co., Duluth, Winnipeg & Pacific Railway Co., Nevada Northern Railway Co., Pittsburgh, Shawmut & Northern Railroad Co., and Spokane International Railway Co., also a list of the Class II and Class III roads and switching and terminal companies that have been retained. The list included 96 Class II roads, 73 Class III roads and 136 switching and terminal companies.

Efforts to Resume Normal Basis

Since the armistice was signed, Mr. Hines said, the Railroad Administration has been trying to get the transportation service back to the normal basis and, realizing the probability that in the reasonably near future the railroads may go back to their owners, is endeavoring to give more consideration to individual railroads than during the war period, and to pursue a policy of considerateness so as not to interfere needlessly with the sort of traffic that would be handled by the corporation if it were in control of its own lines.

Asked whether it was proposed to adjust passenger service and rates back to normal, Mr. Hines said there is no thought of reducing the three-cent passenger rate, but that the three cents has no more purchasing power than the two cents before the war. The surcharge for Pullman passengers has been abolished and it will be the policy to give special rates where they will encourage an additional traffic that is profitable to carry, he said. As to freight rates, Mr. Hines said that it will be the policy to make rates that will develop traffic, but that it must be remembered that to a large extent, the increase in rates merely reflects the universal diminution in the purchasing power of money.

Mr. Hines said the railroad companies have a great many maturities to meet this year, but although they want assistance for that purpose, his policy is going to be that they will have to meet their own maturities as well as to finance largely the additions and betterments for 1919, but that until the next government loan is out of the way they would have difficulty in borrowing money to pay the $290,000,000 advanced to them for additions and betterments in 1918 and the $100,000,000 of temporary advances. Charles B. Eddy, who had been assistant general counsel, was recently appointed associate director of the Division of Finance and charged with the duty of taking up the accounts of the companies for the purpose of finding out their ability to finance themselves and of endeavoring to collect various amounts due the government.

Accounts With Corporations

As illustrating some of the administration's financial methods, Mr. Hines described the loan made to the New Haven, and the relations with the Atchison, Topeka & Santa Fe and the Illinois Central. On December 31 the administration owed the Atchison $38,000,000 on account of its rental, none of which had been paid, but it had expended for the company $22,385,000 for additions and betterments and the company owed it on open account $1,828,236. The administration cannot deduct the entire indebtedness of the company from the standard return, under the terms of the contract, because that would impair its ability to pay its interest, taxes, etc., but it can deduct $8,211,328, and after it has paid the balance, $30,000,000, it can require the company to borrow part of the money to pay it. The rental of the Illinois Central is $16,282,000, of which $2,000,000 was unpaid, and $24,830,199 of expenditures for additions and betterments had been made for its account, while the company owed the government $7,311,365 on open account. The total deduction that may be made is $1,125,144 and the net amount due the company was $932,230.

At the request of the committee Mr. Hines put into the record a statement of the accounts between the director general and the companies as of December 31, 1918, showing the net amount due the companies as $381,806,904, which is reproduced herewith.

He also filed an estimate of the capital expenditures made during 1918 which will have to be financed by the government, amounting to $290,918,283. The capital expenditures for the year for the Class I roads were $573,000,000, and it was estimated that $214,000,000 of surplus, after fixed charges and dividends had been paid from the standard return and other income, could be applied to their payment. As $68,000,000 was due the companies on open account this left a balance of $290,000,000.

Mr. Hines explained that the figures of $750,000,000 had been arrived at by taking the $381,000,000 required to settle accounts, $20,000,000 for the Boston & Maine, $12,800,000 for the inland waterways, and a margin of about $50,000,000. On this basis the companies will be required to finance about $291,000,000 of the program for 1919 in addition to $150,000,000 deducted from their compensation, and as they will have to finance something over $200,000,000 for maturities this year, this contemplates that the railroads during 1919 will be able to borrow in the open market something like $500,000,000. He thought that is all it is possible to hope they can do. In reply to questions, he said he hoped that in the latter part of this calendar year, if financial conditions are reasonably good, the government will begin to get back some of the money, but the administration will be needing it in the meantime.

Mr. Hines said that the economies effected by unified operation in 1918, so far as it has been possible to estimate them in money, have amounted to about $91,000,000 a year, which served in part to offset the abnormal costs that the railroads were subject to in time of war.

"Have you gotten to the point where you believe you are shaking down your organization into any greater efficiency than has heretofore existed?" asked the chairman.

"We are just getting to the point where processes of readjustment can be undertaken," said Mr. Hines, "and this

month the regional directors and federal managers are hard at work on that proposition and, I might say, with a great deal of co-operation from labor. They are trying to adjust things to the basis that ought to exist after the cessation of hostilities."

Chairman Sherley said there seems to be a general impression that there is a complete demoralization existing in all branches of the railroad service. Mr. Hines said he thought the state of relaxation that came about after the signing of the armistice and the natural state of inquiry as to what would happen to the railroads have tended to produce a situation of that sort which will be cleared up largely as soon as we can know something definite as to what is to happen to the railroads.

In connection with questions asked about the status of the short line railroads which were relinquished, Director General Hines filed a statement giving an estimate of the amount of the probable obligation of the Railroad Administration in connection with the co-operative short line contracts as $2,500,000. This includes $500,000 for adjustments of per diem and $2,000,000 for adjustments of traffic.

Mr. Hines said the appropriation was imperatively needed to meet current payments for equipment and additions and betterments. On account of the shortage in its cash, the Rail-

APPROXIMATE STATEMENT OF ACCOUNT BETWEEN DIRECTOR GENERAL AND RAILROADS AS OF DECEMBER 31, 1918

	Due companies.				Due companies on open account (column 2) which can be applied to additions and betterments.	Deductions.			Net amount due companies.
	Balance due on compensation.	Due companies on open accounts.	Total due companies.	Amounts which can be deducted from income.		Due Government on open account.	Credit for material and supplies.	Total deductions.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Alabama & Vicksburg	$259,854	$487,722	$747,576	$21,040	$116,916			$137,956	$609,620
Alabama Great Southern	1,430,513	616,089	2,046,602	342,266	526,121			868,387	1,178,215
Ann Arbor	170,083		170,083	145,769		$305,691	*$305,691*	145,769	24,314
Arizona Eastern	1,242,475	261,332	1,503,807	180,836				180,836	1,322,971
Atchison, Topeka & Santa Fe	38,366,042		38,366,042	8,211,328		1,828,236	*1,828,236*	8,211,328	30,154,714
Atlanta & West Point	252,995		252,995	78,715		192,503	*192,503*	78,715	174,280
Atlanta, Birmingham & Atlantic	238,058	158,122	396,180		158,122			158,122	238,058
Atlantic & St. Lawrence		348,128	348,128		239,939			239,939	108,189
Atlantic City	222,066		222,066			300,162	*222,319*	77,843	144,223
Atlantic Coast Line	8,980,915	1,593,396	10,574,311	2,442,842	1,593,396			4,036,238	6,538,073
Baltimore & Ohio, including coal and coke	5,469,215	2,823,163	8,292,378	5,086,318	2,823,163			7,909,481	382,897
Bangor & Aroostook	962,775	8,876	971,651	40,104	8,876			48,980	922,671
Beaumont, Sour Lake & Western		68,477	68,477		47,863			47,863	20,614
Bessemer & Lake Erie	4,674,714	481,360	5,156,074	2,176,648	481,360			2,658,008	2,498,066
Boston & Maine	7,211,075	807,320	8,018,395	1,842,271	807,320			2,649,591	5,368,804
Buffalo & Susquehanna	592,628	50,850	643,478	8,696				8,696	634,782
Buffalo, Rochester & Pittsburgh	976,410	224,272	1,200,682		224,272			224,272	976,410
Carolina, Clinchfield & Ohio	1,585,157		1,585,157	397,496		267,547	*267,547*	397,496	1,187,661
Central of Georgia	2,500,903		2,500,903	333,684		2,182,363		2,516,047	*15,144*
Central New England	978,124		978,124	358,721		250,104	*250,104*	358,721	619,403
Central R. R. of New Jersey	8,102,301		8,102,301	4,258,645		156,474	*156,474*	4,258,645	3,843,656
Central Vermont	194,098		194,098			457,860	*457,860*		194,098
Charleston & Western Carolina	466,921	271,092	738,013	36,063				36,063	701,950
Chesapeake & Ohio	5,176,983		5,176,983	2,612,838		2,434,672	*2,434,672*	2,612,838	2,564,145
Chicago & Alton	1,718,315		1,718,315			2,460,937	*1,322,195*	1,128,742	589,573
Chicago & Eastern Illinois	2,274,383	1,996,961	4,271,344		1,996,961			1,996,961	2,274,383
Chicago & Erie	225,129		225,129			765,157	*765,157*		225,129
Chicago & North Western	14,201,016		14,201,016	4,093,412		3,168,364	*3,168,364*	1,093,412	10,107,604
Chicago, Burlington & Quincy	22,710,683	961,187	23,671,870	11,579,651				11,579,651	12,092,219
Chicago, Detroit & Canada, G. T. junction	195,203		195,203	105,682				105,682	89,521
Chicago Great Western	1,772,790		1,772,790	531,441		499,110	*499,110*	531,441	1,241,349
Chicago, Indianapolis & Louisville	20,259		20,259	482,869		933,436	*933,436*	482,869	*462,610*
Chicago, Milwaukee & St. Paul	20,022,551		20,022,551	3,174,635		6,300,697	*6,300,697*	3,174,635	16,848,516
Chicago, Peoria & St. Louis	127,540		127,540			318,269	*150,778*	187,491	*59,951*
Chicago, Rock Island & Pacific and Chicago, Rock Island & Gulf	14,183,891		14,183,891	1,021,880		10,618,594	*9,792,282*	1,848,192	12,335,699
Chicago, St. Paul, Minneapolis & Omaha	2,484,790		2,488,790	948,950		1,669,282	*1,669,282*	948,950	1,535,840
Chicago, Terre Haute & Southeastern	534,873		534,873	114,531		282,617	*282,617*	114,531	420,342
Cincinnati, Indianapolis & Western	272,210	90,654	362,867	197,718	90,654			288,372	74,495
Cincinnati, New Orleans & Texas Pacific	2,821,690	1,393,321	4,215,011	1,430,957	375,933			1,806,890	2,408,121
Cincinnati Northern	317,628		317,628	110,854		67,573	*67,573*	110,854	206,774
Cleveland, Cincinnati, Chicago & St. Louis	2,988,597		2,988,597	4,209,151		1,799,247	*1,799,247*	4,209,151	*1,220,554*
Colorado & Southern	996,212	627,217	1,623,429	372,910				372,910	1,250,519
Cumberland Valley	1,228,967		1,228,967	547,838		66,626	*66,626*	547,838	681,129
Delaware & Hudson	1,119,600		1,119,600	1,465,313		1,523,839	*1,523,839*	1,465,313	*345,713*
Delaware, Lackawanna & Western	11,749,477		11,749,477	3,628,602		6,231,774		9,860,376	1,889,101
Denver & Rio Grande	2,319,377		2,319,377	1,319,426		803,976	*803,976*	1,319,426	999,951
Denver & Salt Lake	292,290		292,290			55,578	*55,578*		292,290
Detroit & Mackinac	235,664		235,664	912		198,831	*198,831*	912	234,752
Detroit, Toledo Shore Line	356,512	77,780	434,292	109,460				109,460	324,832
Detroit, Grand Haven & Milwaukee	146,644		146,644						146,644
Detroit, Toledo & Ironton	*124,981*		*124,981*	67,775		328,917	*262,324*	134,368	*259,349*
Duluth & Iron Range	2,355,142	1,291,447	3,646,589	722,578				722,578	2,924,011
Duluth, Missabe & Northern	5,122,051	843,500	5,965,551	1,366,593				1,366,593	4,598,958
Duluth, South Shore & Atlantic	444,637	156,717	601,354		77,485			77,485	523,869
Elgin, Joliet & Eastern	2,862,177		2,862,177	797,984		422,858	*422,858*	797,984	2,064,193
El Paso & Southwestern	4,145,102	1,754,316	5,899,418	275,932	1,754,316			2,030,248	3,869,170
Erie	1,503,939	7,898,264	9,402,203	4,942,667				4,942,667	4,459,536
Florida East Coast	2,192,842		2,192,842	992,958		992,446	*992,446*	992,958	1,199,884
Fort Worth & Denver City	1,272,386	2,180,877	3,453,263	162,811				162,811	3,290,452
Fort Worth & Rio Grande	1,000		1,000			99,789	*4,044*	95,745	*94,745*
Galveston, Harrisburg & San Antonio	3,230,645		3,230,645	87,380		10,887	*10,887*	87,380	3,143,265
Georgia Railroad	549,622		549,622	139,963		114,388	*114,388*	139,963	409,659
Georgia Southern & Florida	231,457		231,457	64,511		241,732	*241,732*	64,511	166,946
Grand Rapids & Indiana	929,385		929,385	96,852		501,295	*501,295*	96,852	832,533
Grand Trunk Western	312,994	1,868,243	2,181,237		1,324,309			1,324,309	856,928
Great Northern	21,866,681		21,866,681	11,782,978		4,726,355	*4,726,355*	11,782,978	10,083,703
Gulf & Ship Island	397,456		397,456			127,340	*127,340*		397,456
Gulf, Colorado & Santa Fe	2,824,174		2,824,174			1,624,380	*1,624,380*		2,824,174
Gulf, Mobile & Northern	158,338		158,338	532,892				532,892	*374,554*
Hocking Valley	1,637,167		1,637,167	708,510		10,525	*10,525*	708,510	928,657
Houston & Texas Central	1,717,506		1,717,506	157,835		5,091	*5,091*	157,835	1,559,671
Houston East & West Texas	375,566		375,566	29,352		91,600	*91,600*	29,352	346,214
Hudson & Manhattan	1,933,114		1,933,114			591,289		591,289	1,341,825
Illinois Central	2,057,374		2,057,374	1,125,144		7,311,365	*7,311,365*	1,125,144	932,230
International & Great Northern	917,731		917,731			227,719	*227,719*		917,731
Kanawha & Michigan	995,141		995,141	484,369		140,358	*140,358*	484,369	510,772
Kansas City, Mexico & Orient (including K. C., M. & O. of Texas)	50,000	21,090	71,090		11,064			11,064	60,026
Kansas City Southern	2,131,698		2,131,698	750,597		1,107,565		1,858,162	273,536
Lake Erie & Western	1,078,542		1,078,542	748,481		709,823	*709,823*	748,481	330,061
Lehigh & Hudson River	446,371	8,590	454,961	157,057	8,590			165,647	289,314
Lehigh & New England	610,761		610,761	155,236		448,586		603,822	6,939
Lehigh Valley	9,321,233	129,595	9,450,828	2,384,172	129,595			2,513,767	6,937,061
Long Island	2,611,949		2,611,949	262,622		2,656,593		2,919,215	*307,266*
Los Angeles & Salt Lake	2,245,417		2,245,417	892,117		821,250	*821,250*	892,117	1,353,300

road Administration, he said, was able to pay only about $25,000,000 on equipment in January, whereas it ought to pay at the rate of about $50,000,000 per month so that it is holding back bills that ought to be paid. The whole amount of $286,000,000 ought to be paid by the month of June and the current program for additions and betterment work would run at the rate of about $50,000,000 per month.

Appropriation Approved by Treasury Department

Carter Glass, Secretary of the Treasury, testified as to the general financial situation, urging the necessity for the appropriation to avoid disturbance of the financial operations of the government which might result if the railroads were required to attempt to finance themselves and failed to do so. The Treasury Department, he said, was very earnestly in favor of the appropriation because it thinks that if the railroads were compelled to go into the open market it would have a disturbing effect on the next Liberty loan and that if the appropriation is not made it will have a very distressing and demoralizing effect upon business generally.

Eugene Meyer, Jr., a director of the War Finance Corporation, expressed the opinion that if the appropriation is

APPROXIMATE STATEMENT OF ACCOUNT BETWEEN THE DIRECTOR GENERAL AND THE RAILROAD COMPANIES AS OF DECEMBER 31, 1918

	Due companies.				Due companies on open account (column 2) which can be applied to additions and betterments.	Deductions.			Net amount due companies.
	Balance due on compensation.	Due companies on open accounts.	Total due companies.	Amounts which can be deducted from income.		Due Government on open account.	Credit for material and supplies.	Total deductions.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Louisiana & Arkansas	$357,987	$16,172	$374,159	$9,394	$13,859			$23,253	$350,906
Louisiana Western	895,178		895,178	29,175		$543,244		572,419	322,759
Louisville & Nashville	14,310,495	227,725	14,538,220	4,945,076	227,725			5,172,801	9,365,419
Louisville, Henderson & St. Louis	326,416		326,416	123,501				123,501	202,915
Maine Central	1,925,697	21,392	1,947,089	288,124	21,392			309,516	1,637,573
Michigan Central	*197,873*		*197,873*	1,860,857		2,638,149	*$2,638,149*	1,860,857	*2,058,730*
Midland Valley	174,346	146,931	321,277	16,165	146,931			163,096	158,181
Mineral Range	147,432		147,432	411		466,575	*262,449*	204,537	*57,106*
Minneapolis & St. Louis	744,857		744,857	259,995		1,744,308		2,004,303	*1,259,446*
Minneapolis, St. Paul & Sault Ste. Marie	7,648,523		7,648,523	789,088		916,424	*916,424*	789,088	6,859,435
Missouri & North Arkansas	13,146	213,391	226,540		19,490			19,490	207,050
Missouri, Kansas & Texas	3,795,303		3,795,303	1,290,536		1,740,396	*1,740,396*	1,290,536	2,504,767
Missouri, Kansas & Texas of Texas	621,773		621,773			2,595,815	*2,595,815*		621,773
Missouri Pacific	9,673,883		9,673,883	2,367,618		9,123,659		11,491,277	*1,817,394*
Mobile & Ohio (including Southern Railway in Mississippi)	1,699,203		1,699,203	388,834		1,488,184	*1,488,184*	388,834	1,310,369
Monongahela	283,086	125,077	408,163	170,516	125,077			295,593	112,570
Morgan's Louisiana & Texas	1,188,526		1,188,526	313,759		299,334	*299,334*	313,759	874,767
Nashville, Chattanooga & St. Louis	3,182,089	51,534	3,233,623	821,377	51,534			872,911	2,360,712
New Orleans & Northeastern	811,631	713,853	1,525,484	426,061	373,007			799,068	726,416
New Orleans & Great Northern	455,952		455,952	74,496		354,885	*174,877*	255,004	200,948
New Orleans, Texas & Mexico	42,673	1,282,002	1,324,675	31,681				31,681	1,292,994
New York Central	2,552,631	720,991	3,273,622	13,122,120	720,991			13,843,111	*10,569,489*
New York, Chicago & St. Louis	1,209,082		1,209,082	98,605		1,039,767	*1,039,767*	98,605	1,110,477
New York, New Haven & Hartford	14,917,128		14,917,128	3,639,354		6,920,884	*6,920,884*	3,639,354	11,277,774
New York, Ontario & Western	1,528,589	744,972	2,273,561	210,558				210,558	2,063,003
New York, Philadelphia & Norfolk	836,051	95,229	921,280	274,377				274,377	646,903
New York, Susquehanna & Western	690,587		690,587	225,071		80,468	*80,468*	225,071	375,516
Norfolk & Western	15,284,163	2,840,310	18,124,473	7,395,555	2,840,310			10,235,865	7,888,608
Norfolk Southern	453,991		453,991	151,454		165,967	*165,967*	151,454	302,537
Northern Pacific	24,557,760		24,557,760	10,876,765		4,126,335	*4,126,335*	10,876,765	13,680,995
Northwestern Pacific	1,235,101		1,235,101			299,495	*299,495*		1,235,101
Oregon Short Line	10,196,750		10,196,750	169,853		2,946,819	*2,946,819*	169,853	10,026,897
Oregon-Washington R. R. & Navigation Co.	4,519,352		4,519,352	275,849		3,906,779		4,182,628	336,724
Pan Handle & Santa Fe	1,330,482	147,752	1,478,234	31,927	147,752			179,679	1,298,555
Pennsylvania, lines west	10,996,785	4,286,888	15,283,673	5,951,722	4,286,888			10,238,610	5,045,063
Pennsylvania, lines east	2,673,495	38,730,527	41,404,022	12,726,912	38,730,527			51,457,439	*10,053,417*
Pittsburgh, Cincinnati, Chicago & St. Louis	7,844,094	1,910,367	9,754,461	854,899	1,910,367			2,765,266	6,989,195
Pere Marquette	2,893,196	1,921,148	4,814,344	770,599	1,921,148			2,691,747	2,122,597
Philadelphia & Reading	9,778,331		9,778,331	4,070,758		2,092,451	*2,092,451*	4,070,758	5,707,573
Pittsburgh & Lake Erie	5,880,219	170,642	6,050,861	2,650,404				2,650,404	3,400,457
Pittsburgh & Shawmut	*45,683*	137,772	92,089	242,261	94,609			336,870	*244,781*
Pittsburgh & West Virginia	237,010	234,385	471,395	589,799				589,799	*118,404*
Port Reading	235,698		225,698			331,127		331,127	*95,429*
Richmond, Fredericksburg & Potomac	1,077,374		1,077,374	137,512		758,866		896,378	180,996
Rutland	782,883		782,883	371,083		108,646	*108,646*	371,083	411,800
St. Joseph & Grand Island	373,811		373,811	138,969		169,948	*169,948*	138,969	234,842
St. Louis, Brownsville & Mexico	983,890		983,890	41,598		19,198	*19,198*	41,598	942,292
St. Louis-San Francisco	9,440,213		9,440,213	401,859		6,144,569	*5,680,038*	866,390	8,573,823
St. Louis, San Francisco & Texas						141,331	*141,331*		
St. Louis Southwestern	2,085,749		2,085,749	1,011,808		2,535,340	*1,026,627*	2,520,521	*434,772*
St. Louis Southwestern R. R. of Texas	555,165		555,165			376,145	*376,145*		555,165
San Antonio & Aransas Pass	320,052		320,052			119,323	*119,329*		320,052
Seaboard Air Line	1,822,025		1,822,025	302,392		2,903,073	*2,903,073*	302,392	1,519,633
Southern Pacific	22,021,038		22,021,038	5,376,977		8,089,161	*8,089,161*	5,376,977	16,644,061
Southern	14,435,980		14,435,980	3,545,233		9,850,294	*9,850,294*	3,545,233	10,890,747
Spokane, Portland & Seattle	1,871,083		1,871,083			716,446	*716,446*		1,871,083
Staten Island Rapid Transit	358,857	355,282	714,139	126,582	355,282			481,864	232,275
Tennessee Central	147,734		147,734			209,858	*127,105*	82,753	64,981
Texarkana & Fort Smith	318,729		318,729			227,400	*227,400*		318,729
Texas & New Orleans	715,135		715,135	28,689		110,711	*110,711*	28,689	686,446
Texas & Pacific	3,198,182		3,198,182	2,450,778		1,898,649	*1,898,649*	2,450,778	747,404
Toledo & Ohio Central	516,651	582,840	1,099,491	425,687	582,840			1,008,527	90,964
Toledo, Peoria & Western	149,740	107,425	257,165	15,866	10,275			26,141	231,024
Toledo, St. Louis & Western	994,294		994,294			342,610	*342,610*		994,294
Ulster & Delaware	58,009	22,547	80,556		22,547			22,547	58,009
Union Pacific	10,200,009		10,200,009	7,622,831		498,607	*498,607*	7,622,831	2,577,178
Vicksburg, Shreveport & Pacific	95,948	467,177	563,125	36,863	75,730			112,593	450,532
Virginian	2,347,603	1,048,384	3,395,987	1,658,885	1,048,384			2,707,269	688,718
Wabash	2,212,772		2,212,772	2,525,058		4,811,057		7,336,115	*5,123,343*
Washington Southern	428,433		428,433	73,463		276,699	*245,580*	104,582	323,851
Western Maryland	1,521,593	958,803	2,480,396	586,733	958,803			1,545,536	934,860
Western Pacific	1,900,350	465,919	2,366,259	1,202,259	465,919			1,668,178	698,091
Western Railway of Alabama	178,238	257,004	435,242	8,491	257,004			265,496	169,747
West Jersey & Seashore	952,682		952,682	76,548		1,531,156		1,607,704	*655,022*
Wheeling & Lake Erie	886,037		886,037	521,203		7,619	*7,619*	521,203	364,834
Wichita Falls & Northwestern	145,245		145,245			170,417	*33,916*	136,501	8,744
Wichita Valley	352,367	72,439	424,806	20,639				20,639	404,167
Yazoo & Mississippi Valley	3,862,318		3,862,318	1,721,583		2,030,886		3,752,469	109,849
Miscellaneous	2,684,959	20	2,684,979	11,336,857		*20*	14,330,515	25,667,362	*22,988,373*
Total	531,575,499	88,576,861	620,152,360	214,211,190	68,204,646	157,320,724	*100,000,000*	339,736,560	280,415,800
Depreciation and retirements, all companies	100,000,000		100,000,000						100,000,000
Difference account of use of round figures in credit for materials and supplies							*1,391,104*	*1,391,104*	1,391,104
Grand total	631,575,499	88,576,861	720,152,360	214,211,190	68,204,646	157,320,724	*101,391,104*	338,345,456	381,806,904

passed the railroads will be in a better position to do without the money than they will if it is not passed because the appropriation will restore credit to the railroads. He said it is well known among investors and bankers that the Railroad Administration faces a difficulty in carrying out its contracts with the railroads and that the credit of the securities of the railroads is impaired by knowledge of that condition. "In other words," he said, "the ability to get the money from the government will make it easy to get the money from the investors and that is a very important factor, not only as to the quantity of money that the railroads may call for from the government, but also the rate of interest to the railroads. He thought that a fair amount of money can be had from the market by the better railroads, provided the Railroad Administration is in a proper position to live up to its contracts."

In September, Mr. Meyer said, the matter of railroad loans was called to the attention of the War Finance Corporation and it passed a general resolution undertaking to help the railroads. Up to that time the railroads had not applied to it for any help, but subsequently a number of roads applied for assistance and the corporation has loaned about $70,000,000 to railroads. Some of the money was used to repay advances which they had obtained from the Railroad Administration, some was used to meet current corporate needs, and some to meet maturing obligations. The Baltimore & Ohio had recently asked for $14,750,000 and the War Finance Corporation agreed to take the loan, but the offer of assistance enabled it to get the money elsewhere.

Acute Railway Situation Demands Prompt Action*

New Revolving Fund Should Be Provided; Extra Sessions of Congress Should Be Called to Pass Needed Legislation

By Samuel O. Dunn
Editor of the *Railway Age*

IN THE BRIEF ADDRESS I shall make I shall try to outline the present situation in the railway field, and also show how the way in which it is handled will affect the workers and the industries of the country, both during the period of readjustment we are in, and after it has passed.

For more than three years, beginning in the fall of 1915 and ending in the fall of 1918, the available traffic taxed, and even overtaxed, the facilities of our railways. Since the armistice was signed there has been a sharp reduction of traffic. This is still going on, and there is now a nominal surplusage of railway facilities and capacity.

During the period when the movement of traffic was so large there occurred an enormous increase in the cost of operating the railways and of providing new facilities. Most of this increase occurred in the year 1918. The increase in expenses last year was partly due to advances in the prices of fuel and materials, and partly to a decline in the efficiency of operation, but mainly to very large advances in the wages of labor. Since January 1, 1918, under government operation, advances in wages amounting to over $800,000,000 a year have been made. Advances amounting to $350,000,000 a year had been made in 1916 and 1917. Therefore, the advances within these three years amount to approximately $1,150,000,000 per year. This is more per year than the largest net operating income the railways have ever earned, and exceeds by at least 50 per cent the largest amount of interest and dividends they ever paid on their capitalization. The average annual wage of a railway employee in 1915 was approximately $850; in 1917 it was over $1,000. It is now close to $1,500.

The enormous increase in the cost of making additions and betterments on the railways, and even of maintaining them, would tend to cause their owners to hesitate to make large expenditures at this time, even though the management of the roads were in their hands. But the management is now in the hands of the government.

This combination of extremely high costs, with private ownership and government operation, is aggravated by complete uncertainty as to how long government operation of the railways will be continued. If it were certain that they would be returned soon to the management of their owners, and the terms on which they were to be returned were settled, the companies would have an incentive to encourage and help provide funds for needed maintenance and improvement work. If it were settled that government operation was going to be continued for a long period or indefinitely, the government would have an incentive to proceed with an adequate program of maintenance and additions and betterments. But the government doesn't know how long it is going to keep the properties; the companies don't know when or whether they are going to get them back; and both, as long as there is such uncertainty and divided responsibility, are disposed to keep expenditures down as much as practicable.

The result is, that the maintenance work being done or prepared for is not sufficient to keep the properties in their present condition, much less improve it. As to addition and betterments, no program for 1919 is in preparation, or is contemplated, which would cause as large an expansion of railway facilities as occurred annually during the years immediately preceding the Great War, in spite of the fact that in those years the expansion of facilities had declined greatly as compared with that of earlier years.

Situation Causing Unemployment

The state of affairs I have outlined, as long as it lasts, must have the effects of depressing American industry in general, and of substantially increasing unemployment. The railways normally employ about 2,000,000 men. There has been a marked decrease in the average efficiency of their employees and a large increase in the number of them under government operation. The heavy decline in traffic which has been occurring since the armistice was signed ought to result in a sharp reduction in the number of employees engaged in handling traffic. The public has to pay the cost of railway operation, and to keep on the payroll men whose services are not needed would be to impose upon the public an indefensible burden of expense. If, besides discharging men who have become unnecessary because of the decline of traffic, the railways shall also refrain from doing maintenance and improvement work which is needed, it is evident that, being such very large employers, the railways will

*An address delivered before the Union League Club of Chicago on February 11.

directly contribute largely toward causing unemployment.

They will, by following this course, contribute indirectly even to a larger extent toward causing unemployment. The railways, beside employing approximately 2,000,000 men themselves, normally make purchases of equipment and supplies amounting to about $1,000,000,000 annually from concerns which are themselves large employers of labor. Probably the railway equipment and supply manufacturers normally employ almost as many men as the railways. The equipment and supplies the railways buy are used in operation; in the maintenance of their permanent way and structures and rolling stock; and in making additions to and improvements in their facilities. By curtailing their outlays for maintenance, and for additions and improvements, the railways will curtail their purchases of equipment and supplies; and by curtailing their purchases, they will render it necessary for manufacturers of equipment and supplies to restrict their purchases of materials and to reduce the number of their employees.

Thus, directly and indirectly, the policy of drastic retrenchment which is being adopted on the railways tends very strongly to cause general industrial depression and to increase unemployment, not only in the railroad business, but in many other important lines of industry.

Is Railway Retrenchment Justifiable?

There are certain arguments which might conceivably be advanced in defense of the present policy of retrenchment.

One is that railway properties are now in a good state of repair and do not need large expenditures for maintenance, and that present railway facilities are sufficient to handle, not only present business, but to develop and handle all the business which the welfare of the country may demand that they shall develop and handle in the comparatively near future.

Everybody familiar with conditions in the railroad industry and in business in general knows, however, that this argument would be without foundation. The railroads are not in a good state of repair. Some of them were not being normally or adequately maintained when government operation was adopted, and, as a whole, although there has been an enormous increase of expenses, they have not been normally or adequately maintained since government operation was adopted. The amount of new rail laid has been millions of tons less than was normally laid before the war. The renewals of ties have been tens of millions less annually than they should be. As a result of these and other things of like nature, the tracks of many railways are not up to their normal condition. It is fortunate for the Railroad Administration and the public that we have had a mild winter. If we had had such severe weather this winter as we had last winter, we probably should have had a very bad series of wrecks due to rail breakages and other failures of track.

The general condition of freight cars is relatively worse still. The normal number of new cars has not been bought for several years, and the normal number of old cars has not been retired. In consequence, there are at least 100,000 freight cars that are reported as "in service" which, under the conditions existing before the war, would have been "scrapped" because it would have been cheaper to have replaced them than to have operated them. Furthermore, there has been a serious deterioration of freight cars in general, and there are hundreds of thousands of them that need heavy repairs.

Not only are existing railway facilities not in a satisfactory condition, but there has been an abnormally small increase of facilities for several years. Formerly we built about 5,000 miles of new railway annually. During the entire last five years we have built only 5,263 miles of new line; and in 1917, and again in 1918, more miles of railway were torn up or abandoned than were built. Now, there are some parts of the country in which, as a result of competitive construction, there is more railway mileage than is needed. But there are much larger parts of the country which have not enough railway mileage, or none at all. The resources of those parts of the country can never be fully developed, they can never be inhabited by the number of people they are potentially capable of sustaining, until they are provided with a larger mileage of railroads.

The needs of the public with respect to the railroads are not confined to the adequate maintenance of those existing and the construction of new lines. Experience has demonstrated that the present productive capacity of the country exceeds the transportation capacity of the existing railways, and that therefore extensive improvements in and additions to the facilities of the existing lines must be made to enable them to handle the country's traffic in periods of heavy business. In 1915 and 1916, before this country entered the Great War, the freight traffic overtaxed the facilities of the railways. In 1917, after we entered the war, the railways, under the Railroad's War Board, tried, by better co-ordination of their efforts, to handle all the available business, and they succeeded in handling a largely increased amount, but still they were unable to handle all that was offered to them. It was expected by many that, under unified government operation, there would be a very large increase in the business handled, but the number of passengers carried in 1918 was only 8 per cent greater and the amount of freight moved was only 2 per cent more than in 1917, in spite of an increase of at least $1,250,000,000, or over 40 per cent, in the operating expenses incurred.

Railway Rehabilitation and Expansion Needed

In view of all this experience, we are amply justified in reaching the conclusion that our existing railway facilities are incapable, under any system of operation, of satisfactorily handling all the business that our existing productive industries—agriculture, manufactures, mining, forestry, etc.—can give them when these industries are being run at their maximum capacity, or, at any rate, approaching it.

At present, many of our productive industries are not being run to their maximum capacity. This is the case because we are in a period of transition from a war to a peace basis. There is an enormous *potential* demand at home, and a world-wide *potential* demand abroad for things that America can and should produce. If we pass through this period of transition without disaster, our great productive industries should within a comparatively short time be operating at full capacity again.

Suppose that there should be no improvement in or expansion of the facilities of our railways before then. Suppose the railways should be so managed meantime that even the large amount of maintenance work which has been deferred should not be done. The result would be that the railways would increase depression and unemployment during the period of transition; that they would cause the period of transition to be prolonged and the resumption of full production by the country's industries to be delayed; and that when capacity production by other industries was renewed the railways would be unable satisfactorily to handle the increased traffic and even unable to handle a large part of it at all.

Should Large Expenditures Be Made Now?

The need for carrying out an extensive program to make up deferred maintenance and to increase the facilities of the railways is clear. But, it may be said, the prices of equipment and materials, and the high wages of labor, make this a very bad time to carry out large programs of expenditures. Railway men are not the only business men who are reasoning thus. Most American business men are. This is

one of the main reasons why industry in general is slowing down.

Now the railways are either going to be kept by the government, or they are going to be returned to their owners. If it were settled that they were going to be kept by the government, it would be the duty of the government to consider this entire matter from the standpoint of the long-run interests of the industries and workers of the country. Nobody knows how long present prices and wages will last, or how great the reductions will be when they come. Therefore, considering the long-run interests of industry and the workers as a whole, it undoubtedly would be better if the government were going to retain the roads, for it to make large expenditures for the maintenance and expansion of railway facilities, so that they would be ready for service when they were needed, than for it to postpone these expenditures, at the risk of not having the facilities ready when they were needed. In other words, it would be better for all concerned for the government to provide needed facilities now, even if the cost should be so high as to make it necessary to advance rates in order to pay a return upon the new investment, than for it to so manage that it would intensify and lengthen the depression during the period of transition, and at the same time fail to provide facilities that will be needed when business again becomes good.

Would the argument for going ahead with needed expenditures be any less strong in case the railways were returned to private operation? No; and, yes. The reasons why, from the standpoint of the public, it would be desirable to go on with them would be equally cogent. But the companies would be in a very different position from the government. The government does not require a certain amount of net operating income to enable it to raise capital for railway purposes. If it did, it would be very hard put to it to raise capital for railway purposes just now, since, from the railway point of view, it is bankrupt. In 1918 it incurred a deficit of over $200,000,000 in operating the railways; and if government control continues and the present disparity between income and outgo is not reduced, it will lose at least as much in 1919. The government can continue to raise capital for railway purposes only because it does not raise it on its credit as a railway manager, but on its general credit as the government of the people of the United States.

The railway companies, on the other hand, must, under private management, raise capital on their credit as owners and managers of railways, and their credit as such depends chiefly upon the amount of net operating income the railways make. In the three years ended on June 30, 1917, the railway companies earned an average of $950,000,000 net operating income a year, and in the year ended on December 31, 1917, they earned approximately $1,000,000,000. In June, 1918, under government operation, passenger rates were advanced 50 per cent and freight rates 25 per cent; and yet, in the year ended on December 31, 1918, the government, as a railway manager, earned only about $750,000,000 net operating income, or about $250,000,000 less than the companies earned in 1917, and about $200,000,000 less than the average amount they earned in the three years ended on June 30, 1917.

New Revolving Fund Needed

Now, as to the present and the immediate future, the Railroad Administration is being obliged sharply to limit all its expenditures, including those for maintenance, because the revolving fund of $500,000,000 granted to it by Congress has been almost exhausted by the deficit incurred last year, by loans to needy railway companies, etc. The Railroad Administration has asked Congress for another revolving fund of $750,000,000. If it should be promptly granted this, there would be no good reason why it should not enter at once upon a vigorous program for making up maintenance which has been deferred since it has been in control, for if it returns the roads to the companies, it must, under the law, return them in as good physical condition as it received them. From every standpoint, it is desirable that Congress, at its present session, should provide this new revolving fund. The Railroad Administration needs it now, and will need it, whether the railways are soon returned to private operation or not. The Railroad Administration must be provided with this new revolving fund in the near future, if it is to do merely the maintenance work on the railways, which conditions imperatively demand shall be begun at once.

Looking farther into the future, it is plain that if the government either should long postpone its decision on whether the railways are to be returned to private operation, or should return the railways to private operation without having first adopted remedial legislation, the consequences would be very serious. If a decision is postponed, the needed expenditures for permanent improvements and additions will also be postponed. On the other hand, if the railways should be returned to their owners without remedial legislation, many of them would find themselves in a situation where they would not only be unable to raise capital for extensive improvements but would be forced to adopt a policy of the most drastic retrenchment. This would be due to two things: First, under government operation much traffic has been diverted from some lines to others and the earnings of the lines from which it has been diverted have been unfavorably affected to a very serious extent. Second, in spite of the large advances in rates made last year the net operating income of the railways, as a whole, is at present very unsatisfactory.

The net operating income of the Class I (large) roads during the last six months of 1918, when the higher freight and passenger rates were in effect, was $539,000,000, which was actually $4,000,000 more than in the last six months of 1917. This might seem to indicate a satisfactory condition of affairs. The fly in the ointment is that in every month of that six months the net operating income was lower than it was in the immediately preceding month, and that it declined from $139,000,000 in July to about $25,000,000 in December. The heavy decline in operating income during the last few months of the year 1918, and especially in December, was largely due to the fact that big retroactive advances in wages were charged into the accounts for those months, and, therefore, the financial position of the railways is not as bad as might be inferred from the statistics for these particular months. On the other hand, their financial position is far from being as good as might be inferred from the results shown during the entire last six months of the year. The net operating income now being earned by the railways as a whole would hardly be sufficient to pay their fixed charges and normal dividends on their existing investment, and much less would it be sufficient to enable them to raise the new capital necessary to make a large amount of new investment. On the other hand, it is altogether probable that if the railways were returned to private operation, the managements would speedily effect large economies in operating expenses which cannot and will not be effected under government operation. Therefore, it is not probable that under private operation very large advances in rates would be needed in order to make the net operating income of the railway companies adequate.

Needed Constructive Measures May Speedily Be Adopted

It is by no means impracticable, then, to adopt within a short time, measures under which the railway companies could safely resume the operation of their properties, and could spend enough to make up any deferred maintenance

the Railroad Administration had not made up and also enter upon an extensive program of additions and betterments.

Now, if this could be done, it is clearly desirable that it should be done. It is desirable because if government operation should be continued much longer—for example, for five years as some contend it should be—the organization of the railways would be so completely destroyed, and the financial relations between the government and the companies would become so entangled, that it probably would be impracticable to restore the railways to private operation at all. Another potent reason why private operation should be restored as soon as practicable is that experience has shown that, on any given basis of prices and wages, private management is more efficient and economical than government management, and, therefore, even without any reduction of prices and wages, the companies would carry out the needed program of railroad rehabilitation and expansion at a smaller cost than the government would. In consequence, the burden of rates which would have to be imposed upon the public to enable the railway companies to carry out this program would be less than the burden of taxes, or both, which would have to be imposed upon the public to enable the government to do it.

The crux of the matter then is that the present railway situation demands, both for the immediate good and the future good of the nation, that legislation for the settlement of the railway question shall be passed and put into effect as soon as practicable. As I have indicated, I believe that this legislation should provide for the early return of the railways to the management of the companies. But even if it should be decided that government operation should be continued—a decision which now seems wholly improbable—it would be desirable that this decision should be reached and announced within the very near future.

But how can an early solution of the problem be arrived at? It cannot be done at the present session of Congress. But, from every point of view, it is extremely undesirable that it should be postponed until the next regular session of Congress, which would not begin until December. Nothing could be done with respect to the railways that would be more contrary to the welfare of the country during this period of transition from a war to a peace basis than needlessly to prolong the present uncertainty as to their future management. This point is emphasized as forcibly by those who, such as Director General Hines, favor a five-year extension of government control, as by those who favor an early return to private operation.

The Solution of the Problem

There is nothing in the present railway problem which would render it impracticable for Congress to pass legislation for a satisfactory solution of it within a few months, if Congress was in session. Therefore, the situation demands that an extra session of Congress shall be called at an early date, if for no purpose but to settle what we are going to do with the railways. Of all of our important problems of reconstruction at home, the railroad problem is easily the most important. President Wilson, in the message he sent to Congress soon after the armistice was signed, indicated that he had no well-formed views on the subject, and that he wished Congress to take the lead in dealing with it. A special session is necessary to enable Congress to do this; and I venture to suggest that it would be appropriate and expedient for clubs and other organizations that believe there should be no avoidable delay in settling the railroad question one way or the other, to memorialize the President in favor of an extra session.

In conclusion, I shall venture to suggest certain steps I believe it is essential to take in order that our railways may soon be restored to a footing on which they will become once more one of the chief agencies in promoting the country's progress and prosperity instead of a growing menace to its progress and prosperity.

First, Congress should pass at its present session legislation granting the Railroad Administration a new revolving fund of $750,000,000, in order that it may immediately begin carrying out an adequate program of maintenance and renewals.

Second, while continuing the government guarantees of standard return until legislation for the financial protection of the companies may be passed, the government should restore the railways to *actual operation* by the companies that own them as soon as practicable. This is necessary in order to give the companies opportunity to rebuild their organizations and to direct traffic back into its normal channels before the government guarantics are withdrawn. It is also necessary in order to enable public authorities to determine what changes in rates should be made to protect the solvency of the companies.

Third, the railway companies should be authorized by legislation passed at an early extra session of Congress to make such consolidation or agreements between lines operating in the same territory as the Interstate Commerce Commission may hold are not prejudicial to the public interest. This is necessary in order to bring about needed coordination of the organizations and facilities of the railways and to eliminate the wastes of competition without, however, eliminating such competition as is both stimulating to the railways and beneficial to the public.

Fourth, the Interstate Commerce Commission should be authorized to regulate the issuance of all railroad securities. This is necessary to protect both the investor and the public.

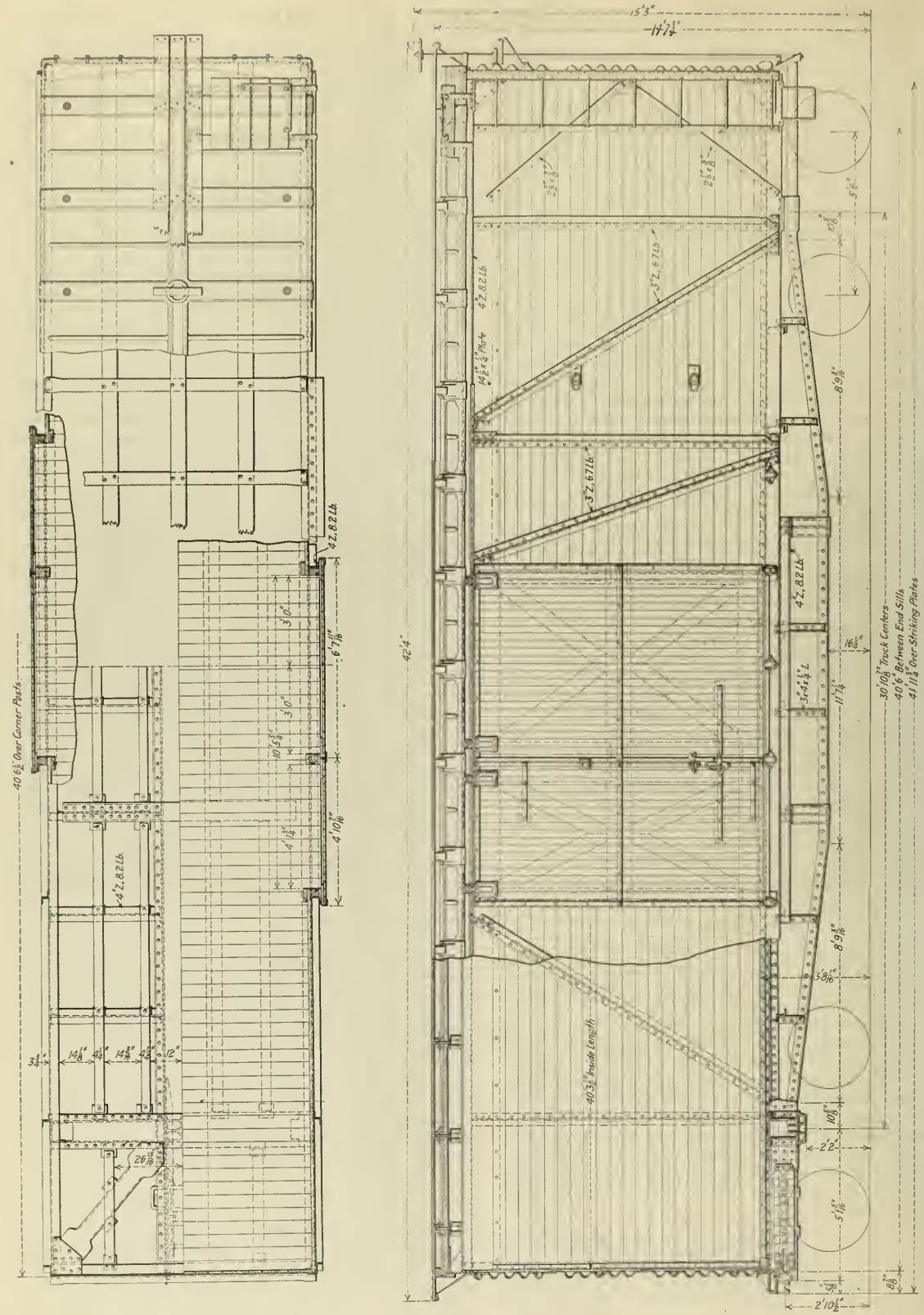
Fifth, all state regulation of railways which directly or indirectly burdens or interferes with interstate commerce or with Federal regulation of interstate commerce, should be forbidden. This is necessary to prevent state regulation from rendering federal regulation nugatory.

Sixth, the principle should be established by legislation that the rates fixed by the Interstate Commerce Commission must be not only fair to the public but such as to enable the railways as a whole in each of the large sections of the country to earn upon their aggregate property investment an average return which shall be sufficient to enable them to raise enough capital adequately to develop their facilities. One of the best methods of establishing this principle which has been suggested is that of fixing at 6 per cent the average return which the roads of each territory shall be allowed to earn on their property investment, and providing that anything in excess of this earned by any individual road shall be divided, part being retained by the company, part going to its employees as a bonus, and part being paid into the public treasury.

Seventh, we should provide by statute for arbitration of labor disputes on railways either by the Interstate Commerce Commission, or by tribunals which shall be composed equally of representatives of the companies, of the employees, and of the public, and forbid any strike or lockout until the report of the arbitration board has been made.

It is my belief that if legislation providing for these things should be passed soon, the railways could be returned to the management of the companies with a reasonable certainty that there would be a marked improvement in their operation and service and an important and salutary renewal of the development and expansion of their facilities.

Grain cars loaded in the Central Western region in January, 1919, totaled 32,432 cars, as compared with 27,500 cars last year, an increase of 17.9 per cent. Coal cars loaded in January decreased 12.1 per cent, 135,589 cars, as compared with 154,254 last year. The loading of live stock increased from 48,277 cars to 65,048, an increase of 34.2 per cent.



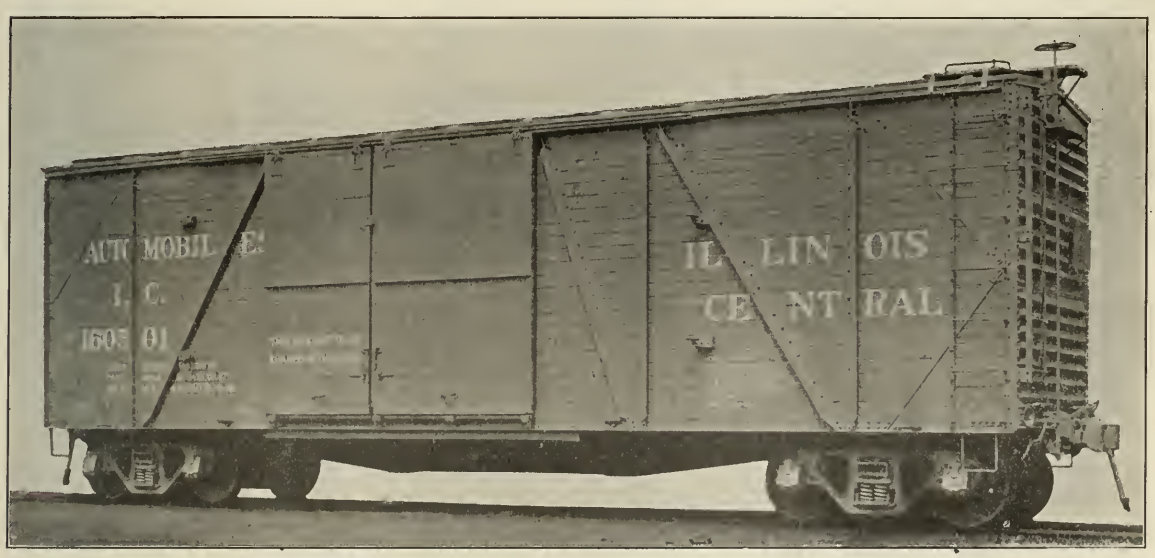
Plan and Elevation of Single Sheathed Automobile Car for the Illinois Central

Forty-foot Automobile Cars for Illinois Central

Single Sheathed Type with Steel End, Especially Designed for Carrying Various Kinds of Lading

PERSISTENT EFFORTS have been made by many roads during the past few years to secure freight cars which are adapted for many kinds of lading. This policy, if consistently followed out, would undoubtedly bring about a reduction in the empty car mileage and an increase in the average carload. The growing tendency to design cars built for a special traffic, so that they are adapted for various kinds of lading is well exemplified by an order of 500 40-ft. automobile-furniture cars of 80,000 lb. capacity recently delivered to the Illinois Central by the Standard Steel Car Company. While designed primarily for automobile and furniture loading, these cars are suitable for almost any commodity that is handled in box cars, excepting grain.

These cars have a light weight of 48,000 lb. They are 40 ft. 3½ in. long and 8 ft. 6⅛ in. wide inside. The height from the floor to the under side of the carlines at the side is 10 ft. ¼ in. The cubical capacity of the car is 3,435 cu. ft.



Illinois Central Single Sheathed Automobile Car

The length over the corner post is 40 ft. 6½ in. and over the striking plates 41 ft. 11¾ in. The width at the ends is 8 ft. 9⅝ in., and between the steel side door posts 10 ft. 5¾ in. The extreme height to the top of the brake mast is 15 ft. 3 in., and to the top of the running board 14 ft. 8 1/16 in. The top of the floor is 3 ft. 8 1/16 in. above the rail.

The underframe is of the fishbelly type. The web plates are 5/16 in. thick and 24¾ in. deep at the center, and 10 11/16 in. at the draft sill, extending continuously from end sill to end sill, being spaced 13½ in. apart. Along the bottom of each web plate is riveted a 5-in. by 4-in. by ⅝-in. angle, with the long flange horizonal. The top chord angles are 3½ in. by 3½ in. by 5/16 in., and to them is riveted a top cover plate 5/16 in. thick and 21 in. wide, extending the full length of the sills. From the inside of the end sill to a point 21 in. beyond the center line of the body bolster, the center sill web is reinforced by a plate 5/16 in. thick extending the full depth of the sill, having at the top flanges 3 in. wide extending inward. These stiffeners are riveted to the inner side of the center sill web plate and to the cover plate. The web plates are also reinforced between the bolsters by vertical stiffeners of 4-in. by 3-in. by ¼-in. angles, which are spaced approximately 3 ft. 6 in. apart and serve also as supports for the floor beams. Malleable iron cheek plates of the double pocket type are riveted inside the draft sills. The couplers have a 5-in. by 7-in. shank and 8½-in. butt. A cast steel yoke having an ultimate strength of 450,000 lb. is used. It is attached to the coupler by a key and is fitted with one M. C. B. class *G* draft spring and one Harvey friction spring. The Carmer release rigging and Imperial centering attachment are used.

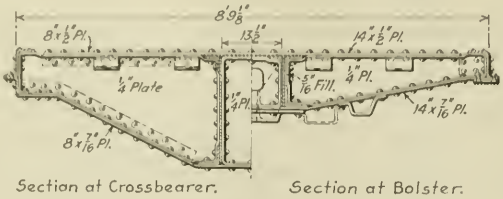
The body bolster is of a box section. The diaphragms are of ¼-in. pressed steel plate with 3-in. flanges all around and are spaced 8 in. back to back. At the outer end of the diaphragm there is a spacer made of a 7/16-in. bent plate. The spacers between the center sills at the bolsters are of cast steel. The top bolster cover plate is 14 in. wide and ½ in. thick extending from side sill to side sill. The bottom cover plate is 14 in. by 7/16 in. and extends the full width of the car. The cast steel body center plate is fastened under the bottom cover plate and is riveted through the bottom chord angles on the center sills and the center sill spacer casting.

The end sills are 8-in., 18.75-lb. channels. To the back of these channels is riveted a 5-in. by 3-in. by ⅜-in. angle by which the end sill is fastened to the top of the center sill. The striking plate is a steel casting riveted to the end sill and to the webs of the center sill. There are two cross bearers on each side of the car, spaced 10 ft. apart. The diaphragms are of ¼-in. plate with a 3-in. flange all around, reinforced at top and bottom by 3-in. by 2½-in. by 5/16-in. angles. A pressed steel filler made of ¼-in. plate is fastened between the center sills at each cross bearer. The top cover plate is ½ in. thick and 8 in. wide, and extends out almost to the side sill, while the bottom

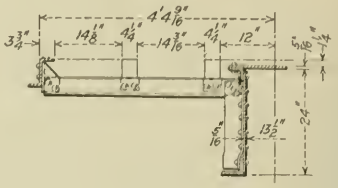
cover plate is 7/16 in. by 8 in. and is fastened directly to the side sill.

The side sills are made up of a 6-in., 16.67-lb. Z-bar of a special section incorporating a grain lock, extending from end sill to end sill. This Z-bar is reinforced under the door opening and for a short distance beyond at each end, by a 4-in., 8.2-lb. Z-bar riveted to the lower flange of the 6-in. Z-bar. The two sections thus form a channel which fits over the end of the crossbearer, the crossbearer bottom cover plate being riveted to the lower flange. The bottom cover plate of the body bolster is likewise fastened to the outwardly extending flange of the 6-in. Z-bar and a malleable iron jacketing casting is placed beneath the cover plate. The side sills and end sills are riveted together at the corners and are reinforced by a 5/16-in. plate. There are diagonal braces extending from the corner of the underframe to the intersection of the center sill and body bolster made up of ⅜-in. plate 12¼ in. wide flanged in the center to a channel section. There are six floor beams on each side of the car made of 4-in. Z-bars riveted to the center sill stiffeners and to short sections of 4-in. by 3-in. angles riveted to the side sills.

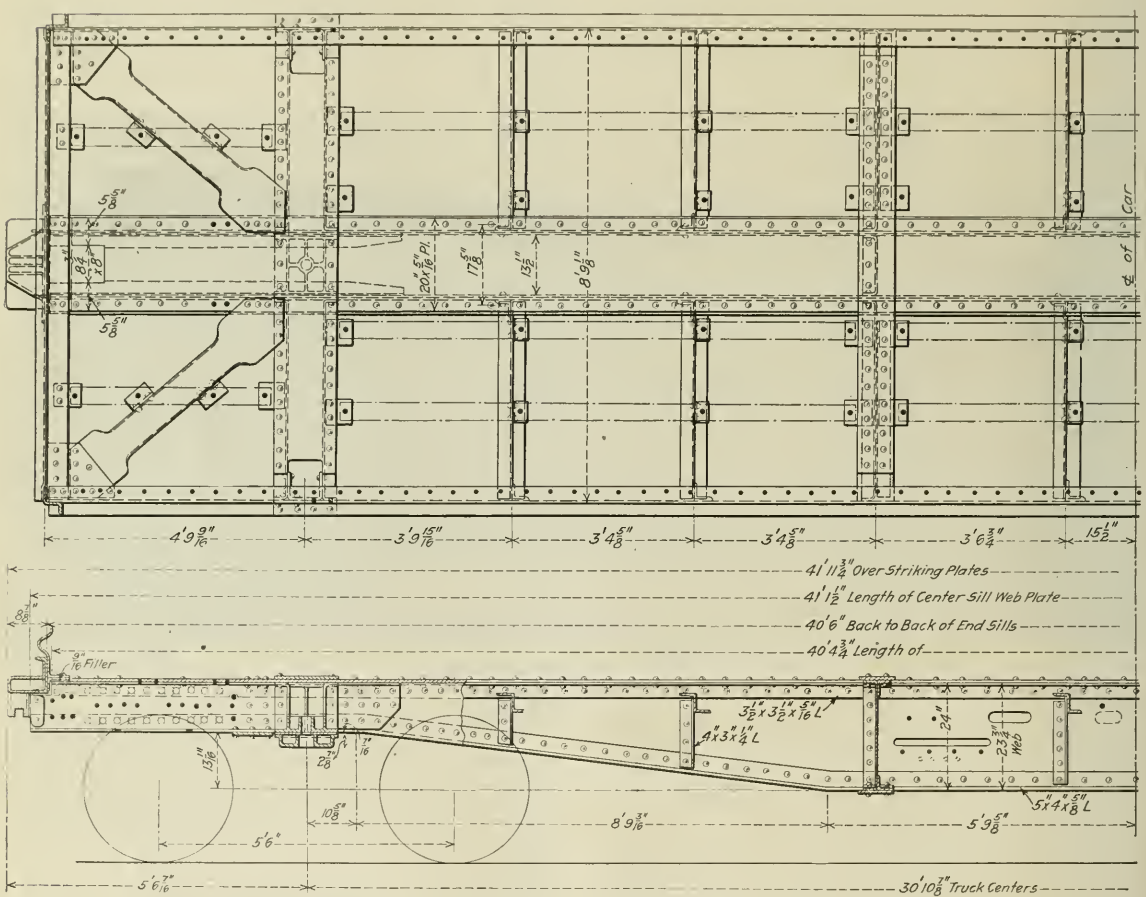
The corner posts are 4-in., 8.2-lb. Z-bars and the side posts and braces are 3-in., 6.7-lb. Z-bars, with the exception of the door posts, which are of the same section as the corner posts. The posts and braces are joined at the top to the 14½-in. by ¼-in. side plate girder which extends from the end post to the door posts and is riveted to the web of the 4-in. Z-bar side plate. The side plate is reinforced at the center by a 3-in. by 3-in. by 7/16-in. angle riveted to the web of the Z-bar and overlapping the side plate girder for a distance of 2 ft. at each end. The end posts are braced by 2½-in. by ⅜-in. diagonal end straps and by flanged corner angles of 5/16-in. plate.



Section at Crossbearer. Section at Bolster.



Section at Crosstie.



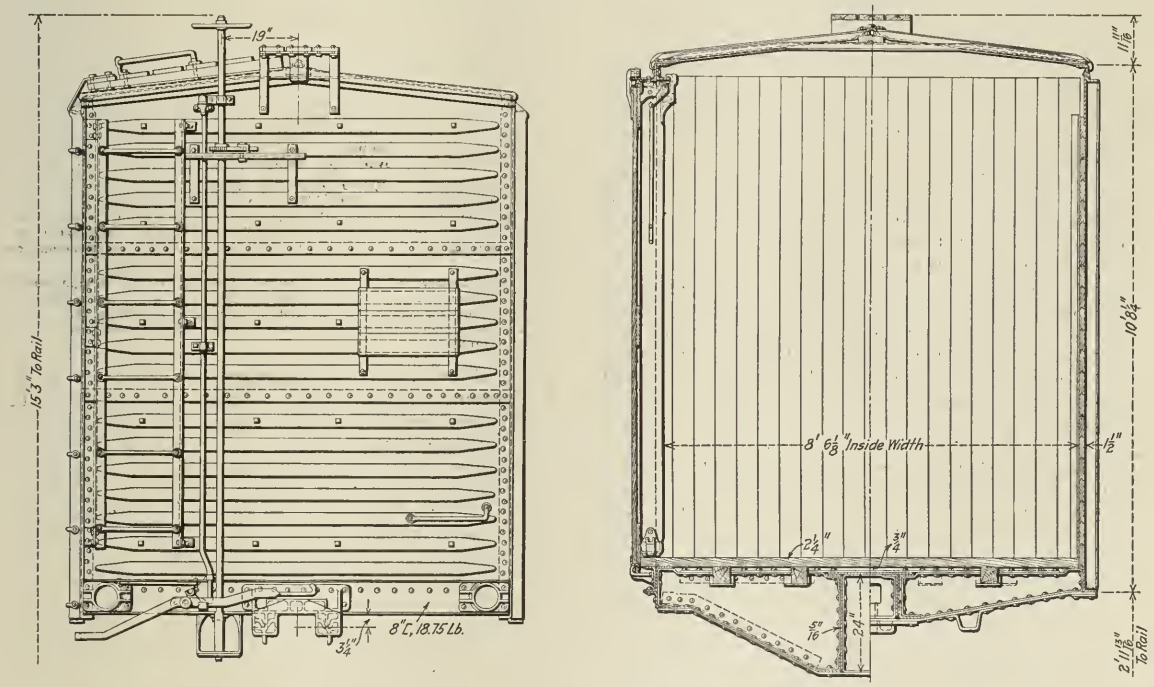
Underframe for the Illinois Central Single Sheathed Automobile Car

The end is of the Murphy pressed steel type, the two lower sections being of ¼-in. plate and the upper sections of 3/16-in. plate. The bottom section is flanged inward, and is riveted to the 5-in. by 3-in. angle on the inner side of the end sill. Five transverse furring strips are provided to hold the end lining.

The floor of the car is supported on yellow pine stringers 4½ in. wide and 4 in. high. Between the body bolster and the end sill there is but one stringer on each side, but in the center of the car there are two. The stringers are continuous over the floor beams, but end at the crossbearers to which they are attached by short sections of Z-bars riveted to the upper flange. The flooring is 2¼-in. yellow pine, shiplapped, bolted to the side sills and nailed to the stringers. The siding is 1½-in. by 5¼-in. yellow pine, tongued and grooved, bolted to the posts and braces. The lower course of the siding fits over one of the ridges on the side sill, thus forming a grain lock. The siding extends to the steel end sheet and an angle iron is fastened in the corner where it meets the 1-in. end lining, this angle being bolted through the side lining and the web of the corner post and also to the corner board in the end lining.

The door posts are spaced 10 ft. 5¾ in. apart, and are staggered, the distance from the center line of the car being 3 ft. and 7 ft. 5¾ in. respectively. There is a movable center door post of white oak, 4 in. by 5½ in., with top and bottom shoes of malleable iron engaging malleable housings, one on the side plate and the other in the floor. When the center post is moved over adjacent to the door post, there is a clear door opening of 10 ft. 1¾ in. When it is brought over to the point where the two doors meet it is automatically locked in position and can be bolted to the frame of the smaller door leaving an opening 6 ft. wide. The doors have steel frames made up of Z-bars at the top and bottom and angle irons at the sides with a transverse reinforcing angle across the center. The stiles, rails and braces are ⅞ in. and the sheathing is 13/16 in. thick. Camel door fixtures are used throughout.

The roof is supported on 13 carlines made of ¼-in. pressed steel plate and riveted to the top flange of the side plate Z-bar. The roof is of the all-steel type with galvanized sheets of No. 16 U. S. gage. The trucks are of the Vulcan cast steel type with cast steel truck bolsters equipped with Barber lateral rollers and a drop forged truck center plate. Brake beam safety bars made of 3-in. by 3-in. angles are attached to the spring plank. The air brake is the New York Air Brake Company's schedule CF-C-10 with J. M. expander ring.



End View and Section of the Illinois Central Automobile Car

Orders of Regional Directors

RECONSIGNMENT OF COAL.—The Southern regional director in circular letter No. 423 quotes the order of the Fuel Administration forbidding the reconsignment of bituminous coal, and calls for careful attention to thwart the natural tendency to ship coal for purposes of speculation.

Administration Passes Not Good Over Non-Federal Railroads.—The Southern regional director, file 1557-6, calls attention to the fact that inadvertently several Railroad Administration 1919 annual passes were made good over the Fort Smith & Western, which is not under Federal control.

Fire Losses.—The Southern regional director, file 1585-58-6, refers to the director general's circular No. 67 relative to action to be taken in case of loss or damage to property by fire. It is necessary to secure the approval of the director of the Division of Capital Expenditures only for work chargeable to capital account costing more than $1,000.

Use of Great Seal.—The Southern regional director, file 1848-6, says that the Great Seal of the United States has been used on the business card of an employee of one of the western railroads, and reminds all concerned that it is unlawful to use this seal on any stationery except that printed for the use of government departments. It is not desired that the seal of the director general of railroads be used on

business cards of railroad men. The Southwestern regional director has issued similar instructions.

Associations Approved.—The Southern regional director, file 841-6, advises that the director general has approved the Chief Interchange Car Inspectors' and Car Foremen's Association. Similar orders have been issued by the Southwestern and Northwestern regional directors.

Motor Gasolene.—The regional director, Eastern region, by file 2800-11-27A514, has promulgated the circular of C. B. Young, manager of the Inspection and Test Section, embodying a specification for railroad gasolene for general purposes.

Cancellation of Permit System.—The regional directors, Eastern and Allegheny regions, announce the discontinuance February 15 of the embargoes placed as a war emergency January 15, 1918, against carload domestic freight for Manhattan Island, the Bronx (New York City), and station deliveries on New York harbor, including Brooklyn terminal companies, which freight is now being moved under permits issued by the Freight Traffic Committee, North Atlantic ports. Such freight may now move without permits, subject to embargoes of the delivering railroads. No change is made in the method of requiring permits for export carload freight, and carload domestic freight must not be accepted for other than regular station deliveries. Reconsignment for export or lighterage deliveries will not be allowed.

Secrecy in the Movement of Troop Trains.—Supplement 4 to Circular 22 of the Northwestern regional director is similar to Order 159 of the Southwestern regional director, abstract of which appeared in the *Railway Age* of February 14 (page 392).

Weighing Shipments of Forage Consigned to Army Camps.—The Northwestern regional director, in a circular dated February 14, calls attention to the fact that the war department has amended Purchase and Storage Notice 73, issued November 21, 1918, by striking out the words "within 100 miles of destination" in paragraph 2 in order to eliminate the necessity for reweighing shipments of forage either at camps or at other points, and requests that instructions be issued to weigh shipments of forage, either at points of origin or en route, for the assessment of freight charges, in order to eliminate the requirement that these shipments be weighed at camps.

Adherence to Restrictions on Administration Transportation.—In Order 161 the Southwestern regional director requests that administration passes, limited both as to territory and trains of various railroads, be checked carefully when presented for passage, to determine whether or not they are good on the road and particular train upon which they are presented.

Organization of the Southwestern Regional Association of Fire Prevention.—In Circular 173 the Southwestern regional director announces the organization of the Southwestern Regional Association of Fire Prevention. All fire prevention inspectors in that region are to be identified with the association. Meetings will be held quarterly. The next one is at Dallas, Tex., on March 19. J. L. Durland, general fire prevention inspector at Houston, Tex., for lines under the jurisdiction of W. B. Scott, is chairman; W. R. Barton, general fire prevention inspector at St. Louis, Mo., of lines under the jurisdiction of A. Robertson, vice-chairman, and G. L. Ball, superintendent of fire prevention at St Louis of lines under the jurisdiction of L. Kramer, secretary.

Club and Association Memberships.—Supplement 2-A to Circular 61 cancelling Supplement 2 to Circular 61 of the Northwestern regional director states that during the period of federal control lines of railroad and steamships under such control should be permitted to become members of chambers of commerce, boards of trade, cotton exchanges, traffic clubs and similar organizations; but such memberships should be limited to organizations in communities reached by their lines, and such lines should not assume dues or contributions greater than are borne by the average industry in such community. Only one membership should be taken out by any one line in chambers of commerce, etc., and as a general rule but one membership in any traffic club. A maximum of four memberships representing one line in any particular traffic club is authorized, but where more than one membership is desired full details should be submitted to the office of the regional director.

Operation of Over and Short Bureaus at Common Points—In Order 163 the Southwestern regional director outlines rules for the establishment and operation of bureaus for the purpose of matching "over" and "short" reports at points having from two to five freight stations and also at points having more than five stations where, according to the judgment of superintendents such bureaus should be established. The rules are as follows:

(a) Agents will promptly exchange legible copies of all "over" reports issued and a copy of joint reports of freight delivered on proof of ownership.

(b) Upon receipt by agents of "over" and "joint" reports (referred to in paragraph (a) they will promptly check against their own "short" reports. Agents should maintain in alphabetical order by roads a permanent file of these two reports.

(c) When "over" reports match "short" reports, the agent holding "over" freight must be furnished full revenue waybill reference and accordingly arrange for distribution of freight. "Revenue waybill" and "short" report reference must be noted on matched "over" report. Freight received on "deadhead astray" waybill and delivered on proof of ownership should be handled in accordance with joint report of freight delivered on proof of ownership.

(d) A matching bureau consisting of representatives of each agency (with one of the agents as chairman who will serve in this capacity for a period of not less than three months) should be organized. This bureau should hold meetings semi-monthly on a designated day for the purpose of comparing records of "over" and "short" freight.

(e) A permanent secretary should be selected who will record in the minutes, attendance, number of "overs" and "shorts" listed, number of shipments matched at meeting and the number of shipments matched in previous meeting. A copy of the minutes should be furnished each agent and freight claim agent of each member road within three days following the meeting.

(f) Each agency should present at the meeting a complete alphabetical list of all "over" and "short" reports which have not been disposed of. Freight warehouses should be checked on the day preceding the meeting and all over freight should be included in the list previously referred to in this paragraph.

Method of Handling Telegrams.—Circular 71 of the Northwestern regional director similar to order 156 of the Southwestern regional director, abstract of which appeared in the *Railway Age* of February 14, (page 393).

Complaint Bureau. The regional director, Eastern Region, announces that there is to be issued a new edition of the posters, informing the public about the Bureau for Suggestions and Complaints, which are displayed in passenger cars and stations. Federal managers are called upon to see that no suitable place for these posters is neglected in the distribution.

Exchange passes. The regional director of the Eastern Region, by file 2100-41A518, calls the attention of managers to the rule regulating annual or time exchange passes requested by one road from another. These are to be issued only for regular daily travel of employees between their home and their work, or (secondly) for employees for regular daily travel between home and work outside of regular suburban territory; or on railroad business where frequent trips of this kind must be made. This "local" travel rule is to apply only for distances not exceeding 50 miles. Exchange transportation other than that here described must be secured from the director of operation, Washington.

Stored cars. The regional director, Eastern Region, by file 1801-22A524, gives notice that freight cars which are stored must be included in the daily records, either as serviceable, or as awaiting shop. If stored cars are not included in the records the averages showing efficiency will not represent the true facts.

Bills Before Legislatures.—A. H. Smith, regional director, Eastern region, February 13, announced the names of five

district representatives who have been instructed to keep in touch with proposed legislation in the several states and to confer, where necessary, with local representatives of employees' organizations. Where bills which are proposed affect the interest of railroad labor the matter should be at once reported to Washington, as there is an understanding between the Railroad Administration and the chiefs of the brotherhoods to deal with all such questions at Washington. In the matter of bills not affecting the interests of railroad labor federal managers are to see to the presentation of opposition, before the legislature or the committees, if opposition seems to be desirable. All such action must be promptly reported to Washington. The chiefs of the four principal brotherhoods have sent out circulars explaining the arrangement which has been made for co-operation between the administration and the brotherhoods.

Standard Specifications for Timber Preservation

The Forest Products Section, Division of Purchases, U. S. R. A. Has Drawn Up Uniform Requirements

STANDARD SPECIFICATIONS for treating timber by the five processes commonly used in injecting creosote oil, or zinc chloride, or a combination of the two, have been prepared by the Forest Products Section of the Division of Purchases, United States Railroad Administration. These specifications will apply to the treatment of all ties and other timber used by the railroads under federal control.

This is a second step toward standardization of railway practice with respect to construction timbers and ties, since the Forest Products Section had previously promulgated a set of specifications for the purchase of ties, thereby simplifying the requirements under which the tie producers were required to operate. A similar result will be obtained in the timber preserving processes since previous efforts at standardization have not met with an appreciable degree of success. The specifications which are reproduced below cover three processes involving the use of creosote oil and creosote coal-tar solutions, the bpmettizing process for the use of zinc chloride and the Card process for the use of zinc chloride with creosote oil.

For Treatment With Creosote Oil by the Full-Cell (Bethell) Process

(1) Except when ordered otherwise by the railroad's representative, the material to be treated shall be air-seasoned until in his judgment any moisture in it will not prevent the injection of the specified amount of preservative; it shall be restricted in any charge to woods into which approximately equal quantities of preserving fluid can be injected, and shall consist of pieces approximately equal in size and sapwood content, on which all framing, boring, or adzing shall have been done, so separated as to insure contact of the steam and preservative with all surfaces.

(2) The preservative used shall be the one most suitable and available of the following standards of the American Wood-Preservers' Association:

"Creosote Oil, Grade 1, for Ties and Structural Timber"

"Creosote Oil, Grade 2, for Ties and Structural Timber"

"Creosote-Coal-Tar Solution for Ties and Structural Timber"

"Creosote Oil, Grade 3, for Ties and Structural Timber."

(3) The material shall retain the amount of creosote oil necessary to permeate all of the sapwood and as much of the heartwood as practicable. The quantities specified may vary from 10 lb. per cu. ft. for material from needle-leaved trees from which most of the sapwood has been removed, to 24 lb. per cu. ft. for piling which has wide sapwood. The quantity of creosote oil retained shall be calculated, on the basis of 100 deg. F., from readings of working-tank gages or scales or from weights of at least one-tenth of the material on a suitable track scale before and after treatment, checked as may be desired by the railroad's representative.

(4) After the material is placed in the cylinder, a vacuum of at least 22 in. shall be maintained until the wood is as dry and as free of air as practicable. The creosote oil shall then be introduced, without breaking the vacuum, until the cylinder is filled. The pressure shall be gradually raised and maintained at a minimum of 125 lb. per sq. in. until the required quantity of preservative is injected into the material or until the railroad's representative is satisfied that the largest volumetric injection that is practicable has been obtained. The temperature of the preservative during the pressure period shall be not less than 170 deg. F., nor more than 200 deg. F., and shall average at least 180 deg. F. After the pressure is completed and the cylinder emptied of preservative, a vacuum shall be maintained until the material can be removed from the cylinder, free of dripping preservative.

(5) At least once each day the railroad's representative shall determine penetration by sampling ties at the middle and rail sections; from other material samples shall be taken as desired. Any holes that may be bored shall be filled with tight-fitting creosoted plugs.

(6) The treating plant shall be equipped with the thermometers and gages necessary to indicate and record accurately the conditions at all stages during the treatment, and all equipment shall be maintained in a condition satisfactory to the railroad. The owner of the treating plant shall also provide and keep in condition for use at all times the apparatus and chemicals necessary for making the analyses and tests required in this specification.

(7) When permission is given to prepare material for treatment by steaming instead of seasoning by air, it shall not be subjected to pressures or temperatures for periods sufficient to injure the wood.

For Treatment With Creosote Oil by the Empty-Cell Process With Final Vacuum (Rueping)

(1) Same as Par. 1, full-cell process.

(2) Same as Par. 2, full-cell process.

(3) The material shall retain an average of at least 6 lb. of creosote oil per cu. ft. for cross-ties and 10 lb. per cu. ft. of other material, and no charge shall retain less than 90 per cent nor more than 110 per cent of the quantity per cubic foot that may be specified. The quantity of preservative retained shall be calculated, on the basis of 100 deg. F., from readings of working-tank gages or scales and from weights of at least one-tenth of the material on a suitable track scale before and after treatment, checked as may be desired by the railroad's representative.

(4) After the material is placed in the cylinder, the preservative shall be introduced, at not over 200 deg. F., until the cylinder is filled.

(5) The pressure shall be raised, and maintained until

there is obtained the largest practicable volumetric injection that can be reduced to the required retention by a quick high vacuum. The pressure and temperature within the cylinder shall be so controlled as to give the maximum penetration by the quantity of preservative injected. After the pressure is completed the cylinder shall be speedily emptied of preservative and a vacuum of at least 22 in. promptly created, and maintained until the quantity of preservative injected is reduced to the required retention.

(6) Same as Par. 5, full-cell process.

(7) Same as Par. 6, full-cell process.

FOR TREATMENT WITH CREOSOTE OIL BY THE EMPTY-CELL PROCESS WITH INITIAL AIR PRESSURE AND FINAL VACUUM (LOWRY)

(1) Same as Par. 1, full-cell process.

(2) Same as Par. 2, full-cell process.

(3) The material shall retain an average of at least five pounds of creosote oil per cu. ft., which shall permeate all of the sapwood and as much of the heartwood as practicable, and no charge shall retain less than 90 per cent nor more than 110 per cent of the quantity per cu. ft. than may be specified. The amount of preservative retained shall be calculated, on the basis of 100 deg. F., from readings of working-tank gages or scales or from weights of at least one-tenth of the material on a suitable track scale before and after treatment, checked as may be desired by the railroad's representative.

(4) After the material is placed in the cylinder it shall be subjected to air pressure of sufficient intensity and duration to provide under a vacuum the ejection of preservative necessary to insure the required retention. For example: With red oak, pressures of 40 to 60 lb. for 30 min., while with pine having a large percentage of sapwood pressures of 70 to 90 lb. for 30 min., will be required. The preservative shall then be introduced, the air pressure being maintained constant until the cylinder is filled. The pressure shall be gradually raised to at least 150 lb. per sq. in., and maintained until all of the sapwood and as much of the heartwood as practicable are saturated, or until the railroad's representative is satisfied that the largest volumetric injection that is practicable has been obtained. The temperature of the preservative during the pressure period shall be not less than 170 deg. F. nor more than 200 deg. F., and shall average at least 180 deg. F. After the pressure is completed the cylinder shall be speedily emptied of preservative and a vacuum of at least 22 in. be promptly created, and maintained until the material can be removed from the cylinder free of dripping preservative.

(5) Same as Par. 5, full-cell process.

(6) Same as Par. 6, full-cell process.

FOR TREATMENT WITH ZINC CHLORIDE (BURNETT PROCESS)

(1) Same as Par. 1, full-cell process for creosote.

(2) The zinc chloride used shall be acid-free and shall not contain more than 0.1 per cent iron. Dry zinc chloride shall contain at least 94 per cent soluble zinc chloride and in any solution purchased the percentage of zinc chloride specified shall be the amount of soluble zinc chloride required.

The material shall retain an average of 0.5 lb. of dry zinc chloride per cu. ft., which shall permeate all of the sapwood and as much of the heartwood as practicable, and no charge shall retain less than 90 per cent nor more than 110 per cent of this quantity.

(3) The treating solution shall be no stronger than necessary to obtain the required retention of preservative with the largest volumetric absorption that is practicable, and shall be thoroughly mixed before use. Its strength shall not exceed five per cent and shall be determined by analysis. Chemical titration, using a silver-nitrate solution with potassium-chromate indicator, will usually be satisfactory. For example: With red oak, the strength shall not exceed 4 per cent and the volume injected shall be not less than 20 per cent, while with pine having a large percentage of sapwood, it shall not exceed 2 per cent and the volume injected shall be not less than 40 per cent. The amount of solution retained shall be calculated from readings of working-tank gages or scales or from weights of at least one-tenth of the material on a suitable track scale before and after treatment, checked as may be desired by the railroad's representative.

(4) Air-seasoned material shall be steamed in the cylinder for not less than one hour nor more than two hours, at a pressure of not more than 20 lb. per sq. in., the cylinder being provided with vents to relieve it of stagnant air and insure proper circulation of the steam and being drained to prevent condensate from accumulating in sufficient quantity to reach the material. After steaming is completed, a vacuum of at least 22 in. shall be maintained until the wood is as dry and as free of air as practicable. Before the preservative is introduced the cylinder shall be drained of condensate, and if the vacuum is broken, a second one as high as the first shall be created. The preservative shall be introduced, without breaking the vacuum, until the cylinder is filled. The pressure shall be gradually raised, and maintained at a minimum of 125 lb. per sq. in. until the required quantity of preservative is injected into the material, or until less than 5 per cent of the total quantity required has been injected during the latter half of one hour throughout which the rate of injection has persistently decreased while the pressure has been held continuously at 165 lb. or more per sq. in. The temperature of the preservative during the pressure period shall be not less than 130 deg. F., nor more than 190 deg. F. and shall average at least 150 deg. F.

(5) At least once each day the railroad's representative shall determine the penetration by analysis. With woods on which potassium ferro-cyanide and uranium acetate will produce color reaction, the penetration may be determined by its visibility. From ties samples shall be taken at the middle and rail sections; from other material samples shall be taken as desired. Any holes that may be bored shall be filled with tight-fitting treated plugs.

(7) Same as Par. 6 for full-cell process for creosote.

FOR TREATMENT WITH ZINC CHLORIDE AND CREOSOTE OIL (CARD PROCESS)

(1) Same as Par. 1, full-cell process for creosote.

(2) Same as Par. 2 for treatment with zinc chloride only.

(3) The creosote oil shall meet the standard of the American Wood-Preservers' Association for "Creosote Oil, Grade 3, for Ties and Structural Timber," amended as follows: The specific gravity of the oil at 38 deg. C., compared with water at 15.5 deg. C., shall be not less than 1.03, nor more than 1.07.

(4) The material shall retain an average of 0.5 lb. of dry zinc chloride and 3 lb. of creosote oil per cu. ft., which shall permeate all of the sapwood and as much of the heartwood as practicable, and no charge shall retain less than 90 per cent nor more than 110 per cent of these quantities per cu. ft.

(5) The preserving mixture shall be composed of the volumetric proportions of creosote oil and of zinc-chloride solution of the necessary strength which are required to obtain the specified retention of the preservatives with the largest volumetric injection that is practicable, and shall be agitated in the working tank and cylinder so as to insure thorough mixing before and while the cylinder is being filled with preservative and while the preservative is being

injected into the material. The strength of the zinc-chloride solution shall not exceed 5 per cent and shall be determined by analysis. Chemical titration, using a silver-nitrate solution with potassium-chromate indicator, before the zinc-chloride solution is mixed with the creosote oil will usually be satisfactory. For example: With red oak, the proportions shall not exceed 77 per cent of 5 per cent zinc-chloride solution and 23 per cent of creosote oil, and the volume injected shall be not less than 20 per cent, while with pine having a large percentage of sapwood they shall not exceed 88 per cent of 2.5 per cent zinc-chloride solution and 12 per cent of creosote oil, and the volume injected shall be not less than 40 per cent. The quantities of preservatives retained shall be calculated from readings of working-tank gages or scales or from weights of at least one-tenth of the material on a suitable track scale before and after treatment, checked as may be desired by the railroad's representative.

(6) Same as Par. 4 for treatment with zinc chloride only.

(7) The temperature of the preservative during the pressure period shall be not less than 170 deg. F., nor more than 200 deg. F., and shall average at least 180 deg. F. After the cylinder is emptied of preserving mixture, a vacuum shall be maintained until the material can be removed from the cylinder free of dripping preservative.

(8) Same as Par. 5 for treatment with zinc-chloride only, except that plugs are required to be creosoted.

(9) Same as Par. 6, full-cell process for creosote.

(10) When water-gas tar instead of creosote is used, it shall meet the following requirements:

It shall not contain more than 2 per cent of water.
It shall not contain more than 2 per cent of matter insoluble in benzol.
The specific gravity of the tar shall not be less than 1.03 nor more than 1.07.
The distillate, based on water-free tar, shall be within the following limits:
Up to 170 deg. C.—none.
Up to 210 deg. C.—not more than 8 per cent.
Up to 235 deg. C.—not more than 20 per cent.
Up to 355 deg. C.—not less than 50 per cent.

(11) When water-gas-tar creosote instead of coal-tar creosote is used, it shall meet the requirements of the National Electric Light Association for "C-Specification covering water-gas-tar creosote oil."

Doings of the United States Railroad Administration

Director General Confers With State Commission Representatives —Cars to Be Returned to Owners

WASHINGTON, D. C.

THE DIRECTOR GENERAL desires to harmonize the relationships between the Railroad Administration and the state railroad and public service commissions and to agree with them on a plan of constructive co-operation under peace conditions. With this object in mind, and at his invitation, a conference was held on February 19 between the director general, Max Thelen, and E. C. Niles, of the Division of Public Service, and members of the executive committee, and the special War Committee of the National Association of Railway and Utilities Commissions, headed by Charles E. Elmquist, president of the association.

The conference developed the earnest desire on the part of both the representatives of the Railroad Administration and of the state commissions to work in the most complete harmony. The director general and Mr. Elmquist both voiced the desire to co-operate in this direction. As a result of the meeting, the director general plans to put into effect the following policy, involving police regulations of the several states, other than those affecting the transportation of troops, war materials or government supplies, or the issue of stocks or bonds or rates, fares and charges. With this policy the representatives of the state commissions expressed themselves as being in entire accord:

"Transportation systems under federal control continue subject to the lawful police regulations of the several states in such matters as spur tracks, railroad crossings, safety appliances, track connections, train service, the establishment, maintenance and sanitation of station facilities, the investigation of accidents and other matters of local service, safety and equipment. It will be the policy of the director general to cause the orders of the state commissions in these matters to be carried out. The attention of the state commissions, however, is invited to the present status of the railroads under federal control, and the responsibility of the federal treasury for any deficiencies in revenue, and it is assumed that expenditures will be ordered only in the light of this status and after full consideration of the bearing of the particular case upon the needs and difficulties of the United States in operating the railroads."

The director general also announced the following policy with regard to investigations and reports on the part of the state commissions and with this policy also the state commissions' representatives expressed approval:

"The director general earnestly desires to accord to the public the best possible service. He requests the assistance of the state commissions in investigating and reporting to him the facts, with recommendations, as to the existing service. All state commissions are requested so far as they can conveniently do so to investigate the character of freight and passenger service, the physical condition of track and equipment, the prompt loading and unloading of equipment, and the general efficiency of the service, in their respective states, and to file reports with the director general, sending a copy to the regional director."

The conference was to be resumed on Thursday with the object of discussing questions involving rates and other subjects of interest to the railroad administration and the state commissions, the object of both being to bring about a perfectly clear understanding on all these matters.

Cars to Be Relocated in Accordance with Ownership

W. T. Tyler, director of Division of Operation, has issued Circular No. 27, which states that present conditions with respect to car supply present an opportunity for:

(a) Relocation of equipment more in accord with ownership than has been practicable during war conditions, under which each unit has been used with the sole purpose of meeting the then existing traffic demands.

(b) Providing to a greater extent for use by the owner of equipment of its accepted standards.

(c) Providing for the return to the owning road when desired for rebuilding or application of betterments, cars which can be put in safe condition for movement at reasonable cost.

To accomplish the above, regional directors are instructed to direct federal managers and all concerned in the proper handling of cars in accordance with the following, without abandoning the principle of common use of cars:

1. In general, cars should be loaded to or in the direction of the home road. This will not apply to cars handled

under direction of the Refrigerator and Tank Car Department of the Car Service Section at Chicago, or those handled under direction of the Eastern Railroads Coal Car Pool at Pittsburgh.

2. The Car Service Section will, as may be agreed upon with regional directors, relocate equipment according to ownership by regions so far as praticable.

3. The regional directors will then relocate the same cars between owners on the basis of ownership so far as practicable.

4. Any railroad will accept its own equipment empty at any junction point.

5. Any cars already placed on storage tracks because of surplus will not be moved so long as relocation orders placed as provided in paragraphs numbered 2 and 3 can be filled from other available supply; or as may be specially directed.

6. When roads desire to rebuild their cars, regional directors should make application through the mechanical department of the Railroad Administration, and upon its approval the Car Service Section will authorize the owners to call upon holding roads (as determined from car records) for the return of the cars in such numbers and at such times as their shop operations require. These cars to move on billing stating the authority and that they must not be diverted.

7. In carrying out the policies here indicated caution should be observed by regional directors so as not to bring about burdensome empty car mileage.

Railway Returns for 1918

Net operating income of the railways in 1918 as reported by the Interstate Commerce Commission was $690,418,778, or about $210,000,000 less than the standard return guaranteed by the government and $284,000,000 less than the net in 1917. Operating revenues for the year amounted to $4,913,-319,604, an increase of $863,000,000, or 21 per cent, while operating expenses were $4,006,894,762, an increase of $1,148,000,000, or 40 per cent. Taxes amounted to $186,-652,095, an increase of about $4,000,000.

Freight revenues increased $616,000,000, passenger revenues were $204,000,000 greater than in 1917, and express revenues were $19,000,000 greater, while mail revenues decreased from $58,793,643 to $53,502,591.

Of the increase in expenses $208,000,000 was in the maintenance of way and structures account, $417,000,000 in the maintenance of equipment account, and $517,000,000 in the cost of conducting transportation, while traffic expenses decreased $17,000,000 and general expenses increased $15,-000,000. The report covers 180 Class I roads and 15 switching and terminal companies, making a total operated mileage of 232,561 miles.

For December the operating revenues were $440,100,165, an increase of $103,000,000, expenses were $395,034,562, an increase of $144,000,000, and the net operating income was $28,237,190, a decrease of $36,000,000. The statistics are as follows:

RAILWAY REVENUES AND EXPENSES, DECEMBER, AND TWELVE MONTHS ENDING WITH DECEMBER

Item	December				Calendar year 1918			
	Amount		Per mile of road operated		Amount		Per mile of road operated	
	1918	1917	1918	1917	1918	1917	1918	1917
1. Average number of miles operated	232,561.23	233,103.64	.....	.....	234,022.91	232,694.53	.....	.....
Revenues:	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
2. Freight	309,034,271	221,657,204	1,329	951	3,450,094,040	2,834,119,707	14,743	12,179
3. Passenger	92,596,741	80,985,621	398	347	1,031,229,266	827,216,574	4,407	3,555
4. Mail	4,607,888	4,515,450	20	19	53,502,591	58,793,643	229	253
5. Express	12,827,445	10,268,250	55	44	126,059,306	106,924,818	538	459
6. All other transportation	10,211,679	9,692,384	44	42	124,157,423	115,344,764	530	496
7. Incidental	10,404,563	9,680,534	44	42	124,033,427	105,288,617	530	452
8. Joint facility—Cr	581,638	447,257	3	2	6,014,508	4,384,489	26	19
9. Joint facility—Dr	164,060	147,644	1	1	1,760,957	1,609,033	8	7
10. Railway operating revenues	440,100,165	337,099,056	1,892	1,446	4,913,319,604	4,050,463,579	20,995	17,406
Expenses:								
11. Maintenance of way and structures	69,505,405	23,809,674	299	102	653,868,469	445,735,253	2,794	1,916
12. Maintenance of equipment	108,797,067	60,703,369	468	260	1,108,030,396	690,826,898	4,735	2,969
13. Traffic	3,357,995	5,568,480	14	24	48,702,051	65,099,358	208	280
14. Transportation	200,661,472	150,636,618	863	646	2,051,193,850	1,534,221,310	8,765	6,593
15. Miscellaneous operations	3,557,299	3,133,884	15	14	39,107,149	34,008,525	167	146
16. General	10,070,453	8,818,298	43	38	112,048,965	96,876,352	479	416
17. Transportation for investment—Cr	915,129	1,368,177	4	6	6,056,118	8,555,486	26	37
18. Railway operating expenses	395,034,562	251,302,146	1,698	1,078	4,006,894,762	2,858,212,210	17,122	12,283
19. Net revenue from railway operations	45,065,603	85,796,910	194	368	906,424,842	1,192,251,369	3,873	5,123
20. Railway tax accruals (excluding "War Taxes")	14,142,960	18,458,477	61	79	186,652,095	182,778,423	797	785
21. Uncollectible railway revenues	64,937	112,166	.....	1	613,206	697,093	3	3
22. Railway operating income	30,857,706	67,226,267	133	288	719,159,540	1,008,775,853	3,073	4,335
23. Equipment rents (Dr. Bal.)	2,040,880	1,449,237	9	6	*15,080,404	*20,322,069	*65	*87
24. Joint facility rents (Dr. Bal.)	579,636	1,215,652	3	5	13,660,358	13,674,847	58	59
25. Net of items 22, 23 and 24	28,237,190	64,561,378	121	277	690,418,778	974,778,937	2,950	4,189
26. Ratio of operating expenses to operating revenues, per cent	89.76	74.55	.....	.....	81.55	70.57	.....	.....

*Debit item.

The Railroad Administration has issued a statement compiled by the Operating Statistics Section, giving the returns for the Class I roads, which places the net federal income for the 12 months at $688,200,083, representing a deficit of $202,135,602 as compared with the standard return for those roads, $890,335,685. This is the first of a series of monthly statements to be issued covering both earnings and expenses and also the statistics of freight train movement and car performance. It is stated that the commission's summary includes a few railroads not under federal control. The statement explains that in December there are ordinarily many adjustments in the accounts correcting over-estimates or under-estimates in previous months based on those accounts which are conducted monthly on a basis of accruals. These adjustments in December, 1918, particularly in charges for retroactive wage payments, have resulted in disturbing the figures in comparison with December, 1917, but the results for the 12 months as a whole are comparable. The statement also says:

"In considering the results for 1918 it should be borne in mind that that year was almost wholly one of war conditions.

It was necessary to move freight expeditiously, in many cases regardless of cost. Preference had to be given to munitions traffic, and this naturally militated against economies. In addition, the railroads were compelled in many instances to employ inexperienced and inefficient labor. The railroads had to supply the demands of the military service generally, just as other industries did, but also had the special demand made upon them of supplying the men for the military railways in France. . . ."

The wage increases altogether had the effect of increasing the 1918 operating expenses by approximately $583,000,000, or about 32 per cent over what the payrolls would have been if there had been no increases in 1918. This does not give the effect of the wage increases if applied to a full year, because many of them did not become effective until the latter part of the year. The increased cost of materials also added heavy burdens, locomotive fuel alone accounting for $125,000,000. It is also pointed out that the 1918 results were adversely affected by the extreme weather conditions of January and February and the traffic congestion which obtained at that time. In January operating expenses took 95 per cent of the revenues and in February 90 per cent.

In commenting on the statistics for freight operation, which were published in our issue of last week, the statement points out that notwithstanding the heavy losses during the first two months under federal control the summary for the year shows that 228,729 miles of railroad produced 435,000,000,000 ton miles in 1918, an increase of 1.8 per cent. The decrease in the percentage of loaded to total car miles is attributed principally to the relatively greater proportion of empty car miles as the result of the policy of the Railroad Administration of moving empties in solid trains to the regions where they would be needed for prospective traffic. This policy had the favorable result of ameliorating the car shortage and of expediting movement of traffic.

The passenger traffic for the year, it is estimated, will show an increase in passengers carried one mile of approximately 9 per cent. The complete figures for the 12 months are not yet available. Those for the 11 months, which are published herewith separately, show an increase of slightly over 9 per cent. These figures include the movement of troops. It is estimated that the passenger train miles for the year were approximately 9 per cent less than in 1917 as the result of the policy of curtailing passenger train service.

Passenger Traffic for November and Eleven Months

The number of passengers carried one mile by the railroads under federal control during the month of November, 1918, decreased 7.1 per cent as compared with November, 1917, according to the monthly report of the Operating Statistics Section. For the eleven months' period there was an increase over the corresponding period of 1917 of 9.2 per cent. The Allegheny and Pocahontas regions continued to show increases in November. The figures by regions follow:

A la Carte Service in Dining Cars to Be Resumed

Director General Hines has sent the following instructions to the regional directors:

"Commencing March 1 next, a la carte service may be resumed on trains where, in the opinion of the federal manager, this can be done and avoid congestion in dining cars with the resulting delays to passengers. On trains where table d'hote service is continued, it is desired that a well-balanced meal be provided of not to exceed five courses, exclusive of relishes and beverages, of good food, well cooked and served, appropriate to the occasion. The price of all table d'hote meals to be $1.25, and be made worth the price. It is required that a prompt and thorough inquiry be made as to the trains on which table d'hote service should be continued with the first purpose of rendering the most efficient and satisfactory service to the traveling public. It is to be clearly understood that the a la carte service is not to be substituted for the table d'hote service on trains where such action would result in overcrowding the dining cars and resultant delay to passengers in obtaining service."

The table d'hote service was put into effect as a war measure because of heavy passenger travel during the war and a shortage of passenger equipment due to the necessity of using a large amount of passenger equipment in the transportation of troops. As these conditions disappear, it is desired to return to the a la carte service, which it is believed will be more satisfactory to the traveling public.

Exports Control Committee Discontinued

The Exports Control Committee, formed by agreement between the secretary of war, the secretary of the navy and the director general of railroads, will be disbanded on March 1 in accordance with a suggestion from the members of the committee that its continuance is no longer necessary. Following the signing of the armistice on November 11 there was a large amount of export war freight enroute to and at the several ports. The disposition of this tonnage has progressed very satisfactorily, either by storage at the ports or diversion to interior points. There remains a heavy food program for overseas, which is well under control by the respective port committees, i. e., Freight Traffic Committee, North Atlantic ports, covering the northern range; Southern Export Committee, covering the South Atlantic and Gulf. The congestion at Pacific ports is now under control through the committees recently appointed as follows: North Pacific Export Committee, Portland, Ore., having jurisdiction over Puget Sound ports, and California Export Committee, headquarters San Francisco, over California ports. The committee recommended that with the view of preventing port congestion hereafter, the committees of control mentioned shall be continued, with authority to regulate the flow of traffic under the present permit system.

The director general has announced the appointment of Conrad E. Spens as assistant director, Division of Traffic, in charge of export and import traffic, in addition to his present

PASSENGER TRAFFIC, NOVEMBER, AND ELEVEN MONTHS ENDING WITH NOVEMBER

Railroad	Average miles operated	Passengers Carried One Mile — Month of November				Eleven months ended November 30			
		1918	1917	Increase or decrease	Per cent	1918	1917	Increase or decrease	Per cent
Total, New England District	8,160	251,907,238	279,122,857	d 27,215,619	d 9.8	3,094,728,623	3,153,507,662	d 58,779,039	d 1.9
Total, Central District	21,959	430,870,211	448,942,511	d 18,072,300	d 4.0	5,288,763,910	5,280,926,519	7,837,391	0.2
Total, Ohio-Indiana District	14,504	205,927,848	229,513,554	d 23,585,706	d 10.3	2,625,421,479	2,554,430,030	70,991,449	2.8
Total, Eastern Region	44,623	888,705,297	957,578,922	d 68,873,625	d 7.2	11,008,914,012	10,988,864,211	20,049,801	0.2
Total, Allegheny Region	12,919	545,324,800	495,497,599	49,827,201	10.1	6,718,201,827	5,686,141,282	1,032,060,545	18.1
Total, Pocahontas Region	4,784	78,631,059	60,345,618	18,285,441	30.3	809,635,514	617,261,608	192,373,906	31.2
Total, Southern Region	37,348	457,865,476	462,930,165	d 5,064,689	d 1.1	5,855,978,976	4,485,017,026	1,370,961,950	30.6
Total, Northwestern Region	46,387	311,637,392	386,875,066	d 75,237,674	d 19.5	4,197,458,806	4,344,814,384	d 147,355,578	d 3.4
Total, Central Western Region	51,168	486,334,161	608,076,538	d 121,742,377	d 20.0	6,952,081,170	6,589,350,805	362,730,365	5.5
Total, Southwestern Region	31,349	273,477,030	303,301,615	d 29,824,585	d 9.8	3,444,628,670	3,002,614,607	442,014,063	14.7
Grand total, all regions	228,578	3,041,975,215	3,274,605,523	d 232,630,308	d 7.1	38,986,898,975	35,714,063,923	3,272,835,052	9.2

d Decrease.

duties as manager, inland traffic, U. S. Food Administration. Mr. Spens will co-operate very closely with the Department of Commerce, the State Department, and the Shipping Board, also with import and export commercial interests, to enable them to compete successfully in foreign fields. In co-operation with the Shipping Board, assistance will be given in establishing new steamship service in American bottoms to foreign countries that will best serve the commercial interests in this country, and also give complete information as to inland and ocean freight rates and other necessary transportation data that will assist in developing foreign commerce. Particular attention will be given to port conditions and the routing of import and export freight to prevent congestion at our ports.

For the time being, the present permit system on export freight will be continued. Necessary improvements at the various ports will be made a special study. Under the Webb act, consolidation of competing industrial concerns for the purpose of developing their export business is permitted. It is expected that consolidated interests, formed as a result, will make for the larger export of manufactured goods from the country.

George D. Ogden, chairman of the Exports Control Committee, will continue as freight traffic manager of the Pennsylvania Railroad, with office at Philadelphia, and R. L. McKellar, secretary, will continue in charge of the foreign commerce service of the Southern Railway System, with office at Washington.

Coal Purchasing Policy Outlined

Director General Hines, in a conference on February 18 with J. L. Lewis, vice-president of the United Mine Workers of America, and Warren E. Pippin, of the Labor Bureau, United States Fuel Administration, representing the organized coal miners of the country, discussed the coal purchasing policy of the Railroad Administration and requested the co-operation of the officials of the United Mine Workers in getting specific instances in which it can assist the general coal mining labor situation, having in mind the limitations necessarily surrounding the Railroad Administration.

The director general outlined the policy of the Railroad Administration in this respect as follows:

"The policy of the Railroad Administration is to avoid any action calculated to depress wages of coal miners or the amount of coal produced. Some time ago our attention was called to the fact that there was a concentration of orders for the Railroad Administration in certain fields so as to leave other fields without railroad orders. We promptly met this situation by giving instructions that coal should be bought as far as possible by each railroad on its own railroad. The point was also made that we were using our storage coal to such an extent as to reduce very largely the current production. We promptly met this by giving instructions that we should diminish our withdrawal of coal from storage and use a large amount of current production.

"It was also claimed that the Railroad Administration was trying to force down prices to such an extent as to bring about a decrease in the price of labor. We met this point not only by requiring the wider distribution of purchases already mentioned, but also by providing that we should not suggest any prices to the operators, and to stipulate that any prices named by the operators must be based on existing wages.

"The point has also been made that publicity ought to be provided in the obtaining of bids and making of contracts. We have met this point by providing that any prices which are established will be available to representatives of the miners or others who may be interested, and who may request the information, both as to prices and as to the names of the sellers.

"This represents our general policy, which is actuated by our earnest desire to protect the general situation. The Railroad Administration has a very important selfish interest to accomplish this, because whatever will protect the general situation will help general business, and this is of vital importance to the Railroad Administration.

"It is very important, however, to bear in mind the fact that the Railroad Administration's part in these matters is much more restricted than is generally assumed. Only about one-fourth or a little more of the total bituminous coal production is consumed by the railroads. To a very large extent the mines whose output can actually be used for railroad purposes is restricted on account of the quality of coal needed. A further important point is that at the request and, indeed, at the insistence, of the Fuel Administration, the Railroad Administration has made contracts for a large part of its coal, with the result that only about 20 per cent of the coal used by the Railroad Administration is not covered by contract. Naturally the contract coal cannot be modified except with the consent of the operators.

"Moreover, the very large amount of storage coal which the railroads have accumulated was accumulated at the request of the Fuel Administration, and while we are endeavoring to use this storage coal in such a way as not to embarrass the situation the fact remains that the coal is there and must be consumed.

"It must also be remembered that the volume of coal which the Railroad Administration consumes is limited by the volume of business, and as business is now falling off this operates to reduce the volume. It seems to me we have met substantially the various needs that have been presented to us. The only other possibility that occurs to me is that if the operators with whom we have made contracts for about 80 per cent of the coal are willing to release us from those contracts we will be glad to distribute that coal among the various mines which can produce the necessary quality of coal and which will be willing to sell at the same prices we have under the contracts."

Weekly Traffic Report

Director General Hines has announced the cancellation effective February 15 of requirements to obtain permits on carload shipments of domestic freight to New York City except for local lighterage. Embargoes against domestic freight to Philadelphia and Baltimore as well as to New York were materially modified on February 15. According to the weekly traffic report for the week ended February 17, the condition at the various ports was in fairly good shape, 4,920,000 bushels of grain having been exported during the week, and a number of ships are now loading. This affords considerable space in the elevators and permits are being issued freely for the movement of freight from the west to both the Atlantic and Gulf ports. The movement of principal fruits and vegetables so far this season, greatly exceeds that of last year. Cattle and hog receipts at the Union Stock Yards, Chicago, decreased 12 per cent under the same period of last year, although sheep receipts showed an increase of 11 per cent. Passenger travel from practically all parts of the country continued unusually heavy, this being particularly noticeable to Florida points. A summary of the report follows:

EASTERN REGION:—The automobile business is reported as being extremely prosperous, and one large concern has acquired 300 additional acres in order to enlarge its plant. During the week permits were issued covering about 25,000 cars of export freight, of which 10,000 were commercial freight.

ALLEGHENY REGION:—A new plan for the delivery of perishable freight at New York, Philadelphia and Baltimore was established on February 15, which should greatly

improve the service. On account of heavy export movement of grain from the elevators at Atlantic seaboard, permits are being issued freely on grain from the West.

POCAHONTAS REGION:—The movement of coal and coke continues very light, showing a decrease of 3,000 cars under the previous week, while local loading of general freight also shows a slight decrease. Twelve pig iron furnaces and steel plants are reported out of blast, some for repairs, and others account lack of orders. Dumping of coal at tidewater showed a decrease of 98,846 tons. Passenger travel continues very good, requiring extra equipment on regular trains, as well as the operation of forty-four extra passenger trains.

SOUTHERN REGION:—The number of cars loaded and received from connections showed an increase of 56,027 cars, as compared with the previous week, although the increase was only 5,473 cars greater than the same period of 1918. There are no accumulations at terminals, or embargoes, but the surplus of box cars still continues. Movement of fruits and vegetables from Florida shows about 25 per cent increase over last year, and the demand for refrigerator equipment is heavy; however, no difficulty in filling requisitions. The low price of cotton continues to retard the movement of this commodity. The domestic demand for lumber continues light, but European bookings are reported. Passenger business was very heavy, and tourist hotels in Florida are having an exceptionally good season.

NORTHWESTERN REGION:—The general strike situation at Seattle has cleared and all laborers have returned to their work, with the exception of the shipyard workers, who will doubtless resume operations within ten days. During the week 101,118 cars of freight were loaded in the Northwestern region, which was a decrease of about 1 per cent under the corresponding week of last year, but an increase of 17 per cent over the corresponding week of the previous month. The elevators at Duluth and Milwaukee are filled to capacity, retarding the movement of grain to primary markets. Live stock loadings continue to show increases as compared with the previous week, as well as with the same period last year. Passenger traffic is heavy throughout the entire region.

CENTRAL WESTERN REGION:—During the week 103,680 cars of freight were loaded, a decrease of about 11 per cent under loading for the corresponding week of last year, partially accounted for by heavy snows, sleet and high winds throughout Nebraska, Kansas and Colorado. The export freight on hand at San Francisco is being gradually reduced, and at the present time is equivalent to 890 carloads. Passenger travel has been about normal, although the movement to California continues heavy. Thirty-four troop trains and a number of extra cars were operated during the week to move discharged soldiers. Passenger schedules are being revised with a view to giving improved service, and observation and buffet cars are being restored on some of the through trains.

Export Traffic

A considerable improvement in the movement of overseas traffic for the week ended February 11 over the week previous is shown in a report from the Exports Control Committee. The total number of cars on hand at North Atlantic ports for the week ended February 13 was 31,436, while for the week ending February 4 there were 32,343, a decrease in accumulation of cars for the week of February 13 compared to the previous week of 907 cars. The deliveries of export freight at the various ports for the months of August to December, 1918, inclusive, amounted to 260,488 cars; apportioned as follows: North Atlantic range, 234,428 cars; South Atlantic range, 4,991 cars; Gulf range, 21,069 cars. The average monthly deliveries for the same period amounted to 52,097 cars.

It is announced that the food administration will purchase within the next 10 days about half a million barrels of flour, and probably an additional half million barrels within the succeeding 10-day period. Permits will not be requested on any of this material for about two weeks.

Automatic Train Control Committee

The Committee on Automatic Train Control devoted its meeting in Washington, February 14, to clearing the decks by eliminating from consideration about 180 plans for automatic train control systems which had previously been passed on and condemned by the Interstate Commerce Commission as having no merit. The committee had before it approximately 250 plans, most of which had never been submitted to any practical test, and most of which had previously been submitted to the commission, but including some 15 new ones proposed to the committee. At the next meeting on February 28 the committee will devote itself to the consideration of 50 or 60 plans which include those that possess a greater degree of merit with a view to reducing the number to those which are worthy of careful investigation. These will be taken up one at a time alphabetically with the persons interested, and from them the committee will probably select one of each type for test.

Rate Policies

The director general has instructed the freight traffic committees that they are not to docket or send out for consideration by the public any case involving a general advance or a general readjustment, as to rates, fares, charges, regulations or practices, in a territory or district, on one or more commodities, until the matter has first been submitted to him and approved for consideration with the public.

The existing policy of the Railroad Administration as to differential freight rates on rail and water routes was established on the basis of war conditions and to meet a war situation, and now that the armistice has been signed very careful consideration is being given to a revision of this policy to meet peace conditions and to make certain that an entirely just and equitable basis for these rates is established under peace conditions. Much complaint has been made because the Railroad Administration has fixed water rates at so near the level of the rail rates as to make the cost of water transportation practically the same as by rail.

Contracts Signed

The director general has signed compensation contracts with the Union Pacific, covering also the Oregon Short Line, Oregon-Washington Railway & Navigation Company, Des Chutes Railroad, Green River Waterworks Company, Rattlesnake Creek Water Company and Union Pacific Water Company, for $38,552,928 yearly; with the Central New England, for $1,468,123; with the Washington Southern, for $468,482; and with the Trinity & Brazos Valley, for $100,000.

Seniority Rights for Russian Railway Service Corps

In supplement No. 1 to General Order No 51, issued by the director general, the provisions of General Order No. 51 are extended to include employees in the service of the Russian Railway Service Corps.

The Train Despatcher's Relaxation (?)—The train despatcher, in addition to his other duties, is required to keep the Information Bureau posted at all times on the prospective arrival of trains, in order that proper time may be posted on all the bulletin boards—this applies not only at terminals, but also at all stations on the line where the trains stop. It is not a case of do it if you have time; the law says we must. We do. It's part of the day's work.—*J. A. Shockey, S. P.*

Railroad Hearings Before Senate Committee

Transportation Problem to Pass to Next Congress—House Committee Decides Not to Hold Hearings

WASHINGTON, D. C.

THE FACT THAT THERE is practically no prospect for any railroad legislation at this session of Congress, beyond the appropriation of the addition to the revolving fund asked for by the Railroad Administration, was emphasized when the House Committee on Interstate and Foreign Commerce on Monday decided not to hold any hearings on the proposal to extend the period of federal control. Chairman Sims of the committee had introduced a bill providing for an extension for five years, and had planned to begin hearings on Tuesday with Director General Hines as the first witness, but when the committee met on Monday it was decided to "table" the subject, as there is not sufficient time for even committee action at this session.

The Senate committee, which has been holding hearings almost daily since January 3, and has listened to a variety of plans for the solution of the railroad problem, has also indicated a loss of interest in the subject as far as this session is concerned, and decided last week to hold only two hearings a week. It also began to limit the time of the witnesses. After holding a session on Tuesday and Wednesday this week it was decided to bring the hearings to a close on Thursday.

Immediate interest in the prospects for the railroads is now centered in the attitude to be taken by President Wilson when he returns to Washington next week from the peace conference. He is planning to leave again for Europe in a few days, but during his stay he is expected possibly to decide regarding an extra session of Congress, which would give an opportunity to work out a new plan of railroad regulation, and also as to the relinquishment of the railroads. There has been some expectation that he might issue a proclamation setting a future date for the return of the roads during his stay here, but there are no indications that the date has been decided.

Director General Hines, in testifying before the House appropriations committee, referred to the possibility of releasing the roads this fall, and doubted very much if there could be a relinquishment earlier than that. He also told the committee that the Railroad Administration is working on a policy of restoring transportation to its normal basis in view of the probability of a return, and the administration is preparing in many ways to facilitate the transition back to private operation. The purpose of the appropriation is to enable the administration to settle its accounts with the railroads and to assist the roads in financing during the transition period.

"And there is a possibility that shortly before the actual relinquishment, the roads will be restored to the corporate organizations for operation under the general direction of the director general.

Testimony before the Senate committee during the past week has included statements by Daniel Willard, president of the Baltimore & Ohio; S. Davies Warfield, president of the National Association of Owners of Railroad Securities; G. M. Freer, president of the National Industrial Traffic League, and N. L. Amster, president of the Investors' Protective Association.

Statements by Howard Elliott, president and chairman of the Northern Pacific and chairman of the committee on intercorporate relationships of the New York, New Haven & Hartford, and by Samuel Rea, president of the Pennsylvania, also were filed with the committee. Senator Underwood filed a statement by E. D. Kenna, formerly vice-president of the Atchison, Topeka & Santa Fe, and Senator Cummins has also put into the records of the hearing plans for the disposition of the railroads proposed by Paul M. Warburg and Jules S. Bache.

Daniel Willard's Statement

Mr. Willard said in part:

"My experience convinced me that it was desirable, in fact necessary, that in time of war or unusual emergency, all of the more important agencies of transportation should be so co-ordinated that, taken together, and as a whole, they might be said to form a national system of transportation. But unified control, like all things else of real value, must be paid for in some manner, and the price is the sacrifice of competition of service. There cannot be unity of control and competition of service at one and the same time—the two things are incompatible. Competition of service has probably done more than any other one thing or influence to raise the standard of equipment and performance of American railroads, and as a policy it should not be lightly given up, and in no event should it be abandoned unless something else of equal or greater value be obtained in its place. I do not, however, share the views of the director general that unified control, when desirable, cannot be had under private ownership with governmental regulation, and the information which Mr. Kruttschnitt has laid before this committee concerning the results of unified control of the steam railroads obtained by the so-called Railway War Board, for a period of nine months preceding federal control, affords a most substantial basis for my belief. That a condition finally developed which the voluntary organization created by the railroads, subject as it was to many statutory restrictions, was unable to deal with promptly and effectively, must be admitted, but we have the direct statement from the director general that he also would have been unable to deal effectively with the same situation had it not been for the fact that he was authorized by law to ignore the restrictions which applied to the railroads under private operation.

I doubt if there has ever been a proper appreciation of the confusion that was caused in this country in connection with all industrial and transportation matters, incident to the sudden change in 1917 from a peace-time to a war-time basis, and much was required besides the mere unification of the railroads to bring order out of the confusion so resulting. As time went on, however, the necessary remedies were first discovered and then applied, the war-time basis became the normal basis, and order was gradually re-established. It was not possible at that time, or in any event did not seem wise, for the railroads to place such restrictions upon the ordinary peace-time commerce of the country as were found to be necessary and practicable later on.

The congestion of freight at the eastern terminals in the fall of 1917 was due largely to an unprecedented condition of commercial and industrial readjustment which the railroads were obliged to deal with, while at the same time having some regard for the existing rules and regulations established by law.

These questions were not primarily and entirely matters of railroad control and operation, although closely related thereto, but were problems that developed, and naturally so, out of a condition of world war, and later on were dealt with more or less effectively by the different governmental agencies established for that purpose.

It has frequently been asserted that the steam railroads

in the United States under private ownership had broken down, and that it became necessary on that account for the government to take possession and assume control of the physical properties. I cannot agree with those who hold that opinion, nor can I find anything in the record of performance of the carriers under private control and operation, or in the record of performance during twelve months of federal control and operation that gives support to that assertion. On the contrary, the record of actual performance under federal control with almost exactly the same facilities and with substantially the same official staff, is the best and most convincing evidence that the railways, both as to physical properties and personnel, had not only *not* broken down, but were in fact most efficient agencies of transportation.

I was not opposed to the taking over of the railroads by the President in December, 1917. Congress itself had foreseen the possible necessity for such action as a *war measure* and had provided for it by suitable legislation passed 18 months before, and at a time when the railroads were carrying a greater volume of traffic than ever before, and when no one ventured to suggest that they were even threatened with breakdown.

A policy of enforced competition did not and could not readily adapt itself to the unforeseen situation. Further, the control over railroad rates and practices which had been vested in the state and interstate commissions could not be, or in any event was not, so exercised as to promptly and amply satisfy the changed conditions brought about by the war, and consequently the financial condition of many of the carriers, because of rapidly mounting cost of operation, became critical. In short, a policy of regulation designed to deal with peace-time conditions, failed to satisfy the requirements created by war, and we are now confronted with the problem—if private ownership is to continue—of providing such a system of regulation as will not only properly protect and promote the interests of the public and the carriers in times of peace, but which will also quickly and easily adjust itself to the requirements either of peace-time or war-time emergency.

Private ownership and operation of the railroads as a policy have not failed. Regulation as a government policy has not failed. It has been clearly shown, however, that a system of regulation designed for peace-time conditions might not, and, in fact did not, properly function in time of war, and as it was necessary to act promptly, the government assumed control of the railroads and proceeded to run them as if there were no restrictive laws and regulations.

"Actual experience now leads to the conclusion, so it seems to me, that the railroads under private ownership, and subject always to governmental regulation, should be lawfully authorized to do whatever would be done in the public interest under government ownership and operation, or is actually being done in such interest at the present time under governmental control and operation.

"I am familiar with the recommendations that have been submitted on behalf of the Association of Railway Executives, and I approve and endorse the general plan so outlined, because I believe that if adopted and put in effect with a firm desire to make it succeed, it would provide such method of procedure and such agencies of control as would enable the railroads in the future under private ownership to deal promptly and effectively with any probable emergency which might arise, and, if in connection therewith Congress will establish a definite and adequate rule for rate-making as related to the invested capital, the credit of the carriers which has been seriously disturbed by the uncertainties of the past will again and in time be sufficiently restored to attract the large sums of new capital constantly required for the additional facilities and equipment necessary to keep pace with the growing commerce of this country.

"I have listened to the report and recommendations submitted by Mr. Clark on behalf of the Interstate Commerce Commission, and I believe they also would go far toward meeting the requirements. The two plans have much in common, but the one suggested by Mr. Cuyler would give to the Interstate Commerce Commission exclusive authority to deal with all rates and security issues, would have Congress provide a definite rule for rate-making, and would create a new Department of Transportation, the head of which would have a seat in the President's Cabinet. Such a department, in my opinion, is desirable primarily in order to bring about that co-operative development and use of the different agencies of transportation which are needed in the public interest.

"Mr. Warfield on behalf of the National Association of Owners of Railroad Securities, has proposed a definite rule for rate-making. His recommendation, as I understand it, contemplates that rates shall be established in each of the so-called rate regions so as to yield, as nearly as may be, a fixed percentage return upon the combined value of the property devoted to the public use by the railroads in that region, with the limitation that if any individual carrier in such region shall be able to earn from rates so fixed a greater return upon the value of its property than the rate per cent fixed for the region, two-thirds of such excess shall go to the government. While this plan does not contemplate a positive guarantee of any fixed amount, it would afford a definite guide or measure and would in my opinion be a decided improvement upon the methods of the past. He suggests that 6 per cent be the fixed rate of return upon the value of the property as shown by the book investment account of road and equipment. I think there can be no difference of opinion concerning the soundness of the principle underlying his recommendation, and I firmly believe that no less a rate of return than 6 per cent upon no less an amount than the combined book property investment account of all the railroads taken as a whole, will be sufficient to establish and sustain the credit of the carriers. My own study leads me to the conclusion that a rate of 6½ per cent upon the combined property investment account, and a rate of 6 per cent, I fear, may prove to be too small, and it may be fairly said that the success or failure of private ownership of the railroads as an economic policy, rests upon the wise and correct determination of this particular phase of the problem.

"All are seemingly willing that railroads should be permitted in the public interest to pay a fair return upon the fair value of their property devoted to the public use, but I am convinced that it has now become necessary that some one speaking with authority should say definitely what is a fair rate of return and upon what definite amount. Congress undoubtedly has authority to fix the rate of return on property devoted to the public use, and until some fairer or more accurate basis is found for determining the value of the railroad properties so used, I respectively submit that the book investment accounts of the carriers as a whole afford the best evidence of such value.

"It would, of course, be the duty of the Interstate Commerce Commission or some other agent of Congress to see that an adequate rate structure was established and maintained, and in that connection it would be a mistake, I believe, to minimize the difficulties growing out of our present dual system of rate regulation. It seems clear that Congress has ample authority to deal with this matter if it chooses to do so. I am in favor of leaving the states as free as possible to deal with all matters affecting transportation, subject only and always to the one qualification that they shall not seek or be permitted in the interest of any particular state to place an undue burden upon the commerce of all the other states.

"The labor phase of the railroad problem is indeed most important as has already been pointed out, but, as has been

shown by Mr. Garretson, it is a common factor to be dealt with under any form of control or operation. Clearly it is in the public interest that those who man the trains and engines or whose duties are in any way related to the safe and proper operation of the roads, should be a selected and reliable class of men, and it is also in the public interest that they should be well paid and provided with safe and suitable working conditions, and further, after they have become incapacitated for the more exacting duties of the railroad service, they should be provided if possible either with work more suitable to their physical condition, or with a pension or annuity based upon their average earnings over a period of years, and the expense incident to this reasonable arrangement should be included in the cost of the service rendered to the public.

"I am not in favor of such a division of excess profits with labor as Mr. Warfield suggests, because such a plan in my opinion would be extremely difficult of fair application and does not rest upon the right principle. I believe thoroughly in good wages, and if a man does work of unusual value he should receive unusual reward, but the two should go together, and that would not necessarily follow under Mr. Warfield's plan. I agree fully with the idea advanced by Mr. Plumb on behalf of the four brotherhoods, that the best results will be obtained when men are actuated by hope of reward, and not by fear of punishment, and in no line of gainful endeavor has there been greater opportunity for advancement and reward than in the railroad service. Private ownership will preserve the conditions which have made such advancement possible. The very great majority of the railroad officers today have reached their present positions through well established lines of promotion and because they were believed to be fitted for the enlarged responsibilities placed upon them. Having entered the railroad service as an unskilled laborer when only eighteen years old, I have seen and know the things of which I speak. Private ownership and operation will preserve and enlarge the opportunities to which I have referred. Government ownership and operation, in my opinion, would in a large degree destroy them.

"Director General McAdoo referred to a number of reforms which he recommended be continued under whatever form of control might ultimately be decided upon. I agree fully with his recommendations in that connection with two or possibly three exceptions. I am opposed, however, to the five-year extension of the period of federal control, recommended by the director general, because I believe that if such extension is granted, that by the end of that period it would be practically impossible to restore the roads to the owners, and government ownership would be the only alternative, and I am opposed to the policy of government ownership and operation of the railroads. The occasion which justified the taking over of the railroads having passed, it is now, so it seems to me, the clear and peremptory duty of the government to restore, as soon as may be, the properties so taken, to the rightful owners. This should be done as soon as Congress can provide, by suitable legislation, for the relinquishment of federal control. In the meantime, it is certainly the moral duty of the government to protect the property from unnecessary harm or disarrangement, in order that it may be restored in 'as good repair and in substantially as complete equipment as it was in at the beginning of federal control.'

"I have carefully considered the plan submitted by Mr. Plumb on behalf of the four brotherhoods. Aside from the fact that I believe his conclusions are erroneous concerning the possible savings to be effected in cost of capital, it seems to me that his plan has all the objections which in my mind are associated with government ownership and operation. He proposes that the government should furnish the facilities and capital needed, and that the railroad officers and employes should operate the properties, and, having a two-thirds majority of the board of directors, they would evidently be in a position to manage the properties as they might elect, and while I have no doubt it would be their honest purpose to operate the roads efficiently, I simply do not believe that efficient operation would be possible or probable under the plan they propose.

"If Congress, as a minimum program:

1. Will provide a definite and workable rule for ratemaking as related to capital, by fixing an adequate percentage ratio of railway operating income to the combined property investment account of the railroads as a whole, along general lines such as I have discussed; and
2. Will affirmatively authorize the railroads to combine their properties and operations, subject to governmental approval, as and when shown to be desirable in the public interest; and
3. Will affirmatively authorize the carriers to issue securities for construction, equipment, enlargement of their properties, and for the refunding of obligations, subject to exclusive supervision of the federal commission; and
4. Will provide for the extension, for a reasonable period, of the indebtedness of the carriers to the United States for advances and loans made by any governmental agency during federal control; and
5. In addition thereto, will either create the new agencies which have been suggested, or enlarge and extend the existing regulating agencies so that matters requiring governmental determination may be promptly disposed of;

"Congress will then have dealt with the matters fundamentally essential at this time. With such legislation, I believe that the difficulties which have confronted private ownership and operation of the railroads in the past will be very greatly reduced, if not entirely eliminated, that the railroad credit will be re-established, and that the public will be provided with ample transportation facilities at reasonable rates and at lower rates than they would be required to pay under government ownership or control."

Corporations Should Be Reinstated

Senator Cummings asked whether it would be wiser, assuming that federal control is not extended, to turn the railroads back immediately or to hold them until Congress acts. Mr. Willard replied that he was not sure either alternative was necessary. He would like to see the Baltimore & Ohio under the management of its own company as soon as possible and would not like to see the period indefinitely extended. If Congress thought it could legislate in six months or a year he did not see why the corporations could not be put back in charge of the properties subject to the direction of the director general so they could begin again the development of their properties in their own way. Assuming that the war emergency made it necessary to set aside the corporation organizations, he said, that occasion is now past. There is now no congestion, no car shortage, no shortage of engines or shortage of labor and no reason why the railroads should be managed today differently than in the past. If the corporations were reinstated, the director general could still issue any instructions he considered necessary to meet any particular situation. Senator Pomerene remarked that if the railroads were not competent to manage their own affairs they could probably employ most of the men who have been connected with the director general's organization. "I assume they could," replied Mr. Willard, "as they had most of them before."

Senator Cummins said it is obvious that there will be no general railroad legislation this session nor until after next December and that if the President and the director general carry out their announced intention the railroads will have been returned before that time. Mr. Willard said he was not in a position to know exactly what position his road would be in under such circumstances because he had not been in charge of its operations and did not know whether the present rates would be sufficient under normal conditions because some of the road's traffic has been diverted to other lines. Moreover, lawyers differ radically as to whether the state rates would remain in effect; if rates were reduced, he said, the railroads could not get along if returned immediately.

"We know," he said, "that wages have been increased by

the government by substantially $900,000,000 a year. If the government having put on that increased charge should turn the railroads back with lower rates than the director general got, the effect would be so serious that I cannot conceive that the government would treat private property that way. I hate to accept the conclusion that the President would do that. I cannot believe that any administration would do what has been suggested."

"If they believe what they say, they intend to turn the roads back very soon," said Senator Cummins.

Senator Pomerene remarked that in view of the fact that the director general still has 21 months, if he asks for a five year extension and cannot get it and then turns the roads back precipitately he would not be acting fairly toward either the public or the railroads. Senator Cummings thought that Congress ought to do something to prevent such a contingency. When Senator Kellogg declared that it was useless to speculate on that subject because if the administration made up its mind to do so it could turn the roads back before Congress could pass a bill, Senator Cummins said he at least proposed to make an attempt. He proposed to offer as an amendment to the appropriation bill his bill to take away from the President the power to relinquish the railroads until authorized by Congress. Chairman Smith of the committee remarked that that would look as if Congress were afraid the President and the director general would not do the right thing.

"It would look as if we were afraid they would do exactly what they have said they would do," said Senator Cummins.

Mr. Willard said that the two fundamentals of the problem are the money that the railroads owe the government and the rate question. In view of the prospective government financing the companies would be unable to pay their loans to the government but doubtless an extension of time could be arranged. The railroads, however, like any other institution, must have money to pay their bills and he pointed out that general commodity prices have increased to a far greater extent than railroads rates. For instance, he said, from 1914 to 1919, the price of wheat had increased 117 per cent and the freight rate on wheat 53 per cent, lumber had increased 119 per cent and the rate 38 per cent, steel rails 89 per cent as compared with 53 per cent, stone ballast 107 per cent as compared with 40 per cent and dressed meats 87 per cent as compared with 53 per cent. Senator Pomerene asked whether Congress ought to authorize the additional appropriation of $750,000,000 for the Railroad Administration or should attempt to arrange things so that the railroads can finance themselves. Mr. Willard said that it seemed to him there was no alternative, in view of the prospective Liberty loan, because unless the government could finance the railroads in part they would be unable to carry out an improvement program. It might be possible for them to borrow money at 6, 7 or 8 per cent, but this would have to be taken care of eventually in the rates and it would be cheaper for the government to advance part of the money.

If Congress should accept the five year plan now, Mr. Willard declared, it might as well recognize that it would be merely accepting government ownership under another name. If the plan succeeded the government would naturally want to continue the operation and if it were unsuccessful the railroads would hardly want their properties back. He pointed out that the Baltimore & Ohio corporate organization now includes only 70 or 80 persons, whereas the 70,000 employees of its operating organization have been taken over by the government. If the director general should carry out the policy that Mr. McAdoo indicated, expending $2,000,000,000 or $3,000,000,000 on the roads for common purposes, it would practically require the government to take over the roads.

Mr. Willard objected to the plan of consolidating the railroads into regional companies, but suggested that they be allowed to be consolidated along natural lines into about 25 large systems. This would preserve competition and would take care of the problem created by the weak roads. Senator Cummins asked why the Interstate Commerce Commission should not be authorized to require such consolidations. Mr. Willard said that the railroads have made such efforts to do this very thing, sometimes to the extent of running against the law, that he thought the only thing necessary was to remove the restrictions and let natural laws work it out. If they did not work out the plan could be made compulsory. Mr. Willard said he had endorsed the plan for a secretary of transportation proposed by the Association of Railway Executives, but did not think it was so fundamental as to whether the cabinet officer or some other agency were created for the purpose. The important thing was to have some agency to study the whole transportation problem, not for the purpose of administering the railroads, but for the purpose of establishing a national transportation policy. Senator Underwood asked to what extent the executives were in favor of the principles of Mr. Warfield's plan. Mr. Willard said the executives had recommended that Congress establish a definite rule of rate-making which would provide an adequate return but did not attempt to state the rule. He was authorized to say that Chairman Cuyler of the Association of Railway Executives had endorsed the fundamental principles of the Warfield plan, but he did not know to what extent the executives generally would agree to it.

In connection with Mr. Willard's testimony, S. T. Bledsoe of the law committee of the Association of Railway Executives filed with the committee a statement comparing the state and interstate passenger fares in effect on December 31, 1917.

Howard Elliott's Statement

An abstract of Mr. Elliott's statement follows:

The Interstate Commerce Law was passed in 1887. Not unnaturally, after 30 years, some defects have been developed in a plan created out of the thought and opinion of people 30 to 40 years ago, and it has been found lacking under the conditions of today, and this is also true of restrictive and conflicting state laws and regulations.

We talk about *solving* the railroad problem. Probably none of our great economic problems can be actually solved permanently. We can, and always will, improve on past practices, and we should approach this matter with that idea in mind and not with the idea that an absolutely perfect plan can be developed and put into effect. Congress in its wisdom can surely take the accumulated information and the best thought obtainable on this important matter and produce a law that will make better the present situation and provide a basis, perhaps, for another 30 years of railroad operation during which period, no doubt, new men, new minds, and new conditions will make it clear that some other arrangement is more desirable for the general welfare of the nation.

What has been accomplished under private ownership and operation in the past is good evidence of what can be accomplished in the future if private energy and initiative are encouraged and repressive and conflicting regulation removed.

The war produced conditions which showed clearly that the then existing regulatory system was not adjusted properly for that emergency. The demands of many classes of employees for heavy increases in pay could not be dealt with successfully by the owners and managers of the railroads. It also showed that in the part of the United States east of Chicago and north of the Ohio river the sudden and rapid increase in the volume of business necessary for carrying on the war was greater than some of the railroads could handle. There was little or no trouble confronting the railroads in handling the business in other parts of the country. This was not a breakdown of the American railroad system any more than the inability of the steel companies to furnish all the steel wanted, the cotton mills all the cotton wanted, and

the shipyards all the ships wanted, was a breakdown of these industries. In these cases immediate steps were taken to increase capacity, some of which steps are only finished now, when the war is over. Similar steps were undertaken to the extent of the ability of the railroads to get money, men and material, but they, too, have been delayed in completing their work just as other industries have been. The real trouble was that under the regulatory system not enough latitude or margin was given to the railroad business to permit it to keep its plant ahead of the demands of the country. There should be a "factor of safety" in the transportation machine so it will at all times be "ready to serve" and able to carry the "peak" load.

To obtain the results needed for the protection and development of the nation it will be necessary to change and modify some practices and ideas that have long prevailed. The owners should assent to a very large measure of federal control, but they should also have federal protection and encouragement. The great labor organizations should assent to some orderly way of settling disagreements over wages and working conditions so that the railroads will continue to serve the public pending the adjustments of disputes. The government in its regulating practices should be more responsive to changing conditions, there must be less interference by states in the national regulation and development of the railroads, and there must be protection as well as regulation.

Present Great Systems Should Be Preserved

The present great systems of railroads have been built up in the last 40, 50, even 70 years, and they have developed along certain lines and are now a part of the industrial and financial structure of the nation. They are co-ordinated to themselves, to the communities they serve, to their connections and competitors as to tracks, terminals, equipment and other physical facilities, and their financial structure is very complicated; and they should be allowed to preserve their identity and integrity physically and financially. Small, unsuccessful and so-called "weak lines" that are dependent upon their connections with the great trunk lines must gradually be absorbed and become a part of some of the larger systems, just as has been done in the past.

Regulated competition, especially as to service, should be continued between the great systems. Without reasonable competition, development and the introduction of the most improved and advanced methods for giving service to the public will be checked. It will be better for the general growth of the territory between Chicago and the Atlantic seaboard if the New York Central is maintained in its entirety, the Pennsylvania System, and the Baltimore & Ohio; in the West, the Burlington system, the Union Pacific, and North Western; in the Northwest, the Northern Pacific and Great Northern; in the South, the Southern Railroad, the Atlantic Coast Line, etc.; in the Southwest and Pacific coast, the Santa Fe and Southern Pacific, and other examples could be given. The continuation of these great systems will develop a greater spirit of effort on the part of officers and employees than if all competition were eliminated, and this spirit means much for the future development of the railroads and greater satisfaction to the public.

Credit to Be Maintained

By means of adequate rates that will reflect promptly changing costs, increasing wages and taxes, and higher cost of new capital, the credit of the railroads and the stability of their securities should be protected because they form so large a part of the assets of banks, insurance companies, trust funds, etc., and because so many people are interested directly in insurance policies and deposits in savings banks. And further, because more capital must be put constantly into the business, and it should be made attractive to the investing public. Capital may be timid, but it is also intelligent. If it is once seen that the government is going to sustain constantly the railroads in the legitimate conduct of their business instead of confining itself so largely to the restraint of activities, there will be no lack of adequate capital, nor will the railroads themselves fail to give good service and justify the capital in its investment.

The man who puts a dollar of his savings into the transportation business does so knowing that his dollar is subject to the power of the government to make the rules and regulations governing the business. The man who decides to earn his dollar by working for the railroad should be willing to submit to reasonable wages and regulations just as much as does the man who puts in his dollar already earned. In a complex civilization like ours there must be continuous service by the transportation agencies, just as much as a continuous supply of water.

To bring this about there must be some method devised for reasonable federal supervision and regulation of wages and working conditions, and such regulation should eventually receive the final approval from the same power that is responsible for the rates of fare and freight charged by the transportation agencies so that the question of income with which to pay will be considered at the same time and by the same final deciding power as the outgo to be paid.

Federal Power Supreme in Cases of Doubt

The power of final decision as to rates and practices must rest with the federal government, and when it is to the interest of the nation as a whole to have a given basis of rates, or to adopt a given practice, rules and regulations of states, counties and municipalities must give way and must be subordinate to federal power.

Any benefits resulting from the management of the director general should be retained where it is reasonably clear that such benefits are of a permanent character and in the interest of the public in peace times. The director general names 17 reforms that he thinks should be continued. Those that prove of permanent value can be carried out successfully under private operation if the platform outlined by Mr. Cuyler and Mr. Thom is put into effect.

Railroads and water carriers should be permitted to make agreements between themselves covering such practices, as well as the making of rates and the division of earnings, all for the purpose of saving waste and giving better service to the public; but such agreements should be subject to close inspection, supervision and approval by federal authorities.

The director general commented on some of the difficulties being encountered in keeping up the organization and morale of the service, and intimated that unless the roads could be kept for a 5-year period they ought to be turned back promptly to their owners because of the difficulty of handling the intricate business satisfactorily under present laws and conditions for a shorter period. I can well understand the difficulties confronting the director general and his administration in view of the centralization of detailed management and operation. There is, however, a method of helping that situation that can be utilized very promptly. If all the information accumulated in the so-called "Newlands inquiry" and that to be obtained from the Interstate Commerce Commission, state commissions, railroads and from other students of the situation, is utilized, does anyone believe that some conclusion cannot be reached within the period fixed by the present law—that is, 21 months after peace?

Let Companies Help the Director General

While this work is going on the President should continue the central organization in Washington under a director general, who will supervise the whole situation, direct policies, and make those adjustments with the various railroads that will be required after governmental control ceases. The

present contracts between the government and the railroad companies should continue until the new protective legislation is passed. But this central organization should direct the operation of the railroads through the companies themselves rather than through a system of regional directors. In other words, say to the boards of directors and executive officers of each company that from and after a given date they are to take charge of their properties and manage, maintain and operate them for account of the United States and as may be ordered by the President through the central organization in Washington. At once there will begin to be a better feeling among officers and men, and less uncertainty about the future; the intricate and delicately adjusted organization on the great systems of railroads will begin to function better and work more smoothly and effectively; there will be less lost motion and crossing of wires than under the very highly centralized system now in existence with regional directors.

Most, if not all, railroad managers have reached the conclusion that what is known as the "divisional system" of operation is better than the "departmental." In other words, that someone must be in the driver's seat on a small enough unit of property to control the ordinary maintenance and operation subject to a central directing authority as to general methods, standards of work, maintenance and accounts. Where the departmental system has been tried it has not proved effective because of conflict of authority between heads of different departments at long distances from a central directing authority.

In making this suggestion I, of course, have no criticism to make of the director general, or of the staff in Washington, or of the various regional directors and their assistants (nearly all of whom I know personally), and they are all good and experienced men, loyal to the country, to the director general, to the railroads, and all have worked unceasingly. I believe the plan of operation adopted for the war period had advantages and helped to produce the results needed during the critical time, but the present methods in my judgment are not the best for peace times, either now or in the future, whatever system of regulation is finally adopted. I am perhaps freer to make this suggestion than many others because any change does not affect me personally for the reason that my work is of such a character that it will not be affected by the proposed change, dealing as it does with the corporate, financial and general questions of policy, organization, finances and management, and not with the detailed operation of the roads.

Morale Can Be Improved

I believe very strongly that a new basis of regulation can be worked out within the 21 months' period, and that if the management and operation of the properties is returned to the directors of each company, subject to the orders of the director general, there will be an improved esprit de corps, less unrest, and that greater efficiency will be obtained; that all of the plans about unification, economy, etc., that the central administration may wish to carry out can be made effective by the corporate organizations promptly. Under this plan there will be some saving in money because there is now more or less unavoidable duplication of effort, and a better preparation will be made for carrying on future constructive work under whatever plan Congress may adopt.

Fear of 5-Year Plan

There has also been some suggestion by the director general of lack of co-operation by the corporations, and that this is one of the difficulties in the situation that might be cured under a 5-year extension of time. On the contrary, I believe that a 5-year extension would make the companies hold back because of fear that the properties would never be restored to the owners. There may have been some differences of opinion, which is not unnatural, in the very large and complicated problems presented to the director general and to those of the corporation charged with the duty of protecting the property rights for which they are responsible.

As a matter of fact, outside of a very proper desire to scrutinize the purchase of equipment at the very high war prices, I think there has been very little difference of opinion between the corporate officers and the federal officers.

Some objection has been made to the distribution of charges for betterments and improvements, and in some cases objections have been made to the work actually undertaken, but these have been small in number and amount.

It would seem to be right and proper to those representing the ownership of the property to point out to the director general that if capital is used for the purchase of unnecessary cars and engines, that reduces the ability of the corporations to make other improvements that may be found more desirable, like repair shops, in order to serve the public by keeping existing cars and engines in first-class order, and large terminal and track improvements that increase the ability of the railroads to make better use of existing cars and engines. In fact, the director general comments on this in his general statement.

The Future

In a growing and still undeveloped country like the United States, and with a future before it more wonderful even than its past, any system of internal transportation should provide for:

1. Inducement for the individual citizen to engage in the business by permitting reasonable rewards for brains, energy, industry and the capital employed, substantially equal to the same kind of rewards in other forms of human effort.
2. Constant developments of the transportation machine so as to keep it at all times ahead of the needs of the growing country.
3. Adoption of improved and improving methods of carrying on the business so as to obtain the maximum of efficiency and economy.
4. Reasonable and regulated competition and co-operation for the purpose of producing development of different sections of the country and improvement in the methods employed by the transportation agencies serving the country.
5. Continuity of service so that the transportation machine will always be in a position to serve the country unless prevented by act of God or by war.
6. Regulation by the United States through suitable government agencies, which regulation must be of such a form as
   (a) To attract capital and permit a steady improvement in, and expansion of, the facilities;
   (b) Which must protect the interests of the public using the railroads and promote the comfort, convenience and safety of that public;
   (c) Which must protect the officers and employees who maintain and operate the road, and which must work constantly in the direction of improving working and living conditions; and which must provide some method of adjustment of any controversies about wages and working conditions;
   (d) And which also must protect the interests of those who have invested money in the securities representing the railroads, and who are also directly interested because of their insurance policies, savings bank deposits, etc.

The suggestions outlined by Mr. Cuyler and Mr. Thom, representing the crystallized opinion of the principal railroad men in the United States, point the way to a system of ownership and regulation which will, in my judgment, produce the results desired by the majority of the people. Mr. Kruttschnitt and Mr. Willard have pointed out how much was accomplished under war conditions during 1917 by the united action of all the railroads, hampered as they were by restrictive laws. Much, if not all that can be accomplished by government ownership and operation can be obtained under the plans suggested and the value of individual initiative retained.

It is very gratifying to find that the Interstate Commerce Commission, out of its experience, makes many suggestions that are in line with those made by the railroad executives. Whether to put all the regulatory power in the hands of the Interstate Commerce Commission, or to relieve the pressure on that body somewhat by giving it help in the form of regional commissions, who will be nearer to the people and to the state commissions, and whether to recognize the great importance of the transportation business by having a cabinet officer to take charge of some of the executive work connected with regulation and to watch and protect the trans-

portation agencies, are, of course, questions of individual judgment. I believe, on the whole, better results for the nation will be secured by the plan suggested by the railroads.

Secretary of Transportation

An effective transportation machine is vital to the interests of the nation in war and peace; its importance justifies having a man in the cabinet to confer on an equality with other cabinet officers dealing with great national questions and resources, and to present the transportation needs of the nation directly to the President and his advisers. He will not manage and operate the railroads any more than the Secretary of Agriculture manages and operates the farms of the country. He will not exercise the vast powers conferred upon the director general as a war measure, and he will not have (as some have suggested) 2,000,000 or more railroad employees reporting to him, directly or indirectly. He will have powers of supervision, of correction, and, what is equally important, of protection to the largest single business of the country after agriculture. With his aid, that of the interstate and regional commissions, and the state commissions, and with changes in laws as suggested, I believe government ownership and operation can be avoided, and that the railroads will enter on another period of stability, and that they will be able to serve the country wisely and well and give to their owners reasonable rewards for their investments.

Statement by Samuel Rea

Samuel Rea, president of the Pennsylvania Railroad, said in part:

The records demonstrate that the American railways under the system of ownership by the people and their institutions, and private management and operation as distinguished from government ownership and operation, have produced the most efficient and cheapest transportation service, have paid the highest wages, and, I have little doubt, the highest taxes, in the world. Therefore, the system that has achieved this for the country should, as a matter of national policy, be continued, suitably modified to meet changing conditions.

The necessity for exclusive national regulation of interstate carriers arises from the many state and federal regulatory laws and the numerous separate and independent commissions created have naturally resulted in multiple and confusing regulation and policies that have seriously restricted the development of the railroads and the country's business and resources. The conclusion, after many years of experience, is that sound railroad credit and improved facilities can be systematically secured only by concentrating the regulatory power and responsibility in the federal government, administered, however, through agencies convenient to the public of the several states.

The necessity for relief from such confusing laws and regulatory policies, with no single governmental body responsible for final results, may be illustrated by the financial condition of most of the roads for several years prior to the war.

The waste and lack of responsibility behind such multiple regulations, with the resultant insufficient net profits, has caused capital to be reluctant to enter into new railroad projects, and new railroad construction has been brought to a standstill, notwithstanding the increase of population and traffic.

The railroad question is chiefly one of national transportation facilities, national traffic and national finance. Therefore, in a complete system of federal regulation, the exclusive power to supervise and authorize the issue of securities by interstate carriers should be the function of the national government. The railroads should have the approval of the secretary of transportation, for the issue of securities to provide for their needs, and similar approval for important capital expenditures for extensions, branches and terminals. These duties are exceedingly important from a financial and traffic standpoint, and they will require prompt action in their discharge, for which some executive officer of the government should be responsible. The termination of federal control will again burden the commission with the stupendous work of handling numerous rate cases and tariffs, railroad accounting, safety appliance acts, hours of service laws, railroad valuation, traffic congestion and car distribution. The suggestions in the plan presented by us to relieve it from executive and administrative duties, and constitute it a judicial body to pass upon complaints concerning the reasonableness and adequacy of rates and traffic practices, and to deal with discriminations, but retaining the supervision of railroad accounting and railroad valuation, are demanded in the interests of good business, and the welfare of the public and the railroads.

To undertake the administrative and executive duties of the commission with reference to the railroads, the suggestion is made for the creation of a department of transportation with a Cabinet officer called the "Secretary of Transportation" as its head, and such administrative assistants as may be essential to properly observe the transportation needs, and adequately provide for the same by such orders as he may be authorized to make, by suggestions and cooperation with the carriers, and by representations to the Interstate Commerce Commission and the President. He would also be responsible for the approval of adequate rates and revenues to provide and maintain such proper service and facilities, and create railroad credit sufficient to meet public demands. He would also be required to protect the just interests of employees, shippers and the traveling public. He would recommend to the President such measures and policies as would promote the public interest and the adequacy of the transportation service. He would deal with suggestions of the railroads as to traffic distribution, and the joint use of terminals, distribution of equipment, and also a proper car supply for shippers. His approval should be essential to new issues of securities, and important capital expenditures for extensions, branches and terminals. He would have power to approve or disapprove decisions of the wage regulation board on questions respecting wages and working conditions.

To my mind, if there has been one helpful situation during the war to prevent delay and secure results, it was the power of the director general to decide transportation questions promptly. The railroad companies and the secretary of transportation, charged with executive and administrative duties, should be left in relatively an equally strong position to act promptly and decisively in executive and administrative questions, subject, however, to appeals to the Interstate Commerce Commission if the public interests are not properly safeguarded. Through this officer, the transportation necessities would become the direct responsibility of the government to the country at large, but this officer would not operate the railroads nor appoint any of its officers or employees.

Suggestion is made that the Interstate Commerce Commission may divide the United States into such number of regions as it may deem wise and as the President may approve, and regional commissions should be created, consisting of one member for each of the states embraced in such region, to provide some regulating agencies convenient to the people of the several states. Decisions of the regional commissions should be final unless the Interstate Commerce Commission shall otherwise order.

The state commissions, however, should continue to deal with the regulation of state public utilities, and to perform such other duties as may be imposed upon them by their respective states, but as to interstate commerce their powers

should only include the regulation of such of the intrastate duties of interstate carriers as do not affect other states, or the relative burden of furnishing and sustaining the facilities and instrumentalities of commerce on which other states are likewise dependent. It seems quite clear that no state should possess the power, or be willing for any other state to possess the power, to create discriminations between the traffic in one state and the traffic in another, or by inadequate rates to make a smaller contribution than their sister states to the support of the transportation facilities on which both states are obliged to rely for the carrying of their traffic. No matter how able, or just, the state commissions may be, they are of themselves unable to relieve interstate carriers from the conflicts or burdens imposed by their own and other state laws.

The ability to promptly initiate reasonable rates would be helpful to business, and would remove the uncertainty that has hurt railroad credit in the past.

The Interstate Commerce Commission should also have the final power to decide minimum as well as maximum rates, and to determine the relations of rates and differentials whenever necessary.

No scheme of railroad regulation can be successful unless there is provided in the statute itself an assurance that the returns from railroad operations will be sufficient to pay operating expenses and taxes, to give a proper return on the investment, and to furnish a basis of credit adequate to provide for the public needs for improved and extended facilities. Otherwise we will see a repetition of restricted railroad credit with its disastrous consequences of limited facilities, inadequate for the commerce of the country. Practical experience demonstrates that only by accommodating the public is it possible for the carriers to be successful, and continue a sound system of finance for any period of time.

It is clearly in the public interest, and equitable to both labor and capital, that there should be no impairment or interruption of the movement of trains. Accordingly the secretary of transportation should have a wage regulatory board on which the public, the employees and the employers should have equal representation. Its conclusions should go to the secretary of transportation, who should be the final authority to decide wages and conditions of service. Pending such investigation there should be no lock-outs and no interruptions of service. The scale of wages and the expense incident to any change in working conditions recommended by the wage board, and approved by the secretary of transportation, when put into effect should be recognized in the making of rates as a legitimate expense in transportation in the public interest.

It is clear from the experience of the past and from the testimony already before this committee by the director general, and from the suggestions of the President of the United States to Congress, that existing laws should be modified to bring about further railroad unification and co-operation among the carriers. In the Pennsylvania System there are 140 active corporations constituting the railroad system. While these 140 companies represent what were originally about 600 separate small companies, further unification is desirable on equitable terms, and could be accomplished better and quicker under national legislation. Therefore, as I assume the conditions on the Pennsylvania System to be typical of many of the larger systems, the interstate carriers should be given authority to acquire the property, stocks and securities of feeding and connecting lines in their territory, including lesser companies, and to accomplish consolidations and mergers subject to the approval of the secretary of transportation. In view of the manifest tendency of public opinion toward proper and useful consolidation of railroad properties, it is necessary to remember that the laws of many of the states, in their conflicting statutory provisions, and in their prohibitions against consolidations, constitute an insuperable obstacle in the way of carrying out any such policy unless national authority is obtained for it.

Subject to his approval, the carriers should also be able to enter into agreements and understandings in respect to any co-operative arrangements based upon experience, which may be found in the public interest, and consistent with efficiency and economical railroad transportation.

As a safeguard against delay or uncertainty that may ensue in making final financial settlements between the railroads and the government when released from federal control, and to avoid any disruption of the financial structure of the country, it may be essential that provision should be made to fund the indebtedness of any carriers to the United States growing out of federal control.

Federal incorporation of the existing interstate carriers may be essential to more effectually carry out the foregoing plan. All contract rights, assets and all powers and franchises, as far as possible, of the existing corporations should be preserved, in addition to such general powers as may be conferred upon the corporations by such federal incorporation act.

Under such a general system of responsible national regulation, containing statutory provisions that will insure reasonable and adequate rates, the railroad companies should be self-sustaining and able to properly serve the public, and they should not become an obstacle to industrial and commercial progress, nor weaken the financial and credit stability of the nation. Many different plans have been referred to in the public press as a basis for future railroad relations with the public and the government, but I believe that the principles of the plan suggested by the railroad executives should form the basis of future Congressional legislation, and will prove more satisfactory, and less costly than any other system of public regulation, control or ownership so far suggested.

Benjamin C. Marsh, executive secretary and director of legislation of the Farmers' National Council and the Farmers' National Committee on Transportation, entertained the committee with an argument for government ownership and operation of the railroads, proposing that they be paid for by inheritance taxes and the taxation of profiteers. Pending the death of the rich men, he proposed a Liberty Loan to obtain $11,000,000,000 or $12,000,000,000 by popular subscription to buy the railroads. He objected to the proposal that railroad officers and employees should elect two-thirds of the directors of a government corporation and suggested five groups of directors, consisting of representatives of farmers, employees, merchants and manufacturers, non-commercial municipal associations and one-fifth to be selected by the President. He suggested that there should be at least one woman in each group. He opposed a five-year extension of federal control.

Mr. Warfield's Statement

S. Davies Warfield, president of the National Association of Owners of Railroad Securities, submitted a supplemental statement on February 13 regarding the plan which he had previously presented and regarding the suggestions for a permanent solution made by Director General Hines. Mr. Warfield said in part:

"The question has narrowed down to the well-recognized fact that a *measure* must be applied by one method or another, by which a given return to the railroads is assured whether guaranteed or not, that is sufficient to attract capital for their legitimate purposes; at the same time earnings are to be limited to a fair and reasonable return. Whether you make this *measure* the bonds or stocks, guaranteed by the government, or unguaranteed, of new and fewer regional corporations to be formed, to be exchanged for the bonds or stocks of present railroad companies in such amounts to the

security owners of each railroad as may represent their proportion of property and earnings of the company issuing them; or whether you make the *measure* a fixed reasonable return on the aggregate of the investment in railroads taken in groups by adjusting rates to produce this return, the amount each railroad receives being dependent entirely upon its competing actively for business and as the result of efficient methods of operation—excess earnings beyond this return being used in the public interest—is the real question now before your committee. For, after all is said, one method or the other must be adopted sooner or later, unless you decide to turn the railroads back under the regulatory methods of the past, and without defining what a "reasonable" or "fair" or "adequate" return to them means. This leaves the Interstate Commerce Commission to define it, without instruction as to policy, which has not been satisfactory or successful in the past.

"Under the regional method guaranteed bonds or stocks of the new and larger regional companies to be formed are to be exchanged for the bonds or stocks of each of the existing companies, in the proportion that you scale down the securities of each or adjust them. Under the second or the method we propose, present outstanding bonds or stocks remain, but the value of the securities of each railroad is dependent upon the *actual property* they represent and the *percentage* of return each railroad earns entirely through its own efforts, earnings in excess of the reasonable return being taken from it and under rates adjusted to the requirements of the plan we have submitted.

"The regional method means government ownership, for in any event, if a governmental guarantee on railroad securities is to be thought of, it must necessarily carry with it, if not at first, eventually, the complete control and management of the companies, whose securities it guarantees. Incentive and initiative cannot be continued under this method of dealing with the subject. For as you exchange your bonds or stocks for bonds or stocks guaranteed by government, of larger regional companies organized under federal incorporation, whether permissive or compulsory or under a federal franchise, with federal management, in whole or in part, we have entered government ownership. Experience has proven that the return on such bonds or stocks would be limited to the guaranteed bonds or other senior securities issued in exchange and intended to represent the main part of the supposed value of your property. What would represent so-called equity would likely never be reached in the distribution of earnings.

"The concentration of railroad facilities in the larger regional companies managed by the government defeats real competitive service. Incentive, initiative and service will shrink in the proportion that you concentrate facilities. The readjustment of business and financial enterprise must await the settlement of the railroad problem under the regional method. The realignment of railroad values would be necessitated in the formation of new companies. The uncertainty attending the exchange of securities would disastrously affect general credit.

"To endeavor to *enforce* consolidation of existing railroad companies into fewer larger regional companies is not in the public interest. Enforcement of consolidation could be secured only through the operation of law of extremely doubtful validity. Enforced or voluntary, it would involve waiting until valuations are made of the properties, now in progress by the Interstate Commerce Commission, or another valuation body must be established, now hardly practicable.

"If consolidation is not enforced but voluntary, the larger corporations become holding companies, and unless and until owners of billions of underlying bonds consent to exchange, which would be unlikely, you would have great companies organized issuing collateral trust securities. Their credit would consequently not be high, even though the government should guarantee their securities for exchange and for sale for improvements to railroad properties. Any plan to secure the exchange of securities that permits underlying bonds of individual railroads to remain outstanding, or parts of other securities to stay undisturbed and hopes to secure the voluntary exchange of securities, whether bonds or stock, under valuation to be determined, and contends this can be done fairly rapidly is misleading. To institute consolidation into larger (holding) companies with issues of securities for exchange and for sale subject to underlying bonds, would not be attractive or calculated to give financial credit to future issues of railroad securities. Voluntary exchange of securities would not get you anywhere. An offer to exchange a collateral trust security to be issued by the larger companies secured by such bonds and stocks as may voluntarily be turned in for exchange, would not attract investors. The proportions of this class of investment required to be given to induce exchange would likely result in small reduction, if any, in capitalization. We have had the experiences of the past in security exchanges of a single corporation, with the usual 'hold up.' Do you not think this would become universal when the whole country would be filled with 'protective committees' and similar 'helpful' agencies? It might constitute a harvest for the bankers, but at the expense of the shippers, the public and the security owners.

"For years past we have seen the general railroad situation dominated by the managements of a few of the larger and more favorably situated railroads; for, through their influences in respect to the rate-making gateways of the country, in division of rates, and through their power, they have been able to favor certain seaport cities, certain localities and railroads in the disposition of freight. This policy will continue only in more aggravated form under this method. In the exchange of securities of present corporations for those of the larger divisional corporations the same influences would necessarily control the larger corporations, for they would receive the greater amount of new securities issued. The advantages expected to be secured by dominating railroad interests through compulsory federal incorporation of railroads, will be just as well attained through the control of the larger corporations. Foreseeing this would not government take full control and complete management to prevent these things happening? We contend, therefore, that this method means government ownership. There cannot be worked out practically a partnership between government and the owners of the railroads, both in ownership and management, and it should not be. Any enterprise, the people, through government, guarantee, through government also should be operated. And if we are to have government ownership, let us have it unconcealed, 'naked and unashamed.'

"If present federal control and operation is continued during the period when the proposed new companies are forming, securities guaranteed and present securities scaled, as suggested, you head the railroads directly into permanent government ownership. It is idle to say, as has been stated, that present federal control and operation can be extended, with definite purposes in the minds of those in control of it, and at the same time state that you do not favor government ownership, when, perforce, you bring it about whether you favor it or not. Give me the direction of extended federal control and operation of the railroads for five years, or even three years, and under my direction they could be so operated that at the end of the period they would find themselves in the position of being forced to accept the larger company proposition, or government ownership, if it was my belief that it was desirable to eventually land them in one or the other direction. The attitude of one man, so placed, could determine and control the policy of the

nation in respect to these great enterprises. His political power, if he chose to exercise it, would be dangerous in the extreme. The power to enforce the payment of government loans to railroads is, in itself, an effective means to an end. One man wielding this great financial power alone, with the government back of him, can do many things to accomplish his aims.

"It is neither fair nor economically sound for the army of railroad employees to be placed under the control and under the political influences possible of being exercised by any such system. To say that it will not be so exercised by an appointee under a government as partisan as our own is not in accordance with the facts. And the higher in the councils of the administration that appoints him you place the man at the head, the greater political power you give him and the more he will exert it. If representatives of labor favor an extension of this system then they are misguided. It is unsafe for either employees, shippers, the public or the owners, notwithstanding the fact that the railroad executives have recommended the continuance of this system in even a more aggravated form.

"The federal control act did not anticipate the operation of these individual railroad properties for the purpose of carrying out the theories of any one government official or set of officials. If Congress should unfortunately determine that larger regional companies shall be organized, then Congress at that moment ought to direct the federal official who will continue to operate the properties during the 21 months remaining, just what he is to do with them in order that their owners and the country may promptly know the final result. But to extend the time for such operation with the power to continue to divert traffic and 'unify' railroad systems or parts of systems, so that under a war measure the business of the railroads, and in fact, part of their property, may be gradually absorbed, one by another, until you reach the point where it will not be possible to return them, is not what your act said, nor is it fair to the owners of the properties for this to be permitted. If Congress by act, will remove the legal barriers to the regulated combination of railroads, and will let the railroads of the country work out their own combinations along natural lines, not enforced lines, you will eventually secure service by such combination, as may be desirable, and such as the public interest demands. But this should proceed orderly under the supervision of the Interstate Commerce Commission (and under the corporation we have proposed).

"By the use of the means you have at your command, supplemented as proposed in our plan, early action can be secured without disturbing the existing railroad structure or financial credit, which the present situation, if nothing else, demands should not be done. Things are at a standstill. Revolutionary policies, such as government ownership or compulsory consolidation, carry profound dangers. Congress might set in motion movements that it could not check."

Shippers Oppose Government Operation

Guy M. Freer, president of the National Industrial Traffic League, said the league had adopted resolutions unalterably opposing government ownership or long-continued government operation of the railroads and expressing the belief that, prior to the return of the roads to corporate control and operation, some legislation should be enacted in the interest of the railroads as well as for the benefit of the public. Realizing that the time remaining will not permit thorough consideration of the subject and the passage of necessary legislation at this session, he offered recommendations for early consideration, followed by a general outline of the program proposed for future legislation.

For immediate action the league recommended definite rejection of the proposal to extend the period of government operation because it is convinced that necessary legislation can be enacted to permit the return of the properties to the owners within the time now fixed by law, and that diligent efforts be made to effect the return at an earlier date if necessary legislation can be had so that the return may be accomplished in an orderly way and with due regard to the interests of the public, including the investors in railroad securities. Pending the return to corporate control and operation the league recommended that Section 10 of the federal control act be amended to provide that during the continuance of government operation, all rates, fares, charges, rules and classifications of the railroads under federal control, as shown in tariffs on file with the Interstate Commerce Commission, shall remain in full force and effect until changed by authority of the Interstate Commerce Commission. After return to corporate operation jurisdiction over such rates, fares, etc., should be the same as prior to March 21, 1918. It was also recommended that provision be made requiring the director general to pay final judgments in suits for recovery of claims for losses, damages, overcharges, etc. Mr. Freer said that shippers never were convinced as to whether the director general has the authority to set aside state rates, but that the power has been exercised and they want it made certain during the remaining period of federal control. He then gave an outline of the suggestions of the league with respect to future legislation, which will be expressed more specifically at a later date if the committee desires, as follows:

"We suggest repeal of anti-trust and anti-pooling legislation as affecting railroads, and the enactment of legislation permitting, encouraging and, in proper cases, requiring co-operative activities among common carriers, such as the pooling of cars, locomotives and other equipment; the joint use of terminals; also the merger of railroads within reasonable limitations and when approved by the commission as in the public interest.

"In permitting pooling of traffic and of the revenue derived from such traffic it should be provided that the approval of the commission be first obtained, and that the service of the carriers to the public be not impaired by such pooling, and that the commission be authorized to dissolve such pools whenever the public interest may so require.

"The commission should be given clear and complete authority to fix the divisions of joint rates, whether or not such joint rates were prescribed by the commission.

"Amend fourth paragraph of Section 15 of the act to regulate commerce eliminating the provision that the commission may not, without the carrier's consent, embrace in a through route substantially less than the entire length of its railroad, etc.

"Amend Section 15 of the act to regulate commerce to give the commission authority to prescribe minimum rates, where the commission finds such action necessary in order to remove unjust discrimination or to correct rates found to be so low as to place an undue burden on other traffic.

"Give to the commission authority to regulate the issuance of railroad securities, and supervise the expenditure of the proceeds thereof.

"Confer upon the commission power to authorize or require extensions, additional facilities and equipment of common carriers and to exercise general supervision over service, operation and maintenance.

"Authorize the Interstate Commerce Commission to cooperate with state commissions, and to utilize, where practicable, the services and facilities of such state commissions.

"Enact such further legislation as may be necessary to give the commission jurisdiction to fully control interchange of traffic between rail and water carriers, the establishment of joint routes over such carriers, and to prescribe joint rates and the divisions thereof, or proportional rates where desirable, in order to encourage the development and use of water

transportation where economical and in the public interest.

"We do not favor continuance of the amendment of August 9, 1917, to Section 15 of the act to regulate commerce, which requires that schedules of rates must be approved by the commission before filing by carriers. We advocate initiation of rates by the carriers, subject to the suspension power of the commission as now embodied in Section 15. In connection with the initiation of rates by the carrier, we recommend that the commission be authorized to establish such machinery or prescribe such procedure as may be deemed desirable to provide for publicity by the carrier of contemplated rate changes, and for conferences between the carriers and the interested public before tariffs are filed, in order to prevent unnecessary litigation before the commission, and minimize demands upon the commission for the exercise of its suspension power.

"We earnestly insist that federal regulation of common carriers be vested in the Interstate Commerce Commission exclusively, and protest against legislation investing federal regulatory authority in whole or in part in any other governmental department or agency."

Mr. Freer recommended that no legislation should be attempted at this session to interfere in any way with regulation by state authorities, saying that the shippers hope it will be possible to work out a plan of co-operation between the state and the federal commissions.

The league, he said, is substantially in accord with the recommendations presented before the committee by the Interstate Commerce Commission and with the features of the Warfield plan that deal with regulation. As to the financial features of the plan the shippers felt that that represented a field which they should not enter into. Mr. Freer declared that the committee should give no heed to the suggestion that the Railroad Administration has not had a fair test. The people of the country never authorized it to make any test and never would have consented to government operation except for the war emergency. It undoubtedly could show an improvement over the first year's operation, but the system is all wrong and ought to be abandoned. If the step of extending it for five years is taken, Mr. Freer declared, it can never be retraced. The Cincinnati Chamber of Commerce, with 3,000 members, had taken a referendum vote which was ten to one against government ownership or continued government operation and he thought that reflected the sentiment throughout the country.

State and Interstate Rates

C. W. Bunn, general counsel of the Northern Pacific, testified briefly on February 13 advocating giving the Interstate Commerce Commission power to harmonize state and interstate rates. No system of regulation will be successful, he said, unless it contains the elements of a power in the federal government, to be quickly and effectively exercised, to control the whole rate situation. He did not suggest that state commissions be abolished nor any limitation of their functions, except that their rates from time to time ought to be reviewed by the Interstate Commerce Commission and if necessary brought into harmony with the interstate rates. The rate subject, he said, is essentially a unit and cannot be dealt with piece-meal or by state laws. He spoke with great respect for the state commissions, but insisted that the weakness of the state situation is that no state authority can look beyond its own borders and cannot regulate with reference to the entire system. He submitted a plan comparing the Minnesota intrastate rates with the interstate rates in the same territory as of January 1, 1918, which, he said, showed that the state rates are approximately two-thirds of the interstate rates. These represent cases of plain discrimination against interstate commerce, he said, but no lawyer can say what a court or a commission will hold to be discriminatory. The Shreveport decision does not provide an adequate remedy without long proceedings and to determine what is a reasonable rate ought not require three or four years of litigation.

The plans which have been proposed for co-operation between the state and interstate commissions, Mr. Bunn declared, represent a weak solution of the problem because each compromise is to some extent a surrender of federal authority and, moreover, would be ineffectual because a large proportion of the state rates are made, not by commissions, but by the legislatures, and the state commission is, therefore, powerless. As an example, he said the North Dakota legislature had recently passed a new rate bill making drastic reductions on all rates in the state.

"No general and consistent policy can possibly be pursued and no definite aim can be realized," Mr. Bunn said, "if the federal government and the states as heretofore are all free to act on the subject of rates within the field occupied by each under the old system. The closer one comes to a true appreciation of the problems of railway regulation, the more apparent it becomes that a railway is a unit; that it can no more be divided by state lines than by county lines; that any attempt to parcel out its regulation is doomed to failure, and that it cannot successfully serve several masters."

He proposed that the commerce act be amended by striking out the proviso in section one which excepts state rates and inserting the following: "and also to the extent hereinafter stated to the transportation of passengers or property wholly within any state," and by adding to Section 13 a new paragraph providing that the Interstate Commerce Commission may after due notice and hearing establish such rules, orders, rates and practices applicable to transportation wholly within any state as it may find necessary to bring into harmony and to the same basis that the rates, orders, rules and practices applicable from time to time to commerce among the states.

N. L. Amster Makes Suggestions

Nathan L. Amster, president of the Investors' Protective Association, filed with the committee a discussion of the railroad problem and a plan for the future management and operation of the railroads. Mr. Amster included a long discussion of railroad financial scandals and declared that his association is unalterably opposed to having the railroads return to pre-war conditions. Asked how many security holders his association represented, Mr. Amster said that he could probably claim 50,000 or 60,000 stockholders through his membership in protective committees of New Haven and Rock Island security owners. He declared that a repetition of the financial scandals cannot be prevented unless the management and financing of the railroads is forever put out of reach of the Wall street banking interests and he presented a plan providing for the incorporation of a national transportation corporation to absorb the stocks of all the railroads now operated under federal control and possibly others, with an authorized capital stock of $15,000,000,000, to be managed by a board of governors composed of seven members named by the President to hold office for life, four members to be selected from the stockholders, one from the employees, one from the commercial or shipping interests and one to represent the government.

The stock of the federal corporation would carry cumulative dividends up to 5 per cent and be limited to 6 per cent, all earnings in excess of the 6 per cent dividend to be distributed as follows: 40 per cent to be distributed among the employees on a percentage basis in proportion to their wages, 30 per cent to be set aside as a fund to be known as a bonus or merit fund as an incentive to employees for unusual service or inventions, and 30 per cent to be used for property improvements. Mr. Amster also proposed the creation of a permanent valuation adjustment commission appointed by the President to determine the fair value of the stocks to be acquired by the federal corporation. The board of governors under his plan would select its own chairman

annually and would employ a staff of five of the best technical and practical railroad engineers obtainable to co-operate with the board in all matters pertaining to the technical operation of the railroads. For the purpose of economic operation the railroads would be divided into five regional systems, each managed by a regional director. The plan also provided for a trust and finance corporation with a capital of $500,000,000 owned by the federal railroad corporation to do the financing for the railroad corporation, also a labor adjustment commission to settle labor disputes and adjust wage scales.

Employees Representatives

E. H. Morton, president of the Order of Railway Station Agents, which has a membership of about 4,000, endorsed the plan for an extension of federal control for three or five years, but said that if such a plan is not adopted the railroads should be returned by July 1, in order to relieve the uncertainty. He opposed permanent government ownership or the profit-sharing plan proposed by the brotherhoods, saying that either would destroy initiative and incentive and that the profit-sharing plan would be conducted at the expense of the great middle class. He also cited figures which he said he had seen in the *Railway Age* to show that the American railroads perform their service with a much smaller number of employees per mile of line than the government-owned railroads in Europe.

P. J. Coyle, president of the Brotherhood of Railroad Station Employees, which he said had a membership of about 15,000 baggage men, freight handlers, etc., endorsed the plan for a five-year extension, saying that this would afford time in which to work out a permanent plan. Asked his opinion as to government ownership, he said he had not made up his mind definitely, but that he would prefer government ownership to the former plan of private management. He said the attitude of railroad employees who are in favor of government operation is influenced mainly by the fear that if the railroads were returned to private management their wages would not be maintained.

Commissioner Woolley's Standard Rate Structure

Robert W. Woolley, member of the Interstate Commerce Commission, who testified before the committee in January recommending that the period of federal control be extended for five years in order, among other reasons, that a standard rate structure based upon a uniform mileage rate plus terminal charges might be substituted for the numerous rate-making plans now in effect, has filed with the committee a plan giving a general idea of what, in his judgment, would form a sound basis for such a standard rate structure, based on cost of service, including a return upon the investment. Assuming 6 per cent to be a fair return, he finds the total transportation cost borne by the public, based on 1916 figures, assumes 25 per cent of this to be assignable to passenger service, estimates that approximately one-third of the cost assignable to freight is required to meet the terminal expenses and finds that the average cost per car mile for the road haul service was approximately 11.37 cents. Estimating the carloads of freight originated by dividing the car miles by the average haul, he gets an average terminal cost per car of approximately $15.75. Using as units 12 cents per car mile and $16 per car to be generous, Mr. Woolley has worked out a series of mileage scales, compared with the rates in effect on June 30, 1916, on certain selected commodities for varying distances. "Where the rate is uniform," Mr. Woolley said, in explaining his plan, "and available alike to all shippers of like commodities, there can be no unjust discrimination, undue preferences and rate inequalities, either voluntary or involuntary—such as the present statutory regulations aim to eliminate, but with which the present rate structure nevertheless is saturated."

Central Western Region; First Annual Report

THE ANNUAL REPORT submitted to the director general by Hale Holden, regional director for the Central Western region, gives the following statement of economies effected:

(A) Unification of Terminals and Stations

	Estimated saving per annum
Stations consolidated, passenger	$284,018
Ticket offices consolidated (25 cities)	507,421
Stations consolidated, freight	447,653
Stations consolidated, joint passenger and freight	228,484
Rearrangement of service into terminals	435,937
Consolidation of car-inspection forces	1,360,196
Consolidation of switching	1,886,602
Consolidation of mechanical forces and facilities	174,696
Rearrangement of freight-train service	272,151
Consolidation and abandonment of railroads	291,900
Telegraph department consolidations	29,171
Rerouting of freight trains	198,182
Consolidation of general office forces and miscellaneous	326,204
Total	$6,442,620

(B) Elimination of Passenger-Trains

Passenger trains eliminated made a reduction of 15,500,784 passenger-train miles per annum, resulting in an estimated annual saving of $11,231,317. In addition there was a reduction in Pullman car service of 38,703,614 passenger-car miles, the saving resulting from which has not been translated into terms of money.

(C) Reduction in Organization

General officers.	
Amount of salaries:	
Under corporate control, 1,466 officers	$7,714,120
Under federal control, 1,174 officers	5,415,981
Saving	2,298,138
Elimination of off-line offices, saving	2,674,256
Reduction in valuation expenses chargeable to operating-expense accounts, amount	100,449
Discontinuance certain New York executive offices, amount	860,000
Total	$5,932,844

(D) Miscellaneous Economies

Folders	$119,376
General advertising	1,345,842
Discontinuance of membership in various associations	111,661
Increased use of railroad wires for telegraph messages	45,523
Miscellaneous	107,208
Total	$1,729,612
Saving through economies by reason of simplified accounting between federal-controlled lines	475,118
Total	$2,204,730
Grand total, A. B, C, and D	$25,811,512

Intangible Economies

Since April, 1918, 124 Baltimore & Ohio locomotives have been received for general repairs, 95 of which have been repaired and returned. During the past six months 95 locomotives have been in service on eastern lines, and 39 are still on foreign lines.

Rerouting of traffic.—Many shippers have adopted direct routing of traffic as a policy of their own besides what the roads have done.

An average of 4,672 cars per week are now saved by means of the sailing-day plan. Especial attention has been given to the most economical and direct routes in the handling of traffic between San Francisco territory, southern California points on the one hand and northwestern territory on the other, and middle west terminals and junctions. In consequence, as an important illustration, the movement of California deciduous and citrous fruits has been handled with better general satisfaction than ever before.

From September 1 to December 21, reports from lines in this region show a total of 29,137 cars rerouted by railroad direction, with an aggregate saving of 3,977,844 car miles, or an average of 137 miles per car, but the voluntary action of shippers has resulted in a larger saving of car miles in the aggregate than that accomplished by the railroads.

Movement of Business

Not at any time has there been a congestion or accumulation of freight traffic of consequence, because the loading and movement were closely policed and when necessary the proper regulating measures were enforced, as evidenced by the grain permit system adopted and in effect since September 18, which action was necessary on account of the unprecedented heavy grain movement during the months of July and August, resulting in all available storage facilities at primary markets being rapidly filled.

The influenza epidemic incapacitated a very large number of operating and mechanical department employees, interfered to a certain extent with the free movement of traffic, but no serious congestions or delays resulted. The car supply generally was ample to meet requirements, with the exception of short periods during the peak movement of seasonable commodities.

Some difficulty was experienced in fully meeting the car requirements for early movement of range cattle and sheep, due primarily to the desire of all shippers to move at the same time, and it was impossible to protect all loading upon demand, but the business was moved with general satisfaction and consistent with facilities at primary markets to receive. In November and December the offerings of hogs for shipment have been greatly in excess of capacity of markets to absorb, which has made necessary the adoption of the permit plan.

During six months 581 solid trains of California fruit were run to the Missouri River and Chicago, with a total of 22,561 cars, an average of 38 cars per train; also 147 special trains from Colorado, containing 4,514 cars, an average of 31 cars per train. All special trains have been operated upon conservative schedules, and the trains filled to reasonable tonnage with non-perishable freight. The growers and distributors have expressed general satisfaction with the service rendered.

Since July 1, 1,037 special oil trains have moved over roads within this region from the mid-continent field, with a total of 30,821 cars, an average of 29 cars per train. In addition to this, 124 special trains were operated from Wyoming and California, with a total of 3,983 cars, or an average of 33 cars per train.

Troop movements to the Atlantic seaboard have aggregated 682 trains and 301,869 men, averaging 443 men per train. With but few exceptions, all trains were operated upon schedule and without any serious accidents. Wherever possible special trains have been run for all commodities moving in volume for certain destinations (fruit, oil, grain, etc.), enabling us to route the trains so as to avoid congested terminals. A total of 1,969 trains, with 63,939 cars, an average of 32 cars per train, have been so handled. The sailing-day plan has been made effective at 106 points in this region, resulting in a saving of 261,508 cars per year.

Some complaint has been made by the shipping public in connection with the sailing-day plan, due to alleged discrimination from a competitive standpoint. I feel that these complaints will be eliminated when the plan is more generally adopted in the other regions and is put into effect as between the eastern producing centers and the western consuming points.

Engines and Cars

The number of locomotives on lines in this region July 13 was 12,364, and the number out of service was 1,907, or 16.15 per cent of power. The number of locomotives on line December 14 was 12,454, with 2,150 out of service for repairs, or 17.2 per cent. The number of locomotives turned out of shops during the week of July 13 was 856, against 811 December 14. This decrease of 45 engines was due to shops going on eight hours December 9, but shows an increase of 137 locomotives repaired over December 14 last year. Total men employed in locomotive department July 13 was 61,870, and on December 14, 65,867, an increase of 3,997 men.

The number of revenue freight cars on lines June 22 was 352,484, of which 5.5 per cent were on shop tracks for light and heavy repairs. Comparing June 22 with December 14, shows that while there were 16,179 more revenue cars on the region, the percentage of total bad orders to revenue cars on lines was 4.9 per cent.

Maintenance and Construction

Railroads in the Central Western Region have been well maintained, although the full quota of rail and ties, because of war conditions, has not been received by all lines. Labor supply likewise has, for the same reasons, been subnormal during most of the year, but by reason of the favorable climatic conditions during the fall and the late arrival of winter weather in the territory east of the Rocky Mountains, it has been possible to overcome a great deal of the delay which existed in the earlier part of the season.

All lines have reported that their general maintenance conditions compare favorably with a year ago, particularly as far as track and roadbed are concerned. Marked progress has been made in specially authorized work during November and December. With an improved supply and delivery of rail, ties, and other material, which is now anticipated, it may be confidently predicted that before the year 1919 is far advanced such maintenance work as has been delayed will be fully completed and all new work authorized, excepting where delayed or deferred for special reasons, will be well on toward completion.

The regional purchasing committee has attended to the distribution of ties reaching this region on the north bank of the Ohio river, and in addition there was shipped between August 15 and December 15 to railroads outside of this region approximately 1,000,000 ties. The tie-treating department has been productive of much benefit and the quality of tie treatment has been improved. Investigations have been made under the direction of the committee toward the location of one or more tie-treating plants in the Rocky Mountain territory so as to utilize vast supplies of native timber available for tie manufacture in that general territory. The organization of the stores department is expected to develop material saving in the handling of stores and reduction in the amount of stock necessary to be carried.

Fuel Conservation Section

A supervisor of fuel conservation has been appointed and good results are already in evidence. The fuel practices of each line have been examined; locomotives in service are ridden and aid given to firemen in improving firing practice. Staff meetings on each line have been held, attended by all officials concerned in the problem of fuel conservation, and enthusiasm to accomplish results has thereby been aroused. On all roads fuel departments have been organized with a man in charge, with necessary assistants to ride locomotives instructing engineers and firemen.

Safety Section

A regional supervisor of safety has been appointed, and active work has been carried on throughout the region. Safety supervisors are now employed on each line, devoting practically all their time to intensifying safety work. There has been an appreciable decrease in accidents during the past four months and further improvement in results is certain to occur from the ample support which the movement is securing from all lines in the region. General, division, shop, terminal and local committees, aggregate 362 committees, representing a total of approximately 6,800 committeemen.

Freight Claims

A supervisor of loss and damage has been appointed and conferences have been held with officials in charge of this work at various points. Rapid progress is being made toward uniform methods of handling claims and for prevention work, and meetings are being held at local points with officers and employees connected with the handling of freight.

A Suggestion Concerning Today's Railroad Problem*

Railroads Cannot Eat Their Cake and Have It; Government Guarantee and Private Operation Irreconcilable

By Otto H. Kahn

It is one of the characteristic qualities of the American people to learn quickly. One year's experience has sufficed to demonstrate to the people at large that government operation of railroads means deterioration in service, higher cost, lessened eagerness to please the shipper and study his convenience—not to mention the menace of politics becoming a determining factor in the fixing of wages, in new construction, betterments, etc.

The program, in support of which I believe public opinion crystallizing more and more, is:

Let the government exercise strong and comprehensive control, but fair and constructive, not punitive or strangling.

Let those features of operation, which under government management have proved advantageous and convenient to the public, be preserved and those features of legislation and administration, which experience has shown to be unduly and unwisely hampering, be abolished.

Without eliminating state commissions, let their functions be so adjusted as to avoid conflict with the federal commission in matters of rate-making and security issues.

Let railroading then be thrown open to private initiative and enterprise, and competition in service; make it an attractive field for capital, and, above all, for men of ability and vision.

If there is one thing less desirable than outright government *operation,* it is government *control* so minute, hampering and all-pervasive as to be tantamount to government operation without corresponding responsibility. Most of the plans which have been put forward within recent weeks from individual quarters, would mean this very thing. Their authors start by declaring themselves utterly opposed to government operation, and then devise a set of provisions, which to all intents and purposes, are equivalent to government operation, or would necessarily lead to it. A feature common to all such plans, and, in my opinion, their fatal defect and largely the explanation of their self-contradictory character, is that they are based upon a permanent government guarantee of minimum earnings for the railroads.

The two things, i. e., private management and permanent government guarantee of earnings, are simply not reconcilable. The railroads cannot eat their cake and have it. You cannot rent your house to some one and then expect to be master in your house. If the railroads want to have private management in fact, instead of merely in name, they must take their chances and rely upon public opinion for a square deal. If they are not willing to do that, if they ask the people to protect them by giving them a permanent guarantee of minimum earnings, the people will rightly insist upon such minute and exacting safeguards as to amount to government operation.

Personally, I am wholly opposed to the timid opportunism which would barter away the reality of private initiative and enterprise for a permanent governmental guarantee of earnings. If we cannot as citizens be convinced that bureaucratic management is preferable to individual effort, we must not as stock or bondholders permit ourselves to be bribed into making a compromise with our convictions. And I am optimistic enough to believe that by deserving the goodwill and confidence of the people, and making adequate efforts to keep them correctly informed, the railroads will get a square deal from the people.

I think, indeed, that public opinion has come to recognize, not from tender regard for the railroads, but from enlightened self-interest, that the roads must be given such treatment henceforth and permitted such opportunity as will attract a free flow of capital; because, otherwise, one of two things is bound to result: stagnation in the railroad industry, which means inadequate and insufficient service for a growing and developing country, or government ownership and operation.

If we are agreed that what we want is real private management under strict but fair, workable and constructive government supervision and regulation, with no permanent guarantee of earnings (but rather profit-sharing with the government and perhaps with labor), it seems to me that the framing of appropriate legislation presents no extraordinary difficulty, provided that an equitable basis of rate-making is established and defined with sufficient preciseness to enable the railroads to obtain actually, instead of merely theoretically, as heretofore, the protection of the courts against the imposition of unduly low rates.

Scientific rate-making is an impossibility. A mathematical, uniformly applicable formula for rate-making might have been possible when the railroads started to come into being. It is no longer possible now. The rate structure is the product of a great many years of testing, experimenting, adapting, bargaining between the railroads and shippers, consumers, ports, etc., in short, of evolution. It is of infinite intricacy, of manifold and subtle inter-relationship.

Even the true value of railroad properties, as ascertained by valuation (to the extent that it can be so ascertained) can merely be one of the factors in rate making. As a matter of fact, I believe that from *the practical point of view* a valuation of railroad properties such as the Interstate Commerce Commission has been engaged in for several years at the expense of prodigious labor and of many millions of dollars, will prove largely futile, because I think a fair appraisal on such principles as the courts will uphold, will show that the railroads on the whole are not over-capitalized and that existing rates certainly do not err on the side of giving more than a fair return.

* An abstract of a paper read before the Brooklyn Chamber of Commerce, February 18, 1919.

But I realize that to satisfy public opinion, a large portion of which suspects the railroads of taxing the people to pay dividends on watered stock, an authoritative appraisal of the true values of railroad properties must be had.

Until the valuations are completed, let the I. C. C. or other authority (having first been granted exclusive power in rate-making) be directed to consider the existing rates as prima facie fair and reasonable on the basis of existing wages and costs, subject to such adjustment of inequalities or injustices between localities and shippers as the I. C. C. may determine (or better still, a committee of railroad presidents and shippers subject to the I. C. C.'s casting vote in case of disagreement).

If wages and cost of materials decrease, let rates decrease proportionately (as determined, say every six months), but in no event, pending the completion of the valuation, below figures which would produce as near as may be an aggregate return equivalent to the rental now being paid by the government for the use of the railroads, plus a fair return upon such new money as may be put into the properties.

In the new railroad legislation about to be framed by Congress let it be precisely defined, instead of having merely a vague and unenforceable formula as heretofore, what items are to be considered by the I. C. C. (or such regional bodies as may be appointed) in fixing rates. The principal ones amongst those items are, of course: Wages, cost of materials, a return on the fair value of railroad properties at a sufficient rate to attract new capital and stimulate enterprise. It is surely not beyond the capacity of language to define with clarity what items enter into the cost of a product. The product which railroads are selling is transportation of passengers and goods. The price of the product is the rate.

I should like to add that, whilst I believe the number of separate railroad corporations could with advantage be greatly diminished and the absorption of the weaker lines by the strong lines should in the interest of good service to the public be facilitated and encouraged, I am opposed to the suggestion that the number of independent systems should be so reduced as to give the country over to a very few great regional combinations. My antagonism to this proposal rests on the ground that I believe it would diminish competition to the vanishing point and soon lead to government operation in fact, if not in name.

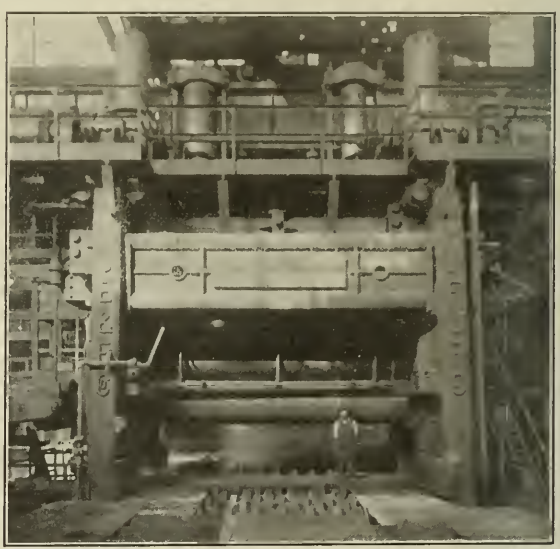
The Largest Plate Mill in the World

THE LUKENS STEEL COMPANY, Coatesville, Pa., has for the fourth time in its history the largest plate mill in the United States. This company, at whose plant the first boiler plate in America was made in about 1820, had in 1890 a 120-in. plate mill which was later rebuilt to the 134-in. size; in 1903 a 140-in. unit was placed in service, and now with a 204-in. No. 5 mill it has for the fourth time the largest mill in the United States. This mill also exceeds anything in any other country, exceeding the 178-in. mill of the Witkowitz Works in Austria and the 168-in. mill in the British Isles.

This new mill is capable of rolling plates up to 192 in. in width and circular pieces a few inches wider, with comparatively little variation in the gage at the center of the plate. When the construction of this large mill was contemplated attempts were made to build a 180-in. three-high mill after the accepted American practice. When it came to obtaining the chilled rolls of the size and weight desired, however, there was no manufacturer to be found in this country who could be persuaded to undertake the contract. Such a mill required chilled rolls 50 in. in diameter, which was larger than anything the roll makers had ever attempted. This new mill is built on the principle of the two-high reversing plate stand commonly used in the British Isles. This arrangement enables the use of operating rolls of smaller diameter and thereby overcomes the difficulty of obtaining the large chilled rolls. These operating rolls are 34 in. in diameter and have a working face of 204 in. with 27-in. necks. They weigh about 30 tons each. The 50-in. diameter backing rolls are made of cast steel with 36-in. necks and weigh about 60 tons each. Special provision was made for removing the smaller chilled rolls for grinding, which is done in a special grinding machine built by the Norton Company. This is the largest grinder ever constructed for this class of work.

It was necessary to use a housing of a built-up type as it is so large that the machining and transportation of a housing cast in one piece would be impossible. Each housing weighs 400,000 lb.

The mill will handle ingots up to 60,000 lb. in weight. When it is operated to full capacity it is estimated that it will roll from 4,000 to 5,000 tons a week. With the other furnaces in operation and an additional two more which are contemplated, the Lukens Steel Company will have an estimated annual capacity of about 500,000 tons of finished plate. This company furnishes the greater part of the railroad locomotive boiler steel used in this country.



The New No. 5 Mill for 192-in. Plates, Lukens Steel Company

Abolition of the office of comptroller of the currency, held by John Skelton Williams, who is also director of the Division of Finance and Purchases of the Railroad Administration, which has been under discussion in the Senate, was taken up in the House last Saturday by Representative McFadden, of Pennsylvania, who introduced a bill and a joint resolution to abolish the office of comptroller of the currency and to provide for an investigation of the official conduct of Mr. Williams in his capacity as comptroller and also in his capacity as director of finance and purchases. Mr. McFadden presented a letter stating that the comptroller of the currency had notified a bank in Pennsylvania that unless steps were taken to convert the company into a national bank the railroad deposits would be removed to a national bank. He also said that Mr. Williams had refused to grant advances to railroads in certain cases unless the trusteeship under a mortgage was changed to some other trustee that was acceptable to Mr. Williams.

General News Department

The Rivers and Harbors bill, containing appropriations aggregating $33,000,000, was passed by the Senate on Wednesday of this week. It contains amendments calling upon the International Joint Commission to ascertain what improvement of the St. Lawrence river from Lake Ontario to the sea is necessary to make the stream navigable for ocean-going vessels, and instructing the United States Board of Engineers to report what water routes are practicable between the Great Lakes and the Hudson river for ocean-going vessels.

Engineering Council, New York, has sent a letter to the Governors of all States urging the appointment of a reconstruction committee in each State, a proper proportion of whose members shall be engineers of prominence, to study means whereby employment may be provided for skilled men of various trades in constructive work. The large number of men now returning from military service makes it possible to recruit organizations of men of above average ability and they can be employed to good advantage on the large public works which must be done.

The Secretary of War has announced that the President has approved the sending of two companies of American railway troops to Murmansk to facilitate the prompt withdrawal of American and Allied troops from North Russia. The desire for the railway troops is based on the fact that supplies and reinforcements for Archangel during the winter have to go by railroad south from Murmansk to a point near the southern extreme of the White Sea and that the operation of this railroad is believed to be absolutely necessary to guarantee the prompt movement of reinforcements and supplies to Archangel and the movement of troops south of that point.

The running of freight trains on Sunday has been partially suspended on the main line of the Pennsylvania Railroad. On February 8, and again on February 15, orders were issued at Altoona to send out no slow freight between 6 p. m. on Saturday and 12:01 on Monday morning, except for coke and limestone. This arrangement is similar to that which was in force several years ago. The Youngstown (Ohio) Vindicator of Monday, February 17, reports that, for the first time since 1907, the switching crews in that city were idle on Sunday, the 16th, except in the yards of the Baltimore & Ohio and the Pennsylvania, where also there was considerable shrinkage of traffic. It was estimated that more than 500 men were enjoying an unusual Sunday rest.

Gustav Lindenthal, designer of the Hell Gate bridge, has laid before the New York-New Jersey Port and Harbor Development Commission an elaborate plan for the improvement and enlargement of transportation facilities in and near New York city involving an estimated expenditure of $211,000,000, not including river front improvements. The plan includes a single span bridge across the North river, a belt railroad in New Jersey laid on a semi-circle of 15 or 20 miles radius; a tunnel under the North river and another to connect with Staten Island; an elevated freight railroad on the west side of Manhattan; a freight classification yard on the meadows between Jersey City and Newark, a passenger station in New York, subway connections to the Grand Central Terminal, and other facilities. Mr. Lindenthal does not overlook the high prices now prevailing, but says that the preparation of plans and the studies preliminary to doing actual work should be begun at once.

The New York Central Magazine, announced several weeks ago, made its initial appearance on February 10. It is a book of 100 pages, 8 in. x 10½ in., and about 40 pages are filled with advertisements; and, says the editorial announcement, the advertisers are to pay the cost of producing the magazine. The reading pages are filled with a great variety of matter, of interest to different classes of employees, much of it consisting of letters from officers and employees, and other original matter. There are departments for men in the operating, the mechanical, the accounting, the engineering, the traffic, the claim, the marine and the safety departments. The personal matter relating to employees has evidently been prepared with great care and there are numerous portraits.

Denver & Rio Grande

In last week's issue of the *Railway Age*, page 412, total operating expenses of the Denver & Rio Grande were erroneously shown as $2,955,559. A 9 was substituted for a 4 and the correct figures are $2,455,559.

Railroad Club of Washington

One hundred and twenty employees of the Railroad Administration in the city of Washington have organized the Railroad Club of Washington. W. C. Kendall, manager of the Car Service Section of the Railroad Administration, was elected president.

Lehigh & New England

In last week's issue of the *Railway Age*, page 416, the operating revenue of the Lehigh & New England was shown as $2,989,895, although freight revenue alone was shown as $3,679,107. Total operating revenues should have been shown as $3,989,895.

American Institute of Consulting Engineers

At the annual meeting of the American Institute of Consulting Engineers the following members of council were elected to take the place of those retiring: S. Whinery, Desmond FitzGerald and J. Parke Channing.

At the council meeting on February 5, the following officers were elected: L. B. Stillwell, re-elected president; A. M. Hunt, vice-president, and F. A. Molitor, secretary and treasurer.

Association of Railway Executives

Robert S. Lovett, president of the Union Pacific; R. M. Calkins, president of the Chicago, Milwaukee & St. Paul, and W. H. Finley, president of the Chicago & Northwestern, have been elected members of the standing committee of the Association of Railway Executives to succeed to the places temporarily held by C. B. Seger, who recently resigned as president of the Union Pacific; A. J. Earling, who recently resigned as chairman of the Chicago, Milwaukee & St. Paul, and E. M. Hyzer, vice-president of the Chicago & Northwestern.

Automatic Train Control

One of the things for which we think the U. S. Railroad Administration is to be commended is the recent appointment of a committee reviving the study and testwork looking to the possible adoption of automatic train control apparatus. In every accident investigation for many months made by the Bureau of Safety of the I. C. C., in which it has been feasible to imagine how an automatic stop would have been a sure preventive, the report has intimated that the failure to have the automatic stop in use was a matter of neglect. If what Mr. Borland says holds water, i. e., that such devices are now available for use, Mr. McAdoo would have ordered their installation. The fact that he ordered standardization of locomotives showed, and showed only, that he was ready to go any length to make the newspapers talk of the great improvements he was bringing about, away in advance of any-

thing the private managements had ever done. As a publicity value, automatic train control would have beaten standardization of locomotives all hollow. Why didn't McAdoo order it on? There is still no report of any definite action. Study, study, test, test, is all that is contemplated. Why not immediate action?- *Railroad Herald.*

Michigan Central Has Good Showing

The table in the January 31 issue, page 323, "Revenues and Expenses of Railroads," showed a net operating income for the Michigan Central for 11 months of the calendar year, 1918, of $13,533,030. Through a typographical error, the next column of the table showed this as a decrease of $2,362,331, as compared with the net operating income of the corresponding 11 months of 1917. As a matter of fact, this was an increase of $2,362,331 over the corresponding 11 months of 1917. The Michigan Central is among the enviable minority of roads that did better in net in 1918 than it did in 1917.

Government Price Adjustment

Following a series of conferences between members of the Cabinet and others, a meeting was held in Washington on February 5, called by the Secretary of Commerce, to consider the industrial situation, with particular reference to unemployment and the prospect of resumption of active buying. The establishment of a satisfactory level of prices at this time offers particular difficulties, because war prices, as fixed, are recognized as abnormal; on the other hand, there is no prospect in the immediate future of the restoration of prewar prices. It was felt that wages would remain on a higher level than before the European war and that no readjustment in the true wages of labor, as measured by purchasing power, should be attempted now. It was the sense of the meeting that the fine spirit of voluntary co-operation in industry which had proved such a valuable factor in the conduct of the war should be availed of to ease and expedite the processes of readjustment and that the manufacturers of the country would be willing to take the first step.

Carrying out the spirit of this meeting, the Secretary of Commerce, acting with the approval of the President, will organize a Board to confer with representatives of the basic industries of the country to examine conditions in industry with a view to the formulation of a scale of prices at which the government departments and other buyers would be justified in buying freely and at which the manufacturers would be willing to sell with a view to maintaining or restoring business activities to a full volume. George N. Peek of Moline, Ill., a former member of the War Industries Board, is to be chairman of the new board. He will select six associates, one of whom will be named by the Railroad Administration. W. M. Ritter, formerly head of the hardwood section of the War Industries Board, has been appointed to supervise organization executive work. Secretary Redfield has announced that neither price-fixing nor price maintenance is contemplated but that immediate action is proposed to suggest proper price levels.

If this conference results in reductions of prices in basic industries, it is probable that the Railroad Administration will place some large orders for railroad materials and supplies, provided Congress makes the $750,000,000 addition to its revolving fund. The Railroad Administration has been in negotiation with the steel companies regarding orders for rails, but there has been a disagreement on the price question.

Future of Gas and Electric Welding

At a joint meeting of the American Institute of Electrical Engineers and American Institute of Mining Engineers, on Wednesday afternoon, February 19, five papers were presented on the subject of welding, as follows: Microstructure of Iron Deposited by Electric Arc Welding, by G. F. Comstock; Path of Rupture in Steel Fusion Welds, by S. W. Miller; Welding Mild Steel, by H. M. Hobart; Electric Welding in Shipbuilding, by S. V. Goodall, and Fusion in Arc Welding, by O. H. Eschholz.

A lively discussion followed their presentation during which it was suggested that as so much had been done in the way of making repairs, particularly by the railroads during the past two years, the time was ripe for bringing the welding processes permanently into the field of construction. It was pointed out that there are many variables to be determined in order to secure a good weld and that successful welding is dependent upon uniformity of results. For this reason it was stated that the welding operator must be both skilled and conscientious, and a diversity of opinion was expressed in the discussion as to whether the operator should be a skilled engineer or whether the average worker could be taught to do good welding work.

The particular significance of the presentation of the papers and the discussion lies in the fact that welding is demanding so much of the attention of our best engineers. This in itself is sufficient indication that the constantly increasing use of welding is to be expected. Conclusions indicated by the discussion were that both gas and electric welding had come to stay and that we may prepare for the time when the average mechanic must learn the use of the welder, just as he has had to learn the use of the hammer and chisel.

Railway Regiments' Tobacco Fund

The Railway Regiments' Tobacco Fund, to which 146 railway supply companies contributed, made seven shipments of tobacco, amounting to approximately eight tons, to railway regiments in service in France. Owing to the congestion in the transport service during the summer on account of the great number of troops going over, it was found that this tobacco was not being delivered to the regiments to which it was consigned, and shipments were, therefore, postponed until the transport service could be organized to the point where delivery was assured; but the movements of the various railway regiments were so uncertain that it was finally decided not to make any further shipments. The total amount subscribed to this fund was $16,129.94, of which $10,056.05 was spent for tobacco, leaving $6,073.89 still in the hands of the committee handling the fund. This sum is approximately 37.5 per cent of the amount subscribed, and the committee, in making arrangements for the closing of the fund, has decided to return to the contributors 37.5 per cent of each subscription received. This will amount to practically all the funds available, with the exception of a few dollars, which will be utilized to defray expenses. In requesting subscriptions it was specifically stated that they were only to be made up to the end of the year 1918, and accordingly, all checks received since December 31, 1918, are to be returned.

The Railway Regiments' Tobacco Fund was initiated by F. A. Poor, president of the P. & M. Company, Chicago, and in order to raise the necessary funds, a committee, composed of Mr. Poor, as chairman, and R. P. Lamont, president of the American Steel Foundries; George A. Post, president of the Standard Coupler Company and of the Railway Business Association (1918); E. H. Bell, president of the Railway Supply Company and of the Railway Appliances Association (1918); J. M. Hopkins, president of the Camel Company, Chicago, and A. C. Moore, vice-president, Safety Car Heating & Lighting Company as members, was organized. Samuel O. Dunn, editor of the *Railway Age*, was secretary of the committee, and John R. Washburn, vice-president of the Continental Commercial Bank, Chicago, acted as treasurer of the fund.

American Electric Railway Association

Arrangements are progressing rapidly for the dinner in connection with the annual meeting of the American Electric Railway Association to be held at the Waldorf-Astoria, New York, March 14. The speakers for the evening are announced as follows: Warren G. Harding, United States Senator from Ohio; Lindley M. Garrison, former secretary of war, and now receiver of the Brooklyn Rapid Transit System, and B. A. Hegeman, Jr., representing the manufacturer members of the association. J. H. Pardee, president of the American Electric Railway Association, will preside.

Traffic News

Coal loading for the week ended February 1 was 178,688 cars, as compared with 207,547 in the corresponding week of 1918. Loading for the following week is estimated at 165,716 cars, as compared with 215,867.

Major Gen. W. M. Black, chief of engineers of the United States Army, has been elected chairman of the Port and Harbor Facilities Commission of the United States Shipping Board, succeeding E. F. Carry, who resigned recently.

War time regulation of the coal trade virtually will cease on March 1, according to an announcement of the Fuel Administration. That date has been tentatively fixed for the abrogation of the order prohibiting the shipment of coal for reconsignment and also the order under which all shippers of coal at tidewater were required to consign their coal to the Tidewater Coal Exchange.

Counting barges already built or in course of construction and twenty new power barges soon to be ordered, the United States Railroad Administration will have for service on the New York State barge canal a fleet of 95 barges; three wooden, 50 of steel, 21 concrete and 20 self propelled steel barges. It is said that the aggregate carrying capacity of these vessels will be 50,000 tons.

At a representative meeting of shippers, wholesalers and consumers of coal held recently at the office of the National Coal Association, at Washington, resolutions were adopted declaring that the present demurrage regulations on coal are unreasonable and in contravention of the law in that the free time allowed at tidewater is insufficient and the per diem charge is excessive and discriminatory. The Fuel Administration was asked to abrogate at once its order requiring all shippers of coal to tidewater to use the tidewater coal exchange.

Gratifying results of co-operation of the shippers of the Minneapolis district in the intensive loading of flour and mill products are shown in the following report to the Railroad Administration:

	1916	1917	1918
Number of tons shipped	2,624,549	2,546,462	2,577,295
Number of cars used	102,289	75,058	62,180
Average tons per car	25.66	33.9	41.4

A comparison of the 1916 and 1918 figures shows a decrease of 1.8 per cent in tonnage with a decrease of 39.2 per cent in number of cars used.

Wooden barges plying on the Mississippi river have greatly lessened the strain on railroads in that section, according to claims of A. W. Mackie manager of the Mississippi river section of the Mississippi-Warrior Waterways of the United States Railroad Administration. Mr. Mackie estimates that the saving for the railroads for the 94 days that the service operated out of St. Louis before ice closed the port. was 7,274 car loads. About 17,430 tons of grain were moved for the Food Administration by these lines, which operated between St. Louis and New Orleans.

Secretary Redfield of the Department of Commerce has authorized the employment of the service of the department's legal staff in behalf of a private litigant, the Solvay Process Company, of Syracuse, N. Y., in a case in which the company seeks to have the Interstate Commerce Commission reduce freight rates on its products and order the return of $60,000 alleged over-charges. "The farmer has the Department of Agriculture to represent his interests," Mr. Redfield said, "and the laboring man has the Department of Labor. I believe the business man should have the proper assistance of the Department of Commerce."

Addresses at Chicago Traffic Club

Henry A. Palmer, editor of the Traffic World and the Traffic Bulletin and William Gourlay, general agent of the American Railway Express Company at Chicago, addressed the Traffic Club of Chicago at a noonday luncheon at Hotel La Salle on February 11. Mr. Palmer's subject was "The Patriotism of Peace," and Mr. Gourlay's "Better Express Service."

An abstract of Mr. Palmer's speech follows:

"It is unfortunate that the whole subject of what we ought to do with our railroads had to be taken up at this time. Such problems as the relative powers of the Interstate Commerce Commission and the state commissions and the question of whether there ought to be regional commissions were problems before the war was ever thought of and are no more so now than then * * * and should have gone over until the immediate question of whether the railroads should be returned to private ownership or not, was settled. It is also unfortunate that those who are appearing before the Senate committee could not have reached some sort of agreement as to fundamentals before they appeared to confuse the lawmakers with their remedies, no two of which contain the same ingredients * * *"

Mr. Palmer emphasized the fact that the great mass of the American people, who have no intimate knowledge of transportation, nevertheless control legislation through their votes and may fall into the error of favoring government ownership unless those who are well informed concerning the railroads take it upon themselves as a duty to spread the truth.

If the traffic clubs of the country could unite on some general plan for the regulation of our railroads they would be doing a service that no one else could do. Representing both the industries and the carriers, their united opinion would carry weight with Congress. The New York Traffic Club, the Transportation Club of Maryland (Baltimore) and the Traffic Club of Newark, N. J., have already adopted identical resolutions. While the industrial members of the Traffic Club of Chicago seem favorable to similar action, some of the railroad members seem to think that their participation in such resolutions would prove a source of embarrassment. On this point Mr. Palmer said:

"Carried to its logical conclusion such a theory means that every employee of the Postoffice Department should think as Mr. Burleson thinks about public ownership * * *; every employee of the telegraph or cable companies should think as Mr. Burleson thinks; and every employee of every railroad and every employee of the express company should think as Mr. Hines thinks. A fine state of affairs that would be, wouldn't it? That there is any danger of its prevailing is the very best argument that could be furnished against government ownership or government operation of anything. If it is to produce a race of spineless individuals afraid to express their own opinions or to vote for what they believe to be right, the sooner we know it the better, that we may choose between an absolute monarchy and a republican form of government * * *"

Mr. Gourlay began with a discussion of claims. These cause a constant waste in time and money and they engender ill feeling. The American Railway Express Company has inaugurated a campaign to reduce loss and damage and is anxious to secure the hearty co-operation of shippers.

If those claims could be eliminated which result from improper or insufficient packing, wrapping and marking, a considerable part of the difficulties of the company and the public would be overcome. During the past few years the poor quality of paper, twine and containers has resulted in much damage to goods. The nature of express service is such that in the course of transit the shipments are handled much more frequently than are freight shipments. Every express car must be loaded to its maximum capacity with articles of all sizes, and weights. All packages cannot ride on the top of a load and the loading of the car cannot be postponed until the entire lading is arranged on the platforms so that the heavy articles can be put in first.

The use of second-hand containers is a fruitful cause of claims. If these containers do not break open they can almost certainly be depended upon to send shipments astray on old marks. It is important that the marking on packages whether written, nailed or pasted thereon, should be done in crayon, lamp-black or ink. The express company has to maintain 19 "No Marks Bureaus" throughout the country. From July 1, to November 30, 1918, these bureaus received 127,859 shipments, or an average of over 25,500 shipments a month. Automobile tires or shoes found without marks average about 1,400 a month.

Foreign Railway News

Exports of locomotives through the port of New York during December, 1918, amounted to $1,755,891, according to figures given in the monthly foreign trade record issued by the National City Bank. The report also shows rails exported to the value of $1,354,795 and car wheels and axles valued at $413,720. Freight cars are not separately shown in the tabulation.

The influence of the influenza epidemic upon the South African Railway traffic necessitated the curtailment of the service as the result of disorganized conditions. At one time there were 15,660 employees, including 8,369 Europeans, off duty. It may be mentioned that there are approximately 39,000 employees in the railway service, so that the department has been seriously handicapped, and the fact that there has been no marked restrictions in the service is a tribute to efficiency and organization.—*Johannesburg Correspondent.*

Chilean Railroad Loan Passed

American Ambassador Joseph H. Shea, cabled from Santiago, February 8, that the Chilean Senate on that day passed a law authorizing a loan of 89,000,000 pesos at 18 pence value for the purpose of supplying the necessary expenses of the State Railroad. Further, an increase of 20 per cent on the passenger and freight rates has been agreed upon.

Increased Railway Rates in Jamaica

Consul Davis B. Levis, at Kingston, Jamaica, has reported that the governor of Jamaica has approved the recommendation of the advisory board of the Jamaican Government Railways that freight rates should be advanced 15 per cent and passenger fares 25 per cent, and the new tariff has been operative since December 1.

The increases allowed were found to be imperative in view of the higher operating costs of the railway and the further necessity of purchases of additional rolling stock and other equipment during the coming year, the present equipment being deemed inadequate for the movement of the anticipated increase of the sugar production.

Serbia's Railroads Ruined

The extreme difficulty of transport through Serbia, and the ruinous condition of the country's railways as a result of wanton destruction wrought by Bulgarians and Austrians in their forced retreat, is strikingly shown, says an Associated Press despatch, by the fact that the American Red Cross, in order to get relief supplies to the Nish section, has had to route its shipments by rail east from Salonica to Dedeagatch, then north to Adrianople, then west to Sofia, and finally across the Bulgarian border to Pirot, a total distance of more than 800 miles.

The regular railroad route north from Salonica to Nish is only about 275 miles, and can be travelled in ordinary circumstances in 24 hours. Red Cross supplies have taken ten days to reach their destination.

From Uskub to Belgrade, nearly 300 miles, the railroad at points is wholly destroyed and dozens of bridges and tunnels are in ruins. It is estimated that the work of reconstruction will require more than a year.

The food and clothing situation in northern Serbia is reported to be very acute.

Mexican Railways in Bad Shape

Felipe Pescador, general manager of the National Railways of Mexico, including the old Mexican Central system, has just issued a frank statement in the City of Mexico of the physical and traffic conditions of these lines. He says:

"To pretend that railroad service in Mexico is given with the accommodations of former days would be a statement devoid of reflection. Many passenger coaches are lacking in the usual interior equipment; in some the window glass is broken, in many the seats are worn out, and it is impossible to get prompt repairs. Coaches which have been used in the military service are in a dilapidated condition. Train schedules are difficult to maintain as precautions have to be taken against rebel bands. Generally speaking, however, the service is normal and accidents are not frequent.

"On the Interoceanic we have not been able to control the situation. The rebels have frequently torn up the rails and attacked the trains. They have been very bad between Puebla and Jalapa, destroying the road, thus requiring guards of 100 or more soldiers to protect each repair gang. Often we find newly repaired track again destroyed before a train can be gotten over it.

"The Mexican Central from Mexico City to La Colorado in Zacatecas may be said to be open. North of the latter point repairs of the road have been made only as the military situation would permit work to be done. Between Torreon and Chihuahua City and north of the latter place there have been frequent interruptions of that line by Villa rebels.

"On the old Mexican Central's Gulf line, which runs from Monterey to Tampico, the roadbed is in bad condition and repair work has been effected only with great difficulty. This is on account of the scarcity of laborers and danger from rebels which infest that section. A tri-weekly service is maintained, however. Also, tri-weekly trains are run each way between San Luis Potosi and Tampico. This last is also a part of the old Central system.

"Construction work on the projected line from the city of Durango to Mazatlan, Sinaloa, continues, but the completion of it is very remote. Laborers and money are needed in large amounts and are both lacking. Over 100 kilometers of this line are in operation and material trains are being run over it.

"A part of the revenues of the National Railways is being used to rebuild stations and other structures as well as for renewing rails."

The Damage to the Belgian Railways

Press despatches from Paris on Saturday last report that the Supreme Council has appointed a special committee to study the claims of Belgium for an indemnity. The American members of the committee are Charles H. Haskins and Col. S. D. Embick.

The Belgian commission which is investigating the damage done by the Germans to railroads in occupied territory, while it has not yet finished its work, is in a position to give interesting figures relative to the destruction caused by the Germans.

The figures show that nearly 690 miles of railroad tracks were destroyed and nearly 260 miles made useless out of a total standard gage mileage of approximately 2,600 in Belgium. This destruction was mostly in the Mons coal valley in the region of Tourmal and around Ghent, Bruges, Ostend and Courtrai.

Seventy per cent of the destruction was carried out during the period from the start of the Belgian offensive on September 28, 1918, to the signing of the armistice.

The Germans appropriated 2,614 locomotives out of a total of 4,534, or about 57 per cent; 9,062 passenger coaches, out of a total of 10,812, or 93 per cent, and 80,568 freight cars, out of a total of 94,737, or 86 per cent.

The block signal system in Belgium was destroyed and replaced by a German system with which the Belgian locomotive engineers are not acquainted. It will have to be removed and the Belgian system again installed. The commission is not able to make public yet the number of bridges or stations destroyed.

All the bridges leading in and out of Ostend and Bruges have been destroyed and virtually all in West Flanders, as well as those over the Meuse at Liege, Namur, Huy, Dinant and Enseremme. Eight bridges over the Ghent-Terneuzen Canal were blown up.

Two of the bridges, at Salzaete, near the Dutch frontier, weighed 1,500 tons each. It is estimated by the Commission that more than 50,000 tons of steel will be required to rebuild the bridges in Flanders alone.

The Commission estimates the damage to railroad material, tracks, bridges and other equipment at more than $1,000,000,000.

France is faced with a most formidable task in reconstructing the important coal and industrial districts of the Department of the Nord and the Pas de Calais, and it will cost $15,000,000,000, according to a statement made to the French Senate by Louis Loucheur, minister of industrial reconstruction. The Germans destroyed 101 coal pits. The French, he said, might be able to produce 3,000 tons daily by the end of 1919 instead of 75,000 tons, the output before the war. Repairs will cost more than $400,000,000, and cannot be accomplished in less than ten years.

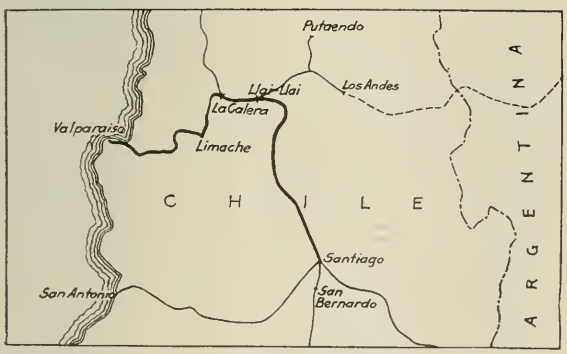
The factories in the district have no raw material and the machinery has been destroyed or carried away to Germany. M. Loucheur said it would take several years and 40,000 freight cars to bring back the machinery.

The Proposed Chilean Electrification

Further details are now available concerning the visit to this country of two prominent Chilean engineers to continue their investigations of the proposed Valparaiso and Santiago electrification, briefly noted in this column in the issue of February 7, page 373.

The two engineers are Rafael Edwardrs and Ricardo Solar. Mr. Edwardrs has been connected with the Chilean State Railways for several years as a consulting engineer in electrification. He is a professor of electrical engineering at the Catholic University at Santiago. Mr. Solar is a civil and electrical engineer and is the head of the laboratory of electrical engineering in the State University at Santiago. They are expected to arrive shortly and will have their headquarters at the office of the Chilean State Railways, 141 Broadway, New York.

The line which it is proposed to electrify is that from Valparaiso, Chile's principal seaport, to Santiago, the capital,

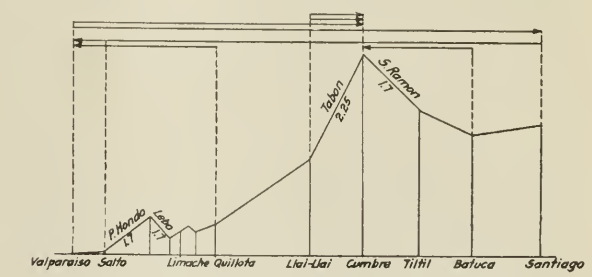


Map Showing the Proposed Chilean Electrification.

The heavy line shows the portion which it is proposed to electrify, and the light lines the connecting lines of the State Railway system. The broken line eastward from Los Andes is the Transandine Railway.

and is 116 miles in length. It is a part of the first zone of the state owned Central Railway and consists in reality of an imortant branch from Valparaiso inland to La Calera, 43 miles, connection being made at La Calera over the main line itself to Santiago, making the other 73 miles. The line is of 5 ft. 6 in. gage. It is double tracked from Valparaiso inland to Llai-Llai and single track only from there to Santiago. As shown on the profile there are four heavy grades. The highest point on the line is at Cumbre, about 2,400 ft. above sea level. To surmount this there is the Tabon grade against traffic towards Santiago, 16 miles in length and of 2.25 per cent. Traffic towards Valparaiso on the other side meets a grade of 1.7 per cent on the S. Ramon grade, about 11 miles long. Just inland from Valparaiso are the Paso Hondo and Lebo grades against traffic from and to the seaport, respectively, both 1.7 per cent.

The traffic handled over the line is of miscellaneous character and is fairly evenly balanced. Between Llai-Llai and Valparaiso the average daily freight train tonnage handled amounts to 4,316 inland and 4,127 towards Valparaiso. Between Llai-Llai and Santiago the traffic is less, 3,832 tons being handled towards Santiago and 3,175 towards Llai-Llai. The trains average about 450 tons. All trains over 300 tons are double-headed. Trains from Santiago to Valparaiso require pusher locomotives from Batuco to the top of the S. Ramon grade at Cumbre and between Quillota and Valparaiso. Those inland from Valparaiso require pusher service inland as far as Llai-Llai, with additional assistance up the



Profile of the Proposed Chilean Electrification.

Tabon grade to Cumbre. The locomotives used are Consolidations weighing 62 tons on drivers, and Mikados weighing 72 tons on drivers.

The principal reason for the proposed electrification is the high cost of coal and to a lesser extent to increase the capacity of the stretch of single track from Llai-Llai to Santiago, physical conditions very largely preventing double tracking. Bituminous coal at present costs $24 a ton in Chile, and even in normal times costs as high as $12 to $14. For the proposed electrification water power is available from the Aconcagua river, which parallels the railroad for a considerable distance. It is proposed to put the generating station at a point on the river about 30 miles from Llai-Llai.

It is hoped that electrification will permit of 500 ton trains with a speed on the heavy grades of 16 to 18 miles an hour. Passenger trains will make a speed of about 30.

Japan's Growing Influence in Chinese Railway Affairs

Special Correspondence from Peking.

With one exception, all of the reports made in these columns of rumored Japanese railway enterprises in China are now confirmed—and one more is added. The Industrial Bank of Japan opened for subscription between October 19 and 23 an issue of bonds in the amount of Yen 50,000,000 ($25,000,000) at 94.5, bearing interest at the rate of 5.5. The payment of interest and principal is guaranteed by the Japanese Government. The purpose stated is "to cover the new investment made by the bank in China in the form of four railways in Mongolia and Manchuria and two others in Shantung and Kiangsu." "The proceeds of the loan will be employed in refunding the temporary loan made to the amount of Yen 40,000,000 ($20,000,000) from the Imperial Treasury and the Bank of Japan of that amount to China as part of the loans contracted for."

While not a foot of earth is turned nor a pound of rail is at hand to show for the Yen 40,000,000 already officially said to be advanced to China, it is interesting to know that the above is only part of a loan of $320,000,000—according to the Manchuria Daily News, which is the official mouthpiece for the Japanese owned South Manchurian railway. This paper continues the report as follows:

"It may be added that the question of financing China for the construction of the six railways in project in Manchuria and Mongolia and Shantung has been long pending, and the Chinese side has conducted surveys of the proposed routes on their own account.

"The four railways in Manchuria and Mongolia are: 1, Changchun-Taonanfu Line; 2, Taonan-Jehol Line; 3, Kirin-Hailungcheng-Kaiyuan Line; 4, a line from a point of Taonan-Jehol Line to a seaport. The two railways in Shantung are: 1, Tsinan-Shunte; 2, Kaomi-Hsuchow.

"In each case, excepting the Kirin-Hailuncheng-Kaiyuan Line, the proposed route runs through a comparatively level country, and bridging work is the only feature taxing engineering skill.

"On the Kirin-Hailungcheng-Kaiyuan Line, the Kirin-Hailungcheng Section traverses a hilly country in which the preponderance of rocky structure

is the most striking geological feature. How soon the construction work will be started is unknown."

The first and second of these lines is a direct invasion of a route under contract with Kuhn, Loeb & Co., dated October 2, 1909, but since held in abeyance on account of pressure brought by Russia and Japan jointly. The fourth of these is no doubt intended to run to Hulutao, a harbor about 150 miles north of Chinwantao, and will cross the Peking Mukden only seven miles away. This certainly violates the agreement with the Peking Mukden bondholders that "the construction of any new railway within a distance of 80 miles of any portion of the existing lines * * * shall not be undertaken by the Administrators-General of the Imperial Northern railways (Peking Mukden)." The Kaomi-Hsuchow line is very effectively counter to the French agreement concerning the Lung-Hai line which permits it to choose its maritime port north of the Yang Tze river and to build branches.

It has been pointed out in former notes how the lines in Shantung will not only confirm the control of this province to Japan but will also make Tsing Tau the outlet for all interior China north of the Yang Tze basin. The Manchurian and Mongolian lines will wrest away the remainder of the vanishing sovereignty of China in those regions. Taken together, the two Japanese spheres will nearly surround Peking. Besides, the position of Japanese islands off the coast give the situation a decidedly military aspect. This will make these agreements a very live topic at the peace conference. There are but two turns which the subject may take. One is to let matters take their course, which will require Great Britain to set up as rigid a control in South China as Japan does in North China, with French and American interests playing a subordinate part to either party, depending upon whichever district they wish to enter. The other is for all railway operations in China to be surrendered by all parties to an international board or syndicate to be administered in trust for the Chinese Government until it is in a position to maintain its own rights vis-a-vis any power. The former procedure will undoubtedly lead to a situation not unlike the Balkans prior to the great war with a corresponding depression in China and discouragement to all progress. The latter would insure the upbuilding of China into a great nation of power and wealth which seems to be contrary to the policy of at least one interested party.

Undoubtedly, if any program of internationalization is to be considered, it will have to be championed first of all by America. The spirit of Great Britain may be sympathetic, but she is probably under such promises to Japan with respect to the war that she cannot more than passively enter into such discussions as this would involve. China herself has always relied upon trading one nation against another, and her thinking in the conference will most likely follow that tradition somewhat. Besides the dominance which Japanese interests now have over her officialdom will probably be able to prevent any constructive program from emanating from railway quarters. Particularly is this true because even the most forward of Chinese public men have for some years past had a nightmare of the "Egyptization" of China. Such a powerful organization as an international syndicate to administer her railways would appear to them as falling not far short of putting China into the same financial category as Egypt.

Italy's Railroads Not Prepared for Tourist Traffic

A recent despatch to the New York Times is authority for the statement that the Italian Government has assigned $360,000,000 to urgently needed reorganization of the State railways, $200,000,000 of this being devoted to purchase of new rolling stock, considerable orders for which have been placed with the United States.

The single Milan-Rome daily express takes up hours in making the journey, and the railway directorate warns intending foreign tourists that a return to anything like normal conditions cannot be expected until at least the end of next year.

Italy has lately undertaken to provide prompt facilities for demobilization of the allied armies from Macedonia and bases in the Orient.

Equipment and Supplies

Prices for the steel castings used on cars and locomotives purchased by the Railroad Administration were discussed at a conference between the manufacturers and the price-fixing committee of the War Industries Board at Washington, on Wednesday. It was agreed to leave the decision to the board.

Locomotive Deliveries

The following new locomotives were shipped during the week ended February 8:

Works	Road	Number	Type
American	C. B. & Q.	3	USRA Santa Fe.
	C. & O.	1	10W. Sw.
	Oregon Short Line	3	USRA 6W. Sw.
	Grand Trunk	2	USRA 6W. Sw.
	C. & O.	1	USRA Mallet
	*Chic. & N'w.	1	Mikado
	Total	11	
Baldwin	Atch., Top. & Santa Fe.	1	Mikado
	B. & O.	4	USRA Mikado
	Great Northern	2	Mikado
	Penn. R. R.	1	Mikado
	Lehigh Valley	2	Pacific
	Phil. & Reading	2	Consol.
	Ill. Cent. R. R.	2	Mikado
	Atlantic C. L.	1	Mikado
	Total	15	
	Grand total	26	

*One Mikado locomotive constructed for the Chicago & Northwestern was shipped to Potomac Yards, Va., to be stored as part of an emergency pool.

Car Deliveries

The Railroad Administration has given the following statement of new standard cars accepted by roads for the week ended February 1:

Road	Number	Type	Manufacturer	Total accepted for given roads
A. C. L.	136	40 ton D. S. Box	Am. Car & Fdy. Co.	183
C. & W. C.	68	40 ton D. S. Box	Am. Car & Fdy. Co.	203
C. C. C. & St. L.	45	40 ton D. S. Box	Am. Car & Fdy. Co.	750
C. C. C. & St. L.	51	40 ton D. S. Box	Am. Car. & Fdy. Co.	91
Georgia R. R.	134	50 ton S. S. Box	Haskell & Barker	300
Ill. Cent.	73	50 ton Comp. Gond.	Am. Car & Fdy. Co.	150
Ill. Cent.	38	55 ton Steel Hop.	Am. Car & Fdy. Co.	38
Ill. Cent.	146	55 ton Steel Hop.	Pressed Steel Car	200
Ill. Cent.	335	50 ton Comp. Gond.	Pressed Steel Car	500
Ill. Cent.	150	55 ton Steel Hop.	Pullman Car Co.	250
Ill. Cent.	45	55 ton Steel Hop.	Ralston Steel Co.	200
Ill. Cent.	100	55 ton Steel Hop.	Standard Steel Co.	200
Ill. Cent.	52	50 ton H. S. Gond.	Standard Steel Co.	300
Mich. Cent.	111	50 ton S. S. Box	Am. Car & Fdy. Co.	354
Mich. Cent.	111	50 ton S. S. Box	Pullman Car Co.	111
T. & O. C.	141	40 ton D. S. Box	Am. Car & Fdy. Co.	141
Total	1,736			

The following new standard cars were accepted during the week ended February 8:

Road	Number	Type	Manufacturer
C. C. C. & St. L.	57	40-t. D. S. box	Am. Car & Fdy. Co.
C. & W. C.	41	40-t. D. S. box	Am. Car & Fdy. Co.
T. & O. C.	109	40-t. D. S. box	Am. Car & Fdy. Co.
A. C. L.	133	40-t. D. S. box	Am. Car & Fdy. Co.
Mich. Cent.	146	50-t. S. S. box	Am. Car & Fdy. Co.
N. Y. C.	209	50-t. S. S. box	Haskell & Barker
Mich. Cent.	238	50-t. S. S. box	Pullman Car Co.
L. & N.	19	50-t. comp. gondola	Am. Car & Fdy. Co.
L. & N.	59	50-t. comp. gondola	Am. Car & Fdy. Co.
L. & N.	213	50-t. comp. gondola	Pressed Steel Car
L. & N.	40	55-t. steel hopper	Standard Steel Car
L. & N.	94	55-t. steel hopper	Pressed Steel Car
Ill. Cent.	112	55-t. steel hopper	Am. Car & Fdy. Co.
Total	1,470		

Locomotives

The Canadian National Railways have ordered 25 Pacific type locomotives from the American Locomotive Company, these locomotives to have 23½ by 28 in. cylinders and a total weight in working order of 260,000 lbs. each.

Freight Cars

The Pennsylvania Equipment Company, Philadelphia, Pa., is in the market for 10, 30 cu. yd., 50-ton capacity steel automatic air dump cars.

Supply Trade News

The eastern branch of the **Independent Pneumatic Tool Company,** will be removed on March 1 from 170 Broadway to larger quarters at 1463 Broadway, New York.

The Patterson Sargent Company is now represented by **L. J. McComb** as railroad paint and varnish salesman, with office at 201 Devonshire street, Boston, Mass. Mr. McComb succeeded **F. Howard Childs,** who died December 15, 1918.

W. W. Butler, vice-president of the Canadian Car & Foundry Company, Montreal, Que., has been appointed president. Mr. Butler is also president of the W. W. Butler Co., Ltd., and a director of the Page-Hersey Iron Tube & Lead Co.

Ezra S. Taylor, assistant to the vice-president of the Pullman Company, has been elected assistant to the president, with office in the Pullman building, Chicago. Mr. Taylor was born at Chicago in 1880. When 17 years old he entered the employ of the Atchison, Topeka & Santa Fe as a member of a surveying gang in Texas. After three years in this work, he came to the Chicago office of the Santa Fe as a clerk in the freight department, and in 1900 he entered the employ of the Pullman Company as a clerk in the auditing department. From 1902 to 1905 he was assistant to the storekeeper, and later to the operating superintendent of the Chicago Elevated Lines at Chicago. The following three years he was assistant purchasing agent for the Western Steel Car & Foundry Company, at Anniston, Ala., and later at the Hegewisch (Ill.) plant. To increase his knowledge of the steel business, Mr. Taylor subsequently entered the employ of the Illinois Steel Company at its open hearth plant in South Chicago, where he remained for one year. In 1909 he returned to the Pullman Company as chief clerk in the sales department, and was subsequently general eastern agent at New York and assistant to the vice-president, which position he held until his appointment as assistant to the president on February 6, 1919.



E. S. Taylor

William M. Ryan, president of the Ryan Car Company, Hegewisch, Chicago, has been elected president of the Calumet Manufacturers' Association, organized last month to promote the business interests of the Calumet district, Chicago, which comprises 300 factories.

W. W. Hayward, secretary and treasurer of the Butler Drawbar Attachment Company, Cleveland, Ohio, died of pneumonia on February 12. Mr. Hayward had served as secretary and treasurer of the company since its organization. He will be succeeded by **W. B. Waggoner.**

Leslie W. Millar, who has been connected with the Navy Department at Bethlehem Ship Yards, Quincy, Mass., for the past year and a half, has been appointed special railroad representative of the Mark Manufacturing Company, Chicago, with offices in the Conway building.

The United States Switch Company, Eau Claire, Wis., originally incorporated with a capital stock of $1,750,000 in Delaware, has been reorganized as a Wisconsin corporation with an authorized capital of $300,000, divided equally into preferred and common stock. The company manufactures automatic switches, signals and other railroad specialties. J. W. Hubbard is president and general manager.

The Menasha Filtermass Company, Menasha, Wis., manufacturer of paper mill and pulp-making machinery and equipment, has added a new type of railroad car-mover to its line of products. A shipment of these devices has been made to a customer in Japan and orders have also been booked from domestic buyers.

A. W. Preikschat, formerly assistant to the engineer of tests, of the Pullman Company, and later special representative in the purchasing department of the Steel Tube Company of America, has been appointed sales representative of the Liberty Steel Products Company, Inc., with offices in the McCormick building, Chicago.

W. S. Quigley, president of the Quigley Furnace Specialties Company, Inc., sailed for Liverpool on the Baltic, February 15, for the purpose of further developing European connections of his company. Mr. Quigley will spend several weeks in England, France and Italy, and visit the plants installing the Quigley system for preparing and burning pulverized coal and lignite.

Captain John M. Taylor has been made publicity manager for the Ferguson Company. He was the first uniformed officer on the grounds at Camp Devens, Mass. There he was assigned to the construction division, Quartermaster Department, for six months and for the balance of the war remained in the south in the Military Intelligence Department. Captain Taylor had considerable experience in the work in which he will henceforth be engaged prior to his entrance into military service.

C. C. Farmer, until recently assistant western manager and resident engineer for the Westinghouse Air Brake Company, has been advanced to the position of director of engineering in the same company. Mr. Farmer has been connected with the air brake company for many years. He was born in California, where he received his education. After a number of years as machinist on the Southern Pacific, he began, in 1891, a study of brake action and train control in the Westinghouse Air Brake Company instruction car, on various roads throughout the country. In the same year, the Missouri, Kansas & Texas offered him the position of supervisor of air brake repairs, from which he was advanced in a few months to air brake inspector of the entire road. In 1896 he became general air brake instructor of the Central of New Jersey and soon after became an inspector for the Westinghouse Air Brake Company. Not long after his second association with the Westinghouse Air Brake Company, he was transferred to the Chicago district as mechanical expert. Then he was appointed resident engineer, and later, with the understanding that he would still retain the title of resident engineer, he was made assistant western manager, from which dual position he has now been advanced to that of director of engineering.



C. C. Farmer

L. F. Phipps, president of the American Frog & Switch Company, Hamilton, Ohio, since its organization, has retired from the presidency and has been appointed chairman of the board of directors. **C. E. Hooven,** president of the Cincinnati, Lawrenceburg & Aurora Electric Railway; vice-president of the Dayton Rubber Manufacturing Company, and president of the Hooven Automatic Typewriter Company, has been appointed president to succeed Mr. Phipps. **Don**

Hooven, secretary and treasurer of the Cincinnati, Lawrenceburg & Aurora Electric Railway and a director in the Dayton Rubber Manufacturing Company, has been appointed secretary. **E. S. Griffis** has been re-elected treasurer, and **W. H. Rabbe**, chief engineer. The control of this company has passed to the Hooven estate.

John S. Y. Fralich has been appointed resident engineer of the western district for the Westinghouse Air Brake Company, succeeding C. C Farmer, promoted to director of engineering. Mr. Fralich has been with the Westinghouse Air Brake Company since 1904. He was born at Harrisburg, Pa., September 19, 1880, was educated in the grade and high schools of Philadelphia, and received his engineering training at Williamson School. He then served a regular three years' apprenticeship as a machinist and was employed for two years as a machinist in the Altoona shops of the Pennsylvania Railroad. He became connected with the Westinghouse Air Brake Company in June, 1904, having been hired as a machinist and shortly thereafter assigned to the inspection force. He was then respectively shop inspector, special inspector, with the experimental test department, supervisor of shop tests, acting assistant to mechanical engineer. He did special engineering work in the Chicago office from March to December, 1913, was appointed assistant resident engineer in December, 1913, and resident engineer of the western district February 1, 1919, as above noted.



J. S. Y. Fralich

New York Air Brake Company

The gross sales of the New York Air Brake Company for the year ended December 31, 1918, totaled $10,380,584, as compared with $10,157,038 in 1917. Net profits for the year after the deduction of charges, were $2,052,553, an equivalent of $20.52 a share earned on the $10,000,000 capital stock, as compared with net profits of $1,893,825, or $18.94 a share earned in 1917.

In his remarks to stockholders, accompanying the annual report, President C. A. Starbuck said in part: "It will be noticed that the net earnings for the year are more than sufficient to continue the payment of the dividend at the rate of 20 per cent. However, the board of directors decided to pay at this time a dividend at the rate of 10 per cent, being of the opinion that the past earnings and future prospects justify the belief that this rate can be permanently maintained and still permit the company to continue to enlarge its working capital to enable it to take on some special business now under consideration."

The Pulverized Fuel Equipment Corporation

The Pulverized Fuel Equipment Corporation has recently been organized for the purpose of taking over the business of the Locomotive Pulverized Fuel Company, and to broaden the activities of the latter to cover the central power station, metallurgical and industrial fields. The head offices are at 30 Church street, New York, with Canadian office in the Transportation building, Montreal.

This corporation installs and delivers in operation complete plants of its "Lopulco" system for the preparation, distribution, storage, feeding and burning of pulverized fuel for any steam generating or heating purposes whatsoever. The development by the Locomotive Pulverized Fuel Company of its "Lopulco" system for the burning of anthracite and bituminous coals, lignite and peat in pulverized forms, has already commercially demonstrated its adaptability for not only steam locomotives and steamships, but for central power station and other direct and waste heat stationary boilers, and for metallurgical and chemical furnaces and cement and other kilns. Many such installations are now in use and in process of construction in connection with public utility properties and large industrial and manufacturing plants.

The officers of the Pulverized Fuel Equipment Corporation will be: J. S. Coffin, chairman; J. E. Muhlfeld, president; H. F. Ball, vice-president, executive; H. D. Savage, vice-president, in charge of sales; V. Z. Caracristi, vice-president, in charge of engineering; Samuel G. Allen, secretary-treasurer.

Pressed Steel Car Company

The annual report of the Pressed Steel Car Company for the year ended December 31, 1918, shows a big increase in earnings over the report for 1917. The surplus last year, after charges and taxes, amounted to $3,950,785, equivalent after the deduction of preferred dividends to $24.60 a share on the $12,500,000 common stock. In 1917 the surplus was $2,130,308, equivalent after preferred dividends to $10.04 a share on the common.

The profits for 1918 after federal tax deductions were $4,350,785, an increase of $1,920,477 over the preceding year. Depreciation charges were $400,000, as compared with a depreciation charge in the preceding year of $300,000. The surplus for last year, after preferred and common dividends, was $2,107,035, as compared with $380,308 in 1917. The profit and loss surplus now stands at $12,704,412. The inventory at the close of 1918 stood at $3,364,479, only a trifle more than half of the inventory item in the balance sheet of the preceding year.

Unfilled orders on hand January 1, 1919, including the business of the Western Car and Foundry Company, amounted to $73,000,000, and of this only about 15 per cent was for the ordnance department and subject to termination. All other business was covered by contracts containing no cancellation clauses. About 25 per cent of this business was for the military railways overseas and about 35 per cent for the United States Railroad Administration.

Railroad Administration Takes Over Superheater Company

Director General Hines announced on February 18 that the United States Railroad Administration, at the instance of the alien property custodian, had purchased more than 51 per cent of the stock of the Locomotive Superheater Company. According to Mr. Hines' statement, this stock originally belonged to German interests. The alien property custodian suggested that the interests of this government could be best protected through some governmental agency acquiring the stock. The purchase by the Railroad Administration will prevent effectively the passing of the stock back to German control.

At the annual meeting of the Locomotive Superheater Company, held at the office of the company, 30 Church street, New York City, the following directors were elected: J. S. Coffin (chairman), S. G. Allen, George L. Bourne, H. B. Spencer, Sanford H. E. Freund, J. N. Wallace, F. W. Scott, T. C. Powell and Henry Morgenthau. Five of these, Messrs. Spencer, Freund, Wallace, Scott and Powell, are representatives of the Railroad Administration.

It was announced that as the affairs of the company have been satisfactorily managed by its officers, no change was made in the management. George L. Bourne, R. M. Osterman, F. A. Schaff, and S. G. Allen were re-elected, respectively, president, vice-presidents and secretary; Henry Morgenthau was elected treasurer, and T. C. Powell, director of the Division of Capital Expenditures of the Railroad Administration, was elected an additional vice-president.

The hearing on regulations for the transportation of explosives and other dangerous articles by freight and express, assigned for February 24, has been reassigned for hearing March 25, at Washington.

Financial and Construction

Railway Financial News

DENVER & RIO GRANDE.—See item in General News about Denver & Rio Grande operating expenses.

HOCKING VALLEY.—This company has sold $7,500,000 five year 6 per cent notes to Kuhn, Loeb & Co. The notes will be offered at 98¼ and the proceeds will be used to meet $5,000,000 6 per cent notes which matured February 1 and were extended for a month.

LEHIGH & NEW ENGLAND.—See item about operating revenues in General News.

MICHIGAN CENTRAL.—See item on net operating income for 11 months in General News.

NEW YORK, NEW HAVEN & HARTFORD.—An application for the appointment of a limited receiver to prosecute suits against certain of the former directors of this company was made to Judge John C. Knox in the United States District Court in New York City on February 13 by a stockholder's committee (Harold Norris, secretary), representing 1,738 shareholders holding 51,959 shares of stock.

Railway Construction

CHICAGO UNION STATION COMPANY.—The John Griffiths & Son Company, Chicago, has been awarded a contract for the construction of the foundation of the head house of the new Chicago Union station. Approximately 100 men began work on that part of the project on February 17. The contract for the construction of the Harrison street viaduct substructure has been awarded to the W. J. Newman Company and work is to be started immediately. The American Bridge Company, New York, which was awarded a contract some time ago for work in connection with the Polk street and Taylor street viaducts, is now fabricating the steel to be used in their construction. It is estimated that the project will soon afford employment for more than 5,000 men, and the applications of discharged soldiers for work are to be given preference.

ILLINOIS CENTRAL.—This road has awarded a contract to the Railroad Water and Coal Handling Company of Chicago for the construction of a complete pumping installation at Bois, Ill. The pump house will be of brick and concrete and the pumping equipment will consist of duplicate installations of 30-hp. oil engines with centrifugal pumps.

QUEBEC & UNGAVA.—A bill has been introduced in the Quebec legislature to authorize this company to build a railway from a point near Seven Islands on the north shore of the St. Lawrence river, Saguenay county, Quebec, north to a point at or near Lake Menihek, thence west or northwest to a harbor between the mouth of Big river and Nastapoka sound on Hudson Bay; also to build branch lines. The provisional directors include W. Perceval, E. S. Holmwood and H. C. Thomson, all of London, England. The head office of the company will be in Quebec.

ST. FELICIEN & UNGAVA.—A bill has been introduced in the Quebec legislature to incorporate this company. The plans call for building a railway from St. Felicien, Lake St. John county, Quebec, north to a point on Lake Mistassini, thence in a northeasterly direction via Lake Nichikun to Lake Petitsikapau, or from St. Felicien direct to Lake Nichikun, thence to Lake Petitsikapau; also to build branch lines. The provisional directors include H. C. Thomson, London, England, and J. T. Ross, Quebec. The head office of the company will be in Quebec.

Pullman employees, taking a straw vote, have decided that government management of the railways is a good thing. Note—The government has increased their salaries three times.—*Los Angeles Times.*

Railway Officers

Railroad Administration

Central

Sanford H. E. Freund, formerly assistant general counsel of the Great Northern, has been appointed assistant general counsel of the Railroad Administration, with office at Washington, D. C.

Operating

D. M. Driscoll, trainmaster of the Northern Pacific, with office at Duluth, Minn., has been appointed assistant superintendent of the Lake Superior division, with headquarters at Duluth.

C. B. Dugan, assistant superintendent of dining car service, has been promoted to superintendent of dining car service of the Illinois Central, the Yazoo & Mississippi Valley, and the Chicago, Memphis & Gulf, with headquarters at Chicago, succeeding **W. C. Francis,** deceased.

Financial, Legal and Accounting

W. W. Dowell, cashier of the Atlantic Coast Line, with office at Savannah, Ga., has been appointed paymaster, with office at Wilmington, N. C.

J. H. Conley, auditor of the Georgia & Florida and the Augusta Southern, with office at Augusta, Ga., has been appointed federal auditor; **W. Blanchard,** treasurer, has been appointed acting federal treasurer, and **Barrett & Hull,** general counsel, have been appointed general solicitors; all with headquarters at Augusta, Ga.

Traffic

W. F. Griffiths, assistant general passenger agent of the Delaware, Lackawanna & Western, has been appointed general passenger agent, with headquarters at New York.

Purchasing

G. E. Scott, purchasing agent of the Missouri, Kansas & Texas, and the St. Louis-San Francisco, has been appointed a member of the southwestern regional purchasing committee, with headquarters at St. Louis, Mo., to succeed **J. L. Cowan.**

Engineering and Rolling Stock

J. W. Peck, signal inspector on the Chicago Great Western, at Chicago, has been promoted to assistant signal engineer, with headquarters at the same point, and **W. J. Mullins,** recently discharged from the army, has returned to his former position as general signal inspector of the same road.

James M. Kinkead, who has been appointed division engineer of the Trenton division of the Pennsylvania Railroad, with office at Trenton, N. J., as has already been announced in these columns, was born in Altoona, Pa., and was educated at Lafayette College, graduating with the class of 1895. After graduation he entered the maintenance of way department of the Pennsylvania and has since been constantly in its employ. He served successively as chainman, rodman, transitman, assistant supervisor and then as supervisor at York, Pa.; Parkton, Md.; Baltimore; Huntingdon, Pa., and Altoona. His appointment as division engineer became effective on February 1.

Axel S. Vogt, mechanical engineer of the Pennsylvania Railroad, Eastern lines, with office at Altoona, Pa., on February 1, retired under the pension rules of the road. He was born on January 19, 1849, at Christianstad, Sweden, and was educated in the public schools. He began railway work in June, 1874, with the Pennsylvania Railroad, and remained in that position until 1882, when he went with Schutte & Goehring, Philadelphia, Pa. In November, 1883, he returned to the service of the Pennsylvania Railroad as assistant engineer of tests. On September 1, 1886, he was appointed assistant engineer, and since March, 1887, served

as mechanical engineer, until his retirement under the pension rules of the road as above noted.

William Frederic Keisel, Jr., assistant mechanical engineer of the Pennsylvania Railroad, Eastern lines, has been appointed acting mechanical engineer, with office at Altoona, Pa., succeeding A. S. Vogt, who has retired under the pension rules of the road. Mr. Keisel was born on September 1, 1866, at Scranton, Pa., and was educated in Lehigh Preparatory School; and in 1887 graduated from Lehigh University with the degree of mechanical engineer. He entered the service of the Pennsylvania Railroad as a draughtsman, in the office of the mechanical engineer, in April, 1888, and was promoted to chief draughtsman in March, 1899. On July 1, 1900, he was appointed assistant engineer, and in September, 1902, he became assistant mechanical engineer, in which capacity he also had charge of the test department at Altoona, until the separation of the two departments. Mr. Keisel's appointment as acting mechanical engineer of the Pennsylvania Railroad, Eastern lines, became effective on February 1.



W. F. Keisel, Jr.

Corporate

Operating

D. C. Smith, general manager for the receivers of the Georgia Coast & Piedmont, with office at Brunswick, Ga., has been appointed also general manager of the Savannah & Statesboro Railroad, succeeding **S. T. Grimshaw,** resigned to go with the Seaboard Air Line.

Engineering and Rolling Stock

Albert H. Eager, assistant superintendent of rolling stock, Canadian Northern, western lines, with headquarters at Winnipeg, Man., has been appointed mechanical superintendent of the Canadian National, with office at Winnipeg. Mr. Eager was born at Waterloo, Que., in 1868, and entered railway service as a machinist apprentice with the Canadian Pacific at Farnham, Que., in 1885. He remained with the Canadian Pacific until 1910, being successively machinist, locomotive foreman, general foreman at Cranbrook, B. C., and at Calgary, Alta., district master mechanic at Kenora, Ont., and again locomotive foreman at Calgary. In 1910 he went to the Canadian Northern as superintendent of shops at Winnipeg, and in 1915 became assistant superintendent of rolling stock of the Canadian Northern, western lines at Winnipeg, which position he held until his appointment as mechanical superintendent of the Canadian National.

Alan T. Fraser, district engineer on the western district of the Canadian Northern, has been appointed chief engineer of the Canadian National, western lines, with headquarters at Winnipeg, Man. Mr. Fraser was born at Pembroke, Ont., in 1872. He was educated in the public and high schools of Pembroke and graduated from the School of Practical Science at Toronto, Ont., in 1892. He immediately entered the employ of the Gatineau Valley, at Wakefield, Que. From 1893 to 1895 he was successively chainman, rodman and leveller for the Canadian Pacific and the Lake Timiskaming, at Mattawa, Ont. Subsequently he was timekeeper on the Ottawa-Montreal Short Line at Vankleek Hill, Ont., transitman and resident engineer of the Crows Nest Pass at Fort McLeod, assistant engineer on the Pipestone extension of the Canadian Pacific, resident engineer of the Ontario & Rainy river at Fort Arthur, Ont., locating and division engineer on the Canadian Northern, with headquarters at Winnipeg, and assistant district engineer of the National Transcontinental at Ottawa, Ont. In 1905, Mr. Fraser entered the employ of the McDonald & McMillan Company, which held a Grand Trunk Pacific contract for work from Portage La Prairie to the Touchwood Hills. The following four years he spent in mining and prospecting in Northern Ontario. In 1910 he returned to the Canadian Northern as locating and division engineer at Edmonton, Alta., and in 1911 he was appointed district engineer at Edmonton, in charge of the location and construction of the main line and branches in Alberta. In 1915 he was promoted to district engineer of the Western district of the same road, which position he held until his appointment as chief engineer.

Purchasing

A. E. Cox, general storekeeper of the Canadian Northern, western lines, has been appointed general storekeeper of the Canadian National, western lines, with headquarters at Winnipeg, Man.

Obituary

W. C. Francis, who was for seven years assistant superintendent of dining car service on the Illinois Central, at Chicago, died in the Illinois Central hospital, at Chicago, on February 9, at the age of 65 years.

Bruce W. Duer, traffic expert for the Public Service Commission of Maryland, at Baltimore, died, on February 15, of pneumonia. He was born on February 17, 1867, at Princess Anne, Md., and was educated at Princess Anne Academy. He began railway work in 1884, with the New York, Philadelphia & Norfolk, serving consecutively as agent, operator and despatcher. In 1888, he went to the Baltimore & Ohio as agent and operator, and was steadily promoted until he became superintendent at Pittsburgh, Pa. In February, 1913, he was elected vice-president of the Georgia & Florida, and later became traffic specialist of the Public Service Commission at Baltimore.

Feminine Curiosity.—A young lady operator working at the summit of Blue Mountain reported a train out at 5 p. m. and then asked: "What did the conductor mean when he said he was going to steal twenty minutes?" The despatcher then ascertained the exact time the train did leave [5:20]. This train went down the hill about eight miles, where it was derailed on account of making excessive speed. Well, they did not find out at the investigation until the conductor and his entire crew had nearly slipped out of the responsibility, when the despatcher remembered the conversation with the operator. Comparing the time the accident happened with the time the train left the last station it was plainly shown that the cause was excessive speed. That's the reason we require all operators to tell the despatcher all conversations and anything that happens at their respective stations. —*J. A. Shockey, S. P., before Pacific Railway Club.*

Absolute Confidence.—The train and engine crews receiving a train order written on tissue paper from an operator, have absolute confidence in what that train order tells them. If they didn't have, the system would break down. If you received a messenger boy with a note to go down and jump off Pier 13 into the bay, would you do it? I don't think you would; but train and engine men, receiving train orders, in effect do that very thing. They ramble through the night at any speed you might wish them to make, pick up a train order by hoop in the crook of the arm, then read it before they get to the switch past which they must not go until it has been read. They know the operator has gone through certain requirements and rules before the train order can be delivered to them and they trust the life and limbs, not only of themselves, but of the passengers in their charge.—*J. A. Shockey, Southern Pacific Train Despatcher.*

EDITORIAL

Railway Age

The Value of the Standard Statistics

Those who attended the meeting of the New York Railroad Club last Friday evening and who had any doubts in their minds as to the practical value of the standard operating statistics, must have left the meeting with these doubts pretty well cleared away. Professor William J. Cunningham, manager of the Operating Statistics Section of the Railroad Administration, told of the purposes of these statistics and of their advantages; in addition, he outlined the more salient features of the different forms. During the discussion reasons were advanced as to why the standardized statistics were of importance and value from the operating and engineering departments' viewpoints. The new forms were severely criticised by two of the speakers, but Professor Cunningham met their objections so fully at the close of the discussion that the meeting gave him quite an ovation. While he emphasized the value of the standard operating statistics for the purposes of administrative control, he showed clearly their great importance in securing improved results when properly used by the local officers. While they in no way interfere with initiative on the part of these officials, they furnish, with more or less promptness, an accurate measuring stick with which to gage their efforts. That the forms were not developed on a theoretical basis, but are eminently practical is indicated by the fact that similar data have been used to a greater or less extent on a number of roads with excellent results. Because they are based upon sound fundamental principles and are logically arranged, they make possible an intelligent and thorough analysis of operating conditions, thus helping to locate and eliminate lost motion and friction, and to develop the most economical and efficient methods. Not a few operating officers have been startled when the facts concerning the performance of the equipment and of operation were clearly and accurately placed before them. Another advantage of these statistics is that they make possible the setting of a definite goal toward which the men may be encouraged to aspire and which intelligent efforts on their part will make it possible to achieve.

Report On South Byron Collision

The New York State report on the South Byron collision, noticed elsewhere, is a thorough and complete document. It is very long, but the author found, no doubt, that completeness and brevity could not be combined. This report should be specially useful to railroad directors, state commissioners and other persons in responsible positions who are inclined to evade the duty of reading a report like this because of their unfamiliarity with the details of signalling and train running. One reason why this country has so large a train-accident death list is the division of the responsibility for the safety of trains among such a large number of individuals—from railroad directors and congressmen down to repairmen and track-walkers—and a report intelligible to all classes has a distinctive usefulness. The outstanding feature of this report is the discussion of automatic train stops and audible signals. South Byron was a notable example of the class of collisions in which these expedients constitute the only "indicated" remedy, and the situation is here fearlessly and trenchantly analyzed. It could not be dealt with exhaustively, of course; that would require a treatise; but Mr. Vanneman has set forth the principal issues very clearly, and any state or federal or railroad officer who has felt that he was in the dark on this subject can here find light for his path. Discussing the question of the cost of providing a safeguard to supplement our best visual signals, Mr. Vanneman states the obvious fact that during the past few years even our richest railroads—most of them—would have found it difficult or impossible to get the necessary money; which reminds us that the government has a very definite responsibility for the safety of passengers' lives, for it is the government that has limited the railroads' income. A railroad president who would spend a half million dollars for automatic stops has before him the very definite question, How many years shall I have to wait for an unwilling Congress or commission to permit me to recoup this expenditure?

Change in Dining Car Service

After a fairly thorough trial of the table d'hote dining car service by the Railroad Administration, it has been decided to discontinue it except where there are special and important reasons for not so doing. In many respects this action is to be regretted, although the administration is doubtless forced to take it because of the numerous complaints which it has received. One of the principal advantages of the table d'hote system is that it makes it possible to serve the meals quickly, with a fairly good variety of food, and at considerably less expense than under the a la carte system. The very fact that the service is quicker has been criticised by those making long journeys, who feel that the slower service under the a la carte system is a distinct advantage in helping to break the monotony of the trip. On the other hand, the quicker service is a very distinct advantage when the trains are crowded and it is advisable to serve the diners as quickly as possible in order not to force some of them to wait an unreasonable time. A student of psychology claims that the greatest objection to the table d'hote system is the fact that Americans as a class insist upon receiving individual attention and do not like to be forced to do anything. He suggests that if a choice could be given of the table d'hote and the a la carte systems at the same time, very few people would order a la carte. The most serious objections to the table d'hote system were made by mothers traveling with small children. It is rather pitiable to watch a small child served with a regular course, a large part of which may not be suited to its needs or tastes. While the dining car conductor is given a certain latitude in cases of this kind, he is told to stick as closely as possible to the table d'hote meal and not to allow any variations unless, in his judgment, it is really necessary. The result has been that most of them have made no allowance for the children. Several dining car conductors who were interviewed, admitted that the table d'hote system made it possible to serve the people more quickly and more satisfactorily and at less cost than the a la carte system, but that they would be greatly relieved to go back to the a la carte system, because it would relieve them of many arguments which were not at all pleas-

ing. While some of those travelers who do not care how much they spend for their meals may be glad to welcome back the a la carte system, those who enjoy a well-balanced meal at a reasonable price will greatly miss the table d'hote meals.

The Situation Becoming Desperate

THE FOREST PRODUCTS SECTION of the United States Railroad Administration has done highly constructive work in preparing and putting into effect standard specifications for cross ties and for their treatment, and other measures tending to improve the quality of the ties used by the railways. These measures should be retained permanently, regardless of the form of railway control ultimately adopted. However, the primary function of this department is the securing of an adequate supply of ties and timbers to meet the requirements of the roads. This it is failing to do. The production of ties has fallen to such an extent during the year since the Forest Products Section has been in existence that maintenance men, particularly in the east, are becoming genuinely alarmed over the outlook.

A falling off in tie production last year would not have been surprising, owing to the shortage of labor and the unsettled conditions in all industries. But the manufacture of ties was even more seriously interfered with by the promulgation of several "reforms" by the Forest Products Section, designed to eliminate certain practices of long standing in the industry. Principal among these was the order eliminating the tie contractor, which destroyed the organization through which a large part of the ties had been secured in the past without building up any other organization to replace it. While we hold no brief for the tie contractors and do not overlook certain abuses which had grown up within their organizations, we do question the advisability of introducing such radical changes at a time when so many other conditions were tending to restrict the output.

As a result of these conditions the production of ties last year was not much over half that of normal years. Drastic as such a curtailment in supply was, the full effects were not evidenced on many roads which entered the season with their usually large stocks on hand. These have since been used and in large part have not been replaced. As a result the roads, particularly in the Eastern and Allegheny regions, now have few ties on hand at the opening of their season of tie renewals when they should normally have their largest supplies.

At a meeting of representatives of the railroads in the Allegheny region a few days ago, it was ascertained that the roads in that region, one of the smallest of the seven, were 11,000,000 ties short. Conditions in the Eastern region are even worse, while the roads in almost all parts of the country have less than their normal supplies on hand.

Ties are a primary necessity for track maintenance. Their deterioration is continuous. Their replacement should therefore be uniform. Railway men are familiar with these facts. Facing this shortage, they are resorting to measures which in many instances are worse than those which it is aimed to correct. Rumors are frequent of the lax inspection and incorrect grading of ties produced along the lines of the purchasing roads. The acute shortage is also leading to greatly increased prices. Only a few days ago the purchasing agent of an eastern road accepted without hesitation the offer of a shipment of Douglas Fir ties from the Pacific Coast (one of the few regions now producing a normal supply) at a cost of over $1.80 each, delivered at New York. Roads which have used treated ties in large measure or exclusively are now using untreated ties because of their inability to hold the ties out of track long enough to season and treat them properly. The effects these measures will have on maintenance costs in future years is evident.

Important as are the improvements which the Forest Products Section is endeavoring to make, it is even more essential that the roads be provided with the ties necessary for their proper and safe maintenance. No further time can be lost in the development of theories. Ties are needed and needed at once.

Vast Increases of Expenses Not Due to Advances in Wages

AS THE STATISTICS of the Interstate Commerce Commission and of the Railroad Administration regarding the operating expenses of the railways in 1918 become more complete they grew more startling. The *Railway Age* estimated that when complete statistics were available they would show that the total increase in expenses over 1917 was $1,250,000,000, and that two-thirds of this would be due to advances in wages and one-third to other causes. The final summary of the Interstate Commerce Commission for the year 1918 which has recently come out, and which covers railways operating 234,000 miles of line, shows an increase in operating expenses for these railways of $1,149,000,000. Director General Hines, in testifying before a committee of Congress last week, estimated that the advances in wages which actually had been charged into the accounts for 1918 amounted to $583,550,000. The conclusion must be drawn that the increases in expenses in 1918 attributable to causes other than advances in wages were about $565,000,000, or almost one-half of the total. In view of the "economies" which Mr. McAdoo anticipated would result from unification, and which the advocates of government ownership predicted would result from government operation, it will probably astound the public to learn that the increase of expenses during the year would have greatly exceeded a half billion dollars without any advance of wages at all.

This showing accentuates the uneasiness that must be felt as to the future of railway net earnings. It has been estimated that the advances in wages made under government control have amounted to over $800,000,000 annually, and much discussion in our own columns and elsewhere has been predicated on the understanding that substantially this amount was charged into the accounts for 1918. It also has been understood that further advances of $60,000,000 to $100,000,000 are yet to come. Why the discrepancy between these figures and the one which Mr. Hines gave? It is largely explained by the following note which is given in Mr. Hines' table regarding the estimated advance in wages in 1918: "The statement does not include the effect of increases covered by Supplements 12 and 13 which were promulgated in December, 1918, with regard to which reliable data are not available." Presumably, therefore, the increases covered by Supplements 12 and 13 to telegraph operators and some other classes of employees, some of which are retroactive, are not included in the operating expenses for 1918 as reported by the Interstate Commerce Commission. Therefore, either part of these advances will yet have to be charged back into the 1918 accounts, thereby increasing the operating expenses shown for that year, or charged into the operating expenses for 1919.

In any event, the amount of wages paid in 1919, unless there should be a drastic reduction in the number of employees, will be far larger than the amount included in the operating expenses for 1918, as reported by the Commission. Assuming the same number of employees, if the wage advances made under government control should prove to run

at the rate of $800,000,000 a year, the total wages paid in 1919 would be over $200,000,000 more than in 1918, while if they should prove to run at the rate of $900,000,000 a year, the total wages paid in 1919 would be over $300,000,000 more than in 1918.

This $200,000,000 to $300,000,000 additional wages must be included in operating expenses at a time when the traffic handled and, in consequence, the total earnings made, are declining. To estimate with any confidence what future earnings and expenses will be when both earnings and expenses are being affected by such influences is impracticable. Theoretically, it ought to be possible to effect large economies, but as a practical matter it will be very difficult, especially under government operation. The railways are overmanned in certain departments, and there ought to be a sharp reduction of the number of employees in those departments, accompanied by a marked increase in efficiency of those retained. It is, however, very difficult substantially to reduce forces under government operation, because it is naturally assumed that under government operation there should be a large measure of consistency and uniformity in the methods used on all the railways, and the varying conditions existing on different railways are not adapted to consistent and uniform reductions of employees. Besides, there is a large amount of deferred maintenance, and there ought to be an increase of expenditures for maintenance.

Nobody familiar with railway conditions in general can study the available statistics regarding earnings and expenses without being driven to the conclusion that regardless of the advances in wages government operation has been more expensive than private operation would have been. What is even more pertinent to the present situation is that nobody can study the figures without being driven to the conclusion that with existing rates, prices and wages it will be difficult for either the government or the railway companies to operate the railways and earn a reasonable net operating income in 1919.

These two conclusions once reached, there should be little difficulty, it would seem, in deciding upon the general policy of dealing with the railways which should be adopted. They should be returned to private operation as soon as practicable in order that the country may benefit by the more economical management which the companies will provide. Before they are returned, however, there should be adopted legislation which will protect the companies from financial disaster due to the vast increases of expenses which have occurred under government operation. The public wants the railways returned to private operation. The great difficulty in the way is the enormous increase in expenses for which the government itself is responsible.

We frequently hear it said that if the railways are returned to private operation the government will not give the companies guaranties of net return in any form—that they will have to take their chances with the regulating commissions and the courts. But why should the companies be told they must take their chances with increased expenses the government itself has piled up? The railway companies took their "chances" with the regulating commissions and the courts before the war with the result that the expansion of railroad facilities almost stopped. If the railways should be turned back to their owners, and existing rates should prove insufficient, the result might be the bankruptcy of many companies and a financial panic before the regulating bodies, even though disposed to do so, could make readjustments of rates which might prove to be necessary. It would be the public as much as the companies that would be taking "chances," and very dangerous chances, if a policy which did not recognize actual conditions should be adopted.

The railways should be returned soon to private operation because under private operation they will be run more economically and give the public more satisfactory service, provided they are fairly treated. They should be protected from financial disaster either by specific government guaranties of net income or by legislation such as that proposed in the Warfield plan requiring the regulating bodies to so fix rates as to yield an adequate return, because if this is not done they may and probably will be unable to accomplish for the public the results which the public wishes accomplished, and failure to accomplish which will hurt the public as much as it will the companies.

Government Operation An Unauthorized Experiment

G. M. FREER, president of the National Industrial Traffic League, gave a pointed answer to some of the arguments advanced by Mr. McAdoo and Mr. Hines in favor of another five years of government operation of the railroads when he urged the Senate committee not to heed the suggestion that government operation has not had a fair test. He made the point that the people have never authorized any test of government operation, and further, that they never would have consented to such a test as has been made of it had it not been for the war emergency. He expressed the opinion that the Railroad Administration might, if given further opportunity, show an improvement over the results of its first year, but declared that the whole system is wrong and should be abandoned as soon as practicable.

The primary purpose for which the railroads were taken over has been accomplished and in a fairly successful manner, considering the matter entirely from the standpoint of meeting the war emergency. In doing so, however, the Railroad Administration has made itself more unpopular than the railroads have been for a long time, and the former director general and the new director general who has assumed the accumulated load, naturally would like to have an opportunity to vindicate the policies that have been followed. Mr. Hines has sought to explain the flow of criticism that has been unloosed since the signing of the armistice removed some of the restraints upon free speech, by attributing it to the natural reaction from the restrictions and inconveniences experienced during the war. It might be more correct to attribute these criticisms to the fact that Mr. McAdoo persisted in ignoring the emergency character of the autocratic powers conferred upon him and in taking advantage of them to conduct an unauthorized experiment in railroad unification and standardization in the midst of a great war.

He seemed to regard not merely government *control,* but government *operation* as a desirable thing in itself, not as a necessary evil forced upon the country by the short-sightedness of its former policies of regulation. The railroads had been shackled and throttled until they could no longer function properly under the difficult conditions confronting them, which, as Mr. Willard has pointed out, were not all matters of railroad operation, and the government, having got them into such a situation, had to step in and assume the burden of responsibility. If Mr. McAdoo had been content to confine himself to the object for which he was placed in charge of the railroads—or the officially stated object—he might now be receiving congratulations upon his success, in spite of any inconvenience to the public or increased expense, instead of being put in a position to demand five more years in which to allow his policies an opportunity to make good.

But the task of conducting transportation to win the war was not big enough for him. He must also conduct an experiment, which he was so confident would be successful, that

while adding some $1,200,000,000 to the operating expenses in a year he kept bragging about the "enormous economies" he was effecting by unified operation. These economies, so far as the regional directors have been able to calculate them in dollars and cents, have amounted to about $91,000,000. Many of them cannot be continued under normal conditions, and they also include such items as the saving of $4,000,000 or $5,000,000 in officers' salaries by charging them to the corporations or to the revolving fund while the expenses of the central and regional organization built up by Mr. McAdoo have been $3,528,946 for a year, and for several months have been running at the rate of $6,000,000 for the year.

If Mr. McAdoo had not laid such great emphasis on the comparatively trivial economies that were being effected, or if they had been regarded merely as a slight offset to the war time cost of railroad operation, the increase in expenses might now attract less attention.

By airily ignoring the mounting expenses, and by referring to the rate increase as a war emergency measure to be followed later by reductions, while promising to maintain the high wages that chiefly made the increase necessary, Mr. McAdoo succeeded for a time—a time during which the slightest criticism of the government was regarded as pro-German—in creating a popular impression that he was "showing up" the former railroad managements. Neither he nor Mr. Hines should resent the criticisms that are now being made as the results for the year become known, or regard them as representing a lack of appreciation of the creditable things that the Railroad Administration has done; they should attribute them mainly to the wide discrepancy between the results which actually have been secured and the results which it was predicted the unauthorized "test" would produce.

From an operating point of view, the principal purpose for which government control was adopted was to enable the railways to handle a large amount of essential traffic during the war, and to handle it better. Mr. McAdoo deserves full credit for having placed in direct charge of operation railway men whose experience and ability were beyond question. It would have been difficult, on the whole, to have made better selections for the operating positions at headquarters in Washington, for regional directors, for district managers and for federal managers, than he made. Furthermore, it would be impossible to express too strongly the appreciation that the nation should feel and show for the loyalty, energy and ability with which the railway men who took important positions in the Railroad Administration did their work. They did not create the organization; Mr. McAdoo created it; but they did their best to make it a success; and in spite of its inherent faults the railway men did make it work well enough to move the traffic.

Unfortunately, the system adopted by Mr. McAdoo was obviously designed far more to conduct an experiment to prove the correctness of his theory of "unified government operation" than merely to meet the war emergency. The result was the development of an over-centralized departmental organization, under which, even with the ablest personnel, the railways could not be operated efficiently and economically, and which, with a less able personnel would have been absolutely ruinous.

The nation has good reason to thank railway officers trained under private management for having prevented Mr. McAdoo's "experiment" from causing all the calamitous results it might have produced; and at the same time it has good reason for condemning him for having undertaken, in the midst of a great national emergency, an experiment which has had many very bad results in spite of all the antidotes the able and experienced railway men in his organization have been able to administer.

Efficiency in Telegraph Service

IS A SAVING of several thousand dollars a year by a properly censored telegraph service worth consideration? In the handling of railroad business, three methods of communication may be said to exist, viz., the telegraph, the traingram and the railroad mail service. The telegraph is used for quick action; the traingram for important matters on which a delay of a few hours will not be serious, and the mail service is used for routine correspondence.

Unless a railroad has a properly supervised telegraph service the wires become congested with messages which should properly have been carried by train. As a consequence, the most efficient use cannot be made of the railroad wires and there is a corresponding decrease in the efficiency of the system, as delays are experienced in the transmission of important messages, while the increased number of messages requires a large force of operators.

The traingram service (some form of which is in use on most railroads) should be effective in order to retain the confidence of officers and employees. But it is often remarked that business may as well be handled by ordinary correspondence as by traingrams because little more attention is given to the proper handling of such letters than to ordinary mail. Consequently, it is felt that more consideration will be given to a telegram; and as handing a message to the operator is the easiest way to handle the matter, a message is sent. Another reason for the reduced efficiency of traingram service is the fact that the traingram envelopes are allowed to be used by every employe, and when traingrams are employed little or no check is obtained on the sending or receipt; therefore, they are too often considered as of little importance, and the recipient is liable to be slow in acting on the contents. Rather than permit these conditions to exist this service might better be eliminated. However, a proper censoring of messages and supervision of traingram service can readily correct these conditions, allowing a more efficient use of both classes of service, with a saving in the number of employees needed.

Elsewhere in this issue there appears an article outlining the methods employed in handling this class of service on one railroad. The methods used there give to each class of service the importance it deserves, with the result that an estimated saving of approximately $10,000 a year is accomplished, in addition to greatly increased efficiency in operation. The methods employed are worth careful consideration by other roads having this class of service in use.

New Books

Lining and Loading Cars of Potatoes for Protection From Cold. By H. S. Bird, investigator, and A. M. Grimes, scientific assistant, 26 pages, 22 illustrations, 6 in. x 9 in. Published by the United States Department of Agriculture, Bureau of Markets, Washington, D. C., Markets Document 17.

Approximately 75 per cent of all cars prepared to protect potato shipments from cold during the winter months are either lined or loaded incorrectly. Protection from cold depends largely upon a constant current of warm air from the heater directly to the ceiling, spreading between the ceiling and the top potatoes, thence through openings at the opposite end of the load down to the space beneath the false floor and from there under the false floor back to the heater again.

The pamphlet explains methods of lining and loading potatoes in the four principal types of cars with heaters, and refrigerator cars without heaters under favorable shipping conditions.

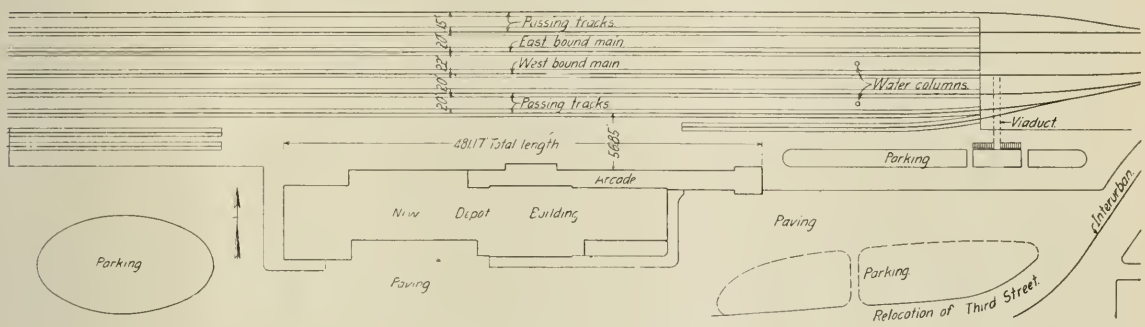
A New Station for the Santa Fe at San Bernardino

Handsome Structure Affords Accommodations for Passengers, Railway Eating House and Division Officers

The Atchison, Topeka & Santa Fe Coast Lines have recently completed a new passenger station, eating house and division headquarters building of unusual design at San Bernardino, Cal. In accordance with the Santa Fe's policy to erect stations typifying the spirit of the locality, the new San Bernardino structure has been built in the mission style, which is so expressive of the Southwest. The project had its inception with the destruction of the old station building at that place by fire in November, 1916, and involved a change in the arrangement of facilities, including a new site for the passenger station, and the movement of the local freight station to another location. These changes, including the preparation of the site, occupied about two years and involved a total expenditure of about $850,000.

The construction of a building adequate for present and estimated future needs necessitated this change in site, and the only available location that seemed to meet the situation was one on the other side of Third street bordering the railroad right-of-way. In order to make this site available it was necessary to secure the vacation of this street for a distance of 1,875 ft., a change which was permitted by the city upon the purchase of sufficient property to permit of a relocation of the street south of the new station site. The freight house has also been moved to this new property on a location west of the passenger station.

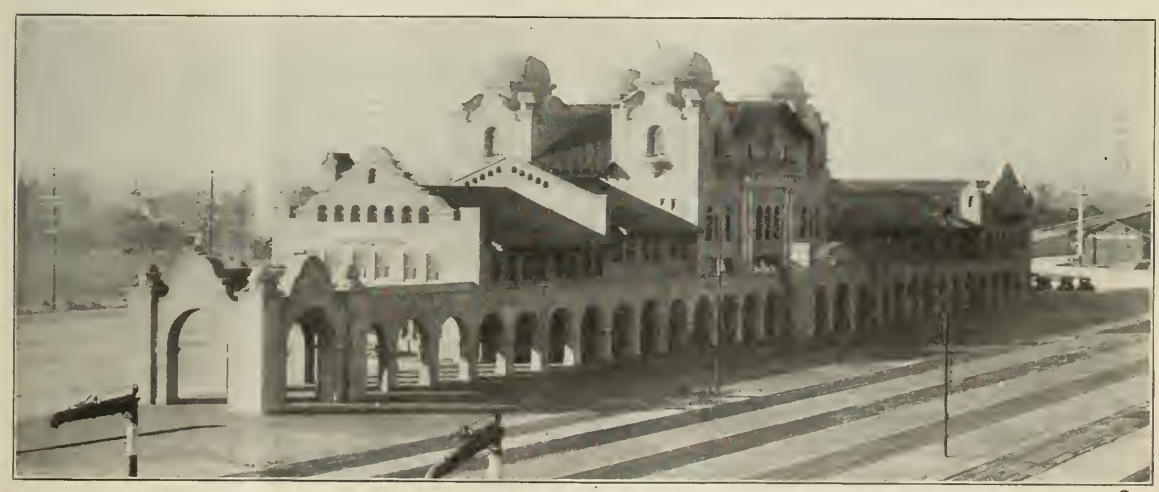
As shown in the photographs, the building presents an unusually pleasing appearance. The predominating feature in the design is a group of four flat domes surmounting the central portion of the structure. These domes receive minor



Layout of the Station Grounds

repetition on the west wing of the building and also on a shelter structure at the east end. In place of a canopy or train shed, the track side of the structure is embellished by a covered arcade consisting of a succession of semi-circular arches extending each way from the track entrance to the waiting room. The roofs are of red terra-cotta tile.

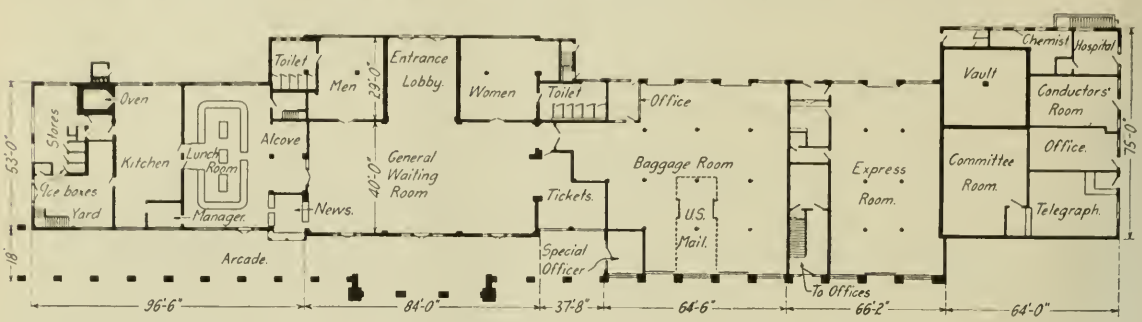
Passing into the station from the track side the passenger enters the main waiting room, 80 ft. long, 40 ft. wide and 22 ft. high. Directly opposite this entrance is a 24-ft. corridor leading to the street door, while on either side of this corridor are separate accommodations for men and women. The walls of the waiting room and the entrance lobby are paneled in art tile wainscot to a height of 9 ft.



The Station from the Track Side, Eating House End

The floors are of quarry tile, while the ceilings are laid off in heavy beamed panel work. Special convenience in handling the business of the passenger is afforded by the position of the ticket office at the west end of the waiting room, adjacent to the baggage room, so that it was possible to place the baggage counter immediately adjacent to the ticket counter. The passengers are served at the latter without any grill or top enclosure.

At the end of the waiting room opposite the ticket office a double door leads to the lunch room which occupies a space 30 ft. by 53 ft., with an additional entrance direct from the arcade. This room has an interior finish similar to that of the general waiting room, while the lunch counter has a tile front with a white glass top. An alcove adjoining this lunch room provides space for dining tables. A news stand occupies space between the waiting room and the lunch room adjacent to the track side of the building. Beyond the lunch room a space 30 ft. by 53 ft. is devoted to the workrooms of the restaurant, including kitchen, manager's office, kitchen yard, storeroom and bake oven. The entire space above the first floor of this wing of the building is used as living quarters for the employees of the eating house.



First Floor Plan of the Station Building

Ample space is provided in the building for the division railway offices. With the exception of the eating house wing, the entire second floor is equipped for office use, while additional office space is provided on the first floor of the west wing for a committee room, storage vaults, telegraph office, conductors' and brakemen's room, two additional office spaces, an emergency hospital and a toilet room for baggage and express employees.

The building is of permanent construction, being largely of reinforced concrete, although a structural steel frame is used under the central portion to support the four domes. Originally a large part of the site was the bed of what was known as Lytle creek, which later had been diverted into another channel. To bring the site to grade required 75,000 cu. yd. of earth filling. It also introduced a complication in the building of the central part of the structure and entailed the extending of the foundations to a depth of 28 ft. below the first floor level. The building is heated by a vacuum steam-heating system.

One of the drawings shows the location of the station with respect to the tracks and the new location of Third street. The space between the building and the nearest passing track, 57 ft., has been laid with white paving brick, and between each passenger track five platforms averaging 1,100 ft. long have been laid with paving bricks. The city side of the station has also been laid out with paved driveways and enclosed parking spaces, so that altogether 280,000 sq. ft. of street paving, 17,870 sq. ft. of cement sidewalks and 3,457 lin. ft. of cement curbs were required. The project also entailed the construction of a steel viaduct for vehicle traffic and a viaduct for foot traffic over the tracks.

This structure was designed and built under the direction of W. H. Mohr, architect for the Santa Fe Coast Lines, and under the general supervision of G. W. Harris, at that time chief engineer of the Coast Lines, and now chief engineer of the Atchison, Topeka & Santa Fe corporation.



View of the Building from the Street, Office Wing in the Foreground

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Return of telephone and telegraph properties to private management by June 30 is recommended in a letter to President Wilson by Charles E. Elmquist, president of the National Association of Railway and Utilities Commissioners, made public last week. "The net results of six months of operation by the Postmaster General of these wire systems," said the letter, "is inferior service and very substantial increases in charges to the public. No military necessity can now be pleaded in support of government control" * * *.

Why Test Should Be Made of Government Operation*

Suggestions Also as to What Additional Features Are Necessary to Give It a Fair Trial

By C. A. Prouty

Director of Public Service, United States Railroad Administration

FOR 22 YEARS I have been associated with the federal regulation of railroads, and never in all that time has the railroad problem been in such utter confusion as today. It is highly desirable and perhaps possible that out of the present uncertainty may come some permanent disposition of this question. To that end it is desirable that all phases of the subject shall be fairly presented and fairly considered.

I have never been an advocate of government ownership or government operation. I have, however, always realized that this was the only possible answer to many of the difficulties surrounding our so-called railroad problem. As I read the papers and observe what is transpiring before Congress, it rather seems to me that there is a disposition upon the part of unthinking persons, fostered with great skill by those interests which profit by private ownership, to eliminate the possibility of government operation. It seems to be assumed that government operation has been tried and failed and that no further consideration need be given to this subject.

A majority of the world's railways outside the United States of America are owned or operated, one or both, by the government. In recent years there has been a continual progress in favor of government operation, and in no well-considered case has any nation ever gone from public to private ownership. England in the past has been unalterably opposed to every suggestion of public ownership, but I am told that, as a result of the war, public sentiment will insist upon the nationalization of railways. I feel that the question is one for serious consideration, and as an insignificant contribution to the discussion I desire to affirm three propositions:

1. Government operation in the United States under war conditions was not a failure, but a success.
2. There has been up to the present time no fair test of government operation under peace conditions.
3. Advantage should be taken of the present situation to make such a test, and the public should suspend its judgment until the result of that test is known.

I.

The government took over our railroads for two purposes. First, to stabilize the financial condition of the railroads. The war produced a most serious and unfortunate effect upon all public utilities. As a rule, the rates of such utilities were fixed and could not be immediately increased. Their operating expenses enormously advanced. The result was to bring upon all financial disaster and to produce in many cases absolute bankruptcy. The three great express companies which were not taken over by the government all operated for the first six months of the year under a heavy deficit. The Adams company lost in that brief period $6,000,000, more than one-half the value of all its operative property.

The railroads alone were taken care of. Their security holders are being paid a sum equal to the largest earnings ever known in the history of these properties. Broadly speaking, interest has been paid upon every security and a dividend declared upon every stock which had been regularly paid for the last three years. The first purpose of government control has been abundantly accomplished, and yet these railroad gentlemen are virtually saying to the country that the government which has protected them from bankruptcy in the hour of their financial stress and is today paying them a most liberal return upon the value of their property is no better than a ravening wolf which is seeking to mutilate and destroy those properties.

The second purpose was of a different character. This government was engaged in a deadly war. It must act speedily. As a part of that action certain transportation by rail was imperatively needed. Food must be taken from the point of production to the port of embarkation with which to feed our starving allies and maintain our own troops. Raw materials must be carried to the munition factory and the completed product transported to the port. Supplies for the erection of cantonments, troops to those cantonments and from those cantonments to the port must be handled. The railroads under private ownership had broken down. They were not rendering and they could not render this service. To obtain that service by rail which must be had, the government was compelled to take over these agencies of transportation.

Now, the government did those things which must be done. I spend no time in detail, but I simply say that the things were done—the food was carried, the munitions were produced, the troops were handled—and all this never could have been done by railroads operated through private ownership. This is a fact which can not be disputed. The second purpose of government operation was therefore accomplished.

II.

You say that the methods of the government were autocratic. Of course they were. War is not a pastime. Every military operation to be effective must be autocratic, and the operation of these railroads for the time being was part of a military scheme. What had to be done under war conditions is no indication of what might be done under peace conditions.

There never has been, up to the present time, any fair test of government control in times of peace. Immediately after the signing of the armistice the director general resigned. With that, the enthusiasm of his administration vanished. The director of operation, next in importance to the director general, also resigned. The director of capital expenditures and the director of inland waterways followed suit. There was a letting go all along the line at the top, and this permeated the whole administration. Under these conditions it is impossible, as every one must know, to maintain morale or discipline or to secure effective operation. You must agree with me, therefore, that up to the present time there has been no fair test of the ability of the government to render a satisfactory and an efficient service in times of peace and that my second proposition is well taken.

*From an address at the annual meeting of the Atlanta Freight Bureau, Atlanta, Ga., January 17, 1919.

III.

This brings me to my third proposition, which is that before the public passes judgment upon this railroad problem there ought to be an actual test of government operation under peace conditions, for the reason that the doubtful questions connected with government operation can only be answered by an actual test. To make this plain, I must say a word as to government operation itself.

And first of all I desire to impress it upon you—and it should never be forgotten in all these discussions—that the thing itself about which we are talking, the rendering of a transportation service by rail, is in essence a function of the government. This has been so declared by the Supreme Court of the United States, and the principle is accepted in all our present-day treatment of the railroads. Why, if this is a government function and if the government finds it necessary in case of private operation to exercise this measure of supervision and control, should not the government discharge that function itself?

It would not be possible today, under present world conditions immediately following the conclusion of the war, to finance the railroads of this country upon a 4 per cent basis; but if the past is to be taken as any guide to the future, if our experiences even of the present are at all convincing, it would be possible for the government in the immediate future to convert the securities of our railroads into a 4 per cent government bond or a 4 per cent railroad bond guaranteed by the government. The net revenue, therefore, which the government requires, and the only revenue which it requires, is a sufficient income to pay 4 per cent upon the value of these properties.

Turn, now, to the private side and listen, as I have listened for many days, to the pleas of these railroad gentlemen for additional revenues. They will assure you that it is not possible to maintain their credit, to provide for the development of their properties, which must be done if the public is adequately served, without a return of substantially 9 per cent; and I am bound to admit that what they say is not without force.

The railroad finances of this country are not in satisfactory shape and they have been continually growing worse in recent years But little money has been raised by the issue of stock. New money has been provided mainly by mortgage security. The margin between value and the amount of the mortgage has been continually shrinking. The time has already come when many of our railroad companies can no longer borrow additional funds, and the time will come sooner or later when nearly every company will find itself in that condition. Additional railroad facilities must be provided, and if those facilities are to be furnished by the railroads themselves, they must, in my opinion, either receive direct assistance from the government or be granted the right to impose rates which will yield an income beyond a fair return upon the value of their property and beyond what they have been receiving in the past.

If it be assumed that 9 per cent is the correct figure, you have the difference between 4 per cent, which the government must pay, and 9 per cent, which must be paid to the private owner, or 5 per cent. The value of our railroads upon the basis of pre-war prices is somewhere between $15,000,000,000 and $20,000,000,000. Five per cent means, therefore, between $1,000,000,000 and $750,000,000 annually. The people of this country start out, therefore, by paying the private owners of this property that sum to discharge for them this public function.

I do not say that this may not be best. Upon the contrary it may even be a good investment, but I desire to call your attention clearly to the fact that the government could save upon the face of things annually by operating these properties itself this enormous sum.

It is true that the effect of this might be somewhat ameliorated in various ways as I have myself elsewhere pointed out, but I know of no way which does not involve the handing over to the private owner of many millions each year which the government itself might save.

Another question which must be solved if these railroads are to be passed back to their owners is that presented by the short line—the weak sister. All over this country, but perhaps especially in the Southeast, are railroads from 25 to 150 miles in length which are known ordinarily as short lines. They are independent properties, having no connection with any larger system. They connect with some trunk line, but there is no financial relation between the two.

In the past these lines have managed to eke out a precarious existence, but the recent increases in operating costs which they have shared along with larger systems have brought them to the pass where earnings are no longer sufficient to pay operating expenses. Almost every day there comes to my desk at Washington a suggestion that some one of these lines must go out of business. Its equipment is to be sold, its rails are to be taken up, for the reason that under the highest rates which can be applied revenues will not equal the cost of operation.

These lines are a vital part of the existence of the communities which they serve, and which can not normally exist without them. Some way must be devised by which their operation can be continued. I have always believed myself that the railroads of a given section, and perhaps of the entire country, must be considered as a whole. This little railroad transports the cotton grown along its line for but 50 miles, but that cotton is subsequently transported over other railroads 1,000 miles to the mill where it is consumed The supplies which that mill uses, the cloths which it produces, are all the subject of transportation by rail. The articles which are consumed in the community served by this little railroad, the fertilizer, the boots and shoes, the groceries, everything, are only handled a few miles by that road, but they have all involved before they reach that road a great amount of transportation by rail. Now, it is not possible to shake this short line free from every other railroad in that section or in the country and say that the rates upon it should be sufficient to maintain the property. In essence your short line is a part of the railroad system of this nation and must be taken care of as such. The difficulty may be in a degree mitigated, but the only perfect answer which leaves nothing to be desired is that the government operate these railroads as a whole, applying just and reasonable rates, and that every part of the transportation system of this country shall contribute properly to every other part.

Another matter which must be dealt with is this general question of unified operation. It has just dawned upon this country that competition is wasteful and ought to be restrained. People are beginning to realize that unnecessary trains have been operated, that freight has been carried by circuitous routes and in most extravagant ways without any real benefit to the public, and that for all this foolishness the public has been required to pay. It has become perfectly apparent both by reasoning and by actual demonstration that if the railroad facilities of this country could be used as a whole, if equipment and joint facilities could be employed to the best advantage, if all duplication of effort could be avoided, the same amount of transportation might be accomplished, the same service rendered to the public with a saving of millions of dollars annually. It is generally conceded, therefore, that when these roads go back the law ought in some way or other to permit of the restraint of competition.

While it has always been my own belief that competition between carriers might to some extent be eliminated with-

out injury to the public, it is apparent that this can not be made effective to a high degree unless we are prepared, not only to permit but to compel. This administration has provided in the city of Chicago an ideal joint ticket office. While our joint ticket offices are not in all cases perhaps satisfactory, that Chicago office is complete and meets the approval of every one. I recently asked the traffic representative of one of the large lines using that facility whether it would be continued if government control were to end. His reply was that the stronger lines would probably favor its continuance, but that the weaker lines would be likely to withdraw and establish offices for themselves and that this might lead to a disruption of the whole project. It has usually been the competition of the weak line which has disturbed the situation, and unless some way can be found to check that competition but little will be accomplished.

For my own part, I do not feel that it is at all certain that competition ought to be eliminated. The great objection in my mind to government ownership has always been that competition would be and must be thereby destroyed. I have doubted whether the same service could be rendered without competition which was rendered under the competitive spur. If the government can render a satisfactory service, then a great saving can be made by unified control and the only perfect unification is under the government itself. Can the government and will the government render a satisfactory service?

I have already said to you that up to the present time there has been no trial of government operation under peace conditions. Plainly stated, the first purpose of the Railroad Administration hitherto has been to win the war, not to serve the public. As a result the service has not been satisfactory. The principal complaint of the public is that its wants are not properly respected and its complaints not properly heeded by the railroads. The off-line solicitor has been called in and there is no one to give the information and render the service which he formerly supplied. It is difficult to obtain information of any sort either as to the location of your freight or the movement of trains. Even the abounding time table of the past has largely disappeared and the public is left without means of self-information. These and many other things have created the impression in the minds of the public that the operators of these railroads who ought to be the servants of the public are entirely disregardful of the wishes of the public.

I can not deny that these allegations are true to an extent, but I do most earnestly insist that the conclusion ought not to be drawn that a proper and satisfactory service can not be rendered by the government. That question can only be answered by an actual test. What the conditions of that test ought to be to make a satisfactory one will be considered later; what I desire to emphasize now is that this question, can the government render a service satisfactory to the public, can not be answered except by actual experience. The public should suspend its judgment until the result of an actual test under fair, normal working conditions is known.

Let it be distinctly understood, however, that I am not today advocating government ownership or government operation.

After being with this problem for 22 years, I feel that whether government ownership should be tried in this country of ours can only be determined by actual experiment. In the absence of that experiment, I would myself vote against it, but I do think that advantage should be taken of the present opportunity to make the test.

Today the United States government is in the operation of these railroads. Under the federal-control act two courses were open to the director general. He might leave the operation of the properties largely in the hands of the owners under his control. That plan would not have involved in any proper sense government operation. The railroad official would have continued to direct the operations of his road, acting under the direction of the government and accounting to the government for the result.

Or the director general could affirmatively take over the operation of the properties and appoint his men, responsible to him alone and acting for him alone, to perform that operation. The latter course was adopted. It was, in my opinion, necessary to adopt it. So far as I can see, it would be impossible for the government to more completely take over the operation of these properties than it has done.

Many things necessary to a unified control have been accomplished, often at considerable expense. Joint ticket offices have been established. In some cases freight offices have been consolidated. Methods of unified operation have been put into effect. From my viewpoint most of those which must be done in order to give government operation a fair test have been done.

This being so, what additional is necessary to give government operation a working test?

First, and principally, it is necessary to know the period during which these properties are to be retained by the government. Today it is uncertain whether this period is to be 6 months or 21 months or 5 years, and this uncertainty permeates and paralyzes the whole railroad operating force from top to bottom. The first thing which should be done in any view of the situation is to definitely fix the term of government control.

Mr. McAdoo has stated that five years were needed for this purpose, and I understand that Mr. Hines will take the same position. I do not in anywise desire to set my own opinion up against theirs, but before Mr. McAdoo testified I had already expressed an opinion that three years would be about the proper time. The matter rested in my mind as follows:

It will take six months for the director general to formulate his plans and reorganize his forces. The point of view has entirely changed. In the past we have been operating these railroads to win the war, and public convenience has been largely sacrificed to that end. In the future they are to be operated to serve the public. This change in the point of view requires many operating changes. Trains must be restored, schedules must be revised, rules for the receipt, routing and transportation of freight and passengers must be recast.

One of the most important things, from my viewpoint, is the working out of some co-operative arrangement with the state commissions. Many of my railroad friends have insisted that the state commission should be eliminated, but this opinion I have never shared. Assuming that it would be possible to establish any system of operation or control which ignored the state commission, it would be, in my opinion, most unwise. The local commission has a kind of knowledge and experience which can not be supplied by any federal tribunal and which should be recognized and perpetuated in any solution of this railroad problem. It has been my belief, and still is, that it ought to be possible to work out under government control some plan of co-operation which should demonstrate the possibility of obtaining results from proper collaboration between the federal and the state authorities.

But all this takes time, and I have felt that it would be at least six months before the new director general could be fairly ready for action, before he could formulate his plans, organize his forces, and get his machine into working shape under peace conditions. The ensuing year should show whether the government can render a service with which the people of this country will be satisfied and at a

cost which they can afford to pay. This would bring us to July 1, 1920. By that time Congress would have accumulated and digested the necessary information from which to formulate legislation. If as seems probable today, government operation was not satisfactory, then a plan for private ownership could be worked out; but if by chance the experiment should disappoint the common expectation, government operation might be continued under some proper plan. It will require from a year to a year and a half to get these properties back into the hands of their owners and arrange for the termination of government control.

I also call your attention to the fact that by the first of July, 1920, the valuation work of the Interstate Commerce Commission will have gone far enough so that a definite idea of the general result can be had. No proper disposition of this railroad problem can be effected until we know what these properties are worth.

Orders of the Regional Directors

LOCAL EXCHANGE TRANSPORTATION.—In Order 109, Supplement 12, the Southwestern regional director has issued instructions concerning the issuing of local exchange passes between carriers, the same as those published in the *Railway Age* of January 3 (page 105).

Surgeons Appearing as Witnesses.—In Circular 174, cancelling Circular 131, the Southwestern regional director calls attention to the fact that surgeons for one railroad under federal control are appearing in court as witnesses against other railroads under federal control. Such action is inconsistent. There is no objection, however, in cases where the surgeon has actually attended the injured person and who testifies from his knowledge of facts acquired in his professional capacity. The intention of the order is to forbid a railroad surgeon from appearing as an expert witness in proceedings against another carrier under federal control.

Rejected Scrap Iron Shipments.—In order 164 the Southwestern regional director issues instructions to watch closely and report promptly any cases where shipments of scrap iron are rejected by consignees or where cars containing scrap iron are not promptly unloaded because of the present unsettled market conditions. This will guard against serious delay to cars.

Fire Loss, Capital Expenditures.—In Order 175 (exception to director general's Circular 67) the Southwestern regional director advises federal managers that in cases of fire damage, where a charge to capital account for rebuilding is less than $1,000, the work may be done without obtaining authority from his office or from the director of the Division of Capital Expenditures.

Mechanical Department Circulars of Instructions.—In Order 166 the Southwestern regional director orders the issuance of all circulars to date pertaining to repairs to freight cars. The circulars so far issued which refer particularly to freight equipment are Nos. 1, 4, 7 and 8 of the mechanical department and 7 and 20 (revised) of the Division of Operation. In cases where roads reissue such circulars they must be issued in their entirety, no portions being left out.

Mileage on Pullman Cars Moved Deadhead.—In Circular 176 of the Southwestern regional director, Public Service and Accounting Circular 58, abstract of which was published in the *Railway Age* of January 17 (page 223), is augmented by quoted instructions from C. A. Prouty, Director of Accounting, which states that mileage charge should be made against the Pullman Car Lines for Pullman cars moved deadhead on the request of the Pullman Company, where no return haul was due or intended. This particular feature was not covered by P. S. & A. Circular 58.

Return of Cars to Non-Federal and Canadian Roads.—In Freight Car Distribution Notice 3 the Northwestern regional director directs the return to Canadian roads and roads not under federal control of all freight cars on federal roads on which per diem payments are being made. The home movement of these per diem cars should be under load, if possible, or empty where the movement can be made in the direction of light tonnage and without serious empty mileage.

Senders' Symbols for Telegrams.—In Supplement 1 to Circular 71, the Northwestern regional director states that for the purpose of securing brevity, all telegrams from regularly established offices (not applying in cases of trainmen, officers or agents when traveling, etc.), must bear symbol numbers as prescribed below:

1. Where but one person files telegrams over one signature, messages shall be numbered consecutively commencing with No. 1 (number to be written at end of telegram), on the first day of each calendar month, the number to be prefixed by the letter A.

2. Where more than one person files telegrams over the same signature and separate files are kept, such person will number his telegrams consecutively, commencing with No. 1 (the number to be written at end of telegram), on the first day of each calendar month, prefixing the number by a letter to be assigned him.

In answering a telegram the number of the message being answered shall be quoted at the beginning of the body of the message and no further reference made, the symbol identifying the date and subject matter. The letters E, L, P and T should not be used as prefixes; and I, H, V and X may be used only to avoid duplication.

Posting Notices in Stations.—Supplement 2 to Circular 112 of the Southwestern regional director describes signs advertising the United States employment service (Department of Labor) which are approved for display in station waiting rooms.

Intensive Loading of Fertilizers.—In Supplement 1 to Circular 67 the Northwestern regional director announces that all shippers of fertilizer who are members of the Chemical Alliance, Inc., and all shippers of agricultural lime who are members of the National Lime Association will furnish the railroad agent an extra copy of the bill of lading for each carload of these commodities sent on the seventh, fourteenth, twenty-first and last days of each month. This copy, which is to be forwarded by the local freight agent to the Car Service Section, at Washington, will be used in compiling data for comparative purposes. Statements are to be furnished to each shipper showing the average loading of these commodities, the object being to educate local dealers and farmers to order in maximum carload lots or, when necessary, to club together for this purpose.

Appeals Concerning Out-of-date Wage Questions.—A. H. Smith, regional director, Eastern Region, by a circular of February 21, number 1200-4-90A535, cautions federal managers against too ready acquiescence in appeals to the boards of adjustment concerning questions of pay which were not properly pending under the terms of the agreements between the roads and employees. It appears that many very old cases have been appealed to the various boards—cases which had been officially dead for a long period before the government took control of the railroads.

General Foremen's Association.—The Northwestern regional director, file 61-1-20, advises that employees who are members of this association be allowed to attend the annual convention, which will be held in the fall of 1919, where they can do so without detriment to the service; transportation should be furnished and necessary expenses allowed.

Grain Embargo—Primary Market.—In Supplement 19 to Circular 34 the Northwestern regional director announces that permits are no longer required for shipments of corn and oats to Milwaukee, Wis., when billed from country stations.

Government Standards for Freight Car Repairs

Railroad Administration Requirements Ambiguous— Will Be Costly If Rigidly Enforced

By A Mechanical Engineer

A CLOSE STUDY of the effort to establish "Material Standards for Freight Car Repairs," as outlined in U. S. R. A. Mechanical Department Circular No. 8 cannot but serve to convince the unprejudiced reader that it contains many ambiguities which are difficult of interpretation, that in many cases its observance is impracticable, and in other cases if followed would accomplish the introduction of the specified standards only at an expense totally unwarranted by the actual benefits realized. The introductory clause of this circular reads: "When renewing parts or applying betterments to freight cars owned by railroads under federal control, if suitable material, either new or second-hand, that is standard to the car, is in stock, it shall be used. Where such material is not in stock, material standard to United States standard cars should be used, if available."

Interpreting the above clause in strict accordance with its reading, it would appear that should parts "standard to the car" not be in stock they may not be manufactured or purchased even if readily available by manufacture or purchase, and regardless of all considerations of economy of repairs "material standard to the United States standard cars should be used, if available." Just what does "if available" mean, and to permit the observance of the most elementary principles of economy should not the conclusion of these general instructions have read, "*if readily applicable to the cars to be repaired?*"

Some of the rules set forth appear to be particularly impracticable of application and unwarranted.

Rule No. 3 reads: "Side bearings—If body or truck side bearings require changing or renewing, frictionless type should be used, interchangeable in capacity and dimensions with those used on United States standard cars."

The committee appointed to consider the general subject of freight car repairs doubtless acted in accordance with its best judgment in deciding to extend the use of a device standardized for new cars by adopting it for repairs to cars in service. Nevertheless, it would seem that frictionless side bearings had not received a sufficiently strong majority endorsement by railroad mechanical department heads to warrant anything more than their recommended use in freight car repairs where conditions permit application without radical change in body or truck bolsters. Any one with a knowledge of the varying side bearing conditions obtaining on the multiplicity of freight car designs in service today can appreciate the problem involved in replacing the ordinary rub side bearings with the frictionless type interchangeable in dimensions with those used on United States standard cars. In many cases such replacement could not be effected for lack of space between the bolsters at the point of attachment of the side bearings; in other cases because of the rub side bearings being cast integral with the bolsters.

As to the stipulated "interchangeability in capacity" with frictionless side bearings used on United States standard cars, an investigation will show that frictionless side bearings have not been and are not rated in accordance with capacity, the efforts of each individual designer being all in the direction of the development of devices whose several parts would continue to function properly and which could be maintained in working condition at minimum cost under the maximum side bearing loads obtaining under modern freight cars.

Rule No. 4 reads: "Side truck frames—When necessary to renew side truck frames, cast steel U-shaped section, United States standard car type, with separable journal boxes, to be used."

The superiority of the cast steel side truck frame to the built-up arch bar type in rigidity, ultimate strength and durability no doubt justified its selection for the United States standard cars, but from the standpoint of supply available for quick repairs there are many who will question the propriety of designating the U-shaped section to the exclusion of the several T-shaped section designs that have given satisfactory service.

With respect to the specified exclusive use of the cast steel truck side frame for renewal of side frames in service: The intent and purpose of rule 4 evidently is the gradual elimination of all arch bar side frames and their replacement by the cast steel U-shaped section United States standard car type. A rigid adherence to this rule would obligate all railroads to immediately secure and carry a stock of the standard cast steel frame. Further, the wording of this rule is so indefinite that it seems necessary that supplementary instructions be issued stating the extent of failure which would constitute sufficient cause for renewal; that is, what proportion of the several members of the arch bar side frame should fail to warrant complete replacement with the cast steel side frame in preference to making easy and quick repairs by renewal of one or more of the individual parts.

The very extensively used M. C. B. arch bar side frame, being a built-up structure composed of solid rectangular bars, columns and column bolts, is very seldom subject to failure in its entirety, and as all of its component parts have been M. C. B. standards for many years and as such are carried in stock by all railroads, this type of side frame lends itself to quick and economical repairs.

The quite extensive adoption and use in recent years of cast steel side frames of the pedestal type, requiring a design of journal box differing from the strictly M. C. B. standard type, presents an obstacle to the use of the standard side frame required by rule No. 4 in making renewals that could be overcome only by entire disregard of all consideration of economical repairs. It can be readily seen that in replacing a failed side frame of this pedestal type with the United States standard car type it would necessitate scrapping the journal boxes or assigning them to storeroom stock for a possible future need which might never develop.

If the foregoing criticism is pertinent it would seem that rule No. 4 requires the issuance of supplementary instructions or the exercise of considerable judgment in its observance to avoid unwarranted expense and unnecessary delays in making repairs.

Rule No. 6 reads: "Draft gears—(a) Friction draft gears, either Cardwell, Miner, Murray, Sessions Type "K," Westinghouse, or similar gears, to be of not less than 150,000 pounds capacity with a maximum travel of 2¾ in.

"(b) Spring draft gears, if used, to be at least equal in capacity to two M. C. B. Class "G" springs, interchangeable with friction gear without change in car construction.

"(c) Clearance between coupler horn and striking casting to be .5 in.

"(d) Coupler to be key connected to draft gear."

Clause (b) of rule 6 seemingly permits the use of spring draft gears of a minimum capacity of 60,000 lb., but the qualifying stipulation reading "interchangeable with friction gear without change in car construction" effectually nullifies this seeming concession, as the most casual investigation will show that no known modern arrangement of draft castings suitable for tandem or twin M. C. B. class "G" springs can be designed so as to likewise provide the length and width of the standard pocket required for friction draft gears.

This qualification being present in rule No. 6, the use of friction draft gears becomes obligatory on steel reinforcements (either draft arms or through center construction) applied to wood underframe cars, or in the replacement of spring draft gears on steel cars where suitable draft attachments standard to the car are not in stock.

The difficulties and expense incident to replacing spring draft gears, either tandem or twin, on the many steel cars so equipped, by friction draft gears are too obvious to dwell upon, and if investigated would convince operating officials of the entire impracticability of this clause of rule No. 6 and the enormous expense which would eventually result in its observance.

Metallic draft arms in the past ten years have been found a very satisfactory, adequate and economical means of reinforcing wood underframe cars, but under rule No. 6 such draft arms must now be used in conjunction with friction draft gears. This brings about the concentration of the entire buffing shock on the center line of draft, with a resultant moment of force about the neutral axis of the section of draft arms above the bolster (which is limited by the design of the car) of such magnitude that stresses will be set up in the metal that are in excess of its elastic limit. This condition does not obtain with a 60,000-lb. capacity spring draft gear and a 2-in. coupler horn clearance, because the buffing shock delivered on the center line of draft is limited to the spring capacity, after which, with the coupler horn in contact with the striking plate the eccentricity of shock is very materially reduced. In other words, in using spring draft gears with metallic draft arms and two-inch coupler horn clearance it is possible to keep within the M. C. B. maximum ratio of unit stress to end load of .15, while in many cases it is not possible to meet this requirement with friction draft gears. Are we to eliminate an altogether satisfactory and economical method of reinforcing wood underframe cars which, when used in conjunction with spring draft gears can be designed to meet a very essential M. C. B. requirement, but which in many cases cannot be so designed when combined with a friction draft gear in an underhung draft rigging.

The foregoing is predicated in the case of spring draft gears on a clearance of two inches between the coupler horn and striking casting. Clause (c) specifies a three-inch coupler horn clearance, but when and how this is to be obtained is left to the ingenuity of the railroad making repairs. On many existing designs of underframes its reduction to practice would result in overstressing the center or draft sills between end sill and bolster.

The statement is ventured that in the opinion of many mechanical department heads spring draft gears are entirely satisfactory on any design of adequate steel reinforcement for wood underframe cars and that the greatly increased cost of applying friction draft gears to equipment of limited life and value is not justified.

Rule No. 8 reads: "Doors—Side doors on box or stock cars (except double deck stock cars) will be bottom supported, and the attachments uniform with those on United States standard cars."

While there may be but few railroad men who will question the superiority of the bottom hung side door to the top hung door, it is difficult to understand the viewpoint of the committee on car repairs in making the bottom hung door an absolute requirement for repairs. In many cases this would necessitate extensive alterations at the side plate and side sill, and possibly involve rebuilding the doors themselves at a cost many times greater than that involved in merely replacing all the original door fixtures. In fact, the design of bottom support attachments for many existing designs of freight cars which would at the same time be "uniform with those on United States standard cars" is a problem which will be found impossible of solution. It would seem imperative to waive this rule for cars with side sill construction which does not readily lend itself to the application of the bottom track with its supporting brackets.

Rule No. 9 reads: "Ends—Box cars with weak constructed ends requiring two-thirds of end to be renewed should be reconstructed as follows:

"(a) Horizontal corrugated steel ends (two or three-piece) having top section three-sixteenth inch thick, and bottom section or sections one-fourth inch thick and corrugations 2¼ in. deep.

"(b) Vertical reinforced ends with 4 or 5 in. 'Z' bars securely fastened to place on end sills and end plates. End plates to be diagonally braced on inside of car, under roof, to side plates, or with reinforcements equivalent in strength."

While a certain latitude is permitted in renewing weak constructed ends because of the two different methods stipulated, an analysis of clause (a) of this rule discloses the fact that it becomes necessary to use one proprietary structure, notwithstanding the fact that the U. S. R. A. specifications for new cars permit the alternate use of three different types of steel ends. To those railroads to whose cars another design of steel end might be more economically applied the injustice of this very narrow restriction is most apparent.

Rule No. 12 reads: "Roofs—When roofs are changed or renewed, outside flexible type metal roof made of 22 or 24 gage galvanized iron with mullions between roof sheets and with flexibility at eaves and ridges, will be applied. Roofs should be interchangeable with United States standard cars having same length and width sheets. To permit the use of standard sheets, the following changes may be made:

"(a) Increase or decrease in thickness, or omitting eave molding, fascia, or both.

"(b) Increase the width of roof flashing at eaves.

"(c) Where cars are equipped with all metal roofs, such construction may be continued when renewals are necessary, if considered desirable to do so."

The effect of this rule on freight car repairs and its practical application is largely a question of interpretation. Taken by itself its observance is required only "when roofs are changed or renewed," but when linked up, with the introductory clause of the circular, which requires that when material standard to a car is not in stock material standard to United States standard cars should be used, it apparently becomes necessary to remove without regard to expense a partly worn-out roof (all wood or inside metal) and apply one particular design of patented outside flexible type metal roof.

There are many who endorse the benefits and economy to be derived from standardized freight cars and locomotives building and hereafter built, while there are also many who oppose such rigid standardization as has been adopted for United States standard cars, but those who advocate standardized new equipment could not pursue a plan better calculated to discredit their views than by acquiescence in the enforcement of Mechanical Department Circular No. 8. If held to be mandatory and put into execution, it would add such a burden of increased cost of freight car maintenance as to rival the increase in direct labor operating costs already

imposed by government control. It is an abortive attempt to extend standards never originally contemplated for anything but new cars of one general predetermined design to some two million (2,000,000) cars of a multiplicity of designs now in service without regard to the enormous cost involved, and it would seem that the Railroad Administration in approving it had acted with a very indefinite knowledge of what its actual reduction to practice would mean. The statement is ventured that thus far it has but served to confuse and delay the normal schedules of individual railroads for freight car reinforcements and maintenance.

The Central Western, the Largest Railroad Region*

Comprising Two-Fifths of Country's Area, It Includes but One-Fifth of Operated Mileage

THE CENTRAL WESTERN REGION is by far the largest of the seven railroad districts in the United States, comprising approximately 40 per cent of the area of the country. It is more than twice as large as the Northwestern region, the second district in point of size, but despite that fact it contains about the same operated mileage. With two-fifths of the area of the country and about one-fifth of the total operated mileage, the Central Western lines own about one-sixth of the equipment in the United States and produce slightly more than one-quarter of the net revenues from railway operation.

Roughly speaking, the Central Western region includes the states of Nebraska, New Mexico, Colorado, Nevada, Arizona, Utah, Wyoming, California, one-third of Oregon, two-thirds of Idaho, one-sixth of Montana, one-half of South Dakota, two-fifths of Iowa, one-half of Missouri, most of Illinois and Kansas and small portions of Indiana, Oklahoma and Texas, or approximately 1,220,000 square miles. The operated mileage under government control in this territory is about 53,000 miles, or about 21 per cent of the total mileage in the United States. With a relatively large area in comparison with its mileage, the region is not so generously supplied with railways as other sections of the United States. The territory contains even a smaller share of the equipment of the country, for the Central Western lines own about 360,000 freight cars, 11,000 locomotives and 9,100 cars in passenger service, or between 16 and 17 per cent of the total equipment of those respective classes in the United States.

Like the roads in the Northwestern region, the Central Western lines compare more favorably with the roads in the more thickly populated sections of the United States from the standpoint of operating income. According to statistics compiled by the Interstate Commerce Commission for the fiscal year 1916, the operating revenues of these lines amounted to about $639,000,000, or between 21 and 22 per cent of those of all roads; operating expenses were $401,000,000, or about 19 per cent of those of all American lines, while net revenues from railway operation were $238,000,000, or from 27 to 28 per cent of those of all lines. Similar percentages for the same period show that the Northwestern region produced 18 per cent of the operating revenues, incurred 15 per cent of the operating expenses and made net revenues from railway operation equal to 24 per cent of those of all railroads.

A Region of Strong and Weak Lines

The Central Western region contains both strong and weak lines. The Atchison, Topeka & Santa Fe, developed under the able leadership of E. P. Ripley; the Southern Pacific, Union Pacific, Los Angeles & Salt Lake and Oregon Short Line, built up under the guidance of E. H. Harriman; and the Chicago, Burlington & Quincy, reorganized and strengthened under the supervision of James J. Hill, are among the best managed railway systems in this country, not to exclude the world. The Illinois Central, although only a portion of it is included in the region, is also a well-managed line. Some of the other important roads, however, have suffered severely from unwise financial manipulation.

Fourteen Roads Over 1000 Miles Long

Fourteen railroads in the Central Western region operate more than 1,000 miles each, and together constitute 91 per cent of the entire mileage of the territory. Four of these railroads penetrate other regions; about 32 per cent of the Chicago, Rock Island & Pacific, 35 per cent of the Illinois Central, 18 per cent of the Southern Pacific and 45 per cent of the Wabash are outside the Central Western district. Taking into account only the mileage within the region, the 14 large lines rank as follows with respect to length: Atchison, Topeka & Santa Fe (including the Panhandle & Santa Fe), Chicago, Burlington & Quincy, Southern Pacific, Chicago, Rock Island & Pacific, Union Pacific, Illinois Central, Denver & Rio Grande, Oregon Short Line, Wabash, Los Angeles & Salt Lake, Chicago & Eastern Illinois, Colorado & Southern, Chicago & Alton and the El Paso & Southwestern.

The Trend and Character of Traffic

The dominant direction of the Central Western lines is east and west. The Santa Fe and the Harriman lines connect the Mississippi valley with the Pacific coast, and, under old competitive conditions, the Burlington in conjunction with the Northern Pacific and the Great Northern constituted another avenue of transportation from the Central West to the Pacific; likewise the Chicago, Rock Island & Pacific had traffic agreements with the El Paso & Southwestern and the Southern Pacific which gave it a share of trans-continental passenger and freight business, while other traffic moved through Denver and over the Denver & Rio Grande and Western Pacific. The westbound freight movement consists mainly of manufactured products and merchandise required by the farms and mines and the trans-Pacific trade. Considerable coal is also shipped to western points.

As in the Northwestern region, the heaviest traffic in the Central Western territory is in products of mines. In the fiscal year ending July 30, 1916, the 14 large lines in the region moved over 92,000,000 tons of this class of freight, or 45 per cent of their total tonnage. By way of comparison, mine products constituted 37 per cent of the tonnage of the nine largest Northwestern lines constituting 88 per cent of the operated mileage of that region. While ore alone made up 17 per cent of the business on those Northwestern roads in 1916, it accounted for but 8 per cent of the total business of the Central Western carriers for the same year. Despite

*This is the fourth of a series of articles describing the characteristics of the seven railway operating districts. The article on the Southwestern region appeared in the *Railway Age* of August 9, 1918, page 235; that on the Allegheny region, August 23, 1918, page 331; and the discussion of the Northwestern region, September 13, 1918, page 483.

this difference the Central Western territory is a prolific producer of ores and particularly of those bearing the more precious metals, which do not move in large quantities. Whereas very little coal is mined in the Northwestern region, Illinois and that strip of Indiana included in the Central Western region contain very rich bituminous coal fields. It is not surprising, therefore, that soft coal constitutes one-fourth of the tonnage moved in the territory.

Agriculture is second to mines as a source of tonnage in the Central Western region. In the fiscal year 1916 the 14 largest lines hauled nearly 40,000,000 tons of agricultural products, or 19 per cent of the entire tonnage handled during the year. Containing a large portion of the Mississippi valley, the largest fertile region on the globe, the Central Western territory includes lines originally built to serve the farms which are still called "granger" roads. The Burlington is the heaviest carrier of farm products, with a tonnage of 7,650,000 in 1916, and the Santa Fe, the Union Pacific and the Southern Pacific are next in importance. The Central Western lines enjoy a large fruit and vegetable traffic. In 1916 the 14 important roads moved approximately 10,500,000 tons of this class of freight; this was five per cent of their total tonnage. The Southern Pacific, the Santa Fe, the Union Pacific, the Rock Island and the Illinois Central are important fruit and vegetable carriers. Under competitive conditions there was a keen rivalry between the Harriman lines and the Santa Fe for the California perishable traffic. The Santa Fe Refrigerator Despatch, affiliated with the latter system, and the Pacific Fruit Express, which served the Harriman lines, provided the latest and most improved types of refrigerator equipment for this business and maintained prompt and expeditious service between points of origin and Eastern markets.

Manufactures are third in importance as a source of traffic, over 32,000,000 tons having been moved in 1916, or about 15.5 per cent of the total traffic handled. In the same period the nine large lines in the Northwestern region moved a tonnage in manufactured products equivalent to 13 per cent of all the freight handled by them. Forest products rank fourth as creators of tonnage in the Central Western region; in 1916, 17,400,000 tons of this class of freight were moved on the 14 important lines in the district, or about 8.5 per cent of the total business handled by them. It will be noted that forest products hold a relatively less important position from the standpoint of tonnage in the Central Western than in the Northwestern region, where the nine largest lines handled a tonnage in this business equivalent to 16 per cent of their entire traffic.

Although products of animals rank fifth as producers of tonnage, accounting for about 10,500,000 tons in 1916, or five per cent of the business handled by the 14 large lines, the Central Western region is undoubtedly the most impor-



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Hale Holden
Regional Director



H. A. Scandrett
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H. R. Safford
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F. E. Clarity
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L. N. Hopkins
Chairman Regional Purchasing Committee



William Sproule
District Director

tant live stock territory in the country. The great packing industries at Chicago, Kansas City and other points in the Middle West receive the major portion of their cattle, sheep and hogs from the Central Western lines.

Oil is rapidly assuming greater importance as a source of traffic in the region. The Oklahoma-Kansas and the California oil fields now produce more petroleum than any other districts in the United States. These two sections are relatively new as oil producers, and will undoubtedly show a steady increase in output for some time to come.

Traffic Density of Region Low

Like the Northwestern, the Central Western region is one of great distances and of long hauls. The average haul of revenue freight on the Union Pacific in 1916 was 412 miles; that of the Santa Fe (exclusive of the Panhandle & Santa Fe) was 293 miles, while that of the Burlington was 275 miles. The traffic density is low compared with that of eastern roads. The ton mileage of revenue freight per mile of road averages about one-fifth of that on roads in the Allegheny region.

Under competitive conditions there was keen rivalry for traffic in the region. As previously pointed out, transcontinental business was shared between the Santa Fe, the Harriman lines, the Hill lines, the Gould lines and the Rock Island and El Paso & Southwestern in conjunction with the Southern Pacific. In the passenger field competition resulted in the operation of exceptionally well-equipped trains. Naturally some duplication of train service obtained because of the sharp struggle for business, and this was one of the first conditions to attract the attention of the Railroad Administration during the war when the conservation of power and equipment was highly important. Accordingly, quite a number of trains were removed from service and likewise competitive advertising for passenger business was prohibited. The Central Western region, however, is an exceptionally fertile field for the development of passenger traffic. Containing both winter and summer resorts and some of the most important national parks and monuments, it is in a position to maintain a high class passenger service the year round.

A Region of Promising Possibilities

Like the Southwestern and Northwestern regions, the Central Western territory is rich in possibilities for further development. Undoubtedly new oil wells and mines will be opened and new farms and industries created more extensively as time goes on. This will mean additional mileage for the Central Western roads and consequently additional traffic.

The Central Western region has no serious terminal problems such as exist in the East. Although lines of the territory operate into the Chicago and St. Louis switching districts, those terminals are under the jurisdiction of the Northwestern and Southwestern regional directors respectively. The only terminal of consequence is the Kansas City district, which is under the immediate authority of W. M. Corbett, terminal manager, who was formerly president of the Kansas City Terminal. In the past, when congestion has appeared on lines in the Central Western territory it has generally constituted a reflection of operating difficulties in Chicago, St. Louis or other gateways to the East.

The region has one subsidiary district roughly constituting the area west of the Rocky mountains. William Sproule, who is district director in charge of this section with headquarters at San Francisco, Cal., has jurisdiction over all lines west of Ogden, Utah, and Salt Lake, Albuquerque, N. M., and El Paso, Tex., and south of Ashland, Ore. Mr. Sproule was formerly president of the Southern Pacific, and is therefore thoroughly familiar with the district over which he has supervision.

The Regional Director

Hale Holden, regional director of the Central Western lines, is like the director general, a lawyer by training. He was born at Kansas City, Mo., on August 11, 1869, and was educated at Williams College and the Harvard Law School. After practicing law at Kansas City he entered railway service on July 1, 1907, as general attorney for the Chicago, Burlington & Quincy. From January 1, 1910, to November, 1912, he was assistant to the president. In the ensuing two years he was vice-president, and on August 27, 1914, was elected president. Mr. Holden has the distinction of being a former protege of James J. Hill and, although an attorney, acquired a broad conception of the best operating principles through his close association with the "empire builder." During the early days of the war Mr. Holden was a member of the Central Department District Committee of the Railroads' War Board, and when the carriers were taken over by the government in December, 1917, he was appointed a member of the temporary advisory committee of the director general. In June, 1918, when the Western railroad region was divided into three parts, Mr. Holden was appointed regional director of the central portion which was designated the Central Western region. When he assumed these duties he resigned his position as president of the Chicago, Burlington & Quincy, the Colorado & Southern, the Ft. Worth & Denver City and the Wichita Valley.

New York Report on South Byron Collision

THE NEW YORK STATE Public Service Commission, second district, has issued a report, signed by C. R. Vanneman, chief of the division of steam railroads, on the circumstances and causes of the rear collision of passenger trains on the New York Central at South Byron, N. Y., at 3:42 o'clock on the morning of January 12, when westbound passenger train No. 11 ran into the rear of westbound passenger No. 17, second section, killing 22 passengers and injuring as many more.

The present report gives the facts substantially as they were shown in the *Railway Age* of January 17, page 212, except that the testimony of the flagman concerning his action is quite different as regards distances; and there are some additional details.

The stopping of the train at this place to have a helping engine attached is not usual; it was necessary in this case because the engine was not steaming well. The ascent westward to Batavia, 7 miles, is at about 44 ft. per mile. The helper was just backing toward the train at the moment the train was struck by No. 11, and thus there was a double collision; and this, says the report, no doubt accounts for the completeness of the destruction of the steel sleeping car at the rear of the standing train. The train was pushed forward about 250 ft.; and when it had thus moved about ten feet it met the pushing engine, moving backward. No. 11 had been running at about 60 miles an hour and its speed was not appreciably slackened; the inspector believes the engineman did not apply brakes until within about 700 ft. of the standing train. He believes that the engineman "for a temporary period was not in possession of his full senses," although both engineman and fireman claimed at the hearing, that the runner was wide awake.

The engineman of No. 11, John Friedley, is 61 years old, and has been running a locomotive since 1885, all of the time in passenger service. In his testimony he said that he never had slept while on a locomotive. The flagman of the standing train, Thomas Groves, has served in that capacity on the New York Central 28 years. His first statement was that

he had gone back about 2,200 ft., and had used torpedoes and a fusee; but he afterward changed his story, and the inspector believes that he had got back not more than 700 ft.; had not used either torpedoes or fusees; but had lighted a fusee after No. 11 had passed him.

Friedley had been out of bed about 17 hours 42 minutes. His fireman, David Brill, had fired on passenger trains only two trips before this one. He claimed that the signals were clear (as the engineman had said) and that he called them properly to the engineman. The line of the road is straight for three miles, and, from tests made after the collision, the inspector believes that anyone looking forward from the locomotive must have seen the block signal lights and the tail lights on the standing train. The engineman claimed to have had his attention attracted by a lantern or lanterns on or near the ground; but he could not have seen these without also seeing the tail lights. The weather was clear. The temperature was about five degrees below zero.

In his conclusions as to the cause of the collision the inspector discusses rule 99, the flagging rule, which was modified in October last when a new code of rules was issued. Formerly, on the passenger tracks, a flagman going back to protect his train was required to remain out until a following train arrived, but this has been abrogated, and whistle signals are now provided for calling in the flagman. After considerable discussion of the reasons for and against this change the inspector concludes that it is not open to criticism. No other railroad, so far as he knows, has a rule under which a flagman must not return to his train.

Another change in the rules discontinues the practice of carrying a red tail light on the platform of the car at the rear of a passenger train, and in the top of the caboose on a freight train. The inspector believes that these lights should have been retained; but that this question has no real bearing on the collision under consideration.

Automatic Train Stops

Under the head of "The Remedy" the report discusses automatic train stops. Frank J. Sprague, an eminent electrical engineer, who has devised an automatic train stop, was called by the representative of the Interstate Commerce Commission, and testified at the hearing on this collision; he said that he had tried to secure the adoption and test of his apparatus on the New York Central. About two years ago plans apparently had been nearly perfected for installing the apparatus, between Poughkeepsie, N. Y., and Peekskill, but the railroad company deferred taking final action, and when this country entered the World War, everything was dropped. Mr. Sprague has reported these facts to the director general of railroads at Washington.

Continuing, the report says:

"The fundamental principle on which an automatic device of this character must be evolved is that it should act when and only when the engineman fails to properly control his train. In other words, the control of the train should remain with the engineman at all times, until he fails to do that thing which in the regular operation of his locomotive he would normally do. If on approaching a section of track which is occupied by another train or which is in some other way obstructed, the engineman reduces his speed to such an extent that he will stop short of the obstruction, then complete control of the train should be left in his hands, with a further provision that this control shall be removed at the instant when it becomes unsafe for him to longer retain it.

"Obviously, the obstacles in the way of such an accomplishment are numerous. To eliminate them requires the employment of intricate and somewhat delicate instruments, among which must be the track relay, a highly developed and wonderfully efficient instrument now used in the operation of automatic signal systems. These instruments have been known to permit clear failures of signals chiefly because they were improperly set up or have been removed from their proper normal positions. Such an accident might occur in the case of the automatic stop, and then we should have a stop inoperative at the crucial time. Of course, such occurrences are remote, clear failures of signals resulting from all causes occurring about once in every 1,000,000 movements of a signal. * * *

"Since all automatic stop or train control devices developed up to this time require the use of certain apparatus on the locomotive or train, it becomes immediately obvious that an additional factor of maintenance over that necessary for the signal is introduced. This is the roundhouse maintenance; and in considering it, it seems well to point out that the introduction of an automatic device on any part of a railroad system means that maintenance of the motive power apparatus must be provided for at all engine terminals at which locomotives are housed which may operate on the part of the railroad so equipped. It can readily be seen what this means for a railroad of the character of the New York Central. Reduced to the minimum, there are but two alternatives; viz., either the whole railroad must be provided with the device, or unequipped locomotives from branch lines must not be permitted on that portion of the railroad on which the device may be installed.

"At best the stop must be an adjunct of the signal system, unless the design replaces the signal system entirely. It seems to be entirely obvious that the roadside portion of the stop may be developed in the laboratory from an initial point of perfection equal to that of the present signal systems, but there are no criterions by which the locomotive apparatus may be measured. Hence the questionable propriety of development under service. I believe that this difficulty can be surmounted if it is concluded that this is the course which should be pursued; but I am not yet fully convinced that there is the necessity for an automatic stop for a train control device. I dislike very much to see the installation of anything which in the least interferes with the supreme authority of the engineman, or which directly or indirectly may be the cause of any relaxation of his normal vigilance.

"In view of the catastrophe under consideration this state of mind leads to inquiries as to what may be done without providing such a device. I know of but one thing. It is certain that something must be provided which will restore the engineman to the proper mental condition if he be other than dead, and in the latter case, the fireman must be impressed into service. To accomplish this there seems to be but one means available; viz., by conveying audibly to the engineman or fireman a notice of the fact that he has failed to do that which is required of him. The most effective audible signal so far devised which does not introduce complicated mechanisms on the locomotive in addition to the already complicated but highly developed roadside signals is the explosion of a torpedo. Such devices in a crude state have been used in England and on the continent, with considerable success, as I am informed. In England, the laborious method of requiring track men to place torpedoes on the rails at signals to warn the engineman of his location in foggy weather has been employed with marked success. On one of the French railroads, it is stated that there have been no accidents resulting from the failure of enginemen to observe signals for many years, during which time the torpedo has been in service. Devices have been under development in the United States for some time but I am not aware that any have been perfected sufficiently to warrant their installation. I believe they can be developed and further that they can be installed at much less expense than a stop device. I am also of the opinion that since such a device need not involve a further distribution of responsibility, beyond the relatively small amount of additional mainte-

ance which would fall upon the signal maintainer, the efforts of those charged with securing greater safety of operation on the railroads should be directed to its development.

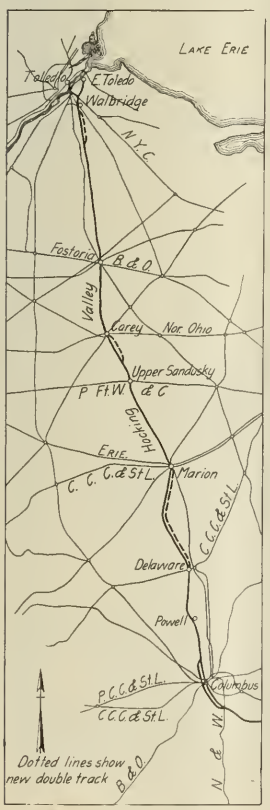
"It is entirely obvious that it has been necessary, especially within the last few years, for executives to give the utmost consideration to every item of expense, and those items in the annual budget covering the future existence of the property as well as the necessities with which to render service to the public have rightly been given first consideration. The dwindling difference between income and expense has left little for the consideration of such items of additions or betterments as the automatic stop, especially when installations estimated to cost upwards of $14,000 per mile have been urged. Of course systems designed to cost much less have been patented and partially developed, but the efficiency of these less expensive devices has been seriously open to question. It seems doubtful therefore, if censure may rest on the executives for not having proceeded with extensive trials, irrespective of the expense involved.

"I do not believe that the problem of perfecting an automatic train control device is impossible, assuming that such a device is essential to the safe operation of the railroads. * * * It is fortunate that the Railroad Administration has appointed a strong committee to consider the matter, and it is to be hoped that the many recent developments of the electrical art have produced features which will soon place the automatic train control in the realm of an unquestioned possibility, provided of course it is concluded that such a device is absolutely essential. The committee should include within its investigations the subject of audible signaling, a relatively unexplored field but one in which I believe the real solution lies."

Second Track Construction on the Hocking Valley

Improvements Undertaken Where Work Was Lightest Constitute Typical Example of a War Project

THE SECOND TRACK now being built by the Hocking Valley between Columbus, Ohio, and Toledo, clearly falls in the class of war work, not only from the standpoint of the results obtained for the amount of work done but from the nature of the auxiliary facilities that are being provided simultaneously at various points along the line. The work has also been conducted in a way that was designed to make the results available as rapidly as possible, but an unavoidable circumstance, also a result of the war, interfered seriously with the program as planned.



Location of the New Second Track

There are few localities in the country where an equivalent amount of double-track line with a 0.2-per cent grade opposing the traffic could be obtained at a smaller cost. By selecting those portions of the line where conditions were most favorable, it was possible to plan 39½ miles of second track involving a total of only 478,000 cu. yd. of grading or about 12,000 cu. yd. per mile, while the bridge work involved is almost negligible. A further evidence of the favorable character of the original location is indicated by the fact that the 0.2-per cent grade was obtained without any change in alinement and only one change in grade.

In accordance with the urgent needs of the times, this work was completed in sections so that portions of the new track could be placed in service as rapidly as possible and thereby relieve the single track. That this program could not be carried out in full resulted from an inability to obtain rail in adequate quantities. Therefore, although nearly all of the grading is completed, only about 15 miles of track has been laid and placed in service to date.

Simultaneous with the construction of the second track, terminal improvements have been carried on at several points on the line which are designed to increase the capacity without the necessity for radical changes. The most important ones include the addition of several tracks to the yards and additions of 12 stalls to roundhouses at Parsons Ave. (Columbus) where traffic is exchanged with the Chesapeake & Ohio Northern and at Walbridge where the road trains from the south are classified and coal cars are turned over to transfer crews for delivery to the Hocking Valley coal dock at East Toledo.

The business of the Hocking Valley is primarily coal from mines on its own lines in the Hocking valley in southeastern Ohio, and from West Virginia mines tributary to the Chesapeake & Ohio. Coal from the latter is delivered by the Chesapeake & Ohio Northern at Columbus. In 1918 the coal hauled from Columbus to the lake aggregated 5,300,000 tons, all of which was moved between April 15 and December 12.

The present line has a ruling grade of 0.3 per cent against northbound movements except for a grade of 0.5 per cent extending most of the distance from Columbus to Powell (14 miles) which is operated as a helper grade. The ultimate plan is to provide a 0.2-per cent grade against northbound traffic and a 0.4-per cent grade against southbound movements for the entire distance from Columbus to Toledo. In pursuance of this plan the second-track work undertaken in the stretches shown on the map has been constructed to conform to these limits of grade. It will be noted that the double-track work undertaken thus far does not include the section between Columbus and Delaware. The elimination of the pusher grade within these limits will require a more or less complete change of location and this has been deferred until some later date.

One unique feature of the plan for the work is the manner in which it is proposed to operate the double track to suit the peculiar nature of the traffic. Coal trains moving northward loaded and coming back light constitute the bulk of the traffic; the remaining train movements comprise two passenger trains and a local freight in each direction. Since the greatest capacity of a single track can be secured with

all trains moving at a uniform speed in one direction it is planned to assign the east track exclusively to the northbound tonnage trains. The west track will be used by the northbound high speed trains, both passenger and freight, in addition to all of the southbound traffic. To this end an adequate number of 100-car passing tracks are being provided on the west side of the southbound track with no passing tracks on the northbound side and only a limited number of cross-overs between the two main tracks. Tonnage trains are now being hauled by Mallet locomotives rated at about 5,000 tons (northbound). This rating will be increased appreciably with the completion of the 0.2-per cent grade line.

Grading

The grading is primarily fill made from borrow. There are very few cuts. With one exception the fills are low. Just north of Delaware an embankment about 1,000 ft. long with a maximum height of 38 ft. was widened for second track, with material from a shovel pit east of the right-of-way near Troy, operated by N. K. Sneed of Huntington, W. Va., who has the general contract for the work from Delaware to Prospect. This same pit was also used to supply material for building the smaller embankments that could not be made readily by team work from side borrow. The material was handled in Kilbourne & Jacobs cars, unloaded from the main track and pushed into place with a Jordan spreader.

Between Prospect and Marion the work is under contract to the J. T. Adams Company, Columbus, who conducted the work in a manner similar to that above described. A shovel pit was opened at Owens, this being over a limestone quarry where an arrangement was made with the owners to remove the stripping. About 150,000 cu. yd. were taken out to a depth varying from six to eight feet. The grade change mentioned above is located at Owens, extending from about a mile south to a half a mile north and with a maximum depth of fill near the station of about seven feet.

While this work is of limited proportions, the manner in which it is done is of interest. The embankment was widened to the level of the existing track by unloading from the main track and using a spreader. A construction track was laid on this new embankment which was then completed to the new grade by raising the track with material from the pit. It was proposed to transfer the traffic to the newly raised track and repeat the operation under the old track but the possibility of interrupting traffic through soft conditions in the new embankment led to the discarding of this plan in favor of one requiring the raising of the operated track under traffic, using blast furnace slag for the filling material. This plan worked out very well except that the coarseness of the material caused some difficulty in handling it.

The raises were made in depths of about one foot, averaging from 1,500 to 2,000 ft. in length per day. The grade change at Owens included the elimination of a highway grade crossing just north of the station through the use of an underpass of 24-ft. span with 13 ft. vertical headroom. The structure consisted of two concrete abutments with a longitudinal steel through deck.

North of Alveda some light work is being done with rather unusual equipment for railway grading, a Thew revolving shovel being used to load 1½-cu. yd. Koppel cars operating on a track of 2-ft. gage. Strings of these cars are pulled by a Koppel steam locomotive for the long hauls and by a horse for the shorter hauls.

Terminal Facilities

One of the most important features of the auxiliary facilities in the way of an entirely new installation is a coal and water station south of Carey. Here two passing tracks will be provided between the two main tracks, each with a capacity of two 100-car trains. At about the mid-length of the passing tracks a Fairbanks, Morse & Company reinforced concrete coaling station of 500-ton storage capacity will be provided to serve all four tracks. Water cranes will also be installed, water being piped from the city water supply at Carey.

At Walbridge, the additional engine terminal facilities include a nine-stall addition to the existing roundhouse. This is of timber construction with brick walls. Eight of the stalls will be 110 ft. deep and one 90 ft. The center line of the ninth stall is on a line with the approach track on the other side of the turntable, so that this stall can be used as a push-in track for dead engines. The extension to the roundhouse is of the same construction as the old part and will be heated by direct radiation in the pits and along the back wall.

In addition to the roundhouse extension, a 500-ton coaling station of the Fairbanks, Morse & Company reinforced concrete type and two Robertson ash hoists are also being installed, while adjoining the roundhouse is a new toilet and washhouse. Considerations of sanitation in the absence of a sewer system in the vicinity led to the provision for a complete sewage disposal plant consisting of septic tanks and settling basins.

Another improvement of largely local utility is a new engine terminal at Marion for the use of switch and local freight engines. This comprises a five-stall roundhouse with a 100-ft turntable and a Roberts & Schaefer coaling station. The engine house is of reinforced concrete with brick curtain walls.

All of the work between Carey and Toledo including the building work is being done under a contract with the A. S. Hecker Company of Cleveland. In conformity with the custom on most work undertaken during the war all contracts in connection with this work have been conducted on a cost-plus-percentage basis. The work has been handled under the general direction of William Michel, chief engineer of the Hocking Valley and under the supervision of W. L. Roller, resident engineer, both with headquarters at Columbus, Ohio.



Turkish Troops and Refugees at Seidler

Standards for the Maintenance of Freight Equipment*

Keeping Up the Condition of Cars to Meet Demands of Traffic; Uniform Classification of Repairs

By H. L. Shipman,
Equipment Inspector, Atchison, Topeka & Santa Fe

DURING THE PAST YEAR the maintenance of freight cars has been influenced by new conditions, due to the general pooling of equipment. This change is particularly noticeable in the box car. Formerly there was a normal percentage of from 35 per cent to 40 per cent of the box cars on the home lines. At the present time this percentage has fallen as low as 7 per cent to 12 per cent. Thus each road has less control over the maintenance standard of its own equipment. It would seem that some standard of maintenance should be established and all roads compelled to keep all freight cars on their lines up to that standard. This percentage should undoubtedly be higher than the standard now maintained by many of the smaller railroads, but some method should be devised to force all roads to come up to this standard. Unless this is done, under present conditions, the average standard of all cars will fall considerably lower, and those roads, which under normal conditions would maintain this standard, will be helpless to keep it up.

There is a limit to the maintenance of equipment beyond which it is not practical or economical to go. If it were possible to maintain all freight equipment in 100 per cent condition, it would not be economical because there are many commodities that can be handled just as efficiently and satisfactorily in a car in fair condition as in one in 100 per cent condition. Since all cars in service are continually wearing out, or deteriorating, all that can be hoped for is to maintain in good condition a sufficient number of cars to handle the commodities that require a first-class car.

There are certain kinds of freight that require a box car, others a refrigerator, stock car, tank car or gondola and other freight may be handled just as well in several of the different kinds of freight cars. Some ladings require the cars to be in first-class condition and others only in fair condition. For example, a box car to handle grain, flour, sugar, or groceries, should be in the best condition possible. The siding must be tight, the roof non-leaking, and the floor and lining level and smooth, so as not to chafe or injure the contents. Wool, raw cotton, hay, brick, etc., may be handled in a car in fair condition without damage. A leaky roof or open siding will not injure these articles, and they cannot fall through cracks in the floor as would bulk grain. The only essential for cars handling the last mentioned articles is that the frame work of the car be strong enough to hold the load and that the trucks and draft gear be in good condition.

A refrigerator car must always be in good condition in order to protect its lading, due to the fact that the requirements of this service are very rigid. A stock car should be in good condition in order to handle live stock without damage, but the same car in fair condition will haul barreled goods, rough lumber, ties, lump coal, and many other articles, very satisfactorily. A gondola must be in very good condition to hold slack coal without loss, but will hold lump, coal, coke, scrap iron, etc., if in only fair condition.

On a typical western road there was a total of 1,240,324 car loads of revenue freight handled during the year 1917. This freight was subdivided under five general headings, namely, Products of Agriculture, Products of Animals, Products of Mines, Products of Forests, and Manufactured and Miscellaneous Articles. The number of car loads of each of these classes of freight was as follows:

Products of agriculture	298,717
Products of animals	172,836
Products of mines	385,836
Products of forests	99,301
Manufactured and miscellaneous articles	283,634

A close analysis of this freight as a whole shows that 72.6 per cent should be handled in cars of first-class condition in order to avoid possible loss or damage due to the condition of the cars; 27.4 per cent of the freight could be handled just as satisfactorily in cars of fair condition.

An extended investigation in the train yard and in a large repair shop of the causes of repairs to freight cars disclosed the fact that only a very small percentage of freight car repairs become necessary due to "time and the elements," or, in other words, rust and decay. To make this study, the repairs to freight cars were subdivided into four general headings representing the principal parts of the car, as body, draft gear, truck and air brake repairs. The investigation showed that most of the repairs required by the bodies of these cars became necessary due to time and the elements, and the next important cause of repairs to the body was starting, stopping and switching or load shift under shock. The draft gear and truck repairs became necessary chiefly due to the starting, stopping and switching of the car. Load shift causes the ends of the car to be pushed out, and posts broken and the siding and lining broken. A very small percentage of the repairs to draft gear or trucks was necessitated by time and the elements. Nearly all of the repairs to draft gear was caused by starting, stopping and switching. The draft gear is broken or weakened by shock in switching and the trucks need repairs because of stopping, as well as shock. The items of the greatest expense in truck repairs are brake shoes, brasses and wheels. It is very seldom a truck has a broken side frame or bolster. The air brakes need repairs because of running and stopping the car. These parts seldom are renewed because of rust.

Combining the causes of repairs of the several parts of the car, the results showed that 47.2 per cent of the repairs to cars became necessary due to the running of the car, and time and the elements; 52.8 per cent of repairs to cars was necessitated by starting, stopping and switching, and the loading and unloading of the car. The 52.8 per cent in starting, stopping and switching and loading and unloading should be again subdivided to show the repairs due to the necessary wear of starting, stopping and switching and the unnecessary wear or abuse of the car. The subdivision shows that 33 per cent of the repairs to freight cars would be eliminated if there were no draft gear, no end sills, posts, siding or lining broken by shock or cornering the car, and no slid flat wheels or cut journals.

The next question to be considered is what percentage of the freight equipment can economically be maintained in first-class condition. As mentioned above, 72.6 per cent of the freight equipment should be in first-class condition to carry the freight of this trunk line without damage or loss due to the condition of equipment. Is it feasible or practical to maintain this percentage as a standard of condition?

In a recent survey of bad order cars on several of our Western roads, it developed that the higher the percentage

*From a Paper Presented Before the Western Railway Club.

of revenue cars bad order on any line, the more men were employed per 1,000 revenue cars on the line, and the greater was the percentages of revenue cars that were repaired each month. Conversely, the lower the percentage of revenue cars' bad order on the line, the smaller was the percentage of cars repaired each month. Comparing four of these roads, and averaging two of the higher and two of lower percentages, the results were as follows:

	Per cent of revenue cars, bad order	Per cent of cars repaired to revenue cars on line per month	Number car men employed per 1,000 rev. cars on line	Total number cars repaired per month	Number revenue cars on the line
Two higher	8.4 per cent	135.4 per cent	76.8	53,248	43,303
Two lower	3.0 per cent	59.4 per cent	37.7	25,909	37,443

Very few roads have a very high percentage of their own cars on their line. The freight car is common property today, therefore, it cannot be supposed that there is any very great difference in the physical condition of the cars on these four roads. These figures simply mean that different roads have different standards of maintenance, and that a road with a high standard will endeavor to keep the condition of freight equipment to a higher standard than the other road. In order to accomplish this end, the one road hires more men and consequently bad orders and repairs more cars than the other. These roads with the high standards of maintenance have found that the old saying "a stitch in time saves nine" is just as true when applied to a freight car as in its original application, and that the net results will show up on the credit side of the balance sheet.

A road with a high standard will cut down train delays and damage claims due to defective equipment, and as a result will pay a greater dividend than the road with the low standard of maintenance. A shipper prefers a road with a high standard of maintenance because he knows his products will receive better attention than on a road with low standards. There will not be the delays en route due to defective equipment and the goods will arrive in better condition.

One step toward distributing repair work among all railroads so as to overcome the present practice of one road making only light repairs and another doing the substantial work, would be to have a standard classification of repairs. This would make it easier to judge work done and the output. I would recommend the following outline as a reasonable and satisfactory classification for the subdivision of repairs:

CLASSIFICATIONS OF REPAIRS TO FREIGHT AND WORK CARS

HEAVY REPAIRS

One or two pair draft timbers.
Two or more sills renewed or spliced.
One or two end sills.
Two or more side or door posts.
One-half or more outside sheathing renewed.
Entire roof relaid or renewed.
Flooring renewed or repaired.
Door rehung or new doors applied.
Car trussed up and body tightened.
Two trucks given general overhauling.
Cars repainted and stenciled.
(Any seven or more of above items constitute heavy repairs.)

MEDIUM REPAIRS

One or two pair draft timbers.
One end sill or new end and siding.
One pair draw sills spliced.
Roof relaid or new roof applied.
Door rehung or new door applied.
Trucks repaired.
Cars trussed.
All new work painted.
(Any five or more of above items constitute medium repairs.)

RUNNING REPAIRS

Uncoupling attachments repaired.
Grab iron renewed or repaired.
Brasses applied.
Brake shoes renewed.
Running boards, repaired.
Brake connection and lever.
Side door rehung.
(Any one or more of above items, or similar thereto, constitute running repairs.)

LIGHT REPAIRS

One or more pair wheels renewed.
Draft timbers tightened and new bolts.
Side door rehung.
Couplers renewed.
Body tightened.
Deadwoods repaired or renewed.
Brake beams repaired or renewed.
(Any one or more of above items, or similar thereto constitute light repairs.)

It is my opinion that such a classification will be more satisfactory than to have heavy, medium, light and running repairs subdivided on a money or hourly basis. The objection to the hourly or money basis of subdivision of repairs is that no record is kept of the cost of either labor or material on individual cars. It would be impossible to keep these records without a great addition to the overhead expense. The proposed plan can be used without any addition to our present clerical force.

In conclusion, the question of freight car repairs may be summarized as follows: Freight equipment should be maintained in approximately 75 per cent condition in order to handle freight without danger of loss or damage due to the condition of the freight equipment; this percentage condition cannot be maintained without the co-operation of all roads, because the freight car today is common property so far as service is concerned.

Discussion

H. H. Harvey (C. B. & Q.): The statement is made in Mr. Shipman's paper that 72.6 per cent of all freight cars should be kept in first-class condition. I question whether it is necessary to have that figure quite so high. It would vary greatly on roads in different localities and will even vary on the different divisions of a single large road. There are many commodities that should never be loaded in a first-class car. One of the worst abuses prevalent on our railroads today is loading hides, fertilizer, immigrant outfits and similar material in first-class equipment. Car men in general are dilatory about calling attention to the abuse of cars. Since cars have been loaded up to the capacity of the axles there has been a great deal of overloading of light cars, and I think the sooner we get back to the 10 per cent overload, the better it will be for the equipment.

J. H. Milton (C. R. I. & P.): The only way that a car can be kept in service with the heavy tonnage handled at the present time is by reinforcing it. When we can get a system in force throughout the United States that will make all the roads reinforce their cars we will get good equipment. Until that is done we will simply repair the cars from time to time and get nothing from our labor. The majority of railroads are spending $50 to $75 to repair cars which only move off the repair track to become bad order again within a week or two. By spending $400 or $500 on these cars they could be put in first-class condition. The equipment is getting worse every day, particularly on the Eastern lines.

F. P. Schultz (Chicago Car Interchange Bureau): The designs of cars are so varied that it is practically impossible to keep a stock of the proper material for reinforcing these cars away from the home road. The Railroad Administration is now moving cars in bad order to the owning roads, and when they get home it is to be hoped that some rules will be formulated that will keep the car on the home road if it is not up to a certain standard. As far as the box car is concerned, I think as long as it is of a design that is kept in general service, it should be maintained in 100 per cent condition. A rough freight car may be given a load that it will carry, but when it is unloaded it may be in a district where there is nothing but grain loaded and the rough freight car will bring back the load of grain which it is not fit to handle. The proper way to handle the rough freight car is to mark it bad order if it is sent out under load.

W. G. Wallace (American Steel Foundries): We have heard a great deal about what has been accomplished by the united efforts of the men in the different regions in handling traffic. Would it not be a good idea to have the transportation men keep more closely in touch with the mechanical men and to prevent car repairs, instead of having so many cars bad ordered? There are a good many things that could be done by getting the transportation officers more interested in the mechanical department problems.

Mr. Milton: I believe the type of underframe required under cars depends largely on the type of draft gear. If a friction draft gear is used the entire shock is thrown on the draft sills. After a spring gear has traveled 1¾ in. the coupler strikes the dead wood and the shock is distributed

on all the sills. This takes the load off the draft sills to a certain extent, and for that reason I think it is useless to have a heavy underframe under cars equipped with spring gear.

G. S. Goodwin (C. R. I. & P.): I agree entirely with what Mr. Milton has said. Incidentally, it might be of interest to note that mechanical department Circular No. 8 provides that draft sills must be constructed to accommodate friction draft gear, and also that the coupler shall be applied with 3 in. clearance between the coupler horn and the deadwood. The circular permits the application of two class *G* draft springs which have a travel of about 1⅞ in. That means that the spring gear must take all the shock, since the horn of the coupler is 1⅛ in. away from the dead wood. It is easy to see what will happen under those conditions.

E. H. Hall (C. G. W.): I do not see how there can be much improvement in the condition of equipment as long as the present rules are enforced. Order No. 12 states that Interstate Commerce Commission accounting rules must be observed. These rules provide that when the cost of repairs exceeds the major portion of the cost of the car to the carrier, the equipment must be retired. With the present high cost of labor and material the cost of repairs often exceeds 50 per cent of the book value, particularly when equipment has been acquired second hand or through receivership. To get such cars back into service requires additions and betterments which are chargeable to the corporation. It seems that the only thing to do in such cases is to put the cars on a side track until the Railroad Administration or the corporation can agree on the distribution of cost.

F. C. Kroff (Pennsylvania Lines): We have filed the inspection report on a considerable number of cars and have them set aside awaiting disposition. Up to the present time we have received no instructions from the Railroad Administration regarding this equipment.

C. J. Juneau (C. M. & St. P.): We are holding about 200 cars between Minneapolis and Milwaukee awaiting disposition and many more are coming in.

Conservation of Material by the Store Department*

Care in Ordering and Handling Will Prevent Waste; Systematic Methods Needed in Reclamation

By J. G. Stuart
General Storekeeper, Chicago, Burlington & Quincy

CONSERVATION LIKE MANY other good things should begin at home. The storekeeper should begin his conservation when he is ordering material. In many cases he orders material which is not really needed and thereby builds up a condition which will call for conservation later. Too much care cannot be exercised in ordering supplies—whether they be for store stock or for special material which is not ordinarily carried in stock. Once an article is ordered that is not really needed we are very fortunate indeed if we are able to get 100 per cent of the value out of it, but if we can prevent the ordering of the article we have surely saved 100 per cent right at the beginning and have also saved the labor of ordering, handling and hauling.

Often the work of ordering material is delegated to someone else. This is bad practice, as there is no more important work in the store department than looking after the ordering of material.

Proper Handling as Important as Intelligent Ordering of Material

The next step in conservation and really one of very great importance is proper care and handling of material. A great deal of money is lost to railroads every year by breakage, leakage and marring of material in various ways, which unfits it for service. These sources of loss can be materially reduced if supplies are properly handled and cared for.

Every man having to do with the handling of material and particularly those who are handling it after it is unpacked should be instructed, so far as it is possible, as to the nature of the material, the use to which it is to be put, the way in which it may be damaged, so that it loses its usefulness entirely, or at least is injured so that only partial service may be had from it. A little rough treatment, in most cases entirely unintentional on the part of the man handling the material, causes expense away out of proportion to the value of the article itself.

A great many articles, many of them of considerable value are left exposed to the weather and thereby rendered almost valueless, or they are handled roughly and must be scrapped because of broken threads or other damage. A carton of electric light bulbs is given a little rough handling and a lot of the lamps are spoiled; although there may be no great difference in the appearance. Iron or steel castings are often finished and then left exposed so that finished surfaces become rutsy. Oil applied to the finished part will preserve the casting.

Rubber hose and all kinds of rubber naturally deteriorate after they have been on hand any great length of time. This should be thoroughly understood by those handling them so the sheet rubber, packing and hose which have been on hand longest will be used first. Proper care should be taken so that rubber is not stored in the bright sunlight or in some unusually dry place; when rubber hose is dated, these dates should be observed by mounting and using the oldest first.

Oil is sometimes shipped from oil houses in cans, barrels and transportation tanks which have not been properly cleaned or have previously contained oil of a different kind. Occasionally illuminating oil is put in a container that has contained lubricating oil and the oil is contaminated so that it is not fit for use. In other cases containers are not properly inspected and after being filled and shipped, leaks develop which cause considerable waste of oil and often damage to other freight in the same car or perhaps makes the floors oil soaked and prevents the use of the car for high grade shipments.

Exposure of Material Causes Waste

Finished lumber is often stored out of doors and considerable loss is occasioned by warping and splitting. It is a common sight to see a railroad lumber yard where practically all of the lumber is stored outside and only a short distance away a commercial lumber yard where the lumber of the same kind is under cover.

Track bolts are often piled outside and the nuts rust in the

*From a paper presented at the annual meeting of the Railway Storekeepers' Association in Chicago on January 25.

bolts to such an extent that considerable extra labor is needed when the bolts are put in the track. If it is necessary to store outdoors and the bolts are not oiled when purchased they can be easily oiled by immersing the keg in an oil bath at time the bolts are received. The oil bath and the extra handling does not amount to more than a couple of cents per keg.

Track spikes as well as bolts are often piled outside in such a way that the kegs are apt to fall apart and a great deal of extra labor is necessary to handle the spikes although the contents may not be injured.

Machine bolts and all kinds of rods and forgings having thread connections are often left piled in such a way the threads are exposed and in many cases entirely spoiled or if not there is extra work in getting the nuts on and off, which would not be necessary if the threads were properly cared for.

Frogs and switches are generally piled outside and often rust badly. A little oil applied to the bolts and nuts will in most cases prevent the rust.

When packages reach the destination with the contents broken or damaged, it not only means that the value of the material has been lost but perhaps a further loss will be entailed waiting for a duplicate shipment.

Even though material has deteriorated to some extent the store department can charge it out at its stock value. But even though we do charge it out at its original value something has been lost. In order properly to conserve material every man on the road must look at it from the standpoint of the railroad and not from the viewpoint of his department alone.

With proper attention to the housing of material large losses can be avoided and while there are perhaps no figures to show that these losses are, anyone who has ever been around a storehouse realizes that they are really serious.

A storekceper is always in a position to call attention to defects in large amounts of material used. Many times a design is not as good as it should be, or there is a weak spot in a certain casting or for other reasons an unusually large number of the items are being used. By carefully watching the stock book the storekeeper will note this unusual consumption and is in a position to report to the department interested so it may investigate and correct the design or strengthen the casting so as to prevent excessive breakage.

Reclamation

One phase of conservation that has come to the front very prominently is reclamation. Notwithstanding the exercise of every possible care in the ordering and caring for material, there is still a great deal of material that is available for reclamation; material that has been used once and by repairs or reworking can be made fit for service again, or material that has been used and by a change in form may be made fit for other purposes.

Some may still question the need of reclamation on railroads, but if these had visited a certain scrap dealer's yard in Chicago, where railroad scrap is handled, a short time ago, I am positive they would be convinced that reclamation is needed and needed badly. In this particular yard there were several thousand tons of scrap and in the scrap were many nuts, bolts, washers, small parts of couplers, knuckles and other smaller items which were perfectly good or could have been made so with very little work. In addition, there were many couplers that did not require any work; in fact, the scrap dealer wanted to sell a carload of good couplers. In addition to the couplers which should have been saved and which did not need any repairs whatever there were a great many which could have been repaired in any up-to-date reclamation plant. There were many brake beams, some needing heads, some fulcrums and some other small parts, but in the great majority of cases very small repairs would have made them fit for use again. In fact, one brake beam, so far as could be ascertained, needed only one nut to make it fit for service.

Reclamation is a subject that requires constant and careful attention and unless most careful attention is given we are apt to find that instead of making a saving we are only incurring additional expense.

Two objectives stand out clearly in reclamation. One is the need of the material after it has been reclaimed, and the other the fact that material can be reclaimed for less money than it can be purchased for. It is true that it often pays us to reclaim material even though it costs decidedly more than it can be purchased for, but this can only be practiced in emergencies or when the item reclaimed is such as will enable us to put a far more expensive item into service. For example, it might not pay to reclaim brake heads under certain conditions, and yet, if we were short of brake beams and also out of brake heads, it might pay us to spend considerable extra money in order to reclaim brake heads so as to enable us to put brake beams into service. As stated above, however, such cases should be the exception.

The constant danger in reclamation is that, unless stock is very carefully watched, material will be reclaimed even though it is not needed, merely because it has been the practice to reclaim it.

The maintenance of accurate and reliable records is essential to prevent the reclamation of material which will cost more than its purchase price new. One thing should be borne in mind at all times—that records must be correct. There may be some justification for a man endeavoring to fool someone else, but it hardly seems possible that there is any justification for his fooling himself, and the man who makes false entries in his reclamation record is simply practicing self-deceit.

To maintain a proper cost record we should have the different articles reclaimed, accounted for separately. It is not at all wise to group a lot of items; for, even though we may be making a saving on the group as a whole, some of the items may be costing too much to reclaim and therefore should not be reclaimed.

The saving made by reclamation will, of course, be the difference between the market value and the total cost of the reclaimed article (including its value as scrap, plus the value of any additional material used in reclaiming it, and the cost of labor, including supervisory and clerical forces and shop expenses). This cost should be checked up often enough to reflect the changes in market conditions or labor costs.

A scrap dock is usually located at a point which will provide good shipping facilities to points where scrap is sold. Generally the reclamation plant is located close to the scrap dock. In many cases a better location for the reclamation plant could be found, but on account of the extra handling which would be necessary on the material it is generally found better to have the reclamation plant at the scrap dock.

In most cases material which is fit for further use should be reclaimed at the point at which it is released—that is, as much of it as can be used at that point. Strict attention should be given to this to prevent long hauls to scrap docks and back to the point where the material will be used. Of course, all of the material cannot be reclaimed at the point at which it is released, therefore plants with larger capacity and better facilities should be established at central points where the minimum haul will be obtained.

Material can be reclaimed more cheaply and in a great majority of cases better at large centrally-located points, as in this way it is possible to get laborers who specialize on reclaiming work with special machinery and therefore do this work better than regular mechanics, although they are in many cases not as highly paid as mechanics would be. In fact, until recently a reclamation plant was a splendid place in which to use handy men.

In establishing or maintaining a reclamation plant it is important to get the co-operation of the other departments in using the material that is reclaimed. There seems to be a natural prejudice against using second-hand material or material that has been worked over and it seems that even workmen prefer to work with new material. We must secure the aid of the foremen of the other departments so they will be firm in their insistence that reclaimed material be used wherever it is suitable.

It is certain that some material will come to scrap or reclamation plants which should not have been scrapped. If the store department makes a great stir over this and perhaps brings down criticisms on those who send it in, such action will, to a great extent, defeat our object. Other departments should not be allowed to become careless in sending in a great deal of usable material, but where there are occasional slips the matter may be called to the attention of those who are to blame as a matter of information, rather than censure. I heard one man remark that he would spend $10 in sorting over his scrap rather than have ten cents' worth of usable material found in the car which his men had loaded. Let us endeavor to keep away from such uneconomical practices.

Learn from Reclamation Methods of Other Roads

It is interesting to go over various roads and investigate the different practices and to note that one road effects large savings on certain items while on another road the same things are not reclaimed at all. No two roads seem to be reclaiming all of the same kind of material, so there is something for each one to learn from every other road.

Recently an inspector was sent to a road when they were loading out scrap couplers and knuckles to pick out such couplers and knuckles as in his opinion could be reclaimed. He was instructed not to take anything until the employees of the road had decided that the article was scrap. Out of one carload of scrap which was shipped he picked out 131 couplers and 263 knuckles which in his opinion could be reclaimed. After allowing for the expense of repairing them and also allowing for their value as scrap, the net saving amounted to over $1,500, considerably more than the entire carload of scrap was worth. This is not an exception—the same thing was tried on another railroad with almost the same results.

Our reclamation men must be broad minded. Those who stay at home generally lag behind and the men of small minds who go to other places, not with the idea of learning anything but to satisfy themselves that their own methods are best, usually are the ones who will fail on reclamation work. The men having to do with reclamation must be broad minded and constantly on the lookout for improvements, constantly searching for additional items to reclaim. Many items were legitimately scrapped five years ago which can now be reclaimed by the use of acetylene. Constantly keeping up to date on methods is necessary in reclamation work.

Items Reclaimed with Profit

I do not wish to give an entire list of all material that can be reclaimed on the railroads. Such a list would be almost endless. In making mention of the few cases of reclamation which follow I have picked out those which are not so common and those which have come to my notice within recent months.

Steam hose gaskets usually costing about 35 ct. each may be reclaimed for 6 or 7 ct. and put back into service. Bolts of one inch diameter and larger, where the head is good, may have an end welded on for threading at a saving of perhaps 50 per cent of the cost of new material. Cast iron wheels may have the flat spots ground out of them by grinding the entire tread of the wheel and making them perfectly round again.

Cattle guards, gates and sign posts may be made from scrap flues. Good scrap pipe and short pieces of new pipe may be made into nipples. Several railroads are welding six-foot lengths on flues which would otherwise be scrapped.

Long time burners usually costing about 35 ct. may be reclaimed and put back into service for not to exceed 3 ct. One road has been saving all of the scrap stay bolts and double refined iron, rattling the lime from them and making slabs of this scrap which are forged into driving rods. Track spikes are reclaimed on most roads. One road has been reclaiming them and sorting them into No. 1 and No. 2; the better to be used in yard and other tracks where there is no great speed and the No. 2 which are a poorer grade, to be used on tracks around shops, rubble car tracks and storage tracks.

Old track shovels, when worn to such an extent as not to be serviceable on sections, can be used for stations, way cars, watch shanties and other places where a coal shovel or small shovel is needed. Second-hand scoops not fit for firing engines are perfectly good for handling cinders on sections.

All kinds of sheet iron as well as scrap flues may be used for making washers. Tie plates, after having been in service, may be repunched and used with lighter rail. Frogs, crossings and switch points may be built up, either in the track or at scrap rail yards.

Cement sacks in all cases are returnable to the shippers. The great question is, does the store get back all of the empty sacks? To accomplish this one road is keeping a very careful check on all of the sacks of cement sent out, showing the car number, date of shipment, consignee, and point to which shipped and is tracing to see that the same number of empty sacks are returned after the cement has been used. Each individual job must be followed up or the best results will not be obtained.

A large number of roads are upsetting their larger car axles and making them into the next smaller size. This accomplishes a large saving. Most roads are insisting that old material be turned back when new material is issued. This has the effect of bringing back to the store many articles which can be reclaimed. One road has made a saving by numbering each lantern issued, charging it to the individual and insisting that the old lanterns be turned in.

There is room for a great saving in the use of secondhand lumber. Roads are constantly taking out old bridges and, though the lumber may not be good enough for use in bridges again, it is satisfactory for other purposes. A resaw established in a lumber yard will generally pay 200 per cent per annum on the investment. In addition to cutting up and getting second-hand lumber in service it enables the lumber yard to furnish any odd size pieces that may be called for.

Wonderful results have been obtained by welding and building up couplers, knuckles, bolsters and other steel castings by the use of acetylene.

In many cases a rerolling mill will give excellent results. I do not think that the returns are nearly as large from a rerolling mill where large sizes can only be reduced to smaller ones, as from a rolling mill where scrap iron may be piled and rolled into any size bars needed. A rolling mill, of course, can only be worked to good advantage on a large road where there is a great deal of scrap of the proper kinds for rolling obtainable and where there is a large demand for bar iron.

To get the best results from a reclamation plant the work should be kept up to date. If large quantities of reclaimable material are allowed to accumulate it is almost certain that the road will buy new material when other material might be reclaimed and put back into use. A reclamation plant has many other advantages. One is that it enables a road to help itself in emergencies as it can generally get from the reclamation plant a few of almost any article needed. It

also has the advantage of cutting down the investment in stock as material is immediately available after reaching the reclamation plant; in fact in many cases it can be reclaimed and put back into service on the same day on which it is received and in most cases within two or three days.

I have not attempted in any way to exhaust this subject; in fact the subject is inexhaustible. I have merely tried to point out some of the fundamentals of conservation and some few particular items. I believe that it is a work that should be given a great deal more attention than has been given to it in the past and if this attention is given I am sure we will get results that will make good returns to the railroads.

The Elimination of Unnecessary Telegraph Messages

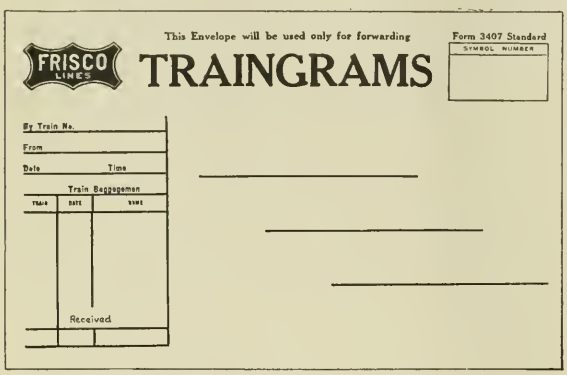
Traingram System in Use on the St. Louis-San Francisco Prevents the Abuse of This Service

By J. H. Brennan

Superintendent of Telegraph, St. Louis-San Francisco, Springfield, Mo.

THE DESPATCHING of important communications by train mail in specially provided envelopes to distinguish them from ordinary railroad mail is not a new idea. Most railroads have had in effect such a service in one form or another for several years. The St. Louis-San Francisco, prior to the inauguration of the present traingram system, had a standard mailgram envelope, which was originally designed for mailgrams, but because of the lack of proper supervision and restrictive instructions it became so commonly and indiscriminately used that the purpose for which it was designed became nugatory.

The present traingram plan on the St. Louis-San Francisco is, in part, the outgrowth of a campaign to eliminate unnecessary telegraphing. The stereotyped explanation that the wire was used because the mailgram service (or railroad



mail) could not be depended upon, especially for deliveries, made it apparent that the objectionable features must be overcome if the wires were to be relieved of the correspondence that did not actually require telegraph service. Recognizing that a dependable traingram service was a necessary adjunct to a campaign to abolish unnecessary telegraphing, a circular was issued by the chief operating officer inaugurating the system under the supervision and control of the telegraph department.

The Application of the System

Traingram blanks and envelopes of a distinguishing color (blue) were provided, and their use restricted to the traingram service. For the purpose of identifying and maintaining a service record on traingrams, each department was assigned a letter or a combination of letters, and each desk in the department that was authorized to send traingrams was assigned a sub-letter, to be followed by a number, the numbers to run consecutively on each desk. These letters and numbers are preceded by the telegraph call of the office at the point of origin. For example, assuming that the office of the superintendent of transportation at Springfield is assigned the letter *S*, and the chief clerk in that department is assigned the letter *B*—the telegraph call for Springfield being *S*, his first traingram on the first of each month bears the following symbol: "S-S-B-1."

Consolidating offices were established at the more important points and placed under the authority of the managers of the relay offices; or, where there was no relay office, under the division operator or agent. At these points outgoing traingrams are delivered, open, to the consolidating office, where they are consolidated and their numbers entered in duplicate on a form provided for that purpose which shows the envelope number, symbol, destination, train, date and time. The duplicate copy of this record is enclosed with the traingrams in an envelope. This envelope is delivered by special messenger to the train baggageman, who is required to receipt for it. At the receiving stations, the contents of the envelopes are checked against the forwarding record, and if any discrepancies are found they are adjusted with the forwarding office by wire.

All traingrams addressed to individuals at a point where there is a consolidating office are, as far as practicable, placed in one envelope and addressed to the consolidating office, instead of being addressed to the individuals direct. All traingrams are "tied out" by the train baggagemen. This method of handling eliminates delays that might occur if these envelopes were to pass through the regular railroad mail channels.

At consolidating offices messengers meet all passenger trains on which traingrams are forwarded, delivering outgoing traingrams and receiving incoming ones. The latter are taken immediately to the consolidating office, where they are checked with the forwarding offices' record; and they are then time-stamped and delivered. It will readily be seen that with the traingrams listed at the originating station, together with the number of the envelope in which such traingrams are forwarded, and a check of the forwarding record at the receiving office, it is possible to trace a traingram from the sender's desk to the addressee's desk.

Numbering and Checking the Traingrams

Traingram envelopes between consolidating offices are numbered consecutively. Where there are several trains a day between these offices, as is the case between St. Louis and Springfield, certain trains between the two points are designated as the ones on which traingrams will be for-

warded. If traingram envelopes are forwarded on other than designated trains, the receiving office is notified by wire of such irregular forwarding.

Numbering the traingram envelopes consecutively enables the receiving office to check failures. If the sequence of the numbers is broken, the forwarding office is immediately notified by wire, and the senders of the traingrams in that envelope are immediately advised. Traingrams addressed to individuals at points where there are no consolidating offices are recorded at the sending but not at the receiving stations.

The term "traingram," as describing this service, is used advisedly. The service covers only communications that are to be forwarded by train. Interchange of memos and correspondence between offices located in the same city is not contemplated.

This system has been in effect on the St. Louis-San Francisco for over four years, and has proved entirely satisfactory and dependable. The loss of a traingram is as rare as is the loss of a telegram, and as explained above, when necessary, the service of a traingram can be investigated and determined as accurately as that of a telegram. On a railroad situated as is the Frisco, where practically every division headquarters can be reached from operating headquarters by overnight train service, the service can be used as an auxiliary to the telegraph, with a resultant improvement in the preferred service by wire and a decrease in the cost of operation.

The Saving Accomplished

During the month of December, 1918, a total of 33,418 traingrams, or an average of 1,078 a day, were handled between consolidating and the more important offices. While it is true that not all of these communications would have been forwarded by telegraph had there been no traingram service, it safely may be stated that 75 per cent of this business, or an average of 809 messages a day, would have been filed for transmission by wire.

The telegraph service may, therefore, be credited with a saving of 809 messages daily. This number of messages reduced to operator hours (one sending operator and one receiving), means that seven operators would be required to handle this business, at an average monthly salary of $159 each, a total of $13,356 per annum. From this should be deducted $3,000 yearly for additional messengers and clerks employed to handle the traingram service, leaving a net theoretical saving of $10,356 per annum, made by the traingram service.

A further feature of value of this service is the absence of any restriction in the length of the traingrams, such as obtains under a censored telegraph service. In the above estimate, approximately 300 traingrams handled daily between local points, of which no record is maintained, were not taken into consideration.

The traingram blank, on blue paper, is like a telegraph blank, with a note at the top to the effect that it must not be used for any purpose except traingram service. The traingram envelope shown, reduced in the engraving, is 9 inches long. The record, form 1214, filled out to be enclosed with the traingrams in each envelope which is sent from a consolidating office, is on a sheet 8½ in. wide and 10¾ in. high. The headings of this sheet are shown at the bottom of the page.

The Belgian Railwaymen and German Oppression*

BELGIUM HAS, IN PROPORTION to her size, the greatest length of railway of any country. There are 2,859 miles of line, representing 30.29 miles for every 100 square miles, as against 22.38 in Great Britain, 15.72 in Germany and 11.72 in France.

These railways are state property, and besides them there are 2,091 miles of light railways worked under the control of the National Society for Local Railways, administered by a council of members, two appointed by a council of four members, two appointed by the state and two elected by the shareholders. The state also appoints the chairman and general manager, and the shareholders elect a supervising committee of nine members (one from each province).

Though these light railways are partly state controlled, the employees are servants of the company, whereas service on the main railways is government work and ranks with the posts and telegraph as "civil service."

Drivers Refuse to Work for Germans

At the time of the invasion (August-September, 1914) the engine-drivers whenever possible took the engines into France. Many of their engines, not being immediately required there, were dismantled and sent to Russia where the transport crisis was most acute. Comparatively few mechanics, however, escaped in this way, and owing to the terrible congestion on the lines, by no means all the engines, so that the invader would have soon been able to use the lines and rolling stock left. The Belgian railwaymen, however, refused to carry on the service, and German employees had to be introduced, who, owing to their lack of experience, especially of the lines constructed on an inclined plane, were the cause of many accidents and the dislocation of urgent military transport.

After their failure to break through to Paris or Calais, and their defeats of the Marne, on the Yser and before Ypres, the Germans began to organize for a long war and to draw all fit men into essential services. As many Germans as were required for an army corps were employed on the Belgian railways, and, in order to free them for military service, the occupying government tried to persuade the Belgian railwaymen to return to work, pointing out to them that the railways were still of service to the civil population when not required by the military. The Germans offered an all-round increase of wages and specially high rates to drivers (at Liege £2 ($10) per day was offered to drivers accustomed to the inclined plane of Haut Pré). All the railwaymen refused these offers, and resisted with the same courage when the Germans tried force instead of persuasion.

Bribery and Threats Useless

By the spring of 1915, after six months' vain attempts to bribe the railwaymen, finding the rolling stock badly in need of repair and being unable to spare mechanics to deal with it, Germany began her policy of force. At Luttre (where the great Belgian repair works are) a deputation of 30 workmen was called and formally offered 5s. to 7s. per day for ordinary workmen and £1 per day for drivers. They refused on behalf of all their comrades. They were then shut up in railway carriages and threatened with de-

*From the Railway Gazette (London).

TELEGRAPH DEPARTMENT

RECORD OF TRAINGRAMS

Forwarded to ..... Office ..... 19....

Envelope No.	SYMBOL	TO	TRAIN	DATE	TIME	Envelope No.	SYMBOL	TO	TRAIN	DATE	TIME

portation to Germany, where they would be obliged to work without payment. Their families were told the same thing, and asked to persuade them. Next day a large crowd gathered at the station, and when the train containing the still resolute workmen moved off it was loudly cheered, the prisoners replying with shouts of "Vive la Belgique." After all, the men were liberated at Namur.

Next, 100 men were collected in a canteen and harangued by a German officer, who promised them a certificate stating that they had only gone to work when forced to do so. "Let those who agree to work step forward," he ended. All the men stepped backward, shouting "Vive la Belgique, Hurrah for our soldiers." After the men, the master, M. Kesseler, manager of the Luttre Railway workshop, was arrested and kept two days in prison. On April 12, 1915, he was sent under military escort to meet his men, who were also guarded and had each been served with a written threat of imprisonment in Germany if they refused to work. The German officer in charge ordered M. Kesseler to persuade his men. He replied that both he and the foremen had taken the oath of allegiance to their King and could not do anything contrary to it. On being again urged and threatened, he consented to speak. He read aloud the German communication, adding: "I leave you to judge what your duty is." The men cheered and refused to work. M. Kesseler and two of the staff men were imprisoned, 190 men were immediately sent to Germany, and 60 more were arrested on June 5.

Another typical instance took place at Malines the same month. Under pressure from the military the burgomaster placarded notices stating that the German authorities called upon the railwaymen to present themselves at the office of the German engineers in charge of the works. No one responded. The Germans then secured the names of the men, arrested them singly in their homes and escorted 500 of them to the works, where, on their refusal to work, they were incarcerated. Finding the men stubborn, the Germans penalized the town. No one was allowed to enter or leave it, and the population had all to be indoors by 6:30 p. m. Still the men would not give way, and eventually the Germans were obliged to raise the embargo without having achieved their object.

Railwaymen Deported

Throughout 1916 the administration in Belgium took every step calculated to increase unemployment, with a view to forcing the men, through distress, to work for Germany. The two main features of this policy were the requisitioning of raw materials and refusal to allow the communes to carry out public works on which they might have used the unemployed.

By the autumn there was an enormous number of unemployed, and the Germans made this an excuse for introducing forced labor. In October began the deportation to Germany of Belgian workmen, whereby, during a few months, between 150,000 and 200,000 men were enslaved. Some of the railwaymen from Nivelles were among the first victims. No discrimination was made between employed and unemployed. At Quaregnon, for instance, 1,000 men were called up and 304 chosen, of whom 227 were employed. After quoting this and 19 similar instances, the senators and deputies of the district of Mons, in a written protest to the German government, add, "Is this the effect of chance? No; generally the choice of men who have work in Belgium is deliberate. The recruiting officers seem to have a marked predilection for the most experienced workmen of certain industries; foremen, men from machine shops and rolling mills, glassmakers, shoemakers, fitters, electricians and farmers."

As regards the railwaymen, the Germans were really more anxious to use their services in Belgium than in Germany, and instances of pressure brought to bear on them, and which amounted to a regular persecution, are too numerous to mention. At Tournai the railwaymen were condemned to four months' imprisonment for refusing to work on German engines. Finding them equally obdurate at the end of their sentence, it was in December increased to a year's imprisonment, during which time they were nearly dying of hunger. During 1916 in Brussels some mechanics were summoned to drive German trains, and were kept three weeks at Kommandantur, alternatively threatened and cajoled. Finding them still determined to give no assistance to the enemy, the Germans ordered the banks to cease any payments of money to their wives and families. The mechanics, still resolute, were deported to Germany, leaving their families either to live on charity or to starve.

Workshops and Plant Destroyed

In 1917 the occupying power increased its demands on the factories and workers of Belgium. It sequestered every workshop for which it could find the personnel, either by importing German or prisoner labor, or by bribing a few of the former workmen. But the majority of the factories could not be worked for lack of labor, and the Germans determined to get what use they could out of them, either by taking the machinery to Germany or smashing it up for shrapnel. At Thy-le-Chateau a lot of railway material, including the cast-iron pillars for the Nord-Midi junction in Brussels, a number of buffers, grease boxes, etc., were thus reduced to scrap iron. Some light railway material had been contracted for at Bruges before the war to the Argentine government, and was all seized.

At the same time they tore up many hundreds of miles of light railways in Belgium and seized the material and rolling stock belonging to the companies. It is supposed that the lines were relaid on the Western front. Rails were one of the main productions of the flourishing Belgian iron and steel factories, but most of the heavy machinery employed in their manufacture was removed to Germany or broken up.

The names are on record of 42 factories thus destroyed in 1917, among which are the railway shops at Malvourt, while others, chiefly in Hainaut, are mentioned in groups of 10 or 20. From this list it can plainly be seen how the owners and men of factories whose production might be useful to the enemy preferred to see their property destroyed or to suffer distress caused by unemployment rather than to put themselves under German guidance.

Railwaymen Resist to the End

Passive resistance in its various forms was still carried on in the occupied provinces during the earlier part of 1918. Life was hard everywhere, but especially in the zones immediately behind the front, which were under military rule, and where compulsory labor was enforced drastically on all who could in any way be useful to the armies.

Transport was, there especially, a vital question for the Germans, and no one with any knowledge relating to it was exempted from the trial of enslavement under threat of German machine guns, often within range of Allied shell fire. Even in this zone of horror patriotism still lived, and the railwaymen were not unworthy of their 10,000 comrades serving with the colors the other side of the Yser. In February, 1918, at Mouscron, a small town in West Flanders, two guards and a railway laborer were sentenced by a military court for "acts opposed to German interests." One of the guards was condemned to death and immediately executed, the two others were sentenced to 15 years' hard labor. In order to terrorize the population the town was placarded with their names and punishments. We may be grateful thus far to Germany for giving us their names to honor, Achille Debacker, executed; Henri Debavoy and Jules Leuridan, imprisoned.

Railroad Prospects Are Still Uncertain

Five-Year Plan Side-Tracked—President May Postpone Decision as to Relinquishment of Roads

WASHINGTON, D. C.

WITH FORMER DIRECTOR GENERAL MCADOO'S plan for a five-year extension of federal control finally side-tracked as far as this session of Congress is concerned and with the prospects for an extra session of the new Republican Congress still uncertain, the question as to the disposition of the railroads is still an unanswered one. There has been a strong expectation that President Wilson, who is spending this week in Washington, might reach some decision as to a future date for the relinquishment of the railroads before leaving next Wednesday on his return trip to the peace conference at Paris. It was also thought that he would decide on the question of an extra session of Congress which would afford an opportunity for the consideration of permanent railroad legislation, but it was announced on Tuesday that he had decided under no circumstances to call an extra session until after his second return from Europe, which may be as late as June, and it is said to be quite possible that no decision as to the relinquishment of the railroads will be reached during his present stay.

In his address to Congress in December the President said: "The only thing that is perfectly clear to me is that it is not fair either to the public or to the owners of the railroads to leave the question unanswered and that it will presently become my duty to relinquish control of the roads, even before the expiration of the statutory period, unless there should appear some clear prospect in the meantime of a legislative solution." If there is yet any clear prospect of a legislative solution it is by no means apparent to a casual observer and there are many in Washington who have believed that the roads would be returned as of June 30, but Director General Hines, who is expected to confer with the President on railroad matters before he leaves, although he has said the roads must be returned soon unless there is an extension, testified before the appropriations committee of the House that he doubted very much if there could be a relinquishment earlier than this fall.

The principal concern of the Railroad Administration at this time is to get the additional appropriation of $750,000,000 for its revolving fund, which was passed by the House on Friday, February 21, and which is still pending in the Senate. Director General Hines and Secretary of the Treasury Glass appeared before the appropriations committee of the Senate on Tuesday, urging the necessity for the passage of the bill at this session in order that the administration may meet its obligations as they come due. The committee is expected to report the bill as a rider to the general deficiency appropriation bill which is one of the measures that must be passed before Congress can adjourn, and the President is using his influence to insure its passage.

The Senate Committee on Interstate Commerce concluded its hearings on Friday, February 21, and at an executive session on Tuesday of this week decided to make no recommendation to the Senate either as to the five-year plan or as to any permanent plan for the solution of the railroad problem. The House Committee on Interstate and Foreign Commerce had previously decided not even to hold hearings. The Senate committee did order a favorable report on Senator Cummins' bill, introduced immediately after the armistice was signed, to amend Section 10 of the federal control law. The purpose of the bill is to restore to the Interstate Commerce Commission its former authority over increases in rates by eliminating the provision which authorizes the President to initiate rates without suspension by the commission, but as the section now provides for a final review by the interstate commission of all rates initiated by the President, it is believed that the amendment might also remove the ground on which the Railroad Administration has asserted its independence of the rate authority of the states.

The committee also reported favorably a bill introduced by Senator Poindexter of Washington, to amend the fourth section of the commerce act.

Senator Poindexter's bill, S. 313, proposes to amend the fourth section to make the long and short haul clause of the federal act absolute, that is, to prohibit the charging of a higher rate for a shorter distance than for a longer distance, eliminating the authority granted to the Interstate Commerce Commission in the present law to permit exceptions. The bill is, of course, directed against the practice of the railroads which has been permitted by the Interstate Commerce Commission of making lower rates to the Pacific coast terminals than to the intermediate points. The subcommittee to which the bill was referred had taken 700 pages of testimony, but the bill received only a few minutes' consideration by the full committee and it is recognized that it stands no chance of passage in the few remaining days of the present session. Its enactment would cause a revolution in the rate structure, upsetting the thousands of adjustments authorized by the commission in its fourth section relief orders. It would amend the present section to read:

"It shall be unlawful for any common carrier subject to the provisions of this act to charge or receive any greater compensation in the aggregate for the transportation of passengers, or of like kind of property, for a shorter than for a longer distance over the same line or route in the same direction, the shorter being included within the longer distance, or to charge any greater compensation as a through rate than the aggregate of the intermediate rates subject to the provisions of this act, but this shall not be construed as authorizing any common carrier within terms of this act to charge or receive as great compensation for a shorter as for a longer distance.

"Whenever a carrier by railroad shall, in competition with a water route or routes, reduce the rates on the carriage of any species of freight to or from competitive points, it shall not increase such rates unless after hearing, and an order granting permission therefor by the Interstate Commerce Commission.

"This act shall take effect 60 days after its approval by the President."

No action was taken on Senator Cummins' bill to prevent the President from relinquishing the railroads short of the 21 months period after the proclamation of peace unless authorized by Congress. The senator announced that he would press the measure on the floor of the Senate either as an independent measure or as an amendment to the $750,000,000 appropriation bill.

After his hearing before the Senate appropriation committee Mr. Hines gave out the following:

"While the committee gave no indication of its attitude, I feel that I have succeeded in demonstrating to the committee the absolute necessity for the entire appropriation and its extraordinarily urgent character. The Railroad Administration needs practically the entire appropriation inside of the next 60 to 90 days to meet obligations which it assumed in the calendar year 1918, partly for rentals to the railroad companies and partly for equipment and other additions and betterments. The appropriating of this money at once will be

of immense value in clarifying the situation, enabling the government to pay without any delay whatever all its obligations as they fall due. This will greatly improve the financial situation of the railroad companies and of the equipment companies and therefore will have an important bearing on the financial conditions generally. It will also enable the Railroad Administration to go ahead without question on its conservative program of maintenance and improvements. I believe I made it clear to the Senate committee that this entire appropriation is really needed merely on account of capital temporarily tied up in the government's control of the railroads; and indeed that of the entire $1,250,000,000 which will have been appropriated if this appropriation shall be granted, practically $1,000,000,000 will be returned to the government as the railroad companies liquidate from time to time their indebtedness to the government. I believe that this process of liquidation will go forward with greater and greater rapidity. This fact of reimbursement of the government for nearly all the money appropriated for the railroads differentiates this appropriation from nearly all other appropriations made by the government. The fact that these moneys are largely due now and that the rest will become due so rapidly differentiates the appropriation from the ordinary supply bills which will not begin to be needed until July 1st next, and makes the appropriation a peculiarly urgent one."

Appropriation Bill Passed by House

The bill appropriating a $750,000,000 addition to the revolving fund of the Railroad Administration was passed by the House on February 21 by a vote of 311 to 14, but not until after a strenuous effort had been made to tie a string to it by amendments to prevent the relinquishment of the roads by the President before Congress has had an opportunity to enact remedial regulatory legislation. An amendment offered by Representative Rayburn of Texas adding a proviso that the roads should not be returned until December 31, 1919, was defeated by a vote of 103 to 51, and a similar amendment by Representative Esch fixing the date as July 1, 1920, was defeated, 91 to 73. Another amendment, to limit the amount to $381,000,000, was also lost. The debate, which covered five or six hours, brought out a storm of criticism of the government's handling of the railroads from the standpoint of expenses and service, and most of the representatives who spoke in favor of the bill took occasion to express their opposition to government ownership or continued government control beyond the time necessary for Congress to enact permanent legislation. The amendments were only defeated after strong appeals had been made to the Democrats by Chairman Sherley, of the appropriations committee, and to the Republicans by Representative Cannon, a member of the committee, to disregard collateral issues and grant the appropriation necessary to enable the Administration to discharge its contract obligations. Many of the speakers indicated their disinclination to vote for the bill except for the necessity for paying the amounts owed by the Railroad Administration to the railroad companies and to the car and locomotive companies for the equipment ordered. Many added the amount of the two appropriations, $1,250,000,000, to the amount of the increase in freight and passenger rates as representing the cost of a year's experiment with government operation, in spite of the promises that most of the appropriation represented temporary advances to be repaid to the government.

Representative Fess of Ohio and Dyer of Missouri said that members of Congress were being bombarded with letters from railroad employees urging them to vote for government ownership or operation, and Representative Dyer read a letter which he and others had received reminding them that they had been elected by the votes of railroad employees and saying that if they wished to remain in office they should vote for the continuation of government control. This letter bore a notation "carbon copy to John Scott, A. F. of L. Building, Washington, D. C.," and, Mr. Dyer said, indicated that the propaganda was organized at Washington.

Chairman Sherley, of the committee, in urging the appropriation, said he was unalterably opposed to government ownership and in favor of turning back the roads at the earliest possible date, but that the question of government ownership is not involved in meeting the condition with which the Railroad Administration is faced.

While Mr. Cannon was speaking for the bill, Mr. Juul asked if the two appropriations represent the entire cost to the nation for its first year's experiment in railroad management, or if there were more that Congress had not been informed about. Mr. Cannon replied that he was neither a prophet nor a son of a prophet. Mr. Denison wanted to know if the appropriation can be used in any way as an argument for continued government operation.

"On the contrary, I think the bill itself, connected with all that has been done, is a very strong argument against government ownership," replied Mr. Cannon. While Mr. Cannon urged the appropriation, he said that unnecessary expenditures had been made "in hiring people to be good."

Mr. Rayburn in advocating his amendment said: "This lesson in government operation has been a costly one and a bitter one, but I believe we will be at least partially compensated for all the money that we will lose by an actual demonstration of the heresy of the whole idea of government ownership. I believe that it is the death knell, at least for a generation, of government ownership of the railroads." He thought, however, that the roads ought to be retained at least until Congress has had an opportunity to enact remedial legislation.

Representative Esch thought a little longer period ought to be provided because of the uncertainty as to whether there will be an extra session.

Senate Committee Hearings

The Senate Committee hearings on proposed railway legislation begun on January 3 were concluded on Friday, February 21.

S. H. Cowan, representing the Texas cattle raisers, testified on February 20, strongly urging legislation at this session to restore the legal remedies of the shippers such as the commission's power to suspend rates. "If Congress is asleep at the switch," he said, "the only course left to the public is an appeal to their public-spirited representatives in the Railroad Administration." Mr. Cowan vigorously opposed both government ownership and continued government operation and demanded that Congress put a stop to the "saturnalia of useless expense." He filed a statement entitled "What Shall We Do to Be Saved?" "The people are tired of having their rights relegated to Washington for some man to determine," he said. "This ought to be a government of law and before it adjourns Congress ought to restore the remedies of the law. Now the shipper has rights only by the grace of the Railroad Administration. The farmers and the shippers generally want the roads turned back to their owners and they want this business of government operation ended just as soon as it is practicable to do so.

"They talk about their economies of unified control. There have been no such economies. There has been a veritable riot of extravagance. They have given wage increases and back pay to men who, knowing they were not entitled to them, have donated their pay back to the Red Cross. The power to initiate rates and to get appropriations simply invites inefficiency and extravagance, but there is a limit to the amount of increased rates the traffic can stand and the roads ought to be put back in the hands of the men who

know how to get economical operation." Mr. Cowan declared that the loss and damage to perishable freight during the past year has exceeded the amount of the rates paid on that class of traffic.

On February 21 Thomas C. Atkeson, representing the National Grange, which he said included 1,000,000 farmers, presented a statement and resolutions supporting the Cummins bill to prevent the President from turning back the roads until Congress has had an opportunity to legislate. He said that he had never been very strong for government owenrship, but had been converted against it during the past year and thought that the majority of the farmers do not favor government ownership. "There are some who do," he said, "but there are fewer of them now than 18 months ago because the government's handling of the roads had not been satisfactory."

A. M. Todd, president of the Public Ownership League, objected when the committee limited him to 10 minutes because he said 90 per cent of the time of the hearings had been taken up by opponents of government ownership. He spent most of his 10 minutes in displaying photographs of expensive tunnels, passenger stations, etc., on the Swiss government railways and filed his prepared statement. The photographs, he said, were to show that the Swiss railways cost five times as much as American railways to build, yet, he said, their rates were lower. To prove this he showed a season ticket on which he had ridden for 45 days for $27. Senator Robinson said he thought that was a discrimination against the ordinary passenger, who, Mr. Todd said, paid 3.1 cents per mile, because the season ticket rate must be below the cost of service and he thought that represented a poor argument for government ownership.

Theodore Prince, of New York, a financial writer, outlined a plan for the creation of a finance corporation, with a capital stock of about $500,000,000 to be subscribed by the railroads, to assist in financing the weaker roads, to handle co-operative improvements, and to finance the debts of the railroads to the government at the end of federal control. He also had a plan of railway regulation.

T. H. Condon, vice-president of the American Federation of Railroad Workers, advocated a continuation of government control or government ownership, because, he said, if the railroads were restored to their owners wages might be reduced.

Thomas F. Blunt, a "private citizen," of Washington, D. C., presented "a 14-point plan" for the ownership, operation and control of the railroads under a government guarantee.

The committee decided to receive briefs from Luther M. Walter, general counsel for the National Association of Owners of Railroad Securities, Bruce V. Crandall and Benjamin Catchings.

Doings of the United States Railroad Administration

Director General and Short Line Association Reach Agreement for Revised Short Line Contracts

WASHINGTON, D. C.

DIRECTOR GENERAL HINES and a committee of the American Short Line Railroad Association have reached an agreement on a revised form of contract to be executed by short line railroads which are not being operated by the federal government as an amendment to the form approved by the director general on October 30 which has been the subject of protracted negotiations as to the interpretation of some of its features. W. M. Blount, assistant to the president of the short line association, has devoted several months to the special work of inducing the Railroad Administration to stop diversions of traffic from the short lines and to make reparation for the traffic that has been diverted and Mr. Hines announced on February 26 that he had approved two standard forms of co-operative short line contracts which are satisfactory to the short line association. The two forms are the same, except that the first covers roads having no competitive traffic and the second covers roads having competitive traffic. In this a clause has been added providing for reparation for diversions of competitive traffic from the short lines between April 1 and November 1, 1918, and for giving to the short lines subsequent to November 1, 1918, the same proportion of competitive traffic as they had in the years 1915, 1916 and 1917. This makes the effective date of the contracts April 1, 1918, a question which has been somewhat in dispute after the approval of the previous form.

The contracts provide:

(1) That all joint rates shall be fairly divided between the director general and the company.

(2) That the short lines shall receive an equitable allotment of cars.

(3) That short lines having a length of 100 miles or less shall be allowed two days' free time for cars owned by a road under federal control and used by the short lines.

(4) That the short lines shall have the right to use the purchasing agencies of the director general in the purchase of materials and supplies and shall have repairs done in the shops of the director general upon the same terms as were enjoyed before federal control.

(5) That in the publication of tariffs and routing, the short lines shall be treated in the same manner as roads under federal control.

(6) That if in the opinion of the director general, it becomes necessary for him to operate the short line railroad, he shall have the right to do so upon the payment of compensation as provided by the federal control act.

For the purpose of finally removing the impression which the short line representatives stated to exist widely over the country, that the Railroad Administration was unfriendly to the short lines, the director general announced that he would make appropriate arrangements to make certain that all officers and employees of federally controlled railroads give fair, just and friendly consideration to questions affecting the short lines which may come up for consideration in connection with the application of the contracts.

Edward Chambers, director of the Division of Traffic, has written a letter to Mr. Blount, requesting the members of the short line association to prepare claims for the diversion of traffic upon blanks to be supplied by the administration and place the claims through the office of the association so that they may be analyzed and prepared in accordance with the direction of the association. This will avoid extra handling and permit of the preparation of the claims in proper form while the execution of the contract is receiving attention. The matter of per diem will be handled by the Division of Operation, which will provide proper forms upon which claims should be presented and will be prepared to handle the matter with reasonable promptness when contracts are executed.

In a letter to Bird M. Robinson, president of the Amer-

ican Short Line Railroad Association, Director General Hines expressed gratification that a complete agreement has been reached on the form of contract to be executed. He also stated that the short line railroads which sign the contract secure all the advantages of railroads which are under federal control, including increases in rates and freedom from levy of attachment on their property. In addition, they will secure the specific advantages as to reimbursement for diverted traffic, two days' free time, and otherwise, specified in the contract. Short line railroads which do not sign the contract, of course, will not receive these advantages and while it will be the policy of the Railroad Administration to deal justly and fairly with non-signatory as well as signatory railroads, Mr. Hines said, those who do not sign the contract but who accept the special advantages of two days' free time and reimbursements for traffic diversions in accordance with the terms of the contract will do so with the understanding that they waive all claims against the government and will execute appropriate papers.

The representatives of the short lines had also called attention to the fact that the Railroad Administration has not heretofore rendered financial assistance to short lines and that they contemplated asking Congress when considering the appropriation of an additional $750,000,000 for the Railroad Administration, to provide express authority for the Railroad Administration to use $50,000,000 of the amount, in its discretion, in making advances to meritorious short line railroads. Mr. Hines said in his letter that careful estimates indicated that $750,000,000 as a minimum and probably more would be needed to carry through the year 1919 the various capital expenditures, advances to corporations and working cash capital, which must be carried in respect of the railroads which the government is directly operating. He, therefore, hoped that any such request would be coupled with a request for a corresponding addition to the appropriation. In transmitting a copy of Mr. Hines' letter to the members of the association and other interested short lines, however, Mr. Robinson advised that after conference with the director general it had been decided to withdraw the request that Congress set aside a part of the fund for the benefit of the short lines because the director general has advised that he will advance out of the $750,000,000 to any meritorious short line having the short line contract, any funds that he would advance to such a line in the event a part of the fund was set aside epecially for that purpose.

Mr. Robinson said to the short lines that he was convinced that the majority, if not practically all, of the short line railroads should definitely secure their legal rights by entering into a contract with the government and he recommended that this be done. He said the director general's letter was most gratifying as a definite recognition of the status of the short line railroads and of the work done for such roads by the association.

Relations with State Commissions

The Railroad Administration and the state railroad commissioners have agreed to disagree as to the jurisdiction over intrastate rates during the period of federal control, and efforts will be made to expedite a test case so that the question may be passed upon by the Supreme Court. As to matters pertaining to service an understanding was reached at a conference last week between Director General Hines and Max Thelen and E. C. Niles, of the Division of Public Service, and the executive and special war committees of the National Association of Railway and Utilities Commissioners by which the authority of the state commissions is restored to a large extent. The terms of the understanding as to all matters except rates were reported in last week's issue. The rate subject was taken up on the second day of the conference, on February 20, and Mr. Hines insisted that the federal control act does not preserve the jurisdiction of the states. Following the conference he issued the following General Order No. 58, providing that:

"In order to clarify the relationship between the United States Railroad Administration and the state railroad and public service commissions, all officers and employees of the United States Railroad Administration shall be governed by the policies and regulations herein set forth, as follows:

"1. Transportation systems under federal control continue subject to the lawful police regulations of the several states which were and are applicable to privately operated transportation systems, in such matters as spur tracks, railroad crossings, safety appliances, track connections, train service, the establishment, maintenance and sanitation of station facilities, the investigation of accidents, and all other matters of local service, safety and equipment. It will be the policy of the director general to cause the orders of the state commissions in these matters to be carried out.

"2. In all proceedings of the character specified in paragraph 1 hereof, formal or informal, officers and employees of the United States Railroad Administration shall recognize the jurisdiction of the state commissions and shall assist them in developing the facts and in applying such remedy as may be necessary and shall fully co-operate with them.

"3. In all formal proceedings of the character specified in paragraph 1 hereof, to which the director general may be a party, he will consider service as having been made on him if made on the federal manager or general manager, as the case may be, of the transportation system affected, or on such official as the federal manager or general manager, respectively, shall designate and whose name he shall file with the state commission for that purpose. The federal manager, or if none, the general manager, shall designate to each state commission an officer conveniently located on whom such service may be made. The legal officers of the United States Railroad Administration are directed to appear in such proceedings and to present fully the facts.

"4. The federal control act empowers the President to initiate rates, fares, charges, classifications, regulations and practices by filing the same with the Interstate Commission, and empowers said commission to review the justness and reasonableness thereof. The state commissions take the position that the intrastate rates are nevertheless subject to their jurisdiction and it will be the policy of the director general to expedite in every way a final decision by the appropriate tribunal of the question thus raised.

"5. The directors of traffic and public service of the United States Railroad Administration are directed, before authorizing advances of any importance in rates, fares or charges either interstate or state, to submit the same to the state commissions in the states affected for their advice and suggestions.

"6. It is important that the records of the state commissions be continued intact. Transportation systems under federal control shall file with the state commissions, for information, all their rate schedules heretofore or hereafter issued during the period of federal control, and annual and other reports and information as to matters within the scope of federal control requested by state commissions according to the provisions of state statutes.

"7. All officers, agents and employees of the United States Railroad Administration are directed to supply information and render assistance as requested by state commissions, in accordance with the provisions of this order.

"8. This order shall be effective on and after its date."

Barges Ordered for New York Canal

The Railroad Administration has let contracts for 20 steel self-propelled barges for service on the New York Barge Canal, to be delivered in four months. They will be of 400 h. p., and will each haul 75 tow barges.

Taxation of Railway Materials

A difference of opinion has arisen between the federal managements of the railroads and the state authorities of Indiana regarding the taxation of railway materials and supplies. A. H. Smith, Eastern regional director, issued a circular last November to federal and general managers asking them to call the attention of their tax representatives to the fact that material and supplies on hand are the property of the United States government and therefore not subject to taxation. The circular stated that where tax reports heretofore have been prepared listing such items the notation "none subject to tax" should be inserted, with any further explanation deemed necessary. The state board of tax commissioners referred the matter to the attorney general of the state, who has recently given an opinion that all property which under private control would have been exposed to taxation should be regarded as subject to taxation under federal control. This was based on the statement that "the active operation of the railway systems was left in the hands of the organizations which existed and had control thereof" before the period of federal control. The opinion also stated, however, that property "not in the possession of a given railway system for its use but merely moving in due course for use of some other system would not properly be assessed to the company so possessing said property at the taxing period" and it is understood that the position taken by the Railroad Administration that the materials and supplies taken over by the government are government property was based on the fact that such materials have been pooled and are being used in common so that the location of certain supplies on one road temporarily does not made them the property of that road. State officials and many of the federal government officials have been slow to recognize the fact that the railroads are not being operated by their former organizations but as a single system by the government. The assessing officers in Indiana have been referred to the attorney general's opinion and instructed to list this property as formerly with a possibility of correction at a later date.

Coastwise Steamship Situation

Appreciating the conveniences furnished in the past to various communities by coastwise steamship lines, the Railroad Administration, for some time past, has been seeking means of protecting this service.

On April 12, 1918, the President took over the boats and other property of the Clyde Steamship Company, the Mallory Steamship Company, the Southern Steamship Company, and the Merchants and Miners Transportation Company, placing them under the direction of the director general of railroads. Such action appeared necessary in view of the fact that during the stress of war requirements these coastwise steamship lines were needed to relieve congestion on rail lines then under federal control and because there appeared to be danger that at least some of the ships in this service would be transferred by their owners to trans-Atlantic service. Following the signing of the armistice it was decided that the maintenance of these lines under federal control was no longer necessary, and therefore Director General McAdoo issued an order on December 5 releasing them. Assurances having been repeatedly given those lines by the Railroad Administration of liberal treatment in the division of traffic and in the division of joint rates, the Clyde Steamship Company, the Mallory Steamship Company and the Southern Steamship Company, accepted this relinquishment and are maintaining service except on a few routes where the combination of light business and high operating expenses have caused temporary suspension pending the return to normal tonnage movement.

One element operating for the benefit of the coastwise steamship lines has been the cancellation of permit requirements which were necessary during the war in the shipment of coastwise freight through ports handling overseas traffic. The permit requirements have been cancelled on account of relief of congestion at North Atlantic ports.

As a further aid to restoring normal conditions, announcement was made by the director general on February 17 that very careful consideration was being given to a revision of the war policy of the Railroad Administration as to differential freight rates on rail and water routes. Differential rates via rail and water routes between the Eastern states and the South and Southeast were not withdrawn during the war period and are still in full force. Because of the return to peace conditions differential rates via rail and water between New England and Central Freight Association territory, Southeastern—Mississippi Valley territory, the West and Southwest, are now being considered and some change in this situation should become effective during the month of March. Some time is necessary to work out details of this contemplated readjustment.

The Merchants and Miners Transportation Company, however, has not so far accepted the relinquishment. In order not to inconvenience the communities served by this company, the Railroad Administration as a temporary measure has been operating the ships since December 5 for the account of the company. But it has been decided to deliver the boats of this company definitely to it at various home ports on March 1. There have been intimations that the Merchants and Miners Transportation Company is giving consideration to the discontinuing of its service, but it is announced, the Railroad Administration will do everything reasonably in its power to facilitate and encourage the continuance of the service by the company.

Automatic Train Control Committee to Inspect Devices

The Committee on Automatic Train Control is planning a trip to begin some time next month for the purpose of examining the operation of automatic train control devices which are now in service. At its meeting in Washington this week the committee expects to dispose of a considerable number of devices which will not meet the requirements, after which it will be free to devote more attention to those which have already demonstrated their practicability. The western trip will include an inspection of the operation of the automatic train control systems on the Chicago & Eastern Illinois between Chicago and Danville, on the lines of the Washington Water Power Company near Spokane, Wash., on the Key Route, out of San Francisco, and on the Western Pacific. Later the committee will visit installations in the east, including that on the Chesapeake & Ohio and one or two in New England.

Post Office May Object to Handling of Railroad Business Mail

The postoffice department may contest the legality of the orders recently issued by the Railroad Administration through the regional directors providing for the carriage of railroad business mail without payment of postage via lines under federal control. Under the laws giving the postoffice department a monopoly in the handling of mail railroads have been allowed to handle as railroad mail matter to or from connecting lines, that is mail in which each carrier has an interest, but have not been allowed to route such mail over an intermediate carrier. The question whether the railroads under federal control came within this limitation came up last year and in August W. H. Lamar, solicitor for the postoffice department, gave an opinion to the second assistant postmaster general that it cannot be assumed that it was the intention of Congress to relieve railways of expense for postage. The federal control law, he held, has not changed the status of the railroads as regarding their legal entity and therefore where it would have been a violation for a railroad

to carry mail prior to the passage of the control act such procedure at this time would still constitute a violation of the law. Since then John Barton Payne, general counsel for the Railroad Administration, has given an opinion that the railroads under federal control are one system and that therefore there are no intermediate carriers among the roads in the federal system. As has recently been noted in our columns the regional directors have given instructions for the handling of railroad mail provided it is not routed over a line not under federal control and while the postoffice department has as yet made no protest it is said to be considering the matter. In case of a difference the matter would naturally be referred to the attorney general for a decision. The action of the Railroad Administration will cause a considerable reduction in the revenues of the postoffice.

Accounting Circular No. 74

Army regulations forbid the payment of transportation charges on a shipment covered by a government bill of lading when a part or all of the shipment has been lost or damaged, until such loss or damage has been adjusted. In order to avoid delay in settlement of accounts for transportation of War Department material and supplies, the following plan will be made effective immediately, according to Accounting Circular No. 74:

The transportation and telegraph section, quartermaster branch, central disbursing division, office of director of finance, is authorized by the Railroad Administration to deduct the amount of any claim for loss or damage from the freight charges due in connection with a bill of lading covering the shipment, a part or all of which has been lost or damaged. Under this arrangement, however, no deduction will be permitted from transportation charges due on other shipments.

When payment is made by the quartermaster's department there will be forwarded a statement explaining the deductions, and a claim will be presented for investigation by the carrier. If such investigation develops no liability on the part of the carrier supplemental bill for the amount deducted in previous settlement will be paid.

The War Department in presenting claim will give all available data regarding the loss and damage in lieu of forms and documents required by paragraph 2 of General Order No. 41.

This plan supersedes any arrangements which may have been entered into by individual carriers.

Government Still Entitled to Land Grant Rates

Federal control of the railroads has brought up many interesting questions as to the relation between the railroads as a government institution and the regular government departments. Acting on an opinion by Judge Payne the Railroad Administration took the position that railroads under federal operation were not bound by the provisions of the land grants to certain railway companies which require them to give reduced rates on government business. With the large volume of government traffic moving during the war period this would have meant a considerable increase in the revenues of the railroads. The controller of the treasury, however, took the opposite position and declined to approve the payment of the freight bills on the basis of regular rates and as there is practically no appeal from his rulings the matter was dropped.

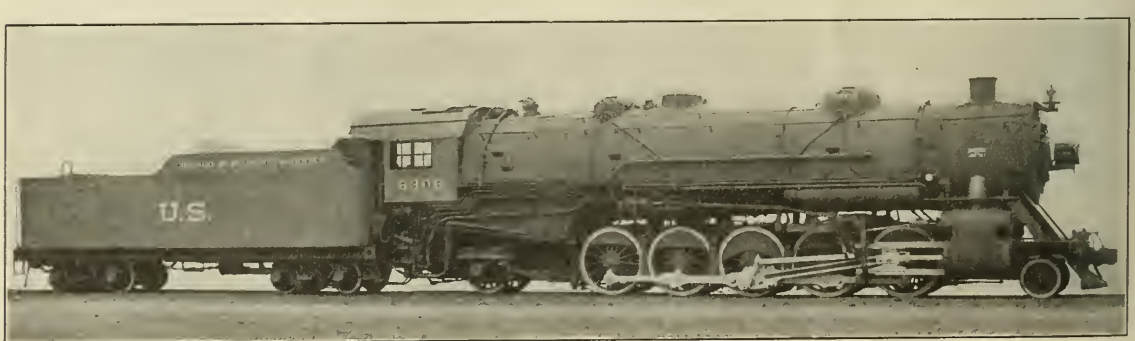
Contracts Signed

The Railroad Administration has executed a compensation contract with the Southern Pacific, providing for the annual payment of $47,959,898. The contract covers the following subsidiaries: Arizona Eastern; Houston & Texas Central; Galveston, Harrisburg & San Antonio; Houston East & West Texas; Houston & Shreveport; Morgan's Louisiana & Texas Railroad & Steamship Company; Louisiana Western; Lake Charles & Northern; Iberia & Vermillion, and Texas & New Orleans. A compensation contract with the Chicago River & Indiana providing for an annual compensation of $108,525 has also been executed.

The Export Situation

Commercial exports continue to show an increase at North Atlantic and Gulf ports, while South Atlantic ports show a slight decrease, according to a report from the Exports Control Committee for the week ended February 18. Total export commercial freight on hand was 259,520 tons as compared with 241,160 tons the previous week. The average number of cars handled at New York per day February 1 to 18 was 381 cars as against 253 for January.

The report states that there are 9,640 cars of food for export on hand, exclusive of bulk grain, at the North Atlantic ports. It is announced that the grain exchanges at Boston, New York, Philadelphia and Baltimore have been notified that applications may now be filed with the Grain Corporation for permits for the shipment of grain and grain products by the various dealers on account of sales made directly by them for foreign markets. In this connection the report states that there is due at Hampton Roads between now and March 5 on account of the Wheat Export Company a total of 51,000 tons of vessel space which will be distributed among the North Atlantic ports. There is a total of approximately 40,000,000 bushels of grain for the food administration and the Wheat Export Company which it is expected will be forwarded prior to April 1.

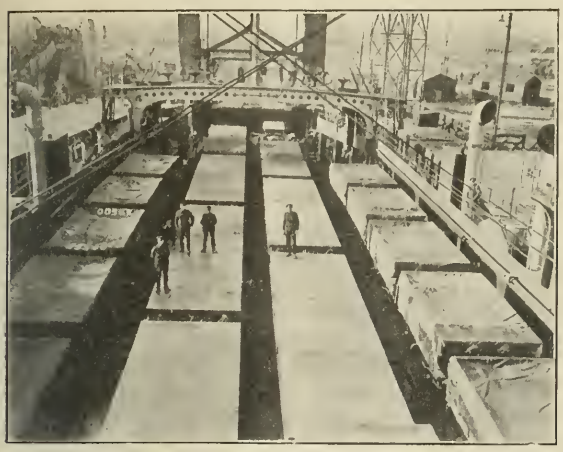


U. S. R. A. Standard Heavy 2-10-2 Type Locomotive

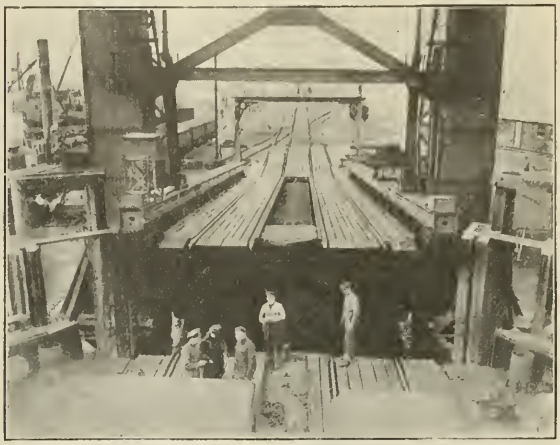
A description of this locomotive was published in the *Railway Age* of February 14, page 389

The English Channel Train Ferry

THE CHANNEL TRAIN FERRY is one of the interesting developments in transportation brought out by the war. It was instituted in 1917 to meet the demands of the British military authorities and plies between certain French ports and the newly created Port of Richborough, on the River Stour, near Sandwich, in Kent. The rise of Richborough as a great forwarding depot is one of the romances of the war. Its creation as a port and the institution of the cross-channel barge and ferry services for the conveyance of military requisites has played a very important part in the conduct of the campaign on the western front. Wharf construction on the Stour was begun in June, 1916, and so well did it progress that by December a regular service of barges was in full operation. From first to last upwards of 4,000 barge loads of ammunition were despatched from Richborough to the battlefields of France, the deadweight tons of guns, ammunition and ordnance stores conveyed in this way reaching the total of 784,741, while the Army Service Corps supplies amounted to 70,877 tons. On a single day in August last no less than 6,374 tons of material were towed across the channel and thence despatched by means of the French canal system to depots established at no great distance from the firing line.



Freight Cars on Board the Boat



The Weigh Bridge at Richborough

The train ferry came into existence in January, 1917, the French ports of Calais and Dunkirk being equipped with terminal facilities corresponding to those at Richborough. The steamers employed are 363 ft. 6 in. long and 61 ft. 6 in. broad and their draft, when loaded, is 9 ft. forward and 10 ft. aft. They have a speed of 12 knots and displace 3,654 tons. The average load carried is about 900



Two Locomotives With Their Loads in the "Well"

tons, and up to the end of the week ending October 23 the tons (deadweight) imported amounted to 58,981. Large numbers of railway trucks, brake vans, locomotives, tanks, etc., were carried across, the work of loading having proceeded with the utmost smoothness, the engines being taken over on their own wheels and the tanks on the special railway trucks on which they had traveled from the works. By this means an immense saving was effected in time, labor and expense, and there is no doubt that the ferry—to quote the words of one of the many correspondents who have lately written about it—"added enormously to our facilities for quick transport during critical months of the present year in France, and it will probably continue to render valuable service in the coming demobilization."

The Industrial Board of the Department of Commerce

THE INDUSTRIAL BOARD of the Department of Commerce is the official name of the organization being formed under the direction of Secretary Redfield of the Department of Commerce, with the approval of the President, "to put into direct effect a program for the readjustment of prices for basic materials," to meet post-war conditions in the hope that this will result in the stimulation of industry. The board is to be composed of representative men from industry, labor and the government who are being selected under the chairmanship of George N. Peek, formerly vice-chairman of the War Industries Board. It is understood that Hugh Frayne, who represented labor on the War Industries Board, also will represent it on the new board and that T. C. Powell, director of the Division of Capital Expenditures of the Railroad Administration, will also be a member.

Secretary Redfield has given out a statement regarding the conditions to be met and the purpose of the committee, in which he says:

"It will be the endeavor of the board to act promptly by consulting and interchanging views with these representatives of industry in the fullest and freest manner possible, with a view to aiding and assisting industry in general to resume activities to the fullest practicable extent. The immediate object is to bring about such reduced prices as will bring the buying power of the government itself, including the railroads, telephones and telegraph, into action and make it possible for the government to state that it is willing to be a buyer for its needs at the reduced prices. If these conferences result in such an understanding on the part of the government with respect to the important basic industries concerning proper prices and bases for prices at which purchases may be made by it, and these are approved by the board, it is believed that upon announcement thereof to the country in general the public will feel justified in promptly beginning a program of extensive buying.

"Such a procedure will in substance establish immediately a basis upon which to resume activities, and in this way the law of supply and demand will be enabled to come into play and from that time forward it will control the changes and readjustments in selling prices of materials and the trend of prices, it is believed, will be upward and not downward."

Secretary Redfield also says it is felt that the proper basis of selling prices will be found to be upon a scale higher than those of the pre-war days, but on the lowest plane possible, having due regard for industry, labor and government, in an effort to wholly eliminate the abnormal unbalanced stimulation that business has had and the inflated prices that have resulted and to start anew upon a normal level.

Train Accidents in January[1]

THE FOLLOWING is a list of the most notable train accidents that occurred on the railways of the United States in the month of January, 1919:

Collisions

Date	Road	Place	Kind of accident	Kind of train	Killed	Inj'd
7	Texas & Pacific	Texarkana	xc	P. & F.	1	1
†12	New York Central	South Byron	rc	P. & P.	22	20
†13	Phila. & Reading	Ft. Washington	rc	P & P.	14	30
18	Pennsylvania	W. Philadelphia	rc	P. & F.	1	4
†20	Chicago & N. W.	Irving Park	rc	P. & F.	2	12

Derailments

Date	Road	Place	Cause of derailment	Kind of train	Killed	Inj'd
7	Southern	Melrose, N. C.	runaway	F	1	2
7	Ches. & Ohio	Hardware	b. rail	F	2	0
25	Seaboard A. L.	Mooresboro	.....	F	0	1
*31	Chi. & Alton	Fulton	.....	P	0	18

The trains in collision at Texarkana, Tex., on the 7th were a through passenger train, switching at the station, and a freight engine which had become uncontrollable and had run some distance unattended, and collided with the passenger train. One fireman was killed and one engineman injured.

The trains involved in the rear collision at South Byron, N. Y., on the 12th were westbound passenger No. 17, second section, and westbound passenger No. 11, which struck No. 17, which was at rest, at full speed. The rear car of No. 17 was crushed, and the car next ahead of it was wrecked; 22 passengers were killed and 20 or more injured. Train No. 11 had run past automatic distant and home block signals set against it; and also had disregarded a flagman's red light. This accident was reported in the *Railway Age* of January 17.

The trains in collision at Fort Washington, Pa., on the evening of the 13th were northbound local passenger train No. 381 and northbound express No. 319, the express running into the rear of the local, which had been stopped because of a freight train, delayed, ahead of it. Fourteen passengers were killed and 30 injured. Train 319 had run past distant and home automatic block signals set against it; also had disregarded the red light of a flagman who was back 1,500 feet. The engineman of No. 319 had had two nights' rest since his last trip, and had been on duty only three hours.

The trains in collision at West Philadelphia, Pa., on the 18th were an eastbound freight train, consisting of fourteen cars of coal, a caboose and two locomotives, the locomotives at the rear, and a following passenger train, No. 20. The freight had become stalled in the tunnel beneath the southbound tracks of the New York Division. The caboose, three locomotives and one baggage car were damaged. The flagman of the freight, who was in the caboose, was fatally injured, and three passengers and one employee on the passenger train were less severely hurt.

The trains in collision near Irving Park, Ill., on the morning of the 20th were a northbound passenger, carrying sailors and workmen to the Great Lakes Naval Training Station, and a following train of empty coaches. There was a dense fog at the time. One sailor and one brakeman were killed, and twelve passengers were injured. The empty train had run past distant and home automatic block signals set against it.

[1]Abbreviations and marks used in Accident List:
rc, Rear collision——bc. Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc. ——boiler, Explosion of locomotive on road——fire, Cars burned while running—P, or Pass., Passenger train——F, or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

The train derailed near Melrose, N. C., on the morning of the 7th about 4 o'clock was a freight train of 22 cars descending Salute Mountain. The train became uncontrollable soon after passing the summit, and the engine and five cars were thrown off the track at safety track No. 2, the engine being overturned. One trainman was killed and two were injured.

The train derailed near Hardware, Va., on the night of the 7th was an eastbound freight. The engine was thrown off the track by the breaking of a rail, and, with eight cars, fell down a bank. The engineman and fireman were killed. The rail had been weakened by a transverse fissure.

The train derailed near Mooresboro, N. C., on the 25th was an eastbound freight. The tender of the locomotive ran off the track while crossing a trestle, and, with nineteen cars of coal, fell into Sand Creek. The engineman was injured.

The train derailed near Fulton, Mo., on the 31st was a southbound combined passenger and freight. Eighteen passengers were injured. The cause of the derailment was a defective truck.

Electric Car Accidents.—Near Strasburg, Ohio, on the 10th an interurban car was derailed at a bridge and plunged 20 ft. to the creek below; of the 25 persons in the car nearly all were injured. On the Third Avenue Elevated, New York City, on the 30th, a rear collision of passenger trains resulted in the death of one passenger and the injury of 20 or more.

New Type of Ditcher Effects Economies

SOME DATA COMPILED RECENTLY on the results secured by several railroads in using power ditchers to clean out cuts, remove slides and do miscellaneous excavating, clearly demonstrate the advantages of this type of equipment over hand methods. In the cases cited the machines were the Erie power ditchers, manufactured by the Ball Engine Company, Erie, Pa. These machines differ from other types



Operating a Ditcher Between Dump Cars

in common use in that the dipper handle is attached to the boom in the same manner as on the ordinary steam shovel; that is, it may be advanced or withdrawn through the boom with the aid of crowding engines mounted on the latter. No craneman is employed, however, since the three engines provided for the separate functions of hoisting, crowding and swinging are controlled by three levers and a foot brake which are handled readily by one man. The boom is 19 ft. 6 in. long and the dipper handle 16 ft. long, thus affording a maximum reach from the center line of the dipper to the center line of the occupied track of 28 ft. 6 in., or enough to permit the wasting of material beyond an adjoining track. These machines are used according to the usual plan, with the ditcher mounted on a flat car placed between two dump cars.

On the Chicago, Burlington & Quincy ditching machines of this type cleaned up side ditches in light cuts, loading four 20 cu. yd. cars about half full of material per hour. On one division a machine averaged 560 cu. yd. per 10-hr. day. In similar work on the Renovo division of the Pennsylvania Railroad one machine loaded 10 60-cu. yd. hopper cars in a 12-hr. day. Eight of these machines were used on the Pennsylvania Railroad last season.

Some information was also obtained from the Pennsylvania Railroad on cleaning up slides. One maintenance officer estimated that the machine was equivalent to 50 men, and would do the work in one-third the time. In one place a slide was cleaned up in 1½ days at a cost of $20 for labor,



Ditching on the Pennsylvania Railroad

coal, interest and depreciation, while experience in a similar location with hand labor indicated that it would have taken 20 men at least six days to accomplish the same results. At the rate of pay then prevailing, $2.40 per day, this would have amounted to $288.

On the Canadian Pacific in the province of Quebec the use of one of these machines for excavating a depressed ash pit illustrates how they may be adapted to such miscellaneous work. In this case, the machine was mounted on a flat car as in ordinary ditching. The excavation was carried to a depth of about 12 ft. below the surface, the material being loaded on cars spotted on a track alongside on the original surface. The average performance under this arrangement was 90 to 100 cu. yd. of material per hour.

A special feature sometimes provided with these ditchers is an automatic crowding device which may be applied to the boom, and has the effect of limiting the position of the dipper teeth to a certain fixed level. By this means the bottom of the excavation can be maintained automatically at a certain depth below or above the level of the track occupied by the ditcher.

General News Department

The Chamber of Commerce, of Cincinnati, Ohio, by a vote of 1,130 of its members, has gone on record as opposing government ownership of railroads, the vote being 1,030 to 100.

An appropriation of $2,500,000 for continuing the valuation work of the Interstate Commerce Commission is included in the sundry civil appropriation bill now before Congress. Last year's appropriation was $3,500,000.

The Senate on February 22 passed a resolution extending until July 1, 1920, the effective date of Section 10 of the Clayton act, except that the section will become effective on March 1, 1919, as to any corporations hereafter organized.

Traveling railroad auditors, to the number of 141, met in Cincinnati on February 23 to prepare a program for beginning negotiations with regional directors for improvement in salaries and working conditions. It appears that similar meetings were held on the same day in a dozen other cities, throughout the country.

C. E. Corcoran, trainmaster of the Chicago, Milwaukee & St. Paul, at Beloit, Wis., was killed on February 23 in the derailment of passenger train No. 301, at Latham Park, Ill., eight miles north of Rockford. The cause of the wreck has not been determined. One passenger was killed, and two seriously and 20 slightly injured. Three coaches rolled down a 20 ft. embankment.

The Minnesota legislature has before it two bills concerning railroads: the Hubert bill, requiring adequate and safe plank crossings, and the Swanson-Hitchcock joint resolution, advocating the reduction of rates on iron ore from Minnesota iron mines to Lake Superior ports from $1 to 63½ cents per gross ton. The Swanson-Hitchcock resolution refers to General Order 28 (June 25, 1918), and declares that the higher rate on iron ore can only result in the closing of Minnesota iron mines and at the same time aiding the mines and mills of Alabama, Pennsylvania, and other states.

The shipper who loads bulk freight to the full capacity of every car assigned to him by the railroad is doing a good thing for himself, for the railroad and for other shippers; but there is such a thing as carrying a good thing too far. This is the substance of a notice that has been sent out by the Car-Service Section of the Railroad Administration, calling attention to the excessive enthusiasm of certain shippers of news print paper who insisted on having 30-ton cars, even when they had to wait for the cars to be brought from some distant point. Cars of higher capacity were available, but to use them for 30-ton lots the paper shippers would have had to lower their record for full-capacity loading!

The proposed restriction of immigration to the United States for four years is the subject of a resolution which has been adopted by the general executive committee of the Railway Business Association, in which all members of the association are urged to use their influence, in every direction possible, against the proposed legislation. The bill pending in Congress is opposed to the prosperity of the United States; desirable immigration should be fostered and not restrained. The satisfactory solution of the railroad problem may be in a measure dependent on immigration; proposals to build new lines or lay additional tracks might fail because of a famine in unskilled labor; and skilled labor has no job until the track is laid.

The vital importance of an early settlement of the railroad question, is the subject of a resolution adopted by the executive committee of the Railway Car Manufacturers' Association on February 18. This association, embracing the 19 principal car builders in the country, represents an industry employing about 100,000 men, and the resolution calls upon all members to make every possible effort to secure the authorization of the addition of 750 millions to the revolving fund, asked for by the director general of railroads, and to use their influence to bring about an extra session of Congress as a means toward early settlement of certain questions, which early settlement is necessary to the revival of business in the car building industry. Without business the car shops cannot co-operate with other agencies in giving work to idle men.

Fourteen bales of silk were thrown out of a car of a westbound freight train of the Delaware, Lackawanna & Western, west of Stroudsburg, Pa., on the morning of February 20, about two o'clock, and some thieves were waiting to carry off the freight in automobile trucks; but it is said that the railroad police and employees thwarted the plan of the robbers and recovered the silk; and one man is under arrest. It appears that the car containing the silk was watched all the way from Paterson, N. J., 69 miles, to a point beyond Stroudsburg, and that the theft occurred within a section of three miles between the point where the watchmen left the train and where other watchmen were to board it. The Scranton Times, which reports the occurrence, believes that one robber had secreted himself in the car before it started from Paterson and that other robbers followed the train all the way in automobiles. Among the measures taken to capture the robbers was the sending out of locomotives to stand on highway crossings and thus interfere with the movement of automobiles.

Audible Signals on the Great Western of England

The Great Western Railway of England, as appears from a statement in the Great Western Railway Magazine, now has torpedo-placing apparatus at several hundred signal cabins, or about 2,000 placers in all; and from 30 to 40 per cent of these instruments have been installed during the past two years. The Great Western has in operation several hundred locomotive cab signals, but the torpedo-placers, we may assume, are on those sections of the company's lines where the cab signals are not used. Some additional interlocking signaling have been installed during the past year and the total number of signal levers in service now, on the company's 3,000 miles of line, is 47,339. The number of cells of storage battery charged during the year 1918 in the signal department was 54,000.

Railroad Y. M. C. A.

Railroad men of the Chicago district and Young Men's Christian Association secretaries who are interested in railroad activities held a conference on February 20 and 21 at Chicago for the purpose of promoting a nation wide campaign to increase the membership of the railroad Y. M. C. A. This conference for the Northwestern and Central Western regions is the last of a series of regional meetings held throughout the country. Among the important changes that are contemplated are the adoption of a standard program in each railroad Y. M. C. A. throughout the country; the establishment of a rigid standard for the officers who are in charge of these departments and the adoption of a continental membership program. The latter contemplates the adjustment of the expiration dates of membership so that the dues of all members will be renewable annually, the country over, on the same date. The plan further contemplates a standard membership fee with a universally exchangeable membership ticket among railroad associations. It is proposed to increase the Chicago association membership from approximately 114,000 to 200,000 by this campaign, which is to be started in the near future. William J. Jackson, federal manager of the Chicago & Eastern Illinois, presided at the Chicago meetings.

Sidell & Olney Railroad to be Sold

The decision given by Federal Judge George W. English at Danville, Ill., ordering the sale of the Sidell & Olney railroad now operated by the Cincinnati, Hamilton & Dayton and the Cincinnati, Indianapolis & Western has been confirmed. Accordingly the road which operates between Sidell, Ill., and Olney, a distance of 85 miles, will be sold at public auction on April 15, at Casey, Ill., although an appeal has been entered in the United States Court of Appeals. The court has set the sale price at $200,000 with the understanding that the road from Sidell to Kansas be operated with a privilege of junking the southern end of the road, from Kansas to Olney. If there is no bid above $200,000 the property will go to Frank H. Potter of Chicago, who has bid that amount.

Snow Blockade in Kansas and Nebraska

A heavy fall of snow accompanied by a high northwest wind demoralized traffic in Nebraska and Southern Kansas for three days, February 13, 14 and 15. Telegraph and telephone wires were down and communication between many points was suspended. A train of the Union Pacific was caught in a drift west of Salina, Kan., and held for 48 hours. The passengers had nothing to eat but eggs, and the men on the train were forced to plow through snow drifts to the nearest town for food. Many Union Pacific trains were held at various points until snow plows cleared the road. Missouri Pacific trains in this section had to be annulled, but the Chicago, Rock Island & Pacific maintained an irregular service. The Golden State Limited of the latter road was 30 hours late before it was finally delivered to the road's southern lines. The Atchison, Topeka & Santa Fe had to send its California trains over the Santa Fe southern lines.

Nine Passengers Killed at Pittsburgh

In an accident to the "Versailles local" passenger train on the Baltimore & Ohio, near Swinburn street, Pittsburgh, Pa., on the evening of February 22, nine passengers were killed, and 70 or more were injured. The train was moving at about 40 miles an hour when its three passenger cars were struck on one side, and partially wrecked, by a locomotive which had been derailed while running on the adjacent main track. This locomotive appears to have been thrown off the track at a point where repairs were in progress and where a rail was not securely spiked. It was running at low speed. The local reports indicate that this engine had passed a block signal set against it. The foreman in charge of the repairs to the signal apparatus is quoted as saying that he waved a white lantern to stop the locomotive, but that after waving the light a few minutes the flame went out. He says that the engineman acknowledged this hand signal by two blasts of the whistle. The engineman is said to have claimed the block signal showed clear and also that he had not been flagged.

Trans-Mississippi Readjustment Congress

The Trans-Mississippi Readjustment Congress with 2,000 delegates from 18 states west of the Mississippi river passed resolutions opposing government ownership and operation of railroads at the closing session of a three-day convention at Omaha, Neb., on February 18, 19, 20. The purpose of the conference was to discuss the readjustment problems of the trans-Mississippi section.

The convention was divided into 18 groups, each of which considered questions pertaining especially to the industry represented by that group and resolutions passed by each of these groups were presented to the general congress for action. Practically all of the groups advocated private ownership and operation of the railroads, subject to governmental regulation and supervision. The composite resolution concerning the disposition of the railroads adopted by the general congress was as follows: "We are opposed to government ownership and operation of the railroads. The roads now operated by the government should be returned as soon as possible to former private ownership and management, subject to governmental regulation and supervision which will prevent abuses of the past and secure to the public the greatest good to be derived from economical, efficient and co-operative management, eliminating restrictive legislation which has heretofore hampered much needed improvements." Harry A. Wheeler, president of the United States Chamber of Commerce in his address before the congress stated that "there has been a stuffing of enthusiasm, ingenuity and initiative under government control."

Getting Trains Over the Road

You are called and ready to leave at 10 p. m., but the brakeman comes up and tells you they are going to throw out a car on account of being crippled, and you pick out the bill for this car and go back to the office with it and get out fifteen minutes late; you have received a message from the despatcher to pick up a car of stock and two cars of powder at Newark and couple a second helper-engine in behind forty cars; the powder has to be cut in in a certain place in the train to comply with the law. Now you are at Redwood and have a time order to make Newark against a manifest train, but you find you must brass a car that is running hot, so you find after you are ready to go that you have not enough time to make Newark and you go to the first siding and side track. Finally you arrive at Newark, get your powder and live stock picked up and your second helper-engine in the train air-tested and ready to go; but a short-time stock train has shown up which must be given preference, and you are again delayed. On the way up the grade you find that the tonnage in the train is in excess of the figures shown and one of your engines has run out of water, so you cut it off and send it to the water tank for water, and wait its return. Several other things are liable to happen. Are you ready to quit? Probably "yes." Does the conductor who ordinarily handles this train quit? Not much. He will probably show up at Tracy not over thirty minutes late, because he has had all the assistance the despatcher can give him in the way of additional helpers, cutting out cripples and giving him help on opposing trains.—*J. A. Shockey (S. P.) before Pacific Railway Club.*

Automatic Audible Warning for Trackmen

A tunnel of the Metropolitan Railway, in London, which much of the time is filled with smoke or steam, has been equipped for its 2,200 ft. of length with an iron tube for giving notice of the approach of trains, the tube to be agitated so as to produce a noise, by means of treadles, and being so arranged that it can be put out of service when no men are at work in the tunnel.

It was found that horns or gongs could be heard not over 700 ft. in a clear atmosphere and a much shorter distance when the atmosphere was filled with smoke or steam. A galvanized iron tube, of about ¾ in, internal diameter, is slung along the side of the tunnel at the height of a man's ear. Hammers, to strike on this tube, are fixed, one at the middle of the tunnel and one on either side of it, each about two-thirds of the distance to the mouth, so that the distance which the sound must be conveyed is about 367 ft. from each hammer. The hammers are actuated by electro magnets enclosed in waterproof iron boxes, and the electrical energy is supplied by six two-volt storage cells; twelve volts, 60 ampere hours. The depression of a bar, at the entrance of the tunnel, opens an electric contact, and this causes the hammers to produce the desired sound in the tube; not very loud, but easily recognized. When the track bar is in its normal position no sound is made. The vibration of the tube may be felt, so that even a deaf man could avail himself of the warning by putting his hand on the tube. Any defect in the electrical circuit causes the warning to sound. As the train passes out of the tunnel it depresses a second bar, which energizes a relay and opens a contact, silencing the hammers.

The apparatus has received the approval of the Board of Trade. It is patented, and is made by the McKenzie, Holland & Westinghouse Power Signal Company, London.

Sauce for the Goose—and for the Gander

[From the Railroad Herald]

The government, in taking charge of the railroads, deferred grade-crossing improvements, so far as possible, until after the war, requesting state, county and municipal authorities also to withhold action. The way is now clear to resume this work. Two considerations are involved. The one is to abolish the grade crossing danger. The other is to safeguard the danger until it can be abolished.

We have so far noticed but one press comment excited by Mr. McAdoo's action; and it is amusing to note that all the criticism of the matter is now turned against the stupid ox-cart driver and the impatient motorist, whereas the editors used to gather up the faults in one and lay it all at the door of the railroads. Not a fragment of it ever fell elsewhere. This menace that neither city nor rural life could escape was everywhere solely an evidence of the bold schemes of corporate greed. Must we conclude that the "freedom of the press" means that under government ownership one opinion as to a given set of facts should be moulded in the public mind, and a different set when railroads are owned by private companies? This newspaper critic commits himself, apparently, to a policy which amounts to saying, in case of an accident, that when the government is the owner of the railroad, the victim of the accident had no business being there, and, if a private corporation is the owner, then the railroad had no business being there!

Mr. McAdoo's administration has also enlightened the public in regard to the freight-car robber. Many articles have appeared, the keynote of which was that now, since the government is the proprietor, railroad property will come in for a brand new form of protection against the trespasser and the thief. As if the government upon assuming the operation of the railroads entered upon a duty that did not already devolve upon it, to protect this property against any violation of law, and as if some new reason had arisen for the penalty of the car thief to be more severe!

Interesting Railroad Library for Sale

At the Anderson Galleries, Park avenue and 59th street, New York city, on the afternoons of March 10 and March 11, about 450 volumes of railroad history of England, America and other countries, are to be sold at auction. These books and other documents were selected by an Englishman and include dates from very early in the nineteenth century down to 1880. Included in the list are numerous important manuscripts, drawings, and prints. Manuscript journals of I. K. Brunel and autograph letters of George Stephenson, and others, are among the curiosities. There are large numbers of colored drawings, including a volume of Robert Stephenson's work for the London & Birmingham. Among the American material is a colored plate of the first train crossing the Humboldt river, original reports, charters, etc. There are many minor volumes as, for example, the train rules of the Concord Railroad, and of the Grand Trunk, the latter dated 1857.

There are six volumes of Herapath's Railway Magazine, and a book about subways (proposed) for London dated 1835. There are numerous original early advertisements and early passenger tickets and a collection of 21 medals commemorating the opening of various railroads. French, German, Dutch, Australian, Italian and Russian railroads are covered by publications dated in the thirties and forties of the last century, and other European countries, as well as Asia, Africa, Australia and South America are represented by very early publications.

Among the American railroads named in the index to this library are the Baltimore & Ohio, the Boston & Lowell, the Boston & Worcester, the Buffalo & Pittsburgh, the Central Pacific, the Chicago & Aurora, the Corning & Blossburg, the Delaware, Lackawanna & Western, the Eastern, the European & North American, the Galveston, Houston & Henderson, the Great Western (Canada), the Hudson River, the Providence & Bristol, the Reading, the Rutland & Burlington, the Southern Pacific, the Troy & Greenfield, the Union Pacific, the Vermont Central, the Virginia & Tennessee, and the Western. The dates on these documents range from 1830 to 1852, and a few later.

Traffic News

The Kalamazoo (Mich.) Chamber of Commerce announces the establishment of a traffic bureau under the direction of George J. Bolender as traffic manager.

The traffic bureau of the Sioux City (Iowa) Commercial Club has adopted resolutions urging on the President and Congress the enactment of legislation that will permit the early return of railroads to their owners.

Coal loading for the week ended February 8 amounted to 165,183 cars, as compared with 215,832 during the corresponding period of 1918. The estimated loading for the following week was 157,215 cars, as compared with 239,261 for the corresponding week of 1918.

J. L. West, formerly traffic manager of the Missouri, Kansas & Texas, is now at the head of the Transportation Bureau of the Dallas (Texas) Cotton Exchange. This bureau, which has just been established by the Exchange, will be conducted under the direction of a transportation committee.

The number of railroad tickets required for occupancy of a drawing room for seat service on day rides is now three instead of five; and three, instead of four, is the number required for the occupancy of a compartment for seat service on day rides. The number of sleeping or parlor car tickets required remains unchanged.

The Western Freight Traffic Committee has requested the various district freight traffic committees to docket for early consideration the question of cancelling all rules requiring the equalization of loaded and empty mileage on privately owned cars moving between points in western territory. This is not, however, to affect the charges on new or newly acquired cars.

Commercial organizations and corporation traffic managers in Cleveland and other points in Ohio, have created a temporary organization looking to the establishment of the "Ohio State Traffic League." The temporary officers are C. M. Andrus of the Otis Steel Company, Cleveland, Ohio, chairman; L. C. Macomber of the Toledo Commercial Club, Toledo, Ohio, secretary, and H. G. Brentlinger of the Standard Register Company, Dayton, Ohio, treasurer. A permanent organization will be formed at a meeting to be held in Columbus on March 24

The Senate Committee on agriculture has favorably reported the Kendrick bill to place the distribution of refrigerator cars owned by the meat packers under the jurisdiction of the Interstate Commerce Commission. The bill also provides for the licensing of packers' facilities and would require the packers to dispose of their interests in stock yards within two years. The committee disregarded recommendations of the Federal Trade Commission that ownership of refrigerator and stock cars be acquired by the government.

A meeting of the livestock interests of the United States (shippers and receivers) for the purpose of agreeing to rules governing the presentation and adjustment of claims of loss and damage to livestock in transit and also to give consideration to necessary accessorial service in the transportation of livestock in the interest of shippers and carriers alike will be held at St. Louis, Mo., on March 18. The meeting was called by T. S. Walton, chairman of the livestock committee representing all railroads under federal control, at the direction of John H. Howard, manager of the Claims and Property Protection Section of the Railroad Administration.

Tidewater Coal Shipments Freed

The Fuel Administration has suspended its order requiring shipments of coal to tidewater to go through the Tidewater Coal Exchange, and also suspending an order prohibiting reconsignments of coal. Suspension of the governmental requirements in nowise affects the continued operation of the Tidewater Coal Exchange through voluntary arrangements made by shippers and the Railroad Administration.

Commission and Court News

State Commissions

The New York State Public Service Commission, first district, has asked the legislature of the state for an appropriation toward the abolition of dangerous grade crossings on the Long Island Railroad between East New York and Jamaica, about four miles. On this section of the road trains are very frequent and there are 21 crossings. The commission desires to authorize the expenditure of $1,000,000, of which one-fourth should come from the treasury of the state, one-fourth from the city of New York, and the remainder from the railroad company. It does not appear that this sum will be sufficient to complete the work.

The New York State Public Service Commission, Second District, in connection with the publication of the report on the disastrous rear collision which occurred at South Byron, N. Y., on January 12, announces its purpose to hold an informal inquiry on the general subject of the prevention of collisions, the sessions to be held probably in New York City in the near future. The Commission expects to invite to participate in this inquiry prominent railroad officers and signal engineers, both from within and without the state of New York, the purpose being to seek authentic facts and well-informed opinions on the whole range of questions relating to the possible solution of the problem.

Court News

Recent Decisions Under Federal Employers' Liability Act

The Illinois Appellate Division holds that a checker employed by a railroad company is engaged in interstate commerce when checking freight out of a car which had been loaded in another state and brought therefrom into Illinois by the company.—Connelly v. Michigan Central, 207 Ill. App. 25.

The New York Appellate Division holds that a laborer, fatally injured while cleaning soot from a boiler in a railroad's power plant, generating electricity for operation of trains on one railroad wholly in New York state and on another partly in New York and partly in New Jersey, was engaged in interstate commerce within the act.—Guida v. Pennsylvania, 171 N. Y. Supp 285. Decided July 1, 1918.

The Texas Court of Civil Appeals holds that where lumber is loaded in a box car in one state and is shipped to another state to be used in the manufacture of doors for grain cars designed for the handling of interstate shipments of grain, an employee who unloaded the lumber in the latter state was engaged in "interstate commerce."—Gulf, Colorado & Sante Fé v. Drennan (Tex.) 204 S. W. 691. Decided June 29, 1918.

A yard brakeman was a member of a crew attached to a switching engine, and his day's work was in switching cars in interstate and intrastate commerce. He had just assisted in switching a string of 50 or 60 cars, some of which were loaded with interstate shipments and was returning to his engine when he was struck and injured. It was held he was engaged in interstate commerce. Erie v. Downs (C. C. A.) 250 Fed. 415. Decided April 10, 1918.

The Maryland Court of Appeals holds that a freight brakeman, who is a member of a crew taking a train from a point in one state to a point in another state, is within the act. Two companies had an agreement whereby each had the right to use the tracks of the other. It is held that an employee of one road who was killed while working on the tracks of the other road, was not at the time of his death an "employee" of the latter road, under the federal act, although the agreement specified that train employees should be subject to the regulations and orders of the company owning the tracks on which they worked.—Hull v. P. & R. (Md.). Decided April 3, 1918.

Foreign Railway News

Service between London and Paris for civilians was introduced over the route via Folkestone on February 3.

The Nyassaland Government is proposing to spend $4,000,000 on a new railway, to serve the country bordering on Lake Nyassa.

All French mobilized reservists who are railway employees, with the exception of those belonging to the active army, are to be immediately placed at the disposal of their respective railways.

The Belgian Government, on February 5, took over the management of the whole Belgian State Railway system, which has hitherto been run by the British, French and United States armies.

A new Italian port will result from the decision of the Italian government to establish a great commercial port at Varano Garganico, on the Adriatic, with a view to improving communications with Southern Dalmatia. A new railway terminating at Varano will place the port in direct communication with Rome and Naples.

The British railway supply export figures for the whole year 1918 are given in the Board of Trade returns for December. They are as follows, the corresponding figures for 1917 being given in parentheses. Locomotives, $5,377,435 ($8,147,270); rails, $2,421,000 ($3,452,375); carriages, $2,807,380 ($825,880); wagons, $1,644,055 ($2,215,120); wheels and axles, $1,722,340 ($783,165); tires and axles, $3,098,795 ($2,697,645); chairs and metal sleepers, $820,450 ($368,410); miscellaneous permanent way material, $2,785,165 ($2,472,210); total permanent way, $6,105,475 ($6,319,630). The weight of rails exported was 26,335 tons (38,900 tons), and of chairs and metal sleepers, 10,173 tons (5,650 tons). Of the locomotive exports $147,950 ($1,138,850) in value went to South Africa and $1,237,050 ($882,965) to British India.

The International Railway Congress has resumed its headquarters at Brussels with the return to that city of M. L. Weissenbruch, the general secretary. The Congress, before the war, held its meetings every five years, meeting in 1895 in London, 1900 in Paris, 1905 in Washington, 1910 in Berne, and the 1915 meeting was to have been held in Berlin. The Congress, before the war, also proved of service to railway men the world over by the publication at Brussels of a monthly bulletin.

Daily Train Service from Nogales, Mexico

Consul Bartley F. Tost, at Guaymas, Mexico, in a recent issue of Commerce Reports says that he is reliably informed that after March 1, the tri-weekly passenger train service of the Southern Pacific Railroad of Mexico between Nogales and Guaymas, Sonora, will be converted into a daily service, except Sundays. From Guaymas south to Mazatlan a tri-weekly service will be maintained.

Books on World Trade

With a view to guiding business men as well as general readers "who take an interest in ships and the sea, and other lands," the United States Shipping Board has recently issued several interesting booklets giving a bibliography of books on world trade in its various aspects. The lists were compiled for the Shipping Board by the Free Public Library of Newark, N. J., and include a list of books on world trade; a list of books on foreign languages; a list of books on foreign countries, including a list of 100 of the best books on modern travel, and a list of books on ships, commerce and the merchant marine. The Board is also issuing a table entitled "Tonnage Explained," describing the five kinds of tonnage in use in the shipping business.

Locomotive Building in Glasgow

The firm of William Beardmore & Co., Ltd., Glasgow, which during the war period and previously played an important part in the construction of ships, armaments, and munitions, has now added to its works at Dalmuir a locomotive building department. The work of constructing the locomotives is to be undertaken in the department which, during the past four and a half years, has been devoted to the making of gun-carriages and gun-mountings, as there were no workshops set apart for locomotive construction at Dalmuir previous to the war. A new plant of an up-to-date design is being installed and the necessary alterations carried out. It is understood that the firm have already on hand a number of contracts, including one from the government to build 35 locomotives for an Indian railway. Although the firm has not hitherto undertaken locomotive building from start to finish, it has manufactured certain important parts of locomotives for many years.

London to Jerusalem: The New Orient Express

Germany's much-advertised Balkan express ceased to run when the Serbians re-occupied their invaded country, but the International Sleeping Car Company intends to re-establish the Orient express from Ostend to Constantinople at the earliest possible date. Plans are also being considered for the running—possibly next winter—of a service from London to Jerusalem, with a through train from Calais. The company is now running services from Paris direct to Mayence via Strasbourg, and from Paris to Trèves via Metz and Luxemburg. Restaurant cars are also now running between Paris and Lille and Paris and Brussels. Naturally the pre-war time schedules have not yet been restored. The Brussels train, for instance, leaves Paris at 7:30 a. m., reaches Lille at 2:50 a. m., Tournai at 4:45 p. m., and Brussels at 9:20 p. m. Before the war the journey could be covered in 4¼ hours. The Mayence train leaves Paris at 8 p. m., and reaches its destination at 12:52 p. m., the following afternoon. Over 16 hours is also allowed for the journey from Paris to Trèves.

New Light Railway Projected for South Korea

Under date of July 5, official permission was granted by the Government-General of Korea, for the establishment of a light railway starting at Masan and connecting with the Honam line at Songchyonli. A branch line will also run from Wanchom to Chonju, the capital of North Chonia Province.

The main line measures 157 miles and the branch line 46 miles, making a total of 303 miles. The gage of the railway will be 2 ft. 6 in., and the building expenses are estimated at 6,000,000 yen ($3,000,000).

According to the plan as it now stands, the building of the railway will be started during autumn of 1919, and finished as follows:

First period—Songchyonli to Tamyang and Masan to Kunpuk; from autumn 1919 till spring 1921.

Second period—Tamyang to Wanchon, Wanchon to Nanwon and Kumpuk to Chinju; from spring 1920 till autumn 1921.

The Value of the Railways of Alsace-Lorraine

The financial correspondent of the Daily Telegraph (London), dealing with the return of Alsace and Lorraine to France, said recently that just before the war 40,000 railway men worked on this system, and the traffic was estimated at 2,800,000 tons of merchandise and 48,000,000 passengers. However valuable this acquisition may be, he said, this railway system cannot be allowed to remain in the condition in which it was delivered to the French by the Germans. It is arranged in such a manner as to multiply communications between Alsace and Germany to the serious disadvantage of those existing between Alsace and France. The first are assured by 17 lines, of which 11 are double tracked, whereas the second, that is, with France, have to be satisfied with three main lines, three secondary lines and a tramway. The contrast is significant, and shows that the whole economic activity of the annexed provinces under German domination was compelled by the law of the conquerors to turn toward Germany. Now the three departments of Alsace and Lorraine look to the west. As soon as possible new lines must be opened which will admit of a transformation in economic activity. It will be necessary now to establish easy means of communication between the iron and steel basin of Briey and the coalfields of La Sarre. By the union of these two important mining regions a matchless metallurgical center should be developed which would place France in the front rank of the great nations producing iron and steel.

Proposed Electrification of Swedish State Railways

According to a report issued by the Administration of the Swedish Railways, the plan of electrifying the whole of Sweden's railway system is now approaching its realization, says the Railway Gazette of London. In 1915 the Railway Administration found it necessary to make a closer inquiry into this question, as it appeared that the high cost of fuel made it advisable to adopt electrical power. It is estimated that if the transition had been made in the year 1913 it would not have cost more than the actual cost of fuel in 1915. As the war proceeded it was found necessary to have recourse to wood instead of coal for firing the engines, and this naturally considerably reduced the speed. That, however, was not the worst of the matter. In the year 1917 40,000,000 cubic meters of timber were consumed, whereas the annual increase in the supply of timber was only 25,000,000 to 30,000,000 cubic meters, and at the same time a large quantity of coal was also used. The steady increase in the time of the train journeys was also a serious matter. A journey from Stockholm to Kiruna (Lapland) now occupies 39 hours; with electrical working the journey could be done in 18 hours. The journey from Stockholm to Gothenburg now occupies, even in the most favorable circumstances, 11 hours, whereas an electrically-driven train could do it in 5½ hours. The Railway Administration estimates that the electrifying of the railways can be carried out in about 10 years. There is plenty of water power in the country, and already several large power works are in existence. It is also suggested that cables strung along the railway lines will be able to supply power for agricultural purposes.

Bagdad Railway in Good Condition

With the elimination of Turkey from the control of Mesopotamia and Syria great developments may be expected in those regions in which the Bagdad Railway will take a commanding part. A correspondent of The London Times says of the section of the railway including the Taurus tunnels:

"The railway between Bozanti, in the Taurus range, and Aleppo, is, on the whole, in first class condition. Some excellent work has been done. The organization near the Taurus tunnel is extremely interesting. . . . Trains can run all the way, but the tunnels need lining with masonry. This is urgent, otherwise they will fall in after the heavy rains; indeed, some of the new cuttings have already fallen. The scenery is magnificent in the tunnel area, and there is a very fine bridge with piers 220 feet high.

"On the Amanus range the tunnel work has been finished, though there are many difficulties owing to the sinking of the high banks. The track is laid and well ballasted for heavy trains to run at forty-five miles per hour. There is ample rolling stock and materials to meet present needs.

"The most striking feature of the railway construction work has been the survey. Owing to the precipitous nature of the mountains, ordinary methods were impossible. A special stereo-photographic theodolite was invented for photographing the mountain passes, and tunnels of a total length of eleven kilometres were plotted and planned from maps made from photographs."

Concerning the economic possibilities of the region touched by this part of the railway, the correspondent says:

"Adana vilayet has an extremely rich soil and two or three

crops are possible every year. At present, owing to the unsettled state of the country, land is very cheap. Under good government, labor should be plentiful, and it is probable that, other things being equal, more progress could be made there than in Palestine and Syria.

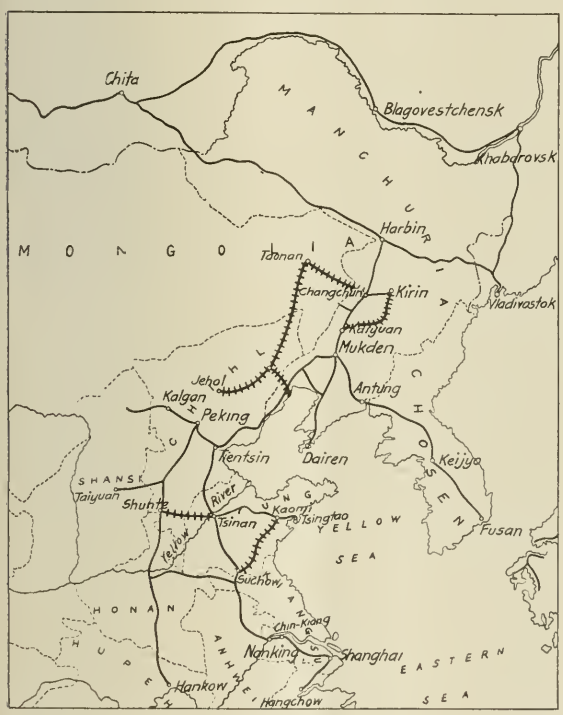
"There are many mines in the Taurus area. Coal also is found in the vicinity, but the quality has not yet been proved. Forests are plentiful and magnificent, and all the requirements of Egypt could be supplied if cutting were organized and the necessary shipping could be provided."

Japan's Growing Interest in Chinese Railway Affairs

The details given in this column last week, page 471, by the *Railway Age's* correspondent in Peking, concerning the six Japanese railway enterprises in Manchuria, Mongolia, Shantung and Kiangsu, China, have also been covered in an Associated Press despatch from Paris, Tuesday.

The despatch gives a translation of the notes exchanged between China and Japan in September, 1918, granting to Japanese financiers the privilege of making loans to China for the building of railways in China proper and to Japan the right to participate in the operation of the railways now constructed in Shantung province.

These notes, which are now before the Peace Conference, supplement the treaty and notes of May 25, 1915, between



The Railways in China Showing in the Cross-Hatched Lines the Railways Mentioned in the News Despatches

Japan and China, in which the Chinese government engaged to recognize all agreements between the Japanese and Germans respecting the disposition of German rights and interests in Shantung province.

Baron Goto, the Japanese minister of foreign affairs, and Tsung-Hsiang Chang, Chinese minister to Japan, signed the three sets of notes exchanged on September 24 last year. One set outlined the new railways which Japanese capitalists may finance in Manchuria, Mongolia and Chile province, north China.

The second set outlines the railways Japanese capitalists may finance in Shantung province, to connect the existing German owned lines with the other principal railway lines in north China. The third set stipulates the conditions under which Japan may participate with China in Shantung province affairs.

The Associated Press despatch follows with the translations of the three sets of notes, but lack of space and the fact that full details were given in last week's issue makes it unnecessary to reproduce them here.

The railway lines in question are shown on the map. The four in Manchuria include: (1) A line from Kaiyuan northeast to Hailung, thence to Kirin, a total of about 180 miles; (2) one from Changchun, north of Mukden, northwest to Taonan, in Mongolia, a distance of about 200 miles, and (3) from Taonan southwest toward Jehol, in Chili province, north China, with (4) a spur extending to the sea at a point still undetermined, but probably Hulutao.

The proposed new railways in Shantung province include (1) a line from Kaomi, 20 miles west of Tsingtau, running southwest to Suchow, about 250 miles, connecting with the partly constructed Belgian line from Lanchow, in Kansu province, to the sea, and (2) a line from Tsinan, in Shantung province, directly west to Shunte, a distance of about 150 miles. This would connect with the railway operating from Peking to Hankow, on the Yang-Tse river and connect Tsingtao with all the important railways in north China.

The British Import Restrictions

George Ed. Smith, president of the American Manufacturers' Export Association and president of the Royal Typewriter Company, discussing the British import restrictions, said, in part, in a statement issued by the association Monday:

"From information which has reached the association since it was announced that the British import restrictions would be resumed on March 1, it would appear that the imposition of these restrictions is simply a temporary expedient rather than an indication of a permanent English policy. From statements of government officials as well as well informed business men in England there is no reason to believe that Great Britain intends to erect a permanent wall against the manufacturers of other countries.

"What has happened is that England has determined to get back upon a normal basis, and is readjusting her business affairs more quickly than we are. She has felt the necessity for giving her own people a chance to put their house in order before opening up her markets to the world. This means that for a certain period a certain percentage of goods manufactured in other countries will be kept upon a restricted list, and that until these restrictions are removed any attempt to expand the sale of these products in England is impracticable.

"The American manufacturer realizes that England is under the necessity of readjusting her domestic affairs. It is true that this readjustment will work considerable hardship on American firms which have a large investment in Great Britain and which cannot supply their English branches with stocks for some time to come. On the other hand, it does not mean that the American manufacturer must abandon his English branches because we are assured that within six months or at most a year, England will once more resume importation upon normal lines. Prior to the war we were England's best customer and she was ours. Excluding the raw materials exported from the United States to Great Britain, the total manufactured exports from us to England and from England to us were approximately the same. We need English markets and England needs American markets, and it is not likely that England would seek to delay longer than necessary the resumption of a mutually beneficial trade.

"While no market could possibly compensate the American exporter for the permanent loss of his English markets, he can make the best of the present situation by devoting himself, heart and soul, to developing his other export fields. He will never have a better opportunity for establishing himself in these new markets than he has at present when there is an abnormal demand for the things which he can supply.

"The manufacturer who promptly adopts this policy under the spur of present necessity should be able to rebuild his

English trade at the proper moment and with a larger volume of export sales in other markets than would be possible if he now continued to send his accustomed exports to Great Britain."

France Needs 3,000 Locomotives and 100,000 Cars

France, as a result of the war, finds itself short of 3,000 locomotives and 100,000 cars, says an Associated Press despatch, while the transportation material that is still nominally on the active list is badly out of repair. The shortage of rolling stock has become very acute lately, for the number of locomotives and cars out of commission for various defects has increased since July last by 10 and 30 per cent respectively. To meet the growing difficulties in the matter of repairs, the State munition factories at Lyons, Toulouse and Roanne have, since the armistice, been turned with all speed into railway repairing shops.

The French Government has long hesitated to place orders in the United States, the despatch continues, where alone new rolling stock could be procured, for fear of depressing the French rate of exchange unduly; but the country's needs became so pressing that orders have now been given, it is understood, for purchasing 800 locomotives and 32,000 cars, while 27,000 American cars that were to have been shipped to France for the use of the American Expeditionary Force have also been acquired. Perhaps the biggest task before the French transportation experts is the restoration of the destroyed railway tracks in the invaded part of France. An army of 75,000 workers will be engaged on this great work for months. It includes the reconstruction of fourteen tunnels and 16,000 bridges for which 50,000 tons of metal are required.

In addition, hundreds of miles of main and branch lines have been temporarily "borrowed" for military purposes from elsewhere, and must now be relaid. The departments affected have been divided up into sections, for each of which a "chief reorganizer" has been appointed. Each of them has been required to give an undertaking that he will have his section in proper working order, as regards transportation, in the course of the present year. An appropriation of 120,000,000 francs has been made by the government to enable the railway companies to purchase rolling stock for urgent public needs. The Minister of Public Works has declared that, in his view, the restoration of France's Northern and Eastern railway systems should be made a first charge upon the war indemnity to be paid by the enemy.

Railway Construction in Mexico

Manuel Aguirre Berlanga, Secretario de Gubernacion of the Mexican Government, has officially announced that construction is now in progress on about seven hundred miles of new lines of railway, says a correspondent in the City of Mexico. This work is being done at the joint cost of the federal government and the respective states traversed by the roads. While the primary purpose of inaugurating extensive railroad construction at this time is to give steady employment to thousands of laborers, the new lines will also afford transportation outlets to rich mineral and agricultural districts, it is pointed out by Mr. Berlanga. All of the materials for the building of these railroads are obtained in Mexico. The cross-ties come from the native lumber mills, and the steel rails are manufactured at the Monterey Iron & Steel Company's plant at Monterey. Mr. Berlanga said:

"The railroads now under construction by the government are to run between Cuatro Cienegas, in the state of Coahuila, to Chihuahua, via Sierra Mojada, a distance of about 450 miles; from Durango to the Pacific port of Mazatlan, a distance of about 135 miles; and from Durango to Canitas, a distance of about 130 miles. All of these lines are important. The building of a railroad from Durango to Mazatlan has been under consideration for 30 years or more. Many surveys were made to locate a feasible route across the Sierra Madres. This has been finally accomplished and the road will be finished in due time, thus establishing a new transcontinental line across Mexico. The Cuatro Cienegas-Chihuahua line will be the means of opening to development vast coal fields in Northern Mexico, while the Durango-Cienegas road will shorten the rail distance between Durango and the capital about two hundred miles and will give a shipping outlet to some rich mining districts.

"Durango is a rich mining state and this railroad construction will be important in adding to the wealth of the nation. The government has enough money to undertake all these works and, in addition, it has established many commercial museums to which natural and manufactured products are brought. Then, besides, the government is expending money to bring all kinds of agricultural implements for the farmers, these implements being distributed along the government-controlled railroads to the farmers at cost price on long-time payments. This has all been done while there has been so much talk of distress in Mexico! It is obvious that if we were in such a shape as has been represented the government could not do these things.

"It is very probable the railroads in the state of Yucatan will be bought by the government, financial arrangements now under way having assumed such shape already, the tendency is to shortly take control. The money will be found to buy these railroads.

"I am aware of the fact that many persons in the United States are misinformed about the real conditions in Mexico. They hear that a train has been blown up or a bridge has been burned. Perhaps life has been lost.

"Take the railroad from Mexico City to Vera Cruz, the line from San Luis to Tampico, or that on the Isthmus of Tehuantepec, to Salina Cruz. These railroads cross a country densely wooded. Two or three men can approach to within ten or fifteen yards of the railroad track with no one aware of their presence. They easily can reach the track, place a bomb, and the train, when it passes, is blown up.

"When the people of the United States read of this they think Mexico is not settled and they pass judgment on the entire country. They do not know that those bandits or train wreckers exist mainly due to topographical conditions. In rugged mountains and practically trackless forests they have their hiding places and it is almost impossible to pick up their trail once they have disappeared. They are not a force, these violators of the law. They are in small groups, and eventually must succumb to the law.

"It is simply a question of time before Mexico will take her place as a big producer. As soon as the world is ready to trade, then the great nations will bring to Mexico what we need in raw materials and the finished products, and Mexico will export to them what they need in all those materials so richly abundant here. As our custom house receipts increase the local commerce in the various states also will increase. Profits of the merchants will grow larger from the stimulated business and more money will be in the country.

"Our budget heretofore has been nearly 75 per cent higher than formerly, due to the great demands of the reconstruction program, yet the revenues are almost meeting it and soon we shall not only be able to cover it but will have a surplus, a certain amount of cash. There is this to be considered: Many of the mines are not working, the owner is not getting returns and the government is not receiving its share, but despite the fact that there is no paper money in circulation, the country for two years having been on a strictly coin basis, there is enough gold and silver for all transactions. Right now coinage of gold and silver is necessary and, say, six months from now, we will have not only sufficient money coined but a surplus.

"Though many of the mines are not working, Mexico produces much gold and silver and, from those mines that are working, a percentage comes to the government as revenue. At our customs house gold is paid. All this is brought here and coined. Then, too, many persons buy silver bars that are bought in by the government.

"If things continue on the same footing as now, very soon we will be able to cover our budget, and, if so, we will begin paying part of the overdue interest on our foreign debt. It is only a question of a little patience, six months, I believe, is all that will be required. Just now, we're a little short of money but we're progressing fine. If we could get financial assistance we'd be glad; however, it is not absolutely necessary."

Equipment and Supplies

Locomotive Deliveries

The following new locomotives were shipped during the week ending February 15:

Works	Road	Number	Type
American	Virginian	5	USRA Mallet
	C. & O.	2	LOW. SW.
	C. B. & Q.	2	USRA Santa Fe
	Cent. of Ga.	1	Mountain
	Oregon S. L.	2	USRA 6W. Sw.
	Total	12	
Baldwin	Atch. Top. & St. Fe.	3	Mikado
	B. & O.	4	USRA Mikado
	Penn. R. R.	1	Mikado
	Phila. & R.	1	Mallet
	Lehigh Valley	1	Pacific
	Norf. & West.	1	Mallet
	Great Northern	1	Mikado
	Total	12	
	Grand total	24	

Cars Constructed in Railroad Shops

The following new cars were constructed in railroad shops during January:

Class of cars	Steel	Steel underframe	Steel center sills	Wood	Total
Passenger—					
Sleeping	..	..	..	..	..
Parlor	..	..	..	..	..
Dining	..	..	..	..	..
Parlor observation	..	..	..	..	..
Dining observation	..	..	..	..	..
Passenger coach	..	..	..	..	..
Passenger baggage	..	..	..	..	..
Passenger and mail	..	..	..	..	..
Mail	..	..	..	..	..
Baggage and mail	..	..	..	..	..
Baggage	..	..	1	..	1
Express	..	..	..	..	..
Express and refrigerator	..	..	..	..	..
Horse express	..	..	..	..	..
Milk	..	..	..	..	..
Total passenger equipment	0	0	1	0	1
Freight—					
Stock	..	..	65	17	82
Hopper	..	..	..	112	112
Gondola	..	..	..	24	24
Flat	..	17	4	7	28
Coke rack	..	..	..	..	..
Work car	4	7	..	7	18
Miscellaneous freight cars	..	..	..	..	..
Caboose	7	56	1	8	72
Box	147	5	..	229	381
Refrigerator	..	..	..	..	..
Total freight equipment	158	85	70	404	717
Total passenger and freight	158	85	71	404	718

Locomotives

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., is in the market for a second-hand, standard gage locomotive weighing 15 to 20 tons.

Freight Cars

The United States Navy Department, Washington, is inquiring for 4 rotary dump cars.

The Anaconda Copper Mining Company, New York, is inquiring for 4 50-ton ore cars.

The Marquette Cement Manufacturing Company, La Salle, Ill., has ordered 100 mine cars from the Lincoln Steel & Forge Company, St. Louis, Mo.

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., is in the market for 2 second-hand box cars, equipped preferably with automobile end doors.

Supply Trade News

Geo. N. VanSweringen, sales representative, has been appointed assistant to the vice-president of the Chicago Railway Equipment Company, with headquarters at Chicago.

The Norbom Engineering Company, Inc., designers and builders of hydraulic dredges and ship yard machinery, announces the transfer of its offices from the Denckla building, Philadelphia, Pa., to its plant at Fifth and Ellis avenues, Darby, Pa.

The annual meeting of the Chicago Pneumatic Tool Company, Chicago, scheduled for February 24, in Jersey City, N. J., has been postponed until March 17. On account of a recent reorganization of the company's auditing department, the annual report is delayed.

The Interstate Car Company, Indianapolis, Ind., is erecting a steel car and tank car repair shop and fabrication plant at Indianapolis, Ind. The building will be of structural steel, 83 ft. by 245 ft., and 40 ft. high, costing approximately $50,000. George J. Dive is in charge.

At the organization meeting of directors of the Air Reduction Company, Inc., New York, held on February 19, the following officers were elected: A. S. Blagden, president; A. R. Ludlow, vice-president; C. E. Adams, treasurer; M. W. Randall, secretary; C. L. Snow, assistant treasurer; C. E. Emerson, assistant secretary.

Lieutenant Sherman C. Amsden, formerly connected with Mudge & Co., Chicago, has been appointed assistant to president, in which position he will have charge of publicity, special sales plans, and investigations. Mr. Amsden was born at Manchester, Mich., in 1889, and was educated in the public schools at Manchester and the high schools of Brooklyn, N. Y., and Detroit, Mich. His first business experience was in the employment of Burnham, Stoepel & Co., a wholesale dry goods firm at Detroit. One and one-half years later he entered the service of the Atchison, Topeka & Santa Fe, at Topeka, Kans., as chief clerk to the division freight agent, later becoming assistant editor of the Employees' magazine of the Chicago, Rock Island & Pacific, at Chicago. Mr. Amsden entered the employ of Mudge & Co. in 1914, and on November 1, 1917, enlisted in the air service, taking ground training at the United States School of Aeronautics at the Universtiy of Illinois, and flying training at Carruthers Field, Love Field and Langley Field, receiving a commission as lieutenant on July 1, 1918. Upon his honorable release from the service he returned to Mudge & Co. to become assistant to president.



Lieut. S. C. Amsden

Fred Mathews, sales representative of the Union Metal Products Company at Chicago, has been appointed southern manager of the Standard Railway Equipment Company, the Pressed Steel Manufacturing Company, the Imperial Appliance Company and the Union Metal Products Company, with headquarters in the Candler building, Atlanta, Ga.

W. B. Gibson, manager of the mining machinery department of the Allis-Chalmers Company, of Milwaukee, Wis., has been appointed manager of the small tank department,

and R. C. Huntington, manager of sales promotion of the Fuller Rubber Company, Hampton, Ohio, has been placed in charge of department of sales, promotion and advertising of the Wm. Graver Tank Works at Chicago.

Emerson Knoff, sales agent for the United States Steel Product Company for a number of years at Seattle, Wash., has been appointed vice-president and general manager of the Gerrard Wire Tying Machines Company, Inc., with offices in the Century building, Chicago. Mr. Knoff was born in 1882, at Cheyenne, Wyo., and received his early education in the public schools of Seattle. Upon his graduation from a Seattle business college at the age of 17 years, he entered the employ of the Seattle Hardware Company as office boy, remaining with that company in minor positions for three years. In 1900, Mr. Knoff entered the employment of the American Steel & Wire Company as clerk in the sales department, and four years later was appointed sales agent at Seattle. The American Steel & Wire Company became a subsidiary of the United States Steel Corporation in 1901, and when the United States Steel Product Company formed a Pacific coast department in 1911 to handle the Pacific coast business of the United States Steel Corporation, Mr. Knoff continued as sales agent, until his recent appointment.



Emerson Knoff

The Baldwin Locomotive Works

The highest gross sales ever recorded in the history of the Baldwin Locomotive Works are shown in the annual report for the year ended December 21, 1918, the total amounting to $123,179,251, compared with $98,263,865 in 1917, the previous record year. The business of the company last year was largely confined to government orders, 11 railway mounts for 14-inch guns and 16 caterpillar mounts for 17-inch guns being constructed as well as 3,532 locomotives, the total having a value of $109,515,970; other regular work was completed amounting to $13,663,281.

Operating costs totaled $105,322,455, and gross profits were $19,760,441, from which deductions for taxes and interest left $18,262,112. From this was deducted reserves for depreciation, amortization of buildings and machinery and reserves for taxes, along with other charges, amounting to $12,509,816, leaving a net profit before preferred dividend payments, which amounted to $1,400,000, of $5,752,292. The surplus, after the preferred dividend payments, was $4,352,295, equal approximately to $21 a share on the $20,000,000 common stock; but as $2,500,000 has been appropriated for plant improvement, which is still unexpended, the surplus for the year was reduced to $1,852,295, equal to about $9 a share on the common stock. The amount set aside for taxes, $6,500,000, was unusually large when compared with $1,750,000 set aside for that purpose last year.

The Eddystone Munitions Company, controlled by the Baldwin Locomotive Works, and which was formed in 1917 to manufacture munitions, last year completed contracts aggregating $14,636,479. Contracts have been suspended subject to adjustment amounting to $6,179,620. Owing to the ending of the war the report stated that this company is now undergoing liquidation.

The Standard Steel Works, another subsidiary, had gross sales of $24,912,467 and net profits of $934,600. Bills payable of $2,500,000 were paid off during the year. Government contracts cancelled after the signing of the armistice totalled $2,500,000. Bills payable of $8,250,000, which the Baldwin company had outstanding at the end of 1917, the report showed, had been paid off last year.

In reviewing operations, President Alba B. Johnson says: "When the greatest production had been reached the armistice was signed and $68,400,000 of contracts were cancelled. The prior contracts received and set aside to give precedence to government orders had been taken when costs were lower than at present. The completion of these delayed contracts will undoubtedly entail a reduction of profits, and in many cases considerable loss. The uncancelled government contracts are now largely completed and there are no immediate prospects of further government orders. The railroads of the United States, whose needs would naturally tend to relieve the present situation, are under control and operation of the United States Railroad Administration, which is pursuing a policy of retrenchment of expenditures.

"So long as this curtailment of domestic business continues the foreign markets must be the chief source of orders. But in view of the political unrest abroad and the time it will take for readjustments to be made so that business can be obtained from foreign sources," Mr. Johnson says, "the board of directors have adopted the conservative policy of strengthening the company's finances, believing that the interests of the stockholders were best served by placing the company in the strongest financial position to meet the uncertainties of the future. For this reason they have continued the policy of omitting the dividends on the common stock."

J. W. Hackett has become associated with the Okonite Company, New York, as sales engineer, effective February 17. Mr. Hackett was connected with the signal department of the New York Central until 1913, when he became sales engineer of the Federal Signal Company, with office at New York, with which company he remained until January 1, 1918. On October 1, 1917, he was commissioned first lieutenant of engineers in the United States army, and ordered into active service on January 5, 1918. After spending three months at the Engineer Reserve Officers' Training Camp at Camp Lee, Petersburg, Va., he was ordered to the office of the chief of engineers at Washington, D. C. He was put in charge of the production, inspection and transportation of sound and flash ranging apparatus.

H. A. Jackson, president of the Chicago Pneumatic Tool Company, Chicago, returned February 19, from England, where he has been inspecting the foreign plants of the corporation. The Consolidated Pneumatic Tool Company, Ltd., and the Pneumatic Tool Company (respectively the selling agency and the manufacturing corporation), subsidiaries of the Chicago Pneumatic Tool Company in England, were found to be in excellent condition. During the war the company has made some profit manufacturing bayonets for the British government while carrying on its regular tool business to capacity. News of the disposition of the International Compressed Air & Electric Company of Berlin, Germany, which the Chicago Pneumatic Tool Company owns, has not yet been received, although Mr. Jackson has been striving for a year to get word of this property.

Trade Publications

Electric Industrial Trucks.—Three types of electric industrial trucks designed for different services including a carrying truck, an elevating platform truck and a tractor, manufactured by the Buda Company, Chicago, are described in its bulletins 327, 328 and 329. These give a general description of the construction and specifications for each type as well as illustrations and drawings. Bulletin 326 contains a brief description of the mechanical features common to all three types.

Rust Preventives.—The Dearborn Chemical Company, Chicago, Ill., has issued a booklet entitled The Prevention of Rusting or Corrosion of Iron and Steel, for the purpose of presenting evidence of the success that has followed the use of No-Ox-Id, a rust preventive developed by the Dearborn Chemical Company, as well as to describe other Dearborn products, including Dearboline, a preparation for cleaning machined parts of emery or grease, Klean-Kleen, for use in cleaning metal during various stages of manufacture, and cutting, quenching and drawing oils, etc.

Railway Officers

Railroad Administration

Regional

W. G. McEwan, superintendent of dining cars of the Louisville & Nashville, has been appointed a member of the Inter-Regional Dining Car Committee, representing the Southern region, to succeed **W. C. Francis,** deceased.

Federal and General Managers

J. B. Yohe, general manager of the Pittsburgh & Lake Erie, the Lake Erie & Eastern, the Monongahela Railroad, the Pittsburgh & West Virginia, and the West Side Belt Railroad, has been appointed federal manager, with office at Pittsburgh, Pa.

W. E. Williams, general superintendent of the Missouri, Kansas & Texas, has been promoted to general manager of the Missouri, Kansas & Texas (exclusive of the Trinity branch, the Beaumont & Great Northern and lines west of Whitesboro, Texas), the Union Terminal of Dallas and the Houston & Texas Central, with headquarters at Dallas, to succeed **W. A. Webb,** who has resigned.

Operating

S. T. Grimshaw has been appointed trainmaster of the Seaboard Air Line, with office at Hamlet, N. C., vice **C. L. Sauls,** transferred.

W. C. Sloan, having returned from service overseas resumed his duties as superintendent of the Pasco division of the Northern Pacific, with headquarters at Pasco, Wash., on February 22.

William K. Hallett, who has been appointed general superintendent of the Bangor & Aroostook, with headquarters at Bangor, Maine, as has already been announced in these columns, was born on March 15, 1873, at Fredericton, N. B., and was educated in the grammar schools. He began railway work on November 11, 1893, with the Canada Eastern, now a part of the Canadian National Railways, as station agent. He remained in that position until July of the following year, and then went to the Bangor & Aroostook as a telegraph operator and agent, and has been in the continuous service of that road ever since. In January, 1896, he was appointed despatcher, and from June, 1898, to June, 1903, was chief clerk to superintendent. He then served as assistant superintendent until March, 1905, and was then appointed division superintendent, which position he held until January 1, 1919, when he was promoted to general superintendent of the same road, as above noted.



W. K. Hallett

Financial, Legal and Accounting

T. S. Ford has been appointed federal auditor, and **C. H. Hueston** has been appointed acting federal treasurer and paymaster of the Des Moines Union, the Iowa Transfer, the Des Moines Western and the Des Moines Terminal, with headquarters at Des Moines, Iowa.

Traffic

J. R. Wells has been appointed assistant general passenger agent of the Southern Railroad, with office at New Orleans, La.

Engineering and Rolling Stock

A. L. Morgan has been appointed chief engineer of the Des Moines Union, the Iowa Transfer, the Des Moines Western and the Des Moines Terminal, with headquarters at Des Moines, Iowa.

C. L. Bunch, shop superintendent of the Southern Railroad, at Spencer (N. C.) shop, has been promoted to master mechanic of the Memphis division, with office at Sheffield, Ala., vice **J. W. Gibbs,** resigned.

George W. Rink, mechanical engineer of the Central of New Jersey, has been appointed assistant superintendent of motive power, with office at Jersey City, N. J. Mr. Rink was born on September 4, 1875, at New York, and graduated from Cooper Institute, New York City, with the degrees of B. S. and M. E. He began railway work on March 14, 1892, as a machinist apprentice on the Erie Railroad. From March, 1896, to March, 1899, he served as a machinist and shop draftsman, and then to September, 1900, as a draftsman on the Northern Pacific. He then entered the service of the Central of New Jersey, as a draftsman and from 1901 to 1902, was roundhouse foreman and inspector of new equipment. Later he was engaged in road testing of locomotives and as draftsman, until 1903, when he was promoted to chief draftsman. From April, 1904, to January, 1909, he was instructor of apprentices, and then was appointed mechanical engineer, which position he held until his recent appointment as assistant superintendent of motive power of the same road, as above noted.



G. W. Rink

J. E. McQuillen, mechanical superintendent of the Gulf, Colorado & Santa Fe, the Fort Worth & Rio Grande, the St. Louis-San Francisco & Texas, the Texas Midland, the International & Great Northern (from Spring to Fort Worth and the Madisonville branch), the Fort Worth Belt, the Fort Worth Union Passenger Station, and the Houston Belt and Terminal, has also been appointed mechanical superintendent of the Fort Worth & Denver, the Wichita Valley, the Missouri, Kansas & Texas (west of Whitesboro), the Wichita Falls & Northwestern, the Abilene & Southern and the Quanah, Acme & Pacific, with headquarters at Galveston, Texas.

William S. Wilson, who has been appointed division engineer of the Pennsylvania Railroad, with office at Oil City, Pa., as has already been announced in these columns, was born on March 12, 1880, at Philadelphia, Pa., and graduated in June 1899, from the Central Manual Training School, Philadelphia. The following August he began railway work in the construction department of the Pennsylvania Railroad, and in 1900 was transferred to the office of the engineer maintenance of way, at Philadelphia. In November, 1902, he was promoted to assistant supervisor on the Trenton division, and later was transferred to the Pittsburgh division. He subsequently served as supervisor consecutively on the Bellwood division, the Erie division, and the Pittsburgh division until his promotion on February 1, 1919, to division engineer of the Allegheny division, with headquarters at Oil City, Pa., as above noted.

Corporate

Operating

J. J. Horn has been appointed superintendent of the Kenora division of the Canadian Pacific, with headquarters at Kenora, Ont., to succeed **J. L. Jamieson.**

J. L. Jamieson, superintendent of the Kenora division of the Canadian Pacific, with headquarters at Kenora, Ont., has been appointed superintendent of the Vancouver division of the same road.

Traffic

F. A. Mitchell has resigned as general traffic manager of the Manistee & North Eastern, and that office has been abolished. **D. Riely,** general freight and passenger agent, will handle matters pertaining to traffic, with headquarters at Manistee, Mich.

A. C. Albertson has been appointed general agent of the passenger department of the Canadian Pacific, with office at Minneapolis, Minn., succeeding **R. S. Elworthy,** who has been transferred to Chicago, as general agent of the Canadian Pacific Ocean Services, Limited.

E. F. L. Sturdee, general agent of the passenger department of the Canadian Pacific, at Boston, Mass., has been transferred to Seattle, Wash., and **L. R. Hart,** general agent at Buffalo, has been transferred to Boston to succeed Mr. Sturdee. **Captain George O. Walton,** formerly city passenger agent at New York, who has been serving in the ordnance department and has been connected with the supply department of the artillery branch, at Washington, has just been relieved of military duty, and has returned to the service of the Canadian Pacific, as general agent at Buffalo, to succeed Mr. Hart, effective March 1.

Purchasing

A. E. Cox, whose appointment as general storekeeper of the Canadian National, Western Lines, with headquarters at Winnipeg, Man., was announced in the *Railway Age* of February 21 (page 476), was born at Huddersfield, Eng., in 1863, and received his education in private schools at Hamburg, Germany, and college at Huddersfield. Mr. Cox first entered railway service in 1883 as time keeper on the Canadian Pacific Western division, with headquarters at Moose Jaw, Sask., which position he held for four years, when he was appointed chief clerk in the stores department of the Manitoba & Northwestern. In 1893 he was appointed storekeeper when the Manitoba & Northwestern was absorbed by the Canadian Pacific, and the following two years was assistant to the superintendent of construction of the Ontario and Rainy River section of the Canadian Northern. Since 1912 he has been storekeeper of the same road, until his recent appointment as general storekeeper of the Canadian National.



A. E. Cox

Railway Officers in Military Service

Major B. O. Johnson, now in the Russian Railway Service Corps, engaged in reorganizing the Trans-Siberian Railway, has been promoted to Lieutenant-Colonel. Lieutenant-Colonel Johnson was superintendent of the Montana division of the Northern Pacific when he entered military service in October, 1917.

Obituary

Pollok H. C. Remone, personal injury claim agent for the Wabash Railroad, with headquarters in St. Louis, died on February 17, at his home in Hinsdale, Ill., at the age of 44 years.

John F. Livingston, president of the Columbia, Newberry & Laurens, died in a hospital at Columbia, S. C., on February 24, at the age of 50.

Frank Tremble, superintendent of telegraph of the Texas & Pacific, and associated lines, at Dallas, Texas, died on February 20, from the effects of injuries received in an accident while making an inspection in a motor car on the line near Weatherford, Texas. Mr. Tremble was born in 1865, at Mattoon, Ill.; he had been in railway service since 1881, and since June, 1903, served as superintendent of telegraph until the time of his death.

Charles B. Compton, freight traffic manager of the Louisville & Nashville, with office at Louisville, Ky., died at his home in that city on February 24. He was born in 1854, at New Albany, Ind., and was educated in the high schools. He began railway work on August 1, 1871, with the Louisville & Nashville, and previous to January, 1882, was general agent of the same road at Birmingham, Ala. He was then promoted to general freight agent, and since April 1, 1901, served as freight traffic manager of the same road.

Carl Stradley, chief engineer of the Oregon Short Line, died on February 11, at Salt Lake City, Utah, of pneumonia. He was born in Indiana, where he received his education, and later moved with his parents to Colorado, and in 1886 began railway service on construction surveys for the Union Pacific. In 1889-90 he was engaged in surveys for the Pacific Short Line, between Lander, Wyo., and Ogden, Utah. In 1890 he was engaged in engineering work for the city of Ogden and later engaged in mining in Colorado, but returned to railroad service, becoming identified with new construction work on the Union Pacific. In 1901 he was engaged in location work for the Oregon Short Line, until appointed chief engineer, April 15, 1911, succeeding William Ashton, who resigned. Mr. Stradley was appointed assistant chief engineer of the Union Pacific System, including the Union Pacific, the St. Joe & Grand Island, and the Oregon Short Line when the government took over the railroads.



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The Y. M. C. A. Headquarters at This Point on the Archangel Front Are in a Box Car

EDITORIAL

Railway Age

Labor and Railway Purchases

Director General Hines, on February 18, at a conference with the vice-president of the United Mine Workers of America and a member of the Labor Bureau of the United States Fuel Administration, representing the organized coal miners of the country, made the statement that "The policy of the Railroad Administration is to avoid any action calculated to depress wages of coal miners or the amount of coal produced." Any possible action that might be taken by the Railroad Administration in the interests of the public could not very greatly affect the wages of the miners or the amount of coal produced, and it is rather strange that the director general should have gone on record in this way, particularly since the policy of the Railroad Administration in curtailing purchases for the railroads has resulted in a greatly decreased production of the railway supply companies, who, of course, employ more men than do the coal mines. This has resulted in throwing thousands of men out of work at a time when every department of the government should do all that it can to keep up production. This was done in the face of the fact that the Railroad Administration is responsible for a large amount of deferred maintenance which must be accounted for when the railroads are returned to their owners. Is it conceivable that the railway supply companies, in appealing to the director general, could have secured better results had they been represented in their requests by representatives of organized labor in their employ?

A Long Step Backward

Scientific study and analysis of railroad operation and its various details have been largely responsible for the remarkable improvements in efficiency and economy in recent years. So great have been these improvements that the roads up to the opening of the war were able steadily to improve their service in spite of greatly increased expenses without a proportionate increase in rates. To make these improvements it has been necessary to prepare accurate records, and, on the basis of these, to improve detail methods and operations by cutting out unnecessary movements or awkward operations and making every move count for the most. In the locomotive and car repair shops, piece work was introduced in order to secure the hearty co-operation of the men by rewarding them in proportion to the greater interest and effort displayed by the individual. Piece work has now been eliminated because the Railroad Administration, in raising the wages, has made the guaranteed day work rate so high, without increasing the piece work prices, that any incentive has been removed on the part of the men for remaining on a piece work basis. This was bad enough, but where the railroad shops, in reorganizing to meet the new conditions, have attempted to make studies of the time used on the different jobs, the government inspectors have interfered and have advised the officers that while they could not order the discontinuance of these studies, the cost, if they were continued, would have to be paid by the railroad corporations. Doubtless, this is a fair example of what might be expected under government ownership of the railroads. If so, it would spell an end to progress since it means that if records are to be done away with and all incentives are to be removed for doing good work, then it is only a matter of time when the magnificent railroad system that has been developed in this country would fade away and become a third-rate institution.

June Convention Exhibits

The executive committee of the American Railroad Association adopted the following resolution at a meeting on February 21: "*Resolved,* That the executive committee, recognizing the educational value of the manufacturers' exhibits, is in favor of the continuance of these exhibits at the conventions of the various sections of the American Railroad Association." The railway supply industry has made a number of important and far-reaching improvements in its products since the last exhibit at the mechanical department conventions at Atlantic City three years ago. Moreover, the railroad situation has changed in respect to the greater need for capacity increasing and labor and time-saving devices. The exhibit this year, therefore, promises to be of even greater educational value than in years past. This fact must be kept clearly in mind by the exhibitors and special efforts should be made to arrange the exhibits in such a way as to show clearly the construction, application and advantages of the various methods and devices. Moreover, special attention should be paid to having thoroughly trained men in charge of these exhibits in order that they may be properly explained to those railroad officers who are seeking practical information, and particularly to the younger men, who are attending the conventions for the first time. The railroad companies should also specially delegate different men whom they send to the conventions to study various classes of the exhibits in order that they may report back and bring to the attention of the higher officers those things that seem to possess the greatest merit and which are specially suited to the peculiar conditions on the roads with which they are connected.

Rearrangement of Lines in the Southwest

The rearrangement of the lines in the Southwestern region to restore the units of the original systems to the jurisdiction of one federal manager is a big step preliminary to the ultimate restoration of these properties to their owners. While the breaking up and regrouping of the component parts of the different railway systems was followed out in varying degrees in most of the regions, the most radical rearrangement occurred in the Southwestern region. Its abandonment here follows similar steps in several of the other regions; the Pittsburgh & Lake Erie has been transferred from the Allegheny to the Eastern region, in which is located all the remainder of the New York Central system; the Western lines of the Pennsylvania and the Baltimore & Ohio have been transferred from the supervision of the Eastern to that of the Allegheny region, which controls the parent lines; the Chesapeake & Ohio of Indiana has been transferred from the Eastern to the Pocahontas region and placed under the jurisdiction of the federal man-

ager of the eastern lines of that system, etc. These restorations bring to an end, in large measure, one of the experiments which was heralded as affording large opportunities for operating economies. There has been bitter complaint from the owners of many of the properties affected which have been broken up and merged with their competitors with results from which they will not recover for many years. The railway systems of this country have been developed along the lines of traffic movement, competing for business at its source and endeavoring to transport it as far as possible before turning it over to connecting lines. The radical rearrangement of the roads in the Southwestern region largely ignored the traffic consideration, while the confusion incident to the rearrangement largely neutralized any operating economies which might have been secured. As in other instances, the Railroad Administration is finding that many of the conditions which it criticized at first are the result of natural economic developments, the justification for which becomes more evident with increased knowledge of the properties and experience in their managment.

Who Was Right About Standardization?

JUST ABOUT ONE YEAR AGO Mr. McAdoo announced his intention of standardizing the equipment of American railroads. In an interview the director general stated that this was one of the greatest reforms that could be accomplished in the railroad business. The committee on locomotives and cars appointed by the Council of National Defense was delegated to recommend standards, which were then referred to a committee of railroad mechanical officers.

Mr. McAdoo stated that the principal reasons for adopting standardized locomotives were, first, to reduce to a minimum the time required to prepare drawings, patterns and dies, and thus expedite deliveries; second, to secure the increased production resulting from quantity methods of manufacture; and, third, to provide a supply of equipment which would be available for use in the event of congestion without the trouble which results when repair parts must be ordered from some distant owning road. The advocates of standardization claimed that it would result in a tremendous increase in production and made extravagant promises regarding the advantages which would accrue.

The standardization project was opposed by the great majority of railroad men, and the *Railway Age* published numerous articles setting forth the disadvantages that would result. Our opposition was based largely on the ground that any increased production that could be secured by standardization would come too late to be of any benefit during the war. We also pointed out that efficiency of operation would be sacrificed if standard equipment was introduced, as the motive power could not be adapted to the grades, clearances, weight of rail and character of fuel found on the individual lines; that standardized locomotives would require the making of new drawings, patterns and dies on every road on which they were introduced; and that the necessity for a liquid reserve of power could have been met by building a comparatively small number of locomotives of some type already in existence, which the builders were prepared to turn out without delay.

In spite of the opposition, not only from the *Railway Age* but also from other sources, the director general persisted in his plan for standardizing motive power. The first orders for cars were placed on April 25 and for locomotives on April 30, quantity deliveries being promised in July. From time to time the Railroad Administration issued optimistic reports concerning the progress of the standard equipment. The first car, it was announced, was completed on June 20, and the first locomotive on July 4, but up to February 1, 1919, almost a year after the standardization program was announced, out of 2,030 locomotives ordered by the Railroad Administration only 880 had been delivered, and of the 100,000 cars ordered for delivery last year, and which we were assured would be ready for handling the heavy business of last fall, only 19,037 had been delivered. This could hardly be called "quantity production."

The volume of traffic during the past two months has not been large enough to tax the facilities of the railroads. Weather conditions have been unusually favorable and there is now a surplus of locomotives and cars. These conditions exist not because of, but rather in spite of, the director general's policy. It is interesting to speculate what would have happened if the war had not ceased, if traffic had continued to increase, and if the weather this winter had been as severe as it was last winter. Locomotive standardization has escaped the test. Under more severe conditions it would have proved one of the worst blunders that America made in the conduct of the war.

The policy of standardizing equipment was adopted because a superficial examination by persons unfamiliar with practical railway matters led to the conclusion that it had great advantages, while the great disadvantages were not so apparent. The outcome has vindicated, and more than vindicated, the stand taken by the *Railway Age,* that if an attempt to standardize equipment were made, the result would be not "quantity production," but a postponement and decline of production. We emphasize this point now because this paper was severely criticised in some quarters last year for opposing standardization. As it has slowed down, instead of speeding up, the production of equipment, so in the long run it would increase rather than reduce operating expenses; and the sooner the program entered upon by Mr. McAdoo is completely abandoned the better it will be for the railways and the country. It is easy to conceive of a program of reasonable standardization which might result in good; but his program of wholesale over-standardization was adapted to do much more harm than good.

Justice for Officers of Lower Ranks

ATTENTION WAS DIRECTED REPEATEDLY in these columns during the latter part of last year to the injustice done to the supervisory forces on the railroads and the serious menace to effective management resulting from the failure to advance the salaries of railway officers in proportion to the advances accorded the men in the ranks. The situation resulting was particularly unfortunate with respect to the technically trained men, not only those classed as officers but also those in minor positions. Comprising a rather small class of employees, their plight was seemingly overlooked by the wage board in dealing with the demands of the large bodies of railway men. While certain classes of lower officers, such as roadmasters, received a measure of recognition early last fall, the technical men in most classes, from rodmen and draftsmen to division engineers and higher, were not specifically mentioned in any of the supplementary wage orders. On some of the eastern roads liberal interpretations of Supplements 7 and 8 afforded moderate advances to most of these men, but in the West this position was not so generally taken and as a result the men suffered keen disappointment and humiliation. Fortunately this situation is now rapidly being overcome. Commencing about the first of the present year the railways have been granting advances in salaries to the supervisory forces and technical men, and while this action is by no means complete on all of the roads, there is promise that all these men will soon be granted just compensation. One

of the causes for the long delay in making these salary advances has been the complexity of the problem involved. Owing to the variations in the degree of responsibility and the duties imposed on positions carrying the same titles on different roads it was impossible to provide for these various classes of men by a blanket order covering the entire country or even an entire region. The only equitable solution was to deal with the matter by individual roads, a method naturally causing considerable delay.

Early Extra Session Vitally Needed to Pass Railroad Legislation

THE FAILURE OF CONGRESS to pass the bill to create a new revolving fund of $750,000,000 for the Railroad Administration is adapted to cause disastrous consequences. It leaves the Railroad Administration almost without money and without any source from which to get it. It cannot get it from railway earnings because the railways are not earning enough net operating income to pay the guaranteed standard return to the companies. The Railroad Administration may be forced to make the most drastic economies in maintenance, regardless of future consequences. This would at once, directly and indirectly, throw hundreds of thousands of men out of employment at a time when government bodies and officials are urging private industries to give all the employment they can. In spite of any retrenchments it may effect, the Railroad Administration will continue to be unable to provide the railways with sufficient funds with which to pay their bills to the railway supply companies. It may become unable to pay the railway companies enough of their standard returns to meet their interest and normal dividends.

There is but one remedy for the condition the non-action of Congress has created. This is for President Wilson to call the new Congress in extra session immediately. It has been reported that Congress will not be reconvened until June. Conditions affecting the transportation and related industries are such that to postpone providing a new revolving fund until June or later might be disastrous, not only to these industries, but to the industries and workers of the country as a whole. Congress is responsible for the failure to create a new revolving fund at this session. President Wilson will be responsible if an extra session is not promptly convened at which the needed legislation can be enacted.

An extra session is needed at once, not only to provide the Railroad Administration with funds it is essential it should have for the welfare of the country, but also to enable Congress to proceed immediately with the framing of legislation under which the railways can be returned to private operation.

The *Railway* Age is not a political paper. It is no part of its function to attempt to say whether the Republicans or the Democrats in Congress should be blamed for the failure of the railroad appropriation bill to pass and for the consequences to which this may lead. But it is our function as a journal devoted to transportation to call attention to the fact that this incident affords one of the most powerful of the many strong arguments the government has forged within the last fifteen months against government ownership and operation.

It always has been argued against government ownership and operation that, under it, the management of the railroads would become a football of politics, to the great material detriment of industry and the people, and with the effect of corrupting politics itself. The failure of Congress to pass this railroad appropriation bill, whose enactment was recognized on all hands as necessary for the welfare of the country, is the best evidence yet afforded of the soundness of the political argument against government ownership. It is a peculiarly fine sample of the kind of thing which would occur over and over again under permanent government ownership and operation. The welfare of the nation, and especially of its laboring people, has been utterly disregarded, while members of Congress have engaged in a struggle which has been carried on largely from political motives.

If the record made by the government in handling the railways during the last fifteen months, including the failure to pass this vitally needed piece of legislation, is not sufficient to convince the American people that permanent ownership and operation is wholly undesirable, we cannot conceive what kind of evidence could be required to convince them.

Wherein Government Operation Has "Failed"

IT IS BEING CHARGED that those who are criticising the results of government operation are trying to take unfair advantage of effects produced by abnormal conditions to discredit the entire cause of government ownership and operation. It is even alleged that such criticism reflects unfairly on the patriotism and work, not only of former Director General McAdoo, but of the railway officers who accepted places in his organization as directors of divisions, regional directors, federal managers, and so on.

The point needs to be emphasized that systems and not men are being discussed. Everyone knows that under one kind of system a certain personnel will get one kind of results in any line of human effort, and that under another kind of system, the same personnel will get a different kind of results. There have been wide differences of opinion and much discussion regarding the relative advantages of the system of private operation of railways and the system of government operation of railways. On January 1, 1918, the United States changed from the former to the latter.

Director General McAdoo showed his confidence in the ability and patriotism of the higher officers of the railways who had been trained under private operation by giving to them most of the important places in his organization. Therefore, while there were radical changes in the positions these men held, the official personnel of the railways under the new system was much the same as under the old. That the men who consented to serve under Mr. McAdoo supported him with energy and ability has been recognized by Mr. McAdoo himself in the most generous and unreserved language. Furthermore, nobody familiar with the facts questions the ability, energy and patriotism with which Mr. McAdoo did his work. The *Railway Age* has said before, and repeats now, that if government operation was to be adopted, it was desirable that a public man should be put in charge; that Mr. McAdoo probably was the best man in the

present national administration for director general; and that he probably worked the particular system he adopted as well as any other man in the country could have.

The system which Mr. McAdoo adopted was fundamentally and in detail different from that which preceded it. It was the very system which advocates of government ownership had contended would enable the government to get better results than could be obtained under private operation. They had advocated consolidation, unification, and standardization of the railways. Mr. McAdoo adopted consolidation, unification and standardization as the fundamental principles of his policy.

Can it be said truly that under the system Mr. McAdoo adopted the operation of the railways has been a "failure"? That depends on what is meant by "failure." Government control was specifically declared by President Wilson in his Railroad Control message, and by the Railroad Control Law, to have been adopted solely as a war measure. Regarding it solely as a war measure, it accomplished its purposes. One of its principal purposes was to save the railway companies from bankruptcy and thereby prevent a collapse of the financial structure of the country. It did this. Another of its principal purposes was to enable the railways to handle the traffic which it was essential should be handled during the war. This was done and done well. Another object of government control was to enable the government to so deal with the labor situation on the railways as to prevent strikes during the war. This was done. These things could and would have been done, and probably better done, under private operation, if the government had done the things necessary to make this possible; but the fact is that the purposes mentioned were accomplished under government operation.

How, then, can it be said that government operation has been a failure? It is true operating expenses have increased greatly, but they would have increased, although probably not so much, under private operation. It is true freight and passenger rates have been increased, but they would have had to be increased under private operation. It is true railway service deteriorated, but it would have deteriorated under private operation. The necessities of war were paramount. Those necessities could not be met without increasing expenses, advancing rates and making radical changes in freight and passenger service.

Wherein, then, has government operation been a failure? It has been a complete failure in that it has utterly failed to justify the criticisms which for years have been heaped upon private operation of railways in this country or the claims which for years have been made regarding the great improvements which could and would be effected under government operation. These unjust criticisms of private operation and extravagant claims regarding government operation continued to be made, not merely up to the time when government operation was adopted, but after it was adopted. They are still being made.

The critics of private operation repeatedly have said that "the railways under private ownership had broken down." Judge Prouty, director of accounting of. the Railroad Administration, made this assertion in a public address as recently as January 17, 1919. It was claimed that under government operation the railways would be able to handle a vastly increased traffic. The outcome failed to support this claim. Under government operation, with all the important law-made advantages the government had over the companies, the railways handled only two per cent more freight than in 1917, and nine per cent more passengers. It was claimed that under government operation the facilities of the railways would be largely increased. The results failed to support this claim.

The traffic handled under government operation in the year 1918 was moved almost entirely with facilities the railways had provided under private operation. It was charged by critics of private operation that it was inefficient and extravagant, and claimed that under government operation vast economies could and would be effected. Director General McAdoo made this claim after he took office. On the contrary, the expenses of the Class 1 roads increased $1,150,000,000 in 1918, of which about one-half was due to advances in wages and one-half to other causes. It was claimed that under government operation much better service could and would be rendered than had been rendered under private operation. This was not done.

Why have the predictions which the advocates of government ownership made regarding the outcome of government operation been completely discredited by the event? Is it because the conditions under which government operation has been conducted have been abnormal? Government operation was adopted solely because the conditions under which the railways had been operated for months had been abnormal, and would continue to be abnormal; and these extravagant predictions continued to be made in face of that fact. The real reason why the results predicted have not been produced is that it was humanly impossible to produce them, under any system of operation, private or government. The advocates of government operation grossly underestimated the efficiency of private operation. They grossly overestimated the efficiency that could be attained under government operation. This is the main reason for the very wide disparity between their claims and predictions and the actual outcome.

But the defenders and advocates of government operation are not discouraged. They continue to descant upon the enormous savings which could be made under government ownership. Judge Prouty recently made the astounding estimate that the government could raise the capital required to buy the railways at 4 per cent; that the railway companies would have to pay an average of 9 per cent, the difference being 5 per cent; and that, therefore, the saving in the cost of capital under government as compared with private ownership, would be from 750 million to one billion dollars annually!

This particular saving might possibly be one-fifth as great as Judge Prouty estimates it, and that it would be far more than offset by increases in operating expenses all experience indicates. Which recalls that a little over a year ago a man named Brookhart from Iowa estimated before a Congressional committee that the saving in operating expenses under government operation would be over $400,000,000 a year. His estimate and the actual outcome of the first year of government operation differed by one and one-half billions of dollars; while Mr. McAdoo missed his guess on the same point by about $800,000,000. In spite of the enormous increase in operating expenses which has occurred, the advocates of government ownership still have the hardihood to try to tell us how much more economical permanent government operation would be than permanent private operation.

As long as the defenders and advocates of government operation persist in making such extravagant claims, it will continue to be necessary, however invidious, to recall their past claims and predictions, and the tremendous discrepancy between these claims and predictions and the actual record of government operation. This must be done in order to enable the public to form a rational opinion as to how much weight it should give to their present and future claims and predictions.

Government control did not fail as a war measure. It accomplished the purposes for which it was adopted. On the other hand, government operation has utterly failed to justify a single one of the claims which have been made regarding the economic results it would produce, and it will continue to fail to justify them in future. And it is as an economic measure, and not as a war measure, that its continuance is being advocated.

Railroad Appropriation Defeated by Filibuster

Government's Financial Program Seriously Embarrassed—Relinquishment Not Under Consideration

WASHINGTON, D. C.

CAUGHT BETWEEN the upper and nether millstones of a political contest between the President and the Republican senators, the bill to appropriate an addition of $750,000,000 to the revolving fund of the Railroad Administration failed of passage at the final session of the Sixty-fifth Congress, which adjourned at noon on March 4. As a result the Railroad Administration is confronted with a situation very similar to that found by Old Mother Hubbard when she went to the cupboard. Along with many other important appropriation bills and other measures the bill needed by the Railroad Administration to enable it to pay the railroad companies their guaranteed rental for 1918, to pay for the cars and locomotives it had ordered and to assist the railroads in financing their improvement program for this year, was sacrificed to a filibuster conducted by a number of Republican senators who resented being asked to vote for important administration bills with little opportunity for consideration in the last few days of the session and who were endeavoring to force the President to call the new Republican Congress in extra session at an early date. No opposition was manifested to the appropriation itself, which had passed the House almost unanimously and which it was generally assumed would be allowed to pass in the Senate, but almost every time-killing expedient known to parliamentary practice was brought into play to prevent its consideration. It has been suggested that the Railroad Administration and the Democratic leaders may have overplayed their hand by their insistence that the passage of the bill was absolutely necessary to avoid a panic, because the purpose of the Republicans was to create a situation which would make an early extra session imperative.

The railroad appropriation was favorably reported by the Senate committee on appropriations as a rider to the general deficiency bill and after an all-night session of the Senate Saturday night the bill was made the unfinished business for Monday. Speeches on the league of nations and the consideration of minor matters which were allowed to intervene took up most of the Monday session and the bill was not even reached until early Tuesday morning. About 3 a. m. Director General Hines was called to the Capitol to use his influence to help the bill but by that time only the President could save it and he preferred to attempt to place the responsibility on the men who had caused the filibuster rather than allow Congress to stay on the job while he is in Europe.

The President left Washington and sailed for France insisting he was taking the proper course in refusing to call Congress in special session during his absence from the country. He declared that "a group of men have deliberately chosen to embarrass the administration of the government," and "to imperil the financial interests of the railway system of the country."

Director General Hines saw the President before his departure and later conferred with the Secretary of the Treasury and the managing director of the War Finance Corporation. On Wednesday he gave out a statement indicating that the question of relinquishment is not being considered but that an effort will be made to tide over the situation by private financing and the co-operation of the Treasury Department and the War Finance Corporation. The latter has available some $300,000,000, some of which it is believed might be loaned to railroad companies on their own application and some of which might be loaned to equipment companies. If some of the railroads can in this way or from the banks raise money to repay to the Railroad Administration advances made for capital expenditures the administration would be able to pay a larger proportion of the rentals. It is evident, however, that the Railroad Administration will not be in a position to order any equipment or to make any capital expenditures except such as can be financed by the companies and the latter in proposing improvement work for this year are to be asked to state whether they can finance it. It is not the policy of the Railroad Administration to cut off any improvement work now under way if it can be avoided by private financing but it had been hoped to avoid the necessity for private financing during the time the government itself will be trying to sell its own securities.

Director General Hines' Statement

"The adjournment of Congress without the passage of the railroad appropriation leaves the United States Railroad Administration confronted with the necessity for the adoption of radically different methods of dealing with its financial problems, than it had contemplated when the adoption of the appropriation was expected," Mr. Hines said.

"The Railroad Administration had felt justified in counting upon the passage of this appropriation. This is true because the money asked for was necessary to meet government obligations duly incurred and because also it promised to improve and stabilize the general industrial situation through enabling the Railroad Administration to go forward confidently in carrying out its policy as to improvements and also as to maintenance. Confidence in obtaining the appropriation was confirmed by the fact that the House Appropriations Committee after extensive hearings reported the appropriation favorably without any dissent, the House passed it by a vote of 272 to 15, and the Senate Appropriations Committee, after hearing, likewise reported it favorably without any dissent. The recognized urgency of the matter brought the appropriation before the Senate for debate, but the debate was not concluded before the session adjourned.

"This unexpected result puts upon the director general the necessity for devising radically different methods of dealing with the extremely difficult situation. I approach the matter in the spirit and with the purpose of finding ways to meet the requirements and to avert financial embarrassments and industrial depression. It would be improper, however, to minimize the difficulties of the situation; but I believe that the very difficulties themselves will result in obtaining patriotic co-operation of all the business interests involved including the railroad corporations and equipment companies and other producers of material and the bankers. At the moment, there is no occasion to discuss the question of relinquishment of the railroads. My first purpose is to try to solve the problem in other ways.

"I am not prepared at the moment to outline specific plans because numerous methods must be devised for dealing with different phases of the subject and each will require its separate study and perhaps a separate plan of co-operation. But I believe that on the part of all responsible interests affected there will be prompt response to my own definite purpose of finding a way to meet the difficulty, and I do not believe anyone should give way to alarm on account of the condition which has been so unexpectedly produced.

"The Treasury Department and the War Finance Corporation are co-operating in the matter with the utmost cordiality.

"In connection with the consideration of this question there

has been no discussion of raising rates, either passenger or freight, because the money derived from rates goes into operating revenues which primarily are not affected by the present situation.

"Generally speaking it will be my object to solve the problem facing the Railroad Administration through financial means, rather than through interfering with work involving the employment of labor. I consider it important that there be no industrial disturbances.

"In connection with necessary financing which will have to be done by the railroad corporations it is the rule that no such corporate financing be undertaken except on certificate of the Railroad Administration, and therefore the Railroad Administration in a sense acts as a clearing house for such financing, thus minimizing the danger of financial confusion."

The failure of the appropriation will not only embarrass the government in its prospective Victory loan campaign but also creates a serious situation for the Railroad Administration, which has exhausted its original revolving fund, and owes several hundred millions more, for the railroad companies that have not received their rental for 1918, and for the car and locomotive builders and the supply companies that are looking for payment for the cars and locomotives as they are delivered.

According to the estimates of the Railroad Administration, the $750,000,000 was required to pay the $381,806,904 which the government owed the railroads for 1918, and to provide $368,193,096 to meet capital requirements for 1919, including $12,840,000 for inland waterways, $20,000,000 for the Boston & Maine reorganization, $286,000,000 for equipment ordered in 1918 and $49,353,096 for financing other necessary capital expenditures in addition to the amount which could be financed by the railroad companies. Mr. Hines has stated that the entire amount for equipment will be due by the end of May and ought to be paid at the rate of about $50,000,000 per month whereas on account of the shortage in cash only about $25,000,000 was paid in January. The money for the Boston & Maine was expected to be required almost at once, that for the inland waterways will be due about May 1 and money for improvements to the railways is needed throughout the year. Before the appropriations committee of the Senate he said that $700,000,000 of the amount would be needed by June 1.

A statement of the accounts between the director general and the railroad companies as of December 31, 1918, which shows how the item of $381,000,000 is made up, was published in the *Railway Age* of February 21, page 434.

Other Bills

Senator Cummins' bill to restore the Interstate Commerce Commission its former authority over rates by authorizing it to suspend rates initiated by the director general was also lost in the shuffle. The Senate Committee had reported the bill favorably and Senator Cummins made a strong effort to have it considered on the floor as an amendment to the appropriation bill. Senator Cummins received some support, particularly from Senator Pomerene and Senator Trammell, but was unable to get a vote on his amendment.

Appropriations for the next fiscal year for the expenses of the Interstate Commerce Commission, including its valuation bureau, and for the continuation of work on the Alaskan railway, were included in the sundry civil bill, which was passed by the House but was also held up by the filibuster in the Senate. The appropriation for the valuation was $2,500,000, which is $1,000,000 less than has been appropriated for this work in recent years. The reduction was made by the commission in asking for the appropriation. The appropriation for the Alaska railway was $4,002,380, representing the balance of the $35,000,000 originally appropriated for the construction of the road. A deficiency appropriation of $9,800,000 which the Interior Department asked as being necessary to complete the road because of the greatly increased costs was not approved by the appropriation committee of the House.

A resolution to extend until July 1, 1920, the effective date of Section 10 of the Clayton law, which had been passed by the Senate for the benefit of the short lines, failed of passage in the House after it had been favorably reported by the judiciary committee.

No Sudden Relinquishment

A continuation of federal operation of the railroads for at least the remainder of this year and possibly for a longer period was thought to be assured by an announcement issued by Director General Hines on February 28, after a conference with the President, which indicated that the President had decided to give the new Republican Congress a chance to try its hand at working out a permanent legislative plan for the future regulation of the railroads before relinquishing his present control. Mr. Hines addressed the following letter to Chairmen Smith and Martin of the Senate committees on interstate commerce and appropriations and to Representatives Sims and Sherley, chairmen of the House committees on interstate and foreign commerce and appropriations:

"As you are aware, there has been some inquiry as to whether there might be an immediate or precipitate return of the railroads to private management. The Railroad Administration has indicated whenever this inquiry has been made that it would not recommend that any such step be taken.

"For your further information, I am glad to say that I have now discussed the matter with the President, and he has authorized me to state that not only will there be no sudden relinquishment of the railroads, but further, that it is not his purpose to relinquish the railroads until there has been an opportunity to see whether a constructive permanent program of legislation is likely to be considered promptly and adopted within a reasonable time."

Some of the Senators who conferred with the President after the failure of the appropriation bill urged him to take this opportunity to return the roads to their owners and wash his hands of the whole affair, but he gave no indication of assent to the proposal, and Mr. Hines' later statement indicated that such a plan is not yet being considered.

The letter was sent to the chairmen of the Congressional committees because a strong effort had been made in the House and a similar effort was to be made in the Senate to amend the bill appropriating the $750,000,000 addition to the revolving fund by a provision taking away the President's authority to relinquish the roads before the expiration of the 21 months' period without the consent of Congress.

As the new Congress does not meet until December, unless called in extra session before that time, and as the President has stated he will not under any circumstances call a session until after his second return from Europe, probably not before June or July, there is little likelihood of any permanent legislation much before the first of the year and a much longer time might be required. How long would be required to convince the President of the likelihood of a program being adopted and what he would consider a reasonable time were left for surmise.

It is assumed that the new Congress would at once take up the study of the railroad question as soon as it is assembled, and the extensive testimony already taken by the Senate Committee on Interstate Commerce would represent that much progress made, although the House committee did not get around to the subject at the session.

A bill prepared by the attorneys of the National Owners of Railroad Securities, embodying the features of the Warfield plan for the return and regulation of the railroads, as submitted recently before the Senate Committee on Interstate

Commerce, was introduced in the Senate at four o'clock in the morning of March 4 by Senator Underwood. The Senator stated that in consequence of the great importance of the subject, this bill was introduced that it might be printed and given wide circulation among the members of Congress and the public. He also requested that the bill appear in the Congressional Record, which was agreed to by the Senate. Senator Watson also introduced a bill to provide for the regulation of the railways after their relinquishment and to enlarge the powers of the Interstate Commerce Commission.

Final Report of Joint Committee on Interstate Commerce

Shortly before the adjournment of Congress, Chairman E. D. Smith presented the final report of the Joint Committee on Interstate Commerce, generally known as the Newlands Committee, as follows:

"The joint subcommittee, created by public resolution No. 25 of the Sixty-fourth Congress, made its report to Congress on January 9, 1917, and recommended therein that the time for making a complete report be extended to the first Monday in December following. Congress approved the recommendation, and in public resolution No. 44, Sixty-fourth Congress, approved January 15, 1917, so provided.

"It was the purpose of the joint subcommittee to enter upon this investigation actively upon the adjournment of Congress on March 4 of that year. However, war with Germany was declared in April of the same year, and conditions became so abnormal that no investigation conducted would elicit information affording a safe basis for a comprehensive revision of existing laws and methods of railroad operation believed to be susceptible of material improvement under normal conditions. Recognizing the difficulties and importance of the task, Congress, in an act approved October 6, 1917, extended the time for the making of this report until the first Monday in December, 1918.

"Notwithstanding the work incident to the war, your committee has taken a large amount of testimony and devoted much time to the study of the questions covered by the resolution. Since the creation of the joint subcommittee the Government has taken over the railroads and operated them as a war necessity.

"In view of the fact that the appropriate committees of the Senate and of the House of Representatives, respectively, have the whole subject under consideration—the Interstate Commerce Committee of the Senate having just concluded, for the time being at least, exhaustive hearings—it is deemed inadvisable that the said joint subcommittee resume its activities, and it is so recommended."

Railroad Administration Faces New Situation*

Will Be Approached in Spirit of Trying to Secure Co-operation in Providing the Necessary Finances

By Director General Walker D. Hines

The problems that you have come here to discuss are, of course, exceedingly close to the Railroad Administration. The Railroad Administration not only has the same motive to promote general industrial prosperity that every other agency of the government has, and it not only has that motive accentuated by the tremendous scale on which it has to conduct this important industrial business, but it has a further distinct motive and perhaps a motive peculiar to itself, that if it can encourage general business prosperity through the management of its own industrial activities it thereby improves its own situation by stimulating the general business and consequently increasing its general revenues. So, from every standpoint I approach this matter with the liveliest interest and sympathy and with the desire to do everything that is practicable to promote the important objects which you have assembled to consider.

In studying this matter we felt that we had a promising program which would go far toward meeting the important necessities of the present situation. We contemplated that we would go ahead and could go ahead without any difficulty, keep up our maintenance of the railroads and their equipment to the standard which the railroad companies themselves had established during the three years ending June 30, 1917, which are generally spoken of now as the three-year test period, that we would also be able to go ahead on a substantial though conservative scheme of improvements and that through ability which we anticipated we would have to pay the amounts due the railroad companies, equipment companies and other creditors we would establish a general credit situation which would enable the railroad companies to borrow substantial amounts of money for the purpose of engaging upon a larger improvement program than the conservative program we had fixed upon. So, from every standpoint we felt encouraged to believe that we could see our way clear at the outset to be a very important factor in this development. When I accepted the invitation which was extended to me to speak to you this afternoon, I hoped to be able to tell you the way was clear to do that without any difficulties whatever. But our program as originally planned rested upon our anticipation that we would get the appropriation of $750,000,000 for which we had applied to Congress.

Therefore, yesterday at noon we were confronted with the problem of endeavoring to remake our program in the face of radically different conditions from those we had anticipated, and I come before you today to tell you in a very few words what I now see is the outlook for the Railroad Administration in dealing with these important problems.

I approach the matter in the spirit that it is my clear duty from every standpoint to try, notwithstanding the failure of this appropriation, to find a way to accomplish the things which you gentlemen want to accomplish. It might be exceedingly easy, under the circumstances, to approach it in the spirit of trying not to find a way, but it is in exactly the opposite spirit that I come before you, and my belief is that, in view of the very difficulties of the situation which has so suddenly confronted us and the business interests of the country, there will be an impulse toward a patriotic co-operation to contrive ways and means to carry forward the reasonable program of the Railroad Administration despite the failure of the appropriation. I have this further guiding principle in dealing with the matter: There would be two general ways in which we might attempt to adapt ourselves to this new situation so suddenly created. One way would

*Address before the Governers' and Mayors' Conference, Interior Department Building, Washington, D. C., March 5, 1919.

be to cut down expenditures as rapidly as possible in every direction, even though these expenditures were highly desirable. The other way would be to try to resort to every possible expedient to prevail on the railroad companies and the other business interests affected to borrow the necessary money to enable us to go forward with these expenditures, and I am emphatically in favor of the plan which contemplates financing these matters so we can go forward with the expenditures rather than of the plan of cutting off the expenditures so we can avoid the financing. From every standpoint it seems to me this is the proper and expedient course to pursue, and in addition to the other reasons which actuate me in approaching the matter in this spirit is the reason which is a controlling consideration with me that I am absolutely out of sympathy with any policy which contemplates the slowing down of industries for the purpose of throwing men out of the employment with the idea in mind that thereby the rates of wages may be cut down for the future.

Approaching the matter along these lines it is going to be my policy and with the most cordial co-operation of the Secretary of the Treasury and of the War Finance Corporation to try to find every way we can to reimburse the Treasury and the Railroad Administration through getting the corporations to borrow the money to pay back advances which have been made and which it will be necessary to make to carry out our program. It would be unwise to create the impression that that is going to be an easy task. It is going to be very difficult, but we are approaching it with the determination that we will make it succeed in a very large extent, and that we will get a large measure of patriotic co-operation from all the interests which are affected.

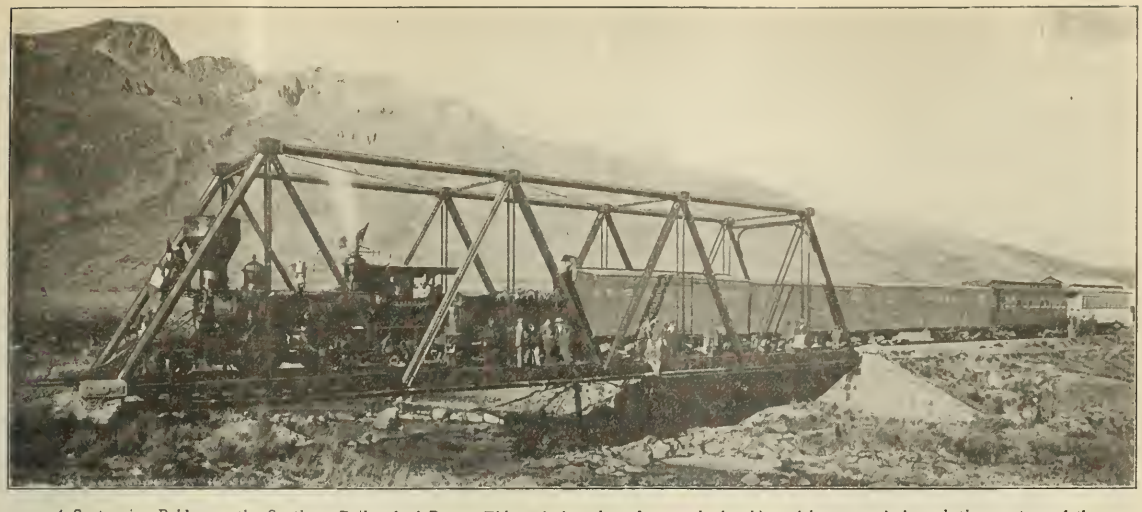
That states the situation as to the general policy with which I am undertaking to face the new problem. The specific proposition which you gentlemen have had much in mind, and which I, too, have already been considering with care, is the question as to what ought to be done by the Railroad Administration with reference to the rates on road-building materials. There has been the feeling which has been conveyed to me from various quarters entitled to the most careful consideration that the advances which were made in rates effective last June to meet the conditions of increased cost growing out of the war had borne too heavily on road-building materials, and that, in order to encourage a program of resumption of road-building, which everybody now appreciates is the thing to be done in the public interest, there ought to be a substantial reduction in those rates. The matter is having the most careful and expeditious consideration in the Railroad Administration, and I am approaching it in the most sympathetic spirit to do everything that is reasonably practicable to meet the expectations in that regard and to accomplish thereby a reasonable encouragement so far as it is possible in view of the very great limitations that rest upon us to bring about the encouragement of the resumption of road-building. I hope very shortly, perhaps in the next week or ten days, to get a final report on that matter upon the basis of which I can take definite action, and while it is impossible to forecast at the moment the action that I can take, I do want to assure you that I am fully alive to the importance of the object which you gentlemen seek to accomplish, and of the fact that not only do we want to help in general, but we have a distinct selfish interest in encouraging the resumption of this industry at the earliest possible moment.

The only other matter that I wanted to mention to you is one which perhaps does not primarily concern the object of this meeting, but I am selfishly taking advantage of this opportunity to mention it to you; and that is, to tell you my general feelings as to what my job is. I welcome an opportunity like this to speak to representatives who have come here from all parts of the country and try to make clear to you that an important factor in undertaking to administer this tremendous task which rests upon me is not to try to bring about one solution of the railroad question rather than another, not to impose my own notions upon the public in any respect in that regard, but to confine myself to the job of rendering the best possible and most adequate possible public service. I am as fully appreciative as any one in this audience of the fact that during the war the railroad service of the country in many respects was cut down to a basis where a citizen did not get the same amount of service and consideration which he got before the war. I would like to impress upon you the thought that that was not due to this temporary federal control of the railroads, but due to the war, and that now that the war is over my own idea is during the remaining period of federal control to do everything in my power to bring back the railroad service of the country to the more favorable conditions that existed prior to the war, and, where the opportunity appears to arise, to make the service even better than that. I do not say this in any idle spirit of promising. I know the difficulties in the way, and I want to ask you ladies and gentlemen to realize the spirit in which I am approaching this difficult task and to give me the benefit of your sympathetic support in enabling me to do what I am trying to do in that regard.

Not long ago I had a very satisfying conference with the representatives of the state railroad commissions, who came here and discussed this whole problem with me, and as the result of the discussion, continuing over two days, I got the distinct impression that those highly important public agencies were going as a general thing to aid me in improving this public service by inspecting how the public service is being rendered in their respective states, and giving me the benefit of their suggestions from time to time as to what ought to be done in order to get back to the more favorable conditions prior to the war and in order to improve those conditions where the opportunity presented. I want as far as I can to carry that message throughout the United States of a desire on my part and on the part of my associates in this tremendously important short period of government control to give the public the very best service possible and of my earnest desire to get the benefit of the greatest possible measure of public support in making that policy a success.

When you find things in the railroad service which are not comfortable, which are inconvenient, which fall short of what you think the service ought to be, I hope you will not form in your own mind the impression that that is what the Railroad Administration is trying to do. I want you to realize that that is what the Railroad Administration is trying to avoid, and it is looking for all the help and all the suggestions it can get, and I do earnestly ask you to do what you can to help, through making suggestions to me, to my associates in Washington, or to the federal managers or regional directors, bearing in mind that they all are direct representatives of the government of the United States, and that the watchword of the Railroad Administration is to render an adequate and convenient public service.

The Missouri House of Representatives has adopted a resolution petitioning Congress to return railroad, telegraph and telephone lines and cables to their owners as soon as possible. The resolution also states that private ownership should be safeguarded by federal regulation of service, capitalization, income and disbursements. The Denver Commercial Traffic Club on February 19 directed its officers to prepare a memorandum to be submitted to Congressmen from Colorado stating the view of the club that the railroads should be returned to their owners at the earliest possible date.



A Suspension Bridge on the Southern Railroad of Peru. This and the other photographs in this article are used through the courtesy of the Pan-American Union

Peru's Railways Need Many Connecting Links

Unrelated Short Lines of Different Gages and Inadequate Mileage Characterize Country's Transportation

PERU DOES NOT POSSESS, strictly speaking, a railway system, but rather only a number of unrelated short railways which follow inland along the river valleys and which lack a connecting longitudinal system. The mountainous character of the country, the fact that it is not well knit politically, and its poor financial condition have all helped to retard a comprehensive scheme of transportation development. Peru needs railways and it seems a logical



Southern Railway of Peru on the Road to Cuzco

conclusion that American engineers and supplies will probably play a leading part in supplying them.

These are some of the features of a report issued this week by the Latin-American Division of the Bureau of Foreign and Domestic Commerce in Latin-American Circular No. 53. The report follows similar reports on Colombia, Mexico and Brazil, the latter two of which have been abstracted in the *Railway Age*. The Peruvian report follows:

Geography

Peru consists of three distinct sections each of which extends from the extreme northern part of the country to the extreme southern. The first of these sections is the narrow, western coastal belt, arid except for its numerous river valleys. These river valleys are the avenues by means of which civilization is slowly pushing inland; a very large per cent of the white population live in them; the country's chief ports are located at their mouths; they produce the country's foodstuffs, in short, they are the centers of the industrial and commercial life of Peru. The second distinct section is composed of the two and some times three ranges of the Andes which reach some of their most forbidding heights in Peru. In the high Andean plateau between these mountain ranges lies hidden the mineral wealth of the country. The third section consists of the eastern slope of the Andes or the montana as it is called, a wild jungle still unexplored except along the upper Amazon and its tributaries. The principal product of this montana region is rubber which is taken down the Amazon and exported through Brazil.

The impenetrability of the Peruvian Andes is directly responsible for the fact that Peru, with an area of nearly 700,000 square miles, has only 1,700 miles of railway or only about 2.5 miles of railroad per thousand square miles of area. Indirectly, railway development has been retarded by other factors; more than half the population is Indian and a very large per cent is illiterate; political unity has been lacking and the government has been involved in a long series of border disputes which has kept the treasury drained.

Railways in Operation

Peru does not possess, strictly speaking, a railway system. The railways are slowly pushing their way across the coastal belt and already two lines, the Central and the Southern, scale the coastal mountain barrier and tap the mineral region of the Andean plateau but no railway has yet penetrated farther east than this. The montana on the east of the Andes is unconnected with the coastal region on the west except by difficult mountain trails over which it is impracticable to

transport freight. There are only three short stretches of longitudinal railroad in Peru; one in the southern part of the plateau section; one in the central part of the plateau section; and one from the port of Callao north along the coast. The ocean is still the only highway available for travel from north to south.

With the exception of the two lines which penetrate the Andean plateau and the three short stretches of longitudinal road, the railways now in operation are short, isolated lines extending from Pacific ports short distances up the river valleys and have but a single function, the connection of interior points of a special river valley with its ocean port.

The following table lists the railways now in operation and gives a few details of each location, length, gage, chief products of the area served, and equipment. Some interesting deductions may be drawn from each of these columns regarding conditions of the lines throughout the whole country. There are some thirty lines listed and only six of this number are over 60 miles in length. Practically all of the railways begin at a Pacific port and follow the course of a river inland. The gages vary from standard to only 2 ft. In every case the roads are dependent on the success of a few plantations or mines for the bulk of their export freight. The figures for equipment which were purposely taken for a pre-war year show the meagerness of the equipment of most of the roads even in normal times.

In 1890, the entire foreign debt of Peru was taken over by the London Corporation of Foreign Bondholders and in return the Peruvian government granted that organization certain concessions including the control of all state railways for a period of 66 years. The Peruvian Corporation was then created by the Corporation of Foreign Bondholders to administer these concessions. In 1907, a new contract was effected between the Peruvian Corporation and the Peruvian government by which certain disputes were adjusted and under which the railway lease was extended for an additional 17 years during which time the government was to receive 50 per cent of the net profits resulting from the operation of the railways after the service of the corporation's railway bonds had been met.

The Peruvian Corporation controls some 1,300 miles of Peru's 1,700 miles of railways. As the following list of roads controlled by the corporation indicates, this 1,300 miles includes all the more important lines of the country with the exception of the Cerro de Pasco Railway.

Railways Controlled by Peruvian Corporation

Central Railway	Pacasmayo
Southern	Pisco to Ica
Trujillo	Chimbote
Paita	

The extensions of the Central to Huancayo and of the Southern to Cuzco were constructed by the corporation. According to the 1907 contract, the government is to provide the necessary state land for further construction work and is to

Name of railroad	Location (Port inland to .....)	Length, miles	Gage	Chief items expt. frt.	Equipment: Locomotives	Pas. cars	Freight cars
Tumbes Ry. (Gov't)	Pizarro to Tumbes, chief town of Tumbes valley	7	2 ft. 6 in.	Petroleum	..	..	..
Paita to Piura (Peruvian Corp.)	Paita up Chira valley to Sullana; south to Piura valley; down this valley to Piura	60	4 ft. 8½ in.	Cotton, petroleum	6	7	43
Piura to Catacaos	Town of Piura down Piura valley to Catacaos	6	2 ft. 6 in.	Cotton, petroleum	3	11	14
Bayovar-Reventazon (private)	Bayovar to sulphur mines at Reventazon	30	metre	Sulphur	2	..	24
Pimentel-Chiclayo	Pimentel to towns of Chiclayo and Lambayeque	15	4 ft. 8½ in.	Rice	2	4	24
Eten, Chiclayo, Ferrenafe	Main line: Pimentel to Chiclayo, Lambayeque and Ferrenafe	27	4 ft. 8½ in.	Rice	8	15	80
	Branch: Chiclayo to Patapo	15	4 ft. 8½ in.	Rice	..	..	..
	Branch: Pimentel to Pomaloa	17	3 ft.	Rice	..	..	..
Eten-Cayalti	Eten to Cayalti in Sana valley	22	2 ft.	Rice	3	2	10
Pacasmayo Yonan (Peruvian Corp.)	Main line: Up Jequetepeque valley to Yonan & Chilete	64	4 ft. 8½ in.	Rice,	..	..	..
	Branch: North from Calasnique to Guadalupe	17	4 ft. 8½ in.	Fruit	..	..	..
Huanchaco Tres Palos	Main line: Huanchaco north to Tres Palos	9	3 ft.	Sugar	2	1	22
	Branch; up Chicama valley to Roma	33	3 ft.	Sugar	..	..	..
Trujillo Railway (Peruvian Corp.)	Salaverry north to Trujillo, Chicama and Chocape hence inland to Ascope	47	3 ft.	Sugar	13	20	170
Chicama Pampas (private)	Chicama up Chicama valley to Pampas	28	3 ft.	Sugar	..	..	..
Trujillo-Laredo-Menocucho	Trujillo up Santa Catalina valley to Laredo	16	3 ft.	Sugar	(Included in Trujillo Railway)		
	Branch: Laredo to Menocucho						
Chimbote-Tablones (Peruvian Corp.)	Chimbote up Santa valley through Tablones to La Limona	64	metre	Sugar	3	3	24
Supe-Barranca Pativilca	Supe north to Barranca in Supe valley and to Pativilca in Pativilca valley	7	2 ft.	Cotton, sugar	1	3	8
Rio Pativilca to Paramonga	Short extension to hacienda, Paramonga	4	metre	.....	3	1	13
Supe-San Nicholas	Supe to hacienda of San Nicholas	4	metre	.....	2	2	4
Reparticion to Alpas	.....	16	metre	.....	..	..	..
Northwestern	Ancon north to Huacho	87	3 ft.	.....	..	..	..
	Up Huara valley to Sayan	34	3 ft.	.....	..	..	..
	Huacho to port	1	3 ft.	.....	..	..	..
	Huaral to Chancay	8	3 ft.	.....	..	..	..
Playa Chica-Salinas (private)	Huacho to salt works	6	metre	Salt	..	..	..
Chancay-Palpa (private)	Chancay up Chancay valley to hacienda of Palpa	16	metre	Cotton	4	5	24
Lima Rys. Co.	Callao to Lima and short branches from both cities	25	4 ft. 8½ in.	.....	20	38	300
Central (Peruvian Corp.)	Callao through Lima up Rimas valley and coastal mt. range to Oroya	138	4 ft. 8½ in.	Copper	55	62	520
	Oroya south along Andean plateau to Huancayo	77	4 ft. 8½ in	.....	..	..	..
	Ticlio on Oroya section to Morococha	9	4 ft. 8½ in.	.....	..	..	..
	Lima north along coast to Ancon	14	4 ft. 8½ in.	.....	..	..	..
Cerro de Pasco	Oroya north to copper mines of Cerro de Pasco Co.	109	4 ft. 8½ in.	Copper	10	7	230
Casapalca El Carmen (private)	El Carmen mines to station on Central	2	2 ft.	Copper	..	..	..
Lima-Atacongo	.....	19	4 ft. 8½ in.	.....	..	..	..
Cerro Azul Canete	Cerro Azul to town of Canete in Canete valley	6	3 ft.	Cotton, sugar	5	4	93
Tambo de Mora-Chincha	Tambo de Mora to town of Chincha	7	metre	Cotton	2	3	8
Pisco-Ica (Peruvian Corp.)	Pisco to town of Ica in Ica valley	46	4 ft. 8½ in.	Cotton, grapes	6	9	18
Southern (Peruvian Corp.)	Mollendo through Arequipa and Juliaca to Puno on Lake Titicaca	325	4 ft. 8½ in.	Wool, hides	50	41	347
	Juliaca north along Andean plateau to Cuzco	211	4 ft. 8½ in.	Minerals, sugar	..	..	..
Ensenada Pampa Blanca (private)	Ensenada, town on Southern, to hacienda in Tambo valley	12	2 ft. 6 in.	.....	2	4	32
Ilo-Moquegua (Gov't)	Ilo up Moquegua valley to town of Moquegua	62	4 ft. 8½ in.	Wine, grapes, olives	3	3	8

allow the corporation to import construction and repair machinery free of duty. According to this contract, the corporation also has the right to construct and own in perpetuity a railway which shall extend from any point on one of the state lines to a point on one of the navigable rivers of the interior. The government is to furnish the land for this line and to give the corporation 6,000 hectares of land for each kilometer completed. Tariffs are fixed by this contract.

The Peruvian Corporation has a capitalization of $80,190,-



Switch Back on the Cerro de Pasco

000, of which $43,740,000 has been issued as ordinary stock and $36,450,000 as 4 per cent preference stock. In addition, debenture bonds have been issued to the amount of $26,244,-000. No detailed statement of the 1917-18 accounts of the corporation are available but according to a short item in the London Economist of December 7, 1918, the net revenue account (after provision for amortization and interest on



"Mount Meiggs," Under Which the Central Railroad of Peru Passes. The Elevation of the Peak is 17,775 ft. and the Elevation of Tunnel at Summit, 15,665 ft., the Highest Point Reached by Any Standard Gage Railroad in the World.

debenture issue) amounted to $2,206,979 which amount included $240,672 brought forward. The directors propose to apply in respect of income tax and other items $351,237; to declare a dividend of 1½ per cent on preference stock; and to set aside an additional 2 per cent on debentures as required by debenture resolution, making 6 per cent for the year.

The government owns and operates on its own account three short lines which have been built since the 1890 agreement with the Peruvian Corporation. These lines are as follows: Tumbes Railway, Ilo-Moquegua, Lima-Lurin (in operation for most of its projected length). According to the state budget for 1918-19, the net receipts of the Tumbes for the coming year are estimated at $2,430; of the Ilo-Moquegua at $16,524; and of the Lima-Lurin at $17,496.

The Lima Railways Company and the North Western Railway Company are English; the holdings of the former are operated by the Lima Light, Power & Tramways Company. The Cerro de Pasco Railway is owned and operated



The Railways of Peru

In addition to the lines shown, the government has passed a law authorizing the construction of a line from Paita inland to the Maranon river (see the *Railway Age* of February 14, page 418.)

by the American mining company of the same name. The Chicama to Pampas Railway is owned by the Casa Grande Company and is the only German owned railway in Peru. The other railways are owned by local companies or individual planters.

Fuel

The Peruvian railways are not dependent on imported fuel as the Brazilian railways are and hence have not been affected by the curtailment of the exports of coal from Europe and the United States since the beginning of the war, but the Peruvian railways are facing a fuel famine nevertheless.

The coal deposits at Jatunhussi, Oyon, Recuay and other points are sufficient to supply Peru with all the fuel she needs, but these fields are still inaccessible and consequently

undeveloped. The fuel for Peru's industrial establishments and railways is supplied by a single foreign corporation, the International Petroleum Corporation, whose holdings are near Tumbes in the extreme northern corner of the country. As a result of the dispute between the Peruvian government and this corporation, no tankers are now operating between Talara and the central and southern ports, which are consequently without fuel.

The railways depend almost entirely on oil from Talara for fuel and are equipped with oil-burning locomotives. The Central alone consumes nearly 3,000 tons of oil monthly and consequently last fall the fuel shortage became so acute that the Peruvian Corporation petitioned the government for permission to reduce its passenger service on this road and others using oil for fuel until such time as oil shipments from Talara should be resumed. This request was refused.

Equipment

The following table, taken from the official Peruvian statistics, gives imports of railway equipment for the pre-war year 1913 and for the last three war years for which figures are available. Since quantities were only available for a few



Scene on the Central Railroad

of the articles included, values have been used throughout. Figures are for calendar years, and are given in Peruvian pounds (official value $4.0665).

Articles by country of origin	1913	1915	1916	1917
Rails and tools	$631,892	$444,826	$310,894	$527,718
United States	448,938	388,397	275,611	525,862
Belgium	135,468	50,734	31,216	.....
Locomotives and portable engines	272,865	56,189	111,863	62,383
United States	191,008	46,787	103,431	55,992
Germany	37,869	9,494	.....	.....
Great Britain	33,097	.....	8,432	6,391
Freight cars for railways or tramways	258,362	108,874	132,906	211,488
United States	140,767	77,595	123,765	211,488
Belgium	92,853	.....	.....	.....
Passenger cars (railway or tramway)—				
United States	88,680	18,920	394	9,647
Belgium	36,528	.....	.....	3,946
Great Britain	12,203	.....	.....	5,701
Germany	39,944	18,920	.....	.....
Hand cars	5,944	4,044	9,730	18,662
United States	1,001	3,383	9,730	18,662
Belgium	4,257	.....	.....	.....

The 1913 statistics demonstrate the successful introduction of American locomotives, cars, rails, etc., into Peru prior to the cutting off of the European sources of supply by the war.

The Central has well equipped and up-to-date shops at Guadelupe where necessary repairing is done and also a small amount of new construction work. The Southern has small but well equipped repair shops at Arequipa. Native Indian laborers are successfully employed by both organizations.

Construction Work

Peru, like most South American countries, has many railways "proyectados," but has only the following three extensions actually under construction at the present time.



"Infernillo" Bridge on the Central Railroad

Chimbote Railway—kilometer 104 to Recuay.

Central Railway—south from Huancayo toward Ayacucho.

Southern Railway—Cuzco toward Santa Ana.

The Recuay extension will tap an important coal deposit which the government is especially anxious to open up in view of the present fuel shortage. The Huancayo-Ayacucho extension will make the coal deposits at Jatunhussi accessible and will open up a country suitable for the raising of wheat and other grains. Congress has recently authorized a loan of $1,500,000 for the extension to the Jatunhussi coal fields. The Cuzco-Santa Ana line will be 168 kilometers in length when finished, will cost $2,500,000 (estimated), and will be narrow gage. The Urubamba valley, which this road traverses, produces coca leaves, rubber, cacao, and fruits. The expense of the enterprise is being partly defrayed by the Federal Government and partly by the government of the Department of Cuzco, which is devoting the proceeds of the internal revenue tax on coca leaves and alcohol to this undertaking.

A law was passed by the Peruvian Congress early in 1918 which provided for an annual appropriation of $2,500,000 to be used for railway construction, but this law was vetoed by the President and a law providing for $1,000,000 for one year substituted by the Minister of Fomento. No information is available as to whether this amount was written into the budget or not.

The construction work is under the direct charge of the Director General de Obras Publicas, Ministerio de Fomento, Lima.

The plans of the Peruvian Government for a comprehensive railway system which shall unite the east with the west and the north with the south are slowly beginning to assume definite outline. These plans include two longitudinal railways and one or more railways connecting the western coast with the navigable rivers of the eastern frontier. One of these longitudinal railways is to extend along the coastal belt and will include the present line from Lima north to Huacho. The second will extend along the plateau section and will include the lines from Cerro de Pasco south to Huancayo and from Puno north to Cuzco. Three possible routes across the Andes have been discussed; one from a point on the Southern Railway to the Rio Madre de Dios, a second from Oroya to the Ucayali river, and a third from Paita or Chimbote to the Rio Maranon and down the Maranon valley. The route from Paita to the Maranon is generally conceded to be the most practicable. Commerce Reports for November 27, 1918, published the text of a decree authorizing this railway from Paita to the Maranon, with extensions south to Ferrenafe and Hualgayoc. (See also the *Railway Age* of February 14, 1919, page 418.)

Among the extensions likely to be built in the near future may be mentioned the following: Sayan to the Oyon coal fields, Chilete to Magdalena, Chuquicara toward Cajabamba. Government engineers have recently surveyed this last extension which is part of the proposed longitudinal railway along the plateau and have estimated the cost of construction. Their report to the Minister of Fomento is technical and quite unemotional, but presents a most vivid picture of the difficulties attendant on the construction of a Peruvian railway.

These engineering difficulties and the almost prohibitive cost of construction have been directly responsible in the past for the slowness with which the railways have pushed up the river valleys and preclude any chance of a rapid development in Peru such as seems likely to occur in Brazil now that construction materials from the United States and Europe will be once more available. However, the hidden riches of the Peruvian Andes and the unknown riches of the plains beyond are beckoning as they never did before; the Peruvian Government is on a sounder financial basis than ever before and anxious to weld its people, isolated in the various river valleys, into a united nation, and hence it seems probable that Peru will slowly push to realization her dreams of a comprehensive railway system and it seems likely that American engineers and supplies will play an important part in this future development as they have in the past.

Mechanical Section of American Railroad Association

Rules of Order; Program of Atlantic City Meeting and Personnel of the General Committee

THE FORMATION of the American Railroad Association with its five sections covering operating, engineering, mechanical, traffic and transportation was announced in the January 17 issue of the *Railway Age* on page 194, and is considered in detail in another article in this issue.

Circular S-3, No. 1a has been issued by the American Railroad Association giving the personnel of the general committee which will be in charge of the convention at Atlantic City next June, together with the rules of order and a list of the committees which will report at the convention.

The general committee is made up as follows:

C. E. Chambers, mechanical assistant, Allegheny Region, chairman.
W. J. Tollerton, general mechanical superintendent, Rock Island Lines, vice-chairman.
Frank McManamy, assistant director, Division of Operation, U. S. R. A.
C. B. Young, manager, Inspection Test Section, Division of Operation, U. S. R. A.
F. F. Gaines, chairman, Board of Railway Wages and Working Conditions.
I. S. Downing, general master car builder, C. C. C. & St. L.
J. S. Lentz, master car builder, Lehigh Valley.
M. K. Barnum, assistant to general superintendent, maintenance of equipment, Baltimore & Ohio.
J. R. Gould, superintendent motive power, Chesapeake & Ohio.
A. Kearney, superintendent motive power, Norfolk & Western.
C. E. Fuller, superintendent motive power and machinery, Union Pacific.
T. H. Goodnow, superintendent car department, Chicago & North Western.
J. W. Small, mechanical assistant, Southern Region.
C. F. Giles, superintendent machinery, Louisville & Nashville.
J. E. O'Brien, mechanical superintendent, Missouri Pacific.
A. P. Prendergast, mechanical superintendent, International & Great Northern.
H. R. Warnock, general superintendent motive power, Chicago, Milwaukee & St. Paul.
James Colcman, superintendent car department, Grand Trunk.
W. H. Winterrowd, chief mechanical engineer, Canadian Pacific.

Rules of Order

The following are the rules of order which will govern the conduct of the section:

1. (a) The membership of Section 3—Mechanical—shall consist of three classes; representative, affiliated and life.

(b) Representative members shall be those officials of railroads above the rank of general foreman having charge of the design, construction or repair of motive power or rolling stock, who shall be designated by the federal manager or executive official of the member of the association to serve in the section.

(c) Any person having such knowledge of science or practical experience in matters pertaining to the construction of motive power or rolling stock as would be of special value to the section may become an affiliated member on being recommended by three representative members. The name of such candidate shall then be referred to the general committee which shall report to the section on his fitness for such membership. He shall be elected by written or printed ballot at any regular meeting of the section held not less than six months after the candidate has been proposed and five dissenting votes shall reject. Affiliated members shall be entitled to all the privileges of representative members excepting that of voting and being elected to office in the section and may serve on committees on appointment by the general committee, in addition to the regularly elected members of such committee.

Such membership shall continue until written resignation is received by the secretary or the membership is terminated by the general committee or by the members becoming engaged in business which, in the judgment of the general committee, would impair his usefulness to the section or discriminate against others similarly engaged. Affiliated members shall not be subject to dues or assessments.

(d) Representative members who have been in good standing twenty years, or members who have served as chairman of the section may become candidates for life membership on the recommendation of the general committee. The names of such members shall be referred to the section in convention for election by written or printed ballot at any regular meeting of the section and five dissenting votes shall reject.

(e) Those persons, active or representative members, who have been in good standing in either the Master Car Builders' Association or the American Railway Master Mechanics' As-

sociation for twenty years, or members who have served as president of either association or as chairman of the section may also become candidates for life membership. Those now carried by the Master Car Builders' Association as life members or by the American Railway Master Mechanics' Association as honorary members will be continued as life members of Section Three—Mechanical.

2. (a) In addition to the chairman, vice-chairman and the general committee of the section, a nominating committee shall be elected.

(b) The general committee shall consist of sixteen elected members including the chairman and the vice-chairman of the section, and, in addition, during the period of federal control, of three representatives of the United States Railroad Administration to be designated by the director of the Division of Operation. The elected members during federal control shall consist of two representatives from each region and two representing the Canadian railroads.

3. The duties of all officers shall be such as shall pertain to their offices or as may be delegated to them by the general committee of the section.

4. (a) The general committee shall exercise general supervision over the interests and affairs of the section, call, prepare for and conduct general conventions.

(b) The general committee shall exercise such supervision over the standards, recommended practice, or rules of this section as may be necessary to meet any emergency that may arise during the year in the conduct of the affairs of the section.

(c) It shall make a report at each convention which shall cover the action it has taken on such general or emergent supervision and make such recommendations as it may deem necessary on questions of importance to the section.

(d) The general committee shall select and appoint the members of the several standing committees and of such special committees as may be found necessary from time to time for conducting the business of the section and for investigating such matters as may be referred to the section or the committee may deem expedient to carry out the purposes of the section. It shall make appointments in the membership of any of the committees that may be necessary to fill any vacancies which may occur.

(e) The general committee shall receive, examine and approve before public reading all communications, papers and reports and it shall decide what portion of the reports, papers and drawings shall be submitted to each convention and what portion shall be printed in the annual report. It shall also determine which, if any, of the subjects presented at the convention or by members shall be referred to the executive committee of the association.

(f) The general committee shall offer to the convention the names of ten representative members not officers of the section as candidates for the committee on nominations.

(g) The general committee may call special meetings of the section to be held not less than thirty days after the notice thereof has been mailed to each member of the section.

(h) Nine members of the general committee shall constitute a quorum for the transaction of business.

5. (a) It shall be the duty of the committee on nominations to offer to the convention the name of one representative member as a candidate for chairman and one for vice-chairman, and the names of seven representative members as candidates for the general committee.

(b) When twenty or more members desire to propose the name of a member for any office, in addition to the names suggested by the committee on nominations, the secretary shall place the name or names of such persons for said office on the printed ballot, making a statement to the effect that such name or names has been proposed by a certain number of members.

6. (a) It shall be the duty of the secretary to issue a circular annually, intimating the date and place when and where candidates may be examined for the scholarships of the section.

(b) Acceptable candidates for the scholarship shall be first, sons of members or of deceased members of the section.

If there is not a sufficient number of such applicants for the June examination, then applications will be received from other railroad employees or the sons of other railroad employees for the fall examination. The secretary shall issue a proper circular in this case as before. In extending the privilege outside of the families of members, preference shall be given to employees or the sons of employees or the sons of deceased employees of the mechanical departments.

(c) Candidates for these scholarships shall apply to the secretary of this section and if found eligible shall be given a certificate to that effect for presentation to the school authorities. This will entitle the candidate to attend the preliminary examination. If more than one candidate passes the preliminary examination, the applicant passing the highest examination shall be entitled to the scholarship, the school authorities settling the question.

(d) The successful candidate shall be required to take a course prescribed by the general committee.

7. (a) The officers, excepting as otherwise herein provided, shall be elected at the regular meeting of the section held in June of each year and the election shall not be postponed except by unanimous consent.

(b) The chairman and the vice-chairman of the section shall be elected by written or printed ballots alternately every second year, the candidate receiving a majority of the votes cast shall be declared elected and shall hold office for two years or until his successor shall be elected.

(c) Members of the general committee and the committee on nominations shall be elected by written or printed ballots. Seven members of the general committee will be elected at each regular session to serve for two years. Five members of the committee on nominations will be elected annually.

(d) In the election of members of the general committee and the committee on nominations each representative member is entitled to one vote.

8. (a) At the first session of the annual meeting the report of the committee on nominations announcing the names of the nominees for officers and the general committee of the section shall be read. Elections shall not be held before the day after such announcement except by unanimous consent. Votes may be cast for any member eligible to serve as chairman, vice-chairman, members of general committee or members of committee on nominations by adding the name to the printed ballot.

(b) In all ballots for chairman, vice-chairman, members of general committee and committee on nominations or for affiliated or life members at the meetings of the section, the following form of voting shall be adhered to: An envelope shall be provided on which there shall be a blank space for the name of the railroad, and the name of the official voting; smaller envelopes shall be provided on which shall be printed the words "For Officers," "For Members General Committee," "For Members Committee on Nominations," "For Affiliated and Life Membership," and otherwise unmarked. In these envelopes the ballots shall be placed by those voting them and they shall then be placed within the larger envelope and presented to the general tellers. When a ballot is to be taken the chairman will announce the names of all required tellers. Three general tellers shall have charge of receiving and recording the ballots cast. When all ballots have been cast these tellers will announce that the polls are closed. They shall then remove the smaller envelopes, count and announce the vote for officers and shall deliver the envelopes marked "For General Committee" to two tellers, who shall count and announce to the general tellers the vote for general committee and those marked "For Committee on Nominations" to two tellers who shall count and announce to the general tellers the vote for the committee on nominations, and those marked "For Affiliated and Life Members" to two tellers who shall count and announce to the general tellers the vote for affiliated and life membership.

(c) The general tellers shall record and announce the total number of votes cast, the result of the vote, and shall be the judges of eligibility of any ballot presented.

(d) When a ballot for officers or membership on committees shall be announced as having eventuated in a tie vote, or be otherwise undecided, upon such announcement the final result shall be determined by the majority of the members present.

9. (a) Unless otherwise provided herein, a vote in the session of the section may be taken *viva voce*, by arising, or by written or printed ballot in any of which only representative members and representatives of the United States Railroad Administration shall participate. Letter ballots may be ordered to be taken in such manner and under such conditions as the section

may by resolution from time to time or the general committee may direct.

(b) Printed ballots for use in the election of officers, members of the general committee and the committee on nominations, and for affiliated and life memberships to be of the form as prepared by the committee on nominations.

10. (a) At each annual meeting, the chairman shall appoint a committee on subjects whose duty it shall be to report at the next annual meeting subjects for investigation and discussion, and if the subjects are approved by the section, the general committee as hereinafter provided, shall appoint committees to report on them. It shall also be the duty of the committee on subjects to receive from members questions for discussion during the time set apart for that purpose. That committee shall determine whether such questions are suitable ones for discussion, and if so, it shall report them to the section.

(b) When the committee on subjects has reported and the section approved of subjects for investigation, the general committee shall appoint individuals or special committees to investigate and report on any subject which a majority of the members present may approve; or individual papers may be presented to the section after approval by the general committee. Papers and reports shall be presented by abstracts, which shall not occupy more than ten minutes in the reading unless otherwise ordered by the section.

(c) Any proposition recommending the adoption of standard construction or practice shall be in writing and be accompanied by drawings, if the latter are necessary for a clear understanding of the subject. Such proposition shall then be submitted to the section for discussion, after which a vote shall be taken to decide whether the proposition shall be submitted for decision by letter ballot to all the members entitled to vote. If decided in the affirmative, the secretary within two months from the time the vote of the section is taken on such measure, shall send by mail to each member a blank ballot, and a copy of the proposed recommendation, with a report, to be approved by the general committee of the discussion thereon; such ballot to be returned to the secretary, who will count all the ballots received within thirty days from the date they were sent to the members, and he shall then announce the vote in such manner as the general committee may prescribe. Any recommendation securing two-thirds of the votes cast shall be adopted by the section.

(d) All reports, resolutions and recommendations involving the use, or proposed use, by railroads, of any device or process which forms the subject matter of any existing patent, shall first be submitted to the general committee, and shall be submitted to the section only by the general committee.

11. (a) The regular annual meeting of the section shall be held in June of each year. The dates of such meeting shall be fixed by the general committee.

(b) The regular hours of session shall be arranged by the general committee and published on the program for each meeting.

(c) The place for each annual meeting shall be fixed at least four months before the annual meeting by the general committee.

(d) At any regular meeting thirty or more members entitled to a vote shall constitute a quorum.

(e) The business of the meetings of the section shall, unless otherwise ordered by a vote, proceed in the following manner:

1. Address by the chairman.
2. Acting on the minutes of the last meeting.
3. Report of secretary.
4. Appointment of resolutions and other committees.
5. Unfinished business.
6. New business.
7. Reports of committees.
8. Reading and discussing questions propounded by members.
9. Routine and miscellaneous business.
10. Election of officers.
11. Adjournment.

12. The revision of the rules of interchange shall be the special order of business at 10:00 a. m. on the second day of each annual convention, unless otherwise ordered.

13. Unless otherwise ordered, the discussion of questions proposed by members shall be the special order at 12:00 noon of each day of the annual meeting.

14. The votes of a majority of the members present shall be required to decide any question, motion or resolution which shall come before the section, unless otherwise ordered. Matters upon which authoritative action is required after approval by the section shall be submitted to the executive committee of the association, through the general secretary.

15. (a) The reports of all committees must be in the office of the secretary not later than April 1 in order that the same can be printed and advance copies issued 30 days prior to the opening date of the convention.

(b) Committee reports which do not reach the secretary as provided for in paragraph (a) will be referred to the general committee to decide whether the report shall be submitted to the convention.

(c) An abstract of the report of each committee will be read to the convention, together with whatever additional data may have been accumulated after the publication of the reports.

(d) The members of committees who may individually or collectively submit a minority report must prepare the same so that it can be issued with the report of the majority to substitute for the majority report in the event the section shall so decide.

(e) Each member of a committee must approve either the majority or a minority report.

16. These rules of order may be amended at any regular meeting by a two-thirds vote of the members present provided that written notice of the proposed amendment has been given by the general committee at least four months before.

Reports of Committees

Thirty-one committees will report at the convention. The first 20, ordinarily considered as Master Car Builders' committees, will report from June 18 to June 20, and 11 committees which would be considered strictly as committees of the Master Mechanics' Association will report from the period of June 23 to June 25. The election of officers will take place on Saturday, June 21. The list of committees is as follows:

June 18-20, 1919, Inclusive.

1. Arbitration, J. J. Hennessey (C. M. & St. P.), chairman.
2. Standards and Recommended Practice (M. C. B.), T. H. Goodnow (C. & N. W.), chairman.
3. Train Brake and Signal Equipment, T. L. Burton (N. Y. C.), chairman.
4. Brake Shoes and Brake Beam Equipment, B. B. Milner (N. Y. C.), chairman.
5. Couplers, R. L. Kleine (Pennsylvania), chairman.
6. Loading Rules, J. J. Burch (N. & W.), chairman.
7. Car Wheels, W. C. A. Henry (Pennsylvania Lines West), chairman.
8. Safety Appliances, C. E. Chambers (U. S. R. A.), chairman.
9. Car Construction, W. F. Keisel (Pennsylvania), chairman.
10. Specifications and Tests for Materials (M. C. B.), F. M. Waring (Pennsylvania), chairman.
11. Car Trucks, J. T. Wallis (Pennsylvania), chairman.
12. Prices for Labor and Material, P. F. Smith, Jr. (Pennsylvania Lines West), chairman.
13. Train Lighting and Equipment, J. R. Sloan (Pennsylvania), chairman.
14. Nominations, F. W. Brazier (N. Y. C.), chairman.
15. Tank Cars, A. W. Gibbs (Pennsylvania), chairman.
16. Draft Gears, R. L. Kleine (Pennsylvania), chairman.
17. Welding Truck Side Frames, Bolsters and Arch Bars, W. O. Thompson (N. Y. C.), chairman.
18. Standard Blocking for Cradles of Car Dumping Machines, James McMullen (Erie), chairman.
19. Revision of Passenger Car Rules of Interchange, H. H. Harvey (C. B. & Q.), chairman.
20. Depreciation for Freight Cars, M. K. Barnum (B. & O), chairman.

June 23-25, 1919, Inclusive.

21. Standards and Recommended Practice (A. R. M. M.), W. E. Dunham (C. & N. W.), chairman.
22. Mechanical Stokers, A. Kearney (N. & W.), chairman.
23. Fuel Economy and Smoke Prevention, William Schlafge (Erie), chairman.
24. Powdered Coal, C. H. Hogan (N. Y. C.), chairman.
25. Specifications and Tests for Materials (A. R. M. M.), F. M. Waring (Pennsylvania), chairman.
26. Design and Maintenance of Locomotive Boilers, C. E. Fuller (Union Pacific), chairman.
27. Locomotive Headlights, H. T. Bentley (C. & N. W.), chairman.
28. Superheater Locomotives, W. J. Tollerton (C. R. I. & P.), chairman.
29. Design, Maintenance and Operation of Electric Rolling Stock, C. H. Quereau (N. Y. C.), chairman.
30. Train Resistance and Tonnage Rating, O. P. Reese (Pennsylvania Lines West), chairman.
31. Subjects, M. K. Barnum (B. & O.), chairman.

An Analysis of the Locomotive Terminal Problem*

Considerations of Location and Size Affecting the Design of a Well Balanced and Efficient Unit

By Gustave E. Lemmerich
Layout Engineer, The Austin Company, Cleveland, Ohio

ENGINE TERMINAL CONGESTION, low motive power efficiency and unusually severe weather conditions are said to have been important contributing causes for the traffic tie-up of last winter. Engine terminal congestion was due both to insufficient accommodations and to antiquated facilities in the existing terminals. It is said that most railroads, due to circumstances beyond their control, were about 10 years behind their normal improvement schedules at the beginning of 1918. As the logical consequence, first consideration was given by the federal management to relieving these sources of trouble. Almost every budget for the railroads in the congested districts contained a large item for engine terminals, and much work was undertaken. The large number of engine terminals under construction has created much interest in economical layout and design. As a contribution to the information on this subject, the following data has been assembled representing the best practice at this time.

General Conditions

An economical engine terminal is one so located and designed that it will function continuously under the severest weather conditions, and clear the maximum number of locomotives in the minimum time. It is obviously necessary to make thorough preliminary investigations before a layout can be adopted. For the sake of this discussion a hypothetical case will be used and it will be assumed that the proposed site for the new engine terminal is at an existing division point.

With the matter of location decided, the present and future importance of the terminal should be thoroughly investigated. If it is located on a main trunk line, is there a possibility that it might be selected as a principal passenger or freight route? What is the amount and character of traffic? Is there a predominance of passenger trains or of through freight or local freight transferred to other roads? All of these questions have a bearing on both the location and the size of the terminal adopted. Exact size is expressed in the number of engines tributary to the terminal, that is, the average number of engines handled per day and the anticipated increase in that number over a period of years.

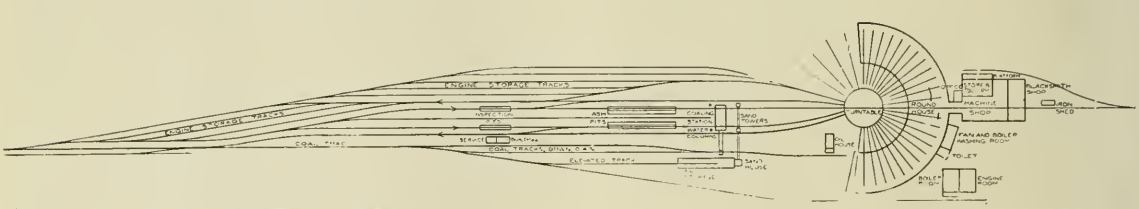
The site selected should be as near as possible to the points where the engines are released or required, and to which they may have access by the most direct routes. A second consideration is that of the topography of the site. This will take into account the amount of grading necessary and the drainage possibilities. The proximity to an unfailing and adequate source of good water is also a point to investigate.

In large cities, and sometimes small ones, it is also important to determine the relation of site cost to ultimate operating economy. An investigation may show that a saving can be made by moving the terminal to less expensive outlying property.

The Layout

In the track layout, an easy and flexible entrance to the terminal should be provided. The track facilities will be governed somewhat by the time necessary at the ash and inspection pits, each requiring an average of about 20 min. A factor which also may effect the layout is the location of the roundhouse, so that the doors will not face the prevailing winds. Still another is the grade at the entrance to the terminal. While this should be an easy one, it is important that the yard grade be approximately level from the inspection pits to the roundhouse. The engine terminal should also be properly equipped with machine tools, power, etc., to expedite the handling of engines in the preparation for their next run.

Assume a terminal for about 100 engines a day in the eastern or central district. After the engines have entered the terminal, they are inspected, ashed, turned, and run into the house.



Plan copyrighted by the Austin Company, Cleveland, Ohio

Typical Engine Terminal Layout

In general, the outgoing engines take coal, sand and water, but quite often incoming engines do the same. As soon as the locomotives have received the necessary attention, they should be sent to the storage yard ready for service under orders of the engine despatcher.

Double track leads to this terminal are desirable if traffic conditions warrant the expense, but occasionally existing conditions will not permit such an installation. Where these cannot be had, the storage yards for outbound locomotives should be as close to the terminal entrance as possible. The least that should be provided at any important terminal is a double track leading over the inspection and ash pits, past the coaling station and to the turntable. Double tracks should also be provided for outbound locomotives and they should lead direct from the turntable. As shown in the layout, one of these may lead direct to the locomotive storage yard, while another may also lead to the yard by way of the coaling station. Separate tracks should be provided wherever possible, for sand storage, the removal of ashes and for handling loaded cars to the coaling station. In providing

*This is the first of two articles on this subject. The second will appear in the next issue.

all of these track facilities, it should be borne in mind that every switch is a source of expense during the winter.

Inspection Pits

At present most of the locomotive inspection pits are located near the entrance to the terminal. This location may be changed, however, in cases where washing pits are also provided. Facilities of this nature have been installed by the Lackawanna and the Erie, where engines are cleaned with a spray of water and oil, applied by air, after they have dropped the ashes and cleaned the fires. This washing is done to afford better inspection, hence, the ash pit should be located in advance of the washing pit, and it, in turn, precedes the inspection pit if they are all arranged in their proper sequence.

While there is no doubt that the washing and cleaning of a locomotive before it is inspected facilitates that work, it means that the ash pit, particularly in the colder climates, may be located too far from the house. It is possible, however, that a thorough study of the arrangement of these several facilities may result in providing them all, without this disadvantage. On the other hand, it is possible to do the inspecting in the roundhouse. This has many drawbacks, however, besides that of adding greatly to the fixed charges for inspection, owing to the higher cost of the roundhouse as compared with the inspection pit.

In the latest designs of terminals, the lengths of inspection pits have been increased to 90 and 100 ft. As a rule they are placed in the open, but at all the terminals being constructed by the Pennsylvania Lines in the past year, fully enclosed shelters of reinforced concrete have been provided. No attempt will be made to heat these buildings, as they are only intended to shelter the inspectors from the weather.

The logical place for the service building is near the inspection pits. Such a building should contain rooms for the inspectors, the engine despatcher, and engineers, lockers, toilets, and space for tools for the engine crews. If this building be located at some other point, say near the machine shop or roundhouse, a smaller building should be provided for the inspectors beside the pits. A pneumatic tube, connecting this service building with the roundhouse foreman's office is a facility for handling reports which is well worth the cost of installation.

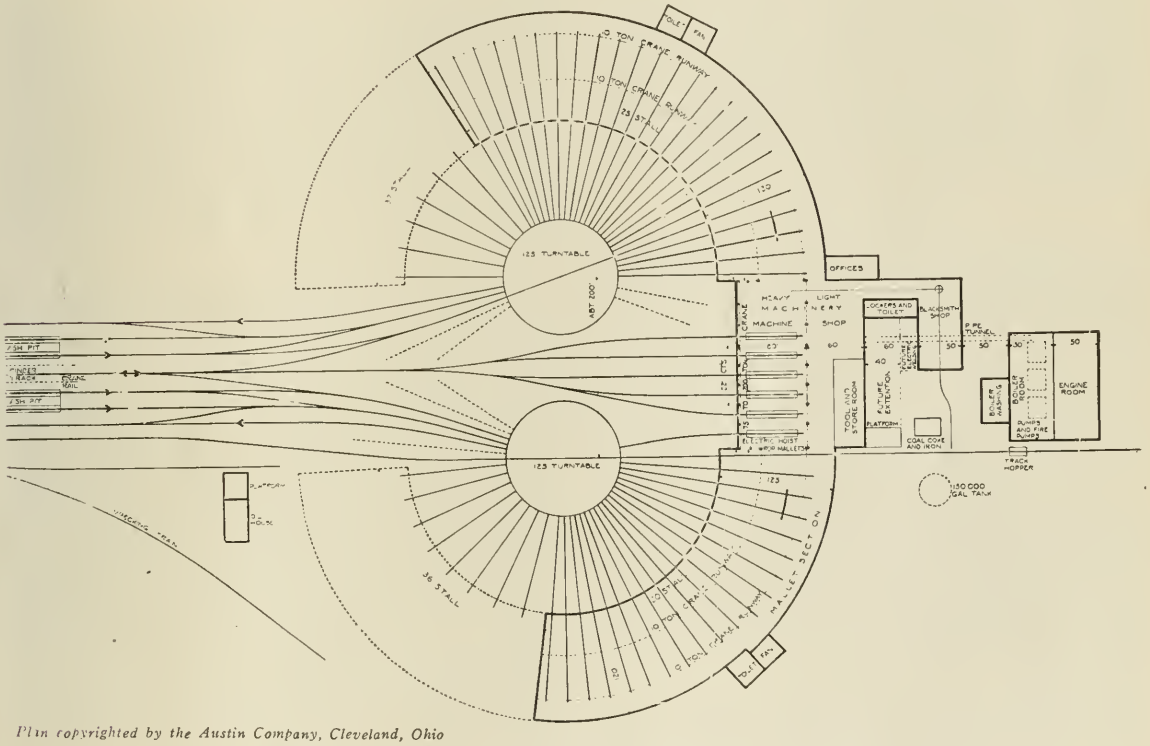
The Ashpit

Inasmuch as the average time required to drop ashes and clean fires is about 20 min., the ashpit is a dominating influence in arriving at an efficient layout. In climates with long cold winters, the ashpit should be located as close as possible to the turntable. Approximately 500 ft. seems to be about right, being gaged by the distance a locomotive safely can run without a fire on the grates. Cold air has a detrimental action on the flues.

In this case the ashpit is assumed to be of the water type, serving two tracks, and should be about 180 ft. long, which is sufficient to serve three engines, except Mallets, per track. It may be operated either by a large locomotive crane, or by a gantry crane. Local conditions, however, may make it advisable to install a small additional ashpit for yard engines.

The floor should be reinforced and quite often rails are laid with their heads projecting about two inches to protect the concrete from the bucket. The girders carrying the rails and the cast iron pedestals, if they are used, should be of liberal dimensions to allow for considerable loss of section from the acid action of wet cinders.

The tanks are filled with water and provided with drainage



Plan copyrighted by the Austin Company, Cleveland, Ohio

Suggested Layout for a Large Terminal with Two Turntables

facilities. Water supply pipes, fitted with sufficient plugs for the hose, should be installed along the sides of the ashpits. The large tanks should have barriers at the ends, removable series grates between tracks, and danger signals or lights to prevent accidents. The pits should be arranged in pairs and sloped at about 50 deg. beneath the ashing tracks toward a large tank between the tracks. The bottom of the tank should be at least 18 in. below the tops of this slope, and it should have sufficient width to allow for turning a large clam-shell bucket.

Other types of cinder handling equipment may be applied to terminals of the size in question, including those in which the cinders are handled in hopper pits or in buckets placed in the pits and from which they are hoisted by various means. For unimportant and smaller terminals the depressed track type of ash pit has been found quite satisfactory. While the method is simple, and no mechanical equipment is required, a pit of this type has its limitations. In some cases the depressed type of pit is installed for one track, and in others for two. In either case, all the work has to be done by manual labor, and the cinder storage space is limited. When labor was plentiful and cheap this type of pit was not so objectionable. Aside from these disadvantages, the depressed track occupies space which might be utilized to better advantage. In order to increase the storage space, it is necessary to lengthen the pit, which is not always economical, because it may seriously delay engine movements to the house.

The Coaling Station

The coaling station should be of the transverse type, and have a pocket capacity for at least one day's supply. A station serving several tracks is preferable to the longitudinal type because it facilitates engine movement to and from the pockets. The loaded coal car tracks should have a down grade toward the track hopper to permit easy feeding of the cars. Lately a good many coaling stations have been built of concrete with bucket type conveyors, the coal being lifted or elevated to the top of the pockets. Under certain ground conditions, a belt conveyor has also been found to be very satisfactory and economical. For any type a demand has developed recently for a coal weighing or measuring device.

At very busy terminals, a second track hopper may be desirable to obtain continuity of service and greater capacity. A shelter over the track hopper is also advisable, as it permits the unloading to be done in all kinds of weather. Moreover if there is an increased demand (which appears certain), for the new 100-ton coal cars, the lengths of the coal track hoppers should be lengthened accordingly in all future coaling stations.

Many railroads are providing for coal storage, close to the coaling station, at all important terminals. At least a month's supply should prove of great value in most cases. Where a storage of about 20,000 tons is provided, a large locomotive crane is an economical appliance for loading and unloading purposes. This crane is also useful at even moderately important terminals. Inasmuch as a crane of this type can switch and unload about 75 tons of coal per hour from cars, it can do this work when it is not otherwise employed. Such equipment can also be used for handling ashes.

In the case of all coal storage, the fixed charges per ton of coal stored, resulting from the cost of the plant, should be fully considered. Coal stored in the open loses heat value, and it may have to be fired differently from the regular run of coal.

Other Facilities

As a general rule the sanding facilities are installed in conjunction with the coaling station. This permits both coal and sand to be taken with one spotting of the locomotive. The amount of storage depends entirely on local conditions. Where the sand required for the winter months is taken out by steam shovel in the fall, the storage, of course, has to accommodate the entire winter supply.

The sand house should be large enough for the easy handling of the wet sand to the top of the stove. The dry sand is usually delivered from the stove to a large tank or pit, from which it is forced by air pressure to smaller tanks located above the track in the coaling station, or to tanks placed on a bridge over the tracks. From these tanks the dry sand is spouted by gravity to the engines.

The oil house should be of a fireproof construction, and a reinforced concrete frame with brick walls is preferred If a Bowser-type oil system is used the design should be based accordingly. The importance of the terminal fixes the oil tank capacity, and correspondingly the size of the building. The outside platform beside the oil delivery track should be of liberal dimensions, and the basement for the storing of tanks should extend under the platform. This arrangement gives an economical design and provides a liberal storage capacity.

The location and number of the water columns will depend on the importance of the terminal and local conditions in the terminal and yard. Water supply for yard engines should be especially considered. The storage tanks should be of very liberal proportions, and for the layout under consideration, the water columns should be 10 in. or 12 in., depending on the distance away from the supply tanks. The size of the tanks depends entirely on local requirements, particular attention being given to prevent failure of the supply through breakdown. The location and size of the water storage tanks is not shown on the layout, because they depend on local conditions.

The Turntable

The lengths of turntables on some roads in the eastern district have now been increased to 110 ft., while the maximum at practically all other new terminals is 100 ft. At new important terminals, where over six Mallets are handled per day, it would be more economical and save time and delays for this class of engines to install a 125-ft. table instead of one of 100 ft. usually employed. At terminals with a preponderance of passenger engines and where a house of about 40 stalls is required, it would be advisable to study the question of two tables. As a matter of fact, new layouts for all important terminals, requiring more than 40 stalls, should take the question of two turntables under consideration.

A 100-ft. turntable will accommodate a car and a switching engine. This feature will absorb the extra cost over a 90-ft. table for a new engine terminal, where the building of the table precedes that of the roundhouse. A 125-ft. turntable will make possible a roundhouse based on 72 stalls in the full circle, without the use of frogs. It will also greatly extend the balancing sphere for a larger number of locomotives of various types.

Twin Turntable Installation

In the accompanying layout, with twin roundhouse facilities, there are two 125-ft. turntables installed in connection with two 120-ft. roundhouse sections. One of the roundhouses contains a 125-ft. Mallet section. A layout of this kind is practical and economical where the terminal handles 150 to 350 engines per day. The need for two tables with 150 engines depends entirely on prevailing traffic conditions. The tendency toward consolidation of terminals should greatly increase the demand for terminals of this kind. The arrangement of the two 125-ft. turntables makes a very flexible and efficient layout possible. By utilizing the extension of the center or cinder track, a clearing track is created in case both tables should be out of commission at the same time.

The plan shows one roundhouse of twenty and one of twenty-five stalls, and they will accommodate between 200

to 250 engines per day. The cost of these 125-ft. turntables, and two houses of twenty and twenty-five stalls, is about the same as a combination of 100-ft. tables with the same number of stalls. The extra cost of the 125-ft. turntables is about equal to the saving in construction of the two houses, resulting from the reduction in floor area and the length of the rear walls. In addition there is the greater advantage of the turntable in better balancing and accommodating the largest locomotives. The greater distance between the table and the house also has many advantages; one of these is that in case of fire every other track will clear an engine.

Wheel removals will be made in the machine shop, by means of a crane of 75 tons to 200 tons capacity, instead of raising the locomotives with jacks. The drop pits installed in the roundhouse are only intended for emergency purposes. For the Mallets, one pit could be provided with an electric hoist.

A 10-ton crane section is provided in each house and the proportions of the shop are such that these house crane runways may extend into the shop proper. The shop plan shows six pits, but this number could be increased to eight and the machine shop extended as indicated. The blacksmith shop is connected to the machine shop by an enclosed passageway which also contains rooms for lockers and toilets.

The power house is of liberal proportions, and space is provided in the boiler room for a fire pump. There is also indicated a tentative location for an auxiliary water tank of 150,000 gal. capacity. This is intended as a reservoir for all water service, boiler washing, etc.

A liberal estimate at present prices for this engine terminal complete and fully equipped is approximately $1,400,000. This would result in fixed charges at 10 per cent, of $140,000 a year, and in a fixed charge for 250 engines of $1.55 per engine per day.

The details of this estimate are as follows:

Grading and drainage	$40,000
Track	90,000
Four inspection pits including covered shed	20,000
Service building	7,000
Coaling station, sand house, etc	105,000
Four water type ashpits—gantry crane	50,000
Two 125-ft. turntables in place	50,000
Oil house and equipment	12,000
Two roundhouses, 25 and 20 stalls, and 2 10-ton cranes	405,000
Boiler washing	40,000
Machine shop and blacksmith shop	105,000
Power house	80,000
75-ton crane, electric hoist	45,000
Electric equipment	40,000
Power house equipment	170,000
Shop equipment	50,000
Miscellaneous	30,000
Total	$1,400,000

Developments in American Railroad Association

Committees Appointed, Tentative Rules of Order Adopted and Meetings Held or in Prospect

THE DEVELOPMENT OF PLANS in connection with the reorganization of the American Railway Association has been progressing rapidly in order to comply fully with Circular 70 of the director general to provide a responsible channel through which he might obtain recommendations for the advancement of railroad practice. The new organization consists of five sections, viz., Operating; Engineering; Mechanical; Traffic and Transportation (the articles of organization, the reorganization chart and by-laws appeared in the January 17 issue of the *Railway Age*, page 194.) In the development of the organization it has been necessary to hold meetings of representatives of each of the various sections to arrange for the proper amalgamation of the different societies with the association; to draw up tentative rules of order and to transact any other necessary business. Three sections of the association have now been organized, these being the Engineering, Mechanical and Transportation sections. The Operating and Traffic sections have not been organized as yet, although steps have been taken in this direction.

The tentative rules of order adopted for those sections already organized cover the membership requirements for each section and the number of members which shall make up the general committee and outline the duties of the general committee and the chairmen of the sections. The general committee selects and appoints the members of standing committees and special committees for conducting the business of the sections and for investigating such matters as may be referred to them. The methods to be employed in the election of officers are outlined and the manner in which the order of business shall be handled at the annual sessions is covered.

The tentative rules of order for the various sections will remain in force until the first meeting of each section takes place. At this meeting the members present will either ratify these rules or make such changes as may appear to be desirable.

Committee Appointments

Temporary general committees have been appointed by the executive committee of the association for each of the five sections. The temporary general committees will handle such business as comes before them until the first meeting of the sections take place at which time permanent general committees will be selected. The temporary general committees appointed for each of the sections are as follows:

SECTION I—OPERATING

W. J. Fripp, general manager, New York Central (chairman).
J. H. Young, senior assistant director, Division of Operation, United States Railroad Administration.
A. F. Duffy, manager, Safety Section, United States Railroad Administration.
C. G. Burnham, federal manager, Chicago, Burlington & Quincy.
A. D. MacTier, vice-president, Eastern Lines, Canadian Pacific.
R. E. McCarty, general manager, Pennsylvania, Lines West of Pittsburgh.
C. L. Bardo, general manager, New York, New Haven & Hartford.
M. H. Clapp, manager, Telegraph Section, United States Railroad Administration.
J. F. Caskey, superintendent of telegraph, Lehigh Valley.
G. G. Yeomans, member, Advisory Committee, Purchasing Section, Division of Finance and Purchases, United States Railroad Administration.
E. J. Roth, manager, Stores Section, Division of Finance and Purchases, United States Railroad Administration.

SECTION II—ENGINEERING

Earl Stimson, general superintendent maintenance of way and structures, Baltimore & Ohio (chairman).
C. A. Morse, assistant director, Engineering and Maintenance Department, Division of Operation, United States Railroad Administration.
H. R. Safford, engineering assistant, Central Western Region, United States Railroad Administration.
C. F. W. Felt, chief engineer system, Atchison, Topeka & Santa Fe.
R. S. Parsons, chief engineer, Erie.
J. A. Atwood, chief engineer, Pittsburgh & Lake Erie.
George Gibbs, chief engineer of electric traction, Long Island.
E. B. Katte, chief engineer of electric traction, New York Central.
R. E. Trout, signal engineer, St. Louis-San Francisco.
W. H. Elliott, signal engineer, New York Central.
F. P. Patenall, signal engineer, Baltimore & Ohio.

SECTION III—MECHANICAL

C. E. Chambers, mechanical assistant to regional director, Allegheny Region, United States Railroad Administration (chairman).
Frank McManamy, assistant director, Mechanical Department, Division of Operation, United States Railroad Administration.
C. B. Young, manager, Inspection and Test Section, Division of Operation, United States Railroad Administration.
F. F. Gaines, chairman, Board of Railroad Wages and Working Conditions, United States Railroad Administration.
T. H. Goodnow, superintendent car department, Chicago & North Western.
H. R. Warnock, general superintendent motive power, Chicago, Milwaukee & St. Paul.
J. E. O'Brien, mechanical superintendent, Missouri Pacific.
A. P. Prendergast, mechanical superintendent, Texas & Pacific.
J. W. Small, mechanical assistant, Regional Director, Southern Region, United States Railroad Administration.
C. F. Giles, superintendent of machinery, Louisville & Nashville.
W. J. Tollerton, general mechanical superintendent, Chicago, Rock Island & Pacific.
C. E. Fuller, superintendent motive power and machinery, Union Pacific.
I. S. Downing, general master car builder, Cleveland, Cincinnati, Chicago & St. Louis.
J. S. Lentz, master car builder, Lehigh Valley.
J. R. Gould, superintendent motive power, Chesapeake & Ohio.
A. Kearney, superintendent motive power, Norfolk & Western.
M. K. Barnum, assistant to general superintendent maintenance of equipment, Baltimore & Ohio.
James Coleman, superintendent car department, Grand Trunk.
W. H. Winterrowd, chief mechanical engineer, Canadian Pacific.

SECTION IV—TRAFFIC

R. C. Wright, assistant director, Division of Traffic, United States Railroad Administration (chairman).
Traffic assistants of the seven regional directors of the United States Railroad Administration
J. H. Howard, manager, Claims and Property Protection Section, Division of Law, United States Railroad Administration.
H. C. Pribble, general claim agent, Atchison, Topeka & Santa Fe.
H. C. Howe, freight claim agent, Chicago & North Western.

SECTION V—TRANSPORTATION

George Hodges, chairman.
C. M. Sheaffer, general superintendent transportation, Pennsylvania Railroad.
H. G. Kelley, president, Grand Trunk.
E. J. Fearson, federal manager, New York, New Haven & Hartford.
E. H. Coapman, federal manager, Southern.
J. J. Bernet, federal manager, New York, Chicago & St. Louis.
G. E. Evans, staff officer, Operation, Louisville & Nashville.
W. L. Park, federal manager, Chicago Great Western.
G. E. Simpson, general supervisor transportation, Chicago, Milwaukee & St. Paul.
W. C. Kendall, manager, Car Service Section, Division of Operation, United States Railroad Administration.
J. W. Roberts, superintendent freight transportation, Pennsylvania, Lines West of Pittsburgh.
J. W. Nowers, car accountant, Atchison, Topeka & Santa Fe.
J. A. Wagner, general manager, Des Moines Union.

These Committees will organize their respective sections and serve as provided in the rules of order until their successors are elected.

E. H. Fritch, secretary of the American Railway Engineering Association, has been appointed secretary of the Engineering section. V. R. Hawthorne, secretary of the Master Mechanics Association and the Master Car Builders Association, has been appointed secretary of the Mechanical section. H. S. Balliet, formerly secretary-treasurer of the Railway Signal Association, has been selected as secretary of the Signal division of the Engineering section, and J. E. Fairbanks, general secretary of the Association, is acting for the present as secretary of the Transportation section.

Meetings Held and Contemplated

A meeting of the Committee of Direction of the Signal division of the Engineering section will be held in Chicago on March 16. The stated meeting of the Signal division of the Engineering section will be held at the Auditorium Hotel in Chicago on March 17. The Transportation section will hold its first meeting in Chicago on March 25. At this time various committee reports will be submitted for consideration. The Telegraph and Telephone division of the Operating section will hold a meeting in Chicago on June 11, 12 and 13 while the annual meeting of the Mechanical section will be held at Atlantic City, N. J., on June 18 to 25 inclusive.

At a meeting of the board of direction of the Railway Signal Association held in Chicago on February 24 and 25, a statement was prepared for the members outlining briefly the steps leading up to the amalgamation of the R. S. A. with the American Railroad Association; the Railway Signal Association, in compliance with Order 70 issued by the director general of railroads, will be known as the Signal division of the American Railroad Association effective at midnight February 28. The necessary details in connection with the transfer of the activities, funds and securities of the Railway Signal Association were consummated by the Board of Direction and the interests of the association will be properly safeguarded. The statement further says that the work will be handled as in the past and that the status of the association has in no way been modified while the scope of its activities will be greatly enlarged. All memberships in the Railway Signal Association are transferred to the Signal division of the American Railroad Association.

Various committees of the Transportation section held meetings in Chicago during the week of March 3 to 8. On March 3 the Committee on Handling Railroad Business Mail discussed problems pertaining to this branch of the service; on March 4, the Committee on Methods was in session; on March 5, the Committee on Demurrage and Storage considered subjects pertaining to this field while on March 6, the Committee on Car Service held a meeting. The reports drawn up by these committees are to be submitted to the Transportation section at its meeting in Chicago on March 25.

Annual Meeting of the Bureau of Explosives

The annual meeting of the Bureau of Explosives of the American Railroad Association was held in Chicago on Tuesday, March 4, and Colonel B. W. Dunn, chief inspector for the bureau, submitted a report which was discussed at this time. This meeting is the first held by the Bureau of Explosives since 1917. The executive committee consists of nine members and ordinarily three members are elected at the annual meeting each year but owing to the failure to hold a meeting in 1918, six members were elected this year. Those elected to the committee were: J. W. Meredith, general superintendent, Central Railroad of New Jersey; W. B. Storey, federal manager, Atchison, Topeka & Santa Fe; A. Robertson, federal manager, Missouri Pacific; N. D. Maher, regional director, Pocahontas region; W. J. Fripp, general manager, New York Central Lines East, and F. N. Pease, chief chemist, Pennsylvania Railroad. Those members holding over were: J. E. Gorman, federal manager, Chicago, Rock Island & Pacific; A. D. MacTier, vice-president, Eastern Lines, Canadian Pacific; C. H. Ewing, federal manager, Philadelphia & Reading.

Following the annual meeting N. D. Maher, regional director of the Pocahontas region, was re-elected president; W. J. Fripp, general manager, New York Central Lines East, was re-elected vice-president; J. E. Fairbanks, general secretary, American Railroad Association, was re-elected secretary-treasurer and Colonel B. W. Dunn was re-elected chief inspector for the bureau.

Information concerning the Mechanical Section will be found in this issue on page 535.

The Automatic Straight Air Brake is the subject of an exhaustive report by the Bureau of Safety of the Interstate Commerce Commission, covering its investigation of the brake in the early part of 1918, which was submitted to Congress by the Commission on March 4; but the record indicates that the report was not officially received by Congress, as its introduction was prevented by the filibuster during the final session. The investigation was made at the request of Congress, and the report makes a volume of some 2,000 pages. This brake was described in the *Railway Age* of July 26, 1918.



A Stretch of Tangent Showing Farm Land Along the Chickaloon Branch

The Progress of the Alaskan Railroad

Detailed Explanation Regarding the Cost of Construction and Present Condition of the Work

By Secretary of the Interior Franklin K. Lane

THE FOLLOWING MEMORANDUM by the Secretary of the Interior regarding the progress on the construction of the Alaskan Railroad, was filed in the Congressional Record on February 26 by Representative Kettner of California, in connection with the debate on an appropriation of $4,002,380 to continue the work on the road. This appropriation was included in the sundry civil bill which was passed by the House but was among the bills the Senate failed to pass before adjournment and the lack of appropriation will delay the work.

The Alaskan Railroad, which is under construction from Seward to Fairbanks, is about two-thirds done. It has been built without graft; every dollar has gone into actual work or material. It has been built without giving profits to any large contractors, for it has been constructed entirely by small contracts or by day's labor. It has been built without touch of politics; every man on the road has been chosen exclusively for ability and experience. It has been well and solidly built as a permanent road, not an exploiting road. It has been built for as little money as private parties could have built it, as all competent independent engineers who have seen the road advise.

In the summer of 1918 I sent Edwin F. Wendt, of the Interstate Commerce Commission, in charge of valuation of the railroads of the United States from Pittsburgh to Boston, to make an investigation into the manner in which the Alaskan Railroad was constructed and its cost. He reported to me as follows:

"In concluding, it is not amiss to again state that after the full study which was given to the property during our trip we are satisfied that the project is being executed rapidly and efficiently by men of experience and ability. It is believed that it is being handled as cheaply as private contractors could handle it under the circumstances."

The road has not been built as soon as expected because each year we have exhausted our appropriation before the work contemplated had been done. We could not say in October of one year what the cost of anything a year or more later would be, and we ran out of money earlier than anticipated. It has not been built as cheaply as expected because it has been built on a rising market for everything that went into its construction from labor, lumber, food supplies, machinery, and steel to rail and ocean transportation. I believe, however, it can safely be said that no other piece of government construction or private construction carried out during the war will show a less percentage of increase over a cost that was estimated more than four years ago.

The men have been well housed and well fed. Their wages have been good and promptly paid; there has been but one strike and that was four years ago and was settled by Department of Labor experts fixing the scale of wages. The men have had the benefit of a system of compensation for damages like that in the Reclamation Service and Panama Canal. They have had excellent hospital service, and our camps and towns have been free of typhoid fever and malaria. That the men like the work is testified by the fact that hundreds who "came out" the past two years attracted by the high wages of war industries, are now anxious to return to Alaska, and for them and in the interest of the Territory, I think we should have a large enough appropriation to speedily complete the road.

There has been but one set-back in construction and that was the washing out of 12 miles of track along the Nenana river. This is a glacial stream which, when the snows melt, comes down at times with irresistible force. In this instance it abandoned its long accustomed way and cut into a new bed and through trees that had been standing for several generations, tearing out part of the track which had been laid. But this damage has been repaired and the road relaid in what is thought to be a safer place. Such accidents may be expected on any road laid through the western mountains. There is not a single railroad from the Copper River road in Alaska to the Southern Pacific in Arizona which has not been closed for weeks, and sometimes months at a time, because of such washouts. Nor is there a western railroad

which has not been compelled to relocate scores and scores of miles of track.

Alaskan Engineering Commission

The credit for the work done is to be given to the men and to the Alaskan Engineering Commission who have had charge of construction. This commission consisted of Mr. Edes, Lieut. Mears, United States Army, and Mr. Riggs. The work of locating and constructing the road has been left in their hands entirely. The only instruction which they received from me was that they should build the road as if they were working for a private concern, selecting the best men for the work irrespective of politics or pressure of any kind. I have not asked them to appoint one man. As a result we have a force that has been gathered from the construction camps of the Western railroads, made up of men of experience and proved capacity. That they have done their work efficiently, honestly, and at reasonable cost is my belief.

Road Constructed

The road as projected is to run from Seward to Fairbanks, a distance of 471 miles. In addition there is a line to the Matanuska coal fields (completed) of 38 miles. The southern end of the road is the old Alaska Northern, running for 71 miles north of Seward, which was bought. The northern end of the road is a part of the old Tanana Valley Road (7 miles), leading directly into Fairbanks, which was also bought. (This was part of a line 44½ miles long running out of Fairbanks, but 37 miles of this road is not counted in any mileage figures here given.)

Between the 71 miles of the Alaska Northern on the south and the 7 miles of Tanana Valley road on the north there was



A Natural Water Tank Used to Water Locomotives

a stretch of 393 miles to be built through a waste. Of this there has been built 206 miles of main-line track, leaving 187 miles of this direct road from Seward to Fairbanks to be yet constructed. But of this stretch 48 miles have been cleared and graded, ready for track, and 30 miles have been cleared. In addition, the Matanuska line running into the Matanuska coal field, 38 miles, has been completed.

So that out of the total of road projected of 509 miles, there has been fully constructed all but 187 miles. And of this 78 miles of right of way have been either cleared and graded or cleared. There has also been constructed 30 miles of yard tracks, switches, sidings, etc., not included in the main-line mileage given above.

The total of track built amounts to 274 miles, this is made up of 244 miles of main-line track and 30 miles of siding.

A full statement of the road constructed and purchased is as follows:

Miles of road constructed	244.0
Miles of yard tracks, etc.	30.0
Alaska Northern, purchased	70.9
Tanana Valley, purchased	44.4
Total	389.3

Cost Per Mile

It is not possible during the construction of a railroad to tell what it costs per mile, because all the foundation work, the construction of bases from which to work, the equipment for construction, and much of the material is a charge which must be spread over the entire completed line. If the cost per mile is figured when but a few miles of road have been



Approaching Tunnel on the Seward Division

built, it might be said to cost a million dollars a mile. This road four years ago could be said to have cost ten times as much per mile as it could be said to cost to-day. So that as to an uncompleted road the best estimate of cost is one that is approximate.

The best estimate that can be made to-day as to the newly constructed road is that it has cost between $70,000 and $80,000 per main-line mile, or between $60,000 and $70,000 per mile of track.

This cost per mile includes the building of the most difficult and expensive stretch of line along the entire route from Seward to Fairbanks—that running along Turnagain Arm, which is sheer rock rising precipitously from the sea for nearly 30 miles. There are miles of this road which have cost $200,000 per mile. Even to blast a mule trail in one portion of this route cost $25,000 a mile.

This cost per mile is increased by reason of the fact that it includes the expense of 48 miles of clearing and grading new right of way and of 30 miles of additional clearing and 30 miles of yard tracks, sidings, and switches.

The basis for the estimated cost of the main-line mileage above given is a table prepared by Mr. Wendt, of the Interstate Commerce Commission, as an expression of the correct deductions from total expenditures that should be made in arriving at cost exclusive of equipment and terminals which are necessary to the road as a going concern and whose cost should be spread over the whole road when completed.

The new construction exclusive of sidings, as we have seen, is 244 miles. The total which has been appropriated for the road is $31,086,684. Of this amount there was a balance on hand December 31, 1918, of $1,214,407, thus making the amount expended $29,876,277.

But all of this has not gone into new construction. Much

of it has gone into the purchase of the old roads referred to (Alaska Northern and Tanana Valley) and their partial rehabilitation, to the construction of two permanent towns (Anchorage and Nenana) as termini, for rolling stock, material, and supplies on hand, etc.

The full table of deductions made by Mr. Wendt is as follows:

Purchase Alaska Northern Railroad	$1,157,839
Its rehabilitation, repair, etc.	2,403,564
Purchase Tanana Valley Railroad	300,000
Its rehabilitation, etc.	46,407
Material and supplies on hand and in transit	2,889,249
Operation and maintenance expense	628,627
Town site expenditures (reimbursable in part)	304,731
Rolling stock for use in operation, consisting of locomotives, freight cars, passenger cars, etc.	570,741
Construction equipment, consisting of steam shovels, ditchers, unloaders, scrapers, etc.	1,382,137
Marine equipment	244,058
Coal mines	193,725
New wharf at Anchorage	124,618
Shop and plant machinery	126,703
Machine shops, engine houses, etc.	218,314
Plants at Anchorage and Nenana, consisting of office buildings, storehouses, quarters for employees, mess houses, hospitals, heating and lighting plants, freight-handling machinery, etc.	1,538,947
	$12,129,662

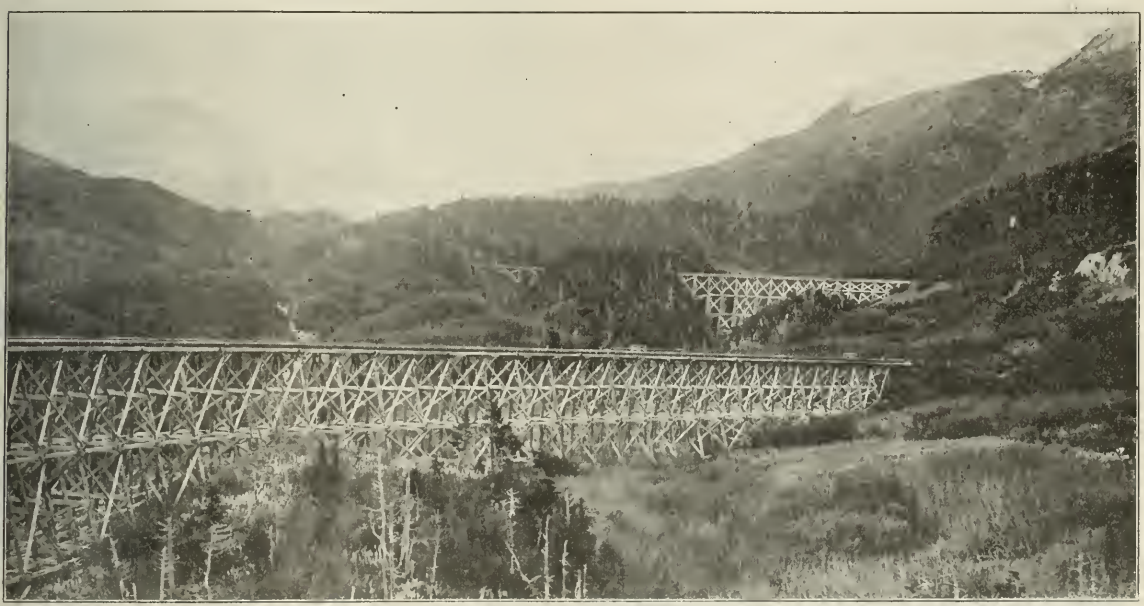
If now we deduct this amount, which should be excluded as not properly chargeable to construction cost of new main line road from the total amount expended, the result is as follows:

Amount expended	$29,872,277
Less deductions	12,129,662
Cost of newly constructed road	$17,742 615
Cost per main line of track	72,716

If the sidings and yard tracks are included, the cost per mile of track would be approximately $64,754. (No allowance is made for the 78 miles of grading and clearing.)

In arriving at his cost per mile Mr. Wendt has deducted as part of his cost construction equipment which cost $1,382,137, consisting of steam shovels, ditchers, unloaders, scrapers, and other tools. This was in large part bought in the first year of the work partially from the Panama Commission, and is in the opinion of Mr. Wendt worth as much today as when purchased, owing to the increase in values since the war. Its value evidently is what it would bring on the completion of the road. Had private contractors built the road they would have had it as salvage. Much of it would have had to be bought for the maintenance of the road after completion. Whether it will be worth what it cost or how much less at that time is a question no one can answer. This is also true as to marine equipment.

The two termini which have been built at Anchorage and Nenana are permanent towns. They were built not as construction camps, but with a view to the necessities of the road in the future, as permanent parts of a working railroad, and would have had to be built after construction was completed in order to properly operate and maintain the road. It is to be noted that this work has been undertaken in a region where it was necessary to build through a forested wilderness, where there were no wharves at the water's edge (where, indeed, a way had to be dredged from the channel to the wharf); where there were no roads, no towns, no experienced labor, and where everything had to be imported a distance of from 1,500 to 5,000 miles. And it was thought best to build not a mere pioneer road like those that are driven into our western forests for the bringing out of lumber or for the reaching of some coal or gold mine, but a road that would attract passenger travel for its scenic beauties and be always the main connecting line between the interior of Alaska and the ocean. For this reason the work has been done not with the end of having so many miles of road built but of having a complete road with all the equipment for its operation, which includes not only cars, locomotives, and tracks, but complete and well-supplied bases and developed miles for fuel.



Trestle Work on the Seward Division

Two estimates were made in 1914 by the Alaskan Engineering Commission as to the cost of the road: (1) From Portage Bay to Fairbanks, at an estimated cost of $59,742 per mile; (2) from Seward to Fairbanks, in which the figure estimated for the road from Kern Creek, or mile 72 north, where all of the new construction has been done, was $55,340 per mile.

The only government-built railroad—that across the Isthmus of Panama—cost $221,052 per mile. The only two recently built railroads in the United States are (1) the Virginian, built by H. H. Rogers, which cost, exclusive of equipment, $151,000 per mile, with labor at from $1.35 to $1.75

per day, and all machinery, fuel, rails, and supplies at its door, and (2) the Milwaukee line to Puget Sound, which is estimated as having cost $130,000 per mile, exclusive of equipment.

Present Condition

The work has been conducted with its main base at Anchorage, which is at the head of Cooks Inlet. This point was chosen as the nearest point from which to construct a railroad into the Matanuska coal fields. That was the primary objective of the railroad, to get at the Matanuska coal. From Anchorage it was also intended to drive further north through the Susitna Valley and across Broad Pass, and to the south along Turnagain Arm toward the Alaska Northern track. To secure coal for Alaska was the first need. So, in addition to Anchorage as a base, one was also started at Nenana, on the Tanana River, from which to reach the Nenana coal fields lying to the south. If these two fields were open one would supply the coast of Alaska and one the interior. This program has been acted upon, with the result that the Matanuska field is open to tidewater, with a down-grade road all the way. The Nenana road has been pushed far enough south to touch a coal mine near the track, which may obviate the immediate necessity for reaching into the Nenana field proper. From Seward north and from Anchorage south the road has been built, so that last fall there was through communication from Seward to Anchorage, Matanuska, and the Susitna Valley.

There is an open stretch across Broad Pass to connect the Susitna Valley with the road coming down from Nenana,



Rock Cut and Tunnel on the Seward Division

and another reach of a few miles on the north of the Tanana River before connecting with the Tanana Valley road outside of Fairbanks. These gaps closed there will be through connection between Seward and Fairbanks.

Overhead

The road has been built by men on the job in Alaska, not by men in Washington. The only bureau maintained in Washington consisted of four clerks in one room. All the rest of the force is in Alaska with the exception of the purchasing division in Seattle.

The commission adopted the system of construction approved by the most competent engineers consulted at the beginning of construction—a combination of letting out the work to small contractors and of day's labor. The only contractor who ever talked of building the road asked a guarantee against loss from the government—what we now know as a "cost plus contract"—and as this would involve a large staff of government superintendents and checking officials, with no guarantee of a minimum cost to the government, but every reason to believe that a maximum cost would be reached, it was thought wise to follow the course we have pursued. As the price of labor, supplies, and other things have risen, we have not had to pay a contractor a percentage on the increasing cost.

In 1918 the wage employees numbered 3,329 and the salaried employees 725. The road has 1,982 wage employees and 441 salaried employees, as estimated for in the book of estimates for 1920.

Rates

It is difficult to know what rates should be charged on such a railroad as this, which is as yet in the process of building, which originates so little traffic as to be negligible, and



Some of the Traffic Possibilities

will not in all likelihood for some years pay operating and maintenance charges, without any return on investment. Plainly, the traffic can not be made to bear charges that would be reasonable from the standpoint of making the railroad pay its own way. To do this would be to retard the growth of Alaska and of the railroad itself. The freight rates on the Alaska Railroad are from 25 to 50 per cent of the rates charged by other Alaska roads. The Copper River and the Skagway roads charge from twice as much to four times as much as does the government road. If, therefore, there is anything in the test so often applied by the Interstate Commerce Commission in judging of the reasonableness of a rate by the rates charged on similar traffic on neighboring roads, the rates on the Alaska road certainly meet that test.

The rates now in force on the Alaska road are approximately the same as those which the Railroad Commission of the State of Washington approved on the Seattle, Port Angeles & Western Railroad between Maynard and Majestic a distance of 60 miles, as the following comparison furnished by the Interstate Commerce Commission shows:

Commodities	Government railroads Per ton	Seattle, P. A. & Western R. R. Per ton
Household goods	$6.40	$13.80
Canned goods	9.80	9.30
Flour	9.80	9.30
Eggs	13.80	11.50
Dried fruits	9.80	10.50
Fresh fruit	16.20	13.80
Meat, cured	9.80	9.30
Kerosene	11.40	10.50
Sugar	9.80	9.30
Vegetables	16.20	20.70
Butter	13.80	11.50
Hardware	13.80	11.50

It would hardly be regarded as unfair to say that on the Alaskan road the rates should be twice as high as on the main line of the Northern Pacific in Washington, considering the fact that the Northern Pacific has several hundred thousand times the density of traffic per mile that the Alaskan Railroad has. Yet a comparison of the two rates shows that the rates on the Alaskan road are not that high by from 25 to 50 per cent. They are, indeed, but a small percentage higher than many of the rates on the Southern Railway running immediately out of this city, which carries in any one hour more traffic than the Alaskan road carries in a year. I am satisfied, however, that the rates in existence on the Alaskan road are not those which will best promote the interest of the Territory and in the end that of the road. And last summer I asked E. O. McCormick, vice-president of the Southern Pacific in charge of traffic, to make a study of the actual conditions in Alaska with the purpose of devising a simpler tariff which would induce whatever traffic could be induced to move over that road and still preserve some justifiable relation between commodities. This is not an easy task. And there must be some experiments tried before anything like a stable schedule can be arrived at.

Water Transportation

One of the serious disadvantages that any new enterprise in Alaska suffers under is the long distance by water which all machinery and supplies must be carried. During the war this has been particularly embarrassing in the carrying on of this work. Because of the highness of the rates charged and the uncertainty of the movement, the commission gave over employing the regular lines and chartered a transport from the War Department which ran from Seattle to Anchorage for two seasons. This service is invaluable to the railroad. While we were without it last season, some such arrangement must be renewed if the railroad is to be completed at as fair a figure as has been thus far maintained. Some months since negotiations were entered into with the Shipping Board looking to the establishing of a line between Puget Sound and Alaskan ports which would serve the railroad, or at least to the putting on of a single boat to Anchorage and Seward. The board offered to charter to the commission a new steel ship at $25,000 per month, which was thought to be too high a figure, and negotiations are still under way in the hope that this offer can be bettered.

Matanuska Coal

By decisions of the Commissioner of the Land Office all of the claims in the Mantanuska coal field were set aside, and by act of Congress a leasing bill was put into effect over the entire field. Under this law a number of claims must be reserved to the government. The field was surveyed and some of the most promising portions of the field have been so reserved.

Two leases have been entered into by the government. Neither of these parties have any other interests of any kind, so far as is known, in Alaska or any connection with any railroad, and neither of them have been successful in developing any large amount of coal. There are many thousands of acres in this field which are open for lease and which will be leased to any responsible parties who will undertake their development. There is no possibility of monopolizing this field, even if some one wished to do so, for the government reserves are kept to be operated in case such monopoly should arise. Thus far, however, the government in operating its own mine has been no more successful than the private lessees, for the coal is so badly broken and faulted that exploration work to follow the seam must be undertaken before development work can be wisely done. And this is being undertaken. Government experts who have examined this field do not promise without further exploring a larger output of coal from this field than 150,000 tons a year.

Population

The population of Alaska has fallen off during the war. She sent, I am told, 5,000 men into the Army, the largest proportion to population sent by any part of the United States. The high cost of labor and materials closed some of the gold mines, and the attractive wages offered by war industries drew labor from Alaska to the mainland. All prospecting practically closed. But with the return of peace there is evidence of a new movement toward that Territory, which should be given added confidence in its future by the completion of the Alaskan railroad.

Interstate Commerce Commission Accident Bulletins

ACCIDENT BULLETIN NO. 66 for the quarter and the year ending December 31, 1918, and Bulletin No. 67 for the quarter ending March 31, 1918, have just been published by the Interstate Commerce Commission. The annual bulletin differs in numerous respects as to size, contents and arrangement from prior yearly reports. The present report, and the two last preceding, are summarized as follows:

CASUALTIES TO PERSONS, 1916 AND 1917

Item	Year ended Dec. 31, 1917		Year ended Dec. 31, 1916		Year ended June 30, 1916	
	Killed	Injured	Killed	Injured	Killed	Injured
Passengers						
In train accidents	131	4,460	111	3,651	141	3,850
Other causes	212	3,914	180	4,357	142	4,529
Total	343	8,374	291	8,008	283	8,379
Employees on duty						
In train accidents	439	4,214	357	3,731	304	3,352
In coupling accidents	167	2,555	136	2,440	123	2,194
Overhead obstructions, etc.	95	1,572	63	1,538	59	1,310
Falling from cars, etc	470	14,634	435	14,084	384	12,196
Other causes	1,445	29,261	1,219	26,517	1,102	23,374
Total	2,616	52,236	2,210	48,310	1,972	42,426
Total passengers and employees on duty	2,959	60,610	2,501	56,318	2,255	50,805
Employees not on duty						
In train accidents	12	75	13	91	9	60
In coupling accidents	...	...	...	...	...	...
Overhead obstructions, etc.	4	5	4	15	5	13
Falling from cars, etc	22	173	62	300	57	292
Other causes	127	291	224	405	230	361
Total	165	544	303	811	301	726
Other persons not trespassing						
In train accidents	109	473	9	73	11	92
Other causes	2,091	5,514	1,735	4,987	1,464	4,347
Total	2,200	5,987	1,744	5,060	1,475	4,439
Trespassers						
In train accidents	68	76	72	151	84	119
Other causes	4,175	3,753	4,856	4,642	4,763	4,990
Total	4,243	3,829	4,928	4,793	4,847	5,109
Total in accidents involving train operation	9,567	70,970	9,476	66,982	8,878	61,079
Nontrain accidents	520	123,835	525	129,740	486	119,296
Grand total	10,087	194,805	10,001	196,722	9,364	180,375

Annual table No. 61, dealing only with train accidents (which term here includes crossing accidents, where trains strike automobiles, etc.,) shows for the year 131 passengers, 451 employees and 109 other persons killed, and 4,460 passengers, 4,289 employees and 473 other persons injured; a total of 691 persons killed and 9,222 injured. The term "other persons" does not include trespassers; these are shown in another table.

Annual table No. 104 is a summary of highway grade crossing accidents, showing by states with reference to Class 1 roads the number of such accidents and the resulting casualties. The total number of highway grade crossing accidents involving non-trespassers was 3,673; number of persons killed, 1,777; injured, 4,356.

The summary by states of accidents resulting in casualties

to trespassers shows the trespassers classified as between employees, persons under 14 years of age, from 14 to 21 years of age, and adults, which are further subdivided between hoboes or tramps and other adults. This table covers 7,813 train and train service accidents, and of the trespassers killed no less than 149 were employees. Of trespassers walking along the track, 189 were hoboes, while 991 were "other adults." Of those killed riding on trains, 259 were hoboes, while 422 were other adults. Annual table No. 60 shows that the number of train accidents per million locomotive miles was 10.22 and that the damage to cars, engines and roadway, was $15,181,810.

First Quarter, 1918

Bulletin 67, for the quarter ending with March, 1918, shows for train accidents and train service accidents, 109

ANNUAL TABLE NO. 61—TRAIN ACCIDENTS, YEAR 1917

Class	Number of train accidents	Damage to railway property	Total non trespassers		Employees on duty: Trainmen		Employees on duty: Other employees		Employees not on duty		Passengers		Persons carried under contract		Other non-trespassers	
			Kil'd	Inj'd	Kil'd	Inj'd	Kil'd	Inj'd	Kil'd	Inj'd	Kil'd	Inj'd	Kil'd	Inj'd	Kil'd	Inj'd
Collisions.																
Rear	1,027	$1,428,000	169	1,403	67	515	7	47	5	18	77	772	13	49	...	2
Butting	367	1,226,120	107	1,719	74	535	4	106	3	9	24	987	1	50	1	32
Broken-train	480	246,246	6	74	4	50	2	9	...	...	...	5	...	7	...	3
Side or raking	1,454	828,430	35	729	33	438	1	24	1	5	...	234	...	24	...	4
Trains with cars not in trains	536	267,800	16	411	12	179	3	17	...	19	...	174	...	16	1	6
Crossing	122	135,690	4	139	3	63	...	1	...	...	...	48	...	3	1	24
Switching	2,990	1,026,630	16	415	11	250	4	42	...	11	...	56	1	37	...	19
Miscellaneous	321	218,530	11	211	6	93	4	19	...	...	...	90	...	8	1	1
Total	7,497	$5,377,430	364	5,101	210	2,123	25	265	9	62	101	2,366	15	194	4	91
Derailments:																
Due to—																
Defects in roadway	2,072	$1,727,230	31	1,067	21	291	5	63	...	1	5	664	...	46	...	2
Failure of power-brake apparatus	275	124,670	1	24	1	22	...	1	...	...	...	1	...	...	...	...
Failure of couplers	141	63,350	...	9	...	9	...	...	...	...	...	...	...	...	...	...
Other defects in equipment	4,646	4,283,670	16	832	12	198	...	67	...	9	4	535	..	14	...	9
Accidental obstructions	332	535,710	51	346	42	173	3	11	1	...	...	138	3	16	2	8
Negligence	1,070	972,070	48	447	41	239	4	35	...	2	1	128	...	28	2	15
Acts of nonemployees	65	67,910	7	83	6	34	...	2	...	...	1	45	...	2	...	...
Other ascertained causes	843	648,380	7	186	4	71	3	17	...	...	...	91	...	5	...	2
Unknown causes	547	543,930	15	220	12	73	1	14	...	1	1	120	...	11	1	1
Total	9,991	$8,966,920	176	3,214	139	1,110	16	210	1	13	12	1,722	3	122	5	37
Locomotive boiler accidents:																
Boiler explosions and defects	91	$176,690	42	120	40	114	2	5	...	...	...	1	..	...	. .	...
Failures of																
Tubing and piping	57	1,290	1	69	1	68	...	1	...	...	...	...	...	...	...	...
Other boiler appurtenances	134	690	1	138	1	137	...	1	...	...	...	...	...	...	...	...
Total	282	$178,670	44	327	42	319	2	7	..	...	...	1	...	...	...	...
Other locomotive accidents:																
Cylinders	26	$10,390	1	11	1	8	...	2	...	...	...	...	...	1	...	...
Driving gear and machinery	140	46,550	...	25	...	25	...	...	...	...	...	...	...	...	...	...
Wheels and axles	76	25,700	...	9	...	9	...	...	...	...	...	...	...	...	...	...
Tenders	1	590	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Miscellaneous	24	6,830	...	14	...	13	...	1	...	...	...	...	...	...	...	...
Total	267	$90,060	1	59	1	55	...	3	...	...	...	...	...	1	...	...
Miscellaneous train accidents:																
To locomotives or cars	1,264	$525,390	5	170	2	104	1	10	2	...	...	43	...	7	...	6
Caused by striking trolley cars, automobiles, etc., at public highway crossing	131	40,300	101	351	1	8	...	...	...	...	...	4	...	...	100	339
Fires, floods, landslides, etc.	2	1,870	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Others	1	1,170	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	1,398	$568,730	106	521	3	112	1	10	2	...	...	47	...	7	100	345
Grand total	19,435	$15,181,810	691	9,222	395	3,719	44	495	12	75	113	4,136	18	324	109	473

SUMMARY OF ACCIDENTS ON STEAM ROADS IN THE UNITED STATES FOR THE QUARTER ENDING MARCH 31, 1918

Item	Casualties to persons: In train accidents	In train-service accidents	Total
Trespassers			
Total trespassers:			
Killed	11	762	773
Injured	28	617	645
Employees:			
Killed	...	15	15
Injured	1	24	25
Other persons:			
Killed	11	747	758
Injured	27	593	620
Nontrespassers			
Total nontrespassers:			
Killed	243	1,107	1,350
Injured	2,748	13,804	16,552
Employees on duty:			
Killed	153	667	820
Injured	1,334	11,816	13,150
(*a*) Trainmen:			
Killed	138	305	443
Injured	1,196	10,786	11,982
(*b*) Other employees:			
Killed	15	362	377
Injured	138	1,030	1,168
Employees not on duty:			
Killed	4	45	49
Injured	28	128	156
Passengers:			
Killed	58	42	100
Injured	1,137	661	1,798
Persons carried under contract:			
Killed	3	6	9
Injured	96	114	210
Other nontrespassers:			
Killed	25	347	372
Injured	153	1,085	1,238
Recapitulation			
Total trespassers:			
Killed	11	762	773
Injured	28	617	645
Total nontrespassers:			
Killed	243	1,107	1,350
Injured	2,748	13,804	16,552
Total persons:			
Killed	254	1,869	2,123
Injured	2,776	14,421	17,197

Item	Casualties to persons in nontrain accidents
Industrial employees:	
Killed	132
Injured	27,602
Other persons:	
Killed	31
Injured	586
Total persons:	
Killed	163
Injured	28,188
Number of train accidents	5,637
Number of train-service accidents	15,687
Total	21,324
Number of nontrain accidents	28,326

passengers, 869 employees and 1,145 other persons killed, and 2,008 passengers, 13,306 employees and 1,883 other persons injured. Of the 109 deaths of passengers 61 were due to train accidents. The details, including also 163 killed and 28,188 injured in "nontrain accidents," are shown in the table on the preceding page.

Both of the bulletins have appendices containing reports of train accidents which have been investigated by the Bureau of Safety. Bulletin No. 66 has 30 pages of this matter, and Bulletin 67 has 24 pages. Among the prominent accidents included in this list are Spartanburg, S. C., October 17, 1917; Caribou, Me., February 5, 1918; Frost, S. C., February 25, 1918; Elizabethtown, Pa., March 15, 1918.

Doings of the United States Railroad Administration

Regrouping of Lines to Restore Pre-War Conditions—Automatic Train Control Committee Makes Progress

WASHINGTON, D. C.

THE DIRECTOR GENERAL has issued a circular, effective March 1, transferring the St. Louis-San Francisco line (between Memphis and Birmingham) from the Southern to the Southwestern region, the Illinois Central line (north of Cairo and Paducah) from the Central Western region to the Southern region, also the following railroads from the Southwestern to the Central Western region: Chicago, Rock Island & Gulf, Chicago, Rock Island & Pacific (from St. Louis to Kansas City, Herington to Salina and all lines south and east of main line between Herington and Tucumcari), Ft. Worth & Denver City, Wichita Valley, Wichita Falls & Oklahoma, and Abilene & Southern.

These changes are being made in the interest of restoring pre-war conditions.

Hale Holden, regional director of the Central Western region, is placing the part of the Rock Island Lines transferred from the Southwestern to the Central Western region under the jurisdiction of the federal manager of the Rock Island. He is also placing the Ft. Worth & Denver City, the Wichita Valley, the Wichita Falls & Oklahoma, and Abilene & Southern, under the jurisdiction of the federal manager of the Colorado & Southern.

B. F. Bush, regional director of the Southwestern region, is regrouping some of the lines in that region as mentioned elsewhere in this issue.

Rules for Disposition of Grain Claims

Director General Hines has issued General Order 57-A modifying General Order No. 57, referring to the disposition of claims for loss or damage of grain loaded in bulk, which had aroused opposition on the part of many shippers.

The director general states in the order that the rules established by General Order No. 57 were adopted as administrative regulations and were not intended in any way to change or alter any existing rule of law. The original order is modified by eliminating reference to a number of disputed questions including payment for the installation of grain doors, liability for leakage through grain doors and the use of the hammer test in determining whether a car is grain tight. These matters are left to the Interstate Commerec Commission for decision in a proceeding now pending before the commission.

The new order is as follows:

Rules Governing the Inspection, Selection and Coopering or Rejection of Cars for Bulk Grain Loading, the Recording of Loss of Grain from Car by Leakage (if any) During Transit, and the Disposition of Claims for Loss and Damage of Grain.

General Order No. 57, issued November 28, 1918, is hereby amended to read as follows:

Claims on grain shipped in bulk constitute a large proportion of loss and damage claims. Some of the widely varying practices of both shippers and carriers with respect thereto are of doubtful propriety, and in many cases result in undue preference and unjust discrimination.

This condition may be attributed largely to the great number of intricate factors entering into the grain business; the condition of scales and weighing practices, which, in many instances, result in weights of doubtful accuracy. Grain in bulk is sometimes loaded at large terminal elevators where so-called official weights are obtained; in other instances, at country elevators where weights are obtained on small scales in many drafts; and in other instances where scale weights are not used but loading weights obtained on measurement basis; and at some points where no elevators are located, grain is weighed over wagon scales, loaded into cars and the sum of the wagon scale weights used to represent the amount shipped.

Destination weights are arrived at in as many different ways as the loading weights, but, as a general rule, the bulk of the grain shipped is destined to terminal markets where official weights are secured, and the differences between those loading and destination weights constitute the basis of claims, although losses resulting from the taking of samples for inspection purposes and the failure of consignee to unload all the grain and other wastage, over which the railroad has no control, are not taken into consideration or accounted for.

At the present time there is a lack of uniformity in the disposition of grain claims. It is intended to clear up this situation and to dispose promptly of such claims as come within the rules hereinafter set forth.

The following rules shall apply until superseded by others that may be adopted as a result of investigation and study of the subject now being carried on by carriers and shippers in connection with the Interstate Commerce Commission.

These rules are adopted as administrative regulations, and they are not intended in any way to change or alter any existing rule of law:

Rule 1.—Selection of Cars for Loading.—Suitable cars will be furnished for bulk grain loading. (See definition.)

Definition.—A suitable car for bulk grain loading is one that is grain tight and fit, or can be made so at time and place of loading by ordinary and proper care in use of cooperage material and by a reasonable amount of cleaning.

Rule 2.—Rejection by Shipper.—While carriers are expected to furnish suitable equipment, the shipper should reject a car which is manifestly unfit for the loading intended.

Shippers should not load bulk grain in a car with door post shattered or broken, or with other defects of such character as to render car obviously unfit, or with inside showing the presence of oil, creosote, fertilizer, manure, coal or other damaging substance of like or kindred character.

Rule 3.—Cooperage.—Grain doors, or grain door lumber of proper quality and dimensions, to cooper side and end doors and other openings of cars used for bulk grain loading, and accessories such as nails, paper, cheese cloth, burlap or similar material for caulking or lining cars, required to prevent loss of grain by leakage, shall be supplied by the carrier, installation to be in accordance with existing rules and practices until changed by competent authority.

Note 1.—Carrier's agent at loading station will ascertain the number of temporary sectional grain doors, or the number of feet (board measure) of grain door lumber used to cooper the car and the approximate weight thereof, and note same on waybill.

Note 2.—Should the carrier's supply of grain door material run short, local agent will promptly notify his superintendent, who will immediately send the required material or authorize local agent to purchase a supply to take care of the emergency.

Note 3.—Shippers or consignees must not appropriate carriers' grain doors or grain door material, neither shall they use the same without specific authority from the carrier.

Rule 4.—Consignor, Consignee or Owner Required to Load and Unload Carload Freight.—Except as otherwise provided by tariff, owners are required to load into or on cars, grain carried at carload ratings, and consignee or owner is required to unload the car, which includes the removal of entire contents, including sweeping of the car. Loading includes adequate securing of the load in or on car; also proper distribution of the weight in the car by trimming or leveling.

Rule 5.—Shipping Weights.—When shipper weighs the grain for shipment, he shall furnish the carrier with a statement of the car initials and number, total scale weight, the type and house number of the scale used, the number of drafts and weight of each draft weighed, the date and time of weighing, and state whether official Board of Trade, Grain Exchange, State or other properly supervised shipping weights; also state number and approximate weight of grain doors used. This information shall be furnished as soon as practicable, forwarding of car not to be delayed for this record.

Rule 6.—Destination Weights.—Consignee shall furnish the carrier with a statement of the car initials and number, the total scale weight, the type and house number of the scale used, the number of drafts and weight of each draft weighed, and date and time of weighing, and state whether official Board of Trade, Grain Exchange, State or other properly supervised unloading weight.

Rule 7.—Leakage or Damage Record.—If damage to or leakage of grain is detected while in carrier's possession, the necessary repairs must be made to prevent further loss or damage, and a complete record made thereof. In case of a disputed claim, the records of both carrier and claimant on said car shall be made available to both parties.

If shipper, consignee, owner or his or their representative should discover leakage of grain from car, he must immediately report the facts to carrier and afford reasonable opportunity for verification.

Rule 8. Claims for Loss.—(a) Clear Record Cars.—If, after thorough investigation by the carrier, no defect in equipment or seal record is discovered, such record shall be accepted as prima facie evidence that the carrier has delivered all of the grain that was loaded into the car. If, however, evidence is produced by the claimant showing a defective record, such evidence shall be investigated, and where sustained, the car shall be considered a defective record car. (See paragraph b.)

(b) Defective Record Cars.—Where investigation discloses defect in equipment, seal or seal record, or a transfer in transit by the carrier of a car of grain upon which there is a difference between the loading and the unloading weights, and the shipper furnishes duly attested certificates showing correctness of weights, and the carrier can find no defect in scale or other facilities and no error at points of origin or destination, then, the resulting claim will be adjusted subject to a deduction of one-eighth of one per cent of the established loading weight as representing invisible loss and wastage.

Note 1.—Transfer in transit, as referred to in Section "b" of this rule, is a transfer for which the railroad is responsible, and not a transfer because of a trade rule or governmental requirement, or because of orders of consignor, consignee, owner or their representative.

Freight Traffic Movement and Car Performance

Net ton miles of freight handled by the railroads under federal control during January amounted to 30,383,169, an increase of 10 per cent as compared with January, 1918, when the movement was very slow on account of congestion and severe weather. The table shows a summary of the report of freight traffic movement and car performance compiled by the Operating Statistics Section.

Automatic Train Control Committee Makes Progress

The Committee on Automatic Train Control at its meeting in Washington on February 28 continued its work of passing on the various devices which had previously been submitted to the Interstate Commerce Commission and a few new ones submitted to the committee; and eliminated from consideration about 40 which are not considered to possess sufficient merit to warrant further study. The committee still has before it about 40 devices, of which many have been passed on and will receive no further consideration unless the proprietors wish to submit additional information. The committee has now reached a stage where it can give more detailed consideration to the devices which have been developed and given an experimental or service test, and its next meeting will probably be in connection with a western trip for the purpose of examining on the ground several devices that have been installed. It is proposed to examine the system in operation on the Chicago & Eastern Illinois between Chicago and Danville on March 21 or 22, after which the committee will inspect the system in operation on the Wash-

Railroad	Average miles of road operated		Net ton miles revenue and non-revenue (thousands)			Net ton miles per mile of road per day			Train miles (thousands)		
	This year	Last year	This year	Last year	Per cent change	This year	Last year		This year	Last year	Per cent change
Total, New England District	8,142	8,147	828,600	716,387	15.7	3,283	2,837		1,959	2,123	d 7.7
Total, Central District	22,398	22,480	5,577,221	4,739,402	17.7	8,032	6,801		7,487	6,861	9.1
Total, Ohio-Indiana District	7,132	7,114	1,023,146	991,086	3.2	4,628	4,494		1,473	1,590	d 7.4
Grand total, Eastern Region	37,672	37,741	7,428,967	6,446,875	15.2	6,361	5,510		10,919	10,574	3.3
Total, Allegheny Region	19,795	19,687	5,882,036	4,733,242	24.3	9,585	7,756		7,892	7,238	9.0
Total, Pocahontas Region	4,776	4,775	1,625,660	1,619,585	0.4	10,980	10,941		1,548	1,638	d 5.5
Total, Southern Region	37,304	37,418	3,611,898	3,482,404	3.7	3,123	3,002		7,184	7,770	d 7.5
Total, Northwestern Region	47,164	47,185	4,196,435	3,691,736	13.7	2,870	2,524		7,137	7,022	1.6
Total, Central Western Region	51,149	51,239	5,504,930	5,397,018	2.0	3,472	3,398		9,243	9,473	d 2.4
Total, Southwestern Region	31,426	31,708	2,133,243	2,249,007	d 5.2	2,190	2,288		4,540	4,819	d 5.8
Grand total, all regions	229,286	229,753	30,383,169	27,619,867	10.0	4,275	3,878		48,463	48,534	d 0.1

Railroad	Net ton miles per train mile			Freight car miles (thousands)								
				Loaded			Empty			Total		
	This year	Last year	Per cent change	This year	Last year	Per cent change	This year	Last year	Per cent change	This year	Last year	Per cent change
Total, New England District	423	337	25.5	34,617	31,921	8.4	14,380	13,169	9.2	48,997	45,090	8.7
Total, Central District	745	691	7.8	192,750	156,675	23.0	107,001	67,756	57.9	299,751	224,431	33.6
Total, Ohio-Indiana District	695	623	11.6	33,658	30,464	10.5	17,882	14,727	21.4	51,540	45,191	14.0
Grand total, Eastern Region	680	610	11.5	261,025	219,060	19.2	139,263	95,652	45.6	400,288	314,712	27.2
Total, Allegheny Region	745	654	13.9	170,727	130,485	30.8	102,636	74,277	38.2	273,363	204,762	33.5
Total, Pocahontas Region	1,050	989	6.2	39,753	37,805	5.2	27,255	25,254	7.9	67,008	63,059	6.3
Total, Southern Region	503	448	12.3	137,733	134,049	2.8	65,131	60,850	7.0	202,864	194,899	4.1
Total, Northwestern Region	588	526	11.8	152,565	137,936	10.6	72,666	45,062	61.2	225,231	182,998	23.1
Total, Central Western Region	596	570	4.6	201,559	190,216	6.0	93,440	70,710	32.1	294,999	260,926	13.0
Total, Southwestern Region	470	467	0.6	85,884	89,334	d 3.9	35,667	31,205	14.3	121,551	120,539	0.8
Grand total, all regions	627	569	10.2	1,049,246	938,885	11.8	536,058	403,010	33.0	1,585,304	1,341,895	18.1

Railroad	Average number of freight cars on line daily					Per cent Unsvble.		Net ton miles per loaded car mile		
	Serviceable		Total							
	This Year	Last Year	This Year	Last Year	Per Ct. Change	This year	Last year	This year	Last year	Per Ct. change
Total, New England District	90,165	103,744	95,378	108,626	d 12.2	5.5	4.5	23.9	22.4	6.7
Total, Central District	389,617	464,116	417,620	489,363	d 14.7	6.7	5.2	28.9	30.3	d 4.6
Total, Ohio-Indiana District	76,344	89,752	81,602	95,949	d 15.0	6.4	6.5	30.4	32.5	d 6.5
Grand total, Eastern Region	556,126	657,612	594,600	693,938	d 14.3	6.5	5.2	28.5	29.4	d 3.1
Total, Allegheny Region	451,417	471,288	485,155	503,328	4 3.6	7.0	6.4	34.5	36.3	d 5.0
Total, Pocahontas Region	84,354	82,754	90,234	87,895	2.7	6.5	5.8	40.9	42.8	d 4.4
Total, Southern Region	286,182	277,106	300,284	288,387	4.1	4.7	3.9	26.2	26.0	0.8
Total, Northwestern Region	344,116	280,392	368,774	299,450	23.2	6.7	6.4	27.5	26.8	2.6
Total, Central Western Region	330,559	306,034	349,375	322,425	8.4	5.4	5.1	27.3	28.4	d 3.9
Total, Southwestern Region	195,829	190,121	202,852	198,489	2.2	3.5	4.2	24.8	25.2	d 1.6
Grand total, all regions	2,248,583	2,265,307	2,391,274	2,393,912	d 0.1	6.0	5.4	29.0	29.4	d 1.4

Railroad	Per cent loaded to total car miles			Car miles per car day			Net ton miles per car day		
	This year	Last year	Per Ct. change	This year	Last year	Per Ct. change	This year	Last year	Per Ct. change
Total, New England District	70.7	70.8	d 0.1	16.6	13.4	23.9	280	213	31.5
Total, Central District	64.3	69.8	d 7.9	23.2	14.8	56.8	431	312	38.1
Total, Ohio-Indiana District	65.3	67.4	d 3.1	20.4	15.2	34.2	404	333	21.3
Grand total, Eastern Region	65.2	69.6	d 6.3	21.7	14.6	48.6	403	300	34.3
Total, Allegheny Region	62.5	63.7	d 1.9	18.2	13.1	38.9	391	303	29.0
Total, Pocahontas Region	59.3	60.0	d 1.2	24.0	23.1	3.9	581	594	d 2.2
Total, Southern Region	67.9	68.8	d 1.3	21.8	21.8		388	390	d 0.5
Total, Northwestern Region	67.7	75.4	d 10.2	19.7	19.7		367	398	d 7.8
Total, Central Western Region	68.3	72.9	d 6.3	27.2	26.1	4.2	508	540	d 5.9
Total, Southwestern Region	70.7	74.1	d 4.6	19.3	19.6	d 1.5	339	366	d 7.4
Grand total, all regions	66.2	70.0	d 5.4	21.4	18.1	18.2	410	372	10.2

ington Water Power Company's line near Spokane, Wash., that on the Key Route interurban line near San Francisco, the test installation on the Western Pacific at Oroville, Calif., and possibly others. Train control systems installed in the east will be visited on a later trip or trips.

Rules Governing Issuance of Passes

W. T. Tyler, director of the division of operation, has issued the following instructions governing the issuance of transportation to corporate officers, employees and their families:

1. Federal managers are authorized to issue *annual* or *trip* transportation to corporate officers, employees and their families, over the railroad with which they are connected, upon request from the chief executive officer of the corporation. The federal managers upon request from the chief executive officer may also request off line trip transportation for corporate officers, employees and their families direct from federal managers of the line over which they desire to travel.

2. Off line *annual* transportation desired by corporate officers, employees and their families should be requested of the director, division of operation, Washington, D. C., by the chief executive officer of the corporation.

The following instructions will govern the issuance of transportation to directors:

1. Annual transportation for directors, good only over line or lines of which they are directors, will be issued by director, division of operation, Washington, upon request of chief executive officer of the corporation.

2. It is not permissible for federal manager to issue trip transportation for directors on home line.

3. It is not permissible for federal managers to request or secure from other federal managers off line trip passes for directors.

4. As passes for dependent members of the families of directors cannot be furnished, requests should not be made.

Monthly Traffic Report to Be Compiled

The Railroad Administration has taken steps to keep itself fully and accurately posted this year regarding the tendency as to the volume of freight traffic and the revenues therefrom. To the end that the Division of Traffic may be fully advised, Director General Hines has issued General Order No. 59, providing that effective with waybills settled after the close of December, 1918, accounts, Class I carriers shall compile and render during the period of federal control monthly reports showing the number of carloads separately as to the 58 principal classes of commodities and all l. c. l. freight, also the number of tons and the total revenue. Special blanks have been provided for this purpose, and the order gives specific definitions and instructions as to reporting the information called for. Shipments moving under any-quantity rates are to be counted as carloads when they weigh 10,000 pounds or more. The tonnage and revenue to be reported are the tons and total revenue shown on the waybills compiled by each carrier from the audited records. In addition to showing the volume of traffic and the revenue, the reports are also to show the movement of the traffic by points of origin and of destination, between points within the same state, between each state and the District of Columbia and each other state, and between each state and the District of Columbia and Mexico, Canada and all other foreign countries. To serve as a corrective, a special report will be required from carriers accepting and forwarding carload grain from terminal elevators. The reports are to be compiled monthly and forwarded to the Bureau of Statistics of the Interstate Commerce Commission on or before the last day of the second month succeeding that for which they are compiled. No other freight traffic statistics are to be compiled by accounting officers except those required by the Interstate Commerce Commission annual report except by special permission from the director of accounting.

Handling of Claims

The Division of Accounting has issued Accounting Circular No. 76, which provides that in order to bring about uniformity in investigation, checking and apportioning overcharge and agency relief claims, in compliance with General Order No. 55, the following rules and practices shall be put in effect at once:

1. Overcharge claims incident to refining, milling, stopping, storing, fabricating, and other similar service in transit should be presented to the carrier granting the privilege for investigation and settlement. No apportionment is to be made of such claims, except that where non-federal carriers participate in the service the adjustment shall be made with such non-federal carriers on the basis of established divisions. Where waybilling and accounting methods, such as waybilling from transit point at balance of through rate, are in effect for the handling of this class of traffic and which protects the proper charges without the presentation of a claim, such practices may be continued. If the amounts assumed under this paragraph constitute a substantial proportion of the revenues of any carrier, the particulars should be brought to the attention of this office.

2. Overcharge claims shall be registered against records in such a manner as will indicate that claim has been presented, and in addition thereto when an initial carrier refunds an overcharge on a collect shipment, or when a destination carrier refunds an overcharge on a prepaid shipment, or when either the initial or destination carrier refunds on account of double collection, a notice giving full waybill reference, claim number, name of claimant, amount paid, and date of payment must be sent to either the destination or initial carrier, as the case may be. The carrier receiving notice shall register on its records necessary information to prevent duplicate payment and to properly adjust Account No. 778, Unrefundable Overcharges.

3. Agency relief claims covering charges on all freight short at destination shall be carefully investigated, and if delivery can not be shown and charges collected, the charges shall be assumed by the settling carrier; provided, however, that carriers not under federal control shall be charged with amounts due from them.

4. Agency relief claims covering charges on freight damaged in transit, refused, or unclaimed, and deficits on account of freight sold shall be carefully investigated, and if amount outstanding is not due from shipper, consignee, or owner of freight, it shall be assumed by settling carrier; provided, however, that amounts due from carriers not under federal control shall be charged in accordance with responsibility.

5. Payments for special services performed, purchases of property, payment of heat, light, and water bills, and other similar items do not in the application of this order come within the meaning of "Relief Claims."

6. Agency relief claims covering charges resulting from the misrouting of freight shall be carefully investigated, and if the charges are not collectible from shipper, consignee, or a carrier not under federal control, they shall be assumed by carrier whose agent is outstanding.

7. When overcharge claims in which non-federal carriers are interested are settled by a federal carrier, the apportionment to non-federal carriers shall be made on the basis of established divisions, the settling federal carrier assuming the entire amount due from or to all federal carriers. When such claims are adjusted by a non-federal carrier, the amounts due to or from all federal carriers shall be settled with the destination carrier. If such carrier be not under federal control, settlement shall be made with the federal carrier that handled the shipment nearest to the non-federal carrier in the direction of destination.

8. Freight confiscated in transit (paragraph 14) does not refer to coal or other freight taken by carriers for their own use, but to freight confiscated by government health departments, revenue officers, or others. Waybills covering such shipments should be reported in interline accounts with freight charges and advances and prepaid, if any. If charges prove to be uncollectible, they should be assumed by settling carrier, except that carriers not under federal control shall be charged with amounts due from them.

9 When in the investigation of overcharge claims it is necessary to obtain rates from other carriers under federal control, the communication shall in all cases be addressed to the accounting officer handling overcharge claims, who shall be responsible for the furnishing of such information.

Through Service Expenses Need Not Be Apportioned

Accounting Circular No. 75 provides that, effective February 1, it will be no longer necessary to apportion among interested carriers the expense of heating, lighting, cleaning, etc., of passenger train equipment employed in through service over railroads under federal control. A fair proportion of the expenses should be charged against any non-federal road which participates in the through service.

Division of Inland Traffic

H. P. Anewalt, manager of inland traffic of the Navy Department, has issued a circular stating that the division of inland traffic is about to discontinue its functions under the management of a representative of the Railroad Administration. Transportation matters will continue to be handled by and under the direction of the Bureau of Supplies and Accounts by Navy personnel exclusively. The circular says the division has been of great assistance in reasonably securing the necessary transportation for the successful prosecution of the Navy war program, and pays a tribute to the hearty co-operation of the various departments and bureaus as well as the transportation lines.

Comparison of Maintenance Work to Be Required

The engineering and maintenance section of the Division of Operation has prepared, and will send out as soon as it is printed, a circular and five blank forms calling for a comparison of the expenditures for maintenance of way and structures to measure the amount of upkeep during the period of federal control as compared with that during the test period. The preparation of these forms has been under discussion for several weeks as to the amount of information required to fully measure the amount of work performed; taking into consideration the difference in unit costs. The accounting section is also preparing to collect somewhat similar data from the accounting standpoint.

Reorganization of the Southwestern Region

Extensive Restoration of Former Conditions—Jurisdiction of Many Officers Changed

At the direction of B. F. Bush, Southwestern regional director, the lines under his jurisdiction have been re-grouped, placing the constituent properties of the old systems under the same federal managers. Evidently this is the first step in returning the roads to private control. The re-grouping was effective March 1.

LeRoy Kramer has resigned as federal manager of the Kansas City, Clinton & Springfield, the Missouri, Kansas & Texas, the Missouri, Oklahoma & Gulf, the St. Louis-San Francisco and the Paris & Great Northern, on February 28, to become vice-president in charge of production of the Willys-Overland Company at Toledo, Ohio, effective March 1.

J. S. Pyeatt, federal manager of the Abilene & Southern, the Fort Worth & Denver City, the Fort Worth & Rio Grande, the Fort Worth Belt, the Gulf, Colorado & Santa Fe, the Houston Belt & Terminal, the International & Great Northern (Spring to Fort Worth and the Madisonville branch), the Quanah, Acme & Pacific, the Houston & Texas Central, the Texas Midland, the Union Terminal of Dallas, and the Wichita Falls & Northwestern now has under his jurisdiction the St. Louis-San Francisco; the St. Louis, San Francisco & Texas; the Kansas City, Clinton & Springfield; the Fort Worth & Rio Grande; the Brownwood North & South; the Paris & Great Northern; the West Tulsa Belt; the Quanah, Acme & Pacific and the Rock Island-Frisco Terminal. Mr. Pyeatt's headquarters will be in St. Louis, Mo.

C. N. Whitehead, general manager of the Missouri, Kansas & Texas, with headquarters at St. Louis, has been appointed federal manager of the Missouri, Kansas & Texas, the Missouri, Kansas & Texas of Texas (including the Trinity branch and the Beaumont and Great Northern), the Wichita Falls & Northwestern, the Oklahoma Belt and the Missouri, Oklahoma & Gulf.

Alexander Robertson, federal manager of the Arkansas Central, the Louisiana & Arkansas, the Memphis, Dallas & Gulf, the Missouri Pacific, the Natchez and Louisiana Transfer, the Natchez Southern and the St. Louis-Southwestern, now has jurisdiction over the Arkansas Central, the Coal Belt Electric, the Memphis, Dallas & Gulf, the Missouri Pacific, the Natchez & Louisiana Transfer and the Natchez & Southern.

William Neff, general manager of the St. Louis Southwestern at St. Louis, has been appointed federal manager of the St. Louis Southwestern system with headquarters at Tyler, Tex., and his jurisdiction extended over the Dallas, Terminal, the Eastern Texas, the Southern Illinois & Missouri Bridge, and the Louisiana & Arkansas.

J. L. Lancaster, federal manager at Dallas, Tex., of the Dallas Terminal and Union Depot, the Denison & Pacific Suburban, the Galveston, Houston & Henderson, the Gulf, Texas & Western, the Houston & Brazos Valley, the International & Great Northern (excluding the line from Spring to Fort Worth and the Madisonville branch), the Missouri, Kansas & Texas of Texas (Trinity branch), the St. Louis-Southwestern of Texas, the Texas Pacific, the Trans-Mississippi Terminal and the Weatherford, Mineral Wells & North Western now has jurisdiction over the Denison & Pacific Suburban, the Fort Worth Belt, the Galveston, Houston & Henderson, the Gulf, Texas & Western, the Houston & Brazos Valley, the International & Great Northern, the Texas & Pacific, the Trans-Mississippi Terminal and the Weatherford, Mineral Wells & Northwestern, with offices at Dallas.

The office of district director at Dallas has been abolished and F. E. Pettibone, district director, has been appointed federal manager of the Pauls Valley, Lindsay and Sulphur districts of the Atchison, Topeka & Santa Fe, the Galveston Wharf Company, the Gulf, Colorado & Santa Fe, the Texas Midland, the Union Terminal of Dallas and the Ft. Worth Union Passenger Station, with headquarters at Dallas.

W. B. Scott, federal manager of the Galveston Wharf Company, the Gulf Coast Lines, the San Antonio & Aransas Pass, the San Antonio, Uvalde & Gulf, and the Southern Pacific, Louisiana and Texas Lines, has been appointed federal manager of the Beaumont, Sour Lake and Western, the Galveston, Harrisburg & San Antonio, the Houston & Shreveport, the Houston Belt & Terminal, the Houston & Texas Central, the Houston East & West Texas, the Iberia St. Mary's Eastern, the Iberia & Vermillion, the Lake Charles

& Northern, the Louisiana Western, the Morgan's Louisiana & Texas, the New Orleans, Texas & Mexico, the St. Louis, Brownsville & Mexico, the San Antonio & Aransas Pass, the San Antonio, Uvalde & Gulf, the Southern Pacific Terminal, the Texas & New Orleans and the Trinity & Brazos Valley. Mr. Scott's headquarters will be in Houston, Tex.

J. A. Edson, federal manager of the Joplin Union Depot, the Kansas City, Mexico & Orient, the Kansas City, Mexico & Orient of Texas, the Kansas City Southern, the Midland Valley, the Missouri & North Arkansas, the Houston East & West Texas, the Texarkana & Fort Smith and the Vicksburg, Shreveport & Pacific, becomes federal manager of the Arkansas Western, the Joplin Union Depot, the Kansas City, Shreveport & Gulf, the Kansas City, Mexico & Orient, the Kansas City Southern, the Midland Valley, the Missouri & North Arkansas, the Poteau Valley, the Texarkana & Fort Smith, the Vicksburg, Shreveport & Pacific and the Wichita Union Terminal.

Consequent Changes in Subordinate Positions

The change in grouping of the lines in the Southwestern region consequently meant changes in subordinate officers under these federal managers, and immediately upon their appointment each of the six men named issued circulars appointing subordinates for the roads under their respective jurisdiction.

J. S. Pyeatt made the following appointments: B. T. Wood, assistant to the federal manager of the Missouri, Kansas & Texas and the St. Louis-San Francisco, to be assistant to the federal manager of all lines under Mr. Pyeatt's jurisdiction; J. M. Kurn, general manager of the Kansas City, Clinton & Springfield, the Paris & Great Northern and the St. Louis-San Francisco, has had his jurisdiction extended over the West Tulsa Belt, and the Rock Island-Frisco Terminal, with headquarters at St. Louis; O. H. McCarty is appointed general manager of the St. Louis-San Francisco & Texas, the Fort Worth & Rio Grande, the Brownwood North & South and the Quanah, Acme & Pacific, with offices at Fort Worth, Tex.; A. Hilton, assistant traffic manager at St. Louis for the Missouri, Kansas & Texas, and the St. Louis-San Francisco, is appointed assistant traffic manager of the St. Louis-San Francisco, the Kansas City, Clinton & Springfield, the Paris & Great Northern, the West Tulsa Belt and the Rock Island-Frisco Terminal; P. O. Jackson, general baggage agent at Dallas for the Missouri, Kansas & Texas of Texas, is appointed general passenger and freight agent of the St. Louis-San Francisco & Texas, the Fort Worth & Rio Grande, the Brownwood North & South and the Quanah, Acme & Pacific; W. F. Evans, general solicitor for the Paris & Great Northern and the St. Louis-San Francisco, is appointed general solicitor for all lines under Mr. Pyeatt's jurisdiction, with headquarters at St. Louis; F. G. Jonah, chief engineer of the Katy-Frisco lines, retains jurisdiction over the St. Louis-San Francisco, the Kansas City, Clinton & Springfield, the Paris & Great Northern, the West Tulsa Belt and the Rock Island-Frisco Terminal with headquarters at St. Louis and also the St. Louis-San Francisco & Texas, the Fort Worth & Rio Grande, the Brownwood North & South and the Quanah, Acme & Pacific, with headquarters at Fort Worth; G. E. Scott, purchasing agent of the St. Louis-San Francisco, and the Missouri, Kansas & Texas at St. Louis, is appointed purchasing agent for all lines under the jurisdiction of Mr. Pyeatt; H. J. Cornin, auditor of the St. Louis-San Francisco at St. Louis, is appointed federal auditor of the St. Louis-San Francisco, the Kansas City, Clinton & Springfield, the Paris & Great Northern, the West Tulsa Belt and the Rock Island-Frisco Terminal, with headquarters at St. Louis; C. S. Snow, assistant auditor of the Missouri, Kansas & Texas of Texas at Dallas, is appointed auditor of the St. Louis-San Francisco & Texas, the Fort Worth & Rio Grande, the Brownwood North & South, with offices at Fort Worth; E. M. Smith, auditor of the Kansas City, Clinton & Springfield at Springfield, Mo., continues in that position; T. K. Hawkins is appointed auditor and federal treasurer of the Quanah, Acme & Pacific, with headquarters at Quanah, Tex.; F. H. Hamilton, acting federal treasurer of the St. Louis-San Francisco, is appointed acting federal treasurer of the St. Louis-San Francisco, the Paris & Great Northern, the West Tulsa Belt and the Rock Island Frisco Terminal, at St. Louis; L. C. Wilds is appointed acting federal treasurer of the St. Louis-San Francisco of Texas, the Fort Worth & Rio Grande and the Brownwood North & South, with headquarters at Fort Worth, and R. F. McGlothlan continues as acting federal treasurer for the Kansas City, Clinton & Springfield at Springfield.

For the roads under the jurisdiction of C. N. Whitehead, the following appointments are announced: W. E. Williams, auditor of the Mississippi Eastern at Quittman, Miss., is appointed general manager of all roads under Mr. Whitehead's jurisdiction, with headquarters at Dallas; C. Haile, traffic manager of the Missouri, Kansas & Texas, and the St. Louis-San Francisco, is appointed traffic manager of the Missouri, Kansas & Texas, the Oklahoma Belt, the Missouri, Oklahoma & Gulf, with headquarters at St. Louis, and also traffic manager of the Missouri, Kansas & Texas of Texas, and the Wichita Falls & Northwestern, with headquarters at Dallas; Joseph M. Bryson, general attorney of the Missouri, Kansas & Texas, is appointed general solicitor of all roads under Mr. Whitehead's jurisdiction, with headquarters at St. Louis; E. L. Martin, engineer of maintenance of way of the Missouri, Kansas & Texas at Parsons, Kan., is appointed chief engineer of the Missouri, Kansas & Texas, the Oklahoma Belt and the Missouri, Oklahoma & Gulf with headquarters at St. Louis and also chief engineer of the Missouri, Kansas & Texas of Texas, and the Wichita Falls & Northwestern, with headquarters at Dallas; G. E. Scott, purchasing agent of the Missouri, Kansas & Texas and the St. Louis-San Francisco at St. Louis, has been appointed purchasing agent of all lines under Mr. Whitehead's jurisdiction, with headquarters at St. Louis; J. G. Livengood, general auditor of the St. Louis-San Francisco and the Missouri, Kansas & Texas at St. Louis, is appointed federal auditor of the Missouri, Kansas & Texas, the Oklahoma Belt and the Missouri, Oklahoma & Gulf, with headquarters at St. Louis; O. H. Bower, general auditor of the Fort Worth & Denver City, and the Houston, Belt & Terminal and federal auditor of the Gulf, Colorado & Santa Fe, is appointed auditor of the Missouri, Kansas & Texas of Texas, with headquarters at Dallas. O. B. Womack continues to act as auditor of the Wichita Falls & Northwestern, with headquarters at Wichita Falls, Tex.; C. T. Carson also retains the position of auditor of the Missouri, Oklahoma & Gulf, with headquarters at Muskogee, Okla.; F. Johnson, acting federal treasurer of the Missouri, Kansas & Texas at St. Louis, is also appointed acting treasurer of the Oklahoma Belt; W. O. Hamilton continues as acting federal treasurer of the Missouri, Kansas & Texas of Texas at Dallas; A. W. Eichenberger, local treasurer of the Wichita Falls & Northwestern, is appointed acting federal treasurer of the Wichita Falls & Northwestern, with headquarters at Wichita Falls; W. P. Dewar, corporate treasurer of the Missouri, Oklahoma & Gulf, is appointed acting federal treasurer of the same road, with headquarters at Muskogee, Okla.; V. G. Hopkins is appointed special assistant, with headquarters at St. Louis, of all lines under the jurisdiction of Mr. Whitehead.

W. N. Neff has organized the control of roads under his jurisdiction as follows: J. E. Callahan, superintendent of the Pine Bluff division of the St. Louis Southwestern, is appointed general manager of all lines under Mr. Neff's jurisdiction, with headquarters at Tyler, Tex.; J. P. Park, general freight agent of the St. Louis Southwestern at St.

Louis, is appointed general freight agent of the St. Louis Southwestern and the Southern Illinois and Missouri Bridge, with headquarters at St. Louis; E. W. LaBeaume, general passenger agent of the St. Louis Southwestern at St. Louis, is also appointed general passenger agent of the Southern Illinois & Missouri Bridge; J. F. Lehane is appointed general freight and passenger agent of the St. Louis Southwestern of Texas, the Eastern Texas and the Dallas Terminal and Union Depot, with headquarters at Tyler; B. S. Atkinson continues to act as general freight and passenger agent of the Louisiana & Arkansas at Texarkana, Ark.; Daniel Upthegrove, general solicitor for the St. Louis Southwestern, with headquarters at St. Louis, has had his jurisdiction extended over the Southern Illinois & Missouri Bridge and the Louisiana & Arkansas, with offices at St. Louis; E. B. Perkins, general attorney of the St. Louis Southwestern of Texas is appointed in addition, general attorney of the Eastern Texas and the Dallas Terminal and Union Depot; A. A. Mathews is appointed chief engineer at Tyler of all lines under the jurisdiction of Mr. Neff; C. A. How, purchasing agent at St. Louis for the St. Louis Southwestern, the Arkansas Central, the Louisiana at Arkansas, the Memphis, Dallas & Gulf, the Missouri Pacific, the Natchez & Southern and the American Refrigerator Transit Company, is appointed purchasing agent for all lines under the jurisdiction of Mr. Neff, with headquarters at St. Louis; R. D. Cobb, auditor of the St. Louis Southwestern at St. Louis, is appointed federal auditor of the St. Louis Southwestern, the Southern Illinois & Missouri Bridge and the Louisiana & Arkansas; A. R. Wood, auditor of the St. Louis Southwestern of Texas at Tyler, has had his jurisdiction extended over the Eastern Texas and the Dallas Terminal and Union Depot; W. J. Wright, auditor of the Louisiana & Arkansas Railroad at Texarkana, Ark., continues to act in that capacity; C. Messick, federal treasurer of the St. Louis Southwestern at St. Louis, is also appointed acting federal treasurer of the Southern Illinois & Missouri Bridge; J. W. Hogan, local treasurer of the St. Louis Southwestern of Texas at Tyler, is appointed acting federal treasurer of the St. Louis Southwestern of Texas, the Eastern Texas and the Dallas Terminal and Union Depot, with headquarters at Tyler. W. F. Wright continues as acting federal treasurer of the Louisiana & Arkansas at Texarkana.

The following appointments are made by F. G. Pettibone, to cover all lines under his jurisdiction: W. E. Maxson, general manager of the Fort Worth & Rio Grande, the Fort Worth Belt, the Gulf, Colorado & Santa Fe, the Houston Belt & Terminal, the International & Great Northern (Spring to Fort Worth and Madisonville branch), and the Texas Midland, is to be general manager, with headquarters at Galveston, Tex.; J. S. Hershey, general freight agent of the Gulf, Colorado & Santa Fe and the Texas Midland, is to be freight traffic manager, with offices at Dallas; W. S. Keenan, general passenger agent of the Gulf, Colorado & Santa Fe and the Texas Midland, is to be passenger traffic manager at Galveston; J. W. Terry, general solicitor of the Fort Worth & Denver City, the Fort Worth Belt, the Gulf, Colorado & Santa Fe, the International & Great Northern (Spring to Fort Worth and Madisonville branch), the Missouri, Kansas & Texas of Texas, the Quanah, Acme & Pacific and the Texas Midland, is to be general solicitor, with headquarters at Dallas; F. Meritt, chief engineer of the Fort Worth & Denver City, the Fort Worth & Rio Grande, the Colorado, Gulf & Santa Fe, the International & Great Northern (Spring to Fort Worth and Madisonville branch), the Missouri, Kansas & Texas of Texas, and the Texas Midland, is to be chief engineer, with headquarters at Dallas; R. L. Irwin, purchasing agent of the Galveston, Houston & Henderson, the International & Great Northern (Spring to Fort Worth and Madisonville branch), the Missouri, Kansas & Texas of Texas (Trinity branch), the St. Louis & Southwestern of Texas and the Texas & Pacific, is to be purchasing agent, with headquarters at Dallas; W. D. McLeod, auditor of the Gulf, Colorado & Santa Fe and the Houston Belt & Terminal, is to be federal auditor, with headquarters at Galveston; T. E. Corley continues to act as auditor and acting federal treasurer of the Texas Midland at Terrell, Tex. A. C. Torbert, local treasurer at Galveston for the Gulf, Colorado & Santa Fe, is appointed acting federal treasurer of the Gulf, Colorado & Santa Fe, the Fort Worth Union Passenger Station, the Union Terminal of Dallas, and the Galveston Wharf Company.

The re-grouping of roads in this region has made necessary the issuing of instructions to the superintendents of the Fort Worth, the Galveston and the San Antonio terminals, who will report respectively to J. L. Lancaster, F. G. Pettibone and W. B. Scott.

The Fort Worth & Denver City, the Wichita Valley, the Wichita Falls & Oklahoma and the Abilene Southern have been placed under the jurisdiction of Hale Holden, regional director of the Central Western region, who in turn has extended the jurisdiction of Robert Rice, general manager of the Colorado & Southern over all departments of these roads. No further changes in connection with these lines have been announced.

In accordance with the regrouping of the lines of the Southwestern region, W. B. Scott has made the following appointments with jurisdiction over the Trinity & Brazos Valley, the Houston Belt & Terminal, the Houston & Texas Central, the Houston East and West Texas and the Houston & Shreveport; G. F. Waid to be general manager; Messrs. Botts, Parker and Garwood to be general solicitors; Gentry Waldo to be traffic manager; I. A. Cottingham to be chief engineer, M. P. Randolph to be purchasing agent and G. R. Cottingham to be federal auditor. L. H. Attwell, Jr., is appointed auditor and G. A. Gandre, acting federal treasurer of the Trinity & Brazos Valley. M. Eckert is appointed anditor and J. H. Lauderdale is appointed acting federal treasurer of the Houston Belt & Terminal. C. B. Udell is appointed acting federal treasurer of the Houston & Texas Central, the Houston East & West Texas and the Houston & Shreveport. The offices of all of these men will be at Houston, Tex.

The St. Louis-San Francisco line between Memphis and Birmingham has been transferred from the Southern to the Southwestern region effective March 1. The Illinois Central lines north of Cairo and Paducah are transferred from the Central Western to the Southern region and the Chicago, Rock Island & Gulf, the Chicago, Rock Island & Pacific (from St. Louis, Mo., to Kansas City, Herington, Kan., to Salina and all lines south and east of the main line between Herington, Kan., and Tucumcari, N. M.), the Fort Worth & Denver City, the Wichita Valley, the Wichita Falls & Oklahoma and the Abilene & Southern are transferred from the Southwestern to the Central Western region.

The part of the Rock Island Line transferred from the Southern to the Central Western region has been placed under the jurisdiction of J. E. Gorman, federal manager of the Rock Island Lines in the Central Western region.

The Brotherhood of Railway Clerks held a southwestern district convention at Houston, Texas, on February 22. This district is composed of the states of Arkansas, Oklahoma, Missouri, Kansas, New Mexico, Arizona, Louisiana and Texas. J. E. Morgan, of Dallas, Texas, president of the Southwestern Federation, presided. The next semi-annual southwestern district convention will be held at New Orleans on August 23.

Orders of Regional Directors

SHIPPING DAY GUIDES.—The regional director of the Allegheny region has issued instructions governing the preparation of consolidated shipping day guides of different roads together with an outline of the procedure which should be followed in analyzing tonnage statistics preparatory to fixing "sailing days" for less than carload freight. At larger stations the traffic movement should be studied for at least twelve days, and at smaller stations thirty days, in order to get reliable data concerning the aggregate volume of tonnage. A consolidated guide for New York city has already been issued, to go into effect on March 10. This is a book of 235 pages, 4½ in. by 10½ in. With this book a shipper has before him in compact form all the data for all of the roads of the city. For example, freight will be taken for Los Angeles on Monday by the Lehigh Valley, pier 34, or the Erie at Harlem Transfer; on Tuesday by the Baltimore & Ohio, at pier 22; on Wednesday, by the New York Central at 37th street; on Thursday by the Lehigh Valley, at pier 34; on Friday by the Baltimore & Ohio, at pier 22, and the Erie at the Harlem Transfer; and on Saturday by the New York Central at 37th street. The delivering road, whichever route is taken, will be the Atchison, Topeka & Sante Fe. For Long Beach, Cal., the instructions are the same except that the delivering company is the Southern Pacific. For San Francisco, shipments may be made every day by three different roads, two of them delivering to the Southern Pacific, and one to the Santa Fe; and on two days in the week the Santa Fe has another route.

Back Pay as Affecting Monthly Comparisons.—The regional director, Eastern Region, by his circular of February 21, numbered 1801-22A536, conveys to federal managers the request of the Operating Statistics Section (Washington) for monthly statements for this year, made out to show true comparisons with the same months of 1918. Statements should show actual expenses in each year, but a supplement should be attached giving a restatement of general accounts with allowances for back pay. In reporting unit cost of train service the seven primary accounts must also be restated. For example, for January, 1918, the expenses actually accrued in that month must be given, plus the January proportion of back pay which was paid subsequent to June 1, 1918; while the expenses for these later months should be those actually accrued in that month minus all back pay which is included but is applicable to previous months. Where the comparisons cannot be given with accuracy, close estimates will be accepted.

Grain Embargo—Primary Market.—Supplement 11 to Circular 161 of the Central Western regional director similar to Supplement 19 of Circular 34 of the Northwestern regional director, abstract of which was published in the *Railway Age* of February 28 (page 486).

L. C. L. Sailing Day Plan.—Circular 178 of the Southwestern regional director directs representatives of railroads who come in contact with shippers and consignees to post themselves as to the merits of the sailing day plan and to overlook no opportunity to discuss it with patrons of the road. Traffic men in particular should keep in touch with the local conditions at local points and co-operate to the fullest extent. This action is to offset adverse agitation by shippers which is due principally to unfamiliarity with the plan. It is the duty of all concerned to give particular attention to the working out of this plan and the handling of merchandise in general at all points to insure, (a) that freight is properly loaded in accordance with the sailing day plan, (b) that cars leave originating terminal on day scheduled to depart, and that under no circumstances must cars be held over for additional tonnage, (c) that shipments move on schedule time to destination.

Relations Between the Federal Administration and State Commissions.—In a letter to Northwestern railroads dated February 27, the Northwestern regional director calls attention to general order 58 of the director general and suggests (1) the selection from the staff of employees of one or more persons in each state whose duty it shall be to frequently and not less than once a week call upon the commissioners of that state for the purpose of advising with them, learning whether or not there are complaints as to service or efficiency and adjusting any of those minor matters which intelligent personal attention can ordinarily satisfy; (2) that an agent of the Federal Administration, ordinarily the state attorney, general manager or superintendent, be designated in each state, filing his name and address with the commission, upon whom service can be made as to any pending proceeding; (3) that all officers, agents and employees of the United States Railroad Administration be directed to supply information and render assistance as requested by any state commission. In all matters of doubt or unusual importance advise with the regional director. Copies of all notices and reports of complaints and the progress of same must be furnished to the regional director who desires to keep in touch with all proceedings before the state Commissions.

Stored Equipment.—The Northwestern regional director File 57-1-27 calls attention to the necessity for such action as seems appropriate to protect from fire empty cars standing in storage yards. A letter is quoted from Charles N. Rambo, manager of the fire loss and protection section, of the Division of Finance and Purchases, citing the article in the "Manual of Fire Protection on Railroad Property" on pages 34 and 35 entitled "Fire risk in connection with storage or concentration of cars on sidings, in yards, or at terminals."

United States Employment Service Posters.—File 3-1-21 of the Northwestern regional director similar to Supplement 2 to Circular 67 of the Southwestern regional director, abstract of which was published in the *Railway Age* of February 28 (page 486).

Telegrams Sent Over Railroad Wires.—Circular 242 of the Central Western regional director similar to Order 156 of the Southwestern regional director, abstract of which was published in the *Railway Age* of February 14 (page 393).

Transportation of Directors, Corporate Officers and Employees.—Order 109 Supplement 13, Cancelling Supplement 11 of the Southwestern regional director similar to Supplement 14 to Circular 29 of the Central Western regional director, abstract of which was published in the *Railway Age* of January 10 (page 159).

Carloading Efficiency.—Circular 177 of the Southwestern regional director calls attention to the practice of shippers ordering small capacity cars and insisting on such cars being furnished, notwithstanding empty cars of larger capacity are available for their loading. This involves additional switching and empty haul. Shippers should be encouraged to continue to load heavily but extraordinary switching service and empty car movements are not warranted.

Car Efficiency—Intensive Loading.—By Circular 179 the Southwestern regional director calls attention to the importance of continuing the campaign which brought about successful loading of freight cars. Agents or others who receive orders from shippers for cars should inquire as to the weight of the freight which is to be shipped and if below the maximum try to induce the shipper to load to the maximum. If the amount ordered does not provide for the maximum loading, try to get the consignee to increase the order.

Lettering of Locomotives.—The Eastern and the Southwestern Regional Directors have announced that on locomotives ordered by the director general for individual roads, and which are paid for by the roads, the letters "U. S." need not be shown on the engines or tenders.

Freight Claims.—The regional director, Eastern region, by circular 600-19A544, calls attention to the necessity for prompt reply to communications from the freight claim de-

partment J. H. Howard, manager of the claims and property protection section, reports that where claims are not dealt with promptly, the delay, in a large percentage of cases is found to be due to the inability of the freight claim department to get prompt and satisfactory replies to inquiries addressed to agents. Mr. Howard also calls attention to the fact that some freight claim officers do not promptly advise the "special agent" (police) in regard to shortages which indicate pilferage. There should be close co-operation between the freight claim officers and the special agents. The Northwestern Regional Director's circular No. 24-1-44 covers the same subject. The Southwestern Regional Director, in order No. 168, gives instructions on pilferage for all freight claim offices.

Passenger Train Performance.—The regional director of the Eastern region, by circular 1801-14A553, gives instructions for making daily reports of passenger train performance, to be sent by telegraph both to Washington and to the regional director. Besides the usual data showing the number of trains, minutes late, etc., all unusual operating difficulties such as storms must be briefly explained. Trains making runs of less than 50 miles are to be omitted, also branch trains dependent on main line connections; and delays of ten minutes or less are not to be considered. The circular prescribes a cipher to be used to economize telegraphing. The Northwestern Regional Director, by circular No. 95-1-12 gives instructions on this subject.

Requests for Statistical Data.—The regional director of the Eastern region, by circular No. 1801-118A543, promulgates the instructions of the director general to the effect that when requests are received from governmental departments, not a part of the Railroad Administration, asking for statisical information, they should be referred to C. A. Prouty, director of the Division of Accounting, Washington. It is believed that these matters can be handled with more expedition and economy at Washington than by the regional or local offices. The Southern regional director, by file 1831-2-6., and the Southwestern Regional Director, by circular No. 182, give similar instructions.

Journal Box Packing.—The regional director of the Eastern region, by circular No. 500-13-14A540, advises federal managers that journal box packing for locomotives and cars may be bought under the individual roads' specification, the Railroad Administration specification R-94-A not being compulsory.

Gas Masks.—The Eastern regional director by circular No. 1800-10-5A541, and the Southern regional director by file 1862-6 call attention to the fact that gas masks used in the army are not effective against poisonous constituents of coal smoke or coal gas, as found in railroad tunnels. Dr. D. Z. Dunott, chairman of the Committee on Health and Medical Relief, of the Division of Operation, has advised the regional directors of this fact, and it is suggested that roads which have bought gas masks with a view to using them in the railroad service make further investigation. Dr. Dunott says:

"If smoke consists merely of liquid and solid particles, with some hydrogen sulphide, sulphur dioxide and some irritant gases, it would be possible to use an ordinary army gas mask: if, on the other hand there is more than .05 per cent of carbon monoxide present the mask will be more of a danger than an assistance. Further, the Hayward respirator which has been purchased by one road, is not designed for eliminating gases; it simply protects against particles * * *."

Car Distribution—Use of Open Top Cars.—In Freight Car Distribution Notice No. 4 the Northwestern regional director states that notwithstanding the present car surplus there are roads which are forcing the restrictions on the use of open top cars for materials other than coal, coke or raw materials used in blast furnace operation, formerly in effect under Circular CS-13 and Supplement 1 thereto issued by the Car Service Section. While it should be understood that in the use of this class of equipment preference still is required where necessary for coal and iron ore traffic, there is at the present time such an abundant supply that there can hardly be any occasion for failure to supply all such cars required for any class of loading.

Southern Freight Inspection Bureau.—The Southern Freight Inspection Bureau has been established to take over the duties of the following existing organizations: Southern Weighing and Inspection Bureau, Virginia & West Virginia Demurrage and Storage Bureau, North Carolina Demurrage Bureau, Southeastern Demurrage Bureau, Alabama Demurrage and Storage Bureau, Tennessee Demurrage and Storage Bureau, East Tennessee Demurrage and Storage Bureau, Louisville Demurrage and Storage Bureau, and St. Louis Demurrage and Storage Bureau, within the boundaries of the Southern region. The new bureau will enforce the regulations dealing with: freight car demurrage, freight storage, descriptions of carload and less than carload freight, carload and less than carload weighing, milling and other transit arrangements (where specifically arranged for), packing and marking regulations, stowage of carload freight, and veterinary inspection. In instances where the railroads are now individually performing any of the stated duties, they will either be supervised or taken over by the new bureau. I. G. Markey is appointed manager, and F. M. Hardin, assistant manager, of the bureau, with headquarters at Atlanta, Ga.

Storage l. c. l. Shipments.—The regional director, Eastern region, by file 600-2-46A554 suggests that where freight houses are not being used to capacity, l. c. l. shipments should be stored in freight houses instead of being sent to public warehouses. Storage is to be charged in accordance with Agent Boyd's Tariff No. 139, I. C. C. No. U. S. 1.

Rental Rate for Locomotives.—The regional director, Eastern region, by file 500-1-3A555, prescribes the rental rate for locomotives as one mill per pound of tractive power per day, with a minimum of fifteen dollars a day. This cancels circular, file 3000-42, of March 12, 1918. The Northwestern and the Southwestern regional directors have issued similar orders.

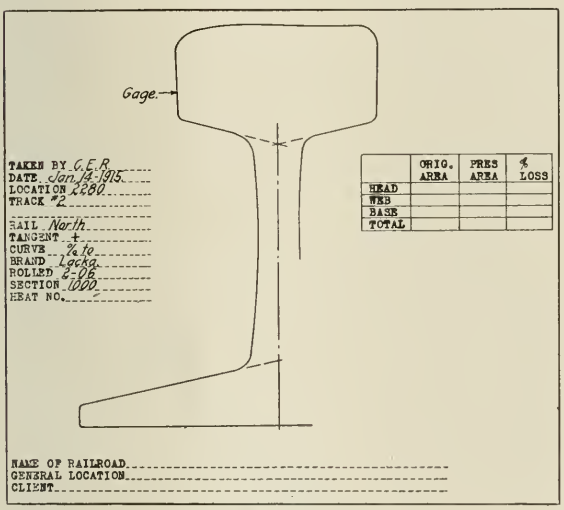
The Use of the Railograph in Valuations for Taxation Purposes

By Cuthbert E. Reeves
Ellsworth, Barrows & Reeves, Engineers,
Buffalo, N. Y.

THE RAILOGRAPH has been used increasingly of late years to determine the wear of rail under various conditions and the necessity of renewals, but, so far as known to the writer, it has not heretofore been employed as a test of value for taxation. In the State of New York the courts have held that the measure of value for local assessment of railroad property, in the case of a paying railroad, is the cost of reproduction less depreciation. During the trial of a recent case to determine the proper assessment of a section of its four-track main line in a taxing district of this state, one of the trunk line railroads introduced testimony as to the value of the rails in its main tracks and side tracks based upon the theoretical condition of it under the application of the "Straight Line" theory of depreciation. In brief, a life of eight years was allotted all rail in the passenger or high-speed tracks, at the end of which time they were assumed to be equivalent to relayer; an additional life of eight years in the low-speed tracks was then allowed, at the expiration of which their value was predicated to be scrap. Rails in sidetracks were considered to have reached a condition equivalent to scrap when laid.

For purposes of taxation it is of course desirable to arrive at a valuation fair to both the owner of the property assessed and to the community at large, and, in the case of a property involving special construction beyond the ability of the ordinary assessing body properly to appraise, it is especially to be desired that such valuation shall be applicable over a period of years. In a given taxing district the present value of some elements of such property may vary somewhat from year to year, but it is beyond the powers of the ordinary assessing board to follow up these changes, such as rail renewals, repainting of bridges and buildings, repointing of masonry, etc.

It is well known that the practice of our railroads in general is to maintain their properties at a uniformly high standard of efficiency, and in so far as track, bridges and other items classed as "Road" are concerned, there will be little change in value from year to year aside from that occasioned by additions and betterments. In valuations for the purpose of equalizing such assessments our practice has been for years to use the "Average Condition" theory in determining the present value of many items of construction.



A Typical Record Sheet

This is especially applicable to rails, where the age is but one of many factors affecting its condition. Replacements of breakages, varying degrees of wear on curve and tangent, excessive wear at stations, water plugs and other stopping places, standard of roadbed, and many other considerations entering into the finding of an exact result.

The condition of fencing is subject to much the same determination. Posts are renewed here and there and wire patched in other places. In fact, all articles which are constantly renewed in kind lend themselves much more to the "Average Condition" theory of depreciation than to the better known and commonly accepted "Straight Line."

In the case referred to in this article we were retained by the taxing district to report upon the value of the railroad property, and to assist in upholding the assessment. As in all such cases, our valuation of the rail was based upon the "Average Condition" theory. For example, all main track rail was considered to have reached a point half-way between its cost as laid new and its value as relayer when removed from main track. On roads with good standards of maintenance the percentage of rails too poor to be classed as relayer is ordinarily very low, and offset by the superior condition of those replacing breakages, etc., subsequent to the original laying to a face. Side-track rail was taken to be in a condition half-way between cost to lay as relayer and value as scrap.

While the application of these rules in certain cases, such as that of a stretch of new rail recently laid, or, a section about to be renewed, would fail to give a technically correct value as of a given date, we believe that over a period of years the result would be eminently fair to both parties.

Although it is not recommended as being practicable or considered desirable, ordinarily, to ascertain the exact condition of rail for purposes of taxation, the necessity of introducing evidence as to the same in this action, and the adaptability of this section of the railroad to such a test, owing to the numerous different brands and years of rail and the freedom from curvature and excessive grade, led to the decision to take exact measurements by means of the railograph. The field work was carried out under the direction of the writer. Sections were taken on both rails of each of the four main tracks at uniform spacing, no effort being made to select or to miss certain rails.

They were all inscribed directly upon standardized cards, a sample of which is shown. All data as to location, weight, brand, etc., were noted in the field. The space provided for cross-sectional areas new and as found in the field was filled in later in the office, the present areas being run three times with a planimeter and the average result used. From this the percentage of loss was computed and listed, being resolved later into terms of percentage of the loss allowable to reduce the rail to relayer condition, to wit, three pounds per yard, the standard of the railroad involved. This was computed for the head of the rail, as it was found that the sections were practically unchanged in web and flange, and in many instances over-ran the theoretical original area.

The loss in 100-lb. rails was found to be 2.83 per cent, averaged by the number of rails measured and 2.99 per cent averaged by the mileage of the various brands and years. The loss of the 80-lb. by the number of rails measured proved to be 5.43 per cent and by mileage 5.63 per cent. The average loss of head in the 100-lb. rails after an average use of 6.75 yr. was but 35.8 per cent of that required to reduce them to relayer condition, being remarkably uniform and very much less than that which an application of the straight line depreciation from new to relayer in eight years would imply. The 80-lb. rail in the freight tracks showed an average loss of 62 per cent of that allowable, in spite of their average length of use of 7.9 yr. under heavy traffic. The average condition of all main track rail proved to be slightly better than half-way between new and relayer. While other factors than loss of section enter into the classification of rail as relayer, etc., for this discussion they may be neglected, the rails under consideration being well maintained, straight, free from surface bends, no curve wear, and ends free from battering.

Examination of some of the first sections taken disclosed a width of head in some cases 3/64 in. greater than the theoretical, and check measurements taken with a micrometer caliper corroborated the railograph prints, the extra width probably being due to variations in the rolls. Deviations from the standard were also noted in the fillets of the flanges and in the angles of the under side of the heads, these probably being due in part to wear in the rolls and in part to excess shrinkage.

Data are not available as to the tonnage passing over these tracks during the period involved, and it is regretted that comparison with the data disclosed by other railograph observations is not possible. Conclusions as to wear based solely upon the factor of length of use are of course reliable only when taken in conjunction with the tonnage borne and other factors entering into such an analysis.

General News Department

W. H. Finley, president of the Chicago & North Western Railway Company, will present a paper on the design and construction of the large grain elevator recently built by that company, at Chicago, before the Western Society of Engineers, Chicago, on Monday evening, March 10.

Charges of grand larceny were preferred against nine employees of the Baltimore & Ohio, at Youngstown, Ohio, last week—one chief clerk, one general yard master, one roundhouse foreman, two freight conductors and four brakemen. One conductor was also charged with carrying concealed weapons. These arrests follow the investigation of a large number of robberies of freight cars.

A strike of boatmen in New York harbor paralyzed local traffic on Tuesday, Wednesday and Thursday of this week, the passenger ferries of the Delaware, Lackawanna & Western being the only railroad craft which were kept running. Embargoes were placed in all directions against freight for New York over routes which have to use ferries or floats to reach the city, and the outbound freight stations on the docks refused practically all shipments. Passengers crossed the river, with some delay, through the tunnels. As we go to press it is expected that the Railroad Administration will grant the eight-hour day and other demands of the strikers; but the attitude of the owners of other boats has not been disclosed.

Major C. W. Cochran has been appointed assistant professor of military science and tactics at Northwestern University, Evanston, Illinois. Until March, 1917, Maj. Cochran was engineer of maintenance of way of the Cleveland, Cincinnati, Chicago & St. Louis at Galion, Ohio, at which time he received leave of absence to take a three-months' course at the Officers' Training Camp at Fort Meyer, Va., after which he was commissioned a captain. He was assigned to duty in the office of the chief of engineers, U. S. A., where he served from September, 1917, to February, 1918. He was then assigned to the 32nd Engineers and assisted in organizing that regiment, which was a special railway and bridge unit. Shortly after he was ordered to France, where he was placed in charge of work on lines of communication and of a number of construction projects. In July, 1918, he was promoted to the rank of major of engineers and was ordered back to the United States to assist in organizing regiments for oversea service, but just before returning to America he was sent to the front lines for a period of observation and study. Soon after Major Cochran reached the United States the armistice was signed and the new regiments were disbanded. He was then assigned to the 2nd Engineers, from which he was assigned to his present duty, as stated above.

Railway Troops Coming Home

A number of the railroad units of the army in France have been assigned for early return to the United States, according to an announcement issued by the War Department. The list of organizations assigned to early convoy includes companies 20, 60, 81, 82, 92, 93, 94, 95, 96, 98, 102, 104, 106, 107, 108, 115, 129, and 137 and casual companies No. 5 and No. 9, of the Transportation Corps, also the Twelfth Engineers' regiment.

Correction

Owing to an error in the article entitled "Standard Specifications for Timber Preservation," published on page 445 of the issue of February 21, the process for Treatment with Creosote Oil by the Empty Cell Process, with Final Vacuum, was designated as the Rueping process. This should have been the Lowry process. On the following page the process for Treatment with Creosote Oil by the Empty Cell Process with Initial Air Pressure and Final Vacuum, should have been designated as the Rueping instead of the Lowry process.

Black Tom Verdict Stands

The Supreme Court of the United States on March 3 refused to review the decision of the lower court holding the Lehigh Valley Railroad liable for damages resulting from the explosion in New York harbor ("Black Tom Island") in July, 1916. While this case involves a judgment of only $23,687, claims for nearly $12,500,000 have been made against the company and the outcome of the majority of them was said to depend upon the result in this case.

Director General to Address A. R. E. A.

Walker D. Hines, director general of railroads, has accepted an invitation to address the American Railway Engineering Association at its annual dinner at the Congress Hotel, Chicago, on Wednesday evening, March 19. The Railroad Administration will also be well represented among the guests at the dinner. C. A. Morse, assistant director, division of operation, is president of the association, and W. T. Tyler, director of the division of operation, and possibly one or two of the other directors will be present, as well as several of the regional directors.

Program for Engineering Week at Chicago

Programs for the meetings of the American Railway Engineering Association and the Railway Signal Association to be held in Chicago in the week of March 17, are assuming definite form. The Railway Signal Association will hold its stated meeting at the Auditorium Hotel on Monday, the 17th, and the American Railway Engineering Association will hold a three-day convention at the Congress Hotel on Tuesday, Wednesday and Thursday. The National Railway Appliances Association's exhibit in the Coliseum will continue through the four days. An outline of the program of the signal meeting appears below:

Report by Committee II—Mechanical Interlocking.
Report by Committee III—Power Interlocking.
Report by Committee X—Signal Practice.
Report by Committee XII—Contracts.

A paper on Concrete Trunking will be presented by B. A. Lundy, assistant signal engineer, New York Central, and Kurt C. Barth, of the Barrett Company, will present a paper on Treated Timber Trunking.

Three other organizations will hold meetings during that week which will be of interest to men attending these conventions and through a coincidence three meetings will be held on Monday evening.

The Western Railway Club will hold its monthly meeting in the Louis XVI room of the Hotel Sherman, at 7:45 p. m. following a get-together dinner in the Italian room at 6:15 p. m. The program will include papers as follows:

"U. S. Naval Batteries in France," by Lieutenant Commander D. C. Buell, U. S. N. R. F., now director of the Railway Educational Bureau, Omaha, Neb.

"The Mechanical Stoking of Locomotives," by W. S. Bartholomew, president of the Locomotive Stoker Company, Pittsburgh, Pa.

The Western Society of Engineers will hold a meeting in its rooms in the Monadnock block for the presentation of a paper on the Railway Terminal Situation in Chicago, by Edward J. Noonan, chief engineer of the Chicago Railway Terminal Commission. This will cover a general discussion of the terminal policy of the Railroad Administration and an enumeration of some of the difficulties of the larger problems with special reference to the solution of the Chicago "down town" problem. It is the intention to ask several prominent railway men to discuss the paper.

Another activity of that week is the Railroad Conference of the American Association of Engineers to be held on Monday, March 17, both in the afternoon and evening in the Gold room of the Congress Hotel. The following program has been arranged:

AFTERNOON SESSION 2 O'CLOCK.

Willard Beahan, equipment engineer, New York Central Western Lines, presiding.

"Shall Engineers be Paid Overtime"? by H. P. Gillette, editor, Engineering & Contracting.

"Principles and Procedure in Classification and Salaries of Railroad Engineers," by J. L. Jacobs, Professional and Special Branch, United States Employment Service, Chicago.

"Schedules of Pay," preliminary report by a sub-committee of the "Railroad Committee."

EVENING SESSION—7.30.

W. H. Finley, president of the American Association of Engineers and president of the Chicago & North Western, presiding.

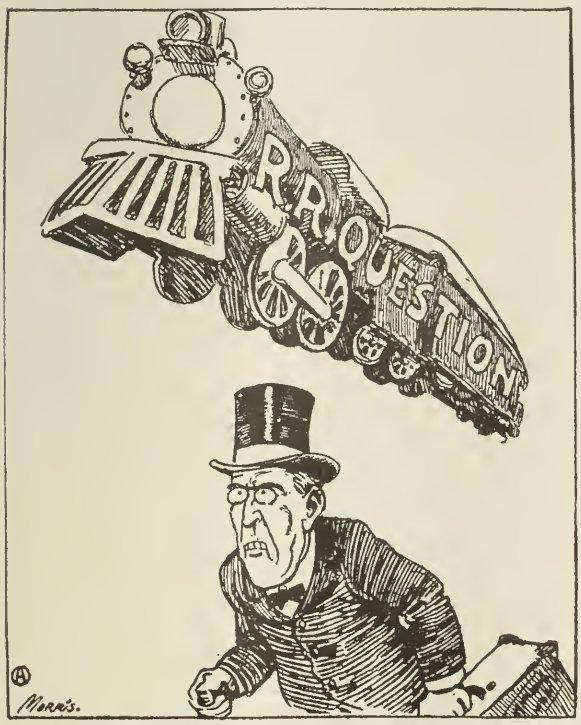
"How Shall Proper Recognition be Obtained"? by W. W. K. Sparrow, corporate chief engineer, Chicago, Milwaukee & St. Paul.

Application of Order 27, and Supplements 7 and 8 to the Railroad Engineer.

Report of the Bureau of Explosives

The bureau for the safe transportation of explosives and other dangerous articles, 30 Vesey street, New York City, has issued the annual report of Colonel B. W. Dunn, chief inspector. The enormous and abnormal movement of explosives by railroads during the past year has been carried on with remarkable freedom from disaster. The military program of the government for the year 1918 called for the production of about two billion pounds of explosives for military use, and for two hundred tons a day of poisonous liquids and gases. For most of the year, up to November 11, shipments amounted to more than two thousand carloads a day, so that it is estimated that during the busy months the railroads of the country had at all times not less than 50,000 cars in transit, on government business, and bearing the explosive placard. This was in addition to the average of 5,000 cars in transit to meet normal commercial demands. Only eleven accidents of all kinds occurred in the transportation of explosives during the year. One life was lost and four persons were injured; total property loss, $33,238. The fatal accident occurred in Canada. This excellent record was due primarily to the general use of standard, approved packages and standard methods of loading, blocking and placing the packages in cars. Losses in transportation of other dangerous and semi-dangerous articles, including the explosives (just mentioned), amounted in the year to $1,642,730; persons killed, 18, and injured, 106. Sixteen of the deaths are recorded in connection with fires arising in the transportation of gasoline.

The total number of boxes of high explosives condemned as unsafe for transportation was 2,971, as compared with 2,291 in the preceding year. The total number of cases of black powder condemned was 194 as compared with 397 in 1917. Total number of inspections, 10,734.



From the Albany Journal

Still Up In the Air

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—F. M. Nellis, 165 Broadway, New York City. Next convention, May 6-8, 1919, Chicago.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—E. H. Thayer, St. Louis-San Francisco R. R., St. Louis, Mo.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, Chicago.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—J. E. Quick, Port Huron, Mich.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Union Station, St. Louis, Mo.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York. Next annual meeting, March 14, 1919, Waldorf-Astoria Hotel, New York.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—F. C. J. Dell, 50 E. 42nd St., New York.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—Otto E. Schlinck, 485 W. 5th St., Peru, Ind.

AMERICAN RAILROAD ASSOCIATION.—J. E. Fairhanks, 75 Church St., New York.—

- Operating Section (including former activities of Association of Railway Telegraph Superintendents and Railway Storekeepers' Association).
- Engineering Section (including former activities of Railway Signal Association).
- Mechanical Section (including former activities of Master Car Builders' and Master Mechanics' Association).
- Traffic Section (including former activities of Freight Claim Association).
- Transportation Section (including former activities of Association of Transportation and Car Accounting Officers).

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Austin Station, Chicago. Next convention, October 21-23, 1919, Cleveland, O.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 910 Michigan Ave., Chicago. Next convention, March 18-20, 1919, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION (see American Railroad Association, Mechanical Section).—Acting Secretary, V. R. Hawthorne, 735 Transportation Bldg., Chicago. Next annual convention, June 23-25, 1919, Atlantic City, N. J.

AMERICAN RAILWAY PERISHABLE FREIGHT ASSOCIATION.—E. F. McPike, 135 E. 11th Place, Chicago. Regular meetings, 2d Wednesday in March and September.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 6202 Greenwood Ave., Chicago.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick,, University of Pennsylvania, Philadelphia, Pa. Next meeting, June, 1919, Atlantic City, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Charles W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, 708 Union Trust Bldg., Washington, D. C.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Semi-annual meeting with Master Car Builders' Association.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—Willis H. Failing, C. R. R. of N. J., Jersey City, N. J.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Next meeting, October, 1919, Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS (see American Railroad Association, Operating Section).—W. L. Connelly, N. Y. C. R. R., Gibson, Ind.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS (see American Railroad Association, Transportation Section).—G. P. Conard, 75 Church St., New York.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—M. J. Trees, Chicago Bridge & Iron Company, Chicago. Next annual convention, October 21-23, 1919, Cleveland, O.

CANADIAN RAILWAY CLUB.—James Powell, 46 Aberdeen Ave., St. Lambert (near Montreal), Que. Next meeting, 2d Tuesday in May, 1919, Windsor Hotel, Montreal, Que.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November, and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS AND CAR FOREMEN'S ASSOCIATION.—W. R. McMunn, New York Central, New York.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION. D. B. Wright, Lehon Company, 45th and Oakley Sts., Chicago.

EASTERN RAILROAD ASSOCIATION.—D. G. Stuart, Washington, D. C. Next annual meeting, May 8, 1919, Railroad Club, New York.

FREIGHT CLAIM ASSOCIATION (see American Railroad Association, Traffic Section).—Lewis Pilcher, R. F. & P., Richmond, Va.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 856, Insurance Exchange Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, B. & O., Lima, O.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago. Next meeting, May 19-22, 1919, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha Ave., Winona, Minn.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION.—F. W. Hager, 1323 Hurley Ave., Ft. Worth, Tex. Next annual convention, October 21-23, 1919, St. Louis, Mo.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Next meeting, May 26-29, 1919, Hotel Sherman, Chicago.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next meeting, September, 1919, Chicago.

MASTER CAR BUILDERS' ASSOCIATION (see American Railroad Association, Mechanical Section).—Acting Secretary, V. R. Hawthorne, 746 Transportation Bldg., Chicago. Next annual meeting, June 18-21, Atlantic City, N. J.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES' COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York. Next annual convention, October 14, 1919, Indianapolis, Ind.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York. Next convention, April 24-26, Congress Hotel, Chicago.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago. Next meeting, March 17-20, 1919, inclusive, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—George A. J. Hochgrebe, 623 Brisbane Bldg., Buffalo, N. Y. Regular meetings, 3d Tuesday in each month, Tenjost Hall, Buffalo, N. Y.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Bldg., Washington, D. C. Next annual meeting, June 11, 1919, Hotel Commodore, New York.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month except June, July and August, Colonial Annex Hotel, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—D. C. Welty, Missouri Pacific R. R., St. Louis, Mo.

RAILWAY ELECTRIC SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—D. L. Eubank, Galena Signal Oil Company, Richmond, Va. Next annual meeting, September, 1919, Hotel Sherman, Chicago.

RAILWAY FIRE PROTECTION ASSOCIATION.—G. L. Ball, St. Louis-San Francisco Ry., St. Louis, Mo.

RAILWAY REAL ESTATE ASSOCIATION.—James P. Nelson, President, C. & O., Richmond, Va.

RAILWAY SIGNAL ASSOCIATION (see American Railroad Association, Engineering Section).—H. S. Balliet, Ass't Terminal Manager, Grand Central Terminal, New York. Stated meeting, on Monday, before 3d Tuesday in March, Chicago.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, N. Y. C. R. R., Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Next annual meeting, June 18-25, 1919, Atlantic City, N. J.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Next annual convention, September 16-18, 1919, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, West Nyack, Rockland County, New York.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1265, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, Western Ry., of Ala., Atlanta, Ga.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Next annual convention, September 16-18, 1919, Auditorium Hotel, Chicago.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. P. Finan, A. T. & S. Fe Ry., Needles, Cal.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., Cleveland, O. Next annual meeting, September, 1919, Hotel Sherman, Chicago.

WESTERN ASSOCIATION OF SHORT LINE RAILROADS.—Clarence M. Oddie, Mills Bldg., San Francisco.

WESTERN RAILWAY CLUB.—A. F. Steubing, 750 Transportation Bldg., Chicago. Regular meetings 3d Monday in month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—Edgar S. Nethercut, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except July and August.

Traffic News

Grain loading this year, up to February 8, amounted to 137,202 cars, as compared with 117,563 for the corresponding period of 1918.

According to newspaper reports the grain growers in Idaho, Oregon and Washington have organized an "Inland Empire Shippers' League," and have filed with the Interstate Commerce Commission a protest against the 25 per cent increase in freight rates on grain and grain products made last June by the Railroad Administration.

J. E. Weller, Chicago resident traffic assistant for the Allegheny region, has issued a supplement to routing circular 103 stating that effective March 1, the provisions of this circular will apply to shipments of copper, lead and zinc. Exception "C" on the first page of the original circular is canceled. These rules are not to apply when in conflict with current embargoes.

The State Public Utilities Commission of Illinois has issued a citation against the Chicago, Milwaukee & St. Paul to appear before the commission at Chicago on March 11, to show cause why the work of elevating and reconstructing tracks in Chicago should not be completed at an early date. Work on the elevating of the St. Paul tracks was postponed approximately two years ago due to the high cost of labor and of material.

The Minnesota State Railroad & Warehouse Commission has filed protests on behalf of Minnesota shippers against the proposed reconsignment charges on grain and hay. Adoption of the reconsignment tariff has been recommended to the Interstate Commerce Commission, following recent hearings. The State Board charges that the assessment of a reconsignment charge of $2 on grain and hay held for state inspection is unjust because this inspection is required by state law and therefore should not be the basis of a special charge by the railroads. It was also pointed out that authorization of such charges will mean that cars now inspected by the state at outside points would be forwarded for inspection in terminals which would become so congested as a result that the railroads would oppose the rule. The recommendation for authorization of a $5 charge in cases where a commission merchant, after a car is placed on a team track, gives an order for it to a purchaser who will unload the car is also believed to be unjust. The state officers maintain that this is not a reconsignment but simply a delivery order requiring no service from the railroad.

National Industrial Traffic League

The program for the spring meeting of the National Industrial Traffic League to be held at Hotel Grunewald, New Orleans, La., March 11 and 12, has been announced in Circular 107 of the league. The principal subjects to be discussed are: Report by the President on the recent Rivers and Harbors congress. Report of the Executive Committee on (1) recommendations to congress with respect to the railroad situation; (2) proposed uniform telegraphic code; (3) proposed mileage scales; (4) sailing day plan; (5) passing reports on l. c. l. freight; (6) restoration of commercial offices of the railroads; (7) uniform hour for opening and closing freight houses; (8) re-establishing shipper's right to route freight.

Reports of committees on car demurrage and storage; on transportation instrumentalities; on bills of lading; on proposed packing rules for express shipments and on tracing express shipments; and on rate construction and tariffs. Reports of baggage committee and freight claims committee. Reports of special claims committees on concealed loss and damage; on grain; on packinghouse products; on coal and coke; on ore and on fruit and vegetables. Report of weighing committee on (1) charge for testing industrial track sales; (2) moisture tolerance on coal and coke; (3) claims for loss of coal; (4) action of Railroad Administration with respect to national code of weighing rules. Report of classification committee. Report of special committee on railway leases and sidetrack agreements.

Foreign Railway News

Advices to the State Department state that the allied railway representatives were called to an informal conference in Vladivostok on February 25, all the seven countries being represented, Mr. Stevens and Mr. Smith representing the United States and the American Ambassador to Japan, Mr. Morris, also had been invited to the conference.

Gen. Horvath attended as the representative of the Chinese Eastern Railway.

In England it is customary for the strong labor organizations to run candidates for Parliament. In the recent election the National Union of Railway Men ran such candidates for Parliament in 24 constituencies, of which those at Derby, Wakefield, Middlesboro, Newcastle (West), Manchester (Ardwick) and Cardiff (East) were "official" candidates. Two only were elected, viz., at Derby, where J. H. Thomas was not officially opposed, and at Kettering, where the contest was "three cornered." The Railway Clerks' Association ran 5 candidates, and the Society of Locomotive Enginemen and Firemen one without success.



Photo from Paul Thompson

During the London Tube Strike the Government Carried Thousands of War Office Clerks in Military Motor Trucks

Free Admission of Railway Supplies Into Mexico

A cablegram of February 21 from the American Consulate General in Mexico announces that a presidential decree in effect from February 20 permits the importation of the following railway supplies into Mexico free of duty for a period of six months: Switch points, iron and steel ties, turntables, iron and steel rails, frogs, and tie plates The duties thereby remitted amount to 0.03 peso per kilo gross weight, or $0.68 per 100 lb.

Modifications in British Railway Supply Restrictions

The British Board of Trade Journal of February 20 announced additional relaxations in the British export restrictions. The following articles are transferred to list C and may therefore be exported freely to American countries: Boiler tubes, iron and steel tubes, railway locomotives and their component parts.

The Minister of Munitions has suspended, as from February 7, until further notice, the Railway Material (Second-hand) Order, 1916, except in so far as relates to freight cars of all types. Dealings in second-hand railway locomotives, rails, chairs, fishplates, fastenings, signal apparatus, ties and the like may now take place without a permit; but second-hand wagons of all types are still war material within the terms of Regulation 30a of the Defence of the Realm Regulations.

Central Uruguay Railway Not to Change Hands

According to press reports, which are not, however, official, the contemplated purchase of the properties of the Central Uruguay Railway Company by the Uruguayan government will not be carried out, says Consul William Dawson at Montevideo, Uruguay, writing under date of December 9. It is stated, he says, that the price demanded was considered too high.

Little or nothing has been heard of this projected change of ownership during the past months, he continues. The purchase of the Central Uruguay lines by the government was under serious consideration as a means of stabilizing exchange. The system comprises 987 miles of track, or about 63 per cent of the total mileage of the country. The purchase price mentioned at the time was 60,000,00 pesos ($62,040,000).

British Government Asks Rail Control

Press despatches from London dated February 28 say that the government's transport bill introduced in Parliament will give the Minister of Transport complete control over every conceivable form of land transport.

The bill provides that complete management of the railways of the United Kingdom is to be conducted by the state for two years, partly to enable the government to make the railways pay dividends and partly to facilitate the movement of men and material during reconstruction.

Complete power is given to the minister to settle rates and charges, salaries and wages and conditions of employment and to make any alterations in policy and accounts that he may deem desirable.

The minister is authorized to purchase by agreement or by compulsion, in whole or in part, any railway, light railway, street car company, canal, inland waterway or harbor and dock undertaking.



The Trans-Balkan Route Through Otranto and Valona, Proposed by Italian Engineers, Would Reduce the Distance Between Rome and Constantinople from 1905 to 1260 Miles and Permit a 48-Hour Journey.

Brazil Railway in French Control

Financial reorganization of the Brazil Railway Company, in receivership since 1914, has been completed except for some minor details with regard to subsidiary lines, according to the New York Tribune. The discharge of W. Cameron Forbes, of Boston, as receiver of the property, is expected to be ordered by the court within the next month.

French interests, representing the bondholders of the road, are now in control and new officers have already been elected, consisting of Louis Wibratte, of Paris, president; A. Roudy, of Brazil, vice-president and general manager, and Emil Petit, of Paris, secretary.

New money to the amount of approximately $4,000,000 has been raised by a syndicate of French bankers, in accordance with the terms of the reorganization plan, which, in brief, called for the issue of 21,060,000 francs of new prior lien bonds. More than two years have been required in working out the reorganization, the progress of which was greatly hampered by difficulties arising out of the war.

Important English interests which held a large amount of the securities of the company when it went into receiver's hands at the outbreak of the war have retained possession of their equity in the property and have joined hands with the French in bringing about the successful reorganization.

Since the beginning of the war the Brazilian system has been starved so far as obtaining new rolling stock and other equipment was concerned, so that in order to put the property in first class operating condition large expenditures would have to be made. It is estimated that 200 new locomotives are needed, as well as thousands of freight cars. At the same time a large tonnage of steel rails is needed.

Railroad Notes from China

Special Correspondence from Peking (Delayed)

The organization of the through traffic bureau as a part of the Ministry of Communications was effected during September. The bureau consists of four sections, general affairs, domestic through traffic arrangements, foreign through traffic arrangements, and the clearing house. The appointment as head of the bureau of Kuan Keng Lin, who is also director of the railway department of the ministry, serves to make clear that it is the intention of the ministry to take a more active part in the management of the railways than has hitherto been the case. This point is accentuated by the further fact that C. S. Liu (a graduate of the University of Pennsylvania) who is now chief of the traffic division in the ministry, has been placed in charge of the general affairs section of the bureau. Chinese also head the two arrangements sections. But the clearing house has been placed in charge of J. E. Foley, the veteran traffic manager of the Peking-Mukden line. Mr. Foley began his railway life in the clearing house in Dublin in 1876. He has been in China some 20 years. For 16 years prior to joining the Peking-Mukden staff he served with the Australian railways, except for one year, 1894, spent on the Pennsylvania Lines. As director of the clearing house Mr. Foley will be responsible for the devising of methods of control of car interchange, inspection, and interline repairs. It is apparent therefore that the ministry has an aggressive policy of unification of the various lines which it expects to have worked out along practical lines. The accounting work of the clearing house has been placed in charge of another foreigner, J. Lockhart, who up to October 1, had charge of the same matters on the Peking-Mukden line. Mr. Lockhart began railway work with the Caledonian Railway in station service in 1896. After working up through the clerical ranks of the Western division superintendent's office, he came to China in 1909 as revenue audit clerk of the Peking-Mukden line. He was given particular charge of through traffic audit when that service began in 1913. The nature of these appointments has given rise to a very definite impression that the Chinese government expects to take from now on a very marked control of her railways, and will make use of the technical ability which will make such control adequate.

Further Details Concerning Japan's Concessions in China

Report was made in these columns several weeks ago that work was to be resumed upon the Lung Hai line from Suchowfu to Haichow, with the remark that where the funds were to come from was a mystery, for it was known that the syndicate which has this concession had allowed its funds to be used by Yuan Shi Kai to further his monarchical ambitions. The mystery is now cleared up. The funds are to come from Japan and be furnished by the group who have been purveying to the Chinese government throughout the past year. The line, however, will not be continued to Haichow, but to Kaomi, near Tsingtau. If this line is built it will divert the bulk of the traffic now delivered to the Tientsin Pukow destined to Pukow. The haul to Tsingtau will be of about the same length as that to Pukow and the harbor at Tsingtau is much superior. This project, taken in connection with the extension of the Shantung Railway to Shunte, indicates a very definite plan to gather as much of the traffic of northern interior China for shipment through Tsingtau as it is possible to get. The commercial interests of Tientsin and Shanghai are immediately threatened, and the disposition of Tsingtau and the Shantung Railway at the peace conference is raised to paramount importance. The peace of the Far East will probably hinge upon the decision made on that question. The Japanese who at first were not satisfied with the extension to Shunte, preferring either Taokow or Chentingfu, have apparently been satisfied. It is said that certain privileges for civil courts under Japanese authority in Shantung have been granted in connection with the railway concession, and it is possible that this is the price.

Another line is also granted to the Japanese group, according to report. This will consist of an extension of the Ssupingkai-Chengchiatun line through Jehol to Peking. Roughly this line will parallel the Peking-Mukden line. But it will be located on the opposite side of a mountain range difficult of passage, and so will compete with it only for business originating beyond Mukden destined to Peking, and vice versa. Publication of the terms of these concessions has aroused no little feeling, and is said to have caused the resignation of Yeh Kung Cho, vice-minister of communications, who was charged with making the terms public. Others give a similar interpretation to his resignation by saying that Japanese influence caused his downfall because he was thought to be susceptible to American influence.

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The Tientsin-Pukow Railway has been interrupted much of late by bandit activities in Shantung. Still further south the line was cut for some days by order of the military governor of Nanking, who refused to allow northern troops to pass through his territory.

* * *

The shortage of cars on the Tientsin-Pukow has placed Shanghai and the government railways running out of that point at the mercy of Japanese coal dealers. These in turn have to wait upon shipping space. As a result those railways will probably have to pay between $16 and $17 per ton for fuel during the coming year.

* * *

The soldier menace on Chinese Government Railways continues. During the past few weeks the Tientsin-Pukow has been broken again. This road, in an effort to minimize trouble from soldiers, changed the time of its through express between Peking and Hankow so as to pass the infested district in the night. This has resulted in an improvement. But some days ago at an intermediate terminal, two officers left a soldier guard with the engine while they went into the town for a leisurely breakfast, returning after they had delayed the train one hour.

* * *

From October 21 to 29, inclusive, occurred the Third Conference of the Standing Committee on the Unification of Railway Accounts and Statistics. This committee is composed of the chief accountants of the several lines, and accounting officers of the Ministry of Communications. Its sessions dealt principally with questions of practice under the still new uniform classification of accounts. All accountants having doubts as to correct practice refer such cases to this committee for discussion. Similarly, exceptions to practices upon the lines taken by the auditors from the ministry are brought up for discussion. Decisions taken by the committee are passed to the ministry for approval, after which they become binding rules. Beyond these routine questions, a start was made toward the promulgation of uniform station accounts and forms. At present there are two distinct varieties followed upon the lines using English as the foreign language, and another upon the so-called French lines. Upon the French lines there are no traveling auditors, reliance being placed upon daily reports. A chief station accountant from the head office makes surprise examinations of such stations as come under suspicion. It is proposed under the new system to put more of the accounting work upon the stations and to increase the force of traveling auditors. The monthly system of reports will then be followed.

DELIVERY OF U. S. R. A. STANDARD CARS AS OF FEBRUARY 1.

Type	Manufacturer	A.C.L.	B. & L.E.	B.R. & P.	C.C. & O.	C. & W.C.	C. & N.W.	C.B.&Q.	C.C.C. & St.L.	C.&S.	Georgia	I.C.	K.&M.	M.C.	M.P.	N.Y.C.	N.Y.N.H. & H.	T.&O.C.	Total
40-t. D. S. Box	Am. Car & Fdy. Co.	183	...	...	...	...	1,250	500	...	...	...	...	...	...	16	500	...	...	2,449
40-t. D. S. Box	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	750	...	...	...	...	...	...	500	...	141	1,391
40-t. D. S. Box	Am. Car & Fdy. Co.	...	...	...	...	203	...	...	...	...	...	...	...	...	...	...	...	...	203
40-t. D. S. Box	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	91	...	...	...	...	...	...	...	...	...	91
																			4,134
50-t. S. S. Box	Am. Car & Fdy. Co.	...	...	...	...	...	500	...	...	...	...	...	...	354	...	...	...	...	854
50-t. S. S. Box	Haskell & Barker	...	...	...	...	...	500	...	...	...	300	...	...	...	...	...	...	...	800
50-t. S. S. Box	Pullman Car Co.	...	...	...	...	...	...	...	...	...	...	...	...	111	...	...	...	...	111
																			1,765
50-t. Comp. Gondola	Am. Car & Fdy. Co.	...	...	...	...	...	500	250	...	...	...	...	...	200	...	250	...	...	1,200
50-t. Comp. Gondola	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	...	...	...	150	...	...	...	250	...	...	400
50-t. Comp. Gondola	Am. Car & Fdy. Co.	50	...	...	...	...	...	...	...	...	...	...	...	200	...	...	...	...	250
50-t. Comp. Gondola	Haskell & Barker	250	...	...	...	...	500	...	...	...	...	50	...	200	...	...	...	...	1,000
50-t. Comp. Gondola	Pressed Steel Car Co.	...	...	...	...	...	...	500	...	...	100	500	...	200	...	500	...	...	1,800
50-t. Comp. Gondola	Standard Steel Car Co.	...	...	...	...	...	...	250	...	...	...	300	...	200	...	...	...	...	750
																			5,400
55-t. Steel Hopper	Am. Car & Fdy. Co.	...	250	...	250	...	...	...	200	...	...	...	...	...	...	...	...	500	1,200
55-t. Steel Hopper	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	...	...	...	38	...	...	...	...	...	...	38
55-t. Steel Hopper	Pressed Steel Car Co.	...	...	500	250	...	...	...	200	...	...	200	300	...	...	500	400	...	2,350
55-t. Steel Hopper	Pullman Car Co.	...	...	300	...	...	...	...	200	300	...	250	...	...	...	...	500	...	1,550
55-t. Steel Hopper	Ralston Steel Car Co.	...	...	...	...	...	...	...	200	...	...	200	200	...	...	...	200	...	800
55-t. Steel Hopper	Standard Steel Car Co.	...	250	...	250	...	...	...	200	...	...	200	...	...	...	500	400	...	1,800
Grand total		483	500	800	750	203	3,250	1,500	1,841	300	400	1,888	500	1,465	16	3,000	1,500	641	19,037

Equipment and Supplies

Locomotives

GILLESPIE BROTHERS & Co., 11 Broadway, New York, are inquiring for one or two second-hand, standard gage locomotives, weighing from 90 to 100 tons. Letters should be addressed to Miss M. Moody, of the West India department.

Locomotive Deliveries

The following locomotives were shipped during the week ended February 22:

Works	Road	Number	Type
American	C. B. & Q.	3	USRA St. F.
	Penn. L. W.	1	Santa Fe.
	Central of Ga.	1	Mountain.
	Chic. Great Western	2	USRA 6W. Sw.
	Erie R. R.	1	USRA St. F.
		8	
Lima	L. & N.	17	USRA Mikado.
Baldwin	B. & O.	5	USRA Mikado.
	Penn. R. R.	1	Mikado.
	Ill. Cent.	2	Mikado.
	Phil. & Read.	1	Mallet.
	Lehigh Vall.	1	Pacific.
	Atch., Top. & St. Fe.	1	Mikado.
	Phil. & Read.	1	Consol.
		12	
Grand total		37	

Freight Cars

The J. G. WHITE Co., New York, is inquiring for 20 tank cars.

The E. I. DU PONT DE NEMOURS & Co. is inquiring for 15 cars.

ANDERSON, MEYER & Co., New York, are inquiring for 100 high-side gondola cars for export to China.

Car Deliveries

New standard cars were accepted during the week ended February 15 as follows:

Road	Number		Type	Manufacturer	Total accepted for given roads
A. C. L.	97	40	T. D. S. Box	Am. Car & Fdy. Co.	413
A. C. L.	131	40	T. D. S. Box	Am. Car & Fdy. Co.	131
C. & W. C.	46	40	T. D. S. Box	Am. Car & Fdy. Co.	290
C. C. C. & St. L.	46	40	T. D. S. Box	Am. Car & Fdy. Co.	194
F. McK. & Y.	151	50	T. S. S. Box	Am. Car & Fdy. Co.	151
N. Y. C.	154	50	T. S. S. Box	Haskell & Barker	363
Mich. Cent.	151	50	T. S. S. Box	Pullman Car Co.	500
L. & N.	178	50	T. Comp. Gon.	Am. Car & Fdy. Co.	237
L. & N.	29	50	T. Comp. Gon.	Am. Car & Fdy. Co.	48
L. & N.	187	50	T. Comp. Gon.	Pressed St. Car Co.	400
L. & N.	154	50	T. Comp. Gon.	Standard St. Car Co.	154
L. & N.	216	55	T. St. Hopper.	Pressed St. Car Co.	310
L. & N.	50	55	T. St. Hopper.	Pullman Car Co.	50
L. & N.	216	55	T. St. Hopper.	Standard St. Car Co.	256
Total	1,806				

New standard cars were accepted during the week ended February 22, as follows:

Road	Number		Type	Manufacturer	Total accepted for given roads
A. C. L.	37	40	T. D. S. Box	Am. Car & Fdy. Co.	450
A. C. L.	116	40	T. D. S. Box	Am. Car & Fdy. Co.	247
A. C. L.	52	40	T. D. S. Box	Am. Car & Fdy Co.	52
C. & W. C.	10	40	T. D. S. Box	Am. Car & Fdy. Co.	300
C. C. C. & St. L.	23	40	T. D. S. Box	Am. Car & Fdy. Co.	217
Pittsb., McK. & Y.	131	50	T. S. S. Box	Am. Car & Fdy. Co.	282
N. Y. C.	115	50	T. S. S. Box	Haskell & Barker	478
L. & N.	8	50	T. Comp. Gon.	Am. Car & Fdy. Co.	245
L. & N.	10	50	T. Comp. Gon.	Am. Car & Fdy. Co.	58
L. & N.	25	50	T. Comp. Gon.	Std. Steel C. C.	179
L. & N.	90	55	T. St. Hopper.	Pressed St. C. C.	400
L. & N.	150	55	T. St. Hopper.	Pullman Car Co.	200
L. & N.	144	55	T. St. Hopper.	Std. Steel C. C.	400
N. Y. C.	33	70	T. L. S. Gond.	Pressed St. C. C.	33
Total	944				

The Railroad Administration has given out the statement in the table in the opposite column showing the delivery of U. S. R. A. standard cars as of February 1.

Machinery and Engineering Supplies Held by War Department

The War Department authorizes the following statement from the office of the director of purchase and storage:

The stock of machinery and engineering supplies on hand as of February 1 is shown by a summary compiled by the statistical division of the office of the director of purchase and storage. The report includes stock on hand at inland storage and at ports, and gives the estimated value of the supplies as follows:

Article	Quantity	Estimated value
Locomotives, standard gage:		
Set up, complete	12	$456,000
Knocked down, complete	120	4,467,000
Knocked down, incomplete	20	740,000
Spare parts ..... tons	891.9	44,387
125 horsepower gas	6	123,000
Locomotives, narrow gage:		
60 C. M. steam	26	292,500
60 C. M., 50 horsepower, gas	1	7,150
Cars, standard gauge:		
Box (complete)	250	650,000
Low gondola (complete)	150	323,850
Flat artillery (complete)	454	306,450
Tank (complete)	150	480,000
Ballasts (complete)	152	454,024
Refrigerator (complete)	100	350,000
Push (complete)	112	3,920
Box (incomplete)	300	690,000
L. S. gondola (incomplete)	200	400,000
Tank (incomplete)	100	290,000
Repair parts (incomplete) ..... tons	578	37,570
Flat cars	350	196,000
Cars, narrow gage:		
Artillery trucks (complete)	100	48,300
Box (complete)	65	76,050
Dump (complete)	219	28,032
Truck materials and fastenings:		
Rails (80 pounds, 67½ pounds, 50 pounds, 35 pounds and 25 pounds) ..... tons	65,426.38	3,729,304
Spikes, bolts ..... do	1,027.2	87,312
Angle and splice bars ..... do	1,167.74	50,446
Turnouts and switches ..... do	2,639.56	131,978
Angle plates, ties, stands, guard rails. do	221.3	11,065
Track material, narrow gage rail and fit.. do	13,144	657,200
Pipe and fittings	19,086.7	1,431,503
Wagon transportation:		
Pontoon trains	757	757,000
Limber and caisson	18	16,830
Dump	55	10,313
Tools, spring	101	35,350
Sprinkler	167	61,790
Escort	994.4	144,188
Auto trucks, trailers and tractors ..... tons	4,606.2	3,454,650
Miscellaneous auto trucks ..... do	1,139.2	797,440
Explosives ..... do	978.6	587,160
Lumber ..... feet b. m.	6,572,317	197,170
Miscellaneous lumber ..... tons	18,391.91	275,879
Machinery:		
Hoisting engines	4	3,375
Engines	61	87,230
Locomotive cranes	16	16,000
Steam shovels	2	18,400
Boilers	2	7,600
Derricks	42	24,780
Road rollers	30	90,000
Sawmills	55	192,500
Gantry cranes and equipment ..... tons	298.1	89,430
Shears, crushers, lathes, planes ..... do	306.4	91,920
Miscellaneous ..... do	11,614	3,484,200
Engineer supplies:		
Paints, oils, turpentine, etc ..... do	644.8	41,912
Electrical material ..... do	513.4	43,639
Roofing paper and felt ..... do	2,218.2	177,456
Wall board ..... do	369.4	29,552
Copper wire ..... do	595.5	297,750
Carbide ..... do	780.2	66,317
Floating derrick ..... do	101.2	7,590
Miscellaneous ..... do	7,638.8	496,522
Steel products:		
Beams ..... do	980.2	53,913
Sheets, corrugated ..... do	5,656.4	362,009
Barbed wire ..... do	587.1	56,362
Plain wire ..... do	691.6	55,328
Angle posts ..... do	462	34,650
Screw posts ..... do	96	7,200
Steel shelters ..... do	661.5	49,613
Bars ..... do	253.2	16,458
Wire netting ..... do	518.2	36,274
Tanks, water and gas ..... do	845.1	59,157
Expanded metal ..... do	980.1	53,906
Steel plates and hangers ..... do	1,839.3	119,555
Steel rope ..... do	104	14,560
Miscellaneous ..... do	22,233	1,667,475
Hardware:		
Hand tools ..... do	545.6	272,800
Bolts, nuts and washers ..... do	559.3	54,811
Nails ..... do	1,774.5	133,087
Boat spikes ..... do	119	8,925
Staples ..... do	307.4	24,592
Compasses	290,233	757,508
Levels	17,926	215,112
Saws	120,410	240,820
Shovels	530,300	483,786
Tape ..... spools	982,981	216,255
Miscellaneous ..... tons	50,000	12,500,000
Grand total		$45,661,129

Supply Trade News

The Dearborn Chemical Company, Chicago, announces the opening of offices in the Commerce Trust building, Kansas City, Mo. E. M. Massen and W. H. Fairlamb will make their headquarters at that office.

The Chicago Pneumatic Tool Company announces the removal of its Cleveland district office from room 813 to room 406 Engineers building, effective March 1. Roos Watson is district manager at this office.

The bill validating informal war contracts, many of which were held by companies engaged in the railway supply field, which has been pending before Congress for several weeks, was signed by the President on March 3.

Wilson W. Butler, whose appointment as president of the Canadian Car & Foundry Company, Ltd., the Canadian Steel Foundries, Ltd., and the Pratt & Letchworth Company, Ltd., Canada, was announced in the *Railway Age* of February 21 (page 473), was born at Danville, Ohio, on December 9, 1862, and received his early education in the Danville Select School. Mr. Butler began his business career with the John Shillito Company, at Cincinnati, Ohio, and later was appointed western manager of the Sterlingworth Railroad Supply Company, at Chicago. Subsequent to his appointment as president of the Canadian Car & Foundry Company, Mr. Butler served as western sales agent of the American Car & Foundry Company, at Chicago; second vice-president and director of the Simplex Railway Appliance Company, at New York; second vice-president and director of the American Steel Foundries, at New York; in 1901, as vice-president and director of the Simplex Railway Appliance Company, he established the manufacturing plant of that company in Montreal, Que. He was also vice-president and director of the Dominion Steel Car Company, near Montreal, where the first steel car manufactured in Canada was built. Mr. Butler was instrumental in the organization of the Canadian Car & Foundry Company, Ltd., composed of the Dominion Car & Foundry Company, the Canada Car Company and the Rhodes Curry Company. Since shortly after the beginning of the war, the plants of the companies of which Mr. Butler is president have been engaged in the production of steel, and the forging and machining of shells, for the American, British and Russian governments. Mr. Butler succeeds **Senator N. Curry,** who has retired from the presidency of the companies, and now holds the position of chairman of the board of directors.



W. W. Butler

O. E. Berggren has been appointed northwestern representative of the A G A Railway Light & Signal Company, vice **H. E. Gifford,** resigned. Mr. Berggren's headquarters are at 857 Peoples Gas building, Chicago.

Frank G. Wallace, vice-president of the **Canadian Locomotive Company,** has been elected president to succeed the late Dr. J. J. Harty, who died in London on February 23. J. L. Whiting succeeds Mr. Wallace as vice-president.

H. H. Morgan, who has been connected with the Chicago office of Robert W. Hunt & Co., for 15 years as head of the cement department and physical laboratory, has been trans-

ferred to the Pittsburgh office as assistant to **D. W. McNaugher**, who is the Pittsburgh partner of this company.

Millard F. Cox, assistant superintendent of machinery of the Louisville & Nashville, at Louisville, Ky., has become associated with the Louisville Fire Brick Works, Inc., of Louisville, as vice-president and consulting engineer.

W. S. Moore, formerly with the **Cleveland Frog & Crossing Company**, Cleveland, Ohio, has been appointed assistant to the president and general manager of the Greenville Gravel Company, with headquarters at Greenville, Ohio.

The Kalamazoo Railway Supply Company, Kalamazoo, Mich., has recently let a contract for the erection of an addition to its plant at Kalamazoo. The building will be of brick, 50 ft. by 135 ft., with a saw tooth roof, and will cost approximately $10,000.

Malcolm L. Maclean, formerly manager of sales, miscellaneous department, of the **American Steel Foundries**, with headquarters at Chicago, and until recently a major in the infantry, has been appointed manager of sales of the Duquesne Steel Foundry Company, at Pittsburgh, Pa.

The controlling interest of the **Carroll Foundry & Machine Company**, Bucyrus, Ohio, manufacturers of locomotive cranes, has been purchased by Cleveland interests, and a temporary organization has been perfected which will be taken over later when the company is reorganized.

The Universal Car Seal & Appliance Company, Lyon Block, Albany, N. Y., has recently been reorganized and has changed its name to the Universal Seal Corporation. It has moved its offices and manufacturing headquarters to 270-276 Hudson avenue, Albany, N. Y. The new officers are as follows: C. R. Martineau, president; Gardner C. Leonard, vice-president; Edward J. Fitzsimmons, Jr., treasurer; Wm. C. Martineau, secretary.

The Deeming-Endsley Company has been organized with headquarters in the Transportation Building, Chicago, with Horace F. Endsley, president; Herbert Deeming, vice-president and general manager; H. M. Barney, secretary and treasurer. The board of directors is composed of Horace F. Endsley, Herbert Deeming, D. D. Glass, H. M. Barney, O. P. Morrison, A. L. Knowles and Eugene Landers. The new company will handle the Morrison Switch-Point Hold-Down and other railroad devices. Mr. Deeming was born in England on April 16, 1880, and began his business career as a stenographer and clerk in the general passenger department of the Freemont, Elkhorn & Missouri Valley at Omaha, Neb., in October, 1897. From July, 1899, to September he was with the American Express Company at Omaha, and from the latter month until January, 1900, he was employed in the general superintendent's office of the Fremont, Elkhorn & Missouri Valley. He was then promoted to secretary to the general freight agent of the same road, and in July, 1902, went to Chicago, where he was employed in the auditor's office of the Chicago & Western Indiana. In January, 1903, he was promoted to a position in the office of the president and general manager. From July, 1903, to February, 1916, he was secretary of the General Managers' Association, at Chicago, and from November, 1907, to February, 1916, was also secretary of the Association of Western Railways. In March, 1916, he became assistant director of the Railway Educational Bureau at Omaha, Neb., and seven months later he became associated with the H. E. Reisman Advertising Company. Later he became associated with Mudge & Company as sales manager, which position he held for nearly two years until the Deeming-Endsley Company was incorporated.



H. Deeming

C. W. Johnson has been appointed assistant manager of works of the Westinghouse Electric & Manufacturing Company. After graduating from Ohio State University, Mr. Johnson entered the employ of the Steel Motor Company of Johnstown, Pa. A year later he became associated with the Bullock Electric Company, of Cincinnati, Ohio, and in 1904 was made superintendent of Allis-Chalmers-Bullock, Ltd., of Montreal, Can. In 1907 he entered the employ of the Westinghouse company, being appointed chief inspector of works, in which capacity he served until his recent appointment.

Interstate Iron and Steel Company

The annual report of the Interstate Iron & Steel Company, Chicago, for the year ending December 31, 1918, shows net earnings of $490,338.45 after the deduction of $60,590.83 for the dividend paid on preferred stock, the adjustment in respect of 1917 federal taxes, ample provision for depreciation, appropriations for the preferred stock sinking fund and the paying of all operating expenses, taxes and sick charges. These net earnings are approximately half of the net earnings reported for the year ending December 31, 1917.

The company's balance sheet for the last fiscal year is as follows:

Assets	
Land, buildings, plant, machinery, furniture and good-will...	$6,032,587.24
Current assets	4,669,753.06
Deferred charges: Insurance, interest, etc	8,662.07
	$10,711,002.37
Liabilities	
Capital liabilities:	
Preferred stock—7 per cent cumulative, issued and outstanding	$860,200.00
Common stock—authorized and issued	4,000,000.00
First mortgage 6 per cent serial sinking fund bonds, issued and outstanding	2,017,800.00
Current liabilities	1,742,887.26
Reserves	454,578.15
Surplus	1,635,536.96
	$10,711,002.37

American Locomotive Company Shows Increased Earnings

The gross business of the American Locomotive Company for the six months ending December 31, 1918, according to a semi-annual statement of operations to the stockholders by Andrew Fletcher, president of the company, amounted to $59,480,026 as compared with $35,959,126 for the same period of the previous year. This large increase was due to the new high records of production made at the larger plants of the company, together with the addition of the production of the Richmond and Montreal plants which, in the six months of 1917, were being reorganized and converted from munitions to locomotive manufacture. The remainder of the report follows:

"The profits for the six months were $8,244,352 before deductions for taxes in comparison with $6,010,009 for the six months' period ending December 31, 1917, an increase of $2,234,343. The percentage of profit to gross was 13.9 per cent as compared with 16.7 for the same period of 1917. A large proportion of the locomotive production was for the United States Railroad Administration, and was sold on a smaller margin of profit than was obtained for the output of the 1917 period.

"There has been reserved for United States income and excess profit taxes and Canadian income taxes $3,148,884, which amount is $1,108,126 in excess of the allowance for the similar period of the previous year. After deduction of taxes an available balance of $5,095,468 net profits remained.

"During the six months two quarterly dividends, each of 1¾ per cent., were paid on the preferred stock and two quarterly dividends, each of 1¼ per cent, were paid on the common stock. A reserve of $1,000,000 out of the net profits has been set aside for additions and betterments, continuing the policy of the management to improve the physical con-

ditions and for balancing the productive efficiency of the various plants, and the remaining surplus of $2,595,468 for the six months period was carried to the general surplus account, making such account as of December 31, 1918—$20,423,975.

"The value of stock materials on hand as of December 31, 1918, has been written down to the present day market prices.

"The amount of inventories of materials and supplies on hand and work in progress December 31, 1918, was $21,432,-377, as compared with $25,411,834 on June 30, 1918.

"The net current assets of the company on December 31, 1918, were $29,652,742.

"Shortly after the signing of the armistice orders were received from the government to suspend work on a contract received in October for 190 trench locomotives for military service in France, the contract price for which was $1,873,400. Negotiations are now under way to effect an adjustment of same. The company should not sustain any loss in the settlement. On November 1, 1918, the company received from the United States Railroad Administration a contract for 500 standardized locomotives, which are now in process of construction.

"The unfilled orders on December 31, 1918, amounted to $54,517,373, and since that date approximately $4,200,000 of orders have been received for Canada, South Africa and Argentine Republic. We anticipate in the near future a moderate amount of additional foreign buying, but the prospect for domestic orders is very poor. The Pittsburgh plant will be closed at the completion of its schedule the latter part of March. The company has sufficient business to operate the other plants at a reduced rate of production until about June 30, 1919.

"It is vitally important to the prosperity of the locomotive industry and all industries connected with the building and equipment of railways, that a prompt and definite settlement be made of the questions before Congress of the disposition and financing of the railroads of this country; such settlement will aid materially in the readjustment of general business from a war to a peace basis."

CONDENSED INCOME ACCOUNT OF THE AMERICAN LOCOMOTIVE COMPANY AND ITS SUBSIDIARIES FOR THE SIX MONTHS ENDED DECEMBER 31, 1918, AS COMPARED WITH THE SIX MONTHS ENDED DECEMBER 31, 1917

	Six months to December 31, 1918	Six months to December 31, 1917	Increase
Gross earnings	$59,480,026	$35,959,126	$23,520,900
Mfg., maint. and adm. expenses and depreciation	50,986,284	29,851,294	21,134,990
	$8,493,742	$6,107,832	$2,385,910
Interest charges	249,390	97,823	151,567
Net profit	$8,244,352	$6,010,009	$2,234,343
Reserve for U. S. and Can. taxes on profits	3,148,884	2,040,758	1,108,126
Profit available	$5,095,468	$3,969,251	$1,126,217
Dividends on pref. for six months	875,000	875,000	.....
Dividends on com. for six months	625,000	625,000	.....
	$3,595,468	$2,469,251	$1,126,217
Reserve for additions and betterments	1,000,000	.....	1,000,000
Surplus profit	$2,595,468	$2,469,251	$126,217

Trade Publications

OSGOOD RAILROAD DITCHER.—The Osgood Company, Marion, Ohio, has issued an eight page leaflet describing the Osgood No. 18 railroad ditcher manufactured by that company. The information is presented in the form of a descriptive article illustrated with half tones and line drawings.

SWITCH-POINT HOLD DOWN.—The Deeming-Endsley Company, Chicago, has issued a 12-page folder describing the results secured with a device manufactured by that company for safeguarding switches against the tendency for the switch points to "cock up." It is illustrated with photographs of actual installations.

THE INSLEY IDEA.—The Insley Manufacturing Company has just issued the first number of a bi-monthly publication to appear under the above name. It consists of eight illustrated pages, 9 in. by 12 in., and is devoted to descriptions and expositions of construction work of interest to contractors, industrial plants and others that are prospective users of Insley equipment.

Financial and Construction

Railway Financial News

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—Hornblower & Weeks and William Salomon & Co. are offering $6,070,000 consolidated mortgage 6 per cent bonds, due June 1, 1930, at 106¼ and interest, to yield 5¼ per cent. These bonds will be secured by a first mortgage on about 1,589 miles of line, and by a second mortgage on about 80 miles additional, total of about 1,669 miles, on which the mortgage debt averages $17,-150 per mile.

MISSOURI PACIFIC.—Matthew C. Brush, president of the American International Shipbuilding Corporation, and John G. Lonsdale, president of the St. Louis National Bank of Commerce, have been elected directors of this company.

NEW YORK CENTRAL.—The Railroad Administration, through John Skelton Williams, director of finance, has authorized the New York Central lines to accept the bid of the Bankers Trust Company for $17,500,000 equipment trust certificates. President Vanderbilt, of the New York Central lines, announced on Tuesday that the director general of railroads had authorized the acceptance of bids made by the Bankers Trust Company, the Union Trust Company of Pittsburgh, and Hallgarten & Co., on approximately a 6 per cent basis, for equipment trust certificates, as follows: $7,410,000, principal amount, New York Central Railroad equipment trust of 1917, 4½ per cent certificates; $7,800,000, principal amount, Michigan Central Railroad equipment trust of 1917, 6 per cent. certificates; $2,133,000, principal amount, Big Four Railway equipment trust of 1917, 6 per cent certificates.

NEW YORK, CHICAGO & ST. LOUIS.—The New York Public Service Commission has issued an order authorizing this company to execute to the First Trust and Savings Company of Cleveland and Walter J. Riley, trustees, a mortgage to secure the $25,000,000 issue of second and improvement mortgage bonds. The order authorizes at the present time the issuance of $4;135,000 in bonds. The proceeds are to be applied to the payment of a note held by a Cleveland bank, to indebtedness to the director general of railroads, to reimburse the company's treasury for capital expenditure and pay current liabilities.

NEW YORK, NEW HAVEN & HARTFORD.—Federal Judge Manton, in the United States District Court of New York, on February 28, reserved decision on the motion of the minority stockholders' committee for the appointment of a limited receiver to prosecute pending litigation to recover $150,-000,000 from former directors of the road.

Railway Construction

BURKEVILLE RAILWAY.—Incorporated in Texas, to build a 20-mile railroad connecting Burkeville, Texas and Wiergate. The incorporators include K. Johnson, T. R. Dickerson and H. C. Knight, all of Burkeville.

TANKS.—Bulletin 259 of the Walter A. Zelnicker Supply Company, St. Louis, Mo., contains a revised list of new and used tanks of all kinds and sizes that are for sale by this company.

RAILROAD BUILDING BOOK.—The Truscon Steel Company, railroad department, Chicago, Ill., has issued the cover and first leaves of a loose-leaf compilation of various data of use in railroad concrete construction. The book is made of a size that will fit the ordinary letter file and in addition to an introductory sheet, three sheets have been included to indicate the character of material to be expected in later issues. One concerns concrete and cement mortar quantities, another gives the sizes and weights of the various reinforcing bars and a third gives properties of collapsible column hooping and the dimensions for column footings.

Railway Officers

Railroad Administration

Central

Oscar A. Price, assistant to the director general of railroads, has resigned, effective on April 1, to become president of the United Artists Corporation.

Luther M. Walters, assistant director of the division of public service and accounting, at Washington, D. C., has returned to active practice as a member of the law firm of Borders, Walters & Burchmore, at Chicago. Mr. Walters will handle railroad and public utility cases.

Regional

The lines in the Southwestern Region have been regrouped, effective March 1, and changes have been made in the jurisdiction of the federal managers, as mentioned in this issue on page 552.

Federal and General Managers

E. E. Calvin, federal manager of the Union Pacific, the Oregon Short Line, the Los Angeles & Salt Lake and the Gilmore & Pittsburgh, has had his jurisdiction extended over the St. Joseph (Mo.) terminal, with headquarters at Omaha, Neb.

LeRoy Kramer, who has resigned as federal manager of the Frisco-Katy lines north of Texas to become vice-president in charge of production of the Willys-Overland Company, Toledo, O., was born at Wichita, Kan., in 1875. He was educated in the Wichita grade and high schools and entered railway service in 1897 as stenographer and clerk in the offices of the St. Louis-San Francisco. From this time until 1907 he was consecutively in various clerkships in the division office and later became chief clerk to the general superintendent of transportation, to the general manager and vice-president and to the assistant to the vice-president. From 1907 to 1908 he was superintendent of the Kansas division and from 1908 to 1909 superintendent of the Central division of the same road. In 1909 he went to the Chicago, Rock Island & Pacific as assistant to the vice-president in charge of purchases and stores. In 1910 he was promoted to assistant to the vice-president of the same road and in 1912 was appointed assistant to the president of the Pullman Company, being elected vice-president of the same company at Chicago in March, 1915. Following the taking over of the railroads by the government, Mr. Kramer was appointed federal manager of the Kansas City, Clinton & Springfield, the Missouri, Kansas & Texas, the Missouri, Oklahoma & Gulf, the St. Louis-San Francisco and the Paris & Great Northern, which position he held until his resignation on February 28 to enter the automobile industry.



Le Roy Kramer

W. A. Winburn, federal manager of the Central of Georgia; the Louisville & Wadley; the Sylvania Central; the Wadley Southern, and the Wrightsville & Tennille, has been appointed federal manager also of the Gainesville Midland Railroad, with office at Savannah, Ga.

J. F. Murphy, general manager of the Missouri Pacific, the Arkansas Central, the Chicago, Rock Island & Pacific (lines from St. Louis to Kansas City), the Memphis, Dallas & Gulf, and the Natchez & Southern, has had the Illinois division of the Missouri Pacific and the Coal Belt Electric returned to his jurisdiction.

The jurisdiction of **H. E. Byram**, federal manager of the Chicago, Milwaukee & St. Paul, the Escanaba & Lake Superior, the Tacoma Eastern, the Seattle, Port Angeles & Western, the Port Townsend & Puget Sound, the Ontonagon, has been discontinued over the Port Townsend & Puget Sound as this line has been relinquished from government control.

C. G. Burnham, federal manager of the Chicago, Burlington & Quincy, the Davenport, Rock Island & Northwestern, the Hannibal Union Depot, the Illinois terminal, the Missouri & Illinois Bridge & Belt, the Paducah & Illinois, the Quincy, Omaha & Kansas, the Rapid City, Black Hills & Western, the Rockport, Langdon & Northern, and the Toledo, Peoria & Western, has had his jurisdiction extended over the St. Joseph, Mo., Union Depot, with headquarters at Chicago.

Operating

J. B. McLaughlin has been appointed inspector of agencies of the Southern Railroad, Richmond division, with headquarters at Richmond, Va.

J. Cannon, general superintendent of the Eastern division, of the Missouri Pacific, has had his jurisdiction extended over the Illinois division of that road and also over the Coal Belt Electric.

Engineering and Rolling Stock

L. W. Duffee, acting chief engineer of the Gulf, Mobile & Northern and the Meridian & Memphis, has been appointed chief engineer, maintenance of way department, with headquarters at Laurel, Miss.

Lieutenant Walter L. Lewis, 163rd Artillery Brigade, who recently returned from France, has received his honorable release from service and has resumed his work in the engineering department of the Great Northern.

E. W. Pratt, assistant superintendent, motive power and car departments of the Chicago & North Western, with headquarters at Chicago, retired from active service on March 1, and has been granted an extended leave of absence. Although not 50 years of age, Mr. Pratt has served the Chicago & North Western for nearly 30 years, starting as a message boy and telegraph student when 14 years old, then working in the engineering department and on construction work to earn money to enable him to complete a course of mechanical engineering at Lehigh University, where he also specialized in chemistry and metallurgy. Having had practical work in both civil and mechanical engineering, Mr. Pratt specialized in electrical engineering for one year with the Western Electric Company of Chicago, and again entered the employ of the Chicago & North Western as general air brake inspector and instructor, being promoted successively to engine house foreman, general foreman, master mechanic and assistant superintendent of the motive power and car departments, in which latter capacity he has remained ten years. Mr. Pratt has been active in railway association work, having been president of the Western Railway Club, Chicago, in 1914-15; president of the American



E. W. Pratt

Railway Master Mechanics' Association in 1915-16 and president of the International Railway Fuel Association in 1917-18.

R. H. Ford, engineer of track elevation of the Chicago, Rock Island & Pacific, at Chicago, has been appointed principal assistant engineer, with headquarters in the same city, and the office of engineer of track elevation has been abolished.

E. B. Hall, assistant superintendent of the Wisconsin division of the Chicago & North Western, with headquarters at Milwaukee, has been appointed assistant superintendent of the motive power and car departments of the road, with headquarters at Chicago, to succeed **E. W. Pratt**, who is on leave of absence.

Captain L. C. Dodge, Engineers, U. S. A., with headquarters in the office of the director general of military railways at Washington, D. C., has received his honorable discharge from the army and has been appointed assistant engineer of bridges of the Baltimore & Ohio, western lines, with offices at Cincinnati, Ohio.

E. B. Ford, office engineer of the Great Northern, with headquarters at St. Paul, Minn., has been appointed assistant engineer of the Northwestern region, with office at Seattle, Wash., to succeed **T. G. Hastie**, who has resigned to become resident engineer of the Great Northern, with headquarters at Great Falls, Mont.

T. O. Sechrist, general master mechanic of the Louisville & Nashville, with office at Louisville, Ky., has been appointed assistant superintendent of machinery and the position of general master mechanic has been abolished. **C. J. Bodemer**, division master mechanic, with office at Albany, Ala., has been appointed assistant superintendent of machinery, vice **Millard F. Cox**, with headquarters at Louisville, Ky., resigned to engage in other business.

J. H. Knowles, whose appointment as chief engineer in charge of construction and maintenance of way and structures of the Western Pacific, the Tidewater Southern, and the Deep Creek was announced in the *Railway Age* of February 7 (page 379), was born on December 15, 1875, at Chicago. In 1899 Mr. Knowles graduated from the University of Wisconsin as a civil engineer, and entered the employment of the government in survey work and irrigation in the western states. In 1901, he began his railway career as a structural draftsman in the chief engineer's office of the Oregon Short Line, at Salt Lake City, Utah. Two years later he was appointed an assistant division engineer on the San Pedro, Los Angeles & Salt Lake, which position he held for seven years. From 1910 to 1912 he was a division engineer on the Western Pacific with headquarters at Elko, Nev., and the following six years he served in the capacity of bridge engineer of that road at San Francisco, which position he held until his appointment as chief engineer of the Western Pacific, with headquarters at San Francisco, Cal., to succeed T. J. Wyche, who has resigned to become chief engineer of the Western Pacific Railway Company.



J. H. Knowles

Traffic

The title of **R. W. Davis** has been changed from general freight agent to freight traffic manager of the Buffalo, Rochester & Pittsburgh, with office at Rochester, N. Y.

F. J. Woulfe, assistant general freight agent of the Lehigh Valley, has been appointed general freight agent of the Lehigh Valley; the Susquehanna & New York, and the Buffalo Creek Railroad, with headquarters at New York.

Corporate

Operating

Andrew McCulloch, whose appointment as acting general superintendent of the Kettle Valley, with offices at Penticton, B. C., was announced in the *Railway Age* of February 14, page 423, was engaged in engineering work on both the Eastern and Western lines of the Canadian Pacific for a number of years until his appointment as chief engineer of the Kettle Valley on June 1, 1910, in which capacity he had charge of the location and construction of the road, later taking care of engineering matters on maintenance as well. On December 16, 1918, Mr. McCulloch was appointed acting general superintendent, combining the duties of that office with those of chief engineer.

Engineering and Rolling Stock

Harry J. Sargent, formerly valuation engineer and later assistant to the chief engineer of the Boston & Maine, with office at Boston, Mass., under federal management, has been appointed corporate engineer, effective March 1.

Obituary

George Wesley Scott, consulting engineer, Chicago, died on March 3 at Battle Creek, Mich. Mr. Scott was formerly with the Pullman Company, and was one of the pioneers in steel car construction.

George R. White, auditor of the Louisville & Nashville, for the corporation, with headquarters at Louisville, Ky., died on February 26, at his home in Louisville, at the age of 40. He was born in Jeffersonville, Ind., and in 1900, entered the service of the Louisville & Nashville as a stenographer. He subsequently was appointed assistant auditor of disbursements, and since the L. & N. has been under government control, served as auditor for the corporation.

Frank F. Robb, formerly superintendent of the Pennsylvania Railroad, died on March 3, at his home in Philadelphia, Pa., at the age of 60. He began railway work in 1879, as a rodman on the Pennsylvania Railroad, at Altoona, and subsequently served successively as assistant supervisor, supervisor and assistant engineer. In June, 1893, he was appointed superintendent of the Bedford division, and subsequently served in the same capacity on different divisions of the road, until December, 1903.

George Pope Furber, claims attorney of the Boston & Albany, died on February 27, in Eliot Hospital, Boston, Mass., at the age of 55. He had been in the continuous service of the Boston & Albany since December, 1892, having served in various capacities in the law department until he became claims attorney, and remained in the same position since the road was placed under government control. At the time of his death he was also a counsel, secretary and clerk for the directors of the corporation.

Colonel William Bender Wilson, formerly an officer of the Pennsylvania Railroad, and author of an elaborate history of the company, died at his home in Holmesburg, Pa., on March 27 at the age of 80. He was born at Harrisburg, Pa., April 5, 1839, and was a telegraph operator at an early age. In 1861 he entered the military telegraph service and was manager of the government office at Washington, where he enjoyed the friendship of President Lincoln. He has been one of the leading spirits in the Old Time Telegraphers' Association, and was president of the Society of the United States Military Telegraph Corps. In the railroad service he was an officer in the transportation department. He retired about twenty years ago. He was the author of numerous books, besides the railroad history, and had received from the legislature of the state of Pennsylvania a gold medal, awarded for patriotic services.

EDITORIAL

Railway Age

Receivership for the Grand Trunk Pacific

The Grand Trunk Pacific has apparently been put into the hands of a receiver, without having defaulted on its outstanding obligations. The interest due March 1, was paid, but on March 6, the vice-president of the Grand Trunk Pacific notified Sir Thomas White, acting premier of Canada, that the company would, owing to the lack of funds, have to discontinue operation after March 10. An application for a receiver in the ordinary way, could not be made, but acting under the War Measures Act, orders in council were passed, appointing J. D. Reid, Minister of Railways, as receiver for the Grand Trunk Pacific. At present the Grand Trunk, which is a parent company to the Grand Trunk Pacific, and guarantor of its second mortgages and Lake Superior branch bonds, is conducting negotiations with the Canadian Government, looking to some settlement of the Grand Trunk Pacific situation. The first mortgage bonds of the Grand Trunk Pacific are guaranteed by the Canadian Government and some of its branch line bonds by the provinces. Advocates of government ownership in Canada have been urging the government to take over both the Grand Trunk Pacific and the Grand Trunk, and the present receivership of the Grand Trunk Pacific is apparently a countermove on the part of the government to a threat of its discontinuance of operation in the game which is being played out in Canada.

A Lesson in Efficiency

One of the most interesting stories that will be written about the participation of the United States in the World War will be the rapidity with which large numbers of our soldiers were given practical instruction in different vocations. An important part was taken in this work by several men who have been interested in industrial education in the railway and railway supply field. Railroad managements can well afford to study this development with a view to making use of it within their own organizations but to a much greater extent than was possible under the emergency conditions that confronted the upbuilding of the army. The *Railway Age* has, for a number of years, consistently advocated the necessity of giving more attention to the education and training of employees in all departments. The railroads of this country can well afford to be proud of the class of service they have given to their patrons in the past, and at fairly low rates compared with those of other countries. The higher wage scales, the greater cost of materials and a more exacting public promise to interfere with the continuance of this record unless steps can be taken to secure better service from each one of the individual employees. There is no question but what railroad men as a class want to do their work in a way that will reflect credit upon their performance. The difficulty is that they are so scattered and have had so little detailed instruction as to the best methods of performing their duties. The remarkable results that have been secured by safety first, loss and damage and conservation campaigns of various sorts give some promise of what might be accomplished if every man understood thoroughly and exactly how he was expected to do his work and realized that some check was being placed upon his performance and that he would secure credit for giving the best possible service. The leaders of the more progressive industries and corporations have awakened to the necessity for training their employees more thoroughly and one of the most promising developments which is to be expected in the railroad field in the period immediately before us is in extending the work that has already been so well started in a few departments of some roads and has been carried forward to a greater or less degree by many of the larger industrial companies.

The Same Old Pork Barrel

A few weeks ago suburban towns tributary to Chicago were holding meetings to denounce the proposed increases in the cost of commutation tickets. A short time later a serious grade crossing accident in one of these towns led to repeated and emphatic expression of the need for separating the grades of the streets from that of the railway supplying the rapid transit service. Of course it did not enter the minds of any of these indignant citizens that there could be any relation between such a non-income-producing investment and a fair rate for suburban tickets. Whether a public utility is controlled by government or by private parties the viewpoint of the average citizen is the same—that it is an opulent institution that can well afford to spend unlimited amounts for local improvements. Whether the desired end is a palatial post office or an extensive track elevation project, the doctrine of the pork barrel functions exactly the same. Under private management of the roads there is at least one obstacle to the unlimited operation of this demand for expenditures, namely, the "selfishly" interested owners, and any plan for the solution of the railway problem which does not introduce some factor vitally interested in the economical management of the properties, will lead to financial disaster.

No Palliatives Will Solve the Problem

However valuable may be any measures which the Railroad Administration may adopt to enable it to get along temporarily without another appropriation, the facts will still remain that these measures will be but palliatives and that there will continue to be great need for an early extra session of Congress to provide the Railroad Administration with funds and to find a final solution of the entire railroad problem. In spite of all the efforts the Railroad Administration is making, it is an indisputable fact that the existing railway situation is depressing industry and causing widespread unemployment. Railway purchases are very small while, for the welfare of the nation, they ought to be very large, and the amount of maintenance and improvement work being done is far less than it should be. A protraction of present conditions will be disastrous to the country during the period of readjustment, and perhaps even more disastrous when the time for a resumption of active business comes. There have been great mistakes made and great offenses committed under private operation of railways; but never did the private managements commit offenses so

inimical to the public welfare as are some of the things that have been done—and some that have not been done—under government control.

Keep Superheater Flues Clean

A series of interesting and practical road tests with a superheater locomotive was made by fuel supervisor F. P. Roesch on the Minneapolis, St. Paul & Sault Ste. Marie to determine the fuel loss occasioned by stopping up superheater flues. A Consolidation type locomotive, having an evaporating surface of 3,000 sq. ft. and a 36-unit superheater, was used for the tests. By means of an electric pyrometer with the thermo-couple inserted in the outside steam pipe about six inches above the steam chest, the amount of superheat in the steam was determined. Various tests were made with different numbers of superheater flues plugged and the amount of superheat noted. The results showed a constantly decreasing amount of superheat obtained for various numbers of flues plugged, amounting to as great a loss as 95 deg. superheat with 18 flues plugged, and showed that in general for every 10 deg. loss in superheat there was an accompanying 2½ per cent loss in fuel. With seven flues plugged there was a fuel loss of nearly three per cent and this increased at a nearly constant rate to about 25 per cent when 18 of the flues were plugged. These tests show quite clearly the losses occasioned by improperly maintained boilers and indicate the necessity for keeping superheater flues clean. The engine men operating locomotives equipped with pyrometers may readily determine the loss in fuel when the superheat is not being maintained to the proper degree. This information should be brought to their attention and to the attention of the roundhouse men, that they may better realize what dirty superheated flues mean.

Tendency to Reduce Centralization

SINCE THE FIRST of the year, it has been apparent that the Railroad Administration has been trying to restore railway operation and service to a normal condition. In his recent testimony before one of the House committees, Director General Hines stated that this policy is being followed, and indicated that it is being done largely because the railways may in the near future be restored to their owners. Director of Operation Tyler has ordered the relocation of equipment more nearly in accordance with its ownership. The purchase of coal has been largely decentralized by putting it principally in the hands of the officers of the individual lines. Many of the inspectors who were sent out in such large numbers from Washington last year and who went behind the backs and over the heads of responsible operating officers, have been withdrawn or required to pay more regard to the wishes of the regional directors and federal managers. The regional directors are being given more complete authority in their respective territories, and are in turn giving more authority to the district managers and federal managers. While this general policy is wise because of the probable return of the railways to private operation, it would also be wise if government operation were to be continued. It would have been as wise last year as it is this year.

If Mr McAdoo had been less bent on carrying out his theory of "unification" and more bent on getting the best possible results by the use of tested and practical methods, the operating expenses of the railways in 1918 would have been some hundreds of millions less than they were. Lord Shaughnessy, chairman of the Canadian Pacific, issued a warning regarding the danger of over-centralization under government control in this country immediately after it was adopted. We published his warning in our issue of January 11, 1918, and an editorial supplementing it in our issue of January 18, 1918. The policy which should have been carefully avoided was the very one which Mr. McAdoo adopted. Seldom was even a small railway system given a more over-centralized organization than that which Mr. McAdoo established on the railways of the United States. The results speak for themselves and speak loudly. Now that railway men are in practically complete charge, they naturally are trying to improve results by reducing centralization. They can do a great deal more decentralizing yet with great advantage.

It Might Have Been Worse

THE FALLING OFF of railway traffic and the open winter have produced such a marked change in the relation between the amount of business offered the roads and their ability to handle it, that any representations made at the present time regarding the inadequacy of railway facilities in this country are somewhat discredited. In contemplating our part in the successful prosecution of the war, the demonstrated ability of the railroads to haul goods to port faster than they could be taken away by the shipping tends to bolster up a feeling of complacency. We muddled through all right, and, as we won't have another war for a long time, why worry?

Our experience in the European war failed, in a measure, as an object lesson on the need of larger railway transportation facilities from the fact that the emergent burden of war imposed on the railroads differed only in terms of magnitude from that of peace times. Points of maximum traffic density in pre-war times remained points of great traffic movement under war conditions. The business imposed was just the kind that the roads were best able to handle. It called for the least possible flexibility in the use of the transportation machine. The principal destination of all war traffic was the North Atlantic seaboard, which is far better provided with rail lines from the interior than any other frontier. Moreover, the center of manufacture is located closer to the Atlantic than to any other coast, so the train haul was far shorter than to any other border of the country.

How different would be the situation if we were compelled to despatch an enormous war traffic to any of our other frontiers! Some idea of the differences between the transportation facilities available on the Pacific coast or the Mexican border, for example, and on the North Atlantic seaboard may be gained from the table below showing miles of main line in the three groups of border States:

State	Mileage of lines	Area sq. mi.	Miles of line per 100 sq. mi.
North Atlantic Coast			
New York	8,404	47,654	17.6
Massachusetts	2,139	8,039	26.6
Rhode Island	306	1,067	19.3
Connecticut	1,000	4,820	20.8
Pennsylvania	11,619	44,832	25.9
New Jersey	2,344	7,514	31.2
West Virginia	4,008	24,022	16.7
Virginia	4,792	40,262	11.9
Maryland	1,418	9,941	14.3
	35,930	188,151	19.1
Pacific Coast			
Washington	5,686	66,836	8.5
Oregon	3,226	95,607	3.4
California	8,439	155,652	5.4
	17,351	318,095	5.5
Mexican Border			
Texas	15,832	262,398	6.0
New Mexico	3,038	122,503	2.5
Arizona	2,416	113,810	2.1
	21,286	498,711	4.3

The territory tributary to the ports between Boston and Norfolk, inclusive, has 19.1 miles of rail lines per 100 miles of territory, while the Pacific Coast States have only 5.5 miles, and those on the Mexican border only 4.3 miles. But this is not the whole story. Most of the trunk lines running to the Atlantic Coast are multiple track lines with extensive trackage in sidings and yards, while the lines leading to other frontiers, with but few exceptions, are single track lines with but limited terminal development. Moreover, the delivery of the average ton of freight to these termini would entail an average haul many times as long as that for the war materials shipped to France or England last year.

It is clear from these considerations that the ability of the American railroads to handle the traffic of a military campaign of first magnitude to any other border of this country than the Atlantic seaboard cannot be measured by the ability they showed in handling the traffic of the European war. Under the policy to which the railroads of the country have been subjected, whereby they have not been able to earn reasonable returns on their investments, except during periods of great prosperity, the expansion of railway facilities has necessarily been limited. The Eastern lines have much greater capacity than the Southern or Western lines because they had reached a high state of development before the policy of restrictive regulation was adopted; and yet they still need a great enlargement of facilities. The capacity of the Western and Southern lines will be slow indeed, becoming equal to that of the Eastern lines under a studied policy of restriction; and yet failure adequately to develop them might prove some time to have been a colossal blunder from a military as well as an industrial point of view.

Railway Labor Under Private Operation

IT IS EVIDENT that if needed legislation can be secured the railways will be restored to private operation in a comparatively short time. If the welfare of the nation is given paramount consideration they will be restored to both private control and operation before the end of this year. In anticipation of this change the Railroad Administration is adopting important measures to restore normal conditions of traffic movement and of operation.

Some of the most important and difficult problems which will have to be solved when private management is resumed will be presented by the necessity of establishing good working relations between the managements and the employees of the railways. Most of those who are now in direct charge of operation for the government will be continued in direct charge by the companies. It should be the policy of the operating executives, with the approval and support of the Railroad Administration, to take steps while the railways are still in the hands of the government to make it as easy as practicable after private operation is resumed for the managements and the employees to work together harmoniously and in such a way as will promote the best interests of the companies, the employees and the public.

When government control was adopted only a part of the employees were organized. Under government control practically all have become organized. This is a change which nobody should regret. The labor union is just as characteristic, as desirable, and even as necessary a development of modern industry as the corporation. One is an organization to promote the interests of labor; the other an organization to promote the interests of capital. In each case organization gives power. This power can be abused in either case with results that will be harmful to the public, or so used that it will promote the welfare of the public. If in either case the power is abused the results will in the long run be harmful to the public and to those who possess and abuse it. Recent developments throughout a large part of the world have indicated that strong and ably led labor unions will prove to be civilization's principal safeguard against the ruin and crimes of bolshevism. In any event, almost all classes of railway employees have become organized and their unions probably have come to stay. Future efforts of railway managements should be directed, not toward destroying the unions, either old or new, but toward reaching understandings with them which will protect and promote the interests of all concerned.

Labor on railways, like labor in other industries, is going to demand shorter hours of work and better working conditions. It is going to demand a voice in the settlement of all questions the determination of which will affect the welfare, and even the sensibilities, of working people. And why should it not have a voice in their settlement? The employing class, including both the owners of capital and the officers who have managed industries on behalf of the owners, has taken too narrow a view of the rights of labor in the past. Doubtless at the present time a large part of the workers have an exaggerated view of their rights and mistaken opinions regarding what will promote their welfare. But the employed class as well as the employing class is vitally affected by the way in which industry is managed. It is benefited if industry is well managed and injured if industry is ill managed; and, as a matter of fact, the principal criterion of whether an industry is well or ill managed should be the effects produced upon the workers in it, since they greatly outnumber those who own industry and those who represent the owners in the management.

Labor's demands for a more influential voice in the management of industry will have to be heeded in the long run whether employers wish to heed them or not. The exact means by which labor shall be given a more influential voice in management remain to be determined. Its representation may take the form of members of boards of directors. It may take the form of works committees representing the various unions. One of the principal tests of the ability of the manager of an industry in future will be the success he has in taking labor into the management, in getting its point of view, in distinguishing between what is reasonable and what is unreasonable in its demands, in making labor itself distinguish between the reasonable and unreasonable, and in gaining its confidence and support in carrying out policies which will inure to its benefit as well as to that of the owners of the industry. Perhaps in the long run labor itself will become the owner of many or most industries through the initiation of profit-sharing or other plans. Who knows?

The difficulty of solving the problem of restoring the railways to their owners is largely due to the immense advances in wages which have been granted under government control. The opposition of many employees to the restoration of private operation is chiefly due to the fear that the present wages will not be maintained. We have never known any representative of the owners of the railways to advocate, either in public or private, general reductions of the existing wages. It would appear, however, from the statistics of current earnings and expenses, that wages must be reduced, or rates must be advanced, or there must be a great increase in the efficiency of operation. From the standpoint of labor, which of these policies is preferable? Certainly not a reduction of wages. Also, certainly not another advance of rates. Advances of rates, like advances in prices, increase the cost of living of all classes of the people, including railway employees. The welfare of railway employees as well as of all other classes, will be best promoted by increased efficiency, and consequent increased economy, of operation.

In the past the securing of increases of efficiency has been regarded as solely the function of the managers—that is, of the owners and of the officers placed by them in charge of the properties. No such increases of efficiency as have been

gained in the past can be gained in future by the owners and officers alone. For them to attempt to gain them alone would be constantly to antagonize labor, and labor is becoming so strongly organized that methods to increase efficiency will become increasingly difficult to introduce over its opposition. The co-operation of labor must be secured, and this is the best of all reasons for adopting plans for giving it a voice in management. Labor does not understand the essentials of efficient operation. The main reason why it does not is that it has never had opportunity to take part in or study management and thereby learn the essentials of efficiency. Labor must be given opportunity to be taught these things by its own leaders and representatives, and its leaders and representatives can be equipped to teach them only by being brought in close contact with the problems of management and getting experience in their actual solution.

Labor has been given a larger part in railway management under government control than it formerly had under private control. It cannot be said that the results thus far produced have been good. The abolition of piece work and other measures have been adopted, which have tended to reduce efficiency and increase expenses. But undoubtedly these things have been mainly due to the fact that because of the want of study and experience labor has not understood the essentials of efficient operation or the injurious effects which in the long run inefficient operation must have upon labor itself. In the long run there will be only one way to prevent such results. This will be to give labor an opportunity to learn by actual experience.

Some years ago the "safety first" movement was started on the railroads by the organization of committees of both officers and employees to study and remedy the conditions which caused accidents. The results gained were not as great as could have been desired, but that substantial results were gained, and that they were good, is beyond question. Equally harmonious and energetic co-operation between the officers and employees to promote efficiency must be obtained if greatly increased efficiency is to be secured. The main problem of railroad management in the future will be to secure the harmonious and energetic co-operation of officers and employees in increasing efficiency. The owners and managers of the railways and the leaders of the employees cannot begin too soon, for the good of all concerned, to confer with each other regarding the best means of bringing this co-operation to pass.

Mr. Hines' Immensely Difficult Task

NO PUBLIC OFFICIAL in the United States deserves and needs the assistance of all classes of people more, or perhaps so much, at the present time as the director general of railroads, Walker D. Hines. He deserves the support of all, because, at great personal sacrifice and in an effort to render a public service, he is trying not only with ability, but with rare courage and resolution, to carry the railways through a most trying and difficult period.

Mr. Hines needs the support of all, because without their support in the present emergency no man could perform successfully the task imposed upon him and for the developments of which he has not been responsible.

Mr. Hines expected, and had reason and a right to expect, that Congress would pass at its last session the bill creating a new revolving fund of $750,000,000 for the Railroad Administration. Nobody seriously questioned that that fund ought to be provided. It was needed to enable the government to fulfill obligations which the Railroad Administration had assumed in conformity with law. The bill was defeated in an attempt to accomplish certain purposes which had no relationship to its intrinsic merits.

The director general was confronted already by a multiplicity of very difficult problems. The uncertainty regarding the future of the railways was destroying the morale of the railroad organizations. Operating expenses were rapidly increasing, largely because of policies adopted by Mr. Hines' predecessor, while traffic and earnings were declining. In consequence, net earnings had fallen to a very low basis. The train service employees, one of the strongest and most important groups of the employees of the railways, were pressing for a large advance in wages and for a settlement of the question of time and a half for overtime. Even if the railroad appropriation bill had been passed, the director general's task of operating the railways satisfactorily and at the same time carrying out even a small program of additions and betterments would have been extremely difficult.

The failure to pass the railroad appropriation bill, coming at a time when, even without this, the problems presented to the Railroad Administration were so numerous and so difficult, would result in a national calamity unless the director general should show enough ability and courage to meet the crisis presented and could get the support from various sources that he imperatively requires. He needs the support of railway labor, which has been very generously treated under government operation. He needs the support of every railway officer, for with prices and wages so high, the efficient operation of the railroads is almost as essential to the national welfare now as it was during the war. He especially needs the support of all the large financial interests of the country. The government is obligated to pay the railroad companies the standard returns guaranteed by the law. If the financial institutions will advance to the railroad companies the money required to provide for betterments and additions and the railway companies will in turn advance it to the government it will be possible to go on with the program of improvements which has been outlined and thereby prevent the railways from becoming a greater cause than they already are of industrial depression and unemployment.

But will the financial institutions advance the railroad companies the needed capital? They will advance capital to those whose credit is strong. The case of those whose credit is weak is more dubious. If the companies can and do borrow the needed money they will have to pay interest on it, and, in many cases, a high rate of interest. Will the government be willing to pay to the companies as high a rate of interest for advances they may make to it as the companies will have to pay to the banks? There has been a lot of squabbling about the rate of interest that the government should pay to the companies. It would be manifestly unfair for the government, under the peculiar conditions now existing, to ask the railway companies to borrow money and then loan it to the government to carry on the government's work at rates of interest less than the railway companies must pay for it.

The government took control of the railroads to solve the pressing railroad financial problem. It certainly is a striking fact that the companies probably will now have to go into the market and borrow money to enable the government to handle the business.

Since the railways are under government control, and since the problems presented are so numerous and difficult, the country is fortunate in having in the position of director general a man of Mr. Hines' resourcefulness, courage and ability, and with his valuable experience under private railway control in handling railway financial matters. If he does not succeed in solving all the problems presented in a way satisfactory to the public he will be entirely justified in saying that no man could have satisfactorily solved all of them. If he does succeed in solving them in a measurably satisfactory way it will be a great achievement, for which he will deserve the applause and thanks of the nation.

Letters to the Editor

Give the Weather Man His Due

CHICAGO, ILL.

TO THE EDITOR:

Under the heading "Annual Reports of the Regional Directors" there appears in the *Railway Age* of February 14, page 393, the annual report of the regional director of the Northwestern region for 1918 as made public by the Railroad Administration. In this report, under the subhead "Co-operative Action" is the following paragraph: "A manager was placed in charge of the Upper Lake Michigan and Lake Superior ports to supervise the handling of ore, grain and coal and to co-operate with a committee representing vessel and ore interests. Rerouting by this organization made a saving of 3,577,434 miles. The steaming of ore was almost entirely eliminated; saving, it is estimated $197,000."

On what hypothesis this estimate of $197,000 was based, or who did the hypothecating is unknown to the writer. It seems probable from the amount, $197,000, that the estimator took the total amount expended in 1917 for steaming of ore at the head of the lakes as a basis of comparison.

The steaming of ore means the thawing of ice from ore frozen in cars, by means of steam, in order that the ore may be unloaded into the pockets of the ore docks. The steam used is obtained from locomotives held in ore yards for this purpose, the steam usually being piped into the loaded cars by means of lines of steam hose ending in perforated pipes, which pipes are thrust into the ore loads as steam is turned on. This process of steaming is expensive because it requires locomotives, fuel and crews, but special steaming plants for this purpose can only be erected and maintained at very considerable cost. Like snow handling equipment, the special steaming plant would be in use for only an uncertain few days per year, depending entirely on the weather.

It is obvious that if there is no frost during the season of navigation sufficiently severe to freeze ore in transit, there is no steaming of ore necessary. In case any ore freezes in pockets of the docks, hot water from locomotives is used to flush and clean the floors. Steaming is only needed for ore to be unloaded from cars.

Now it happens that the worst season in many years in this particular regard was experienced in 1917. Due to war needs, to the late date of beginning ore transportation and to strikes at the ore docks, a great traffic in ore was carried on at the head of the lakes in the late summer and autumn. This traffic was increased from week to week and kept going until the latest possible date in the autumn in order to fill war orders. In consequence a great deal of ore was frozen in cars toward the end of the season, and had to be steamed. In 1918, however, no iron ore in cars was frozen or steamed by either of the two principal ore carriers at the head of the lakes on account of the uniformly mild weather which continued long after the close of navigation. The same or nearly the same conditions apply to all railroads carrying ore at the head of the lakes in 1918.

The expense of steaming ore has been a matter of anxiety and investigation with a view to betterment by officers of individual railroads under corporate control for years. It seems that the federal management has at last solved the problem, by a method of co-operation with a committee of ore and vessel representatives, and by the mysterious and unacknowledged co-operation of Him who tempers the wind to the shorn lamb. Only Private Bill Brock, of "Dere Mabel" fame, so far as is known, has been able to so camouflage a horse as to really make him look just like a picket fence. All abuse and no praise will in time discourage the most loyal co-operator. Would it not look better to give the weather man his due?

OBSERVER.

A Disclaimer

LONDON, ENG.

TO THE EDITOR:

In the *Railway Age* for January 31, I find Clifford Thorne reported as having stated before the Senate Committee on Interstate Commerce that "he had analyzed the rates on fifty commodities for representative hauls in Great Britain which had been selected by W. M. Acworth, and that on four-fifths of them the rates were lower than the rates in Official Classification Territory in this country."

I am at a loss to understand to what statement of mine Mr. Thorne can allude. I have never, so far as I know, except on one occasion nearly thirty years ago, selected rates for purposes of comparison between England and America. On the contrary, I have for years past publicly asserted again and again that representative hauls do not and cannot exist. Only last year in an official report to the government on the railways of Rhodesia I wrote, "Particular cases in my judgment prove little or nothing. * * * It can hardly be that among half a million rates there are not a dozen or twenty or a hundred that can be impeached. * * * It can hardly be but that a general manager can counter each case of alleged hardship with a dozen favorable rates."

It is true that in the year 1891 in my book *The Railways and The Traders,* which was, as I stated in the preface, a sketch of the railway rates question from the railway point of view, I inserted comparisons between certain English and American rates. I introduced them, however, by saying, "Let it be frankly confessed that in one sense the rates which follow cannot be asserted to be typical of American rates. * * * They are rates actually in force. If they prove nothing else they at least prove this, that it is as easy to produce figures to show the moderation of English charges as it is to find others to convict them of being excessive and extortionate."

Is it to this thirty years old statement of mine so qualified that Mr. Clifford Thorne alludes, or has he fathered on me a comparison made by somebody else?

W. M. ACWORTH.

Returning to à La Carte Service

CHICAGO, ILL.

TO THE EDITOR:

The resumption of à la carte dining car service recently ordered by the director general of railroads, as noted in the *Railway Age* of February 14, page 408, will be a matter for congratulation and relief on the part of the traveling public, who loyally "stood for anything" during the world war: who gave and saved and were inconvenienced in a thousand ways without any serious murmur. Beyond a shadow of doubt the traveler had, and still has, cause for complaint of the railroad administration's table d'hôte dining car service.

Traveling on heavy traffic trains west of Chicago the writer has found the table d'hôte dinner offered for one dollar to be equal to that obtainable in the better class cafés for two dollars. The service east of Chicago, though not quite so good, is still worth the money. In the sequel lies the cause of discontent.

On lighter traffic lines extending northward from Chicago, with the same general menu, there is worse than war-time service today. Is there any reason why a traveler should pay $1 for a "compartment" plate of half portions of coarse

boiled beef, stringy, watery canned beans, and a thin dab of mashed potato, following as scant a fish course of creamed cod fish spread on a bit of cold toast, when traveling on a light traffic train; whereas, for the same price he can buy oysters on the half shell, turkey and cranberry sauce and all else that goes to make up a first-class $2 dinner, served in first-class style and in generous portions on a heavy traffic train?

It would seem that either the individual railroads have been allowed to alter their dining car services for better or for worse at will, or that prices and profits and numbers of courses only have been standardized, while the standard of food provided in return for the dollar has not been taken into consideration. It is to be hoped that the light traffic lines which have undoubtedly made poor progress with the table d'hôte service and the financial returns therefrom, will at once reinstall their à la carte dining car service which before the war was in most cases admirable.

TRAVELER.

The Prevention of Collisions

NEW YORK.

TO THE EDITOR:

Readers who are interested in the problem of reducing the disgraceful collision record of the railroads of this country must have taken fresh heart from your issue of February 28. Mr. Vanneman, of the New York State Public Service Commission, sweeps away some of the deadwood which has clogged most of the discussions on this subject. That feature of the report which may be more important than all the rest is found only by turning to the obscure item on page 515, which tells us that a general inquiry is to be held. This inquiry ought to be of great value. Investigations of particular accidents always leave much to be desired, for railroad officers are on the defensive and remain as reticent as they know how to be. The investigators or any parties adverse to the railroad company often seem to fall far short of a judicial frame of mind, and anything like a broad treatment of the general question of safety is almost impossible. The New York commissioners have here a fine opportunity to do some constructive work.

On one point Mr. Vanneman adopts the excessively cautious attitude of the railroad signal engineers (which caution has greatly retarded true progress). He says that an automatic stop (or a cab signal), if used, must be installed on the whole road; otherwise locomotives from branch lines, not equipped, must be kept off from those divisions on which the device is installed. This objection is not so important as it seems. The frequent use of engines off their regular divisions is unnecessary—*it should be made unnecessary,* even at considerable expense; but when such use does become necessary the thing to do is to make use of the absolute manual block system; and temporarily to keep trains two blocks apart, if necessary to afford the needed confidence. Every railroad is liable to have to run trains against the current of traffic, and should be prepared for the suspension of automatic-block-signal protection at any time. A road which is not prepared to protect trains by the space interval at any time, on the shortest notice, without any apparatus except the telegraph or the telephone, is very far from being an ideally equipped road.

And it may not be unfair to urge Mr. Vanneman to greater courage in another direction. He says that to instal locomotive apparatus it will be necessary to enter unexplored fields; though he refers briefly to English and French experience. But why not investigate thoroughly what Europe has done?

The Great Western Railway of England has used cab signals for a dozen years; and for five years these signals have been in constant service on considerable numbers of locomotives. Why should not Mr. Vanneman go over and spend a few weeks in England and France?

An engineman can shut his eyes to the visual signals; he can even shut his mind to the signals when his physical eyes are wide open; but shutting his ears to an audible signal is far more difficult. Query: Do we fully appreciate the principle of the audible signal? We have been using torpedoes for half a century, but have we not neglected some of the lessons which they teach? Mr. Vanneman refers to the torpedo arrangements in Europe as "crude"; but some things that are crude still conduce powerfully to the safety of railroad operation—for example, broken stone ballast.

Your cold and condensed editorial on this report leaves out a lot of things which American railroad men ought to take to heart. You sympathize with the railroad president who has had difficulty in getting all the money needed to introduce necessary safeguards on his road. This sympathy is all right; everyone of us shares in it; but in the last analysis the railroad president *must take the risk*—as indeed he must with his whole financial problem. Is not this true? Congress does not intend to allow the railroads to increase their incomes until they actually starve. If this is mere pessimism and grumbling, you may make the most of it. Plain facts may as well be faced.

Mr. Vanneman, in his full report, printed since your paper came out, discusses the flagging rule, the practice of the New York Central in the management of tail lights, and other things. This is useful matter for railroad men who need it, but the dominant impression is, *Why* do railroad men need it? Why is this past history useful? Why are we still discussing ways of perfecting the flagging rule when many years of experience have demonstrated that the task is hopeless? The New York Central has changed its arrangement of tail lights, and the decision to do this was, no doubt, the result of much time spent in careful discussion; but we ought to be spending our time in discussing modern improvements, rather than ancient canal-boat methods. The real desideratum is to run trains (by means of the space interval) under such circumstances that they will be safe even though no tail light should be visible more than 500 feet away.

This proposed New York inquiry ought to be the starting point for a really progressive movement. Nearly or quite all of the informative discussion on the collision problem which has been promulgated so that the public could really get the benefit of it has been available only in fragments. We have various deliverances from the Interstate Commerce Commission, but none of them furnish an adequate view of the railroads' side of the question. If our railroad managements agree with the Interstate Commerce Commission no one knows it. If they disagree, there has been no clear setting forth of the facts. There ought to be a public debate, with strong men to present both sides. The signal manufacturers are supposed to be able to remedy all of our troubles, but they, as well as the Interstate Commerce Commission, seem satisfied to stand off and wait. Why do they not induce the railroads to make better progress? Or, if they have tried to do this and have failed, what is the reason for the failure? All public questions of real importance are made the subject of thoughtful public discussion in Congress, or in a legislature, or a court, or the pulpit, or some free forum. Is it or is it not correct to call this question of safeguarding passengers' lives an important public question?

V. P. O.

Five men arrested at Albany, N. Y., last week, by New York Central police are believed to have stolen mileage tickets from 75 small stations in New York state. More than 20 stations in the immediate vicinity of Albany have been broken into.

Heavy Standard Mallet Type Locomotive

The First of the Government Order for Over 100 of These Engines Delivered to the Norfolk & Western

THE FIRST ORDER of 1,025 locomotives placed by the United States Railroad Administration included an order of 20 heavy (2-8-8-2) standard Mallets. This was later increased to over 100, 65 to be built by the American Locomotive Company and 41 by the Baldwin Locomotive Works. The American Locomotive Company has within the past month made the first delivery of these locomotives. While they were scheduled and lettered for the Virginian Railway they have been assigned for duty on the Norfolk & Western. These engines are the largest of the standard locomotives built for the Railroad Administration and represent the limit to which a locomotive can be built to come within the maximum clearance limitations set by the Railroad Administration (15 ft. 9 in. high and 10 ft. 9 in. over cylinders). These locomotives are smaller than those which can be used on the Virginian Railway, as evidenced by the 2-10-10-2 type Mallet locomotives which were recently built for that road by the American Locomotive Company. These latter engines have a width clearance of 12 ft. and a height clearance of 16 ft. 7½ in. On the other hand, the clearance limitations of these standard engines compare very favorably with the 2-8-8-2 Mallets recently built by the Norfolk & Western to that company's own design. Being limited by these clearance restrictions a very careful design had to be made to provide a locomotive of the power required.

In the matter of power these standard engines may be compared with locomotives of similar wheel arrangement built by the Norfolk & Western in its own shops, and for the Western Maryland by the Lima Locomotive Company. A table comparing the principal dimensions of these two locomotives is included. A description of the Norfolk & Western locomotive was published in the *Railway Age* of July 12, 1918, page 59. From this table of comparison it will be seen that the standard locomotive is 6,000 lb. heavier than that built by the Norfolk & Western, and 3,300 lb. heavier than that built for the Western Maryland. The working pressure on the standard locomotive is also 10 lb. greater than that of the Norfolk & Western locomotive and 30 lb. higher than that used on the Western Maryland locomotive. The boiler proportions of the standard locomotive and those of the Norfolk & Western compare very favorably. However, the Norfolk & Western design provides about 200 sq. ft. more heating surface and about 35 sq. ft. greater superheating surface. While these two engines are very nearly alike in proportions, they are of an entirely different class as far as the construction details are concerned, which will necessitate a different line of repair parts and illustrates plainly one of the chief objections to standardization.

The standard 2-8-8-2 Mallet locomotive has a total engine weight of 531,000 lb., of which 28,000 lb. is on the leading truck, 237,000 lb. on the front or low pressure unit, 241,000 lb. on the high pressure unit and 25,000 lb. on the trailing truck. It is built for a permissible axle load of 60,000 lb., which is the same limit prescribed for the standard 2-6-6-2 locomotive. The cylinders are 25 in. and 39 in. by 32 in., and a working pressure of 240 lb. is carried on the boiler. The distribution of the weights amongst the various drivers is shown in the weight diagram, which was prepared by F. P. Pfahler, chief mechanical engineer of the Mechanical Department, United States Railroad Administration. The clearance diagram, also prepared by Mr. Pfahler, is included in the illustrations.

TABLE OF COMPARISON OF 2-8-8-2 TYPE LOCOMOTIVES

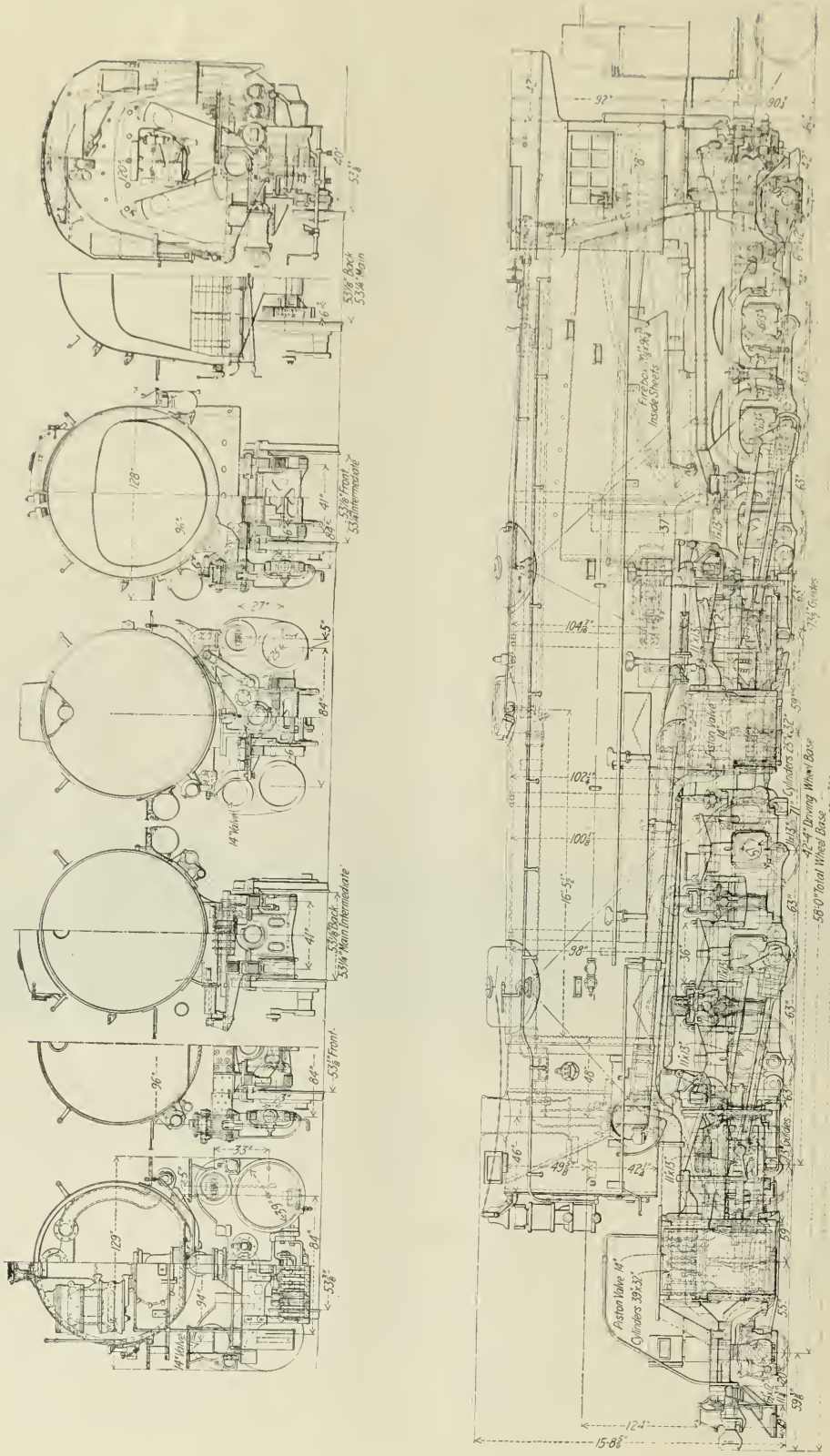
Name of road	U. S. Std.	Norfolk & Western	Western Maryland
When built	1919	1918	1915
Tractive effort, compound, lb.	106,000	104,300	106,000
Weight, total, lb.	531,000	535,000	495,000
Weight on drivers, lb.	478,000	472,000	445,000
Diameter of drivers, in.	57	56	52
Cylinders, diameter and stroke, in.	25 and 39 by 32	24½ and 38 by 32	26 and 40 by 30
Steam pressure, lb., per sq. in.	240	230	210
Total heating surface, sq. ft.	6,120	6,316	5,669
Superheater heating surface, sq. ft.	1,475	1,510	1,264
Grate area, sq. ft.	†96	96	80
Weight on drivers ÷ tractive effort, (compound)	4.7	4.5	4.2
Tractive effort × diameter drivers ÷ equivalent heating surface*	695.	680.6	726.3
Equivalent heating surface* ÷ grate area	86.6	89.4	94.9

* Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.
†,Gaines combustion chamber is used on this locomotive.



Standard 2-8-8-2 Type Locomotive for the U. S. Railroad Administration

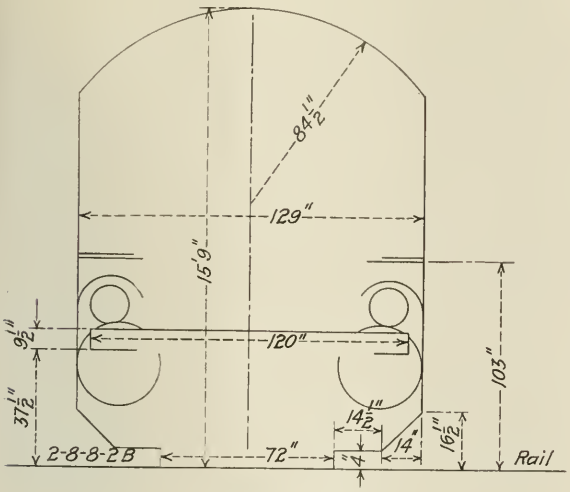
The boiler of these locomotives has an outside diameter at the first ring of 98 in. It is of the straight barrel type and has shell plates 1 1/16 in. thick. The dome is located on the third course and on account of the clearance limitation is only nine inches high. The boiler is equipped with a Gaines combustion chamber. The length of tubes is 24 ft. There are 274 2¼-in. tubes and 53 5½-in. flues, which are of No. 8 gage, being one gage heavier than the general standard practice in the construction of Mallet locomotives, due to the fact that a working pressure of 240 lb. is carried on the boiler. The firebox is 170⅛ in. by 96¼ in., having an effective area of 96.2 sq. ft. The firebox sheets are ⅜ in. thick and the back tube sheet is ½ in. thick.



Elevation and Sections of the Standard Heavy Mallet Type Locomotive

The tube spacing is similar to that used on the standard 2-6-6-2 type Mallets.

The frames for these locomotives are 6 in. in width, the same as for the 2-6-6-2 locomotives and are 6¾ in. deep over the pedestals, having a minimum thickness of 5½ in. The lower rails are 4½ in. deep, with a minimum thickness of 4 in. The frames for the high and low pressure engines are connected with the Baldwin type of frame hinged casting. From the standpoint of design they are, with the exception of differences in dimensions, practically exact duplicates of the frames built for the standard 2-6-6-2 locomotive.



Clearance Diagram

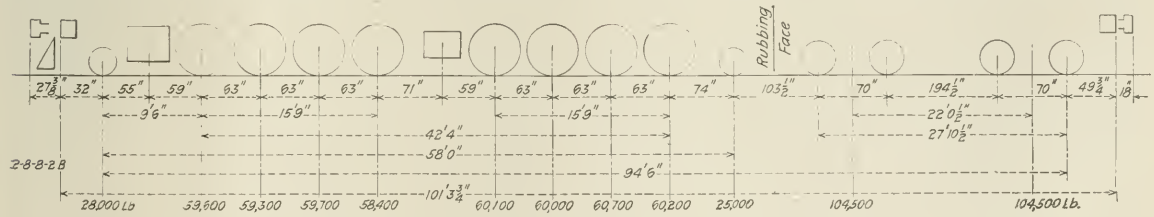
As in the case of the 2-6-6-2 standard locomotive, both the high and low pressure cylinders are provided with piston valves. A larger diameter of valve is used, however, it being 14 in. The travel of the valve for the high pressure cylinders is 6½ in. and it is given a lap of 1 in., a lead of ⅛ in. and an exhaust clearance of ¼ in. In the low pressure cylinders the valve is double ported and has a travel of 6 in. with a lap of 1⅛ in., a lead of 3/16 in. and an exhaust clearance of 7/16 in. As in the case of all the standard locomotives the valves and cylinders are bushed with Hunt-Spiller gun iron. Both cylinders are spaced 84 in. between centers, whereas in the lighter Mallets the spacing is 85 in. As in the case of the 2-6-6-2 Mallet the Mellin type of by-pass and intercepting valve is used.

In the matter of general design the crosshead for the 2-8-8-2 locomotive is the same as that of all standard locomotives. The dimensions are also practically the same, with the exception of the piston fit, the diameter of the boss in the body of the crosshead being made eight inches instead of seven, on account of the heavier piston rod, which is 4½ in. in diameter for the 2-8-8-2 locomotive and 3¾ in. in diameter for the 2-6-6-2 locomotive. The pistons have a dished section and those for the high pressure cylinders are interchangeable with those used on the light standard Pacific and the Eight-wheel switchers. The specifications require that they be made of rolled steel or cast steel. They are provided with packing rings of Hunt-Spiller gun iron. The pistons for the low pressure cylinders are, of course, not interchangeable with any others used on the standard locomotives, although they are of the same general standard design. They are made of cast steel and are of dished section, having, as in the case of the high pressure cylinders, two packing rings of Hunt-Spiller gun iron. The piston rods for both the high and low pressure units are 4½ in. in diameter. Paxton-Mitchell piston and valve rod packing is used on these locomotives.

The main rods of both the high and low pressure cylinders are precisely the same. They are 118 in. long from center to center and are of I-section, being 3 in. wide and 6 in. deep, with 1½-in. flanges and a ½-in. web. They are of the same design as the main rods used on the 2-6-6-2 standard locomotive, the only difference being that they are one inch longer between centers and the flange is ½ in. deeper. Thus it will be seen that rods for both these locomotives can be manufactured from exactly the same size of stock material. The design of the strap end is exactly the same, the only difference being that the rods for the 2-8-8-2 type are a little heavier than for the 2-6-6-2 type locomotive.

Among the interchangeable details of these locomotives may be mentioned the dump grate rigging, which is the same as that used on the light and heavy Santa Fe locomotives; the pilot, which is standard for all except the switchers; tires, which are common to the 2-6-6-2 and the light Santa Fe; and engine truck and trailer axles, which are common to all of the standard locomotives. The engine truck box is the same as that used on both designs of Mikado and Santa Fe and the 2-6-6-2. The front bumper is the same as that used on all except the switchers and the frame pedestal shoe, wedge, and wedge bolt are the same on all locomotives except the switchers. In addition to this there are many other details which are common to the 2-6-6-2.

The specialties used on these locomotives as well as on the other standard engines were enumerated on page 91 of the January 3 issue of the *Railway Age*.



Wheel Spacing and Loading for the Heavy Standard Mallet

The following is a list of the general dimensions of these locomotives with the principal data:

General Data

Gage	4 ft. 8½ in.
Service	Freight
Fuel	Bit. coal
Tractive effort (compound)	101,300 lb.
Tractive effort (simple)	121,600 lb.
Weight in working order	531,000 lb.
Weight on drivers	478,000 lb.
Weight on leading truck	28,000 lb.
Weight on trailing truck	25,000 lb.
Weight of engine and tender in working order	740,100 lb.
Wheel base, driving	42 ft. 1 in.
Wheel base, rigid	15 ft. 6 in.
Wheel base, total	57 ft. 4 in.
Wheel base, engine and tender	93 ft. 3 in.

Ratios

Weight on drivers ÷ tractive effort (simple)	3.93
Total weight ÷ tractive effort (simple)	4.37
Tractive effort (compound) × diam. drivers ÷ equivalent heating surface*	695.
Equivalent heating surface * ÷ grate area	86.6
Firebox heating surface ÷ equivalent heating surface,* per cent	5.2
Weight on drivers ÷ equivalent heating surface*	57.5
Total weight ÷ equivalent heating surface*	63.8
Volume equivalent, simple cylinders, cu. ft.	22.2
Equivalent heating surface* ÷ vol. cylinders	375.
Grate area ÷ vol. cylinders	4.33

Cylinders

Kind	Compound
Diameter and stroke	25 in. and 30 in. by 32 in.

Valves

Kind	Piston
Diameter	14 in.

Wheels

Driving, diameter over tires	57 in.
Driving journals, diameter and length	11 in. by 13 in.
Engine truck wheels, diameter	30 in.
Engine truck, journals	6½ in. by 12 in.
Trailing truck wheels, diameter	30 in.
Trailing truck, journals	6½ in. by 12 in.

Boiler

Style	Straight top
Working pressure	240 lb. per sq. in.
Outside diameter of first ring	98 in.
Firebox, length and width	170⅛ in. by 96¼ in.
Firebox plates, thickness	⅜ in.
Firebox, water space	5 in.
Tubes, number and outside diameter	274—2¼ in.
Flues, number and outside diameter	53—5½ in.
Tubes and flues, length	24 ft.
Heating surface, tubes	3,860 sq. ft.
Heating surface, flues	1,825 sq. ft.
Heating surface, firebox	435 sq. ft.
Heating surface, total	6,120 sq. ft.
Superheater heating surface	1,458 sq. ft.
Equivalent heating surface*	8,333 sq. ft.
Grate area (with Gaines wall)	96 sq. ft.
Smokestack, height above rail	15 ft. 8⅝ in.
Center of boiler above rail	10 ft. 4 in.

Tender

Tank	Water bottom
Frame	Cast steel
Weight	209,100 lb.
Wheels, diameter	33 in.
Water capacity	12,000 gal.
Coal capacity	16 tons

* Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

Howard Elliott on Needed Regulation

IN AN ADDRESS before the Commercial Club of Chicago on March 8, Howard Elliott, chairman and president of the Northern Pacific Railway Company, said in part:

"It has been urged that government control and operation should be continued until January 1, 1924, instead of being limited to 21 months after the ratification of the treaty of peace, as fixed in the present law. This is on the theory that better results can be obtained for the nation and the railroads under such long time plan than to return the roads to the owners for operation. But does the record of government operation give any great promise of such better results?

"Certainly private ownership and operation, while not perfect, have produced unusual results. Private owners created a system of railroads with less investment of capital for the service rendered, and had up to December 28, 1917, furnished better service to the public and at lower rates and has paid higher wages to employes, than in any civilized country. This was done when the citizen had for a considerable period "liberty" to exercise his "tireless energy" and his "individual responsibility and initiative."

"What is called the labor question is, of course, one of the most serious and difficult confronting the whole world, the railroads in particular, and there must be a broad view of it and a spirit of give and take by all classes of people. All good citizens desire to see the wages and living conditions improve, but there is a limit to what commerce and industry can pay, and survive. It is surely better to have reasonable wages and continuous employment rather than to force wages so high that industry languishes, for then the wage earners themselves will suffer most of all.

"The man who puts a dollar of his savings into the transportation business does so knowing that his dollar is subject to the power of the government to make the rules and regulations governing the business. The man who decides to earn his dollar by working for the railroad should be willing to submit to reasonable wages, rules and regulations, just as much as does the man who puts in his dollar already earned. It is in the public interest to have the invested dollar regulated reasonably, and it is equally in the public interest that the dollar paid for service and the conditions of service should be regulated reasonably.

"And if employees can once be satisfied that a *fair* and impartial tribunal is in existence to hear important complaints that cannot be settled promptly on the "home road" between employees and employer, there should be no need of strikes, which are simply a form of war. The world has just lost millions of men and billions of treasure in a struggle whether force rather than justice and reason were to settle the affairs of the world. Surely the United States, the most enlightened and progressive nation in the world, can, if it takes up the question seriously, work out some plan for adjusting industrial disputes that will carry out the doctrine of 'live and let live' and save the loss, sorrow and anguish that comes to thousands of innocent people who have no part or voice in the controversy or its settlement.

"Capital may be timid but it was bold enough in the last 50 years to create our great American railway system. It will be willing to go on with that work if it can be assured that the policy of the government will be to sustain the railroads in the legitimate conduct of their business and allow reasonable liberty of action instead of repressing and hampering the work. The credit of the roads will come back when people understand that Congress has laid down the rule that a reasonable rate is also an adequate rate, sufficient to reflect changed costs, increased wages and rates for the use of money; when Congress insists that some reasonable method of adjudicating controversies about wages and working conditions shall be written into the law of the land; and when the nation insists that it is the duty of a President to preserve, protect and expand the transportation facilities of the country, just as much as agriculture, banks, manufacturers, commerce, or other forms of individual activity.

"Whether to put all the regulatory power in the hands of the Interstate Commerce Commission, or to relieve the pressure on that overburdened body by giving it help in the form of Regional Interstate Commerce Commissions which will be nearer the people and to the state commissions, and whether to recognize the great importance of the transportation business by having a cabinet officer to take charge of some of the executive work connected with regulation and to watch and protect the transportation agencies, are, of course, questions of individual judgment.

"An effective transportation machine is vital to the interests of the Nation in war and peace. Its importance justifies having a man in the cabinet to confer on an equality with other cabinet officers dealing with great national questions and resources, and to present the transportation needs of the nation directly to the President and his advisors.

"The charge is made that this plan injects the management of the railroads into politics—unfortunately you cannot divorce politics entirely from the situation if you admit the principle of regulation by the government, but in the long run with the President and the Secretary of Transportation directly interested in giving the country good service it has seemed to us that the highest standard of political action would be obtained."

The movement of freight last Sunday over the Pennsylvania Railroad was continued at full pressure. The expected order to send out no trains on Sunday except for live stock and perishable shipments was not issued, a number of derailments last week having caused serious congestion at several points.

Will the Mexican Railway System "Come Back"?

The Carranza Government Has Established Railway Purchasing Agents at New York and Houston

By P. Harvey Middleton
Executive Assistant, Railway Business Association

Up on the thirty-fifth floor of the Woolworth building, in New York, you will find Senor F. P. de Hoyos, general purchasing agent of the Mexican government railway administration, who has recently resumed the buying of equipment for the bandit-wrecked railroads of Mexico. Carranza's New York office has already spent $764,581 for railway supplies, paid for with bank credits established in New York, all purchases being made f. o. b. There is constantly on hand in New York a bank credit of $150,000, which is renewed as funds are used up. On the second floor of the Gulf building, in Houston, Texas, G. B. Aleman is also acting as purchasing agent for the Mexican government railways, but I am unable to learn the extent of his purchases to date.

Of course, three quarters of a million dollars or so in railway supplies spreads out pretty thin over 9000 miles of railways which have been systematically shot full of holes in revolutions, counter-revolutions and bandit raids for over five years, but the important thing is that Mexico has started to rehabilitate her railways, and that she is able to finance purchases of railway supplies through New York banks.

Senor Rafael Nieto, acting Minister of Finance for Mexico, visited New York the second week in February to arrange for the extension of a bank credit to Mexico, secured by customs revenues, to cover orders for railway supplies. It is understood that these orders will include 25 locomotives, 500 freight cars and a large tonnage of steel rails. Senor Nieto has engaged Lindley M. Garrison, former Secretary of War, and receiver of the Brooklyn Rapid Transit Company as counsel.

At 25 Broad street, New York, the dispossessed officials of the National Railways of Mexico Company, ejected by the Carranza decree of December 4, 1914, and denied access to their offices and archives in Mexico, sit around in the same uncomfortable ease that for a time afflicted some of our best-known American railroad corporation officers—with the rather important difference, however, that the National Railways of Mexico Company have not received any financial return from the Carranza government on its seized properties, a system comprising the National Railroad of Mexico, the Mexican Central, the Mexican International, the Hidalgo & Northeastern, the Vera Cruz & Isthmus, the Pan American, the Mexican Southern, and, under lease, the Interoceanic—in all, 8,038 miles of line, 51 per cent of the stock being controlled by the Mexican government, and the balance owned by Americans. The investment in road and equipment of the National Railways of Mexico at the time of their seizure was $853,073,281.

Damage to Railroads

Some idea of the field for railway supplies in Mexico may be gathered from the fact that during the revolution the tracks and roadbeds in almost every part of the republic were damaged or destroyed. The line of the Mexican Northwestern is almost a wreck from end to end. In some places on the Mexican Central the rebels used scrapers to obliterate the roadbed. From 35 to 40 per cent of the railroad bridges throughout the country were destroyed, and numerous stations between Monterey and Mexico City were burned. Fifteen stations were damaged or utterly destroyed on the Interoceanic alone. During 1911-1917, 9,250 cars were lost on the National Railways, which would represent about 40 per cent of the rolling stock.

It was reported from Tampico in September last that the railroad equipment was so short in that region that when the single daily passenger train from Monterey was delayed there was no outgoing train the following morning. The line from San Luis to Potosi at that time was unsafe on account of roving bandits, who had frequently blown up sections of the track and dynamited trains. All crossties and much of the steel will have to be renewed before safe, fast and regular service can be relied upon. Practically none of the rolling stock is suitable for first-class traffic.

Attention should also be drawn to the statement of Felipe Pescador, general manager of the National Railways which appeared in the *Railway Age* of February 21, page 470 and to that of Manuel Aguirre Berlanza Secretario de Gubernacioñ which appeared in the *Railway Age* of February 28, page 518.

Repairs Temporary

Recent reports indicate that the Mexican National is at present in a reasonably good condition, so, too, the lines from Matamoras to Monterey, Paredon to Saltillo, Tampico to San Luis Potosi, and Mexico to Toluca, Irapuato, Guadalajara and Aguascalientes. The Railways of Yucatan, the Southern Pacific of Mexico, the Vera Cruz, and the Mexican Railway are likewise reported as having been brought into fair condition. It is important to note, however, that so far much of the repairing that has been done is necessarily of a temporary nature, wooden bridges being substituted for steel structures.

Accidents provoked by rebels have diminished in number on the Tehuantepec, Pan American, and Alvarado lines. How much capital the Mexican government will actually devote to the rehabilitation of the railways is still undetermined. The Mexican Congress has, however, authorized the placing of three loans amounting to 300,000,000 gold pesos (about $150,000,000), for the purpose of reorganizing the finances of the railroads and establishing a new bank of issue.

It is estimated that it will be necessary to spend at least $50,000,000 to rehabilitate the railways of Mexico, if they are to be brought back to the state of efficiency existing under the American operating officers prior to the revolution. Under the Diaz government concessions granted to private companies for railway construction provided for the automatic return of the railways to the government after a stated period, usually 90 years, upon the payment by the government of compensation for rolling stock, buildings and material on hand at the date of the transfer.

When Carranza took over the National Railways of Mexico in 1914 the decree provided that an indemnity should be paid based on the average earnings for five years, plus 10 per cent, but up to the present time the Mexican government has been unable to meet the interest on its state bonded debt, interest in default on January 1, 1918, being $12,047,807. In addition to this, interest is in default on $50,747,925 general mortgage 4 per cent gold bonds of the National Railways

of Mexico, and on $7,000,000 Vera Cruz & Pacific first 4½ per cents.

The mileage of the lines of the National Railways of Mexico consists of 6,410 standard gage and 388 narrow gage. Sidings and yards, 896 miles standard gage and 45 narrow gage. In addition, the National Railways system owned or controlled, prior to the Carranza edict, 162 miles of the Texas-Mexican line and 12 miles of Decauville construction. It had in 1914 15,700 standard gage freight cars of a total capacity of 521,957 metric tons; 1,779 narrow gage freight cars of a total capacity of 38,244 metric tons; 454 standard gage passenger cars, and 113 narrow gage passenger cars; 670 standard gage locomotives, and 92 narrow gage locomotives.

New Lines Built or Under Way

New lines projected by the Mexican National Railway administration include a line along the Gulf of Mexico from Matamoras on the border to Vera Cruz via Tampico and Tuxpam, with a branch to Honey which will afford connections to Mexico City, and an extension of the line on the Pacific side from Llano Grande to Mazatlan. A line is now under construction from Canitas to Durango, of which 250 miles have been completed. Another line is being built east of Saltillo. A line is also being built from Cuatro Cienagas, State of Coahuila, to Chihuahua, via Sierra Mojada, approximately 450 miles. Another line is under construction from Durango to Mazatlan, about 135 miles, making a new transcontinental line across Mexico. The Cuatro-Cienagas-Chihuahua route will tap large coal fields in Northern Mexico. The Durango-Cienagas road will shorten the distance to the Mexican capital by some 200 miles and will open up rich mining areas.

Announcement was made in Mexico City on December 19, 1918, that construction work will shortly be commenced on a railway connecting the city of Merida, capital of the State of Yucatan, with Mexico City. A contract has been prepared with the Development Company of the Southeast for carrying out the work. The road will run from Merida through the southern portion of Yucatan, passing through the State of Campeche and Tabasco, and effecting a junction with the Pan American Railway at the station of Santa Lucrecia, State of Vera Cruz. This route will traverse a very rich agricultural region which is at present without rail communication. A large amount of rolling stock and other material for this line has already been landed at Progresso by steamer.

Newspapers in Mexico City have during the past month announced a great revival of interest in railway development. The steel works at Monterey have already made one delivery of 5,000 tons of steel rails for the line between Monterey and Tampico. Orders are in hand at the same plant for all lines under government control. Preparations are under way for the completion of the line of the Southern Pacific Railway of Mexico from its present terminus south of the city of Tepic with the existing lines from Guadalajara west, and thence to Mexico City, thus giving direct rail communication with all the cities of the states of Sinaloa and Sonora, as well as with the Pacific coast of the United States.

Application has been made to the Mexican Government by a British syndicate for a concession to construct a railroad from San Geronimo on the Ishmus of Tehuantepec, to Campeche, a distance of about 450 miles. At San Geronimo the proposed road will connect with the National Tehuantepec Railroad, and at Campeche with the United Railways of Yucatan. The application really seeks to revive a concession that was granted by the Government several years ago for a railroad that was to be built along the same route as is now in view. Under the original concession the route for the proposed railroad was surveyed and was found to be feasible from an engineering and construction standpoint.

America's Stake

Over one billion dollars of American capital is invested in Mexico, of which $235,464,000 is in railway stocks and $408,926,000 is in railway bonds. For this reason the ability of Mexico to "come back" is of vital interest to Americans, and especially to the American railway supply interests, for it is one of the few countries in the world where American railway investments far exceed those of Great Britain—a potent factor in securing orders for supplies. In the past Mexico has shown surprising ability to recuperate quickly from internal troubles. Since the beginning of 1918 real progress has been noted. The mines and smelters with a few important exceptions are running to capacity, the oil wells are producing freely, farms are being worked extensively, the government is distributing agricultural implements at cost, and the condition of the railroads is receiving serious study, although in certain sections bandit raids are still of frequent occurrence.

Existing Railways Inadequate

With a population of 15,000,000, spread over 767,000 square miles, the existing railway development of Mexico is entirely inadequate, and there are immense areas, rich in minerals or with very productive soil, practically isolated from the rest of the country. The present railways have come into existence to meet the needs of special interests. Mineral railways for the conveyance of ore from mines to convenient shipping points, for instance, have developed into important lines.

Of all the railways in Mexico those making up the National Railways group are by far the most important, for they have four points of entry on the United States border, their lines running south from Matamoras, Laredo, Eagle Pass and El Paso, and connecting with the important harbors of Tampico and Vera Cruz on the east coast and with Manzanillo on the Pacific.

At San Geronimo, on the Tehuantepec Railway, there is a branch line called the Pan American Railroad, which is a part of the National system. It runs along the Pacific coast to Tapachula on the borders of Guatemala, and is part of that great dream of American statesmen—a direct railway route from the United States to the southernmost republics of South America. It is hoped that when the world settles down to business again this project will be carried out, and then we shall be able to take a train from New York for Chile and Peru via Mexico, Guatemala, Salvador, Nicaragua, Costa Rica and Panama.

Other important lines include the British owned Mexican Railway, operating 402 miles of line between Mexico City and Vera Cruz, which has been twice confiscated, and is now operated by the Mexican government. It runs from the lowlands of Vera Cruz up through the mountains, and is a marvel of engineering, at one point reaching an altitude of 10,000 feet. In some places it runs along the mountain side on terraces hewn out of the solid rock. The cost of construction was $125,000 per mile.

Then there is the Mexican Central, which has suffered so severely from the rebels, and which follows part of the ancient mountain trail used by the looting Spanish conquerors in passing to and fro between the oceans, from the Gulf of Mexico to the Pacific. The Tehauntepec Railway, with 305 miles of line, running across the isthmus from the Atlantic to the Pacific, spans the narrowest neck of land on the American continent with the exception of Panama, and has recently been brought completely under the control of the Mexican government.

In northern Mexico is the American owned Kansas City, Mexico & Orient, with 349 miles of line in Mexico, which

has so far not been disturbed by the Mexican government. This was the first direct line to cross the frontier between the United States and Mexico, extending from Kansas City to the Bay of Topolobampo, on the Mexican Pacific coast, opening up a magnificent country of immense area, rich in mineral and agricultural resources. The Mexican Northwestern Railway, a British enterprise, controls 496 miles of line between El Paso and Chihuahua and the Southern Pacific of Mexico, still in the hands of its American owners, with 1,246 miles of line, runs from Nogales on the border to Culiacan and Orendain. Part of the main line and several of the branches are out of business temporarily.

The urgency of the need for American railway supplies in Mexico is emphasized by a cablegram sent by the American Consul General in Mexico on February 21 announcing that a presidential decree in effect from February 20, 1919, permits the importation of the following railway supplies into Mexico free of duty for a period of six months: Switch points, iron and steel ties, turntables, iron and steel rails, frogs, and tie plates. The duties thereby remitted amount to 0.03 peso per kilo gross weight, or $0.68 per 100 lb. According to the report submitted by the assistant director general of the Mexican Government Railways, total receipts for the last week in December, 1918, amounted to 1,607,680 pesos. This is a marked increase over the weekly receipts for the first six months of 1918, when the average was only 1,217,027 pesos. This refers only to the lines under government control.

Mexico to Report Progress

At a meeting arranged by the Council on Foreign Relations in the Hotel Astor, New York, on March 11, prominent Mexican business men gave accounts of the progress of Mexico in the last three years since the overthrow of the Diaz regime. The speakers included Ramon Prida, former President of the Chamber of Deputies of Mexico; Oscar Braniff, landowner; Garza Aldape, former Secretary of the Interior of Mexico, and Jose Castellot, Jr., son of a former Mexican senator. Meanwhile Rafael Nieto, acting Secretary of Finance of the Mexican government, and Dr. Alfredo Caturegli, fiscal agent of the Mexican republic in this country, are conferring with American bankers regarding the retiring of the Mexican national debt. According to the official statement of President Carranza, the amount of this debt in 1910 was about 450,000,000 pesos, Mexican currency, to which should be added the loan contracted by the Madero government in New York amounting to 100,000,000 pesos. No payments of interest have been made since May, 1914, when they were suspended by order of President Huerta. It is significant that National Railways of Mexico 4½ per cent bonds due 1957 sold on the New York Exchange on March 11 at an advance of 15 points over the last sale in December, 1918.

Bankers' Committee to Study Mexico

J. P. Morgan & Co. announced on February 24, that an international committee had been appointed for the purpose of protecting holders of securities of the Mexican Republic and of the various railway systems of Mexico, and to study conditions in Mexico with a view to evolving a plan to rehabilitate that country. The committee will number 20, 10 representing the United States, five Great Britain and five from France. The members of the committee are as follows:

J. P. Morgan, chairman; John J. Mitchell, president Illinois Trust & Savings Bank, Chicago; Walter T. Rosen, of Ladenburg, Thalmann & Co.; Charles H. Sabin, president Guaranty Trust Co., New York; Mortimer L. Schiff, of Kuhn, Loeb & Co.; James A. Stillman, chairman of the board, National City Bank, New York; James N. Wallace, president Central-Union Trust Co., New York; Albert H. Wiggin, chairman of the board, Chase National Bank, New York; Robert Winsor, of Kidder, Peabody & Co., Boston; Laurence Currie, of Messrs. Glyn, Mills. Currie & Co., London; Sir Clarendon Hyde, of Messrs. S. Pearson & Son, Ltd., London; E. R. Peacock, chairman of the Bondholders' Committee of the Mexico Tramways and the Mexican Light & Power Group of Companies, London; Vivian H. Smith, of Morgan, Grenfel & Co., London; Vincent W. Yorke, chairman of the Mexican Railway Co., Ltd., London; William d'Eichthal, of Mirabaud & Co., Paris; Georges Heine, director of the Banque de l'Union Parisienne; Andre Honnorat, member of the Commission for the Protection of French Holders of Mexican Securities; Jaques Kulp, auditor of the Banque de Paris et des Pays-Bas, Paris; Joseph Simon, inspector of finance, general delegate of the Commission for the Protection of French Holders of Mexican Securities.

The Mexican government will appoint a committee to treat with this international bankers committee and it is believed that Robert Pesqueria, financial agent at El Paso will head the group.

Senor Nieto after several conferences with J. P. Morgan is said to feel very optimistic as to the outcome of the negotiations. Although final power rests with President Carranza, Senor Nieto may tentatively reach an agreement with the financiers. A well known banker whose name cannot be mentioned in discussing the situation is quoted as follows:

"I believe Carranza is in the same position as a man who has backed the wrong horse and is trying to recuperate his losses by playing the favorite. From all advices, he undoubtedly was playing with Germany, who is now put out of the running, and he plainly sees that the United States is now the only nation in the world that can finance him through his present difficulties.

"What Mexico needs is some definite financial plan. What she needs most is some Alexander Hamilton to lead her out of the financial wilderness into which she has wandered. I believe the Carranza officials are at last looking into the future and are beginning to realize that without the co-operation of foreign capital the country can never prosper, even with all her potential wealth.

"At present she is almost the pariah among nations. No other country in the world has enacted such atrocious legislation nor any other ruler dared to issue the confiscatory manifestoes and decrees that Carranza has put forth. However, this will all be in the past if the present government can give some form of guarantee that vested rights will be recognized and the interests of citizens of the United States given adequate protection. It is a consummation devoutly to be wished, not only for the benefit of the proletariat of Mexico, but for the enrichment of the world in general."

The new developments on the part of the present Mexican ernment has ordered the establishment of 23 commercial exment of Industry, Commerce and Labor of the Mexican Government has ordered the esablishment of 23 commercial exhibits in North, South and Central America and Europe, and has appointed four commercial agents, who will be stationed in St. Louis, New Orleans and San Francisco and Barcelona, Spain. The exhibits will be housed as adjuncts of the Mexican Consulates in San Francisco, New Orleans, Tampa, New York, Los Angeles, Philadelphia, the West Indies, Central and South America and European cities.

The Bangor (Me.) Chamber of Commerce has adopted resolutions calling on public service commissioners to see that all public utilities are properly and efficiently run and declaring that every community should support commissions in seeing that public utilities have sufficient revenue to give good and safe service, and to make all needed further developments. All Boards of Trade are urged to agitate this question of the relations of the public to the welfare of essential utilities.

Railway Freight Transference and Handling

By H. McL. Harding *

No one has doubted but that the movements of package freight at railway terminals will be performed mechanically, as soon as the psychological time should arrive; that is, as soon as there is a sufficiently insistent demand, with conditions favorable in respect to education and finance. From an analysis of these movements based upon engineering experience they can be divided into inbound freight movements, outbound freight movements, a combination of these two, and the movements at transfer stations. In addition, there are the transfer movements at the combined marine and railway terminals. All of the above stations can be combined, but it is preferable to have the transfer stations separate.

The following movements refer to the outbound and inbound station movements, chiefly for l.c.l. freight. To the present time, improvements in these freight movements have consisted in refining existing methods of hand or motor truck conveying. To accomplish this, cars have been placed so as to reduce the length of the freight transference and the design of the freight station has been modified so as to make the travel shorter and the handling easier. These are all most praiseworthy, but it may be said that now there is little opportunity for further improvement in the design or in the operation by making further similar changes or a more intensive use of the congested floor areas.

It seems as though the usual operating facilities have been perfected as far as possible, and it is now necessary to look to other mechanical appliances or to other combinations of standard appliances to make any great and marked advances in this branch of railway terminal engineering. From many sources there come inquiries as to whether it is not possible to increase the freight transferring capacity of existing freight stations; that is, an increased tonnage moved per hour so as to obviate the necessity of purchasing additional land, and to reduce the time of car detention at the terminals and to save manual labor for a higher class of railway service. The stations, platforms and trackage spaces at the loading and unloading terminals have been worked to their limit and passageways on the surface are filled by an almost continuous line of trucks of various descriptions.

It will be advantageous first to enumerate the freight movements at the various simple and complex railway freight stations, and then to see what proven types of machinery manufactured by large companies in the United States can be readily and easily adapted to the various movements. By utilizing standard types of machinery, there is avoided any experimenting, and by installing the machinery of the largest manufacturers, adapted under the advice and the direction of experienced consulting engineers, there is a certainty of contract fulfilment and of commercially successful operation. Too often this latter has been neglected.

The movements at inbound freight stations consist (in general) in lifting the freight mechanically from within the sides of open cars or from the doors of closed cars and transferring the freight to within the inbound shed, and there assorting, distributing and tiering. By mechanical tiering a greatly increased temporary holding capacity is attained. The transference should be in the most direct line possible and then a longitudinal movement for the distributing and tiering according to the names or marks of the consignees.

These mechanical movements should be applicable to various designs of stations whether for through track or stub track stations. It should not be necessary to change the ground plan of the station or of the platforms or the layout of the tracks or the general methods of operation.

*Former President, Society of Terminal Engineers. Consulting engineer of the State of New York on barge canal terminals.

Inbound Freight Station

The movements should be in loops so that many loads can follow one another continually without congestion, with rapidity and without rehandling by manual labor. There should also be parallel movements of different freight loads. The machinery should be of such type that there can be an excess of transferring capacity; that is, that the freight can be moved from the cars as fast as it can be ready for the machinery and yet not depend upon crowded floor surface spaces.

In the inbound stations the freight can be piled by the mechanical appliances so as to be most conveniently arranged for the draymen of the consignees, or segregated for any form of transshipment. The freight can be delivered by the same machinery upon the drays or upon the tailpiece of the drays. The drays are thus more quickly loaded, more drays can back up and can be loaded in a given time. Better service can thus be given to the consignees.

Outbound Freight Station

At the outbound freight station, the movements are from the dray to the outbound freight station, from the outbound station to the cars. In some cases the freight may be taken directly to the cars from the drays. As team freight is unloaded directly from car to dray at the inbound station, so at the outbound station cars are loaded directly from dray to car. The inbound station is in width from 60 ft. to 70 ft. and the outbound in width is about 30 ft. At the outbound station all movements can be performed mechanically. These consist in lifting from the dray, transferring to the floor of the outbound station, lifting mechanically from the floor and transferring upon the open cars and to the closed cars.

There should also be included within the scope of these movements the inspecting, the weighing and the routing. Often it may not be necessary that certain classes of l.c.l. freight should pass through the outbound shed.

The ancient methods of operation can supplement the later system. The old and the new can be operated simultaneously. Should it be desired to combine the inbound and the outbound stations, either together or at different places at the same station, then the same machinery can be used at the inbound as well as at the outbound station. At a transfer station, the number of strings of cars and number of cars in each string may be as desired.

If there should be nine strings of cars and twenty cars in each string, it is possible to transfer mechanically from any one car to any of the other 179 cars by a continual succession of rapid movements without congestion or confusion or rehandling by manual labor.

It is, however, necessary to have engineering advice as to the adaptation and adoption of the machinery so as to avoid possible mistakes. Such mistakes have too often occurred and in all cases are due to lack of engineering advice.

Conclusions

At railway freight stations, all kinds of miscellaneous freight can be successfully transferred and handled mechanically, thereby more than doubling the transfer capacity of a given station area, reducing the time of car detention with a corresponding reduction in terminal expenses.

Attaining commercial success of such a terminal installation is based upon a knowledge of the operating conditions and the performance of different types of machinery. This knowledge should be combined with experience with all the various conditions of railway freight terminals. Its success is therefore not a manufacturing problem, but one of terminal engineering.

The Plans for New Railroad Legislation

The Transportation Problem Will Not Be Lost Sight of While Congress Is Adjourned

Republican leaders in Congress are already making plans for the extra session, which some of them say will be called by May 15, at which the question of permanent railroad legislation, as well as the appropriation for the Railroad Administration, will occupy an important place. It is assumed that the appropriation, along with the regular supply bills, will receive first consideration, but the committees on interstate commerce are planning early action on the problem of the disposition of the railroads after their relinquishment from federal control, and it is possible that hearings will be held before the Congress assembles. Senator Cummins, who will be chairman of the Senate Committee, has left Washington, but expects to return soon, and Representative Esch, who will be the chairman of the House Committee, has remained in Washington. Mr. Esch has given out an outline of a bill which he says represents his ideas as to what should be done, and which is in essentials the same as one he introduced in Congress a short time ago. It follows closely the suggestions made by the Interstate Commerce Commission, and it is reported that it was drafted at the commission's offices. A similar bill was also introduced by Senator Pomerene during the session. The fundamentals of the bill are as follows:

The return to private control of the railroads as soon as it can be accomplished without undue shock to the roads and the financial world. Government control would cease automatically on the enactment of the bill.

Increases in the powers of the Interstate Commerce Commission, especially in the power to initiate and fix maximum and minimum freight rates, including the power to determine rates on water transportation from port to port. This is designed to prevent railroads from destroying water competition.

Pooling of traffic and equipment under control of the Interstate Commerce Commission.

Complete federal control of the issuance of railroad securities.

Joint terminals wherever desired, compensation for owned terminals to be determined upon a fair and reasonable basis by the Interstate Commerce Commission.

Retention of state railway commissions, with power to sit with the Interstate Commerce Commission upon rate hearings, but without a vote upon decisions fixing rates.

Special designation of privately owned cars as common carriers, with especial reference to refrigerator cars owned by packing companies.

"The provision making private cars common carriers is far reaching in its effect," said Mr. Esch. "By making the refrigerator cars owned by the packing companies common carriers, at one stroke this would bring within the jurisdiction of the Interstate Commerce Commission all the alleged abuses complained of, arising out of the management of the refrigerator cars by the packing concerns. Given this power, it would seem to me that the Interstate Commerce Commission could adjust all matters relative to that situation."

Mr. Esch explained also that his proposed legislation will make it mandatory upon the Interstate Commerce Commission to take into consideration all labor costs in determining rates.

"I am clearly of the opinion that the state commissions should have unreserved control over what are termed police powers, and that on matters of purely local character their jurisdiction should outweigh the federal power," Mr. Esch said.

"It is highly desirable that Congress be reconvened at the earliest feasible day, not only in order to provide for financing the $750,000,000 revolving fund which failed in the last Congress, but to define a permanent policy of government regulations."

A bill introduced by Senator Watson just before the adjournment of Congress (S. 5677) provides for rate making by the Interstate Commerce Commission on a basis to yield a return of 6½ per cent on the property investment of the carriers by groups with a provision for sharing with the government earnings above 7 per cent, for the avoidance of conflicts between state and interstate jurisdiction as to rate making, and for the enlargement of the powers of the Interstate Commerce Commission, to authorize it to compel joint use of railway properties where desirable, and to regulate the issuance of securities and to supervise the expenditure of the proceeds. The bill also provides for pooling and consolidations subject to the regulation of the Interstate Commerce Commission.

The bill provides that the rates now in effect at the termination of federal control shall continue to be the lawful rates until changed by order of the commission, both in respect of the service specified in the act to regulate commerce and in respect of service wholly within one state in cases where the relation between the intrastate rates and the interstate rates may affect interstate or foreign commerce, or subject it to discrimination, unreasonable prejudice or disadvantage. As soon as practicable after the termination of federal control, the commission would be authorized to prescribe and cause to be put into effect rates which may not be changed or departed from except by order of the commission. At the same time, the bill provides that the commission shall see to it that the rates for service within one state are not such as to injuriously affect interstate or foreign commerce and to that end the commission is authorized, whenever it deems necessary or proper, to prescribe the lawful rates for service wholly within one state. The commission is also required to make such changes in rates as will maintain the 6½ per cent return and to that end is authorized to prohibit rates which it shall find to affect injuriously interstate commerce, or which it shall find to be unreasonably low or unremunerative, and to prescribe minimum rates. The commission is also authorized to prescribe regulations to make adequate provision for depreciation and obsolescence of property.

Section 2 provides that whenever the net railway operating income shall for any fiscal year exceed 7 per cent, the commission shall within three calendar months ascertain the amount and the carrier shall within three additional months pay over to the treasury two-thirds of the amount so certified. Whenever the commission shall find that as to any carrier the income so fixed is or will be unfair or will deprive the carrier of just compensation because the property investment account does not adequately represent the value of the property, or for any other reason, the commission shall fix the just maximum income, it being the purpose of the act to raise and stabilize the credit of the carriers as a whole, but neither to raise nor to impair the financial standing of carriers whose credit is ample to furnish adequate facilities and service for the needs of the public. It is provided that no carrier shall from railway operating income increase the rate of dividends above the rate established prior to federal control unless it shall have expended or appropriated out of railway operating income for additions, betterments or improvements

PROPOSED RAILROAD PLANS

	RAILWAY EXECUTIVES	ASSOCIATION OF RAILWAY SECURITY OWNERS	INTERSTATE COMMERCE COMMISSION	WALKER D. HINES, DIRECTOR-GENERAL	BROTHERHOODS	VICTOR MORAWETZ	PAUL WARBURG
OWNERSHIP AND OPERATION	Private	Private.	Private.	Private.	Government ownership. Operation by private corporation run by employees, which pays government a rental out of the receipts of operation.	Private.	Private.
MERGERS	Federal incorporation with mergers allowed, subject to approval of Secretary of Transportation.		Mergers of existing companies may be made in the public interest.	Roads of each locality to be combined into regional systems, six to twelve in number.	Roads all to be operated by one private corporation, stock of which is to be held in trust for the exclusive benefit of the employees.	Railroads to be consolidated into ten or fifteen Federal corporations. Present securities to be refunded by 4% debentures and stocks.	Under Federal franchise, mergers may be made, subject to supervision of Federal regulating body.
REGULATION OF SECURITIES	Federal control exclusively.	Under supervision of Regional and Interstate Commission.	Federal regulation of the issuance of securities.			Debentures and stock to be issued only as authorized by Federal Railway Board.	By Federal regulating body.
CONTROL	A cabinet officer "Secretary of Transportation" to be appointed. Interstate Commerce Commission should be relieved of executive and administrative duties, except as to valuation and accounting, and act as quasi judicial body. Regional Commissions.	Federal regulation through Interstate Commerce Commission, as at present constituted, co-ordinating with six Regional Commissions. Co-ordination between State and Regional Commissions.	Better defined relationship between State and Federal control. A broadening of Federal control.	Five-year extension of Federal control. Modified private operation and control thereafter. Government representation on Boards of Directors.	No "Secretary of Transportation" continuation of powers of Interstate Commerce Commission. The directors shall be selected, one-third by non-appointed employees; one-third by appointed officers and employees; one-third by President.	Federal corporations to be under regulation of a Federal Railway Board headed by Cabinet Officer. Specified number of directors of Federal corporations to be appointed by Federal Railway Board. Regional boards and one central board of regulation.	Regional Board upon which State commissions might be represented with a reorganized Interstate Commerce Commission of 5 or 7, half judicial and half administrative in character at head.
RATES AND RETURN ON CAPITAL	Regulation of rates by Federal government exclusively. Carriers may initiate rates which shall become effective unless disapproved by Secretary of Transportation. Statute shall specifically provide for adequate rates, which must reflect cost of wages and other expenses. Rates may upon complaint be brought before I. C. C. for review with power to prescribe minimum rates.	A minimum rate of return, fixed by Act of Congress, through rates adjusted as occasion may demand. Interstate rates to be left in hands of State Commissions.	Revenues should be "adequate" and "reasonable." No statement as to any change in the method of rate procedure.	Government to ascertain and guarantee railroads a fixed fair return.	Under regulation of Interstate Commerce Commission. When the government's share of the distribution of profits exceeds 5% of the gross operating revenues, reductions in rates should be made to absorb the 5%.	To be regulated by Federal Railway Board through central and regioal boards; local rates to be referred to regional boards, through rates to central board.	Rates to be determined by Federal regulating body. Railroads accepting plan to be guaranteed 4½% on Federal valuation.
DISTRIBUTION OF PROFITS		Earnings in excess of fixed reasonable return to be distributed among employees, railroads earning them, and for certain improvements not to be capitalized in rate making.		Profits above the specified fair return are to be moderately shared in by the railroads and the government, possibly also by labor.	Government guarantees return on bonds issued in exchange for existing capital. Any balance over this is to be divided between operating corporation and the government for the purpose of enabling the Interstate Commerce Commission to reduce rates. The operating company will disburse its share to the employees, in proportion to their annual wages.	Government to guarantee dividends of $2.50; any distribution in excess of $4 to be divided with government. Government to have option to buy stock at any time at $85 per share.	Any return on capital between 6% and 7% to be divided with government and possibly with labor. All over 7% to go to government.
FINANCING	Provisions to be made for funding by the United States of indebtedness of carriers to it growing out of Federal control.	A Federal corporation directed by the nine Interstate Commerce Commissioners and eight railroad men to finance purchase of equipment from the Railroad Administration, purchase of new equipment, and financing of the return of the roads to private control.		Comprehensive program of capital expenditure during five-year period; probably to be provided partly by government; partly by roads themselves where able to borrow.	All financing to be done by the government.	Debentures to be issued to an amount such that interest requires 40% of operating income. Balance of operating income to be capitalized at 6% in stock.	
JOINT USE OF TERMINALS, ETC.	Subject to direction of the Secretary of Transportation; also other similar matters.	To be arranged, also re routing of freight, etc., by above Federal Corporation.					
WAGES	This and similar questions to be settled by officers and representation of individual employees affected, if possible, otherwise by a board under the Secretary of Transportation.	Regional Commissions to act as Boards of Conciliation. Appeal to Interstate Commission.			A committee of nine directors of operating company empowered to make binding and final decisions in all wage disputes.		

on an average of the preceding two years subsequent to December 31, 1917, an annual sum equal to one-half of one per cent of its property investment account, and beginning at the termination of federal control and averaging by three-year periods, no additions to property investment account shall be considered by the commission in establishing rates or in certifying excess income, except in so far as the sum applied to such additions, from such income, shall exceed one-half of one per cent on the property investment, nor shall such sums be capitalized except in so far as they exceed one-half of one per cent. The purpose is to establish and enforce, so far as practicable, the policy of paying out of income the cost of necessary additions, betterments and improvements to road and equipment that do not directly produce or increase income and thereby avoid increases in the bases of rates or in the capital charges.

Section 3 authorizes the pooling of equipment or traffic or consolidations after having received the approval of the Interstate Commerce Commission as necessary or desirable in the public interest, to prevent unnecessary additions to the property investment or to avoid unnecessary duplication of facilities.

Section 5 makes it the duty of each carrier to provide its fair relative share of freight car equipment, measured by its freight ton miles and the number of cars required to make its average ton mileage movement. This section also authorizes the commission to require reports regarding the movement of freight cars, etc., and whenever congestion is threatened to designate an agent or agents to co-operate with the carriers in order to remedy the conditions by embargo license, diversion or other efficient means.

Section 7 provides for the establishment of regional bureaus subordinate to the Interstate Commerce Commission.

Digest of Proposed Solutions of the Railroad Problem

The Equitable Trust Company of New York has prepared the accompanying digest of the principal plans proposed at the hearings before the Senate Committee, regarding which it says:

"The digest, when analyzed, yields a composite plan, which may be regarded as a combined solution evolved by the best brains of the country.

"In the first place, we find that government ownership is almost altogether without support, except from the railroad brotherhoods as represented by their counsel, Glenn E. Plumb. The predominance of opinion is for private control under restrictions, designed to promote better, more efficient service than was possible under the old system. The extension of government control to the five-year period proposed by ex-Director General McAdoo likewise meets with little favor. In opposition thereto, it is argued that it would merely postpone the date of determining a problem which must come up for solution sooner or later; that it would tend to make the return of the roads to their owners more difficult; that it would place them in such heavy debt to the government that liquidation or refunding would be practically impossible, and that there is nothing in the railway problem which cannot be solved in 21 months as well as in 60.

"There is substantial unanimity that mergers should be permitted when in the interest of the public, and that the issuance of securities should be subject to federal control. The latter subject is closely related to the question of government guarantee of capital, for if the government is to undertake the assuring to the roads of a specified minimum return, it is only logical that it should have something to say as to the creation of new securities, and accompanying new capital investment. The plans of the Association of Railway Security Owners, of Paul Warburg, and of Director General Hines, all contain provisions for such guarantee. The railway executives do not suggest anything quite so specific, but insist that rates shall be adequate as well as reasonable.

"The rate question, which is perhaps the most difficult of all to determine, is variously approached. There is a tendency to concentrate the rate-making power in federal authority without, however, entirely destroying the power of the state commissions. This is in line with the sensible policy of eliminating, so far as possible, the conflicts which are inevitable where there is dual authority, or where the federal authority may be hampered and its orders nullified by state action. There is, moreover, a sentiment in favor of an attempt to arrive at some precise figure which will represent equitable compensation to the security holders. Several of the plans contain suggestions for profit sharing with labor, with the government, or with both, in case profits shall exceed this figure. Here we have the community of interest idea, which has received widespread application in industry, proposed for a new field—transportation. The justice and economic soundness of its adoption will scarcely be questioned, though there will doubtless be conflicting ideas to be reconciled in working out precise details. From the standpoint of the security holders, the important features of a guaranteed minimum return, together with a division of profits above a maximum, means at the same time the elimination of uncertainty as the possibility of reduction of one's income below a certain feature, and the loss of opportunity for very marked appreciation.

"In other words, it would greatly stabilize railway securities and minimize their speculative features.

"The views in connection with methods of financing the roads are not at all in agreement. Particularly interesting is the novel proposal of Mr. Morawetz, who advocates the refunding of all existing securities by means of a fixed and continuing proportion of debentures and bonds. This would apparently give the debentures a high investment standing, and would still leave the stock sufficient equity, together with the minimum guarantee of $2.50 per share by the government, to assure it of an investment character only moderately tinged with speculation.

"The successful features of government operation are not to be lost with the return of the roads to private control, if the ideas of several of the authors of the various railway plans are carried out. The joint use of terminals, the elimination of competitive features which yield no additional public service, such as separate ticket offices, almost identical passenger train schedules, etc., may be eliminated in the interest of economy.

"Some thought has also been given to methods of settling wage disputes. Three of the plans quoted aim to set up permanent organizations for the handling of these questions. Presumably a regular line of procedure for obtaining hearings and appeals would be instituted. If found workable, this would provide the machinery for proper consideration of, and decisions upon, this very vital matter."

The National Association of Railroad Tie Producers, St. Louis, Mo., has issued a circular calling attention to the fact that never in the history of the industry have weather conditions been more ideal than have prevailed for the last 90 days. There has been a minimum of snow and rain in the Southwestern region, thereby permitting not only the making of ties, but their hauling, the latter being an extremely important item for the producer with limited capital. These conditions account for the large production of ties which ordinarily would not come out in this region at this season of the year. The labor surplus prevailing in many parts of the country, however, has not helped conditions in the tie camps where there still exists a shortage of experienced tie makers, although many producers have offered increased wages.

Merchants' Association of New York Against Government Ownership

THE MERCHANTS' ASSOCIATION of New York City, one of the largest organizations of the kind in the country, adopting the report of a special committee recently appointed, has reaffirmed its position, taken on November 15, 1916, in opposition to government ownership of railroads and other public utilities. The special committee consisted of Frank R. Chambers, chairman; James G. White, Otto H. Kahn, Francis H. Sisson, H. H. Porter and Professor J. F. Johnson. Copies of the full report may be had on application to the secretary of the association, Woolworth building, New York City. Following are characteristic extracts:

Except under war conditions the sole plea that can be advanced to justify the operation by governments of public utilities is that governments can provide better service at less cost than can private operators—that is to say, the assumption that government operation is more efficient and less costly than private operation. We do not believe that this contention can be sustained. The fields of politics and economics are dissimilar and separate. The field of politics (meaning thereby the art of government) is mainly the regulation of conduct and the protection of rights. The field of economics is the production and utilization of material things. The principles, the methods and the machinery of political administration are wholly different from those of economic activities and not adapted nor adaptable to the latter. The differences are fundamental and cannot be reconciled. No business, whether public or private, can be operated efficiently and without great waste, under the constant injection at the top of new, untried and often unfit executives and managers; nor with the rank and file deprived, by lack of opportunity for advancement, of the incentive to zeal and energy.

In the case of private operation we find continuously brought into play the qualities and the conditions which tend to maximum business efficiency—experience, knowledge, special training, and the zeal arising from opportunity and self-interest. The successful management of any large business undertaking requires that the utmost freedom of action be granted to the executive. It is assumed as a condition of his employment that his experience, training and special skill will enable him to exercise a wide discretion so wisely as to promote the welfare of the business. His initiative is given full play and he is enabled, whenever occasion requires quick action, to do whatever is necessary to be done.

Public service plants publicly operated are frequently starved by reason of the failure or refusal of the public officials to approve the outlays, without which a high degree of efficiency cannot be maintained nor adequate service supplied. Long experience by this Nation in the distribution of money for public improvements has demonstrated beyond any question that the outlays for that purpose are largely determined by political influence, and but little by economic utility. Seven hundred million dollars have already been spent by the United States Government for the improvement of internal waterways, but there is no complete system; and most of the money has been expended for unrelated local improvements, entirely unwarranted by the possible benefits.

In New South Wales with the nationalizing of its railroads, employees, by reason of their organized political power, so far over-reached in their demands that a widespread public reaction was created, resulting in the disfranchising of government railroad employees, thus destroying entirely their political power by depriving them of their voting power. Wage-making for political rather than economic considerations is fraught with danger for all concerned. The multiplication of needless offices and superfluous employees is universal in every branch of government service. The useless subdivision and the increase in officials in public management is mainly due to political causes, the obvious motive being to provide additional places for political henchmen. Because of these conditions the cost of performing the work is largely and wastefully increased. Under the present railroad control more than eleven hundred new officials are employed in the central administration at Washington in addition to an even greater number distributed in the offices of the regional directors. The aggregate expense of the present railroad administration has been increased by many millions of dollars annually, despite the widely heralded consolidation and unification whose purpose was to effect economy.

With the single exception of Prussia, State-owned railroads have been financial failures. In general, their rates are higher and their service poorer than those of privately operated railroads. The French State-owned railroads embody all the abuses referred to above. The French Government took over the Western system January 1, 1909. After five years of government operation, the gross revenue had increased by $6,556,000. During the same period the operating expenses had increased by $13,090,000.

As a result of their disillusioning experience several hundred American municipalities have discontinued their attempts to save money by carrying on a business undertaking through the machinery of politics. There are in America, apparent exceptions to the general rule of municipal inefficiency; but they are only apparent and not real. Seemingly excellent showings are frequently made. These usually cover only a short initial period. They generally only cover obvious current costs, and omit important factors of future costs. Loss in taxes, interest on investment, depreciation, amortization, extensions and betterments, rents and maintenance of public buildings whose costs are borne by other departments, are commonly ignored. By these omissions an apparently favorable financial showing is made, while a true accounting would show the reverse. Municipal operation has been successful in various European municipalities, notably Glasgow, but politics, in the American sense, does not enter into these municipal undertakings; municipal activities are in those cities regarded solely as business matters to be managed by business methods.

We are not unmindful of the defects that characterize the operation by corporations of public utilities, but we do not believe that those defects can be cured by substituting another method which in every respect of efficiency is much below the standards that generally prevail under private management. Other remedies than the substitution of methods abounding in greater evils should be found.

We believe that the public can best be served by utilizing the efficiency, enterprise and energy of private corporations for the continued operation of public utilities, under such public control as shall protect the public in its right to efficient service and fair rates; and at the same time assure to private capital invested in public utilities a fair return upon such capital. We do not find any change of conditions resulting from the war which warrant or require the previous position of The Association, in opposition to government ownership and operation, to be modified.

The Pacific Railway Club, San Francisco, Cal., has decided by unanimous vote to retain its present standard of membership, as set forth in its constitution; the club will admit to membership only persons actually engaged in railroad service, or those in the service of railroad regulatory bodies who have had at least three years of actual railroad service, and members of the faculty of colleges of recognized standing. Imposing these requirements the Pacific Railway Club continues to be the only club in the United States made up exclusively of railroad men.

Modern Tendencies in the Design of Roundhouses*

Increased Size of Locomotives Is Effecting Marked Changes in Engine Terminal Structures

By Gustave E. Lemmerich
Layout Engineer, The Austin Company, Cleveland, Ohio

ROUNDHOUSE CONSTRUCTION during the past year has varied almost with every road. The trend has been toward reinforced concrete construction, although wooden frame, brick-wall houses have predominated. The delay in getting authority to proceed and the need for getting construction under way promptly did not permit as careful a study to be made of new types of construction as has been the case in the past.

Another feature of engine terminal progress has been the impetus given the roundhouse standardization idea. One or two important roads have designed standard stalls and applied them to houses of different sizes at as many as 12 locations. This greatly reduced the time required to produce working drawings and permitted construction to get under way at all terminals at about the same time. Practically all the newer designs have increased head room to improve ventilating and daylighting, and the continuous monitor type is being more generally used.

The depth of the house has now been increased to practically 120 ft. on several important railroads. On the Pennsylvania Lines West the new roundhouses have a depth of 118 ft. 3 in.

There is also an increasing tendency to equip houses with to 200 tons, installed in a back shop, to which rank the machine shop has been raised.

Size of the Roundhouse

The length of some of the latest locomotives is as follows:

Type of locomotive	Length over all, locomotive and tender
U. S. Standard, 6-wheel switch	66 ft. 9 in.
U. S. Standard, 8-wheel switch	70 ft. 0 in.
U. S. Standard, light Mikado type	82 ft. 0 in.
U. S. Standard, heavy Mikado type	82 ft. 4 in.
U. S. Standard, light Santa Fe type	87 ft. 4 in.
U. S. Standard, heavy mountain type	86 ft. 8 in.
U. S. Standard, tentative Mallet 2-6-6-2	about 99 ft. 5 in.
U. S. Standard, tentative Mallet 2-8-8-2	about 103 ft. 10 in.
Western Maryland Mallet, 2-8-8-2	102 ft. 10 in.
Virginian Mallet, 2-10-10-2	108 ft. 7 in.
Richmond, Fredericksburg & Potomac Pacific type	85 ft. 4 in.
Erie Triplex, 2-8-8-8-4	103 ft. 10 in.

There is hardly any doubt that the limit of the length of locomotives and tenders has not yet been reached. This is especially true of the length of the tender. This fact should be carefully considered for new roundhouses, where the status of the power in the engine district has not been fully developed.

Considering the foregoing points, the character of the road



A Three-Section Roundhouse with a Single-Section Monitor

bridge cranes and a number of roads have installed smoke exhaust systems. These serve two purposes—to eliminate the smoke nuisance and provide draft (in place of other means) for starting the fires.

These deep roundhouses, combined with the heavier and larger motive power will surely lead to a more careful analysis of the roundhouse situation. The unused area and the expensive roof construction will result in giving more consideration to the rectangular house. The heavy engines will also compel the more general replacing of the present method of raising engines with jacks, by the more up-to-date application of electric hoists. At more important points it is possible that this work will be done by cranes of capacities up and the terminal in question, the following tentative stall lengths are recommended: 90 ft., 100 ft., 110 ft., and 120 ft.

(a) For short line roads, branch lines where no heavy power is required, and where locomotive not much over 70 ft. in length are used the stall length recommended is 90 ft.

(b) At unimportant terminals for smaller roads with comparatively light power and handling locomotives not over 80 ft. in length, the stall length recommended is 100 ft.

(c) For more important terminals, handling Mikado, 2-10-2, and a few 2-6-6-2 Mallet locomotives, the stall length recommended is 110 ft.

(d) For engine terminals, handling few 2-8-8-2 Mallets, besides the ones mentioned under paragraph (c), a combination of a 110-ft. house, with a few stalls of 120 ft. for the Mallets, is recommended. The section of the house should be such that extensions can be made readily.

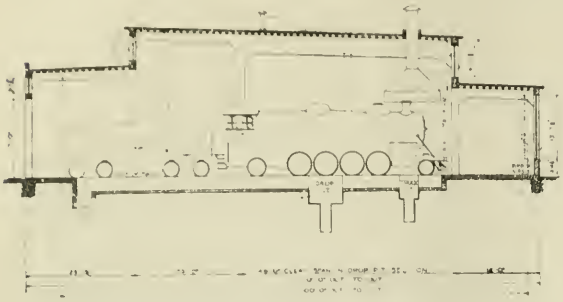
(e) For important engine terminals, where a crane installation is desired for locomotives under 85 ft. in length, a 110-ft. stall length is recommended. For locomotives over 85 ft. in length or where more working space is found desirable, a 120-ft. house is suggested

(f) At terminals where a few of the largest 2-10-10-2 type Mallets are handled, a similar combination to that outlined under (d) is suggested.

*This is the second of two articles on engine terminals. The first installment appeared in the *Railway Age* of March 7.

The depth of the Mallet section in this case, however, should be 125 ft. for Mallets up to 105 ft. For Mallets over that length the stalls should be lengthened correspondingly.

The number of stalls required for a roundhouse depends largely on the local traffic and other conditions existing at the terminal. These conditions are also subject to great fluctuation during the year and with the traffic seasons. For these reasons the ratio of the average number of engines handled per day to the number of stalls in the roundhouse varies, say, from three to five or even seven to each stall.



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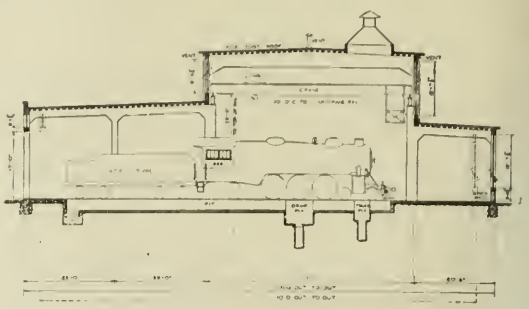
A 100-ft. Roundhouse Without a Crane



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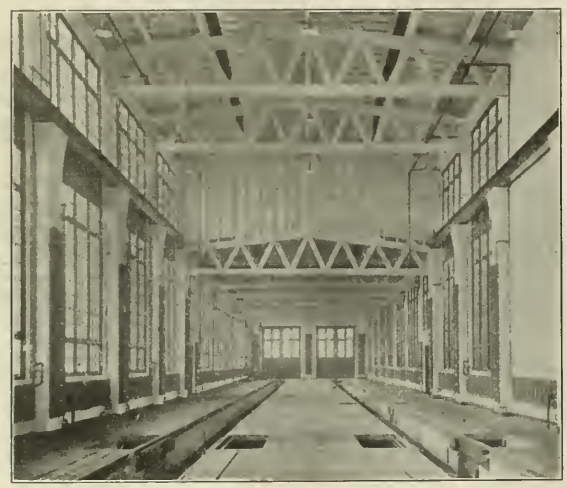
A 110-ft. Roundhouse With Provision for a Crane

The roundhouse should not be a storage place for engines. It is not designed for this purpose; it is too expensive; it is not in the right place nor under the right jurisdiction for this purpose. If covered storage should be found desirable, it can be provided in or near the engine storage tracks, in a partially open shed, designed for this function and of a cost in harmony with the purpose it has to fulfill.



Interior of a Rectangular Engine House of the Longitudinal Type Recently Built

Appurtenances

The roundhouse should be provided with as much glass surface as possible to provide liberal daylighting and it should be well heated and ventilated. For all practical purposes, the hot blast system seems to be best adapted to cope with roundhouse conditions. It will thaw out the engines quickly and provide a forced ventilating system, which is also desirable and economical. Such a heating plant must be installed on broad lines, with the full understanding of roundhouse conditions, and bearing in mind the immense value of a well-heated and ventilated house at times when power is needed badly.

At important terminals a traveling crane of 10-tons capacity should be provided in the work section. It is a very useful appliance in these times when reliable man power is scarce. As a substitute a jib crane could be installed in each stall. A small self-propelled electric crane, designed on lines similar to a wrecking crane, and of about three tons capacity, would certainly prove to be a very economical appliance for transferring tools and machine parts between the roundhouse and the machine shop.

The pit walls should be three feet wide in the area where an engine is likely to be raised by jacks, and at other points a width of two feet will suffice. In case tracks should be extended beyond the pits, the rails should rest on concrete walls, to prevent breaking the pit walls. As a general rule the pit length is made about the same as the locomotive for which the house was designed.

Wooden swinging doors are generally preferred, although a number of recent houses have been fitted with steel or wooden slat rolling doors. At present doors are made about 14 ft. wide and 17 ft. high in the clear. Failure to provide substantially-built doors to withstand the rough handling to which they are subjected has resulted in larger repair bills than necessary. This latter point is responsible for limiting the glass area to 35 per cent in these doors, and on some roads no glass is used at all. A three inch door, heavily reinforced and trussed with steel angles and long strap hinges, is recommended. Another small but important feature is the latch post for holding the door open. In a reinforced concrete round house, it is good economy to design the girder

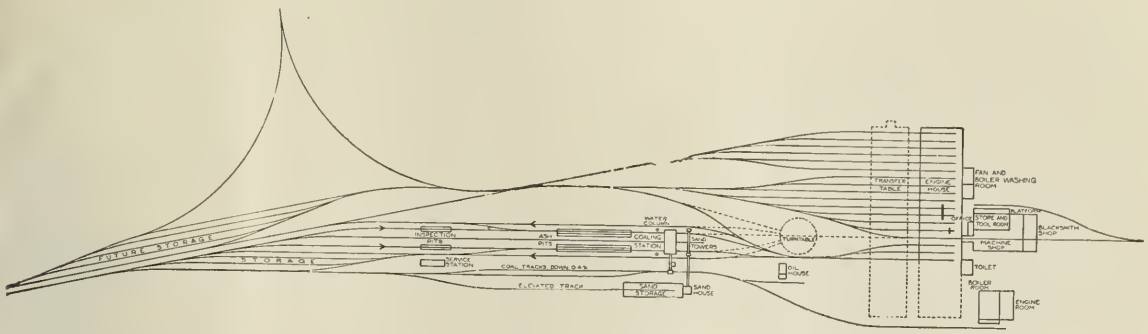


Exterior of Rectangular Engine House

supporting the roof over the doors, so that if one post is hit by a derailed engine, the roof will be carried safely.

The rear wall of the roundhouse should be practically all windows. A height of at least 17 ft. from the top of the rail to the under side of the girder should be provided to clear a locomotive in case it should run through the rear wall. This wall as a rule is about 3 ft. 6 in. high and 9 in. thick.

Generally a transverse house is preferable to a longitudinal one, but local conditions may make the former out of the question. The rectangular house, owing to the parallel spacing of the pits, is much easier and cheaper to build than a roundhouse. A track spacing of about 20 ft. is recommended, and this will permit a large, high window to be placed between each set of doors. These windows will throw



Design of a Rectangular Engine House of the Transverse Type, Showing Relation to the Other Terminal Facilities

On some roads this wall is replaced in the center 12 ft. by a wooden or asbestos wall to simplify and reduce the cost of repairs.

Rectangular Houses

In some layouts the shape of the property makes a rectangular house fit better than a roundhouse. This is true for small as well as for large and important terminals. In small layouts a rectangular house is frequently selected, because a "Y" is already in place or easy to put in, thus saving the expense of a turntable.

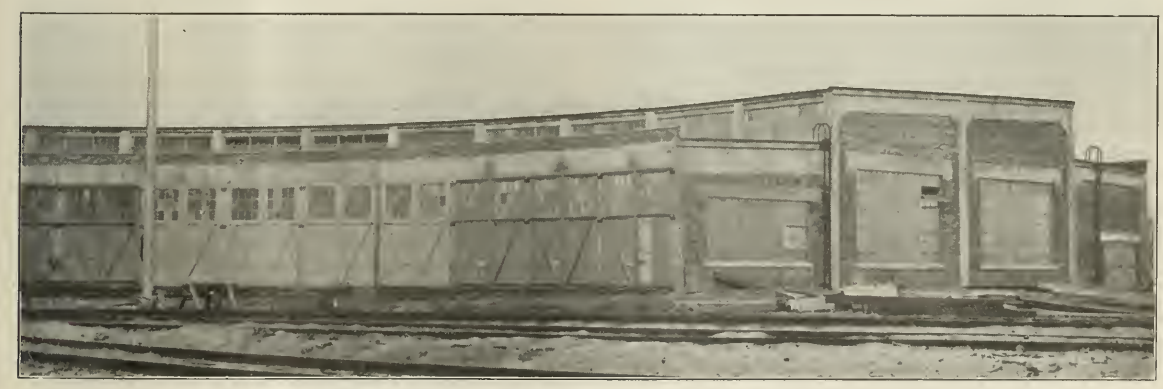
At large important layouts, the transfer table may be located between two transverse engine houses. In such a convenient and compact arrangement, it is possible to confine the very light overhauling to one house and place the

the light in the working aisles and all glass may be omitted in the doors, where it does not belong.

The Machine Shop

The importance of the terminal and local conditions are the determining factors for the machine shop. There is a tendency toward a more liberally equipped shop and the size has been increased accordingly. Experience has shown that at least 3,200 sq. ft. of floor space should be provided at even small terminals. This should be divided about as follows:

Machine shop	1,600	sq. ft.
Tool and store room	600	" "
Office	300	" "
Blacksmith shop	700	" "



A Four-Section Roundhouse with a Two-Section Monitor

pits for the running repairs and the back shop in the other house. In a layout for some important terminals, the rectangular house will, in most cases, require the installation of both a turntable and a transfer table.

One disadvantage of a rectangular house layout lies in the number of switches required when a transfer table is not provided. These switches are objectionable on account of their high first cost and expensive maintenance. As the track entrance to the house is longer than one over a table, it also increases the running mileage of engines per year, but with proper design of the layout this may be greatly reduced.

The shop should be back of the drop and removal pits and it should be directly connected with the roundhouse by a passageway. At more important points the shop should consist of a light and heavy machinery section. The latter should be served by a 10-ton traveling crane, or by jib cranes placed where most needed. The electric locomotive hoist should also be located in this part of the shop. The light machinery section could also contain the tool and store room. At important terminals the store room is frequently housed in a separate building. A good location for the engine terminal foreman's office is adjoining the tool room, so that on

some shifts one man could attend to both. The proper location for the blacksmith shop seems to be in the rear bays of the machine shop building. Some provision should also be made for locker and toilet facilities, either in the machine shop or in a separate building.

The Power House

In the new larger and higher roundhouses, especially those equipped with cranes, a better appreciation of good heating and ventilating and the increased application of air have added greatly to the importance of the power house. Consequently, the power house should be liberally dimensioned, as it is expensive and inconvenient to enlarge, and the surplus room for future needs is but a small percentage of the total cost. The boiler room should be served by an elevated track or a track hopper for coal delivery, and the plant should be located conveniently to the roundhouse fan room. At some of the more important points, it may be a paying proposition to install automatic stokers and coal hauling machinery to save man power. There should also be an ash conveyor, with a hoist to an ash storage bin, from which the cinders can be dumped into a cinder car.

The terminal should be well lighted, and an installation of high-efficiency incandescent lamps of the larger sizes is suggested.



Interior of a Reinforced Concrete Roundhouse

A tentative scheme for lighting a roundhouse equipped with a crane, as illustrated in this article, is as follows:

No.	Lamp Size in watts	Location
1	75	Front section.
1	200	Second section.
3	200	Crane section.
1	200	Rear section.
1	200	Passageway.
2	200	Fan and boiler washing room.
1	200	Office.
6	200	Tool and storeroom.
4	200	Light machinery section.
11	200	Heavy machinery section .
8	200	Blacksmith shop.
5	200	In front of doors for a 20-stall house.

A sufficient number of portable 40-watt lamps for the pits, machine tools, etc.

The yard should be provided with a sufficient number of 500-watt lamps for flood lighting.

As a finishing touch to all engine terminals, convenient walks should be provided between the roundhouse, oilhouse, storehouse, powerhouse and other buildings. A driveway from some outside approach leading to the storehouse and office is also desirable. In locating the driveway the question of fire protection should also be taken into account.

General Plans

After the general layout and details have been approved, general plans should be prepared, covering:

Drainage.—This embraces such facilities as inspection and ash pits, washing pits (if installed), water columns, the track hopper of the coaling station, turntable pits, oil house basement, roundhouse pits, including drop and truck pits, heating duct, power house pits, tunnels, etc. It also includes the sanitary sewage system.

Other facilities.—This covers the complete water pipe line system for locomotive supply, sanitary purposes, fire protection, etc.; also air and steam lines; a pneumatic tube line from the inspection pits to the roundhouse office and all electric lines for lighting.

A layout plan is prepared for construction purposes, analyzing the full scope of the work in all its phases. This should give quantities, the number of carloads of the different materials needed, the material tracks required at the different stages of the work, and the sheds and storage places required. On one of the plans the construction program could be indicated, giving the number of men to be employed on the different buildings in the consecutive stages of the work. This plan should also cover the grading, showing the quantities, overhaul, etc., the underground work, that is, the quantities of piping, etc., and the concrete work, buildings, etc. If a record of the progress is shown on these plans and prints are issued at regular intervals it will serve as a check on the work and indicate where adjustments in the pre-arranged schedule should be made.



From the N. Y. Tribune

It Doesn't Happen to Be That Kind of Animal

The Development of the Refrigerator Car Pool

Unified Control Instituted By the Car Service Section Proves a Boon to Shipper and Carrier

For the purpose of promoting more expeditious and economical handling of the refrigerator equipment required for the movement of perishable commodities and with "elasticity of equipment" as the proposed remedial measure, the Refrigerator Department of the Car Service Section of the Railroad Administration was established on July 1, 1918. W. L. Barnes, assistant manager of the Car Service Section and formerly superintendent of transportation of the Chicago, Burlington & Quincy, was placed in charge of the new bureau with headquarters at Chicago and he immediately introduced a system whereby all refrigerator cars were placed under unified control for distribution.

The pooling of ordinary freight equipment has long been advocated by many transportation and operating men, but owing to the varying degrees of protection required by different commodities and the independent railroad ownership of refrigerator cars by comparatively few railroads their pooling has been deemed impractical in the past. Separate refrigerator lines have been developed to handle specific classes of commodities produced in certain localities and these private lines have taken care of these special districts well. However, there are other producing quarters which have constantly been retarded in their development by the lack of suitable transportation facilities for their commodities, where the carriers serving them have been forced either by their financial status or the seasonal character of the commodities to forego developing adequate means for bringing these commodities to the market.

At the time the refrigerator car pool was established several important lines were in operation, each one of which operated one of the three types of refrigerator cars used in the handling of perishable commodities. The most highly developed type of refrigerator car was used by the packing industry for handling fresh meats and similar commodities requiring low temperatures and no ventilation. These cars are equipped with brine tanks, highly insulated throughout, but there were no means of ventilation. These cars were therefore not suitable for handling shipments requiring ventilation and accordingly were used wholly between the various packing plants and eastern markets.

The second type of refrigerator car other than those operated by the packers is equipped with ice bunkers and ventilators, making it suitable for handling perishable freight (other than fresh meat) either under refrigeration or ventilation. Among the private car lines which developed and operated refrigerator cars of this type are the Pacific Fruit Express whose cars operated from California, Oregon, Washington, Idaho and Texas to all points, particularly in central and eastern territory; the Santa Fe Refrigerator Despatch whose cars operate principally from California, Colorado, Arizona, New Mexico and Texas to central and eastern territory; the American Refrigerator Transit whose cars operate from points in Texas, Arkansas, Oklahoma, Louisiana, Kansas, Missouri and Colorado to central and eastern territory; the Fruit Growers' Express, operating from southeastern and eastern territory to central territory in the fruit and vegetable service; the Union Refrigerator Transit, whose cars operate out of New Orleans, La., and Mobile, Ala., in the banana traffic; and the Frisco Refrigerator Line, operating principally from Missouri, Arkansas, Oklahoma and Texas to central and eastern points.

The third and lowest type of refrigerator cars are insulated only, not being equipped with ice bunkers, tanks or ventilators and are suitable for handling beer and ice or for the protection of commodities from frost. Several of the lines mentioned have developed this class of car. The St. Louis Refrigerator Car Company especially operates this type of car in the beer traffic of the middle west. The difference in these types of cars is due to the fact that fruit and vegetables not only require refrigeration, but also a good circulation of air, whereas in the handling of meat and packing house products the reverse is the case and little other than insulation is required for such commodities as beer and ice. There are at the present time in the United States approximately 20,000 standard brine tank refrigerator cars, 95,000 standard refrigerator cars suitable for handling shipments under refrigeration and ventilation and 21,000 insulated refrigerator cars suitable for handling such commodities as beer and ice or for the protection of commodities against frost.

Problems Confronting the Refrigerator Department

The problem confronting the new bureau was substantially the eradication of certain obvious defects in the existing methods of handling refrigerator cars. These defects fall into three general classes, all of which are the result of competitive conditions. The first of these and perhaps the most glaring from the viewpoint of efficient operation is the empty haul. Refrigerator cars loaded to distant markets over foreign lines had to be returned promptly to the owner roads under the old car service rules. For example, if the route of the loaded car was in the form of a zig-zag or if it included a wide detour to reach some particularly attractive market, the car if returned empty, had to pass over the same line which it followed in the loaded haul. If loading was available for the car at destination it had to be loaded to some road on the home route of the car. These restrictions necessarily limited the use of equipment.

Closely related to the empty haul problem is that of the availability of equipment. Under the old plan a railroad was not vitally interested in any shortage on other lines except possibly on its immediate connections; neither was a road under any obligation to render assistance in the way of equipment to other carriers. Cars returning empty over foreign roads to their owner roads might pass around localities where freight was waiting for shipment in the general home direction and this equipment might not be available for such business because of the necessity for following a specified route.

Another defect in the old system of operating refrigerator cars was the complex and inefficient method of handling the routine of car distribution. Cars unloaded on a foreign road had to be reported to the car accountant of the owner road who checked against the records to determine its return route and after an unavoidable delay issued orders for the disposition of the car, its route home and the instructions for getting it there. Meanwhile the per diem expense continued and the car was out of service.

This was the general status of refrigerator car distribution in all parts of the United States prior to February 21, 1917, when the car service rules were modified to some extent. The principle of the car pool, however, was not applied to refrigerator equipment until the creation of the Refrigerator Department of the Car Service Section. The establishment of unified control materially reduced the amount of empty haul. Railroads owning refrigerator cars no longer have their cars

returned directly to them. The aim of the Refrigerator Department has been to furnish all roads with enough cars, regardless of ownership, to fill their loading requirements at all times and if the equipment then on their own lines is not sufficient for their needs, the department has diverted enough cars from adjacent lines to cover the shortage. In the re-location and equalization of equipment, which is unavoidable under any scheme because of the seasonal character of some commodities, there still remains the problem of empty mileage, but these empty movements have been confined to the most direct route, thereby saving time and increasing the availability of equipment. The problem of the empty haul was still further met by the issuing of an order by the Refrigerator Department requiring the holding road to make not only such minor repairs to foreign equipment as were necessary to keep it in service, but to repair cars as the owner road would do had they been returned to it under the old plan. It can readily be seen that with the elimination of these two sources of delay, the work of the Refrigerator Department has proved advantageous to both the shippers and the carriers. In the execution of orders for the elimination of these two factors by the roads under federal control it was found that empty haulage was still further decreased by the removal of some of the chief causes for the bad ordering of cars and their consequent removal from service. Yard switching and classification have been minimized. Especially in the handling of empties in yards had this bad-ordering been prevalent, and any reduction in the necessity for such switching has consequently meant a proportional decrease in the number of cars injured.

In discussing this added availability under the new plan the points already stated, namely, the elimination of the empty haul due to the necessity for the return of cars to the owner road and the reduction in the bad-ordering constitute two of the main points in favor of centralized refrigerator car control. Obviously the enforcement of these measures meant more cars available for the carriers with which they could handle such increases in production of certain commodities as the producer might effect. Added to the increased availability already brought about by these changes was the ending of the delay incident to the reporting of cars to the owner road and the subsequent waiting for instructions as to their disposition. Instead, upon being unloaded, cars are immediately made available for further use according to rules promulgated by the Refrigerator Department. If no loading is available at destination the cars are moved immediately to other sections in need of cars. The car service representative at the unloading point has them reloaded promptly, providing commercial freight suitable to be placed in the car or a perishable commodity which the cars were suited to handle is available. Under all conditions they are kept moving in the general direction of a section in which commodities they are especially suited to handle are produced, for standing instructions sent out by the refrigerator bureau provide for the movement of specific types of cars in certain general directions. Exceptions to these rules are made from time to time by the bureau to meet certain conditions of supply and demand which arise.

The whole subject of car distribution was simplified and cleared by these directions. Agents of the car service sections know the probable time of the arrival of cars and either load them immediately or order them moved empty in the direction of their usefulness.

It can readily be seen that by the elimination of these operating losses it has been possible to give the shipper throughout the United States improved service in so far as car supply is concerned. Data compiled by the Car Service Section showing the percentage of cars supplied on loading orders during 1918, as compared with the previous year indicate that, since the organization of the Refrigerator Department in July, every railroad under federal control has been able with few exceptions to offer its shippers all the cars they needed, whereas in the previous year in many cases the shippers were able to get but a small percentage of the necessary cars. Only 21 of the 105 roads covered in the report showed decreases in the percentages of cars supplied on loading orders during any month of this period and these decreases totaled but 42 road months or an average of two months per road for the 21 roads. These figures show merely the cars supplied on loading orders and do not show the relation between the number of cars ordered and those actually utilized, for it is often the case that the estimates of equipment requirements are in excess of the number of cars loaded.

This improvement in car supply has been made in the face of increased production of perishable product in nearly every part of the country. For example the production of apples in the Northwest was 25 per cent heavier than before, the New York Central traffic in perishable commodities was the heaviest in the history of the road, the Great Northern has handled 4,000 cars of potatoes and 2,000 cars of fruit in excess of the previous year's record, the production of Georgia peaches increased greatly, 1,000 more cars being handled than last year, and the Wisconsin lines have had an exceptionally heavy movement of cabbage and other perishables; yet the roads in these territories have been able to handle this added traffic easily.

The Opinion of Shippers and Carriers

Associations of shippers, at first skeptical of the pooling plan, have been convinced of its efficiency and have repeatedly complimented the Refrigerator Department. A majority of the carriers have also been pleased with the new plan and have co-operated with the refrigerator car bureau to the fullest extent. On the other hand there is a legitimate argument against the plan on the part of the larger railroads owning refrigerator cars for they have invested large sums in these cars and in creating an organization to handle them and they have pledged themselves to provide the producers in those parts of the country served by their lines with certain types of refrigerator cars and with a certain class of service. It is to their advantage if competitive conditions are to return to observe these understandings strictly. To avoid criticism from this source the Refrigerator Department has endeavored to keep certain types of cars in the same service they were formerly in, for instance, the cars of the Santa Fe Refrigerator Despatch and the Pacific Fruit Express, which have always been engaged in the moving of California and Colorado fruits are now loaded to or in the direction of or billed empty to California when they are released at their destination.

How the Refrigerator Department Works

The records of the Refrigerator Department show that there are approximately 136,600 refrigerator cars under their control in the United States. While the routine work in keeping track of these cars in one bureau appeared large at first, not only have accurate records of every movement of these cars been kept by a comparatively small force, but they have been so kept that the location of any types of cars can be told at a glance. Telegraphic reports are received from terminals showing the types of refrigerator cars loaded, delivered or received from day to day. Passing reports are also made by divisions on the movement of cars through their territories and these reports are entered on large sheets which show the location of each type of car by roads.

On another large sheet, the information sent in by agents of the bureau is summarized weekly by showing under the heading, "Preceding Week," the cars required by different roads and the cars loaded and under the heading, "Succeeding Week," the cars required (estimated on loading orders at the terminals) and the estimated cars available to fill these

orders. By intelligent study of these charts, orders for relocation and equalization of equipment are issued from the central office.

The Future of the New Plan

The maintenance of this system leads logically toward the standard refrigerator car, applicable for the handling of any perishable commodity. In the past railroads have purchased refrigerator cars generally to suit the commodities in which they were principally interested and when loaded to various points throughout the country become badly scattered. Being equipped only for certain classes of perishable freight, they frequently fail to meet the specific requirements of the roads on which they may be released, whereas if refrigerator cars were standardized, it would allow the arbitrary movement of all refrigerator equipment from roads which have a surplus, to those originating traffic.

Whether this new plan will be retained by the United States government direct or through the Railroad Administration or under the direction of a department created by the railroads themselves after the readjustment period cannot be foretold; nevertheless the problem and its solution is vitally interesting to the producer, the distributor, the carrier and even to the ultimate consumer.

Southern Region—Operating Conditions

The Only Region Which Earned Net Income in 1918 Sufficient to Meet the Government's Guarantee of Rentals

THE CHARACTERISTIC of the south in normal times is the high proportion of railroad mileage to the amount of traffic to be carried. A period, therefore, of prosperity in the south and increased traffic movement has generally been reflected in comparatively large increases in net operating revenue of the southern railroads. The Southern region of the United States Railroad Administration which is under the direction of B. L. Winchell, is a natural unit. It includes the roads south of the Ohio and Potomac rivers and east of the Mississippi, with the exception of the three coal roads, the Norfolk & Western, Chesapeake & Ohio and Virginian, which were logically formed into a separate region, the Pocahontas. Of the roads placed under Mr. Winchell's direction, the Atlantic Coast Line, Louisville & Nashville, and Nashville, Chattanooga & St. Louis and the Illinois Central were strong financially and have the reputation of having been particularly well operated. The Southern Railway was by no means as strong financially, but great improvements have been made, both in operation and in the physical condition of the property, within recent years. The Seaboard Air Line is the weakest of the larger southern roads financially, but has been particularly well and economically operated since W. J. Harahan has been president.



B. L. Winchell
Regional Director, Southern Region

The Southern Railway has been engaged for a number of years on one of the largest railroad improvement schedules undertaken by any road in the country in recent years. This is the double tracking and, in large part, relocating of the main line from Washington to Atlanta, Ga. The work has been going on for so many years and had at times to proceed so slowly that comparatively few people fully appreciate the magnitude of it. From an old, single-track crooked line, with innumerable six-degree curves and 1 per cent grades, this main trunk line into the south has been converted into a double track, rock-ballasted line with maximum curves of four degrees and with a maximum grade of six-tenths of one per cent. This line is completed with the exception of a comparatively few miles near Toccoa, Ga. It would be hard to exaggerate the importance of the part played by it in the operation of the Southern region. It is probable that it would have been physically impossible to have handled the amount of traffic which the Southern region was called upon to handle in 1918 had the Southern Railway's double track line to Atlanta been much less nearly complete.

Charles H. Markham was appointed regional director of the Southern region with office at Atlanta, on January 18, 1918, and was succeeded, when he was transferred to the Allegheny region, June 1, by B. L. Winchell. The operating heads of the roads, under private operation, were in most cases made federal managers of the property, under government operation. Thus, E. H. Coapman, vice-president in charge of operation of the Southern, was made federal manager of the Southern Lines; C. M. Kittle, vice-president of the Illinois Central, was made federal manager of that property; W. J. Harahan, president of the Seaboard Air Line, was made federal manager of that property; J. P. Beckwith, vice-president of the Florida East Coast, was made federal manager of that property; W. L. Mapother, vice-president of the Louisville & Nashville, was made federal manager of that property and of the Nashville, Chattanooga & St. Louis. The Atlantic Coast Line was placed under Vice-president Lyman Delano as federal manager.

B. L. Winchell has had a very long career both as an operating and traffic man and, prior to his appointment as regional director, had been director of traffic of the Union Pacific.

The South has been a land of camps. There were 22 of them situated south of the Ohio river and east of the Mississippi. Not only did this necessitate a very large movement of materials, first for building the camps and then for supplying troops located therein, but it also disrupted the ordinary flow of traffic to a tremendous extent. There was, of course, a great troop movement and this was done on very short notice and, necessarily, absolutely regardless of cost. An order would be given for the movement of 25 troop trains, and 25 freight trains would be immediately placed on sidings or in yards and the locomotives so released would be used to move the troop trains. Passenger equipment had to be gathered up from all parts of the country; Pullman and tourist sleeping cars were by no means sufficient to supply the needs of such movement and it was necessary to send, in some cases, as far away as the northwest to get

coaches. In studying the financial results of the Southern region, this great movement of troops into and out of the camps must be borne in mind. Passenger business is seldom as profitable as freight business and besides the extraordinary expenses that are connected with troop movement there was the added expense of delays to freight trains through the commandeering of freight locomotives.

The Southern region as a whole paid a lower scale of wages than did some of the other regions prior to the wage increases made by the government. The increases, therefore, in the south were greater in proportion than they were on many northern and western roads. Notwithstanding this fact and the expenses incident to troop movement, the region earned more than $12,000,000 in excess of the guaranteed standard return.

Some saving from the short routing of freight undoubtedly was made and some friction was caused to shippers by rerouting, but in general an attempt was made to give the shipper what he was accustomed to where this was not inconsistent with the general scheme of operating the region as a unit.

The fact that the Southern region had no great complicated problem such as each of the other three regions in the eastern part of the United States had, permitted concentration on operating problems which it is safe to say goes far toward explaining the success which the roads in this region had in holding down operating expenses. It may appear slightly fanciful to ascribe a large part of the increased net earnings to so intangible a thing as the state of mind of the operating forces of the southern roads, but, nevertheless, there is an inescapably large amount of evidence to this effect; each item, small in itself, but large in the aggregate, pointing to greatly increased efficiency due to more fully aroused interest in employees and officers. Especially is this so on the Southern Railway. There is a really remarkable general attitude of being up on their toes among operating men on the Southern. One phase of this deserves mention; the lengthening of schedules of passenger trains permitted and encouraged a drive for trains being on time. In times past, the south has suffered probably more than its share from trains being late. At present, a fine record is being made in this respect. What applies to passenger train movement also applies to the elimination of delays in freight service. Engines are turned more promptly; less time is lost in yards; it is apparently just a combination of all the little things that go to make up better railroading which explains the showing made by the Southern region.

By far the largest increase in gross earnings, proportionately, is in passenger earnings. The Illinois Central passenger earnings increased 20 per cent in 1918 over 1917; the Atlantic Coast Line 43 per cent; the Louisville & Nashville 50 per cent; the Southern Railway 68 per cent; and the Seaboard Air Line 69 per cent. While it is true that troop movement has to be carried out regardless of expense, nevertheless, such very great increases in passenger revenue, as was shown by these roads in 1918, were sufficient to offset pretty heavy increases in expenses and still carry over some contribution toward net earnings.

Freight revenue showed substantial increases but on no such scale as passenger revenue. The Seaboard Air Line freight revenue increased 14 per cent; the Atlantic Coast Line 26 per cent; the Illinois Central 26 per cent; the Louisville & Nashville 28 per cent; and the Southern Railway 30 per cent.

Maintenance expenses on all of the roads increased heavily, and especially was this so with maintenance of equipment. On the Louisville & Nashville, for instance, the increase in maintenance of equipment expenses in 1918 as compared with 1917 was 57 per cent, and on the Southern Railway it was 67 per cent.

The increases in transportation expenses were no more than proportionate to the increased wage scales and the larger volume of business. Thus, on the Atlantic Coast Line they amounted to 45 per cent; on the Southern Railway to 53 per cent; on the Louisville & Nashville to 55 per cent; and on the Seaboard Air Line to 50 per cent.

What will happen in the Southern region in 1919 is an interesting problem. The south, depending for its prosperity so largely on the price of cotton, is now in a state of great uncertainty. The bid price for cotton has taken a rather startling drop, but, on the other hand, the owners of cotton are holding on to it with grim determination. At times the buyer and seller of cotton are 15 cents apart in their estimate of the proper market price. When we think that up to 1916 the difference in price per pound of cotton between 10 cents and 15 cents made the difference between a year of depression and a year of great prosperity in the south, it is easy to realize the extent of the uncertainty which is reflected in a bid price of 20 cents and an asked price of 35 cents for cotton. Sales at present are taking place at Savannah at about 27 cents, but it is estimated that only a very small part of the cotton crop for 1918 has actually moved to market.

Although cotton carries a high freight rate, the importance of it as a commodity to the railroad companies is much less than the importance of the buying power which high-priced cotton gives the south, or lack of buying power because of low cotton prices. Nevertheless, the tonnage of cotton which the railroads can still count on having to move is considerable and will be a factor in 1919 earnings. If this cotton is sold at high prices, there is a good prospect of the south enjoying a continued period of prosperity which should be reflected in railroad earnings; but even great prosperity will hardly take the place of the traffic—passenger and freight—which was furnished by the military camps. The railroads of the south, like those of the rest of the country, have no immediate prospect of any important reduction in costs of labor or materials. The Southern region made an extraordinarily fine showing in 1918; the prospects for 1919 are not so good.



From the Baltimore Sun

A Fairy Godmother Appears on the Scene

Doings of the United States Railroad Administration

Director General Hines Is Using Every Effort to Arrange for Financial Aid to the Roads

WASHINGTON, D C.

THE PROBLEM of how to get along without $700,000,000 until the President sees fit to call an extra session of Congress at which the difficulty may be remedied has given Director General Hines a busy time since March 4, but progress has been made on expedients for tiding over the situation until Congress can act, and it is hoped that a definite plan may be announced in another week. After a series of conferences with the secretary of the treasury, the directors of the War Finance Corporation, members of the Railroad Administration Advisory Committee on Finance and a number of prominent bankers, a partial solution was suggested at a meeting with a committee of railroad executives on Tuesday when Mr. Hines announced that he was considering the advisability of having the Railroad Administration issue, under reasonable conditions and limitations, warrants for amounts due the railroad companies for their rental for 1918, in such a form as would serve as collateral for railroad companies desiring to make loans through banks, the warrants to be taken up by the Railroad Administration when Congress makes the appropriation needed to meet the situation.

The administration owed the railroad companies on account of their rental as of January 1, $381,000,000, after making such deductions toward the cost of capital expenditures as it is authorized to make under the compensation contracts and after deducting sums due the government on open account, but outside of the 35 roads whose contracts are signed, the companies have nothing to show for it except a law which authorizes the government to guarantee them an amount "not exceeding a sum equivalent as nearly as may be" to their average net operating income for the three pre-war years. They know that the Interstate Commerce Commission has certified the amount of this "standard return" and they know that the contracts that have been executed provide for the payment of the full amount of the standard return in each case, but it is believed that an acknowledgment of indebtedness on the part of the government will afford them a more substantial basis of credit. Such warrants would not be discountable or negotiable, but they would be assignable as collateral, and the director general would require no specific authority to issue the warrants.

The situation of the equipment companies, to which the administration is obligated for $286,000,000 for cars and locomotives ordered last year, payable as the equipment is delivered, was to be discussed at a conference with the manufacturers on Thursday. The warrants might also be used to pay for the equipment, as equipment trusts cannot be used until after the equipment is turned over to the railroads.

At the invitation of Mr. Hines a conference was held on Tuesday between the director general and a group of representative railroad corporation executives, members of the War Finance Corporation and members of the Advisory Finance Committee of the Railroad Administration to discuss the financial situation facing the Railroad Administration and the companies as a result of the failure of the Congress to pass the $750,000,000 appropriation requested by the Railroad Administration.

In order to get the problem before the conference, the director general outlined the immediate necessities of the situation as follows:

AMOUNT NEEDED UP TO JUNE 30

For interest and other corporate requirements of the railroad corporations	$166,066,762
To meet amounts due equipment companies from the Railroad Administration	183,681,965
To pay for indispensable additions and betterments, including equipment ordered by railroad companies	110,000,000
To meet maturities of the railroad corporations	100,948,965
To meet excess of cash requirements to pay current vouchers over the probable receipts up to March 31	101,000,000
To bring cash balances in hands of federal treasurers up to $200,000,000, which is the normal requirement for one month	40,000,000
Total	$701,697,692

The item of $166,000,000 includes dividends and is an estimate of what will be required in addition to what the companies can provide from other sources.

It was made clear that to a large extent it will be necessary for the railroad corporations to meet their requirements by obtaining loans from bankers, the resources of the War Finance Corporation to be reserved to protect special cases.

The War Finance Corporation has some $300,000,000 available for loans, and it is reported that the banking interests had been inclined to take the position that these resources should be taken advantage of before private financing is resorted to, but the Shipping Board and other government departments also want some of the money, and moreover the ability of the War Finance Corporation to make loans is limited by the statutory requirements as to security. While some of the stronger railroad companies might be able to meet the requirements, the roads which are less able to borrow on their own account in many cases could not furnish the security required by the corporation.

Eugene Meyer, Jr., manager director of the War Finance Corporation, assured the director general and the conference that the corporation was desirous of doing everything possible to assist in meeting the situation, having in mind the interests of the government in protecting loans and the legal limits placed upon the corporation.

The director general and the conference generally proceeded on the view that it was highly desirable to devise ways to provide for payment of bills and have the situation met through financing rather than by a general suspension of work which would have a deterrent effect upon business generally.

Following the morning conference, the railroad executives met in the afternoon and adopted the following resolutions:

RESOLVED:

1. That it is the sense of this conference of railroad executives that the railroad companies will, in the present financial emergency, co-operate in every practicable and reasonable way with the Railroad Administration in its efforts to provide for financial requirements pending an appropriation by Congress to relieve the situation;

2. That, while the problems to be met are largely matters between the individual roads, the Railroad Administration, the War Finance Corporation and the bankers, it is deemed wise to have the general subject supervised, on behalf of the railroad companies, by a central committee, with power to consider the questions involved and to give such aid and co-operation, and to make such suggestions, as may be possible, to the individual roads, to the director general, to the War Finance Corporation and to the bankers; it being understood that such committee is not to have power to commit any individual company without its assent;

3. That the chair be, and hereby is, authorized and requested to appoint such committee, to consist of seven mem-

bers, of which Howard Elliott, the chairman of this meeting, shall be ex-officio, chairman.

The chair thereupon appointed the following committee: Howard Elliott, Albert H. Harris, Robert S. Lovett, Samuel Rea, Henry Ruhlender, Henry Walters, Daniel Willard, Alfred P. Thom, counsel; George M. Shriver, in charge of accounts, and E. G. Buckland, secretary.

This resolution was presented to the director general, who held a brief conference with the members of the committee and expressed his gratification over the attitude adopted by the executives, adding that he was very happy to have the committee to co-operate with the Railroad Administration. A further meeting was arranged for Thursday between the director general and the members of the committee of executives, and on Wednesday Mr. Hines discussed the subject further with the secretary of the treasury, the War Finance Corporation, the Federal Reserve Board and the comptroller of the currency.

The conference on Tuesday was attended by the following: Walker D. Hines, director general of railroads; Howard Elliott, chairman, Northern Pacific; R. S. Lovett, president, Union Pacific; Daniel Willard, president, Baltimore & Ohio; Samuel Rea, president, Pennsylvania; Woodward Hudson, president, Boston & Maine; Harry Bronner, president, Missouri Pacific; vice-president and general counsel, Great Northern; H. Walters, chairman, Atlantic Coast Line; Charles B. Perkins, president, Chicago, Burlington & Quincy; F. D. Underwood, president, Erie; W. H. Williams, chairman, Wabash; W. K. Vanderbilt, Jr., president, New York Central; A. H. Harris, vice-president, New York Central; Charles A. Peabody, president, Illinois Central; E. G. Buckland, president, New York, New Haven & Hartford; Agnew T. Dice, president, Philadelphia & Reading; William H. Findley, president, Chicago & Northwestern; L. E. Johnson, president, Norfolk & Western; representative and counsel, Seaboard Air Line; Henry Ruhlender, president, St. Louis-San Francisco; Charles E. Schaff, receiver, Missouri, Kansas & Texas; Fairfax Harrison, president, Southern; Alfred P. Thom, general counsel, Association of Railway Executives; Franklin Q. Brown, chairman, Finance Advisory Committee; Frederick W. Scott, member Finance Advisory Committee; James N. Wallace, member Finance Advisory Committee; Eugene Meyer, Jr., managing director, War Finance Corporation; Clifford M. Leonard, director, War Finance Corporation; Angus W. McLean, director, War Finance Corporation.

Division of Finance and Purchases Reorganized

John Skelton Williams has resigned as director of the Division of Finances and Purchases of the Railroad Administration, effective March 15, and the division will be divided into two new ones, the Division of Finance and the Division of Purchases. Swagar Sherley, chairman of the House Committee on Appropriations in the Sixty-fifth Congress, who had charge of the railroad appropriation bill which passed the House, has been appointed director of the Division of Finance, effective about April 15, and Henry B. Spencer, now chairman of the Central Advisory Purchasing Committee, has been appointed director of the Division of Purchases, effective on March 15. For the time being, Director General Hines will himself direct the work of the Division of Finance with the assistance of the associate director of the Division, Charles B. Eddy.

Mr. Williams will become chairman of an advisory finance committee, which will be expected to submit to the director general from time to time its advice on matters of financial policy and also to make to the director general preliminary reports on any proposed reorganizations which may require his approval. He will also become chairman of an advisory committee on purchases which will be charged with authority to investigate and advise on important questions of policy involving the purchase of materials and supplies for the railroads. He will also remain on the staff of Director General Hines and will continue to preside at staff conferences in the absence of the director general.

Mr. Sherley is a native of Louisville, Ky., and is a lawyer by profession, having begun practice in 1891 in Louisville, following his graduation from the University of Virginia. He was a member of the House of Representatives in the 58th, 59th, 60th, 61st, 62nd, 63rd, 64th and 65th Congresses. For a number of years he has been a member of the House Appropriations Committee and succeeded Representative Fitzgerald of New York as chairman of that committee. Through his long service on the Appropriations Committee, he has become unusually familiar with government finances and has become an expert in extricating the essential facts from a great mass of financial details.

In announcing the appointment Director General Hines said:

"I have known Mr. Sherley personally for many years and have always had an unusually high regard for him as a lawyer and as a man. I deem myself very fortunate in having succeeded in persuading him to accept the appointment as Director of the Division of Finance of the Railroad Administration. I have been in intimate contact with him recently during the consideration before the Congress of the appropriation requested by the Railroad Administration and have been deeply impressed by his knowledge of financial and legal problems, the thoroughness of his methods and the accuracy of his insight. He strips away the unimportant and deals with the very heart of his problems."

Mr. Spencer was appointed chairman of the Central Advisory Purchasing Committee on its organization last year and has retained his office as vice-president of the Southern Railway System, which he now resigns. He was born December 16, 1872, and after his graduation from Harvard University in 1895 he entered railway service as a clerk to the superintendent of the Elgin, Joliet & Eastern. In January, 1897, he was made chief clerk to the superintendent and in December, 1897, he was appointed assistant superintendent of the Alabama Great Southern. From September 1, 1898, to January 1, 1901, he was superintendent of the Louisville division of the Southern Railway, from January 1 to February 1, 1901, assistant general manager of the St. Louis-Louisville lines and from February, 1901, to April 1, 1905, general manager of the same lines. On April 1, 1905, he was appointed general manager of the Southern Railway System and on November 1, 1906, he was elected vice-president.



H. B. Spencer
Director of the Division of Purchases

Correspondence between Mr. Williams and the director general regarding this change was made public by the Railroad Administration. Mr. Hines, in his letter to Mr. Williams accepting the resignation, testifies in the most unqualified terms to the patriotism, integrity and self-sacrifice with which Mr. Williams has discharged the duties of his position and expresses satisfaction that he will still be able to give him the benefit of wise counsel, long experience in high standards of public service in an advisory capacity.

Mr. Williams' letter of resignation says the time has now come to put fully into effect changes in the organization which he had discussed with Mr. Hines on February 12, at which it was agreed that the business of the Division of Finance and Purchases had reached proportions to justify separation into two divisions, each receiving the entire time of an administrative head. The letter says that while arrangements were being made for the working out of this adjustment, Representative McFadden had introduced in the House of Representatives a resolution for the investigation of Mr. Williams' work, both as comptroller of the currency and director of the Division of Finance and Purchases. After discussing Mr. McFadden's charges, Mr. Williams says that as Congress has adjourned without further attention to the McFadden resolution, it is now possible for him to tender his resignation. Mr. Williams' reappointment as comptroller of the currency was not confirmed by the Senate, but he continues to hold the office through a Treasury Department appointment.

Railroads Aided Mobilization

Appreciation of the excellent work performed by the railroads and the Railroad Administration in handling the large troop movement when the work of mobilization was at its height, is included in a report of the Provost Marshal General to the Secretary of War on the operation of the selective service system. The report says the nationwide distribution of the camps to which the selectives were to be sent complicated the entraining problem and required the most careful handling. Before a call could issue the Railroad Administration required 14 days' notice, of which eight days were used for the compilation and printing of train schedules, and six days were needed by the local boards to notify registrants and to allow them sufficient time to arrange their affairs before leaving for camp. The schedules compiled and published by the Railroad Administration provided as carefully for a contingent of one man as for a contingent of 100. By working out every detail in advance the mobilization proceeded in a smooth and orderly manner. The report continues:

"It is a matter of duty and pleasure here to express admiration of the work of the United States Railway Administration in transporting selectives. No more difficult transportation problem could be conceived, involving as it did the simultaneous movement of small detachments in variant numbers from thousands of county seats and the concentration of their delivery at several hundred posts and stations. The arrangements for transporting and feeding these men were made by the railroads, and this work was so satisfactorily performed that less than a dozen complaints were received during the entire year. They have been called upon to handle as many as 50,000 selected men in one day; and to transport within a single month over 400,000 men for the selective service system alone. Their hearty co-operation at all times was one of the main assets of this office in the work of mobilization. Special attention is invited to their performance on November 11, 1918, the day on which the armistice was signed and hostilities ceased. Calls had issued and all arrangements had been made for some 250,000 men to be entrained during the five-day period beginning November 11. The United States Railroad Administration was advised by telephone at 10:25 a. m. on Monday, November 11, of the cancellation of these calls by order of the secretary of war. In 35 minutes they had notified all the railroads of the country; had stopped further entrainments; had reversed such contingents as were en route; and were restoring the men to the original points of entrainment. This achievement stands out as a marvel of efficiency, and is but an indication of the co-operation which they constantly tendered.

"The number of men called, to October 31, 1918, was 2,801,358. Of this number 45,882 did not travel over railroads under the control of the United States Railway Administration, due to the fact that they reported at mobilization camps within the immediate vicinity of their local boards. The remaining number, 2,755,476 men, were handled by the United States Railway Administration. The average number of miles per man traveled to a mobilization camp was 388; the entire mobilization, therefore, involved the equivalent of 1,069,124,688 miles of travel by one passenger.

"The relation of this mileage movement of selectives from local boards to camps, to the entire mileage for war department troop movements of all kinds, and to the total passenger mileage in the United States for the same period, is shown by the following table:

Mobilization by Mileage

Mobilization, by mileage	Number	Per cent of total mileage	Per cent of War Department mileage
1. Total passenger mileage in United States, September 1, 1917, to November 1, 1918 (estimated)	51,494,683,000	100.00	.....
2. For War Department troop movements of all kinds (estimated)	4,440,000,000	8.62	100.00
3. For movements from boards to camps (estimated)	1,069,124,688	.....	24.08
4. For movements intercamp and from camps to seaboard (estimated)	3,370,875,312	.....	75.92

"It thus appears that the movements required for mobilization under the selective draft represented about one-fourth of the entire troop movement for the war department."

Deficit as Compared with Standard Return in January

The railroads started the year 1919 with a failure to earn the standard return, according to preliminary figures. Returns of 193 roads to the Interstate Commerce Commission, or only two roads less than are included in the commission's monthly tables, earned a net operating income of $18,841,000, whereas the standard return for January for the Class I roads alone was something over $55,000,000. The same roads in January, 1918, had an operating deficit of $4,006,000. The operating revenues were $394,974,000 as compared with $284,371,000 in January, 1918, and the expenses were $359,579,000, as compared with $270,719,000, and this figure includes only a very small amount of back pay, as most of the back pay for 1918 was cleaned up in the December accounts.

Wage Demands for 1919

Now that most of the back pay for 1918 has been taken into the accounts, the processes which are expected to result in a new series of retroactive payments for 1919 are still being continued. The January accounts included no back pay except in the case of a few roads, but the request of the train service brotherhoods for an upward revision of their wage scales and time and one-half for overtime is still pending, on a recommendation of the Board of Wages and Working Conditions which is before the director general for a decision. The award when issued is expected to be retroactive to January 1, and the shop employees have asked for a new increase to become effective as of the same date.

It is understood that the Railroad Administration is holding out against the demand for a penalty rate for overtime in train service, but the brotherhood executives have been in Washington for some time making vigorous efforts to have it granted, and the subject has been discussed at length at a conference of the regional directors and federal managers which began last week. Most of the regional directors left on Saturday, but the federal managers remained over this week, going over the matter in detail to study the effect of such a change and possible alternatives.

A letter addressed to the director general by B. M. Jewell, acting president of the railway employees' department of the American Federation of Labor, and the executives of the in-

dividual organizations, says that great dissatisfaction has been manifested by the machinists, blacksmiths, boilermakers, sheet metal workers, electricians and car men, regular and helper apprentices and helpers, "due to the present inadequate wage rates," as contained in the awards made in 1918, and they desire to present a request for further increase "to place them in a position to meet the ever-rising cost of living and maintain a more equal differential between classes of railroad employees and those engaged in a similar capacity in other industries." The letter states that these employees have been very insistent in their demands for some time, but the request has been withheld until they have become so persistent that it has been deemed advisable to comply with their wishes. The letter also urges upon the director general the necessity of arranging a conference with the representatives of the shop crafts for the purpose of arriving at a thorough understanding of the award to be issued covering this request, prior to the issuance of the general order.

"If this is not done," the letter says, "you can but expect a repetition of the situation as it has existed after the issuance of each wage order thus far. We are sure that if the recognized representatives of the employees are permitted to have such a meeting with you they will be in possession of the necessary information to enable them to advise their membership as to the full provisions of the award, thereby insuring you, also our people, against the very unpleasant expressions of protest made by wire, letter and through newspapers, none of which are for the best interests of the service. Matters of this kind under private control have been handled in a very orderly manner by us and can still be handled in the same way if we are but permitted to understand the exact provisions of the award, being allowed sufficient time to advise our people through regular channels of their recognized organizations the best course to pursue regardless of whether or not the award is considered satisfactory to them."

The new scale of rates requested provides for a minimum hourly rate of 85 cents per hour, as compared with the present minimum of 68 cents, for machinists, blacksmiths, sheet metal workers, electrical workers, car men and boilermakers, a minimum hourly rate of 60 cents an hour for helpers, and differentials above the minimum hourly rate for certain classes of employees. Machinists working on valve motion work, tool room work, rod work, heavy machine operators, layers out, air men and federal inspection men ask an excess of 6 cents an hour above the machinists' rate. Certain classes of boilermakers ask an excess of 6 cents above the boilermakers' rate. Blacksmiths employed as hammersmiths ask an excess of 25 cents above the blacksmiths' rate. Electricians employed as armature winders ask an excess of 25 cents above the rate for electrical workers.

The request provides that general foremen, foremen, assistant foremen, and leaders shall be paid on an hourly basis and receive overtime compensation for all services rendered in excess of eight hours per day, with a minimum hourly rate of $1 for general foremen, 95 cents for foremen, and 90 cents for assistant foremen, gang foremen and leaders; provided that all rates in excess of these shall be continued and monthly rates now in effect shall be the basis for establishing the hourly rates, the monthly rates to be divided by 200 to obtain the hourly rate.

The request also provides that operators of electric, acetylene, thermit or other improved welding processes or machines shall receive an hourly rate of 91 cents, that all employees performing the recognized work of any craft who have had one year's experience or less shall receive 67 cents an hour, who have had one year or less than two years' experience shall receive 70 cents an hour, two years' and less than three years', 74 cents an hour, over three years 'and less than four years', 79 cents an hour. This does not include regular and helper apprentices. It is provided that should any of the above leave the service, employees with not less than four years' experience shall be assigned to their positions and paid the minimum rate. Regular and helper apprentices assigned in connection with the work of their respective crafts are to receive as a starting rate 35 cents per hour, with an increase of 2½ cents per hour for each six months up to and including the first three years, and an increase of 5 cents per hour for the first six months of the fourth year and 7½ cents per hour for the last six months of the fourth year.

Improvements to Be Financed by Companies

For the purpose of emphasizing the fact that capital expenditures for this year must be financed generally by the railroad companies, T. C. Powell, director of the Division of Capital Expenditures, has issued D. C. E. Circular No. 19, which is sent to regional directors, with copies to federal managers, as follows:

In conferring with corporation officers and securing from them a definite statement for or against contemplated additions and betterments chargeable to capital account, you, of course, understand that it is not our purpose, generally speaking, to make such improvements unless the company finances the project.

Before forwarding to this office, therefore, D. C. E. Forms which carry the approval of the corporation, and before permitting the federal (general) manager to start work on any project costing more than $1,000 chargeable to capital expense, please be careful to develop the exact scope of said corporate approval.

The corporation officer may desire to express general approval of the project without committing himself as to finances and in that case such projects should be submitted separately, with the comments of the corporation officer and your recommendations.

There appear to be four other phases in this matter:

(1) Those improvements which are approved by the corporation, and which the corporation is prepared to finance on its own credit without calling upon the Railroad Administration in any way.

(2) Those items which the corporation approves, but not being able to finance on its own credit, is prepared to furnish security to the Division of Finance of the Railroad Administration, by means of which the director of finance will be able to assist in securing funds.

(3) Those projects which are approved by the corporation, but which cannot be financed by the corporation on its own credit in the open market, and for which the corporation is not prepared to furnish security to the director of finance, and for which, therefore, the corporation must call upon the Railroad Administration to furnish all the funds on the notes of the corporation without security.

(4) Disapproval by the corporation.

To simplify the handling, please state the exact obligations by endorsing upon D. C. E. Form 4 any one of the notes described below which fits the case:

(1) Work covered by this form is approved by (corporate name of railroad company), which also agrees to finance from funds other than those received from the Railroad Administration the charges to its capital account required to complete the work.

(2) Work covered by this form is approved by (corporate name of railroad company), which also agrees to finance the charges to its capital account required to complete the work, by furnishing to division of finance satisfactory collateral.

(3) Work covered by this form is approved by (corporate name of railroad company), but the corporation is not prepared to finance from its own funds or to furnish the collateral whereby it may assume the charges to its capital account required to carry out the work.

(4) Work covered by this form is not approved by (corporate name of railroad company).

Mr. Powell has also issued the following Supplement 4 to D. C. E. Circular No. 1:

Since the issuance of Supplement 3 to D. C. E. Circular No. 1, dated December 31, 1918, it has developed that large expenditures were made during the year 1918 in connection with improvements chargeable to capital account which were not authorized nor the expenditures reported on D. C. E. Form 5.

It is necessary that any such expenditures shall be reported accurately and that D. C. E. Form 5 shall reflect not only expenditures for work specifically authorized, but all expenditures properly chargeable to capital account.

Supplement 3 to D. C. E. Circular No. 1 is hereby rescinded and effective as of *January 1, 1919,* the following instructions should be observed:

I. Paragraph "Sixth" of D. C. E. Circular No. 1, dated March 27, 1918, relating to the preparation of D. C. E. Form 5, a monthly report of authorizations and expenditures, is revised so as to read hereafter as follows:

Sixth.—A monthly report, commencing with the month of January, 1919, should be made on D. C. E. Form 5 Revised.

This report should include all unexpended balances in connection with uncompleted work contracted for or commenced prior to January 1, 1919, and all work authorized or commenced after that date which involves a charge to capital account.

The report should divide the work into classes according to the classification outlined in D. C. E. Circular 2, and printed on D. C. E. Form 5 Revised.

In preparing this statement, the following rules should be observed:

(*a*) In columns 2 and 3 should be reported the unexpended balance in connection with work authorized or commenced prior to January 1, 1919; and so far as the amount chargeable to capital account is involved should agree with column 14 of the subrecapitulation "Uncompleted work" of the "carry-over." The figures reported in these columns must not be changed during the year 1919 without previous approval of this office.

(*b*) In columns 4 and 5 should be reported only the work specifically authorized during the year 1919 on D. C. E. Forms 2 or 4. No work except that reported on D. C. E. Form 2 should be included in these columns unless the approved D. C. E. Form 4 has been received.

(*c*) In column 6 should be reported the sum of columns 2 and 4, and in column 7 should be reported the sum of columns 3 and 5.

(*d*) In columns 8 and 9 should be reported all expenditures made during the month in connection with work chargeable to capital account whether specifically authorized or not.

(*e*) In columns 10 and 11 should be reported the cumulative expenditures made in connection with work chargeable to capital account whether the work has been specifically authorized or not.

(*f*) In column 12 should be reported only the aggregate of the unexpended balances in connection with work specifically authorized.

(*g*) In column 13 should be reported—

1. The aggregate of the expenditures made in excess of work specifically authorized.

2. Total expenditures made in connection with all work which *has not* been specifically authorized on D. C. E. Forms 2 or 4.

II. In preparing D. C. E. Form 5 Revised for January, 1919, it will be necessary to report the "unauthorized expenditures" made to December 31, 1918, as reported on special statement provided for in D. C. E. Circular 14, paragraph "Sixth." This should be done by reporting the amounts in columns 9 and 11, and the operating expenses in connection therewith in columns 8 and 10. Unless D. C. E. Forms 4 were approved for any of this work during January, the entire amount should be also reported in column 13 (unauthorized expenditures) as provided for in paragraph (*e*).

III. I again wish to emphasize the necessity for the prompt rendition of this statement, and for the accuracy of its preparation. The statement should be mailed not later than the 25th of the succeeding month. In the event any federal manager finds it is impossible to mail the statement on the 25th day of the first succeeding month, he should telegraph the director Division of Capital Expenditures, to that effect, giving the reason therefor and the approximate date on which it will be sent.

Rental Charges for Dining Cars, Locomotive Cranes, Lidgerwood Unloaders, etc.

The director general has approved the following as rental charges to be applied between railroads for dining cars, locomotive cranes, Lidgerwood unloaders, etc., effective as of March 1:

	Rate per day
Dining Cars: Furnished (except provisions)	$40.00
Locomotive Cranes:	
Five tons capacity or less	15.00
Over 5 tons capacity and less than 20 tons capacity	20.00
Over 20 tons capacity	25.00
Wrecking Cranes:	
Steam wrecking cranes, 75 tons capacity and lass	40.00
Steam wrecking cranes, capacity more than 75 tons	55.00
Lidgerwood Unloaders:	
Without cable and plow	7.00
Including cable and plow	10.00
Ditching Machine	10.00
Pile Drivers:	
Drop hammer	10.00
Steam driver	15.00
Self-propelled steam driver	22.50
Steam Shovels:	
With dipper less than 2½ cubic yards capacity	15.00
With dipper 2½ cubic yards capacity or greater	20.00
Other Work Equipment:	
Self-cleaning ballast cars	1.50
Equipment or tool cars	1.50
Tank or water cars	1.50
Boarding, bunk, commissary, or camp cars	1.50

(Provided that in no case shall the rates for "Other Work Equipment" be less than the per diem rates.)

Note.—When necessary to haul this equipment over road owning it for delivery to borrowing road, or intermediate carrier, the following rates to apply:

Cars enumerated under "Other Work Equipment" ..... 3½c. per mile
Dining cars ..... 10c. per mile

Locomotives, Lidgerwood unloaders, pile drivers, steam shovels, unless otherwise provided by special arrangement. Tariff rates to apply.

Final Report of Exports Control Committee

The Exports Control Committee, established June 11, 1918, for war purposes to control the flow of export traffic has just made its final report, the committee having been disbanded March 1 at its own suggestion. The report, which was for the week ended February 28, shows that in the South Atlantic and Gulf districts the permit control on all bulk grain, both export and domestic, and all sacked grain for export destined to or via the Gulf port elevators has been removed. In the future, carriers will not require permits for grain moving to or via any of the Gulf ports. The embargo restrictions calling for permit system on iron and steel articles when destined to South America, Central America, Mexico, Cuba and the West Indies have also been withdrawn, so that the only movement subject to permit control will be on iron and steel articles moving overseas.

The movement of overseas traffic for the week ending February 25 shows that receipts have again exceeded the deliveries to the extent of 1,737 cars at North Atlantic ports. There are 10,823 cars of food for export on hand at North Atlantic ports, which is 1,183 cars more than last week.

The report shows that there were 28,000,000 bushels of grain at Buffalo afloat for the Food Administration and Wheat Export Company, in addition to the grain in elevators. Applications will shortly be presented covering a movement of approximately 6,000,000 bushels of grain a week via North Atlantic ports, divided according to conditions at the ports, an ample shipping program being available to promptly take care of grain on arrival.

As to Gulf ports, the stock of grain at New Orleans is 4,345,000 bushels, with only one ship in port and six overdue with total grain allocations of 936,000 bushels.

Passenger Traffic

Passenger traffic continues to show increases in various parts of the country, according to the latest weekly report of traffic conditions issued by the Railroad Administration, and to accommodate the travel the passenger service is gradually being restored to pre-war conditions in many places. Arrangements have been made to place several suburban club cars in service between New York and Plainfield, N. J. The New York Flyer between New York and Harrisburg, Pa., will shortly be re-established by the Philadelphia & Reading. Tri-weekly sleeping car service was established between Washington, D. C., and Hot Springs, Va., on March 3 by the Chesapeake & Ohio. Some additional passenger service has been put on by the Missouri Pacific. On March 1 all lines in the Central Western region, except the Atchison, Topeka & Santa Fe on its California Limited, resumed a la carte dining car service. A change in the special car tariff reducing the minimum requirement for use of a special car from 30 to 25 fares is to be made effective about March 15.

Maintenance Program for 1919

A maintenance of way and structures program for 1919 which will be sufficient to make the average upkeep for 1918 and 1919 equal to that of the three-year test period before federal control, is to be made up by the federal and general managers and submitted to the Railroad Administration at Washington for approval by April 15, according to instructions issued to regional directors by C. A. Morse, assistant director, division of operation, in charge of engineering and maintenance. With the instructions was sent a special form to be filled out with the average amount expended during the three-year period under each subdivision of the maintenance of way and structures accounts equated on the basis of the increased wages and material prices, together with similar information for 1918 to show whether the amount expended in 1918 was greater or less than during the test period after making an allowance for the higher wages and prices in 1918. The program for 1919 will then be made up by taking the average for the test period and adding or subtracting the difference between that average and the expenditures for 1918. Extraordinary expenses and expenditures on account of renewals rather than upkeep are to be separated. According to the Interstate Commerce Commission's figures for 1918 the expenditures for maintenance of way and structures in 1918 were $654,000,000 as compared with $446,000,000 in 1917, an increase of $208,000,000. According to an estimate made by the Railroad Administration, the increase in wages in the maintenance of way and structures account was $96,290,000, or 29.9 per cent. and the estimated pay roll excluding increases was $321,791,000.

Increased Number of Employees Due to War Conditions

Walker D. Hines, director general of railroads, has authorized a reply to a statement by Howard Elliott, president of the Northern Pacific, in a recent address, that the Pennsylvania Railroad System had nearly 40,000, or about 16 2/3 per cent more employees on December 31, 1918, under federal control than on December 31, 1917, under private control. Mr. Hines' statement incidentally makes public the fact that the total number of railroad employees in January of this year, was 8.2 per cent greater than in December, 1917.

"For this comparison," the statement says, "Mr. Elliott selects a month of private control characterized by extraordinarily bad weather when maintenance of way and other outside work was at a standstill on the Pennsylvania System and when blockading of traffic largely diminished car repairs, and selects a month under federal control in which unusually clear weather prevailed, when business was moving freely and when it was possible and advisable to go forward with maintenance of way and also with car repairs. Of itself the wide disparity between these two months produces an unfair comparison and accounts for a substantial part of the increased number of employees upon which Mr. Elliott dwells. But in addition there are two fundamental mistakes of treatment which vitiate Mr. Elliott's argument and emphasize its unfairness to the Railroad Administration.

"Mr. Elliott first makes the mistake of treating the Pennsylvania Railroad as typical of the entire country. This is not the case. Taking the railroads under federal control as a whole, the number of employees in January, 1919, as compared with December, 1917, shows an increase of only 8.2 per cent, much less than the increase on the Pennsylvania system. The increase in the number of employees under government control as compared with the number of employees when the roads were under private management is almost negligible except in the regions of intense war activity, and the most striking of these was the Allegheny region (which includes the Pennsylvania Railroad), where the essential coal and the steel were produced, and where many shipbuilding yards and other war industries were located.

"Mr. Elliott makes the further mistake of charging up as a necessary characteristic of federal control under peace conditions temporary features which were really due to war conditions. During the year 1918 the United States Railroad Administration organized the railroads of the country on a war basis to do the railroad part of the work of defeating the Germans. There was an extraordinary 'turnover' of railroad employees, due to the constant loss of employees to the military and naval service, to the service of operating the American railways in France and to other lines of work which were paying higher wages. This necessitated the employment of many untrained and inexperienced men and in the nature of things involved the necessity for having more men to do the same amount of work. Again, the transportation service under war conditions was in many respects much more burdensome than is indicated by the mere number of ton miles hauled. A vast number of special trains, both passenger and freight had to be run and an unusual empty car mileage had to be made.

"Again, the Railroad Administration had to keep organized up to its maximum capacity so as to be ready to put forth a constantly increasing effort and be ever ready, even if there might be an exceedingly severe winter, to do everything that ought to be done to carry on the work on an increasingly extensive scale and under an increasingly heavy strain. Thus the Railroad Administration had to be in a state of preparedness for the maximum war requirements in spite of the difficulties in securing trained employees; it, therefore, had to put forth every effort to have its forces sufficient as winter came on to meet any emergency.

"The armistice came so unexpectedly that it was impossible by the end of the year to readjust the organization so as to get rid of these war conditions and get down again to a peace basis. The problem was taken up promptly and has ever since been pursued with vigor in order to get back to a peace basis, but several months will still be required for that purpose. To seize on the war conditions which still existed in December, 1918, as an argument against the efficiency of the Railroad Administration even after readjustment to peace conditions is calculated to confuse, and is most unfair to the railroad officials of all ranks who have been trying so loyally and intelligently to bring the railroad conditions back to a normal peace basis.

"Nothing else in public or private control was conducted on a normal basis during the intense period of the great war. In all other sorts of enterprise it is assumed on all sides as

a matter of course that neither the war results nor the results of the readjustment period are to be taken as typical of peace results after readjustment can be accomplished. Yet Mr. Elliott singles out the Railroad Administration and treats it as an enterprise whose results under peace conditions and after an opportunity for readjustment can fairly be tested on the basis of what had to be done for the public safety under the stress and difficulty of the greatest war in history.

"The very facts that Mr. Elliott cites strongly emphasize that federal control has important opportunities under peace conditions to improve the situation through eliminating the extra costs which were due to war necessities. We are endeavoring to take advantage of all these opportunities and to bring about a readjustment in the public interest, having at the same time due consideration of the necessities of the general industrial situation. I welcome and am aided by understanding and discriminating criticisms of the situation, but I deprecate criticism which seeks to fasten on the Railroad Administration as a permanent characteristic of its policies and methods after readjustment to peace conditions, the things which were not due to federal control but which were due to the necessities of the war."

Back Pay to Be Reported

Several requests have been made upon the regional directors and federal auditors for information respecting the amount of back pay charged to operating expenses for the year 1918 arising out of the application of the provisions of General Order No. 27 or supplements thereto. Federal auditors were required to estimate a good portion of the data reported on this subject. The estimates, in many cases, were not comparable with the actuals subsequently determined, so that the results received were far from satisfactory. In order that the accounting division may properly answer the many inquiries made upon it respecting the subject of back pay, Accounting Circular No. 77 directs that federal auditors shall prepare a report showing the amount of back pay included in the operating expenses of each month of the year 1918 that is applicable to other months of that year, the amount in each month applicable to each other month to be shown in the month or months in which it is properly includable. After showing the full amount of back pay included in each month and the proper apportionment of that amount between the months to which it is applicable, a classification of the total amount assigned to each month is to be shown among the general accounts of operating expenses affected thereby.

If it is not reasonably possible to accurately assign the amount of back pay to the month or months to which it is applicable, such amount shall be apportioned among the appropriate months on some reasonable basis of estimate, and a note shall be made on the report that the distribution was made on an estimated basis.

Investigation of Wm. H. Wood Firebox

The William H. Wood corrugated locomotive firebox is the subject of a report recently made to Frank McManamy, assistant director, Division of Operation, United States Railroad Administration, by a sub-committee of the Committee on Standards and published by the Railroad Administration. The committee made a thorough investigation of the service records of the five fireboxes of this construction actually applied to locomotives and examined the fireboxes, now all replaced by others of standard design. Its conclusions are "that the Railroad Administration should not apply any of these fireboxes for the following reasons:

"That the economy claims have not been proven.

"That the life to be expected, based on the best performances is very much less than that of the ordinary form of box.

"That the time out of service will be very much greater than with the ordinary box."

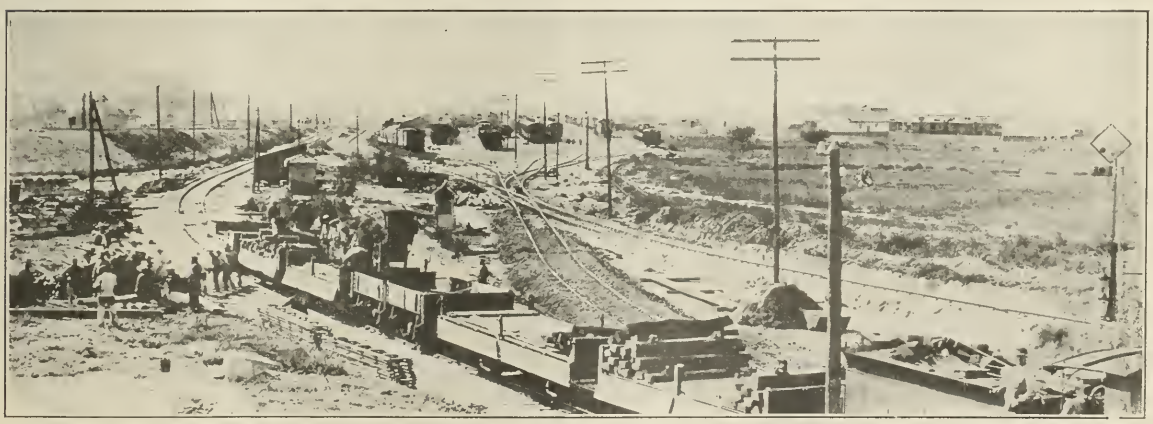
The committee does not believe that there is sufficient advantage in this form of construction to compensate for the added difficulty and expense involved in its repair and renewal.

Board of Referees to Determine Compensation

In accordance with provisions of the federal control act the Interstate Commerce Commission has appointed Commissioner Aitchison, M. O. Lorenz, statistician, and A. G. Hagerty, attorney examiner, as a board of referees for the purposes of determining the just compensation of the Chicago, Terre Haute & Southeastern and the San Antonio, Uvalde & Gulf, which have petitioned for the appointment of referees, because their compensation has not been adjusted as provided in Section 1 of the act.

Trackmen's and Shopmen's Working Conditions

Two representatives of each regional director and an equal number of representatives of the Brotherhood of Maintenance of Way Employees and Shop Men began a meeting at Washington on March 10 for the purpose of recommending to the Board of Wages and Working Conditions a set of uniform rules governing working conditions. A tentative draft was submitted to the board by the brotherhood some time ago.



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One of the Railway Receiving Yards of the United States Railway Engineers in France

Orders of Regional Directors

LOCOMOTIVE DICTIONARY *and Master Car Builders' Dictionary.* A. H. Smith, regional director, Eastern region, by file 500-88A583, advises that the director general has authorized a continuance by the railroads of past practice with respect to the furnishing of the Locomotive Dictionary and the Master Car Builders' Dictionary to their mechanical and purchasing officers. The Southern regional director, file 1701-2-6, issues the same notice.

International Railway Fuel Association.—The regional director, Eastern region, by file, 1301-28A584, advises that the director of the division of operation desires a large attendance of railroad fuel men at the International Railway Fuel Association's annual meeting, at Hotel Sherman, Chicago, May 19, 20, 21 and 22. The convention will discuss the conservation of railroad fuel coal, and railroad fuel men ought to attend regardless of whether or not they hold membership in the association. Federal managers are asked to see that their lines are properly represented, more particularly by men connected with the transportation and mechanical departments; such delegates to go prepared, as far as possible, to take an active part in the work of the convention. The Southern regional director, file 520-6, and the Northwestern director make the same request.

Interchange of Freight on Sundays.—A. H. Smith, regional director, Eastern region, by file 1200-2-29A576, calls for advice as to how far it has been possible to discontinue the interchange of "dead" freight on Sundays, and as to whether any further work of this class can be eliminated.

Automatic Train Control Devices.—The regional director, Eastern region, by circular 500-87A571 calls for a statement of all automatic train control devices now in use or installed; and instructs federal managers to see that no new installations are authorized until approved by the Automatic Train Control Committee.

Unsanitary Condition of Toilets.—The regional director, Eastern region, by circular 1600-111A572, advises federal managers that complaints are being received concerning unsanitary toilets in coaches and in passenger stations. This matter must be given attention so as to reduce to the lowest possible point all just grounds for reasonable criticism. The Northwestern region, by file 100-1-4, and the Southwestern, by Circular 183, receive the same notice.

Monthly Report of Fire Protection.—The regional director, Eastern region, in circular 1801-97A570, says that this report is to include only the activities of the inspectors attached to the fire protection and inspection department; it must not include things done by shopmen and other employees.

Issuance of Passes to Non-Government Roads.—The Southern regional director lays down the rule concerning the issuance of trip transportation to independently operated railroads: Trip transportation may be furnished to independently operated railroads on the basis of that furnished in 1917; in addition, trip transportation is furnished to Washington when necessary on account of railroad business with the United States Railroad Administration or other governmental department (not to include passes for families). These Washington passes will be issued by the director of the division of operation, but it will be proper for the railroads to continue past practice with reference to furnishing other trip transportation to such lines. The Eastern regional director, by file 2100-26A578, issues a similar notice.

Failures of Mechanical Stokers.—The Southern regional director calls the attention of federal managers to numerous delays and failures of locomotives equipped with mechanical stokers, due to iron bolts, and other metallic substances, as well as rock and other foreign material, left in bottoms of coal cars. Instructions should be issued through purchasing department and fuel inspection forces to insure that empty cars shall be thoroughly cleaned before loading, and every effort must be made to prevent any metal substance being loaded with coal. Supervisors and foremen in charge of coaling stations must be instructed that special effort be made to eliminate foreign matter, destructive to stoker equipment, when coal is loaded on locomotives. The Eastern regional director, by file 500-1-54A585 issues similar orders, and Order 170, Southwestern region, covers the same subject.

Wages Due Operators from Western Union.—The Eastern regional director, by file 1200-4-56A-582, calls attention to a complaint that on one railroad the Western Union Telegraph Company has withheld payment of bills for back pay due joint employees, linemen and others. The director of the Division of Operation advises that the federal managers should take a positive stand that the telegraph company be expected to pay its proportion of the increased wages granted by the Railroad Administration; that the contract between the telegraph company and the railroad does not require any previous agreement as to increases.

Movement of Army Medical Corps.—Circular 188 of the Southwestern regional director requires cars belonging to the United States army medical service to be returned promptly to Jersey City, N. J., and Newport News, Va.

Fires Resulting from Derailments.—The Southwestern regional director in Circular 189 calls attention to fires resulting from derailment of trains containing gasoline or other highly inflammable commodities. He cites the case of a freight train in which three freight cars were destroyed at an estimated loss of $12,500, and the principal cause was violation of rules.

War Saving Stamp Notices.—Circular 112, Supplement 3, of the Southwestern regional director gives authority for the posting of War Saving Stamp notices in stations, shops, etc.

Report of Classified Locomotive Repairs.—The Southwestern regional director in Order 172 announces the adoption of Form MD-34 for uniform reports of locomotives receiving classification repairs. This report is mailed monthly to Frank McManamy, Washington, and a copy is sent to the regional director.

Industry Tracks.—Order 185, cancelling Circular 102, Supplement 1, to Circular 102, Circular 119 and Circular 146 of the Southwestern regional director, abstracts all letters of interpretation of General Order 15 issued on March 26, 1918, and Supplement 1 thereto covering the practice to be followed in the construction, maintenance and operation of industry tracks.

Freight Cars; Cost Limit of Repairs.—Supplement 1 to Circular 23 of the Northwestern regional director, in complying with paragraph 8 of Division of Operation Circular 20, includes a model for the report of inspection and estimated cost of repairs to freight cars recommended for retirement or application of betterments and states that after cars are inspected and reported on this form the federal manager of the using road will transmit the original and two copies, with his recommendation, to the federal manager of, the owning road, who will transmit one copy to the corporation, securing its approval; retain one copy and return the original to the federal manager of the using road, notifying him of the action taken.

Second-Hand Rails.—The regional director, Eastern region, by file 500-8-8A562, prescribes, for convenience in acounting, prices for different qualities of second-hand rail which may be carried in stock, to avoid the difficulty of following the fluctuations in market prices. Except where there is some very serious objection to the contrary, the new rail is to be charged at the invoice price at which purchased, and stock is to be calculated at the average price paid for such rail on hand or being purchased; and second-hand rail, for stock purposes is to be valued as follows: Relayer, $28; Sidings and Yard, $25; Scrap, $14. When material of this kind is to be sold, the sale is to be made at the

highest price obtainable; and periodically, say semi-annually, the Auditing Department can readjust the operating accounts to reconcile the actual situation with the monthly accruals.

Sheds for Protection of Car Repairers.—The regional director, Eastern region, by Circular No. 1800-133A567 calls for information concerning laws requiring the construction of sheds for this purpose. The director general has been asked by the brotherhood to adopt a policy and is anxious to pass upon the matter with as little delay as possible. Federal directors are asked to advise what States now have car shed laws, and their provisions; what railroads have adopted the policy generally of providing car sheds at the more important car repair points, and to recommend what the practice should be.

Army Medical Cars.—The regional director, Eastern region, by Circular No. 2000-38-86A563 calls attention to the importance of promptness in returning to their headquarters the cars belonging to the U. S. Army, Medical Service, when the wounded men and invalids have been removed therefrom. The personnel of the Medical Corps is attached to each car, and a necessity exists for moving the Army Medical trains upon passenger schedule back to the point of origin as soon as relieved at destination. These cars have their headquarters at Jersey City, N. J. (Pennsylvania Railroad), and Newport News, Va. (C. & O.)

Development of Coal Mines.—Order 173 of the Southwestern regional director cancels Order 134 relative to applications for coal mine tracks. Hereafter such applications should be handled the same as applications for industrial tracks.

Freight Car Distribution.—Supplement 8 to Circular 70 of the Northwestern regional director directs that cars at a junction point with the home road will only be delivered to owner as approved by the regional director. Approval will be given where such delivery is not contrary to the current trend of empty movement. Care must be exercised to avoid diverting the movement of empty cars from proper channels. Ordinarily, where there is a definite movement of traffic through certain gateways the empty return movement should be made via the same gateways. By Notice No. 6 the Northwestern regional director calls for better movement of *automobile cars* to eastern territory. Shortage of cars for loading, particularly in Michigan, is growing acute. All such cars east of the Missouri river should be moved east at once, empty if necessary; but so far as possible, some should be loaded for destinations west and north of a line drawn through Detroit, Cleveland and Indianapolis. Automobile cars that are in storage mixed with ordinary box cars and not readily accessible will be switched out only when convenient and economical. A canvass, however, must be made of stored cars with a view of getting such cars in service with the least possible delay consistent with economical operation. Automobile cars in bad order should be given preference over ordinary box cars in making repairs. On account of being less serviceable, 36-ft. cars will not be moved empty on this order; but should be supplied for eastbound loading. Orders will not be accepted from other roads for empty automobile cars, with the exception of cars for loading by short line roads, or in switching service, where the loading road has no car supply. These instructions will not interfere with giving full distribution of available cars on local orders for automobile loading.

Stored Equipment.—Circular 184, of the Southwestern regional director is similar to 557-1-27 of the Northwestern regional director, abstract of which was published in the *Railway Age* of March 7 (page 555).

Taxation of Material.—A. H. Smith, regional director, Eastern region, by circular 2002-4A252, quoting the general counsel of the Division of Law advises that government property not in use by a railroad is not taxable locally. The general counsel says:

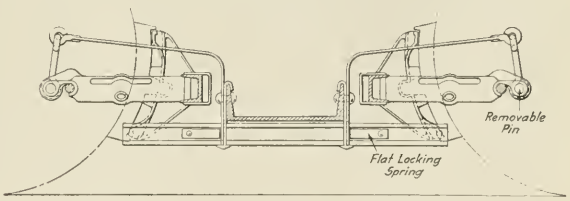
"Material and supplies of roads under Federal control on hand December 31, 1917, were taken over by the United States Railroad Administration and payment for the same made by the Government through credit entry on the books in favor of the corporation. In my opinion, such material and supplies became the property of the government; likewise material and supplies acquired since that date have been paid for by the government, thereby being the property of the United States government and not subject to taxation any more than army camp or post office supplies. Where material and supplies have been allocated to any particular road and used for maintenance, same became a part of the physical property of that particular road, and immediately subject to tax as such. Or, where material and supplies have been allocated to a particular road for use in connection with extensions or improvements, and charged to the corporation making such extensions or improvements, same became a part of the physical property of the road and subject to tax as such. Manifestly, it would be unfair for a state or community to assess taxes against a particular road for material and supplies, the property of the government, temporarily located at such point but perhaps designed by the Administration to be sent to some other state to be used by the government, in its operation of the railroads on an entirely different road at a distant point.

"It is impossible for me to determine in each specific instance the status of ownership of material and supplies, but there is no reason why this cannot be done in every instance by the proper officers of the road and the question of taxation handled accordingly."

Exchange of Passes with Steamships.—The Southern regional director, file 1557-53-6, directs that past practice regarding the exchange of trip transportation with independently operated steamship companies be continued.

Atlas Safety Guard and Third Point Support

For some time past the American Steel Foundries, Chicago, has been manufacturing a safety device for brake beams known as the Atlas safety guard. This consists of a bar of I-section fastened beneath the spring plank in such a position as it will support the brake beam in case the brake hanger should fail or the pins fall out. A further improvement has been made in this device by providing an additional support for the brake beam to insure even brake shoe wear. This is accomplished by extending arms upward and outward from the safety bar support on the spring plank and fastening the brake beams to these arms by short links. In cases where one safety bar is used on each truck, these links are attached to the end of the brake beam strut; when two safety bars are applied the links are fastened to the tension member. The safety bars, as in the previous design, are held in place by flat springs and can readily be slid through the supports under the spring plank when it is desired to remove the brake beam. The arm and links being above the beam do not interfere with it in any way.



Atlas Safety Guard and Third Point Support

Decreasing the "Man Mileage"

By O. E. Fisher
Comptroller, Kettle Valley Railway

THE STRESS OF THE TIMES has awakened us to a realization that economies which we never thought of in pre-war times are now possible. We have increased the car load and the train load, we have substituted cheaper and different materials that seem to answer the purpose as well as the more expensive kinds used in the past; we have decreased the train mileage, but what about decreasing the man mileage? Are we sufficiently interested in increasing the "efficiency lading" of officers and employees?

Railway operation is essentially different from other commercial operations whose volume of business handled may be fully as large. It is necessary to maintain strict discipline and perhaps handle many things in a more exacting manner than would be required in most commercial enterprises, but in our ardor have we not sometimes sacrificed efficiency instead of adding to it? Look at a few instances coming under actual observation on different railways.

A young freight conductor, just promoted, in figuring a close meet delayed a comparatively unimportant passenger train five minutes—a loss that was made up within the next fifty miles—and by so doing saved thirty minutes' time for the slow freight he was handling. The letter he received the next morning fairly scorched the paper it was written on, with its burning invectives; and after two or three succeeding occurrences of a similar nature he quite naturally fell into the habit of losing an hour at meets, if necessary, rather than take any chance of getting similar criticisms.

How frequently we see an operating officer glance over a morning report and say to a clerk, "Run down those delays and let me have the result." Forthwith a series of letters of the following tenor go out: "Let me have at once the cause of the disgraceful delay at Pumpkin Centre yesterday. What do you mean by such work as this?" Or, "I want to know at once what was the reason for an hour and ten minutes' delay at Hoop Pole Junction yesterday; see that it doesn't happen again." In many cases there is a perfectly plausible reason for the delay. Why not say, "I notice you were delayed thirty minutes yesterday at Pumpkin Centre; what was the reason, please; and how could it have been avoided?" This, quite likely, would bring out some constructive information and the criticism could then have been applied if it were required.

The phrase, "Please let me have your explanation," is much overworked. In many cases, there is no explanation other than an admission of the fault. A common style of letter to agents reads, "Please explain why you failed to unload a case of canned goods for your station from car 36245 on the 7th," and the reply runs, "I have impressed on Warehouseman Jones that this must not happen again." Yet, Jones perhaps knows nothing about the affair. Why not write, "Your failure to unload a case of canned goods, etc., last Friday was the occasion of some inconvenience to our patrons and may result in a claim. Look into the matter." A little softening of this kind is worth a hundred times its cost.

On another road an officer, with several officers reporting to him, required that every detail should be submitted to him for personal approval. This killed all initiative in the subordinate officers, giving them first-class training for office boys, instead of railway officers. This was carried to the point that a section crew of several men was delayed two hours waiting for this "personal approval" to get seventy-five cents' worth of powder from the store to clear a rock from the track that was in danger of delaying an approaching passenger train. A lineman was delayed an hour getting "personal approval" to his requisition for gasoline before getting out to repair a break in the telegraph line, when the approval of his immediate superior could have been secured in a few minutes.

On a certain railway, where, following the usual practice, it is necessary to secure a formal authority before doing any work charged to the cost of the road, a superintendent, who had been having considerable trouble with a water tank and had expended a considerable sum for maintenance, was in danger of losing the water supply and delaying important trains; and he hit upon a plan of ending the trouble for all time by an expenditure of $16.50, which he properly charged to additions and betterments. He was severely censured for doing this work in advance of a proper authority and, being of a sensitive nature, this letter occupied his mind for several days to the exclusion of other work. It is because of instances like this that we still find cases of an officer having saved (?) a substantial amount by some subterfuge of passing a charge on to another department (and probably increasing the amount substantially in so doing).

One of the most vital questions in railway economics is the relations of the employees to the company; almost all branches of labor are becoming strongly organized, and in many instances their demands are quite unreasonable. In order to secure coal or other needed material we have to pay the market price and, once we purchase it, we try to conserve it and make it go as far as possible; surely we ought to give the conservation of man power no less attention. Some of the unreasonable demands of labor organizations take root in the defects of our methods. I could name two general offices, each employing a number of clerks. In the one, pay and advancement are governed purely by ability; the men start on a minimum basis, and if a clerk develops ability along special lines and handles his work better than ordinary, he will in due course find an increase in his pay check—perhaps the check itself being the first advice of the increase. There is nothing but team work in that office and the relative unit of cost of work turned out is very much lower than the average; and everybody is satisfied. It is not an infrequent occurrence to see three or four clerks working a half hour after quitting time because they are interested in finishing a particular piece of work. In the other office, the head of which is an officer drawing a salary of several thousand dollars a year, there is a fixed rate of pay for each desk, which can only be changed by an extensive process of approvals and super-approvals. At six o'clock, quitting time, an observer would think that a fire alarm had been sounded, making it necessary to get out of the building quickly; and at thirty seconds past six the room is empty. The head of this office said that he wished it were possible to dispense with ten men and take half the money and divide it among those remaining; by so doing, he felt sure that 20 per cent of the cost of running the office could be saved.

I can hear a chorus to the effect that this would not be uniform; it would break down our system, and so forth. But, granted this were the case, would not the system improve with a little breaking, or at least bending? As for uniformity, not many men are uniform.

If a man is really capable, the only way that capability can be developed is by giving him increased authority; holding him to a circumscribed path tends to petrify him. A closer understanding between officers and the men in the ranks (where we all came from) will, without doubt, result in an improvement in our man mileage.

The shops of the Altoona Northern, at Altoona, Pa., were destroyed by fire on the morning of March 5; the estimated loss, including damage to one locomotive and two cars, was $75,000.

General News Department

The Southern Pacific reports that it has carried 46,346,228 revenue passengers during the past year without the loss of a single life in a train accident, and in the last ten years has transported 380,837,002 revenue passengers 14,480,042,394 revenue passenger miles with safety average such that a passenger may travel the equivalent of 579,000 times around the world without loss of life in a train accident.

The East Bay Terminal is now the busiest railroad center on the Pacific Coast. Because of the shipbuilding activities at Vallejo, Cal., and Bay Point, and the joint use of the Oakland Pier by the Southern Pacific, the Western Pacific and the Atchison, Topeka & Santa Fe, there has been a great increase in traffic. Six passenger trains, with 72 cars, leave Oakland Pier within a 30-minute period in the morning and at night 11 trains, with 96 cars, arrive within one hour. There are three workmen's trains, not shown on the time table, that carry over 2,000 men night and morning between Oakland and Bay Point, and 1,400 men between Oakland and the Mare Island navy yard.

The conference of governors and mayors held in Washington last week adopted resolutions recommending that the railroads be retained by the government for 21 months after the proclamation of peace and that they be used during that time, so far as possible, to furnish "buffer" employment. "The government should not only provide for transportation necessities of property, but it should use the railroads as the means of helping private industry." The resolutions also recommended that the Railroad Administration immediately reduce the freight rates on all building material, especially road building material, and the Railroad Administration has announced that some reductions are contemplated.

The strike of boatmen and longshoremen at New York City was settled, so far as the railroad boats are concerned, on March 8, the Railroad Administration making large concessions to the strikers; but the non-railroad interests held out, and a number of important steamships, ready to sail to European ports, were delayed several days by their inability to get coal. Some of the liners proceeded with a partial supply, expecting to take coal at Halifax. On Wednesday of this week the Interborough Rapid Transit Company, using about 2,000 tons of coal daily, had on hand only four days' supply. Officers of the road appealed to the federal government at Washington for relief.

A. R. E. A.

Because of the pressing nature of the problems imposed upon him by the failure of Congress to pass the railroad appropriation bill, Walker D. Hines, director general of railroads, has felt obliged to recall his acceptance of the invitation to speak at the annual dinner of the American Railway Engineering Association at Chicago next week.

Senator Atlee Pomene of Ohio, member of the Senate Committee on Interstate Commerce who has taken active part in the recent hearings on the railroad question, has accepted an invitation to speak at the dinner of the engineering convention next Wednesday.

The Association of Railway Executives

The committee having in charge the presentation of this association's recommendations to Congress, consisting of Julius Kruttschnitt, Daniel Willard, Samuel Rea, Howard Elliott, Alfred P. Thom, and Thomas DeWitt Cuyler, has been enlarged by the addition of Judge Robert S. Lovett, president of the Union Pacific. The standing committee was also enlarged by the addition of Carl R. Gray, president of the Western Maryland.

The Association of Railway Executives took under its general direction the Bureau of Railway Economics, the Association of Corporate Accounting Officers, and the Association of Railway Corporate Engineers.

Slack Work in Shops

In the large repair shops of the New York, New Haven & Hartford, the working time has been reduced to forty hours a week. About 4,000 persons are affected. The Pennsylvania has reduced the working time at many shops. The Nashville, Chattanooga & St. Louis has made a reduction of ten per cent in the forces of its large shops.

Railroad Library Sold

The library, consisting of 450 volumes containing early railroad history of England, America, and other countries, which was noticed in the *Railway Age* of February 28, page 514, as about to be sold in New York City, was disposed of, in a single lot, on the first day of the sale, to George D. Smith, of New York City, dealer in rare books, for $5,500. The books are now at Mr. Smith's store, No. 8 East Forty-fifth street.

Officers to Attend Engineering Convention

W. T. Tyler, director of the Division of Operation, has written to the regional directors regarding the twentieth annual convention of the American Railway Engineering Association to be held in Chicago next week, saying he will be glad to have officers and employees who can be spared from their duties attend the convention, take part in the discussion and see the exhibits. B. L. Winchell, regional director for the Southern region, has written to federal and general managers a similar letter saying: "These meetings always develop matters of interest and value. In view of the necessity at this time of utilizing in the most efficient manner both materials and labor, it is expected that this coming meeting will bring up matters of more than ordinary importance."

"Railway Supply Men's Night"

A unique program has been arranged by the New York Railroad Club for its meeting at the Engineering Society's building in New York at eight o'clock on Friday evening, March 21. The club, like other railway clubs, includes in its membership a large number of railway supply men and it was felt by the subjects committee that it would be quite fitting to set aside one meeting which would be entirely devoted to a consideration of subjects of prime interest to the railway supply men but of hardly less interest to the railroad men because of the intimate relationship which must necessarily exist between the two parties. With this in mind, the following program has been arranged:

(1) The practical value and importance to the railways of the service departments maintained by railway supply companies will be discussed by A. L. Humphrey, vice-president of the Westinghouse Air Brake Company.

(2) The great contribution, in the direction of increasing the efficiency and capacity of railway operation, made by the engineering departments of the railway supply companies will be discussed by William E. Woodard, vice-president of the Lima Locomotive Works, Inc.

(3) The desirability of taking some steps looking toward insuring a more uniform rate of production of railway supplies will be considered by Dr. W. F. M Goss, president of the Railway Car Manufacturers' Association.

REVENUES AND EXPENSES OF RAILWAYS

Month of December, 1918

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Bingham & Garfield	36	$248,507	$4,780	$260,779	$34,669	$63,349	$1,665	$56,197	$4,582	$165,494	63.46	$95,284	$4,265	$91,020	—$73,755
Pittsburgh, Shawmut & Northern	204	80,787	6,490	91,139	20,105	42,608	1,603	41,751	5,063	111,531	122.37	—20,392	1,841	—22,277	15,663
Louisiana Railway & Navigation Co.	356	201,550	57,881	274,391	46,748	48,330	3,482	160,326	7,289	266,174	97.00	8,216	16,383	—8,169	—90,079
Houston & Texas Central	887	539,465	210,367	801,053	143,892	62,999	3,461	289,331	17,520	509,160	63.56	291,894	15,656	75,980	176,260
Twelve Months of Calendar Year 1918															
Bingham & Garfield	36	$3,308,158	$48,536	$3,450,747	$475,406	$570,836	$16,323	$689,514	$56,776	$1,854,093	53.73	$1,596,655	$114,101	$1,482,554	—$426,808
Pittsburgh, Shawmut & Northern	204	1,115,743	64,158	1,216,348	335,852	636,690	14,987	637,781	80,642	1,706,354	140.29	—490,006	21,795	—511,845	—292,216
Louisiana Railway & Navigation Co.	356	2,170,752	730,694	3,078,059	500,253	518,073	52,033	1,422,871	92,743	2,585,974	84.01	492,085	171,920	319,920	—231,186
Houston & Texas Central	928	6,189,187	2,212,798	9,041,981	1,203,144	1,500,932	109,922	3,364,059	222,438	6,397,011	70.74	2,644,970	406,118	2,236,113	—606,146
Month of January, 1919															
Alabama & Vicksburg	141	$151,022	$73,991	$241,285	$28,341	$62,818	$1,660	$110,099	$7,641	$212,125	87.91	$29,160	$9,406	$19,743	—$3,796
Alabama Great Southern	312	593,325	171,095	813,239	53,349	171,266	16,834	372,199	16,431	628,285	77.25	184,954	24,561	160,370	73,399
Ann Arbor	301	312,956	50,148	376,209	83,542	70,223	2,418	151,319	12,879	326,442	85.17	55,767	13,100	42,634	54,823
Arizona Eastern	377	289,966	51,794	370,881	85,006	52,743	1,201	105,797	3,177	247,400	66.70	123,481	16,282	107,144	—32,301
Atchison, Topeka & Santa Fe	8,635	9,143,307	3,303,478	13,028,540	1,804,168	3,291,239	128,568	5,255,361	264,908	10,737,629	82.41	2,290,911	550,683	1,738,263	—339,258
Atlanta & West Point	93	119,712	80,857	222,015	26,518	44,154	3,069	89,813	6,622	169,925	76.53	52,091	8,500	43,557	3,912
Atlanta, Birmingham & Atlantic	640	273,694	78,737	381,525	111,069	147,358	5,544	232,682	13,666	510,368	133.77	—128,843	16,000	—145,021	—144,380
Atlantic & St. Lawrence. Included in Grand Trunk Western.															
Atlantic City	177	159,657	103,116	295,540	43,358	29,609	90	172,314	905	246,370	83.36	49,170	12,000	37,170	86,623
Atlantic Coast Line	4,839	4,023,437	1,494,850	5,887,841	775,685	1,070,811	53,559	2,326,324	105,085	4,365,055	74.13	1,522,786	200,000	1,322,065	218,072
Baltimore & Ohio	5,145	9,543,081	2,700,554	13,332,117	2,079,349	4,703,969	151,486	7,055,035	425,873	14,505,132	108.79	—1,173,015	411,340	—1,587,284	1,280,543
Baltimore & Ohio Chicago Terminal	91	.....	—8	127,687	52,606	52,377	908	132,110	11,432	254,814	199.56	—127,128	31,876	—159,004	—23,574
Baltimore, Chesapeake & Atlantic	87	60,057	28,151	88,077	8,677	14,433	986	60,272	3,574	87,942	99.84	136	3,160	—3,025	—45,525
Bangor & Aroostook	632	375,502	73,735	470,484	99,735	92,972	4,632	200,476	14,282	417,319	88.69	53,166	21,000	32,111	45,492
Beaumont & Sour Lake	118	97,016	20,380	121,862	24,224	16,780	3,119	49,526	6,744	100,392	82.38	21,470	2,700	18,744	—28,793
Belt Ry. Co. of Chicago	31	.....	.....	256,233	40,221	40,796	383	198,667	9,352	289,419	112.95	—33,185	16,442	—49,628	52,689
Bessemer & Lake Erie	217	570,123	32,950	662,851	45,203	314,567	9,278	326,581	23,345	705,530	106.43	—42,679	14,500	—57,239	151,549
Bingham & Garfield	36	136,640	3,187	146,137	31,534	40,156	2,109	43,930	7,143	127,850	87.48	18,286	9,565	8,721	—108,363
Birmingham Southern	2	46,225	.....	56,904	3,935	3,964	795	21,041	3,078	32,813	57.66	24,091	2,681	21,410	18,291
Boston & Maine	2,258	3,231,414	1,565,962	5,445,485	673,519	1,142,878	27,522	3,363,082	179,067	5,425,870	99.63	19,615	172,386	—152,771	506,711
Buffalo & Susquehanna R. R. Corp.	296	180,603	7,411	192,811	45,595	83,909	1,783	69,186	7,879	208,353	108.06	—15,542	3,250	—18,792	—48,636
Buffalo, Rochester & Pittsburgh	590	1,240,706	120,004	1,400,274	197,007	526,221	15,219	680,792	32,297	1,453,375	103.79	—53,101	27,000	—80,101	52,678
Canadian Pacific Lines in Maine	233	256,521	40,960	310,166	39,905	69,076	2,685	248,173	3,722	363,561	117.21	—53,395	11,000	64,396	3,138
Carolina, Clinchfield & Ohio	282	445,774	29,523	487,897	83,112	114,367	4,160	158,513	13,905	373,806	76.61	114,091	16,300	97,791	21,943
Central of Georgia	1,918	955,173	519,225	1,658,806	329,676	395,004	28,042	780,617	57,189	1,588,448	95.75	70,358	66,750	3,264	—349,700
Central of New Jersey	684	2,736,288	578,631	3,612,003	378,040	866,204	16,904	1,624,359	81,605	2,985,348	82.65	626,654	157,696	468,977	682,638
Central New England	301	473,864	24,273	519,439	87,302	140,992	1,509	292,291	8,960	533,651	102.74	—14,212	16,000	—30,214	—58,638
Central Vermont	411	323,304	79,399	432,297	48,199	124,108	6,160	311,073	17,703	507,540	117.41	—75,243	17,406	—92,653	5,953
Charleston & Western Carolina	342	187,105	57,875	257,979	45,978	66,030	3,468	120,452	6,497	242,424	93.96	15,555	8,500	7,055	—31,562
Chesapeake & Ohio Lines	2,484	4,467,104	1,220,636	6,032,070	965,778	1,358,148	39,802	2,434,698	109,452	4,944,330	81.96	1,087,740	172,000	915,447	950,998
Chicago & Alton	1,050	1,464,191	461,660	2,032,653	278,669	578,869	20,621	921,869	47,057	1,858,738	91.44	173,914	55,500	118,380	334,775
Chicago & Eastern Illinois	1,131	1,567,597	395,783	2,093,216	311,719	735,286	19,464	961,463	48,819	2,079,824	99.36	13,392	79,592	—66,649	338,216
Chicago & Erie	269	709,791	73,569	823,273	84,909	154,398	9,510	444,903	24,127	720,295	87.49	102,978	25,752	77,226	565,929
Chicago & North Western	8,090	6,494,743	2,589,884	9,795,841	1,332,124	2,292,616	70,750	5,213,116	246,074	9,238,404	94.31	557,438	475,000	80,509	1,175,821
Chicago, Burlington & Quincy	9,372	8,681,844	2,481,515	11,647,080	1,364,561	2,423,584	88,686	4,967,754	324,222	9,245,746	79.38	2,401,334	476,182	1,921,966	864,011
Chicago, Detroit & Con. Gd. Trk. Jctn. Included in Grand Trunk Western.															
Chicago Great Western	1,496	1,060,251	490,501	1,653,617	207,090	465,490	24,676	798,251	46,050	1,554,398	93.99	99,219	54,975	43,955	114,080
Chicago, Indianapolis & Louisville	657	598,075	200,195	867,334	88,756	238,096	11,579	403,559	23,493	772,610	89.08	94,724	30,663	64,351	220,593
Chicago Junction	12	.....	.....	314,804	95,817	55,826	92	260,242	7,823	419,800	133.35	—104,996	2,156	—107,152	7,530
Chicago, Milwaukee & St. Paul	10,273	8,045,272	2,209,984	11,054,718	1,358,169	3,641,152	67,957	5,706,578	283,057	11,072,949	100.16	—18,231	511,748	—532,761	71,828
Chicago, Peoria & St. Louis	247	94,941	24,022	125,305	33,404	59,334	2,386	81,281	9,241	185,645	148.15	—60,340	7,407	—67,760	—14,678
Chicago, Rock Island & Gulf	474	271,945	82,618	371,329	71,553	102,044	6,052	184,851	11,316	376,646	101.43	—5,316	13,155	—18,574	—139,430
Chicago, Rock Island & Pacific	7,731	5,295,066	2,264,511	8,002,958	1,471,474	2,179,275	93,729	3,982,893	191,380	7,956,898	99.42	46,060	343,391	—297,915	—357,662
Chicago, St. Paul, Minn. & Omaha	1,749	1,560,581	546,007	2,314,848	203,590	434,856	24,016	1,107,396	57,452	1,845,820	79.73	469,028	108,177	359,803	324,436
Chicago, Terre Haute & Southeastern	374	318,809	22,009	347,185	49,185	168,930	3,613	140,568	7,248	372,888	107.40	—25,499	14,500	—39,999	—46,927
Cincinnati, Indianapolis & Western	321	162,715	51,843	233,143	57,852	80,349	4,309	142,825	12,915	298,590	128.07	—65,447	10,243	—75,690	—91,276
Cincinnati, New Orleans & Texas Pacific	337	1,036,264	410,997	1,511,117	88,386	398,179	20,616	521,235	29,979	1,071,177	70.89	439,940	39,000	399,748	400,202
Cincinnati Northern	251	211,937	16,757	233,557	43,968	62,066	2,188	80,364	5,062	193,649	82.91	39,908	8,000	31,845	59,409
Cleveland, Cincinnati Chic. & St. Louis.	2,395	3,276,131	1,276,308	5,347,881	777,783	1,263,865	74,494	2,346,118	106,628	4,608,370	86.17	739,511	185,000	553,403	643,258
Coal & Coke. Included in Baltimore & Ohio.															
Colorado Midland. Discontinued.															
Colorado & Southern	1,100	874,873	151,034	1,089,357	109,904	255,945	6,635	410,523	36,306	825,415	75.75	263,943	47,100	216,566	—80,167
Colorado & Wyoming	41	22,961	1,134	96,283	7,314	17,662	115	50,198	4,186	79,475	82.54	16,808	3,723	13,086	6,770
Cripple Creek & Colorado Springs	76	18,671	3,564	22,403	692	3,905	158	4,445	267	9,468	42.26	12,935	2,500	10,410	¶ .....
Cumberland Valley	163	397,774	63,318	481,048	67,525	96,600	6,582	215,935	10,663	397,984	82.73	83,064	9,614	73,374	15,113
Delaware & Hudson Co., R. R. Dept.	873	2,291,076	228,169	2,663,954	400,565	859,462	18,659	1,319,252	113,566	2,744,614	10,302	—80,660	60,000	—141,504	554,149
Delaware, Lackawanna & Western	955	4,400,467	880,576	5,699,053	499,404	1,255,534	39,518	2,545,024	107,652	4,500,274	78.97	1,198,779	220,101	978,277	321,453
Denver & Rio Grande	2,641	2,131,675	380,418	2,568,465	263,642	738,256	18,426	935,024	66,776	2,053,160	79.93	515,305	100,000	414,944	69

¶ Not available.

Industrial Board of the Department of Commerce

The personnel of the Industrial Board of the Department of Commerce, which is seeking the co-operation of basic industries in an effort to readjust prices, is as follows: George N. Peek, formerly vice-president of Deere & Company, chairman; Samuel P. Bush, president of the Buckeye Steel Castings Company; Anthony Caminetti, commissioner general of immigration, Department of Labor; Thomas K. Glenn, president of the Atlantic Steel Company; George R. James, president of the William R. Moore Dry Goods Company; T. C. Powell, director of capital expenditures, Railroad Administration, and William M. Ritter, president of the W. M. Ritter Lumber Company.

The Railroad Administration is understood to be ready to place an order for 500,000 tons of rails if the price is adjusted to its satisfaction. The railroads are now receiving about 40,000 tons a month on orders placed before the period of federal control, and at that rate deliveries will be completed about July 1. Secretary Redfield has indicated that the first purpose is to reduce prices at the expense of excess profits without disturbing wages for the present.

American Railway Engineering Association Program

The following program has been prepared for the Twentieth Annual Convention of the American Railway Engineering Association to be held in the Florentine room of the Congress hotel, Chicago, on Tuesday, March 18, to Thursday, March 20, inclusive. Morning sessions will be held from 9:30 to 12:30 and afternoon sessions from 2 to 5. At the first session on Tuesday the president's opening address will be followed by reports of the secretary and treasurer and of standing and special committees after which the reports of the various regular committees will be taken up in the order indicated below.

As announced in last week's issue three meetings of interest to members of this association will take place on the evening of Monday, March 17, the day preceding the convention. The Railway Signal Association will hold its meeting at the Auditorium on Monday, March 17.

TUESDAY

Signals and Interlocking.
Signs, Fences and Crossings.
Conservation of Natural Resources.
Track.
Records and Accounts.
Rules and Organization.
Economics of Railway Labor.

TUESDAY EVENING

Illustrated Use of Labor-Saving Devices.
Developments in the Study of Transverse Fissures.

WEDNESDAY

Wood Preservation.
Yards and Terminals.
Electricity.
Ties.
Stresses in Railroad Track.
Buildings.
Ballast.
Roadway.
Rail.

THURSDAY

Iron and Steel Structures.
Masonry.
Water Service.
Wooden Bridges and Trestles.
Uniform General Contract Forms.
Economics of Railway Operation.
Economics of Railway Location.

Aviation Records

Washington to New York in one hour twenty minutes is the latest 200-mile airplane record. This speed is said to have been made on March 6 by Col H. A. Dargue and Lieut. Philip Lucas, army aviators. They flew at a height of about 6,000 feet., in an airplane equipped with a 400 hp. Liberty motor.

On March 7, Major Fleet and Captain White flew from Dayton, Ohio, to Mineola, N. Y., in 4 hours 33 minutes. Mineola is 20 miles east of New York City. This is the time deducting a stop of about two hours for repairs at Newburgh, N. Y. The air-line distance between Dayton and New York is about 540 miles, but the distance flown can be stated only approximately as the flyers were driven 100 miles off their course by a storm. By reason of the snow and the fog they had to ascend to a height of about 10,000 ft., and they steered all of the way by compass.

Two large United States naval flying boats, of the F-5-L type, flew from Hampton Roads, Va., to New York City (Rockaway), on March 12, without a stop, in four hours thirty minutes, each machine carrying seven passengers with a gross load of about 13,000 lbs. The distance is about 300 miles. During the flight the A1070, one of the two flying boats, developed trouble in one of her 400 hp. Liberty motors. While the huge machine continued in the teeth of the stiff breeze Chief Mechanic Sacks overhauled the defective engine, and succeeded in repairing the fault in midair. After this the flight proceeded without further incident. Each of the two boats carried photographic apparatus, and photographs and moving pictures were taken during the flight. The A-1070 was piloted by Ensign Souther, and the A-4036 by Ensign Irvine. Wireless telegraph and telephone communication was maintained between the two ships and with the shore stations throughout the flight. These airplanes each measure 103 ft. 9 in. across the wings, and have an overall length of 74 ft. 3 in. Each is equipped with two twelve-cylinder 400 hp. Liberty motors. They are capable of eight hours' sustained flight.

Railway Business Association

The Railway Business Association announces that chairmen of all standing committees of the association for the present year have accepted appointment as follows: Railways After the War, W. W. Salmon, president, General Railway Signal Company; Government Purchasing Policies, Knox Taylor, president, Taylor-Wharton Iron & Steel Company; Action, A. H. Mulliken, president, Pettibone-Mulliken Company; Finance and Administration, W. G. Pearce, president, American Brake Shoe & Foundry Company. The secretary of the association in a recent bulletin says that the number of new members acquired thus far during 1919 is 43, which brings the roll up to 338, the greatest number yet reached by the association.

The secretary also quotes a telegram which President Alba B. Johnson of the association sent to Director General Hines. The telegram is as follows: "Congratulations on your courageous and manly spirit in facing difficult situation created by failure of revolving fund bill. You are quoted as expressing confidence in patriotic co-operation of equipment companies. Please regard the Railway Business Association as ready to name conferees to participate on behalf of the railway supply industry in development and execution of measures to stabilize employment."

Steps are under way, in which the Railway Business Association will participate, for co-operation among representatives of the several interests to meet the serious transportation and industrial situation immediately confronting the country.

Thirteenth Engineer (Railway) Regiment Sees Active Service

The 13th Engineers Regiment, composed of railway men on roads running west from Chicago, which has been operating military railroads back of Verdun was scheduled to leave Fleury-sur-Aire on March 7, on the way to an embarkation port preliminary to its return home. According to a cable published in the Chicago Daily News, on March 6, it has the distinction of being the first American Engineer Regiment to enter active service in the war, and has an excellent record for the handling of men and supplies, and for the assistance given in the preparation for the American drive on the Meuse-Argonne.

Although engineer regiments are generally classed as non-combatant units, the 13th has been classed as a combat unit in orders from the American and French headquarters, with the instructions that on the discharge papers of each officer and man the words, "Took part in the Champagne, St. Mihiel and Meuse-Argonne offensives," be inserted. Another distinction of the 13th is the insignia of a blue square cloth patch with a red engineer castle in the center, surrounded by a circle of 13 white stars, which indicates the beginning of the American nation and the start of the American expedition. Usually a division is the smallest unit that has its own shoulder insignia.

On October 18, 1917, the 13th took over the operation of the railroads in the French advanced zone and was relieved on February 28, 1919. At the end of 1918 it had moved 1,777

trains, carrying millions of men, including many who were wounded, and 9,230,080 tons of freight, as well as the private trains of President Poincare, General Pershing, Secretary Baker and others. The 13th was operating, on the day the armistice was signed, 229 kilometers (138 miles) of track supplying the Argonne, Verdun and St. Mihiel fronts.

As part of the railroad was within range of the German artillery and all of it within range of heavy explosives and machine guns of airplanes, the men were obliged to run the trains and repair the track under constant fire. Twenty-four immense railroad guns were firing along this line. One track was used for ammunition and the other for supplies.

Several members of this regiment received special recognition. In his letter forwarding the decorations, General Pershing said: "The cheerfulness, adaptability, loyalty and self-sacrificing devotion to duty uniformly displayed under trying circumstances by officers and men from the regimental commander to the most recently arrived private have added a new luster to the traditions of our railway service."

American Welding Society to Be Organized

An association known as the American Welding Society will be organized at the Engineering Societies building, New York, at 10:30 a. m., March 28, 1919. This society will merge the welding committee of the Emergency Fleet Corporation and the National Welding Council, and its purpose is to provide a disinterested and dependable source of information on welding, not only for the benefit of the manufacturers of welding apparatus and supplies, but also to aid those who use welding in their production and those who purchase welded goods. The society will bring together in the manner usual for scientific societies persons from all branches of the industry, who may be interested in any of the welding processes. It is proposed that the society will create and assist in maintaining a Bureau of Welding which will be a separate organization designed to take advantage of the principle of co-operation in research and standardization. The American Bureau of Welding will consist of a joint board of directors, 30 from the American Welding Society and one each from the various scientific and engineering societies, including the American Railway Association, and one each from the United States Commerce, Navy and War Departments and the United States Shipping Board.

Membership in the American Welding Society is divided into five classes: Class A, sustaining members, annual dues $100; open to one or more representatives from each corporation interested. Class B, annual dues $20; open to individuals who may or may not be employed by corporations, and to consulting engineers, college professors, etc. Class C, annual dues $10; open to members of existing societies which will become affiliated with the new society through the proposed Bureau of Welding. Class D, annual dues $5; open to welding artisans. Class E, open to trade associations, putting them in the same category as corporations. Class F, honorary members. Class C and D memberships do not carry the privilege of voting or holding office.

The activities of the society will include the promotion of research work on problems of common interest to all or groups of the membership, including the financing of such projects; the consideration of questions of standardization, which it is proposed shall be handled in co-operation with the American Engineering Standards Committee through the agency of the Welding Bureau; the exertion of a steadying and unifying influence on legislation affecting welding by supplying law makers with authentic information, and the study of proper methods of training autogenous welders.

It is reported that already a large number of corporations and engineers are interested in the project, including officers and members of many of the national technical and engineering societies, universities and engineering schools, government departments and bureaus, gas and electric welding companies, and shipbuilding, steel and automobile companies. Those interested in the proposed organization should address H. C. Forbes, secretary, American Welding Society—Temporary Association, Engineering Societies building, New York City.

Traffic News

Coal loading for the week ended February 22 amounted to 155,935 cars, as compared with 230,599 for the corresponding week of 1918. Estimated reports for the week ended March 1 show a total of 162,666, as compared with 241,073.

A decrease of 33.9 per cent is reported in the number of cars loaded with grain during the month of February on the roads comprising the Central Western region, as compared with the records for the same period last year. During this period in 1919 29,668 cars of grain have been loaded, as compared with 44,907 cars during the corresponding month last year. There was also a decrease of 33.7 per cent in the number of cars of coal loaded, the cars totaling 82,219, as compared with 124,040 cars during the month of February, 1918. During the same period this year, 51,342 cars of livestock were loaded, as compared with 51,181 cars last year.

Hon. F. K. Lane, Secretary of the interior, announces further progress during the month of February in the classification of public lands by the Geological Survey. Under the stock-raising homestead law, permitting entries of lands chiefly valuable for grazing and the raising of stock in tracts of 640 acres or less, lands were designated during February as follows: Colorado, 87,540 acres; Idaho, 46,215 acres; Montana, 390,791 acres; Oregon, 92,686 acres; Wyoming, 525,662 acres. The total area designated for the month was 1,142,894 acres. Over a half million acres of land were designated under the enlarged-homestead act, permitting entry in areas of 320 acres or less. These areas lie in Colorado and North Dakota. By this action the total area classified as nonirrigable and designated for entry under this act was increased to more than 285,000,000 acres.

The Western Freight Traffic Committee has docketed with the St. Louis, and New Orleans district freight traffic committees the question of rates on packing house products and fresh meats in peddler cars from Oklahoma City, Okla., to Southern Pacific points in Louisiana. The action is taken on the request of interested shippers. The committee has also docketed with the Denver, Kansas City, and Dallas committees the question of rates on slack coal from Colorado and New Mexico producing points to El Paso, Tex. The request is for 75 per cent of the lump coal rates. Acting again on the request of interested shippers the committee has also docketed with the St. Louis committee the question of revising the rates on petroleum from the Ardmore-Lawton, group to northern destinations to the basis of 3½ cents instead of 5 cents over the rates from northern Oklahoma. The St. Louis District Freight Traffic Committee, in announcing synopses of its dockets of March 6 to be considered by the committee, includes one which provides for rates on steel rails, cross ties and track fastenings, in straight or mixed car loads. This committee will also consider the cancellation of loading, unloading and weighing charges on livestock at the Independent Stock Yards at St. Louis, Mo.

Activities of the Traffic Clubs

The activities of the Traffic Club of Omaha, Neb., have been taken over by the Traffic Managers' committee of the Traffic Bureau of the Chamber of Commerce of Omaha and the former organization has ceased to exist.

The Traffic Club of the Cincinnati Chamber of Commerce has unanimously elected the following officers: P. J. McLaughlin, traffic manager for the Charles Boldt Glass Company, Cincinnati, chairman; E. H. Smith, vice-chairman, and H. B. Rubey, secretary.

At the meeting of the Akron Traffic Association on February 25, E. V. Conwell, counsel for the American Express Company at Akron, Ohio, spoke on "The Packing and Marking of Freight"; C. W. Barber, agent of the Akron, Canton & Youngstown Railway at Akron, Ohio, on "The Payment of Freight Charges"; R. A. Higham, traffic foreman of the In-

ternational Harvester Company at Akron on "Why is a Traffic Club," and E. C. Knox, traffic manager of the Firestone Tire & Rubber Company at Akron, on "Claims."

Restoration of Export and Import Rates Asked

Restoration of the pre-war basis of export and import rates through Pacific ports was asked by a delegation of representatives of the Pacific coast cities, Seattle, Tacoma, Portland, Los Angeles and San Francisco, at a conference with Edward Chambers, director of the Division of Traffic, at Washington, on March 10. They pointed out that while during the war the cancellation of the rates had little effect, the effect since the signing of the armistice has been to divert a large amount of traffic for the Orient to New York and the Panama canal. Mr. Chambers promised some relief in 10 days.

Chicago Traffic Club Advocates Private Ownership

The Traffic Club of Chicago at a special meeting held on February 25, adopted resolutions opposing government ownership or operation of railroads and favoring their return to private ownership as soon as possible, with legislation to protect the interests of the public and of the carriers. The resolutions also "favor the enactment of suitable legislation which will continue in effect, after the return of the railroads to their owners, the existing rates, fares, and charges pending, their change by the carriers or by proper authority." The resolutions were prepared and submitted by a committee composed of F. B. Montgomery, traffic manager of the International Harvester Company (chairman); Samuel O. Dunn, editor of the *Railway Age;* H. C. Barlow, traffic director of the Chicago Association of Commerce; Oscar F. Bell, traffic manager of the Crane Company; E. L. Dalton, traffic manager of Montgomery Ward & Company; Luther M. Walter, of the firm of Borders, Walter & Burchmore; H. A. Palmer, editor of the Traffic World; F. B. Houghton, traffic manager of the Atchison, Topeka & Santa Fe; F. Zimmerman, traffic assistant to the Chicago terminal manager; W. A. Terry, assistant traffic manager of the New York Central; S. H. Johnson, traffic manager of the Chicago, Rock Island & Pacific, and O. A. Constans, traffic manager of the Baltimore & Ohio.

In order that these resolutions may be properly presented to Congress and to complete arrangements to co-operate if possible with other traffic clubs in this matter a committee on public affairs has been appointed, with F. B. Montgomery as chairman, and Samuel O. Dunn and Oscar F. Bell as members.

Freight Rates to the Orient

A delegation representing Pacific coast ports, Chicago business establishments and inland waterway cities held a conference last week at the Chicago Association of Commerce for the purpose of enlisting the aid of the Railroad Administration in promoting American competition with England in the matter of oriental trade. Resolutions adopted at the meeting urged the United States shipping board to put into effect the rates announced for trans-Pacific business by placing upon the Pacific ocean the vessels of the Emergency Fleet Corporation to carry cargoes at these rates and that the Shipping Board co-ordinate its work with that of the Railroad Administration. Another set of resolutions calls attention to the need of restoring the business of the nation to normal and urges the discontinuance of the "stringent permit system." Under the rates in effect before the government took possession of the railroads, Chicago shippers could send many commodities to the orient at $1.50 per 100 lb. and it is the restoration of this rate that is now asked for.

H. H. Merrick, president of the Chicago Association of Commerce, and H. H. Garver, head of the association's Foreign Trade Bureau directed the course of the meeting. Among those who attended the session were Robert Bridges, president of the Port of Seattle, Wash., Harry Y. Saint, secretary of the Foreign Trade Bureau of the Chamber of Commerce and Commercial Club of Seattle, Samuel J. Wettrick, special counsel for the Seattle Chamber of Commerce, and the following Chicago men: Frank T. Bentley of the Illinois Steel Company, R. R. Hargis, of Wilson & Company, T. T. Bradford of the International Harvester Company, A. C. Owen of Swift & Company, and M. B. Howell, of Montgomery Ward & Company.

Commission and Court News

Interstate Commerce Commission

E. Morris and E. B. Boyd, agents, have filed with the commission a fifteenth section application for a revision of commodity rates from all points in central territory, including Illinois and Mississippi river east and west bank pro-rating points; also Madison and Beloit, Wis., and points grouped therewith, published in tariffs of individual carriers, to points in eastern trunk line and New England territory, including the Virginia cities and points in Canada subject to Boston rates, in order to restore relationships and differential bases existing prior to the issuance of General Order No. 28.

In Commercial Club of Omaha v. Baltimore & Ohio, et al., the commission finds that the 1917 summer excursion fares between Omaha, Neb., and eastern points gave undue preference to Kansas City and St. Joseph, Mo., whence the Chicago & Alton reduced its fares below the normal basis from Kansas City and St. Louis to Chicago and other carriers met the reduction. The commission finds that there is nothing to show that the Omaha rates were unreasonable in themselves. No summer excursion fares were made in 1918, but the decision is expected to deter the carriers from a re-establishment of the unlawful adjustment in the future.

In the case of the Chicago Live Stock Exchange vs. Atchison, Topeka & Santa Fe, et al, the Interstate Commerce Commission holds that the Union Stock Yard & Transit Company of Chicago is a common carrier subject to the provisions of the act to regulate commerce, and that the notice of cancellation of its tariff of charges for loading and unloading live stock in carloads at the Chicago Stock Yards has not been justified. The commission finds that the loading and unloading of livestock is the duty of the shipper, but may be assumed by the carriers in those instances in which their convenience is aided and their equipment conserved by so doing. In the absence of a showing of undue prejudice, how much, if any, of the loading and unloading charges at the Chicago Stock Yards may properly be absorbed by the line haul carriers is dependent upon the degree to which their interests are conserved in any particular instance; and the failure to absorb all of the charges at the Chicago yards, while absorbing such charges at certain other markets, has not been shown to produce undue prejudice.

State Commissions

A "service bureau" has been created by the railroad commission of Texas, at Austin, Tex., in order that individuals, firms and cities may be rendered direct assistance in securing satisfactory railroad service, both freight and passenger.

The governor of New York has recommended and the legislature is expected to pass a law abolishing the Public Service Commission of five members for the first district (New York City), and establishing in its stead a commission of one member for the regulation of railroads and public utilities and another commission of one member to supervise the construction of new subways.

Court News

Employers' Liability Act

The Circuit Court of Appeals, Fourth Circuit, holds that an engine regularly hauling interstate passenger trains was used in interstate commerce when taken out of a train in order that a bolt might be repaired, being placed in the shop and sent out the same day on its regular run, and the employee injured in doing the work was injured while employed in interstate commerce.—A. C. L. v. Woods, 252 Fed. 428. Decided May 7, 1918.

Foreign Railway News

The total number of passengers carried by the five companies controlled by the London Electric Railway Company —including the Metropolitan District, and the General Omnibus Company—last year, is estimated at 901,000,000. This is exclusive of passengers booked through from other railways.

French Railway Striker Sentenced

Midol, secretary of the Railwaymen's Union of the Paris-Lyons-Mediterranean Railway, who, on January 25, caused a strike of one minute's duration on the entire system, has been sentenced to one year's imprisonment, with benefit of the First Offenders' Act.

Rebuild Serb Railroad

Rapid progress is being made in the repair of the main Serbian railway which runs from Belgrade through Nish to Salonika, says a French wireless despatch from Salonika. It is hoped that the first trains will be able to run between the northern frontier and Nish before the end of March. All the bridges and many miles of rail were destroyed by the Germans and the Bulgarians. The repair of the telegraph lines paralleling the railway is nearly completed.

Another Strike in Cuba

The general strike in Cuba has spread, according to advices to the State Department at Washington, last week, until transportation in fully half of the country is tied up. Practically all industries are reported at a standstill.

The latest demands of the unions, the advices said, are that all non-union railroad employees be discharged. In the Havana docks, 500 convicts now are employed as stevedores.

Greece Wants Steel Ties

The Greek government is in the market for 500,000 steel railway ties of 242 pounds weight each, according to the official announcement made by the Canadian Trade Commission, Ottawa, Canadian firms contemplating bidding, the announcement says, must take immediate action as the demand is urgent. American firms are known to be already in the field. The Trade Commission has reason to believe that this may give Dominion manufacturers a chance to use surplus steel and the forging presses which were installed for munitions making, possibly at better rates than their competitors.

Swiss Ocean Projects

The French minister for public works has approved a program adopted by the Superior Council for public works in connection with the improvements to be introduced in the communications by rail between Switzerland and ocean ports. This program includes especially the establishment of a new line between Limoges and St. Germain des Fosses, the improvement of the present express service from Bordeaux to Lyons by the strengthening of the line between St. Germain des Fosses and Lyons, and by the electrification and double tracking of the lines on the Paris-Orleans Railway, and, finally, the electrification of the difficult sections on the Tulle-Clermont-Ferrand line.

Military Railways in France

Replying in the Senate recently to interpellations in regard to supplies, M. Claveille, minister of public works and transports, stated that he had informed the British and United States Governments that the French Government intended to maintain the railway works which their allies had carried out on French territory, under financial conditions which remain to be fixed. The minister also spoke of the work of restoring roads, of which it would be necessary to remake 65,000 miles, and waterways, on which 115 locks and 450 bridges have to be reconstructed, while 60 miles of canals have been entirely destroyed. He added that the Germans had delivered up to the middle of February between 36,000 and 37,000 freight cars and between 1,400 and 1,500 locomotives, or one-half of the material due to France.

International Control of Railroads Proposed

The question of the internationalization of railways and international waterways has come into sudden importance, says a press despatch from Paris, through a report made to the Commission on Waterways, Ports and Railways by its drafting committee. The British desire to have the waterways used without discrimination, while the Americans, realizing the effect the application of this principle might have upon their great railway systems, are insistent upon confining the application of the principle of international use of such communications to special cases to be enumerated, and especially to new states.

The Czechoslovaks and the Poles are disposed to resist the international use of their communications unless reciprocal privileges are allowed to them.

Equipment for Mexican Railroads

According to advices from the City of Mexico, the Carranza government has ordered the purchase of 200 passenger cars for the National Railways of Mexico. The cars will be bought in the United States and will be used to replace the equipment that was destroyed during the protracted revolutionary period. The government also plans to place a large order for freight cars in the United States in a short time. The shops of the railroad are building and repairing freight cars as rapidly as possible, but the additions do not begin to meet the demands of traffic. It is reported that the government will prohibit the operation of private freight trains upon the railroad lines of the country as soon as the shortage that now exists in equipment is filled. Several mining and other industrial companies have been operating their own trains for some time past.

Chinese Railroad Problems

Associated Press despatches from Peking Monday report that influential Chinese interests which have been opposed to the plan for unification and internationalization of the Chinese railways are relaxing somewhat in their opposition to the plan. The Japanese official opposition, however, is still in evidence.

It was announced Monday, says the despatch, by the Chinese Minister of Communications that the government would agree to the internationalization of the Shantung and South Manchurian (Japanese); the Chinese Eastern (formerly Russian), and the French Yun-Nan railways, but would object to the internationalization of the railways under Chinese government control. Another suggestion is that China be admitted to the banking group, being credited with a certain proportion of the advances made as were Russia and Japan when they were first admitted to the coalition of interests.

Danish Railways Need Equipment

No new railroads have been built in Denmark during the war, and no new lines or extensions planned, says Consul B. L. Agerton, writing from Copenhagen on January 8. Additional tracks are being laid in some places, but materials are not available for very much work of this kind. The track and roadbed of the Danish railways are in fairly good condition, but the rolling stock is insufficient and in bad repair. During the summer and fall, when traffic is heaviest, there is a great shortage of rolling stock, both of cars and of locomotives. These are normally purchased abroad, but during the war no deliveries have been possible. In November the State railway ordered 700 freight cars and 9 parcel-

post cars from the Danish factory "Scandia," of Randers, Denmark. This factory, however, is not yet in a position to complete any of the cars, because of a lack of materials. The railroads themselves have undertaken to purchase the wheels and axles elsewhere.

[The railways of Denmark are almost entirely state owned. The State Railways operate about 1,300 miles, all of standard gage. The equipment consists of 625 locomotives, 2,234 passenger train cars, and 10,361 freight cars, as well as marine equipment in the form of 24 steam ferries and 7 steamboats.]

Hoover to Be Made Director General of Austrian Railroads

The Supreme War Council, according to despatches from Paris Saturday, has decided to give Herbert C. Hoover, director general of Allied relief, practical control of all the railways in the old Austrian Empire and to make him the mandatary of the council in demanding locomotives and freight cars from each of the new states of old Austria with which to create a food and relief service. The relief train will run over all lines without political or military interference. The service will be under the relief administration, headed by Mr. Hoover.

Mr. Hoover has placed the matter in the hands of American army engineers for execution. The engineers have been detailed by General Pershing.

The decision of the council amounts in effect to making Mr. Hoover director general of the Austrian railway system in the carrying out of relief work.

Five new states have arisen within the area of old Austria, and all have agreed, says the despatch, to place the entire question of the distribution and management of the railway rolling stock in Mr. Hoover's hands.

Later despatches say that Col. Ryan of the American Army has been appointed executive officer in charge of the work. He formerly was a railway manager in the United States.

Col. Ryan will be assisted by liaison officers of various allied nationalities and will cooperate with the allied food mission at Triest.

English Channel Tunnel Project Revived

The driving of the tunnel under the English Channel to France is being considered by the government as among its projects for after the war, according to announcement by Bonar Law, who speaking in the House of Commons Monday, said he was discussing the matter with Premier Lloyd George as a means of finding employment for discharged soldiers.

The Daily Mail claims to have definite information that the British and French governments have agreed to the construction of a tunnel under the Channel, and that the details are now being discussed by a special commission in Paris, which also is considering the building of tunnels under the Bosporus and the Strait of Gibraltar.

The engineering plans for the Channel tunnel, according to the Daily Mail, are so far advanced that work could be begun immediately.

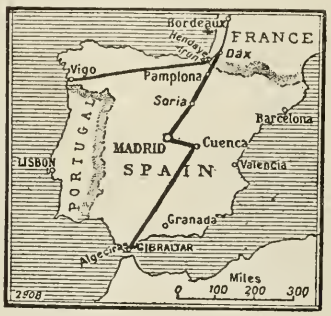
"It is proposed," says the Daily Mail, "to start the tunnel some distance inside both countries, instead of near the coast, as was originally intended, so as to avoid the risks of a fall of the cliffs, such as already has occurred on the British side near the point where the work would have been begun.

"In addition to tracks, the tunnel will carry telephone and telegraph wires, superseding the present sea-bed cables, and also pneumatic tubes for carrying letters and parcels. The French and British railroads concerned are willing to finance the scheme, but the two governments wish to exercise control and some sort of joint state finance for the work may be adopted."

Speaking of the tunnel the Railway Gazette (London), a few weeks ago, said: "Estimated to cost $80,000,000, a mere trifle in these days of gigantic expenditure, there is no possible doubt that the capital would speedily be forthcoming on the project receiving government approval. It is to be hoped that constructional operations will soon commence, for this essentially important traffic link between England and the continent has been too long delayed. The cross-channel train ferry service now running with success constitutes some little endeavor to improve the means of communication, but, even under the best conditions, a train ferry is a very poor substitute for a physical connection."

London to Gibraltar via Spain

Considerable interest is being manifested in Spain, says a correspondent to the Times (London) in two great railway projects. The first, already voted as a Bill by the Spanish Senate, is for a direct line from Dax, in Southern France, to Algeciras, near Gibraltar. This line is a project of the English and French Governments, and will form a link in the great railway from London to the Cape, the completion of which is now only a matter of time. This line across Spain will be of the international and not of the Spanish gage; it will be worked by electric traction, and will take the shortest possible route.



Many schemes have been prepared, says the Times' correspondent, but, although the final decision has not yet been made on many points of detail, the broad principles have been agreed upon. The northern section of the line, from Dax to Madrid, to avoid unnecessary competition with the Norte Railway from Irun, will not touch the points of junction from which that line draws its chief goods traffic, and will pass direct through Pamplona and Soria. The southern section, in the plan which seems most likely to be approved, will for similar reasons take a straight course through a practically uninhabited part of the country.

It is proposed to make only one stop between Madrid and Algeciras, at Cuença, where—as the line will be, at first at any rate, a single one—the trains from the north and south will cross. The northern journey will be made in six to seven hours, as against the present 13 from Irun to Madrid.

The other line is designed to run from Vigo to the French frontier, probably at Hendaye, and is part of a great American project for developing the port of Vigo by the building of docks, warehouses, and all the equipment of a great commercial harbor. By this scheme, the journey from New York to Paris can be shortened by 24 hours, and its importance can be measured by the fact that its realization will give America a commercial entrance to Europe. It is being warmly supported by Spanish capitalists and the industrial interests of the north.

The vast contracts connected with these schemes are already the subject of rival studies and investigations, and English firms, proposing to take a part, the correspondent says, should lose no time in getting into touch with the conditions on the spot.

[Further details concerning these projects will be given in early issues of the *Railway Age*.—Editor.]

Revival of International Services

The re-establishment of the Paris-Bucharest and Paris-Warsaw services, in addition to those between France and Belgium, not to mention the service now maintained to and from Cologne, for the use of the allied armies, serves, says the Railway Gazette (London), as a graphic reminder of the extent to which international routes which have been suspended for the duration of the war are now being brought into use again. Germany and Austria, from their central position, afforded the shortest and most convenient routes for many of the international European expresses running between west and east, and, as in the case of Switzerland, the international transit traffic represented an important source of revenue to their railways. The future of these

services represents a problem of the greatest interest, on which definite prediction would be dangerous at the moment, since so very much depends not only on the territorial adjustments, re-drawing of boundaries, and emergence of new states coming under the purview of the Peace Conference, but also on the future forms of government adopted by the German and Austrian States, which have hitherto enjoyed sovereign powers. One prediction seems, however, safe to make, and that is that within the next few years Italy will handle a larger proportion of the international transit traffic than has been the case in the past. Apart from the very obvious reasons for giving preference to an allied nation, one has to bear in mind the emergence of new routes to the near east, and the schemes for electrifying and otherwise improving traffic conditions on the Italian railways.

Inter-Allied Committee for Trans-Siberian Formally Organized

Allied control of the trans-Siberian railway has been effected, says an associated press despatch from Vladivostok, by the formal organization of interallied, technical and military committee, the result of negotiations of more than six months. M. Oustrougoff, minister of communications in the Omsk government, heads the interallied committee, and John F. Stevens, the American railway expert, the technical committee. The United States is represented on the interallied committee by C. H. Smith, once of the Missouri Pacific railroad, and on the military committee by Col. Gallagher, quartermaster of the American expeditionary forces.

Other representatives on the interallied and technical committees follow: Great Britain, M. Elliott, commissioner at Omsk, and Col. Jack; France, M. Bourgeois and Col. Le Veuvre; Italy, Signor Gasco Mater and Signor Garibaldi; Japan, acting, Matsudaira, and Hampei Nagao; China, Iiu, former minister to Petrograd, and Dr. Jeme Tien-you.

The authority of Mr. Stevens is absolute concerning actual operation of the railroad. He is at liberty to employ American, Russian and allied operatives at his discretion and has a free hand in technical matters. The interallied committee is to control the rates and the economic policy. The military committee is charged solely with the co-ordination of military transportation and policing the line. It has no voice in the local management.

Advices to Washington report that American Ambassador Morris, who has been attending the sessions of the Inter-Allied Committee on the Supervision of Siberian Railways at Vladivostok, has returned to his post at Tokio.

Despatches to the State Department announcing his return said that Col. Emerson, inspector-general of the American engineers, had installed an improved system of telephone communication on the Siberian lines.

Traffic and Rolling Stock Conditions in Germany

The same unsatisfactory, retrogressive conditions which at present prevail in most German industries manifest themselves in locomotive and wagon construction, says an article in Engineering (London).

The main and auxiliary workshops of the Prusso-Hessian railways employed before the war 70,300 hands, which number gradually was doubled during the war, amounting in the beginning of 1918 to 140,140 hands. In spite of this increase in the number of employees, the capacity of the works has materially decreased. It is stated that during the summer of 1918 as many as 950 locomotives were delivered duly repaired per week, while the number had receded to 680 per week in the beginning of 1919. The shortage of materials is not so pronounced at these works as at the private concerns, since the Railway Department still has considerable stocks. The lack of copper caused much difficulty during the war in the repair of locomotives, and certain parts which were formerly always made of copper had to be made of iron.

Demobilization has, to a great extent, mended matters and, besides, a fair amount of copper is said now to be available. The private concerns have had greatly to reduce their output. One of the largest undertakings in this branch in North Germany was not able to deliver a single locomotive during December, although the number of hands employed had been materially increased. A number of new firms have taken up the repair of locomotives, but seem to have to contend against a considerable amount of technical difficulties. The Prussian Department for Public Works has placed contracts for an amount of 1,600,000,000 marks (about $320,000,000), and altogether 3,300 locomotives and 71,000 wagons have been ordered.

The Berlin Tramways have recently contracted for a large number of cars and trailers, principally with the Hannover Wagon Company which, being outside the combine, accepts lowet prices than the works within the ring. These works have orders for 100 driving cars and 100 trailers, the former being about 250 per cent and the latter 100 per cent dearer than before the war.

[The above will supplement information given in this column in the *Railway Age* of January 17, 1919, page 228.]

Speaking more particularly of traffic conditions, another item in the same issue of Engineering says: From all accounts the rolling-stock of the German State Railways is in a deplorable condition, which applies both to the engines, the passenger carriages and the goods wagons, and the revenue is at the same time dwindling down. For November, 1918, the passenger traffic certainly showed an increase in receipts of 10,485,000 marks, compared with the same month of the previous year, but the rates had in the meantime been raised 10 per cent. The receipts from the goods traffic showed a decrease of 40,950,000 marks, or 24.16 per cent, compared with November, 1917, in spite of the rates in the meantime having been raised 15 per cent. As a result, the receipts were, on the whole, 30,465,000 marks, or 12.86 per cent lower than for the corresponding month the previous year. Some minor receipts from other sources reduced the deficit, as compared with the same months the previous year, to 27,890,000 marks, or 10.49 per cent.

The British Railway Labor Situation

The agreements which ended the strike on the London tube railways, on February 8, by no means settled the labor disputes on those lines and still less on the rest of the British railways. They were only temporary devices, says the Times (London), to bridge over the period between February 1, when the railwaymen's eight-hour day came into operation, and the time when a more permanent plan can be effected. What that permanent plan will be, no one can say. It has yet to be discussed, in connection with other far-reaching questions affecting the conditions of service and wages of railwaymen, at joint conferences between the Railway Executive Committee and the Executive Committees of the Railwaymen's Unions.

Though the cabinet has laid down that the eight-hour day which it conceded was to be a working day of eight hours, exclusive of meal times, the railwaymen's leaders still believe that the whole question of the exclusion or inclusion of meal times can be reopened.

Apart from the question of working hours, there are other issues of first importance which the railwaymen are raising in the conferences. They can best be stated in the form of summaries of the national programmes formulated by the three great unions of railway employees, the N. U. R. (with 400,000 members), the Locomotive Engineers and Firemen (40,000), and the Railway Clerks' Association (70,000).

The following summaries, taken from the Times (London), will outline the railwaymen's demands:

National Union of Railwaymen

(1) That all advances given as war increases (originally called "bonuses" and later "war wages") be converted into permanent wages;

(2) That eight hours constitute a working day, and 48 hours a working week;

(3) That double time be paid for all overtime and for Sunday duty, and time and a half for night duty;

(4) That the period of rest between each turn of duty be not less than 12 hours;

(5) That 14 days' holiday with pay be allowed annually;

(6) That conditions of service be standardized on all railways in the United Kingdom; and

(7) That there be equal representation, both national and local, for the union on the management of all railways.

LOCOMOTIVE ENGINEERS AND FIREMEN

(1) That the standard rates of pay be: Enginemen and electric motormen, 14s. a day; firemen and electric trainmen, 10s.; cleaners and electric train gatemen, 7s.

(2) That 10 per cent be added to the standard rates of every 10 per cent increase in the cost of living from June, 1917, and reductions to be on the same basis; but no reduction if the cost of living falls below the figure for June, 1917.

(3) That a special rent allowance of 5s. a week be granted to men in London and other expensive centres.

(4) Eight hours a day.

(5) That time and a quarter be paid for overtime and night duty, and double time for Sunday duty.

(6) At least 12 hours' rest between turns at home station; nine hours when booked away from home station.

(7) Lodging allowances of 2s. or 3s. a day away from home.

(8) That 14 days' annual holiday, with pay, be allowed after 12 months' service.

RAILWAY CLERKS' ASSOCIATION

(1) A 38-hour week for day workers and a 34-hour week for night workers.

(2) A scale of minimum salaries beginning at £70 a year for a boy of 16 and rising by regular increments to £230 for a man of 28, with an additional £20 throughout the scale for clerks employed in London.

(3) A further scale, ranging from £250 to £1,000 a year, for stationmasters, goods agents, and others holding positions of more than ordinary responsibility.

It should be explained, says the Times, that had the war not intervened, the hours, wages, and conditions of service of railwaymen would have come up for revision in the normal course four years ago. In October, 1914, however, a truce agreement was entered into by the N. U. R. and the Locomotive Engineers with the railway authorities, providing for the continuance of the 1911 Conciliation Scheme and a stereotyping of "all existing contracts and conditions of service" during the suspensory period. The truce agreement has now been determined. The position of the Conciliation Scheme is obscure, but presumably it has ended with the truce, and the Railway Executive Committee, under the authority of the Board of Trade, is to embark on the negotiation of the railwaymen's programs on a national basis.

The outstanding item in the programs, of course, is the demand of the N. U. R. that "war-wage" advances shall be made permanent. Those advances now aggregate 33s. a week. As they were made under the truce agreement, it could be contended by the Government that they cease with the agreement. There is, however, a clause in the agreement made on August 8, 1917 (when "war bonus" was converted into "war wages") which provides that the additional wages "are to be regarded as a war advance intended to assist in meeting the increased cost of living, and are to be recognized as due to and dependent on the existence of abnormal conditions now prevailing in consequence of the war."

The following table shows the various stages by which the "war wage" was raised to 33s. a week (16s. 6d. in the case of employees under 18 years of age):—

	Men s. d.	Boys s. d.
October, 1914	3 0	1 6*
October, 1915	2 0	1 0
September, 1916	5 0	2 6
April, 1917	5 0	2 6
November, 1917	6 0	3 0
April, 1918	5 0	2 0
September, 1918	5 0	2 6
November, 1918	3 0	1 6
Total	33 0	16 6

*June, 1915.

On the occasion of the last advance a scheme was adopted, with the concurrence of the Board of Trade, under which the war wage should thereafter be regulated by a sliding scale based on the cost of living as shown in the official Board of Trade returns. The program of the Locomotive Engineers' Society, it will be noted, provides for a continuance of this scheme, and is a less extreme demand than that of the larger union.

Australia Bars Importation of Goods Not of British Origin

Press despatches from Melbourne, under date of March 8, report that the minister of customs of the Commonwealth of Australia has issued a proclamation prohibiting the importation into the Commonwealth of all goods other than those of British origin. The reason for this action is not explained in the despatches.

Equipment and Supplies

Representatives of car and locomotive companies who attended a conference with Director General Hines on Thursday morning included Andrew Fletcher, president, American Locomotive Company; S. M. Vauclain, vice-president, Baldwin Locomotive Works; Mr. Dixon, vice-president, and Mr. Larson, treasurer of the Lima Locomotive Company; W. W. Woodin, of the American Car & Foundry Company; J. W. Bettendorf, president, Bettendorf Company; D. B. Gehly, treasurer, Cambria Steel Company; C. A. Liddle, vice-president, Haskell & Barker Company; E. S. S. Keith, of the Keith Car & Manufacturing Company; J. E. Johnson, vice-president, Laconia Car Company; H. W. Miller, vice-president, Lenoir Car Works; Mr. Joyce, of the Liberty Car & Equipment Company; R. J. Magor, of the Magor Car Corporation; W. C. Arthurs, of the Mt. Vernon Car Manufacturing Company; Mr. Pigett, president, Pacific Car & Foundry Company; J. E. Ralston, president, Ralston Steel Car Company; J. N. Hansen, president, Standard Steel Car Company, also representatives of McGuire, Cummings Manufacturing Company; the Pressed Steel Car Company, and the Pullman Company.

At the conference, Director General Hines gave assurance that there was no cause for alarm and that the situation would be met, but he was not prepared to state just what plan would be adopted. Several of the representatives will stay over to discuss the matter with him later. While warrants could be issued to equipment builders, it is possible that an effort will be made to have the banks carry them so they can pay for the materials, labor and specialties.

Reduction in Steel Prices

A reduction in price of 4 per cent below the prices agreed upon last summer by the government and the American Iron & Steel Institute has been fixed for the steel castings used on the cars and locomotives ordered by the Railroad Administration, by the price-fixing committee of the War Industries Board, after negotiations with the steel casting manufacturers.

The prices as fixed are as follows:

BOLSTERS (BODY OR TRUCK)

Capacity car	Quoted price	Reduction	Revised price
30-ton	$87.50	$3.50	$84.00
40-ton	99 50	3.98	95.52
50-ton	108.50	4.34	104.16
57½-ton	118.50	4.74	113.76
62½-ton	130.00	5.20	124.80
70-ton	165.00	6.62	158.88

TRUCK SIDE FRAMES

FREIGHT CARS AND LOCOMOTIVE TENDERS

Capacity car	Quoted price A*	Quoted price P†	Reduction A*	Reduction P†	Revised price A*	Revised price P†
30-ton	$118 50	$124.50	$4.74	$4.98	$113.76	$119.52
40-ton	129.50	135.50	5.18	5.42	124.32	130.08
50-ton	139.50	151.50	5.58	6.06	133.92	145.44
57½-ton	154.50	166.50	6.18	6.66	148.32	159.84
62½-ton	170.00	181.00	6.80	7.24	163.20	173.76
70-ton	175.50	201.50	7.02	8.06	168.48	193.44

*Andrews design. †Pedestal design.

Locomotive and Car Deliveries

New cars were accepted during the week ended March 1 as follows:

Road	Number	Type	Manufacturer	Total accepted for given roads
A. C. L.	157	40 Ton D. S. Box	Am. Car & Fdy. Co.	456
C. C. C. & St. L.	33	40 Ton D. S. Box	Am. Car & Fdy. Co.	250
P. McK. & Y.	148	50 Ton S. S. Box	Am. Car & Fdy. Co.	430
C. C. & O.	61	50 Ton S. S. Box	Bettendorf Co.	61
N. Y. C.	147	50 Ton S. S. Box	Haskell & Barker	625
L. & N.	33	50 Ton Comp. Gond.	Am. Car & Fdy. Co.	336
L. & N.	21	50 Ton Comp. Gond.	Std. Steel Car	200
N. C. & St. L.	58	50 Ton Comp. Gond.	Am. Car & Fdy. Co.	58
N. Y. C.	112	70 Ton L. S. Gond.	Pressed St. Car	145
Total	770			

The following new locomotives were shipped during the week ended March 1:

Works	Road	Number	Type
American	Erie R. R.	4	USRA Santa Fe
	Penn. La. W.	5	Santa Fe
	Monongahela	10	USRA Mikado
	Chic. Great Western	2	USRA 6W. Sw.
	Grand Trunk	1	USRA 6W. Sw.
	Cent. of Georgia	1	Mallet
		23	
Baldwin	A. T. & St. F.	3	Mikado
	Lehigh Valley	3	Pacific
	Great Northern	2	8W. Sw.
	Car. Clinchf. & Ohio	3	Mikado
	B. & O.	2	USRA Mikado
	Phila. & Reading	1	Consol
	Great Northern	1	Mikado
	Chic. Burl. & Quincy	1	Mikado
	Ill. Cent.	1	Mikado
	Penn. R. R.	1	Mikado
		18	
	Total	41	

127 locomotives were delivered during February to the railroads under federal control, in addition to eight miscellaneous domestic and 164 foreign locomotives.

Freight Cars

THE LIBERTY STEEL PRODUCTS COMPANY, New York, is inquiring for 100 small industrial flat cars for 18 in. gage.

Iron and Steel

THE PENNSYLVANIA EQUIPMENT COMPANY, Philadelphia, Pa., is in the market for 2,500 tons of 45-lb. relaying rails.

BRITISH INDIA is in the market for 800,000 tons of rails, also splices, bolts and angles, to be delivered in 1919, 1920 and 1921, according to a cable received by the Canadian Trade Commission in Ottawa, from the Canadian Mission in London, with which it is in co-operation. While this order will doubtless be filled largely by British and Canadian firms, it is interesting as indicating the transportation expansion and rehabilitation which is to come about in the most populous of British possessions.

Signaling

LEHIGH VALLEY.—This company has ordered from the General Railway Signal Company, a mechanical interlocking, 16 levers, for Vosburg, Pa., and a smaller machine for Carney, Pa.

THE MONONGAHELA SOUTHERN has contracted with the Union Switch & Signal Company for the erection of two electro-pneumatic interlocking plants, one a 27-lever frame for controlling 40 functions to be located at Wilson, Pa., the other a 15-lever frame for controlling 18 functions to be located at Clairton Junction, about one mile from Wilson.

THE UNITED RAILWAYS & ELECTRIC COMPANY, Baltimore, Md., has awarded a contract to the Union Switch & Signal Company for the installation of an electro-pneumatic interlocking at Sparrows Point, Md., at a junction of its own lines and a crossing of one of these lines with the Pennsylvania. The machine will have a total of 11 levers for controlling 21 functions. Alternating current track circuits will be installed. The Electric Company's lines will have color light signals and the Pennsylvania will be equipped with position light signals.

THE HYDRO-ELECTRIC POWER COMMISSION of the Province of Ontario, Canada, has placed an order with the Union Switch & Signal Company, Swissvale, Pa., for the installation of a complete electro-pneumatic interlocking plant. The Power Commission is excavating for a canal to carry water from the Niagara river above Niagara Falls to a hydro-electric plant twelve miles away. The rock and earth from this excavation is being carried away by trolley trains, and it is on the trolley line that the interlocking is to be placed. It is estimated these trains will run through this interlocking at the rate of one every 90 seconds. Signal indications will be displayed by means of color light signals.

Supply Trade News

Malcolm Gifford, president of the Gifford-Wood Company, manufacturers of ice harvesting machinery and elevator conveyances, died on Wednesday, March 5, at Hudson, N. Y.

A. G. Jablinski has been appointed chief engineer of the **American Crane & Engineering Company,** with headquarters in the Nasby building, Toledo, Ohio. Mr. Jablinski was formerly with the Browning Company, of Cleveland, Ohio.

J. E. Slimp, who has for many years been connected with the sales department of the Ohio Brass Company, Mansfield, Ohio, has resigned to become associated with H. C. Dodge, of Boston, who is at the head of several manufacturing companies in New England. Mr. Slimp will remain with the Ohio Brass Company until approximately April 1.

Edwin Besuden has been appointed eastern district manager of the railway department of the Chicago Varnish Company, in charge of steam and electric railway sales. His headquarters are at 50 Church street, New York. Mr. Besuden was formerly sales manager of the Jewett Car Company and was connected with that company for 16 years.

O. Edwin Berggren, whose appointment as Northwestern representative of the A. G. A. Railway Light & Signal Company, with headquarters at Chicago, was announced in the *Railway Age* of March 7, (page 564), was born in Chicago on August 1, 1881, and received his education in the Chicago grammar schools and a business college at Chicago. Mr. Berggren began his business career in the passenger department of the Northern Pacific at Chicago in March, 1900, where he remained for two years and then entered the freight department of the Wisconsin Central, at Chicago. From 1904 to 1907 he was in the sales department of the Pullman Company, and the following five years was connected with the John Peirce Company, Chicago, in the construction of buildings, resigning from that company to enter the employment of the H. W. Johns-Manville Company in the railroad and contract departments, at Chicago. Later he became associated with the International Refrigerating Manufacturing Company as traveling representative, in which capacity he continued for two years, after which he was employed by the Ford Manufacturing Company in the same capacity. Previous to his appointment as Northwestern representative of the A. G. A. Railway Light & Signal Company, Mr. Berggren was in the service of the Construction Material Company at Chicago as traveling representative.



O. E. Berggren

John B. Canfield, who since March 1 has been associated with the Harley Company of Springfield, Mass., as special representative and counsel, commenced work in mechanical lines with the Boston & Albany, at Boston, Mass., in 1885, as machinist apprentice. He continued with the railroad as foreman machine shop, general foreman locomotive department and master mechanic of the Albany and Boston divisions, severing his connection with railroad work in 1916, after a continuous service of 30 years. In 1906, while in the railroad service as master mechanic at Boston, Mass., Mr. Canfield enrolled as a law student in the Boston Evening Institute, now the Northeastern College of Law, graduating in June,

1910, with the degree of LL.B., and was admitted to the Massachusetts bar September 23, 1910. At the time of his coming to the Harley Company, he was actively engaged in the practice of his profession at Springfield, Mass. During the war he served as major of engineers, and was commanding officer of the Sixth Battalion, 21st Engineers, being honorably discharged in January of this year.

George K. Heyer is the new assistant telephone sales manager of the Western Electric Company, having been advanced from the position of railway sales engineer. He has been an employee of the company since 1902, and always has been in New York. He will remain there as his headquarters will be at 195 Broadway. **E. V. Adams** succeeds G. K. Heyer as railway sales engineer of the Western Electric Company. He has been a Western Electric man since 1910, when he began in the railway sales department of the Chicago house. He was transferred to St. Louis in 1912, and the following year went to New York, where his headquarters will remain.

B. W. Matthews has been elected a director and a vice-president of the Joseph Richards Company, advertising specialists, New York. Mr. Matthews was graduated from Stevens Institute of Technology in 1908, having obtained some business experience by spending his summer vacations in the office of the principal assistant engineer of the Pennsylvania Railroad, Jersey division. From 1908 to 1910 he was an assistant engineer in connection with the building of the Belmont Tunnel in New York. For the two following years he was connected with the Bausch & Lomb Optical Co., Rochester, N. Y., as advertising and sales manager of the engineering instrument department. The next year he was advertising manager of the Keuffel & Esser Co., Hoboken, N. J., and in 1913 joined the service staff of the Simmons-Boardman Publishing Co. During this period, Mr. Matthews made the best of an opportunity to study the economic utility of various railway supplies from an advertising and sales standpoint, especially machinery and shop equipment, his studies taking him into some of the largest industrial plants and railroad shops in the United States. In February, 1917, Mr. Matthews joined the staff of the Joseph Richards Company. In the analysis and plan for the advertising of almost any kind of product, the need of a trained technical mind is now generally accepted. Mr. Matthews' education and business experience has been very largely along these lines.

LaSalle Portland Cement Company Sold

The plant of the LaSalle Portland Cement Company, LaSalle, Ill., formerly the German-American Portland Cement Works, was sold on March 11 by representatives of A. Mitchell Palmer, alien property custodian. The controlling interest in the stock was bid in by a group of cement manufacturers headed by A. C. Dustin of the Sandusky Cement Company of Cleveland, O., plants and including other successful bidders were A. Y. Gowen, vice-president of the Lehigh Portland Cement Company, Chicago, Charles Voettcher, president of the Cement Securities Company, Denver, Col., and C. H. McNiden, president and general manager of the Northwestern States Portland Cement Company, Mason City, Ia. The German-American Portland Cement Works was organized on December 5, 1899, with an authorized capital stock of $450,000. The book value of the stock, as determined on January 31, by certified public accountants is about $983,000 while the total value, according to the price paid at the sale is $1,287,000 or about one third more than the book value. Of the 4,500 shares of stock, Mr. Dustin and the interests he represents purchased 3,687 shares.

The Bucyrus Company

According to the annual report of the Bucyrus Company of South Milwaukee, Wis., the net earnings for the year ending December 31, 1918, were $658,403, after the deduction of a sum approximating the probable tax requirements under the war revenue act. During the year a one per cent dividend was paid quarterly on the preferred stock or a total paid during the year in dividends of $160,000. The earned surplus at the end of the year was approximately 42 per cent of the preferred stock issued as compared with 30 per cent a year ago and the accumulated unpaid dividends thereon aggregated 25 per cent at the same date after deducting the dividend payable January 2, 1919.

W. W. Coleman in his statement to the stockholders said in part: "The high prices of materials, the relatively large volume of business and the necessity of financing the gold note issue authorized by the Board of Directors on May 29, 1917 (maturing June 15, 1918) at its maturity required the use of considerable sums of money and introduced larger problems of finance than the company has had occasion to deal with in previous years; the conservation of cash resources which has been the policy of this company made it possible to meet the requirements of the situation by current borrowing at favorable interest rates * * * The total shipments for the year were slightly in excess of those of the previous year."

The company has been extensively engaged in war work, especially in the building of "mobile derricks" and locomotive cranes for the U. S. Engineer Department, and in the machining and assembling of light artillery for the government. The cancellation of government contracts after the signing of the armistice found most of the contracts held by the Bucyrus Company practically completed or in such condition that no extremely difficult complications or serious disorganizations of working forces were involved and therefore the claims for adjustments to be presented to the government are not considerable in amount.

The balance sheet is as follows:

ASSETS

Cash		$212,744
Accounts and bills receivable		1,704,760
Inventories		3,158,603
Payments made on company and employees' subscriptions to Fourth Liberty Loan, other Liberty Bonds and War-Savings Certificates	$147,977	
Less bank loans therefor	104,160	
		43,817
Dominion of Canada Victory Loan Bonds		24,525
Land, buildings, machinery, patterns, securities, patents, etc.		6,700,554
Total		$11,845,003

LIABILITIES

Bills payable		$985,000
Accounts payable		373,045
Advance payments received		89,028
Preferred dividend payable January 2, 1919		40,000
Accrued taxes and sundry reserves		537,872
Capital Stock:		
*Preferred (Auth. $5,000,000) issued	$4,000,000	
Common (Auth. $5,000,000) issued	4,000,000	
		8,000,000
Surplus as at December 31, 1918		1,820,058
Total		$11,845,003

Good Field Abroad for Electrical Machinery

E. M. Herr, president of the Westinghouse Electric & Manufacturing Company, believes that a reduction in the present high scale of wages to make possible a reduction in prices is necessary if the manufacturers of this country are to retain and to expand their foreign trade. He says, in a statement issued Monday by the American Manufacturers' Export Association, of which he is a director, that in his industry the development of a large export business would be rapid if it were not for the high prices which must now be charged for electrical machinery.

"It is encouraging to note," Mr. Herr says, "that there have been some very substantial decreases in the cost of a few of our raw materials, and if some yielding in the very high labor costs can also be obtained we would soon find an expansion of the export demand for electrical machinery that would more than compensate labor for any sacrifices in hourly rates by the longer hours and more continuous work which would result.

"Plans are already matured for the development of larger central electrical power stations in some of the more important industrial countries, and extensive projects for the electrification of some of their railroads are under way. The smaller and less economical steam plants will in this way be displaced by larger ones, and the demand for transmission devices and electrical machinery will be greatly increased.

"The largest electrical manufacturing companies abroad are in Germany, and it will be some time before they can operate advantageously. This gives American companies an

unusual opportunity, if promptly seized, to bring our exports of electrical machinery to an amount and value which might not have been possible under normal conditions. We also have the financial situation in our favor, for whereas before the war countries such as South America, South Africa, Australia, India, and China looked to London, Berlin, and Paris for credits and loans, now these facilities of commerce must be obtained in the United States. And unless we arrange to invest our capital in those countries, we cannot command our fair share of their trade, even though our prices may be competitive.

"In seeking electrical machinery business in export territory our agents must make their principals realize that the machinery we sell these people must be designed and built for their requirements and not, as has in the past too often been the case, as we are accustomed to build it. Much effort has been expended in trying to convince the foreign buyer that our styles and construction were best and should be satisfactory to him, instead of making an effort to ascertain what he desired and then furnishing it.

"In addition to adapting our goods to export requirements we must arrange to give service in this trade at least as good as in our domestic market. Too often export shipments have been delayed and foreign customers disappointed on account of the domestic demand becoming suddenly unusually active, when export orders were made to wait while the rush of domestic orders was worked off."

Westinghouse Electric Sells British Holdings

Announcement was made Monday that the Westinghouse Electric & Manufacturing Company has sold to British interests for approximately $7,000,000 its holdings in Electric Holdings, Ltd., a concern which was organized in London in May, 1917, to take over the British Westinghouse Electric and Manufacturing Company.

In return for stock control of the latter the Westinghouse Electric received about half of the common stock of the Electric Holdings, Ltd., and $6,500,000 of its ten-year 5 per cent prior lien bonds. These securities were sold in the transaction just completed as a result of negotiations conducted by Guy E. Tripp, chairman of the Westinghouse board, and a group of the company officials who sailed for England about a month ago.

The agreement of sale of control of the British Westinghouse Electric & Manufacturing Company to the London Interests was based on an alliance whereby the American concern was restricted to conducting business in the Western hemisphere and the Far East, while the European territory, Africa and Australia was given to the British.

American Steel Foundries

The annual report of the American Steel Foundries for the year ending December 31, 1918, shows net profits of $2,695,727 after deductions for depreciation of $426,412 and interest charges of $136,497. The gross sales were $49,113,098 as compared with $49,369,584 for the previous year. The earnings after the deduction of manufacturing, selling, administrative, head and district office expenses, were approximately half of those of the previous year, or $4,442,237.21 as compared with $8,718,296 for 1917. The federal taxes for 1918 were $1,357,200, whereas for 1917 they were $2,287,600. The undivided surplus now stands at $7,182,846 as compared with $6,429,228 in 1917. Capital additions during the year totaled $670,747 which consisted chiefly of extensions made to the Alliance, Ohio, and Indiana Harbor, Ind., plants of the company. Dividends on the basis of seven per cent annually were paid, involving a total of $1,202,880 and there was made in the third and fourth quarter an extra disbursement of $429,600 in Liberty Loan bonds on the basis of 1¼ per cent for each quarter. Substantially the entire product of the company's plant was for government work.

R. H. Ripley, acting president, in his report states: "Great changes in our financial statement since that issued for the nine months ending September 30, 1918, were made by events occurring subsequent thereto. It was not until the latter part of the year that action on war profit and income taxes took definite form, upon which conclusions could be based and our statement reflects this situation. The armistice in November resulted, as was to be expected, in cancellation of large tonnages of our products, preparation for the production of which had already been made. The basic materials and all stores became uncertain as to price and value and it, therefore, appeared the part of wisdom to make drastic reduction of our inventories, which were abnormally large by reason of the condition brought about by the state of war and the necessary preparation for our continued participation therein. We cannot say what the year 1919 may hold for the company. It was not to be expected that the pace of business could be maintained, and curtailment of operation and earnings are to be expected for the present and perhaps until such time as some of the vital questions now pressing for settlement be disposed of definitely. The tonnage now on our books would under pre-war conditions justify the hope of a satisfactory year. A large volume of repair and renewal business has been held back during the war which if now released would favorably affect our situation. If, however, the plan under which the railroads are to be operated is not soon and wisely determined, we can look for little buying from this source and a correspondingly quiet year."

The balance sheet is as follows:

Assets	
Real estate, buildings, plant, machinery, tools, equipment, patents and good will, plus additions during the year—less depreciation reserve	$21,302,455
Miscellaneous securities, inventories, accounts and bills receivable (less reserves) and cash	15,127,168
Deferred charges to operations	53,571
	$36,483,194
Liabilities	
Capital stock (authorized and issued)	$17,184,000
Four per cent debentures	1,372,800
Accounts payable and payrolls accrued, provision for war profits, income and other taxes and accrued interest on debentures	4,633,144
Reserves	797,000
Appropriated surplus	5,313,403
Undivided surplus	7,182,846
	$36,483,194

Trade Publications

Graphite Products.—The Joseph Dixon Crucible Company, Jersey City, N. J., has issued a new pocket catalogue covering the various products handled by this concern. Several pages are devoted to lists of articles for special use in mills, on railroads, automobiles, etc., these lists being intended for reference to various subjects for which special pamphlets will be supplied.

Airco Service.—The Air Reduction Sales Corporation, New York, has issued small folders illustrating and describing the work done by its equipment in repairing or building up broken or worn equipment used on railroads. Illustrations show the manner in which a broken locomotive cylinder casting has been restored and how worn track frogs are built up.

Blaw Forms.—The Blaw-Knox Company, Pittsburgh, Pa., has issued a 24-page booklet describing and illustrating the forms manufactured by that company for use in building curbs, gutters, concrete pavements and sidewalks. Special designs are illustrated for each purpose named and illustrations show the adaptation of this equipment to different pieces of actual construction.

Bascule Bridges.—The Strauss Bascule Bridge Company, Chicago, has issued a 70-page catalogue on the Strauss bridges, which contains a detailed exposition of the bascule and direct lift bridges developed by this company. The book also contains a partial list of the railway and highway bridges built according to these designs in various countries of the world and a list of 30 steam railways that have used the Strauss service.

Graphite Products.—A new pocket catalogue has been issued by the Joseph Dixon Crucible Company, Jersey City, N. J., entitled "Dixon's Graphite Products." While not a complete catalogue, it furnishes a good idea of the variety of products

made by this company. Pages are devoted to lists of articles especially for mills, railroads, automobiles, etc., with brief descriptions. Pamphlets dealing in detail with any one product may be had upon request.

WRENCHES.—The Coes Wrench Company, Worcester, Mass., has issued a 14-page catalogue dealing with the line of screw wrenches and accessories made by this company. These include steel, knife and hammer handle wrenches. Information is given regarding their construction, manufacture and strength compared with other wrenches, as shown by tests made at the Harvard University testing laboratory. The catalogue contains a number of illustrations.

FLANGING.—An attractive catalogue entitled "A Solution of Your Flanging Problems," containing 30 pages, 9 in. by 12 in., has been issued by the McCabe Manufacturing Company, Lawrence, Mass., illustrating and describing the wide range of work that can be done on the McCabe flanging machine, and showing economies that may be effected by its use. The greater part of the book is given over to illustrations showing finished products, such as various kinds of tanks, locomotive firebox and boiler sheets, steel car parts, etc.

CRANES FOR SHOPS, ROUNDHOUSES AND YARDS.—The Whiting Foundry Equipment Company, Harvey, Ill., has recently issued catalogue No. 135 superseding catalogue No. 127. This catalogue describes electric, pneumatic and hand power traveling cranes, locomotive and coach hoists, gantry traveling cranes, jib cranes and pillar cranes. It gives a general description not only of the cranes but also of the details such as cabs, trucks, brakes and electric equipment and discusses the field where the various types may be used to advantage. The illustrations show numerous typical installations on railroads.

LAKEWOOD CLAM SHELLS.—The Lakewood Engineering Company, Cleveland, Ohio, has published bulletin No. 26 containing 24 pages illustrative and descriptive of the Lakewood clam shell buckets. The first seven pages are devoted almost exclusively to large photographs showing a wide variety of the applications of these buckets to excavating and rehandling of material. Following this are several pages of drawings and tables showing the details of these buckets, the principal dimensions, etc. Two pages illustrate and list various classes of construction equipment manufactured by this company.

LIGHTING.—The National X-Ray Reflector Company, New York-Chicago, has issued a 246-page book, 8 in. by 10 in., bound in cloth, which is an exposition of the manner of lighting all kinds of interiors by the use of the X-Ray reflectors. This matter is divided into chapters dealing with such subjects as illumination from concealed sources, control of light, indirect lighting, direct lighting, etc. In each case general principles of illumination involved are presented first and followed by an explanation of the special application of the X-Ray equipment. A considerable portion of the book is devoted to descriptions of a large number of actual installations.

ASH DISPOSAL.—The American Steam Conveyor Corporation, New York, has issued a 160-page book on modern methods used in handling ashes in power plants. The first 32 pages are devoted to an exposition of the various methods in common use for the handling of ashes, including manual labor and the various mechanical and "current" methods. The remainder of the book is devoted to an explanation of the steam-jet conveyor method and its application to various types of boilers and furnaces together with a large number of descriptions and illustrations of actual installations of this equipment for office buildings, factories, railroads, etc.

BELT FASTENERS.—"The Crescent Principle of Belt Joining" is the title of a four-page bulletin issued by the Crescent Belt Fastener Company, New York, describing the fasteners made by this company for joining all kinds of belting. These are claimed to give a flush joint, allowing the belt to have continuous contact with the pulleys. Several illustrations show completed joints with the various kinds of fasteners. The method of making the joints is also explained and illustrated. A ready reference chart, by means of which a belt man or machinist can readily determine the correct type of belt fastener to use for any condition of service, is included in the bulletin.

Financial and Construction

Railway Financial News

BUFFALO, ROCHESTER & PITTSBURGH.—This company has applied to the New York Public Service Commission for approval of an issue of $1,500,000 in 4½ per cent bonds, and authority to pledge the bonds, if not sold, as collateral to loans for extensions, betterments, improvements within the past five years.

ERIE.—Following a meeting of the executive committee, President F. D. Underwood announced that the company had concluded negotiations with the Railroad Administration by which it is assured an annual standard return of $15,729,000. In addition the road will have an estimated non-operating income during 1919 of $4,250,000, making its aggregate gross income for the current year $19,974,000. On the above basis, after deducting interest charges, rentals, sinking fund requirements and other income, there should remain a surplus of $5,320,000. With regard to the payment of $15,000,000 Erie notes falling due April 1, Mr. Underwood stated that there were several plans under consideration with the Washington authorities and that a decision would probably be reached this week when it would be made public.

GEORGIA COAST & PIEDMONT.—The United District Court of Savannah has ordered the sale of this road May 6 on petition of David Loewenthal, of New York. A minimum price of $300,000 has been set. The road, extending 100 miles from Collins, Ga., to Brunswick, has been in the hands of receivers since July 14, 1916.

GRAND TRUNK PACIFIC.—The receivership of this company is noticed in an editorial elsewhere in this issue.

LEHIGH VALLEY.—Henry S. Drinker, president of Lehigh University, who served as general solicitor of the Lehigh Valley Railroad from 1885 to 1905, has been elected a director to succeed William R. Butler, deceased.

NEW YORK, CHICAGO & ST. LOUIS.—This company has sold William A. Read & Co. $4,000,000 second and improvement mortgage series A 6 per cent gold bonds. The new bonds are dated May 1, 1918, and mature on May 1, 1931. This is the first issue out of the total amount of $25,000,000 authorized. Interest is payable semi-annually. An application will be made to list on the New York Stock Exchange, and the company agrees to pay the normal Federal income tax up to 2 per cent if exemption is not claimed by a bondholder. The new bonds are secured by direct mortgage lien upon the entire property of the company, subject to $18,350,000 first mortgage sinking fund 4 per cent bonds due in 1937, outstanding, which cannot be increased in amount.

PENNSYLVANIA RAILROAD.—Stockholders of this company at their annual meeting on March 11 authorized an increase in indebtedness of $75,000,000 and the acquisition of the Cumberland Valley Railroad. Directors of the railroad previously had approved the new issue, and while the stockholders ratified it, they also provided that a stock vote upon the increase in debt shall be taken March 25, the date of the annual election of officers. The $75,000,000, it is proposed, will be raised in general mortgage bonds. The directors already had authority to increase the indebtedness of the company $46,000,000, so that the action at this meeting and March 25 will raise the total to $121,000,000.

Railway Construction

TEXAS ROADS.—O. B. Colquitt, president of the Eastland, Wichita Falls & Gulf Railway Company, and associates, have raised $156,000 for the purpose of financing the first link in a railroad which they plan to build through the oil fields of central west Texas. The first link of seven miles will be built between Eastland, Texas, and Mangum for the purpose of relieving existing traffic congestion in this district. The proposed road will afford a connecting link between the Texas & Pacific and the Missouri, Kansas & Texas.

Railway Officers

Railroad Administration

Regional

The St. Louis, Troy & Eastern has been relinquished from Federal control according to an order issued by **A. S. Johnson,** terminal manager at St. Louis, Mo., and approved by B. F. Bush, regional director of the Southwestern region.

Federal and General Managers

William N. Neff, who has been appointed federal manager of the St. Louis Southwestern System, the Dallas Terminal, the Eastern Texas, the Southern Illinois & Missouri Bridge, and the Louisiana & Arkansas, with headquarters at Tyler, Texas, as was announced in our issue of last week, was born in 1874 at Lawrence, Kan., where he received a public school education. He entered the employ of the Missouri Pacific in 1889 as baggage master and was consecutively to 1891 assistant agent and operator. In 1891 he was promoted to chief clerk to the division superintendent and in 1893 became clerk to the roadmaster of the same road. From 1895 to 1896 he was a road clerk in the superintendent's office of the Great Northern. Subsequently he entered the employ of the Montana Central as telegraph operator and in 1897 again became a road clerk in the general superintendent's office of the Montana Central. In 1897 he returned to the employ of the Great Northern as clerk in the general superintendent's office and in the same year was appointed chief clerk to the superintendent. In 1898 he became chief clerk to the general superintendent and in 1899 assistant superintendent of the same road. In 1900 he became superintendent of the St. Louis Southwestern, later becoming superintendent of the St. Louis Southwestern of Texas, which position he held with the exception of one year during which he was chief clerk to the president of the same road until 1911, when he was appointed first vice-president and general superintendent of the St. Louis Southwestern of Texas and also general superintendent of the St. Louis Southwestern. In 1914 he was granted a leave of absence but was later appointed superintendent of the Northwestern Pacific at Sausalito, Cal. In 1917 he was again appointed vice-president and general manager of the St. Louis Southwestern of Texas and general manager of the St. Louis Southwestern, with headquarters at Tyler, Tex., in which position he continued after the railroads were taken over by the government.



W. N. Neff

Operating

John L. Wilkes has been appointed superintendent of the Washington division, Washington Terminals, with office at Washington, D. C., vice **Robin W. Farrell.**

F. Wear has been appointed superintendent of the Butte division of the Great Northern, with headquarters at Great Falls, Mont., to succeed **D. F. Dixon,** who has been assigned to other duties.

C. B. Dugan, whose appointment as superintendent of dining car service of the Illinois Central, the Yazoo & Mississippi Valley and the Chicago, Memphis & Gulf, with headquarters at Chicago, was announced in the *Railway Age* of February 21, page 475, was born in Owego, N. Y., on June 2, 1865, and received his education in the public schools and high schools of Owego. In 1900, he entered railway service as a dining car conductor with the Pullman Company, in which capacity he served three and one-half years, when he was appointed inspector on the Erie, which position he held for nine years. In 1912, Mr. Dugan entered the service of the Illinois Central as inspector in which capacity he served for six years until his promotion to assistant superintendent of dining car service which position he held until his recent appointment.

Financial, Legal and Accounting

Charles H. Hueston whose appointment as acting federal treasurer and paymaster of the Des Moines Union, the Iowa Transfer, the Des Moines Western and the Des Moines Terminal, with headquarters at Des Moines, Iowa, was announced in the *Railway Age* of February 28 (page 521), was born at Spring Valley, Minn., on August 11, 1864, and received his education in the public and high schools of Spring Valley. Mr. Hueston entered railway service with the Chicago & North Western on April 8, 1886, where he remained for 17 years. The following sixteen years he served in the capacity of general superintendent of the Des Moines Western and the Des Moines Terminal, which position he held until his recent appointment as acting federal treasurer and paymaster.

Trace S. Ford, whose appointment as federal auditor of the Des Moines Union, the Des Moines Western, the Des Moines Terminal and the Iowa Transfer was announced in the *Railway Age* of February 28, page 521, began his railroad career with the Iowa Central in 1885. After eight years of service with that road, he entered the accounting department of the Oregon Railroad & Navigation Company, later serving in the same departments of the Chicago & Alton and the Chicago Great Western as clerk and chief clerk. Later he became connected with the New York City Street Railway, where he was engaged for two years on special accounting work. In 1910 he was appointed auditor of the St. Paul & Des Moines, and when that road was absorbed by the Chicago, Rock Island & Pacific, he became auditor of the Wichita Falls & Northwestern at Wichita Falls, Tex., and reorganized their accounting departments. When the Wichita Falls & Northwestern were taken over by the Missouri, Kansas & Texas, he entered the service of the San Antonio, Uvalde & Gulf as auditor, with headquarters at San Antonio, Tex., where he remained for three years. The following two years he served in the capacity of auditor and treasurer of the Pittsburgh, Lisbon & Western, resigning at the end of that time to accept the appointment as auditor of the Des Moines Union in September, 1918, which position he held until his recent appointment as federal auditor of the Des Moines Union, the Des Moines Western, the Des Moines Terminal and the Iowa Transfer.



T. S. Ford

Traffic

T. L. Peeler has been appointed industrial agent of the Missouri, Kansas & Texas, the Missouri, Kansas & Texas of Texas, the Wichita Falls & Northwestern, the Oklahoma Belt and the Missouri, Oklahoma & Gulf, with headquarters at Dallas, Texas.

D. M. Goodwyn, assistant freight traffic manager of the Louisville & Nashville, has been promoted to freight traffic manager, with headquarters at Louisville, Ky., to succeed **C. B. Compton,** deceased. The office of assistant freight traffic manager has been abolished.

M. J. Powers, formerly general passenger agent of the Delaware & Hudson, has been released from military service, and has resumed his duties with the title of assistant general passenger agent of the Delaware & Hudson; the Greenwich & Johnsonville; the Schoharie Valley; the Champlain Transportation Company, and the Lake George Steamboat Company. **Walter C. Harden,** assistant general passenger agent, has been appointed district passenger agent in charge of dining car service, and performing such other duties as may be assigned to him; both with offices at Albany, N. Y.

R. B. Robertson has been appointed general freight agent of the Chicago, Indianapolis & Louisville, with headquarters at Chicago. Mr. Robertson was born in Milwaukee, Wis., on April 18, 1879, and began his railway career in the traffic department of the Wisconsin Central in 1898. In 1901, he entered the service of the Monon as soliciting agent, and the following ten years he served in the capacity of traveling freight agent and commercial agent with headquarters at Milwaukee when he was appointed general agent at Chicago on July 3, 1912. On January 1, 1915, he was promoted to division freight agent, and on March 1 of the same year he was appointed assistant general freight agent of the same road. Mr. Robertson was furloughed to the war department on May 1, 1918, receiving the title of assistant chief of inland traffic service, with headquarters at Chicago. In this capacity he had jurisdiction over the movement of troops and war department property in the middle west. He succeeds **J. A. Simmons,** who will confine his attention to freight traffic matters on the Cincinnati, Indianapolis & Western as general freight agent, with headquarters at Indianapolis, Ind.

Norman W. Pringle, assistant general passenger agent of the Lehigh Valley, has been promoted to general passenger agent, with headquarters at New York. He was born on August 11, 1881, at Huntingdon, Que., and began railway work November 1, 1902, with the Rutland Railroad in the freight house at Rutland, Vt. Six months later he entered the passenger department, and subsequently was traveling passenger agent on the same road. In May, 1909, he went to the Lehigh Valley, and served as New England agent at New Haven, Conn., until December, 1914, when he was appointed division passenger agent, with office at Buffalo, N. Y. In October, 1916, he was transferred in the same capacity to Ithaca, from which position he was promoted in December, 1917, to assistant general passenger agent, with office at New York, and now becomes general passenger agent of the same road, also the Susquehanna & New York, and the Buffalo Creek Railroad.



N. W. Pringle

Engineering and Rolling Stock

W. Y. Scott, assistant signal engineer of the Boston & Maine, with office at Boston, Mass., has been appointed signal engineer, with the same headquarters, succeeding **J. V. Young,** deceased.

O. H. Frick, field engineer on valuation work with the Chicago, Milwaukee & St. Paul, has been appointed district engineer of the Middle district, with headquarters at Milwaukee, Wis., succeeding **Charles Lapham.**

The jurisdiction of **A. H. Yocum,** signal engineer of the Philadelphia & Reading, the Atlantic City Railroad and the Port Reading, has been extended over the Central of New Jersey and the New York & Long Branch, with office at Philadelphia, Pa.

W. L. Webb, district engineer of the Chicago, Milwaukee & St. Paul, with office at Chicago, has been assigned to special work in connection with the Chicago Union Station, and Lieutenant **C. F. Urbutt,** formerly in the construction quartermaster's department of the United States army, succeeds Mr. Webb as district engineer.

C. W. Mathews, master mechanic of the Cincinnati Terminals and Kentucky division of the Louisville & Nashville, with office at Covington, Ky., has been transferred to the Albany (Ala.) shops, vice **C. J. Bodemer,** assigned to other duties; **W. E. Hunter,** master mechanic of the Knoxville and Atlanta divisions, at Etowah, Tenn., has been transferred to the Cincinnati Terminals and Kentucky division, which office at Covington, vice Mr. Mathews, and **G. H. Berry,** succeeds Mr. Hunter.

Robert H. Ford, whose appointment as principal assistant engineer of the Chicago, Rock Island & Pacific, with headquarters at Chicago, was announced in the *Railway Age* of March 7 (page 568), is a graduate of Norwich University, Northfield, Vt. He began his railway career with the Central Vermont with which road he was engaged in various roadway, engineering and construction capacities. In 1906 he went with the Missouri Pacific as maintenance of way inspector and the following year he was appointed principal assistant engineer of the system. In 1910 he resigned from the above road to become chief engineer of the Hodges-Downey Construction Company, general railway contractors, in which capacity he served for two years. He then entered the employ of the Chicago, Rock Island & Pacific as special engineer. Previous to his recent appointment as principal assistant engineer he was engineer of track elevation in charge of general construction and special work, principally in the Chicago district.



R. H. Ford

Purchasing

George W. Snyder, assistant engineer of maintenance of way on the Pennsylvania Railroad, at Philadelphia, has been appointed to the newly created position of general storekeeper for the Pennsylvania, lines east, with office at Philadelphia, Pa.

Corporate

Executive, Financial, Legal and Accounting

W. F. Kennedy has been appointed auditor of the Louisville & Nashville, for the corporation, and **R. J. Wagoner** has been appointed assistant auditor; both with offices at Louisville, Ky.

Operating

Walter T. Moodie, whose appointment as superintendent of Division No. 1 of the Central district of the Canadian National, was announced in the *Railway Age* of February 7, 1919, page 424, was born at Glasgow, Scotland, on March 10, 1882, and received his education in the Allen-Glen School at Glasgow and Scotland Technical College. He began his railway

service on March, 1903, as assistant engineer, with the Caledonian railway. From 1905 to 1908 he was engaged as assistant engineer on the location and construction of the Central South African Railway, and the following three years served as assistant engineer on the Canadian Northern, until he was appointed engineer of maintenance of way, in which capacity he continued for four years. In October, 1915, he was promoted to the office of district engineer in which position he remained until his recent appointment as superintendent of the Canadian National.

Traffic

W. T. Marlow has been appointed general freight agent of the Canadian Pacific Ocean Services, Limited, in charge of freight traffic, Atlantic and Pacific services. **G. D. Robinson** has been appointed European freight agent, and **G. C. Dew** has been appointed Asiatic freight agent; all with offices at Montreal, Que.

George Stephen, who has been appointed freight traffic manager of the Canadian National Railways, with office at Toronto, Ont., as has already been announced in these columns, was born on July 5, 1876, and began railway work in June, 1889, as a junior clerk in the foreign freight department of the Canadian Pacific, at Montreal, Que. He remained in that department at Montreal and later at St. John, N. B., until August, 1899, and was then appointed chief clerk in the general freight office at Winnipeg, Man. From July, 1900, to the following January, he was traveling freight agent in the western provinces, and subsequently served as contracting freight agent, in British Columbia on the same road. From June, 1901, to December, 1906, he was chief clerk in the general freight office of the Canadian Northern, at Winnipeg, and then was assistant general freight agent. He was promoted to general freight agent in May, 1909, and in November, 1916, became freight traffic manager of the same road, in charge of the territory from Port Arthur to Duluth, west to the Pacific Coast, with office at Winnipeg, which position he held at the time of his recent appointment as freight traffic manager of the Canadian National Railways, as above noted.

R. E. Larmour, general agent of the freight department of the Canadian Pacific, with office at New York, has been promoted to general freight agent with headquarters at Montreal, Que. He was born on September 26, 1869, at Brantford, Ont., and began railway work on the Grand Trunk as a clerk in the office of his father, who was a division superintendent. He served on that road consecutively at London, at Windsor and at Detroit, until November, 1898, when he resigned to go to the Canadian Pacific as chief clerk in the freight office at Winnipeg, Man. He subsequently served consecutively as acting agent, general clerk in the superintendent's office at Ft. William, agent at Port Arthur, freight claim agent at Vancouver, B. C., and at Winnipeg, Man., and as general agent at Ft. William. From July, 1908, to June, 1909, he served as general freight agent of the Kootenay and Boundary districts, at Nelson, B. C., and the following June was transferred to the Central division, at Winnipeg. In June, 1911, he was appointed division freight agent, at Vancouver, B. C., and in July, 1914, was appointed assistant general freight agent at the same place. Since October, 1915, he has served as general agent of the freight department at New York, and now becomes general freight agent, with office at Montreal, of the same road, as above noted.



R. E. Larmour

Obituary

Frank D. Hurst, division freight agent of the New York Central, with headquarters at Youngstown, Ohio, died on March 8, at Santa Fe, N. M., at the age of 49.

James Balkwill, superintendent of the Canada division of the Michigan Central, with headquarters at St. Thomas, Ont., died suddenly of heart disease while traveling from Fargo, N. D., to St. Thomas. Mr. Balkwill was 51 years of age.

A. F. Page, trainmaster of the Illinois Central, with office at Louisville, Ky., died on March 8, from the effects of injuries received when he jumped from a fast moving automobile which he thought was about to collide with a locomotive.

Sir Guy Calthrop, Bt., general manager of the London & North Western Railway of England, and (since 1917) controller of coal mines under the British government, died on February 23, in London, at the age of 49. In 1886 he began railway work as a junior at Euston Station, becoming in 1892 outdoor assistant to the superintendent, and in 1901, assistant to the general manager. In 1902 he went to the Caledonian Railway as general superintendent, and later until 1910 was general manager of that road. He was appointed general manager of the Buenos Ayres & Pacific Railway in 1910, and four years later returned to the service of the London & North Western as general manager.

John J. Harrower, for many years secretary of the Eastern Railroad Association, died at his home in Washington, D. C., on January 9, 1919, at the age of 78. His service began with the organization of the association, on February 6, 1867, and extended over more than 50 years. At that time, Mr. Harrower was a clerk in the office of Daniel L. Harris, president of the Connecticut River Railroad and the first secretary of the association. On January 1, 1879, when the office of the association was moved to Boston, he severed his connection with the Connecticut River Railroad and became an exclusive employee of the association. He was elected secretary in May, 1887, and filled that position until May, 1918.

Edward Francis Kearney, president of the Wabash, died at his home in St. Louis, Mo., after a few days' illness of pneumonia. He was born on March 27, 1865, and began railway work in 1882 as a telegraph operator for the Pennsylvania Lines. He remained with that road until February, 1903, being employed respectively as freight clerk, chief operator in the superintendent's office, train despatcher, trainmaster's clerk, chief clerk to superintendent and trainmaster. The following year he was superintendent of the Terminal Railroad Association of St. Louis and the St. Louis Merchants' Bridge Terminal Railway, going to the Chicago, Rock Island & Pacific in February, 1904, as supervisor of mails. From April to October of that year he was superintendent of transportation on the St. Louis & San Francisco. In April, 1905, he was appointed superintendent of terminals of the Missouri Pacific at St. Louis and in February, 1908, was promoted to superintendent of transportation of that road and the St. Louis, Iron Mountain & Southern. He was made general superintendent of transportation in January, 1913, and three months later was elected first vice-president of the Texas & Pacific, with headquarters at New Orleans, La. Mr. Kearney held the latter office when he was appointed receiver of the Wabash in 1915, and was later elected president of that road, which position he held until the time of his death.



E. F. Kearney

EDITORIAL

Railway Age

DAILY EDITION

The Signal Division Attendance

The first meeting of the Signal division of the American Railroad Association was successful to the point of exceeding the most earnest hopes of those in charge, in so far as attendance was concerned. Perhaps this success might be attributed to the recent amalgamation with the A. R. A. and the desire of signalmen to see the actual results of this change; perhaps it was due to the shifting of personnel in the signal field during the past year or it may be the result of the uncertainty as to the fate of the railroads themselves, or the natural desire of all railroad men to exchange views on the subject. Whatever the cause, the fact remains that signalmen of all classes are taking an active interest in the conduct of the old Railway Signal Association this year and its new relations with other associations and with the railroads. Definitely, the registration yesterday showed there were 319 members of all classes in attendance as compared with 198 last year, an increase of 121 members.

Railroad Administration Helps Conventions

The higher officers of the Railroad Administration have taken a very broad and intelligent view of the value of the conventions of railroad associations and of the exhibits of equipment and supplies made in connection with them. The regional directors, with the sanction of Director-General Hines and Director of Operation Tyler, sent out circular letters to the federal managers instructing them to cause as many of their engineering and maintenance officers to attend this year's Railway Engineering Association convention as could be spared from their other duties. Director-General Hines intended to be a speaker at the association's annual banquet on Wednesday evening, but will be prevented by pressure of work in Washington. Director of Operation Tyler intended also to attend the dinner, and it is still hoped that he will do so. It is probable also that some of the regional directors will be present. Formerly, under private operation, the executive officers of the railways did not take as much interest in and give as much encouragement to the meetings of the important association and the exhibits in connection with them as was desirable in the interest of the greatest efficiency of operation. The greater recognition given to the conventions by the higher officers under government control should cause gratification; and it should be continued after the railways are returned to private operation. Never in the history of America was there such need of the greatest attainable efficiency and economy of railway operation as there is now. The increased efficiency and economy needed must be attained, if at all, chiefly by means of the use of methods and devices which will save labor. The conventions of the technical associations and the exhibits given in connection with them afford among the very best means available for developing methods and seeing devices intended to increase efficiency, and especially to increase it by saving labor. The Railroad Administration is rendering a good service to the railways and the country by giving the conventions and exhibits its powerful support.

The A. R. A. Signal Division and the War

At this time a year ago the Railway Signal Association, now the Signal division of the American Railroad Association, held its meeting under decidedly different conditions than exist at present. The winning of the war was then the all-important factor. Practically no one at that time believed that the enemy could be forced to lay down his arms as soon as he did. Every thought, every act, in fact, everything that was done had therefore the one purpose in view—that of making victory possible. The R. S. A. did its bit; its records show that a number of its members joined some branch of the military or naval service. These men, some of whom have already returned and again engaged in their former occupations or other civil pursuits, have had experiences which they can look back upon as mile stones in their lives, which bear inscriptions of service and of which they can justly feel proud.

The railways of France, Belgium, Italy and the other countries in the fighting zones had to be operated and maintained in order that military operations could be carried on to the fullest extent. In that connection the signal engineer is as essential as he is in civil life, likewise the men under his leadership. In that capacity at least three of the R. S. A. honor roll men have served as officers or in the ranks of engineer companies in the field; still others in supply units, and in the forces at the fighting front. On another page is an article describing the activities of various members in the war. However, the struggle is over now and these men are returning with only a memory of the past. Some will undoubtedly renew their former activities and re-establish their standing under new conditions. As far as association work is concerned they will have to adjust themselves to the newly created Signal Division of the American Railroad Association, which adjustment will depend largely upon the spirit with which all members enter into the reorganized A. R. A., and must assume the responsibility for the success of all activities relative thereto.

The A. R. A. and Other Associations

In the reorganization of the American Railroad Association many of the technical railway associations are being merged with it. The discussion of the reorganizations at the meeting of the Railway Signal Association yesterday was one of many illustrations of the fact that there is by no means entire unanimity among railway officers regarding the effect on the work of the various railroad associations that the merger with the American Railroad Association is going to have. The determination of whether the change will have a good or a bad effect will be made chiefly by the American Railroad Association itself. The old American Railway Associa-

tion was criticised a great deal because, as was alleged, it did not assume its proper responsibilities and perform its duties. To a large extent this criticism was just. The way in which the American Railway Association conducted its business rendered it impossible for it to be an efficient and effective organization. Almost all its work was done by its various committees, including the executive committee. Its semi-annual meetings usually were perfunctory affairs. They ordinarily did not last more than three or four hours, and there was almost no discussion on the floor. The disposition of the reports recommended by the executive committee almost always was adopted in steam roller fashion.

In consequence, there was not the full and intelligent consideration of the various problems with which it was the duty of the association to deal that there should have been. Furthermore, the association ignored many problems with which it should have dealt. Finally, it failed to adopt means of giving general effect to the standards and recommended practice which it adopted.

If, after having assumed a wide control over the work of organizations in the engineering, mechanical, signaling, transportation and other fields, the American Railroad Association should transact business in the same way that the American Railway Association has in the past it will not only fail to accomplish anything substantial itself, but it will also prevent the organizations over which it has taken control from accomplishing as much as they have in the past. The members of the new American Railroad Association must make it an organization worthy to exercise the suzerainty over the other organizations which it has adopted. In order to do this it will be necessary for the American Railroad Association to meet at least twice a year, to continue its meetings through at least two days instead of through only three or four hours, and to adopt effective means of getting the railways to carry out the standards of practice which the association shall adopt. While the railways are under government control it will be the function of the director general to give effect to the association's decisions, but probably the A. R. A. will outlive the Railroad Administration.

By co-ordinating the work of the various technical organizations much good can be accomplished, but whether the good that can be accomplished actually will be accomplished remains to be seen.

Effect of Passing Sidings on Capacity

AMONG THE PROBLEMS that confront many of the railroads today is that of increasing their capacity. Some lines are experiencing serious delays in moving trains, when, if the facts were known, a large portion or all of the difficulty might be eliminated. In connection with such problems Committee 10 of the Signal division of the American Railroad Association has made extensive investigations. Several years ago this committee, then known as Committee 1 of the Railway Signal Association, was assigned the work of making a study of the problems of signaling single track roads and of determining the influence of the proper location of passing sidings on the capacity of lines. As a result of such investigations, the committee one year ago, then known as Committee 10 of the R. S. A., submitted its report on the above subject to the association as information. Since then it has continued its study with a view of amplifying and analyzing the same problem when applied to two or more tracks. These studies have been combined into the report that was submitted at yesterday's meeting of the Signal division of the A. R. A.

Comparing the analysis of the single track with that of two or more tracks, it is evident that the problems are quite different even though time in both cases is the controlling factor in determining the number of trains that can be operated between two points. In the first case opposing trains are dealt with, while in the second case the predominating factor is following trains, with occasional layouts of opposing traffic on one or more tracks. The problem of the proper location of passing tracks resolves itself into an analysis of the particular layout under investigation, and the quantity and type of traffic involved. However, fundamental formulae can be applied to the various conditions and simple rules can be followed which will aid in the work of increasing the capacity of the roads.

For instance, it is quite evident that the location of passing tracks which will result in the minimum amount of delay to freight trains which are to be passed by passenger trains, will be their location so that the spacing between freight trains will be equal to the difference in running time of the freight and passenger trains between sidings. Other factors, of course, enter into a study of the capacity of the roads, such as signaling, and interlocking, additional main lines, etc. A comprehensive study was made of a piece of existing road in accordance with the prescribed method of analyzing multiple track lines, which would result, if proposed plans were adopted, in a reduction of 30 to 70 per cent in the interference on main tracks for freight service and an increase of 35 per cent in the number of freight trains that could be handled at exceptionally restricted points, besides a considerable reduction in the time required in moving over a division owing to a reduction in delays. The decided effect that the proper location of passing sidings, as well as proper signal and interlocking conditions, may have upon the capacity of main tracks is worthy of the most careful consideration by the railroad officers in charge of operation and if the analysis shows that a material increase can be effected at a cost that can perhaps be compensated for, in a reasonable length of time, the cost should be incurred.

The Future of the R. S. A.

THE FUTURE OF THE Signal division of the Engineering section of the American Railroad Association will depend largely upon the attitude assumed by those comprising its membership. The old Railway Signal Association retains its original membership, among whom are those who have in the past been instrumental in advancing the association to its present high plane.

Excellent work has been done by the R. S. A. in the development of standards and practices for the signal field —a field assuming greater importance each year. It will be essential that the same or greater enthusiasm exist among the members in future in order to accomplish as good or better results as they have in the past. The Railway Signal Association having been a voluntary organization, has had its work largely carried on by voluntary efforts of the members, who have devoted to it such time as their duties permitted. Under the new organization the members, as representatives of their roads, will feel free to give the time required to committee work. This should tend to cause more and better work on their part. As the business of the Signal division will be carried on in the future as was the business of the R. S. A. in the past, the affiliated members will still have an important voice in the affairs of the division through committee assignments, and on the floor of the meetings, although they will not be privileged to vote by letter ballot. The enthusiasm and activities of the affiliated members in the

future will depend to a great extent upon the attitude of the representative or voting members. If the affiliated members find that their suggestions and activities are received with indifference their enthusiasm will be reduced and eventually killed, and the good results obtained from their work during the last 24 years will be lost.

Much good may be accomplished if more definite specifications are adopted in the future than has been the case in the past. In order to accomplish this each member should consider carefully what will be of the most benefit to all the railways, and not merely to his railway. There may be a tendency on the part of the members to restrict the expression of their views under the new organization because, as part of the American Railroad Association, they will be governed largely by the wishes of their superiors, while under the old R. S. A., as a voluntary association, they were not under this restraining influence. When a man gets up to voice an opinion in future he is apt to reflect the policy of his road, and for that reason he may be ultra-conservative. It is to be hoped, however, that the members will continue to express their personal opinions on their experience.

The dues of the members entitle them to the literature published by the division. A digest of the proceedings has been issued each year in the form of a bound volume. Such a digest is of great value to all interested in this branch of railroad work and should be continued, as the information so presented is in handy form for quick and ready reference.

A very spirited discussion took place after an outline of the work in connection with the amalgamation was presented to the meeting yesterday. It would appear desirable that signaling should be given a separate section of the A. R. A. instead of being made merely a division of a section.

The Annual Dinner

Tickets for the annual dinner of the A. R. E. A. will be on sale in the corridor in front of the convention hall at the close of the morning session today. In view of the expected large demand for tickets those planning to attend are urged to secure their tickets as early as possible. They are sold at $3.50 each. In view of the long program a special effort will be made to seat the guests promptly at 7 o'clock.

The speakers at the dinner will include United States Senator Atlee Pomerene, of Ohio, who will speak on "Some Phases of the Railroad Question;" Dr. George Adam, pastor of Emmanuel Congregational Church, Montreal, Quebec, who will speak on "Language and Ideals;" Hon. Clarence N. Goodwin, of Chicago, whose subject will be "Americanization in Connection With Maintenance of Way Labor on Railroads," and Robt. J. Cary, general counsel New York Central Lines, at Chicago, who will take for his topic "Noblesse Oblige—Our New Nationalism." Senator Pomerene is a member of the Senate committee on Interstate Commerce and has been present at all of the recent hearings at which the various solutions of the railroad problem have been presented. He is, therefore, particularly well qualified to discuss the subject.

A.R.E.A. Board of Direction Meeting

A meeting of the board of direction of the American Railway Engineering Association was held in the English room of the Congress Hotel at 10 o'clock yesterday morning where a four-hour session was spent in the transaction of routine business and the completion of plans for the convention. For the first time in the history of the association all of the 19 members of the board of direction were present.

Secretary Fritch's Two Sons in Service

Secretary Fritch was much gratified to receive a message last Thursday from his son E. J. Fritch, announcing his safe arrival at Newport News from service overseas. He was a sergeant in the 75th regiment, Coast Artillery. Mr. Fritch has the distinction also of having had another son in the service, L. C. Fritch, who was in the medical department and who has received his discharge and returned to school.

Hu and Wu

Among the recent members of the American Railway Engineering Association are T. C. Hu, chief technical secretary of the Chuchow-Chinchow railway, Peking, China, and Da-Chang Wu, formerly structural draftsman with the Santa Fe, who has recently returned to China.

The A. R. E. A. Convention Program

The Twentieth Annual Convention of the American Railway Engineering Association was called to order at 9:30 this morning and will continue in session until Thursday afternoon. The sessions will convene at 9:30 a. m. and 2 p. m. Following the address of the president and the reports of the secretary and treasurer, the reports of standing and special committees will be presented as follows:

First Day—Tuesday, March 18—
- Signals and Interlocking.
- Signs, Fences and Crossings.
- Conservation of Natural Resources.
- Track.
- Records and Accounts.
- Rules and Organization.
- Economics of Railway Labor.

Evening Session—
- Illustrated Use of Labor-Saving Devices.
- Developments in Study of Transverse Fissures.

Second Day—Wednesday, March 19—
- Wood Preservation.
- Yards and Terminals.
- Electricity.
- Ties.
- Stresses in Railroad Track.
- Buildings.
- Ballast.
- Roadway.
- Rail.
- Annual Dinner at 6:30 p. m.

Third Day—Thursday, March 20—
- Iron and Steel Structures.
- Masonry.
- Water Service.
- Wooden Bridges and Trestles.
- Uniform General Contract Forms.
- Economics of Railway Operation.
- Economics of Railway Location.
- New Business.
- Election and Installation of Officers.
- Adjournment.



Signal Division in Session

Stated Meeting of Signal Division of the A. R. A.

First Session Held Under the Changed Conditions— Abstracts of Reports With Discussion

THE MARCH STATED MEETING of the newly-created Signal division of the American Railroad Association was held in the Auditorium hotel, Chicago, on Monday, March 17. The morning's session was called to order at 9:55 a. m. by President R. E. Trout, signal engineer, St. Louis-San Francisco, and adjourned at 12:45 p. m. The meeting re-convened at 2 p. m. and continued until 7 p. m.

The first order of business was the approval of the minutes of the last meeting. As there was no unfinished business the new business before the Association was taken up. In this connection the circular letter covering the conditions leading up to the change, dated February 24, which had been forwarded to all members of the Association, was read.

The Secretary stated that beginning April 1 new members enrolled would be classed as affiliated members. Members who are railroad men and who have not been appointed by their railroads as members of the Signal division of the American Railroad Association will be required to pay $3 per annum as dues. Others not railroad men who are admitted as affiliated members will be required to pay $6 per annum. Up to April 1 the dues will be as they were formerly and members will be accepted in the association under the old arrangement until midnight March 31, 1919. The secretary stated that the securities of the association and the loving cup had been transferred to the care of the secretary and were held in trust. The secretary stated that the Committee on Direction, at a meeting held March 16, decided that the June meeting of the division will be held at Atlantic City, June 26 and 27. This time it was also decided to hold the annual meeting in Chicago on September 17, 18 and 19, 1919.

The regulations for the Signal division of the A. R. A. as of March 16, 1919, were then read. It was moved and seconded that these resolutions be accepted and this motion carried. The handling of committees in the future will be the same as in the past except that, on proper notice, the secretary will be present in person or assign some one to act as recording secretary for the meetings. A resolution was presented before the meeting that it was the sense of the division that they be organized as a separate section of the American Railway Association.

After reading this resolution a number of points were brought out by members with reference to the effect the proposed change would have on certain meetings and upon the actions of the division. The resolution and the discussion covering these points is given below.

The secretary submitted the following resolution:

WHEREAS, The Signal Division of the American Railroad Association desires to be of the utmost value to the United States Railroad Administration and the railroads, and,

WHEREAS, The Division includes in its membership many officers occupying positions in the Signal departments of the railroads which are distinct in character from those of any other department, and,

WHEREAS, The inclusion of the activities of the Signal Division with those of any section of the association will prevent the rendering of the most efficient and valuable services, therefore, be it

Resolved, That the Committee of Direction of the Signal Division be instructed to bring to the attention of the executive committee the necessity and desirability of the creation of a separate section to cover the activities of the Signal Division.

WHEREAS, The Signal Division of the American Railroad Association desires to be of the utmost value to the United States Railroad Administration and the railroads, and,

WHEREAS, The division includes in its membership many officers occupying positions in the signal departments of the railroads which are distinct in character from those of any other department, and,

WHEREAS, The inclusion of the activities of the Signal

Division with those of any section of the association will prevent the rendering of the most efficient and valuable services, therefore, be it

Resolved, That the Committee of Direction of the Signal Division be instructed to bring to the attention of the executive committee the necessity and desirability of the creation of a separate section to cover the activities of the Signal Division.

(On a motion, duly made and seconded, the resolution was adopted.)

L. R. Mann (Mo. Pac.): Wouldn't it be well to say what the alternative would be, in case this does not come into effect?

T. S. Stevens (A., T. & S. F.): There is no alternative possible.

The President: It means, of course, that there will be a signal section instead of a signal division. We will be a separate section.

Frank Rhea: It seems to me that this resolution was passed before you had time to consider it. It occurred to me that the status of railroad men, and possibly of the United States Railroad Administration, was in doubt. What is the status of railway men in Canada in this Signal Section? Do they have any status at the present time, other than affiliated railway members?

The Secretary: Answering Mr. Rhea direct, any employee of any railroad in the world, which railroad belongs to the A. R. A., we hope will be an appointed member by the railroad, which means that that individual, or as many individuals as are appointed by any one property, will be what are termed representative members.

Mr. Rhea: That is, for the United States Railway Administration?

The Secretary: For the universe, if you please.

Mr. Rhea: How will they be appointed for anybody that is not under the jurisdiction of the Railway Administration?

The Secretary: Any one property which belongs to the A. R. A., which is international, becomes automatically, without the U. S. R. A. attached to it, a member of the Signal Division of the A. R. A.

Mr. Rhea: Are there other railroads that are members of the A. R. A.?

The Secretary: There are, including Canada and foreign countries.

Mr. Rhea: Under Order 70?

The Secretary: No, sir.

Mr. Rhea: I don't appreciate then how they can be.

The Secretary: Without hearing all the documents available, Mr. Rheat is speaking about the American Railway Association, and not the newly organized American Railroad Association. There is a difference in the technique of the two.

Mr. Rhea: Of course, I am not a mind reader.

The Secretary: I do not desire it understood that there is any secret code in the arrangement. The cards are all on the table, and if Mr. Rhea has not all the documents, we will be glad to produce them for him.

Mr. Rhea: This may be not pertinent to the situation, but there is another question I would like to ask now. This says that members are appointed by their respective railroads. Now, does that eliminate dues, and if you do not want the proceedings, can you still continue a member?

The Secretary: All members of the R. S. A. are now members of the Signal Division automatically, whether they are active, junior, associate, life or honorary members. A member in the circular spoken about is an appointee of an American railroad, a member of the A. R. A. from a certain specific railroad, which specific railroad has appointed one or more men from its railroad as members of the signal division, as signal experts. That is a detail that has not been developed, because a railroad might appoint a signal engineer, assistant signal engineer, inspector, supervisor, and assistant supervisor, and another railroad might only appoint a signal engineer. Those men are non-producing members in the signal division, for they do not pay dues, because the parent railroad who appointed them as representative members pays dues for them, so they are deadheads. That leaves on the active and junior list of the R. S. A. a certain number of employes who are not members or representative members, as we call them. Those people, if they desire, to continue in the Signal Division, are privileged to continue as affiliated members, because they are employed on railroads, international railroads, if you please, and they will pay $3, as they have in the past, for the privilege of membership, and receive the literature. The $3 is nominal, to reimburse our treasury for printing a lot of additional copies, which run into something like $4,000 beyond our regular quota.



R. E. Trout
President of R. S. A.

The next affiliated member is a non-occupant of a position on a railroad; not necessarily a supply man, for instance, Mr. Rhea himself. He may be an affiliated member of the signal division by paying $6 per annum. This is after December 31, 1919, I am speaking about. All of these people that we have spoken of, whether they are R. S. A. tagged or signal division A. R. A. tagged, will come to our meeting, and they will be on the floor doing everything that they have done in the past, and they will do as they did in the R. S. A.

Mr. Rhea: Can there be such a thing as anyone joining as an affiliated member in the future?

The Secretary: We hope that there is not one man who is today a member who will drop out, and we hope that we shall be able to bring in at least 10,000 more.

Mr. Rhea: I have had a peculiar interest in this situation. I am No. 52 on the membership list. I have had a feeling in the past that I had somewhat of an equity in the R. S. A. That may have been visionary and optimistic. In the proceeding which has taken place I have somewhat of a feeling, as a non-railroad member, that there has been some equity removed from me. I feel that my property has been confiscated.

The Secretary: I hope Mr. Rhea will disabuse his mind of any such feeling, or anyone who has a similar feeling. Under the new conditions, when we adopt standards, we are in a position now to have them accepted by the higher authorities in the railroad business, which in the past has been a thing almost impossible of accomplishment. A careful analysis discloses not one

thing in which this change is not to the advantage of the association, and if there is anyone who sees any indication for the modification or for the breaking down, instead of building up, we will certainly welcome the expression of that opinion, in any way that it may come to us.

Mr. Stevens: As I analyze this thing, in the old R. S. A. we had certain types of membership who had certain privileges and then we had representative memberships. It is true, I think, on a letter ballot the representative vote could carry the standard. The members came to the meeting just as they will do now, and presented matters for letter ballot on the floor, and if we did not agree to them we did not approve them, and we will be able to carry out the same action now. In the old days, if the membership thought well enough of the standard to submit it to letter ballot, the representative vote carried it, just as the membership, appointed by the railroads now, will carry it, if it is to be carried, or dispose of it otherwise.

As I view the situation, we will have no direct connection with the Railroad Administration, but the Railroad Administration will have sufficient confidence in what the Executive Committee of the A. R. A. does, if they are requested so to do, to make certain appliances standards of the railroads in the country, and that is the only function that the Railroad Administration intends to use in connection with our activities. We will go along recommending standards just as we have done. The members who were voting on the floor will still have the vote, and the only difference will be when a letter ballot is put out, those members will not have a vote, and that is practically what they have not been doing since we established the representative vote.

The Secretary: The railroads will appoint the representative member, and all other members are active members as they were in the R. S. A.—that is their status.

W. H. Arkenburgh (Can. Nat. Car. Co.): Under the old plan, representatives of manufacturers have been privileged to come to the meetings and pay our dues, but not vote on anything except the place of meeting. Under the new arrangement do we have the rights of members?

The Secretary: You have the right of voting on the floor—you have all the privileges of active membership.

P. M. Gault (I. C.): You have not said anything about company members. There are still a certain number of the members in the association who are employed by companies, and I would like to know what their status is.

The Secretary: Companies are corporations and corporations are members of the American Railroad Association, the same as in the case of the U. S. R. R. A.

J. C. Mock (M. C.): I want to ask whether all the formalities in the change of name have been properly gone through with? Ordinarily a change of name, a change of organization, including a change of dues, responsibilities, etc., would be a matter for the membership to decide rather than the board of direction.

The President: The board of direction did meet, and they called in as many members of the Association as they could get together. I believe Mr. Mock was invited but did not come. We tried to get as many members together as we could to pass on this subject.

Mr. Gault: Who is going to have the representative, the railroad administration or the owner? You cannot have both.

The Secretary: My understanding is that all corporate organizations which choose to be, are members of the A. R. A. All of the Administration railroads that desire to become members of the A. R. A. are members. Now, there cannot be any conflict.

W. H. Elliott (N. Y. C.): I will state in answer to Mr. Gault's question that the corporation membership in the A. R. A., and that the representative appointed to cast the vote of the railroad on the basis of one vote for each 1,000 miles, will be appointed by the railroad subject to the control of the Railroad Administration.

Mr. Stevens: I feel somewhat the same as Mr. Mock with regard to the action of the R. S. A. joining the A. R. A. You have heard the circular read today putting the matter before you, and it has been approved. I think, however, so far as the R. S. A. is concerned, the matter would be in better standing if the same circular was approved by the annual meeting and finally approved at the annual convention. I do not believe that the board of direction should have done anything so radical on its own initiative. The submission of this circular to the eastern meeting and the annual convention will bring out more good points than bad ones. It will be a good thing to do.

Mr. Rhea: I have studied the constitution and cannot find that the board has the authority for this action. Mr. Camp and Mr. Stevens also know that the active membership of the association had no voice in what has happened. I am of the opinion that this matter should have been submitted to the whole association for a vote before any action was taken.

Mr. Stevens: I want to take issue with that statement. The R. S. A. has not been confiscated by the A. R. A. They have not made any effort to do that. They formed a new association, the American Railroad Association, and they asked the R. S. A. to join, and the board has taken the best action it could so far as details are concerned. What I would like to see done is to have approval of the membership in our proceedings. I move that the R. S. A. circular presented at this meeting, dated February 24, be presented both at the Atlantic City meeting and the annual convention, for the approval of the members of the Railway Signal Association.

C. A. Dunham (G. N.): I feel called upon to disagree with what Mr. Rhea has said. As a member of the Board I fail to find where any alternative proposition was available. It may be, under the old R. S. A. constitution, that the Board has perhaps gone a little far in making the amalgamation or transfer, if you please, of this association as the Signal division of the A. R. A. But I feel this meeting is not disposed to criticize the board for doing the only thing that it could do.

Under the new organization, every member of the old association has acquired a membership in a much larger and stronger association than was true before. As a member of the Signal division of the A. R. A. he is going to have a great deal better status than was true under the old conditions. The findings of this Signal division, if you please, are going to have the force of executive adoption and approval, and the recommendations of the Signal division, when so approved, will be obligatory, not optional. We are going to be in a very much stronger position in the future than has been true in the past. I feel very sure that the Signal division is going to receive very cordial support from the A. R. A. and in a short time we will find ourselves very much better situated than has ever been true in the past.

A. G. Shaver (Consulting Engineer): I have been a member of the R. S. A. a number of years, and it has always been the practice, so far as I have been aware, when there has been in contemplation change of any kind, to let it be known to the membership of the association and the matter acted on as the constitution provides. I have not understood that the change now made at the whim, in a measure of a few railroad officers in this

country, has been submitted to the membership as the constitution provides. It is my understanding that the R. S. A. is an incorporated body, working under a constitution, and if that is so, the constitution provides the method of procedure, and unless such procedure has been followed, the R. S. A. still exists.

I have been interested in the proceedings of the R. S. A. for many years, and I dislike exceedingly that any change in its name or activities should be brought about. Primarily you are now providing something to accomplish what a few people in the country want, and it may be only temporary. You probably will have to make a change again later on. I am bringing this matter up, in the hope that some means may be found whereby an affiliation of the R. S. A. with the A. R. A., in some way, will accomplish what the Railroad Administration would like without taking too radical a step towards a consolidation with the A. R. A.

Mr. Dunham: Mr. Shaver struck a responsive chord in the hearts of a good many members. It is unquestionably true, as a matter of personal privilege, we would like to have retained many features of our old association. But that is not the question—under the situation the R. S. A. had no alternative. You will remember in 1917, through the American Railway Engineering Association the A. R. A. laid the foundation stone, if you please, of an amalgamation of all of the voluntary associations and we thought that ultimately we would be consolidated into the A. R. A.

As President of the association at that time it was my privilege to present the situation for the R. S. A. to the governing board of the A. R. E. A., and that association in turn transmitted the reports from all of the voluntary associations to the A. R. A. I make this statement rather with the idea we should be prepared to feel that we are not going back to the previous conditions. I believe I am violating no confidence when I state that the railroad executives of this country have felt for a long time that the activities of the various voluntary associations, while desirable in many respects, were not well co-ordinated, and that it was desirable to draw them into a closer and better working organization.

Mr. Rhea: Mr. Dunham made some of the points I had in mind. This has been a voluntary association and we had a constitution and an equity in the association. Under compulsory action the change was made, apparently the members had no vote in the matter—the board of direction, to save the situation, as he apparently puts it, has taken action which they thought was necessary, but it has not been done in conformity with the constitution of the R. S. A.

One of the reasons we have in America the great transportation machine which we have all been proud of is that we have had our voluntary associations and have had the benefit of the individual initiative of the members of those associations, and God help us if we lose that in whatever form it may come up.

A. G. Shaver: I agree with what Mr. Rhea has had to say. I still think the R. S. A. should be continued. I can see we are forced into a scheme of some kind to get the affiliation that certain individuals want, but the affiliation might come, it seems to me, in some manner that will still leave the R. S. A. as it has been in the past, with the membership having the right and privilege to express its will which it cannot do under the arrangement now proposed. The membership of the R. S. A. as part of the A. R. A. is going to kill the individual initiative as I see it.

W. M. Camp (Railway Review): The board is pleading that it did this thing under pressure and had no alternative. I do not know whether that is true or not. The same proposition was put up to the A. R. E. A. and they took a vote of the membership on it, and the membership voted it would *not* go into the proposed amalgamation on the terms submitted. The American Railroad Association has submitted new terms and the expectation is now that the A. R. E. A. will come in. But I want to call your attention to the fact that the A. R. E. A. *did* take a vote and turned it down. This association, apparently, did not have the grit to do it.

Mr. Dunham: I think the action taken by the meeting this morning ratifies the action already taken by the board. There was a difference between R. S. A. and the A. R. E. A. The latter association was purely voluntary and was composed wholly of members who paid their own dues, with a few exceptions. There was no railroad membership in that association. Now, that was not distinctly true of the R. S. A. The railroad companies, through their representative membership in the R. S. A. had authority to adopt any standard or other proposition submitted to them, and that may be, in a sense at least, a direct representation of the railroads, as it was in fact, because the railroads paid for the representative voting power according to their mileage. It seems to me that that difference brought the R. S. A. well within the scope of the A. R. A.

The board does not lack courage in any sense of the word. There is not a signal engineer on the railroads who has not had a difficult time of it for the last 20 years, largely because he has not had proper backing, either through the railroads or through an association. I submit that that weakness has been removed by this change of organization. We are now going to be affiliated with a strong railroad organization that is going to give us a backing, and we will find that our recommendations will receive more careful attention and be given greater recognition. We are not going to be hanging to a shoe string as in the past.

W. J. Eck (Southern): I would like to assure the members that they have not been tricked. The board of direction has not put anything over anybody and it has not been a matter of lack of courage or anything of that sort. It has proceeded in an orderly manner. About a year ago the subject of the amalgamation of the various associations was discussed by the board for a long time and a report was presented and approved by the association by a viva voce vote, that should occasion come, where a universal railroad association should be established, the R. S. A. would become a part of it.

It is possible there are others who are in the same position as Mr. Mock, who said he did not realize what was going on, but as a matter of fact, it was open and above board, and when it came about that the Director-General of Railroads asked that the American Railroad Association be formed, the board of direction of the R. S. A. not only had the constitution to back them, but they also had the approval of the association to enter into such an arrangement. In case the arrangement should terminate the securities of the old R. S. A. are held intact by the board of direction and all the machinery is preserved so that the R. S. A. could be resurrected tomorrow if it was necessary.

F. W. Pfleging (U. P.): I object to any insinuation that the board of direction had the big stick held over them. In fact, the board put up the proposition, and outlined the work, and submitted it to the A. R. A. for adoption. I know that the committee of direction put up everything and no one told them to do it.

Mr. Fugina: I was notified of the original conference the board of direction had with reference to this mat-

ter about a year ago. Since that time until recently I was violently opposed to the action the board contemplated. There were other signal engineers who felt the same way. We discussed the matter at various times among ourselves and were much inclined to criticize the action of the board of direction. When a number of the members were told by the board of direction exactly the arrangement that was to be effected, they won over every one of us, and I believe the R. S. A. will fare better in the future than in the past. I do not believe that the board of direction has had any lack of courage, after they told me what they had done I felt they had a great deal of courage, and I believe the members of the association can thank them for it.

As to other points, I do not believe it is imperative for this association to take action—I believe that the board of direction had power to handle the matter—and I believe if the members will go into the matter fairly, they will be convinced that it is really a great thing for the advancement of the association. At the same time, I believe that the members of the association should have an opportunity of ratifying the plan; we should give them the privilege to vote on it.

The Secretary: Section IV of the constitution reads as follows:

"The board of direction shall manage the affairs of the association and shall have full power to control and regulate all matters not otherwise provided for under the constitution, except to make the association liable for debt to an amount greater than that which, at the time of contracting the same, shall be in the secretary-treasurer's hands, in cash, and not subject to prior liability."

It is a fact that there is nothing in the constitution to provide for such a transfer.

H. M. Sperry: If we review a few facts we may clear our minds on this subject. (1) The railroads are in the possession and control of the federal administration; (2) the R. S. A. was a railroad organization, as shown by its representative members, and, therefore, differs from the ordinary voluntary organization; (3) the change was a necessary change as a part of the railroad program, that is, the Administration program; (4) the action has been ratified by your board of direction and the plan put through and it was actually ratified at this meeting, and, therefore, in any action taken now you must upset your previous ratifications.

As to the position the directors were placed in in deciding this, they had a very difficult proposition. They were faced with precedent, and no one likes to go against precedent, but they had the courage to do what they had to do and did it well, and as we stand today the R. S. A. is not changed and put on the shelf, but it has changed its name and is a bigger and stronger association, and the proof is the attendance at this meeting. (Applause.)

Mr. Stevens: I want to support everything that has been said with reference to the approval of the board's action. I do not think we will ever go back, even voluntarily, to our old status. I have always been an advocate of co-ordination of the voluntary associations in this country, because we are connected together in a way, and the standards of one association will overlap with those of the others, and we cannot do the work we should do unless we have some co-ordination. I wish to withdraw my motion.

On motion by Mr. Elliot, discussion was concluded.

Report of Committee III—Power Interlocking



THE COMMITTEE SUBMITTED a report on the following subjects: Specification for Electric Motor Switch Operating and Locking Mechanism, Specification for Electric Interlocking Machine. Only such sections of the specifications as have not been presented before are printed below. Regarding section 1-g. Tests made by various members of the committee and checked by other interested members of the association indicate the proposed specification will ordinarily provide a factor of safety of two, at the present maximum switch loading. Other structures along railroads which must withstand shocks without failure ordinarily have factors of safety from three to six. The views of the members were desired on this point.

Section 2-e provides for R. S. A. lock and operating rods, which as yet are not standardized. Section 2-l also provides for an R. S. A. switch layout as regards centering of lock and operating rods.

Section 2-h with reference to unauthorized movement. The committee desires criticism on this point.

The adoption by the association of this specification will automatically change the following sections of the Electric Interlocking specifications now in the Manual.

300. Switch mechanisms.

(a) Switch operating and locking mechanism shall conform to R. S. A. specification for Electric Motor Switch Operating and Locking Mechanism.

(b) Switch motor shall conform to R. S. A. specification for Electric Switch Motor.

Sections 301 and 312 will be eliminated.

The committee recommended that the specification for electric motor switch operating and locking mechanism and that the one for electric interlocking machine be accepted for presentation to the annual meeting for approval and submission to letter ballot for inclusion in the Manual.

Specification for Electric Motor, Switch Operating and Locking Mechanism

First and Second Range Voltage

1. Operating Requirements

(a) Mechanism shall perform its normal operation in the following sequence: (1) Throw detector bar one-half stroke, and unlock switch. (2) Throw switch. (3) Lock switch and throw detector bar one-half stroke. (4) Indicate. 1919.

(b) Mechanism shall be so constructed and equipped with an efficient friction clutch that it can be stopped, reversed, or obstructed at any point of its movement without damage. 1919.

(c) Mechanism shall be so constructed that it will follow the movement of the controller at the point of control. 1919.

(d) Mechanism shall be so constructed that indication cannot take place nor locking device complete its movement, unless the lock rod has moved to the full normal or full reverse position and the position of the mechanism corresponds thereto. 1919.

(e) Circuit controlling device shall be so constructed that

it will, for proper operation, be dependent upon the movement of the lock rod. 1919.

(f) Normal operating voltage for: (1) First range voltage mechanism shall be 20 volts, and time of operation at this rating shall not exceed 30 sec., nor shall it exceed 40 sec. at a voltage 20 per cent below normal. 1919.

(2) Second range voltage mechanism shall be 110 volts and time of operation at this rating shall not exceed four seconds, nor shall it exceed five seconds at a voltage 10 per cent below normal. 1917.

(g) Mechanism shall normally be capable of delivering to either the operating rod or detector bar connection, an operating effort of not less than 4000 lb. at any point of the stroke. 1919.

2. General Design

(a) Mechanism shall be equipped with a terminal board constructed from moulded insulating material (approved by the purchaser) on which all wiring in the case, including motor wires, shall terminate. Such terminal board shall be readily accessible and be housed in a weather-proof compartment within the mechanism case and provided with a separate metallic cover. Each terminal thereon shall be marked by stencilled imprint or other equivalent method. The wiring, neatly arranged, shall be placed in fiber ducts or chases of ample capacity and shall form an integral part of the apparatus. R. S. A. rubber-insulated wire not less than No. 14 A. W. G. provided with eyelets, at each end, shall be used. 1919.

(b) Circuit controlling device shall be housed in a non-sweating, dirt-proof compartment within the mechanism case and be provided with a separate metallic cover. Four contacts shall be provided in addition to those necessary for the control of the mechanism, so designed that they will be positive in action and each can be adjusted to open or close at any part of the operation as required. Contact terminals shall be marked by stencilled imprint to correspond to the marking on the mechanism terminal board. 1919.

(c) Contact springs shall be made of non-corrosive material of sufficient mechanical strength and current carrying capacity to satisfactorily operate in connection with the circuits used. 1919.

(d) Switch box in accordance with R. S. A. specification { shall / shall not } be provided. Such switch box shall be housed in the compartment with circuit controlling device. The contact terminals shall be marked by stencilled imprint to correspond to the marking on the mechanism of the terminal board. 1919.

(e) Mechanism and case shall be designated for use with lock rod, R. S. A. drawing....., and operating rod, R. S. A. drawing..... Ends of plungers or locking dogs and holes or notches in lock rod shall have square edges. Such holes or notches shall not be more than 1/16-in. larger than the plunger, measured on a line parallel to the travel of the lock rod. 1919.

(f) Mechanism, circuit controlling devices and terminal board shall be enclosed in a substantial metallic weather-proof case, designed for two tie supports, the cover of which shall be equipped with suitable fastenings for application of purchaser's padlock, and when opened, shall provide access to all parts. Means for readily draining oil and water accumulations shall be provided. 1919.

(g) Mechanism case shall be provided with wire opening for all wires entering case and equipped with couplings, adapter casting and armored hose connection, R. S. A. 1410. 1919.

(h) Mechanism shall be designed to prevent an unauthorized movement due to (a) unauthorized derangements; (b) external force applied to connections; (c) mechanical vibration. 1919.

(i) Mechanism shall be designed to permit an emergency operation by use of a hand crank which shall be furnished when specified as a part of such mechanism. 1919.

(j) Provision shall be made outside the mechanism case to hold hand crank and secure same against theft. The opening through which the crank is to be applied for hand operation shall be provided with a metallic weather-proof cover attached to the mechanism case, and equipped with suitable fastenings for application of purchaser's standard padlock. The location of such cover shall be conspicuously marked. 1919.

(k) Mechanism and case shall be so designed that they will be applicable to right or left-hand switch operation and can be readily changed from one to the other in the field. 1919.

(l) Mechanism and case shall be so designed that the centering of the lock and operating rods and the location and kind of fastenings to switch ties will conform to switch layout, R. S. A. drawing..... Mechanism operating rod shall have six-inch throw. 1919.

(m) Mechanism and case shall be designed for operation of detector bar R. S. A. 1098, and mechanism shall provide nine-inch total stroke for driving such bar. 1919.

(n) Mechanism case shall be designed so all unused openings may readily be securely closed. 1919.

(o) Mechanism case and motor assembled as applied to a switch, the ties of which have been adapted not more than two inches, shall not extend more than two inches above top of rail (A. R. A. clearance diagram). 1919.

3. Dielectric Tests

(b) Surface leakage space of not less than ¼-in. shall be provided between any exposed metallic part of the apparatus carrying current and any other metallic part thereof. 1919.

(c) Windings shall withstand a potential test of twice their rating at a suitable frequency without an excess current indicating a short circuit. 1919.

6. Bearings

(a) Bearings shall be of ample dimensions to insure reasonable durability. 1919.

(b) Means shall be provided for necessary lubrication of bearing surfaces. 1919.

(c) All exposed oil holes shall be provided with weather-proof oil cups or covers. 1919.

8. Paint

(a) Mechanism and case, except finished parts, shall be painted one coat of red lead and raw linseed oil and two finishing coats of purchaser's standard paint. 1919.

(b) Finished parts shall be coated with manufacturer's recommended rust preventive. 1919.

9. Tests

(d) Switch mechanisms shall be subject to, and withstand without injury, the following tests:

1. Insulation test at place of manufacture of 3000 volts a. c. applied to the assembled electric apparatus for one minute. The potential shall be obtained from an a. c. generator or transformer of at least five k. w. capacity. 1919.
   - (a) Windings to ground. 1919.
   - (b) Between windings. 1919.
   - (c) Between any terminal post, or circuit controller and ground. 1919.
   - (d) Wiring to ground. 1919.
2. The application of sufficient power to motor connection of gear train so that a push or pull of 5000 lb. will be delivered throughout the stroke of the throw rod during normal time of operation. 1919.
3. The application of sufficient power to gear train so that a push or pull of 5000 lb. will be delivered throughout the stroke of the detector bar driving connection during normal time of operation. 1919.

Specification for Power Interlocking Machine

3. Drawings

(a) Purchaser's drawings. Drawings shall accompany the specifications and form an essential part thereof. 1919.

4. Design

(a) The machine frame and locking bed shall be composed of sections, each containing not more than 15 lever spaces, and shall be so designed that additional sections may be added on either end. 1919.

(b) Like parts of the machine shall be interchangeable. 1919.

5. Locking

(b) Locking required for insuring the proper sequence in the operation of working levers shall be installed with the machine. 1919.

(c) For each spare lever and each spare space, provisions shall be made in the locking bed to accommodate either:

1. One locking shaft with one cross locking bar and one longitudinal locking bar for the full length of the machine. 1919.
2. One tappet with one longitudinal locking bar for the full length of the machine. 1919.

(d) The machine shall be equipped complete with locking guides or brackets. 1919.

(e) Locking shall be distributed as uniformly as possible in the locking bed and so arranged as to be easily accessible. 1919.

6. Levers

(a) Levers shall be numbered from left to right, and be in accordance with requisite sheet. 1919.

(b) Levers shall be arranged so that they can be removed without interfering with the operation of other levers. 1919.

(c) Spare levers shall be furnished in place complete with magnets, standard circuit controllers, locking shaft and driver, or tappet, and connections and tappet complete for the operation and control of their respective units. 1919.

(d) All levers shall be equipped with reverse latches. 1919.

(e) All levers, except those of the horizontal slide type, shall be equipped with normal latches. 1919.

(f) Levers shall be designed to permit the application of electric locks independent of indication locks. 1919.

7. Case

Machine shall be enclosed in a case, which shall have separate removable doors or panels for each section to give access to all parts of the machine, and shall be provided with locks as provided for on requisition sheet. 1919.

8. Painting

Painting of the machine and case shall be in accordance with R. S. A. specification. 1919.

9. Dielectric Tests

(c) Separate windings, which are insulated from each other, shall withstand a potential test of 3000 volts a. c. for one minute between their terminals and other metal parts from which the windings are insulated. 1919.

(d) A potential of twice the normal operating requirement at a suitable frequency shall be impressed across the windings without any excessive flow of current indicating a short circuit. 1919.

11. Circuit Controllers

Machine shall be equipped with manufacturer's standard circuit controllers necessary for the control of the circuits shown on drawings listed on requisite sheet. 1919.

12. Indication.

(a) Levers for the control of switches, derails, movable frogs, crossing bars, drawbridge locks and bolt locks shall be equipped with devices to insure the locking of the units in a position corresponding to the position of the levers before the release of the mechanical locking can be effected. 1919.

(b) Levers for the control of signals shall be equipped with devices to prevent hte release of the mechanical locking until the signals directly or indirectly controlled have assumed their normal position. 1919.

(c) Switch levers shall be free to move between their indicating positions. 1919.

13. Terminal Board

Machine shall be provided with a terminal board, constructed from insulating material, approved by the purchaser, and provided with terminal or binding posts for making all connections to the machine. 1919.

14. Lever Light Indicators

(a) Lever light indicators, when required, shall be located in front of the machine immediately above or below the levers. 1919.

(b) Electric lamps for lever indicators shall be in accordance with R. S. A. specification. 1919.

15. Contacts

(a) Contact springs shall be made of non-corrosive metal, or shall be protected against corrosion, and of sufficient strength and current carrying capacity to satisfactorily operate in connection with the arrangement of interlocking units for which the machine is furnished. 1919.

(b) Contact springs shall make sliding contact. 1919.

22. Requisites

(c) Machine shall be designed to operate in accordance with track and location plan....., dated.....
..... 1919.

(d) Machine shall be as shown on contractor's general drawing....., dated.....,
or catalogue reference..... 1919.

(e) Upon the completion of the work called for by this specification the following contractor's { tracings / blueprints / Van Dyke prints } shall become the property of the purchaser:

1. Track and location plan. 1919.
2. Locking sheet. 1919.
3. Dog chart. 1919.
4. Combination wiring. 1919.
5. Manipulation chart. 1919.
6. Track diagram. 1919.
7. Cable and wiring plans. 1919.

(f) Levers:

Lever frame;
Working levers, Signal .....
Switch .....
.....
.....
Spare levers, Signal.....
Switch .....
.....
.....
Spare spaces .....
Total .....
1919.

(g) Machine shall be designed for the control of circuits, the maximum voltage of which will be.....volts { direct / ..... cycle, alternating } current, and where special requirements are to be met, ... amperes. 1919.

(h) Electric locks together with normally open latch circuit controllers in addition to the indication locks (magnets) shall be provided for { section locking. / approach locking. / check locking. / .....locking. } 1919.

(i) Electric lock magnets shall be arranged for normal operation at.....volts { direct / .....cycle, alternating } current. 1919.

(j) Lever indicators shall of the { electric light / ..... } type for normal operation at ..... volts { direct / .....cycle, alternating } current. 1919.

(l) Levers controlling signals { shall / shall not } be provided with lever indicators. 1919.

(m) Auxiliary circuit controllers of the { spring / mechanical stick } type shall be provided for the following levers.....
and shall have.....contacts. 1919.

(n) Automatic time release providing.....seconds retardation in lever movement shall be provided for the following levers..... 1919.

(o) Insulation of coils and windings, if not enameled wire or fabric covered wire, impregnated, shall be as follows.....
..... 1919.

(p) Case:

Case shall be of { steel, enamel / wood. ..... / ..... } finish and equipped with { purchaser's standard cabinet / ..... } locks.
1919.

Committee: F. B. Wiegand (N. Y. C.), chairman; I. S. Raymer (P. & L. E.), vice-chairman; F. W. Pfleging (U. P.), vice-chairman.

Sub-Committee "A."—F. W. Pfleging, chairman; F. J. Ackerman (K. C. T.), Daniel Cushing, A. B. DuBray (I. C. C.), N. S. Lynch (M. P.), J. W MacCormack (K C. T.), O. R. Unger (M. P.), J. B. Weigel (L. & N.), G. A. Ziehlke (U. P.).

Sub-Committee "B."—B. J. Schwendt (T. & O. C.), chairman; E. T. Ambach (B. & O.), S. J. Dewey (C. C. C. & St. L.), H. L. Kilian (N. Y. C.), J. H. Oppelt (N. Y. C. & St. L.), H. H. Orr (C. & E. I.), J. C. Seaman (N. Y. C.), T. C. Seifert (C. B. & Q.), W. C. Sibila (N. Y. C.).

Sub-Committee "C."—I. S. Raymer, chairman; G. H. Burnette (Monongahela), W. D. Carrol (B. & O.), G. A. Motry.

Sub-Committee "D."—Jacques Stoltz (N. Y. C.), chairman; L. E. Carpenter (P. R. R.), C. G. McCauley (W. T. Co.), Charles Soper (L. I.), Walter Tyler (L. I.), G. C. Whitney (N. Y. Mun. Ry.),

Discussion

F. B. Wiegand (Chairman), presented the preliminary part of the report and B. J. Schwendt (T. & O. C.) presented the portion of the report regarding the specification under operating requirements.

W. K. Howe (G. R. S.): While all signal companies are using friction clutch, in my opinion that paragraph would be fully complete if the words "with an efficient friction clutch" were omitted. It is conceivable that something other than a friction clutch might be used to equal or possibly better advantage. I would like to have inserted the words "or other suitable means" after the words "friction clutch."

Mr. Wiegand: The committee will accept that addition of the words "or other equivalent means."

Mr. Schwendt presented Sections (c), (d), (e) and (f-1) of the report regarding operating requirements.

W. H. Reichard (F. S.): It seems to me that it is necessary to add to paragraph F-1 the circumstances under which these times and voltages should apply, and I would suggest that there be appended "when connected to reasonably free working switch," and the size specified.

T. S. Stevens (A. T. & S. F.): I notice that in 1-G there is a maximum operating effort provided. Why not make this time dependent on the operating effort, being not greater than as provided for in 1-G.

Mr. Schwendt: That is what the committee had in mind, and the point brought out by Mr. Reichard was talked over. It would be pretty hard to say what would be a reasonably free working switch, and to specify the conditions, so we tried to confine it to the maximum operating effort.

Mr. Stevens: Why not tie them both together in some way by including in f-1 that fact, a voltage 20 per cent below normal when the operating effort is not greater than in 1-g, or some sentence of that kind?

Mr. Schwendt: The committee accepts the suggestion.

(Mr. Schwendt then submitted the portion of the report as to second range voltage mechanism.)

Mr. Reichard: I understand the paragraph about to be read now under g is going to be tied with the first and second range voltage times. Is that so?

Mr. Schwendt: We are simply going to tie them with an operating effort not exceeding that specified in 1-g.

Mr. Reichard: I think that the committee is of the opinion that the switch machine should develop then an operating effort of four thousand pounds through a stroke of six inches, as we will ultimately develop, in four seconds of time; is that so?

Mr. Schwendt: Shall be capable of doing that as a strength requirement.

Mr. Reichard: I think the horse power output of that effort is far beyond the present practice of any switch mechanism with which I am acquainted. It seems to me that is a very impracticable designation.

Mr. Schwendt: It is not brought out in this specification. The committee has not considered as part of the assignment the design of the motor, and made no specification regarding the motor. This leaves the switch machine then standing by itself, as far as strength requirement is concerned, and attempts to establish a factor of safety. It does not necessarily follow that the motor would have to be of equal strength if it is not required. If it is required, the same switch machine will really do.

Mr. Reichard: It would seem to me if there is no motor connected in this specification, the design of operation and the voltages expressed are inconsistent with the specifications.

Mr. Schwendt: The two necessarily have to be tied together on account of strength requirements, and that was the thought of the committee in putting in such things that would indicate the motor was included.

L. F. Howard (U. S. & S.): Do I understand this is merely a specification to insure the stresses of the switching movement without the stresses imposed by the motor? That being the case, I suggest (g) be eliminated entirely, because I think (b), under Section 1, will impost all the stresses that are necessary to insure that you have a sufficiently strong mechanism. I am positive in switching mechanisms that the track-resisting phases of the mechanism are of great importance, and it is well known that impact tests are required for wheels that are subjected to shock as well as tests of tensile strength, and it does not seem to me that the report you read is any criterion on which to build a general specification for switch makers.

Mr. Schwendt: The committee before attempting to establish these figures made a number of tests to ascertain about what the different machines were doing—it did not attempt to break any machines, but in making those investigations we found a number of cases where 2,150 lb. were actually required on throw rod. We thought a factor of safety of two would not be too great, and we suggested the 4,000 lb. minimum.

At this point the discussion became lively as to the items in the specification covering the strength of the apparatus and various points were brought out by the members on the floor, and the manufacturers took issue with certain paragraphs presented on this subject. The type of insulation used was also discussed and suggestions made for the rewording of such paragraphs.

(Mr. Schwendt then read Par. (b), under general design, and several members offered criticisms that were submitted to the committee.)

Mr. Reichard (Fed. Sig. Co.): As to General Design 2 (d), I think that is another reason for the requisite sheet. "Switch-box in accordance with R. S. A. Specification." How can anyone tell to-day what that is going to be? A switch-box, I believe, should properly be termed a switch circuit controller. It is in committee at the present time. We may be able to conveniently house such a mechanism in the switch machine house. If this paragraph is left in, then every switch machine which is built in accordance with these specifications will have to have sufficient room in which the switch-box may be used. It would seem to me, perhaps, that more definite information should be given concerning the switch circuit controller.

Mr. Schwendt: It was the thought of the committee in placing that as it has in 2 (d) to make provision for the switch box in the mechanism case, so that it all can be self-contained. By making this provision, all the wires will go into just one point.

Mr. Stokes: I would say that in the switch circuit controller the R. S. A. specification would answer whether it was operated from the point or to the point and the lock. It seems that it has not left anything to the imagination as to whether this space is to be provided in the housing of the switch machine, or as to whether or not it shall be installed when the machine is ordered.

Mr. L. H. Howard: As to 2 (g), I would suggest the elimination of R. S. A. 1410. There are many cases where that connection would not be suitable.

Mr. Schwendt: The committee had in mind hose couplings in fixing it so it would be an easy matter to connect up to a movement from any angle in order to meet that condition and make it more universal.

Mr. Reichard: With regard to 2 (m) I would suggest the elimination of all reading matter after R. S. A. 1098, without the additional information that the mechanism shall provide nine inches total stroke.

C. F. Stoltz (C. C. C. & St. L.): 1 (a) provides that the movement under the sequence in which the mechanism performs shall operate the detector bar one-half inch stroke. If the detector bar is to operate but one-half inch stroke, why should the mechanism move nine inches?

Mr. Reichard: I don't think it is necessary to be specific with regard to nine inches.

Mr. Schwendt: The committee will take that.

Mr. Reichard: I could not comment on 3 (b) unless I am advised whether the motor is to be considered as part of this specification.

Mr. Schwendt: I assume eventually the motor will be considered as part of this specification, and I think remarks should be made on the assumption that it will.

Mr. Reichard: Then I think we should have the exception of ¼ in. with respect to motor commutators.

Mr. Schwendt: Any objection to 8 (a)?

W. K. Howe: These machines are painted with this red lead and linseed oil, and it takes three or four days for them to dry. It is very expensive, and do you think it is necessary that all of the parts that you have mentioned be painted with red lead?

Mr. Schwindt: What would you suggest on that, as to the inside?

W. K. Howe: There are many mechanisms that are now being coated with linseed oil only,-and cast iron parts seem to stand up pretty well when so treated. The thing that I have in mind is to get rid of that red lead and linseed oil that takes so long to dry.

Mr. Schwendt: The Signal division of the A. R. A. now has the A. R. A. specifications for painting, and I would like to ask Mr. Howe if it would be satisfactory if we include a clause reading that the painting of the mechanism shall be in accordance with the R. S. A. specification for shop painting?

Mr. Howe: I don't believe I know what that is.

Mr. Saunders: At the time that R. S. A. specification was under discussion, the question of dipping castings was discussed, and I believe it was agreed that that was the preferred method, of dipping them in paint, not red lead. Specification 8 (a) as it now reads covers too much to be covered in one clause. I think you will have to split it up to cover various parts, and in all probability apply the R. S. A. specification for painting a majority of them.

(Mr. Weigand read R. S. A. Specification 1198.)

Mr. Howard: Doesn't that refer principally to wrought iron and steel? A great many of these mechanisms are cast iron, which is one of the most rust-resisting materials there is. Personally, I believe a dipping coat is absolutely as much as you ought to put on cast iron.

Mr. Schwendt: The committee will consider the suggestion made.

(Mr. Wiegand submitted specifications for power interlocking machine and after receiving suggestions from several members, the committee was excused with thanks.)

Report of Committee II—Mechanical Interlocking



THE COMMITTEE presented a report on unit specifications for mechanical interlocking machines having S. & F. locking, and recommended that they be accepted for presentation to the annual meeting for approval and submission to letterballot for inclusion in the Manual. The specifications follow:

1. General

(a) Machine shall be arranged for (vertical horizontal) leadout. 1919.

(b) Machine shall have..... levers and ..... spare spaces, total..... 1919.

(c) Levers shall be numbered and arranged in accordance with a track and signal plan, dog and locking sheet approved by the purchaser. 1919.

(d) Levers ..... shall be equipped with counterweight of ..... pounds, to assist in moving them to normal position. 1919.

(e) Machine legs, bottom girders, lever shoes, lever number plates, quadrants, top plates, rocking links, back, front and intermediate rails, and blocks, bearings and locking brackets shall be made of cast iron. 1919.

(f) Latch shoes, latch handles, latch nuts, universal links, link blocks, drivers for end of locking shafts, locking shaft drivers for longitudinal locking bars, bottom girder caps, swing locking dogs and driving pieces for longitudinal locking bars shall be made of malleable iron. 1919.

(g) Levers, tail levers, latch rods, end strips and locking bracket caps shall be made of open hearth steel. 1919.

(h) Locking shafts, longitudinal locking bars, cross-locking, locking dogs and stops, driving piece blocks and all pins shall be made of cold drawn steel. 1919.

(i) Latch springs shall be made of spring steel wire. 1919.

(j) Trunnions shall be made of forged steel. 1919.

(k) Machine shall consist of four and eight lever sections. 1919.

(l) Levers shall be spaced five inch centers. 1919.

(m) Height of machine for vertical leadout shall be 2 ft. 8½ in. from bottom of leg to top of finished top plate. 1919.

(n) Height of machine for horizontal leadout shall be 3 ft. 5⅞ in. from bottom of leg to top of finished plate. 1919.

(o) Like parts of machine shall be interchangeable. 1914.

(p) Each spare space shall be equipped with lever shoe, pin and cap. 1919.

(q) Bolts and screws shall have U. S. standard threads. 1919.

(r) Nuts, bolt and cap screws shall be hexagonal unless otherwise specified. 1919.

(s) Bolts and cap screws shall be provided with spring lock washers where practicable. 1919.

(t) Taper dowel pins shall be standard taper one-fourth inch per foot. 1919.

(u) When necessary to hold parts in fixed relation to each other, dowel pins or finished bolts shall be used. 1919.

(v) Moving parts of machine shall work freely without lost motion. 1919.

(w) Machine painting shall be in accordance with R. S. A. specifications for painting. 1919.

2. Machine Legs

(a) Legs for vertical lead-out machine shall be 2 ft. 7¼ in. in height and base of leg shall be provided with four holes for ¾-in. bolts. 1919.

(b) Legs for horizontal lead-out machines shall be 3 ft. 5 in. in height and base of leg shall be provided with four holes for ¾-in. bolts. 1919.

3. Bottom Girders

(a) Bottom girders shall be fastened to legs with two ¾-in. thin square head finished bolts. 1919.

(b) Caps shall be fastened to bottom girders with two ½-in. square head bolts. 1919.

4. Top Plates

(a) Top plates shall be fastened to machine legs with six ½-in. T head bolts, one ½-in. cap screw and four 7-16-in. taper dowel pins. 1919.

(b) End strips shall be fastened to top plates with two ½-in. T head bolts. 1919.

5. Levers

(a) Levers shall be numbered left to right. 1916.

(b) Levers shall be 5 ft. 10⅛ in. from center of fulcrum to end of handle. 1911.

(c) Levers shall have equal and uniform throw. 1919.

(d) Tail levers shall be drilled to provide 8¾-in., 9¾-in.,

10¾-in. stroke and shall be interchangeable as front or back tail levers. 1919.

(e) Lever shoes for vertical lead-out machine shall provide approximately equal stroke above and below horizontal and so arranged that connections can be made to front or back tail levers. 1919.

(f) Two-position levers shall be latched in normal and reverse positions. 1914.

(g) Three-position levers shall be latched in normal, central and reverse positions. 1914.

(h) Levers and tail levers shall fit snugly into lever shoes and be fastened thereto with two ¾-in. finished bolts. 1919.

(i) Lever shoe pins shall be 1-in. diameter. 1919.

(j) Latch shoes shall provide for 4½-in. opening for latch springs and shall be fastened to levers with two ½-in. tap bolts and one 7-16-taper dowel pin. The hole for dowel pin to be located below the hole for the lower tap bolt. 1919.

(k) Quadrants shall be fastened to top plates with three ½-in. bolts. 1919.

(l) Rocker links shall be fastened to quadrants with one 1-in. diameter pin, pin to be held in place in quadrant with one ⅜-in. headless set screw. 1919.

(m) Latch rods shall be straight ⅝ in. by 24¾ in. from end of block to end of thread, thread to be S.A.E. standard 2¼ in. long and supplied with hexagon check nuts. 1919.

(n) Latch nuts shall be designed with ⅝-in. offset, to be 3 in. long from center of hole to end of nut and to be tapped with S.A.E. standard ⅝-in. tap. 1919.

(o) Latch springs shall be 11-16 in. inside diameter and shall be of proper strength to operate the locking bars when the lever is at either end of quadrant and the latch is free to drop. 1919.

(p) Latch handles shall be 12 in. long from center of holes to end of handle and shall be connected to lever and latch rod with two ½-in. cheese head pins. 1919.

(q) Lever number plates shall be fastened to levers with one ½-in. cheese head pin. 1919.

(r) Universal links shall be 5¾ in. center to center, and connected to rocker links with one 1-in. flat swivel pin and one ½-in. cheese head pin. 1919.

(s) Link blocks shall be 1 in. by 1½ in. by 1⅛ in. with a sliding fit, and to have 5-16 in. by 5-16 in. lip. 1919.

6. Locking

(a) Machine shall be provided with mechanical locking of a type which will be effective prior to the application of energy to the unit controlled. 1919.

(b) Machine shall be fully equipped with cross-locking brackets and locking shafts with cranks and drivers. For each spare lever and each spare space, one cross-locking bar, and one longitudinal locking bar for the full length of the machine shall be provided with operating connections complete. 1919.

(c) Locking shall be distributed as uniformly as possible without crowding in the locking bed and so arranged as to be easily accessible. 1919.

(d) Bearings for front, back and intermediate rails shall be fastened to machine legs with four ½-in. bolts and two 7-16-in. taper dowel pins. 1919

(e) Bearings for machines having locking beds wider than 24 way shall be provided with supports under outer end. 1919.

(f) Front and back rails shall be interchangeable. 1919.

(g) Intermediate rails shall be wide enough to accommodate two standard locking brackets. 1919.

(h) Front, back and intermediate rails shall be provided with one way caps. 1911.

(i) End blocks shall be fastened to rails with one ⅜-in. cap screw. 1919.

(j) Ends of locking shafts shall be square and of like dimensions. 1914.

(k) Drivers for end of locking shafts shall be fastened to locking shafts with one ½-in. bolt and connected to universal link with one ½-in. cheese head pin. 1919.

(l) Drivers for longitudinal locking bars shall be of the clamp type with filler blocks and fastened to locking shafts with one ⅝-in. bolt and nut through end of driver. 1919.

(m) Eight and 12 way locking brackets only shall be used. 1919.

(n) Locking brackets shall be planed out for longitudinal bars to a depth of 1 37-64 in. below finished top of bracket and shall be 1 1-16 in. wide and for cross-locking bars to a depth of 25-32 in. by 49-64 in. wide. One ¼-in. and two 7-16-in. holes shall be drilled with jig through end of bracket and shall be fastened to rails with four ⅜-in. cap screws and two ¼-in. straight dowel pins. 1919.

(o) Longitudinal locking bars shall have 1¾-in. stroke and shall be provided with stops for normal and reverse positions of the bar. 1919.

(p) Splices in longitudinal locking bars shall be made by means of two channel clamp splices and fastened together with two ¼-in. bolts with nuts and cotters. 1919.

(q) Trunnions for swing dogs shall be reversible and shall be provided with washers and cotters. 1919.

(r) Swing dogs shall be straight and reversible. 1919.

(s) Straight locking dogs, Nos. 2 and 5 only, shall be used, and shall be drilled so that a normal drive dog can be made a reverse dog by turning it end for end, or a reverse dog can be made a normal dog in the same manner, or a double end dog, No. 5, can be made to take the place of either a normal or reverse dog. 1919.

(t) Locking drivers, dogs, swing dog trunnions and stops shall be riveted to longitudinal bars with ¼-in. rivets. 1919.

(u) Latches when locked shall have not more than 1-16-in. lift for direct locking between levers and an additional lift of not more than 1-64 in. for each special in the combination. 1919.

7. Material and Workmanship

(a) Material and workmanship shall be first class in every respect. (G. P. 9-a.) 1911.

(b) The contractor shall replace, at his own cost, any part or parts of the apparatus and material furnished by him, which shall, within a period of one year from date of acceptance of the installation, fail to perform its proper function because of any defect in the design, construction, application or erection of such apparatus. (G. P. 9-b.) 1915.

8. Inspection

(a) Purchaser will make such inspection of the completed product as to assure him that the requirements of the specification have been met. (S. S. I.-a.) 1917.

(b) Purchaser may make desired inspection at all stages of manufacture. (S. S. I.-b.) 1917.

(e) The manufacturer shall make such tests as may be necessary to demonstrate to the satisfaction of the purchaser that the apparatus is in accordance with the requirements of the specifications and contract. 1918.

9. Packing

(a) Material shall be packed to permit convenient handling and to prevent loss or damage during shipment. (S. S. P.) 1916.

10. Marking

(a) Purchaser's order and requisition number, name of consignor and name and address of consignee, shall be plainly marked on outside of package. (S. S. M.-a.) 1916.

(b) Detail list of loose pieces, containers and their contents shall be furnished for each shipment. Where carload shipments are made, show routing and car identification. (S. S. M.-b.) 1916.

Committee: C. J. Kelloway (A. C. L.), chairman; G. W. Chappell (N. Y., N. H. & H.), vice-chairman; Samuel Miskelly (C., R. I. & P.), vice-chairman; Larsen Brown (A., T. & S. F.), O. H. Eichblatt (S. P., Atlantic System), F. E. Jacobs (C. & W. I.), J. W. McClelland (P. & R.), W. B. Morrison (D., L. & W.), E. J. Relph (N. P.), R. W. Taylor (B. & O.), Wm. Dawson (N. Y. C.), Oswald Frantzen (N. Y., N. H. & H.), H. F. Lomas (I. C.), E. E. Mack (C. & E. I.) E. K. Post (P. R. R.), Chas. Stephens (C. & O.), J. I. Vernon (N. Y., N. H. & H.), W. F. Zane (C., B. & Q.).

Discussion

E. J. Relph (N. P.): In connection with (d) this is for vertical, how about horizontal?

Mr. Kelloway (Chairman): One could be provided if a weight is found necessary. There are only a few cases where counter weights are necessary, and the committee has provided for those few cases.

Mr. Relph: In (f) I propose they be made of cold drawn steel, the same to be held in place with a cotter pin.

Mr. Kelloway: That is a good point, and the committee will take that into consideration.

P. M. Gault (I. C.): In regard to the latch spring

that Mr. Relph mentioned, the specification is indefinite, and when you turn to levers, the size of the wire used for the spring is not mentioned. I think the spring should be so designed that we would get the same spring from each manufacturer and they would be interchangeable.

C. A. Dunham (G. N.): I ask the committee if it has given consideration to the question of increased lever ratios. If I am not mistaken, paragraph (n) contemplates practically the present-day machine, with a lever-ratio of about 1 to 5, I believe it is. It has been my experience that an increased lever-ratio would be a good thing. I believe some of the members would be interested in knowing that the practice abroad provides for a ratio of 2 to 7, giving the tower man more power and making a mechanical machine which works easier than the standard machine here.

Mr. Kelloway: That has been considered. Some of the companies manufacture such a machine today, and they are being used on the Pennsylvania Railroad and the Atlantic Coast Line, but we decided four years ago to go back to the standard machine, believing that the increased length of lever was not advantageous.

Caleb Drake (C. & N. W.): I think there should be something provided to take care of the end pin on each end of the machine from working out. I have looked at the detailed specification and cannot find it.

J. A. Peabody (C. & N. W.): We have had these pins come out. There should unquestionably be some provision made for taking care of them. It can be done by means of tap screws or otherwise.

Mr. Kelloway: The committee will consider that matter.

Mr. Gault: Nut locks should be added to that clasp, as we frequently have these come loose.

G. H. Dryden (B. & O.): I would suggest in (c) "levers shall have equal and uniform throw" the addition of, "and shall be in true alinement."

Mr. Kelloway: The committee will accept that.

Mr. Relph: Is the committee figuring on designing a new lever shoe for the horizontal step. The present lever shoe does not fit in the lever and is held in place by three bolts and a dowel pin. According to (h) a new lever shoe would have to be designed.

Mr. Kelloway: The committee did not deem it necessary to provide a new lever shoe for new horizontal machines, as you lead your pipe connections off from the horizontal, and therefore the old lever shoe was considered a proper design.

A. J. Kelly (C. C. C. & St. L.): We have had occasion to change our latch shoes and the dowel hole did not run up, and we should specify just how much below that is to come.

Mr. Kelloway: We will consider that point.

Mr. Gault: The specification by inches does not give an exact specification to dowel pins. That is something with which many of the section men have had trouble. They measure one end and the fellow who slips them out measures the other end, and if they were ordered by number, we would get what we wanted.

Mr. Kelloway: We simply state how the latch shoe is to be latched to the lever. We refer to dowel pins later on, and give specifications for them. The committee has spent considerable time on the matter of latch springs. Perhaps Mr. Howard will give us a statement on this subject.

L. F. Howard (U. S. & S. Co.): I said that the specification, as it appeared at the time of the annual meeting, was not sufficient. That is, if you want to draw up a specification of a spring you should specify the general dimensions, and specify the compression to be given by different voltages and get something you want. In order to do that, you will have to first make experiments to find out what load you want to handle, and knowing the load, you can specify the compression. You can then determine the dimension of the latch shoe. We agree the way it is specified now will take care of the situation by putting in fillers where you want to get increased tension for the machines.

W. H. Elliott (N. Y. C.): I think the latter part of this specification should be revised along the lines stated by Mr. Howard, and between now and the time it is put to letter ballot, to make a positive requirement instead of leaving it to general investigation. We have made tests to determine what we believe is a proper load for a spring for the levers.

Mr. Kelloway: The committee will be glad to consider that matter.

Section (b) expresses the consensus of opinion at the New York meeting. Mr. Christofferson suggested, and it was approved by the association that we would have all locking brackets in the machine, and cross-locking bars, drivers and shafts for the spare levers and spare spaces, and we got it out in that way.

C. A. Christofferson (N. P.): I do not think there will be much trouble in fitting up a lock on our own machine. It might be that we might have to make a few changes, but it is much better to have a bar in and provide for it, than to have a lot of short bars in that you might have to take out.

Mr. Howard: I would suggest that in par. (m) that the words "not more" be inserted, so that it will read, "and not more than 12."

Mr. Kelloway: The committee will be glad to go into this matter.

Mr. Kelloway: The committee has given the matter of straight swing dogs (par. (r)) further consideration, and is prepared to recommend the present type of dog, except that it shall be 3/8 in. thick, and each dog shall be interchangeable.

Mr. Gault: Referring to paragraph (s), at the meeting in New York last fall, I believe Mr. Kelloway stated the number of dogs had been reduced to five or six.

Mr. Kelloway: The committee will re-write this paragraph and include additional dogs that we have found it is necessary to have, in respect to some of the larger machines.

Mr. Ralph: I don't think the size of the machine should determine what dog should be done away with. I see no reason why we should not use 1, 2, 3, 4, 5, 6, 7, 9, 11, and 13, doing away with 10, 12 and 8.

Mr. Kelloway: We can lock up all machines with the number of dogs that we have recommended. It may require a little additional labor in making up dog charts.

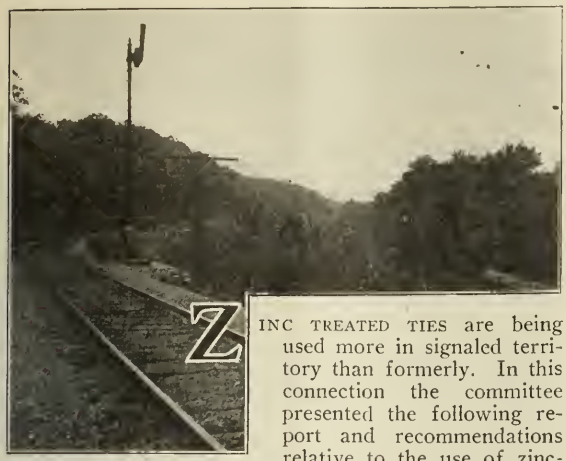
Mr. Stevens: I suggest the elimination of par. 7, and the addition of the warranty clause as provided in the power specification.

Mr. Kelloway: We accept that.

Mr. Relph: Mr. Chairman, I have a clause: "All parts of machines that can be knocked down shall be marked with steel figures, and given the numbers which they take in the assembling machine. Locking brackets, cross-locking, longitudinal locking and swing dogs shall be marked to read from the back of the machine. Longitudinal bars shall have their letter numbers marked directly over their drivers. Swing dogs shall be marked with letter numbers at the trunnion end, and space bars at the nose end.

(The committee was dismissed with thanks.)

Report of Committee IV—D. C. Automatic Block Signaling



ZINC TREATED TIES are being used more in signaled territory than formerly. In this connection the committee presented the following report and recommendations relative to the use of zinc-treated ties in track circuits.

1. As the electrical conductivity of zinc-treated ties decreases with age during the first year, better results may be had by allowing the ties to season for a period of from two to six months before using in a circuited track, thus avoiding the use of the tie while its conductivity is greatest.

2. For good results, the number of zinc-treated ties installed per year in any track circuit should not be greater than 15 per cent of the total number of ties in that circuit.

3. (a) It is recommended that a maximum rail resistance not to exceed .1 ohm per 1,000 ft. of track be maintained. Ordinarily it will be lower. This resistance can and should be reduced to a minimum by using bonding wires of high conductivity or increasing the number of bonding wires per joint.

(b) Rail and bonding resistance may be determined by the following formulæ in which

E—Volts at rail—battery end.
e—Volts at rail—relay end.
I—Amperes flow from battery.
i—Amperes flow through relay.
R—Rail and bonding resistance total in ohms.
r—Rail and bonding resistance per 1,000 ft. of track in ohms.
L—Length of track circuit in feet.

$$R = \frac{2\,(E-e)}{(I+i)} \qquad r = \frac{2000\,(E-e)}{L\,(I+i)}$$

4. (a) The length of track circuit should be determined by the ballast resistance or the resistance from rail to rail through ties, ballast, and track insulation.

(b) The following table expresses in ohms per 1,000 ft. of track readings on various kinds of ties:

Ballast Resistance in Ohms per 1,000 Ft. of Track

Date, 1917	Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Temperature	Humidity
April 12	4.27	5.36	48.02	44.55	24.87	13.37	40° F.	40%
May 17	2.28	3.22	34.52	24.68	21.19	12.42	82° F.	73%
June 8	1.91	2.76	15.66	15.72	9.50	5.82	58° F.	50%
Aug. 6	3.48	6.42	32.82	26.99	12.65	16.05	78° F.	46%
Sept. 14	2.56	3.15	14.64	14.27	9.67	6.55	77° F.	56%
Oct. 25	4.85	6.06	28.92	28.92	15.96	7.77	41° F.	75%
Average	3.23	4.49	29.09	25.85	15.64	10.33		

Key: Section 1—Zinc-treated red oak.
Section 2—Zinc-treated red oak soaked and scrubbed.
Section 3—Red oak treated with 25 per cent creosote, 75 per cent gas oil.
Section 4—Red oak treated with 10 per cent creosote, 90 per cent gas oil.
Section 5—White oak untreated.
Section 6—Various species—old ties in place for several years.

(c) Ballast resistance may be determined by the following formulæ in which

E—Volts at rail—battery end.
e—Volts at rail—relay end.
I—Amperes flow from battery.
i—Amperes flow through relay.
Y—Ballast resistance total in ohms.
y—Ballast resistance per 1,000 ft. of track.

$$Y = \frac{2\,(E+e)}{(I-i)} \qquad y = \frac{2000\,(E+e)}{L\,(I-i)}$$

(d) Unless the ammeter with which the current readings are taken is of an extremely low resistance, such readings should be taken only for the purpose of determining the resistance of the unit and relay. The current flow should then be calculated from these resistances and the voltage drop across them, otherwise the error due to the resistance of the instrument will affect the results.

(e) When the rail resistance is equal to .1 ohm per 1,000 ft. of track, a 2-ohm relay used, and the ballast resistance per 1,000 ft. of track as determined by the above formulæ is as shown below, the track circuits should not exceed the lengths shown opposite the following resistances:

1 ohm —2,200 ft. 3 ohms—4,400 ft.
2 ohms—3,400 ft. 4 ohms—5,200 ft.

The lengths as above shown provide for the operation of the relay at 150 deg. F., under which condition, with .6 volts at the battery, 115 milamperes flows through the relay.

5. Because of a low ballast resistance in track circuits where zinc-treated ties are used, a 2-ohm relay should be used, as it will operate satisfactorily when a relay of higher resistance will not.

Committee: C. F. Stoltz (C. C. C. & St. L.), chairman; G. H. Dryden (B. & O.), vice-chairman; F. H. Bagley (L. & N.), M. A. Baird (Erie), E. E. Bradley (W. M.), J. H. Butridge (I. C.), T. N. Charles (Southern), J. J. Corcoran (N. Y. C.), A. R. Fugina (L. & N.), R. E. Green (M. C.), E. Hanson (G. C. & S. F.), Leroy Wyant (C. R. I. & P.), G. W. Hulsizer (C. & A.), Geo. A. Kirley (B. & A.), G. W. Kydd (B. & O.), B. A. Lundy (N. Y. C.), E. B. Pry (Penn. Lines West), G. W. Trout (P. M.), E. L. Watson (P. R. R.), E. P. Weatherby (T. & P.), E. E. Worthing (S. P. Lines Atlantic System), R. B. Arnold (C. & N. W.).

Discussion

A. R. Fugina (L. & N.): There are a number of things in the report that I believe should have further consideration. I refer more particularly to Par. 1, in which it is stated that the period of seasoning ties should be from two to six months. I don't believe that two months is sufficient time for seasoning. I believe that the minimum should be six months. Par. 2, it seems to me, should be further qualified; that is to say, 15 per cent of the total number of ties in a circuit may be renewed each year. That depends a great deal upon the length of the track circuit, and it depends upon the track circuit conditions. With certain track circuits, under good track circuit conditions, you may be able to use more than 15 per cent, and on other track circuits it would not be practical to use as much as 15 per cent. In other words, the rail resistance and the ballast resistance of the track circuit will determine the number of zinc-treated ties that can be used in the circuit.

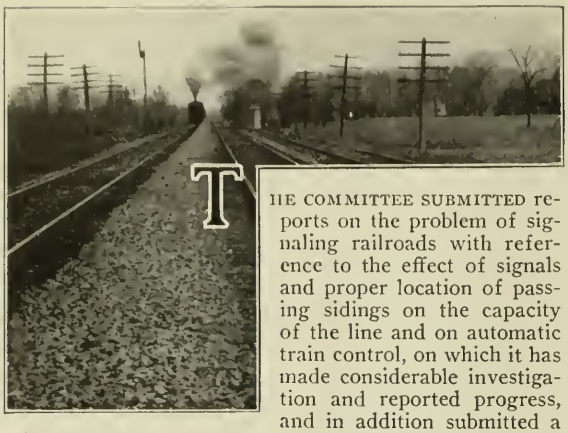
Under 4-e, I don't think that 115 milamperes is sufficient. In other words, that we would require at least 130 milamperes flowing through the relay. For that reason it may be that the information given is somewhat misleading.

We will now call for the report of Mr. C. F. Stoltz, Chairman.

Mr. Stoltz (Chairman): The committee's idea was that it should not require that all ties should wait for six months before being installed. It depends altogether on how much zinc is put into the ties, and that is something that railroads will have to settle for themselves. There is another thing I want to lay emphasis on, and that is bonding resistance. The success, or rather the failure of the track work, is more often due to bad rail bonding that it is to bad ballast, and anything that can be done to increase the conductivity of the rails will help a great deal more than anything else, and it can be done.

(The committee was dismissed with thanks.)

Report of Committee X—Signaling Practice



THE COMMITTEE SUBMITTED reports on the problem of signaling railroads with reference to the effect of signals and proper location of passing sidings on the capacity of the line and on automatic train control, on which it has made considerable investigation and reported progress, and in addition submitted a brief summary of some of the devices which are showing promises of development. These devices are: The American Train Control System; Shadle Automatic Train Control; National Safety Appliance Company, and Shweyer Automatic Train Control.

The committee recommended that the matter on location of sidings and that on automatic train control be accepted and presented to the association as information.

Effect of Siding on Capacity of Two or More Tracks

In the study of the effect of signaling (block signaling) and the location of passing sidings on the capacity of a track with traffic in one direction, we have quite a different problem from that of a track with traffic in both directions, for while in both cases time is the governing feature in determining how many trains can be operated between two points, in the case of a track with traffic in both directions it is the time of opposing trains which controls; whereas on a track with traffic in one direction it is the time of following trains. The subject naturally divides itself into two parts: First, a proper location of passing tracks; second, capacity of a line without passing tracks.

Proper Location of Passing Tracks

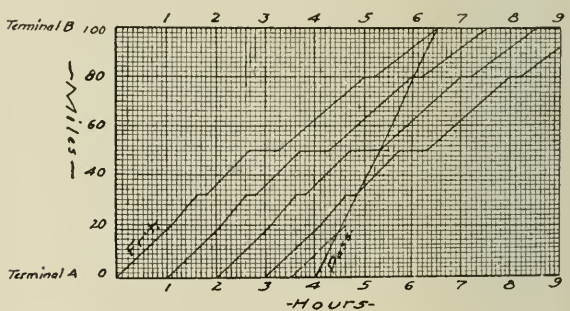
In order that we may have a concrete example on which to base the formulæ and methods which we intend to produce, we will take a 100-mile division on which only two classes of trains are operated. First, freight trains whose running time over the division, including necessary stops for coal and water, is 6½ hr.; and second, passenger trains whose running time over the division is 2½ hr. The running time of the freight train we will assume to be as follows:

From terminal A to mile post 20	66 min.
From mile post 20 to mile post 32	30 min.
From mile post 32 to mile post 50	54 min.
From mile post 50 to mile post 80	105 min.
From mile post 80 to terminal B	78 min.
Total	333 min.

The necessary stops for the freight train we will assume to be 12 min. at mile post 32 for water; 33 min. at mile post 50 for coal and water, and 12 min. at mile post 80 for water; total time for stops being 57 min., so that the total time consumed on the division, as before assumed, would be 390 min.

The accompanying diagram shows a freight train leaving terminal A at 12 midnight and arriving at terminal B at 6:30 a. m., and a passenger train leaving terminal A at 4 a. m., arriving at terminal B at 6:30 a. m. It is quite evident from an inspection of this diagram that if there were no passing tracks on the division, no freight trains could be operated between midnight and 4 a. m. In other words, the passenger train occupies the line for four hours. This time of four hours is equal to the difference between the running time of the freight train and the running time of the passenger train; or if we let T represent this interval of time, and tF and tP represent the total running time of the freight and passenger trains, respectively, we would have $T = tF - tP$.

If there were no passing tracks on the division, but one freight train could be operated during this interval



Graphic Method of Locating Passing Tracks on Double Track Lines

of time. If there was one passing track on the division of only one train capacity, then only one more freight train could be operated, and if there were two such passing tracks, then only two more freight trains could be operated. So, the number of trains that could be operated during this interval of time would be one more than the number of passing tracks. It is also quite evident that the maximum delay which could occur to a freight train at terminal A if there were no passing tracks would be four hours, for if it could not leave terminal A in time to reach terminal B before the passenger train, it would have to wait at terminal A until after the passenger train had left that terminal. Consequently, the maximum delay would also be equal to $tF - tP$. It is quite evident that the proper location of passing tracks would be one that would cause the minimum amount of delay to the freight trains when they are passed by the passenger train. In order to show the conditions under which such

a minimum delay will occur, we present the following diagram (Fig 2):

This diagram is a portion of the usual train diagram, and it shows two freight trains being passed by a passenger train at adjacent sidings. Freight train No. 1 arrives at siding B at such a time in advance of the passenger train that it can clear the main line in accordance with any rules that may be in effect relative to this particular train movement. Freight train No. 2 also arrives at siding A the same amount of time in advance of the passenger train. These would be the conditions under which the minimum amount of delay would be caused to the freight trains, and that delay would be only the actual time which it is necessary for a freight train to lose due to its entering a siding to be passed by another train. This loss of time, which we will call *a*, may be divided into three parts, as follows: (1) The time lost by the freight train due to stopping for switch and starting again and getting into clear on the siding, which time we will call *b*; (2) the time the freight train must remain at rest on the siding in order to be passed by another train, which time we will call *e*; and (3) the time lost by the freight train in starting from the siding and re-

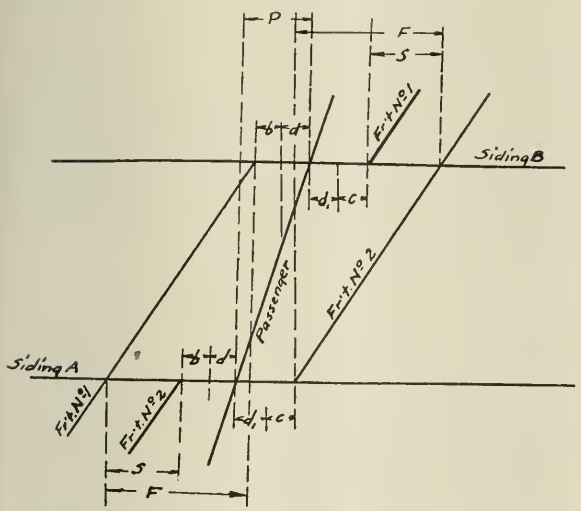


Figure 2. Location of Passing Tracks for Minimum Delay

gaining its normal speed, which time we will call *c*. The time *e* which a train must remain at rest on the siding is again divided into two parts. (1) The time which it must be into clear before the arrival of the passenger train as per rules which may be in force, and (2) the time which it must remain at rest after the passenger train has passed the siding. This time also being in accordance with rules which may be in force. These two subdivisions of the time *e* we will call *d* and d^1, respectively, so we would have $a = b + c + d + d^1$.

Representing the running time of the freight train between sidings by F, and the running time of the passenfer train between the same sidings by P, we would have from the diagram $S = F + c + d^1 - P - d^1 - c$. Or, $S = F + b + d - P - d - b$. Or, in either case, $S = F - P$. S in this case being the spacing in time between the two freight trains.

From this we learn that the minimum delay will occur to a freight train when the spacing between freight trains is equal to the difference in running time of the freight and passenger trains between the sidings. The maximum delay would occur to a freight train when, for example, freight No. 1 arrived at siding A just too late to make siding B in advance of the passenger train in accordance with the rules which may be in effect, and in consequence thereof it has to wait at siding A until the passenger train had passed that siding, in which case the freight train would arrive at siding B on the time shown on the diagram for train 2. The time lost by such a delay to freight No. 1 would be as shown by the diagram, equal to S, which, as heretofore shown, is F — P. The maximum delay is then the difference between the running times of the freight and passenger trains between the sidings and this maximum delay will be found on a division at the point where this F — P is the greatest.

Coming back now to the train diagram of our concrete example, it is quite evident that the maximum F — P will be the smallest when this F — P is the same for the space between each of the passing points; or, in other words, the passing tracks should be so located that the difference between the running time of a freight train and passenger train between them would all be equal, or, what is the same thing, the spacing between freight trains which are to be passed by the passenger train should be all equal.

As there is always one more space than there are passing tracks, we can construct the following formulæ:

$$S = \frac{tF - tP}{N + 1},$$ in which N equals the number of passing tracks. For example, if there were to be three passing tracks on the 100-mile division of our concrete example, the proper spacing between freight trains would be

$$S = \frac{390 - 150}{4},$$ or, $S = 60$ min.

The proper location of this number of sidings can be easily determined graphically by laying out on the diagram freight trains leaving terminal A one hour apart, or at 1 o'clock, 2 o'clock and 3 o'clock, and the points where they intersect the passenger train line would be the proper location of the passing tracks, or on the diagram at mile posts 32, 50 and 80. It will be noted from this diagram with such a location of passing tracks that the running time of a freight train between each of the passing tracks, plus the time that it is either taking water or coal, minus the running time of the passenger train between the same sidings, is in each case equal to 60 min. We can, therefore, establish the general rule that the proper location of passing tracks on a double track line would be such that the difference between the running time of the freight trains, including necessary stops, and the running time of the passenger trains, including necessary stops, between them should all be equal. This analysis does not take into consideration the use of the second main track for passing trains.

From the foregoing it follows that the capacity of a division is increased as the value of the time F — P is decreased. The value of this term may be decreased by either decreasing F, which would be increasing the speed of the freight trains, or by increasing P, which would be decreasing the speed of the passenger trains, and it is quite evident that the actual maximum capacity can only be reached when the value of this term is zero, in which case passing tracks would not be needed and the spacing of trains would usually be governed only by the longest time which the train is obliged to remain at rest at any point upon the division.

When all trains are running at equal speed the capacity of a division can be expressed by the simple equation,

$$Z = \frac{f}{T},$$ in which Z equals the number of trains, T an interval of time and *f* the interval of time between trains.

If no form of block signaling is employed, this time f is determined by the maximum length of time a train is obliged to stop at any point on the division for any purpose, such as for taking coal and water, in which event the time f is equal to the amount of time which the train remains at rest for such a purpose, and the equation for capacity under these conditions becomes $Z = \frac{T}{D}$, in which D equals the length of time consumed at the stop.

If the rules or a form of block signaling is used which requires a definite time interval between trains, then the capacity is determined by the simple equation $Z = \frac{f}{T}$, but in no case can f be less than D.

In neither of these cases is the speed of trains or their length a factor in determining the capacity of a division,

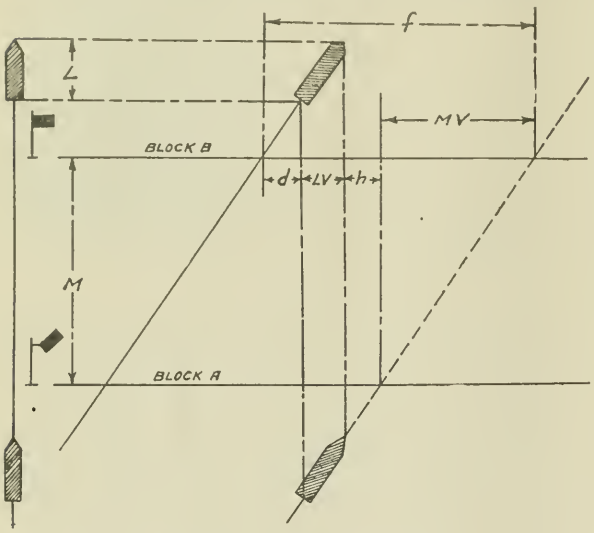


Figure 3. Diagram Showing Maximum Length of Block with Minimum Train Spacing

unless it should happen that D or f is less than the time it takes a train to travel its length. When, however, either rules, or a form of block signaling is used which requires a definite space between trains, then the term f depends not only upon the speed and length of trains, but also upon the length of time it requires the train to travel through the required space, and also upon two other factors which we will point out.

Capacity of a Line Without Passing Tracks

Figure 3 shows two trains running as close together as it is possible over a block signal territory. In this, figure M represents the maximum length of block in this territory and L represents the length of train. The time d is the time that must elapse after the rear end of the preceding train has passed block B before the signal at block A can be made to indicate "proceed." This time may be fixed by rule, in manual block operation or in automatic block operation it would be the time required for the signal at block A to assume a proceed position after the rear of a train had passed into the block governed by the signal B. The time h, which is commonly called "sighting time," is the time that must be allowed for the following train to observe the signal A after it has assumed the proceed position in order that the train A may continue at its normal speed. Representing the speed of the train in miles per minute by Lv, we would have for the value of f: $f = h + Mv + d + Lv$, and the equation for capacity would become $Z = \frac{T}{(M + L)\,v + h + d}$. If for any reason there is a necessary stop in any block, such as a stop for coal or water, then the time lost by a train on account of such a stop must be included in the time f, and if the time f for which the block in which the stop occurs is the maximum f for the division, then this stop becomes a factor in determining the capacity of the division. In this case we would have $f = h + Mv + d + Lv + D$. In this equation M is not the maximum length of block, but it is the length of the block in which the delay represented by D occurs. The equation for capacity now becomes $Z = \frac{T}{(M + L)\,v + h + d + D}$. To illustrate the use of these formulæ, let us determine the capacity of two pieces of road, over each of which only one class of trains is operated. One of these roads being equipped with manual and the other with automatic block signaling. Let it be assumed that the trains are ½ mi. long, and that they run at the rate of speed of 3 min. per mile on both roads. On the manual block road assume that the maximum length of block is 7 mi., and for the automatic block territory assume that the maximum spacing of signals is 1 mi., so that the maximum length of block for trains running under proceed signals would be 2 mi. In both cases let h equal ½ min., and in manual block let d be 5 min. and in automatic block ¼ min. We would have then as the capacity in trains per day: For manual block—

$$Z = \frac{1440}{(7 + .5)\,3 + .5 + 5} = 51.$$

For automatic block—

$$Z = \frac{1440}{(2 + .5)\,3 + .5 + .25} = 174.$$

Analysis of Line Having Mixed Traffic

A method of analyzing the capacity of a double track line where mixed traffic is operated is to consider the passenger schedule as fixed and then determine the amount of time these passenger trains occupy the line, the remaining time being that which is available for freight traffic.

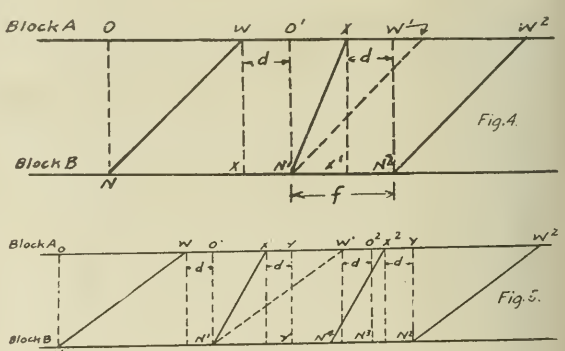


Fig. 4. Diagram of Mixed Traffic

In Fig. 4, N W represents a freight train, N^1 W^1 and N^2 W^2 representing other trains of equal speed. N^1 X^1 represents a passenger or other train running at a greater speed. It is obvious that f for the passenger train N^1 X^1 is all that the main track capacity is reduced

for freight purposes and that parallelogram N^1 W^1 W^2 N^2 will represent this reduction in capacity due to a single high speed train. In Fig. 5 as in Fig. 4, N W represents a freight train N^1 W^1 and N^2 W^2 representing other trains of equal speed. N^1 X^1 as in Fig. 4 represents a passenger train and N^4 X^2 represents a second one. From this it is obvious that when the time between two passenger trains N^1 N^2 is less than f for a freight train which in this case equals N^1 N^3, there is no time in which a freight train can enter the block; therefore, the total time that the main track capacity is reduced for freight purposes is passenger train time f, which equals N^4 N^2 plus the time between the passenger trains N^1 $N4$ or N^1 N^2 and the amount that the main track capacity is reduced for freight purposes, may be represented by the parallelogram N^1 W^1 W^2 N^2.

Application of Formulæ for Analyzing a Two or More Track Line

The report also included information concerning the application of formulæ on a double track line 122 mi. long having a heavy passenger business, with 36 regular passenger trains in each direction at the east end and 19 regular passenger trains in each direction at the west end. The line is equipped with automatic block signals.

The complete analysis includes a number of charts and explanatory matter concerning the present conditions and proposed changes, which included the addition of third and fourth tracks at certain points.

In order to obtain free use of the third and fourth tracks, 39 mi. of automatic signaling and 5 new interlocking plants besides the enlargement of some others would be required. The effect of the change would be a reduction of from 30 to 70 per cent in the interference resulting from the use of main tracks for freight service in various territories, and an increase in the number of freight trains that could be handled at the most restricted point from 21 to 29 trains, or 35 per cent. In addition, the time of trains over the road would be considerably reduced on account of the reduction in delays; the capacity of the yards at three points would be greatly increased and the lost time of locomotives at these points greatly decreased on account of greater freedom and better distribution of time when trains could be received and dispatched from these points.

Committee: J. A. Peabody (C. & N. W.), chairman; W. J. Eck (Southern), vice-chairman; C. C. Anthony (Santa Rosa, Cal.), H. S. Balliet (Grand Central Terminal), C. A. Christofferson (N. P.), C. E. Denney (N. Y. C. & St. L.), C. A. Dunham (G. N.), W. H. Elliott (N. Y. C.), G. E. Ellis (I. C. C.), J. V. Hanna (K. C. T.), J. G. M. Leisenring (Ill. Traction), H. K. Lowry (C. R. I. & P.), J. C. Mock (M. C.), F. P. Patenall (B. & O.), A. H. Rudd (P. R. R.), W. B. Scott (Gulf Coast Lines), T. S. Stevens (A. T. & S. F.), E. G. Stradling (C. I. & L.), B. Wheelwright (G. T.).

Discussion

(J. A. Peabody (chairman) presented the report.)

The report is made as information, and your committee recommends that this matter on the location of sidings be accepted by the association as information, and I so move. (Motion carried.)

The second subject, report on automatic train control. This is also submitted as information and I move that it be so accepted. (Motion carried.)

(The committee was excused with thanks.)

Report of Committee VI—Standard Designs

The outline of work assigned to the committee this year covers among other things the following:

(1) Prepare standard designs. (2) Prepare standard designs of switch fittings. (3) Check and criticize drawings which other committees are authorized to prepare, giving to each drawing a title and number. (4) Revise standard plans to meet unit specifications as approved.

The committee presented eight drawings, four of which are revisions of previous issues, two drawings are new, and two are presented for information and further discussion if found necessary:

R. S. A. 1014, One-Way Horizontal Pipe Compensator (Details and Assembly)—revised. Compensator base has been strengthened to avoid breakage in shipment and in service.

R. S. A. 1015, One-Inch Signal Pipe and Coupling (Details and Assembly)—revised. Rivet holes at one end transposed, to obtain more economical shop practice, and note "Slightly bevelled to remove burrs," added, after "ends faced."

R. S. A. 1070, Binding Post (Details and Assembly)—revised. Washer changed from No. 14 to No. 18 A. W. G. brass. Note changed from "Edges rounded" to "Sharp corners removed."

R. S. A. 1220, Cross-arm Bolts (Through and Double Arm)—revised. Square washer added, together with reference numbers.

R. S. A. 1409, Cotters (Size—Drilling—Location). Data Sheet—new.

R. S. A. 1459, Staff Tip Adapter—new.

Drawings S. K. 20, Movable Point Frog, and 21, Double Slip Switch, are submitted for reference and information, as confirming the discussion at the annual meeting in 1918, showing method recommended by Committee II as to disposition of rods and fittings.

The committee would like to have further discussion on the subject of "Fittings for Interlocked Switches," exhibits of which have been submitted to the association from time to time since 1914.

The committee was instructed by President Trout to follow up the matter of the standardization of lamps and in co-operation with the representatives of regional directors, meetings have been held with very satisfactory results, and it is thought that plans covering our recommendations will be presented at the next meeting.

Committee: F. P. Patenall (B. & O.), chairman; J. C. Mock (M. C.), vice-chairman; W. A. Hanert (N. Y. C.), C. J. Kelloway (A. C. L.), B. H. Mann (M. P.), F. W. Pfleging (U. P.), W. N. Spangler (P. R. R.), M. E. Smith (D. L. & W.), R. E. Trout (St. L.-S. F.).

Manufacturers' Representatives: J. J. Hubbard (F. S. Co.), W. P. Neubert (U. S. & S. Co.), H. B. Taylor (H. S. & S. Co.), S. N. Wight (G. R. S. Co.)

Discussion

In connection with the one way horizontal pipe compensator a few slight changes were suggested by some of the members. The same was true regarding the other designs submitted. The chairman of the committee was desirous of having the members discuss at length the fittings of interlocked switches as a guide in connection with future work on this subject.

Report of Committee XII—Contracts



THE COMMITTEE submitted as a progress report the following proposed form of contract for block signal and interlocking work:

THIS AGREEMENT, made this ..... day of ..... in the year ..... by and between ....., party of the first part, hereinafter called the "Contractor," and ..... party of the second part, hereinafter called the "Company":

WITNESSETH, That, in consideration of the covenants and agreements hereinafter mentioned, to be performed by the parties hereto, and of the payments hereinafter agreed to be made, it is mutually agreed as follows:

The contractor shall furnish all materials, superintendence, labor, equipment and transportation, except as hereinafter specified, and shall execute, construct and finish, in an expeditious, substantial and workmanlike manner, to the satisfaction and acceptance of the ..... of the Company, hereinafter called the "Engineer".....
.....
.....

The work covered by this contract shall be commenced within ..... days after the execution of this contract and shall be completed on or before the ..... day of ....., 19..

In the event of failure to complete the work within the time specified, there shall be deducted from the contract price the sum of ....., which amount is agreed upon not as a penalty, but as liquidated damages.

And in consideration of the completion of the work described herein, and the fulfillment of all stipulations of this agreement to the satisfaction and acceptance of the Engineer of the Company, the said Company shall pay, or cause to be paid, to said Contractor, the amount due to the Contractor, based on the following prices:
.....
.....
.....
.....

Bond

1. The Contractor agrees, at the time of the execution and delivery of this contract and before the taking effect of the same, to furnish and deliver to the Company a good and sufficient bond of indemnity to the amount of.....
.....dollars, as security for the faithful performance, by the Contractor, of all covenants and agreements on the part of the Contractor contained in this contract. The security in such bond of indemnity must be satisfactory and acceptable to the Company.

This bond shall remain in force and effect in such amount, not greater than that specified, as shall be determined by the Engineer.

Understanding of Plans and Specifications

2. The Contractor hereby distinctly and expressly declares and acknowledges that, before the signing of this contract, he has carefully read the same, and the whole thereof, together with and in connection with said plans and specifications, and that he has made such examination of this contract and of said plans and specifications, and the location where said work is to be done, and such investigation of the work required to be done, and in regard to the material required to be furnished, as to enable him to thoroughly understand the intention of the same, and the requirements, covenants, agreements, stipulations and restrictions contained in this contract and in said plans and specifications, and distinctly agrees that he will not hereafter make any claim or demand upon the Company, based upon or arising out of any alleged misunderstanding or misconception on his part of the said requirements, covenants, stipulations and restrictions.

Plans and Specifications.

3. The work to be done is more fully described in the specifications dated.....and the following plans:
.....
.....
.....
which specifications and plans are hereto attached and are hereby declared to be, and are accepted, as a part of this contract.

Work that may be called for in the specifications but not shown on the plans, or shown on the plans and not called for in the specifications, or anything not expressly set forth in either plans or specifications but which nevertheless is obviously necessary or implied, shall be furnished and performed the same as if specifically shown or mentioned in both.

Rights of Various Interests

4. Wherever work being done by Company forces or by other contractors is contiguous to work covered by this contract, the respective rights of the various interests involved shall be established by the Engineer, to secure the completion of the various portions of the work in general harmony.

Consent to Transfer

5. The Contractor shall not transfer this contract, nor sublet any part of the work without the written consent of the Engineer and such consent shall not relieve the Contractor of his liabilities under this contract.

Inspection

6. All work and material shall be at all times open to inspection, acceptance or rejection of the Engineer or his duly authorized representative. The Contractor shall provide reasonable and necessary facilities for such inspection.

Defective Work or Material

7. Any omissions or failure on the part of the Engineer to disapprove or reject any work or material shall not be construed to be an acceptance of any defective work or material. The Contractor shall remove, at his own expense, any work or material condemned by the Engineer, and shall rebuild and replace the same without extra charge, and in default thereof the same may be done by the Company at the Contractor's expense, or, in case the Engineer should not consider the defect of sufficient importance to require the Contractor to rebuild or replace any imperfect work or material, he shall have power, and is hereby authorized, to make an equitable deduction from the stipulated price.

Indemnity

8. The Contractor shall indemnify and save harmless the Company from and against all losses and all claims, demands, payments, suits, actions, recoveries and judgments of every nature and description brought or recovered against it, by reason of any act or omission of the said Contractor, his agents or employes, in the execution of the work or in consequence of any negligence or carelessness in guarding the same.

Settlement for Wages

9. Whenever, in the opinion of the Engineer, it may be necessary for the progress of the work to secure to any of the employes engaged on the work under this contract any wages which may then be due them, the Company is hereby authorized to pay said employes the amount due them or any lesser amount, and the amount so paid them, as shown by their receipts, shall be deducted from any moneys that may be or become payable to said Contractor.

Liens

10. If at any time there shall be evidence of any lien of claim for which the Company might become liable, and which

is chargeable to the Contractor, the Company shall have the right to retain out of any payment then due or thereafter to become due, an amount sufficient to completely indemnify the Company against such lien or claim, and if such lien or claim be valid, the Company may pay and discharge the same and deduct the amount so paid from any moneys which may be or become due and payable to the Contractor.

Risks

11. The work under this contract in every respect shall be at the risk of the Contractor until finished and accepted, except damage or injury caused directly by Company's agents or employes.

Order and Discipline

12. The Contractor shall at all times enforce strict discipline and good order among his employes, and any employe of the Contractor who shall appear to be incompetent, disorderly or intemperate, or in any other way disqualified for or unfaithful to the work entrusted to him, shall be discharged immediately on the request of the Engineer, and he shall not again be employed on the work without the Engineer's written consent.

Company's Employes

13. The Contractor shall not employ or hire any of the Company's employes without the permission of the Engineer.

Intoxicating Liquors.

14. The Contractor, in so far as his authority extends, shall not permit the sale, distribution or use of any intoxicating liquors upon or adjacent to the work, or allow any such to be brought upon, to or near the line of the railway of the Company.

Right of Company to Amplify Plans

15. The Company shall have the right, during the progress of the work, to amplify the plans, to add explanatory specifications and to furnish additional specifications and drawings.

Power of Engineer

16. The Engineer shall decide controversies arising between the parties hereto as to the meaning or intent of the plans and specifications. He shall give such instructions and directions as may be necessary for the Contractor to properly carry out the work, and his interpretation of the plans and specifications shall be final and binding. The Engineer shall have power to reject or condemn all work or material which is imperfect, defective or unworkmanlike, or which, in any way, does not conform to this contract; to direct the application of forces to any portion of the work, which in his judgment requires it; to order the force increased or diminished and to decide questions which may arise between the parties relative to the execution of the work.

Order of Completion. Use of Completed Portion

17. The Contractor shall complete any portion or portions of the work in such order of time as the Engineer may require. The Company shall have the right to take possession of and use any completed or partially completed portions of the work, notwithstanding the time for completing the entire work or such portions may not have expired; but such taking possession and use shall not be deemed an acceptance of the work so taken or used or any part thereof.

Changes

18. The Company shall have the right to make alterations in, additions to, or deductions from, the work, without in any manner affecting or making void this contract.

No changes, additions or deductions shall be made except upon written order of the Engineer and the value of the work so changed, added or deducted, shall be agreed upon and added to or deducted from the contract price.

Unavoidable Delays

19. If the Contractor shall be delayed in the performance of the work by reason of fire, flood, strikes or other causes beyond his control, or if the Company shall be delayed in the performance of its covenants and agreements by causes beyond its control, then the time for completion of the work may be extended, as may be agreed upon, without in any way affecting the conditions of this contract or the liability of sureties on the bond.

Suspension of Work

20. The Company may at any time stop the work, or any part thereof, by giving.....days notice to the Contractor in writing. The work shall be resumed by the Contractor in.....days after the date fixed in the written notice from the Company to the Contractor so to do. The Company shall not be held liable for any damages or anticipated profits on account of the work being stopped, or for any work done during the interval of suspension. It will, however, pay the Contractor for expense of men necessarily retained during the interval of suspension, provided the Contractor can show that it was not reasonably practicable to move these men to other points at which they could have been employed. The Company will further pay the Contractor for time necessarily lost during such suspension at the rate of.....per cent per annum on the estimate value of materials, equipment and fixtures furnished by the Contractor on the work which are necessarily idle during such suspension, said rate of.....per cent per annum being understood to include depreciation, interest and insurance, but if the work, or any part thereof, shall be stopped by the notice in writing aforesaid, and if the Company does not give notice in writing to the Contractor to resume work at a date with..... of the date fixed in the written notice to suspend, then the Contractor may abandon that portion of the work so suspended and he will be entitled to the estimates and payments for such work so abandoned, as provided in Section 25 of this contract.

Forfeiture

21. If at any time the work is not progressing to the satisfaction of the Engineer, he may so notify the Contractor in writing, and if the progress of the work fails to show an immediate improvement satisfactory to the said Engineer, he may, at his discretion, for the failure to prosecute the work with an adequate force, for non-compliance with orders as to the manner of performing it, or for any omission or neglect of, or failure to comply with any of the requirements of this agreement, on the part of the Contractor, declare this contract forfeited, which declaration of forfeiture, made in writing and served upon the Contractor, shall exonerate the Company from any and all liabilities and obligations arising under this contract, and any balance due the Contractor on account of work done shall be forfeited to the Company, and the Engineer shall have full power to enter upon and take possession of the work, and to contract with any other person or persons for its completion.

Replacement of Defective Parts

22. The Contractor shall replace promptly at his own expense any part or parts of the apparatus and material furnished under this contract which within a period of one year after the date of final acceptance of the work shall fail to perform its proper functions because of any defect in the design, construction or installation of said apparatus or material.

Patents

23. The Contractor hereby covenants and agrees to indemnify and save harmless the Company of and from all loss, damage, claims, suits, recoveries or judgments, which may arise or be made, had, brought or recovered by reason of or on account of the material, tools, implements, machinery, fixtures, or anything used in or about the work to be performed under the contract, being infringements, or being claimed to be infringements, of letters patent issued by the United States or any foreign country.

Payments

24. Payments for work covered by this contract shall be made in the following manner.....
.....
.....
.....

Final Payment

25. Upon the completion of the work, the Engineer shall certify that all of the work comprehended under this contract has been completed and accepted by him under the terms and conditions thereof, whereupon the entire amount found to be due the Contractor shall be paid to the Contractor at.....within..... days after date of said certificate, provided, however, that before final payment is made, the Contractor shall submit evidence satisfactory to the Engineer that all payrolls, material bills, and outstanding indebtedness in connection with this work, have been paid.

This agreement shall inure to the benefit of and be binding upon the legal representatives and successors of the parties respectively.

In Witness Whereof, the parties hereto have executed this agreement in.....the day and year first above written.

Witness:

.....

.....

Committee: R. C. Johnson (B. R. T.), chairman; H. F.

Haag (U. S. R. A., Southwestern Region), vice-chairman; Hadley Baldwin (C. C. C. & St. L.), H. S. Balliet (Grand Central Ter.), George Boyce (C. St. P. M. & O.), R. L. Davis (M. C.), W. H. Elliott (N. Y. C.), A. R. Fugina (L. & H.), R. L. Huntley (U. P.), J. B. Latimer (C. B. & Q.), John Leisenring (Ill. Traction), H. F. Lomas (I. C.), J. A. Peabody (C. & N. W.), E. B. Pry (Penna., Lines West), J. M. Waldron (I. R. T.).

Discussion

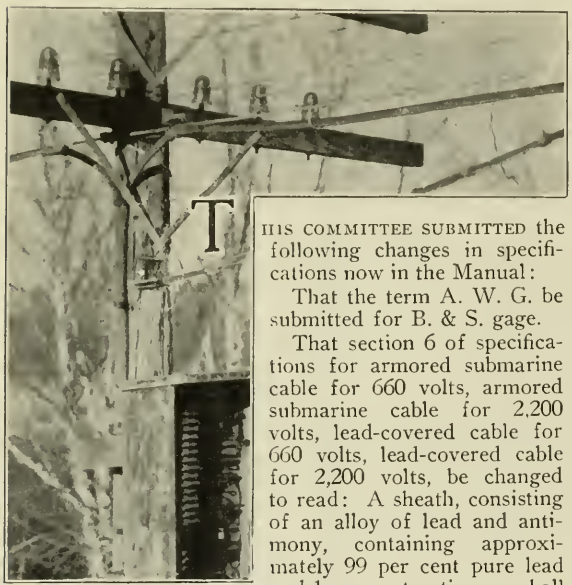
The Secretary: The committee on contracts has only a progress report to make, and the chairman is not present. At his request I suggest every member of the association who has any suggestions whatsoever on the proposed contract—a good many legal questions are involved—and in the absence of practically all of the leading members of this committee, write to the chairman of the committee directly, and to the vice-chairman, forwarding a carbon copy, between now and not later than March 29, 1919, with any suggestions, objections or criticisms that any of the members have to make to this report.

W. H. Elliott (N. Y. C.): I object to the form of contract, for the reason that it represents only one side, the engineer or railroad company, leaving out any consideration for the contractors' interest.

L. F. Howard (U. S. & S. Co.): Are the manufacturers to have an opportunity to have a conference with the committee before the June meeting?

The Secretary: A careful study has been made by a number of gentlemen who have thought the matter over, and they felt they had not sufficient time to digest such a document. Now, the opportunity is given to every one interested to present their views between now and March 29, and immediately after that date the committee will hold another meeting and it is their desire to have present every one they can get hold of to assist in the discussion and develop these contracts into final form.

Report of Committee IX—Wires and Cables



THIS COMMITTEE SUBMITTED the following changes in specifications now in the Manual:

That the term A. W. G. be submitted for B. & S. gage.

That section 6 of specifications for armored submarine cable for 660 volts, armored submarine cable for 2,200 volts, lead-covered cable for 660 volts, lead-covered cable for 2,200 volts, be changed to read: A sheath, consisting of an alloy of lead and antimony, containing approximately 99 per cent pure lead and 1 per cent antimony, shall be applied over the assembled and taped conductors, etc.

That the specification for friction tape be revised to read as follows:

1. General

(a) The tape shall be made of cotton sheeting which is thoroughly impregnated on both sides with a friction rubber compound. The edges of the tape shall be straight and the width even. No pin holes should be observable when the tape is held before a strong light. 1914.

(b) Unless otherwise specified, the tape shall be ¾-in. width. 1919.

2. Friction Rubber Compound

(a) The compound shall have a rubber base and be of the strength and insulating qualities required to meet the specified physical and electrical tests. 1914.

(b) The compound shall be free from active sulphur or other substances which will act injuriously on copper or the cotton tape. 1914.

3. Cotton Tape

The cotton tape shall be cut from sheeting well, evenly and firmly woven from good cotton and free from defects, dirt, knots, lumps and objectionable irregularities of twist. The warp of the fabric shall extend lengthwise of the tape and the tape shall not ravel continuously when unwound from the original roll. 1914.

4. Tests

(a) Manufacturer shall give the purchaser sufficient notice of time when material will be ready for testing. (S. S. T.-a.) 1916.

(b) Manufacturer shall provide, at point of production, apparatus and labor for making the required tests under the supervision of the purchaser. (S. S. T.-b.) 1916.

(c) Tests may be made at point of production, or on samples submitted, and may also be made at destination. (S. S. T.-c.) 1916.

(d) Tests shall be made from samples taken from any part of any roll. 1919.

5. Physical Tests

(a) The finished tape shall be unwound from the original roll and wound in concentric layers for a distance of 12 in. at a rate not to exceed 2 ft. per minute upon a ¼ in. mandrel under a tension of 7½ lb. for ¾-in. width. 1919.

(b) Tape shall then be unwound under a tension of 3 lb. for ¾-in. width. 1919.

(c) The adhesion between the plies shall be such that the rate of separation after 2 in. have been unwound shall not exceed 10 in. in 3 min. 1919.

6. Tensile Strength

(a) The tensile strength of the tape shall be not less than 30 lb. for ¾-in. width. 1914.

(b) The test for tensile strength shall be made on a piece of tape 12 in. in length between grips and stretched at the rate of 10 in. a min. 1919.

7. Heat Test

(a) Strips of tape 18 in. in length, taken from the original roll, shall be exposed to a dry heat of approximately 210 degrees F. for 16 hr. 1919.

(b) Immediately upon removal from the heat, the strips shall be wound in concentric layers for a distance of 12 in. upon a ¼-in. mandrel at a rate not to exceed 2 ft. a min. under a tension of 7½ lb. for ¾-in. width. 1919.

(c) Tape shall then be unwound under a tension of 1½ lb. for ¾-in. width. 1919.

(d) The adhesion between the plies shall be such that the rate of separation after 2 in. have been unwound shall not exceed 10 in. in 3 min. 1919.

8. Electrical Test

(a) The tape shall stand a potential strain of 1000 volts (effective value) 60 cycles applied for 1 min. by placing a section of tape between two brass ball electrodes each ¾-in. in diameter. The electrodes shall be spaced so that tape will just move between them. 1919.

(b) The voltage shall be gradually increased, after tape has been placed between electrodes, until limiting value is attained. 1919.

9. Inspection

(a) Purchaser will make such inspection of the completed product as to assure him that the requirements of the specification have been met. (S. S. I.-a.) 1916.

(b) Purchaser may make desired inspection at all stages of manufacture. (S. S. I.-b.) 1916.

(c) If, upon arrival at destination, the material does not meet the requirements of this specification, it may be rejected and returned to the manufacturer, who shall pay all freight charges. (S. S. I.-c.) 1916.

10. Packing

(a) Material shall be packed so as to permit convenient handling and to prevent loss or damage during shipment. (S. S. P.) 1916.

(b) The tape shall be furnished in rolled strips having the following dimensions and weight:

Width, Inches	Approximate Thickness	Minimum Length per Pound	Weight per Roll, Pounds
½	.015	135 ft.	0.33
¾	.015	90 ft.	0.5
1	.015	67.5 ft.	0.67
1½	.015	45 ft.	1.0
2	.015	33 ft.	1.34

1919.

(c) Each roll shall be enclosed in a tin box or wrapped in tin foil and enclosed in a box to secure and fully protect the contents. 1914.

(d) Each package shall contain the full specified weight of tape, exclusive of wrapping and boxes, and shall be marked with the manufacturer's name, the width of the tape and its weight. 1914.

11. Marking

Purchaser's order and requisition number, name of consignor and name and address of consignee, shall be plainly marked on outside of package. (S. S. M-a.) 1916.

Committee: W. H. Elliott (N. Y. C.), chairman; C. D. Cronk (N. Y. C.), W. L. Dryden (S. I. Rap. Trans.), B. F. Oler (P. R. R.), A. H. Rice (D. & H.), D. W. Richards (N. & W.).

Discussion

W. H. Elliott (Chairman) presented the report. On motion, the substitution of the term "A. W. G." for "B. & G. gauge" in the specification was approved, and also the specifications for armored submarine cable, for 2 voltages, and lead-covered cable for 2 voltages. The specifications for friction tape was then put to vote and carried, and the committee was excused with thanks.

Creosoting Wood Signal Trunking to Extend Its Life

The use of creosote for preserving trunking has been considered by the association in the past and the question is one requiring more attention at the present time. In this connection a paper was presented before the association by Kurt C. Barth, technical representative of the Barrett Company, Chicago. Several samples of trunking and capping treated as recommended were submitted at the March meeting of the association, together with the paper. This paper follows:

The purpose of this paper is to submit this subject for consideration and discussion; to make a brief mention of the available information, and particularly to suggest to the Railway Signal Association further careful study. No effort has been made to support certain statements or data, as it is expected that will be developed during committee sessions.

Briefly, the premises for discussion are:

First: It is known that wood trunking, capping and posts decay rapidly, obviously resulting in increased maintenance. The average physical life of untreated trunking can be said to approach four to five years for Douglas fir; two to six years for Southern yellow pine, depending upon grade, and as regards cypress, I would prefer to leave the value of its "eternal" qualities to the judgment of those who have used it.

Second: I have been informed that the average mechanical life of high grade signal wire is said to be about 12 years, varying from four to five years at interlocking plants, where laid adjacent to rails, from 18 to 20 years where not exposed to severe strain. Thus, it is obvious that an increase in the natural life of trunking to about that of the average mechanical life of wire is very desirable, and would mean a considerable saving.

Third: The logical remedy is to employ preservative treatment. The preservative to be considered is coal-tar creosote oil. The available methods are both pressure and non-pressure, although the latter is more adaptable because a refined oil is used and lighter treatments given.

Fourth: The use of coal-tar creosote oil has been seriously objected to because of the belief, based on experience to a certain extent, that creosoted trunking bleeds, and the free creosote oil which thus exudes will rapidly deteriorate the insulation of the wire, causing interruption to service, etc.

If this fact is substantiated, and no remedy found for the condition complained of, then the preservative treatment of trunking may be impracticable. I believe, however, that a surface treatment with refined coal-tar creosote oil would increase the life of the trunking and parts, without the slightest threat of injury to insulating compositions of good quality.

Fifth: Extracts of expressions from various sources are appended as appendix "A." It is evident that there exists considerable difference of opinion regarding this matter, but none sufficiently serious to preclude arriving at a practical solution. It is hoped in this connection that the co-operation of the wire manufacturers will be had, and that they will endeavor to aid rather than obstruct efforts which may be expended to solve the problem.

Sixth: Surface treatments with refined coal-tar creosote oil (conforming to specification No. R-828A, U. S. Railroad Administration) should be employed for signal trunking, capping and support posts, and when properly conducted, bleeding should not occur. Such treatment should consist of immersion of the trunking, after having been completely manufactured, in refined coal-tar creosote oil maintained at a temperature between the minimum and maximum limits of 150 degrees F. and 200 degrees F. for from 15 min. to 30 min., depending upon species and the grade of wood used. (Steam coils to be used for heating oil.)

Where strictly permanent work is under consideration, and the type of construction warrants the cost, and a more thorough impregnation of the trunking is desirable, and in that event treatment with refined coal-tar creosote oil by the open-tank process (hot and cold treatment) is recommended. The trunking should then be pitched, as heavy treatments may result in a slight bleeding, even of refined oil, although it is to be understood that refined creosote is far less likely to cause trouble or injure the insulation than when the commercial grades of creosote are used for trunking treated by the pressure process. The primary danger is not the treatment in itself, but the possibility that the lower boiling fractions of coal-tar creosote oil will bleed from the trunking as the result of supersaturation during treatment, and collect in sufficient quantities to act as a solvent on the insulation. As these lower boiling fractions are largely removed from the refined creosote, which is herein recommended for treatment of trunking, and as surface treatments do not thoroughly impregnate the lumber, but merely coat the surface, the danger of deterioration is minimized, while if the treatments recommended are properly con-

ducted, this is entirely eliminated. Where treatment is given in the field, a refined creosote shall be liquid at ordinary working temperature, and as it is practically non-volatile the usual difficulty of solidification of the oil and evaporation are removed. It is my belief, furthermore, that when the cut ends of the trunking are brush-treated in the field, and a little oil is accidentally splashed or dropped on the trunking, no harm will result, because of the exceptional purity of a proper refined creosote.

In conclusion I suggest that this matter be referred to a standing committee, or a special committee for further careful study, as it is quite self-evident that the economy resulting from preservative treatment with refined coal-tar creosote oil is decidedly worth while. In fact, the benefits are at least two-fold. First, extension of the period of service of trunking, of the wire, and practically everything else involved. Second, it is much cheaper to use refined creosote than the cheapest paint.

Extract From Proceedings of R. S. A. for 1908

Page 81.

Appendix "A."

Mr. B. H. Mann: In connection with Mr. Stevens' remarks I would like to ask if some one has not had some experience with treated conduit. My experience is that a conduit where it was not treated, particularly where it crosses a track and must be in the ground four or five years, that when renewing trunking you will have to handle the wire, that is, you will have to take your rubber tube out and bend it, which is not a good thing for that rubber tube at that age. Has not some one had some experience with creosoted conduits or some other treatment, particularly in connection with the rubber-covered wire, that we may have the advantage of it and still do something with Mr. Stevens on this trunking proposition?

The President: The Northwestern are using a great deal of the bituminous conduit.

Mr. Rosenberg: For Mr. Mann's information I would say that I have had considerable experience with creosoted trunking and will say that as it ages, it gets harder and firmer, the only objection that I find with it is, that after eight or ten years, when you undertake to take it apart, to get inside of the trunking, it is a hard matter to nail it together again; it will split, gets to be the nature of bone, but if it is left to remain without taking it out, it will never rot and will last fifty years or longer.

Mr. Mock: We had one time an installation that required an impregnated trunking. I am sure that it was creosoted, but we took it up with a wire manufacturer and he advised that he would not guarantee the wire, if we used that trunking, explaining that it would act on the rubber insulation in such a way as to reduce its life considerably. It is possible that there is something on the market now that would be better than treated lumber.

The President: I believe the experience of the Lackawanna was that the creosoting did interfere with the rubber insulation; made it punky.

Mr. Stevens: That is, if the wire was not protected by pitch.

The President: Yes, if you put creosoted trunking in and then pitch your wire in, you ought to have a good piece of work.

Mr. Stevens: Underground trunking properly treated, heavy enough to stand mechanical strains, and the wire laid in properly, the trunking pitched before the wires are laid in, and the trunking afterwards filled up with pitch will be the ultimate wire construction for all electric work, but I do not look to see that now.

Quotation From Letter Written by Commercial Creosoting Plant

We find a very prevalent impression that the insulation will deteriorate in contact with creosoted lumber, and it is, of course, a fact that rubber suffers in contact with liquid creosote oil.

It has never been proven to our satisfaction that there is sufficient free oil exuding from creosoted trunking or conduits to damage the ordinary insulation on signal wires, and on account of this fact we find the prevalence of this impression may be due to unwarranted statements made by competing firms of conduit.

Opinion of an Electric Illuminating Company

Question: Do you fear that the insulation of cable or wire would be affected by coming in contact with the creosoted conduit?

Answer: No.

Discussion

G. A. Guyer (N. Y. C.): I am told that it is almost impossible to obtain creosote oil at the present time in sufficient quantities to take care of all ties that are to be treated, and I wondered if the zinc treatment that is being used for preservation would in any way affect the insulation on our wires.

Mr. Barth: I don't see why there would be any objection to using zinc as long as it does not interfere with the operation of your apparatus. That is a question I cannot answer. As far as procuring creosote, you will understand that I have recommended surface treatment, of which I am primarily speaking, that oil meeting the specification of the United States Railroad Administration, and it can be obtained in reasonable quantities at the present time.

O. R. Unger (Mo. Pac.): I wish to state that the Missouri Pacific have renewed 42 miles with creosoted lumber, and practically used all new wire, and in eight months the result was that you could strip it off with your finger.

C. R. Hodgdon (C. P. R.): We have been using a refined creosote oil, putting it on with a brush. We have had some in service about two years, and we have seen no ill effects from it.

The President: I wish to extend a vote of thanks to Mr. Barth for his paper. (Applause.)

Santa Fe Signal Supervisors' Reunion

The fifth annual luncheon of the past and present members of the Santa Fe Signal Supervisors Committee was held in the French room of the Congress Hotel Monday noon. Those present were: T. S. Stevens, signal engineer; L. Brown, Sr., assistant signal engineer; G. K. Thomas, Jr., assistant signal engineer, and E. Hanson, signal supervisor, all of the Atchison, Topeka & Santa Fe; G. R. Cowherd, signal engineer, El Paso & Southwestern; B. T. Anderson, assistant signal engineer, Delaware, Lackawanna & Western; Harold K. Ferguson, Austin Company, and J. S. Hobson and J. E. Saunders of the Union Switch & Signal Company.

On the second page of the souvenir menu was a photograph of H. Hobson, signal supervisor of the Santa Fe at Topeka. The last page contained the following poem:

"What we have we'll hold," meant lands and gold,
When we strove in the days gone by.
But now we fight for freedom's right,
And we'll hold the right or die.

Signal Division Registration

The registration of signal men at the meeting of the Signal section of the American Railroad Association yesterday aggregated 319, the largest in the history of the Association. It compares with 198 for the same day last year.

*Members in Military and Naval Service.

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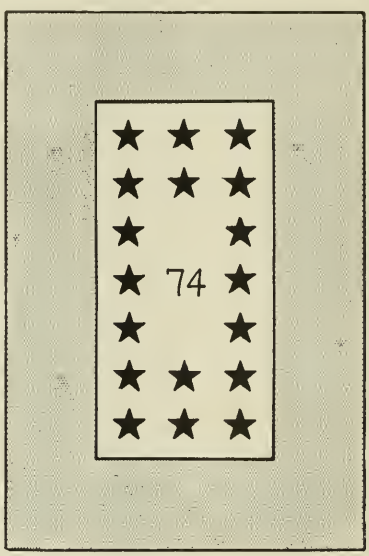
Hobson, J. S., Western Mgr., Union Switch & Signal Co., 917 Peoples Gas Bldg., Chicago, Ill.
Hollister H. L., Sig. Engr., Hall Switch & Signal Co., Garwood, N. J.
Howard, L., Frederic, Chief Engr., Union Switch & Signal Co., Swissvale, Pa.
Howe, W. K., Chief Engr., General Railway Signal Co., Rochester, N. Y.
Holden, A. C.
Hudson, E. E., Vice-Pres. & Gen. Mgr., Waterbury Battery Co., 30 Church St., New York, N. Y.
Jacobs, Harry M., Sig. Accessory Dept., General Electric Co., Schenectady, N. Y.
Keefe, T. A., Salesman, Hazard Mfg. Co., 2213 First Nat. Bk. Bldg., Pittsburgh, Pa.
Kyle, W. T., Sales Agt., Page Steel & Wire Co., 30 Church St., New York, N. Y.
Lepreau, F. J., Vice-Pres. & Div. Mgr., Thos. A. Edison, Inc., Primary Battery Div., Bloomfield, N. J.
Lorenz, J. M., Salesman, Central Electric Co., 4425 Ellis Ave., Chicago, Ill.
Moriarty, T. O.
Milhoan, F. B.
McCarthy, D. J., Chf. Engr., Chicago Ry. Sig. & Supply Co., Carpentersville, Ill.
Manuel, W. N., Rep., Corning Glass Works, Corning, N. Y.
Miller, Chas. A., Salesman, The Okonite Co., 501 Fifth Ave., New York, N. Y.
Miller, P. W., Rep., Kerite Ins. Wire & Cable Co., Church St., New York, N. Y.
Marloff, Geo.
McCune, C. A.
Nelson, G. A., Spec. Rep., Waterbury Battery Co., 30 Church St., New York, N. Y.
Neubert, Walter P., Mech. Engr., Union Switch & Signal Co., Swissvale, Pa.
Newcomb, E. W., Pacific Coast Rep., Thos. A. Edison, Inc., Primary Battery Div., 1205 Hobart Bldg., San Francisco, Cal.
Pflasterer, C. S., Ry. Signal & Tel. Depts., National Carbon Co., Cleveland, Ohio.
Pflasterer, W. R., Rep., National Carbon Co., 1415 Conway Bldg., Chicago, Ill.

Phillips, J. L., Sales Engr., General Railway Signal Co., 30 Church St., New York, N. Y.
Pratt, Alfred E., Sales Dept., National Carbon Co., 10015 Westchester Ave., Cleveland, Ohio.
Reichard, W. H., Asst. Gen. Mgr., Federal Signal Co., Albany, N. Y.
*Renshaw, Paul.
Roberts, John, Railway Dept., General Electric Co., Schenectady, N. Y.
Rodman, I. P., Sales Engr., Thos. A. Edison, Inc., Belmont Ave., Bloomfield, N. J.
Saunders, J. E., Asst. Chief Engr., Union Switch & Signal Co., Swissvale, Pa.
Shaver, A. G., Cons. Elec. & Sig. Engr., Room 857, Peoples Gas Bldg., Chicago, Ill.
Sheene, Henry R., Res. Mgr., Union Switch & Signal Co., Ry. Exchange Bldg., St. Louis, Mo.
Simmen, P. J., Pres., Simmen Automatic Ry. Sig. Co., 1575 Niagara St., Buffalo, N. Y.
Sperry, H. M., Pub. Rep., U. S. & S. Co., General Railway Signal Company.
Fed. Sig. Co., Hall S. & S. Co., Room 3318, 120 Broadway, New York, N. Y.
Small, E. A., Jr.
Talbert, W. W., Resident Mgr., Union Switch & Signal Co., Peoples Gas Bldg., Chicago, Ill.
Tureff, S. J., Office Engr., Federal Signal Co., 52 Vanderbilt Ave., New York, N. Y.
Underhill, J. Delmar, Salesman, The Okonite Co., 501 Fifth Ave., New York, N. Y.
Van Steenburgh, W. R., care of The Okonite Co., Box 140, G. C. P. O. Sta., New York, N. Y.
Vogel, E. W., Pres., Chicago Railway Signal & Supply Co., Peoples Gas Bldg., Chicago, Ill.
Whall, F. R., Gen. Mgr., C. H. Whall Co., 170 Summer St., Boston, Mass.
Wuerpel, M., Asst. to Pres., General Railway Signal Co., Rochester, N. Y.
Young, J. W., Rep., Kerite Ins. Wire & Cable Co., 30 Church St., New York, N. Y.
Ziegler, A. A., Jr., Elec. Engr., United Electric Apparatus Co., 36 Greenough Ave., Boston, Mass.

Railway Signal Association Men Engaged in the War

A Comparative Statement and Classification of Members Who Served, With Activities of Some

When the armistice was signed on November 11, 1918, there were 74 members of the Railway Signal Association in various branches of the military and naval service. These men on the R. S. A. honor roll who responded to their country's call represented about 5 per cent of the present membership of the association, which is approximately 1,250. At the present time the Railway Signal Association has 706 active, 202 junior and 332 associate members. The honor roll of 74 names includes 33 active, 22 junior and 19 associate members. These men have served in the past as committee chairmen or vice-chairmen and as members of various committees and have aided in other ways to promote the interests of the association. Their participation in the war has been none the less active, and the high quality of the service they have rendered is characteristic of their conduct in the R. S. A. A brief outline of the activities of those men in the war whose records we have received is of interest and is given below.



The R. S. A. Service Flag

Capt. E. L. Adams, formerly senior signal engineer, Bureau of Valuation, Southern district, Interstate Commerce Commission, with headquarters at Chattanooga, Tenn., was called into military service as a captain of engineers in the Engineer Officers Reserve Corps on September 3, 1917. He was ordered to Fort Leavenworth, Kan., for training and on December 5 of that year was attached to the 112th Engineer Regiment at Camp Sheridan, Montgomery, Ala. In January, 1918, he received orders for overseas duty and arrived in France about one month later. He has since traveled over a large part of France in connection with his official duties and says, "I have been handed around to various outfits ever since I came over, making short stops with each." During his travels from place to place he had a chance to observe some of the signaling on part of the roads in central France. He says that the signals are operated by wire with very elaborate compensating arrangements and that the switches are operated by pipes, but with no facing point locks or switch and lock movements. They also operate cross-overs from one end with nothing to indicate the movement of the switchpoints. All trains are operated on absolute block, and a rather simple and ineffective lock and block instrument is used.

Major Azel Ames, Jr., who recently resumed his associations with the Kerite Insulated Wire & Cable Company at New York after receiving his discharge on January 17, 1919, was called into military service on July 15, 1917, with the 8th Coast Defense Command, National Guard, New York. The following month he was transferred into the United States army and served at Fort Wadsworth, New York Harbor, until the end of the year, following which he attended a coast artillery school at Fortress Monroe, Va., during January and February, 1918, and helped organize heavy artillery regiments located at Fort Screven, Ga.; Fortress Monroe, Va., and Camp Abraham Eustis, Va. He served with the 61st, the 75th and the 41st Artillery, C. A. C.

Major R. F. Morkill, formerly signal engineer of the Grand Trunk at Montreal, Que., enlisted in the Canadian army as a supernumerary second lieutenant in the Canadian Engineers early in October, 1914. He had served previously in the South African war as lieutenant with the Canadian Mounted Rifles. Immediately following his enlistment he was sent to England and during the winter of 1914 and 1915 he helped build the camp at Salisbury Plain and did searchlight work along the English coast. Early in 1915 he was ordered to France and took part in the second battle of Ypres on April 22-24. Two months later he became a captain and was transferred to the Royal Engineers, following which he was ordered to England to command and train a company, and was so engaged until the latter part of December of

the same year, when he again returned to the front with his company. In the New Year's honors of January, 1917, he was presented with the Military Cross. Later he was promoted to Major of the Royal Engineers and attached to the staff of the Director General of Transportation and given charge of the signaling with the title of signal engineer on the British railways in the occupied portions of France and Belgium. In this connection he put in something over 700 levers besides restoring and afterwards maintaining many plants which had been damaged by shell fire.

Lieut. Robert H. Phinney, formerly assistant engineer in the signal department of the Chicago & North Western, enlisted in the 415th Railway Telegraph Battalion in December, 1917. The battalion was mobilized in January, 1918, and was stationed in Chicago until the latter part of February, at which time it sailed for France via England, arriving there about the second week in March. He was in charge of supplies for the battalion and the latest reports indicate that he still serves in that capacity. The work of the battalion consists of building and maintaining military telegraph and telephone lines.

Lieut. C. D. Symes, formerly signal inspector on the Duluth, Winnipeg & Pacific, at Virginia, Minn., entered military service immediately after the United States declared war. Previous to coming from Great Britain to the United States in 1911 he had had considerable training in the London Volunteers, and when he offered his service in the United States army he received a commission as first lieutenant and was ordered to Fort Leavenworth for training. In February, 1918, he was sent overseas, where he soon became engaged in active service. He was awarded the Croix de Guerre and has twice been mentioned in divisional citations, these citations being as follows:

First Lieut. Clarence D. Symes, Company "D," 1st Engineers, displayed absolute disregard for personal danger in assisting in saving an ammunition dump that was burning. It was by his splendid example that the men worked fearlessly and succeeded in saving a great amount of ammunition. Between the Argonne and the Meuse.

First Lieut. Clarence D. Symes, Company "D," 1st Engineers, displayed splendid qualities of leadership and good judgment in handling his men and showed absolute disregard for personal danger throughout the advance, going ahead of the tanks in several instances in the face of heavy enemy machine gun fire. St. Mihiel Salient.

In the early part of this year Lieut. Symes was transferred from the 1st Engineers to the Inter Allied Railway Commission and was appointed signal engineer to the commission (American sector), American Army of Occupation.

Major W. M. Vandersluis received his commission as captain in the Engineer Officers Reserve Corps on June 13, 1917. He was ordered to the Fort Leavenworth training camp on September 5, 1917, and in December, 1917, he was attached to the 35th Engineers at Camp Grant, Rockford, Ill. The following month he was ordered to overseas duty and arrived in France on February 18, 1918. Most engineering officers received further training in a school operated by the 116th Engineers at Angers, France, and Major Vandersluis was stationed there for a time. For about two weeks in March, 1918, he was placed in charge of a casual company at Blois, France, and on April 2 he was assigned to work under the Chief of Utilities in the Motor Transport Corps, where he served continuously until his discharge on February 20, 1919. He also served about six weeks as signal engineer, in November and December, 1918, with the Transportation Corps. He received his appointment as Major in the Motor Transport Corps on October 7, 1918.

The following list of members are serving or have served in some branch of military or naval service. The list includes the positions they held before entering the service:

Active Members

E. L. Adams, senior signal engineer, Interstate Commerce Commission, Chattanooga, Tenn.
W. G. Atwood, assistant district engineer, Interstate Commerce Commission, Chattanooga, Tenn.
A. M. Bears, signal supervisor, Canadian Pacific, Winnipeg, Man.
Angus Beaton, acting signal supervisor, Canadian Pacific, Winnipeg, Man.
P. A. Bliss, signal supervisor, Southern Pacific, Ogden, Utah.
E. N. Bousquet, signal inspector, New York Central, Cleveland, Ohio.
C. W. Cochran, engineer maintenance of way, Cleveland, Cincinnati, Chicago & St. Louis, Galion, Ohio.
William Crawford, signal engineer, Oren Electric Lines, Salt Lake City, Utah.
A. C. Everham, terminal engineer, Union Pacific, Kansas City, Mo.
P. W. Gage, signal supervisor, Chicago, Burlington & Quincy, La Crosse, Wis.
R. C. Gardner.
M. L. Goehringer, signal supervisor, Missouri Pacific, Nevada, Mo.
Wm. C. Lancaster, electrical engineer, Canadian Northern, Montreal, Que.
W. Landesberg, assistant traffic manager, Moscow-Kazan Railroad, Moscow, Russia.
Stanley W. Law, assistant signal engineer, Northern Pacific, St. Paul, Minn.
E. R. Lindsey, signal inspector, Chicago & Eastern Illinois, Chicago.
F. M. Loud, signal engineer, Public Service Railway, Newark, N. J.
C. A. Lyon, general signal inspector, New York Central & St. Louis, Nashville, Tenn.
M. P. Martin, signal inspector, Illinois Central, Chicago.
R. F. Morkill, signal engineer, Grand Trunk, Montreal, Que.
Wm. B. Nichol, assistant engineer, Boston & Albany, Boston, Mass.
E. T. Owens, associate editor, *Railway Signal Engineer*, Chicago.
G. C. Parsons, superintendent building construction, Twin City Rapid Transit Company, St. Paul, Minn.
A. J. Patterson, junior signal engineer, Interstate Commerce Commission, Washington, D. C.
L. M. Perrin, senior signal engineer, Interstate Commerce Commission, San Francisco, Cal.
R. M. Phinney, assistant engineer, Chicago & North Western, Chicago.
G. A. Rodgers, chief draftsman, Wabash, Decatur, Ill.
N. Roginsky, assistant superintendent telegraph, Moscow-Kazan Railway, Moscow, Russia.
O. B. Ruggles, signal supervisor, Boston & Maine, Salem, Mass.
Charles Stebbins, Jr., assistant supervisor, Richmond & Chesapeake Bay, Richmond, Va.
C. D. Symes, signal inspector, Duluth, Winnipeg & Pacific, Virginia, Minn.
W. M. Vandersluis, signal engineer, Illinois Central, Chicago.
A. J. Yarrell, signal inspector, Chicago, Indianapolis & Louisville, Bloomington, Ind.

Junior Members

Sam Black, signal shop foreman, Chicago & North Western, Madison, Wis.
E. Bouchet, signal foreman, Chicago, Milwaukee & St. Paul, Avery, Idaho.
Wm. H. Claus, draftsman, Illinois Central, Chicago.
D. K. Crawford, draftsman, Gulf, Colorado & Santa Fe, Topeka, Kan.
Homer Dunn, draftsman, Santa Fe Coast Lines, Los Angeles, Cal.
C. L. Falk, maintainer, Wabash, St. Louis, Mo.
Theo. Groth, maintainer, Chicago, Milwaukee & St. Paul, Tacoma, Wash.
John S. Hall, transportation student, Canadian Pacific, Montreal, Que.
Wm. Heard, signal foreman, Union Pacific, Green River, Wyo.
H. E. Johnson, signal foreman, Toledo & Ohio Central, Columbus, Ohio.
C. B. Keers, signal construction foreman, Atchison, Topeka & Santa Fe, Topeka, Kan.
Roy Kimple, draftsman, New York Central, Cleveland, Ohio.

Earl Perkins, wireman, St. Louis, Iron Mountain & Southern, Mineral Point, Mo.
S. F. Rollins, draftsman, Illinois Central, Chicago.
F. J. Ryans, signal draftsman, Illinois Central, Chicago.
D. A. Scarnickia, draftsman, Grand Trunk, Montreal, Que.
W. A. Schrader, Wabash, Decatur, Ill.
A. M. Smith, signal maintenance foreman, Erie, Buffalo, N. Y.
L. C. Smith, assistant foreman, Long Island, Jamaica, N. Y.
W. G. Stansel, draftsman, Elgin, Joliet & Eastern, Joliet, Ill.
G. Stevens, construction foreman, Union Pacific, Cheyenne, Wyo.
J. F. Trimble, maintainer, Grand Trunk, Lansing, Mich.

Associate Members

Azel Ames, Kerite Insulated Wire & Cable Company, New York.
C. C. Bailey, signal accessories department, General Electric Company.
Wm. H. Bleecker, sales representative, Page Woven Wire Company.
P. E. Carter, sales engineer, General Railway Signal Company, New York.
P. H. Chapman, manager, National Electric Specialties Company, Toledo, Ohio.
C. M. Deardorff, sales engineer, General Railway Signal Company, Chicago.
E. B. Doane, sales representative, Chicago Railway Signal & Supply Company, New York.
John Featherston, sales department, Union Switch & Signal Company, Swissvale, Pa.
J. H. Finney, manager, Aluminum Company of America, Washington, D. C.
J. W. Hackett, sales engineer, Federal Signal Company, New York.
C. N. Johns, sales agent, Page Woven Wire Company.
R. B. Johnson, assistant engineer, General Railway Signal Company of Canada, Lachine, Province of Quebec, Canada.
John F. Kelly, electrical engineer, Federal Signal Company, Albany, N. Y.
F. Kingsley, associate editor, Electric Railway Journal, New York.
Wm. J. Payne, inspector, Saxby & Farmer Company, Ltd., Montreal, Que.
Paul Renshaw, signal engineer, Federal Signal Company, New York.
E. A. Warner, Jr., commercial department, Union Switch & Signal Company, Swissvale, Pa.
W. W. Wenholz, General Railway Signal Company, Rochester, N. Y.
P. P. Williams, eastern representative, Chicago Railway Signal & Supply Company, New York.

Annual Exhibit of the N. R. A. A. at the Coliseum

The Post War Show Proves Attractive to Delegates and Visitors to the A. R. E. A. Convention

"We will play to a crowded house this year," said C. W. Kelly, secretary of the National Railway Appliances Association and stage manager of the 11th annual exhibit of the association at the Coliseum, which opened yesterday morning. This was a week ago and during the seven days intervening wonders have been accomplished. Another show had been playing in the Coliseum, namely, an organization of Chicago's soldiers recently returned from overseas, which used the building during its sojourn in Chicago as a reception hall. Accordingly, Stage Manager Kelly had to literally "roll up his sleeves and fall to." He marshaled his forces, set the stage hands and decorators to the converting of the drab interior of the Coliseum into a spotless buff and old ivory stage and at the same time helped the principals in the four-day show in work on their convention costumes and in the rehearsal of their respective parts. The whole was welded into a co-ordinated production for the exhibition of appliances used in steam and electric railway operation, construction and maintenance.

There was no hitch in the official opening, as was sometimes the case in the past. The total registration of supply representatives at noon yesterday was 75 more than last year's total registration of 921. At the close of the first day this year there were 160 additional registrants. All exhibitors had their exhibits in place with the exception of one. This has not been the case in the past.

The show in its entirely is, as P. T. Barnum might say, "Bigger and better than ever." The number of active exhibitors continues to increase, five additional appliance companies being added to the total of last year, yet the N. R. A. A. still clings to their re-edited golden rule of "quality and not necessarily quantity." The exhibits themselves are mostly active service appliances, educational rather than showy and all a bit more tastefully arranged, perhaps, in order to show the busy railroad visitor the salient points of the appliances with the least possible expenditure of time. Needless to say, the devices exhibited are ones which have proven their efficiency and success in actual service.

No radical changes have been made in the arrangement or management of the N. R. A. A. show, the acclaim which greeted the handling of last year's exhibit being sufficient to prove the success of the arrangement instituted at that time. However, there has been some change in spirit, due almost wholly to extraneous circumstances, from that of last year. The changes in railroad organization, especially in the personnel of railroad construction and maintenance of way departments, which began with the taking over of the railroads by the government has, of course, continued. Furthermore, the uncertainty of what is to become of the railroads eventually and the admitted precarious financial condition of the railroads has tended to instill in the minds of the engineering executives attending the convention the necessity of making what purchases they are able to make with extreme care. This in turn means a more rigorous investigation of the comparative efficiency and usefulness of different appliances which are necessary to railroad operation and maintenance and which the railroads must buy to a certain extent to maintain operation. All of this reverts to the N. R. A. A. in increased attendance and interest in the products exhibited. Continuing the successful practice of last year, the main entrance to the show is through the annex, which in turn is an integral part of the exhibit. The floor plan of the Coliseum is substantially the same as in previous years, with many firms occupying practically the same space as last year.

Mr. Kelly's statement concerning the expected attendance is not amiss, for the changes in railroad personnel already mentioned and the conditions back of the railroads and the railway supply fields accurately foretold the success of the N. R. A. A. show this year. The opinion, which has been developed during the past two years, that the appliances exhibited at the Coliseum are equally attractive to the executive and the subordinate is now producing results. A fair percentage of the visitors at the Coliseum yesterday were men who hold subordinate positions and certainly their interest in the appliances of the different supply companies is no less than that of the executive who is searching for the best means of extending the money allotted to his department, for it is the subordinate who must use the appliances and whose effi-



Officers of the National Railway Appliances Association

P. C. Jacobs, Vice-President
G. C. Isbester
L. W. Shugg

E. H. Bell, Honorary Director
Merle J. Trees, President
A. P. Van Schaich
T. W. Aishton

C. W. Kelly, Secretary-Treasurer
J. Alexander Brown
E. E. Hudson

ciency is dependent upon their appropriate selection.

The exhibition will, as usual, open every morning at 8:00 a. m., closing at 10:00 p. m., with the exception of the closing day, Thursday, March 20, when the closing hour is set at 6:00 p. m.

A new plan has been instituted this year in the issuing of tickets. This plan, which is essentially the placing of tickets in the hands of those who will be able to distribute them to the greatest advantage, is intended to weed out those who are really not interested in the N. R. A. A. exhibit or who are not in any way connected with the railway or railway supply business and consequently will give more opportunity to the representatives of the supply firms to devote their time to those who are vitally interested in their products. It is believed that before the convention opens tickets were placed in the hands of practically every railroad man who could possibly attend the show and who in any way would be interested in railway appliances and their use.

The officers and members of the Board of Directors of the National Railway Appliances Association for the past year were: President, Merle J. Trees, Chicago Bridge & Iron Works, Chicago; vice-president, P. C. Jacobs, H. W. Johns-Manville Co., Chicago; secretary-treasurer, C. W. Kelly, Kelly-Derby Co., Chicago; honorary director, E. H. Bell, Railroad Supply Company, Chicago. Directors: J. Alexander Brown, Pocket List of Railroad Officials, New York; G. C. Isbester, Rail Joint Company, Chicago; E. E. Hudson, Waterbury Battery Company, Waterbury, Conn.; T. W. Aishton, National Malleable Casting Company, Chicago; A. P. Van Schaick, Lackawanna Steel Company, Chicago; L. W. Shugg, General Electric Company, Schenectady, N. Y.

Merle J. Trees, president of the association, is vice-president and general manager of the Chicago Bridge & Iron Works, Chicago. He was born at Mayview, Ill., on June 14, 1883. After graduating from the University of Illinois in 1907, Mr. Trees entered the employ of the Chicago Bridge & Iron Works and his whole business career since that time has been with this company. In 1909 he was appointed sales engineer and in 1911 he became manager of the Chicago sales office. In 1913 he was appointed general sales manager and in June, 1917, was appointed vice-president and general manager, which position he holds at the present time.

List of Exhibitors

The following is a list of the firms presenting exhibits, with the devices on display and the names of the representatives present at their booths:

Adams Motor & Manufacturing Company, Chicago.—Gasoline inspection motor cars. Represented by W. E. Adams, R. A. Harris, L. Gerhardt and A. P. Grenier. Spaces 218 and 218½.

Adams & Westlake Company, Chicago.—Signal lamps; long time burners; switch locks; lanterns; railway station and platform lamps. Represented by W. H. Baldwin, A. S. Anderson, C. B. Carson, W. J. Piersen, H. G. Turney, J. F. Stender, Wm. S. Hamm and G. L. Walters. Spaces 87, 88, 106 and 107.

A. G. A. Railway Light & Signal Company, Elizabeth, N. J.—Railway grade crossing signal; highway danger signal; daylight signal; unison flash signal. Represented by J. K. Howard, A. G. Shaver, O. E. Berggren and H. J. Johnson. Spaces 39 and 40.

Air Reduction Sales Company, New York.—Oxy-acetylene generator; oxy-acetylene welding and cutting torches and apparatus; welding and cutting supplies; special apparatus for frog welding. Represented by E. L. Mills, A. S. Kinsey, R. A. Sossong, J. A. Warfel, B. N. Law, Fred Wyman, Sam Shayken, C. Wallin, M. M. Weist, W. W. Howard and F. G. Gorke. Spaces 7 and 8.

The Alexander Milburn Company, Baltimore, Md.—Portable carbide lights; oxy-acetylene welding and cutting apparatus. Represented by J. A. Schreiber, C. R. Pollard, E. C. McNutt and D. Bartlett. Space 14.

Alger Supply Company, Chicago.—Kerosene snow melting outfits; switch fittings; trunking supports; signal devices. Represented by O. S. Flath and J. M. Fitzgerald. Spaces 167, 167½ and 168.

American Abrasive Metals Company, Chicago.—"Feralun" anti-slip treads for passenger coach steps. Represented by H. W. Mowery, C. A. Barker, L. A. Hale and R. L. Brown. Space 15.

American Hoist & Derrick Company, St. Paul, Minn.—"American" railroad ditcher. Represented by F. J. Johnson, W. O. Washburn, Edward Coleman and C. J. Hook. Space 88½.

American Kron Scale Company, Chicago.—Kron dial freight house scale. Represented by E. Ohnell, W. W. Camp, C. F. Larson, J. Kirk Rowell, E. M. Abramson, J. Sykes, F. M. Franklin, J. Bjornson and John Kelly. Space 125.

American Malleable Castings Association, Cleveland, Ohio.—Malleable iron castings with machines for demonstrating the twisting test and tensile strength. Represented by S. H. Standish, J. S. Llewellyn, W. A. Draves, A. O. Buckius, Jr., G. A. Faitz, D. J. Maher and F. A. Kavanaugh. Spaces 221 and 222.

American Railway Bridges and Buildings Association, Chicago.—Represented by C. A. Lichty. Space 226.

Anchor Company, New York.—Efficiency rail anchor. Represented by T. B. Bowman, G. H. Chadwell and O. Metcalf. Space 192½.

American Railroad Signal Supervisory Association, Chicago.—Represented by R. R. Baker, C. Drake and H. R. Bills. Space 226.

American Steel & Wire Company, Chicago.—Right-of-way fencing; galvanized steel fence posts; steel gates; wire rope; rail bonds; electrical wires and cables; switching ropes; telephone wire; railroad spikes; nails; staples and tacks; barbed wire; concrete reinforcement; springs; screw stock; wire; pole steps. Represented by L. A. Dietrich, J. W. Meaker, A. W. Froude, M. A. Evans, J. W. Collins, J. F. Alexander, L. P. Shanahan and B. H. Ryder. Spaces 51½, 52, 70, 70½ and 71.

American Valve & Meter Company, Cincinnati, Ohio.—Poage water columns with telescopic spouts; Anderson economy switch stands; Anderson interlocking switch stands. Represented by J. T. McGarry, D. J. Higgins, F. C. Anderson and J. DePinal. Spaces 130, 131 and 132.

American Vulcanized Fibre Company, Wilmington, Del.—Vul-cot fibre for track insulation. Represented by C. C. Bell, H. C. Hackett, John Barron, Wm. Maxwell and H. M. Dexter. Space 126.

Armco Iron Culvert & Flume Manufacturers Association, Middletown, Ohio.—Represented by Fred Milhoan and G. W. Jenkins. Spaces 99 and 100.

Austin Company, Cleveland, Ohio.—Photographs and details of ten types of standard buildings and special railroad buildings. Represented by G. A. Bryant, W. L. Bailey, B. Hopkins, W. F. Chambers, P. W. Swern and E. M. Haas. Spaces 158 and 158½.

The Balkwill Manganese Crossing Company, Cleveland, Ohio.—Articulated cast manganese crossings. Represented by S. Balkwill. Space 115.

The Barrett Company, New York.—Barrett's specification roofs and waterproofing; Tar Rok sub floors; Everlastic shingles and prepared roofings; Elastigum plastic cement; Nox Aer Leek boiler covering; semaphore roofing; Holt roof connections; Tarvia and paving pitch filler; Carbosota grade one liquid creosote oil. Represented by W. S. Babcock, C. T. Bilyea, John J. Ross, G. R. McVay, F. W. Freeman and K. C. Barth. Spaces 107½ and 108.

Benjamin Electric Manufacturing Company, Chicago.—Industrial lighting fixtures; water tight, steam tight, and vapor proof fixtures; electrical lighting specialties; water tight, weather proof conduit fittings. Represented by C. B. Harlow, G. B. Weber, A. E. Lubeck, O. L. Johnson and W. J. Goodrich. Spaces 157 and 157½.

Bethlehem Steel Company, Bethlehem, Pa.—New Century switch stands; Steelton positive switch stand; U. S. Army and Navy standard switch stand for heavy and light rails; switch stands. Represented by E. S. Knisely, R. W. Gillespie, N. E. Salsick, R. E. Belknap, G. S. Vickery and John F. Hennessy. Spaces 199 and 216.

Blaw-Knox Company, Pittsburgh, Pa.—Models of Clamshell buckets and steel forms for concrete construction; concrete mixers; plate and structural steel work; water cooling devices for open hearth furnaces. Represented by R. L. Grannis, R. B. Randall and O. B. Pulis. Space 170.

Boss Nut Company, Chicago.—Boss lock nuts. Represented by J. A. MacLean, J. W. Fogg and W. G. Willcoxson. Spaces 1 and 2.

Bryant Zinc Company, Chicago.—Highway crossing signals; batteries; bells; relays; signal accessories. Represented by Stanley C. Bryant, Jerre P. Costigan, Jno. Hensel and Theodore Cole. Spaces 154 and 155.

The Buda Company, Chicago.—Electric industrial trucks; "Hyduty" Paulus track drill; Buda-Wilson bonding drill, with Liberty clamp; car replacers; journal jack; Liberty tool grinder; switch stand; electric gate post; motor section cars; motor velocipedes; inspection car; ratchet jack; bumping post. Represented by J. L. Artmaier, H. C. Beebe, A. L. Bliss, Vaughan Y. Bell, G. E. Bryar, C. H. Bull, E. Conant, W. C. Dyer, M. A. Evans, R. B. Fisher, J. J. Gard, L. R. Griffin, H. J. Harkless, W. F. Hebard, G. W. Hoover, W. P. Hunt, Jr., H. L. Miller, P. G. Pendorf, F. E. Place, M. A. Ross, F. C. Tams, E. A. Thiele and L. M. Viles. Spaces 61, 62, 63, 64 and 65.

The Burden Iron Company, Troy, N. Y.—Staybolt iron; engine bolt iron; iron boiler rivets. Represented by John C. Kuhns. Space 10.

Camp Culvert Form Company, Denver, Colo.—Steel form for culvert construction. Represented by E. M. Camp. Space 225.

Carbic Manufacturing Company, Chicago.—Carbic cakes; portable acetylene lights; generators, oxy-acetylene cutting and welding equipment. Represented by D. C. Duncan, G. B. Van Buren and T. J. Hegland. Space 185.

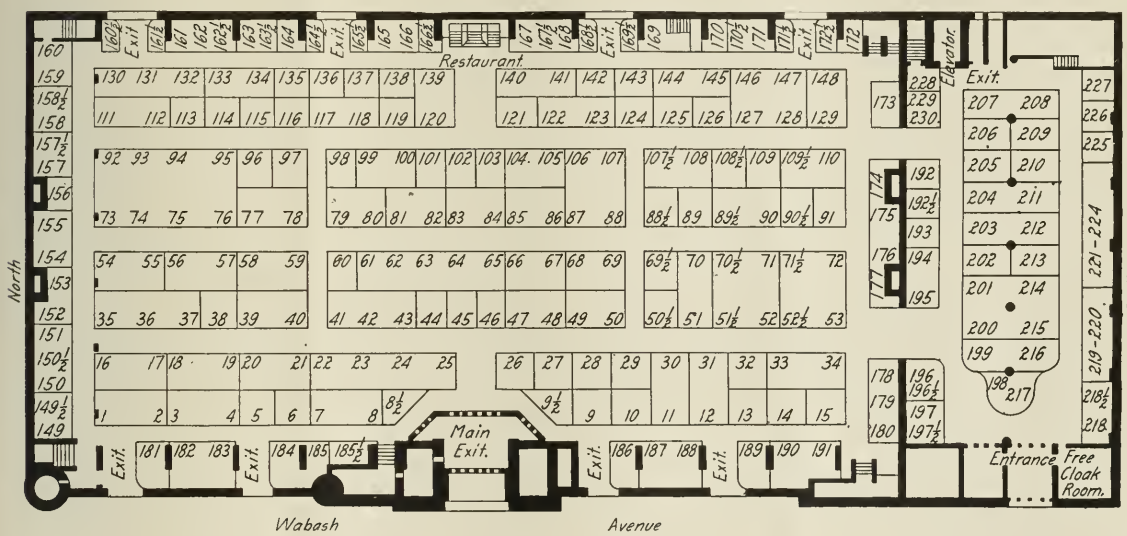
Carnegie Steel Company, Pittsburgh, Pa.—36-in. passenger train car wheel; 36-in. engine truck wheel with large diameter of sprinkling train. Represented by R. N. Chipman and E. D. Jackson. Space 135.

Clark Car Company, Pittsburgh, Pa.—Pictures and literature covering the Clark extension side dump cars. Represented by H. E. Chilcoat and H. G. Doran. Spaces 163 and 163½.

Cleveland Railway Supply Company, Cleveland, Ohio.—Switch stands; guard rails; "Safety" foot guards for guard rails and switches; malleable tie plates; flangeway guards for highway crossings and station platforms; automatic industrial track couplers. Represented by F. A. Peck, J. S. Peck and E. G. Deucher. Spaces 207 and 208.

Crerar, Adams & Company, Chicago.—Calumet track drills; Calumet die starter; shovels; jacks; Hercules and Standard trucks; waste; hammers; railbenders; chain blocks. Represented by J. Arthur Martin, G. D. Bassett, W. I. Clock, C. W. Gregory, R. M. Bullard, E. C. Poehler and W. L. Reidell. Space 28.

Detroit Graphite Company, Detroit, Mich.—"Superior Graphite Paint" for structural iron; "Sta-white" for storehouse interiors, freight car paint. Represented by T. R. Wyles, L. D. Mitchell, W. C. Bradford, A. H. Kuerst, H. I. Miller, L. F. McFarland, W. D. Waugh, J. J. Hogan and Capt. A. B. Edge. Space 108½.



Floor Plan of the Coliseum

hub; rolled steel piston blanks and piston center blanks; gear blanks for cranes and other shop uses; steel cross ties; splice bars; Braddock joints; electrical tool steels. Represented by N. M. Hench, Samuel Fray, E. S. Mills, C. B. Friday, H. Van Zandt and G. W. Landrus. Spaces 52½, 53, 71½ and 72.

Cast Iron Pipe Association, New York.—Cast iron pipe. Represented by R. C. McWane, F. E. Hutchins and J. F. McClure. Space 200.

Chicago Bridge & Iron Works, Chicago.—Model steel tanks. Represented by Merle J. Trees, George T. Horton, H. B. Horton, H. B. Murphey, K. I. Small, F. L. Cook, H. C. Brown, C. M. Ladd, C. H. Scheman, L. McDonald, R. C. Campbell, S. A. Poyer, F. E. Lee, W. R. Manock and O. A. Bailey. Spaces 51 and 70.

The Chicago Flag and Decorating Company, Chicago.—Bunting signal flags; U. S. and foreign flags; tourist luncheon equipment. Represented by Geo. L. Glendon, Walter Glendon, Thos. Glendon, J. McArdle, L. G. Magnusson and L. C. Bergeron. Spaces 187 and 188.

Chicago Malleable Castings Company, Chicago.—Thomas rail anchor tie plates. Represented by J. S. Llewellyn and W. M. Osborn. Space 142.

Chicago Railway Signal & Supply Company, Chicago.—Mechanical and electrical railway signaling devices. Rrepresented by E. W. Vogel, E. K. Brashears, A. C. Dunne, W. C. Martin, Carl Suhr, C. R. Ahrens, D. J. McCarthy, Wm. C. McClintock and W. H. Dayton. Spaces 77 and 78.

Chipman Chemical Engineering Company, Inc., New York.—Atlas "A" method of killing track vegetation, including method

Deeming-Endsley Company, Chicago.—Morrison switch-point hold-down. Represented by Herbert Deeming, Horace F. Endsley and P. O. Morrison. Space 184.

Diamond State Fibre Company, Chicago.—Rail insulation; fibre receptacles. Represented by Theo. Herbert, C. N. Reeves, H. P. Wilson and J. Esch. Space 13.

Paul Dickinson, Inc., Chicago.—Smoke jacks; ventilators and chimneys for engine house, shops, and small buildings. Represented by A. J. Filkins, E. B. Filkins, M. Carney and H. Knutson. Space 98.

The Duff Manufacturing Company, Pittsburgh, Pa.—Lifting jacks; high speed ball bearing for car and locomotive work. Represented by T. A. McGinley, E. A. Johnson, C. A. Methfessel and C. N. Thulin. Space 91.

Edison, Inc., Thos. A., Bloomfield, N. J.—Models of 1918 batteries; switchboard illustrating various methods of lighting automatic signals. Represented by L. W. McChesney, F. J. Lepreau, A. J. Loughern, I. P. Rodman, P. A. Garrity, E. A. Brown, E. W. Newcomb, O. P. Rose, R. I. Frost, B. F. Hines and Mr. Constable. Spaces 18 and 19.

Edison Storage Battery Company, Orange, N. J.—Edison alkaline storage batteries. Represented by H. G. Thompson, F. V. McGuiness and E. T. Sawyer. Space 636.

Electric Storage Battery Company, Philadelphia, Pa.—Chloride accumulator; "Ironclad" and "Exide" batteries for car lighting; interlocking and signal service; batteries used by Government during the war. Represented by G. H. Atkin, J. Lester Woodbridge, T. Milton, H. M. Beck, W. E. Dunn, W. Heritage and H. E. Hunt. Space 60.

Equipment Corporation of America, Chicago. "Shop mule" industrial gasoline tractor. Represented by W. F. Hebard, B. C. Hooper, C. H. Conrad, A. C. Sloss, H. D. Gumpper, H. T. Rich, A. D. Moseby, H. M. Capron and L. F. Mead. Space 161½.

The Eymon Crossing Company, Marion, Ohio.—Continuous rail manganese crossing. Represented by Byron E. Wilson and James H. Eymon. Space 169½.

Fairbanks, Morse & Company, Chicago.—Oil engine, centrifugal pumps, steam pumps; motor cars; locomotive water crane; electric motors, generators and scales. Represented by L. H. Matthews, E. C. Golladay, D. K. Lee, F. J. Lee, C. B. Skelton, B. S. Spalding, F. M. Condit, W. F. Singer, A. A. Taylor, S. Smith, F. P. Drinker, J. F. Flanagan, H. E. Vogel, E. J. Coverdale, O. Tharle, C. W. E. Witter, G. J. Akers, F. M. Gardner, K. Jurgensen, G. Howard, E. Lang, C. H. Wilson, H. G. Balke, E. E. Pendray, H. E. Vergosen, J. D. Daggett, M. J. Kochendorfer, J. W. Ferguson and F. A. Moseley. Spaces 73, 74, 75, 76, 92, 93, 94 and 95.

The Fairbanks Company, Chicago.—Fairbanks trucks and barrows; Fairbanks valves; Star engine lathes; Louden overhead carrier system; electro magnetic portable drills, hammers and Canton crane. Represented by N. Lansing De Long. Spaces 196 and 196½.

Fairmont Gas Engine & Railway Motor Car Company, Fairmont, Minn. Featherweight inspection cars; standard section motor cars; motor car outfits. Represented by Harold E. Wade, W. F. Kasper, Ward G. Day, R. J. Sawyer, R. B. Ballard, C. S. White and H. D. Fitz. Spaces 41, 42 and 43.

Federal Signal Company, Albany, N. Y.—Represented by Paul Renshaw, Carl Henze, M. R. Briney, H. C. Ware, C. N. Beckner, W. H. Reichard and S. J. Turreff. Spaces 47 and 48.

Federal Sign System (Electric), Chicago.—Federal Safety First electric railroad lantern; Federal electric siren; Federal electric renewable fuse. Represented by F. T. Baird, O. S. Burke and F. J. Ffrench. Space 228.

H. K. Ferguson Company, Cleveland, Ohio.—Represented by H. K. Ferguson, A. J. Hollingshead, H. S. Jacoby, O. C. F. Randolph and J. M. Taylor. Spaces 152 and 153.

The Frictionless Rail, Boston, Mass.—Frictionless rail for track curves. Represented by F. A. Barbey, S. W. Simonds, T. F. Dwyer, Jr., and J. T. Chamberlain. Spaces 133 and 134.

General Electric Company, Schenectady, N. Y.—Turbo-generator headlight sets; battery charging sets; switchboards; resistance units; lantern slides and photographs of installations of electrical equipments; lead burning transformer. Represented by John Roberts, H. W. Stewart, H. M. Jacobs, W. H. Sigourney, C. Dorticos, A. P. Jenks, A. J. Francis and L. W. Shugg. Spaces 35, 36 and 37.

The General Railway Signal Company, Rochester, N. Y.—Represented by F. L. Dodgson, W. S. Henry, W. K. Howe, H. W. Lucia, L. Thomas, J. R. Wills, M. Wuerpel and W. R. Young. Spaces 45 and 50.

Gilbert & Barker Manufacturing Company, Springfield, Mass.—Combination pump and tank oil storage outfits. Battery "T 29" back geared lubrication outfit; "T 31" cabinet lubricating tanks; "T 6" gallon stroke lubricating pump. Represented by J. E. Ham and J. R. Field. Space 169.

Gould Storage Battery Company, New York.—Full sized submarine battery; 40 ampere hour R. S. A.; 400 ampere hour R. S. A.; plates; separators. Represented by T. Entz, T. O. Moriarty and G. Berger. Spaces 149 and 149½.

Wm. Graver Tank Works, Chicago.—Model of Graver type "K" water softener; water filters; steel, oil and water storage tanks; general steel plate work construction. Represented by W. R. Toppan, W. C. Curd and J. J. Felsecker. Spaces 144 and 145.

Grip Nut Company, Chicago.—Grip nuts. Represented by W. E. Sharp, B. H. Forsyth, H. E. Passmore, Albert Roberts, J. E. Weatherford, H. J. Tierney and C. J. Wymer. Spaces 190 and 191.

W. & L. E. Gurley, Troy, N. Y.—Engineering and surveying instruments; Gurley precise transits with patented one-piece truss standard. Represented by H. M. Dibert and Malcolm Butement. Space 69½.

Hall Switch & Signal Company, Garwood, N. J.—Reception booth. Represented by W. J. Gillingham, H. W. Wolf, J. A. Ritter, H. L. Hollister, C. J. Harvig, D. R. Day and O. B. Frink. Spaces 85 and 86.

The Hatfield Rail Joint Manufacturing Company, Macon, Ga.—Hatfield rail joints and Hatfield rail joint fastenings. Represented by Walter T. Johnson and U. R. Hatfield. Space 166½.

Hayes Track Appliance Company, Richmond, Ind.—Hayes derails. Represented by S. W. Hayes, R. W. Slautterback, W. Harding Davis, Arthur Gemunder, E. L. Ruby, F. C. Stowell, C. S. Driffill, R. H. Gausepohl, P. L. Harris, R. S. Carson and O. M. Kendall. Spaces 140 and 141.

Hazard Manufacturing Company, Wilkes-Barre, Pa.—Rubber insulated signal wires and cables; lead encased wires and cables; steel tape armored cables; circular loom cables; wire rope; galvanized strand. Represented by A. W. Gabriel, Geo. P. Cady, Leroy W. Allen, H. B. Pflasterer, Thomas A. Keefe and Carl P. Brodhun. Spaces 3 and 4.

Hegeman-Castle Corporation, Chicago.—Clapp fire resisting paint; C. & C. electric welders; Anglo-American target enamel; tool steel gears and pinions. Represented by Chas. H. McCormick. Space 137.

Hubbard & Company, Pittsburgh, Pa.—Track tools and shovels. Represented by O. W. Youngquist, J. V. Smith and W. H. Remmel. Space 143.

Ingersoll-Rand Company, New York.—"Imperial" pneumatic tie tampers; portable compressor cars; pneumatic spike-driving hammer; screw spike drivers; portable pneumatic emery grinders; wood borers and drills for rail bonding. Represented by W. H. Armstrong, Charles Dougherty, C. W. Melcher and J. N. Thorpe. Space 206.

International Steel Tie Company, Cleveland, Ohio.—Steel twin ties for paved street track; steel crossing foundations and international paving guards. Represented by Wm. P. Day, W. C. Mahon, T. J. Lavan, V. E. Heglaw and W. S. Godwin. Space 189.

International Marine Welding Company, New York.—Roller lock nut. Represented by Cortlandt F. Ames and W. Craig Stone. Spaces 171½ and 172½.

H. W. Johns-Manville Company, New York.—Asbestos roofing; asbestos shingles; asbestos smoke jacks; pipe and boiler insulation. Represented by J. E. Meek, J. C. Younglove, G. A. Nicol, P. C. Jacobs, P. R. Austin, J. M. Borrowdale, H. M. Butters, H. Flannagan, D. L. Jennings, W. H. Lawrence, C. E. Murphy, H. G. Newman, J. H. Trent and E. H. Willard. Spaces 174, 175, 176 and 177.

O. F. Jordan Company, East Chicago, Ind.—Jordan spreader and ditching attachment. Represented by Walter J. Riley, Robert E. Bressler and Joseph A. Adley. Spaces 56 and 57.

The Joyce-Gridland Company, Dayton, Ohio.—Railroad jacks. Represented by Chas. D. Derby. Space 27.

Kalamazoo Railway Supply Company, Kalamazoo, Mich.—Hand, push and velocipede cars, motor cars, track drills, valve grinders, gauges, levels; railway appliances. Represented by Jno. McKinnon. Spaces 22, 23, 24 and 25.

Kaustine Company, Inc., Buffalo, N. Y.—Kaustine waterless toilets. Represented by G. W. Hambrook, F. B. Shalters and David A. Evans. Space 29.

Kelly-Derby Company, Inc., Chicago.—Ten H. P. oil-burning engine; Kaustine waterless chemical toilets; warehouse trucks; cast iron and semi-steel wheels. Represented by F. W. Adams, H. L. Bachman, W. H. Day, O. K. Fischer, W. B. Holcomb, C. W. Kelly and F. G. Koehler. Spaces 11 and 30.

The Kerite Insulated Wire & Cable Company, Inc., New York.—Insulated wire and cables. Represented by R. D. Brixey, Azel Ames, J. W. Young, P. W. Miller, J. A. Renton, C. R. R. Harris, B. L. Winchell, Jr., G. A. Graber, W. H. Fenley and J. A. Hamilton. Spaces 68 and 69.

Keystone Grinder & Manufacturing Company, Pittsburgh, Pa.—Railroad tool grinders. Represented by S. S. Newman and J. S. Wincrantz. Space 193.

The Kilbourne & Jacobs Manufacturing Company, Columbus, Ohio.—"K. & J." automatic air dump car. Represented by J. S. Mossgrove and David Greene. Space 97.

Knickerbocker Roofing & Paving Company, Chicago.—Standard bridge water-proofing; pitch and felt roofing for railroads. Represented by Mark A. Cronin and Geo. W. Pulford. Space 183.

Lackawanna Steel Company, Buffalo, N. Y.—Sections cases; rail joints; splice bars, hook shoulder tie plates; Abbott rail joint plates and safety head angle bars. Represented by A. P. Van Schaick, J. L. Hench, G. O. Benson and F. E. Abbott. Spaces 33 and 34.

The Lehon Company, Chicago.—Membranes for reinforcing concrete waterproofing; composition roll roofing and asphalt shingles; mastic floors, waterproof insulating fabrics and papers for refrigerator cars; plastic car roofing; canvas coach and caboose roofing. Represented by Tom Lehon, D. B. Wright, Chas. V. Eades and Edward Leonard. Space 109.

Lipman Refrigerator Car & Manufacturing Company, Beloit, Wis.—Refrigerator compressors; special refrigerating equipment for railway cars. Represented by C. E. L. Lipman, E. Lipman and T. E. Lipman. Space 116.

Chas. R. Long, Jr., Company, Louisville, Ky.—Paint films; sample panels, sample plates. Represented by Chas. R. Long, Jr.,

Harry Visserin, G. S. Turner, M. E. Keig, W. H. Heckman and Samuel W. Russell. Space 90½.

John Lundie, New York.—Lundie tie plates, Represented by C. Z. Moore and John Lundie. Space 165½.

The Lufkin Rule Company, Saginaw, Mich.—Measuring tapes; rules. Represented by S. B. McGee, Frank G. Brown and Fred Hollingworth. Space 121.

Macomber & White Rope Company, Kenosha, Wis.—Wire ropes for all railroad use. Represented by R. E. Jacobs, E. E. Roibirds and J. Boope. Spaces 89½ and 90.

M. W. Supply Company, Philadelphia, Pa.—Vaughan switch heaters; Vaughan rail benders; Vaughan guard rail clamps; Anchor guard rail clamps; tie plate guard rail fasteners. Represented by David L. Vaughan and Chas. Z. Vaughan. Space 101.

MacRae's Blue Book Company, Chicago.—MacRae's Blue Book. Represented by Albert MacRae, T. H. MacRae, Lloyd Simonson, L. R. Rollins, E. B. Cooks, C. H. Hill, R. S. Lundy, Alex Smith, W. F. Miller and J. A. Walsh. Space 9½.

The Madden Company, Chicago.—Three men rail laying machine; derrick truck car; "Red Top" steel fence post; Richter blue flag derail; Blair tie spaces; Harris-Muff ballast screen; Wagner switch point straightener; Veerac motor car; Perfect rail brace. Represented by Wallace W. Glosser, R. V. Dawney and H. C. Holloway. Spaces 194 and 195.

Marsh & Truman Lumber Company, Chicago.—Bloxonend flooring. Represented by F. L. Bronez, C. J. Carter, I. R. Garretson, A. B. McHenry, Mr. Mellier and M. G. Truman. Space 213.

Massey Concrete Products Corporation, Chicago.—Reinforced concrete products. Represented by C. F. Massey, F. V. Shannon, Lee Frank, J. E. Moody, R. G. Eliel, E. C. Alexander, Paul Kircher, Charles Gilman, J. E. Higgs, Jr., W. I. Creese, P. E. Longstreet and H. E. Burns. Spaces 54 and 55.

McGraw-Hill Company, New York.—Technical publications. Represented by Wm. Buxman. Space 8½.

Mercury Manufacturing Company, Chicago.—Electric storage battery tractors. Spaces 117 and 118.

Metal Hose & Tubing Company, Brooklyn, N. Y.—Gasoline, oil and paint spray hose and connections. Represented by J. M. Oden, R. S. Westcott, P. L. Tolerton, R. Berkowitz and U. J. Edwards. Space 96.

Metal and Thermit Corporation, New York.—Welded samples of rails and heavy sections; pipe welding by thermit process; carbon free alloys produced by thermit process. Represented by Henry S. Mann, C. D. Young, W. H. Moore and T. B. Skilton. Space 185½.

Miller Train Control Corporation, Danville, Ill.—Full size train-control equipment in operation. Represented by W. B. Murray, H. B. Miller, J. N. Garber and P. E. Herren. Spaces 197 and 197½.

Monroe Calculating Machine Company, Chicago.—Monroe calculating machines. Represented by Henry H. Doty, R. W. Peck, Jerome Kennedy, T. D. McElhiney and R. U. Preble. Space 9.

Mudge & Company, Chicago.—Mudge motor cars. Represented by Burton Mudge, Robert D. Sinclair, Karl J. Eklund, Jean K. Vanatta, Karl H. Leedom, Clyde P. Benning, Lloyd O. Stratton, Charles M. Mudge, George W. Bender, Loren Buchanan, W. J. Behlke, Jr., V. Pagett, Sherman C. Amsden, Fay E. Posson, Arthur L. Pearson, Albert C. Force and William B. Ross. Spaces 127, 128, 146 and 147.

National Carbon Company, Inc., Cleveland, Ohio.—Columbia track batteries; Columbia R. S. A. signal batteries; Columbia storage batteries; Columbia dry batteries; Hot Shot batteries; carbon brushes; lighting, moving picture and photographic carbons; welding and searchlight carbons; Columbia flashlights and flashlight batteries; carbon telephone specialties and special forms in carbons. Represented by Chas. S. Pflasterer, W. H. Arkenburgh, J. M. Spangler, W. R. Pflasterer, A. E. Pratt, R. J. Cox, W. G. Waitt, R. W. Erwin, C. W. Wilkins, L. W. Fischer and Wallace O'Connor. Spaces 150, 150½ and 151.

National Concrete Machinery Company, Madison, Wis.—Concrete posts, molds, reinforcements and signal signs; The Toohey timber dapper. Represented by S. T. Walker, Victor Rogers and A. H. Anderson. Space 164.

National Lead Company, New York.—Dutch Boy red-lead; Dutch Boy white-lead. Represented by F. M. Hartley, Jr., and Chas. B. Field. Space 113.

The National Lock Washer Company, Newark, N. J.—Lock washers and Hipower nut locks. Represented by C. H. Loutrel, F. B. Archibald, J. H. Horn, A. T. Thompson and R. L. Cairncross. Space 192.

The National Malleable Castings Company, Cleveland, Ohio.—Track devices. Represented by T. W. Aishton. Space 102.

National Surface Guard Company, Chicago.—Tie tongs; combination tie and rail tongs; rail saws; cattle guards. Represented by C. C. Zimmerman and H. A. Smith. Space 210.

Nichols & Bros., Geo. P., Chicago.—Gas engine power plant for turntable tractor; electric tractor; transfer table model; two electric collector devices; air motor. Represented by Geo. P. Nichols, S. F. Nichols, R. M. Gaston and N. Fries. Space 173.

North American Engine Company, Algona, Iowa.—Section motor cars and engines. Represented by E. A. Adams, C. W. Nicoulin, C. H. Cretzmeyer, J. Edward Murphy and Mrs. C. H. Cretzmeyer. Spaces 170½ and 171.

Ogle Construction Company, Chicago.—Models, photographs and designs of locomotive coaling stations and coal handling machinery. Represented by R. A. Ogle, C. F. Bledsoe and M. W. Powell. Spaces 12 and 31.

The Okonite Company, New York.—Rubber-covered wires and cables. Represented by H. Durant Cheever, J. V. Underhill, F. J. White, W. R. Van Steenburgh, H. A. Hamilton, Charles A. Miller and J. W. Hackett. Spaces 16 and 17.

O'Malley-Beare Valve Company, Chicago.—Globe, angle and check valves; medium and extra heavy; special valves; Duplex blow-off cocks; Perfection gauge cocks. Represented by Edward O'Malley, Thomas O'Malley, J. N. Gallagher, J. E. Brown, J. M. Pigott, W. H. Morris, F. A. Hitesman. Space 114.

The P. and M. Company, Chicago.—P. & M., Vaughan, Henggi, Ajax rail anti-creepers; bond wirep rotectors. Represented by F. A. Poor, P. W. Moore, Fred A. Preston, F. N. Baylies, D. T. Hallberg, S. M. Clancey, George C. Clifford, J. D. Griswold, P. H. Hamilton, George E. Johnson, J. E. Mahoney, John Reagan, W. H. Reaves, John Ritchie, P. V. Samuelson, L. S. Walker and William A. Maxwell. Spaces 122 and 123.

Page Steel & Wire Company, New York.—Armco iron bond wires; "Copperweld" bond wires; Armco iron and "Copperweld" wire, single and strand, for electrical transmission; Armco iron welding wire. Represented by W. T. Kyle and C. A. McCune. Spaces 81 and 82.

Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa.—Steel railway service tanks; railway bridges; signal bridges. Represented by Max Whitacre, W. W. Hendrix, M. P. Cogswell, E. J. Mershon, W. R. Workman, J. E. O'Leary, H. W. Ford, W. A. DaLee, C. L. Todd, A. C. Pearsall, Herbert Miller. Spaces 83 and 84.

The Pocket List of Railroad Officials, New York.—The Pocket List of Railroad Officials. Represented by J. Alexander Brown, Harold A. Brown and Charles L. Dinsmore. Space 26.

Positive Rail Anchor Company, Marion, Ind.—Rail anchors; guard rail; braces and plates; tie plates; rail braces; combination tie plates and rail braces. Represented by A. H. Told, J. A. Shoulty, L. C. Ferguson, E. A. LeBeau, W. H. Davis and C. H. Webb. Spaces 178, 179 and 180.

The Protective Signal Manufacturing Company, Denver, Colo.—Highway crossing and electric signaling equipment. Represented by Will C. Neahr, Raymond Ramage and Walter E. Wegner. Spaces 165 and 166.

Pyrene Manufacturing Company, New York.—Hand chemical fire extinguishers; hand drawn chemical fire engines; fire protection and prevention supplies. Represented by R. G. Henderson, B. K. Cosby, H. M. McCullen, R. M. La Barr, W. L. Krause, C. I. McCarthy, R. C. Houghton and Jirah D. Cole. Space 186.

The Q & C Company, New York.—Bonzano joints; rolled steel step joints; derails; replacers and clamps; rail benders; guard rail clamps. Represented by J. V. Westcott, E. M. Smith, F. F. Kister, E. R. Packer, C. M. Brennan, R. J. McComb and C. F. Quincy. Spaces 120 and 139.

The Rail Joint Company, New York.—Continuous standard, insulated and step joints; Weber standard and insulated joints; 100% joints. Represented by V. C. Armstrong, W. P. Thomson, B. G. Braine, J. A. Greer, R. W. Payne, McLeod Thomson, R. R. Seward, E. F. Schermerhron, E. L. Van Dresar, F. C. Webb, E. A. Condit, Jr., W. S. Boyce, J. N. Meade, H. C. Hickey, Chas. Jenkinson, R. W. Smith, C. B. Griffin, J. H. Larson, Alex. Chapman, J. C. Barr and J. G. Miller. Spaces 79 and 80.

Railway Review, Chicago.—Railway publications. Represented by Willard A. Smith, Harold A. Smith, W. M. Camp, C. W. Parks, J. E. Gougeon, C. L. Bates and L. H. Lozier. Space 44.

The Railroad Supply Company, Chicago.—Tie plates; derailers; wig wag signals; relays; crossing bells; lightning arresters; annunciators; channel pins; electric measuring instruments; crossing gates; relay boxes; time relay; ground plates; terminals; cable posts; connectors. Represented by E. H. Bell, Paul W. Kohnen, H. M. Buck, M. J. Fox, R. S. Prentice, H. G. Van Nostrand, F. M. Hill, A. H. Smith, W. C. Irwin, Geo. T. Cook, F. C. Webb, Geo. M. Kenyon and R. D. Hawley. Spaces 104 and 105.

Ramapo Iron Works, Hillburn, N. Y.—Manganese switch points; switch stands; guard rail clamps; double shoulder solid

bottom switch riser plates. Represented by Thomas E. Akers, J. Edgar Davidson, Arthur Gemunder, W. C. Kidd, William Wait Snow and James B. Strong. Spaces 109½ and 110.

Reading Specialties Company, Reading, Pa.—Car and engine replacers; compromised rail joints; guard rail clamps; rail benders; derails; guard rails; rail straighteners; tie spacers; replacer clamps. Represented by B. J. Buell. Space 45.

Rice Manufacturing Company, Indianapolis, Ind.—Red Devil rivet cutter; Baby Devil rivet cutter. Represented by A. G. Rice, L. E. Miller and A. Ryder Dyer. Space 172.

Richards-Wilcox Manufacturing Company, Aurora, Ill.—"Overway" conveying systems; lift doors; door hangers; fire-door hardware; grindstones and hoists. Represented by J. V. Wise, J. H. Wise, A. J. Eggleston and E. J. G. Phillips. Spaces 159 and 160.

Rich Tool Company, Chicago.—High speed drills; reamers; countersinks; rivet sets. Represented by James L. Crowley. Space 182.

Roadmasters and Maintenance of Way Association of America, Sterling, Ill.—Represented by P. J. McAndrews. Space 227.

Rogers' Journal Packing Company, Inc., Chicago.—Rogers' Stecos journal packing for locomotives, passenger and freight cars. Represented by E. C. Hall and C. A. Elsy. Space 156.

Roberts and Schaefer Company, Chicago.—Photographs of reinforced concrete locomotive coaling plants; "RandS" gravity sand plants and cinder handling plants for railroads. Represented by Clyde P. Ross, M. V. Bailliere, C. C. Brackett and H. S. Shimizu. Space 89.

Safe Lock Switch Machine Company, Lexington, Ky.—Safe Lock switch machine. Represented by C. Daugherty, D. M. Case, C. F. Jones and Leo Jones. Space 168½.

Sellers Manufacturing Company, Chicago.—Sellers anchor bottom wrought iron tie plates. Represented by J. M. Sellers, G. M. Hogan, R. A. Van Houten, T. D. Crowley and R. J. Platt. Space 124.

Signal Accessories Company, New York.—Signal material. Represented by F. C. Lavarack and C. R. Ahrens. Space 119.

Simmons-Boardman Publishing Company, New York and Chicago.—Railway Age; Railway Maintenance Engineer; Railway Signal Engineer; Railway Mechanical Engineer; Railway Electrical Engineer. Represented by E. A. Simmons, L. B. Sherman, Henry Lee, C. R. Mills, F. S. Dinsmore, H. H. Simmons, H. H. Marsh, J. M. Rutherford, R. H. Smith, F. W. Lane, F. C. Koch, Samuel O. Dunn, R. V. Wright, E. T. Howson, W. S. Lacher, J. G. Little, A. F. Stuebing, K. E. Kellenberger, B. W. Meisel, H. Parkes, N. H. Crossland and T. E. Crossman. Space 46.

Southern Pine Association, New Orleans, La.—Structural yellow pine of interest to engineers; methods of prolonging life of ties and piling by preservatives; rail fastenings; model of unit of railroad shop; model of creosoted pine water tank; model of timber span; model of highway bridge; moving pictures showing various phases of lumber manufacturing. Represented by Alfred L. Kammerer. Spaces 203 and 212.

T. W. Snow Construction Company, Chicago,—Railway water crane; railway oil crane; railway coal hoist. Represented by T. W. Snow and R. E. Gurley. Space 50½.

Squire Cogswell Company, Chicago.—Volkhardt valves and hydrants; Hauck thawing burners and oil burning equipment. Represented by Willis C. Squire and C. P. Cogswell. Space 161½.

Standard Asphalt and Refining Company, Chicago.—Sarco mineral rubber mastic floors; Sarco mineral rubber refrigerator compound; Sarco waterproofing; Sarco mineral rubber roofing materials; Sarco mineral rubber coatings. Represented by R. F. Trumbull, E. L. Hedrick, George A. Thornton, E. P. Shipley, Charles Muller, J. M. Woodruff, H. C. Riehle and C. L. Gauthier, Spaces 161, 162 and 162½.

The Stuebing Lift Truck Company, Chicago.—Lift trucks; platform systems. Represented by Albert O. Kraemer. Space 230.

Templeton, Kenly & Company, Ltd., Chicago.—Simplex track, ballast and bridge jacks; Simplex emergency jacks; Simplex pole pulling jacks; Simplex auto and truck jacks. Represented by W. B. Templeton, H. B. Burlow and A. C. Lewis. Space 32.

Track Specialties Company, Inc., New York.—Guard rail clamp; guard rail brace; compromise joint; switch plate and brace; anchor plate; rail joints; tie plate; rail brace; derailer; track shim bender. Represented by W. B. Lee. Space 205.

Train Control Appliance Company, El Paso, Tex.—Automatic train control. Represented by M. B. Bulla, H. S. Campbell and E. C. Monroe. Space 209.

Toledo Scale Company, Toledo, Ohio.—Scales; automatic portable; self-contained automatic dormant; section of 25 ton automobile scale. Represented by H. O. Hem, C. H. Hapgood and Geo. W. Bollinger. Space 136.

Torchweld Equipment Company, Chicago.—Welding and cutting apparatus; oxy-acetylene regulators; welding torches; cutting torches. Represented by C. J. Nyquist, W. A. Slack, H. R. Fenstemaker, W. L. Schnert and N. Robel. Space 181.

Underwood Typewriter Company, New York.—Bookkeeping and billing machines. Represented by F. A. Robinson and F. W. Blake. Spaces 200, 201, 214 and 215.

Union Switch & Signal Company, Swissvale, Pa.—Represented by A. L. Humphrey, G. A. Blackmore, L. F. Howard, W. P. Neubert, J. P. Coleman, J. E. Saunders, C. O. Harrington, H. A. Wallace, J. F. Talbert, W. P. Allen, Aaron Dean, H. W. Griffin, J. J. Cozzens, J. L. Brastow, J. S. Hobson, W. W. Talbert, S. E. Gillespie, V. K. Spicer, J. L. Loucks, Geo. Marloff, J. D. Roett and H. R. Sheene. Spaces 66 and 67.

U. S. Wind Engine & Pump Company, Batavia, Ill.—Railway water columns; pumps; tanks; watering devices for locomotives; spouts; valves; switch stands. Represented by L. E. Wolcott, C. E. Ward, James P. Prindle, E. B. La Salle and F. E. Pearson. Spaces 111 and 112.

United States Switch Company, Eau Claire, Wis.—Automatic railway switch lock. Represented by J. W. Hubbard. Space 6.

Verona Tool Works, Pittsburgh, Pa.—Track tools; track jacks; levels; gauges; nut locks. Represented by H. S. Paul, E. Woodings, H. C. Mull and E. L. Ruby. Spaces 129 and 148.

Volkhardt Company, Inc., Stapleton, N. Y.—Railroad water hydrants. Represented by Wm. Volkhardt, Chas. P. Cogswell and W. C. Squire. Space 160½.

The Walls Frogless Switch & Manufacturing Company, Kansas City, Mo.—Complete railway frog. Represented by C. E. Ennis, J. J. Lutz, O. Leamon and J. J. Schimmel. Spaces 219, 219½ and 220.

The Waterbury Battery Company, Waterbury, Conn.—Waterbury unit cylinder primary batteries; Waterbury plate type primary batteries; Waterbury separate cylinder type primary batteries; Gordon primary batteries; Waterbury track batteries. Represented by E. E. Hudson, G. A. Nelson and S. T. Hough. Space 38.

Wayne Oil Tank and Pump Company, Fort Wayne, Ind.—Pumps for handling oils, gasoline, naphtha, lubricating oils and fuel oils; storage tanks; measuring devices and gauges. Represented by B. F. Geyer. Space 138.

West Coast Lumbermen's Association, Seattle, Wash.—Douglas fir, Sitka spruce, western hemlock and red cedar lumber. Represented by C. J. Hogue. Spaces 204 and 211.

Western Electric Company, Inc., New York.—Telephone train dispatching equipment; shop lights; electric drills and track tampers; incandescent lamps; storage battery power and light units; safety switch and steel towers; signal and code wires. Represented by John C. Binning, Geo. Hull Porter, G. K. Heyer, E. V. Adams, R. M. Campbell, A. L. Crater, W. O. Turtle, F. M. Evans, W. J. Davis, Jr., Geo. Sherry, T. J. Rider, G. E. Cullinan, Walter P. Hoagland, C. H. Wharton and L. A. Muttart. Spaces 58 and 59.

Woolery Machine Company, Minneapolis, Minn.—Railway motor car and engines for railway motor cars. Represented by H. E. Woolery. Space 5.

The Wyoming Shovel Works, Wyoming, Pa.—Shovels. Represented by G. E. Geer and H. C. Emery. Space 103.

Western Railway Club Meeting

W. S. Bartholomew, president of the Locomotive Stacker Company, Pittsburgh, Pa., made an illustrated address at the monthly meeting of the Western Railway Club last evening on the use of mechanical stokers in locomotives. He emphasized particularly the importance of the stoker in increasing the capacity of the locomotives and the advantages from an operating standpoint.

Lieutenant-Commander Dexter C. Buell of the United States Navy Bureau of Ordnance gave an illustrated address on the construction and use of the batteries of 14-in., 50-caliber naval rifles which were placed on railway mountings in such a way that they could be moved almost anywhere on the railways of France. These were assembled in record-breaking time and rendered good service at the front as early as last September. Lieutenant-Commander Buell is known to railway men as director of the Railway Educational Bureau at Omaha, Nebr.

Meeting of the American Association of Engineers

A Report of the Railroad Conference Held Yesterday in the Gold Room at the Congress Hotel

A RAILROAD CONFERENCE under the auspices of the American Association of Engineers was held yesterday in the Congress hotel. Primarily the conference was called to discuss means of promoting the social and economic welfare of the railroad technical engineer and to formulate principles for the direction of the railroad committee of the association. Both afternoon and evening sessions were held.

The discussion, in the afternoon, was begun by H. P. Gillette, editor Engineering Contracting, who spoke on, "Shall Engineers Be Paid Overtime?" Mr. Gillette was of the opinion that the designer or supervisor of important work never ought to hold himself or be held to a time unit as a basis for payment for services rendered. He doubted, however, if it was just to require men holding positions of semi-mental, semi-muscular duties, such as ordinary drafting or surveying, to be oblivious to the length of the working day in the hope of being rewarded by advancement to the supervisor class.

After calling attention to the fact that there is no logical dividing line between subordinates and supervisory positions a practical way of meeting the difficulty suggested was to use the highest wage or salary paid to union labor employes on the line as a standard. All technical engineers receiving more than the sum determined as above would then be placed in the supervisor class and receive no pay for overtime.

This discussion was followed by a paper entitled "Principles and Procedure in Classification and Salaries of Railroad Engineers," which was presented by J. L. Jacobs of the Curtis Publishing Company. He said in part:

Essential features and underlying principles for sound classification and salary standardization have been developed as a result of intensive studies, experiences and observations of employment situations in many services. These essentials and principles are set out as measuring standards for the classification and standardization of the railroad professional engineering positions as well as for other professional engineering groups.

As the plan proposed for the railroad professional engineers measures up to these standards so will the broad purposes be attained. The program of service and standardization of all the professional engineers should be the program of the railroad professional engineering group and that program should include the following 14 essentials:

(1) Equitable and logical basis for fixing and adjusting salaries in relation to duties and qualification requirements and cost and standard of living.
(2) Definite wage differentials for different positions based on special work and qualification requirements, location and other special employment conditions.
(3) Classification of positions into functional classes, all positions being placed into classes according to general character of duties and into grades according to responsibility and difficulty of work.
(4) Standard and distinctive titles for all positions having similar duties and work requirements.
(5) Definitions of duties and responsibilities for each position.
(6) Definitions of qualification requirements for each position.
(7) Definite and equitable plan for recognition of efficient service and seniority through periodic advancement—particularly applicable to the lower grade positions.
(8) Definite lines of promotion for employees in the various groups and grades.
(9) Definite regulations for the determination, adjustment and control of salaries and working conditions.
(10) Standards of service for use as a basis of advancement, transfer and increases based on efficient service and seniority.
(11) Basis for the establishment of co-operative relations and measures between employees and management to improve social, economic and industrial conditions.
(12) Definite plan of administrative machinery for insuring equitable and orderly handling of problems of classification, salaries, working conditions and other matters of mutual interest.
(13) Definite formation of effective and fully representative associations for studying, developing and advising on the industrial, economic and public matters which are of common interest to all and for mutual support.
(14) Definite proposals for the next steps in the improvement of the status of professional engineering and the development of positive methods and ideals for service and employment.

The following general procedure could be successfully applied in connection with the broad program of classification and salary standardization for railroad professional engineering positions as well as for the other professional engineering groups:

(1) Establish co-operative relations with representatives of professional engineering groups and associations, employers and governmental agencies, with a view of obtaining common understanding, full-hearted consideration and support in the development and establishment of the standardization program.
(2) Determine the divisions of professional engineering groups and the order in which classification and salary standardization for the same are to be developed.
(3) Collect for analysis, information and data from reports and documents containing laws, rules and regulations and descriptions of the organization, work and qualification requirements of the positions under consideration.
(4) Collect for analysis information and data on cost and standard of living, hours of work and other working conditions for the respective positions by districts and for the country as a whole.
(5) Develop groups of occupations setting forth standard and distinct title designations, definition of duties and qualification requirements; character of occupations, and lines of advancement and promotion.
(6) Establish factors and standards for the determination of basic salaries and differentials dependent on educational requirements, cost and standards of living, working conditions and special qualifications.
(7) Develop standards of service as a basis for selection, assignment, transfer and advancement according to service and seniority.
(8) Prepare code of regulations and conditions as part of the general standardization plan.
(9) Hold conferences with representative of engineering groups and employers with a view of obtaining suggestions as to changes in classification standards and factors, and approval of the general plan.
(10) Prepare regulations and procedure on the manner and method of applying and administering the standardization program.

Mr. Jacobs' paper was followed by an open discussion of the schedule of monthly salaries for technical engineers: In submitting the schedule the committee stated that it had proceeded on the basis of fixing minimum rates for tapemen, division engineers, and chief engineers, considering that these positions were basic. The fixing of the intermediate rates was then largely mechanical. Adjustments were made, however, to ensure that the rate fixed for a particular position was commensurate to that paid to men of similar rank in other departments.

Summarized, my views as to the three prime requisites to obtaining greater recognition for the engineering pro-

fession may be stated as follows: (1) Organization, (2) licensing, (3) broader education, interest and activity in other than purely technical matters.

The movement of the day appears to be in the direction of organization by classes, and the engineering profession ought to be, and I trust is, alive to the movement. Therefore, let us invite the co-operation of all and use our influence in every direction to build up a national association which will embrace all branches of the profession and have as its object not only the advancement of technical research, but the economic, social and political welfare of the profession as a whole.

W. W. K. Sparrow, corporate chief engineer of the Chicago, Milwaukee & St. Paul, presented a paper entitled, "How Shall Proper Recognition of the Engineering Profession Be Obtained?" He said in part:

While I understand the question most of us are perhaps most interested in at this time is the economic welfare of the engineer and how to secure more adequate compensation for his services, yet I feel that we should not confine our discussion or energies to this phase of the question only, but should also endeavor to secure greater application and recognition of the profession socially and politically and in the problems of reconstruction, with which not only this country, but the whole world is today confronted.

After citing several striking instances of this lack of recognition and some of the causes contributing to this condition, he continued:

During the day the following schedule of monthly salaries was adopted:

	Minimum salaries per annum, depending upon extent and importance of duties	
Chief Engineer	$15,000	$9,000
Assistant Chief Engineer	9,000	7,200
District Engineer	6,000	4,800
Assistant District Engineer	5,400	4,200
Division Engineer	4,800	4,200
Assistant Division Engineer	3,600	2,750
Resident Engineer, Chief Engineer or District Engineer	4,200	3,000
Office Engineer—Field Engineer	5,400	3,600
Engineer of Bridges	7,500	6,000
Assistant Engineer of Bridges	5,400	4,800
Signal Engineer	7,200	4,200
Assistant Signal Engineer	4,800	3,000
Building Engineer	6,000	3,000
Valuation Engineer	8,400	7,200
Assistant Valuation Engineer	6,000	4,800
Chief Pilot Engineer	4,800	3,600
Pilot Engineer	3,600	3,000
Engineer Accountant	3,600	3,000
General Superintendent of Motive Power	15,000	9,000
Assistant General Superintendent of Motive Power	9,000	7,200
Mechanical Engineer	7,500	6,000
Assistant Mechanical Engineer	4,800	3,600
Engineer of Tests	7,500	6,000
Electrical Engineer	6,000	4,800
District Electrical Engineer	3,600	2,700
Shop Engineer	4,800	3,600
Chief Draftsman	3,600	3,000

	Minimum salaries per month		
Leading Draftsman or Designer	200	to	250
Draftsman	150	to	200
Junior Draftsman	125	to	150
Tracer	100	to	120

	Minimum salaries per month		
Engineer Inspectors	150	to	225
Instrument Man	200	to	225
Rodman	125	to	150
Tapeman	100	to	120

New Signal Committee Chairman

The name of one new committee chairman appears upon this year's list of the standing committees of the A. R. A. Signal Division. Committee IV, Direct Current Automatic Block Signaling, is headed by C. F. Stoltz, signal engineer of the Cleveland, Cincinnati, Chicago & St. Louis. Under the direction of Mr. Stoltz, it will be the duty of this committee to prepare unit specifications for direct current motor operated signal mechanisms, including in such specifications the requirements for the maximum energy in watt-seconds to operate, and the minimum watts to hold the signal and minimum torque in lever arm foot pounds required to return the mechanism to the stop position with and without spectacle and blades. Instructions will also be prepared for making torque tests of electric motor signals, and unit specifications will be drawn up covering signals and their installation; rail bonding; wire lines; switch circuit controllers and resistance units.



C. F. Stoltz
New Committee Chairman, Signal Division

Mr. Stoltz became a member of the Railway Signal Association in 1913 and in 1914 he was appointed a member of Committee IV, on which he has served continuously to date. In 1918 he was appointed vice-chairman of the committee.

In 1916 he was appointed to Committee VII, Direct Current Relays, and has served continuously on this committee to date. As a member of Committee VII, Mr. Stoltz has helped in the preparation of unit specifications for direct current relays; standard relay resistance table and recommended minimum allowable drop away point for relays of resistances named in the standard resistance table. The outline of the work for 1919 covers the preparation of specifications for coils, cores, armatures, etc., on relays and provides for the interchangeability of the parts.

After Mr. Stoltz graduated from Miami University in 1906 he entered the service of the Cleveland, Cincinnati, Chicago & St. Louis as a draftsman and served in this capacity until 1910. He was then appointed assistant signal engineer for the Big Four, which position he held until November 20, 1913, when he was appointed signal engineer for the system, the position which he now holds.

The Amalgamation of the Railway Signal Association

Its Relation to the American Railroad Association and the Manner in Which Its Activities Will Be Affected

WHAT RELATION WILL THE Railway Signal Association bear to the American Railroad Association? Will its activities be curtailed or increased and what benefits will the members derive from the new arrangement? These are typical of many questions which are being asked by the members of the Railway Signal Association and indicate the wide difference of opinion which exists as to its future. Many members view with regret the loss of its indentity, and rightly so, as this reflects the enthusiasm and *esprit de corps* existing among them which has been the means of placing the association on the present high plane it occupies today.

A History of the Change in Status

In view of the above a brief history of the steps taken in the amalgamation plan may not be out of place at this time. The old Railway Signaling Club was founded on March 11, 1895, by George Basford, now president of the Locomotive Feed Water Heater Company of New York. At the March meeting of this organization in 1903, held in the Wayne hotel at Detroit, Mich., C. C. Rosenberg made the motion which resulted in changing the name of the Railway Signaling Club to the Railway Signal Association. At midnight on February 28, 1919, the affairs of the Railway Signal Association were terminated and the activities of the organization were transferred to the American Railroad Association. Thus there lacked but a few days of completing a period of 24 years of progress by the former association.

On January 28, 1918, the director general issued General Order No. 6 directing that carriers' operating revenues should not be expended for the payment of expenses of persons or agencies constituting associations of carriers unless such associations were approved in advance by the director general. The Railway Signal Association made application and received temporary approval for the use of funds already on hand to pay the current expenses of the association until April 30, 1918. The director general on April 26, 1918, approved the R. S. A. *until further orders*, and authorized the carriers to pay the necessary assessments needed for the current expenses of the association. On May 2, 1918, a conference of the presidents of some of the larger voluntary railroad organizations was held in New York on the call of Acting President Thompson of the American Railway Association, to comply with the suggestion of the director general that the several associations be amalgamated to form one congress of associations.

A meeting of the Board of Direction of the R. S. A. was next held at Chicago on May 9 and 10, 1918. In addition to the members of the Board of Direction, C. A. Christofferson, R. B. Elsworth, P. M. Gault, F. B. Patenall, J. A. Peabody, F. B. Wiegand, G. E. Ellis, A. R. Fugina, J. Leisenring, H. K. Lowry and B. H. Mann were present. A plan was outlined at this meeting which was later submitted to the joint conference of the several railroad organizations.

On January 10, 1919, the director general issued Circular No. 70 stating that during the period of Federal control and in order to provide a responsible channel through which the director general may obtain recommendations for the advancement of railroad practice, the American Railway Association has revised its articles of organization and by-laws and will change its name to the American Railroad Association. This association consists of five sections, viz.: operating, engineering, mechanical, traffic and transportation. Its scope was enlarged to cover the former activities of a number of the associations, including the Railway Signal Association. This association becomes the signal division of the Engineering section. Railroads under Federal control may become members of the American Railroad Association and are directed to be represented and participate in the activities of each section through their proper officers.

On February 24, 1919, the Board of Direction of the R. S. A. held a meeting at Chicago, to comply with Circular No. 70 and arranged that the R. S. A. will be known as the Signal division of the Engineering Section of the American Railroad Association as indicated in the following resolutions:

Resolved, That in pursuance of Article VII, Section 4, of the Railway Signal Association constitution, reading—"The Board of Direction shall manage the affairs of the association and shall have full power to control and regulate all matters not otherwise provided for in the constitution, except to make the association liable for debt to an amount greater than that which, at the time of contracting the same, shall be in the secretary-treasurer's hands in cash and not subject to prior liabilities."—the affairs of this association are transferred to the Signal division of the American Railroad Association.

Resolved, That in pursuance of Circular No. 70 of the Director General of Railroads of the United States, issued under date of January 10, 1919, the affairs of the Railway Signal Association, effective midnight, February 28, 1919, are hereby terminated and the activities of that organization transferred to the American Railroad Association.

The necessary details in connection with the transfer of the activities, funds and securities of the R. S. A. have been consummated by the Board of Direction and the interests of the R. S. A. properly safeguarded.

The Membership and Committee of Direction

The membership of the Signal division will consist of representative members and affiliated members. The representative members are appointed by their respective railroads and the affiliated members will consist of the former active, junior, associate, honorary and life members. All present memberships of the various classes as outlined above are transferred to the Signal division either as members, if they were representative members before, or as affiliated members. Future affiliated membrs may be appointed by the Committee of Direction. Each railroad affiliated member (the former active, other than those appointed as representative members, and junior members) will pay $3 per annum and other affiliated members (the former associate members) will pay $6 for such printed matter as may be provided by the Committee of Direction of the division.

The present organization provides for a chairman, two vice-chairmen, a secretary, a committee of direction and standing committees for the division. The chairman and vice-chairmen of the division will be elected annually by the section. The Committee of Direction will consist of 16 members, and its chairman and two vice-chairmen will be elected from among its members.

R. E. Trout, signal engineer of the St. Louis-San Francisco, was elected chairman of this committee, and C. J. Kelloway, superintendent of signals, Atlantic Coast Line, and F. W. Pfleging, signal engineer, Union Pacific, were elected the vice-chairmen. The other members on this committee are W. J. Eck, signal and electrical superintendent, Southern Railway; C. A. Dunham, signal engi-

neer, Great Northern; W. H. Elliott, signal engineer, New York Central, Lines East; A. H. Rice, signal engineer, Delaware & Hudson; J. H. Cormick, signal engineer, Canadian Northern; E. E. Worthing signal engineer, Southern Pacific Lines, Atlantic System; A. P. Hix, signal engineer, Terminal Railroad Association of St. Louis; E. G. Stradling, signal engineer, Chicago, Indianapolis & Louisville; G. E. Ellis, Division of Safety, Interstate Commerce Commission; H. K. Lowry, signal engineer, Chicago, Rock Island & Pacific; Barton Wheelwright, engineer maintenance of way, Grand Trunk New England Lines, and F. P. Patenall, signal engineer, Baltimore & Ohio.

The Committee of Direction will conduct the business of the division and it will be its duty to fix the number of and appoint the members to the committees that may be necessary to properly investigate and report on such subjects as may be assigned. It is proposed to hold regular meetings of the Committee of Direction in March, June and September, respectively, of each year, the date and place to be decided on by the chairman. These meetings will likely be held in advance of the stated meetings of the division. Special meetings may be held at the call of the chairman. The annual meeting of the division will be held in September of each year, the time and the place of meeting will be announced approximately three months in advance by the Committee of Direction.

The Standing Committees

For the present the standing committees of the division are as follows:

Committee on Committees
Committee on Annual Meetings
Committee on Editing
Committee on Mechanical Interlocking
Committee on Power Interlocking
Committee on Direct Current Automatic Block Signaling
Committee on Maintenance and Operation
Committee on Direct Current Relays
Committee on Standard Designs
Committee on Alternating Current Automatic Block Signaling
Committee on Wires and Cables
Committee on Signaling Practice
Committee on Batteries and Switchboards
Committee on Contracts
Committee on Electric Testing
Committee on Lightning Protection
Committee on Valuation
Sectional Committees

The membership of the standing committees may consist of both representative and affiliated members of the division as no change in practice is contemplated from the methods followed in the past. This allows those especially qualified in scientific and engineering lines to be appointed to such committees. The reports of these committees will be presented to and open for discussion by all representative and affiliated members at the stated and annual meetings. The only change in practice made is in connection with the adoption of the recommendations made by the committees by letter-ballot. In the past all representative and active members voted on these recommendations. In the future only those representative members appointed by the railroads will vote by letter-ballot on recommendations for final adoption, but indirectly this vote will represent the consensus of opinion of the division as the views of the majority will likely be reflected in the letter-ballots of the representative members. Both representative and affiliated members can vote on subjects handled by the committees and presented before the meetings. The representative members will vote in the future as they have in the past, the number of votes depending upon the mileage and also upon the signals on their respective roads. A road may delegate one man or a number of men as representative members to cast the number of ballots to which it is entitled.

Roads Not Under Government Control

The question is often asked "Will railroads not now under government control or of less than 100 miles in length have the opportunity for proper representation in the work of this division?" It is the feeling among members of the R. S. A. who are on roads not under government control but who have given their time and efforts to the advancement of the association in the past, that they should be given an opportunity to continue their activities and to receive the benefits of membership in the division. As outlined above these members will have an opportunity to take part in the activities by serving on committees and by taking part in the discussions at the meetings. Furthermore, the railroads not under government control may appoint these men as their representative members and they will then be accorded the full privileges of such members.

The status of the railroads not under Federal control, including the Canadian and Mexican railroads, is exactly the same as in the past. No distinction will be made, as far as the American Railroad Association is concerned, between those roads under Federal control and those that are not.

In the past some railroads have sent their supervising signal officers (as the supervisors, inspectors, etc.) to the meetings of the R. S. A. and have paid their expenses. In the future the railroads can follow their past practice in this regard. Those members of the division in the military and naval service of the country whose dues were remitted while in the service will not be required to pay their dues for the time so employed, and on return to civil life they can resume their standing as representative or affiliated members, as the case may be. Regional committees of the Signal division will be continued in the future as in the past. In the future the Signal division will handle exclusively all work pertaining to signaling and rules for signaling. The recommendations made by this division can be made mandatory by order of the Director-General should he so desire.

Signal Division Regulations

1. The division shall include those actively connected in official or supervisory capacities with the design, construction, maintenance and operation of railway signaling devices. Affiliated members may be appointed by the Committee of Direction.

2. There shall be a committee of direction, which shall consist of 16 members, including the chairman and vice-chairmen, and a committee on nominations of five members to be elected annually by the division.

The Committee of Direction shall conduct the business of the division, and shall authorize, order, define duties, fix the number of and appoint the members of such committees as may be necessary to investigate and report their findings and recommendations upon any subject considered by them.

For the present there shall be the following committees:

Committee on Committees.
Committee on Annual Meeting Arrangements.
Committee on Editing.
Committee on Mechanical Interlocking.
Committee on Power Interlocking.
Committee on Direct Current Automatic Block Signaling.
Committee on Maintenance and Operation.
Committee on Standard Designs.
Committee on Direct Current Relays.

Committee on Alternating Current Automatic Block Signaling.
Committee on Wires and Cables.
Committee on Signaling Practice.
Committee on Batteries and Switchboards.
Committee on Contracts.
Committee on Electric Testing.
Committee on Lightning Protection.
Committee on Valuation.
Sectional Committees.

3. Regular meetings of the Committee of Direction shall be held in March, June and September, respectively, of each year, the date and place to be decided by the chairman. Special meetings of the committee may be held at the call of the chairman.

An annual meeting of the Signal division shall be held in September of each year, the time and place to be designated by the Committee of Direction, approximately three months in advance. Special meetings may be held at the call of the Committee of Direction.

4. The Committee of Direction shall offer the names of 10 representatives of members, not officers of the division, as candidates for the Committee on Nominations.

5. It shall be the duty of the Committee on Nominations to offer to the annual meeting of the division the names of one representative of a member as candidate for chairman and one for first vice-chairman and one for second vice-chairman, and the names of four representatives of members as candidates for the Committee of Direction. Every third year five representatives of members to be nominated as candidates for the Committee of Direction.

Nominations for officers or membership on the Committee of Direction or Committee on Nominations may be made by any representative of a member at the annual meeting at which such officers or members of committees are elected, provided such nominations have been endorsed by 25 representative members.

6. Officers, excepting as otherwise herein provided, shall be elected at the annual meeting of the division held in September each year, and the election shall not be postponed except by unanimous consent.

The chairman and the first and second vice-chairmen of the division shall be elected by printed ballot each year, the candidate receiving the majority of the votes cast shall be declared elected and shall hold office for one year or until his successor shall be elected.

Members of the Committee of Direction and the Committee on Nominations shall be elected by written or printed ballots; four members of the Committee of Direction shall be elected to serve for three years. Every three years five members of the Committee of Direction shall be elected; five members of the Committee on Nominations shall be elected annually.

President's Annual Dinner

C. A. Morse, president of the American Railway Engineering Association, was host to the members of the board of direction, the past presidents of the association and the members of the committee on arrangements at a dinner in the English room of the Congress Hotel at 7 o'clock last night. The party numbered 26 and included ten past presidents of the A. R. E. A., John F. Wallace, first president of the association, Wm. McNab, Hunter McDonald, W. C. Cushing and Charles S. Churchill, in addition to the five past presidents who are members of the board of direction. Three past presidents of the American Society of Civil Engineers, John F. Wallace, Hunter McDonald and A. N. Talbot were among the guests.

Rest in Peace (?)

IF WE HAD no Manual for our needs
Or Digests with their lengthy screeds,
No standard circuits, cranks or studs,
We'd all be unexploded "duds."
If it wasn't for the R. S. A.
We'd clutter up the right o' way
With experiments and hobbies punk
And spend a million bucks for junk.

II

For this signal game's no easy graft
And grief would now engulf the craft
If every mother's son had tried
To all his skill and knowledge hide,
But R. S. A. (our worthy dad)
Collected "kinks" both good and bad,
Culled out the worst and kept the best,
Adopting those that stood the test.

III

Since way back there in ninety-five,
He gathered *hombres* who were *live*.
A flock of green and vernal rubes,
Strong and husky untrained boobs,
Some brains mixed in; yes, quite a lot
And poured all in the melting pot.
The alloy of this motely clan
Produced the present signal man.

IV

In spite of all the good he's done
It looks as if his race was run,
It seems at times there's no escape,
We must go out and order crepe.
We're told, a "step-dad" (A. R. A.)
Has moved right in, prepared to stay.
In line "us orphans" then must stand
And jump sidewise at each command.

V

If our *real Pater* is laid out,
Let us romp in and stand about
And shed a salty, briny tear,
As we gang around his somber bier.
Go tell the bunch; let each one make
An effort to attend the wake,
For in the future, life will be
Dry (two ways) for you and me.

VI

Our step-dad will feed us hash galore
On handling scrap down at the store,
He'll teach us how to ballast track,
And high explosives—how to pack.
We'll read of weights, airbrakes and claims
'Till our mind gets like a pair of hames,
And warped and bent we'll lose our grip,
Our interest and our membership.

VII

Let's all buck up and keep our goat,
And dodge that wooden overcoat.
We children might be raw and crude,
But to drown us now would be real rude.
If time and thought to work we give,
Old A. R. A. may let us live,
And say and point to us with pride,
"Them's some bright brats, dodgast their hide."

VIII

Sometime the "Big Boss' U. S. A.
Will call the Railroads in and say,
This transportation job's no snap.
For the love of Mike take back your scrap.
And on that joyful judgment day,
We'll resurrect old R. S. A.
So cheer ye up, don't sit and mope,
This bunch is good, let's live in hope.

N. R. A. A. Annual Meeting

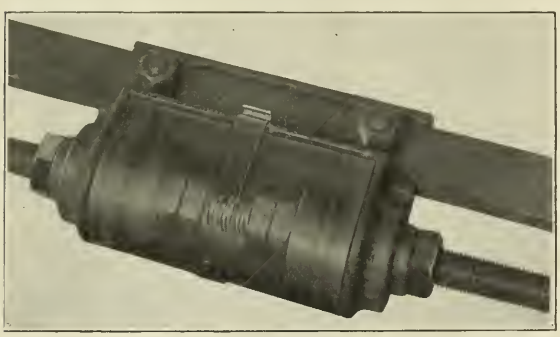
The annual meeting of the National Railway Appliances Association will be held in the dining room of the Coliseum at 11 o'clock this morning. Reports of the officers will be presented and new officers elected.

Committee Meetings of the Signal Division

Several committees of the Signal division are to hold sessions to-day and to-morrow. Committee No. 8, Alternating Current Automatic Block Signaling, will meet at 9 a. m. to-day, in Room 260, Auditorium hotel. Committee No. 4, Direct Current Automatic Block Signaling, will convene in Room 1303 of the Blackstone hotel at 9:30 a. m.. The new Committee on Valuation will meet at 9 a. m. in Room 312 at the Auditorium hotel. Committee No. 2, Mechanical Interlocking, will meet Mr. Kelloway in the lobby of the Congress hotel at 10 a. m. On Wednesday, March 19, Committee No. 3 on Power Interlocking will hold a meeting at 10 a. m. in Room 312 of the Auditorium hotel.

Weather-Proof Switch Adjustment

In order to provide protection against an accumulation of ice, snow, sand, or other extraneous substances between the sleeve shoulders and bracket of switch operating rod adjustments, the Union Switch & Signal Company, Swissvale, Pa., has designed a bracket with a cover as shown in accompanying phantom illustration. This switch adjustment bracket and cover are intercheangeable with the standard bracket supplied by this company



New Switch Adjustment Bracket

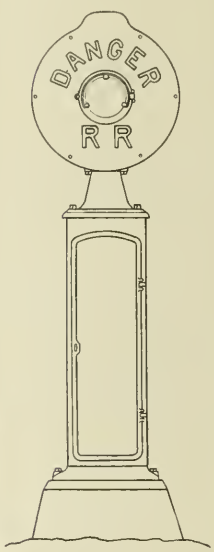
for a number of years, so that no difficulty will be experienced in replacing the older brackets by the new one wherever trouble has been experienced, or is anticipated, due to various substances becoming attached to switch connecting rod adjustments. The sheet steel cover fits snugly over the sleeves and the nuts which limit their stroke. It is held in place by a tempered steel spring bent at both ends to latch over the shoulders of the bracket.

Standard Signal and Marker Lamps

The Handlan-Buck Manufacturing Company of St. Louis, Mo., has placed on the market a number of new lamps in which all the parts are interchangeable, with the same size oil pots and lens, and with one length of shaft on all burners. The marker lamp brackets are adjustable to any location on the train. The series of new lamps includes semaphore and train order lamps, a switch lamp with or without enamaled lens targets, engine classification markers with interior steel lens shields operated from the outside and a rear-end marker. The signal lamp conforms to the Railway Signal Association standard, while the other four lamps have been designed with the signal lamp as a basis. All the lamps have been designed to save space and to reduce the number of repair parts.

A. G. A. Railway Light & Signal Company's New and Improved Devices

The highway danger signal shown in the illustration consists of a flashing red light projected through 8⅜-in. lenses located in the center of the disc on each side of the signal head. The same burner which produces the illumination through the lenses also illuminates the white letters of the sign on the signal head so as to permit them being seen from a distance at night. The source of light consists of dissolved acetylene gas in a steel cylinder located in the housing which also supports the signal head. One cylinder of gas will operate the signal, flashing continuously from 5 to 10 months, at a reasonable annual cost, depending upon the adjustment of the burner. The height of the flashing signal can be varied by introducing pipe of the proper size between the housing and the signal head. The particular signal illustrated shows the signal head on top of the housing without any pipe extension. This design is used on highways traveled largely by automobiles where it is necessary to have the flashing signal low enough to permit the operators of automobiles to see the flashing light underneath an automobile top.



The Flashing Signal

An improvement has been made in the highway grade crossing signal lamp manufactured by this company, which consists in the adoption of an 8⅜-in. lens, which gives a beam spread of 30 deg. and through which light is projected so that it can be seen at a distance of 400 to 600 ft. in bright sunlight.

This company has developed also a new electro-acetylene color light signal for railway purposes. The lights are projected through 8⅜-in. lenses and may be operated with either a flashing or steady light. Electro-magnets are provided for controlling the gas supply to the burner. It is claimed that the indications of the signal are plainly visible in the day time and that the red light may be seen 1,800 to 2,000 ft. in bright sunlight. The electro-magnetic valve operates on about 1.8 volts and the resistance of the magnets is such that this voltage will permit a caustic soda battery to operate one valve for nearly two years.

EDITORIAL
Railway Age
EDITORIAL
DAILY EDITION

Record for Convention Attendance

The twentieth annual convention of the American Railway Engineering Association promises to be the most successful meeting ever held by this association. One indication of this is the record attendance for the first day as evidenced by a registration of 368 members and 125 guests, and a capacity crowd in the Florentine room during most of the committee reports. The fact that so many more railway men are present this year is explained in part by the serious obstacles in the way of attendance at the two preceding conventions. Last year war conditions, war improvements and war labor shortages kept many at home. The year previous, the prospect of a nation-wide railroad strike had a like influence. However, no little credit for the presence of larger numbers is due to the Railroad Administration in encouraging attendance at the meeting and inspection of the supply exhibit.

A Problem in Acoustics

One unfortunate circumstance introduced by the large attendance at the meetings is the bearing it has on the unsatisfactory acoustics of the convention hall. Knowing the faults of the room, seasoned members have discovered the portions of the hall in which the difficulty is least pronounced. But when it is filled nearly to capacity the auditor has no choice in the matter—he must take a seat where he finds it, which may or may not be in one of the "dead spots." Just what the solution is, cannot be determined without some study. A change in the arrangement of the seating or the position of the rostrum from the side to the end of the room might improve matters. One thing is certain, however, the speakers, presiding officers, committee chairman, and others should pay more attention to their manner of speaking. Engineers as a rule are not orators, but they might try harder to make up for their shortcomings in this regard. This is one problem resulting from the growth of the association and as such it should be recognized.

Cooperation With Manufacturers

C. A. Morse touched upon an important point in his presidential address yesterday morning when he referred to the importance of co-operation with the manufacturers in the development of standard designs for maintenance of way materials. This subject received further emphasis in the discussion of the report of the track committee yesterday afternoon when that committee presented designs for switches and frogs which had also received the approval of committees and manufacturers. The preliminary purpose in the preparation of designs of this character is, of course, to develop those plans which will best meet the demands made on them. If these plans can at the same time be made so as to afford maximum economy of production in the plants of the manufacturers, this is to the mutual advantage of the railways and the makers. Engineers have too often been prone in the past to disregard shop problems in preparing their designs, with the result that their work has been needlessly expensive. If unit costs can be reduced without sacrificing quality this should by all means be done. Other committees of the association can well afford to follow the practice of the track committee in this respect.

Large Attendance at Conventions and Exhibit

The results of the instructions issued by officials of the Railroad Administration to federal managers to have as many of their engineering and maintenance of way officers as could be spared from their usual duties to attend the conventions and visit the exhibit this week were very apparent, both in the convention hall and at the Coliseum yesterday. The attendance at the sessions of the American Railway Engineering Association crowded the room throughout the day. At the Coliseum there were more railway officers inspecting the exhibit than probably ever was the case in any past year. Furthermore, it was evident that the railway men took a keener interest in the convention proceedings and in the exhibit than they probably ever did before. The large attendance is due not only to the support given by the Railroad Administration, but also to the fact that the amount of work being done by the engineering and maintenance of way departments is unusually small at this time. The best time for railway officers to attend conventions and examine railway appliances is when the demands on their time at home are the least, and the ultimate outcome cannot fail to be an increase in the efficiency with engineering, and maintenance work will be handled when more of such work is to be done.

An Important Assignment

One of the chief benefits to be derived from the preparation of statistical records is that they provide the measuring stick for determining progress. They afford the best means which a department head can utilize in keeping in touch with affairs throughout his entire organization. And they go farther. They enable him, by comparison, to determine accurately the actual state of his organization and to ascertain whether it is progressing or standing still. In fact, it is rapidly becoming recognized that without proper regard for records and accounts a commercial concern cannot prosper. In consequence the old corner grocery methods are a thing of the past. The railroads are no exception to this rule and in their case they have a right to look to the A. R. E. A. for guidance in the matter of standard methods as well as standard forms. In consequence of the new conditions now obtaining in railroad matters as a result of which it is essential to know definitely just what is entering into the property, in both labor and materials, it seems that the development of the best means for the collection and tabulation of information, particularly insofar as the engineering departments of the railways are concerned, is the most important work

with which the Committee of Records and Accounts is faced.

Development of Unified Standards

IN the past the idea has generally prevailed among engineers that one of the chief requisites of any engineer was the ability to design. There is no question as to the importance of such ability, but in living up to what has been the ideal the practical side of their work has been in a degree lost sight of by the designers. In railway work this has led to a multiplicity of designs for similar articles and the placing of an undue burden on the manufacturer who must, in furnishing supplies, make the necessary provision in the equipment of his plant to meet the requirements of the various designs. To the manufacturer this practice results in large sums being tied up in equipment which is idle for long periods of time with consequent increased costs of production. The railroads in purchasing supplies, are required to absorb these increased costs in the purchase prices. From any angle the practice is wasteful. While new designs are, of course, encouraged by the American Railway Engineering Association, it goes further. It furnishes the means for unifying design while yet allowing for modifications that constitute real improvements. The development of these unified designs is important both to the railways and the manufacturers and the Association should have the best co-operation of both in their development.

A Service for the Young Man

ONE OF THE DISTINCTIVE signs of the times is the increased consideration given by the various associations of professional and technical men to the welfare of the younger men. A large part of this has been directed to what might be termed material considerations—wages, working conditions, etc., subjects which have been of special interest during the last year or more because the advances in compensation accorded to the great mass of labor have necessarily exerted an influence on conditions in the lower ranks of the technical forces on the railroads.

However, there are other phases of this subject than those involving compensation and employment. The leaders in the professions are charged with certain responsibilities to the younger men in matters of technical attainment. In conformity with this thought, some associations have provided for junior memberships in order that the men in subordinate positions may derive certain of the benefits of memberships without need of any reduction in the qualifications for entrance for the corporate member. Thus the organization can perform a real service without detracting in any way from its high standards of personnel.

Are there no opportunities for the American Railway Engineering Association along these lines? Since its activities are limited to those of a technical association, it must be generally conceded that the matters of material welfare are rather outside of its province, although the development of studies in the economics of labor might lead eventually to that end. For the present, however, it would seem that the association could be of real help to the younger men from the educational standpoint. The high regard with which the work of the association is held by the outsider is demonstrated by the extended use recently made of the Manual by the federal government. The proceedings and bulletins are also standard works of reference.

This raises the question as to the possibility of providing some form of subordinate, limited qualification, membership that would enable the men in the ranks to receive the publications. The advantages accruing from this arrangement would be limited by no means to the men themselves, for the railroads would also derive benefits through the wider dissemination of the best practices. Supplemental to the wider use of the publications, it might be feasible to encourage attendance at the meetings, an arrangement that would be of further benefit to the subordinate technical men through the inspiration of contact with the leaders in their chosen branch of railway service.

A Wise Decision

THE AMERICAN RAILWAY ENGINEERING ASSOCIATION is to be congratulated on the wisdom and ability displayed by its officers during the past year in their negotiations relative to the amalgamation of the leading railway technical societies into one composite organization. As the matter was originally presented by the American Railway Association, an organization of railway executives, it required courage for the officers of the engineering association to stand out for what they thought was best, contrary to the suggestions of their superiors. The spirited discussion at the meeting of the Railway Signal Association on Monday showed the resentment which many members of that association bear to the amalgamation even after that society has consented to the plan. Similar opposition has also been evidenced among some of the members of other organizations involved.

The amalgamated organization has possibilities for constructive work beyond those possessed by any of the individual organizations. At the same time it remains for that association to demonstrate that it will utilize these opportunities. The associations which have been invited to amalgamate have long records of constructive work behind them. The record of the American Railroad Association which fathers the new arrangement is not so favorable. Furthermore, as we have pointed out previously in these columns, the very nature of the amalgamation, including the official character of its management and of its conclusions, will naturally result in a certain loss of freedom in expression and in action which will detract from the value of the work done.

The arrangement which the American Railway Engineering Association suggested last spring and which it has been able to effect with the American Railroad Association, whereby harmony of action is assured while the engineering association retains its individual identity and inntiative has much to commend it. After all, the value of association work is measured by the work of its individual members and this is promoted in a large measure by professional pride and interest rather than from direct assignment as a routine duty. The result of the two-fold experiment which is now being inaugurated—complete amalgamation in some instances and co-ordination and co-operation in the engineering section—will be watched with much interest.

Record Breaking Attendance at Coliseum

The attendance at the National Railway Appliances exhibit yesterday broke all records for a single day's gathering at this exhibit. Over 6,000 railway men visited the display yesterday as compared with approximately 4,900 on the same day one year ago. Among the visitors yesterday were a number of foreign railway representatives, including men from Japan, France and Dutch East Indies. This large attendance was recorded in spite of an unusually large attendance at the convention.

Mr. Hooley on Engineers

With apologies to Dunne (F. P.) and Dunn (S. O.)

"D'ye mind me tillin' ye, Dinnissey, 'twas some years ago, about th' engineers that has a convintion ivery year at th' Congress Hotel?" asked Mr. Hooley last evening when Dennissey, as usual, came into his place to see if there was anyone standing around who was likely to loosen.

"I mind ye sid somet'ing about th' min that run th' thrains, 'nd that as they were gittin' more pay thin anny other relrod imployay they was goin' t' try to get more pay thin th' orfcers av the road. D'ye mean that time?" inquired Dennissey, with only a mild show of interest.

"Ye're incapacity f'r takin' in th' manin' av me remarks putts ye in one class by ye'rself," rejoined Mr. Hooley. "Ye'r thinkin' about th' min what drives th' injines, 'nd I'm talkin' about th' min that build th' thracks what th' injines runs on.

"I told ye thin that whin I'm talkin' about th' injineers that's holdin' a convintion at th' Congress, I'm manin' th' min that me old frind Jerry Sullivan called th' aljaybray min. Thim's th' wans that figure out on paper what th' min what do th' work's got to do. They lay out th' thracks, 'nd th' stations, 'nd th' switches, 'nd th' side thracks, 'nd th' bridges, 'nd kape watch av thim t' say that they're fit f'r t' run thrains over."

"I had a frind wance, I mind me now, what they called a siction boss, 'nd another what walked th' thracks by night," interrupted Mr. Dennissey, brightening up as he thought he had caught his friend's meaning.

"O, Dinnissey, Dinnissey, wull ye niver learn anything afther arl me indeavors t' insthruct ye? I towld ye, 'twas tin years ago, in riference t' these same min how they laid out th' thracks 'nd built th' tunnels, 'nd I made ye an illustration av a tunnel through th' Rocky Mountains where f'r that th' injineer'd miscalculated, th' tunnel—th' hole through th' mountain—was made too long 'nd shtuck out av th' mountain at both inds. Th' injineer av that road covered up his mistake by buildin' snowshids over th' ind av th' hole where it shtuck out. T' make mistakes 's human, Dinnissey, but t' know how t' kiver 'em up requires spicial talent 'nd take-a-nickel ijication.

"Th' injineers 's arl ijicated min, Dinnissey, 'nd ye c'n say they're human by th' number av thim that's bin in th' milit'ry service these last years. They're human 'nd they're ijicated, 'nd what's more, they 're pathriotic. The prisidint av this association what's holdin' th' convintion 's bin in th' service av his counthry directin' th' operation av th' relrods av th' counthry, 'nd he's made good at it, too. He's bin in charge av th' maintenance av the relrods 'nd th' injineering av arl av thim. 'Nd th' rigiminits that wint t' France f'r t' build th' roads there. Thim was brave min, Dinnissey, 'nd was arlways a little ahid av th' front line."

"But what's arl this got to do wit' th' convintion that's on at th' Congress?" inquired Dennissey, yawning.

"I don't know," answered Mr. Hooley.

"But 'tis these same min that's got togither t' shtudy th' problims of thrack, 'nd roadway, 'nd bridges, 'nd th' like av that. I towld ye they was human, 'nd they make mistakes, 'nd they're arl th' time corrictin' th' mistakes that's bin made by thim that's gone before, rist their sowls, whither they're did or not. Whin they get togither, as now in a convintion, wan man tills av th' misthakes another man has made, 'nd it serves 's a warnin' t' that man t' ijicate himsilf some more so as t' learn to civer thim up, 'nd t' th' others not t' make th' same."

"Cud ye till me av some av th' other misthakes that's bin made besides th' tunnel that shticks out bot' sides av th' mountain?" asked Dennissey with interest.

"I cud, but I won't," answered Mr. Hooley, as he proceeded to close up the place.

Today's Program

The program for today will include the presentation of the following reports:

Wood Preservation
Yards and Terminals
Electricity
Ties
Stresses in Railroad Track (Special)
Buildings
Ballast
Roadway
Rail

The annual dinner is scheduled in the Gold room of the Congress Hotel at 6:30 o'clock.

Prominent Speakers at Dinner Tonight

The annual dinner of the American Railway Engineering Association will be held in the Gold Room of the Congress Hotel tonight. The speakers will include Senator Atlee Pomerene of Ohio, Dr. George Adam, Judge Clarence N. Goodwin and Robert J. Cary.

Senator Pomerene is a member of the Senate Committee on Interstate Commerce which has conducted the recent hearings on the railroad situation. He is a close student of the railroad problem and will speak on "Some Phases of the Railroad Question." Dr. Adam is pastor of the Emannuel Congregational Church, Montreal, Quebec, and will speak on "Language and Ideals." Mr. Goodwin was formerly a judge in Chicago and has made a close study of the immigrant and naturalization problems. His subject will be "Americanization in Connection With Maintenance of Way Labor on Railroads." Mr. Cary is general counsel of the New York Central Lines at Chicago and will take for his topic "Noblesse Obligee—Our New Nationalism."

Tickets for the dinner were placed on sale in the corridor outside the convention hall yesterday noon and the rapidity with which they were taken indicated an unusually large attendance.

Wood Preservers Meet

The executive committee of the American Wood Preservers Association, which spent all day Monday in conference at the Hotel Sherman, will reconvene at noon today to conclude the business before it. The principal topic for consideration will be the change of the location and the date for the next convention, which is now scheduled to be held in Chicago the fourth week of January, 1920. Owing to the fact that the Automobile Show will be held in Chicago during the same week, difficulty is being found in arranging for satisfactory hotel accommodations.

F. J. Lepreau Resigns

Frank J. Lepreau, vice-president and general sales manager of the Primary Battery Division of Thomas A. Edison, Inc., has resigned, effective April 1. Mr. Lepreau has been connected with Thomas A. Edison, Inc., since 1909, and with the Batteries Supply Company, now a part of the Edison company, since 1905. Prior to that time he was associated with the Western Electric Company and the Stromberg-Carlson Manufacturing Company.



The American Railway Engineering Association Convention in Session

American Railway Engineering Association Proceedings

Report of Tuesday's Sessions, Including President's Address and Abstracts of Several Committee Reports and Discussions

THE TWENTIETH ANNUAL convention of the A. R. E. A. was called to order in the Florentine Room of the Congress Hotel, at 10 o'clock yesterday morning by the president, Charles A. Morse, assistant director, Division of Operation, Engineering and Maintenance of the United States Railroad Administration. An unusually large number of men were present at the opening session and many members and guests registered during the day. As the minutes of last year's meeting had been printed and distributed, their reading was dispensed with and the convention passed immediately to the president's address. Following this the reports of the secretary and treasurer were presented, after which the Association began the consideration of the reports of committees.

Address of President Charles A. Morse

This is the twentieth annual convention of this Association, and if we look back over the period covered by the life of the Association, and see the changes that have taken place in the physical character of the railroads of the country, we recognize that this covers a period of general reconstruction of our railroads and of maintenance methods and requirements. This has been caused by the effort upon the part of the railroads to satisfy the demands of the public for better passenger service, more prompt freight service, better station facilities and, coupled with this, greater safety to the traveling public, and to employees.

In this reconstruction the American Railway Engineering Association has played an active part. Its organization, covering as it does the whole American continent, has been able to bring together men of a great variety of experience and to put out recommendations from time to time for the guidance of those having this work to do, based upon this experience.

That its efforts have met with success is shown by the fact that its manual of recommended practice is to-day the ready reference book of all railroad engineers and maintenance officers, and during the late war was so recognized by the government, which ordered over 2,800 copies for the use of its railroad and engineer officers.

The Association now has about 1,400 active members, about 1,000 of whom are in the employ of railroads, the balance comprising ex-railroad officers, professors of engineering, consulting engineers, and engineers employed by companies manufacturing or handling railroad supplies.

We have, up to this time, only attempted to give recommended practice. If we could through some means insure the carrying out of these practices great results would be secured. The arrangement by which this Association is to work in closer connection with the American Railroad Association should assist in securing more uniform practice by the railroads which are members of that Association. It would be a great step forward if that Association would establish standards that would be compulsory instead of recommendatory.

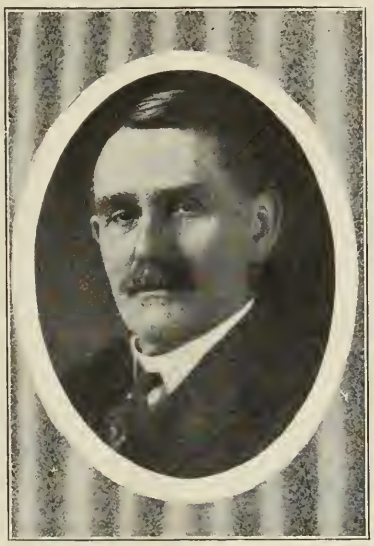
We have only started on the work that should be done by the American Railway Engineering Association. We have the big end of it ahead of us. We are to have a report from the Track committee at this convention, giving recommendations for standard frogs and switches, which report has been approved by a committee of manufacturers. In other words, the engineer and the manufacturer have gotten together and agreed upon a plan that combines the manufacturer's point of view and that

of the user. I hope this will lead to a more extended practice of bringing the manufacturer into the conference, for it must mean greater economy in the manufacture of the articles. We, as engineers, have been too prone to make plans without reference to shop practice, the result being unnecessary cost, with nothing to show for it.

It is to be regretted that many of the larger railroads do not follow all of the recommendations of this Association, notwithstanding the fact that the engineers of these roads have taken an active part in perfecting such recommended practices. A campaign should be started to see if we cannot get our recommendations adopted by all of the railroads, and especially by those whose engineers are members of the Association.

The chief engineer, as a rule, recommends the standards for maintenance of roadway and structures, and if we can get them interested in A. R. E. A. standards it will be an easy matter to have them adopted.

In the matter of forms for reports and records in connection with maintenance of way and structures, there is at present no uniformity of practice among the different railroads. Our committee on Records and Accounts has prepared certain forms for recording maintenance of way information, some are used by some railroads, but I doubt if they are all used on any railroad. I have had occasion during the past six months to try and secure various maintenance of way information from the railroads, and have been surprised at the lack of such information in shape to be furnished readily by the majority of the roads. Upon looking into the matter I have found that the rules of accounting as issued by the Interstate Commerce Commission were prepared from an accountant's point of view, and they evidently consulted no one familiar with maintenance of way matters, the result being that they stop in their instructions before they get down to enough detail to insure such uniformity as will give a proper comparison between different railroads of the various items that would be of great value in analyzing maintenance expenditures. A study of this matter should be made by our committee and forms and instructions compiled that will give such information. Much has been printed regarding details of cost of maintenance of equipment, and costs are fairly well known for certain items; but when we get below the cost per mile for maintenance of way we find nothing, and when we see the variation in accounting details we realize that the figures given out of cost of maintenance per mile are absolutely valueless for comparison as between railroads. With the maintenance of way and structures costing from 14 per cent to 20 per cent of the total cost of operation, there should be such records kept as will permit of greater study of detailed costs.



C. A. Morse
President of the A. R. E. A.

Of the information now called for by the Interstate Commerce Commission, little or no use is made, it is not even tabulated, and if one wants to use any of it, he has to go to the individual railroad reports filed in their office and dig it out, one railroad at a time. There should be some one in the employ of the commission to handle this information, who knows something about maintenance matters, and who could say what information should be secured and who could properly analyze the information and tabulate it for the use of the railroads.

Our committee is best qualified to handle this matter properly, and when it has reached its conclusions we should ask the Interstate Commerce Commission to add to its instructions, so as to give the results that the committee on Records and Accounts decide desirable.

With the increase in the cost of labor there must be an awakening on the subject of maintenance methods. There should be a carefully worked out maintenance program prepared by every railroad, and followed, instead of the haphazard manner in which it is handled at this time.

There are many things in the way of talk of uniformity in practices of railroads that should be corrected, and one of these is the rail section. The subject of a properly designed rail section has been a live one for 30 years, it having been the subject of a study and report of a committee of the American Society of Civil Engineers, later of a committee of the American Railroad Association, and it has been a subject of special study by the Rail committee of this Association for the past ten years. Recommendations were made to, and approved by, the American Railway Association about two years ago for but seven sections between the weights of 70 lb. and 130 lb. per yard, and yet there are being ordered and rolled to-day about 50 different sections of rail between these weights and there are 12 different sections of 100-lb. rail being rolled.

There is another practice that is, if anything, more absurd and unnecessary than the variety in rail sections; that is the variation in drilling of rail. We should all make an effort to get the drilling recommended by this Association adopted by the railroad with which we are connected. The Rail committee has been investigating the vertical location this year. The spacing longitudinally was recommended several years ago. Variation in drilling of rails also affects the joints, making it necessary to have joints drilled differently for each railroad's needs and thus requiring them to be made to order. With standard rail sections and uniform drilling, joints could be carried in stock by the manufacturer and supplied as required, thus permitting them to be manufactured in bulk at odd times the same as other standard shapes.

The events of the past four years have brought about another change that will be farreaching and will affect the engineer and his work. The gathering together of nearly four million soldiers from all stations in life, and the fact that, when these men were put in uniform and trained for soldiers, it was not a question of education, family connections or financial conditions that counted, but the *man*, and when it was shown that there were equally good men measured by courage and manliness developed from one class as another, it opened the eyes of all to the fact that, measured by the standard of red blood and physical ability, class disappeared, with the result that they will all return with greater respect for mankind.

The very fact that, when clothed, housed and fed alike, they produced the same results is proof that if paid fair

wages, furnished with proper living quarters and surroundings, including good food, properly cooked and served, they will be equally good citizens. Environment is what gives a man or takes from him his self-respect. When he loses his self respect he loses his ambition, and with that gone he becomes only a machine.

President Beatty of the Canadian Pacific, in a talk to a class of student apprentices, recently stated that a man from his head down was worth $2.50 per day, and whatever more he was worth depended upon what he had in his head. Self-respect is one of the things that is located in a man's head and makes him ambitious and takes him out of the mere machine class. Many of these men are handicapped by not being able to read the English language and having little or no education in any language. There is a popular movement under way to arrange night schools for these men, whereby they may improve themselves. It is felt that if they can be provided comfortable quarters, where they can keep clean and have a place to read or amuse themselves after work, that many will gladly take the opportunity if offered them.

This is a part of what is known as the Americanization scheme, and as so large a proportion of the floating labor element is employed on public works, and as to-day the engineer is the one who plans all of the large industrial plants, this problem of Americanization of foreign laborers is being checked up to the engineers.

We have made some advances during the past two or three years toward improving this situation on the railroads. We must go at it on a much larger scale, not from a humanitarian point of view only, but from a business point of view. The high wage has come to stay, and it should be the aim of every one to try and give as much for the high wage as can be given. Whatever is given cheerfully is, as a rule, a benefit to the giver rather than an injury. What we must try to do is to improve the surroundings, the frame of mind and the physical condition of the worker, so that he gives in increased efficiency, because he wants to do so and because he is interested in the work he is doing.

Reports of the Secretary and Treasurer

The following report on the general affairs of the Association for the past year is respectfully submitted:

Number of members last annual report		1,387
Admitted during the year	97	
Deceased	13	
Withdrawals	22	
	— 35	
	—	62
Total membership		1,449
Members in military service		137

By reference to the financial statement it will be noted that the total receipts during the calendar year ending December 31, 1918, were $37,540.88; disbursements, $31,176.17; excess of receipts over disbursements, $6,364.71. The dues of members in military service were remitted by the Board of Direction to the amount of $1,739. The association has participated in the various war loans to the extent of $12,000—$11,000 being invested in United States Liberty Loans and $1,000 in the Canadian Victory Loan.

The usual number of bulletins and the annual volume of the proceedings were issued during the year. The demand for the various publications of the association shows a gratifying increase. It is especially gratifying to record that the war department of the United States Government during the year purchased 2,818 copies of the Manual of the Association for the use of the United States Army. A liberal discount was given the government on this large order.

Financial Statement for Calendar Year Ending December 31, 1918

Balance on hand January 1, 1918		$30,894.48
Receipts		
Membership Account—		
Entrance fees	$ 530.00	
Dues	6,694.50	
Subscription to bulletin	6,694.50	
Binding Proceedings and Manual	707.31	
Badges	26.00	
Sales of Publications—		
Proceedings	1,089.20	
Bulletins	724.75	
Manual	8,665.83	
Specifications	88.55	
Leaflets	44.20	
General Index	1,286.75	
Advertising—		
Publications	2,281.00	
Interest Account—		
Investments	1,601.01	
Bank balance	98.04	
Annual Meeting—		
Sales of dinner tickets	786.00	
Miscellaneous	266.09	
American Railway Association—		
Rail Committee	5,957.15	
Total		$37,540.88
Disbursements		
Salaries	$ 6,038.00	
Proceedings	4,830.54	
Bulletins	6,983.97	
Manual	1,728.55	
General Index	26.00	
Miscellaneous stationery and printing	473.15	
Rents	1,165.01	
Light	26.10	
Telephone and Telegrams	125.27	
Equipment	25.80	
Supplies	286.69	
Expressage	438.32	
Postage	904.27	
Exchange	47.11	
Taxes	18.45	
Committee expenses	100.00	
Annual Meeting expenses	1,108.95	
Audit	100.00	
Refund of dues account military service, etc.	324.00	
War work campaign contribution	250.00	
Miscellaneous	175.69	
Rail Committee	6,000.30	
Total		$31,176.17
Excess of Receipts over Disbursements		$ 6,364.71
Balance on hand, December 31, 1918		$37,259.19
Consisting of:		
Bonds	$35,065.65	
Cash in S. T. & S. Bank	2,168.54	
Petty cash in Secretary's office	25.00	
	$37,259.19	

Stresses in Track Fund

Balance on hand, January 1, 1918		$2,688.97
Received from interest during 1918		58.42
		$2,747.39
Disbursements		
Salaries	$1,055.47	
Transportation	48.33	
Hotel and meals	85.30	
Telephone and telegrams	3.00	
Supplies	77.59	
Postage	10.00	
Expressage	6.35	
		1,286.04
Balance on hand in Standard Trust & Savings Bank, December 31, 1918		$1,461.35

Report of the Treasurer

Balance on hand, January 1, 1918		$30,894.48
Receipts during 1918	$37,540.88	
Paid out on audited vouchers during 1918	31,176.17	
Excess of Receipts over Disbursements		6,364.71
Balance on hand, December 31, 1918		$37,259.19
Consisting of:		
Bonds	$35,065.65	
Cash in S. T. & S. Bank	2,168.54	
Petty cash in Secretary's office	25.00	
	$37,259.19	

Stresses in Track Fund

Balance on hand, January 1, 1918	$2,688.97
Received from interest during 1918	58.42
Total	$2,747.39
Paid out on audited vouchers during 1918	1,286.04
Balance on hand, December 31, 1918	$1,461.35

The securities listed above are in a safety deposit box of the Merchants' Loan & Trust Safe Deposit Company, Chicago.

Respectfully submitted,
GEO. H. BREMNER, Treasurer.

GENERAL BALANCE SHEET

December 31, 1918

Assets

	1918.	1917.
Due from members	$ 2,495.35	$ 2,817.85
Due from sales of publications	1,823.94	1,421.17
Due from advertising	400.00	440.00
Due from A. R. A. (rail committee)	470.98	431.66
Furniture and fixtures (cost)	997.40	997.40
Gold badges	51.00	67.50
Publications on hand (estimated)	6,000.00	6,000.00
Extensometers	500.00	500.00
Investments	35,065.65	29,065.65
Interest on investments (accrued)	711.96	828.15
Cash in Standard Trust & Savings Bank	2,168.54	1,803.83
Petty cash fund	25.00	25.00
Total	$50,709.82	$44,398.21

Liabilities

Members' dues paid in advance	$ 2,053.50	$ 1,371.50
Impact test fund on electrified railways	285.46	285.46
Advertising paid in advance	120.00	75.00
Surplus	48,250.86	42,666.25
Total	$50,709.82	$44,398.21

Report on Records and Accounts

The committee reports progress on the subject of Cost-Keeping Methods and Statistical Records. During the year the committee has received from the Bureau of Railway Economics and leading publishing houses information on the subject of cost-keeping methods as applying to railroads. In reply to a circular letter, sent to the different railroads on this subject, 35 answers were received, of which one-third were accompanied with information in the nature of blank forms used in accounting records; another third indicated interest in the subject, and the remaining third stated their records were kept in accordance with the I. C. C. classification.

In view of the changes taking place in the railroad situation during the past year—and we are still in the midst of this transition period—the committee suggests that this and all other subjects except that on the use of small cardboard or other suitable material for field men be reassigned to it for the coming year.

Committee: W. A. Christian (I. C. C.), chairman; M. C. Byers (W. M.), vice-chairman; F. L. Beal (L. & A.), Lester Bernstein (B. & O.), H. Bortin (Cons. Eng.), J. W. Fox (C. of Ga.), B. B. Harris, R. C. Sattley (C. R. I. & P.), H. M. Stout (N. P.), G. D. Hill (N. Y. C.), G. T. Kuntz (U. P.), Henry Lehn (N. Y. C.), J. H. Milburn (B. & O.), J. C. Patterson (Erie), Huntington Smith (N. Y. C. & St. L.), W. D. Wiggins (Pa. Lines).

Discussion

Mr. Christian (Chairman): It will not be worth while for me to read all of these, because I wish to submit this report as one of progress only. I move that this be accepted as a report of progress only.

J. L. Campbell (E. P. S. W.): Before that motion is put, perhaps it would be proper to say just at this time, particularly within the last year, some new questions have arisen in connection with this matter of accounting, brought about primarily by the relations that exist between the railways and the government. In the agreement by which the government took over the railways there was a provision that the roads should be returned in as good condition as they were received. It developed immediately that the relative conditions of the roads in the two periods could not very well be measured in terms of dollars and cents on account of the great change in the unit prices for labor and material. It may be well for this committee to consider some form of reporting units of material and units of labor going into the property. They will always be exact measures of what is being done with the property, as far as the record covering these two points is concerned.

R. C. Sattley (C. R. I. & P.): There are a good many railroads that are trying to get out of furnishing this to the Interstate Commerce Commission.

W. H. Courtenay (L. & N.): As to keeping a record of ballast, I took occasion some twenty years ago to ascertain how much ballast there was on a line of railroad completed in 1868. The L. & N. had kept very good accounts, that were instituted originally by the late Albert Fink, showing the quantities of materials used and the various expenditures. By merely ascertaining the amount of ballast purchased for this operating division I ascertained it was sufficient to provide a four-foot depth of ballast under the ties for the whole length of the division. I had known that division since 1879, and to my certain knowledge there had never been at any time sufficient ballast put under the ties.

It is impossible to tell how much effective ballast you have at any one time on railroads such as ours. Ballast is lost—it becomes dissipated—and to maintain a division properly you must have it ballasted every year, and every time the track is resurfaced a certain amount of ballasting is required.

It is impossible for the railroads to give you the complete details about the ballast. It cannot be done. I say that with a good deal of emphasis, because I know. In the first place, if you have all these reports, you have to rely on them, primarily, on the unfortunate section foreman, who must act as the original bookkeeper. I hope this matter of getting detail statistics, particularly with a view to determining whether the U. S. R. A. maintains the track as well as the corporation did in the three test years ending June 30, 1917, can be reached in some practicable way. There can be a great deal said on that subject.

The President: I have been through about the same thing. As you were telling about the four feet of ballast I was wondering how many inches of leather we would have on our shoes if we added all that we had worn out in our lifetimes. This ballast is worn out, and, according to my notion we have to decide on a certain depth of standard ballast—the Pennsylvania Lines have decided on 24 in. This you may say is an arbitrary proposition, and no one has any right to do that, but there are many arbitrary things which are necessary, and if you are going to get comparisons you must have some arbitrary rules, and have the comparisons conform to these rules, instead of having 50 or 100 different standards of comparison. My thought is that you must get figures in some certain way in order to make comparisons. In regard to Mr. Sattley's remarks, I have received profiles for 230,000 miles of road, and I found it would take me 230,000 years to go over that and dig out the information.

R. H. Ford (C. R. I. & P.): I think the greatest benefit of the work of this association would accrue to this country if we could get rid of a lot of records and accounts now being prepared by our maintenance people. I have been impressed with the tremendous number of useless accounts that are being promulgated. It seems to me if the committee would devote its attention to a simplification of accounts and records that seem to have been gradually accumulating on railroads for many years they could do more real benefit than specifying some particular form of accounting or what some particular item of accounting means.

(The motion made by the chairman of the committee was then put to vote and carried and the committee dismissed with thanks.)

Report on Signals and Interlocking



A REPORT was submitted by the committee on the following subjects:

2. The problem of signaling railroads with reference to the effect of signaling and the proper location of passing sidings on the capacity of the line.

3. The specifications adopted by the Railway Signal Association which warrant endorsement, conferring with Committees 5, 6, 15, or other appropriate committees, on appliances affecting track or structures.

4. The desirability of providing in connection with an automatic signal system: (a) An overlap. (b) Approach restricting speed indications.

5. The various types of light signals for day and night indications.

8. Automatic train control.

Progress reports were submitted on other subjects which had been assigned the committee.

Under item (2) the committee submitted its report in three parts. In the report of 1917 it stated that "our work on this subject will be in applying and testing formulas and methods on pieces of road with actual movements of trains."

In accordance with the above statement the committee submitted a report on a single track railroad (published on page 598 of March 19, 1918, issue of the *Railway Age*). Further work was done in the development of a method of analysis of two or more track railroads, and this method was tested on a piece of railroad (see March 17, 1919, issue of the *Railway Age*). Recommendations of the committee are given under the heading of conclusions.

Under item (3) the committee submitted a list of matters acted upon at the Railway Signal Association convention in 1918 and adopted by letter-ballot. Recommendations on this subject are given under the heading of conclusions.

Under item (4) the committee reported as follows:

(a) Overlaps are not desirable for following movements, as adequate advance information can be provided in the signal system.

(b) Overlaps are necessary for opposing movements where adequate advance information cannot otherwise be provided.

The action recommended will be found under the heading of conclusions.

In Appendix C the committee submitted a report on item (5) and recommendations on this subject are given under the heading of conclusions.

Item (8) on automatic train control is covered in Appendix D, while recommendations are given under the heading of conclusions.

Conclusions

The committee recommended that the report on subject 2 be accepted as information.

That the list of Railway Signal Association specifications and standards submitted by this committee in its report in 1918 be published in the Manual as supplementary to the list heretofore inserted for the information of the members. Also that the submitted list of Railway Signal Association specifications and standards published in Appendix B be published in the Manual as supplementary to the list heretofore submitted or inserted for information of the members.

That the report on subject 4 be adopted and published in the Manual.

That the report on subject 5 submitted in Appendix C be accepted as information.

That the report on subject 8 given in Appendix D be accepted as information.

Committee: J. A. Peabody (C. & N. W.), chairman; W. J. Eck (Sou.), vice-chairman; Azel Ames, C. C. Anthony, H. E. Astley (N. Y. N. H. & H.), H. S. Balliet (N. Y. C.), A. M. Burt (N. P.), C. A. Christofferson (N. P.), C. E. Denney (N. Y. C. & St. L.), F. L. Dodgson, C. A. Dunham (G. N.), W. H. Elliott (N. Y. C.), G. E. Ellis (I. C C.), Paul Jones (Penna. Lines), J. R. Leighty (M. P.), J. G. M. Leisenring (I. T. S.), H. K. Lowry (C. R. I. & P.), J. C. Mock (M. C.), F. P. Patentall (B. & O.), A. H. Rudd (P. R. R.), C. L. Ruppert (C. R. I. & P.), Mott Sawyer (C. M. & St. P.), W. B. Scott (S. P.), A. G. Shaver (Cons. Engr.), Thos. S. Stevens (A. T. & S. F.), W. M. Vandersluis (I. C.), B. Wheelwright (G. T.), R. E. Woodruff (Erie).

Appendix C—Light Signals for Day Indications

For the purpose of this report, the following definitions apply:

1. Position light signal: A signal on which the various indications are given by positions of white lights.

2. Color light signal: A signal on which indications are given by colored lights only.

3. Position color light signals: Signals on which the indications are given by the position and color of lights.

The report covered color-light and position-light signals for day and night use.

Three types of light signals have been designed to meet the requirements of railroads and traction lines satisfactorily and economically.

(1) A long-range signal for high speed traffic. This requires a concentrated light source, very efficient lenses and considerable care in installation and alignment.

(2) The majority of traction lines and interurban railways can use a light-signal of medium range, relatively inexpensive construction and having considerable spread to projected beam.

(3) There is another class of signaling where very short ranges are required, and where medium size and expense is the deciding factor.

In referring to these signals they were designated as long-range, medium-range, and short-range.

In broad daylight, under unfavorable sun and background conditions, there are two alternatives open for the light source for long-range signals. Either a very high wattage lamp must be used, or a lower wattage with a concentrated and accurately located filament. The long-range signal has a very small beam spread, on account of the concentrated filament employed. Consequently, these signals have been designed to facilitate accurate alignment by providing separate horizontal and vertical adjustments.

Colored Light Signals

For long-range signals it has been found advisable, in order to increase efficiency and reduce the size of signals, to employ a double lens, by which means a large angle of the spherical candlepower of the lamp is intercepted. The outer lens used at present varies from 8⅜ in. to 10 in. For medium-range signals the double lens is still employed to secure high efficiency, but standard lamps are used. The construction is relatively simple, as no accurate location of filament has to be provided. For short-range signals, to reduce cost, the double lens is omitted and a small lens, usually 5⅜ in. in diameter, has been substituted. In practice a 40-watt lamp with filaments of different resistance, so that one will burn out before the other, or two 25-watt lamps in multiple, are used. If fixed lights are used, so as to locate the signal if the active light is extinguished, the second lamp might be dispensed with but would be used in the fixed light. In any event, on account of the colors cutting down the range, 35 to 50 watts per light are required.

Position Light Signals

Only two ranges are provided: Long range, 4,000 to 5,000 ft. for high signals, and short range, 1,000 ft. more or less, for dwarf signals.

As colors are eliminated, the effective range per candlepower at the lamp is greatly increased, but special provisions have to be made for elimination of sun reflection and phantom lights; this is taken care of by special conical cover glasses, arrangement of reflectors and treatment of the inverted toric lenses, and by use and position of the spherical lamp bulb.

The short-range signals are not hooded, but are provided with chiffon screens and frosted cover glasses. These require two 20-watt lamps, burned under voltage, or a maximum of 34 watts per signal. Experiments are now being made with the view of using same type cover glass as the high signals and reducing the wattage per signal to 10.

The high signals are equipped with 5⅜-in. lenses and cover glasses, and the dwarfs with 4 in.

Conclusions

(1) Colored and position-light signals, for day and night use, by elimination of all moving parts except the control relays, reduce the number of failures.

(2) Light-signal aspects have greater visibility and range under adverse weather and background conditions than the semaphore, while the close indications compare favorably.

(3) Light signals give uniform indications at all times. Other types of signals give the indication by position in daylight, by color at night, and by both during transition periods. The various aspects of the position-light signal are equal in intensity, range and visibility.

(4) In general practice, the number of aspects of any one arm of a semaphore is limited to three. With the position-light signal, four distinctive positions may be used, while the number of indications given by colored-light signals is limited only by the colors available.

(5) Where power is available, the cost of operating light signals is less than for operating motor signals.

(6) Current consumption under normal automatic signal conditions:

Position-light signals: 45-watt lamps—20 watts.
One colored light: 35 to 50 watts.

For interlocking signals, consumption is increased depending upon the number of lights displayed, but the ratio holds.

(7) Cost of maintenance of light signals is considerably less than that of motor signals, and, as the colored-light signal has less lights to renew, it has an advantage in this respect over the position-light signal.

(8) The field for the economical use of light signals is limited, as noted above, to points where power is available. In this field the light signals have advantages over other types. The position-light signal can be installed at any location where clearance will permit the present standard semaphore to be erected. The colored-light signal can be used in more restricted clearances.

Type of Signals

There are two general types of colored light signals: (a) Indoor or tunnel type; (b) outdoor type.

The indoor type is comparatively simple, as it is used in dark or semi-light locations and only a limited range is required, hence the optical problem involved is easily solved. The outdoor type of colored light signal presents much greater difficulties from the optical standpoint, as it must give a distinctive indication under bright sunlight conditions. This must be discernible at a range of about 3,000 ft. for steam road or high speed interurban electric service. The indoor type of signal units are made up in 2 or 3-lens units to give the aspects required for two-position or three-position signaling. A two-arm signal is obtained by combining two 3-lens units.

There are two classes of outdoor type of signal units: (a) Long-range class—3,000 ft. range; (b) short-range class—1,000 ft. range.

The short-range class uses the same cast-iron case as the indoor or tunnel signal, but has a special lens arrangement known as the doublet lens combination and requires higher wattage lamps than the indoor signal.

The long-range signal has larger doublet lenses than the short-range signal and takes a larger size and larger wattage incandescent lamp.

The short-range class of outdoor colored light signal unit comprises two lenses, one mounted behind and close to the other. This is known as a doublet lens combination. The outer doublet lens receives the light from the inner doublet and refracts it so as to give parallel rays, as the rays of light from the inner doublet lens are not parallel.

In the long range class of outdoor type of colored light signal unit doublet lenses are employed. The outer doublet lens is 8⅛ in. in diameter and 4 in. focus, and is made of clear glass. The inner doublet lens is 5½ in. in diameter and has a focal length of 1½ in. The color is as specified. The outer doublet lens can be furnished of half toric design if increased spread in one direction is required.

In the installation of colored light signals:

(a) Large numbers of indoor and short range outdoor colored light signals have been furnished to the New York Municipal Railways.

(b) Long-range outdoor colored light signals have been furnished to the Chicago, Milwaukee & St. Paul for use on its electrified divisions, and to a number of high-speed interurban trolley lines in Indiana. Colored light signals have not been used to any extent on steam roads, being required by trolley lines or electrified steam roads where alternating current power and power transmission lines are usually available.

Appendix D. Automatic Train Control

The following data in regard to classification of devices and reports of official tests made by the Block Signal and Train Control Board and by the Bureau of Safety, Interstate Commerce Commission of train control devices, was given as information. The train control devices that have been tested and those that have been developed to the extent that models have been made or patents issued may be divided into the following classes or type:

1. Mechanical trip.
2. Electric contact rail.
3. Insulated track rail.
4. Magnetic inductive.
5. Inductive.
6. Hertzian wave or wireless.

Devices Tested

Rowell-Potter Safety Stop.—This included an automatic signal system, with signals operated by power stored by a passing train, and a mechanically operated train stop, tested on the C., B. & Q.

Harrington Train Control and Alarm.—An overhead mechanical trip, and audible cab signal, tested on the Erie.

LaCroix Train Control System.—An automatic stop and cab signal system of the intermittent contact rail type, tested on the Staten Island Rapid Transit Railway.

Warthen Cab Signal and Train Control System.—A cab signal and automatic train stop of the intermittent overhead contact type, tested on the B., R. & P.

Railway Automatic Safety Appliance Company.—An automatic stop device, of the mechanical trip type, controlled electrically, tested on the P. M.

Jones Signal System.—An automatic train stop of the mechanical trip type, electrically controlled, tested on the N. Y. C.

Gray-Thurber Train Control System.—An automatic train control system using a short section of insulated track and an insulated portion of the train, tested on P., Ft. W. & C.

American Train Control Company.—An automatic train control system of the intermittent electrical contact type, tested on the Maryland & Pennsylvania.

Gollos Railway Signal Company.—An automatic train control system of the intermittent electric contact type, tested on the C., B. & Q.

Wooding Train Control System.—An automatic train control system of the intermittent electric contact type, tested on the D., L. & W.

American Train Control System.—This has been installed on the C. & O. on seven miles of its single track main line between Gordonsville and Cobham, Va., and practically all the engines have been equipped that operate over that district. Plans are being made for some extension of the system. This is a ramp or intermittent contact type, and is a development of the Jones System tested by the Interstate Commerce Commission on the Maryland & Pennsylvania.

Stadle Automatic Train Control.—This is a ramp or intermittent electrical contact type of train control, and was tried on the C., I. & W.

National Safety Appliance Company.—This company has made a small installation at Oroville, Calif., on the W. P., and is of the induction type.

Schweyer Automatic Train Control.—This system is an induction scheme on rather a different principle from the other schemes of this nature which have been proposed.

Discussion

J. A. Peabody (Chairman): It is recommended that this matter be accepted as information. I so move.

(The motion was carried.)

(Mr. Peabody then presented Subject 3.)

Mr. Peabody: You understand that this matter which we are reporting now was submitted to this association a year ago and turned back for further consideration on the part of this association.

C. E. Lindsay (U. S. R. A.): In the interest of the committee on Outline of Work, I want to ask if any conclusions have been arrived at by the Signal Association which would modify the work for next year.

Mr. Peabody: All we submit here has been passed on and approved by letter ballot by the Signal Association. I move that the first half of this matter (as given above under "Conclusions") be approved.

(The motion was carried.)

(Mr. Peabody then read the latter portion of this matter (under "Conclusions") and moved the adoption of that portion of the report.)

A number of members objected to the fact that the plans are not available for examination so that there is not an adequate opportunity to investigate them. Others contended that the lists of drawing numbers with references to the Signal Association Manual were valuable as information and could be of greater use if published in the Manual of the A. R. E. A. than if given only in the Proceedings.

(Mr. Peabody's motion to insert the information in Appendix B in the Manual was carried.)

(Mr. Peabody then read the matter relating to Subject 4 and moved its adoption.)

H. R. Safford (U. S. R. A.): Would it not be better if the second clause of that recommendation could be expanded to contain a little more to indicate the character and conditions under which other types of advance information can be substituted for this condition? It says: "Overlaps are necessary for opposing movements, where adequate advance information cannot otherwise be provided." Is that capable of being a little more definitely specified?

J. C. Mock (M. C.): The conclusion was reached after the consideration of the problem of protecting the train with proper advance information by using a second distant signal for some special cases for double track operation. For the single track operation it is a question whether the traffic will permit of a proper advance information of approach to the home signal. We cannot always move the trains over the road as we should like to do with a single track, and the overlap is quite necessary under those conditions, and about the only place

where we feel an overlap would be justified as against approach information. The committee does not advocate the overlap. As you will understand from our conclusion, the overlap as we regard it is the distance between home signals, plus the allowance beyond the second home signal for the stopping of a train under unusual conditions where the engineer cannot see far enough ahead of him in the same direction to stop the train. In single track that would be merely the distance between two opposing home signals—it is an overrun, really, beyond the stop signal.

W. C. Cushing (P. L. W.): Is not the distant signal indication or advance signal indication sufficient for that purpose?

Mr. Mock: We think so, and ordinarily the overlap is used in single track and formerly was used very extensively in double track signaling as a matter of economy, but it is regarded as poor practice to give only home signals—a home signal means stop, and it is realized that the home signal locations were so arranged that it is physically impossible for the trains to stop on that indication. Then they permit the train to overrun and protect them from the rear home signal by the overlap, which is simply the extension beyond the usual distance between two home signals which enables the train to hold the second home signal behind the engineer for a certain distance into the next block.

Mr. Cushing: I believe a stop signal, for the proper enforcing of discipline, should be used as such. A clause like this should not be put into our Manual without very careful consideration.

(This matter seemed to result in considerable confusion of ideas, so Mr. Mock and A. G. Shaver (con. engr.) gave detailed explanations, using objects on the table to represent the trains, signals, etc. However, further difference of opinion developed and on a motion by Mr. Safford the subject was referred back to the committee.)

Mr. Peabody: Section 5, "Report on the Various Types of Light Signals for day and night indications." The report on this subject is submitted in Appendix C, and we move that this be accepted as information.

(The motion was carried.)

Mr. Peabody: "Report on automatic train control." I move that this be accepted as information.

(Motion carried.)

Mr. Lindsay: I think it would be in order for the chairman of the Block Signal and Train Control Board to make a statement as to the organization of that board, which has occurred since our last convention. The last train control board was in existence several years ago, and has been revived by the action of the United States Railroad Administration. That fact is not recorded in our proceedings.

The President: It seems to me that it is up to the committee to find out and report the fact that there is one in existence. It has just started to do some work, and that is all that could be said for it. It has simply been appointed and organized, and is starting into work along the line of proving, if possible, the practicability of automatic train control. Probably the Signal committee will be very busy before another year.

Mr. Peabody: On the other subjects the committee reports progress.

(The committee was discharged with thanks.)

Report on Economics of Railway Labor



THE COMMITTEE has considered plans and methods for organizing to obtain labor for railways and finds that under present circumstances it seems advisable to continue investigation before presenting any set plan of organization for your consideration. The committee reports progress on this subject.

The committee presents in Appendix "A" its report on the methods of equating track sections now in use.

The committee presented in Appendix "B" tentative outline plans for boarding cars and boarding houses for railway laborers, with a view to criticism before taking up detail drawings.

The committee presents in Appendix "C" a study of the problems of establishing proper relations between units of track expenditure and units per mile of line, for different classes of road for the purpose of determining a normal maintenance expense and to obtain, as far as possible, uniform conditions involving (a) separation of expenses as between road, signal and bridge and building departments; (b) the determination of the ratio of the labor cost to total cost as a progress report.

The committee presented in Appendix "D" a list of 60 labor-saving devices with short descriptions of these machines and their purposes.

Conclusions

The committee recommends:

That the report on methods of equating track sections be accepted as information and printed in the Proceedings.

That the report on methods of equating track sections be accepted as information and printed in the Proceedings.

That the report on typical plans for boarding cars and boarding houses for railway laborers be received as a progress report. (To be considered further at the next convention.)

That the study of relations of units of track expenditure to units of mile of line with view of determining a normal maintenance expense and to obtain, as far as possible, uniform conditions involving (a) separation of expenses as between road, signal and bridge and building departments; (b) the determination of the ratio of labor cost to total cost, be received as a progress report.

Committee: E. R. Lewis (D. S. S. & A.), chairman; C. H. Stein (E. R. R. of N. J.), vice-chairman; W. J. Backes (N. Y., N. H. & H.), R. A. Baldwin (C. N.), J. Q. Barlow (Cons. Engr.), A. F. Blaess (I. C.), W. M. Camp, W. R. Dawson (N. & W.), R. C. Falconer (Erie), R. H. Ford (C., R. I. & P.), W. R. Hillary (Pa. Lines), C. B. Hoyt (N. Y. C. & St. L.), W. H. Hoyt (D., M. & N.), E. D. Jackson, C. M. James (A. C. L.), C. E. Johnston (K. C. S.), A. C. Mackenzie (C. P. R.), John C. Nelson, C. A. Paquette (C., C. C. & St. L.), J. W. Pfau (N. Y. C.), H. R. Safford (U. S. R. R. A.), Lieut-Col. H. J. Slifer.

Appendix A—Equating Track Sections

Labor constitutes the largest single item of maintenance of way expense; in fact, it is larger than all oth-

expenditures combined, aggregating approximately 56 per cent of all charges of this department. From its nature it is the expenditure in which there is the greatest opportunity for the display of economy and likewise the greatest danger of waste and efficiency. It would, therefore, naturally be expected that the distribution of this expenditure, aggregating over one-half million dollars a day, would be surrounded with elaborate safeguards to insure the greatest return. Yet investigation shows that the reverse is true. As a result, the allotments are commonly made on an arbitrary basis of so many men per section, with only very general consideration of the relative amounts of work to be done.

In the discussion of labor distribution the gang is the unit in the maintenance of way organization. As the larger part of the employees in this department are engaged in track maintenance and are employed in section gangs, the committee has confined its discussion to this class of work, although the general principles apply equally to other maintenance work.

In general, section limits have been established by giving each gang an equal mileage of main line with whatever auxiliary tracks come between these limits. The gangs are then allowed an equal number of men. The result is that some gangs have much more work to perform than others because of unequal mileages of sidetracks and special local conditions. With an unequal distribution of the work, it is evident that the greatest return is not being secured from the total expenditure and loss occurs.

The importance of equating sections on a more equitable basis has been recognized for years and some study has been given to its solution. As a result, certain more or less arbitrary ratios have been established on a few roads, and while perhaps crude and inaccurate, are a step in advance of the common practice.

Thus, on the New York Central two miles of sidetracks, or 15 switches, are considered equivalent to one mile of main track. Allowance is also made for special local conditions, such as soft subgrade, high rock cuts, excessive curvature, character of traffic, etc. An ordinary section is given about six equated miles of main track.

On the Southern Pacific two miles of branch lines, or four miles of sidings, are considered equivalent to one mile of main line. Sixteen switches are also considered equivalent to one mile of track of the kind in which the switches are placed. Consideration is also given to the nature of the rail, ballast, curvature, density of traffic, etc.

On the Cleveland, Cincinnati, Chicago & St. Louis track sections have been equated where the line has been double-tracked, the length of such sections being made equivalent to six miles of single track on the following basis: Second track, 85 per cent of main track; passing track, 50 per cent of main track; yard tracks in heavy terminal yards, 50 per cent; other sidetracks, 30 per cent; turnouts, each equivalent to 300 ft. of main track.

On the New York, New Haven & Hartford a mile of main track has been taken as a unit. Two miles of sidetrack, or 15 switches, are considered equivalent to one mile of main track. The various lines of this road have been classified between main line, secondary main line, and branches, partially on the basis of the tonnage passing over them and in part on the importance of the lines from a passenger standpoint where the tonnage alone is not sufficiently heavy to bring them into what is considered the proper class. Different allowances of men per equated track mile are made on the lines of these different classes, consideration being given to the fact that on divisions of two and four tracks the shorter distance sectionmen have to go compensating them slightly for the heavier traffic.

An equation was worked out on one division of the Michigan Central about five years ago, covering 300 miles of single main track and 500 miles of branch tracks and sidings. As the result of a 12 months' study of the actual distribution of work on this division, the following relations were established, one mile of single main track being considered as the unit:

	Per Ct.
One mile of single main main track, Class "B"	100
One mile of single branch track	65
One mile of passing track	46
One mile of yard track	32.4
One mile of industrial track	24
One main track turnout	3.4
One side track turnout	1.4
One railroad crossing (one track crossing only)	3.1
One highway crossing (highway over one track)	2.0
One mile of fence (one side)	2.7
One mile of right-of-way (100 ft. wide)	4.2
One farm crossing (over one track only)	0.4

On the Toledo division of the Pennsylvania Lines west of Pittsburgh, consisting almost entirely of single track, with only a small amount of second track, one mile of main track is considered equivalent to three miles of sidetracks, four miles of yard tracks, 20 main line turnouts, 40 turnouts in side and yard tracks, 25 railroad crossings, 40 public highway crossings and 60 private crossings.

The Baltimore & Ohio has given careful attention to the subject of equating track sections in connection with the development of its standard track work system, as the determination of standard performances is essential to the computation and payment of bonuses. The details of this system, including the determination of units of track work, were described in a monograph by Earl Stimson, published in the proceedings of this association for 1916.

The Grand Trunk has given careful consideration to this problem. Based upon its extended studies, the following basis has been approved for equating track forces:

2	miles of passing track	= 1 mile of main track
2½	miles all other sidings	= " " " "
15	switches	= " " " "
24	single derails connected with tower or switch stand	= " " " "
12	single track railway crossings	= " " " "
15	single highway crossings (public roads)	= " " " "
10	single highway crossings (city streets)	= " " " "

Appendix B—Typical Plans for Housing Labor

The committee prepared and presented for consideration a number of tentative typical plans for housing maintenance of way labor, including bunk houses, camp cars, knockdown camps and permanent camps.

The camp car outfits are for gangs moving frequently. The question of ceiling or lining the cars will depend upon the class of labor and the locality, but the committee feels that the prevailing idea should be to make the quarters for the men comfortable and as attractive as consistent.

The knockdown portable camps are intended for use at points where large gangs will be required for a year or two, after which time they may be moved to other points. These camps may be provided with electric lights and sanitary sewage facilities where available. These features will, however, depend on the advantages and ordinances of the particular locality. In general this construction consists of building sections bolted together.

The bunk house plans do not show lockers. These can be provided, however, as shown in the plan for a permanent camp. The floors of these buildings, as well as the permanent camps, are placed about two feet above the ground for ventilation, and it is suggested that during

the winter months, if necessary, the opening be banked up with earth in order to make the building warmer.

Appendix C—Relations Between the Unit of Track Expenditure and the Unit Per Mile of Line

The necessity for a study of this kind is increasing rapidly, because standards of maintenance are constantly being more closely scrutinized and made the subject of discussion, and in the development of the entire railway problem this is getting to be a more and more important feature.

One of the roads represented on the committee has attempted a study of this subject as related to its own zone, and the committee presented an abstract of the results of that study.

In this study it was noted that:

(1) The ratio of road department expense to total maintenance of way expense varied from 76 per cent to 79.2 per cent.

(2) The ratio of bridge and building expense to total maintenance of way expense varied from 18.2 per cent to 22.5 per cent.

(3) The ratio of signal expense to total maintenance of way expense varied from 1.5 per cent to 2.6 per cent.

(4) The ratio of road department labor to total labor expense varied from 77.9 per cent to 79.1 per cent.

(5) The ratio of bridge and building department labor to total labor varied from 18.5 per cent to 19.8 per cent.

(6) The ratio of signal department labor to total labor varied from 2.2 per cent to 3.5 per cent.

(7) The ratio of road department labor to total road department expense varied from 54 per cent to 54.8 per cent.

(8) The ratio of bridge and building department labor to total bridge and building department expense varied from 46.8 per cent to 56.2 per cent.

(9) The ratio of signal department labor to total signal department expense varied from 68.2 per cent to 74.5 per cent.

These ratios, of course, are without regard to classification of line, and the figures cover the system as a whole.

The analysis extended over a three-year period during which time important and erratic increases occurred in the cost of labor and materials, and yet it is interesting to note that the relative percentages were not changed materially thereby.

Labor, of course, is the basis for all material costs, and if labor in all classes of industrial development increases in about the same ratio, and if a normal program of work is maintained, it follows that the proportions should not differ materially, but it was somewhat surprising that during the period under discussion, with all of the violent fluctuations in material costs, these relations were not vitally affected.

Of course, during the year 1918 it is quite probable that a similar analysis would establish different proportions as between labor cost and material cost because of the rather heavy increases in wages put in effect during the year in railway service, and yet it may be found that material costs followed about the same curve.

A further analysis of this data reflects a suggested method for attempting to establish a normal maintenance cost, having regard to two major conditions—first, class of road, and second, equated track units—the basic unit being one mile of main track of first-class railroad.

The railroad under consideration occupies a northern latitude and is subject to extremes of climate ranging from 20 deg. below zero to 100 deg. above zero, and embraces about 1,000 miles, which were divided into four classes, as follows:

Class A-1. Being a double track, heavy traffic density line on which the standard of maintenance provided for the laying of 100-lb. rail, and carrying a high speed passenger traffic and a heavy freight traffic with locomotives equivalent approximately to Cooper's E-50 loading.

Class A. Single track line handling similar traffic, except passenger train service was local, but engine loadings were the same. The standard of maintenance on this class of line called for the use of 90-lb. rail.

Class B. Medium light branch line, well ballasted and laid with relaying rail, and handling locomotives equivalent to about E-40.

Class C. Very light branch lines handling a limited traffic, not exceeding three or four passenger trains and three or four freight trains per day.

Certain assumptions had to be made for the purpose of equating track values, which were as follows:

One mile of main track is equivalent to 2 miles of passing track, 2½ miles sidetrack, 15 switches.

In this analysis the period under consideration was five years from 1912 to 1917, inclusive, during which period costs generally increased, but fairly stable proportions were maintained throughout the period.

Of course, this analysis does not cover other important features of the work, such as bridges and buildings, signals, etc., but any study of this kind necessarily must be progressive, and track expenditure being the larger proportion of total expenditure, logically should be taken first.

Discussion

E. R. Lewis (Chairman): Your committee was instructed first to report on plans and methods for organizing to obtain labor for railways.

Last year there were reported three resolutions which are practically accepted today as the sense of the committee upon this subject and progress is reported.

(Vice-President Stimson in the chair.)

The Chairman: I think from the manner in which the committee presents the subject of the method of equating track sections, and the fact that they have not asked for instructions to consider it for next year, that they consider the matter fully covered and closed. I think there are many of the members present here who probably have some ideas, and it might be well to get an expression from them.

W. H. Courtenay (L. & N.): It seems to me an improvement on the method suggested by the committee is to assign a given number of men to the operating division, and let the roadmaster exercise his discretion as to where they should be working. There may be one section where less men are required than another, and if the roadmaster is a good and intelligent man with discretion, do not tell him arbitrarily to put 1 or 1½ or 2 men on each mile, but give him the number of men for the whole division and let him distribute them as he pleases. It would be an intelligent solution of the problem.

Mr. Lewis: The practice of giving the roadmaster a little latitude in that matter, I think, has obtained for a good many years on many roads. Probably most of them have left it to the judgment of the roadmaster. Now, his judgment may be particularly good, or not so good, and it has been found in many instances proper results are not obtained. When the Committee on Track first started this subject, the idea was to get it reduced to a science, which I think it should and can do.

E. T. Howson (Ry. Age): I will say further in response to the point raised by Mr. Courtenay, that it was one the committee had in mind. The sub-committee working on this endeavored to assist the roadmaster by studying the effect of the various physical conditions of

his track, the number of turnouts, etc., giving him the benefit of that data, so that he could distribute this force allotted to him between the different sections to equate the number of men more nearly to the work to be performed.

Mr. Courtenay: In answer we have prepared data very similar to that given in the report.

The Chairman: While this equation given is a guide, it cannot always be followed in the distribution of the force. The actual condition of the track to be maintained is quite a vital determining feature in connection with this equation, so in addition to this factor of equivalent mileage there is what might be called "condition per cent" that ought to be considered in determining the proper distribution of the force.

C. C. Cook (B. & O.): The point brought out by Mr. Stimson is essential. There should be a condition per cent. If your condition on every section was the same to begin with, your equated mileage would be a proper basis, but that does not prevail. So in figuring up the amount of force that each section should have, it is necessary to take into account its condition. I think that it can be scientifically worked out. It only means a very close and detailed study of the actual track and structure conditions. I don't think we could establish it to the fraction of a per cent, but in working out the detail for certain conditions per cent, and taking the sum of the whole, we arrive at a better conclusion than by arbitrarily fixing a force for the roadmaster, or for each section gang. I think it is a subject that deserves more attention and detailed study.

W. M. Camp (Ry. Review): This has been a very practical question with the roadmasters for a good many years, if you look through the proceedings of the Roadmasters' Association for 30 years back. I think the roadmasters would be gratified to have these studies made through the engineering department. I don't think it is intended that they should be an exact guide in distributing men. There are a great many things in the maintenance of way department that are very useful if they can only serve as a rough guide or rule to go by.

Mr. Lewis: This is a problem that every man must work out for himself, taking into consideration the peculiar factors on his own road. Furthermore, percentages will vary to some extent from year to year. The committee has given percentages here that may be exact on some roads; on other roads they might not apply at all.

C. W. Baldridge (A. T. & S. F.): The equating of track values is something that every roadmaster ought to find by some rule other than by his own judgment, and an outline of this kind would unquestionably be a great advantage, especially to a new man.

(The report on the method of equating track sections was accepted as information. Mr. Lewis then presented the matter "Typical plans for housing labor.")

J. L. Campbell (E. P. & S. W.): This phase of the subject suggests an element of the problem that lies somewhat outside or beyond the obvious field of physical activity, and a solution of the physical problems in connection with the maintenance and operation of railways. Quite apart from the economics of railway labor, there is another field that I am sure will, if comprehended reasonably well by the association, add a great deal to the value of this organization.

The laborer is much more than a physical machine that we use in carrying out this part of the work. When we consider the housing of these employees, we at once face the human element, and there, whether we recognize it or not, and whether we are prepared to admit that which is before us, we then have the wonderful element of the human heart, with all of its longings and its aspirations, noble or ignoble.

In so far as we can comprehend the human element; in so far as we can handle and cultivate it; in so far as by proper treatment of the man as a human, as a man like ourselves; in so far as we may properly and legitimately satisfy his ambitions, you will readily see that we are building up an *esprit de corps*, and any organization that will do that will find that it is a wonderful help, a wonderful strength, in the organization as a whole, in working out these physical problems and getting physical results. In so far as we can get together employers and employees, as directors of work and as those who obey directions, the closer we can get together as human beings on a common ground of understanding, the nearer we are going to get the solution of the really great problems before us.

I recognize we are not going to do that in a day. I don't know whether it will ever be accomplished or not. That element of the future is quite obscure to me, and I presume it is to you, but regardless of what we think of it now, of our preparation or lack of preparation to meet and handle it, there is the great problem of the future. There is the great problem that might be covered in a general way by the word socialism.

Aside from all those large questions, we can make a little beginning here in the matter of the housing of these employees, in the treatment that we can give them, and in the human touch that we can bring to them. To the extent that we do that we will be contributing something to the solution of the really great problem of the future, not only in the problems of business, but in all the conditions in this country and Europe and all over the world. The war has developed this great problem to an acute stage, and we must, whether we wish to or not, recognize the fact that we do not stand today where we stood yesterday on this question. It is becoming more and more acute every day, and I believe that it will be profitable to this association to think seriously about these things, as I have no doubt you are thinking, because in that common thought finally, perhaps, some solution will be found.

The Chairman: I think the manifestation of this human interest is shown in the designs that have been presented for providing these men with decent places to live in, and the committee certainly has provided some very satisfactory and adequate means to serve this end.

R. H. Ford (C. R. I. & P.): I think perhaps it may be of some interest to the convention to know what has been done along the line of Mr. Campbell's remarks by the railways generally. Of course, as we all know, we have gone from the 10-hr. to the 8-hr. day. I have no doubt but what all railroad men have endeavored to take care of their employees, and we have got to accomplish more work in the 8-hr. period or in the 10-hr. period. The great trouble with our laborers is that the ratio of efficiency is very low, and the cause of it is due to the wretched housing and feeding that we as railroads have permitted our men to continue in. There isn't any gainsaying the fact that as a business proposition we have not given attention to the fact that the old style methods of housing and feeding were bad.

There has been more progress made, I think, collectively, on the railroads during the past year in housing and caring for their men than there has been in the previous 10 years, but we have only made a very slight beginning. I look at this thing purely as a business proposition. There is no doubt that the humanitarian idea and element is an important factor, as I think some of us begin to understand. I do not believe that we have appre-

ciated the benefit of caring for the common laborer.

The committee received very little information from the members generally as to this labor question. If the committee is to do the work that I believe is so important they have got to hear more from the general body of the members than they have in the past year or two. I think Mr. Campbell is absolutely right. We have got to take up the matter from an entirely different angle. We have got to make an intensive study of the common labor problem from an altogether different angle than heretofore. As you all know, the result of the last year or two has changed the condition so that some action that is positive and direct will be necessary if we are going to continue.

Mr. Lewis: The committee recommends that this report on typical plans for housing labor be received as a proper report.

Mr. Stimson: If there is no objection, it will be so received.

(Mr. Lewis then presented Appendix C, which was accepted as a proper report.)

Mr. Lewis: We present Appendix D as a progress report, and desire its reassignment for further consideration.

The Chairman: If there is no objection, that will be the course taken.

(The committee was then excused with thanks, and the meeting adjourned.)

Report on Rules and Organization

A large amount of work has been done on "Manual of Rules for the Guidance of Employees of the Maintenance of Way Department," but the data are not in shape to be presented at this meeting, and hence the committee asks for further time in which to complete this topic. Progress is also reported on the other subjects. The committee recommends that the same subjects be reassigned for the coming year.

Committee: W. H. Finley (C. & N. W.), chairman; F. D. Anthony (D. & H.), vice-chairman; O. F. Barnes (Erie), E. H. Barnhart (B. & O.), W. C. Barrett (L. V.), H. L. Browne (C., R. I. & P.), J. B. Crothers (C. F. & F. W.), S. E. Coombs (N. Y. C.), C. Dougherty (Soo), H. M. Edgerton (C. G. W.), B. Herman (Soo), A. J. Himes (N. Y. C. & St. L.), F. D. Lakin (Erie), B. M. McDonald (N. Y. C.), Jos. Mullen, E. T. Reisler, W. H. Rupp, P. T. Simons, R. E. Warden (M. P.).

Discussion

(In the absence of the chairman, W. H. Rupp presented the report.)

Mr. Rupp: The committee decided to make no recommendation in regard to rules and regulations because of the large number being put into effect by the Federal Management. With regard to fire protection, you probably know the government has taken over the insurance of the property, and the large force of inspectors put out by the government has made the rules for this particular department. This matter is in a state of transition, as the rules are changing from time to time, and we think that this subject should also be reassigned.

Subject 6: "Prepare rules for the inspection of bridges and culverts" is a very broad subject, and we recommend that you reassign these subjects for another year, and we will report progress over the whole subject. I move that this report be accepted as a progress report and the subjects reassigned to the committee.

(The motion was carried and the committee excused.)

Report of the Committee on Track



In Appendix A the committee presented a number of changes in the Manual made necessary by changes in plans for turnouts and crossovers, proposed in Appendix B.

In Appendix B the committee submitted typical plans of turnouts, crossovers, slip-switches and double crossovers and detail plans for such work and recommended their adoption.

In Appendix C the committee reported on the reduction of taper of tread of wheel to 1 in 38 and on canting the rail inward and submits the matter as information, in addition to the report the committee made on the same subject in 1918.

The committee has continued its investigations of tie-plates subject to brine drippings, but on account of the unsettled conditions during the past year has been unable to obtain reliable data in connection with its tests now being made on the tracks of the Chicago Junction Railway at Chicago. The committee expects to start new tests during the current year.

The committee has prepared a specification for relayer rail for various uses, but it is not ready to submit it to the Association.

In Appendix D the committee reports on reducing the allowable flat spots on freight car wheels, and recommends that the report be received as information and referred to the Master Car Builders' Association with the recommendation that the allowable limit of flat spots be fixed at 1½ in.

The committee reported progress on the effect of fast trains upon cost of maintenance of way and equipment.

Conclusions

The committee recommended for adoption and publication in the Manual plans for frogs and switches, as follows:

Sixteen ft. 6 in. split-switch with uniform risers; 16 ft. 6 in. split-switch with graduated risers; 11 ft. 0 in. split-switch with uniform risers; 11 ft. 0 in. split-switch with graduated risers; details of split-switch fixtures (general); details of split-switch fixtures (special features); detail of split-switch fixtures, heel plates and turnout plates; illustration bills of material for 11 ft. and 16 ft. 6 in. split-switches, in accordance with the above plans; plans for No. 6, No. 7, No. 8 and No. 10 rigid frogs and No. 10 spring rail frog.

Committee: W. P. Wiltsee (N. & W.), chairman; M. C. Blanchard (A. T. & S. F.), Geo. H. Brenner (I. C. C.), Garrett Davis (C. R. I. & P.), P. D. Fitzpatrick (C. V.), G. W. Hegel (C. J.), T. H. Hickey (M. C.), T. T. Irving (G. T.), J. B. Jenkins (B. & O.), H. A. Lloyd (Erie), J. R. Leighty (M. P.), F. H. McGuigan, Jr. (G. T.), J. V. Neubert (N. Y.

C.), R. M. Pearce (P. & L. E.), H. T. Porter (B. & L. E.), J. H. Reinholdt (M. & St. L.), E. M. Rhodes (B. & O.), J. B. Strong (Ramapo Iron Works).

Appendix A—Revision of Manual

With the adoption of the plans shown in Appendix B, it will be necessary to eliminate the plans on pages 169, 170 and 171 in the 1915 Manual. The specifications for frogs, crossings and switches, on pages 172 to 181, will need revisions in paragraphs 10, 11, 18, 38, 43, 48, 52, 53, 61 and 62. The most important of these changes are, in the throw of the switch, the tie spacing at the heel of the joint, the angle of planing chamfer cut, the size of switch rods, the lengths of No. 6 and No. 8 rigid frogs, and material of fillers, riser blocks and spring covers.

The revision of the tie-plate specifications was carefully considered in connection with the specifications now being prepared by the American Society for Testing Materials, but as that tentative specification has again been revised, it was thought advisable to delay this matter and recommend that the next committee consider these specifications as well as other specifications in the Manual in connection with the committee of the American Society for Testing Materials, and if possible decide on a specification that has the approval of both associations.

Appendix B—Typical Plans of Turnouts, Crossovers, Slip-Switches and Double Crossovers

The plans were made for 100-lb. rail, but the plans and specifications will apply for any standard rail section weighing 80 lbs. or over. No patented features have been specified, and all details shown are recommended as being good practice established by use in service on the railroads of America. Where alternates are detailed the parts have been made interchangeable in so far as possible by giving the essential dimensions. All alternates detailed are in extensive use by preference in some parts of this country.

The plans as submitted have the approval of both the Track committee and the switch and frog manufacturers of the Manganese Track Society. It has been found that there are in use at the present time not only a great variety of styles of switch fittings, but a variety of dimensions for the same style of fittings used on the railroads of America. The adoption of these plans will not only make the dimensions uniform for the same style of fittings, but will make the different styles of fittings largely interchangeable.

Slip-Switches

The Committee on Signals and Interlocking has suggested a change in the drilling of the first holes in the switch point to read 2½ in. by 5 in. by 5 in. by 5 in., but after a conference we were advised that the Committee on Signals and Interlocking is not unanimous on this question and can work to the present drilling, which is better suited to hand-thrown switches, and the interlocking details can be worked with the present drilling satisfactorily; so our committee has decided not to recommend any change in the spacing of holes from the end of the rail specified in the present Manual, page 179. The height of the holes, however, is not specified in the Manual. A height of 1¾ in. above base of rail, measured on the face of reinforcing bar, is recommended so that the height may be uniform and the switch slips interchangeable.

Switch plates are detailed in two widths, 6 in. width and 7 in. width; the riser plates in two styles, solid base riser plates and pressed riser plates. In the 6-in. width the pressed riser plates are shown of ⅝ in. by 6 in. stock; the solid base riser plates of ½ in. by 6 in. stock, under base of stock rail; the 7-in. width of ¾ in. by 7 in. stock. The 7-in. width as specified in the 1915 Manual is recommended for congested traffic conditions, but the lighter 6 in. width is desirable for use where there are less congested traffic conditions. The switch plates, in any case, being longer than standard tie plates as used for tangent track, should preferably be of heavier section. This should be taken into consideration in making up bills of material, especially for tie-plated turnouts.

Switch rods as specified in the 1915 Manual are recommended of rigid style when the throwing fixtures are provided with adjustment for wear and other causes. However, as there are a large number of throwing fixtures in use that do not provide these adjustments, three details of adjustable switch rods and clips are illustrated. The drilling in the switch points being the same, any of the switch rod and clip details can be applied.

Two styles of split switches are shown, one of uniform risers and one with graduated risers. For tie-plated turnouts, where equivalent plates and fixtures are used, the weight of material is approximately the same for the two styles of switches.

The split-switch with uniform risers is a development of the 16-ft. 6-in. switch shown on page 178 in the 1915 Manual. The elevation of the switch rail is run off in the lead rails. The heel plates have been detailed not only to provide for the run-off of the switch elevation, but also for shoulders for both the lead rails and the stock rails. A variable tie spacing is given so that the same detail of plates will apply to turnouts No. 7 to 10 inclusive. This construction provides shoulder tie plates from the heel of the switch back to where there is sufficient spread to permit the use of standard shoulder tie plates. With this style of switch the splice bars may be bolted up tight, and the play between the shoulders back of the switch heel allows sufficient flexibility for the throw of the switch.

The plan of the split-switch with graduated risers details a 16-ft. 6-in. split-switch with a vertical bend in the switch rail so that the heel joint is level with the stock rail. A heel block is illustrated with the bolts tightened on pipe thimbles, permitting a hinge motion for the throw of the switch. With this style of switch, the heel joint being level, additional heel or turnout plates are not required except when further tie plating is desired, as in a tie-plated turnout. Also, with this style of switch the equipment can be cut down to a minimum by omitting the heel block and heel plates for a cheaper switch for emergency or light traffic requirements.

Rigid Frogs

One style of rigid frogs is detailed for No. 6, 7, 8 and 10 frogs, in which the flare in the wing rail is machined from the head of the rail. This is recommended in preference to the bent flare, as it allows the use of shorter bolts and more rigid construction. The detail of point planing conforms to the 1915 Manual. The diameter of the bolts is specified to vary according to the height of the rail.

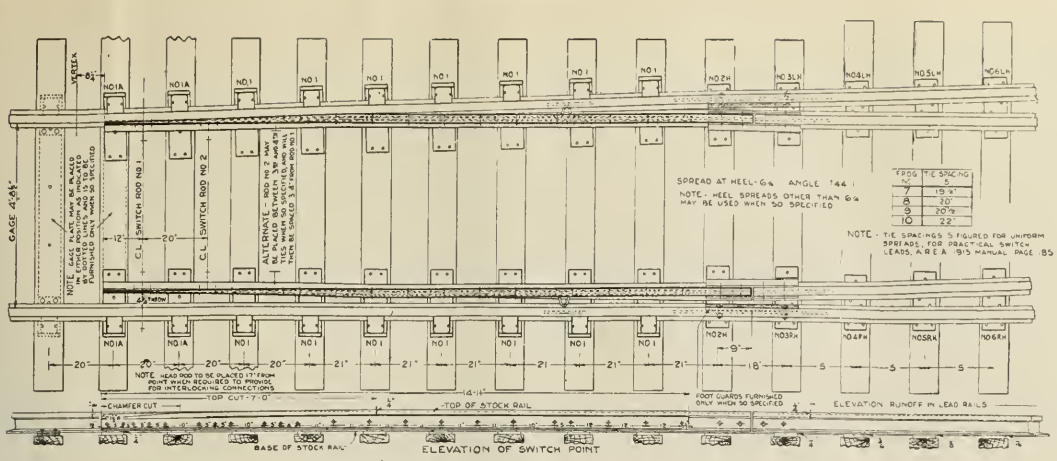
Two approved methods of plating are illustrated. The shorter three-tie base plate with tie plates beyond is recommended rather than the long base plate as illustrated in the 1915 Manual. For well-ballasted track individual tie plates throughout are recommended as good practice.

Spring Rail Frogs

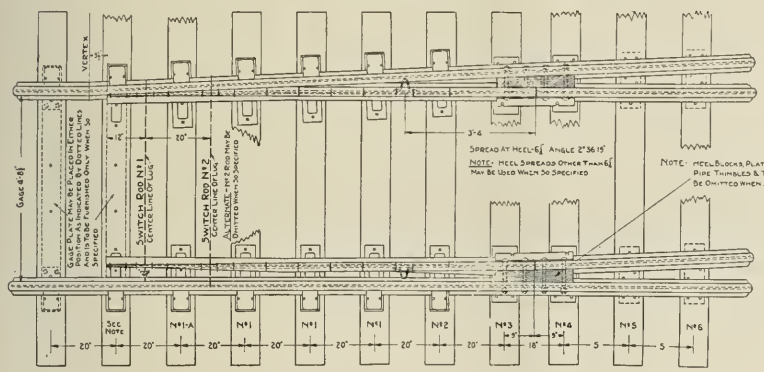
The spring rail frog is not customarily used except on the main line. A No. 10 frog is detailed to go with a 16-ft. 6-in. switch. The details, however, will apply in general to Nos. 8 and 11 frogs.

General Notes

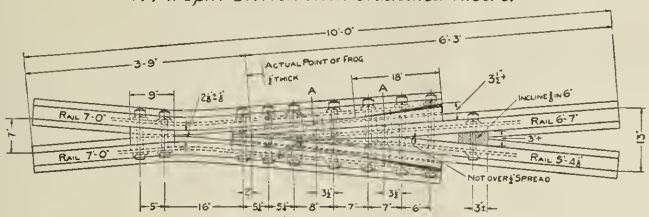
The throw of the switch is specified 4¾ in. on the center line of switch rod No. 1. This will make the throw



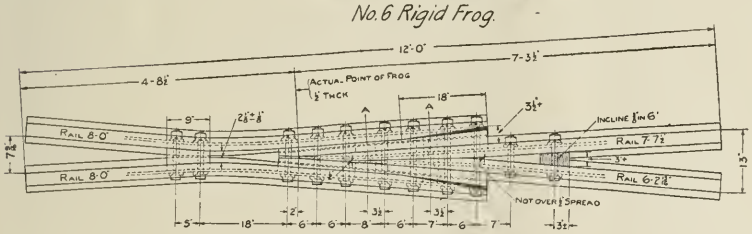
16½-Ft. Split Switch with Uniform Riser.



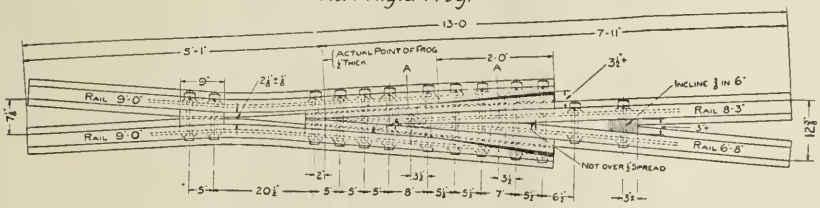
11-Ft. Split Switch with Graduated Risers.



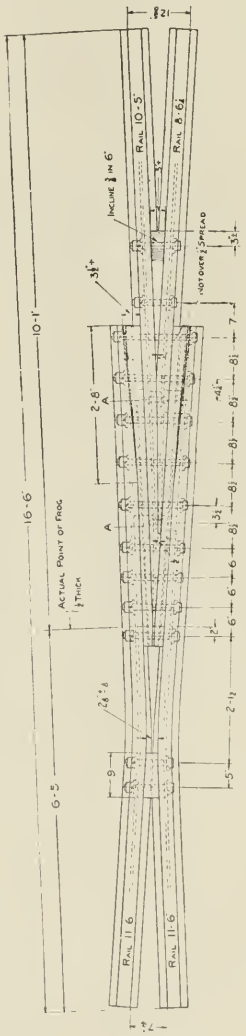
No. 6 Rigid Frog.



No. 7 Rigid Frog.



No. 8 Rigid Frog



No. 10 Rigid Frog.

Standard Switch and Frog Designs

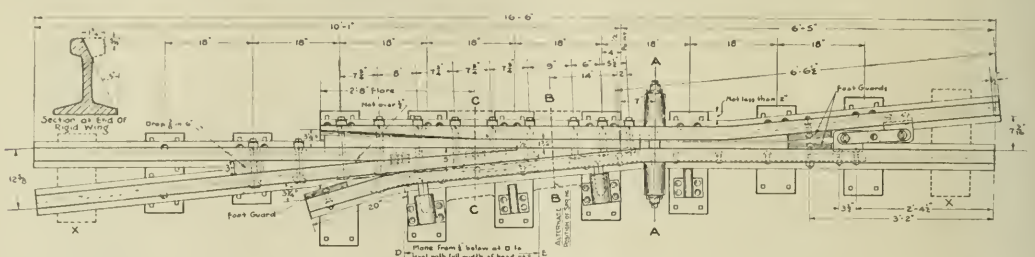
at the point approximately 5 in. in practice, or, theoretically, 4 15-16 in. at the point of a 16-ft. 6-in. switch. The tie spacing at the heel joint for the switches is shown as 18 in. which is to be recommended rather than the wider spacing shown on the plans in the 1915 Manual. The angle of planing the chamfer cut is specified as 78 deg., as the 70 deg. angle specified on page 179 in the 1915 Manual is generally considered too abrupt and is not in common use.

The switch rods are specified in two sizes, 1 in. by 2½ in. and ¾ in. by 2½ in., as the ¾-in. by 2½-in. rods, as specified on page 180 in the 1915 Manual, are considered too light to meet heavy congested traffic conditions.

The No. 8 rigid frog has been detailed 13 ft. long, instead of 13 ft. 6 in. long, as specified on page 184 in the 1915 Manual, so that it may be substantially built and cut from 33-ft. rails. The 6 in. difference in length is made on the heel end of the frog, and will not interfere with theoretical alignment data for the lead.

The No. 6 rigid frog has been detailed 10 ft. long, as this length provides ample room for splice bars. A longer frog is considered objectionable for a sharp turnout.

It will be noted that the frogs recommended in the Manual are Nos. 8, 11 and 16. While the committee is not reconsidering this recommendation, it is its intention to submit, as well as plans for frogs of those angles, also plans of Nos. 6, 7, 10 and 20 rigid frogs and No. 10 spring frog, as there is considerable demand for frogs of these numbers.



No. 10 Spring Rail Frog

Appendix C—Reduction of Taper of Tread of Wheel to 1 in 38 and on Canting the Rail Inward

Prior to 1878 the amount of coning in car and engine wheel varied. At that time, a ratio of 1 in 38 was adopted by the Master Car Builders' Association and this remained standard until 1907, when the association revised the taper to 1 in 20, the present standard. Twenty-six railroads in the United States and Canada have reported to the committee on this subject and 22 of the 26 state that the standard coning of 1 in 20 is used on all their equipment. Two roads use a coning of 1 in 38 on all steel and steel-tired wheels and 1 in 20 coning on cast-iron wheels. One road uses a coning of 1 in 38 on all equipment. Another using a coning of 1 in 20 states that it is about to change to 1 in 38. One road uses no taper on engine and tender wheels and a taper of 1 in 20 on passenger and freight equipment.

Experience has shown that a certain amount of taper of tread of wheels is necessary to reduce rubbing or slipping friction between the wheels and the rails which is the cause of loss of metal from the flange and tread of the wheel and from the rail, instead of from rolling contact. For economical wearing to both wheel and rail, the wheel must roll on the rail with the least amount of rubbing and slipping and the wheel travel parallel to the rail. The coning of the wheel and the contour of the head of rail must give the proper contact to provide the least amount of sliding friction.

In the past it has been the general practice of the railroads to place the vertical axis of the rail perpendicular to the plane of the track. However, some roads have deviated from this practice and canted the rail inward. With the standard Master Car Builders' wheel taper of 1 in 20 and the vertical axis of the rail at right angles to the plane of track, the point of contact with the rail of A. R. A. section and 14-in. top radius is 45/64 in. inside of the center of the rail toward the gage side and for wheels having a 1 in 38 taper and the same section of rail, the point of contact is 23/64-in. inside the center of rail.

The proceedings of the Master Car Builders' Association for 1916, states as follows concerning wheel tapers:

"A flange thicker than the present standard has some distinct disadvantages. One of the strongest arguments offered for the adoption of the present taper of tread of 1 in 20 was the opportunity afforded a pair of wheels to move laterally until both run upon a common diameter, this condition tending to keep flanges away from the rail, thereby not only decreasing the flange and rail wear, but train resistance as well. Unless the whole track structure is changed, a thicker flange would reduce or eliminate entirely this opportunity for lateral motion."

There are also several disadvantages of heavy coning, one being that the surface of the rail gradually wears to an inclined surface similar to cone of wheel. In this condition, the abrasion of metal and slippage resistance is considerably increased.

It would appear that the amount of taper for minimum wear of wheel is not the condition which results in economical wear and least stress in rail. In view of the fact that rail must be designed for the heaviest wheel loads, while the wheels are designed for a definite car capacity, it may be expedient to sacrifice some degree of service of wheel to favor the factor of safety and life of rail.

The committee at this time has not received sufficient information, nor is it satisfied, to recommend whether or not the rail should be canted and to what extent. However, it does feel at this writing that the canting of rail 1 in 20, which is the same as the taper of tread of the Master Car Builders' standard, is too much. Therefore, from these general conditions which are cited, it would indicate that if the rail was installed and maintained in this position so as to provide a uniform bearing and wear on the head of the rail, which of course in turn would give the best area of contact of the equipment, the best results would be obtained from wheel wear and rail wear. In recent years, the slightly extra length, or extra bearing, of the tie plate on the shoulder or outside of base of rail was the largest factor in this respect.

The report was accompanied by a tabulation of the replies received by the committee to its circular letter

asking for information concerning the wheel taper and inclination of the rail.

Appendix D—Reducing Allowable Flat Spots on Freight Car Wheels

The committee is unanimously of the opinion that a 2½-in. flat spot under a modern heavy freight car creates a severe damaging stress in the rail and that the present allowable limit of flat spots is excessive. Forty years ago, in 1878, when the average freight car wheel load was but 8,250 lb., the Master Car Builders' Association fixed the allowable limit of flat spots at 2½ in., and although wheel loads have increased to 18,750 lb. (100,000-lb. capacity car) and as high as 30,000 lb., and the speed of trains is now much greater, the present Master Car Builders' rules retain the allowable limit at 2½ in.

In 1916 the committee endeavored to confer with the Master Car Builders' Association, but was informed that their executive committee were unanimously of the opinion that—

(a) Although maximum car capacity has greatly increased, there has been a corresponding increase in the strength and durability of cars and rails, so that relatively the 2½-in. limit remains quite safe.

(b) The corners of a 2½-in, flat spot soon become rounded so that the actual impact therefrom is much less than the theoretical; also the force of the blow is greatly diminished by the elasticity of car springs and roadbed.

(c) The reduction of the limit would mean tremendous expense for changing and scrapping flat wheels, and for these reasons the Master Car Builders' Association has steadfastly refused to consider suggestions from the American Railway Engineering Association that the allowable limit be reduced.

On the other hand, American Railway Engineering Association committees, while admitting the lack of accurate corroborative evidence, has consistently contended for reduced limit, because—

(a) The impact from a flat spot under the modern heavy car is many times greater than the impact from the car of 1878, when the present 2½-in. limit was fixed, due to much higher speeds and the fact that the maximum wheel load is now nearly four times heavier than in 1878.

(b) Actual tests have indicated that a 2½-in. flat spot delivers a serious blow to the rail.

(c) It is a fact that rails are broken by flat spots, though specific cases have been difficult to cite, because often the rail, while badly damaged, may not break until some time after the passage of the flat wheel.

(d) The reduction from 2½ in. to 1½ in. would not be very expensive, for the reason that very few additional car miles can be obtained before a 1½ in. flat has become 2½ in., and, further, the greatest damage to the track occurs while the wheel is making these last few miles.

The committee, as the results of studies during the past two years, offers the following additional reasons why the allowable limit of flat spots should be reduced from 2½ in. to 1½ in.

(a) Ordinarily, wheels having 2½ in. flat spots are removed from the axle and scrapped, whereas if the limit were fixed at 1½ in., it would be possible to reclaim such wheels and replace them in service by grinding out flat spots without removing them from the axle and at a cost of about $0.60 per pair. Grinding is being done with excellent results on a number of roads and is recognized by authorities as good practice, provided, of course, that the wheel has not been burned during the process of flattening. Therefore, a reduction of the allowable limit from 2½ in. to 1½ in. would not only lessen the impact and damage to the rail, but should prove economical from the standpoint of service in life of wheels.

(b) While it is true that the strength and stiffness of rails has more than doubled (if we assume 60 lb. and 100 lb. A. S. C. E. section as the standards of 1878 and 1917 respectively) and as contended by the Master Car Builders' Association has almost kept pace with increasing wheel loads, it is a fact that this added stiffness of the rail and track structure actually augments the impact from a flat wheel, and this is especially true in winter. Recent tests on the Pennsylvania Railroad show that the average load from a flat wheel recorded on frozen roadbed was from 15 to 25 per cent greater than in warm weather tests.

Increasing the rigidity of the track structure reduces the distance in which a rail may deflect and absorb the energy of a blow from a flat wheel and consequently increases the impact.

Questionnaires were sent to 55 railroads for the purpose of securing data as to damage done to rails and opinions as to whether the present allowable limit should be reduced. Replies were received from 26 roads and may be summarized as follows:

Roads.		*Favor Less Than*	
No.	*Miles.*	*2½" Limit.*	*Remarks.*
16	51,303	Yes.	Three roads (5,395 miles) report several hundred rail failures due wholly to 2½-in. flats spots. The remainder favor a reduction of limit, but have no specific data as to failures.
5	26,485	No.	Have no data to indicate that present limit should be changed.
2	3,705	No.	Regard present limit as O. K.
23	81,483		

Conclusion

The committee is of the opinion that the allowable limit of flat spots should be reduced from 2½ in. to 1½ in. as a means of securing greater service life of both rail and wheels. We, therefore, respectfully suggest that the Association refer the above-mentioned facts to the Master Car Builders' Association, with the recommendation that the allowable limit of flat spots be fixed at 1½ in.

Discussion

W. P. Wiltsee (Chairman): The committee has reported progress on a number of subjects and the principal one is No. 2, "Report on Typical Plan of Turnouts, Crossovers," etc.

(Mr. Wiltsee then read the matter under subjects 1 and 2 from the report, as found in appendices A and B.)

Since this report was prepared the committee has continued its work, and has prepared tentative plans for 22 and 30-ft. switches; Nos. 11 and 16 rigid frogs; Nos. 8 and 11 spring frogs; 8-ft. 3-in., 11-ft. and 16-ft. 6-in. guard rails, and also have considered plans for a No. 20 frog. They are not in shape to present at this meeting. It has been necessary to make plans that could be used under all traffic conditions. We have endeavored to keep the standards down to a minimum. This report is the report of practically the whole track committee. I move the adoption of these plans.

A. Montzheimer (E. J. & E.): I notice this report does not show the clamped frog. We have been using the clamped frog for over 12 yrs. and it has been very satisfactory. It would be a good thing if this report was so made that we could use the clamp frog and still be in line with this practice.

C. W. F. Felt (A. T. & S. F.): I second that suggestion, and it has occurred to me a good way to cover that would be to prepare an alternate plan.

Mr. Wiltsee: The committee had tentative plans drawn up on that matter. Because of the recommendations of some members of the committee we did not include clamped frogs.

A. H. Mulliken (Pettibone, Mulliken Co.): Standard

plans have been prepared for clamped frogs. We have alternates on switches and on spring rail frogs, and it would seem fair to the 60,000 miles of road that are using this clamped frog that there should be this alternate.

L. Yager (N. P.): We are using this frog.

R. S. Parsons (E. R. R.): I don't think the question at the present time is whether a clamped frog is a good one. The question is whether we shall adopt the report of this committee, and embody the essentials in the shape of this standard plan. This committee has spent a good deal of time on these plans, and they have taken into consideration other ideas. This is a peculiarly excellent time to have standards adopted throughout the United States. The whole tendency of the Railroad Administration has been to adopt standards. If we had these plans adopted and included in our Manual, the track man would find something tangible on this particular question, which is sometimes so troublesome. The clamped frog can be developed and introduced at the next meeting, if that is considered desirable.

C. W. Baldridge (A. T. & S. F.): In the matter of adopting the bolted frog as recommended practice, and not showing any alternate plan, or permissible plan, such as the clamped frog, I remember a year or two ago there was great criticism of various railways for not conforming to the recommended practice which is published in the Manual. It has been shown that a large mileage of the railways are using successfully and satisfactorily a clamped frog, and unless there is some real good reason for recommending against it, the committee should be instructed to select an alternate plan. I do not believe there is any argument which justifies a ruling against that type of frog.

J. E. Willoughby (A. C. L.): What governed the committee in determining the length recommended for the frog and switch point?

Mr. Wiltsee: The length of the frog is governed by the cutting of the rail. The different lengths of frogs work out better for a 33-ft. rail and there is no waste in material. The length of switch points was adopted by the association a number of years ago.

Mr. Willoughby: Is it the idea of the committee that the cutting of the rail is more important than any other feature of the design?

Mr. Wiltsee: No, sir. We met all other features of the design, such as length, width, yield, and every other point we could think of, and still saved the cutting of the rail.

John V. Hanna (K. C. T.): I looked into this question a few years ago. The manufacturer was asked what the advantage would be to the company in using 16.5-ft. points instead of 15-ft. and he said there was none. I would like to have information as to how the purchaser gets the benefit of economy in cutting up the rail.

Mr. Mulliken: In cutting rails and making frogs and switches the material is handled by machinery more rapidly than you gentlemen imagine. It is a great economy and convenience to cut a 33-ft. rail through the center. I do not think it is fair, in making 15-ft. switches, to charge the roads for 16.5-ft. of rail, because if it is necessary to make a 15-ft. switch, we could get 30-ft. rails from the mills.

Mr. Wiltsee: The association adopted a 11-ft. and a 15-ft. switch a number of years ago. It seems to me the advantage is purely with the railroad company. If you get a 16.5-ft. switch you get a better one with a better angle.

Mr. Hanna: How much advantage is there in the angle? It may be that the manufacturers now figure a little differently on the waste, but they told us we did not really make anything by taking the longer point.

The President: Naturally, the length of a frog, a guard rail or a switch point depends on the merchantable rail that it is made of. In the days of the 30-ft. rail we used a 7.5-ft. guard rail. When we used a 33-ft. rail it was divided into four pieces. In our frogs we used a 10-ft. switch point, ⅓ of a 30-ft. rail. My idea is you want good merchantable stuff, as there is no advantage in getting odds and ends.

The different reports from the mills show that they roll from 350 to 750 tons a week for frog and switch manufacturers.

Mr. Mulliken: Twelve concerns are making frogs and switches in the United States, and when they are running full time they will use over 400,000 tons of rail in 12 months for this purpose.

J. L. Campbell (E. P. & S. W.): I have no objection whatever to these plans or anything that they contain. I think the committee has submitted a very excellent set of plans as far as they go. My objection is on account of some of the things they do not contain. I believe before we get through with the plans and consider the matter settled for the time being, that they should include a plan for the clamp frog, and I believe, also, some additional adjustments of the connecting rod.

If the committee would consent to an addition to that motion, and have it include a direction to them that for the next year's work they recommend a plan for a rigid frog and make an additional study of the adjustment of the connecting rod, all of my objections to the matter as it now stands will be removed, and I would like to see the matter disposed of in that way. I would like to see these plans adopted at this time, as far as they go, with the understanding that the subject is not closed and we will have an additional report along these lines including the points I have mentioned, next year.

Mr. Wiltsee: The subject is not closed by any means. If it is the desire of the convention that we include a clamped frog, the committee is only too willing to do it.

Mr. Campbell: I move that the motion before the house, which is on the adoption of these plans, be amended to include a direction to this committee to bring in at the next annual convention a recommended plan for a clamped frog, and an additional report upon adjustments of the connecting rods.

(This motion was carried.)

Mr. Wiltsee: I move that the convention adopt the plans.

(Motion carried.)

Mr. Wiltsee: I move that Appendix C be received as information.

(Motion carried.)

Mr. Wiltsee: I move that the subject matter in Appendix D be accepted as information and referred to the Master Carbuilders' Association.

C. E. Lindsay (U. S. R. A.): I want to emphasize the fact that the weight on the wheel cuts a very great figure. A 1-in. flat spot on a locomotive or on a locomotive tender does more damage than we have any appreciation of, and I think that fact should be emphasized in presenting the matter to the Master Carbuilders' Association, or the mechanical section of the American Railroad Association. Their attention should be called to the fact so that they might differentiate if they consider it necessary in determining the limit of the flat spot under different loadings.

Mr. Wiltsee: The committee will modify the report to agree with the instructions of the Master Carbuilders' Association, and if they make a report limiting the flat spot to ½-in. I think that will cover it.

(Mr. Wiltsee's motion was then put and carried.)

(The committee was excused with thanks.)

Report on Conservation of Natural Resources

At the moment when our country was engaged in the supreme effort of its lifetime to "make the world safe for democracy," when it was speeding up its war industries to the limit and straining every nerve to deliver a maximum of men and equipment to the battle line, there came a shortage of coal. While the signing of the armistice will relieve to a certain extent the demands abroad, the requirements at home will be as persistent as ever, for there must come a period of reconstruction. During this period the leading industries will simply change their product from a war to a rehabilitation basis and continue as active as they were before the armistice was signed. Those industries not necessary to the winning of the war that were obliged to curtail their production to economize on fuel will now seek to recuperate their interests by a speed-up program of production. On account of the shortage of coal brought on by the exigencies of war and which, no doubt, will continue on account of the reconstruction needs, the committee felt that it should confine all of its attention this year to a study of the conservation of fuel.

Of the total amount of coal used in the United States in 1917, 544,000,000 tons were bituminous and 77,000,000 were anthracite. As the railroads consumed 175,000,000 tons of this, or nearly one-third of the total output, their fuel question becomes one of huge proportions and demands the most serious thought and attention that they are able to give it.

There are three ways of relieving the situation: (1) By getting a better grade of coal from the mines. (2) By increasing our facilities for transportation. (3) By practicing conservation.

If the mines will see that better and cleaner coal is delivered to the railroads it will save them transporting thousands of tons of slate, rock, and other impurities commonly found in bituminous coal. These surplus materials are an additional burden, not only to the railroads that haul them, but also to the consumers that use them, for they decrease the efficiency of the power-plant and increase the size of the ashpile.

The Railroad Administration is ordering new equipment and is repairing that which it already has; but even then it cannot cope with the situation, for the roads must handle a heavier tonnage than they have ever handled before. They must haul raw material to the industries, they must carry foodstuffs and provisions for the Army and Navy, and they must move soldiers from the camps and the water-front.

The greatest possibility seems to lie in conservation. Statistics show that during 1917 the total equipment for handling coal constituted about one-third of all the traffic of the country. The transportation of fuel becomes then a problem of extraordinary magnitude and offers enormous opportunities for saving by the railroads and other industries of the country. As the railroads use nearly one-third of the total amount of coal consumed, a heavy responsibility rests with them in meeting the nation's need.

One-fifth of all coal burned in locomotives is used when the engines are not moving trains. Some of this is consumed at engine terminals and some on passing tracks waiting for trains to meet. Most of this coal is necessary, but it does present to the despatcher, yardmaster and roundhouse foreman a splendid field for study in the economy of the use of fuel. They should see that trains move promptly, spending no more time in yards and on sidings than is necessary for safety in operation.

The trainmen should see that equipment and material entrusted to their care is handled to the best advantage and they should put forth every effort to expedite train movements. Four-fifths of all the coal burned in locomotives is consumed while they are actually moving trains. For the use of this fuel the engine crew is largely responsible. If they could save only one per cent they would use 1,600,000 tons less a year. Their efforts would be greatly enhanced, however, if the equipment were in good condition.

The stationary boilers in shops, pumping stations and heating plants require a large amount of fuel, and present a great opportunity for saving in their construction and operation. This allows the maintenance of way and shopmen to serve in this great conservation program. Telegraph operators and towermen should be alert to clear their trains as soon as it is possible to do so, for every stop a train is obliged to make requires an additional amount of fuel. Conductors and brakemen should see that passenger trains do not become overheated and that cabooses do not burn more coal than is necessary for the comfort of the crew. Station agents can add their mite by saving a little each month. The efforts of each might seem insignificant, but the sum total would represent an amount that would well merit consideration.

For one reason or another, railroads are often obliged to store out-of-doors a great deal of the coal they use. Sometimes it is done to equalize traffic by using coal cars at a season when they are not in demand by the public, sometimes it is done to forestall shortage due to strikes or other interruptions at the mines; but unless proper care is exercised in the storing of such coal serious loss may result from physical and chemical deterioration.

As the Fuel Conservation Section of the Division of Operation of the U. S. Railroad Administration has given the subject a great deal of special study and attention and has prepared in condensed form a most thorough outline of the methods for conserving coal, the committee feels that it can do no better than to embody some of its recommendations in this report.

The report concludes with abstracts of these suggestions and discussions of the fuel situation in Canada and the possibilities of peat as fuel.

Committee: R. C. Young (L. S. & I.), chairman; S. N. Williams, vice-chairman; R. H. Aishton (U. S. R. R. A.), W. K. Barnard, C. B. Brown (Can Govt. Rys.), Moses Burpee (Ba. & Ar.), C. H. Fisk, E. E. King (Ia. State Col.), William McNab (G. T.), W. F. Ogle (C. R. I. & P.), J. L. Pickles (D. W. & P.), J. W. Votey (Univ. of Va.), W. C. Willard.

Discussion

R. C. Young (Chairman): This committee this year was obliged to change its report several times, because of the changes in existing conditions, but it has prepared a short report on conservation of fuel, thinking that was one of the most important things before us at this time. Prof. King is responsible for this report, and I will ask him to say a few words to the convention about it.

Prof. E. E. King (Univ. of Ill.): The matter that the committee presents is based and taken largely from recommendations of practice of the Fuel Conservation section of the Division of Operation, United States Railroad Administration. The committee felt that it could do no better on this occasion than to recommend, or simply incorporate in its report, the recommendations of this committee.

Wm. McNab (G. T.): The convention should understand that this report is merely one prepared and furnished gratuitously to the convention as information.

Mr. Young: I move that the report be accepted.

(The motion was carried, and the committee was excused with thanks.)

Report of Committee on Signs, Fences and Crossings

A VERY MARKED IMPROVEMENT has been noted during the past two or three years in the matter of better protection of grade crossings. The great evolution in highway traffic which has taken place during the past 15 or 20 years, in which the horse-drawn vehicle has been largely supplanted by the much faster motor vehicle, has greatly complicated the grade crossing problem. The greater speed of the highway traffic to-day calls for a more comprehensive form of signal than was necessary under former conditions; for, as in train movements, there is need of definite early warnings. The motorist needs to be advised of the necessity of a stop in time to afford him ample opportunity to reduce his speed before reaching the point of danger. The old signs, calling upon the public to "stop, look and listen" before crossing tracks, are no longer adequate. In providing the necessary warning, the railroads have been confronted with a definite obstacle, since they must be installed at considerable distance from the track, and therefore usually outside the railroad property. They have therefore been without right to erect the signs or authority to maintain and protect them from injury.

The rational solution of this vexatious problem, therefore, seemed to be to place the responsibility for the cautionary signals on the state, county or municipal authorities, and this has been done in eight states. There should be no controversy as to the justice of this decision, as the matter of safety on public highways should be as carefully guarded by their properly constituted authorities as that provided by the railroads. The pioneer state in this movement was New Hampshire, which was later followed by Vermont, Massachusetts, Connecticut, Maine, California, Oklahoma and Illinois. Bills providing for similar laws have been presented to the legislatures of a number of other states, upon which action is still pending.

Most of the laws that have so far been passed contemplate locating these signs about 300 ft. from the tracks, when, in the judgment of the commission, the crossing involves such hazard as to require the installation of a "stop" sign at the crossing; and, with the exception of those of Connecticut, imposes the erection and maintenance of warning signs outside of the railroad right-of-way on the highway commissioners who have authority over the ground upon which the signs are installed, while the installation and maintenance of "stop" signs in close proximity to the tracks and therefore usually inside the right-of-way is imposed on the railroad.

In Connecticut the cautionary signs must be furnished by the railroads, but installed by the state, county or city authorities. In California the law requires vehicles approaching grade crossings of railroads to run at a speed not exceeding 15 miles per hour. Tennessee has a law requiring automobilists to come to a stop before crossing railroad tracks. Texas laws require them to reduce speed to 6 miles per hour at all crossings except those protected by gates or flagmen. The state of Washington has a law requiring automobiles carrying passengers to stop before crossing railroad tracks.

The order of the Public Utilities Commission of Illinois, issued on July 31, 1918, in the execution of statutes passed by the state legislature in June, 1917, prohibits the installation of any other signs or signals, such as advertising notices, within 300 ft. of any railroad grade crossing, to prevent any possibility of confusion with the regular crossing protection signs. This is an excellent provision, but does not go far enough. Rigid restructions should be placed on the erection of unnecessary signs anywhere on the public highways. The motorist's attention is too often jaded by signs containing misleading inscriptions, and until such notices and signs of fantastic design are prohibited, there will, of necessity, be more or less confusion with actual warning signs.

The commission's order included explicit specifications and drawings for both the "stop" and "approach" signs. They must be made of No. 16 gage porcelain-enameled metal, crimped backward at least ½ in. around the perimeter. The letters must be black on a white field and the rear of the sign is painted black. The supporting post may be either wood or iron, but must be of sufficient strength to make a solid and substantial support. The posts must be designed to permit a bracket or attachment to be installed for the purpose of supporting a light or signal at night, wherever, in the opinion of the commission, this may be necessary.

The painting of black and white diagonal stripes on crossing gates and the use of circular disks instead of flags by crossing watchmen have now become common on many railroads.

Over 110,000 grade crossings were reported by the National Association of Railroad and Utility Commissioners in the 22 states from which replies to a circular letter were received. Basing calculations on the above data, it is estimated there are about 200,000 grade crossings in the United States and that there are about 2,000 persons killed annually at these crossings. It further appears from the reports that in the above 22 states only about 10 per cent of the crossings are protected by gates, flagmen or bells.

In the matter of grade crossing elimination, considerable progress has been made in Connecticut, Illinois, Massachusetts, New Jersey, New York, Oklahoma, Oregon, South Carolina and Wisconsin. Massachusetts, with only about 2,000 miles of railroad, has spent in the past 30 years about $42,000,000; Illinois, in a much shorter period, has done work involving an expenditure of over $55,000,000, much of it in the city of Chicago; New York, with about 8,000 miles of railroad, has spent about $44,000,000. Estimates of the cost of elimination of grade crossings have been prepared in a few states running into hundreds of millions of dollars. In California the average cost is estimated at $30,000 each; in Colorado at $40,000; in New York at $48,000, and in Wisconsin at $25,000.

Considerable information has already been presented to this association bearing on the division of cost as between the railroads and the public. It occurs to the committee that the most equitable plan for the division of cost is that of New York, where the burden is imposed equally on the railroads and the public.

Types of Manufactured Posts

Early in September a circular letter was addressed to the officers of about 30 railroads soliciting information on concrete and steel posts. Only 19 replies were received —14 of which were to the effect that no concrete posts were used during the year and 10 to the effect that no steel posts had been used. From the remaining replies only two companies used concrete posts to any extent and that only one company used steel posts in quantity. This was, no doubt, due to the high price of steel in the case of steel posts, and to the high price of labor and material entering into the manufacture of concrete posts. This condition is likely to continue until normal prices are restored.

So far as the committee is able to judge from the replies received, those companies which have adopted concrete posts as standard, and have been large users of them, are continuing their use. Comparatively few steel

posts have been used during the year. Those roads on which wood posts are standard are not inclined to change to other types at present prices. In general, those roads using concrete and steel posts report satisfactory service.

One chief engineer, on whose road steel posts are standard, recommends that all steel posts should be set as other posts, and not be driven, in order to avoid damage to the tops of the posts. While the committee is aware that the tops of some steel posts are more or less crimped or battered in driving, it is believed to be due to some extent to careless driving, and to the use of a cap not properly designed. Especially large driving caps are now being furnished, which are claimed to be giving satisfaction. The committee therefore feels that the proposition to set all steel posts, except in the case of rock or other obstructions, would defeat the whole plan of economy in the use of certain types of steel posts, besides the difficulty of setting them with any degree of rigidity.

Committee: W. F. Strouse (B. & O.), chairman; Arthur Crumpton (G. T.), vice-chairman; F. D. Batchelder (B. & O.), H. E. Billman (M. P.), C. G. Bryan (I. C.), G. F. Black (Me. C.), A. S. Butterworth (G. F. & A.), B. J. Dalton (M. K. & T.), F. T. Darrow (C. B. & Q.), G. N. Edmonson (N. Y. C.), R. C. Gowdy (F. W. & D. C.), Paul Hamilton (C. C. C. & St. L.), Maro Johnson (I. C.), L. C. Lawton (A. T. & S. F.), S. L. McClanahan, L. A. Mitchell (Un. Tr. Co.), T. E. Rust, A. Swartz (T. & W.), W. D. Warren (N. Y. N. H. & H.), K. G. Williams (M. V.).

Discussion

Arthur Crumpton (Vice-chairman): Owing to war conditions, the committee has not reached any conclusions this year, but submits progress reports on two subjects, grade crossings and fence posts. No conclusions having been reached, the committee recommends that these reports be received as information.

(The committee was excused.)

The Evening Session

A continuation of the report of the Committee on Economies of Railway Labor took place last evening when a series of slides illustrating the use of labor saving devices was presented by R. H. Ford, principal assistant engineer, Chicago, Rock Island & Pacific, Chicago. This was followed by a talk on transverse fissures by H. M. Wickhorst, expert of the Rail committee. In the discussion which followed, J. E. Howard, engineer-physicist of the Interstate Commerce Commission, gave illustrations to indicate that such failures are the result of fatigue of the metal. A number of other speakers questioned this theory and cited a number of examples which demonstrated that the quality of the material was at least partially responsible.

Railroad Administration Approves Convention

The United States Railroad Administration has indicated its approval of the American Railway Engineering Association and encouraged the attendance of railway men. Circulars have been issued by the regional directors to this effect, the following from the Northwestern region being typical of those issued by the other directors:

"The twentieth annual convention of the American Railway Engineering Association will be held at the Congress Hotel, Chicago, March 18, 19 and 20, 1919. On account of the educational benefit accruing to employees attending these conventions, will you please arrange to have the members of this Association, as well as other officers and employees interested in the maintenance of way department, who can be spared from their duties, attend this convention, take part in the discussions, and see the exhibit of railway appliances."

Co-operation of this character has contributed largely to the attendance at the meeting of the A. R. E. A. as it did for the meeting of the Signal Association Monday.

American Railway Signal Supervisory Association

The American Railroad Signal Supervisory Association will hold its first annual meeting in the Elizabethan Room of the Congress Hotel at 9 o'clock this morning. The first hour will be devoted to an open meeting, following which the remainder of the day will be spent behind closed doors. Some of the subjects to be discussed will be the proposed rates of salary and definition of title. Election of officers for the next year will also take place. Fifty roads are at present represented.

Division Foremen to Hold Meeting

The division signal foremen of the Chicago & North Western will hold a meeting on Wednesday, March 19. This meeting is a get-together for the foremen on the various parts of the system to permit them to become better acquainted and talk over their work.

Personnel of New Signal Division Committee

Subsequent to the amalgamation of the R. S. A. with the A. R. A., a committee on valuation, to be part of the signal division, was appointed with T. M. Carley as chairman and P. M. Gault, assistant engineer in the Signal department of the Illinois Central, Chicago, as vice-chairman. The other members are as follows: F. H. Bagley, assistant signal engineer, Louisville & Nashville, Louisville, Ky.; G. E. Beck, assistant signal engineer in the valuation department, New York Central (West), Cleveland, O.; P. F. Canfield, signal pilot, New York, New Haven & Hartford, New Haven, Conn.; J. C. Finch, signal inspector, Missouri Pacific, St. Louis, Mo.; E. E. French; Caldwell Homewood, assistant supervisor of signals, Pennsylvania, Philadelphia, Pa.; W. F. Hudson, assistant engineer in the valuation department, New York Central (East), New York; George W. Kydd, signal pilot engineer, Baltimore & Ohio, Baltimore, Md.; F. F. Schaller, signal engineer, Bureau of Valuation, Interstate Commerce Commission, Washington, D. C.; T. E. Smith, supervisor bridges and buildings, Southern Lines West, Tuscaumbia, Ala.; G. K. Thomas, assistant signal engineer, Atchison, Topeka & Santa Fe, Topeka, Kan.; C. H. Wiegand, supervisor of signal construction, Atlantic Coast Line, Jacksonville, Fla., and E. E. Worthing, signal engineer, Southern Pacific (Atlantic System), Houston, Tex.

This committee has been instructed to: (1), report on the average life in years of the important units of the different types of signal installations, considering depreciation and obsolescence separately; (2), report on the government Bureau of Valuation method of applying depreciation; (3), prepare tables for the different types of signal installations which will show the percentage of material to be added to cover waste, contour, sag, loss, breakage, etc.; (4), prepare a typical construction program which will include the various types of interlocking, automatic signals, etc., for a single track railway following with additional tracks to increase the road to a double track, three-track and four-track railroad, and (5), extension of the joint Signal Committee of the President's conference committee study of labor costs to establish percentage to be added to material to arrive at total cost.

Twenty Years of Progress in Railway Engineering

Some Facts About the Origin and Growth of This Body of Railway Men During the Last Two Decades

A LITTLE MORE THAN 20 years ago, October 21, 1898, to be exact, a little group of men met in the Auditorium Hotel, Chicago, and set on foot the preliminary arrangements for the organization of what is now known as the American Railway Engineering Association. Because of the important position which the association has since achieved and its present widespread influence in railway engineering affairs, it seems fitting to call attention to some of the earlier items of its history and to recall the names of its founders for the benefit of those who have become members of the association during the succeeding years. This, the twentieth annual convention, seems a peculiarly opportune time for gathering up some of these links that connect its present history with its past.

It is probable that few even of the most far-sighted of the founders of this association appreciated the magnitude of the movement which they were setting on foot.

As a matter of fact, some hesitancy was expressed, not as to the need of such an organization, but as to whether engineers in sufficient number would join its ranks to enable the association to assume that place in railway work which the importance of its interests demanded. Owing, however, to the indefatigable energy and competence of those who were elected to guide its destinies in the early years, the association almost immediately assumed an important position and at once assured its founders that they had made no mistake in shaping the preliminary organization and outlining plans for future work. From the very beginning the work of the association was directed along the same broad lines which have since characterized its course.

Even though their names form a part of the permanent records of the association, it is well to call especial attention to those pioneers to whom the association as at present constituted, owes so much. Those who attended the preliminary meeting on October 21, 1898, were the following:

H. A. Kennedy, general superintendent, Cleveland, Canton & Southern.
F. E. Paradis, chief engineer, Chicago Terminal Transfer.
C. Dougherty, roadmaster, Illinois Central.
G. W. Merrill, roadmaster, Chicago, Milwaukee & St. Paul.
W. S. Kinnear, principal assistant engineer, Michigan Central.
G. W. Taylor, St. Louis Terminal Association.
W. E. Emery, roadmaster, Chicago & North Western.
E. C. Macy, division engineer, Iowa Central.
W. M. Duane, roadmaster, Cleveland, Cincinnati, Chicago & St. Louis.
J. B. Dickson, roadmaster, Chicago & North Western.
L. C. Fritch, superintendent, Baltimore & Ohio Southwestern.
C. A. Wilson, chief engineer, Cincinnati, Hamilton & Dayton.
G. S. Cheyney, general roadmaster, Indianapolis, Decatur & Western.
H. W. Church, roadmaster, Lake Shore & Michigan Southern.
G. H. Bremner, assistant engineer, Chicago, Burlington & Quincy.
A. Torrey, chief engineer, Michigan Central.
Harry P. Robinson, editor *The Railway Age*.

The circular calling for this preliminary meeting was issued from the office of the *Railway Age*. It is a matter of some interest that it was the original expectation to graft this engineering association upon the existing Roadmasters' Association, which had formerly and has since exerted considerable influence in matters pertaining to railway track maintenance. However, at its annual meeting at Denver, in September, 1898, the Roadmasters' Association by a close vote decided that it would remain a roadmasters' organization and not by a change of name constitute itself a possible nucleus for the proposed Engineering Association.

At the preliminary meeting a temporary organization was effected with the late Augustus Torrey, chief engineer of the Michigan Central, as chairman, and L. C. Fritch, then superintendent of the Baltimore & Ohio Southwestern, as secretary. The chairman appointed, as a committee to prepare a constitution and by-laws, John F. Wallace, then assistant second vice-president, Illinois Central, chairman; P. Alex. Peterson, then chief engineer, Canadian Pacific; Thomas Rodd, chief engineer, Pennsylvania Lines West of Pittsburgh; C. H. Hudson, chief engineer, Southern Railway, and W. G. Curtis, engineer maintenance of way, Southern Pacific.

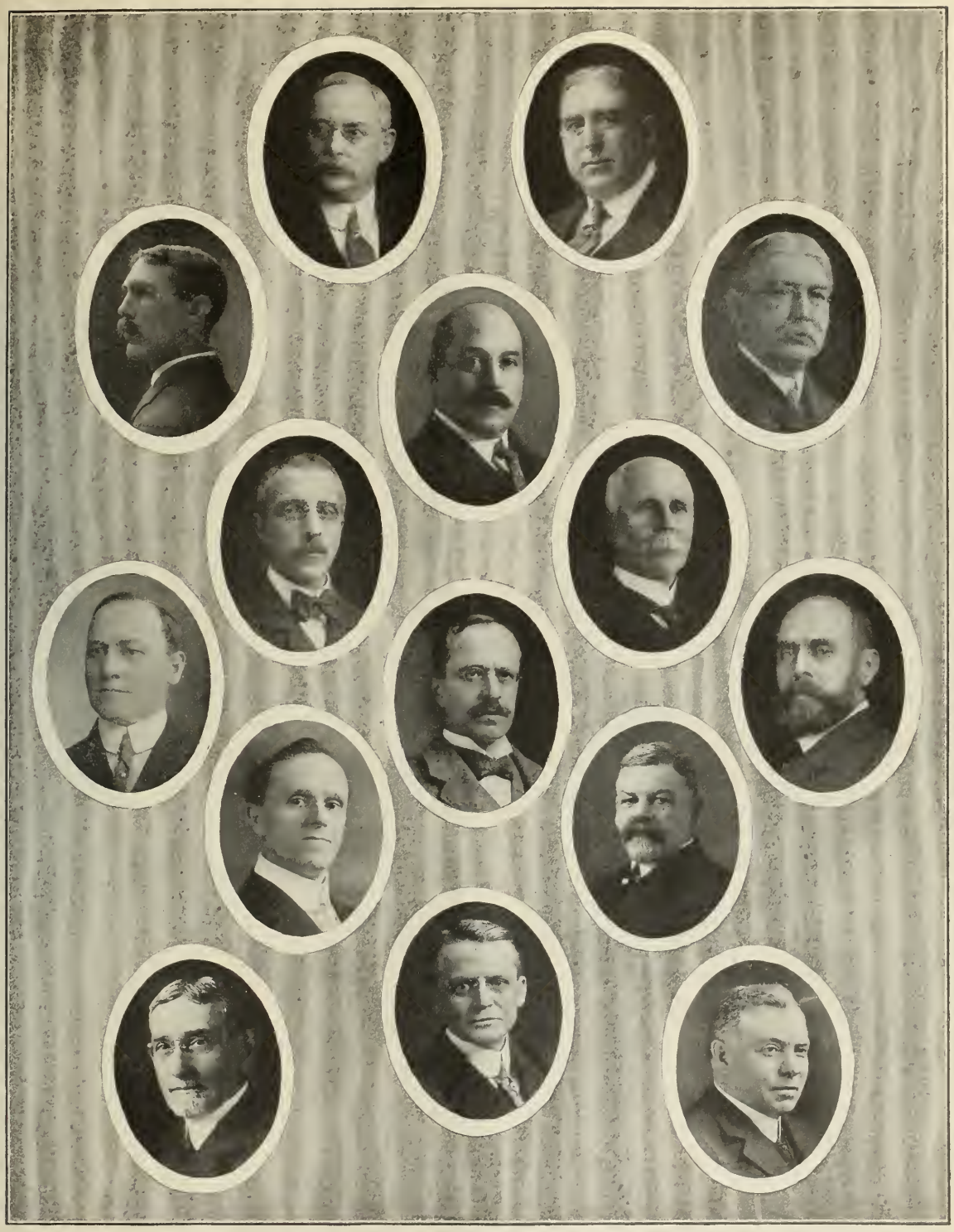
At a meeting held in Buffalo on March 30, 1899, a permanent organization of what was then known as the American Railway Engineering and Maintenance of Way Association was effected with these officers:

President, John F. Wallace, assistant second vice-president, Illinois Central;
First vice-president, P. Alex. Peterson, chief engineer, Canadian Pacific;
Second vice-president, W. G. Curtis, engineer maintenance of way, Southern Pacific;
Treasurer, W. S. Dawley, chief engineer, Chicago & Eastern Illinois;
Secretary, L. C. Fritch, superintendent, Baltimore & Ohio Southwestern.
Directors—Augustus Torrey, chief engineer, Michigan Central; Thomas Rodd, chief engineer, Pennsylvania Lines West of Pittsburgh; D. J. Whittemore, chief engineer, Chicago, Milwaukee & St. Paul; F. H. McGuigan, superintendent, Grand Trunk; W. K. McFarlin, chief engineer, Chicago, Rock Island & Pacific; Hunter McDonald, chief engineer, Nashville, Chattanooga & St. Louis.

The first real convention of the association was held in Chicago on March 14 and 15, 1900. The success of this meeting is probably unparalleled in the history of new organizations and no small measure of the success with which the association started off is due to the great ability of John F. Wallace as presiding officer.

The association has in succeeding years honored itself as well as the chosen members in the selection of its presiding officers. Its earlier leaders were: Wallace, Kittredge, Kelley, Johnston, Berg, McNab, Fritch, Cushing. Several of these have held office for two terms; Johnston declined re-election and Berg was removed by death less than two months after his election. McNab was elected to succeed him. In the more recent years the office has been ably filled by E. F. Wendt, W. B. Storey, Robert Trimble, A. S. Baldwin, J. G. Sullivan and now by C. A. Morse. The last named has had even more than ordinary opportunity to demonstrate his capacity, having been selected by the United States Railroad Administration as assistant director of operation in charge of engineering and maintenance.

At the convention in March of 1911 the name of the association was changed from the American Railway Engineering and Maintenance of Way Association to the American Railway Engineering Association, the old name having proved too awkward and unwieldy. The old name, however, has died hard and even to this day one



The Past-Presidents of the American Railway Engineering Association

John F. Wallace — G. W. Kittredge

Hunter McDonald — H. G. Kelley — A. W. Johnston

Walter Berg — Wm. McNab

L. C. Fritch — W. C. Cushing — C. S. Churchill

E. F. Wendt — W. B. Storey

Robt. Trimble — A. S. Baldwin — J. G. Sullivan

still bears reference to the "Maintenance of Way Association."

The manual of the association, which, when it was first proposed was described as a means of "bottling up" the concentrated wisdom that had been squeezed out of a vast amount of individual investigation and the interchange of personal experiences was first proposed by A. W. Sullivan, then general superintendent of the Illinois Central and later general manager of the Missouri Pacific. This first tentative consideration was crystallized at the fourth annual convention into a resolution presented by Mr. Berg, which, promptly adopted, became the foundation upon which the manual has grown to its present proportions and importance. The first edition was published in 1905. That this work has received widespread recognition as an authority is indicated by the purchase of over 2,800 copies of the last edition by the United States Government during the war. The association's specifications for steel bridges, the study of the effects of moving loads upon bridges, the work of its rail committee and the investigation now in progress on stresses in track are matters covered in the Manual or other publications of the association worthy of special mention. For much of this work the association has been indebted to representatives from the faculties of engineering schools who have from the first closely associated themselves in its work to the benefit of the association and with an influence upon their own work whose value can scarcely be overestimated.

The Last Days of Hiram J. Slifer

News of the death of Col. Hiram J. Slifer at one of the base hospitals in France on February 4, 1919, was a shock to his many friends and acquaintances. Dying in the active service of his country at the mature age of 62, after an active railway career in this country, Mexico and the Canal Zone, his life was not one that ever placed him under Roosevelt's classification of the "men who lead soft lives." His name will go into the records of the association as one who did it honor. Because of his wide acquaintance among fellow members of the association, we welcome this opportunity to present a few facts concerning his last days, in the form of three letters received from France, one of which he wrote himself to his friend, G. E. Greer, which is abstracted below. This gives in Col. Slifer's own words a detailed account of the accident which eventually caused his death.



Col. H. J. Slifer

"Neufchateau (Vosges), France,
"December 30, 1918.

"On November 13, two days after the Armistice was signed, I went into the German territory to make an inspection of some track where the Germans had mined and blown up an eight-foot embankment every couple hundred feet for possibly a quarter of a mile. I went on the inspection trip on one of our usual six-men gasoline inspection cars. These are just as high as the standard car, but they are only two feet wide and subject to derailment. I had practically been living on one of these cars during October and November, and never had an accident, although many of our men were injured, but my turn came on November 13. The car was derailed near the town of Buzancy, at the point where the Germans had mined the embankment and track, and I was thrown down the bank, about eight feet high, and into a stream of running water, with the car on top of me. I have always made a habit of running inspection cars in duplicate, that is, running two cars, one following the other, so that in case one car gives out I will have the other to use, and I was very lucky to do so on this particular day, for the reason that the men on the second car discovered my absence and got me out of the water just in time and before I was drowned.

"I worked my way back to a field hospital and was later sent to an evacuation hospital, and I have been in Base Hospital No. 66 at Neufchateau since November 18. Was getting along very nicely when I was attacked with bronchial pneumonia, which affected every part of my system and my heart was very low. In fact, the doctors had some doubt as to whether I would pull through, but thanks to my constitution I am again on the mend, and am leaving here on January 2 for Cannes, on the French Riviera, where I will be at a convalescent camp until I get enough strength to rejoin the regiment, of which I am now in command, as our colonel has been relieved and is chief engineer of the First Army. I shall expect to join the regiment at its headquarters at Conflans and go back home with it, but I do not look for orders much before April or May.

"(Signed) HIRAM J. SLIFER,
"Lieut.-Colonel, C. of E., U. S. A."

The following letter by Capt. John R. Thompson, addressed to J. Beaumont, of the division of valuation, Interstate Commerce Commission, Chicago, contains an impressive account of Col. Slifer's death and funeral:

"Commercy (Meuse), France,
"A. P. O. 747,
"February 5, 1919.

"Last Saturday I was in Conflans, headquarters of the 21st Engineers, and heard that Col. Slifer was in town. I went to his quarters and had a long visit with him. You probably know that he has been in the hospital since he was injured last fall, and he told me Saturday that it was a great burden to him to be in Conflans, but he wanted to see his old friends with the 21st Engineers, and he thought he could stand it, but the strain was telling upon him badly, and when I left him he said that he knew that he had made a mistake in making the effort. He stayed in Conflans over Sunday and on Monday started for the southern part of France, but got only as far as Neaufchateau and was compelled to return to the hospital at that point. This morning Col. Howard, of the 13th Engineers, came into the office and told us that Col. Slifer died yesterday and the funeral would be at the hospital near Vertuzey at 12 o'clock today.

"I attended the funeral, and to me it was the most impressive ceremony I have ever attended. It was military, and, considering the circumstances, there was a large attendance. In addition to the prescribed military escort consisting of a firing squad of about 100, a full band, honorary pall bearers of lieut.-colonels and colonels and active pall bearers of captains, there was a large gathering of officers, both from his own regiment and friends. As the body was lowered into the grave in a casket in a large American flag, the firing squad fired three rounds and then the bugler blew taps. Occasional explosions of damaged ammunition in the distance, together with the surroundings, made the ceremony most impressive, and

I will always remember it. Among the officers present that you will know were Capt. Rowland, Capt. Stonp and Capt. J. V. Brown.

"From all I have heard of Col. Slifer's experience in France, he has made an excellent officer both from a military and railroad point of view. He is well liked by all his men, and his death was a great blow to them, as I have heard those who live in Chicago often speak of the time when they could parade through the Loop on their return to the States with their colonel.

"(Signed) JOHN R. THOMPSON."

Some details of the service which Col. Slifer rendered to his country from the time that he was commissioned as major in the Engineer Officers Reserve Corps until he was incapacitated by the accident that caused his death, and a tribute to his ability as an officer of the National Army, are contained in the following letter by M. E. Pumphrey, captain of engineers, United States Army, addressed to the *Railway Age:*

"Headquarters 21st Engineers, A. E. F.,
"February 11, 1919.

"The many friends of the late Lieut.-Colonel Hiram J. Slifer will no doubt be interested in his part of the Great War. Colonel Slifer was commissioned as Major E. O. R. C. on August 15, 1917, and was assigned to active duty with the 311th Engineers at Camp Grant, Rockford, Ill., September 12. On September 20 he was transferred to the 21st Engineers, Light Railway, with which regiment he was connected until the time of his death. On September 28, 1917, he was commissioned Lieut.-Colonel, Engineers, N. A.

"During the two months that this regiment was at Camp Grant he took charge of the picking of the special trained men for the work which this regiment was to do and ably assisted Col. E. D. Peek, regimental commander, in perfecting the organization of the regiment. He left the states with the regiment and arrived in France on January 10, 1918, and proceeded to Challuy (Nievre), near Nevers, France, where regimental headquarters were established. During the few weeks that he was located at this place he assisted in the preparation for construction of important works in this vicinity.

"On February 27 he proceeded with the regiment to Sorcy (Meuse), where he was located until July. It was here that Col. Slifer's experience and ability was to come into play. Sorcy was designated to be made into an important railhead for the American troops, which occupied the Toul Sector. It also was the headquarters of the American light railways in the Advance Zone. In April Col. Slifer was made chief engineer of the light railways, 21st Engineers, and inaugurated plans of construction, maintenance and operation which later proved to be of inestimable value.

"During the month of July, Col. Slifer was engaged in superintending and planning a light railway system to serve the American sector to the south of Luneville. Upon completion of this work he returned to Sorcy to find that preparations were in progress for an action which was afterward known as the St. Mihiel offensive. During the period of preparation Col. Slifer was at his office or in the field every day, working from 12 to 18 hr. out of the 24.

"After the close of the St. Mihiel offensive Col. Slifer was ordered to Vraincourt, Meuse, northwest of Verdun, with the regiment where they took station on October 12. At that time the light railways of that sector were in a deplorable condition and practically no service was being rendered to the combatant troops. By November 1 an immense amount of work had been done on the light railways and the ammunition and rations were being placed within one mile of the front on the Meuse-Argonne sector. On November 1, the date of the beginning of the final drive, Col. Slifer spent several hours visiting the various detachments which were working under shell fire and encouraged and helped them very materially. During the period from November 1 to November 13 he was constantly with his men under the most trying and dangerous conditions, and it was due primarily to him that the Services of Supply bore up under the strain in the Advance Zone. On November 13, while traveling on a light railway motor which was derailed, his arm was broken. He was taken to a near-by hospital and in the course of a few days evacuated to a base hospital, where he developed pneumonia. Upon his partial recovery from this sickness, he was evacuated to a hospital at Cannes (Mediterranean), where he rapidly recovered his strength. In the middle of January a medical board decided that he be sent home, as it was considered that he would be unable to stand the work under the trying climate where his regiment was located.

"In order to say good-bye to his men, he made a trip to Conflans (Meurthe et Moselle), where he arrived January 31; and on February 2 he started to Bordeaux. Upon arriving at Neufchateau (Vosges) his condition was such that the doctor ordered him to a hospital, where it was found that he had pneumonia a second time. Due to his enfeebled condition, he was unable to survive the second attack, and expired in one of the base hospitals on February 3. On February 5 he was buried at the American Cemetery near Sorcy (Meuse) with the rest of the members of his command who had been killed in action, or who had died in France.

"While Col. Slifer had had no previous military training before entering the National army, he was in every respect a soldier. His remarkable ability was of invaluable help in the transportation service of the advance zone. For practically eight months he lived within 10 miles of the front and spent considerable time within one or two miles of "No Man's Land." It is probable that no commanding officer of any unit in the A. E. F. was more respected or beloved by his officers and men than Col. Slifer. His loss is felt most keenly by all, and the Army lost the services of one of the finest types of Americans.

"(Signed) M. E. PUMPHREY,
"Captain Engineers, U. S. A."

Col. Slifer was one of the earliest members of the A. R. E. A., being the twenty-first member. He had been active in its work throughout its history and was a member of the Committee on Economics of Railway Labor at the time of his death.

An Inspection of Steel Ties

The Tri-City Steel Tie Corporation, St. Louis, is arranging to conduct a party to inspect an installation of 306 of its ties in a high speed main track of the Chicago & Alton, at Robey St., Chicago, leaving the Van Buren St. Station of the Illinois Central at 12:15 today. These ties were installed on this track over three years ago and an opportunity is now afforded to inspect them after this exacting service. The party will return to Van Buren St. by 1 o'clock. All interested railway men are invited to make this trip.

Many Erie Men Attend Convention

The officers of the Erie have arranged for every division engineer and almost every supervisor on the system to visit the convention and exhibit for at least a day. Half of the division engineers and supervisors were present at the meeting yesterday and the remainder will come to-day.

New Committee Chairmen of the A. R. E. A.

Only five of the 22 regular and 2 special committees of the American Railway Engineering Association have been under the leadership of new chairmen during the past year. In the case of one of these, the Committee on Track, the present chairman, W. P. Wiltsee, is completing the unexpired portion of the term of John R. Leighty, the regular chairman, appointed last spring, and who resigned during the year. Mr. Wiltsee was vice-chairman previously. He has taken an active interest in track work on the Norfolk & Western, on which road he is assistant to the chief engineer. His interest to track matters extends to the Roadmasters' and Maintenance of Way Association, in which he has taken an active part for some time. During the last two years he has served as an officer in that organization. Mr. Wiltsee has given considerable time to original studies of track matters, one of which has been to arrive at an analytical determination of rail renewals through measurements of rail wear.

George J. Ray, the new chairman of the Committee on Rail, is essentially a student and one of his particular hobbies is improvement in the quality of rail. Consequently his selection as chairman of this important committee is a logical one. As chief engineer of the Delaware, Lackawanna & Western, he has been responsible for a large amount of constructive work in the study of rail wear and rail failures. One practice in particular for which he is responsible on that road is the segregation of the rails laid in the track according to heats, so that it is possible to keep a careful history of each heat of rails rolled for this road. Under his supervision the Lackawanna has been a pioneer in the use of screw spikes and heavy tie plates, his studies along this line having been the subject of an important bulletin published by the association. Although track matters seem to have taken a very large part of his attention, Mr. Ray commands no little distinction as the chief engineer of the Lackawanna during the inception, prosecution and completion of the



W. H. Hoyt
W. P. Wiltsee

G. J. Ray
B. H. Mann

W. H. Finley
C. M. Taylor

New Committee Chairmen of the A. R. E. A.

world famous Tunkhannock viaduct. At the present time he is on leave of absence in order to serve as engineering assistant to the director of the Eastern region. Aside from the important part he has taken in association committee work, he has served a term as director.

The appointment of C. M. Taylor as chairman of the Committee on Wood Preservation is another illustration of the close co-operation between the American Railway Engineering Association and other organizations specializing in different branches of work carried on by this Association. Mr. Taylor has been an active and valuable member of the American Wood Preservers' Association for a number of years, being one of its vice-presidents at the present time. His position as superintendent of treating plants for the Central Railroad of New Jersey and the Philadelphia & Reading at Port Reading, N. J., makes him eminently fit for leadership of the Committee on Wood Preservation at a time when that industry is passing through a marked transition.

The Committee on Yards and Terminals is headed this year by B. H. Mann, signal engineer of the Missouri Pacific. While his training has been largely along the line of signaling his railroad experience has been so varied, covering Eastern and Western roads both large and small, and he has always been given to studying his problems from a broad viewpoint, that he is in fact well chosen for leadership of this committee. He has, however, taken a very active interest in signal matters, having served as a member of the Railway Signal Association of which he was president in 1912.

The chairmanship of the rather prosaic Committee on Rules and Organization is held this year by W. H. Finley, formerly chief engineer of the Chicago & North Western, and now president of the corporate organization of that road. Mr. Finley's interests are varied and this is only one of a large number of activities in which he plays an important part.

The new chairman of the Committee on Wooden Bridges and Trestles is W. H. Hoyt, who succeeds to the leadership of the committee from the position of vice-chairman. He is assistant chief engineer of the Duluth, Missabe & Northern, where he has had an opportunity to obtain an extended experience in trestle work in connection with the design, construction and maintenance of large ore docks. Mr. Hoyt is an active member of the association, but his interest in engineering society matters is not restricted to this body, since he is also active in the work of the Duluth engineering societies.

Orders for Steel Rails in Prospect

The committee representing the steel manufacturers will hold a conference in Washington on Wednesday with the Industrial Board of the Department of Commerce, which is seeking the co-operation of the industries in an effort to readjust prices. If a satisfactory price is agreed upon, the Railroad Administration will place an initial order for 500,000 tons of rails. Steel companies have already offered a reduction of $5 under the prices set last year—$55 for Bessemer and $57 for open hearth—but the Railroad Administration wants lower prices.

Director-General Hines held a conference in New York on Monday with the regional directors and also with some of the bankers regarding the plans for financing the Railroad Administration's debts to the railroad companies. A further conference will be held with the railway executives in Washington when the director-general is expected to announce definitely the plan for issuing warrants for part of the amounts due to the railroad companies.

A. R. E. A. Registration

The following is the registration of the members and guests at the convention of the American Railway Engineering Association on yesterday, the opening day:

Members

Abbott, F. E., Insp. Eng., Lackawanna Steel Co., Buffalo, N. Y.
Allen, L. J., Ch. Eng., Ann Arbor R. R. Co., Owosso, Mich.
Ambrose, J. R. W., Chief Eng., Toronto Term. Ry., Toronto, Ont., Canada.
Ames, Azel (in military service).
Angerer, Victor, Pres. Wm. Wharton Jr. & Co., Inc., Easton, Pa.
Angier, F. J., Supt. Tim. Pres., B. & O. R. R., Baltimore.
Armour, Robert, Mas. Eng., Grand Trunk Ry., Montreal, Can.
Armstrong, H. J., Asso. Prof. C. E., Armour Inst., Chicago, Ill.
Atwood, J. A. (Director), Chief Eng., P. & L. E. R. R., Pittsburgh, Pa.
Auten, J. C., Prin. Asst. Eng., Penna. R. R., Wilmington, Del.
Bailey, A. R., Asst. Prof., Univ. of Mich., Ann Arbor, Mich.
Baldridge, C. W., Asst. Eng., A. T. & S. F. Ry., Chicago.
Baldwin, A. S. (Past-President), Vice-Pres., I. C. R. R. Co., Chicago.
Baldwin, Hadley, Asst. Ch. Eng., C. C. C. & St. L. Ry., Cincinnati, O.
Baldwin, R. A., Asst. Eng., C. N. R., Toronto, Canada.
Ballard, E. E., Asst. Eng., A. T. & S. F. Ry., Chicago.
Balliet, H. S., Asst. Term. Mgr., Gr. Cen. Ter., and Sig. Eng., N. Y. C. R. R., New York.
Baluss, F. C., Eng. B. and B., D. M. & N. Ry., Duluth, Minn.
Bardwell, R. C., Asst. Eng., M. P. R. R, St Louis, Mo.
Barnes, O. F., Div. Eng., Erie R. R., Jersey City, N. J.
Barrett, J. E., Supt. Trk. B. & B., L. & H. R. R., Warwick, N. Y.
Barrett, W. C., Div. Eng., Lehigh Valley R. R., Sayre, Pa.
Barry, G. R., Div. Eng., Penna. Lines, Chicago.
Barry, H. B., Dist. Eng., St. L.-S. F. R. R., Springfield, Mo.
Bates, Onward, Con. Eng., Chicago.
Beahan, Willard, First Asst. Eng., N. Y. C. R. R., Cleveland, Ohio.
Beall, L. L., Chief Eng., A. B. & A. R. R., Atlanta, Ga.
Beckett, F. T., Eng. M. of W., C. R. I. & P. Ry., El Reno, Okla.
Bell, Gilbert J., Eng. Western district, A. T. & S. F. Ry., Topeka, Kan.
Beugler, Edwin J., Con. Eng., Westinghouse, Church, Kerr & Co., New York.
Beye, John C., Oak Park, Ill.
Blum, Bernard, Div. Eng., Nor. Pac. Ry., St. Paul, Minn.
Boardman, Francis, Div. Eng., Elec. Div., N. Y. C. R. R., New York, N. Y.
Bond, F. L. C., Chief Eng., G. T. Ry., Montreal, Can.
Boyd, G. E., Div. Eng., D. L. & W. R. R., Buffalo, N. Y.
Breckinridge, W. L., Chief Eng., C. B. & Q. R. R., Chicago, Ill.
Brenner, Geo. H. (Treasurer), Dis. Eng., Bureau of Valuation, I. C. C., Chicago.
Brown, A. V., Eng. M. W., Lake Shore Electric Ry., Sandusky, Ohio.
Briggs, Z. M., Asst. Eng., P. R. R., Pittsburgh, Pa.
Brown, E. H., Supery. B. & B., N. P. Ry., Minneapolis, Minn.
Brown, H. C., Jr., Chicago.
Brown, H. W., Asst. Div. Eng., Penna. Lines, Cleveland, O.
Brumley, D. J., Chief Corp. Eng., I. C. R. R. Co., Chicago.
Brunner, John, Asst. Insp. Eng., Ill. Steel Co., Chicago.
Buehler, Walter, Con. Eng. Wood Pres., Barrett Co., Chicago, Ill.
Burgess, G. H., Chairman Val. Comm., D. & H. Co., Albany, N. Y.
Burke, M. J., Asst. Eng., Big Four Ry., Indianapolis, Ind.
Burns, J. F., Asst. Eng. M. W., L. & N. R. R., Louisville, Ky.
Burpee, Moses, Ch. Eng., B. & A. R. R., Houlton, Me.
Burrell, Chas. F., Eng. M. of W., K. & I. T. R. R., Louisville, Ky.
Burton, W. J., Asst. Eng., Mo. Pac. R. R., St. Louis, Mo.
Campbell, J. L. (Director), Ch. Eng., E. P. & S. W. R. R., El Paso, Tex..
Carpenter, H. R., Chief Eng., M. P. R. R., St. Louis, Mo.
Chandler, Charles, Asst. Bridge Eng., I. C. R. R., Chicago.
Christian, W. A., Senior Civil Eng. in charge of Track and Roadway, I. C. C., Chicago, Ill.
Churchill, Chas. S. (Past-President), Vice-Pres., Norfolk & Western Ry. Co., Roanoke, Va.

Clark, W. A., Chief Eng., D. & I. R. R. R., Duluth, Minn.
Clements, M. F., Bridge Eng., Nor. Pac. Ry., St. Paul, Minn.
Cleveland, G. C., Chief Eng., N. Y. C. R. R., West of Buffalo, Cleveland, Ohio.
Coburn, Maurice, Supervy. Eng., Penna. Lines, Indianapolis.
Cochran, C. W. (In Military Service).
Conner, J. K., Chief Eng., L. E. & W. R. R., Indianapolis.
Cook, C. C., Chief Dept. of Personnel, B. & O. R. R., Baltimore, Md.
Coon, C. J., Eng. Gr. Cen. Terminal, N. Y. C. R. R., New York.
Corthell, A. B., Chief Eng., B. & M. R. R., Boston.
Courtenay, W. H. (Director), Chief Eng. L. & N. R. R., Louisville, Ky.
Cox, J. B., Cons. Eng., Chicago, Ill.
Coyne, C. S., Asst. Eng., Grand Trunk Ry., London, Ont., Canada.
Crumpton, Arthur, Val. Eng., G. T. Ry., Montreal, Canada.
Curd, W. C., Chicago.
Curtis, L. G., Chief Eng., B. & O. R. R. Co., Baltimore, Md.
Curtiss, L. B., Asst. Eng., Nor. Pac. Ry., St. Paul, Minn.
Cushing, W. C. (Past-President), Ch. Eng. M. of Way, Pa. Lines, Pittsburgh, Pa.
Darden, W. L., Eng. Bldgs., S. A. L., Norfolk, Va.
Davidson, Geo. M., Chemist & Eng. Tests, C. & N. W. Ry., Chicago.
Davis, A. L., Office Eng., I. C. R. R., Chicago, Ill.
Davis, Garrett, Asst. Eng., C. R. I. & P. Ry., Kansas City, Mo.
Deimling, J. F., Ch. Eng., M. C. R. R., Detroit, Mich.
Delamere, C. T., Eng. Const., C. P. R., Montreal, Canada.
Dick, H. B., Dist. Val. Eng., B. & O. R. R., Cincinnati, Ohio.
Didier, Paul, Prin. Asst. Eng., B. & O. R. R., Pittsburgh, Pa.
Dillenbeck, Clark, Asst. Ch. Eng., P. & R. Ry., Philadelphia, Pa.
Dodgson, F. L., Con. Eng., Gen. Ry. Sig. Co., Rochester, N. Y.
Donahey, J. A., Cleveland, Ohio.
Dorley, A. F., Eng. M. W., East. Lines, M. P. R. R., St. Louis, Mo.
Dorrance, W. T., Chief Dr., N. Y. N. H. & H. R. R., New Haven, Conn.
Douglas, H. T., Jr., Chief Eng., C. & A. R. R., Chicago.
Doupe, J. L., Chief Surveyor, C. P. R., Winnipeg, Canada.
Downs, L. A. (Director), Asst. Gen. Mgr., I. C. R. R., Chicago, Ill.
Draper, E. S., Eng. Str., B. & A. R. R., Boston, Mass.
Dunham, Chas. A., Signal Eng., G. N. Ry., St. Paul, Minn.
Dyke, R. L., Div. Eng., N. Y. S. & W. R. R., Elmira, N. Y.
Eaton, W. T., Eng. Dept., St. L. S. W. Ry., Tyler, Tex.
Eck, W. J., Signal and Electrical Supt., Sou. Ry., Washington, D. C.
Edgerton, H. H., Asst. Eng., C. G. W. R. R., Chicago, Ill.
Edwards, W. R., Sen. St. Eng., I. C. C., Washington, D. C.
Ehrke, John, Supt., Grand Trunk Ry., Battle Creek, Mich.
Elder, J. D., Div. Eng., M. C. R. R., Niles, Mich
Elliott, W. H., Signal Eng., N. Y. C. R. R., Albany, N. Y.
Ellis, G. E., Sig. Eng., Div. of Safety, I. C. C., Washington, D. C.
Ellsworth, F. H., Div. Eng., N. Y., N. H. & H. R. R., New Haven, Conn.
Entwisle, E. D., Ch. Eng., J. & S. C. R. R., Johnstown, Pa.
Ericson, E. G., Prin. Asst. Eng., N. W. Sys. Pa. Lines, Pittsburgh.
Evans, W. T., Asst. Eng., C. & A. R. R., Chicago.
Fair, J. M., Asst. Supr., Penna. R. R., Philadelphia, Pa.
Fairbairn, J. M. R., Ch. Eng., Can. Pacific Ry., Montreal, Canada.
Fairchild, Dennison, Div. Eng., Nor. Pac. Ry., Duluth, Minn.
Faucette, W. D., Chief Eng., S. A. L. Ry., Norfolk, Va.
Felt, C. W. F., Chief Eng., Santa Fe Ry. System, Chicago.
Ferguson, H. K., President, Ferguson Co., Cleveland, Ohio.
Fitzpatrick, P. D., Ch. Eng., Cent. Vt. R. R., St. Albans, Vt.
Ford, C. F., Supr. of T. & T. Dept., C. R. I. & P. Ry., Chicago, Ill.
Ford, R. H., Prin. Asst. Eng., C. R. I. & P. Ry., Chicago, Ill.
Fox, J. W., Corp. Ch. Eng., Cen. of Ga. Ry., Savannah, Ga.
Frink, E. A. (Director), Principal Asst. Eng., S. A. L. Ry., Norfolk, Va.
Fritch, E. H. (Secretary), Chicago.
Fulks, E. B., Vice-Pres., Amer. Tar Products Co., Chicago, Ill.
Gardner, W. H., Jr., Ch. Eng., G. & S. I. R. R., Gulfport, Miss.
Garman, H. O., Con. Eng., Ind. R. R. Com., Indianapolis, Ind.
Garner, R. D., Eng. Const., S. N. E. R. R., Providence, R. I.
Gaut, J. B., Supt. B. and B., Grand Trunk Ry., Chicago.
Gennet, C. W., Jr., Eng., R. W. Hunt & Co., Chicago, Ill.
Gersbach, Otto, E. M. W., Ind. Harbor Belt R. R., Gibson, Ind.
Glass, R. G., Asst. Insp. Eng., Ill. Steel Co., Chicago, Ill.
Godlove, Geo. W., Jr., Asst. Eng., A. T. & S. F. Ry., Chicago.
Going, A. S., Eng. Const., Grand Trunk Ry., Montreal, Can.
Gold, M. H., Div. Eng., S. A. L. Ry., Savannah, Ga.
Goldstraw, Walter, Asst. Architect, Grand Trunk Ry., Montreal.
Grime, E. M., Supv. B. & B., Nor. Pac. Ry., Dilworth, Minn.
Griswold, H. C., Louisville, Ky.
Haas, F. M., Railroad Spec., The Austin Co., Cleveland, O.
Hale, H. E., Group Eng., Pres. Conf. Com., New York City.
Hamilton, Paul, Eng. Tr. & Roadway, Big Four Ry., Cincinnati.
Hand, G. F., Asst. Eng., N. Y. N. H. & H. R. R., New Haven.
Hanna, John V., Ch. Eng., K. C. Ter. Ry., Kansas City, Mo.
Hannaford, A. R., Asst. Eng., Grand Trunk Ry., Hamilton, Ont.
Harman, H. H., Eng. Bridges, B. & L. E. R. R., Greenville, Pa.
Harris, G. H., Asst. Ch. Eng., M. C. R. R., Detroit, Mich.
Harris, G. W., Staff of President, Ch. Eng., A. T. & S. F. Ry. Co., Chicago.
Harsh, H. H., Div. Eng., B. & O. R. R., Pittsburgh, Pa.
Harvey, W. C., First Asst. Eng., C. G. W. R. R., Chicago, Ill.
Hastings, E. M., Res. Eng., R. F. & P. R. R., Richmond, Va.
Hawk, A. T., Architect, Rock Island Lines, Chicago, Ill.
Haydon, J. D., Roadmaster, L. & N. R. R., Louisville, Ky.
Hayes, Reuben, Str. Eng., Southern Ry., Washington, D. C.
Hazen, H. T., Eng. M. Way, C. N. R., Toronto, Ont., Can.
Hegel, G. W., Ch. Eng., Chicago Junction Ry., Chicago, Ill.
Hemenway, E. O., Asst. Eng., A. T. & S. F. Ry., Chicago.
Hench, N. M., Eng. Tr. Appl., Carnegie St. Co., Pittsburgh.
Hendricks, V. K., Asst. Ch. Eng., St. L.-S. F. and M. K. & T. Rys., St. Louis, Mo.
Hewson, E. G., Div. Eng., G. T. Ry., Toronto, Ont., Can.
Hickey, T. H., Insp. Maint. of Way, M. C. R. R., Detroit, Mich.
Hillary, W. R., Supervising Eng., Penna. Lines, Toledo, Ohio.
Hillegass, E. B., Eng. Roadway, A. C. L., Savannah, Ga.
Holmes, R. L., Eng. Water Service, T. & P. Ry., Dallas, Texas.
Houghton, E. R., Contract Eng., Union Pacific R. R., Omaha.
Hovey, M. H., Con. Eng., Madison, Wis.
Howard, C. P., Senior Civil Eng., Bureau of Val., I. C. C., Chicago.
Howson, E. T., Engineering Editor, *Railway Age,* Chicago, Ill.
Hoyt, C. B., Supt. Tr. Maint. and Const., N. Y. C. & St. L. R. R., Cleveland, Ohio.
Hoyt, W. H., Asst. Ch. Eng., D. M. & N. R. R., Duluth, Minn.
Ibsen, Hans, Bridge Eng., M. C. R. R., Detroit, Mich.
Irving, T. T., Ch. Eng., Grand Trunk Ry., Western Lines, Detroit, Mich.
Irwin, A. Chas., Portland Cement Association, Chicago.
Irwin, J. C., Asst. Val. Eng., B. & A. R. R., Boston, Me.
James, W. A., Asst. Ch. Eng., Can. Pac. Ry., Winnipeg, Man.
Johnson, Maro, Care Eng. Dept., I. C. R. R., Chicago.
Johnston, T. S. (In Military Service).
Jones, Paul, Supt., Penna. Lines, Toledo, Ohio.
Kammerer, A. L., Consulting Timber Eng., St. Louis, Mo.
Katte, E. B., Ch. Eng. Elec. Trac., N. Y. C. R. R., New York.
Kenney, E. F., Met. Eng., Cambria Steel Co., Philadelphia, Pa.
Kent, A. S., Chief Eng., C. I. & L. Ry. Chicago, Ill.
Kimble, W. P., Div. Eng., Erie R. R., Marion, Ohio.
King, E. E., Prof. of Ry. Civil Eng., Univ. of Ill., Urbana, Ill.
Kircher, Paul, Ch. Eng., C. F. Massey Co., Chicago.
Knowles, C. R., Supt. Water Service, Ill. Cent. R. R, Chicago.
Kuehn, A. L., Genl. Supt., American Creosoting Co., Chicago.
Lacher, W. S., Asst. Eng. Editor, Railway Age, Chicago.
Lahmer, J. A., Dist. Eng., M. P. R. R., Little Rock, Ark.
Laird, H. G., Eng. Roadway, A. C. Line, Jacksonville, Fla.
Lakin, F. D., Div. Eng., Erie R. R., Meadville, Pa.
Larsson, C. G. E., Asst. Chief Eng., Am. Bridge Co., New York.
Leatherbury, F. W., Div. Eng., G. C. & S. F. Ry., Temple, Tex.
Leckie, A., Loc. Eng., K. C. S. Ry., Grandview, Mo.
Lee, E. H. (Director), Prest., C. & W. I. R. R. Co., and Belt Ry. of Chicago, Chicago.
Lee, Frank, Eng. M. of Way, Eastern Lines, C. P. R., Montreal.
Leffler, B. R., Eng. Bridges, N. Y. C. R. R., Cleveland, Ohio.
Lemond, J. S., Asst. to Ch. Eng. M. of Way and St., Sou. Ry., Charlotte, N. C.
Lewis, C. M., Div. Eng., Erie R. R., Dunmore, Pa.
Lewis, E. R., Ch. Eng., D. S. S. & A. Ry., Duluth, Minn.
Lindsay, C. E. (Director), Member Board of Railroad Wages and Working Conditions, U. S. R. A., Washington, D. C.
Little, J. G., Asst. Eng. Editor, *Railway Age,* New York City.
Lloyd, H. A., Asst. to Supt. Maint., Erie R. R., Jersey City, N. J.
Long, M. A., Asst. to Ch. Eng., B. & O. R. R., Baltimore, Md.
MacFarland, H. B., Eng. of Tests, A. T. & S. F. Ry., Chicago.
Mackenzie, A. C., Eng. M. Way, C. P. R. R., Winnipeg, Manitoba.
Macomb, J. de N., Office Eng., Santa Fe Ry., Chicago.
Maischaider, A. F., Eng. M. of Way, Big Four Ry., Mattoon, Ill.
Mann, B. H., Signal Eng., Mo. Pac. R. R., St. Louis, Mo.
Masters, F. H., Div. Eng., E. J. & E. Ry., Gary, Ind.
McBride, J. S., Eng. Val., C. & E. I. R. R., Chicago, Ill.
McComb, R. J., Supt. Tracks, W. & L. E. R. R., Brewster, Ohio.
McCooe, David, Supt. of Track, G. T. Ry., Toronto, Ont., Can.

McGuigan, Francis H., Jr., Asst. Eng., Grand Trunk Ry., Montreal, Can.
McLeod, H. W., Asst. Eng., C. P. R., Winnipeg, Man., Canada.
McNab William (Past-President), Chairman, Val. Com., G. T. Ry. System, Montreal, Canada.
McQuarrie, M. K., Eng., Dominion Atlantic Ry., Kentville, Nova Scotia.
McVay, C. M., Eng. M. of W., K. & M. Ry., Charleston, W. Va.
Meade, J. M., Special Eng., A. T. & S. F. Ry., Topeka, Kan.
Michel, Wm., Ch. Eng., Hocking Valley R. R., Columbus, Ohio.
Mills, A. L., Receiver, Ft. S. & W. R. R., Ft. Smith, Ark.
Mitchell, Geo. A., Supt. B. & B., G. T. Ry., Toronto, Ont., Can.
Mitchell, L. A., Supt. Roadway and Bldgs., Union Tr. Co. of Ind., Anderson, Ind.
Mock, J. C., Sig.-Elec. Eng., M. C. R. R., Detroit, Mich.
Modjeski, R., Con. Engineer, Chicago, Ill.
Montzheimer, A., Ch. Eng., E. J. & E. Ry., Joliet, Ill.
Morgan, O. K., Eng. in Charge, C. C. & O. Ry., Johnson City, Tenn.
Morphy, L. G., Des. Eng., B. & A. R. R., Boston, Mass.
Morrison, E. C., Div. Eng., Sou. Pac. Co., San Francisco, Cal.
Morrison, W. W., Eng. M. W., P. S. & N. Ry., Kittanning, Pa.
Morse, C. A. (President), Asst. Dir. of Operation, Engineering and Maintenance, U. S. R. A., Washington, D. C.
Motley, P. B., Eng. Bridges, C. P. R., Montreal, Can.
Mountain, G. A., Ch. Eng., Can. Ry. Commission, Ottawa, Can.
Murr, L. A., Asst. Eng., S. A. L., Portsmouth, Va.
Murray, W. A., Div. Eng., New York Central R. R., Albany.
Nagel, John R., Gen. Roadmaster, Mo. Pac. R. R., Nevada, Mo.
Neubert, John V., Eng. Track, N. Y. C. R. R., New York.
Newbegin, P. C., Maint. Eng., B. & A. R. R., Houlton, Me.
Newhouse, C. E., Asst. Div. Eng., B. & O. S. W. R. R., Seymour, Ind.
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The Thirteenth Engineers (Railway)

Friends of officers and men in the 13th Engineers (railway), which was organized at Chicago early in 1917 and which includes a number of A. R. E. A. members, will be interested in the following account of the experiences of this regiment and the part it played in the great war. This was prepared from a memorandum written by Major W. G. Arn. The regiment is composed of men from roads running west and south from Chicago.

The 3d Reserve Engineers, afterwards the 13th Engineers (railway), was organized at Chicago and received preliminary training on the Municipal Pier in that city. On arrival in France the regiment was located in Chalons-sur-Marne for one month, where a preliminary study of French track maintenance of way methods was made. In September, 1917, the regiment was transferred to the Second French Army in the Department of the Meuse, with headquarters at Fleury-sur-Aire, to take over the maintenance and operation of the 6 Bis line of military railroad. The maintenance of this line was assumed in a period of very heavy rainfall, which caused a flooding of the Aire and other valleys in the territory covered by the 6 Bis line, and caused numerous washouts.

The 13th Engineers having been organized without track laborers, the French assigned to this service under the 13th Engineers two companies of Indo-Chinese troops from the French province of Tonkin. Being intelligent, these men quickly learned the various features of track maintenance and made an excellent force. They are very sober, industrious and amenable to discipline, but small of stature. The personal and camp cleanliness of these troops was remarkable.

At the time the 13th Engineers took over the 6 Bis line it consisted of a main line 60 kilometers long from Sommeille-Embranchment to Dugny-Grand-Vaux with 13 kilometers from Fleury to Souilly double tracked, and two single track branches, one from Fleury to Clermont-en-Argonne and the other from Souilly to Dombasle. At that time the work of constructing second track from Sommeille-Embranchment to Fleury was under way, this work being handled entirely by the 5th French Engineers.

The amount of railroad construction work in the Second French Army sector having increased to such an extent that the force of the 5th French Engineers in that territory were inadequate for all of the supervision, the 13th Engineers were assigned to take charge, under the direction of Commandant De Lastours of the 5th French Engineers, of some of the work, the labor to be furnished by the French Second Army.

For building an artillery loading and unloading yard at LaCousance, Madagascar negro labor troops of the French Colonial Army were assigned, the work being directed by experienced officers and men of the 13th Engineers. The Madagascar negroes were of very low intelligence, extremely lazy and inefficient. After the work had partially completed the French Army found it necessary to take the Madagascar troops for other service and the job was finished by the band and all men of the 13th who could possibly be spared from other service.

Other construction work of a like nature carried on was the grading and construction of tracks for the ammunition yard at Evres, the grading for a railroad yard at Pierrefitte, the completion of grading for a military railroad between Gimecourt and Pierrefitte, and the erection of a station and camp buildings for the railroad from Loxeville to Pierrefitte.

The grading and track work on that part of the line of railroad from Loxeville to Pierrefitte, which was handled under American supervision, was performed by the Indo-Chinese troops, with the exception of the building erection, which was done exclusively by members of this regiment. At the time the 13th Engineers were asked to take charge of the completion of this work there was no force in the French Army available for the service, so it was decided to transfer the two companies of Indo-Chinese who had been serving on maintenance of way work on the 6 Bis line to this work and replace them on the 6 Bis line with Americans. In the meantime legislation having provided for increased strength in railway regiments, the 13th Engineers was increased to the extent authorized and from the increased force sufficient men were obtained to provide a maintenance force on the 6 Bis line.

During the period of training preliminary to taking over the 6 Bis line the members of the maintenance of way force assisted the French force in repairing cuts in the track caused by enemy shell fire, there being considerable activity of the German artillery and aeroplanes at that period which followed the French attack and advance of the August immediately preceding. During the fall and winter following there was a limited amount of shelling along the line, but in very few cases was the track cut.

The railroad operated and maintained by the 13th Engineers was increased from time to time by the addition of the old lines of the Est Railway from Clermont-en-Argonne to Verdun, from Clermont to St. Menhould, from St. Menhould to the trenches north of Vinne-la-Ville, from Ancemont to Verdun, from Verdun to Conflans, from Ancemont to Lerouville, from Verdun to Sedan, and the 19 Bis military line which, in connection with existing lines of the Est Railway, formed a belt line around the city of Verdun and its suburbs.

Immediately preceding and during the period of the American advance in the territory between the Argonne forest and Verdun the line was cut repeatedly in various places, especially in the Verdun terminal, where there were six separate places that the track was cut in one morning. The general rule in cases of shell fire was that repairs were not made until shelling ceased, except in cases of very urgent need for the track, and in such cases it was necessary to make the repairs under shell fire.

A letter from another member of this regiment, dated Feb. 24 and received last Saturday, indicated that this regiment would be moved from Fleury-sur-Aire about March 15. The record which this regiment has made for itself is indicated by the fact that 9 officers and 22 enlisted men have received the French Croix de Guerre. Since the departure of Col. N. L. Howard recently for America (he arrived in New York on March 12), Major Arn has been in command. Recent press reports indicated that the Thirteenth regiment itself may be expected to return within a few weeks for demobilization after an active service of nearly two years.

Annual Meeting of Appliance Association

President Trees' Address; P. C. Jacobs Is Elected President; Change Made in By-laws

THE ELEVENTH ANNUAL MEETING of the National Railway Appliances Association was held in the Coliseum at 11 o'clock yesterday morning. M. J. Trees, president of the association, in opening the meeting, spoke briefly of the work of the past year and reviewed the developments of the past year. He said:

President Trees' Address

The eleventh annual exhibition opened with every space filled. This would seem fully to justify the change in the floor plans made last year which gave 31 additional exhibit spaces. The registered attendance, including only those visitors who presented passes or railroad transportation cards at our exhibit on Monday, 1918, was 2,942, and on Monday, 1919, was 3,612. This would seem to indicate a large attendance of railroad men this year.

In further patriotic support of the government, your board of directors during the year authorized the purchase, from the surplus, of $3,000 Third Liberty Loan Bonds and $3,000 Fourth Liberty Loan Bonds.

It was decided best that the charge for exhibit spaces for this exhibition should remain the same as last year, notwithstanding the present higher cost of all commodities that enter into a display of this kind. This naturally resulted in absorbing a part of our surplus. In this connection your board of directors, after passing through the uncertain times of the last two years, is of the unanimous opinion that a substantial financial surplus should always be maintained to assure the stability of our organization. Our director of exhibits will explain to you briefly how you, as exhibitors of this association, can help to reduce the operating expenses and thus obviate the necessity of establishing abnormally high rates on exhibit spaces.

It has been suggested that some distinction be made between an exhibiting and a non-exhibiting member of our association. This change would necessitate an amendment to our present constitution and by-laws which is to be presented for such action as you may wish to take.

Our secretary mailed out this year more than 10,000 invitations and passes to railroad men and others who might be interested in our exhibition. The principal reason for using passes is to restrict the attendance as much as possible to those who may have some interest in the products of our exhibitors. In the past there has been some needless expense and duplication in the distribution of passes, due to a few of our members mailing a large number broadcast to lists of railroad men who, no doubt, have already been officially invited and furnished passes by our own secretary.

Invitations were also sent this year to a list of the foreign consuls located in Washington, as well as to a number of foreign commissions who are now traveling in this country studying railroad problems.

In closing, permit me to express to you the appreciation of your board of directors for the earnest co-operation that our members have shown during the past year. I also wish to thank personally the members of the board of directors and our most efficient secretary, Mr. Kelly, for the splendid way they have all worked together in handling the affairs of the association for this exhibition.

Treasurer's Report

C. W. Kelly, the secretary-treasurer, made the following report: While this year will be operated at an estimated loss of $5,000, it is not unexpected, because while floor space and membership remained the same, the expenditures have been greatly increased in practically every channel. There is a marked advance on labor, on decorations and installation. There were also some exhibits which came in at a late hour which had to be handled on over-time and were further belated due to rainy, bad weather.

With the general high prices which are now in existence and have been during the formation and construction of this exhibition, the treasurer feels gratified indeed to be able to make a report with as little loss as herein indicated.

Secretary's Report

Mr. Kelly also presented a report as secretary of the National Railway Appliances Association, in which he referred to the changes which had been made at the Coliseum this year in the handling of exhibits. He said, in part:

At the time of awarding space, the floor contained, as last year, 267 spaces, of which all were awarded with the exception of some 36. The entire floor plan, however, was filled by January 2. There were a few necessary changes which were occasioned due to business conditions and the floor plan was completely filled, as is now represented on the floor of the exhibition building, about the first of March.

There are at this time 36 non-exhibiting memberships and some 41 requests for space which do not hold either membership or space contracts. This is a very unusual showing to the credit of the association in the light of existing conditions.

We were successful this year in securing the Coliseum building so that we could locate the exhibits and fixtures on Tuesday, March 10, but due to lateness of shipment by a number of exhibitors, together with the lateness of the arrival of Chicago exhibits, there was received at the Coliseum building very few exhibits until Thursday noon, a greater part of these being exhibits which had arrived early and were held in storage for delivery to the Coliseum. The great bulk of our exhibits arrived Saturday morning and up to a late hour Sunday night. This occasioned a great deal of confusion and has been responsible for much additional unnecessary expense.

The enrollment has been carried out exactly along the lines of policies established last year and at noon on Monday we had registered and delivered badges to 65 more of our members than for the total enrollment of last year.

We have inaugurated this year a new style of door pass for checking incoming exhibits, which has been very successful, indeed, in handling the exhibits at the door. We will inaugurate a new exit pass which will allow the exhibitor to give a complete list of his several packages and parcels, and enable him to secure a receipt for his exhibit, and at the same time give to the association an original receipt with an attached coupon which may be used by the exhibitor in case some cartage company should have to call for the exhibit.

The arrangement for bills of lading, both for freight and express, will be handled exactly as heretofore, and the J. M. Taft Cartage Company, as well as the express officials, will occupy the present office of the secretary,

where way bills for both freight and express may be properly filled out.

The secretary feels that the operation of our restaurant this year has been up to the standard of previous years and that the management has tried to render us favorable service. It must, however, be borne in mind that because of the few exhibitions held in the Coliseum this year it was necessary for the catering company to move in every article for this service on short notice.

Report of Director of Exhibits

As director of exhibits Mr. Kelly made a number of suggestions as to how the handling of the exhibits at the Coliseum could be improved. Much trouble is now experienced by the fact that the exhibitors do not ship the exhibits in sufficient time. The bills-of-lading should be sent to the secretary's office and local exhibitors should be more prompt in getting their exhibits to the Coliseum. The delay in shipping the exhibits causes a heavy extra expense in delivering them and setting them up. Much expense could be avoided if exhibitors could study them out carefully in advance and advise the Association as to the exact amount of work that would be required. To improve the appearance of the exhibit it is important that standard signs be adhered to; the height of these should not exceed 5 ft. 4 in.

In closing his report Mr. Kelly directed attention to the fact that the Coliseum must be turned back "broom clean" for other occupancy on Saturday night, March 22. As the exhibit closes at 6 o'clock on Thursday evening, the management will require about one-half hour to remove the columns, floors and wires for electric work, after which the boxes will be furnished and work may proceed in crating as late as the exhibitors care to stay.

Change in By-Laws

The action of the board of directors was approved in making certain changes to the by-laws defining the difference between associate and active members and recommending that the word "active" be inserted at various places in the by-laws. For instance, it is provided that the directors must be active members; active members shall be entitled to one vote; 25 per cent of the active members shall constitute a quorum; and the constitution may be amended by affirmative vote of the majority of all active members.

Article III relating to membership was changed to read as follows:

Section 1. The membership of this association shall be divided into two classes, active members and associate members, who shall be corporations, firms and individuals engaged in the manufacture or sale of railway materials, engineers or contractors engaged in railway construction and publishers of the technical press and others interested in railways.

Section 2. Active membership can only be held by an individual, firm or corporation who has applied for and has been assigned space for the annual exhibition of this association.

3. An associate membership shall have all the rights of members except that of voting and holding office.

Election of Officers

The nominating committee, of which H. C. Holloway was chairman, reported the following nominations for officers; the nominees were unanimously elected: President, P. C. Jacobs, H. W. Johns-Manville Co., Chicago; vice-president, J. B. Strong, Ramapo Iron Works, Hillburn, N. Y.; treasurer, C. W. Kelly, Chicago, Ill.; directors, E. A. Johnson, Duff Mfg. Company, Pittsburgh, Pa.; and Lieutenant Commander G. C. Isbester, Rail Joint Co., Chicago.

A. R. E. A.—A. R. A.

The American Railway Engineering Association is the only one of the seven associations in the railway field which participated in the negotiations leading to the amalgamation of the primary organizations into the American Railroad Association, which still retains its individual identity. At the same time it is cooperating in the organization and work of the newly-formed composite association in every way possible. The fact that this has been accomplished successfully reflects to the credit of the officers of the engineering association who have represented that organization in the negotiations.

The suggestion that the leading organizations in the steam railway field coordinate their activities through one common association is not a new one. Three or four years ago a committee of the American Railway Association approached the American Railway Engineering Association in common with a number of similar societies with a plan leading to their voluntary affiliation with that association, but nothing came of the suggestion. Early last spring, following the passing of the roads under government control, the suggestion was revived and Arthur W. Thompson, acting president of the American Railway Association, called a conference of representatives of seven of the leading railway associations, including the A. R. E. A. and the R. S. A., at which it was stated that the government was favorable to the organization of one central railway association to which it could refer matters for expert information in diversified fields.

Although the American Railway Engineering Association was not the only organization approached on this subject whose membership was individual as contrasted with representative or official constituency, its officers emphasized the fact that they had no power to go into any arrangements which would merge their activities with those of any other association and take away its independence of action without expressed authorization from the members. Accordingly on July 25, C. A. Morse, as president of the American Railway Engineering Association, referred the question of the proposed amalgamation to the members of the society for an expression of opinion. Up to September 5, 1918, when the replies were tabulated, out of 668 replies received 577, or over 87 per cent, voted against the amalgamation, while among the 83 who voted in favor of the measure were several who qualified their votes with the notation "for the duration of the war."

With this expression of the attitude of the membership before it, the board of direction replied to the American Railway Association renewing the suggestion which it had made on May 14, 1918, that the associations now in existence constitute sections of a proposed American Railway Association or Congress; that each section should be responsible for work assigned and should report through its regular officers to the congress; that the congress should be organized with a director representing each section; that the president be either appointed by the Director-General or elected by the boards of direction, and that there be a general secretary of the congress with such assistance as may be necessary. It was further pointed out that as the American Railway Engineering Association is an individual organization, maintained from the dues of its members and from the sale of its publications and therefore self-supporting, no savings to the railway companies would be effected by the proposed amalgamation.

The plan which was suggested is in a general way the one which has been adopted in so far as the American Railway Engineering Association is concerned. In the

meantime the six other associations to whom the question had been presented had expressed their willingness to participate in the proposed amalgamation. As a result the Director-General issued Circular No. 70 on January 10, 1919, creating the American Railroad Association for the period of the war, "to provide a responsible channel through which the Director-General may obtain recommendation for the advancement of railroad practice."

The activities of the other organizations were merged with and made subsidiary to the American Railroad Association by the provisions of this circular. Membership in the amalgamated association is by roads. Active membership is limited to roads under federal control and 100 miles or over in length. A line is entitled to one membership for each 1,000 miles of road or fraction thereof. The American Railroad Association is divided into five sections, operating, engineering, mechanical, traffic and transportation. The engineering section is further subdivided into three divisions, (1) location, construction and maintenance, (2) signalling, (3) electrical working.

Thus officially the American Railway Engineering Association and the engineering section of the American Railroad Association are entirely separate. However, while the engineering section has been organized along the lines of the other sections, the personnel of its officers duplicates that of the American Railway Engineering Association to such an extent as to insure unity of work and to secure for the American Railroad Association the benefit of the united committee and association work of the A. R. E. A.

The by-laws of the American Railroad Association provide that each section shall be governed by a chairman, a vice chairman and a general committee. At a meeting of the engineering section in New York on February 20 a temporary organization was effected to function until the annual meeting of the American Railroad Association in November. At that meeting the following officers were selected: Earl Stimson, superintendent of maintenance, B. & O., chairman; R. E. Trout, signal engineer, S. L.-S. F., vice chairman; members of general committee, H. R. Safford, engineering assistant to regional director, Central Western region; R. E. Parsons, chief engineer, Erie; C. A. Morse, assistant director, division of operation (in charge of maintenance and engineering), U. S. Railroad Administration; C. F. W. Felt, chief engineer, A., T. & S. F.; J. T. Atwood, chief engineer, P. & L. E.; F. P. Patenall, signal engineer, B. & O.; W. H. Elliott, signal engineer, New York Central; George Gibbs, chief engineer electric traction, Long Island, and E. B. Katte, chief engineer electric traction, New York Central. Messrs. Stimson, Safford and Atwood were selected to represent the American Railway Engineering Association; Messrs. Parsons, Morse and Felt to represent the maintenance committee of the American Railway Association; Messrs. Trout, Patenall and Elliott to represent the Railway Signal Association, and Messrs. Gibbs and Katte to represent the Electrical Working Committee of the American Railway Association. Incidentally all of the members of the committee are members of the American Railway Engineering Association.

As an indication of the close cooperation which will exist between the American Railway Engineering Association and the engineering section of the American Railroad Association, E. H. Fritch, secretary of the former organization, will also become secretary of the engineering section of the composite association and will consolidate his office force with that of the larger organization in the Transportation Building, Chicago.

The Chicago Terminal Situation *

One of the important factors contributing to the failure of terminal operations to show the same degree of efficiency that has characterized some of the other departments of railroad operation has been the application of the competitive principle to terminal developments and operations. The railroad systems of our country have been built up on the competitive principle. It was the effort of each railroad company to place itself so that it would be on a parity with its competitors in terminal developments as well as in other matters.

But the application of such a principle as applied to large centers like Chicago falls of its own weight, since it is obvious that each of the railroads cannot secure, maintain and operate adequate terminal facilities in each and every section or district within metropolitan terminal areas where important freight traffic is to be had. The effort to do so has resulted in complications which have increased the cost of terminal operations and in developments which have retarded or placed obstacles in the way of the logical development of the city.

With the entry of our country into the European conflict and the necessity of coordinating all our resources in a manner to obtain a maximum of efficiency, it was early seen that it would be necessary to remedy the very serious condition presented in the competitive operation of our railroads. A sincere effort on the part of the railroads to cooperate on their own initiative was ineffective because of the limitations of existing laws and other conditions. It, therefore, became necessary for the government to take over the operation of the railroads during the emergency.

Theoretically, with all restrictions removed, the government should have been able—so far as existing facilities would permit—to approximate the ideal consolidation of our railroad properties. That this has not been done has been due to many factors, principal of which were the war conditions which had very much disturbed the normal orderly flow of business and traffic.

Nevertheless, out of the temporary control—and in the absence of legislation to the contrary we must assume it is temporary control—has grown a recognition of the desirability of retaining at least those particular features of cooperative operation that are consistent with private control of railroad properties. Certainly today the proposition of applying the cooperative principle to the solution of terminal problems is no longer received as visionary or impractical, and the fact that railroad officers are accepting this principle is in evidence.

From discussions so far published it would seem that the railroads would emerge from the present governmental control under one of the following forms of management:

A. The management of the entire transportation facilities of the country as a unit, somewhat after the manner the railroads are now being operated.

B. The forming of group managements within natural geographic or traffic divisions or regions with or without a central governing board to facilitate interchange between groups.

C. The return to the original individual managements, but with provisions for pooling earnings and expenses—under some form of governmental regulation.

D. The return of the railroads to their individual managements with the pre-war status unchanged.

The alternative treatments of the general transportation problem have been set down above, not in the order of personal preference, but in the order most desirable from the terminal standpoint. The theoretical correct

*Abstract of a paper presented on March 17, 1919, before the Western Society of Engineers by E. J. Noonan, Chief Engineer, Chicago Terminal Commission.

solution of the terminal problem at Chicago in its entirety would only be possible under a condition in which the entire railroad system of the country was being operated as a whole under a central management—form A given above—because only under such a condition would it be possible to exercise control over a shipment from point of origin to point of destination.

By exercising control over a shipment from origin to destination it is possible to consolidate and route shipments so that a minimum of delay will be incurred in intermediary terminals, and in many instances the shipments may be consolidated and routed so as to entirely avoid large congested terminal areas like Chicago. This of course only applies to commodities which are handled in large volume and particularly to shipments originating in the West and Central West and destined to Atlantic Seaboard points. Where such traffic could not be routed around the Chicago terminal, it could be consolidated so that it would pass through the terminal in solid cuts with a minimum of delay. Even with such a method in operation there would still be a vast amount of freight originating in and destined to Chicago which would have to be handled within the terminal district and the proper coordination and interchange of facilities within the terminal district for the handling of this character of freight is a problem of the very greatest importance.

Should the ultimate treatment of our general transportation system take the form of either "B" or "C" outlined above, it would seem that only through the formation of a terminal company or the pooling of all terminal facilities under one management could a solution of the Chicago terminal problem be obtained. Even then, the same theoretical efficiency that would be possible under form "A" could not be obtained. Should the roads be returned to their individual managements on the pre-war status, it is believed that the impetus given to the idea of cooperative terminal operation has been such that the individual railroads will be willing to take advantage of the mutual benefits to be secured in jointly working out terminal developments especially in the more congested districts.

The railroads approach Chicago from all points of the compass except the Lake Michigan side and within the district there are terminal facilities from some twenty-six railroads which enter the district and some thirteen railroads which lie wholly within the district. During the past few years there has been in operation, at the southwest corner of the terminal area, one of the largest freight yards in the country, and the only yard that acts as a clearing between different railroads. This clearing yard is reached by both the Indiana Harbor Belt and the Western Indiana, over either of which it is possible to reach all of the railroads entering the terminal area. Inside these two belts the Chicago Junction Railroad acts as a partial belt for handling traffic to and from the stock yards and the manufacturing district.

It is believed that with these facilities and the existing facilities of the individual railroads there is sufficient trackage if properly coordinated and used efficiently under unified operations to meet immediate requirements for handling carload freight. Future yard developments on the separate lines entering the terminal district should be located along the outer margin of the terminal area and should be planned for an operation that will simplify switching movements and consolidate as much as possible both through freight and freight destined to points within the Chicago terminal.

Less Than Carload Freight

[The speaker described the area and facilities occupied by the railroads for handling L. C. L. freight and referred particularly to the area between the Union loop and Twelfth street.]

All of the railroad freight houses in this area are of an antiquated type, have practically reached a point where their reconstruction is required in order to afford increased shipping facilities and their operation and construction is such as to cause a maximum of congestion on the streets leading through and to this area. Another thing which impresses one in observing the railroad facilities in this area is the small area occupied by buildings as compared with the great area occupied by tracks. This emphasizes the necessity for a more intensive use of this valuable real estate.

Public interests, shipping interests and economy in railroad operation demand that this entire terminal area be revamped and modern freight house facilities be constructed that will provide adequate shipping facilities that can be operated without undue congestion on the city streets. Such a development would result in a saving in operating costs to the railroads and a utilization of property now superficially occupied. To bring this about it is necessary for the facilities to be constructed and operated along cooperative lines; in fact, it is practically impossible otherwise to bring about the improvement that is necessary in this area.

River Straightening

[The speaker outlined the plan for accomplishing a rearrangement of railroad property in connection with a project for straightening the Chicago River. He also described the progress made in passenger terminal improvements with particular reference to the Illinois Central project.]

Corrections in Report of American Association of Engineers

In the *Daily Railway Age* of Tuesday, March 18, in the report of the meeting of the American Association of Engineers, J. L. Jacobs, who presented a paper on "Principles and Procedure in Classification of Railroad Engineers," was referred to as being connected with the Curtis Publishing Company. This is wrong; Mr. Jacobs is a consulting industrial engineer with offices in Chicago.

In reporting the remarks of W. W. K. Sparrow on page 658 of the same issue, two paragraphs were omitted, thus making the report incomplete. These paragraphs follow:

I am a railroad man and am speaking, I presume, largely to railroad men and, of course, that is the branch of the profession which, as railroad men, we are most interested in. While urging complete organization of railroad engineers, I do not want anyone to go away with that as the goal in view. A small organization of one section of the profession will not accomplish the desired result. We must have an organization which, when it speaks through its duly elected representatives, will speak for the whole engineering profession of the United States. That voice, gentlemen, will be heard and listened to. We railroad engineers can, however, set the necessary example and strive to organize the railroad section of the National Association in such a manner that it will serve as an incentive to other branches of the profession to do likewise.

The movement of the day appears to be in the direction of organization by classes, and the engineering profession ought to be, and I trust is, alive to the movement. Therefore, let us invite the co-operation of all and use our influence in every direction to build up a National Association which will embrace all branches of the profession and have as its object not only the advancement of tech-

nical research, but the economic, social and political welfare of the profession as a whole.

A Member of the French High Commission

Captain G. Vanneufville of the French High Commission, buyer of railway supplies for all French railways, visited the National Railway Appliances exhibit yesterday afternoon. He is stopping at the Blackstone Hotel and will remain in town for a day or so only. He is accompanied by C. P. Sanburgand, consulting and inspecting engineer of London, and Edward Lee, who is representing Mr. Sanburgand's interests in New York.

New Signal Appointments

C. G. McCauley, formerly supervisor of signals and track for the Washington Terminal Company, Washington, D. C., has been appointed engineer of signal construction on the Jacksonville, Fla., terminals, effective March 1. Mr. McCauley reports to the signal engineer of the terminal company in connection with this construction work.

American Railroad Signal Supervisory

This association held its first annual meeting yesterday in the Elizabethan room of the Congress Hotel. The morning session opened at 10 o'clock with a total registration of 85 members from 28 roads. Among the questions considered were the nomination of officers for 1920 to be elected by letter ballot. The adjustment of the wage situation was discussed in considerable detail with the thought of assisting in straightening out the differences which apparently exist.

Roadmasters Executive Meeting

The executive committee of the Roadmasters and Maintenance of Way Association will meet at the Auditorium hotel at 10 o'clock this morning to discuss the work of the association and to make plans for the convention which will be held in Chicago next September.

Supply Man's Son Received Croix de Guerre

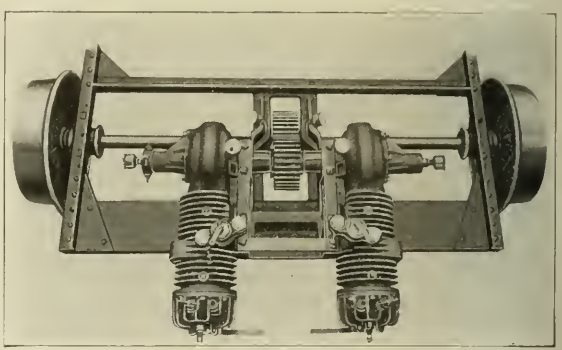
Frank Lepreau, vice-president, Thomas A. Edison, Inc., Primary Battery Division, who is in attendance at the exhibit at the Coliseum, was greatly pleased yesterday to receive word that his son, Sergeant William N. Lepreau, with the U. S. Marines in France, has just been awarded the French Croix de Guerre with two palms. This honor was bestowed by Gen. Petain. The honor is the more unusual because of the fact that the recipient is only 18 years old at the present time.

Studying American Technical Universities

H. F. Streiff, a civil engineer from the Dutch East Indies, visited the convention yesterday and was much interested in its activities. He is now engaged in a detailed study of engineering colleges in the United States for his government. Mr. Streiff is a civil engineer graduate of the University of Delft, Holland, who went to the Dutch West Indies on the completion of his college course. After spending five years in the Bureau of Construction of the engineering department of the Government Railways in that country he was made an instructor in civil engineering in the Technical School at Batavia. In 1914 he was appointed director of this college. In March, 1918, the government appointed him to study the advisability of establishing a high grade engineering college. Mr. Streiff was made a member of that committee and the chairman of a sub-committee on foreign educational affairs. In that capacity he was sent by the governor to the United States, arriving at Seattle on February 10. After visiting the leading engineering universities in the Central West he will visit several colleges in the East and return to his country via San Francisco and the Philippines.

A New Method of Applying Power Plants to Section Motor Cars

Mudge & Co., Chicago, has developed and is using a new method of applying the "E" and "G" power plants in the ES-2 and GS-2 section motor cars, which affords unusual accessibility to the entire power plant. This construction is patented and known as the sub-frame construction. The frame consists of a 6-in. 18-lb. channel in front and a 2-in. by 2-in. by ¼-in. angle in the rear, both of which are riveted to 2-in. by 2-in. by ¼-in. longitudinal angles. At the corners where the cross members join the side members, strength and rigidity have been secured by the use of gusset plates which are riveted to the cross and side members by four ⅜-in. rivets in each corner of the forward end and five ⅜ in. rivets in each



View of the Sub-Frame Construction

corner of the rear. The cast iron base is then bolted to the power plant frame, the entire arrangement being designed so that the greater part of the weight of the engine is carried directly on the channel.

The advantage of this construction is the distribution of the entire load on the Hyatt roller bearings and boxes which are bolted to the longitudinal angles by four bolts in each bearing. This is a safeguard against bending strain on the driving axle. Another advantage is the accessibility to the power plant, as, by removing the six bolts and nuts which attach the power plant frame to the car frame and disconnecting the throttle, timer controls and fuel lines, the cylinders, carburetors, wheel, axles, etc., can all be taken out from under the car in the same manner as a pair of trucks are removed from a box car.

A New Type of Storage Tank

One of the shortcomings of the steel storage tank for the handling of bulk materials such as coal, ashes or sand, is the difficulty of maintaining the plates exposed to the contents since such materials, as a rule, have the effect of abrading the interior surfaces, making it practically impossible to maintain a coat of paint. As a result there is little or no protection against rusting and the life of the plates is considerably less than that of the rest of the structure. To overcome this difficulty the Green

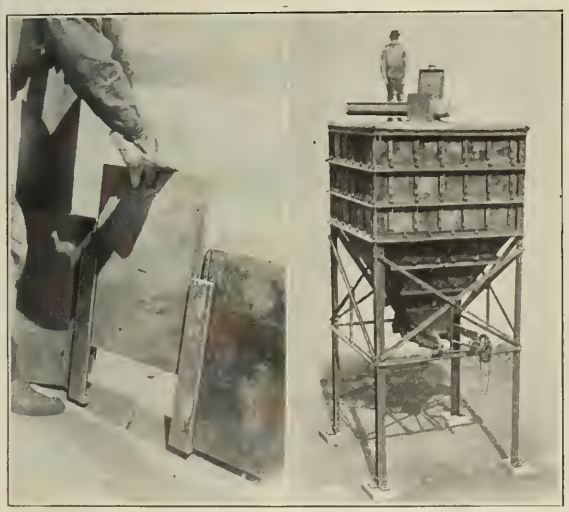
Engineering Company, East Chicago, Ind., has developed a plan for combining structural steel with cast iron whereby the steel is used for the frame or load-carrying members, while the cast iron is applied in the form of plates and other parts that make up the container. By this means the load-carrying ability of structural steel is combined with the greater resistance to corrosion of cast iron. There is also the further advantage that the cast iron



Close View of the Hopper Gate

is used for these portions of the structure, namely, the plates, where in the steel erection is the most difficult. On the other hand, the erection of the simple structural steel angle frame and the assembling of the cast iron members is relatively simple.

The character of the construction and the method of erection are shown in the photographs. Structural steel is used for the tower and for the frame of the tank. Cast iron separators having an H-section are hung at proper intervals on horizontal members of the tank frame and form the vertical supporting members for the cast iron



Assembling the Plates A Tank Complete

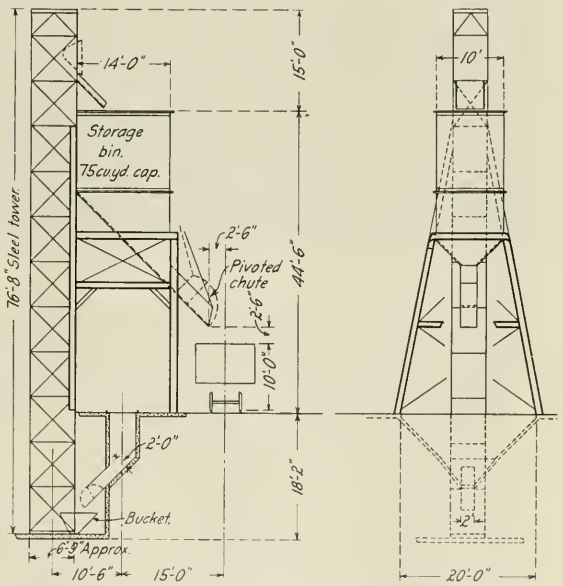
plates which are slid down into the grooves formed by the H-section of these separators. Adequate allowance is made for the horizontal lap of the cast iron plates so that the tank is sufficiently tight to hold common dry materials. The design provides for a cover of similar construction, but this may be omitted if the use to which the tank is put does not make this necessary or desirable.

Another feature of this form of construction is the gate provided at the bottom of the hopper. This is also made so that the parts exposed to the contents of the tank are all of cast iron. It is equipped with an easy rolling slide operated with a rack and pinion from a wheel and chain.

For economy of manufacture and rapid delivery these tanks are made on the standard unit construction basis, but with provision for three sizes—one 9 ft. 8 in. square, one 11 ft. 8 in. square and one 13 ft. 8 in. square. The height of each size may be varied by increments of 2 ft. and provision is made also for combining these unit tanks in batteries, so a large latitude of capacity is available. The lengths of the tower legs may be made to suit the requirements, while the height of the tank may be varied from minimum of 11 ft. for the smallest size to a maximum of 22 ft. 6 in. for the largest size. For railway installations, these tanks have special application for coal bunkers and ash pockets in power plants and for wet sand bins, etc.

Disposing of Locomotive Cinders

One of the most recent developments in engine terminal facilities is the application of equipment used for handling concrete to the disposal of cinders. The Insley Manufacturing Company, Indianapolis, Ind., producers



Side and End Elevation of the Cinder Plant

of towers and spouting for the transportation of concrete, has devised a combination of a track hopper pit with a steel hoisting tower and an overhead storage bin for handling cinders.

The plan provides for a cinder pit about 20 ft. long with a sloping bottom terminating in an opening leading into a hoisting pit of greater depth where a controllable gate is installed to discharge the cinders into a hoist bucket of the Insley roller hoist type. In the installation shown this bucket has a measured capacity of 30 cu. ft. or a net ash capacity of about ¾ cu. yd. A steel tower approximately 77 ft. high elevates the ashes to an overhead storage bin of 75 cu. yd. capacity, this bin being carried on a frame the legs of which straddle the pit track. This bin is provided with a suitable gate and a pivoted chute for discharging cinders from the bin into a car on an adjoining track.

An Interesting Application of the Concrete Atomizer

How a waterproof cement mortar may be applied to a leaky masonry surface through which water is seeping under a considerable hydrostatic head is illustrated by the results secured with the concrete atomizer in lining the soffit of a stone arch carrying a double-track line of the Pennsylvania Railroad as well as the Raritan canal over a brook near the passenger station of the Pennsylvania at Trenton, N. J. The situation was so serious as to require the repair work to be undertaken at a time when the government, which was using the canal, found it impossible to shut off the water. In consequence, the work had to be done under the head of water.

The concrete atomizer is a device for the application of



The Arch Soffit with the Concrete in Place

concrete, while in suspension in a stream of superheated steam. The concrete is mixed by means of paddles revolving in a steam-tight drum, from which it is discharged through a piston valve into an adjoining chamber, where it is combined with a blast of steam and discharged through a hose to a nozzle at the point of application. A complete description of this device appeared in the *Railway Age Gazette* of March 19, 1915, page 675.

On the arch at Trenton, the concrete was applied to a thickness varying from four to six inches. No attempt was made to trowel or finish the surface, the finished appearance being as illustrated in the photograph. Owing to the presence of water in the creek it was necessary to conduct the work from a float. A 35-hp. boiler, steaming at about 100 lb. per sq. in., was placed on the bank near the bridge and from this steam pipes were run to the concrete atomizer mounted on the float. Superheating was accomplished by a salamander with a 50-ft. coil of 2-in. double extra heavy pipe. The mode of operation was to apply a jet of steam to a few square feet of the stone surface for a sufficient time to heat the stones to a temperature that would vaporize the water leaking through. As soon as this condition was obtained the hot concrete was jetted on the surface with a pressure of about 50 lb. per sq. in.

In the course of the work it was found that if the pebbles were omitted from the jetted concrete, the material would not adhere to the surface through which the water was leaking. In other words, the small pebbles hammered the hot mortar into the crevices and checked the flow of water. Before the work was started it was feared that the steam released in the inclosed place under the arch would interfere with the visibility of the work, especially on days when there was no wind, but by inclining the jet toward one end of the arch a current was produced which kept the work in sight of the operator, although it was invisible to bystanders.

One difficulty encountered in the work was that whereas it was intended to use a quick setting cement throughout this work, one shipment of cement received was of a kind that refused to set under the conditions imposed. This caused considerable trouble for some time. Other difficulties encountered in the conduct of this work included several rises of the creek level to such an extent as to submerge the float. Many stones in the arch had a vitreous surface of great smoothness, but this did not prevent the mortar from adhering and the work has been made waterproof except at the opening in the arch near the south end where an outlett had been provided for emptying the canal. All of the work was done by Harold P. Brown, New York, who was the originator of the concrete atomizer.

A New Side Clearance Telltale

THE SIDE CLEARANCE telltale shown in the illustration has been in use on the Elgin, Joliet & Eastern for some time as a medium for warning trainmen and others, who happen to be on the sides of cars, of obstructions between or at the side of tracks. This device



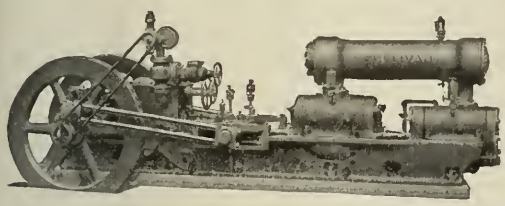
A New Side Clearance Telltale

which is manufactured and sold by Gifford & Co. of Chicago, consists of a vertical staff, at the top end of which are two flexible blades, similar to those used on dwarf signals, fastened at right angles to the staff. The staff is mounted on a metal frame, which serves as a base and also as a fulcrum, from which the staff swings like a pendulum. That portion of the staff above the standard consists of wood, while the part below is a metal bar provided with a counterweight which holds the staff normally, in the vertical position. This counterweight is adjustable so as to permit a variation in the swinging

qualities of the telltale to meet the requirements of the purchaser. This telltale can be used to give warning of the presence of bridges, girders, elevators, coal sheds and other obstructions, portions of which come within the clearance line formed by men hanging on the sides of cars. The flexible blades are intended to be of the same length as the portion of the obstruction within the clearance line; so that a man hanging on the side of a car will hit the blade. If his body comes in contact with the staff it will be deflected toward the horizontal, but will immediately assume the vertical position as soon as it is clear from contact with the man.

Recent Improvements in Air Compressors

The large photograph shows a new model of steam-operated air compressor of a type applicable to installations supplying air to air-lift pumps, locomotive sanding plants, cinder conveyors, train charging pipe lines and other purposes for which a permanent installation is applicable. It was developed from an earlier type through the introduction of a number of improvements and the



The Type WB-3 Air Compressor

application of some new features. It is of the straight-line type with a single steam cylinder and two air cylinders for two-stage compression and is suitable for air consumptions ranging from 400 to 940 cu. ft. of free air per min. compressed to a maximum pressure of 100 lb. per sq. in.

One of the new features is a speed and pressure governor providing for three adjustments, namely, maximum speed, minimum speed and air pressure, each inde-



The Sullivan End Rolling Finger Valve and Guard

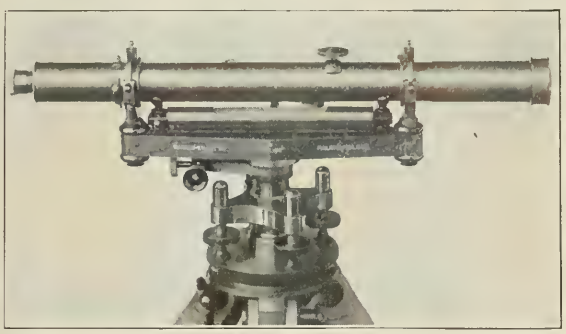
pendent of the other. The speed-controlling element is inclosed in a casing to protect it from dirt.

Another new application is the use of "end-rolling finger valves," as shown in the smaller photograph. The valves, which are in the air cylinder heads, consist of thin flat steel sheets cut to form four finger-like blades. These are bolted to the cylinder heads so that the fingers take seats over long, narrow ports, the ports being opened or closed according to whether the fingers are laid flat against the seats or bent backward away from them. To protect the valves and prevent excessive lifting from the seats they are covered by steel guards having the same general shape as the valves, but made of a thicker material and given a definite curve away from the valve seat. In opening, the fingers impinge against these guards with a sort of rolling motion from which the name, "rolling finger valve," was derived. Advantages ascribed to these valves include rapidity of action, wide port opening with minimum wire drawing and a reduction in the number of moving parts. The end rolling effect also eliminates the hammering or slapping commonly occurring in the operation of air valves.

These pumps are made in two sizes, one with 12-in. by 14-in. steam cylinders and the other with 16-in. by 16-in. steam cylinders. They are designed to operate to a maximum air pressure of 100 lb. per sq. in. with an ample factor of safety for a steam pressure of 150 lb. per sq. in. The compressors are known as the "Sullivan WB-3" air compressors manufactured by the Sullivan Machinery Company, Chicago.

A Wye Level With New Accessories

Engineers who at some time in their experience have done any appreciable amount of surveying have developed certain well defined ideas on the requirements of surveying instruments for accurate and efficient work. Aside from the necessary refinement of construction, a matter wherein the user is dependent on the reputation of the maker, the accuracy of the instrument is dependent on certain features which are readily subject to the buyer's observation, while the facility with which the instrument may be used in accomplishing rapid work is contingent in a measure upon certain accessories developed from time to time or upon the methods by which these accessories are applied to the instrument. For this rea-



The Sterling Model 16M Level

son a description (or what is commonly termed the 'specifications") of an instrument are always matters of considerable interest to men who have used levels or transits or are responsible for their use by others.

The Sterling engineer's wye level, Model 16M, recently developed by the Warren-Knight Company, Philadelphia, embodies a number of features which warrant a rather detailed account of the specifications. The improvements consist in the use of a hardened steel center fitted in a socket of annealed iron, secured to a ribbed level bar of hard bronze. The leveling screws are fitted into replaceable bushings, the leveling head being so designed as to insure an absolutely non-cramping center.

The telescope is set low in the wyes, and the entire instrument is said to be extremely rigid and well balanced. The reflecting mirror on the far side of the telescope, shown in the illustration, may be detached or used on

either the right or left side of the instrument, as desired. The focusing slide and eyepiece are provided with dust guards and the telescope collars are of hard bell metal. A new type of lock screw for securing wye clips is used, and the clamp and tangent screws rotate with the level bar and are always in the same relative position to the operator.

A Pneumatic Rivet Cutter

"Rivet busting" with a sledge and a cold cut or "buster" will "take the sap out" of a man about as quickly as anything, for it is very hard work. On the other hand, cutting rivets with a chisel bit in a pneumatic riveter is a slow job that has been compared to cutting down a big tree with a hatchet. In other words, there has been a real need for a tool to cut out rivets quickly, cheaply and safely.

One device which lays claim to this distinction is the Red Devil rivet cutter manufactured by the Rice Manufacturing Company, Indianapolis, Ind. This tool is intended for removing defective rivets in connection with structural steel erection or repair work as well as for cutting apart old structural steel that is to be saved for re-erection at some other point. This rivet cutter is said to cut a 1¼-in. rivet in 10 sec. and to dispose of ⅞-in. and 1-in. rivets with from three to five blows. An air pressure of 90 lb. gives the best results with this tool, although it can, if desired, be used with pressures as low as 40 lb.



Using the Red Devil Rivet Cutter on Structural Steel Work

The mechanical features of the device are simple. It consists essentially of a cold drawn, seamless tube about 5 ft. long with suitable fittings hydraulically pressed onto it at either end. The rear end is fitted with a valve by means of which air may be admitted into the rear end of the tube, while it is permitted to exhaust from the forward end of the tube through a rubber tube by-pass, or, by giving the valve a quarter turn, the air may be admitted through the by-pass to the forward end of the tube and exhausted from the rear end. The forward end of the tube is equipped with a bushing designed to give a good fit for a chisel bit. The interior of the tube is occupied by a plunger ground to fit the tube with just enough clearance to enable it to slip readily from end to end, yet allowing a minimum of air leakage.

As shown in the photograph, three men are required to operate the cutter. One stands at the forward end to guide the bit while two carry the rear ends by means of suitable handles, one of them manipulating the valve lever. By replacing the valve in position to admit air to the rear of the tube, the plunger is driven swiftly against the chisel; then if the lever is given a quarter turn, air admitted through the by-pass returns the plunger to the rear end of the tube, while the air behind the plunger escapes through an open port. After a little practice the workman can operate the rivet cutter either fast or slow or strike heavy or light blows. This enables him to give a light blow when the rivet is almost cut off to prevent the head from flying. Springs in each end of the tube absorb all the shock of the plunger other than that given to the chisel, so it is not difficult to hold the device when in use. The rivet cutter weighs 65 lb. in an operating condition and has a total length of 58 in. Under average conditions three men operating the tool are said to cut from 25 to 33 times as many rivets as they could cut in the same time by hand. A smaller tool known as the Baby Devil is manufactured by the same company for use on rivets of ⅝ in. diameter and less, this machine being handled by two men instead of three.

More Efficiency in Lighting Installations

One of the perplexing phases of the gradual introduction of high power illumination since the invention of the electric lamp was the long continued use of shades and reflectors of unscientific design. For many years these devices were constructed with little or no consideration of their efficiency in light distribution or of the detrimental effect upon the eye of the bright glare of the unshaded filaments. But gradually the closer study of illumination resulted in the introduction of lamp fixtures that effected a maximum use of the light available and whereas these principles were first applied only to the more expensive installations, consideration was given eventually to the improvement of fixtures of a type suitable for industrial installations and other applications where efficiency had to be combined with moderate first cost and economical maintenance.



An Industrolite Fixture

As an example of a type of lamp fixture adaptable to use in shops, roundhouses, freight houses, etc., the lamp shown in the illustration indicates how efficiency may be obtained in a moderate priced fixture. This is an all-steel porcelain enameled shade design for use with type "C" lamps. It consists of a shade over the lamp having a relatively flat reflecting surface with a guard suspended around the globe to shut off the brilliant glare of the filament. But the light thus intercepted is not lost, since it is reflected either to the shade above or to the working surface below the lamp. The open construction of the fixture also provides ventilation. All of the light from the lamp in a fixture of this kind is directed at angles below 90 deg. This fixture is known as the "Industrolite" and is manufactured by the Luminous Unit Company, St. Louis, Mo.

EDITORIAL
Railway Age
DAILY EDITION

There are many difficulties to be overcome by committees in carrying their work to a successful conclusion. Probably as great a problem as any is that of deciding definitely, when standard practice is to be recommended to the convention, what shall be the scope of the report. There is always the possibility, in arriving at this decision, of flying too high or too low. If the first is the case, the recommendation becomes theoretical and the man seeking guidance becomes discouraged when he finds that the suggestions cannot be applied to his difficulties in a practical manner. It is obvious that the results of the second alternative are even worse. The association is to be congratulated on the fact that the reports submitted are so universally free from either of these extremes.

Difficulties of Report Making

One of the most formidable problems ever imposed on this association was the establishment of standards for what we are wont to call "clearance diagrams" for roadway structures. Difficulties have been encountered largely through a lack of co-ordination of the work of this and other organizations of railway men. Thus there are clearance diagrams for bridges and buildings, for third rails and for clearance diagrams for locomotives and cars, each without any relation to the other. As a result the real "clearance"—the actual space between the outside limits of the rolling stock and the nearest projection on the adjacent roadway structures—is a rather indefinite quantity, when, as a matter of fact, it is this clear space that is so important. Is not this objectionable condition caused in part by the inadequacy of the present terminology? "Clearance diagram" does not adequately express what we have in mind. A "limiting dimensions" diagram is awkward and does not express the full meaning. Some better term should be evolved.

What Do We Mean by Clearance

The strenuousness of the times through which we have been passing during the past year has been reflected in the committee work of the American Railway Engineering Association. The withdrawal of many men from civil into military service has deprived the committees of their services while the demands made upon the time of those remaining at home have been so many and so urgent as to curtail their activities. As a result, the excellent reports which many of the committees have prepared have been due to unusual efforts. It was the experience of several committees that it was necessary to curtail the number of subjects reported on, while in at least three or four instances little or no progress was reported. Now that the war has ended, and the members of the association in military service are returning rapidly to their former positions, these handicaps should be removed in a large measure. If the committees to be appointed make as much of their opportunities during the coming year as have those of the present, the association may well look forward to unusually high grade reports at the next convention.

The War and Committee Work

The investigations made by the Committee on Ballast as to the use of reinforced concrete slabs in railroad roadbeds brought out interesting and widely differing opinions from more than 25 chief engineers. While it is true that adverse opinions were expressed by some, the fact that interest was expressed by the great majority is evidence that the studies into this problem should be continued. The use of concrete for this purpose is not new by any means, but its application has been localized largely to tunnels, etc. The investigations, however, indicate its possible adoption for more general use and the conclusions reached by the committee as to its possible field will be received with much interest.

Further Possibilities for Concrete

One element responsible for the eminent success of this convention lies in the fact that C. A. Morse, president of the American Railway Engineering Association, is also the chief engineering officer of the United States Railroad Administration. In the course of the discussion on many of the subjects submitted by the committees on Tuesday there were not infrequent references to various dealings of the Administration with the railroads—matters concerning which there may have been some misunderstanding. Mr. Morse has evinced a happy faculty for explaining the Administration's point of view. In several cases by a straight forward statement, coupled perhaps with one or two homely illustrations, he was able to demonstrate the nature of the problems with which he is confronted as assistant director of the division of operation in a way that has cleared up the difficulties.

C. A. Morse, Director of Maintenance

Railway maintenance men are now facing the problem of Americanization to an extent never before realized. It is becoming evident that the railroads, in justice to themselves, and for the welfare of the country as a whole, must do their share in helping the foreigner to gain a real conception of American ideals and to enroll him as a substantial and creditable citizen. The events of the past three years have awakened the nation to the vital necessity of doing this and of the grave danger of neglecting the foreigners among us and allowing them to live by themselves, and according to the traditions and ideals of their native countries—ideals which in many instances are at direct variance with those of this nation. The

The Americanization Program

seriousness of the problem has been emphasized in no uncertain manner since the world war started in 1914, but the danger is that the necessity of improving conditions in this respect will be overlooked and forgotten, now that active warfare has ceased. Many of the large industries have made great strides in Americanizing their foreign-born employees; this they have done from business as well as patriotic motives. It has paid so well in the elimination of friction and misunderstandings, and in the better and more orderly government of the industrial communities in which they are located that they are being encouraged to go forward with still more elaborate plans. The Pennsylvania railroad has made excellent progress with its schools for Italian and other foreign-speaking employees and with its instruction in better citizenship; the results have been worth while and other roads can well afford to develop similar programs.

A Service to the Country

The Yards and Terminals committee rose to the occasion in a splendid manner last summer when it prepared and issued several reports of timely value for immediate use. That on unit operation of terminals in large cities was of special service at the time when the Railroad Administration was endeavoring to co-ordinate such facilities in order to increase their effectiveness and capacity for the handling of the tremendous traffic of the country at a time when delay in the movement of a large proportion of the business could not be tolerated. The preparation of a series of fundamental principles by this committee whose members had given this subject special consideration for a considerable time, was highly valuable to men who had the new problem thrust upon them with little chance for preparation. The association published this report as soon as it was available. It can well afford to follow the same practice with respect to reports of other committees whenever early need for the information arises. The association can be of the greatest value to the railway industry by giving first consideration to the problems of greatest importance, and then by making the results of its investigations available at the earliest practical date.

More Work to Be Done

The A. R. E. A. is now twenty years old and has brought forth more than a "three-foot bookshelf" of proceedings, bulletins and manuals during the two decades of effort. In view of these results it has been questioned whether there is enough work left to keep twenty or more committees busy for the next twenty years. After listening to yesterday's discussions the answer is unreservedly—yes. The discussion of the Tie Committee's report on screw spikes is a most eloquent confirmation of this view. Mr. Ray's lucid demonstration of the excellent results secured with screw spike track construction as opposed to the data accumulated by the committee and as borne out by the extended investigation made by officers of the Pennsylvania, goes to show that there are two schools of thought on this subject, each group being equally sincere in its views. In scientific matters such a divergence of opinion is not the result of prejudice, but shows a lack of complete data or a failure to appreciate the full significance of all the evidence at hand. More time and further study are necessary for an adequate correlation of the facts that will permit a sufficiently accurate analysis to disclose the real truth. Such matters as these will keep the association busy for many years to come.

Mr. Hooley on the Coliseum Exhibit

By F. W. Lane

"Th' exybit at th' Collyseeum 's ixciptionally good this year," casually remarked Mr. Hooley as he wiped off the bar and noticed that he was alone with his parasitic friend Dennissey.

"Exybit, what it is?" inquired Dennissey, desirous as ever of showing Mr. Hooley that species of gratitude which is a lively expectation of favors yet to come. "Ye towld me th' other day that Barnum & Bailey and Ringling's was consollyda-ated. 'S th' show at th' Collyseeum agin now?"

" 'Tis no circus, Dinnissey, iv we ixcipt th' times when two min riprisinting compating lines are manoeuvrin' t' atthract th' fav'rable attintion av th' same man t' th' matarial they've got on exybition," replied Mr. Hooley, reflectively.

"No, Dinnissey, 'tis th' exybit av relrod thrack supplies that th' ingineers that's havin' a convintion at th' Congress hotel are supposed t' be inthrusted in, 'nd some of thim do go t' say it, iv they don't have nothin' better to do. 'Twould pay ye t' git a tickut fr'm somebody that wud take ye f'r a thrack man 'nd go down 'nd see ut. 'S I towld ye tin years ago on a sim'lar occasion, ye might be able t' tell a simmyfor fr'm a watherspout, or a whalebarrow fr'm a hand car. But ye cud shine in discussin' th' merits av th' picks 'nd shovels, f'r, 's far's my knowledge goes, them's th' only tools ye've more thin a passin' acquaintance wit'.

"I wudn't advise ye t' thry t' get int' th' inthricacies av th' signal systems, f'r that ye'er knowledge av such things, as dishplayed by ye whin I was tillin' ye about th' signal min indicates t' me obsarvin' mind that there's manny things thats beyant th limmuts av ye'er philosophy, Horatio, t' quote me frind th' bard av Avon agin. But they's switches 'nd frogs—not th' kind ye eat the ligs av—'nd iverything th' relrod min use on th' right av way, ixcipt dagoes.

"But I stharted in t' till ye why th' exybit this year's betther than iver before. Ye see, 'tis this way: F'r sivral years th' relrods 've bin too poor to spind money on such things as kapin' th' thrack in first class shape, or iv they've had th' money they had to spind it in kapin' up th' wages av th' other departmints. Ye mind what I've towld ye about th' raises in wages av th' injinemin 'nd firemin. Will, ye see, iv th' relrods don't have money to spind f'r thrack maintenance they don't buy thrack tools, 'nd thrack supplies, 'nd that, I asshume, is wit'in ye'er comprehinsion. So th' manufacturin' companies that's riprisinted at th' Collyseeum exybit have had time t' get up new 'nd timptin' appli'nces—that's what they call thim, relrod appli'nces—'gainst th' time whin th' roads begin again t' buy thim.

"It shtands t' rayson, Dinnissey, that th' thrack can't go on foriver wit'out some woruk bein' done on it, whither th' guv'mint kapes th' roads or not. F'r that rayson, iv f'r no other, th' min that make th' tools th' relrods ought to use have got together a fine colliction. 'Tis a grea-at show, Dinnissey.

" 'Tis th' time now, Dinnissey," observed Mr. Hooley, reflectively, by way of a snapper to his previous observations, " 'tis th' time now f'r arl good min t' come t' th' aid av the parthy. Only, Dinnissey, th' parthy an't th' wan that ginerally nades our assishtance. 'Tis th' thrue pathrite that putts th' good av his counthry above mere parthy consid'rations. Now whin we've licked th' Boshe, th' thrue pathrite's thryin' t' hilp th' counthry out av th' hole th' Boshe got it into, 'nd wan av th' bist ways to do

us is t' hilp th' relrods get on their bote fate. D'ye get my manin', Dinnissey?"

"Wud ut hilp anny iv I go t' the Collyseeum?" inquired Dinnissey, with some show of feeling.

"It might show ye've got some pathriotic spirrut in ye, as well's th' other kind," answered Mr. Hooley, pushing forward the tools of his trade.

Automatic Train Control Committee on Western Trip

THE AUTOMATIC TRAIN CONTROL COMMITTEE, appointed by the Railroad Administration on January 14 to investigate devices for automatically stopping a train in the event of failure of the engineer to obey signal indications, and so far as possible when the signal fails to indicate a condition requiring a stop, is beginning this week a trip to inspect several such devices which have been installed on western railroads, with a view to making recommendations to the Railroad Administration for further installation on a large scale of such devices as it deems practicable. The committee will leave Chicago Friday afternoon to inspect on Saturday the operation of the Miller Train Control System in service on the Chicago & Eastern Illinois between Chicago and Danville, Ill., and it will again leave Chicago on Sunday for Spokane, Wash., for an examination of an automatic stop on the Washington Water Power Company's railway. Thence it will proceed to San Francisco, where such a device is in service on the line of the Key Route Electric Railway, and to Oroville, Calif., where an installation has been made on the Western Pacific. Later it will look at other devices on eastern roads, including one in service on the Chesapeake & Ohio.

The committee's instructions from the Division of Operation of the Railroad Administration were "to proceed at once to make a study of, and report upon, the automatic train control devices now undergoing test upon various lines of railroad or available for test, with their recommendations for the installation and further practical test of any devices now or during their investigation made available for that purpose, which they may consider practicable and reasonably conforming to the purposes to be accomplished. The report of the committee will include recommendations upon the requisites of automatic train control and conclusions upon the mechanical or economic features of such of the devices as the committee may find available for practical use."

The Chicago & Eastern Illinois was a pioneer in the development of an automatic stop and now has the most extensive installation of the kind in the country. It has been in regular and satisfactory operation on the double track line from its Dolton Yard, in Chicago, to Danville, a distance of 106 miles, since the fall of 1914, after 3 or 4 years had previously been spent in experimenting, testing and developing the train control system. During the 4 years since the device was put in regular service particular attention has been given to perfecting its operating efficiency under all weather conditions and service requirements.

The first action of the Automatic Train Control Committee was to draw up a list of requisites for the design and construction of an adequate automatic train control system and at its meeting in Washington the committee passed on about 250 plans for automatic train control devices submitted to it, most of which had previously been examined and reported on by the Interstate Commerce Commission. After an examination of the plans the committee has eliminated all but 36 of the devices as not meeting the requirements, and it is now concentrating on those that have proven their merit in service or which are regarded as worthy of more careful consideration, with a view to selecting one or more different types for further practical test.

The chairman of the committee is C. A. Morse, formerly chief engineer of the Chicago, Rock Island & Pacific at Chicago, now assistant director of the Division of Operation of the Railroad Administration and president of the American Railway Engineering Association. The other members are W. P. Borland, chief of the Safety Bureau of the Interstate Commerce Commission; C. E. Denney, assistant to the federal manager of the New York, Chicago & St. Louis; H. S. Balliet, signal engineer, electric division of the New York Central; Henry Bartlett, chief mechanical engineer, Boston & Maine; J. H. Gumbes, general superintendent of the Western Pennsylvania grand division of the Pennsylvania Railroad, and R. W. Bell, general superintendent of motive power of the Illinois Central. G. E. Ellis, heretofore signal engineer of the Interstate Commerce Commission, is secretary. The members of the committee are attending the convention.

Today's Program

The program of the American Railway Engineering Association convention for today is as follows:

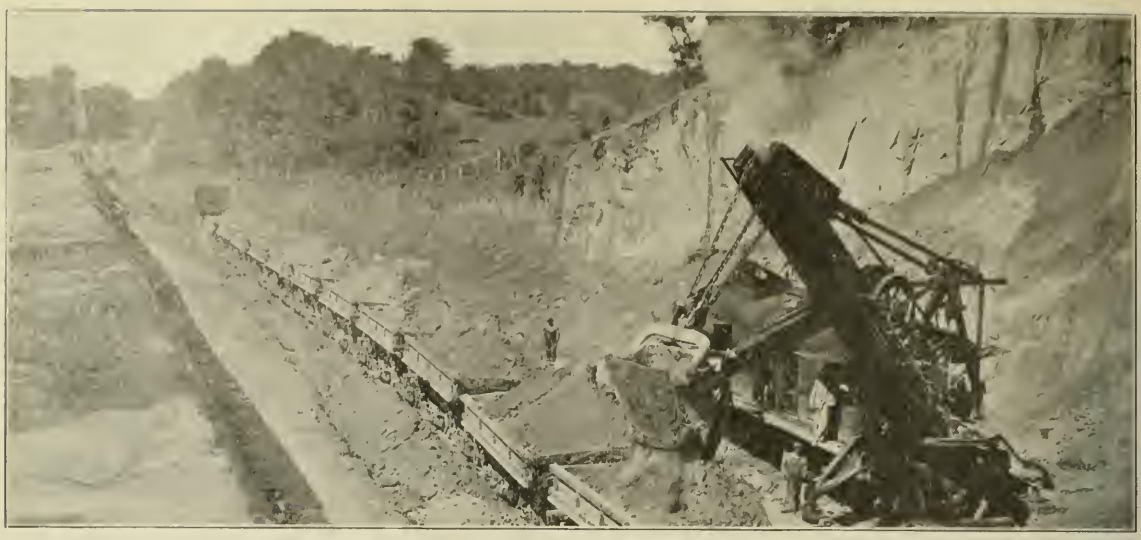
Iron and Steel Structures.
Masonry.
Water Service.
Wooden Bridges and Trestles.
Uniform General Contract Forms.
Economics of Railway Operation.
Economics of Railway Location.

Pennsylvania Railroad Recognizes A. R. E. A.

For the first time in the history of the American Railway Engineering Association, the Pennsylvania Railroad has sent a number of its officers to attend the meeting. Thirteen officers of the maintenance of way department arrived yesterday morning to spend several days in attendance at the conventions and the exhibit at the Coliseum. While officers of this road have attended the meetings in past years, they have done so as individuals and without official instructions; this year they are here under orders from their superior officers. Those composing the general managers' committee representing the Pennsylvania Railroad, Lines East, at the convention include: J. B. Baker, supervisor, general managers' office; J. C. Auten, principal assistant engineer, Southern division; J. H. Harris, principal assistant engineer, New Jersey division; G. H. Brown, principal assistant engineer, Eastern Pennsylvania division; J. O. Hackenberg, division engineer, Maryland division; T. J. Skillman, division engineer, New York division; H. H. Garrigues, division engineer, Philadelphia terminal division; J. H. Reading, division engineer, Middle division; E. B. Wiseman, division engineer, Buffalo, division; E. J. Ayars, division engineer, Williamsport division; C. W. Richey, assistant division engineer, Pittsburgh division; J. M. Fair, supervisor engineer maintenance of way office, and George Ehrenfeld, supervisor, Pittsburgh division.

Japanese Officer Visits Convention

Baron Chuzo Mori, civil engineer with the Imperial Government Railways of Japan, with headquarters at Tokio, Japan, and temporarily stationed at New York City, has been an interested attendant at the convention and the exhibit at the Coliseum.



American Railway Engineering Association Proceedings

A Report of Wednesday's Sessions Including Presentation of Nine Committee Reports With Discussions

THE SECOND DAY'S SESSION of the convention of the A. R. E. A. was called to order at 10 o'clock by Vice-President Stimson in the absence of President Morse, who was confined to his room by illness. The room was unusually well filled throughout the entire day. Reports were presented by the committees on Wood Preservation, Yards and Terminals, Electricity, Ties, Stresses in Railroad Track, Buildings, Ballast, Roadway and Rail. These reports and the discussion which they brought out are given below.

Report of Committee on Wood Preservation



IN APPENDIX A the committee submits changes and additions on the following items and recommends their adoption under the heading of Conclusions.

(a) Revised specifications for creosote oil.

(b) Revised specification for creosote-coal-tar solution.

(c) Revised title to include creosote-coal-tar solution with creosote oil under methods for determining absorption.

(d) Revised wording and fuller details in the analysis of creosote oil.

(e) Revised specification for zinc chloride.

(f) New specification covering the method for determining the strength of zinc chloride solution.

In Appendix B the committee submits information concerning creosoted water tanks. The committee also submits the results of a very thorough investigation of the Burnettizing treatment and submits for information general conclusions relative to the value of zinc chloride and creosote oil and a mixture of the two. It submits a revised specification for the treatment of ties by the Burnettizing process, which is recommended for adoption under the heading of Conclusions.

In Appendix C, the committee submits as information an improvement of the Bateman method as proposed by the Forestry Service.

The committee reports progress on subjects (3) Water gas tar as a preservative; (4) Uniformity of practice and specifications with other associations; (5) Douglas Fir preservative treatment.

Conclusions

The committee makes the following recommendations to the Association:

FOR ADOPTION AND PUBLICATION IN THE MANUAL

1—(a) Proposed revision of specifications for creosote oil.

(b) Proposed revision of specification for creosote-coal-tar solution.

(c) Proposed revision of title to include creosote-coal-tar solution with creosote oil under methods for determining absorption.

(d) Proposed revision of wording and fuller details in the analysis of creosote oil.

(e) Proposed revision of specification for zinc chloride.

(f) Proposed specification covering method for determining the strength of zinc chloride solution.

2—Proposed revision of specification for treatment of ties by the Burnettizing process.

Accept as Information

Report on the creosoting of water tanks.

Report on the question of the treatment of ties with zinc chloride and the general recommendations and conclusions in connection therewith.

Report covering improved method for determining visually the penetration of ties treated with zinc chloride.

Recommendations for Future Work

Your committee recommends for next year's work the continuation of the subjects now assigned, and as new subjects:

(1) Availability and use of sodium fluoride as a preservative for cross-ties.

(2) Creosote treatment to be used in the protection of piles in teredo infested water.

Committee: C. M. Taylor (P. & R.), chairman; Dr. Hermann von Schrenk (Cons. Timber Engr.), vice-chairman; F. J. Angier (B. & O.), F. L. C. Bond, E. H. Bowser (I. C.), W. A. Fisher, C. F. Ford (C. R. I. & P.), C. J. Graff (N. Y. C.), R. H. Howard (Wab.), C. H. R. Howe (B. & O.), J. E. Johnson (M. C.), G. E. Rex (A. T. & S. F.), Lowry Smith (N. P.), O. C. Steinmayer (S. L. & S. F.), H. Stephens, E. A. Sterling, C. H. Teesdale (Forest Products Lab.), J. H. Waterman (C. B. & Q.).

Appendix A—Revision of Manual

A joint committee consisting of representatives of the Preservative Committee of the American Wood-Preservers' Association and of this committee conducted a further investigation on the question of "Water in Creosote" with special reference to the water content of oil shipped in tank cars and the sampling of such cars before being unloaded. The work to date strengthens our belief that the Zone Sampling Method, adopted as standard practice (see Vol. 18, A. R. E. A. Proceedings, page 1271), is correct in principle, but that it needs a further refinement for actual application. The committee suggests that this co-operative work be continued until the method is definitely determined for all conditions.

The committee, after a study of the specifications for creosote oil and creosote-coal-tar solution, finds that the specifications adopted in 1912 should be revised. This revision is necessary because increased safe-guards have been developed for enforcing the specifications. The specifications herewith recommended are the result of several years' work of committees of the American Railway Engineering Association, American Wood-Preservers' Association and American Society for Testing Materials. The three revised specifications differ from the specifications now printed in the Manual only in the addition of certain clauses to make the specifications more workable.

Standard Specification for Creosote Oil

The oil shall be distillate of coal-gas or coke-oven tar. It shall comply with the following requirements:

1. It shall contain not more than 3 per cent of water.
2. It shall contain not more than 0.5 per cent of matter insoluble in benzol.
3. The specific gravity of the oil at 38 deg. /15.5 deg. C. shall be not less than 1.03.
4. The distillate based on water-free oil, shall be within the following limits:
   Up to 210 deg. C. not more than 5 per cent.
   Up to 235 deg. C. not more than 25 per cent.
5. The specific gravity of the fraction between 235 deg. C. grade and 315 deg. C. shall not be less than 1.03 at 38 deg. /15.5 deg. C.
   The specific gravity of the fraction between 315 deg. C. and 355 deg. C. shall not be less than 1.10 at 38 deg. /15.5 deg. C.
6. The residue above 355 deg. C., if it exceeds 5 per cent, shall have a float test of not more than 50 sec. at 70 deg. C.
7. The oil shall yield not more than 2 per cent coke residue.
8. The foregoing test shall be made in accordance with the standard methods of the American Railway Engineering Association.

In addition to the oil conforming to the above standard specification, the two grades specified below may be used when the higher grade oil cannot be procured. The specifications are the same as the standard except as noted below.

Specification for Grade 2 Creosote Oil

4. The distillate, based on water-free oil, shall be within the following limits:
   Up to 210 deg. C. not more than 8 per cent.
   Up to 235 deg. C. not more than 35 per cent.

Specification for Grade 3 Creosote Oil

4. The distillate, based on water-free oil, shall be within the following limits:
   Up to 210 deg. C. not more than 10 per cent.
   Up to 235 deg. C. not more than 40 per cent.

It is urged that when Grades 2 or 3 are used, consideration be given to the injection of a greater quaitity of creosote oil per cubic foot.

Specification for Creosote-Coal-Tar Solution

The oil shall be a coal-tar product, of which at least 80 per cent shall be a distillate of coal-gas or coke-oven tar, and the remainder shall be refined or filtered coal-gas or coke-oven tar. It shall comply with the following requirements:

1. It shall contain not more than 3 per cent water.
2. It shall contain not more than 2 per cent of matter insoluble in benzol.
3. The specific gravity of the oil at 38 deg. /15.5 deg. C. shall not be less than 1.05 nor more than 1.12.
4. The distillate, based on water-free oil, shall be within the following limits:
   Up to 210 deg. C. not more than 5 per cent.
   Up to 235 deg. C. not more than 25 per cent.
5. The specific gravity of the fraction between 235 deg. C. and 315 deg. shall not be less than 1.03 at 38 deg. /15.5 deg. C.
   The specific gravity of the fraction between 315 deg. C. and 355 deg. C. shall be not less than 1.10 at 38 deg. /15.5 deg. C.
6. The residue above 355 deg. C., if it exceeds 26 per cent, shall have a float test of not more than 50 sec. at 70 deg. C.
7. The oil shall yield not more than 6 per cent coke residue.
8. The foregoing tests shall be made in accordance with the standard methods of the American Railway Engineering Association.

The committee recommends that the precaution pertaining to inspection and precautions in the use of the creosote-coal-tar solution, as now appearing in the Manual, be changed to read as follows:

Precautions to Be Followed in the Purchase and Use of the Creosote-Coal-Tar Solution

1. The specifications for a creosote-coal-tar solution are submitted for the guidance of those desiring to use the coal tar addition to creosote.
2. There should be a distinct understanding between all concerned that a mixture is specified and used.
3. The refined coal-tar used shall be subject to inspection or analysis by the railway company at any time, such examination to be permitted upon request prior to the mixing of the solution.
4. In case the railway company makes its own solution of coal-tar and creosote, using crude tar for this purpose, it shall specify clearly as to the quality of the tar. Only low carbon coal-tar should be used, the amount of free carbon not to exceed 5 per cent.
5. The coal-tar may be added to the creosote at treating plants when suitable facilities for properly mixing the solutions are available, otherwise the solution should be mixed by the manufacturer, but subject to the inspection or supervision of the railway company. The coal-tar and creosote should be thoroughly mixed at a temperature of approximately 180 deg. F. before being applied to timber. The mixing should be done in tanks other than the regular working tanks, and the tanks containing the mixture should be heated and agitated thoroughly

each time before any oil is transferred to the working tanks.

6. In treating with the mixture the temperature of the solution in the cylinder should not be less than 180 deg. F.

The committee further recommends that the title on page 548 of the 1915 Manual, dealing with methods for determining absorption, now reading "Methods of Accurately Determining the Absorption of Creosote Oil," be changed to read "Methods of Accurately Determining the Absorption of Creosote Oil and Creosote-Coal-Tar Solution."

Analysis of Creosote Oils

Since the adoption of the revised standard methods for analysis of creosote oil, as printed in the Supplement to the Manual for July, 1917, Bulletin 197, and as a result of co-operative work between committees of this Association, the American Wood-Preservers' Association, and the American Society for Testing Materials, certain slight corrections, changes and additions have been made. The committee recommended that these be embodied in the standard specifications for creosote analysis.

Zinc Chloride

The specification of zinc chloride appearing in the 1915 Manual, page 551, is not present practice. It has been revised to conform with present usage, and it is recommended that the following revised specification be inserted in the Manual:

The zinc chloride shall be acid-free and shall not contain more than 0.1 per cent iron. Fused or solid zinc chloride shall contain at least 94 per cent soluble zinc chloride. Concentrated solutions shall contain at least 50 per cent soluble zinc chloride.

Appendix B—Service Test Records

The committee reported progress on this work and submitted for information this year the work that has been done by the Illinois Central in using creosoted water tanks as its standard. (*Railway Age,* Oct. 18, 1918, page 709.) The committee feels that other railroads could well afford to investigate the matter of creosoting water tanks, as the life of a water tank depends almost entirely on the prevention of rot, and if the tank and supports are properly framed and treated a very long life can be reasonably expected.

The sub-committee was also asked to make "A critical study of the records of service given by the zinc chloride treatment and state definitely the results which may be obtained from that treatment. The question as to what might be expected from treatment with zinc chloride is of very general interest, particularly under the present emergency conditions.

In the following report the committee presents such records as have been found available, together with discussions, and the conclusions drawn from track experience. It has formulated definite recommendations as to methods to be followed in order to obtain the best results with zinc chloride treatment, with general conclusions as to what may be expected of zinc chloride treated ties when treated and used according to these recommendations.

A careful study of the track records and personal conferences with those familiar with the use of zinc treated ties lead to the conclusion that proper treatment will, at least, double the life of an untreated tie in the same situation. The experience of roads which have used zinc chloride treated ties clearly shows that the best results are obtained only when thoroughly sound ties are treated. Undoubtedly, many of the poor results obtained with zinc chloride treated ties were due to the fact that many ties were more or less rotten before they were treated. Decayed timber can never be expected to give good service. It is frequently stated that ties can be properly seasoned along the right-of-way or where cut, and that any deterioration can easily be detected by careful inspection. It has been demonstrated beyond all doubt that visual inspection of ties several months after cutting is not only impractical but frequently very misleading, because of the internal decay not evident on the outside. The successful preliminary preparation of ties is one of the most vital factors in obtaining successful service, and it is necessary that ties in all stages before treatment be kept in well-ventilated piles, free from every possible kind of infection. To help prevent these conditions, all ties should be shipped promptly after cutting to the seasoning yard at the treating plant. This means that all yards should be kept free from weeds, decayed wood and standing water.

The best results from the use of zinc chloride treated ties can only be obtained when the ties are thoroughly air seasoned before treatment. This calls for carefully constructed tie piles, care being taken to keep the stringers as far out towards the ends of the piles as possible and with sufficient air spaces between the piles.

Careful records should be kept of the ages of the tie piles, for it has been found far better to treat ties on the basis of age rather than on visual inspection. The time necessary to properly air season will vary, but in general the best results have been obtained by seasoning red oak ties twelve months and pine ties about four months.

In order to assure proper information as to the age of ties, the committee finds that some railroads have adopted the admirable system of end-branding the ties as they are taken up by the inspector, with a figure or paint mark, indicating the month of the year in which the ties were cut, which practice we strongly recommend.

The committee finds that the life of zinc chloride treated ties is greatly influenced by geographical factors, conditions of ballast, the amount of traffic, weight of rail, etc. The service obtained is to be ascribed more to these factors than to the kind of timber or the zinc chloride treatment. In other words, while softwoods like pine have generally given shorter service than hardwoods like oak, this difference is due to the fact that the pine ties rail-cut more rapidly than oak, thereby giving an opportunity for water to lodge under the rail bearings and leach out the zinc salt with the consequent more rapid decay of the pine ties.

Climatic influences undoubtedly have a large bearing on the possible length of life. A study of the tables clearly shows that in regions of low rainfall and dry atmospheric conditions, longer life has been obtained than in regions of high rainfall and high humidity. It is also true that the same holds for regions of low mean temperatures as compared with regions of high mean temperatures.

Influence and Treatment.—One of the most striking conclusions obtained, from the study made, is that the quality of treatment has the most direct bearing on the ultimate life obtained. It has been clearly demonstrated that poorly treated ties give short service and well-treated ties give longer service. The committee finds that poor treatment has been caused by: (1.) Excessive steaming of green or partially seasoned ties, in order to obtain any absorption at all. In many cases the absorption even after such steam treatment was very poor. (2.) The injection of an inadequate amount of zinc chloride. (3.) Paying no attention to the relation between the strength of the solution and the duration of pressure, resulting in a large amount of the zinc chloride solution being compacted in the outer layer of wood, when it should have

permeated the entire tie. (4.) The lack of intelligent and thorough supervision.

One of the criticisms of the zinc chloride treatment is that the preservative, being soluble in water, leaches out and, therefore, can not be expected to give permanent protection. A general investigation of the results clearly indicates that the leaching process does not take place as rapidly as has been assumed. We have determined from an examination of ties which have been in the track for a number of years that they still retain zinc chloride well distributed throughout the tie. This is more noticeable in drier climates. The committee finds that while zinc chloride is a water soluble salt, it leaves the wood very slowly and that sufficient is retained in the wood fiber to give protection that will at least double the life obtained from the untreated wood.

One of the results found by actual track inspection is that many zinc treated ties were taken out because of checking. The extent of checking varies with the climate, ballast conditions and the kind of wood, and appears to be peculiar to zinc treated ties and does not prevail with creosoted ties.

As already indicated, zinc chloride treated ties have failed because (1) partially decayed or improperly seasoned before treatment; (2) improperly treated, either from excessive steaming, insufficient absorption of preservative, or unequal distribution of preservative throughout the tie; (3) poorly protected against mechanical wear; and (4) for lack of careful supervision of the entire process of treatment.

These factors have undoubtedly contributed much to the severe criticism of zinc chloride treatment. The committee feels that too much stress cannot be placed upon a proper recognition of these facts. A thorough study has convinced us that many of the records of short life are unquestionably to be ascribed to either one or more of the reasons given above.

Lack of proper mechanical protection stands out strongly as another reason for frequent failure of zinc chloride treated ties. While proper mechanical protection is essential on any treated ties, it is especially important on those treated with zinc chloride. Very slight mechanical abrasion or injury permits the preservative to leach out of the tie. Hundreds of thousands of zinc chloride treated ties have been removed from track in which the ends and middle were perfectly sound, but which failed immediately under the rail base.

Improper inspection and supervision of treatment is frequently responsible for the failure of zinc chloride treated ties. The solution is colorless and gives in iteslf no indication of its strength, nor is it easy to determine penetration by borings. Visual inspection of penetration is difficult, and more reliance must be placed on volumetric absorption. Slight errors in determining the strength of the solutions may have serious results. Zinc chloride treatment, furthermore, requires judgment of the condition of the wood before treatment, and a complete appreciation of the many variable factors making for good treatment require technical inspection and supervision at all stages.

General Recommendations

As a result of the study made, we submit the following recommendations with reference to zinc chloride treatment and the use of zinc chloride treated ties. The specification submitted takes the place of the one given in 1915 Manual, page 551, headed Zinc Chloride Treatment.

1. *Handling Ties Before Treatment.*—Ties should be promptly brought to the seasoning yard. All piles should be marked showing the age of the ties, and the fitness of ties for treatment should be based on the number of months seasoned rather than on visual inspection. Under all circumstances there should be absolute assurance that only sound ties are treated.

2. *Treatment.*—All ties should be treated according to the standard specification by the Burnettizing process, as follows:

Specifications for the Treatment of Ties by Burnettizing Process

Seasoning.—No ties shall be treated unless they are thoroughly air seasoned. The railway's representative shall at all times be the judge as to whether ties are seasoned sufficiently to obtain the required absorption of the preservative.

Classification of Timbers.—Only the same kind of wood, and, as far as possible, only the same sizes shall be treated in the same charge, unless permission is obtained from the railway's representative to treat certain specified kinds of wood or certain specified sizes in the same charge.

Absorption.—The amount of zinc chloride absorbed shall be on the basis of an average of ½ pound of dry zinc chloride per cubic foot of wood. In any one charge the minimum absorption allowed shall be 0.45 lb. per cu. ft. If the average absorption falls below this quantity, the charge will have to be retreated. The maximum absorption allowed in any one charge shall be 0.55 lb. per cu. ft. Deficiency in absorption in any one charge shall be made up in subsequent charges. Under no circumstances shall the actual solution used be stronger than 5 per cent. In all cases the solution shall be as weak as possible with the highest possible volumetric absorption.

For red oak ties the solution shall be approximately 4 per cent, or less, and at least 20 per cent by volume of the solution shall be injected. For pine and other coniferous woods, the strength of the solution shall be not more than 2 per cent, and at least 40 per cent by volume of the solution used shall be injected. For woods other than oak and pine the volumetric absorption shall be as high as possible. The exact figure to be used shall be determined by the railway's representative. After determining this figure, the solution to be used shall be as weak as possible, consistent with obtaining an absorption of ½ pound of dry zinc chloride per cu. ft. and the necessary volumetric absorption. The amount of solution absorbed shall be determined by calculations based on the gage readings of the working tanks. The gage or gages should frequently be tested as to their accuracy. This absorption should be checked occasionally by weighing an entire charge of ties before and after treatment on a suitable track scale. The weighing of one charge in ten shall be considered sufficient. The strength of the solution at all times and at all stages shall be carefully controlled by chemical titration, using a silver nitrate solution with potassium chromate indicator.

Treatment.—All ties after being placed in the cylinder shall be subject to a preliminary steam treatment for at least one hour and not more than two hours, at a pressure not exceeding 20 lb. After the steaming, a vacuum shall be drawn for one to two hours, and where it is necessary to break the vacuum in order to empty the cylinder of condensed water, a subsequent vacuum shall be drawn following the emptying of the cylinder. In all cases the most complete vacuum, consistent with the elevation of the treating plant, shall be obtained.

The zinc chloride solution shall then be introduced into the cylinder at a temperature not less than 130 deg. F. nor more than 180 deg. F., and a temperature of at least 150 deg. F. shall be maintained throughout the entire operation. A pressure of approximately 125 or more lb. per sq. in. shall be applied for a sufficient period to obtain the proper volumetric absortion.

Any ties, regardless of the amount of preservative in-

jected, shall be deemed completely treated when, at any time during the latter part of the pressure period, the pressure having been held at 165 or more lb. continuously for a half-hour period, the absorption during such a period is less than 5 per cent of the total volume of zinc chloride solution which is to be injected into the charge.

3. *Handling Subsequent to Treatment.*—Cross-ties treated with zinc chloride should be air seasoned, preferably at the treating plant after treatment, for at least 60 days before insertion in the track. We base this recommendation on the following factors:

1. Thorough air seasoning of treated ties will give increased strength to cross-breaking and increased spike-holding power. It will also result in reducing plate rail wear.

2. Air seasoned ties will show a saving in shipping weight.

3. By air seasoning ties either at the treating plant or at distributing yards a better distribution will be obtained than if they are scattered on the right-of-way.

4. Air seasoned ties will show a reduced tendency to leaching.

5. It is essential to air season zinc treated ties to prevent signal disturbance.

6. By air seasoning ties at storage yards, a shipping reserve will be established, to be drawn on when cars are available.

4. *Supervision and Inspection.*—All stages of the handling of ties both before and after treatment require careful supervision. It is strongly recommended that provision be made for the thorough supervision of all stages of the treating process by a competent technical man, preferably of chemical training, at the treating plant, under the direction of the railroad official in direct charge of wood preservation.

Where and When Zinc Treated Ties Can Be Used

The geographic region in which zinc chloride ties could be recommended was made the subject of study by the committee. Realizing that the present emergency conditions warrant the use of zinc chloride, in many regions where under nromal conditions it would not be used, a meeting was called at Madison, Wisconsin, on October 10th to determine the best possible procedure, with the result that the following resolutions were unanimously adopted:

1. "That the line of demarcation for the present emergency practice as between zinc chloride and creosote oil in the treatment of cross-ties, north and west of which zinc chloride should be used, follow the line of 45-in. rainfall, starting on the coast of Texas and going north to the point where the south side of the extended line of the state of Tennessee would intersect the 45-in. line, follow the south side of Tennessee to the ridge of the Alleghenies, thence following the ridges of the Alleghenies until it intersects the 40-in. rainfall line and thence along the 40-in. line to the Canadian border."

2. "That where due to emergency conditions the supply of creosote oil is not available for ties in region south and east of this line, zinc chloride be used."

The committee recommends that these resolutions be submitted to the association for approval while the present emergency conditions prevail. The basic line upon which the use of zinc chloride treated ties has been drawn was developed from information submitted to the committee by the United States Forest Service and from information collected by the committee covering actual track service.

General Conclusions

The committee, recognizing that the conclusions to be drawn from track records and track tests may lead to a too optimistic conclusion as to what could be expected on an average over the whole field, and perhaps obscure the possible result to be obtained from other preservatives, feels that misleading conclusions may be drawn, unless we present the general aspects of the whole situation after the study we have devoted to it, so we, therefore submit the following conclusions:

1. That creosote is the best timber preserving agent known for all purposes, and by reason that its composition is not affected by either rainfall or temperature, and in addition has a lubricating effect on the wood which diminishes the injury due to mechanical wear, and this combination of qualities places it at the head of all treating preservatives.

2. That where for economic reasons creosote oil is not available, or other conditions of maintenance will not justify the expense for creosote treatment, the adoption of zinc chloride is without question justified in the treatment for ties. Climatic conditions will go further in determining the economy of this treatment than in any other, and as one can unquestionably figure on doubling the life of the untreated timber by its use, and in dry climates this life will undoubtedly be extended.

3. That in localities where the rainfall is excessive and with a humid atmosphere, where good zinc chloride treatment would be unfavorably influenced by leaching, and in any climate where checking of the timber is likely to be excessive, or the mechanical abuse of the fiber is extreme, and it is not considered possible to secure a straight creosote treatment, the introduction of some lubricating agent with zinc chloride will have a beneficial effect in retarding the destruction of the timber from the above causes.

Appendix C—Indicators for Determining the Burnettizing of Ties and Timbers

The basis for the investigation was the work done by E. Bateman, chemist on forest products, and his report issued by the United States Department of Agriculture, Forest Service, Circular 190, entitled "A Visual Method for Determining the Penetration of Inorganic Salts in Treated Wood."

In his method a representative disk of the treated wood is cut as a test piece. The freshly cut surface is dipped for an instant in a 1 per cent potassium ferrocyanide solution. The entire surface should be moistened, but the disk should remain in the solution not more than 10 seconds. After the disk has been thus moistened, the excess of the solution is removed from the face by blotting paper. The moistened block is then dipped into a 1 per cent solution of uranium acetate and allowed to dry. At first the whole block may have a reddish tinge, but, on drying, the untreated portions will have a dark red or maroon color, while the treated portions will be slightly whiter than the natural wood."

While this method has been in use for several years, many operators have found that the method of applying the test was not satisfactory, and also that the line of demarcation between the treated and untreated areas was not clear and distinct. The committee has therefore developed another method (described in the report) which continues to use the same chemicals as given by Bateman. The committee feels that these changes in the application of Mr. Bateman's method constitute a very decided improvement and should be used by all operators in checking the penetration of the preservative in the Burnettizing process. The committee is working on a method for determining the penetration of zinc chloride in red oak and hopes to have this ready for next year.

Discussion

C. M. Taylor (Chairman): The particular work before the committee this year was the revision of the creosote oil standards up to the present time. The revised specifications for creosote oil are given in Appendix A. The basic changes in the old specifications as now appearing in the Manual are not very great. Section 5 of each specification for creosote oil covers a new refinement for determining the purity of oil which says that: "The specific gravity of the fraction between 235 deg. C. and 315 deg. C. shall not be less than" a certain gravity. That clause has been added in order to tie down the high boiling point fractions. Further there has been added the process given under Sec. 6 of each specification. This is another guarding point to take care of high boiling point fractions, likewise, Sec. 7 of each specification. These specifications are proposed for adoption and publication in the Manual. I move their adoption.

J. L. Campbell (E. P. & S. W.): As a matter of information, I would like to ask the committee if in the preparation of these specifications it had any consultation with the manufacturers of creosote to ascertain if there would be any material difficulty or objection to compliance with the provisions of the specifications? We not infrequently run up against strenuous objections of the manufacturers to furnishing material according to the specifications for various reasons which they set up.

Mr. Taylor: The manufacturers assure us there is no reason why the specifications given here cannot be followed.

The Chairman: I ask the committee if these specifications as revised are the same as adopted by the American Wood Preservers' Association?

Mr. Taylor: They are the same as proposed for adoption by the American Wood Preservers' Association, so the two associations are proposing to have exactly the same specifications, so that we will have two oil specifications alike under which people may work, and they will both be the same if they are both adopted.

C. E. Lindsay (U. S. R. A.): Can the committee give us any information as to what increased quantity of creosote oil per cubic foot should be injected when grades 2 or 3 are used.

Mr. Taylor: The committee is not prepared to propose any standard for that. When you use grades 2 and 3, you are not using the best grade of creosote oil; consequently, what one might consider a factor of safety might not appeal to another engineer.

(The motion was carried.)

(Mr. Taylor then presented for adoption and publication in the Manual the following: Specifications for creosote-coal-tar solution; precautions to be followed in the purchase and use of the creosote-coal-tar solution; that the heading in the Manual which covers the point, "Methods of accurately determining the absorption of creosote oil," be changed to read, "Methods of accurately determining the absorption of creosote oil and creosote-coal-tar solution"; extra instructions in the actual analysis of creosote oil; standard specifications for zinc chloride; a new method for determining the strength of zinc chloride solutions; the specification for the treatment of ties by the Burnettizing process.)

(The action on the above was favorable in each instance.)

Mr. Taylor: In connection with the report on zinc chloride treatment, the committee went into the discussion of it primarily from a war standpoint. The conclusion was that because of the scarcity of creosote oil there were certain territories where at that time it was not advisable to use anything but creosote oil if it was available, and that in the other parts of the country zinc chloride should be used. The line of demarcation between the territories that should use the zinc chloride and those which should use the creosote oil follows very closely the 40 in. rainfall. It starts in Texas and goes up to the Canadian border at a point very close to Maine. That line is one that possibly by future committees will be advanced further north and further west, and coincide with what has been the line previously between the roads that use zinc chloride and those that use creosote. In connection with this study they came to the conclusion that there were three general conclusions that should guide any railroad in determining what treatment should be used in their particular locality. These conclusions are merely submitted to you for your information.

The final part of our report is in connection with subject 5, "Report on indicators for determining the Burnettizing of ties and timbers." There is nothing new about this indicator for determining the penetration of zinc chloride in timbers, except we have taken what has been done by the Forest Service and improved it some.

(The committee was excused with thanks.)

Progress Report on Stresses in Track

DURING THE YEAR the data of the tests to find the effect of counterweight of locomotive drivers made late in 1917 on the track of the St. Louis-San Francisco have been worked upon with very interesting results. Tests were also made on the track of the Illinois Central to find the effect of counterbalance of the Mikado locomotive. Other tests were made on the Illinois Central and the Chicago, Milwaukee & St. Paul to determine the distribution of pressure immediately under the tie and also the stresses in the tie, and considerable work has been done in reducing the data.

The committee plans to study the results of the experimental data now available and to take up the preparation of a report upon the part of the subject so covered. It is believed, too, that sufficient information has now been accumulated to begin the discussion of the relation of the results to the principles governing the design of railroad track. It is expected also that the test work will be continued during the coming year.

Committee: A. N. Talbot (Univ. of Ill.), chairman; W. M. Dawley (Erie), vice-chairman; A. S. Baldwin (I. C.), G. H. Bremner (I. C. C.), John Brunner (Ill. Steel Co.), W. J. Burton (M. P.), Chas. S. Churchill (N. & W.), W. C. Cushing (Pa. Lines), Dr. P. H. Dudley (N. Y. C.), H. E. Hale, Robt. W. Hunt, J. B. Jenkins, George W. Kittredge (N. Y. C.), P. M. LaBach, C. G. E. Larsson (Am. Br. Co.), G. J. Gray (U. S. R. A), Albert Reichmann (Am. Br. Co.), H. R. Safford (U. S. R. R. A.), Earl Stimson (B. & O.), F. E. Turneaure (Univ. of Wis.), J. E. Willoughby (A. C. L.).

Discussion

A. N. Talbot (Chairman): The tests made on the Frisco last year show that stresses in the rails under the main drivers were on the average nearly four times as great at a speed of 50 mi. an hour, as at 5 mi. an hour with the Santa Fe type of locomotive. The stresses found in the rail under the Pacific type of locomotive ranges from 60 to 70 per cent more at a speed of 60 mi. an hour than the stresses at 5 mi. an hour. Tests made on the Illinois Central during the summer with the Mikado type showed that at 45 mi. an hour a speed materially higher than is permitted on the road, stresses were about twice as great as at a speed of 5 mi. an hour.

In all these cases the trailer and even the front trucks of the locomotive showed an increase in stress at times corresponding to the position of the counter weight on the drivers which gave the highest stress. Under the main driver the maximum effect was reached when the counter weights were down.

In addition to this work with the locomotives and the effect of counterweights, tests have been made on ties in the track to determine from the flexure of the ties the effect produced in them of the distribution of pressure upon the ballast lengthwise of the tie. While it is a very difficult matter to get these bending movements and the distribution very closely, we shall have some information on these points. I can only say that the ordinary wooden cross-tie seems to be subjected to all kinds of stresses by bending in different directions.

The committee was disappointed last year because there was no opportunity for the members to study the report and to discuss it.

C. E. Lindsay (U. S. R. A.): I would like to ask the committee if in their experiments they have used 8-in. by 8-in. ties, and whether they have considered the use of a 7-in. by 9-in. tie with the long axis vertical at the joint?

Prof. Talbot: The committee has used 6-in. by 8-in. ties and 7-in. by 9-in. ties with the wide dimension horizontally, but not the 8-in. by 8-in. It has not been proven so far I think that a greater vertical dimension would be of advantage. There is nothing to indicate that a decrease in the amount of bending would be of advantage to the track. It may be that it is desirable.

C. P. Howard (I. C. C.): I would like to ask Prof. Talbot if the increase in the static pressure developed by these experiments does not coincide closely with what was found to be the case in short spans of bridges.

Prof. Talbot: I presume that the results would be much alike, but the conditions are considerably different. In the case of the short spans another element enters, namely the deflection of the structure. If a bridge has a solid floor, it may be expected that the condition then, aside from the deflection on the structure, will be very much the same as in the track.

W. M. Camp: Prof. Talbot touched on two or three matters that seemed to me to be a very practical application of those stresses in the track. One was the fact that where the end of a tie is not well supported by a bank outside, the flexure is greater than it is where there is a good bank to support the end of the tie and the ballast. I should think another very practical study would be economical length of ties. Another question which comes up is in regard to the weight of rail in relation to the length of tie.

Prof. Talbot: The committee has had in mind the study of the effect of the length of ties upon action in the track. These tests should be made some time after the tamping is done to see what the conditions become then, because it is quite evident that the conditions to which the tie is subjected immediately after the tamping may be far different from those which come upon the tie after a considerable time has elapsed.

(The committee was relieved with the thanks of the association.)

Report of Committee on Roadway



THE COMMITTEE SUBMITTED as information eight profiles of specific instances of shrinkage of embankments on the Atchison, Topeka & Santa Fe, giving the percentage of material required to restore the several embankments to their original width after a lapse of four years' time.

The prevention or cure of water pockets is a subject which has been before the committee for several years. In 1914 a circular letter was sent to the different members of the association, asking certain questions in regard thereto. A large number of replies were received to this inquiry and the sub-committee of that year made a progress report. The committee at that time was not ready to form conclusions either as to the best method of preventing water pockets or the best method of curing water pockets that exist. We do not find that anything of particular interest along these lines has been developed since that report, except that of specially preparing the roadbed before laying track by means of rolling.

It is desired, however, to report on this subject, and we have condensed and tabulated the replies made to the circular letter above referred to, and attach a copy of the replies. From these replies and our own experience along this line, we would recommend the following conclusions be adopted for inclusion in the Manual:

CONCLUSIONS

(1) Water pockets have existed for many years in certain localities since construction.

(2) They have increased and become more noticeable since the use of heavier equipment and greater density of traffic.

(3) In water pockets the ballast has generally been beaten down into the roadbed and formed troughs under the track, the sub-ballast and roadbed being pushed out laterally and sometimes raised, forming walls, to prevent the water draining from under the track.

(4) Water pockets exist in fills as well as cuts, but more generally in cuts of a clayey nature.

(5) They exist in localities where soil conditions are unfavorable to satisfactory maintenance, particularly in clay.

(6) Method of surfacing and tamping track has no particular effect in forming water pockets, but the class of material used as ballast does have considerable effect.

(7) Water pockets can be prevented in many cases by proper formation of roadbed and use of proper kind and depth of ballast, as follows:

(A) Where the roadbed, in either cuts or fills, is composed of a more or less clayey material, after the work has been brought to a sub-grade all construction tracks should be removed and the sub-grade rolled with a road roller weighing about ten tons, to a uniformly smooth surface with either sufficient crown or side slope to shed water; any resulting depressions below sub-grade being loosened up with a plow and brought up to sub-grade by the addition of material of the same kind as that composing the roadbed; and then rerolled. After several years' use under traffic it may be necessary to cut through the shoulder of the sub-grade at frequent intervals to afford drainage, as the sub-grade under the track will settle several inches lower than the shoulders.

(B) Sub-ballast should be of engine cinder, screenings or other similar material, so as to prevent the roadbed working up into the ballast proper. Stone ballast

should not be used directly on top of clay or loam roadbed.

(C) Sufficient depth of ballast should be provided to insure even distribution of the load on the roadbed.

(D) Construction trains should not be run, if possible to avoid, over track laid on new roadbed without ballast. This drives the ties into the roadbed and forms depressions, which later on develop into water pockets.

(E) In wet cuts, sub-soil drains of vitrified bell and sewer pipe should be laid on a 4-in. well-tamped bed of engine cinders in deep ditches, with uncemented joints, and the trench then back-filled with same material as removed if at all porous, otherwise back-fill with engine cinder.

(F) Wet cuts of clay should have sufficient crown to drain properly, and the surface should be smooth. Any back-filling necessary to make a smooth surface should be made of the same material as exists in the cut.

(G) In building new roadbed alongside existing tracks on same grades, care should be taken not to form new roadbed of impervious material at a higher elevation than the original roadbed, but the new roadbed should be kept at or below this level so as to provide an outlet for the drainage through the existing ballast. This is particularly important on hillside construction. If change in existing gradient is to be made, new roadbed for both tracks should be on same level.

(8) In curing water pockets the principal object is to provide proper drainage. This may be accomplished, according to localities, in several ways, as follows:

(a) In cuts, by means of sub-soil drains of vitrified bell and sewer pipe, laid in ditch or between tracks with uncemented joints. They should be laid at such depth as to be below any movement of the sub-grade and below the water to be drained. They should be below the frost line. Lateral drains of pipes or of cinder or stone may be made to tap the pockets if necessary. Pipe should be covered 12 in. or more with porous material, and then the trench should be back-filled with the same material as removed, if at all porous, otherwise use engine cinders for back-filling.

(b) In cuts where material is very soft to a considerable depth, a drain about 3 ft. square may be provided of large stone, either in the ditch line or between tracks, and of sufficient depth to take the drainage.

(c) In cuts where material is soft to a great depth, old ties or bridge timbers may be driven just outside the ends of the ties. These serve to hold the roadbed in place and to some extent lower the water level, leaving the top surface of the roadbed more firm.

(d) On fills, water pockets should be tapped by lateral ditches and filled with porous material so as to drain.

(e) In many cases the material will have to be excavated and a bed of old timber, cinder or other material spread over the surface to provide sufficient area to prevent the further penetration of the ballast into the roadbed, and the ballast should then be replaced with good, clean material.

Committee: W. M. Dawley (Erie), chairman; J. A. Spielmann (B. & O.), vice-chairman; J. R. W. Ambrose (Tor. Term.), H. E. Astley (N. Y. N. H. & H.), C. W. Brown (L. & N. E.), S. P. Brown, B. M. Cheney (C. B. & Q.), C. W. Cochran, W. C. Curd, Paul Didier (B. & O.), S. B. Fisher (M. K. & T.), W. C. Kegler (C. C. C. & St. L.), H. W. McLeod (C. P. R.), C. M. McVay (K. & M.), F. M. Patterson (I. C. C.), W. H. Petersen (C. R. I. & P.), P. Petri (B. & O.), W. F. Purdy (Mon. Sou.), R. A. Rutledge (A. T. & S. F.), W. H. Sellew (M. C.), J. M. Sills (St. L.-S. F.), W. P. Wiltsee (N. & W.),

Discussion

W. P. Wiltsee (representing the committee): Five subjects were assigned to the committee and we have reported on two. It is the intention of the committee that the profiles presented be received as information. I so move.

C. P. Howard (I. C. C.): I would like to call attention to these profiles, that nothing is said about subsidence, and, therefore, we will assume that all the diminution in the size is shrinking and not subsidence. I wonder if the committee has found any of the settling was due to subsidence, and also if it made any effort to find out how the embankment was formed down toward the bottom. I ask if the committee knows how much material and excavation it took to make the banks, and whether the banks as finally shrunk were greater or less than the amount of material in the excavation.

Mr. Wiltsee: I do not think those points were considered, but the committee will consider them this year.

R. H. Ford (C. R. I. & P.): Before we receive these profiles, I would say that the amount of subsidence shown is very small. I think they are open to some question as to their thoroughness of preparation.

Mr. Wiltsee: This profile shows shrinking and not subsidence. The matter of subsidence does not enter into that.

Mr. Ford: I will substitute shrinkage for subsidence; it applies in either case. The shrinkage of these banks is much less than the experience of the average man.

W. H. Hoyt (D. M. & N.): These fills have been brought up to their original level by adding more material. Now, apparently that provides not only for shrinking, but also for any subsidence that may have occurred in these fills. As this question is an important one, and as these profiles do not show the class of material and many other points that might have an important bearing on the accuracy of the statements in the report, I do not think we will be justified in publishing them.

George H. Bremner (I. C. C.): I think it is important to indicate the part of the country to which these profiles apply, so that we would better understand the conditions surrounding them.

(After further discussion, the motion that the profile be received as information and published in the proceedings was carried. Mr. Wiltsee then read the matter on the curing of water pockets, including the conclusions, and moved its adoption and printing in the Manual of the association.)

J. G. Sullivan: I think that practically everything the committee has said there is thoroughly good practice. I would like to see it amplify one feature if possible, and that is the crowning of the roadbed. My experience has been that after we started crowning roadbeds we were getting a great deal better results in countries where material will hold water. There is some objection to it in a country where you lay track in the frost, but that is offset by the benefit you derive from the condition of the track afterwards.

One other feature that I should think might be added, although it is hard to control, and that is the time at which you lay track. If you lay track in the spring with the frost in the ground or just going, it causes more trouble in forming a pocket after the track is laid than any other one thing.

Mr. Ford: I think we all realize the force of what Mr. Sullivan has said about this. There is one thing which he has not alluded to, which I do not see covered in here. As an investment, it is very often desirable if the road can be graded a year previous and left to weather. The interest on the money that is expended for grading and letting it lie a year is a good investment. Some of the paragraphs which have been alluded to here might not be necessary, but I notice that they are not

made obligatory, but that they constitute a method where by work can be done.

The Chairman: Par. F has been changed to read "All roadbed should have sufficient crown to drain properly, and the surface should be smooth." Does that cover it?

Mr. Sullivan: And it should be maintained in this condition until ballast is placed on it.

The Chairman: It now reads: "All roadbeds should have sufficient crown to drain properly, and the surface should be smooth, and maintained in this condition until the ballast is placed." The last word in the paragraph "cut" is changed to "roadbed."

C. W. Baldridge (A. T. & S. F.): It seems to me that Art. E, under (7), should be made to agree with Art. A, under (8). The object is exactly the same. Art. E does not provide for covering the pipe with positively porous material, and I would suggest that both articles be made to read: "All pipe should be covered 12 in. or more with engine cinders or equally porous material," and then the trench be back filled with the same material as removed, if at all porous, etc."

Mr. Wiltsee: The committee will accept that amendment.

(Following this there was an extended discussion as to the practicability of applying these conclusions in actual work, it being the contention that they were too theoretical.)

A. S. Baldwin (I. C.): It is a very discouraging thing to a committee to submit a report of this kind, and not secure publication. I am quite sure that a number of years ago when I was doing such work, such information as is given in this report would have been very valuable. We cannot expect to have a perfect report under any conditions, and, therefore, I would like to see this report included just as it is written and printed in the Manual.

(After some further discussion Mr. Wiltsee's motion was put and carried.)

The committee was then dismissed with thanks.

Report of Committee on Rail



THE SPECIFICATIONS for steel rails in the Manual are in need of revision in the light of knowledge gathered in recent years, and specifications were submitted in Appendix A for consideration and discussion during the coming year. A number of changes have been made from the present specifications in the Manual, all of which should be given careful thought, but mention may be made of the following:

a. The manganese is raised 10 per cent in both lower and upper limits in open-hearth rails, making the proposed requirement 0.70 to 1.00 per cent.

b. For open-hearth rails of 111 lb. per yd. and over the carbon is made 0.67 to 0.80 per cent, an increase of 0.05 per cent for the heaviest class of rails.

c. For open-hearth rails the acceptance analysis is made on a sample from the finished rail instead of the ladle test ingot.

d. The bending of the rail in the physical testing may be accomplished by either the drop test or the quick bend test (hydraulic bender), as agreed upon in the contract.

e. The elongation is required to be at least 8 per cent in 1 in. instead of 6 per cent.

f. Three test pieces for bending are selected from each heat of open-hearth rails and all three are required to meet the requirements.

In order to decrease the pressure required to gag a rail, Dr. P. H. Dudley has been making experiments at several mills with the supports in the gag press increased from the usual spacing of 42 in. to spans up to 60 in. Curves of the relation between the distance between supports and the load required to produce permanent set show that the load decreases as the span increases, and consequently the local pressure of the bending die and the distortion of the metal at the point of pressure would decrease. Some experimental work has been done in gagging rails with the longer spans and we hope to have some developments to report at a later date.

A standard method of testing rail joints is desirable to enable the results of different laboratories to be compared with each other, which cannot now ordinarily be done, due to differences in the details of conducting the tests. The Committee submits in Appendix B a method of testing rail joints with the recommendation that it be adopted and included in the Manual. This method proposes a span of 4 ft. between supports, which is longer than has been used in most investigations of rail joints, but is done for the purpose of allowing the test to be made with a lighter load and thus allowing it to be made in a greater number of laboratories. This is also the span used in the hydraulic bend test of rails and in the drop test of sections of rail 111 lb. per yd. and over.

The Pennsylvania Railroad has continued work with the hydraulic or quick bend method of testing rails. This method seems to be preferable to the drop test, in that it gives more complete information, is quicker of operation and the breaks also are practically always normal tension breaks of the part in tension, which is frequently not the case in the drop test. For these reasons it has been included as an alternative method of testing rails in the proposed specifications for steel rails submitted with this report.

Another method that is being tried for the examination of the interior condition of rails is the process of deep etching of longitudinal sections, in strong acid. The Altoona Laboratory has examined some longitudinal slabs about ¼ in. thick, cut from the interior of the head of transverse fissure rails, by keeping them for two hours in a hot mixture of hydrochloric and sulphuric acids. The committee has modified this method by taking a ¾-in. slab consisting of the top part of the head. This slab is etched or pickled for 30 to 45 min. in strong commercial hydrochloric or muriatic acid in a large porcelain dish and kept at a temperature of about 180 deg. F. The committee expects to have some results from these examinations to report at a later date.

Recommendations

The committee submits the following recommendations:

1. That the method of testing rail joints submitted with this report be adopted by the Association and included in the Manual.

2. That the revised specifications for steel rails submitted with this report be printed in the Proceedings for consideration and discussion during the coming year.

Committee: G. J. Ray (D., L. & W.), chairman; H. B. MacFarland (A., T. & S. F.), vice-chairman; E. E. Adams (U. S. R. R. A.), J. A. Atwood (P. & L. E.), A. S. Baldwin (I. C.), W. C. Barnes (S. P.), Chas. S. Churchill (N. & W.), W. C. Cushing (Penn. Lines), G. M. Davidson (C. & N. W.), Dr. P. H. Dudley (N. Y. C.), J. M. R. Fairbairn (C. P. R.), L. C. Fritch (C., R. I. & P.), A. W. Gibbs (P. R. R.), J. D. Isaacs (S. P.), Howard G. Kelley (G. T.), R. Montfort (L. & N.), A. W. Newton (C., B. & Q.), J. R. Onderdonk (B. & O.), H. R. Safford (U. S. R. R. A.), J. P. Snow (Cons. Engr.), F. S. Stevens (P. & R.), E. Stimson (B. & O.), R. Trimble (Penn. Lines), F. M. Waring (P. R. R.), M. H. Wickhorst.

Appendix B. Standard Test for Rail Joints

In order that comparison of results of different types of joint bars may be made, the uniform method of procedure for laboratory test shall be as follows:

General Assembly. Complete rail joints, full bolted, shall be used. Before joints are bolted the loose scale shall be removed from the contact surfaces of rails and joint bars so that there may be clean, dry surfaces for surface contact. Rail joints shall be then subjected to tests that will show the strength and deflection of the joint under transverse load with head up and also with head down. The results are to be compared with a test of a continuous rail of the same span for determination of rail joint efficiency and rigidity. The joints are to be bolted with heat-treated bolts, or if other bolts are used the quality and kind of bolt shall be stated. The rail used for test of joints shall be cut from the same piece of rail as rail for continuous span. Rails used for test pieces shall be preferably from the same rail, or at least from the same heat of rails. New rails and joint bars shall be used for test.

Quality of Material. Material for both rail and joint bars shall be subjected to standard tension tests, to hardness tests, to chemical analyses and, if heat-treated material, to microscopic examination. Measurements to be recorded for joint bars of the area sketch of section, moment of inertia, length, weight, location of bolt holes, camber if any. Measurements of rail section include area sketch of section, moment of inertia, weight per yard, location and size of bolt holes. Joints are to be bolted up so that there shall be a space of ⅜ in. between the ends of the adjoining rails. Bolts are to be applied so that they shall not be in contact with the sides of the bolt holes through the rails. If necessary ends of rails to be faced off to give required spacing and bolt clearance.

The supports shall be solid, flat bearing surfaces with vertical faces 48 in. apart, with the inner edges rounded off to ⅛ in. radius. The load to be applied midway between the supports by a block, having a radius of 16½ in., and a width not less than the width of the base of the rail.

Loading. An initial load of 3,000 lb. shall be made at which load the deflectometer shall be set at zero. Uniform increments of load of such magnitude shall then be applied to accurately define the elastic limit. Maximum deflection and set to be determined for each increment of loading. Deflections and permanent sets to be measured to one-thousandths of an inch. Loading to continue until adjacent rail ends meet. Note is to be made of readings of the load at which the joint bars or rails commence to scale.

Number of Tests. Three concordant tests shall be made, and results shall be recorded in detail. Abnormal tests to be discarded.

Efficiency. The efficiency of a rail joint is expressed as the ratio of the elastic limit in pounds of the rail joint divided by the elastic limit of the continuous rail; this efficiency to be given first with head up, second with head down, using data to correspond to conditions imposed. Rail joint efficiencies shall be expressed in per cent.

Rigidity. The rigidity of a joint is a comparison of the deflections of the rail and the joint under the load that develops the elastic limit of the joint. It is the ratio expressed in per cent, of the deflection of the rail to the deflection of the joint at this loading; that is, the deflection of the rail divided by the deflection of the joint at the elastic limit of the joint.

The rigidity shall be expressed for the two conditions of test, with head up and with head down.

Appendix I. Transverse Fissures

By Dr. P. H. Dudley

Government investigators class interior transverse fissures as fatigue fractures of metal while railroad officers have facts from their service records of rails which prove that they are not fatigue fractures of metal. The government investigators do not explain the origin, time and place of occurrence of the nuclei, nor the variation in size from $\frac{1}{16}$ to $\frac{3}{8}$ in. in diameter of the type of interior transverse fissures classified by me as intergranular. All fractures of this type show nuclei of considerable area, and that they are not points. These areas constituting the nuclei, rupture as a unit and not in detail, showing positively and conclusively that fracture was caused by the application of a rapidly applied blow of a pressure beyond the elastic limit, or even ultimate strength of this interior core of inferior metal.

The government investigators conclude that the fracture of the nucleus and the subsequent development constitutes a fatigue fracture of metal, but as they occur only in an occasional rail head of like design, under the same traffic conditions, railroad officers do not accept this statement. There is, however, no difference of opinion between the railroad officials and the government investigators about the growth in the track of the specular surfaces which start from and around the nuclei of interior transverse fissures.

I have mentioned in previous communications to the Rail committee that rails rolled from reheated blooms did not develop as many interior transverse fissures in the track as rails rolled direct from the ingots. I have collected the service records of eight railroads. These reported 559,644 tons by direct rolling for the years 1909 to 1915—given in detail per year—and 1054 interior transverse fissures were developed. The railroads also reported 322,593 tons from reheated blooms which developed only 59 interior transverse fissures. The rails were rolled at 11 different mills.

The railroads are to be congratulated that the Rail committee statistics of the service records of rails show at the present time a remedial method of manufacture of rails which at least reduce the interior transverse fissures 90 per cent in the output.

Appendix J. Frictionless Rail

The committee made an investigation of the extent to which frictionless rail is in use on steam roads and the results following its installation. The committee ascertained that 27 steam and 7 electric roads had installations of this form of rail and presented abstracts of reports made to it regarding the service which this rail was rendering.

Discussion

G. J. Ray (chairman) submitted Subject No. 1 and (1) "Revision of Manual" and said: It is the recommendation of the committee that the revised specifications for steel rails, submitted with this report, be printed in the proceedings for consideration and discussion, during the coming year. I want to ask the chairman to grant rail manufacturers the privilege of the floor if they desire to discuss this matter at the present time. I move you that these revised specifications be accepted and published as information and for discussion.

The Chairman: If there are any members of the rail manufacturers present who wish to discuss this question, we will be glad to hear from them.

M. A. Weymouth: As secretary of the Manufacturers' Rail Committee, I have been asked to present this: "To the American Railway Engineering Association: The manufacturers have had no opportunity to properly consider the requirements given in this specification. They, understand, however, from Recommendation No. 2, of the Report of the Rail Committee, that these specifications, as presented, are to be considered as a study

only and not as practical specifications to be used for commercial purposes. It seems that in order to bring the rail specification into a practical form which can be used by the railroads in contracting for their rail requirements, it will be highly desirable for the Rail committee to have a consultation with the rail manufacturers."

Mr. Ray: It is the intention of the Rail committee to ask the manufacturers to a meeting, probably, in the near future.

The Chairman: The motion is that the revised specifications for steel rails submitted with this report be printed in the proceedings for consideration and discussion during the coming year.

(Motion carried.)

Mr. Ray: Subject 5, assigned to the committee, is as follows: "Make critical study of joint bars from the standpoint of design and material, together with laboratory tests, including strain-gage measurements after having established a uniform method of comparative testing." The committee asks that the association adopt the method of testing rail joints submitted with this report, and included in the Manual. In order to get this matter before the house, I move you that the proposed matter be adopted by the association and printed in the Manual.

C. E. Lindsay (U. S. R. A.): I do not know what is meant by "Transverse Load" in "general assembly." And I also feel that the length of rail should be specified. You would get different results if you use a full 33-ft. rail.

H. B. MacFarland (Santa Fe): The transverse load refers to the load or application in a vertical direction. You possibly had in mind that it should be in a horizontal direction?

C. W. Baldridge (Santa Fe): I found in examination of failed joints that there is an idea among track men at least, that a good many joint failures or bar failures in the head of the bar are started by the wire edge on the under side at the head of the rail in the end. In the matter of testing it might be advisable in the assembly to provide for the underside of the head of the rail at the end, to be rounded off slightly, before the joint is assembled for the test.

Mr. MacFarland: It is not practicable, on account of there not being testing machines of various types throughout the country to take care of such a test. That would have to be a special test.

Mr. Baldridge: One reason I suggested the rounding off of the lower edge is that I think it would pay to have a man with a file to take off the feather edge on the lower side of the head of the rail at the end.

Mr. Ray: As a matter of information, I believe the trouble Mr. Baldridge speaks of can be overcome in an easier way by making some provision in the angle bar. There has already been done, and tests are under way at the present time, which indicate that there may be something in that.

The Chairman: The motion before the convention is that the method of testing rail joints submitted with this report, be adopted by the association and included in the Manual.

(The motion was carried.)

Mr. Ray: In connection with subject No. 7 I want to call the attention of the association to the data headed "special investigations."

(Mr. Ray then read from this section of the report.)

Mr. Ray: It is well for the association to bear this matter in mind, and any information that can be given that will either substantiate that argument or will change the results the other way, will be much appreciated.

Mr. Ray: At the time the report was gotten out, the report of the sub-committee on Intensity of Pressure due to wheel loads and resistance of rail steel to crushing and deformation had not been received. Since that time it has been received, but the chairman of the sub-committee is not here and he requested Mr. Bronson to say a few words, and I will let him tell you what has been done.

(C. B. Bronson (N. Y. C.) then described the tests made during the past year.)

The Chairman: In excusing this committee, with the thanks of the association, I will ask the members to send to the committee any data they may have on this subject.

Report of Committee on Buildings



THE COMMITTEE RECOMMENDS in its report:

1. That the matter under "Revision of Manual" be approved.

2. That the conclusions under the heading "Design and merits of high and low platforms at passenger stations" be approved and published in the Manual.

3. That the conclusions under the heading "Umbrella versus Butterfly sheds" be approved and published in the Manual.

The committee recommends that the same subjects be reassigned for the coming year.

Committee: M. A. Long (B. & O), chairman; G. H. Gilbert (Southern), vice-chairman; G. W. Andrews (B. & O.), D. R. Collin, W. H. Cookman (P. R. R.), C. G. Delo (C. G. W.), W. T. Dorrance (N. Y. N. H. & H.), K. B. Duncan (G. C. & S. F.), C. H. Fake (M. R. & B. T.), A. T. Hawk (C. R. I. & P.), F. F. Harrington (Virginia), E. A. Harrison (A. T. & S. F.), A. Larsen, J. W. Orrock (C. P. R.), S. B. Phillips (U. P.), R. V. Reamer (C. R. R. of N. J.), C. W. Richey (P. R. R.), John Schofield (C. N.), Z. H. Sikes (N. Y. C.), W. J. Watson (Cons. Engr.).

Appendix A—Revision of Manual

Definition of Terms Published in the Manual and Supplements Thereto

Station.—An established location for the accommodation of passenger and freight traffic. (Manual 1915, page 187.)

Transfer Platform (Freight).—A platform approximately level with freight car floors used in transferring freight from car to car. (Manual 1915, page 207.)

Shop Buildings.—Various structures for the construction and repair of locomotives, cars and other railway equipment. (Manual 1915, page 188.)

Engine House.—A structure for housing and the general maintenance of engines in service. (Manual 1915, page 188.)

Turntable.—A revolving structure for turning locomotives or cars. (Manual 1915, page 188.)

Transfer Table.—A traveling structure with a track on which a locomotive or car can be run and transferred

from one parallel track to another. (Manual 1915, page page 188.)

Coaling Station.—An established location for the storing and delivering of coal to locomotives. (Manual 1915, page 192.)

Oil House.—A building for the storage and distribution of oil and waste. (Manual 1915, page 194.)

Section Tool House.—A building for housing of section cars, tools and small track material. (Manual 1915, page 195.)

Power House.—A building for housing apparatus for supplying light, heat and power for various purposes. (Manual 1915, page 189.)

Rest House.—A building for the accommodation of employees, usually containing rest and recreation rooms, sleeping quarters, lunch room, lockers, bath, etc. (Manual 1915, page 208.)

Butterfly Shed.—A type of structure erected over platforms for protection from the weather with a central line of supports and roof sloped towards center for drainage. (Manual 1915, page 208.)

Umbrella Shed.—A type of structure erected over platforms for protection from the weather with a central line of supports and roof sloped to the sides for drainage.

Ash Pits.—A structure into which cinders are deposited from locomotives, for subsequent removal. (Supplement to Manual 1917, page 35.)

Inbound Freight House.—A building for the handling of freight for delivery to consignee. (Manual 1915, page 201.)

Outbound Freight House.—A building for the receiving of freight by the railroad for shipment. (Manual 1915, page 201.)

Following Additions to the Manual

Coaling Stations.—Where coal is stored in summer for use in locomotive stations in winter and where the amount stored is less than 75,000 tons, no special mechanical device is recommended, it being more economical to store it by unloading cars by hand or crane and reclaiming it by the use of tools that can be put to other use when not handling coal, such as locomotive crane, ditcher or steam shovel.

Ash Pits.—We wish to add an additional cut and description as follows:

A scheme for conveying and disposing of cinders through pipe by vacuum created by steam. In order to handle them by this method cinders must not be wet down.

Scales.—At terminal stations where scales can be given proper attention and where the volume of business will justify, dial scales are preferred for weighing mail, baggage and express.

Appendix B—High and Low Platforms at Passenger Stations

While very few railroads in this country have adopted platforms level with the car floors, they have always been the standard in use in Great Britain. One of the chief recommendations for raised platforms is the saving of time required for passengers boarding and leaving cars over that required for walking up and down steps at low platforms.

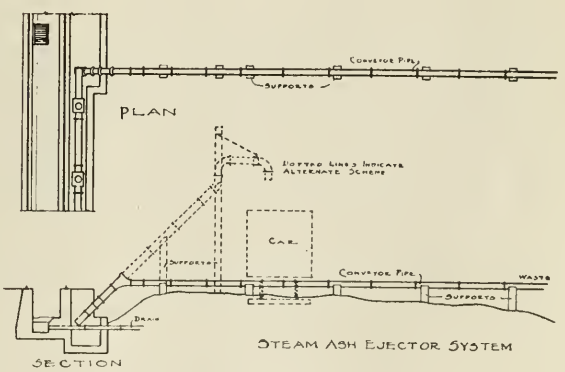
As the interchange of equipment is extensive, clearance must be provided for the widest equipment on the road involved. As passenger equipment is narrower than freight equipment, this arrangement leaves a void or space between the car and platform that might cause accidents to passengers who carelessly enter and leave trains. Some railroads are equipping their passenger cars with an extension flap to the trap door to bridge this opening; the operation of which is practically automatic. When the trap door is down the opening of the vestibule door causes the sliding portion to extend beyond the side of the car. Closing the door returns it to its normal position. When it is necessary to raise the trap at stations not equipped with high platforms it is not desirable for the trap to be extended. To provide for this feature a handle is set flush in the end of the car body by means of which a connection between the door and the trap may be disengaged. It is designed with a uniform extension to take care of a gap at platforms built on curves as sharp as 6 deg.

There are platforms in use in subways that have mechanical extensions moving out until they are practically touching the side of the car, so that there is practically no space between the side of the car and the platform.

Platforms are built either of wood, concrete or steel, or a combination of these materials. At important points, where traffic is heavy, they should be roofed over.

Where high platforms are used it is necessary to use a special design of baggage truck. One road having in use a great many high platforms is considering the construction of trucks on small wheels on which the baggage will be stored until the arrival of the train, the truck will then be pushed into the baggage car and left there with its load to be assorted while the train is traveling from one station to another. The baggage to be taken off at the next station will be loaded on this or a similar truck, so that an entire load can be taken out of the car as soon as the train stops. In this scheme the time consumed for handling baggage, express and mail at stations will be reduced considerably.

Low platforms are more universally used and consist of cinder fill, with or without wood or concrete curbs,



Plan and Section of an Ash Disposal System

brick with concrete curb, concrete with concrete curb, and concrete with a wearing surface of asphalt mastic.

In comparing high platforms with low platforms, the advantages in favor of the high platforms are as follows:

1st—Facility, rapidity and safety with which trains may be loaded or unloaded.

2nd—The prevention of the public crossing the tracks.

3rd—Where platforms are below the street level, a saving of about 3 feet in the vertical height to be traveled by passengers.

4th—Passenger, baggage, express and mail can be handled more rapidly, which means a reduction in the time of station stops.

5th—They afford convenient space for the housing of ducts, cables, signal equipment and sometimes elevator machinery.

6th—Where passenger traffic is heavy raised platforms permit the use of additional doors.

They have certain disadvantages:

1st—The cost of changing passenger equipment to serve both high and low platforms, and the cost of constructing subways or bridges for passengers express and baggage.

2nd—Where freight trains must use the tracks adjacent to high platforms the restricted clearances may prevent the operation of certain cars and cause heavy expense for transfer of freight.

3rd—The necessity for special form of baggage truck having a low floor.

4th—It is impractical to place a switch within the limits of the platform, due to lack of clearance for equipment.

By canvass of various roads it is found that low platforms vary from 5 ft. to 5 ft. 6 in. from the center of track to the face of platform curb, and level with the top of rail to 6 in. above it.

It is recommended that low platforms be built to 5 ft. 6 in. from center of track to face of curb and to be 4 in. above top of rail at curb.

Recommendations for the Manual

On account of the existence of high platforms at important terminal stations and the desirability of interchange of passenger equipment throughout the country, the committee suggests that the Association recommend to the M. C. B. Association that all passenger equipment in the future be so constructed that they can be used at either high or low platforms.

It is recommended that high platforms be provided only in connection with tracks devoted exclusively to passenger business.

Appendix C—Umbrella Versus Butterfly Sheds at Through Stations

There is no choice between the umbrella shed and the butterfly shed, so far as protection from the elements is concerned, the edge of the gutter being in the same relative position on both types. Neither one successfully accomplishes what they are designed for, as the edge of the roof must be kept outside of the clearance diagram, and this places the protective feature so far from the coaches that the benefit to passengers is limited.

Where no waiting room is provided in connection with umbrella sheds, it is recommended that partitions be built between supporting columns; these partitions to be located at every third bay where traffic is heavy, and every fifth bay where traffic is light.

With the umbrella shed type, two gutters and two leaders from the gutters to the central post are necessary. With the butterfly type no gutters are required. This eliminates the first cost for gutters and means lower maintenance cost.

Some railroads use circular supporting columns for the butterfly type, making use of this column for the regular down-spout. On account of the prevalence of cinders the drains at the bottom of the columns are likely to be stopped up and in cold weather the columns will freeze and burst.

In either type of shed it is recommended that at or below the platform level of the down-spouts a trap with clean-out be installed. It is considered preferable to place the down-spouts outside the supporting column.

At umbrella sheds in some parts of the country snow collects in such quantity that it becomes necessary to shovel it off. Consideration should be given roofing sheds in such localities, with a roof having a hard surface, as a composition roof is easily ruined by laborers digging into it with picks and shovels removing snow and ice.

A canvass of the representative roads shows that the cost of umbrella and butterfly sheds is very similar, an average pre-war cost being $1.10 per sq. ft., exclusive of the paving and curb.

The average height from curb to eaves is 16 ft. The average spacing center to center of supports is 30 ft.

The above average price covers the cost of various types of sheds, including the following:

(1) Steel supporting structure covered with wood sheathing and composition roofing.

(2) Frame supporting structure covered with wood sheathing and composition roofing.

(3) Pre-cast concrete columns and roof slab covered with composition roofing.

Conclusions

In that part of the country where heavy snow occurs the umbrella type of shed is preferable, though somewhat more expensive in first cost. In that part of the country where heavy snows are not a factor, the butterfly type of shed is preferable.

Discussion

M. A. Long (Chairman): The work covers a review of the Manual. The first work was to give a definition of terms published in the Manual and supplements thereto. I move that these be accepted and published in the Manual.

(The motion was carried.)

Mr. Long: The committee has decided to add an additional item with reference to coaling stations. A great deal of consideration has been given to the storage of coal, and a number of roads have gone to much expense for mechanical equipments. The committee considered at what point it would be economical for the railroad to go to this expense. I move that this matter be published in the Manual.

R. S. Parsons (Erie): I think the recommendation should be modified somewhat and made to read, "Unless said coaling storage site shall be in connection with the handling of coal from cars to hopper." In many instances if you use the same hopper for unloading the coal and practically the same machinery, you can with very little expense store the coal, providing you have the space. The only additional expense is that of reclaiming machinery which in some cases is simple and inexpensive. We have some such plants on our line where, while the entire coaling station is an expensive one the additional expense of permitting us to store some 30,000 tons of coal is very slight, the advantage of being able to free cars and store what coal you do not put immediately into your coaling pockets and then reclaiming it from the storage pile is very great in the releasing of cars; in keeping at the coaling station an adequate supply of coal to save the transportation department the difficulty of keeping a large amount of coal in the yards, and the advantage of having the coal there for use whenever you want it.

Mr. Long: The committee considered that point, but we did not have any figures showing what the operating costs for coal would be. We were told the cost would be about 25 cents a ton, which made it look high, and we thought that we could reach the same end by recommending the use of a ditcher or locomotive crane. You can store a maximum of 20,000 tons, which could be reached by a locomotive crane boom and taken from the storage pile and put into the hopper of the coaling station. The question is one of cost per ton handled.

Mr. Parsons: I personally feel that reclaiming will not cost over five or six cents a ton from the storage pile.

R. H. Ford (C. R. I. & P.): The best device is the modern coaling plant with an auxiliary, a large storage pile so arranged that locomotive cranes can do the loading and the propelling as well. So far as the cost of 25 cents a ton is concerned, I don't know where the gentleman got his figures, but that is enormous. Ten cents ought to cover the operation if the coal is within a reasonable distance, that is, less than half a mile from the coaling plant.

Mr. Long: That cost is brought about by the investment in a special plant for distributing coal to the storage pile and reclaiming it. That may be exaggerated. (Mr. Long's motion was put to a vote and carried.)

Mr. Long: We would like to add to the Manual a paragraph with reference to scales. A question came up in regard to the report that is now in the Manual, stating that it did not cover scales for handling baggage. Mr. Lindsay raised the question as to why we preferred the dial scale. That is simply because we can handle so much more over a dial scale than over a beam scale, so that we felt it was proper to recommend the dial scale in preference to the beam scale. That requires a whole lot of attention, but it is more efficient in the end.

(Mr. Long's motion was put to a vote and carried.)

Mr. Long: We recommend with reference to Appendix B that the two paragraphs on platforms be accepted by the convention and published in the Manual, and that the balance of the report be published in the proceedings.

Mr. Ford: As I understand the purport of the chairman's remarks, it is suggested by the committee that all platforms at important terminal stations be made high platforms, and that we recommend that the M. C. B. Association change their passenger equipment to conform with that. That may be all right, but it occurs to me it will be better if this committee would confer with the M. C. B. Association before making this as a specific recommendation from this association. I don't think we are in a position to take a definite stand on it with the information that the committee has given us.

Mr. Long: The committee will withdraw that paragraph and recommend that the last one only be published in the Manual, and that the balance of the report be published in the proceedings.

(Mr. Long's motion was put to a vote and carried.)

Mr. Long: We recommend that the report on Appendix C be accepted and published in the proceedings, and that the conclusions be published in the Manual.

C. E. Lindsay (U. S. R. A.): It has been my experience that the principal essential to the proper operation of either type is a down-spout of ample dimensions, durable material, and provided with some means of cleaning and thawing it out when it becomes frozen. With such ample down-spout arrangement and such conveniences, the butterfly type is always preferable to the umbrella type.

(Mr. Long's motion was put to a vote and carried.)

(The committee was relieved with the thanks of the association.)

Report on Yards and Terminals



IT WAS THE FEELING of the members that, on account of the war conditions and because of the Federal operation of railroads, "Unit Operation of Railroad Terminals in Large Cities," was of such importance that it could well engross the best efforts and thought of the committee. It was agreed that each member of the committee should familiarize himself with the work, methods and information obtained by the local unification committees in his vicinity, and from this and his own experience be prepared to unite in proposing a complete, logical and practical general method for the proper unification of terminals, as useful as the Committee's Catechism of last year on "War Emergency Yard Improvements." (This catechism was published in the *Railway Age* of Sept. 27, 1918, page 595.)

Intermediate Sorting Yards

The committee is not able to offer anything new on the general subject of classification yards, but has made some inquiry as to practices and given the time of one meeting to the discussion of the particular subject of switching from classification yards to departure yards—especially as regards the use of a small sorting yard located between the classification yard and the departure yard. The committee finds some conflict of opinion as to the advisability of providing such an auxiliary yard, but in so far as it has information, up to this time, provision for such an intermediate yard has seldom been made in yard designs or at any rate in the actual construction of yards.

In some classification yards the sorting of cars into station order or into other similar secondary groupings is accomplished more or less completely by the construction and use of a sorting yard tributary to the hump with its ladder next to the outside track of the main yard and with its short body tracks diagonal thereto. Another method of accomplishing the same thing might be the subdivision of a few of the main classification tracks at one side of the yard by means of intermediate ladders.

The committee thus far is impressed with the thought that generally the secondary sorting of cars into station order, etc., can be accomplished satisfactorily by supplementing the classification accomplished via the hump with flat switching performed by trimmer engines either at the foot of the hump or in the departure yard, thus saving the additional investment, the increased length of terminal district, and the delay to cars that would attend their delivery to and removal from the sorting yard, if such an auxiliary facility were provided.

Nevertheless, there may be situations where the construction of an auxiliary sorting yard will be necessary, because it may be impossible to provide sufficient tracks in the classification yard, or because the number of the cars requiring classification into "set out" or placement order may be too great to allow their switching at the departure end of the classification yard, or in the departure yard, without undue interference with the flow of traffic. Such an auxiliary yard should have a sufficient number of tracks of length to conform with the particular requirements of the situation, and where practicable, with assisting grades. In order to minimize the backward movement of cars this yard might be located between the classification yard and the departure yard at one side of the regular current of traffic between these

yards. In some cases it is probable an alternate location would be alongside the departure yard.

Conclusions

The committee concludes:

1. That the preliminary report on Unit Operation of Railroad Terminals in Large Cities including the Catechism on Unit Operation of Railroad Terminals be published in the Manual of Recommended Practice.

2. That the matter under Subjects 5 and 6 be received as a progress report.

The committee recommends that the subjects of this year be continued for next year.

Committee: B. H. Mann (M. P.), chairman; A. Montzheimer (E. J. & E.), vice-chairman; W. G. Arn, Hadley Baldwin (C. C. C. & St. L.), Miles Bronson (N. Y. C.), G. H. Burgess (D. & H.), A. E. Clift (I. C.), L. G. Curtis (B. & O.), H. T. Douglas, Jr. (C. & A.), A. C. Everham, E. M. Hastings (R. F. & P.), Reuben Hayes (Pa. Lines), D. B. Johnston (Pa. Lines), F. E. Lamphere, H. J. Pfeifer (T. R. R. of St. L.), S. S. Roberts (U. S. R. R. A.), C. H. Spencer (I. C. C.), E. B. Temple (U. S. R. R. A.), E. E. R. Tratman, E. P. Weatherly, W. L. Webb (C. M. & St. P.), A. J. Wharf (P. & P. V.), J. G. Wishart (C. R. I. & P.).

Discussion

B. H. Mann (Chairman): The subject has been included in approximately 150 questions under about 57 sub-heads. It has been requested to include in this year's proceedings a skeleton of a sample organization of a unified terminal.

(H. S. Pfeifer (T. R. R. of St. L.) then read the plan and Mr. Mann moved its adoption. After considerable discussion, none of it relating to the subject matter of the report, but rather on the disposition to be made of it, Mr. Mann withdrew his motion and the report was received as information.)

(The committee was dismissed with thanks.)

Report of Committee on Electricity



THE COMMITTEE last year submitted to the Association a list of technical definitions and the Association tentatively adopted and published them in the Proceedings with the understanding that the membership would have an opportunity to consider and offer suggestions to the committee. The following list of definitions has been revised and is now submitted for adoption and printing in the Manual. These definitions, so far as possible, conform with those in use by the U. S. Bureau of Standards and printed in the National Electrical Code and those of the American Institute of Electrical Engineers. It will be noted that the definitions are arranged in alphabetical order rather than in logical sequence. This has been done with the view of conforming to common usage in the Manual. Words in parentheses after each definition indicate new definitions by the word "proposed" or the source of existing definitions.

Electrical Definitions

Bond.—A metallic means for connecting conductors to permit passage of electric current. (Proposed.)

Bonder.—An employee assigned to install or maintain bonds and their appurtenances. (Proposed.)

Bracket Support.—An arm supporting the trolley wire or catenary. (Proposed.)

Bridge Support.—A rigid overhead structure supporting the trolley wire or catenary. (Proposed.)

Cable Conductor.—Wires bound together acting as a conductor. (Proposed.)

Catenary Suspension.—Any form of trolley construction supported by a longitudinal wire or cable. (Proposed.)

Clearance Line (Equipment).—The line beyond which no part of the equipment shall project. (Proposed.)

Clearance Line (Third Rail).—The line beyond which no part of the third rail structure shall project. (A. R. E. A. Manual.)

Conductor.—A metallic path for the flow of electricity. (Proposed.)

Contact Conductor.—That part of the distribution system other than the traffic rails which is in immediate electrical contact with the circuits of the cars or locomotives. (A. I. E. E. 706.)

Contact Rail.—A rigid contact conductor. (A. I. E. E. 767.)

Contact Rail (Overhead).—A rigid contact conductor above the elevation of the maximum equipment line. (A. I. E. E. 768.)

Cross-Span Support.—Overhead wire or cable supporting the trolley wire or cantenary. (Proposed.)

Direct Suspension.—Any form of overhead trolley construction in which the trolley wires are attached by insulating devices directly to the main supporting system. (A. I. E. E. 780.)

Distributing System.—That portion of the conductor system which carries current of the kind and voltage received by the cars or locomotives. (Proposed.)

Duct Line.—A structure consisting of one or more tubes and chambers for the housing of wires or cables. (Proposed.)

Jumper.—A cable used to connect the ends of two contact conductors. (A. R. E. A. Vol. 18, page 145.)

Patrolmen.—Employees assigned to inspect track and third rail structures, cables and wires. (Proposed.)

Pulling Chamber.—A chamber in a duct line provided for pulling cables and wires into ducts. (Proposed.)

Splicing Chamber.—A chamber in a duct line, in which cables are spliced and inspected. (A. R. E. A., Vol. 18, page 144.)

Substation.—A structure and its contained group of apparatus or machinery which receives current from a transmission system, changes its kind or voltage and delivers it to a distribution system. (A. I. E. E. 762.)

Third Rail.—A contact conductor placed at either side of the track, the contact surface of which is located a few inches above the level of the top of the track rails. (A. I. E. E. 769.)

Third Rail Gage.—Distance measured parallel to plane of top of both running rails between gage of nearest running rail and inside gage line of third rail. (A. R. E. A. Manual.)

Traction Linemen.—Employees assigned to install or maintain wires and cables and their appurtenances for all railroad voltages. (A. R. E. A. Manual.)

Lineman (New).—Employees assigned to install or maintain wires and cables and their appurtenances. (Proposed.)

Transmission System.—That portion of the conductor system carrying current of a kind or voltage different

from that received by the cars or locomotives. (Proposed.)

Transmission Line.—A system of towers or poles and cables or wires carrying current from the source of power to the substations. (Proposed.)

Trolley Wire.—A flexible contact conductor customarily supported above the cars. (A. I. E. E. 777.)

The sub-committee on water power has to some extent investigated the utilization of water power for electric railway operation and has collected some data to indicate to what extent water power is now used to generate electricity for the operation of steam railroads. In the table below are shown the principal steam roads which have been partially electrified, the source of power, and the approximate annual current consumption. In the case of those roads using current generated by steam, the reason why water power was not used is given so far as obtainable.

Electrified Steam Railroads—1917

Line	1917, Miles Electric Track.	Trolley Voltage.	Kind of Service, Passgr. & Frt.	Power From	KWH 1917 at Power House for Trains.	Reasons for not Using Water Power.
P. R. R., N. Y....	97	650 DC	P	Coal	64,290,840	None available
L. I. R. R., N. Y..	208	650 DC	P	"	97,382,970	None available
P. R. R., Phila...	95	11000 AC	P	"	23,100,360	None available
W. J. & Seashore.	150	650 DC	P	"	32,825,600	None available
Grand Trunk.....	12	3300 AC	P&F	"	3,913,300	None available
Nor. & Western...	90	11000 AC	F	"	56,651,700	Coal cheaper
New York Central.	253	650 DC	P	"	102,585,000	None available
N. Y., N. H. & H.	530	11000 AC	P&F	"	90,500,000	Some water pr.
M. C., Detroit....	25	650 DC	P	"	7,431,000	None available
Hoosac Tunnel....	21	11000 AC	P&F	Both	7,727,000	
B. & O., Baltimore.	8	650 DC	P&F	Water	6,200,230	
C., M. & St. P.R.R.	600	3000 DC	P&F	"	124,600,000	
B. A. & P.....	90	2400 DC	F	"	23,408,270	
Erie (Roch. Div.).	38	11000 AC	P	"	1,894,860	
Great Northern....	10	6600 AC	P&F	"	4,080,000	
Southern Pacific...	138	1200 DC	P	"	27,844,000	
Total 2365					675,000,000	

The development of any water power for a certain kilowattage should require that the combination of stream flow and reservoir capacity is capable of developing the same kilowattage throughout the year. In the Middle Atlantic and New England states, within a reasonable distance—not to exceed 200 miles of any railroad having a dense traffic and excluding Niagara Falls—the streams where an appreciable head is available are erratic as to stream flow. A small amount of power can be developed economically, but to develop an amount reasonably to be expected from a central station requires either a reservoir or an auxiliary steam station. The result of this is usually a plant in which the capitalization is so excessive that, in spite of the low operating cost, electrical energy cannot be produced at a price to compete with that generated in an all-steam station of like capacity, and economy.

A concrete example of fuel saving by the substitution of electric for steam operation where comparable statistics are available is the electrification of the Chicago, Milwaukee & St. Paul between Avery, Idaho, and Harlowton, Montana, a distance of 440 miles and comprising an electrification of 600 miles of track. During 1917, 124,000,000 K.W.H. (equivalent to approximately 3,900,000,000 ton miles) were generated by water power for the operation of trains. Based upon actual records taken prior to electrification, 220,000 tons of coal and 453,000 barrels of oil (equivalent to a total of 350,000 tons of coal) were burned under locomotives for an equivalent steam service. In 1917 there were 2365 miles of steam railroad under electric operation in the United States and it has been reported to the committee that during the year there were 675,000,000 K.W.H. generated for the operation of trains over these electrified tracks. Applying the figures obtained from steam and electric operation of the Chicago, Milwaukee & St. Paul Railroad to all of the roads electrified, would result in a saving of 1,890,000 tons of coal per annum, had it been possible to produce all of this electrical energy by water power.

A concrete example of fuel saving, where coal is used to generate electric power, is furnished by the Norfolk & Western electrification of about 90 miles of track between Bluefield and Vivian. During the year 1917 there was generated 56,652,000 K.W.H. for the operation of trains, using 87,160 tons of coal at the power house. Based upon records of coal consumption on steam locomotives on the Norfolk & Western, 147,600 tons of coal would be required for an equivalent steam service. Applying a similar saving to the 2365 miles of electrified steam railroads would show a saving of 720,000 tons of coal per annum if all electric energy had been generated by steam power plants.

The total developed water power of the United States is reported by the Secretary of Agriculture in 1916 as 6,500,000 H.P. The undeveloped water power is reported in Senate Document 316, dated 1916, as 53,900,000 H.P., of which 39,200,000 H.P. is within the limits of the Rocky Mountains and Pacific Coast states.

Calvert Townley in a statement to a committee of the United States Chamber of Commerce on January 14, 1918, made in behalf of the Engineering Council, calls attention to the fact that the federal government still retains as proprietor more than two-thirds of the total area of the 13 western states in which the bulk of the undeveloped water power is located. If any parts of the public lands are needed for reservoirs, dams, transmission lines, etc., a permit of the Secretary of the Interior is required, which is revocable at any time, without cause. Other water powers are on navigable streams, and require an Act of Congress for their development. A revision of these laws is under consideration. Outside of the western water power states and the territory tributary to Niagara, water power generally should be developed with auxiliary steam power.

Conclusions

(1) It is important to reduce the use of coal where possible by the development of water power.

(2) Water power will show the greatest economy in the West on account of the higher cost of coal and minimum cost of water power development, but may show economy in other districts at present or future coal prices.

(3) In general, auxiliary steam plants should be built, to develop the water power beyond its minimum capacity, and to secure reliability of service.

(4) Laws should be modified to permit the development of water power on public lands and on navigable streams, under reasonable restrictions.

(5) In its studies and investigations of this subject the committee have been impressed with the failure of some of the carriers to so keep their records as to permit the proper segregation of data which is necessary to calculate the tons of coal consumed in steam locomotives separated from coal consumed for other purposes on sections or divisions where electricity has been substituted for steam.

Recommendations

The committee recommend the following for your action:

(1) The adoption and publication in the Proceedings and in the Manual of the electrical definitions, and continue the examination of the subject-matter in the Manual pertaining to Electricity.

(2) Continue collecting statistical data relative to clearances of third rail and overhead working conductors, and submit revised tables at the next annual meeting.

(3) Continue the subject of the revision of joint specifications for transmission line crossings over railroad companies' right-of-way and send delegates to co-operate with committees of the American Railroad Association and of the American Electric Railway Engineering Association and the United States Bureau of Standards.

(4) Continue the subject of electrolysis and insulation and send delegates to co-operate with the American Committee on Electrolysis in the preparation of its future report.

(5) Continue the subject of maintenance organization and relation to track structures.

(6) Accept as information and publish in the Proceedings the report on water power. In this connection the committee desires to call attention to the fact that it has found but little data bearing on the cost of steam railroad operation applicable to divisions where electric operation has been established, and urge upon engineers and accounting officials the desirability of so arranging the accounts as to accurately show the cost of steam operation and that such accounts be available before attempting to compute the cost of electric operation.

(7) Accept as information and publish in the Proceedings the report on Electrical Interference, and continue the subject.

(8) Accept as information and publish in the Proceedings the committee's report on the National Electrical Safety Code, and continue co-operation with the United States Bureau of Standards in the preparation of Safety Codes.

(9) The acceptance and publication in the Proceedings of the report as a whole.

Committee: Edwin B. Katte (N. Y. C.), Chairman; A. G. Shaver (Cons. Engr.), Vice-Chairman; A. H. Armstrong (Gen. Elec.), H. M. Bassett (N. Y. C.), Z. M. Briggs (Pa. Lines), D. J. Brumley (I. C.), H. M. Church (B. & O.), C. S. Churchill (N. & W.), R. D. Coombs (Cons. Engr.), Walt Dennis (Wab.), R. H. Ford (C., R. I. & P.), W. F. Graves, G. W. Kittredge (N. Y. C.), C. E. Lindsay (U. S. R. R. A.), H. K. Lowry (C., R. I. & P.), W. L. Morse (N. Y. C.), W. S. Murray (Cons. Engr.), Frank Rhea, J. R. Savage (L. I.), M. Schreiber, H. U. Wallace.

Discussion

(E. B. Katte (Chairman) introduced the report and it was accepted as a whole for publication in the proceedings.)

(Mr. Katte then introduced Mr. Wagner of the Bureau of Standards.)

M. W. Wagner (U. S. Bureau of Standards): I would like to have everyone here today familiar with the present status of the National Electric Safety Code. We have a proposed revision of it, which deals with overhead and underground circuits of all kinds. We have submitted it from time to time to those who are vitally interested for suggestions as to positive changes to be included in this revised copy and we are receiving suggestions which are of great value. This proposed revision has been submitted to a number of conferees who are to go over it and give us the benefit of their criticism. We are about to receive these criticisms and comments, and as soon as they are in and the various suggestions have been boiled down, it is likely there will be a conference held in Washington or New York, or some other easily accessible place, where further discussion and criticism will be given. After that, a lithographic copy of the revision will be issued, which will show wherein changes are made. We hope to submit this to a general conferee list. If there are any members of this association who would like a copy of that report, we will send it.

(The committee was dismissed with thanks.)

Report of Committee on Ties



THAT SCREW SPIKES prolong the life of ties over that obtained with cut spikes was the opinion on 27 out of 29 railroads that reported in 1914. Three years later a committee for the Pennsylvania Railroad finished an investigation on this subject, which it had conducted for 9 years, and agreed upon the following statement: Screw spikes have no advantage over nail spikes. When used with clips without tie plates, the cutting of the rail into the tie permits the rail to slip under the clip, thus widening the gage." As a result of these diverging opinions, the committee has tried to find the present general opinion among railroads on this subject, in the hope that it could summarize the practice and distinguish the conditions under which either form of track connection was the better as regards the durability of the ties.

For this purpose, a list of questions was sent to 75 railroads. From these, 58 have replied, and of these 58, 52 stated either that they had never used any screw spikes, or else that their trials had been so limited that no conclusions could be formed. Of the other 6 replies, 2 railroads believed that screw spikes permitted a longer life of tie than cut spikes. Three railroads reported that screw spikes did not permit longer life of tie than cut spikes. One electric elevated and subway road reports that screw spikes do prolong the life of ties. Two railroads believed there was no reason for using screw spikes unless the ties were bored and treated before the screw spikes were applied. Six railroads considered this unnecessary. Eight railroads believed that a screw spike should not be used as an anchor, and that it should be kept free from the slots in the angle. Five railroads considered that it should be used as an anchor and put in the slots in the angle. One railroad used some device to put in the spike hole to make the screw spike secure again after it had become loose, or after the chamber around it had decayed. Eleven railroads used no such device.

As a result of these diverging opinions, it is the opinion of the committee—

(1) That there is not sufficient data available, due to lack of general use, to show that the use of screw spikes will increase the durability of ties, except under special conditions.

(2) That there may be specific forms of track construction where screw spikes prolong the life of ties such as on elevated structures, and so-called permanent track where there is a more substantial foundation provided than on ordinary tie and ballast track.

Methods for Controlling Tie Renewals

Our study of the replies to inquiries in last year's investigation of methods for controlling tie renewals indicates a wide divergence of methods under apparent similarity of organization and physical conditions.

This suggests the possibility of developing a uniform method of determining the essentials necessary to control tie renewals, namely:

(1) Preliminary physical inspection of ties in track —based on a predetermined renewal standard.

(2) Field checks of the preliminary inspection in whole or in part.

(3) Utilization of statistics as a further check on tie renewals and the determination of final allotment.

(4) Checking results obtained.

The tabulations of replies received from 100 railroads with an aggregate mileage of 223,000 would indicate that there are three general methods for determining the number of ties to be renewed.

(a) Field inspection by section foremen, supervisor or roadmaster.

(b) Inspection by tie inspector.

(c) Determination by statistics.

Evidence should be obtained to disclose which method is best suited to local conditions and the type of organization to insure following predetermined standards of renewal and avoid divided responsibility for safe maintenance. The information at hand does not indicate the best methods of obtaining effective field checks to secure economy and safety. The question arises as to the relative importance of statistics as compared to field inspection as a further check on tie renewals. The best methods of final allotment of tie supply should be further developed. It is evident that an inspection of ties removed from track affords the best means of checking extravagance and placing the responsibility for same. This leads to the determination of the best method for making an independent check and devising means for determining and avoiding inadequate renewals.

The usual report on trials of substitute ties was included.

Conclusions

(1) The committee recommends that forms Nos. M. W. 301, 302, 303, 304 be withdrawn from the Manual.

(2) That the report on the effect of the design of tie-plates and track spikes on the durability of cross-ties be received as information.

(3) That the report as to methods in use by various railroads for controlling tie renewals be received as information.

(4) That the report on substitute ties be received as information.

Committee: F. R. Layng (B. & L. E.), chairman; H. S. Wilgus (P. S. & N.), vice-chairman; W. C. Baisinger (A. T. & S. F.), M. S. Blaiklock (G. T.), F. T. Beckett (C. R. I. & P.), E. Boardman (N. Y. C.), W. J. Burton (M. P.), W. A. Clark (D. M. & N.), S. B. Clement (T. & N. O.), E. L. Crugar (I. C.), L. A. Downs (I. C.), G. F. Hand (N Y. N. H. & H.), E. D. Jackson, A. J. Neafie (D. L. & W.), G. P. Palmer (B. & O.), Louis Yager (N. P.).

Discussion

F. R. Layng (Chairman): The first subject which we report on is the effect of the design of tie plates and track spikes on the durability of cross-ties. The second subject is the methods in use by various railways for controlling tie renewals. Committee No. 6 gives a report on trials of substitute ties. This is offered as information. I move that these reports be received as information and published in the proceedings.

G. J. Ray (U. S. R. A.): We went into the screw spike proposition for the primary reason of saving ties. We thought we would be able to treat a certain class of ties and establish good long life. One thing which I mentioned in my report is that the use of an inferior class of pine tie is not advisable on a heavy traffic road, and the screw spike does not materially lengthen the life of that tie. The standardization of the thread on the spike is another important thing. You realize if you put a screw into wood and extract it immediately and insert another screw of the same diameter of shank but with a different thread, you immediately spoil the threads in the wood and after this has occurred a couple of times you can pull the screw out with your fingers. Some of the errors made in connection with the screw spike are due to that very cause, and some of the opinions expressed on its efficiency which this committee must pass on are based on such information. Two main points are whether screw spikes will increase the durability of the ties, on which there is not enough information available, and on the second point there is some doubt in the mind of the committee whether on a more or less yielding roadbed the screw spike is not a failure.

In the fall of 1911 the Lackawanna put into service what was known as the Hopatcong cut-off, 30 mi. of double track over which the main line traffic of the Lackawanna is hauled. The rail was laid on creosoted pine ties, red oak, maple, beech, gum, and a little of everything. We have taken out possibly 30 or 40, or perhaps 100 ties. We had ties in which we could remove the spikes with our fingers as they had a shell of a half inch and were rotten in the center. Outside of these cases there were no screw spikes that were loose after eight years of service. I do not feel that we will be able to give much definite information on the effect of the screw spike on the other ties for a matter of five or seven years.

When we first considered creosoting ties, the problem was to get the full benefit out of the additional expense of treating. From our experience with bridge ties and all sorts of flange plates, we came to the conclusion there was no use in putting a creosoted bridge tie on our railroad with a flanged plate. We would have torn the ties all to pieces before they were worn out, and we felt we must go to the flat-bottomed plate. We have a lot of curvature on the road and did not want to take any chances with the flat-bottom plate unless we had something else to hold the plate in place, and hold the rail, and we went to the screw spike to save the tie from mechanical wear. We put in machines and adzed and bored the ties before they were treated, to insure this protection beforehand and prevent the destruction of the timber by cutting wood which is not properly treated. We believe we are getting good results from using the screw spike.

On this particular line that I speak of we laid part of the line with 91-lb. Lackawanna rail, rolled in 1910. The rest of it was 101-lb. section rolled in 1911. We have had less rail failures on that line than on any other part of the railroad, notwithstanding the fact that we have settlements as great as three feet on some parts of this road. The question of settlement so far has not had any serious effect on the results on that particular line. Our present cost of maintenance is the best evidence in the world that we have made no mistake on the screw spike. During the first 10 months of the year 1918, figures given out by the Administration show that the Lackawanna was the only road which had not very materially increased its maintenance expense. That may not have been due to the screw spike altogether, but I am very sure it did not have any bad effect on the result.

F. Boardman (N. Y. C.): The committee was confronted with an almost unanimous report from the roads of whom they asked these questions that they did not believe in screw spikes. They had, on the other hand, the very successful installation on the D. L. & W. and on one or two other roads. In making these adverse criticisms in the report, there were a number of specific reasons given. It was the opinion of the committee that with the information before them, it was not proper to make a general statement that screw spikes were desirable in

spiking down ties unless standards of construction and maintenance were also specified. Among other things we asked for was a detailed report from the D. L. & W. road, which is now being gotten up to answer these specific objections.

Mr. Ray: I did not intend in what I said, any criticism of the committee's work. I expected just such a report. How are you going to plug a rotten tie, and that is one of the vital questions we have to face. If for any reason a spike does get loose we have two more holes in which to replace it. Our only difficulty has developed with reference to curved conditions. We have absolutely none on straight track.

C. W. Baldridge (A. T. & S. F.): The Santa Fe has put in probably 100 miles of track with screw spikes, and if you ask Mr. Rex of the tie department what results you get, you will get one answer, and if you ask me you will get another. This question has been pretty well handled by the committee up to the present time, and from their study there is nothing to prove that the screw spike is of any benefit in protecting the tie.

C. E. Lindsay (U. S. R. A.): The committee has submitted a report on methods in use which are comprised in field inspection and post-mortem examination. Certainly the conditions of the present season will necessitate an even greater use of preliminary field inspection if railroads are to be maintained in proper condition to approach the succeeding winter. I have always advocated preliminary field inspection, coupled with an arbitrary rule that no section foreman should be allowed to put in more than a designated number of ties per rail length without asking for inspection by his superior and I have had most excellent results from that method. The ordinary foreman will open up his track where he has a tie which he considers proper to remove, and will find that the tie alongside it is getting soft, and while he is at it will think he might as well take out the two ties instead of one, unless some check is placed upon his action. I would seriously urge upon the committee the study for the succeeding report of the subject of definite methods that should be followed of preliminary inspection, rather than post-mortem examination.

(Mr. Layng's motion was then put to vote and carried.)

Mr. Layng: The committee last year canvassed the association and found that forms 301, 302, 303 and 304 were not being used by the members and it was further stated in these replies that there was no prospect of their being used. The committee therefore recommends that these forms be withdrawn from the Manual. Mr. Chairman, I so move.

Mr. Lindsay: I would like to ask if the committee discovered from their replies received what the objection was to these forms?

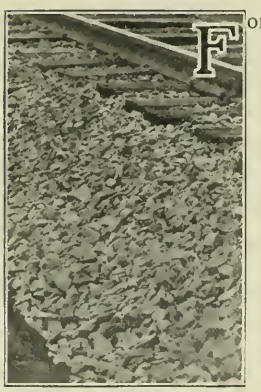
Mr. Layng: One reply that I recall suggested that it would be necessary to have a clerk on each section, in order to keep up the forms. Most of the replies simply said that they were not being used.

Mr. Safford: I would certainly vote no on that. I don't believe we should withdraw forms from the Manual that have been developed after some years of study by the committee, merely because we find that they are not in general use.

The Chairman: If that same principle was applied generally, we would not have much of our Manual left, I am afraid.

Mr. Lindsay: I move you that the forms be referred to the committee for reconsideration. (Motion carried, and the committee was relieved with the thanks of the association.)

Report of Committee on Ballast



For subjects for the consideration of the Ballast committee in 1919, we recommend the following:

(1) Report on proper depth of ballast of various kinds to insure uniform distribution of loads on the roadbed, conferring with the special committee on Stresses in Track and the committee on Roadway.

(2) Report on methods and comparative cost of applying ballast, giving special attention to the organization of the ballast gang.

(3) Study and report on the design of gravel washing plants. Study and report on the design of stone crushing plants.

(4) The use of reinforced concrete slabs or other devices to assist the ballast in distributing the load on soft roadbed.

Methods and Comparative Cost of Applying Ballast

Realizing the stress under which all railroad men would be working, the committee confined itself to the organization of the ballast raising gang, only touching incidently upon cost or work preparatory for and subsequent to the putting in of the ballast.

A circular letter was sent out to the roads represented in the association to which letter was attached the tentative diagram presented to the association at its last annual meeting in March. Representatives of the carriers were requested to furnish the committee with a diagram similar in form showing their typical ballast gang, together with a brief narrative description of the method of using the gang to the best advantage, and any cost figures they might have available. Some few replies have been received and they have led the committee to modify the tentative diagram, principally in the way of increasing the number of jackmen, forkers and tampers and restating the flagging requirements.

Notes have been added calling attention to certain matters, among others the fact that upon old track in commercial service, another gang would be required to prepare the way for the ballast-raising gang. It is understood, of course, that a finishing gang will follow the ballast gang, after the ballast has been consolidated under traffic, to put the track in proper surface and line, dress the ballast section, dress shoulder, etc.

Some suggestions in the way of detail methods have been made, as follows:

It is helpful to number the men and chalk their numbers on the rail over the particular ties these men are to tamp. The New York Central and the Santa Fe both say it pays in the quality of work obtained.

The Norfolk & Western suggests that the head flagman, whose duties will be light, can tighten bolts and in some instances dig jack holes. The rear flagman can put on rail anchors and tidy up without interfering with his job. This presupposes that the flagging will be done by one of the ballast gang as would be the case on a new

line. If regular trainmen are used on an operated line, such work presumably could not be required from them.

Several comment that a tamping spade, heavy and narrow, is better than a pick or bar for the first tamping after a raise.

Agreement is pretty general that on an operated track, an advance gang digging out spent ballast, widening shoulder, renewing ties and making general preparation for the spreading of the new ballast, should be handled as a separate unit well in advance of the ballast gang. If track has to be lowered under overhead obstructions, bank widening is required or similar work has to be done. This preliminary work may require a large force and special facilities.

Opinion seems to be divided whether the lifting jacks should be worked in a bunch or in two sets a short distance apart as recommended by the committee.

The Pennsylvania Railroad suggests that on new construction the tampers should be spread out more than indicated on the diagram.

Suggestions have been made that the head jacks should be heavy No. 6's, which weigh 99 lb. and would require two men to a jack instead of one. The committee has accepted the suggestion and modified its diagram accordingly.

The committee realizes that circumstances must govern, and any typical organization must be modified to meet local conditions. The diagram is submitted as a guide and as representing good practice under average conditions.

Conclusion

The diagram as presented should be published in the Manual as representing good practice in the organization of a gang to raise track on new ballast under normal conditions.

Gravel Washing and Stone Crushing Plants

At first it was thought possible to design a general plan and give brief description or specifications for several typical stone crushing and ballast washing plants; but when local conditions were taken into consideration, it was found practically impossible to design such typical plants which would fit all local conditions.

It was, therefore, decided that probably the most helpful method of handling this subject would be to include in the Proceedings a general plan and brief description or specifications of any successful plants which could be obtained. Therefore, some 30 carriers were circularized with regard to the design of these plants, and 14 answers were received; but due to the conditions prevailing during the war, it was impossible to get much information upon this subject. Five plants were described and illustrated, which, together with other gravel washing and stone crushing plants, previously described, the committee considers the nucleus to which additional similar data may be added as acquired.

Method of Cleaning Stone Ballast

The committee was fortunate in obtaining from W. C. Cushing, chief engineer of maintenance, Pennsylvania Lines West of Pittsburgh, a copy of the descriptive instructions of two methods of cleaning stone ballast, which were issued in 1915 to certain division engineers to be followed as a part of the regular ballast cleaning program of that year. Mr. Cushing advises that, due to unsatisfactory labor conditions, conclusions have not yet been reached, and until the supply of labor permits the railroads to return to a more normal condition, it is probable that very little can be learned from a comparative test of these methods.

The instructions in question follow:

Instructions for Cleaning Ballast

Not in Connection with Tie Renewals

The space between the ties (cribs) is to be cleaned to the bottom of the ties, the space between tracks to be cleaned to 6 in. below the bottom of the ties, and the shoulders outside of the ties to be cleaned down to the top of the sub-ballast, where any. Where there is no sub-ballast, clean to the sub-grade. Every 50 ft. one crib to be cleaned out to a line, on a uniform grade between the bottom of the center ditch and the sub-grade outside the track to form a cross drain from the center ditch.

Under the ordinary fork method, the ballast is to be cleaned in the usual manner by shaking the ballast on forks and throwing the cleaned ballast remaining on the forks back into the track, and the small particles of ballast and dirt which pass between the tines of the forks to be disposed of by throwing it over the bank, or by any other way that may be expedient. When the dirt can be disposed of by throwing over the bank, its cost may be included in with the cleaning. When it is necessary to move the dirt any distance it shall be thrown into piles and the cost of doing so included with the cost of cleaning, but the cost of removing it afterward shall be kept separate and not made a part of the cleaning cost.

Under this method of cleaning it will not be necessary to use a definite number of men in the gang, but it should not be extra large, nor very small. On double track there should be three men in each sub-gang; one on each berme and one in the center. The man in the center to work to the right or left as needed, and those on the sides to work in through the cribs to meet him. The sub-gangs to be started about 100 ft. apart. Thus, with a gang of 12 men they would be spread out over about 300 ft. of track. When starting, the ballast removed will have to be piled up until a space about 3 ft. is cleaned, after which the shaken ballast can be thrown directly back in the 3-ft. space.

For the Trench-Zepp method 3 screens are to be used with a force of 12 men and a foreman, distributed as follows: Two men to shovel from each shoulder to their respective screen; two from the center into the center screen, and one man in the center of each track shoveling into the screen most available; one man with a pick working ahead to loosen hardened ballast, and three men, one for each screen, to dress down the ballast on the center and shoulders, form a uniform ballast line and dispose of the dirt. When the dirt can be disposed of by throwing over the bank, its cost may be included in with the cleaning. When it is necessary to move the dirt any distance it shall be thrown into piles and the cost of doing so included with the cost of cleaning, but the cost of removing it afterward shall be kept separate and not made a part of the cleaning cost. When necessary, a water boy in addition to the twelve men can be employed. In operation, the center screen will work ahead of the side screens, and the man attached to this screen will work ahead of the side screens, and the men attached to this screen will clean out the cribs, to about one foot inside of the inside rails of the double track.

In Connection with Tie Renewals

Under the ordinary method such ties as are spotted are to be renewed in the ordinary manner with the ordinary sized force, but a record of the cost to be kept, for use in comparing this method with the screen method.

By the screen method such ties as are spotted are to be renewed by a force of eight men and a foreman with one screen, and a water boy if thought expedient. The force is to be distributed as follows:

One man picking ballast loose ahead of the bank.

Three men digging the ballast out of the track and throwing it onto the screen.

One man removing the refuse and straightening up the ballast.

Two men removing the spikes, taking out the old tie, putting in the new tie and spiking.

One man following up about 300 to 400 ft. in the rear, putting ballast in around the tie and trimming up the track.

All the ballast on the shoulder and in the cribs is to be taken out, but not from the center between tracks (this can be cleaned at another time). Where only one tie is to be renewed clean out the cribs on both sides of the tie. When two ties are to be renewed clean out the crib between the two ties and one crib on the outside of each tie or three cribs. When three ties are to be renewed clean out four cribs, etc.

The work to progress as follows: The first man with a pick will proceed to pick loose the ballast where ties are spotted. The three men cleaning out the ballast from track will follow about 12 ft. behind and shovel onto the screen. The one man in charge of the screen will see that the ballast falls onto the track, into pans, or on the outside shoulder, as may be deemed best in each case, for re-use in tamping the new ties. It is left in this shape until the two men who are putting in the ties come along. They will take out the spikes, remove the old tie, put in the new tie and tamp immediately, leveling off enough ballast into the cribs to make the track safe. The man who follows up in the rear is not started until the other force has proceeded far enough to allow as many trains to go over as may be deemed necessary by the foreman to settle the ties and permit of proper retamping, the idea being that the retamping after traffic has gone over it will all be done before the ballast is filled in to its proper section, so that it will not be in the way of tamping.

A record of progress and cost is to be kept and signed by the foreman.

Committee: H. E. Hale, chairman; J. M. Meade (A. T. & S. F.), vice-chairman; C. B. Baldridge (A. T. & S. F.), J. S. Bassett, W. J. Bergen (N. Y. C. & St. L.), Theo. Bloecher, Jr. (B. & O.), H. E. Boardman (N. Y. C.), C. J. Coon (N. Y. C.), T. W. Fatherson, G. H. Harris (M. C.), F. A. Jones (M. P.), J. S. McBride (C. & E. I.), William McNab (G. T.), S. B. Rice (R. F. & P.), H. L. Ripley (N. Y. N. H. & H.), Paul Sterling (N. Y. N. H. & H.), B. B. Shaw (C. R. I. & P.), F. J. Stimson (Pa. Lines), D. W. Thrower (I. C.), D. L. Sommerville (N. Y. C.), W. K. Walker, R. C. White (M. P.), W. D. Williams (Cin. Nor.).

Discussion

H. E. Hale (Chairman): The diagram gives an outline of a proposed ballast gang. It is recommended that this diagram be published in the Manual as representing good practice in the organization of the gang to raise track on new ballast under normal conditions. I move the adoption of the diagram as a guide.

J. E. Willoughby (A. C. L.): The diagram provides for a force of 71 men, and a total force of 77 all told. That seems to be a pretty large force. We have got fairly good results out of a gang of 25, and I do not know whether the committee ascertained the fact that 71 men would be an economical gang to operate. I have no objection to the report, or the diagram, if the committee has ascertained that that number is the proper number, although I do not think it would be altogether suitable to some sections of the country.

Mr. Hale: The committee could not obtain data giving the most economical gang, largely due to the effect of different local conditions, and the methods of accounting made the figures such that it was difficult to compare them, but the committee felt that this size gang was in its opinion an economical gang, felt that it could be reduced if it was desirable to do so.

R. H. Ford (C. R. I. & P.); Does the committee recommend a total force of 71 men, irrespective of the weight of rail or track conditions?

Mr. Hale: We have made no difference as far as weight of rail is concerned, but we feel that local conditions would vary the conditions to some extent. The diagram is to be a guide or recommended practice. Probably local conditions will affect it materially.

Mr. Ford: I think the committee might change the title and make it—"A suggested diagram for a force of 77 men," without leaving the inference that a force of 77 men is the proper force for raising track.

Mr. Hale: The committee will accept a change in the title—a suggested diagram is what the committee really had in mind.

The Chairman: I would ask the members if it is desirable to put into the Manual a chart for a gang organization such as this, or should it not be adopted when it becomes a number of a series.

Mr. Hale: The suggestion of Chairman Stimson is in the right direction, but in the absence of any diagram in the Manual, the committee would like to see at least one diagram put there.

C. E. Lindsay (U. S. R. A.): The instructions to the committee were: "Report on methods and comparative cost of applying ballast, giving special attention to the organization of the ballast gang." They have merely taken the organization and reported on that, without giving accompanying data of costs and methods. I believe one should not go into the Manual without the other.

Mr. Hale: The committee made an endeavor to get costs without much success. We appreciate the fact that the subject is not completed. This is in the nature of a progress report, and we want to carry it over. The committee felt there were two separate propositions, organization and cost. While they are related, they are distinct parts of the question referred to. The committee felt they had at least studied the subject enough to recommend one organization of a track gang.

(Motion to accept the recommendation of the committee carried.)

Mr. Hale: Two other subjects were assigned to the committee: study and report on design of gravel washing plants and study and report on design of stone crushing plants. Your committee thought at first they could probably design a typical plant, but as soon as we started we were confronted with the fact that the local conditions were so important we were unable to design anything along that line, and we thought possibly it would be more helpful to the association to pick out efficient plants, which were in operation, giving photographs or drawings sufficient to describe them and, if possible, the original cost and the cost of washing the gravel.

Mr. Ford: A more comprehensive study of the question of ballast is desirable, and we should have a specification as to what ballast is and what it consists of.

Mr. Hale: We were able to get from Mr. Cushing of the Pennsylvania Lines West, instructions for the cleaning of ballast. The committee thought they were interesting enough to bring to the attention of the association. We were also able to get information in connection with reinforced concrete slabs to assist the ballast in supporting the track on soft spots. We are indebted to Mr. Bowser of the Queen & Crescent for a copy of his report. The committee recommends that this be assigned as one of the subjects for further consideration.

(The committee was relieved with the thanks of the association.)

Trade Acceptances for Railway Supply Companies

(From Our Washington Editor)

Representatives of the Railway Executives Committee have been conferring with the Railroad Administration regarding the form of the proposed warrants to be issued for money due to the railway companies; the subject will be considered further at a conference between Director-General Hines and the Railway Executives' Committee on Thursday, when it is hoped that a definite decision will be reached. This meeting was to have been held on Wednesday. Arrangements for paying for the $286,000,000 worth of equipment ordered last year are practically complete. A committee headed by F. N. Hoffstot, president, Pressed Steel Car Company, is working on the details of trade acceptances to be given by the Railroad Administration and is arranging for the presentation of drafts by the equipment builders and specialty manufacturers.



Banquet of the American Railway Engineering Association

Annual Dinner of the Engineering Association

Abstracts of Addresses at the Twentieth Annual Dinner Held in the Gold Room of the Congress Hotel Last Evening

THE TWENTIETH ANNUAL DINNER of the American Railway Engineering Association was held in the Gold Room of the Congress Hotel last evening with Vice-President Earl Stimson presiding in the absence of President C. A. Morse, who was confined to his room with a cold. The speakers included United States Senator Atlee Pomerene of Ohio; Dr. George Adam of Emmanuel Congregational Church, Montreal, Canada, and Robert J. Cary, general counsel, New York Central Lines, Chicago. Hon. Charles N. Goodwin of Chicago, who was scheduled to speak on the Americanization Problem of the Railroads, was detained at his home at the last minute by illness. Abstracts of the addresses are given below.

Some Phases of the Railway Problem

Senator Pomerene, in speaking on this subject, said in part:

The ramifications of the railroads run into every activity of life. The public cannot do without them, and they cannot do without the public. The prosperity of the one means the prosperity of the other; the crippling of one, the crippling of the other. Vitally they are a part of us. They are the veins and arteries through which course the blood of commerce. When we come to treat with them, I submit that they should have the best thought, and the best skill, of the best-trained experts in the land, whether in the field of transportation, finance or legislation. Practical men are needed for the job—not dreamers, not the theorists, not the reactionary who always looks backward and never forward.

LEGISLATION

In considering what ought to be done with the railroads, let us bear in mind the following well-established facts:

1. The three years preceding government control were the most prosperous in the history of our railroads.

2. Before the war period the railroads of the United States gave the public the best service in the world.

3. The per-ton-mile cost to the shipper was cheaper in this country than in any other country in the world.

4. The wages of the employees, though they were too low, were higher than the wages paid by any government-owned roads anywhere in the world. And lest this statement may be misunderstood, I want to make it perfectly clear that, generally speaking, the railway men were justified in asking the raise in their wages which they demanded prior to the period of government control, and which were given to them after government control began. Whether we shall hereafter have government ownership or private ownership, the same rate of wages, relatively speaking, as compared with living costs, should be maintained.

SALARY REDUCTIONS

One of the sops to Cerberus which has been handed to the public is the fact that among the economies of government ownership the director-general's office has saved $6,115,000 in salaries to officials and to counsel. We are told that many officers in the great campaign for economy were separated from their high salaries. That may be so. I assume it to be so. But I also know that the director-general has on his staff, among others, 72 officials drawing from $10,000 to $50,000 each per annum. Five draw $50,000, two draw $40,000 each, three $35,000 each, two $30,000 each, eight $25,000 each, eleven $20,000, and the 72 draw salaries aggregating $1,398,000, or an average of $19,418.05.

SOME GENERAL ORDERS OF THE DIRECTOR-GENERAL

The Railroad Control Act provides that "actions at law and suits in equity may be brought by and against such carriers, and judgments rendered as now provided by law; and in any action at law or suit in equity against the carrier *no defense shall be made thereto upon the ground that the carrier is an instrumentality or agency for the Federal Government.*" The Congress believed this language was about as clear as it could be made. Nevertheless, the director-general of railroads issued the

famous, or rather infamous, order, the effect of which, if legal, is to set aside this act of the American Congress, as well as the Carmack Act. Another order, No. 50, is equally reprehensible.

Let me call your attention also to another order, No. 57, relating to the shipment of grain. It is a principle of law, not to say of common sense, that when a shipper calls for a car in which to ship grain, it will be reasonably fit for the purpose for which it is intended. There can be no doubt about that principle. Every railroad and every shipper have acted upon it; and yet the director-general's office issued Order No. 57 placing upon the shipper the burden to inspect the car and ascertain whether or not it has any leaks.

Granting that the director-general had the power to issue all of these orders, I submit that it was bad policy to issue any of them. Not one of them was issued out of regard for the convenience of the public. Not one of them helped to win the war. All of them added to arousing a spirit of discontent among the people. I deny that the director-general had the power to issue these orders repealing statutes, but if he had the power, right policy should have forbidden it. This is a democracy. We live in America. We do not live in Russia, and we will not submit either to the rule of the Czar or the Bolsheviki.

Government Control

I submit, irrespective of whether you are a believer in government ownership or private ownership, to ask the right to hold the railroads five years without giving to the owners any assurance of what will be done, lacks the one fundamental principle that should control a government in all its actions, namely, to deal honestly and fairly with its people.

The following changes during government control seem to be generally approved:

1. The general advance in wages.
2. The joint use of terminals.
3. Greater interchange in use of equipment.
4. Greater control over the routing of freight.
5. Greater unification in the control and operation of the roads, or, to put it in another way, fewer railroad companies.

I believe the public recognizes these general changes necessary and proper. They have been advocated for several years by all students of the subject; and, speaking especially of greater unification of operation and control, believers in government ownership expect this result to follow if the roads are absorbed by the government. Those who are opposed to government ownership likewise believe it is necessary in order to bring about greater economies and better service for the shipping and traveling public. So far, then, as these particular changes in operation are concerned, government control under the director general has proven nothing new.

Every one concedes that the last year of government control has not been a fair test of government ownership, and every fair-minded man will admit that the last year of private operation, hampered as the railroads were by restrictive legislation and demands of the war, was not a fair test of the capacity or efficiency of private ownership and operation. I recognize the fact that there is revolution in the air. I know there is a very general feeling of unrest; but I submit that after the transportation systems have been developed to their present state under private ownership, and we have created a plan of regulation through the Interstate Commerce Commission and the various state commissions, common prudence will suggest that because its railroads do not properly function we should not tear down over night the old structures, stone from stone. Rather we should take counsel together and where the present regulations do not suffice, amend them, drastically if need be; but don't destroy them and adopt some plan wholly new and untried in this country. Excepting those who have their personal advantages to gain, whether consciously or unconsciously, or theories which they want to reduce to practice, very few want it. It does not have the support of the practical men of to-day.

New Legislation

It may be of interest to say a word on the subject of proposed changes in the law. On January 21, 1919, Congressman Esch in the House, and I in the Senate, introduced a bill to make certain changes in the "Act to Regulate Commerce." The principal changes are:

First. To extend its regulations to any common carrier or carriers engaged in the transportation of passengers or property, not only wholly by railroad, but also to those engaged in such transportation "wholly by boat between points on the rivers and lakes of the United States, and in such carriage of persons and property, partly by railroad and partly by water, whether or not both are used under a common control, management, or arrangement for a continuous carriage or shipment."

Second. That hereafter, in reaching its conclusions as to the reasonableness of any rate, fare, charge, classification, regulation or practice, the commission shall take into consideration the increased cost of labor and other operating costs, in so far as they become material, in any case under investigation.

Third. The commission is authorized and directed to require carriers to interchange and use all engines, cars, and other facilities owned or used by them in such manner as shall best serve the public interest in times of shortage of equipment in any section of the country, upon just and reasonable terms as between the carriers as the commission may prescribe; and the commission is authorized and directed, to provide by order for the use, in the public interest, of all terminals of carriers, upon such terms as between the carriers as the commission may find just and reasonable.

Fourth. The Commission is authorized, from time to time, upon application by carriers, or others, or upon its own initiative without such application, to permit, upon order, the pooling of traffic and facilities and the consolidation of two or more carriers, under such rules and regulations and under such terms as shall be just and reasonable, as in its opinion shall conduce to the public good; which arrangements shall continue so long as in the judgment of the commission the public interest may require.

Fifth. The Commission is authorized not only to fix the maximum rate as heretofore, but in case it finds such action just and reasonable, prescribe the minimum rate, fare or charge to be published and maintained by the carriers.

Sixth. Provision is made for doing away with the so-called twilight zone which exists between the federal and state authorities, and with a view to the preservation for the public welfare of the functions and efficiency of both federal and state commissions.

Seventh. The issuance of all securities by a common carrier is subject to control and regulation by the Interstate Commerce Commission, and is very carefully guarded.

There is nothing in the Commerce Act fixing the standard of return on the capital invested. Assuming that the standard of return is fixed at 6 per cent, one plan proposed may be outlined in brief as follows: Let the country be divided into regions, fixing the traffic rates sufficiently high so as to yield a net return in each

region of 6 per cent on the combined railroad property in that region. This, of course, would not be sufficient to yield 6 per cent on the new or poorly located or equipped roads, and it would yield more than 6 per cent on the better class roads. It is proposed that the surplus thus earned, over and above the 6 per cent on the total property investment, shall be applied in the public interest as follows:

(1) One-third for the benefit of the employes of the railroads.

(2) One-third to be retained by the railroad companies for such uses as they may determine.

(3) One-third to be held in a fund to be devoted to the purposes provided under the plan and under the direction of the Interstate Commerce Commission, or some other public agency.

I do not commit myself to the details of this suggestion, but I believe that out of it Congress can devise a plan which will at the same time prevent excessive earnings by some of the more prosperous roads, encourage by increased rates of fare some of the weaker roads, and fix a standard of return on the property invested which will induce new capital to embark in railroad enterprises.

Conclusions

Let me conclude by saying—

(1) I am unalterably opposed to any extension of government control.

(2) Government control was intended for war purposes, and it ought not to be continued for peace purposes, unless some assured, not speculative or conjectural, advantage can be gained thereby.

(3) I deny the legal or the moral right of any man, or set of men, to ask that the government hold private property during peace for a period of five years in order to attempt experiments in management.

(4) If government ownership is desired, a spirit of fairness and of common honesty would seem to suggest that the property be returned to its owners, and the issue made thereafter. In any event, the change from private ownership and operation under proper restrictions, or government ownership and operation, should be undertaken, if at all, in normal times, and not during this period of social, financial, and industrial unrest.

(5) Corrective legislation along the lines discussed tonight should be attempted first, rather than to adopt any revolutionary policy during this crisis in our country's affairs.

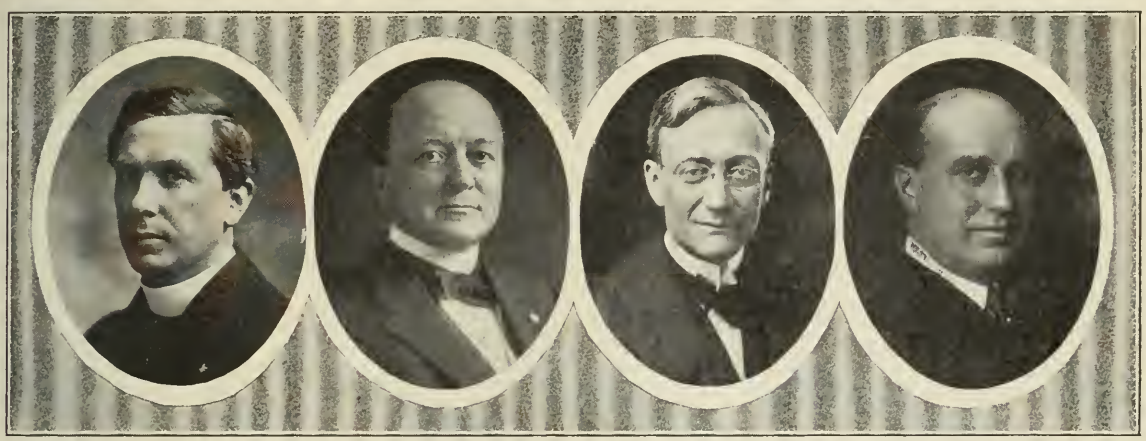
Noblesse Oblige, Our New Nationalism

Robert J. Cary, in speaking on the above subject, said in part:

Ex-President Taft, in discussing the League of Nations, says that we are to create 20 nations where there were but 4. All of these people, in whom sense of self-reliance, initiative and decision has been stifled by generations of repression, will greet liberty with wild eyes and fly apart as do molecules of gas when relieved of pressure. Imagine our trade relations, our economic intercourse with such an undisciplined force; imagine regulating immigration among masses of such humanity; imagine a plague of such vast dimensions, unquarantined; imagine the menace to the world's society, and particularly to our own institutions, in the unguided activities of so large a portion of the world's population.

Can the issue then, be, as the short-sighted would have us believe, between an altruistic League of Nations, in which we surrender our sovereignty for the universal brotherhood of man, on the one hand, and this country in splendid isolation wrapped in its own nationality for the purpose of saving and developing its material prosperity, on the other hand? I, for one, protest against the position in which the advocates of a League of Nations are permitting themselves to be unwittingly maneuvered. The primary issue is not now a question of avoiding entangling alliances, of refusing to embark on a voyage of idealism, but rather the highly expedient one of concluding a half-finished job to keep intact that for which we primarily entered the war, our own free institutions and our own prosperity.

We, of this generation, have been awkward patriots; for patriotism has always come to us with the impersonal touch; at best it has been recognized as a worthy abstraction taking concrete form in the romance of past achievement. But the material mobilization of this country, as the result of the war, tells only half of our recent story. The dynamic force of our progress in Europe, and by reflex in our own affairs, is found in the unlooked for spiritual mobilization of one hundred millions of people. The government, whether rightly or wrongly, is disintegrating the army, the air forces, the material resources of the war. Shall we also abandon, as no longer required in our national affairs, this greatest safeguard of liberty,



Speakers at the A. R. E. A. Dinner

Rev. Geo. Adam | Sen. Atlee Pomerene | Judge Clarence N. Goodwin | Robt. J. Cary

the present keen patriotism of the millions of the United States?

The Archbishop of York has told of hard gray days in England, of few doors that had not been visited by the Angel of Death, of men going to and fro with set faces and dry eyes, of thousands without resiliency, and then of the tremendous reaction sweeping through England, not alone because America had entered the war, but from the tremendous moral force of a united America entering the war. This land he pictured with its hundreds of millions in future generations as the chief world force to perpetuate human liberty, not by the old process of empire building, but by the reaction of its institutions throughout all other lands.

Our controversy is not whether we shall take our place in an international council. This is already predetermined by circumstance. Our insistence should be that criticism of the constitution of such a council shall be constructive, as coming from men eager to co-operate, but disputing only over ways and means of proper co-operation. This world's forces are put in play by unanimity of sentiment, not unanimity of opinion. Absence of controversy suggests the dead hand, but unanimity of sentiment is the moral force that has won the war. Millions, in response to this force, have already eagerly kept "Their Rendezvous with Death." It remains for us, the living, to finish the work.

"Language and Ideals"

Another speaker was Dr. George Adam, pastor of the Emannuel Congregational Church of Montreal, Que., whose subject was "Language and Ideals." Dr. Adam's theme was the bond of language between the peoples of America and Great Britain. He paid a glowing tribute to the language which, he said, derived its worth from the best of other tongues. It took poetic feeling from the Greeks, law from Latins and democracy from the Angles. Much has been added to the language in forceful and direct speech by the Americans. Dr. Adam touched also on the bond of friendly relations brought about by the participation of these two nations in the great war, with its sacrifices for common ideals of democracy and regard for the rights of smaller nations.

Revision of Capital Expenditures

(From Our Washington Editor)

In view of the financial situation imposed upon the Railroad Administration and the railroads by the failure of the $750,000,000 appropriation bill, the entire program of capital expenditures for this year is to be reviewed. The Division of Capital Expenditures has given the railroad corporate officers an opportunity to reconsider under existing conditions any approvals which have heretofore been given by them for additions and betterments, whether carried over from last year or new work.

T. C. Powell, director of the Division of Capital Expenditures, after conference with Howard Elliott, acting chairman of the Railway Executives Committee, has issued D. C. E. Circular No. 20 directing the regional directors to instruct each federal manager to afford the proper corporate officer, upon application, full opportunity to review all projects chargeable to the capital account whether in progress or contemplated. If the corporate officer withdraws or withholds approval of any project for financial reasons or otherwise, the instructions are as follows:

"1—Work not started shall not be commenced without further approval by this division.

"2—As to projects already started and actually under way, please see that no further work is done except, (a) when necessary to insure safety; (b) where the project is so far complete that to stop work would be more expensive than to continue it; (c) where the job is covered by bona fide contract and to stop the work would seriously demoralize conditions, especially as to the working forces.

"In all cases where the federal manager and the regional director believe the work should be done, whether as to new work or as to continuing work now in progress, even though the railroad company withholds or withdraws this approval, a full report should be promptly made to the Division of Capital Expenditures with a copy to the president of the company stating the objections or disagreements that cannot be overcome, with the definite recommendation of the federal manager and regional director. Pending further approval by this division no such work should be started and except as provided in Section 2 above no such work in progress should be carried on."

A. R. E. A. Men as Corporate Executives

One of the interesting developments of the past year has been the induction of railway engineers, many of them members of the American Railway Engineering Association, into the corporate organizations of the roads, not alone as engineering officers, but as executives, namely, presidents, vice-presidents and chairmen. The creation of separate federal and corporate organizations on the roads, together with the selection of many presidents and vice-presidents of the various railroads for government positions as federal managers or as officers of the central or regional organizations of the Railroad Administration created many vacancies in the corporate organizations of the roads, and several members of the American Railway Engineering Association were named to fill such vacancies. Among these may be mentioned A. S. Baldwin, vice-president of the Illinois Central; L. C. Fritch, vice-president of the Chicago, Rock Island & Pacific, and Charles S. Churchill, vice-president of the Norfolk & Western; all three of them are past presidents of the A. R. E. A. Others on the list are E. H. Lee, president of the Chicago & Western Indiana; W. H. Finley, president of the Chicago & North Western, and Ralph Budd, chairman of the Executive committee, Chicago, Burlington & Quincy. While it may not have been entirely clear at the time that the separation of the corporate from the government managements of the railroads took place, subsequent events have clearly demonstrated the distinct need of strong corporate organizations to protect the interests of the properties and their owners.

In attempting to analyze the reasons for some of the earlier appointments of railway engineers to corporate executive positions, it was seen that there was a special need for engineering rather than operating talent in fulfilling these important stewardships because of the necessity for a check on the character of additions and betterments undertaken by the government as well as for a study of the degree to which the roads are being maintained according to the standards prevailing previous to the advent of government operation. The fact that valuation work was being continued was cited as a further reason for the need of officers in the corporate organizations who were thoroughly conversant with this problem. But as pointed out recently by one corporate officer, such engineering ability could very readily have been retained in the corporate organizations without need of appointments to executive positions. More than this, exactly the same qualifications for executive officers are demanded today as were required of men in like positions under

private managements of the roads. As a matter of fact, the only bearing which the present state of separate government and corporate organizations has on the matter is the fact that this separation created a large number of vacancies at one time.

A number of the men mentioned above were occupying executive or operating positions at the time that they were placed in the corporate organizations. Mr. Lee had been vice-president and chief engineer of the Chicago & Western Indiana; Mr. Budd, those training had been largely in engineering, was executive vice-president of the Great Northern, and Mr. Fritch, who was formerly chief engineer of the Chicago Great Western, had more recently occupied operating positions on the Canadian Northern and the Seaboard Air Line. On the other hand, Mr. Finley, who had been chief engineer and for a long time bridge engineer, of the Chicago & North Western; Mr. Baldwin, who was chief engineer of the Illinois Central, and Mr. Churchill, formerly chief engineer and recently assistant to the president in charge of valuation on the Norfolk & Western, were occupying engineering rather than executive positions at the time of their advancement, although the fact that they were called into a broader field is positive proof that their duties as engineers had been demanding activities not limited to a narrow interpretation of the term "engineering." Appointments like those above mentioned testify to the ability of the engineers to develop along the broad lines and for the high standards set by the American Railway Engineering Association for its members and officers.

A. R. E. A. Registration

Following is the registration of the members and guests at the convention of the American Railway Engineering Association on Wednesday:

Members

Allen, Andrews, Consulting Engineer, Chicago.
Allee, O. P., Prest., Railway Concrete Supply Co., Kansas City, Kan.
Andrews, Geo. W., Asst. to Eng., M. W., B. & O. R. R., Baltimore, Md.
Andrews, J. T., Asst. Eng., B. & O. R. R., Baltimore, Md.
Barnhart, E. H., Asst. Eng., B. & O. R. R., Baltimore, Md.
Blanchard, A. M., Val. Dept., Grand Trunk Ry., Montreal, Can.
Bloecher, Theo., Jr., Div. Eng., B. & O. R. R., Philadelphia, Pa.
Boardman, H. E., Asst. Eng., Val. Dept., N. Y. C. Lines, New York, N. Y.
Bohland, J. A., Bridge Eng., G. N. Ry., St. Paul, Minn.
Boots, E. W., Asst. Eng., P. & L. E. R. R., Pittsburgh, Pa.
Bowser, E. H., Supt., Timber Dept., I. C. R. R., Memphis, Tenn.
Brown, J. M., Corp. Eng. Maintenance and Construction, C. R. I. & P. Ry. Co., Chicago, Ill.
Browne, H. L., Asst. Eng., C. B. & Q. R. R., Galesburg, Ill.
Buck, C. M., Div. Eng., A. T. & S. F. Ry., Topeka, Kan.
Butterworth, A. S., Chief Eng., G. F. & A. Ry., Pensacola, Fla.
Cassil, H. A., Eng. M. of Way, P. M. R. R., Detroit, Mich.
Clapper, Leland, Eng. B. & B., D. & I. R. R. R., Two Harbors, Minn.
Clarke, A. C., Asst. to Chief Eng., B. & O. R. R., Baltimore, Md.
Clift, A. E., Gen. Mgr., I. C. R. R., Chicago, Ill.
Connor, E. H., C. E., Mo. V. Br. & I. Co., Leavenworth, Kan.
Cook, R. A., Val. Eng., C. & A. R. R., Chicago, Ill.
Copland, A. C., Office Eng., C. & O. Ry., Richmond, Va.
Cronican, W. P., Asst. Eng., Illinois Cent. R. R., Chicago.
Cunningham, A. O., Chief Eng., Wabash Ry., St. Louis, Mo.
Darrow, F. T., Asst. Chef Eng., C. B. & Q. R. R., Lincoln, Neb.
Delo, C. G., Chief Eng., C. G. W. R. R., Chicago, Ill.
Dewey, S. J., Asst. Sig. Eng., Big Four Ry., Cincinnati, O.
Dixon, J. M., St. Paul, Minn.
Doyle, T. L., Asst. Div. Eng., Pa. Lines, Logansport, Ind.
Edmondson, G. N., Div. Eng., N. Y. C. R. R., Rochester, N. Y.
Fisher, W. A., New York, N. Y.
Flora, G., Insp. Track Val., Grand Trunk Ry., Durand, Mich.
Goodell, John S., Asst. Eng., Santa Fe Ry., Hollyrood, Kan.
Gowdy, R. C., Chief Eng. for Corp., C. & S. Ry. Co., Denver, Colo.
Fritch, L. C. (Past-President), V. P. and Corp. Eng., C. R. I. & P. Ry. Co. and Minneapolis & St. Louis R. R. Co., Chicago.
Grant, E. W., Asst. Eng. Val., Santa Fe Ry., Topeka, Kan.
Gwyn, J. G., Chief Eng., D. & R. G. R. R., Denver, Colo.
Hadley, E. A., Engr. Asst. to Reg. Dir., U. S. R. A., St. Louis, Mo.
Haggander, G. A., Bridge Eng., C. B. & Q. R. R., Chicago, Ill.
Hamilton, H. F., Res. Eng., G. N. Ry., St. Paul, Minn.
Harris, L. G., Div. Eng., A. T. & S. F. Ry., San Marcial, N. M.
Harrison, E. A., Architect, A. T. & S. F. Ry., Chicago, Ill.
Hartley, L. C., Chief Eng., C. & E. I. R. R., Chicago, Ill.
Heidenthal, W. C., Eng. M. W., N. Y. O. & W. Ry., Middletown, N. Y.
Hewes, John, Jr., Div. Eng., B. & O. R. R., Flora, Ill.
Hogeland, A. H., Chief Eng., Great Nor. Ry., St. Paul, Minn.
Hunley, John B., Eng. Bridges and Str., Big Four Ry., Cincinnati, O.
Huntley, R. L., Chief Eng., U. P. R. R., Omaha, Neb.
Hynes, M. V., Gen. Supt., C. I. & W. R. R., Indianapolis, Ind.
Jacoby, H. S., Cleveland, Ohio.
Johns, C. W., Eng., Branch Lines, C. & O. Ry., Richmond, Va.
Johnson, Noah, Val. Eng., Wabash R. R., St. Louis, Mo.
Johnston, D. B., Div. Eng., Pa. Lines, Louisville, Ky.
Johntz, H. H., Div. Eng., M. K. & T. Ry., Parsons, Kan.
Khuen, Richard, Gen. Man. Erect., Am. Bridge Co., Pittsburgh, Pa.
Kissell, J. E., Eng. M. of Way, Big Four Ry., Mt. Carmel, Ill.
Kittredge, George W. (Past-President), Chief Eng., N. Y. C. R. R., New York City.
Lane, H. A., Chief Eng., B. & O. R. R., Baltimore, Md.
Larsen, Albert, Div. Eng., Miami Con. Dist., Dayton, Ohio.
Layng, F. R., Eng. Track, B. & L. E. R. R., Greenville, Pa.
Leisenring, J. G. M., Sig. Eng., Ill. Trac. Sys., Springfield, Ill.
Lonnbladh, L. F., Special Eng., Brier Hill Steel Co., Youngstown, Ohio.
Manson, E. F., Master Carpenter, Rock Island Lines, Manly, Ia.
Markley, A. S., Master Carpenter, C. & E. I. R. R., Danville, Ill.
McKey, D. M., Loc. Eng., S. A. L., Plant City, Fla.
Merwin, C. E., Chief Eng., Detroit Ter. Ry., Detroit, Mich.
Milburn, J. H., Chief Draftsman, B. & O. R. R., Baltimore, Md.
Morrow, F. E., Chief Eng., C. & W. I. R. R., Chicago, Ill.
Murray, W. A., Div. Eng., N. Y. C. R. R., Albany, N. Y.
Myers, J. B., Eng. M. of W., B. & O. R. R., Eastern Lines, Baltimore, Md.
Nuelle, J. H., Gen. Man., N. Y. O. & W. Ry., Middletown, N. Y.
Nye, C. M., Prin. Asst. Eng., G. N. Ry., St. Paul, Minn.
Olson, E. H., Asst. Eng., A. T. & S. F. Ry., Chicago, Ill.
Patterson, J. C., Prin. Asst. Eng., Erie R. R., New York.
Paul, C. E., Prof. of Mech., Armour Inst. of Tech., Chicago, Ill.
Pedersen, H., Asst. Eng., M. St. P. & S. S. M. Ry., Minneapolis, Minn.
Peterson, W. H., Eng. M. W., C. R. I. & P. Ry., Des Moines, Iowa.
Pittman, T. M., Jr., Asst. Eng., Ill. Cent. R. R., McComb, Miss.
Puder, F. R., Asst. Eng., C. T. H. & S. E. Ry., Chicago, Ill.
Raymond, W. G., Dean. Colo. Appl. Sc., State Univ. Iowa, Iowa City, Iowa.
Reid, J. W., Str. Eng., Robins Conveying Belt Co., Chicago.
Rex, George E., Mgr., Treating Plants, Santa Fe Sys., Topeka, Kan.
Ringer, Frank, Vice-Pres., Joplin Union Depot Co., Dallas, Tex.
Roach, J. H., Val. Eng., N. Y. C. R. R., New York City.
Robinson, J. S., Div. Eng., C. & N. W. Ry., Chicago, Ill.
Rose, L. S., Asst. to Fed. Man., Big Four Ry., Cincinnati, O.
Schmid, R. L., Asst. Eng., N. C. & St. L. Ry., Nashville, Tenn.
Schnacke, A. D., Asst. Eng., A. T. & S. F. Ry., Topeka, Kan.
Scribner, C. J., Asst. Scale Eng., C. B. & Q. R. R., Chicago.
Sessions, O. H., Asst. Eng., G. T. Ry., Battle Creek, Mich.
Shaw, W. J., Jr., Div. Eng., M. C. R. R., St. Thomas, Ont.
Shillinger, J. G., Chief Eng., Rutland R. R., Rutland, Vt.
Simmons, I. L., Bridge Eng., C. R. I. & P. Ry., Chicago, Ill.
Skeels, E. B., 875 Old Colony Bldg., Chicago.
Smith, Lowry, Special Engr., Nor. Pac. Ry., Brainerd, Minn.
Soete, F. X., Val. Eng., N. Y. O. & W. Ry., Middletown, N. Y.
Sperry, H. M., New York.
Stimson, F. J., Supt., Pa. Lines, Richmond, Ind.
Storey, W. B. (Past-President), Federal Mgr., A. T. & S. F. Ry. System, Chicago, Ill.
Strayer, L. W., Div. Eng., B. & O. R. R., New Castle, Pa.
Teal, J. E., Asst. Eng., B. & O. R. R., Baltimore, Md.
Tuthill, G. C., Acting Br. Eng., M. C. R. R., Detroit, Mich.

Van Hagan, L. E., Asso. Prof., U. of Wis., Madison, Wis.
Walker, W. K. (in military service).
Walling, V. R., Prin. Asst. Eng., C. & W. I. R. R., Chicago, Ill.
Waterman, J. H., Supt. Timber Pres., C. B. & Q. R. R., Galesburg, Ill.
Westfall, C. C., Eng. Bridges, I. C. R. R., Chicago, Ill.
Wiggins, W. D., Val. Eng., Pa. Lines West, Pittsburgh, Pa.
Williams, H. C., Chief Eng. Con., L. & N. R. R., Louisville, Ky.
Williams, K. G., Res. Eng., Union Ry. Co., Memphis, Tenn.
Williams, S. N., Professor-Emeritus of Civ. Eng. (Cornell College, Iowa), Oak Park, Ill.
Wilson, C. A., Consulting Engineer, Cincinnati, Ohio.
Wurzer, E. C., Div. Eng., M. C. R. R., Detroit, Mich.
Zinn, A. S., care Chief Eng. Office, M. P. R. R. Co., St. Louis, Mo.
Zook, M. A., Res. Eng., Bureau of Valuation, I. C. C., Washington, D. C.

Guests

Anderson, Burt T., Asst. Sig. Eng., D. L. & W. R. R., Hoboken, N. J.
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Atwill, A. L., Asst. Engr., C. & W. I. R. R., Chicago.
Ayars, E. J., Div. Eng., Pa. R. R., Williamsport, Pa.
Barber, H. E., Gen. Mgr., M. & E. R. R., Marion, Ill.
Beauwheel, A., Roadmaster, Ottawa, Ontario.
Bibbs, J. E., Asst. Bridge Engr., M. C. R. R.
Bretschneider, Wm., Div. Engr. Dt. E. & W. T. Ry., Houston, Tex.
Brooks, J. T., Roadmaster, Maine Central R. R., Brunswick, Me.
Busch, H. F., Springfield, Mo.
Cartwright, H. B., Asst. Engr., S. A. L. R. R., Jacksonville, Fla.
Chevery, E. A., Supt. Mo. Pac.
Clark, A. M., Asst. Br. Engr., N. Y. C. & St. L., Cleveland, O.
Cook, Oscar C., Metallurgical Engr., Tenn. Coal, Iron & R. R. Co., Birmingham, Ala.
Correll, H. E., Supt. C. R. I. & P., Eldon, Mo.
Cowell, H. E., Supt., C. R. I. & P., Eldon, Mo.
Dwyer, Edw. J., Supvr. Track, Erie R. R., Croxton, N. J.
Eddington, C. R., Galesburg, Ill.
Fithian, E. B., Mo. Pac., Poplar Bluff, Mo.
Hall, W. H., Supt. Tel., M. K. & T. R. R.
Harting, O. F., Asst. Ch. Eng., T. R. R. A. of St. L., St. Louis, Mo.
Hesselbusch, H. W., Asst. C. E., Southern R. R., Washington, D. C.
Horton, W. D., Patton Paint, Chicago.
Howe, Woodbury, Locating Eng., A. T. & S. F. Ry., Chicago.
Judd, Frank R., Engr. of Bldgs., I. C. R. R., Chicago, Ill.
Keig, J. R., Chief Frt. Insptr., Central Region, Purchasing Comm., U. S. R. R. R. A.
King, Coleman, Long Island R. R., Jamaica, N. Y.
LaRoy, H. A., Div. Engr., Portland Cement Assn.
Malloy, G. J., Asst. Div. Engr., Erie R. R., Jersey City, N. J.
Malone, J. F., Insptr. M. of W., Cincinnati, O.
Meriwether, David, Jr., Asst. to Ch. Eng. Const., Southern R. R., Washington, D. C.
Miner, K. S., Superv. B. & B., N. Y. C. R. R., Ottawa, Ontario.
Ratliff, C. M., Asst. Engr., K. & I., Louisville, Ky.
Shermerhorn, A. D., Div. Engr., U. P. R. R., Omaha, Neb.
Van Antwerp, Eugene, G. T. Ry., Detroit, Mich.
Selden, M. C., Asst. Supt., C. & O. R. R., Newport News, Va.
Smith, R. M., Asst. Engr., Mo. Pac. R. R., Falls City, Neb.
Snyder, J. A., Roadmaster, M. C. R. R., Jackson, Mich.
Stewart, Frank J., Supvr. Track, Erie, Podjervis, N. J.
Vielland, L. F., Jamaica, N. J.
Wagner, W. H., Elec. Eng., Bur. of Standards, Washington, D. C.
Walker, John, Asst. Eng., G. T. Ry., Alandale, Ontario.

Railroad Administration Collects Maintenance Data

For the purpose of affording a comparison of the expenditures for maintenance of way and structures to measure the amount of upkeep during the period of federal control and during the three-year test period, as well as to set the program of maintenance for 1919, the Division of Operation of the Railroad Administration has issued Circular No. 28, accompanied by five blank forms calling for information as to each property under federal control regarding the expenditures in the years ended June 30, 1915, 1916 and 1917 and December 31, 1918. The contracts between the government and the railroad companies specify that such an analysis of the maintenance of way and structures expenses may be made at the end of each year of federal control. It is also considered necessary to call for this data in order to set the program of maintenance which will be required during the current year. An explanation of the forms and instructions for furnishing the information, which is to be forwarded by May 1 to C. A. Morse, assistant director of the Division of Operation, is given in the circular as follows:

Explanation of Forms to Be Used in the Analysis of Yearly Expenses

Form EM2—Analysis of Total Maintenance of Way and Structures Expenses

This form is designed to show an analysis of total maintenance of way and structures expenses for the purpose of comparison between the test period and the federal control period. A report upon this form should be rendered for each year of both the test and federal control periods, by accounts and for each operating division as well as for the total operating property. Where the expenses are kept by accounting divisions instead of operating divisions, the expenditures of the accounting divisions embracing the operating division shall be combined. No separation of the expenses of an accounting division shall be made where it is included in two or more operating divisions, but it shall be included as a whole in the operating divisions in which it has the greatest mileage. For the railroads having accounting divisions a sketch map should be furnished showing the relation of the accounting divisions as combined to the actual operating divisions, together with the mileage of the operating divisions as combined from the accounting divisions, for each year under consideration.

Column 1—*Accounting Number.* This is self-explanatory.

Column 2—*Maintenance of Way and Structures Expenses—Primary Accounts.* Contains the maintenance of way and structures accounts classified under groups. This classification is for the purpose of equating expenses in the test period to correspond to the basis of cost of labor and material during the federal control period. The joint facility accounts have been omitted from this column for the purpose of showing for each railroad the gross amount expended by it for the maintenance of way and structures upon the property covered by its contract. The account "No. 275 Insurance" has also been omitted in accordance with section 5 (a) of the contract.

Column 3—*Total Maintenance of Way and Structures Expenses.* The items to be included in this column should correspond with the railroad's report to the Interstate Commerce Commission.

Column 4—*Labor (Including Contract Labor Force Account).* Under this head include the labor charges which are made directly from pay roll distributions and contractor's force account vouchers.

Column 5—*Net Material Charges.* Include under this head the amounts charged from material distributions and other sources, suitable deductions to be made to cover credits on account of material recovered, including scrap material.

Column 6—*Ledger Value of Property Retired and Replaced.* Include in this column charges to maintenance of way and structures expenses, representing the ledger value of property retired and replaced, as defined in Para-

graph 7 of General Instructions, page 13, Road and Equipment Classification.

Column 7—*Charges for Property Retired and Not Replaced.* Include in this column any charges which have been made to maintenance of way and structures expenses representing the value of property retired and not replaced.

Column 8—*Depreciation.* Include in this column any charges which may have been made to the depreciation accounts in the Interstate Commerce Commission Classification of Operating Expenses, where same has been kept by any road.

Column 9—*Miscellaneous Charges and Credits.* Include in this column all miscellaneous charges or credits, such as work train expenses (including labor and material when not directly distributed to primary accounts from pay roll and material distributions), miscellaneous vouchers, lump sum contracts, bill credits, etc.

Form EM3—*Comparison of Labor Costs for the Test Period with the Federal Control Period.* This form is for the purpose of obtaining the factors for equating the amount of labor (including contract labor) for the test period upon the basis of labor costs for the federal control period. It will be prepared by operating divisions and total operating property.

Column 1—*Group.* Contains the groups under which the accounts are classified, as published in Column 2 of Form EM-2. Only groups which include labor charges are here shown.

Column 2—*Occupation.* Show the principal occupations of employees engaged in work classifiable under the respective groups. Opposite the designation "Others" give information for all occupations not specifically named in the form, it only being essential that opposite this caption there shall be included items for labor which are relatively large and will materially affect the general averages.

Column 3—*I. C. C. Classification of Employees—Numbers.* The number shown in this column corresponds to schedule 561, "Employees and their compensation" as reported to the Interstate Commerce Commission. There the items are prefixed with the word "All," both the units and compensation as reported to the commission should be taken. The items prefixed with the word "Part" should be distributed so as to include under each group only the units of service and compensation properly assignable.

Column 4—*Units of Service.* In this column the units of service should be given in hours. The service of monthly employees should be reduced to hours upon the basis of the assigned number of hours constituting a year's work.

Column 5—*Compensation.* In this column should be shown the compensation properly assignable to the units included in Column 4.

Note.—There should be included in Columns 4 and 5, the units of service and compensation for labor covered in vouchers when the amount of such labor is sufficiently large to materially affect the "Equation Factor" of any group.

Column 6—*Average Compensation Per Unit of Service.* Under this head show the quotient obtained by dividing items in Column 5 by those in Column 4.

Note.—In Columns 7, 8 and 9 show for the federal control period information similar to that required in Columns 4, 5 and 6 for the test period.

Note.—Columns 6, 9 and 10 require no entry except on the lines designated "Totals and Averages."

Column 10—*Equation Factor.* Show under this head the quotient obtained by dividing Column 9 by Column 6.

Form EM-4—*Comparative Cost of Principal Items of Maintenance of Way and Structures Materials.* This form is designated for the purpose of obtaining the factors for equating the net material charges for the test period upon the basis of the cost of material during the federal control period. To be prepared only for total operating property.

Column 1—*Description of Material.* In this column should be listed, under the groups, the more important items of material properly assigned. A list of such material is at end of these instructions. Important items not included in the list are to be considered by individual railroads. In this column is also shown "Equation factor." Information for this item is only to be shown in Column 10. Group (3) "Rails," should be sub-divided (a) New Rails, (b) Second-hand Rails, (c) Scrap Rails.

Column 2—*Unit of Measure.* In this column should be included the appropriate units for the several classes of material shown.

Column 3—*Quantities Used for Three Years.* This column is provided to show the total quantities of the several classes of material used in maintenance during the test period.

Column 4—*Total Cost for Three Years.* Show the total costs of material used, the quantities of which are shown in Column 3.

Column 5—*Average Quantity Per Year.* The total quantity of each item of material should be shown in this column. These quantities are obtained by dividing quantities in Column 3 by three (years).

Column 6—*Average Total Cost Per Year.* The information in this column is obtained by dividing the information in Column 4 by three (years).

Column 7—*Quantities Used Year 1918.* The total quantity of each item of material used during the year 1918 should be shown in this column. For the purpose of this return the quantity of each class of material charged to accounts, "Ties," "Rails" and "Ballast," should be shown. With respect to other accounts it is intended that only the quantities of the important items of material should be shown. A general description of these items is given at the end of these instructions.

Column 8—*Total Cost Year 1918.* Show the total cost of material the quantities of which are shown in Column 7.

Column 9—*Average Unit Prices.* In this column should be shown the average unit prices at which the material of the several classes used for maintenance was charged in the accounts for the year. Where but one grade or kind of material is included in an item, the average disbursement price should be shown. Where an item includes several different grades or kinds of material divide the total charges for the material issued during the year by the number of units.

Column 10—*Cost Based on Average Quantities for Test Period.* The information required is obtained by multiplying the quantity shown in Column 5 by the prices shown in Column 9. In addition to the cost there is also to be shown in this column the equation factor. This factor is obtained by dividing the total for the group under Column 10 by a similar total in Column 6.

Form EM-5—*Comparison of Maintenance of Way and Structures Expenses (2 Sheets).* This form is designed to show by accounts the labor, material and miscellaneous charges (Columns 4, 5 and 8, Form EM-2) for the test period (average), the year of federal control, the equated expenses for the test period and the increase or decrease in expenses in federal control period, compared with equated expenses for test period. This form is to be prepared by operating divisions and total operating property.

Sheet 1—Column 1—*Account Numbers.*

Column 2—*Maintenance of Way and Structures Expenses—Primary Accounts.* The accounts shown in this

column are the same as on Form EM-2, with the exception that on Sheet 1, Account 21-1, Rails, is sub-divided to show separately new, second-hand and scrap rails. This separation is made for the purpose of more accurately equating the expenses for rails used in maintenance during the test period to the basis cost of such material for the federal control period. This separation is not considered necessary on Sheet 2.

Column 3—*Average Expenses for Test Period—Labor.* The labor expenses shown in Column 4, Form EM-2, for each year of test period is to be totaled and divided by three to arrive at the average for test period.

Column 4—*Equation Factors.* The equation factors shown in Column 10, Form EM-3, are those to be shown in Column 4, the factor for the group being inserted opposite the various accounts of the group. As group 10 has no equation factor or Form EM-3 the factor for this group is obtained after the equated expenses for groups 1 to 9 have been totaled in column 9, sheet 2. The sum total of groups 1 to 9, column 9, sheet 2, should be divided by the sum total of these same groups for the "average of test period," column 8, sheet 2, which gives you the equation factor for group 10.

Column 5—*Equated Expenses—Test Period.* This information is obtained by multiplying column 3 by column 4.

Column 6—*Federal Control Expenses.* This information is taken from column 4, Form EM-2, for the year of federal control.

Column 7—*Increase or Decrease in Federal Control Expenses.* This information is obtained by deducting column 5 from column 6. Increases to be shown in red, decrease in black.

Columns 8 to 12—*Material Expenses.* The information for these columns is prepared from the same sources as columns 3 to 7. The equation factors, column 9, however, is taken from column 10, Form EM-4, except for group 10. These factors, while for total operating property, will be applied the same for each operating division.

Sheet 2—Column 2—*Maintenance of Way and Structures Expenses—Primary Accounts.* The accounts shown in this column are the same as on Form EM-2. At the bottom of this column, after the sum total is shown for groups 1 to 10, items are provided for the totals of columns 6, 7 and 8, Form EM-2, showing "Ledger Value of Property Retired and Replaced," "Charges for Property Retired and Not Replaced" and "Depreciation." The information for these three items are only to be shown in the total columns 8 to 11, as they are not subject to equation. In columns 8 and 9 show the same amounts, being the "average for test period."

Columns 3 to 7—*Miscellaneous Charges and Credits.* The information for these columns is obtained from same sources as columns 3 to 7 in sheet 1. The equation factors, however, are composite and obtained from the labor and material results on sheet 1 as follows: Divide the sum of columns 5 and 10 (sheet 1) by the sum of columns 3 and 8 (sheet 1) for each group except group 10.

Columns 8 to 11—*Totals—Labor, Material and Miscellaneous.* These columns are the totals of the preceding columns, namely, 3, 5, 6, 7, 8, 10, 11, 12 (sheet 1) and 3, 5, 6 and 7 (sheet 2).

Form EM-6—*Extraordinary Items of Maintenance of Way and Structures Expenses.* It is the object of this form to segregate each year those items of an extraordinary nature which impair a true analysis of the maintenance expenses of the property for the purpose of measuring the standard of upkeep. From an operating and engineering standpoint we are concerned with the fair distribution of the expenditures over the property and the return of the property in good repair and for that reason we separate in this analysis the expenditures by divisions and try and arrive at those expenditures which reflect the comparative maintenance of the property during the test period and period of federal control. For test period use equated expenses.

Column 1—*Account Numbers.*

Column 2—*Maintenance of Way and Structures Expenses—Primary Account.* The accounts in this column are the same as Form EM-2.

Column 3—*Maintenance Expenses Incidental to Additions and Betterment Work.* In all improvement work there are maintenance of way and structures expenses incidental thereto, such as demolishing the property, rearranging or relocating existing tracks and structures (including in some instances a charge of line), maintaining traffic during the work, etc. As these expenditures have no direct bearing on the ordinary upkeep of the property, it is necessary that we set them aside in this column. The estimate for authority for capital expenditure will show these items and in many cases the estimate can be used in arriving at these incidental expenses; but for large improvements these estimates are, of course, often materially changed in the actual work done and should be checked in such cases.

Column 4—*Extraordinary Maintenance of Way and Structures Expenses From Floods, Explosions, Train Wrecks and Accidents.* These expenses when extraordinary are readily obtainable; the ordinary expenditures should not be accounted for in this column.

Column 5—*Salvage Credits in Connection with Property Retired.* On Form EM-2, column 6, we show the "Ledger Value of Property Retired and Replaced," but the salvage credits are included in column 9. These credits where they are sufficiently large to affect the yearly expenditures should be stated in this column.

Columns 6 to 9—These columns are left blank for the convenience of the individual roads for use in setting forth any other expenses entering into the yearly expenditures which are extraordinary, such as large adjustments, large credits not previously separated in this analysis, etc. Fire losses during federal control should be shown on this blank by accounts if they enter to any degree into the expenses, and in any case should be stated in total for the year.

General—The foregoing forms should bring out a true indication of the upkeep of the property, but the reporting official should supplement them with any additional information of conditions of which he is familiar that may aid in arriving at the correct situation as to the maintenance of the railroad.

Extracts From Contract—Section 5—"Upkeep"

Section 5—(a) During the period of federal control the director general shall, annually, as nearly as practicable, expend and charge to railway operating expenses such sums for the maintenance and repair of the property as may be requisite in order that such property may be returned to the companies at the end of the federal control in substantially as good repair as it was on January 1, 1918: Provided, however, that the annual expenditure and charges for such purposes during the period of federal control on such property and the fair distribution thereof, over the same, equal an amount in the aggregate to the average annual expenditure during the test period, less the cost of fire insurance included therein, except so far as the amount expended is subject to the adjustments provided in paragraph (c) of this section relating to the difference in cost of labor and material and the provisions of paragraph (e) of this section in regard to the destruction of property by fire.

(b) The director general may expend such sums, if any, in addition to those expended under paragraph (a)

of this section, subject to adjustments paragraph (c) as may be requisite for the safe operation of the property assuming a similar use to the use during the test period, and not substantially enhancing the cost of maintenance over the normal standard of maintenance of railroads of like character and business during said period, and the amount of such excess expenditure during federal control shall be made good by the companies.

(c) In comparing the amounts expended under paragraphs (a) and (b) of this section with the amounts expended during the test period due allowance shall be made for any difference that may exist between the cost of labor and materials and between the amount of property taken over and the average for the test period, and as to paragraph (a) for any difference in use between that of test period and during federal control, which, in the opinion of the commission, is substantial enough to be considered, so that the results shall be, as nearly as practicable, the same relative amount, character and durability of physical reparation.

(d) At the request of the director general or the company, there shall be an accounting of the amounts due by or to any of the parties under paragraphs (a) and (b) of this section, at the end of each year of federal control and at the end of federal control.

(e) If during federal control any of the property is destroyed or damaged otherwise than by fire or public enemies, and is not restored or replaced by the director general, he shall reimburse the companies the value of the property destroyed or the amount of the damage at the time of the loss, and the cost of restoration or replacement, or said value or damage, as the case may be, shall be charged to annual railway operating expenses, it being understood that extraordinary losses caused by floods, explosions, train wrecks or accident are included in the matters covered by this paragraph, while ordinary losses due to such causes are included in the matters covered by paragraph (a) of this section.

If during federal control any of the property is destroyed or damaged by fire, and is not restored or replaced by the director general, he shall reimburse the companies the value of the property destroyed or the amount of the damage at the time of the fire; and the cost of restoration or replacement of said value or damage, as the case may be, shall be charged to annual railway operating expenses, but the same shall not be considered a charge to such expenses for the purposes specified in paragraph (a) of this section.

(f) If any addition, betterments or road extensions are made to the property taken over at the expense of the companies and with the approval or by the order of the director general during federal control, he shall expend and charge to railway operating expenses such sums for labor and materials as may be requisite for the proper maintenance and repair of such property until end of federal control.

The circular also quoted from section 5 of the standard form of compensation contract between the Railroad Administration and the railroad companies, which governs the matter up upkeep.

Because the preparation of the forms has required more time than was expected, Mr. Morse recently issued instructions in the form of a letter to regional directors for the preparation of the data required to make up a maintenance program for this year so that the average upkeep for 1918 and 1919 will be equal to that of the test period after equating for the increased prices for labor and materials, but the information required for that purpose is in much less detail than that called for by the circular and is to be submitted for approval by April 15.

A. R. E. A. Men Identified With Railroad Administration

The large measure of recognition given to the American Railway Engineering Association through the appointment of its officers and members to important positions in the central and regional organizations of the United States Railroad Administration is a striking evidence of the high standing of the association. While these appointments have been made on the individual merits of the men selected, it is no reflection on them to say that identification with the activities of the association exerted no small influence in their selection for these positions. Of particular significance from the standpoint of the association was the selection of its president, C. A. Morse, formerly chief engineer of the Chicago, Rock Island & Pacific, for the position of assistant director of the division of operation in charge of maintenance, with headquarters at Washington. In this same connection attention is also directed to the fact that H. R. Safford, second vice-president of the association, is also in the government service, having been called from Canada, where he was chief engineer of the Grand Trunk, to the position of engineering assistant to Hale Holden, director of the Central Western region.

Probably the most important position held by any member of this association is that of director of the Northwestern region, occupied by R. H. Aishton, formerly president of the Chicago & North Western, who is member No. 237 of the A. R. E. A. and one of the first members to be identified with the Railroad Administration, when, as regional director of the Western region, later divided into three regions, he was in direct charge of all railways in the Western section of the United States.

Railway engineers were first used in a strictly engineering capacity in connection with the organization of the Railroad Administration in passing upon the budgets presented by the individual railroads for additions and betterments, work to be done as war measures during the construction season of 1918. This work was conducted largely by E. E. Adams as assistant to the director of the division of capital expenditures. The director of this department was until recently Robert S. Lovett, president of the Union Pacific, under whose direction Mr. Adams had worked for several years as consulting engineer for the Union Pacific system. Approval of additions and betterments budgets in the Eastern region was for a considerable period subject to the review of an engineering committee of which F. L. Stuart, consulting engineer, and H. A. Lane, chief engineer, of the Baltimore & Ohio, were members.

Following the promulgation of wage order No. 27, a Board of Wages and Working Conditions was appointed which has been largely responsible for the supplemental orders on wages, and this board includes in its members C. E. Lindsay, a director of the A. R. E. A., who was formerly division engineer of the New York Central at Albany.

While the Railroad Administration availed itself of the services of engineers early in the period of government control in connection with capital expenditures, it was not until quite late in the season that any steps were taken to centralize the supervision of maintenance of way. On July 1, following the organization of the

Southwestern region, E. A. Hadley, chief engineer of the Missouri Pacific, was appointed engineering assistant to B. F. Bush, director of the Southwestern region, this being the first recognition of the necessity for an officer of this kind in the regional organizations. The great step for the unification of the administration of maintenance was not taken until late in August, when Mr. Morse was given supervision over maintenance work throughout the entire country. Other regional maintenance officers were appointed about the same time to serve in advisory capacities under the regional directors and as a committee under the chairmanship of Mr. Morse on matters of national import. It is a significant fact that all of these regional maintenance officers with one exception are members of the American Railway Engineering Association. This list includes G. J. Ray, engineering assistant to the director of the Eastern region; E. B. Temple, engineering assistant to the director of the Allegheny region; J. E. Crawford, engineering assistant to the director of the Pocahontas region; H. R. Rodenbaugh, engineering assistant to the director of the Southern region, and Mr. Safford and Mr. Hadley, previously mentioned.

In addition to those members of the association specifically mentioned above as carrying out certain particular branches of the work of the Railroad Administration, quite a few of the members were retained individually for certain specific activities of a diversified nature that are incapable of definite grouping. This list includes the following: L. W. Baldwin, operating assistant to the regional director of theAllegheny region; A. T. Hardin, assistant regional director, Eastern region; Howard Elliott, member Joint Fuel Zone Committee; H. B. Spencer, chairman, Advisory Committee, purchasing section; Major Edward C. Schmidt, Fuel Conservation Section; A. W. Gibbs, member committee on mechanical standards, division of operation; W. J. Cunningham, manager, operating statistics section; S. S. Roberts, staff officer, engineering, Southern region; G. D. Brooke, on staff of regional director, Allegheny region, and Lester Bernstein, on the taff of the regional director, Eastern region.

The A. R. E. A. Elects Officers

SHORTLY BEFORE the close of the afternoon session yesterday, Secretary Fritch announced the results of the balloting for officers for the ensuing year. The selection was as follows:

President, Earl Stimson, general superintendent maintenance of way, Baltimore & Ohio, Baltimore.

First vice-president, H. R. Safford, engineering assistant to regional director, Central Western region, Chicago.



Officers of the American Railway Engineering Association
Earl Stimson, President
H. R. Safford, First Vice-President J. A. Atwood, Second Vice-President

Second vice-president, J. A. Atwood, chief engineer, Pittsburgh & Lake Erie, Pittsburgh.

Treasurer, George H. Bremner, district engineer, Division of Valuation, Interstate Commerce Commission, Chicago.

Secretary, E. H. Fritch.

Directors, Charles F. Loweth, chief engineer, Chicago, Milwaukee & St. Paul, Chicago; F. L. Thompson, chief engineer, Illinois Central, Chicago; Hadley Baldwin, assistant chief engineer, Cleveland, Cincinnati, Chicago & St. Louis, Chicago.

Nominating Committee, C. F. W. Felt, chief engineer, Atchison, Topeka & Santa Fe, Chicago; G. J. Ray, chief engineer, Delaware, Lackawanna & Western, Hoboken, N. J.; J. R. W. Ambrose, chief engineer, Toronto Terminal Railway, Toronto, Ont.

Earl Stimson, President

Earl Stimson, the new president of the American Railway Engineering Association, is not a rolling stone. Nevertheless he has gathered no moss on his back. While his entire engineering experience has been accumulated in the course of the long period of employment with a single railway system, the Baltimore & Ohio, this fact has not curtailed his development into an engineer of broad views capable of appreciating the problems to be encountered under a wide variety of conditions.

As regards his relations with others he is of a quiet, retiring demeanor, ungiven to advertising his own merits, and above all extremely conscientious with regard to facts. This trait of his character can be illustrated no better than by relating the following incident: About six months ago there appeared in these columns a sketch

of his career, published in connection with the announcement of his appointment to the position of general superintendent maintenance of way and structures. This sketch contained an error as will be noted from the following excerpt from a letter received from Mr. Stimson: "I wish to call your attention to the fact that there is one mis-statement, which I would be very glad, indeed, to have you correct, and that is with reference to my graduating from Cornell University in 1895. While I attended Cornell University in 1893, 94 and 95, I did not graduate, and although I would consider it a great honor to graduate from that institution, I do not care to seemingly assume that honor unearned."

He is a hard worker and is universally liked by his men. His long years of service are the best proof of his ability, as the position of engineer maintenance of way is most tedious and not only requires the exercise of engineering ability but also a capacity for handling detail. He is also head of an interesting family, consisting of his wife and six children.

Mr. Stimson was born at Cincinnati, O., on September 2, 1874. He was educated at Cincinnati University and attended Cornell University during 1893, 94 and 95. He entered railway service in June, 1905, as a rodman in the maintenance of way department of the Baltimore & Ohio Southwestern, with headquarters at Cincinnati. In 1896 he was promoted to assistant engineer, being transferred to Chillicothe, Ohio, in 1898. In 1899 he was promoted to resident engineer of construction, with headquarters at Osgood, Ind., where he remained until 1901, when he was advanced to the position of assistant division engineer at Chillicothe. His promotion to division engineer took place in April, 1902, when he was placed in charge of the engineering work of the Springfield division at Flora, Ill. He was transferred to Washington, Ind., in May of that year where he remained until 1905, when he was made engineer maintenance of way of the Baltimore & Ohio Southwestern. A further promotion to the position of chief engineer maintenance of way of the Baltimore & Ohio was given him in April, 1910. The title of this position was changed to engineer maintenance of way in 1912, and he held this position until August, 1918, when he was made general superintendent of maintenance of way for all lines grouped with the Baltimore & Ohio Eastern Lines, under the jurisdiction of C. W. Galloway, federal manager.

The Service Record of the Appliances Association

Although the National Railway Appliances Association is essentially a cold, businesslike organization, composed of companies banded together for the purpose of exhibiting railroad appliances to the proper representatives of the various railroads, the personality of the companies constituting this association is in reality the spirit of its existence. The personality of these component parts is in turn dependent upon the character of their executives and the men in their respective employ. Hence a story of the National Railway Appliances Association in the war is the history, or service records, of its members.

The war records of the past year have served to a large extent to classify all humanity and endeavors into those that did and those that didn't. The National Railway Appliances Association did. The various railroad supply firms which constitute the association did. And in turn the men forming these companies did. This is the record in general.

The National Railway Appliances Association, being an intangible thing with a list of officers and directors and a treasury substantial but once a year before the annual exhibit and as regularly emptied a few weeks later after the close of the exhibit, could consequently do its bit as an association only by purchasing an allotment of Liberty Loan Bonds by dint of stringent economy. The records of the association's companies and the individual record of their employees is a record, too, of the N. R. A. A.

The contributions of different companies to the winning of the war may be expressed in terms of their blue and gold starred service flags, the records of their purchases of Liberty Bonds, their contributions to the various charitable organizations and the converting of their producing plants to the filling of government contracts for war materials. Unfortunately, no record has been kept of the war activities of members of the association nor have many of these activities been published during the past year, nevertheless, bits of their work are brought to light in their annual statements, in the reports of the charitable organizations and now, with the relinquishing of many plants from war material fabrication in the return of these plants to the production of their usual products.

A few examples of the war records of the railway supply trade firms will suffice to show the character of the assistance rendered the government during the period of hostility.

The Chicago Bridge & Iron Works, Chicago, of which M. J. Trees, president of the National Railway Appliances Association, is vice-president, has turned its three plants to the making of war materials for the government to the exclusion of its own products. Its service flag contains 183 stars and among those who have made enviable records in the service of the government are George P. Horton, president, who was assistant general manager of the Submarine Boat Corporation until January, 1919; Robert Murray, vice-president and manager of operation, who is now a lieutenant-colonel in the 21st Engineers, 77th Division, a part of the Army of Occupation, and Charles S. Pillsbury, assistant general sales manager, who is now overseas in the Construction Department of the Signal Corps.

The Manganese Track Society, when the need arose for standards for special track work for use on the railways which the United States forces in France had taken over, assisted S. M. Felton, director general of railways of the United States army, in their preparation, A complete set of standards for special track work, including frogs, switches, crossings and crossovers, was developed and the magnitude of the requirements is indicated by the fact that 5,000 turnouts alone were specified in the first order. A. H. Mulliken, president of the Manganese Track Society, and other members of the society were actively engaged in this work.

As stated before, these examples illustrate the work that members of the N. R. A. A. have done as their bit. Practically every member of the association could boast of a similar record and to enumerate them would be to simply repeat with slight modifications. Of special interest in connection with the work of the railway supply companies is the history of the Railway Regiments Tobacco Fund, instituted in October, 1917. The list of contributors to this fund to provide "smokes" for the members of railway regiments in France is replete with the names of N. R. A. A. firms. No doubt, if lists of the contributors to other funds of a similar nature were compiled the N. R. A. A. would have an equally good representation.

Of the men prominent in the association, several were not content with being the man behind the gun and entered active service. For instance, George C. Isbester, a member of the board of directors of the National Railway Appliances Association and district sales agent of the Rail Joint Company, Chicago, entered the navy in June, 1917, with the rank of lieutenant-commander and acted as paymaster at the Great Lakes Naval Training Station, with headquarters in Chicago. For many years Lieut. Commander Isbester has been a member of the Naval Reserve. He served in this capacity until July, 1918, when he was assigned to more active duty on the staff of Admiral Sims in London. Word recently received from him indicates the possibility of his early return to Chicago.

Tom R. Wyles, prominent for the past ten years as either an officer or a member of the board of directors of the National Railway Appliances Association, entered the Quartermaster Corp of the United States army in May, 1917, with the rank of captain and was stationed at Madison Barracks, N. Y. He resigned from the army in September, 1917, to become director of the Central district of the Military Training Camps Association, with headquarters at Chicago. This association under Mr. Wyles' direction came to be recognized as the best means of obtaining proper material for officers fitted to serve in the army during the emergency. Army authorities were at first skeptical of the efficiency of this plan, but before the signing of the armistice complete recognition had been given to Mr. Wyles' committee and its jurisdiction extended to the examining and recruiting of men fit to become officers in all branches of the army. Much of the credit for the success of this plan is attributed to his efforts.

Among other men prominent in the N. R. A. A. and who have been actively engaged in war work are Fred A. Poor and Fred A. Preston, president and vice-president, respectively, of the P. & M. Company of Chicago. Mr. Poor for three months from September to December, 1918, was assistant director of personnel of the American Red Cross at the American Red Cross headquarters in Washington, in which position he had charge of the selection of Red Cross workers for overseas duty and also the representatives of the American Red Cross in the United States. Mr. Preston was commissioned as captain in the Air Service of the Signal Corps in October, 1917, and sailed for France in the same month. There he was stationed in Paris and connected with the Supply Section of the Air Service of the American Expeditionary force, being commissioned a major before his return to the United States in December, 1918. He received his honorable discharge at Washington on December 29, 1918.

Soon after the declaration of war, Warren R. Roberts of the firm of Roberts & Schaefer, Chicago, was commissioned a major in the construction division of the United States army, in which work he was identified with the building of several of the large cantonments in the United States. Later in 1918 he was promoted to the rank of lieutenant-colonel and attached to the Purchases, Stores and Traffic Division of the General Staff, with headquarters at Washington.

Facts concerning the activities of individuals connected with the N. R. A. A. are hard to obtain and doubtless there are many men whom the older members of the association will remember as having been actively engaged in government work and whose records have never been chronicled. A summary of the work of these men would be highly interesting yet almost impossible to obtain at the present time. Others of whom notice has been received of their entry into active service are: Azel Ames, Jr., of the Kerite Insulated Wire Company, and until a few weeks ago a major in the 63d Regiment of Coast Artillery, stationed at Fort Screven, Savannah, Ga.; C. H. Wilson, St. Louis railway representative of Fairbanks, Morse & Co., and formerly a first lieutenant in the Tank Corp; T. E. Carthers and C. M. Deardorff, formerly sales engineers with the General Railway Signal Company, N. Y.; R. P. Johnson, assistant engineer, with the General Railway Supply Company of Canada at Lachine, Que.; E. A. Warner, Jr., of the Union Switch & Signal Co.; Captain John M. Taylor, formerly with the H. K. Ferguson Company of Cleveland, Ohio; Major O. F. C. Randolph, with the same company, who has been an officer in the 16th Engineers (Railway) in France since August, 1917; Lieutenant Sherman C. Amsden, formerly sales manager of the Mudge & Co., Chicago, and now assistant to president of the same company; Lieutenant W. W. Glosser, who has been associated with the P. & M. Company and the Madden Company, both at Chicago, and Captain A. Fletcher Marsh, of the Marsh-Truman Lumber Company, Chicago, who was connected with the Lumber Production Division at Washington.

The Railway Engineering Association in the War

The honor roll of the American Railway Engineering Association contains the names of 137 members who joined the armed forces of the United States, Canada or Great Britain. Coming as they did from a body of men whose training and experience fitted them especially for leadership and technical attainment, the service rendered by this group of men proved invaluable in the various lines of special activities to which they were assigned. Nor is the record of the association to be judged by mere number of its roll of members who joined the colors, for with repeated admonition regarding the extreme importance of transportation at home as a part of the military machine there is no question but that many of the members were deterred from action which their patriotism prompted by the demands made upon them for service in this country. Be that as it may, there is no substitute for the sacrifices of military service. The men who suffered loss of position and home and income to serve their country deserve special recognition to which no others can lay claim.

Two members of the association made the supreme sacrifice. Lieut. Colonel Hiram J. Slifer, who died in France, will be remembered by his many warm friends and it is with no little satisfaction that we present on another page of this issue some detailed information concerning his military service and the accident leading to his death, together with some notes on the last days of his life.

The first member to die in the service of his country was Capt. Louis Vincent Manspeaker, who died of pneumonia on February 9, 1918, while in training at Camp Lee, Va. Capt. Manspeaker had been commissioned on January 1, and was expecting early assignment to active service on the other side at the time of his death. He was buried with military honors at his old home in Champaign, Ill. Before his entrance into the service he had been an assistant engineer on the Chicago & Alton, with headquarters at Bloomington, Ill. His previous railway experience extended to the Missouri, Oklahoma & Gulf and the Madeira-Mamore Railway of Brazil. Capt. Man-

speaker was an engineer of ability, energy and high regard for duty. He had a pleasing personality that won him many devoted friends, who keenly felt the loss occasioned by his death.

The most conspicuous service rendered by any member of the association and which will go down in history with greatest emphasis is that of S. M. Felton, director general of military railways, whose energy, resourcefulness and wide knowledge of railway matters, coupled with his executive ability in organizing railway troops and assembling and forwarding railway supplies, were largely responsible for the success of the American railway transportation system in France. The remarkable feature of Mr. Felton's military career is the fact that he carried on the great work in close contact with the military establishment in the capacity of a civilian, for he persistently refused to accept a commission.

Linked with Mr. Felton's name is that of William J. Wilgus, who was a member of the commission that went to France in May, 1917, to investigate the transportation needs of the American expeditionary forces. Later he collaborated with Mr. Felton in determining the equipment requirements and upon the perfection of a permanent organization was given a commission as colonel in the capacity of senior deputy to Brig. General W. W. Atterbury, the director general of transportation, in the Services of Supply.

It is interesting to note that seven other members of the association were officers in Gen. Atterbury's organization. In this number were included all three engineers of construction, namely, Col. H. C. Booz, now corporate chief engineer of the Pennsylvania Railroad; Col. H. M. Wait, formerly city manager of Dayton, Ohio, and Lieut. Col. A. W. Hudson, formerly engineer of construction on the Hell Gate bridge. Others on this list are Maj. W. M. Vandersluis, signal engineer of the military railways, who was formerly signal engineer of the Illinois Central; Lieut. Col. B. L. Bugg, one of the general superintendents, formerly general manager of the Atlanta, Birmingham & Atlantic; Col. F. W. Green, one of the port terminal superintendents and formerly assistant to the president of the St. Louis-Southwestern, and Lieut. Col. E. B. Cushing, director general of army transport service, who was formerly assistant general manager in charge of the maintenance of way department on the Sunset Central Lines.

Later Col. Cushing saw service in Italy and more recently with an important American commission appointed by Gen. Pershing for service in the Rhine valley, the North sea ports and other points where the possessions of the allies come in contact with the states of the German republic. In addition to the men mentioned above who were identified with the transportation forces of the Services of Supply, not a few members of the association were, and many of them still are, connected with various other branches of the service in important positions. Some of them, like Col. George H. Webb, formerly chief engineer of the Michigan Central, and Col. J. F. Jonah, who has recently returned to his position as chief engineer of the St. Louis-San Francisco, were officers in the various railway regiments organized early in 1917 to form a portion of the advance guard of the American troops that landed in France early after the declaration of war.

Some facts concerning Col. Jonah's experience are mentioned here as illustrating the nature of the services performed by American railway men in military activities somewhat more remote from railroad work than that connected with the operation of the military lines under the Services of Supply. Commissioned as a major on January 23, 1917, he was ordered into active service with the 12th Engineers in June, and landed at Liverpool on August 12, taking part in the memorable parade of the four engineer regiments in London on August 15. Upon landing in France he was immediately assigned to duty back of British lines in Picardy on the location and construction of light railways serving the British. On October 17 he was detached from the 12th Engineers and appointed chief engineer, Department of Light Railways for the American Expeditionary Forces. This service occupied the greater part of the winter of 1917 and the early months of 1918 and involved the examination of trains, light railway systems, shops, etc., on the front from Verdun to the Swiss border, in addition to considerable construction work. In September 10, 1918, he was promoted to the rank of lieutenant-colonel and when the signing of the armistice removed the necessity for any further construction of light railways he was relieved from active duty and returned to the United States, where he arrived in January, 1919.

An account of this kind must not be restricted to men who were in the United States army. Among Canadian members who distinguished themselves in the war is Col. C. W. P. Ramsey, C. M. G., of the Canadian Overseas Railway Construction Corps, who was a member of the first construction battalion to leave Canada.

This organization left Canada in June, 1915, and after some time in England reached France in August. It was later attached to the English army and was engaged in all manner of railway construction work. The corps distinguished itself especially during the retreat in the spring of 1918, being turned into demolition parties to destroy the lines of communication in the face of the German advance. Col. Ramsey was awarded the C. M. G. (Commander of the Order of St. Michaels and St. George) and was promoted to colonel in April, 1917. Before entering military service he was engineer of construction of the Canadian Pacific and in association affairs was identified with the work of the committee on Economics of Railway Location. Colonel Ramsey has returned to Canada and has resumed his duties with the Canadian Pacific.

Maj. F. L. C. Bond, recently made chief engineer of the Grand Trunk, saw extended service in France. F. W. Thornton, general manager of the Great Eastern Railway of England, was commissioned a brigadier-general in the British army and served in a capacity somewhat analogous to that of Gen. Atterbury in the American army.

Fifty Millions to Railroad Administration

(*Special Telegram to the Railway Age*)

WASHINGTON, D. C., March 19, 1919.

"The War Finance Corporation has loaned fifty million dollars to the Railroad Administration, which is to be used to replenish working capital in the hands of Federal treasurers to meet current requirements. One of these is for a large number of cross ties now being received, which are to be paid for on delivery. A large number of Federal treasurers have been in Washington this week. This sum represents all that the Administration itself can get from the War Finance Corporation, although individual railroad companies may make loans."

Wood Preservers Change Convention Date

Owing to the fact that the Automobile Show will be held in Chicago during the fourth week of January, 1920, the Executive committee of the American Wood-Preservers' Association, at a meeting held in the Auditorium hotel yesterday, decided to postpone its convention two weeks. It will, therefore, meet at the Hotel Sherman, Chicago, the second week in February.

Railroad Administration Closes Contracts

The Railroad Administration executed compensation contracts on Tuesday with the Salina Northern for $15,000; the Louisville, Henderson & St. Louis for $343,915, and the Louisville & Nashville for $17,310,000.

Baltimore & Ohio Luncheon

Engineering officers of the Baltimore & Ohio held a get-together luncheon at the Congress hotel yesterday, which was attended by about 55 members of the eastern and western organizations. L. G. Curtis, corporate engineer, Baltimore & Ohio, presided and a number of those present responded to toasts.

Concrete Freight Car on Exhibition

A freight car with reinforced concrete floor, sides and ends has been designed and patented by Joseph B. Strauss, president of the Strauss Bascule Bridge Company, Chicago, and is on exhibition at the Central Station, at 12th St. and the Illinois Central tracks, during the convention. The first car built to this design was placed in service with appropriate ceremonies on Monday.

Roadmaster's Committee Meeting

The members of the Executive committee of the Roadmasters' and Maintenance of Way Association spent most of yesterday at a meeting in the Auditorium hotel, planning for the next convention. The work of the committees was reviewed and other problems facing the association were discussed.

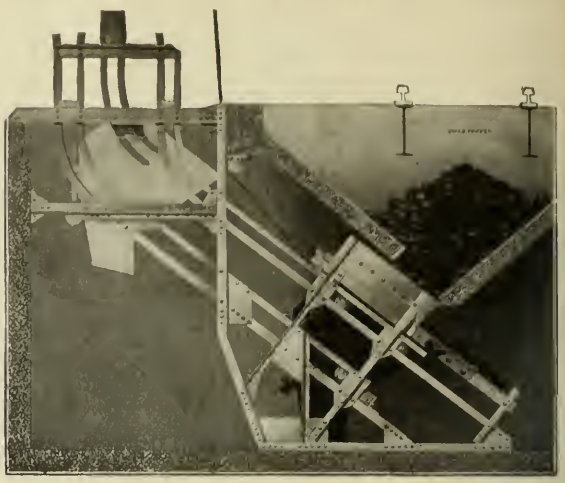
Correction

The statement was made in our Daily Edition on March 19 that General Petain had bestowed the French Croix de Guerre with two palms on Sergeant William N. Lepreau, son of Frank Lepreau, vice-president of Thomas A. Edison, Inc., Primary Battery Division. This statement was incorrect with respect to the bestowal of this honor by General Petain, as he confers such honors on commissioned officers only.

A New Development in Coaling Station Design

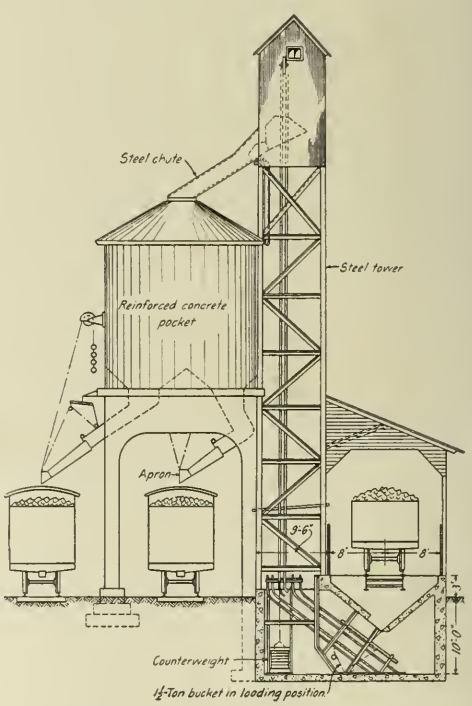
THE COUNTERBALANCED bucket has been recognized for years as one of the most economic and efficient methods of hoisting coal. It has one disadvantage, however, the necessity for a deep pit placed beside the track hopper; that is, it is necessary to have a pit deep enough so that the coal deposited in any part of the track hopper pit will reach the bucket in a well adjacent to one side of the pit in addition to the vertical height occupied by the bucket itself. Whenever difficult foundation materials are encountered in the construction of a pit of this kind, the cost of a substructure for the station may be excessive.

To meet the needs of difficult situations of this kind coaling plants have been built in which the coal was delivered to the hoisting bucket by means of an incline from a hopper under the center of the track pit at an angle of about 30 deg. from the horizontal. This plan necessarily involves the use of a separate feeding bucket with its added operating and maintenance costs. To eliminate this extra feature the Roberts & Schaefer Co., Chicago, has perfected and patented the design and construction of a shallow pit counterbalanced bucket for handling coal from the track hopper to storage, this design being known as the "RandS" shallow pit elevating bucket. In this design the hoisting bucket, instead of



Enlarged View of the Incline Under the Track Hopper

descending into a pit vertically below the hoisting tower, passes down an incline to a point underneath the track hopper, where the coal may be received through a gate direct from the hopper. After receiving its load of coal



Sectional End Elevation of the Station

from the track hopper the bucket starts upon its upward journey along the incline, drawing with it the undercut gate until the aperture from the track hopper is completely closed when the gate is released and the bucket

continues on an incline until clear of the track hopper, as shown in the cut. At this point in the bucket travel, the ball-bearing rollers which guide the bucket in its vertical travel gradually glide into their guides and the rollers which guided the bucket in its inclined travel become disengaged. The bucket continues on its vertical travel until it comes to the top of the plant, where the apron is released, allowing the bucket to discharge its load.

A Recent Development in Fire Doors

THE IMPORTANCE TO railroads of fire prevention and control is annually evidenced in the reports of the Railway Fire Protection Association. In a recent report of this Association the fact was disclosed that the average annual loss to railroads from fires closely approximates $7,000,000. In buildings one of the principal methods for the prevention and control of fire is in the installation of fire doors in the division walls.

The photographs shown with this article are two of many types of fire doors manufactured by the Merchant & Evans Company of Philadelphia, Pa. These types are particularly applicable to railroad structures. The hinged doors operate with non-automatic hardware, but if desired automatic hardware may be used. The sliding door shown is, of course, automatic.

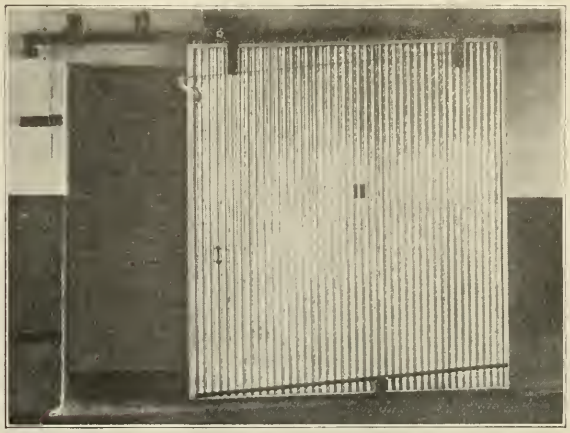


Hinged Fire Doors

In construction the doors shown and other types manufactured are similar. Essentially they consist of a double panel of heavy corrugated galvanized steel, lined with sheet asbestos and bound in a rigid, continuous frame of 3/16-in. by 2½-in. bar steel. The frame is reinforced on all edges by an extra heavy binder of galvanized steel, forming a box for the panel and thus preventing damage to it. Provision is made for expansion and contraction, so that distortion and warping of the door is impossible and the radiation of heat is reduced to a minimum by means of a series of regular air spaces, properly insulated, covering the entire area of the door.

The absence of a wood core reduces the weight of the doors, the average weight being not more than 5 lb. per sq. ft. The absence of wood or other material subject to deterioration reduces maintenance charges to the minimum and the heavy steel binder on the edges prevents damage to the frame from trucking.

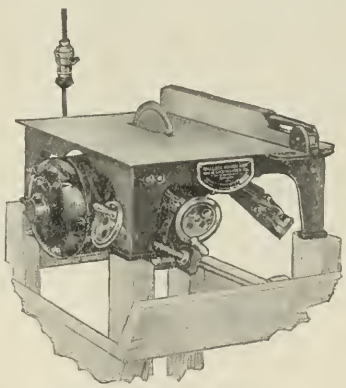
While these fire doors and fire shutters have been on the market but a short time, they are in use extensively by railways, including the New Haven, the Pennsylvania and the Reading.



Sliding Door of Automatic Type

Bench Saw for Woodworking Shops

A PORTABLE BENCH SAW, so designed that the saw can be raised or lowered and tilted to any angle up to 45 deg. with the table always remaining in a horizontal position, has recently been placed on the market. This machine is adapted for use in carpenter, cabinet and pattern shops.



Electric Driven Portable Saw

It can be operated on an electric light circuit still maintaining sufficient power to take a 2-in. cut through hardwood, making it possible to utilize it on at least 80 per cent of ordinary carpenter work. By its portable feature the time ordinarily lost in taking material from the bench to a saw located some distance away is saved.

The table is 17 in. by 20 in. and the saw is 7 in. in diameter. The saw may be tilted by means of a hand wheel and screw on the side of the machine. It is driven through cut gears from a ½ hp. motor fitted with a ball bearing to take up the thrust when the saw is tilted for

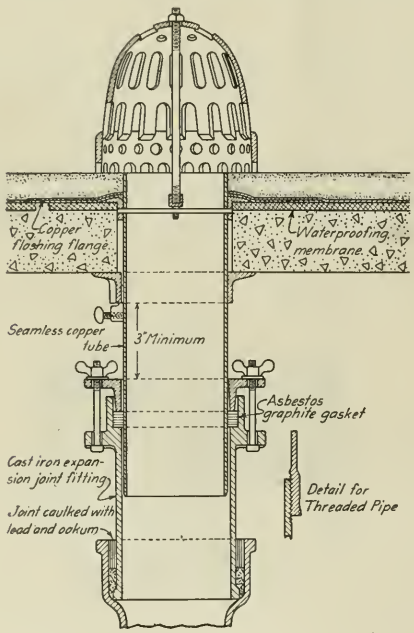
cutting at an angle. The advantage of this method of tilting over the ordinary tilting table is apparent, especially in cutting long stock which may be done without danger of breaking the angle by the stock coming in contact with the floor. The saw may be raised or lowered so as to cut or groove any depth up to 2 in.

The cross cut frame is adjustable to a 45-deg. angle and is an integral part of the machine, being swung under the table when not in use. The rip fence is of the box type and is clamped to the table by means of an eccentric lock. It is finished on both sides so that it may be used on either side of the saw. The saw is protected by a shutter guard which is held in place by a spring but slips back as the stock is fed into the machine.

This saw is a recent addition to the line of bench machines manufactured by J. D. Wallace & Co., Chicago.

A Roof Connection Fixture

THE MOST EXPENSIVE and carefully placed roofing is of little value if the connections of the roof or roofing to the outlets for vents and down spots are faulty or develop defects during service. Especially serious conditions arise when down spouts which occasionally carry a considerable volume of water are carried down inside the building. On source of trouble with such roof connections is the settlement of the building, or the expansion and contraction of the riser pipe which tends to destroy the union between the roofing and the



A Holt Roof Connection Fixture in Place

flanges of the roof connection, or even pull apart the riser pipe at the joints.

One means designed to overcome difficulties of this kind is the Holt roof connection, handled by the Barrett Company, New York. Since its introduction several years ago several modifications of this device have been developed so that it has been made applicable to a variety of conditions and roof details. The essential feature of this device is a slip joint in the pipe, formed by a special asbestos graphite gasket surrounding a copper tube. In some designs this slip joint forms a part of the roof connection itself, but in others it is located in a separate fitting just under the roof. The latter form is of more general application and is illustrated in the drawing. This shows the arrangement for a concrete roof or floor, but other arrangements provide for other forms of roof and roofing.

It will be seen in the drawing that a section of copper tubing is connected to the roof or floor by means of a flanged fitting and is covered with a cast iron strainer. The lower end of this tube fits into a special cast iron expansion joint. This fitting is arranged to connect at its lower end with bell and spigot cast iron pipe or with screw pipe, while its upper end provides the slip joint with the copper tube. The type of roof connection shown is available in 3-in., 4-in., 5-in., and 6-in. diameter pipes and other types are to be had in diameters as great as 8 in. Instruction sheets are issued which show how the joints may be applied to various forms of construction.

Value of Special Rail Inspection Demonstrated

THE MANUFACTURER of a particular device, the inventor of a special design, or the originator of some particular method of doing a piece of work, all strive for opportunities to demonstrate the particular efficiency of their own methods or devices as compared to those produced by others. But as a rule results are only comparative and it is not often that conclusive statistics may be compiled which demonstrate the proposition in actual figures. As a striking exception to this rule the officers of Robert W. Hunt & Co. have been able to demonstrate the advantages of the special system of rail inspection instituted by this company through statistics compiled by others, namely, the rail statistics compiled by the American Railway Engineering Association. As these statistics show the results secured on the different railroads for the different makes and ages of rails it is a simple matter to segregate the statistics covering rails known to have been rolled under the special inspection from those rolled without it and compare the results secured from both classes.

Comparisons prepared in this manner from the rail failure statistics published in 1918, giving the returns on rails rolled in the United States in the five years 1913 to 1917, inclusive, give some interesting results. In brief they show that there were 30 per cent more failures per 100 miles of track laid with rails that did not receive the special inspection than on those which did have it. These comparisons are summarized in the table given below:

OPEN HEARTH STEEL ONLY—RAILS MADE IN U. S. ONLY

Total track miles reported	37,862.33
Total track miles covered by special inspection	17,154.65
Per cent of miles reported covered by special inspection	45.3
Number of failures per 100 track miles (all rails)	31.13
Number of failures per 100 track miles covered by special inspection	26.67
Number of failures per 100 track miles not covered by special inspection	34.83

To those unfamiliar with the nature of special inspection the following explanation defines the difference between so-called "special" inspection originated by Robert W. Hunt & Co., and what may be termed the ordinary inspection.

"Special inspection is, in short, inspection applied to the whole process of manufacture, while ordinary inspection consists especially of an examination of the finished rails to prove the accuracy of the section rolled, the me-

chanical finish and the final classification into first or second quality, etc., while, of course, the physical tests specified are also given attention. Special inspection, whereby inspectors are located in all important parts of the mill during manufacture, is supplemental to ordinary inspection and obviously requires the employment of more inspectors than does ordinary. Generally speaking, the actual number of men employed on special inspection is three times that of ordinary, but this feature depends on mill conditions and especially on its size and tonnage."

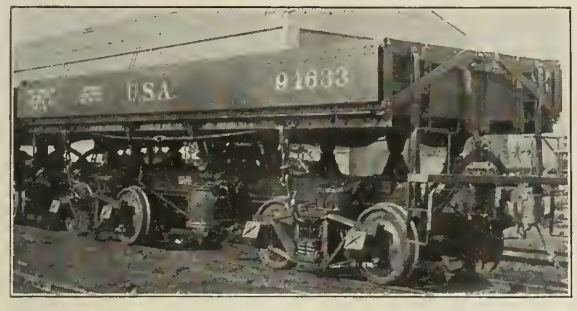
A Recent Type of Air Dump Car

An air dump car in which the locking and unlocking and the position of the bed of the car are controlled absolutely by air without the use of side chains and without any fixed connection between the bed and the underframe



Automatic Compression Lock Type

has recently been introduced by the Western Wheeled Scraper Company of Aurora, Ill., for use in classes of work where it is desirable to employ cars without side chains. The dumping and righting of the bed are accomplished by the use of two short, vertical cylinders, one on each side of the car, so placed that their piston rods engage with the underside of the bed through hinged connections, called push rod extensions. The strut or post is hinged at its bottom end to the body bolster. Its upper end moves in a guide attached to the floor of the car, so that the motion of the strut is controlled positively.



Type of Air Dump Car Used by the A. E. F. in France

To lock the car in the carrying position, a brace has been pivoted at the upper end of each strut which the lower end engages with a cam fastened to a rack shaft, which in turn is operated by the movement of the piston in the cylinder. By this method all the parts between the bed and the frame are in compression.

By engaging directly with the bottom of the car, the piston rods utilize the total power of the air pressure in the cylinders in dumping or righting the car, thus eliminating all losses due to cables and sheaves. The thrust of the piston is applied near the outer edge of the car bottom, giving the greatest possible leverage and reducing the amount of power needed.

This simplified form of dumping device has also been applied to cars fitted with side chains for controlling the position of the bed. This type of car was used extensively in war construction in France, where nearly 1,000 have been supplied. It is furnished in four sizes, 12-yd., 16-yd., 20-yd. and 30-yd. capacity.

The Morrison Switch Point Hold Down

A device which is said to insure an easy throwing switch while at the same time always holding it in surface and eliminating all vertical motion in the points has recently been introduced by the Deeming-Endsley Company of Chicago. The device is known as the Morrison switch point hold down and consists of 4 parts; two attaching clamps which fit over any standard switch plate, a bolt, and a horizontal guide rod 1 in. in diameter, which is secured at one end to the attaching clamps, extends through a hole 1⅛ in. in diameter, drilled in the web of the switch point and turns up under the ball of the running rail.

It is applied readily, the work consisting of drilling a hole in the web ¼ in. above the flange and 18 to 21 in. from the toe of the point; then the plate is raised on the inside of the point and a slot ½ in. deep is made in the



The Switch Point Hold Down in Service

tie the width of the attaching clamps; the lower lips of the clamp are then set under both sides of the tie plate and the curved end of the horizontal rod is inserted in the switch point and the other end is pressed down until it rests on the upper lips of the clamps. The application of the bolt completes the operation except for driving a small spike in a slot provided in the clamp to hold the rod firmly against the rail. These spikes permit of adjustment of the device as required.

Although this device has been on the market but a comparatively short time it is in extensive use on steam roads. Among the roads using the device are the Dallas Union Terminal, the Kansas City Southern and the Gulf, Colorado & Santa Fe. It is claimed for the device that it prevents derailments at switches and insures additional life to switch points.

Some New Pipe Threading Tools

A NEW RATCHET HANDLED pipe cutter with quick changing units for different sizes of pipe is a convenient tool recently developed for working in tight places on pipes ranging from ⅛ in. to 1 in. in size. The device is also applicable to bench work. As shown in the illustration, it consists of a series of six die heads of ⅛-in., ¼-in.,

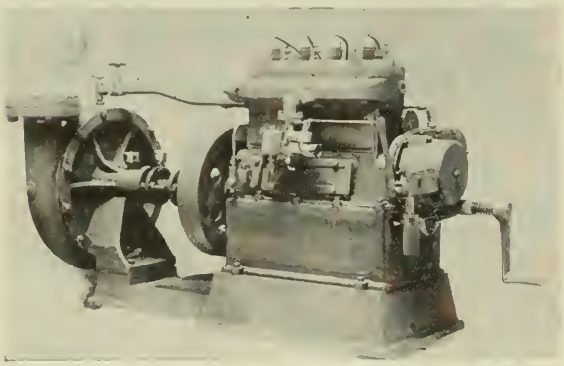


The Ratchet Handle and the Six Die Heads

⅜-in., ½-in., ¾-in. and 1-in. size, which are fitted into a socket containing a ratchet and also fitted with a handle. These heads can be changed quickly and have bosses on the sides that engage slots in the sides of the socket to keep them from turning independent of the socket. The ratchet is completely inclosed so that it is readily kept free from dust and grease and also eliminates possible loss of any loose parts. This device is manufactured by the Borden Company, Warren, Ohio, and is known as the No. 3 Beaver Junior ratchet.

Pumping Outfit for Railway Water Supply

IN ITS UNIVERSAL TYPE F centrifugal pumping outfit designed for use in railway installations where a full head capacity is desired the University Motor Company of Oshkosh, Wis., has made a practical application of a gasoline motor direct connected to a centrifugal pump. The outfit has a capacity of 265 gal. per min. with a 55-ft. head. The important feature of this plant is the fact that the engine is designed and constructed to operate continuously with practically no attention or trouble. It will pump 150,000 gal. in a 10-hr. day, with a fuel consumption of about 9 gal. of gasoline. It is of the four-cylinder balanced type capable of operating at a normal speed of 1,000 r. p. m. It has a removable cylinder head,



A Full-Head Three-Inch Centrifugal Pumping Outfit

high tension ignition, automatic oil pump and generator, all parts being enclosed and running in oil.

The governor controls the speed, holding it to 1,000 r. p. m. regardless of the load, so that the water can be shut off at any time without adjusting the engine. The cylinders are 2⅝ in. by 4 in. and the crank shaft has a diameter of 1½ in. and adjustable bearings. All the small parts are hardened steel, ground to interchangeable size.

The oil pump is of the plunger type, taking oil from the base and pumping it through the sight feed glass in the gear. The oil flows from this point to all interior parts, automatically lubricating them. It is removable by dismounting the discharge pipe union.

The engine is fitted with an Atwater-Kent ignitor or magneto and is wired up complete with spark plugs when shipped. The pump has a 3-in. discharge and a 4-in. suction and is equipped with a ball thrust bearing to take the end thrust of the runner. It is connected to the engine fly wheel by means of an arm coupling. The pump can be fitted with a foot valve so it may be primed.

A Cylindrical Telephone Booth

A CONCRETE TELEPHONE BOOTH of cylindrical form has been developed recently as a substitute for the square or hexagonal shapes more commonly used in the past and over which it is said to have a number of advantages. The idea in developing this design was to supply the demand for a moderate priced booth of perma-



Two Views of the Booth

nent construction that can be transported readily, and will not be damaged when being shifted from place to place. As seen in the illustration, the booth consists essentially of a section of concrete pipe of three feet inside diameter with holes cut for a door and (if desired) for windows. The conical roof is cast separately and fits down over the cylindrical body.

Both the barrel and the roof are designed for the stresses occurring during transportation and erection. Owing to the cylindrical shape of the barrel of the booth, rolling is a most convenient method of moving it about. The booth has no floor since there seems to be a demand for a house in which a cinder floor can be placed. When used as a sentry box two windows are provided, but these are ordinarily omitted when it is used as a telephone booth and when used for this purpose a hole of one inch diameter is provided in the back for the entrance of a telephone cable and a ring is inserted in the roof to hold the slack in the cable. This type of concrete booth was developed and is being manufactured by the C. F. Massey Company, Chicago.

EDITORIAL

Railway Age

How High Wages Can Be Maintained

As suggested in the *Railway Age* of March 14, the high wages to railway employees can only be maintained by either raising the freight and passenger rates, or by increasing the efficiency of the individual employees. The problem presented should be solved as far as possible by increasing efficiency. The Railroad Administration is therefore face to face with a tremendous problem which can only be solved by a thorough and intensive educational program. First and foremost, the managements and the men must be made to realize the vital necessity for cordial and hearty co-operation. This may sound academic, but it is a fundamental principle on which any sound solution of the railway problem must be based. It can be inspired by a large, broadminded expression and attitude toward this end on the part of those at the head of the Railroad Administration and its various subdivisions. In the second place, educational campaigns must be conducted in all departments and among every class of employees to show them exactly how they can best do their various tasks. In these days of highly specialized work, many of the men lose interest because of the monotony of their work, and look with fear and distrust upon any further tendency in that direction. This fact must be recognized and the training of the men must be broad enough so that they may occasionally be shifted and thus maintain their interest in the work. Good work, either as to quality or quantity, cannot be done by men who are not interested in it, and who are not working at it in the spirit of playing a game.

Reduced Demurrage Rates Called For

The brakeman, in the old story, who wanted a pass to go home at the end of the week was rebuffed by the cold-hearted superintendent with the question whether he would expect a farmer to hitch up a horse and buggy on Saturday night to carry home a hired man. "No," said the brakeman, "of course not; but he would be a darned mean farmer if he should refuse such a small favor when he had the team all hitched up and was going in that direction." The lumber dealers who are now demanding the reduction of demurrage charges on freight cars present to the railroads the same argument: Your cars are standing 'round earning nothing; why charge us for delaying them when you continue to delay them (empty) yourselves? It is the old question of maintaining a *system,* for the promotion of regularity and broad economy, even when the immediate evidence of economy is lacking. A demurrage charge is necessary to insure economical use of track room, regardless of the value of the car. To suspend or modify the charge every time the value of the car service changes, tends to defeat the main purpose of the rule. Experience has demonstrated this. Uniformity of rates is of value in itself in spite of minor or temporary unfairness. If the lumbermen could have the full benefit of the brakeman's argument their traffic sharps would soon be proposing that on descending grades as, for example, from Altoona to Harrisburg, lumber should be carried for nothing—at least in cases where a car might be needed to fill out a train to the standard length! The interesting feature about this request of the lumbermen is that in Washington it comes before Max Thelen, director of the division of public service. Mr. Thelen formerly was a railroad commissioner in California, where a high demurrage charge has been in force for nearly ten years, producing marked economy in the use of freight cars; and in his answer he may be expected to set forth the true principles of demurrage rates, high or low, regular or irregular.

What Locomotives Should Be Stoker Fired?

There are now about 5,000 locomotives equipped with mechanical stokers in this country. The rapid rate at which the stokers have been applied during the last few years is due to the necessity for increasing the capacity of the individual locomotives and thus the amount of traffic that can be handled over a division in a given time. The question as to the dividing line between the hand-fired and the stoker-fired locomotives has been one of much debate and discussion. The size of the locomotive, within the questionable limits, is not nearly so important a factor as the capacity to which the locomotive is to be worked for long periods. W. S. Bartholomew, president of the Locomotive Stoker Company, gave it as his opinion at a meeting of the Western Railway Club on Monday evening that, in general, locomotives should be equipped with stokers which weigh 200,000 lb. or more on the drivers, have a tractive effort of 50,000 lb., a grate area of 60 sq. ft., and which require more than 4,000 lb. of coal per hour for long periods. Of course, there are cases where it is desirable to use mechanical stokers on locomotives below these limits. Lighter and less powerful locomotives, for instance, may be stoker fired to advantage when they are worked to the limit of their capacity for sustained periods. While stoker-fired locomotives may use more coal per locomotive mile—and undoubtedly they will if the best use is made of them—it does not follow that the rate per ton mile will be any higher, and even if it is the cost of moving the freight per ton mile will be decreased because of the larger tonnage per train or the more rapid rate at which it is moved over the division. It is true that the higher the rate of combustion the lower the efficiency of combustion. We must pay the price in fuel economy if we are to get the greatest horsepower output from a locomotive, but the increase in the train load and the greater amount of business that can be handled over a division in a given time will far more than offset any loss in this respect. As Mr. Bartholomew suggested, the important thing is to move the maximum amount of tonnage over a division in a minimum amount of time.

Financing the Needs of the Railroads

The government has announced its intention of issuing what amounts to due bills to the railroad companies for amounts owing on rental and accepting 90-day drafts for amounts owed for equipment. In this way the money received from freight and passenger revenues can be so conserved as to permit of the continued operation of the railroads until such time as Congress meets and passes a bill providing an additional $750,000,000 or more for the Railroad Ad-

ministration's revolving fund. The total amount of such due bills will probably run up to some hundreds of millions of dollars, the exact amount depending on how far the roads fall behind in earning the rentals due and the length of time that will elapse before Congress is called in extra session. The railroad corporations are, therefore, thrown on their own resources to finance their corporate needs. The due bills will not be negotiable, but will be assignable and could presumably be used as collateral for railroad corporations' note issues. The sale, however, by the government of the Victory Loan bonds is about to begin and the strain on government credit will at best be severe, without having the added difficulty of competing with railroad collateral notes secured by government promises to pay. Bankers, railroad men and the Railroad Administration are now in conference. A plan is being worked out by which the due bills of the government and the accepted drafts can be taken by the railroads and equipment companies to their banks and discounted just as commercial paper would be discounted. It then should be possible for the banks to rediscount these due bills with the Federal Reserve banks, which in turn can issue currency against them. Under ordinary circumstances this would be an expansion of credit that might not be justifiable, but under present circumstances it would appear to be the best solution of a most difficult and complicated problem. There is, of course, the question of the legality of such a proceeding as here suggested, but the law giving the President the right to take over the railroads is so broad that, to the layman at least, its provisions appear to give the Railroad Administration ample authority to issue due bills which will be legal obligations and, therefore, acceptable for discount by the banks and re-discount by the Federal Reserve banks. Such an arrangement would interfere in the smallest possible degree with the successful flotation of the Victory Loan bonds.

Freight Car Situation Serious

ONE OF THE CHIEF CRITICISMS of the railroads under private management has been that during periods of depression, it has been common practice to curtail expenses materially, thereby accentuating non-employment conditions and not using the opportunity for bringing the rolling stock up to a good condition of repair. This same criticism now applies most decidedly to the railroads under government operation. It is doubtful if the general condition of the more than 2,500,000 freight cars was ever as bad as it is today. While the government's statistics show a bad order car situation of a little over five per cent, they by no means represent the true condition of all the freight cars. Traffic has fallen off tremendously and quantities of freight cars are stored all over the country. Naturally, those cars that are in the worst condition are the ones chosen for the storage tracks and those which are better able to run are kept in service. The percentage of cars in bad order refers only to those cars that are in service and therefore the figure is low. If, on the other hand, traffic conditions were such as to require the use of all the cars the country would be in bad shape for equipment.

It is a well known fact that the cars are in a deplorable condition. One federal manager has ventured the statement that he has never seen them to be in worse condition. It is necessary that something be done and be done quickly to improve the situation. A general reduction in working hours and in labor forces is being made in the car departments all over the country. Such a policy is extremely short-sighted and does not adequately protect future business. Car Service Section Circular CS-53 and Circular No. 27, recently issued by W. T. Tyler, director of the Division of Operation, indicate that the bars are down now for returning the cars home to the owning lines. Every step should be taken to get the cars home in order that they may be properly repaired and the betterment programs which have been suspended for such a long period continued. The war, of course, has been responsible for the present condition of cars, due primarily to the fact that business was excessively heavy and that a very small percentage of cars was on the home rails. If the Railroad Administration is out to make a showing in operating expenses in the same manner as the private corporations have done in the past, the cars will not be repaired, but if, on the other hand, it recognizes the excellent opportunity now, with traffic light, of getting these cars into the shop and putting them into first-class condition, our railways will be in shape to better handle any large increase in business which is very liable to come after peace negotiations have been closed.

Advance of Rates Needed Under Either Government or Private Operation

THE SENTIMENT of the public and of Congress undoubtedly has crystallized in favor of the return of the railways to private operation. The continuance of government operation or the adoption of government ownership will not be seriously considered if it can be avoided.

But every month's statistics of earnings and expenses emphasize with increased force the fact that the return of the railways to private operation will be no simple and easy matter. In no month since the armistice was signed have the railways earned anywhere near enough to pay the standard returns guaranteed to the companies. In November their net operating income was $57,000,000; in December, $28,000,000; and in January, $19,000,000; a total of $104,000,000. The average operating net income earned in the same three months of the fiscal years 1915, 1916 and 1917—the years on whose income the guaranteed standard returns to the companies are based—was over $215,000,000. In other words, during the last three months for which statistics are available the government's guarantees to the companies were approximately $215,000,000; the net operating income actually earned was $104,000,000; and the deficit incurred by the government was about $110,000,000.

The statistics for January are relatively the worst of all. The total earnings made by railways under government control were $109,826,000 more than in January, 1918. The freight business moved was 10 per cent more than in the terrible January of 1918. The weather conditions were as favorable to economy of operation as were ever known in winter. Nevertheless, the increase in the operating expenses of the roads over January, 1918—although only a small amount of retroactive advances in wages was included—was $88,200,000, with the result that, as already shown, the net operating income made was only $19,000,000. The average net operating income earned in January in the three years on which the returns guaranteed to the companies are based, was $55,331,000. Thus, in the first month of the year the Railroad Administration shows a deficit of over $36,000,000.

It does not seem reasonable to assume that either the freight movement will remain as small as it is now, or that operating expenses will remain relatively as high as they are now. Business will surely begin soon to show signs of recovery from the slump which followed the signing of the armistice. The operating officers, from Director of Operation Tyler down, are making the most energetic efforts to control and reduce expenses. But under the present system of government operation there are certain big special obstacles to the reduction of expenses which are extremely difficult to overcome. Besides, the train service employees are still to be given a large advance of wages, and the expenditures for maintenance must be increased, if the properties are to be kept in even as good condition as at present.

Undoubtedly if the railways were returned to private operation they would be more economically operated than they can be under the present system. But it is impossible to believe, in view of the statistics of earnings and expenses for recent months, that, with existing wages of labor, prices of fuel and materials and passenger and freight rates, they can be so operated under government control as to avoid another large deficit, or under private control as to enable them to earn enough to pay their interest and reasonable dividends.

There is no prospect of a reduction of wages. Prices of fuel and materials are weakening some, but not much. In the circumstances, there seems to be but one method available for restoring the balance between earnings and expenses, and that is to advance rates again.

It is impossible to see how, without another advance of rates, the railways could be restored to private operation without bankrupting many companies and forcing many others to suspend their dividends. It is also impossible to see how the government, without another advance of rates can avoid piling up a larger and larger deficit. Its deficit in the year 1918 was about $225,000,000. This was increased to about $260,000,000 by the deficit incurred in January, 1919.

The public must pay in taxes the entire deficit incurred in operating the railways. But there ought not to be any deficit incurred. Those who use transportation service should pay the entire cost incurred in rendering that service. The taxpayers should not be required to pay any part of it. The Railroad Administration ought to advance the rates at once enough to prevent any more deficit from being incurred. With the rates high enough to cover all railway costs, including the standard return to the companies, they would be high enough to enable the railways to be safely returned to private operation.

Would public opinion permit another advance in rates? We believe it would, if the facts were presented to the public clearly and fully. The price the public will have to pay if the railways are not returned to private operation will be greater, either in rates or taxes, or both, than the price it will have to pay if they are not returned to private operation, for our own experience, like that of every other country that has had experience, has shown that government operation inevitably is more expensive than private operation.

Public sentiment has crystallized in favor of returning the railways to private operation. But if this is to be done without endangering the entire financial fabric of the nation, the return must be made under conditions which will enable the companies to live. If the effect of the return of the railways to private operation is to be to increase the prosperity of the country, the return must be made under conditions which will enable the companies to prosper. Perhaps after the railways had been under private operation for some time rates no higher than those now in effect would be sufficient. But it will take months after private operation is resumed to restore operating conditions to normal and effect the improvements in operating methods which are needed to secure the greatest practicable economy. During this period of readjustment the companies will need higher rates to enable them to prosper, or even to live, almost as much as the government now needs them in order to stop the increase of its deficit.

It will not cost the public near as much to return the railways to private operation as it would to continue government operation; but it will cost something. Will the public willingly pay the price necessary to restore private operation, or will it refuse to pay it, and thereby in effect force itself to pay the much higher price that it will have to pay if it continues government operation? The public must answer this question. It is one of the most important and pressing questions now confronting it.

The Public Learns When It Pays the Bill

THE PRESENT SYSTEM of government management of the railroads is sometimes described as "public" management, while the former system of corporate management is referred to as "private," but some of the important facts regarding railroad affairs are rather less public now than they were before. Railroad wages have been enormously increased during the past year. An estimate of the aggregate amount of this increase has received considerable publicity—with some assistance from those who were interested in letting it be known that government operation has been rather expensive. But only a very few people have much of an idea as to how the money was distributed, what relation the increase in wages bore to the increase in the cost of living, or the facts which determined the decisions which produced the wage awards. Wage orders, revisions, supplements, addenda and interpretations, expressed in terms of increases, percentages, minimum rates, or rates per month in place of former rates per hour, or vice versa, have followed each other with such bewildering rapidity that no one not in close touch with the facts knows whether or not to believe the stories that are passed around of call-boys receiving more than technically trained engineers, of sudden advances from $65 to $185 a month, of green "car knockers" being paid more than experienced passenger enginemen, etc.

Doubtless it is as yet too early for the complete statistics to be available, but in comparison with the amount of public discussion which accompanied the campaign of the brotherhoods for a basic eight-hour day in 1916, the wage increases of 1918 have passed almost unnoticed. The eight-hour day demand, which resulted in an increase of wages amounting to about $65,000,000 a year, became a matter almost of public debate. Not only were its pros and cons fully discussed in the newspapers and on public platforms, but the conferences between the representatives of the employees and of managers were held in open session and were fully reported.

Most of the proceedings relating to the wage increases of 1918 have been conducted behind office doors. The very fact that large demands have been made by the employees' organizations, such as that of the brotherhoods last summer for further increases and time and one-half for overtime, which is now in the process of reaching a decision, and the recent demand of the federated shop crafts for a third increase within a year, are not made public. They are discovered by reporters weeks afterward. It is true that public hearings were held before the Railroad Wage Commission last winter and because a newspaper got a "scoop" on its findings they were later given out, but the recommendations of the commission were merely the prelude to the series of wage orders that has followed. The Board of Wages and Working Conditions also holds hearings in the preliminary stages of a wage controversy between the organizations and the Railroad Administration—there are still controversies, although they are managed with less propaganda than was used on both sides in 1916—but the board merely recommends and the settlements are the result of negotiation.

Some of the facts pertaining to the public operation of the railroads have been made public in the form of replies to the critics who have made what the Railroad Administration considers an unfair statement of them. For instance, Howard Elliott, by referring to the fact that there were 16 per cent more employees on the Pennsylvania after a year of government operation than in December, 1917, has brought out the fact that the increase in the number of employees on the railroads as a whole was only 8.2 per cent, whereas an impression had been created that there was a shortage of labor. Whether or not it was fair to point to the number of employees at the beginning and at the end of 1918 as an example

of the effect of government operation, after the railroads had been obliged to take on almost any kind of men they could get, such a comparison was needed to keep the government ownership advocates from claiming that labor has been more efficient under government operation and higher wages than it would have been under other circumstances; just as it has been necessary for some people outside of the Railroad Administration to call attention to the increase of $1,140,000,000 in operating expenses in a year in order to let the public know that the government has not accomplished the legerdemain of increasing wages $800,000,000 a year merely by cutting railroad presidents off its payroll, consolidating ticket offices and standardizing locomotives.

The Victory Liberty Loan

THERE ARE MANY REASONS why readers of the *Railway Age* should prepare now to make large subscriptions to the Victory Loan to be offered in April. One reason is that the government reached the peak load of its war expenditures after the Fourth Liberty Loan funds had all been exhausted. Another is that the Victory Loan bonds or notes will be an especially desirable investment.

The government will have to borrow about six billions from the public in order to fund its present floating indebtedness to the banks. The treasury has been forced to issue $300,000,000 a week in Treasury Certificates in order to meet the extremely heavy outlays incident to liquidating the war machine. The governmental expenditures reached high tide in November, December and January, as shown by the table:

September	$1,557,264,285
October	1,664,862,261
November	1,935,249,309
December	2,060,975,854
January	1,962,350,949
February	1,189,913,903

The drop in February should not be the cause of too much gratification, as there is an estimated $2,500,000,000 in informal contracts awaiting disposition through Act of Congress. The government's real need of funds, therefore, is obvious.

As regards the investment merits of the new bonds or notes, their short maturity will make them the most popular security on the list for the investment of cash reserve funds. It is argued that their short maturity and the extremely active market that they will enjoy will protect the bonds or notes from market vicissitudes, and that they will be regarded everywhere as a cash asset.

The passage of the Victory Liberty Loan law by Congress creates an additional $50,000 tax exemption that will prove valuable to many investors. Under the new act it will be possible for an individual who buys $6,650 of the new bonds or notes, to hold a total of $160,000 in war bonds in addition to the First 3½s, with entire exemption from surtaxes. The new exemptions are to carry, moreover, for five years and not for two, as in former bond acts.

New Books

Some Tests of Douglas Fir After Long Use. By Arthur C. Alvarez, University of California Publications in Engineering, Vol. 2, No. 2, pages 57 to 118. Published by the University of California Press, Berkeley, Cal. Price, 70 cents.

This comprises a report on a series of about 1,200 tests of Douglas fir timbers taken from the old City Hall of Oakland, Cal., after about 36 years' use. The conclusions reached are that Douglas fir, properly housed, does not decay and that the strength of this material is not appreciably changed by this long use. However, the modulus of elasticity for compression parallel to the grain is nearly doubled, while the strength of beams under impact is only about 86 per cent of that in new timber.

Letters to the Editor

Salaries of Railroad Officers

NEW YORK CITY.

TO THE EDITOR:

The editorial on recent resignations of high railway officers in the *Railway Age* of January 24, recalls an agitation of several years ago, at which time some people were complaining of the large salaries paid to the more important men in the transportation field. Sober thinkers knew, then as now, that such criticism could not be justified on any logical grounds, or with any due regard for the bigger and broader issues involved.

I once told a newspaper editor that a good railroad president was easily worth $100,000 a year to any company that expected to get anywhere. Nothing has occurred since then to change my view of the matter, but many things have tended to confirm it. The man who is worth a big salary will not work for a small one and would be a fool to do so.

With regard to the political view of the salary question, there is one point that has never been sufficiently stressed. This is the fact that the average public office-holder seeks a political career because he cannot earn a living in any of the recognized businesses or professions. To such a man, the petty salaries attached to the ordinary run of political "jobs" seem like a fortune, and it naturally follows that he has no idea of relative values in the business world. Impecunious himself, his view of the really big men of the country is narrow and envious, and his desire is to use his political position to injure them, if possible.

Instead of reducing the compensation to railroad officers, it should be greatly increased, and the liberality should go down at least as low as the office of division superintendent. A tactless or incompetent division superintendent can do the best of roads a great deal of damage. In fact, this office is entitled to far better men than it often receives, but the railroads, like other concerns, will only get what they pay for.

The day of the "rough-cut diamond" is over, and the managers of railroads must be gentlemen as well as officers. A man does not have to be a boor in order to be a railroad expert. As a matter of fact, most of the ill-mannered men that I have come across in the railroad field were of a distinctly inferior type even when judged by what they knew or didn't know of their chosen business. So much for that!

When the railroads are returned to their owners, the stockholders of the more prominent and prosperous lines should insist upon the election of capable general officers, pay them adequate salaries and instruct them to discharge every minor officer who does not measure up to the proper standards of his position. Peremptory and drastic treatment is the only cure for insolence and incapacity among divisional organizations. When we start reform, let us leave the $100,000 president where he is, and "get after" the pugnacious young mischief-makers who antagonize the public out on the road. Let us visit the top lofty young "super," and make him take his feet off the desk or get out! Needless to say, there is more in this remark than meets the eye.

ARTHUR CURRAN.

The International Railway Fuel Association will hold its eleventh annual meeting at the Hotel Sherman, Chicago, on May 19, 20, 21 and 22. The work of the convention will, as heretofore, be directed exclusively to the conservation of railroad fuel coal.

Compensation of Railroads Under Federal Control

Less Than Justice Done by the Administration in Its Interpretation of the Law Taking Over the Roads

By J. M. Souby
Solicitor, Kansas City Southern

WHAT MIGHT BE CALLED the official documents dealing with the compensation of railroads under federal control are five in number and consist of:

The President's proclamation of December 26, 1917.
The President's statement accompanying his proclamation.
The President's message to congress of January 4, 1918.
The Federal Control Act of March 21, 1918.
The standard form of contract, final draft of September 22, 1918.

It will be of interest to take up the various provisions of these five documents and see, first, to what extent the promises and recommendations of the President contained in the first three were sought to be made good by Congress in the Federal Control Act; and, second, to what extent the director general and his representatives have undertaken in the contract to give the railroads the full benefit of all that is granted or permitted by that act. For convenience, this inquiry will be conducted under separate, specific headings which are suggested by the subject matter involved and more particularly by the arrangement of the contract, as follows: the measure of the compensation itself, the question of maintenance of the property—tangible and intangible—during federal control, additions and betterments made thereto during such control, and miscellaneous matters which may be suggested in the course of our investigation.

The Compensation

The proclamation states that the basis of compensation for each railroad will be "an annual guaranteed compensation * * * equivalent, as nearly as may be, to the average of the net operating income thereof for the three-year period ending June 30, 1917." The statement contains a promise to recommend this basis to Congress, and the message does make such recommendation. The basis was adopted by Congress, and is embodied in the Federal Control Act (first paragraph of Section 1), with modification only (second paragraph of Section 1) with respect to the definition of operating income to include hire of equipment and joint facility rents and the requirement (third paragraph of Section 1) that the so-called war taxes accruing during federal control shall be paid by the railroads. The Contract provided (paragraph (d) of the preamble and paragraph (a) of Section 7), for the basis of compensation stipulated in the Act, with the additional modification (paragraph (f) of Section 4), which requires the railroads to pay all salaries and other expenses necessary to preserve their corporate existence during federal control, to protect their rights and carry out their obligations under the contract (paragraph (b) of Section 3), except such as may be specifically authorized by the director general, and the discretion of the latter in the premises is absolutely unlimited by the contract except as to a few specified expenditures which may be incurred in connection with the valuation of their properties under Section 19 (a) of the Act to Regulate Commerce.

This reduction of the stipulated compensation by the amount of expenditures which may be made by the railroads during federal control for corporate expenses of a character authorized by the commission's classification of accounts to be charged to operating expenses, and such as were actually incurred and so charged in their accounts during the test period, is contrary to the clear implication of the Federal Control Act, as well as being violative of all the utterances of the President dealing with this subject. In the second paragraph of Section 1 of the Act, it is provided "that any railway operating income accruing during the period of federal control in excess of such just compensation shall remain the property of the United States." Such "operating income" is defined throughout the act to mean the same thing and to embrace the same items of receipt and expenditure during federal control as it is made to mean and embrace during the test period, with the exception of the single item of "war taxes." Still more clearly, however, it is provided in Section 12 of the Act:

"That moneys and other property derived from the operation of the carriers during federal control are hereby declared to be the property of the United States. Unless otherwise directed by the President, such moneys shall not be covered into the Treasury, but such moneys and property shall remain in the custody of the same officers, and the accounting thereof shall be in the same manner and form as before federal control. *Disbursements therefrom shall,* without further appropriation, *be made in the same manner as before federal control and for such purposes as under the Interstate Commerce Commission classification of accounts in force on December 27, 1917, are chargeable to operating expenses or to railway tax accruals* and for such other purposes in connection with federal control as the President may direct, *except that taxes under titles one and two of the act entitled 'An Act to Provide Revenue to Defray War Expenses, and for Other Purposes,' approved October* 3, 1917, or any act in addition thereto or in amendment thereof, *shall be paid by the carrier out of its own funds.*"

One of the guarantees which the President in his statement says he will recommend to Congress is that the railroads, while under federal control, "shall receive a *net operating income* equal in each case to the average net income of the three years preceding June 30, 1917." It is fairly to be presumed that it was the congressional intent, expressed in the Federal Control Act, to provide for this guarantee, except only as specifically otherwise provided therein. Any sum of money paid to a railroad as compensation during federal control, out of which any of its own regular operating expenses remain yet to be paid, falls short by that much of being "net operating income."

In view of the complete separation of the railroad corporations from the operation of their properties which has been brought about by the director general, which, while permitted by both the proclamation and the act, seems yet to have been actually contemplated by neither, the necessity is undoubtedly presented for the exercise of some discretion by the director general as to what expenditures made by the corporations shall be allowed as expenses of operation to be borne by the government; but the contract, by failing completely to limit that discretion, fails by that much to *guarantee* to each railroad the full compensation which the proclamation and the act warrant it in expecting.

Moreover, the bare "standard return," without modification, is not held out by any of the first four documents referred to above as the maximum compensation which any successfully operated railroad may hope to receive while under federal control. The proclamation, after stating the general basis of compensation, adds:

"But nothing herein contained, expressed or implied, or hereafter done or suffered hereunder, shall be demed in any way to impair the rights of the stockholders, bondholders, creditors, and other persons having interests in said systems of transportation or in the profits thereof to receive just and adequate compensation for the use and control and operation of their property hereby assumed."

The statement also contains the following expressions:

"Investors in railway securities may rest assured that their rights and interests will be as scrupulously looked after by the government as they could be by the directors of the several railway systems * * * I am entirely confident that the Congress will be disposed in this case, as in

others, I see that justice is done and full security assured to the owners and creditors of the great systems which the government must now use under its own direction or else suffer serious embarrassment."

And in his message to Congress, the President states:

"It is, I am sure you will agree with me, right and necessary that the owners and creditors of the railways, the holders of their stocks and bonds, should receive from the government an *unqualified guarantee* . . . that the several roads will receive under federal management such compensation as is equitable and just alike to their owners and to the general public. I would suggest the average net railway operating income for the three years ending June 30, 1917. I earnestly recommend that these guarantees be given by appropriate legislation."

It was apparently in an effort to make good the President's promise and to justify his confidence in it that Congress provided, in the sixth paragraph of Section 1 of the act:

"If the President shall find that the condition of any carrier was during all or a substantial portion of the period of three years ended June thirtieth, nineteen hundred and seventeen, because of non-operation, receivership, or where recent expenditures for additions or improvements or equipment were not fully reflected in the operating railway income of said three years or a substantial portion thereof, or because of any undeveloped or abnormal conditions, so exceptional as to make the basis of earnings hereinabove provided for plainly inequitable as a fair measure of just compensation, then the President may make with the carrier such agreement for such amount as just compensation as under the circumstances of the particular case he shall find just."

Of course, a matter of this kind cannot be expected to be covered by a standard form of contract which is intended for application to all railroads generally, and until each individual contract is finally agreed upon we cannot know definitely to what extent the director general has given each railroad the full benefit of the foregoing provision of the act. If anything is to be inferred, however, from the attitude heretofore manifested in his negotiations with the railroads and from the contracts which have actually been entered into up to the present time, the standard return, as defined and modified by the standard form of contract, is the maximum which can be expected by any railroad which was in successful (i. e., solvent), operation during the test period. Of the various facts mentioned in the foregoing quotation from the act which might be taken into consideration in determining whether the standard return affords a fair, equitable and just measure of compensation, viz.: non-operation, receivership, recent capital expenditures not fully reflected in the earnings during the test period, and exceptional undeveloped or abnormal conditions affecting the earnings during that period, it is only the first two, non-operation and insolvency, which have as yet gained any special consideration at the hands of the government representatives. Non-operation is mentioned because it is only in connection with property actually under construction and not yet in operation during the test period that recent capital expenditures seem to be regarded as "not fully reflected" in the earnings of such period. Where such expenditures have been made on property that was actually in solvent operation during such period, they seem to be regarded always as so reflected, whether made prior to or during the test period or between the end thereof and the beginning of federal control. (See paragraph (c) of Section 4 of the contract.)

Maintenance During Federal Control

Tangible Property.—In giving the first quotation from the proclamation, in order to confine it to the specific subject under consideration, we purposely omitted the very significant words relating to maintenance. The full text at the place in question reads:

"The director shall, as soon as may be after having assumed such possession and control, enter upon negotiations with the several companies looking to agreements for just and reasonable compensation for the possession, use, and control of their respective properties on the basis of an annual guaranteed compensation *above accruing depreciation and the maintenance of their properties* equivalent, as nearly as may be, to the average," etc.

The following is one of the "definite guarantees" which the statement promises will be recommended that Congress give the railroads:

"First, of course, that the railway properties will be maintained during the period of federal control in as good repair and as complete equipment as when taken over by the Government."

The President says in his message:

"It is, I am sure you will agree with me, right and necessary that the owners and creditors of the railways, the holders of their stocks and bonds, should receive from the government an *unqualified* guarantee that their properties will be maintained throughout the period of federal control in as good repair and as complete equipment as at present."

The fourth paragraph of Section 1 of the Act reads in part as follows:

"Every such agreement shall also contain adequate and appropriate provisions for the maintenance, repair, renewals, and depreciation of the property, for the creation of any reserves or reserve funds found necessary in connection therewith, and for such accounting and adjustments of charges and payments, both during and at the end of federal control as may be requisite, in order that the property of each carrier may be returned to it in substantially as good repair and in substantially as complete equipment as it was in at the beginning of federal control."

If Congress had been content to permit the foregoing to stand without qualification as its disposition of the question of maintenance during federal control, it would thus have given the railroads not a whit more than was promised and recommended by the President. It went further, however, and made indefinite the otherwise definite guarantee contained in the quotation, by adding a proviso as follows:

"In making such accounting and adjustments, due consideration shall be given to the amounts expended or reserved by each carrier for maintenance, repairs, renewals, and depreciation during the three years ended June thirtieth, nineteen hundred and seventeen, *to the condition of the property at the beginning and at the end of federal control and to any other pertinent facts and circumstances.*"

The contract, on the other hand, goes a long way toward restoring the certainty destroyed by the foregoing proviso of the act, but such result is purchased wholly at the expense of the railroads. Disregarding entirely "the condition of the property at the beginning and at the end of federal control" and giving no consideration whatever "to any other pertinent facts and circumstances," or regarding all other facts and circumstances as wholly impertinent, it makes "the amounts expended or reserved by each carrier for maintenance, repairs, renewals, and depreciation during" the test period the absolute measure of the government's obligation in the premises. Reference is made to paragraph (a) of Section 5 of the contract, which reads as follows:

"During the period of federal control the director general shall, annually, as nearly as practicable, expend and charge to railway operating expenses, either in payments for labor and materials or by payments into funds, such sums for the maintenance, repair, renewal, retirement, and depreciation of the property described in paragraph (a) of section 2 hereof as may be requisite in order that such property may be returned to the company at the end of federal control in substantially as good repair and in substantially as complete equipment as it was on January 1, 1918: *Provided, however,* That the annual expenditure and charges for such purposes during the period of federal control on such property and the fair distribution thereof over the same, or the payment into funds of an amount equal in the aggregate (subject to the adjustments provided in paragraph (c) and to the provisions of paragraph (e) of this section) to the average annual expenditure and charges for such purposes included under the accounting rules of the commission in railway operating expenses during the test period, less the cost of fire insurance included therein, shall be taken as a full compliance with the foregoing covenant."

The adjustments provided in paragraph (c) of the same section, to which reference is made in the above quotation, are that in comparing the expenditures during the two periods allowances are to be made for any differences in the cost of material and labor obtaining therein. Paragraph (e) of the same section, to which reference is likewise made in the quotation, as that paragraph is apparently sought to be applied by the representatives of the government at the present time (see P. S. & A. Bulletin 5 of July 10, 1918), presents a much more serious qualification of the guarantee with respect to the maintenance of the property during federal control and its restoration to the railroad in as good condition as when taken over by the government than is contained in the above quotation. After providing that where railroad property is damaged or destroyed during federal control, otherwise than by public enemies, the director general shall have the option of restoring or replacing it or of reimbursing the railroad for

its value or the amount of its damage at the time of the loss, such paragraph goes on to provide:

"The foregoing parts of this paragraph are subject to the proviso that in case of loss or damage any additions and betterments made in connection with or as a part of the restoration or replacement of property damaged or destroyed and chargeable under the accounting rules of the commission in force December 31, 1917, to investment in road and equipment, shall be charged to and paid by the company."

As it seems to be sought to apply the foregoing provision in the accounting bulletin referred to above, the obligation of the government for property destroyed has no reference whatever to the value thereof at the time of its loss, but, whether the director general chooses to replace it (in kind or otherwise), or declines to replace it, the extent of his liability in the premises is the book value of the property, which means the amount charged to investment account on the books of the company, less any depreciation reserve which might be carried in its accounts, with respect to the property in question. On the other hand, it is sought to charge the company for the property used in replacing that which was destroyed at the actual cost of same at the time of the replacement, regardless of what its value may be relative to that which it replaces. In other words, it is sought to credit the railroad for property destroyed on the basis of pre-war prices and to charge it for all replacements of same at war prices. It seems hardly conceivable, however, that such a construction of the contract can prevail.

The contract, in one particular, however, even undertakes to go a step beyond what the President promised, or Congress granted, with respect to maintenance during federal control, and opens up to each carrier the possibility of having its property maintained during such period, and perhaps turned back to it at the end thereof in better repair and in more complete equipment than the company maintained it theretofore or might be able or willing to maintain it thereafter. The pleasure with which this possibility might otherwise be viewed by the railroads, however, is very materially mitigated by the certainty that it must be realized, if at all, at their own expense; for paragraph (b) of Section 5 of the contract provides:

"The director general may expend such sums, if any, in addition to those expended and charged under paragraph (a) of this section (subject to the adjustments provided in paragraph (c) of this section) as may be requisite for the safe operation of the property described in paragraph (a) of section 2 hereof, assuming a use similar to the use during the test period and not substantially enhancing the cost of maintenance over the normal standard of maintenance of railroads of like character and business during said period; and the amount, if any, of such excess expenditures during federal control shall be made good by the company as provided in paragraph (b) of section 7 hereof."

Intangible Property.—To a successful railroad, the most serious aspect of federal control is the possible effect upon its business of the manner in which its property may be operated by the government. Except perhaps by implication in some of the quotations which we have already given, we find nothing in any of the first four documents under consideration with reference to the maintenance of the intangible property of a railroad during federal control. The contract, however, as if with the purpose, generally laudable, of leaving absolutely nothing to implication, provides in paragraph (a) of Section 3, that the rental stipulated in paragraph (a) of Section 7 shall be accepted by the carrier as full compensation not only for the use of its property during federal control, but also for any and all loss and damage to its business or traffic by reason of the diversion thereof, or otherwise, which may be caused to it by the manner in which its property may be operated by the government.

The standard return of a particular railroad reflects, of course, the use of both its tangible and intangible property during the test period, and it might be willing to accept such operating results as fairly indicative of the proper amount to be received by it for the loss of the use of all of its property during federal control, but it would be actually plunging into the dark to accept such sum as also including fair and just compensation for losses which might result to it from the abuse of its property during such period. The government is interested in the intangible property only in so far as it may have contributed to the increased efficiency of the physical property at the time same is taken under federal control, and a wholly proper use of the physical property as a part of the unified system of all the railroads under federal control might well prove to be an abuse of the intangible property from the standpoint of the railroad when it comes back into possession.

During the test period, the railroad not only received the amounts used in computing the standard return, but at the end of such period may have been in the possession of a better property than it had at the beginning, as reflected in the increasing earnings during the last year of the test period. Is it fair to ask it to accept the standard return as full compensation for all losses which may be sustained during federal control before it is possible to know what the condition of its property, both tangible and intangible, will be at the end of that new indeterminate period? The contract has undertaken to the extent which we have already shown, to take care of this uncertainty so far as the physical property is concerned, but refuses absolutely to give the carrier any assurance with respect to the maintenance of its intangible property, at the same time precluding it from making any claim for loss on account of a failure on the part of the government to provide for such maintenance.

Additions and Betterments

Neither the President's proclamation nor his statement contain any reference to the question of additions and betterments made to the railroad property during federal control, one of the most important and troublesome of all the questions involved in the proposed contract between the government and the railroads. His message to Congress refers to it only very briefly, in the following words:

"Only under that authority (i. e., government administration) can new terminals be constructed and developed without regard to the requirements or limitations of the particular roads."

The second paragraph of Section 6 of the act, however, provides specifically that:

"The President may also make or order any carrier to make any additions, betterments or road extensions, and to provide terminals, motive power, cars and other equipment necessary or desirable for war purposes or in the public interest or in connection with the property of any carrier. He may from said revolving fund advance to such carrier all or any part of the expense of such additions, betterments," etc.

Section 4 of the act provides for additional compensation in the way of reasonable interest on the cost of all additions and betterments made by the railroads with the approval or by order of the President. These provisions of the act are embodied in the Contract, in paragraph (c) of Section 4, and paragraph (d) of Section 7.

The third paragraph of Section 6 of the act provides:

"Any loss claimed by any carrier by reason of any such additions, betterments, or road extensions so ordered and constructed may be determined by agreement between the President and such carrier; failing such agreement, the amount of such loss shall be ascertained as provided in section three hereof."

This important and valuable right given the railroads to make claims for loss on account of additions and betterments made at their expense by order of the director general, and have such claims determined in accordance with the procedure provided in Section 3 of the act, is materially affected and restricted by various provisions of the Contract. For instance, in paragraph (e) of Section 5 of the contract, as we have already seen, the railroad is required to pay for any additions and betterments made by the director general in connection with or as a part of the restoration or replacement of property damaged or destroyed, which are chargeable to investment account under the commission's accounting rules. Paragraph (h) of the same section then provides:

"If any question shall arise, either during or at the end of federal control, as to whether the covenants or provisions in this section contained are being or have been observed, the matter in dispute shall, on the appli-

cation of either party, be referred to the commission, which, after hearing, shall make such findings and order as justice and right may require, which shall be final as to the questions submitted and be binding on and observed by both parties hereto, except that either party may take any question of law to the courts, if it so desires."

Obviously, one of the main grounds upon which a railroad claims a loss on certain additions and betterments may well happen to be that they are for war purposes, and not for the normal development of the company, yet, instead of giving the railroads the benefit in such cases of the proceedings provided in the act, the contract provides in paragraph (b) of Section 7:

"In the event of a difference as to the fact whether additions and betterments are for war purposes and not for the normal development of the company, or as to whether an addition is a road extension, the question may, on application of either party, be referred to and determined by the commission."

In paragraphs (b) and (c) of Section 8, while it is provided that in case of failure of the parties to the contract to agree with respect to any claim of the railroad for loss accruing to it by reason of expenditures for additions and betterments charged to it during federal control, resort may be had to the procedure provided in Section 3 of the act, there is an additional proviso, however, which materially modifies the rights of the railroad and limits its recovery in all such cases. This proviso is that:

"No loss shall be claimed by the company and no money shall be due to it in respect of such additions and betterments upon the ground that the actual cost thereof at the time of construction was greater than under other market and commercial conditions; and for the purpose of determining such controversy the amount paid for any addition or betterment shall be deemed the fair and reasonable cost thereof and shall be taken as the basis for such determination."

If an assertion by a railroad that loss has resulted to it by reason of abnormal prices paid by the government for the additions and betterments under consideration would not afford a valid basis for a claim under Section 6, paragraph four, of the act, then the above provision of the contract is wholly unnecessary. On the other hand, if such assertion does furnish ground for a valid claim under that section, then the contract undertakes to give the railroads something less than is guaranteed them by the act. No one appreciates more than do the railroads the advisability and desirability, in writing contracts, of avoiding so far as may be possible all probability of litigation thereunder, and of stipulating so far as possible the amount of damages to be recovered in case of litigation. At the same time, no one better realizes the impossibility, in the case of ordinary contracts voluntarily entered into between the parties, of securing such results always at the expense of one party to the contract. So far as the provisions in question, of the proposed contract, accomplish these results, they do so wholly by concessions required on the part of the railroad.

From the foregoing discussion, it will be observed that about the only material provisions of the act for the railroads' benefit which are not sought in the contract to be modified outright to its disadvantage, or reduced to the very narrowest limits permitted by the terms of their grant, are those of Sections 2 and 3, which relate to the situation presented when no contract is made. Stated in another way, it will be difficult to find any substantial right or benefit accruing to the railroad under the Contract which is not, to some extent at least, less than that which is specifically granted or is clearly permitted by the act.

The attitude of the government which is reflected by the standard clauses of the contract, seems to be maintained likewise with respect to the provision of Section 2 of the act to the effect that, pending the making of a contract or in case of failure of all negotiations for a contract, the President may, nevertheless, pay the railroad up to 90 per cent of its standard return. This provision is, of course, merely permissive in its terms; but if, as seems to be obvious, its purpose is to save the constitutionality of the act, then it should be regarded as mandatory in cases where the railroad would otherwise, for lack of funds, be unable to contest its claims for compensation and thus be coerced into signing the contract offered by the government. Thus far, however, the representatives of the government have declined to offer assurance to any railroad that if it declines to execute the contract offered, it will receive any compensation whatever for the use of its property pending a proceeding under Section 3 of the act to determine whether or not it is justified in refusing to execute the document offered.

We do not propose to discuss the constitutionality of the act, but merely remark that such may well be doubted if full effect is given to the final sentence of Section 2, which provides that the acceptance of any of the benefits under that section shall constitute an acceptance by the railroad of all the provisions of the act. A railroad which finds itself unable to contest the validity of any of the provisions of the act without accepting benefits under Section 2, immediately finds itself precluded from such contest by its waiver of all claims of invalidity through its acceptance of such benefits.

At least one other matter of interest in connection with the act and the proposed contract is the question of the status of things after a railroad has originally declined to execute the agreement offered, has proceeded under Section 3 of the act and had its just compensation determined, we shall say finally, by the Supreme Court on an appeal from a decree of the court of claims. It doubtless will still remain for the railroad to secure a contract with the government into which shall be incorporated the amount of compensation thus determined in lieu of that originally offered. The question is whether, except for their ability to supply these figures in the blank spaces remaining in paragraph (d) of the preamble and paragraph (a) of Section 7 of the contract, the parties will be any nearer an agreement than they were before resort was had to the courts.

It is only in two instances that the act provides for resort to the procedure outlined in Section 3 to determine differences arising between the railroads and the government with respect to federal control. One is in Section 3 itself and the other is in Section 6. The latter refers to the disposition of claims for losses on additions and betterments made during such control, most of which must await the end of federal control for their determination. The first has reference only to the claim for just compensation, and while in the broad sense the question of just compensation embraces all matters covered by the contract, such as maintenance, additions and betterments, etc., as used in Section 3, it seems to be confined to the amount of rental *per se*. It is "all claims for just compensation not adjusted (as provided in section one)," that are to be so tried out. This would seem to refer only to the first two and the sixth paragraphs of Section 1, since other matters treated in that section, such as war taxes and maintenance, are dealt with therein as separate and distinct from the just compensation referred to in the first paragraph. Also, in Section 3, after providing for the proceedings before certain boards of referees, it is said:

"The President is authorized to enter into an agreement with such carrier for just compensation upon a basis not in excess of that reported by such board, *and may include therein provisions similar to those authorized under section one.* Failing such agreement, either the United States or such carrier may file a petition in the Court of Claims *for the purpose of determining the amount of such just compensation,* and in the proceedings in said court the report of said referees shall be prima facie evidence of the amount of just compensation and of the facts therein stated."

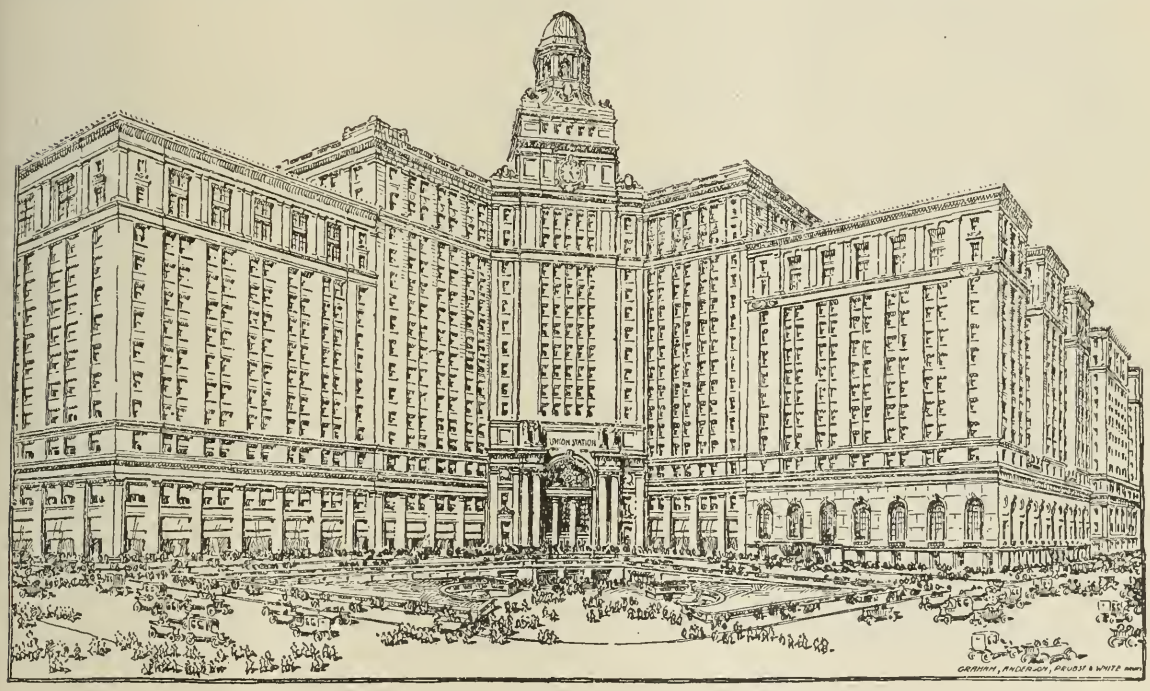
From the above quotation it would appear that after the finding has been made by the board of referees, the matters referred to in Section 1, other than the single one of just compensation, still remain the subject of negotiation between the parties, and it seems certain that nothing is to be litigated before the court which has not already been tried out before such board. It thus results that, as to some of the most important matters for consideration between the railroads and the government in the making of their contracts, no procedure is provided in the act for settling the differences that may develop between the parties.

New Plan for a Union Station at Cleveland, Ohio

Terminal Ordinance Project Ratified by People of That City Is Subject to Railroads' Approval

THROUGH THE RATIFICATION of an ordinance by a popular referendum the city of Cleveland has signified its approval of a new union station plan. This project is being promoted by the Cleveland Union Terminals Company, a corporation financed by local capital for the construction of a passenger station and freight terminal to be leased to the railroads entering the city. While neither the railroads nor the Railroad Administration are parties to the agreement, officers of the terminal company have assured the people of Cleveland that the railroads are favorable to the plan, and that it is expected to conclude agreements which will permit work to proceed soon on the fulfillment of the plan proposed.

The plan of the terminal company contemplates a passenger station for all through and local passenger trains of all of the steam railroads and interurban lines now entering the city, in addition to facilities for considerable further development of electric interurban service in co-operation with the steam roads. It is proposed to place the head house of the station at the southwest corner of the Cleveland Public Square, with the station tracks forming the base of a great "U," the two legs of which will form the approaches to the station on the opposite sides of the Cuyahoga valley The fulfillment of this plan involves a 3,500-ft. bridge with eight tracks across the Cuyahoga valley just west of the proposed station.



Suggested Design for the Passenger Station with a Two-Level Street Entrance

Supersedes Lake Front Plan

This project is an alternative for the plan for a passenger station on the lake front for which the New York Central, the Cleveland, Cincinnati, Chicago & St. Louis and the Pennsylvania Lines had previously entered into an agreement with the city. In 1903 plans were submitted to Tom L. Johnson, mayor of Cleveland, for the Mall, a municipal center involving a group plan for public buildings, with a recommendation that a plan including a railroad station on the lake front be adopted. In 1904 designs in conformity with this idea were started for a new courthouse and shortly afterward for several other public buildings. However, it was not until November, 1915, that a popular referendum, passed by a vote of 68,357 to 17,153, approved a contract ordinance for a union station, to be built in conformity with the city's plan for a civic center.

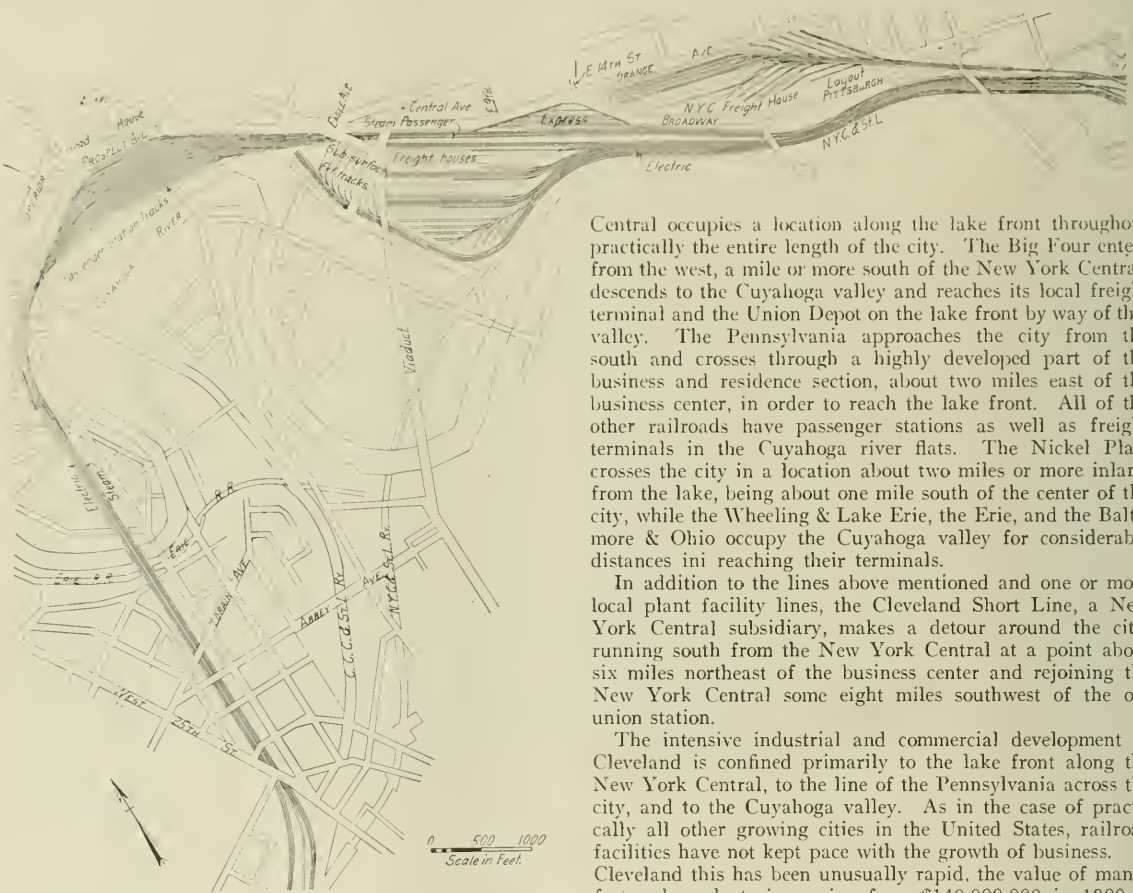
Under this contract the city agreed to sell to the railroads for $1,400,000 certain land at the north end of the Mall and to grant the railroads permanent easements over certain adjacent city-owned lake front property. The city agreed to spend the $1,400,000 to improve portions of the Mall, to pay a proportion of certain other expenses, and to acquire additional Mall lands. The railroads agreed to erect the station, to begin the construction of the station within six months after the deeds to the property had been delivered, and to complete the station within three years after the work was started. The city and railroads also agreed to co-operate in acquiring from the federal government rights in submerged lands and easements on government owned property.

The fulfillment of these conditions has been delayed and the only tangible evidences of progress are the completion of some public buildings and vacation of property for the Mall site. The new ordinance for the new terminal provides that

these three railroads are to be released of all obligations under the old contract as soon as they avail themselves of accommodations to be provided in the proposed public square terminal.

The proposed nullification of this earlier plan was the cause of considerable opposition to the new project. The fact that the city had made considerable expenditures along the lines of the old project was pointed out by a number of civic bodies who opposed the new plan, and by Bion J. Arnold, consulting engineer, Chicago, who was retained to make an investigation by the Cleveland Chamber of Commerce. He argued that the new plan should not be approved without studying the possibilities of providing accommodations for all the railroads on the lake front. However, notwithstanding this opposition the ordinance was ratified by a large majority.

The interests back of the new terminal plan are headed by O. P. Van Swearingen, president of the New York, Chicago & St. Louis and head of the Cleveland & Youngstown, which



Map of the Proposed Passenger and Freight Terminals with the Approaches

is a line projected in 1912 to afford rapid transit to a considerable suburban area east of the city. A portion of the last named line has been constructed, the most important feature being the $4,000,000 high level freight terminal built for the New York Central at Orange avenue and Broadway, which involved a 3½ mile approach line over the right-of-way of the Cleveland & Youngstown from a connection with the Cleveland Short Line Railway, a belt line owned by the New York Central.

The idea of the Union Terminal project was conceived in the course of developing further plans for the use of the Cleveland & Youngstown as a lead to freight and passenger terminals for the railroads entering Cleveland by way of the Cuyahoga valley. A common freight terminal was proposed in the vicinity of Broadway and Central avenue, with a stub-end passenger station in approximately the location now proposed for the new station of the Union Terminal Company. When this plan was submitted to the Railroad Administration early in 1918 it was suggested that a through station with accommodations for all the railways would be preferable, and work was accordingly started on such a plan.

The Railway Layout at Cleveland

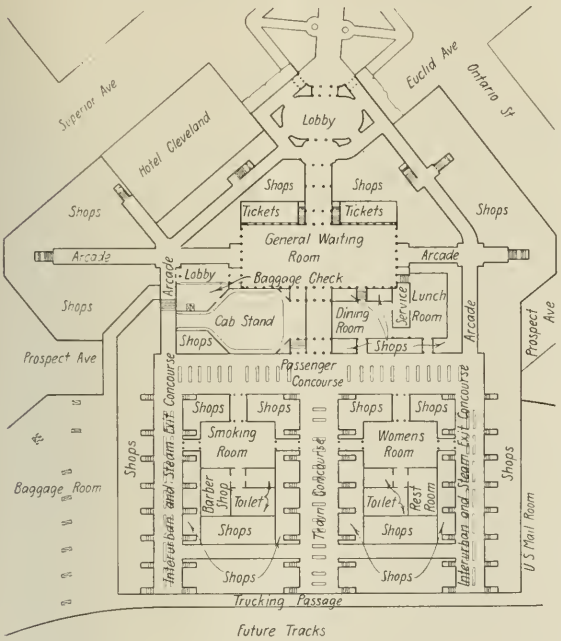
Seven steam railroads enter the city. The New York Central, the Big Four and the Pennsylvania Lines use a station on the lake front at the foot of Ninth street. The New York Central occupies a location along the lake front throughout practically the entire length of the city. The Big Four enters from the west, a mile or more south of the New York Central, descends to the Cuyahoga valley and reaches its local freight terminal and the Union Depot on the lake front by way of this valley. The Pennsylvania approaches the city from the south and crosses through a highly developed part of the business and residence section, about two miles east of the business center, in order to reach the lake front. All of the other railroads have passenger stations as well as freight terminals in the Cuyahoga river flats. The Nickel Plate crosses the city in a location about two miles or more inland from the lake, being about one mile south of the center of the city, while the Wheeling & Lake Erie, the Erie, and the Baltimore & Ohio occupy the Cuyahoga valley for considerable distances ini reaching their terminals.

In addition to the lines above mentioned and one or more local plant facility lines, the Cleveland Short Line, a New York Central subsidiary, makes a detour around the city, running south from the New York Central at a point about six miles northeast of the business center and rejoining the New York Central some eight miles southwest of the old union station.

The intensive industrial and commercial development in Cleveland is confined primarily to the lake front along the New York Central, to the line of the Pennsylvania across the city, and to the Cuyahoga valley. As in the case of practically all other growing cities in the United States, railroad facilities have not kept pace with the growth of business. In Cleveland this has been unusually rapid, the value of manufactured products increasing from $140,000,000 in 1900 to $270,000,000 in 1910, a growth of 94 per cent. Owing to the inadequacy of railway facilities the roads have been unable to develop suburban traffic, as a result of which an undue burden has been placed upon the electric interurban lines which are ineffective because of the slow speed made on the city streets. A total of 157 passenger trains enter and leave the city on the steam roads in 24 hours, of which 50 are on the New York Central, 24 on the Pennsylvania, 29 on the Big Four, 16 on the Baltimore & Ohio, 12 on the Wheeling & Lake Erie, 6 on the Nickel Plate, and 20 on the Erie. All of the existing downtown passenger stations are antiquated and most of them inadequate for present traffic.

Access to the Proposed Terminal

Under the plan of the Union Terminals Company, access to the proposed freight and passenger stations will be obtained by the use of about three miles of approach line to be constructed by the terminal company, in addition to the rerouting of trains over existing properties of the various railroads. The Erie, the Nickel Plate and the Big Four will have virtually direct communication with the terminal tracks,

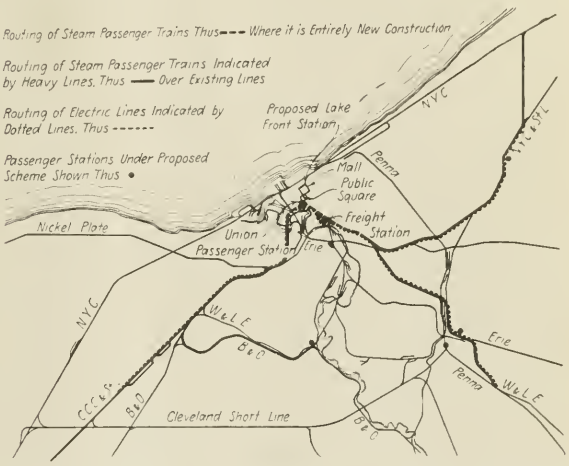


Proposed Plan for the Main Floor Level of the Passenger Station

while the Pennsylvania and the Wheeling & Lake Erie will use a route approximately four miles long over the Erie, but shortening their present routes from one-half to one and one-half miles. The New York Central will use the Cleveland Short Line and the Nickel Plate tracks from the east and

longer. In all other cases the distance by the proposed routing is the same as the old or shorter.

The contemplated electric interurban development provides for additional tracks adjoining those of the steam roads on three of the routes of entrance as shown by dotted lines on the map. By the construction of these lines all of the existing interurbans could be removed from the city streets and still provide for considerable further interurban development and thus increase the use of territory adjacent to Cleveland for residence and industrial purposes. Another pertinent feature of the ordinance is that the railroads will be required to use electric power for the operation of their passenger trains over

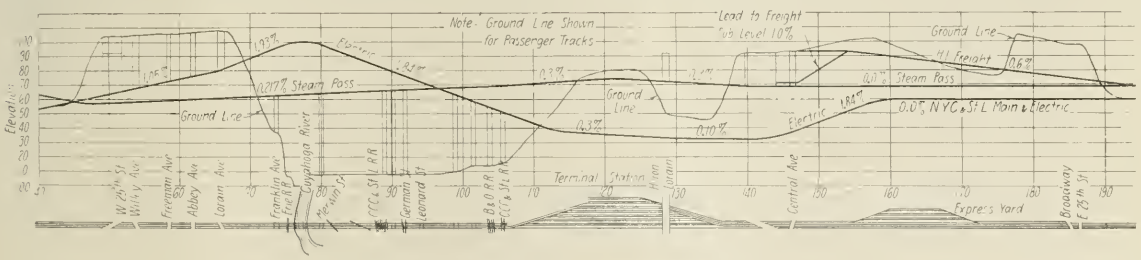


Proposed Routing of the Various Roads Entering Cleveland

the terminal lines within five years after the terminal facilities are placed in service.

Formidable Engineering Problem

The physical layout of the location of the terminal company's tracks and station is such as to present a formidable engineering problem. The east leg of the approach development, the freight terminal and the passenger station will occupy the rim of the bluff overlooking the Cuyahoga flats. The west leg consists largely of the 3,600-ft. bridge with the remaining portion depressed below the ground surface to afford



Profile of the Proposed Terminal and Approaches

the Big Four from the west, involving a total detour of 22 miles. The Baltimore & Ohio will use the Big Four for a distance of three miles, which will give the Sterling branch of the Baltimore & Ohio direct access, but will require the Akron line to operate in a reverse direction over about 3½ miles of the Sterling line.

In the case of the Nickel Plate the new route will be about one mile longer than the old one, for the New York Central it will be about 2½ miles longer than at present, and for the Akron line of the Baltimore & Ohio it will be about 3½ miles

overcrossings for the city streets and the tracks of the Nickel Plate and the Big Four. Notwithstanding the adverse location, the plans provide for approach grades to the station not exceeding 0.3 per cent, which is considerably less than the grades of some of the existing lines to be used as main routes to the terminal.

The plans for the viaduct over the valley contemplate separate structures for the steam and electric lines. The former will cross on a grade of some 64 ft. above the normal water level in the river, necessitating provision for bascule spans

at the river crossing to satisfy navigation requirements. For the electric lines structure the river crossing is placed at an elevation of 100 ft. above the river to permit of the use of a fixed span, but this necessitates approach grades on either side of nearly 2 per cent.

The Passenger Station

The passenger station plan provides for a building many stories in height, serving not only as a station structure, but also as an office building, retail shop, arcade and hotel. One unit, that of the hotel, is already completed and in use. The main entrance to the building is to be at the southwest corner of the Cleveland Public Square and will utilize a considerable portion of the southwest quarter of this area for developing the portal and approach ramp. Advantage of the topography will be taken to get a two-level entrance. The lower end of the square permits of a descending ramp to the main station floor level which is one story below the level of the streets. At the corner of the square there will be direct street entrances to the second floor level of the station building, but with ample provision for stairways down to the main floor. Another entrance to the second floor level is provided from Prospect avenue, which cuts through the station layout.

The main waiting room, about 100 ft. wide by 240 ft. long, will occupy the center of the block between Prospect avenue and the Square, with ticket offices, cab stand, restaurants and shops surrounding it. From this waiting room a main corridor will lead south on a 10 per cent descending ramp to a passenger concourse occupying the space directly under Prospect avenue. From this, three other concourses will extend to the south and occupy a level midway between the steam road tracks, which are to be located on an upper level, and the suburban tracks, which will occupy a lower level. The central concourse is to be used for passengers departing on the steam roads, and will have stairs on each side leading up to the steam-road level. The two side concourses are to be used for access to and from the interurban level. The interior areas on the concourse level will be devoted to space for a smoking room, a women's waiting room and toilet facilities, as well as a considerable number of arcade shops. To the east and west of the concourses, areas will be provided for mail and baggage rooms, respectively, with elevators communicating with the two track levels.

The ultimate development for the station tracks of the steam lines will be 30 tracks, but half that number is considered adequate for the needs of the present and immediate future. The average length of platform is about 1,000 ft., of which about 200 ft. at each end will be on the approach curves. The development on the interurban level will be somewhat smaller than on the steam road level.

The Freight Terminals

As in the case of the passenger station, the plans for the freight terminals provide for an elastic development. The ultimate provision is for a series of multiple story freight houses, express buildings and warehouses extending along the west side of Broadway from the passenger station to the vicinity of the New York Central high level station. The track layout for the freight station is shown on the map. Freight houses for the various roads are to be located between Central avenue and Fourteenth street. These will be provided with tracks and driveways on the level of Broadway with a team track to the south on this same level. Between Eagle avenue and Central avenue a series of multiple-story warehouses are planned, to be served with tracks about 20 ft. below the level of those for the freight houses. One unit of this group has been completed and is now in use. The lead to these tracks is on a level with the proposed electric line tracks on the extreme outside of the layout, while the lead to the station for the steam roads will occupy a level midway between those of the surface freight houses and the subsurface levels, and immediately adjacent to Broadway. Provision for handling express is contemplated along Broadway near Fourteenth street, with tracks leading off the passenger approach tracks.

The plans for the proposed terminal were developed under the direction of W. E. Pease, chief engineer of the Cleveland Union Terminals Company, Cleveland, Ohio, subject to criticism and suggestion by a committee of engineers appointed at the direction of A. H. Smith, regional director of the Eastern region, by each of the roads involved in the plan.

Orders of Regional Directors

FREE PASSES TO STEAMSHIP COMPANIES.—Supplement 14 to Order 109 of the Southwestern regional director gives authority for continuing past practice in the issuance of exchange trip transportation with independently operated steamship companies. The Northwestern regional director, by Supplement 46, issues the same notice.

Prohibition of Smoking in Mail Storage Cars.—Order 174 of the Southwestern regional director quotes a postal regulation issued by the postmaster general, applicable to railroad employees when their duties require them to be in mail storage cars, which states that no person shall smoke or carry lighted cigars, cigarettes or pipes in mail storage cars while cars are being loaded or unloaded or while in transit.

Freight Car Distribution.—Order 175 of the Southwestern regional director gives instructions for the relocating of cars in accordance with Circular 27 of the director of the Division of Operation, dated February 15. These instructions are similar to those of the Northwestern director, noticed last week. Railroads desiring the return of certain cars for rebuilding or application of betterments must submit request to the regional director, who will arrange the necessary details with the Mechanical Department and the Car Service Section of the Railroad Administration.

Rental Charge—Locomotives.—The Southern regional director in Circular letter No. 429 says that from February 20, the rental charge for locomotives will be one mill per pound of tractive effort per day, with a minimum of $15 a day.

Color Blindness.—The Eastern regional director has sent to the federal managers, for the benefit of the surgeons of the railroads, copies of Public Health Bulletin No. 92, entitled "Color Blindness," prepared by Dr. George L. Collins, and issued by the Treasury Department. Dr. Collins says that the classes of color blind persons which should not be permitted to serve as trainmen are (1) those possessing a color perception containing three or less units; (2) those possessing a greater number of units than three who have the red end of the spectrum so shortened as to prevent the recognition of a red light at a distance of two miles; and (3) those with a central scotoma for red and green.

Standing Orders from Consignees.—The Eastern regional director, file 5600-19A600, directs all federal managers to adopt, if not already in force, the rule that freight shall be delivered only to the consignee, or to the person or persons named in a written order. From business houses, the local freight agent should have a standing order containing the name or names and signature or signatures of the drayman or other person or persons to whom goods are to be delivered. Similar orders have been issued by the Central Western and the Northwestern regional directors.

Loss and Damage.—The Eastern regional director, file 5600-19A596, sends to federal managers the result of a study, on one of the Eastern roads, of the freight claim situation in the year 1918. Unlocated loss of entire packages accounts for 25 per cent of all freight claim payments, an increase of over 100 per cent over the preceding year. The principal causes are named. At points common to two or

more roads, the agents should maintain a regular exchange of over and short information. Furniture, glass and certain other commodities are constantly subject to excessive damage; damage to these and to perishable commodities is a matter requiring constant study. The duty of getting shippers to pack goods more securely ought to be attended to by the freight agent at the time of shipment, rather than by the claim department. Failure to attend to reicing, when cars are behind time, and failure to take special care at times of extreme low temperature, are among the causes of loss to perishables. Many other details are discussed. Federal managers are requested to take such action as may be deemed necessary and to send to the regional director copies of any instructions which they may issue.

Studies of Traffic Conditions.—The Eastern regional director, file 2000-16-201A598, calls on federal managers to supplement their reports of traffic conditions made last December, with advice as to how actual conditions have confirmed the estimates then made; and if at variance, how and to what extent. A new report is called for at this time, outlining the prospects as to business up to July 1, next, and also for the six months next following thereafter.

Locomotives in Service.—The Eastern regional director, file 1200-4-56A597, calls for a statement showing the number of locomotives in service on October 1, 1918, showing, for each class, the different weights on drivers. This is wanted for the Board of Railroad Wages and Working Conditions.

Chinese Alien Passengers.—The regional director, Eastern region, by file 1600-115A599, advises federal managers that carriers under federal control need not furnish the bond heretofore required as a condition precedent to transporting Chinese aliens through the United States. The carrier must strictly comply with the regulations of the Bureau of Immigration, and evidence that the passenger has made his trip within the prescribed time must be laid before the immigration officer at the proper port in due season. If a Chinese alien passenger should escape while in transit the fact must be reported at once, and any officer or employee permitting such escape will be disciplined.

Shipping Day Arrangements.—The regional director, Eastern region, by file 2000-7-9A604, advises that shipping day plans have been made out for the principal common points, and that federal managers should now appoint committees to work out these plans for local stations. These committees should consult freely, as may be necessary, with district chairmen, or with G. C. Woodruff, regional chairman, New York City.

Estimates for New Ties.—The regional director, Eastern region, by file 1800-83A605, calls attention to the fact that the requirements of the several roads for new ties for 1919, as received at Washington, indicate renewal programs far in excess of the average renewals during the test years; this, presumably, because of the necessity for restoring the normal stock on hand. Roadmasters, or supervisors, must make careful personal inspection of the track so as to see that no ties are replaced which can be carried over another year, while still keeping the tracks in safe condition.

Free Lighterage, New York.—Beginning April 1, the free lighterage of domestic carload freight at New York harbor will be resumed; but shipment can be made only under the system of permits now in force. Permits will be issued by the Freight Traffic Committee, 141 Broadway, New York City. Lighters are still in pressing demand for export traffic and consignees, to get the benefit of the new arrangement, must be prompt in unloading.

Number of Employees to Be Reported Monthly.—The regional director, Eastern region, by file 1801-124A606, gives instructions for the sending of monthly reports, beginning with February, to W. J. Cunningham, Washington, showing the number of employees in service on the 16th day of each month, with the number of days or hours worked, the compensation, the class—which of the 68 classes prescribed by the Interstate Commerce Commission—and figures by which to make comparison with the same month of the preceding year.

Posters of the Complaint Bureau.—The Southwestern regional director, in order 176, instructs that posters relative to the bureau for suggestions and complaints should be displayed in waiting rooms, consolidated ticket offices, smoking and wash rooms in Pullman cars, and in coaches or chair cars where smoking and wash rooms are provided, but not in coaches or chair cars having neither smoking rooms nor wash rooms apart from the toilets. These posters must not be displayed in the body of any car nor in the toilet rooms. The new posters are to be substituted for those previously provided for distribution.

Daily Situation Report.—Circular 190 cancelling circular 29 of the Southwestern regional director, requires all roads to furnish a daily telegraphic SWD No. 2 report to cover only loads delayed or held 48 hours or more. This report will take the place of the CD-1 report. Code letters are given for the number of loads on hand awaiting movement on account of disability of the owning road, principal cause of delay, prospects for reducing accumulation in the next 24 hours, number of loads held for export and coastal boats, number of loads held at destined points on own line on account of formal embargoes, number of loads held for connections on account of their inability to accept, and any important general conditions on the line not included in the above. Unless there is a total accumulation of 200 loads or more on any one road, no additional information other than the first item for which there is a code letter need be sent.

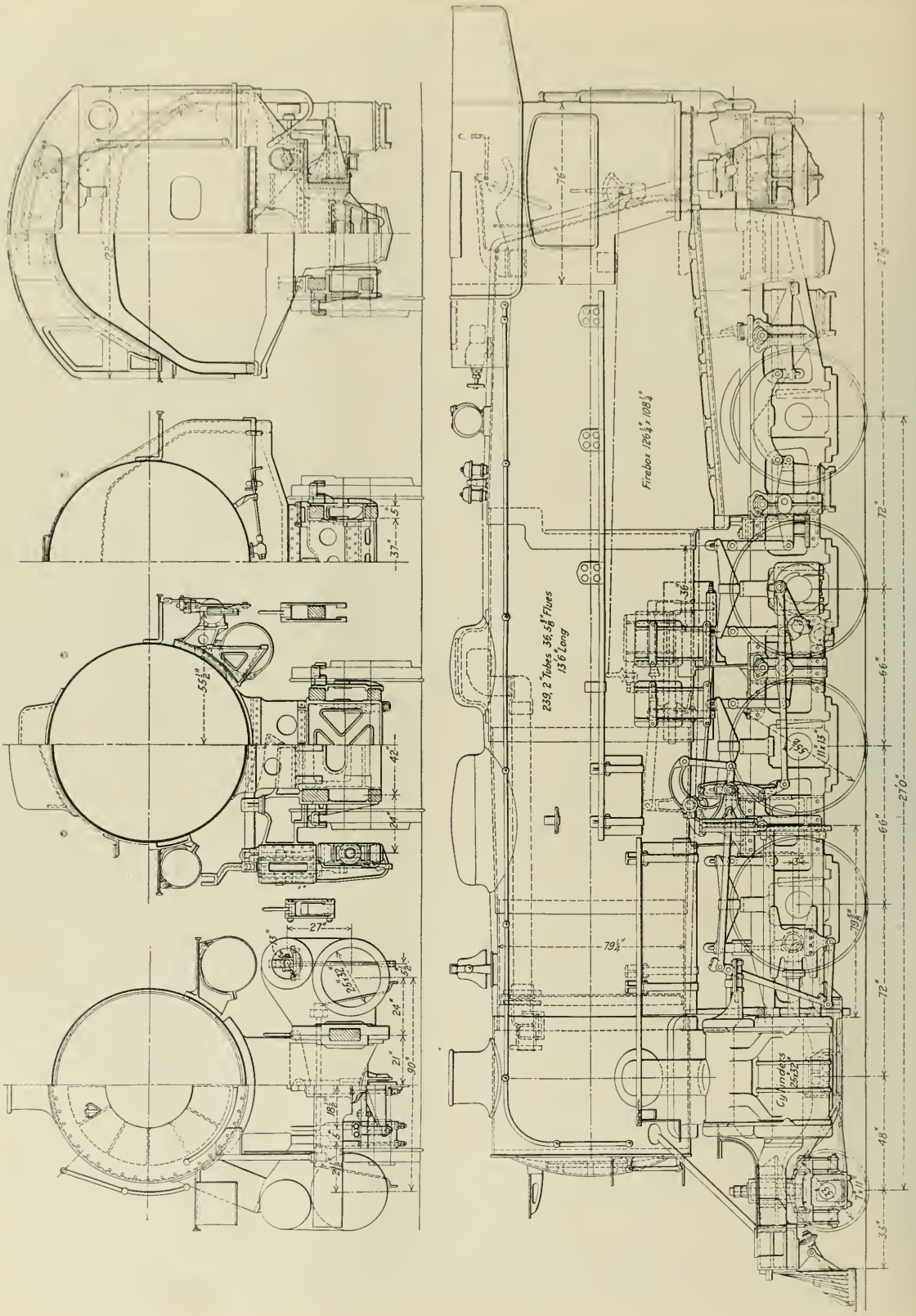
Eastern Car Pool Gondolas.—The Northwestern regional director in Freight Car Distribution Notice 8, cancelling Notice 2, states that roads which are members of the Eastern Coal Car Pool will now accept current home delivery of open top cars of their ownership from roads not members of the pool. Flat bottom coal cars of pool ownership may be continued in local service where convenient. Self-clearing hoppers and mill type gondolas should be sent home, but may be loaded as convenient to or in the direction of the home road.

Protection of Cotton from Fire.—Order 178 of the Southwestern regional director discusses the question whether roads using oil burning locomotives need apply stripping to cars for the protection of cotton, or whether this protection should be applied by a coal burning road upon receipt of the cotton from an oil burning road. It is held that the originating carrier should do whatever is necessary to cars to protect cotton and similar commodities in transit, as it would not be practicable to depend upon a connecting or intermediate road to furnish such protection.

Distribution of Automobile Cars.—Supplement 1 of Freight Car Distribution Notice 6 of the Northwestern regional director directs that 36-ft. automobile cars shall hereafter be moved east empty (except from territory west of the Missouri river) the same as automobile cars of larger size. It is imperative that the east-bound movement of automobile cars be expedited as much as possible, and the situation followed vigorously to prevent misuse or delay.

Uniform Method for Handling Hog Shipments.—Circular 191, cancelling Circular 149 of the Southwestern regional director states that on March 12, the embargo and allotment plan governing the movement of hogs to various markets was entirely lifted, therefore Circular 149, issued on December 24, outlining the method of handling hog shipments, is cancelled.

Storehouse Devices and Practices.—The Northwestern regional purchasing committee in bulletin 125 calls attention to a list of the special appliances, devices, profitable practices, etc., reported by the various regions to the stores section of the Central Advisory Purchasing Committee.



Elevation and Sections of the P. & R. Consolidation Type Freight Locomotive

Large Consolidation Type Locomotive for the P. & R.

With Tractive Effort of 61,260 lb. and Small Drivers, They Are Adapted to Heavy Drag Service

THE PHILADELPHIA AND READING is now receiving from The Baldwin Locomotive Works a consignment of Consolidation type locomotives which are notable for their weight and hauling capacity, and also because they are the only engines built to a railroad company's design to be included in the 1,430 locomotives ordered last year by the Railroad Administration.

In the table will be found a comparison of the leading dimensions of these locomotives with the first Baldwin Consolidation type built for the Philadelphia & Reading:

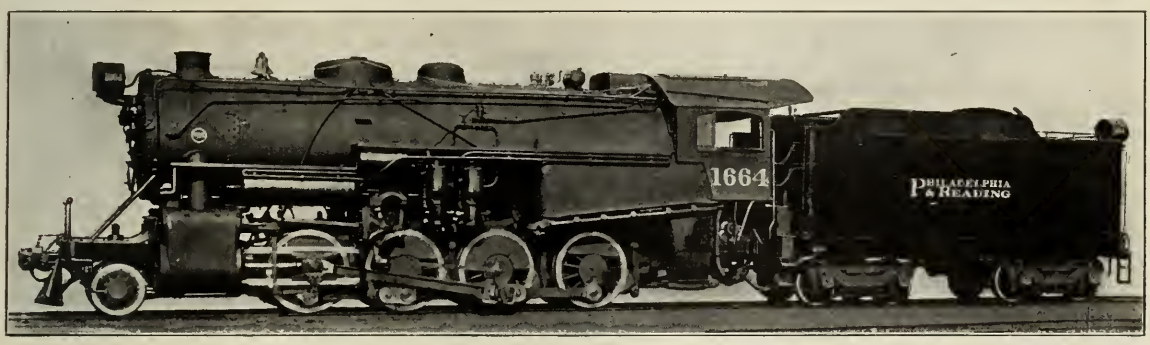
Date built	Cylinders, in.	Drivers, diam., in.	Steam pressure lb. per sq. in.	Grate area, sq. ft.	Water heating surface, sq. ft.	Superheating surface, sq. ft.	Weight on drivers, lb.	Total weight, lb.	Tractive effort, lb.
1880.....	20 x 24	50	120	76	1,357	...	90,000	104,000	19,600
1918.....	25 x 32	55½	200	94.9	2,655	575	250,800	281,100	61,200

The locomotives built in 1884 had boilers of the Wootten type, equipped for burning fine anthracite, and this same type of boiler in a somewhat modified form and of greatly enlarged dimensions, is used in the new design. The fuel generally used today consists of a mixture of fine anthracite and bituminous coal, and this is burned on a rocking grate,

COMPARISON OF P. & R. CONSOLIDATION AND MIKADO TYPE LOCOMOTIVES

Type	2-8-0	2-8-2
Tractive effort, lb.	61,260	57,320
Total weight, lb.	281,100	329,300
Weight on drivers, lb.	250,800	246,600
Diameter of drivers, in.	55½	61½
Cylinders, diameter and stroke, in.	25 by 32	24 by 32
Steam pressure, lb. per sq. in.	200	225
Heating surface, total evap., sq. ft.	2,655	4,224
Heating surface, equivalent, sq. ft.	3,518	5,264
Grate area, sq. ft.	94.9	108
Tractive effort x dia. drivers ÷ equiv. heating surface	966.5	669.7
Firebox heating surface ÷ equiv. heating surface, per cent	8.4	6.2
Grate area ÷ vol. cylinders	5.2	6.4

The boiler has a conical ring in the middle of the barrel, which increases the diameter from 79¼ in. at the first ring to 85⅝ in. at the throat. The firebox has a combustion chamber 39 in. long, and a brick wall 26 in. high is built across the throat of the chamber. Flexible bolts are used almost exclusively in the water legs, and four rows of expansion stays support the front of the crown. The firebox has two oval fire-door openings, and the doors are power operated. A Standard stoker is applied. The mud ring is single riveted, except at the corners, where it is increased in depth to take two rows of rivets. A four-hopper ash-pan is applied with the two rear hoppers back of the wheels outside the frames. The equipment includes a power grate shaker.



Heavy Consolidation Type Locomotive Built for the Philadelphia & Reading

instead of on a combination of water tubes and pull-out bars, as applied to the earlier locomotives.

The new locomotives are designed for heavy drag service, and are in many respects similar to a group of Mikado type locomotives which preceded them. In consideration of the kind of fuel used, however, and the relatively small diameter of the wheels, a firebox of sufficient depth can be placed above the rear drivers without raising the boiler center to an excessive height. In the new Consolidations, the boiler center is placed 9 ft. 7½ in. above the rail.

In one of the tables will be found a comparison of the principal dimensions and ratios of the Consolidation and Mikado types. It will be seen that the new locomotives have smaller driving wheels and lower boiler pressure than the Mikados, but the cylinders are one inch larger in diameter and they have a starting tractive effort almost 4,000 lb. greater than the Mikados. It is evident that there is a considerable sacrifice in heating surface, there being eight less superheater units and 20 less tubes, which are 4 ft. 2 in. shorter than those in the Mikado type boiler. The difference in grate area is less marked. For heavy drag service, however, high tractive effort at slow speeds is the controlling factor rather than high sustained horsepower capacity.

The smokebox is comparatively short, and is equipped with the Economy front end arrangement, patented by I. A. Seiders, superintendent of motive power and rolling equipment of the railroad. A special feature of this arrangement is a breaker plate, which consists of a slotted plate fitted with deflecting vanes. This plate is placed under the superheater damper and in front of the tubes, and is very effective in breaking up the large sparks before they strike the netting. The netting frames are most substantial in construction, and the device has proved effective in preventing the setting of fires due to escaping sparks.

The cylinders are cast separate from the saddle, the right and left hand cylinders being interchangeable. They are made without bushings, and have barrel walls 2¼ in. thick. The cylinder castings and central saddle are made with suitable recesses through which the frames pass. The frame at this point has a single section, 5 in. wide by 13 in. deep—and the cylinder, frame and saddle, are held together on each side by a total of 59 horizontal bolts, 1⅛ in. in diameter. The saddle and cylinders are keyed to the frames at the front by vertical keys. The valve motions are of the Walschaert type, and are controlled by the Ragonnet power reverse gear.

The frames are of most substantial construction. They have a depth of 7½ in. above the pedestals, and the pedestal binders are held in place by three bolts in each end. The main pedestal wedges are self-adjusting. Strong transverse braces of cast steel are applied to the frames between adjacent pairs of driving-wheels. The brace back of the main drivers supports sliding bearings, which carry the front end of the mud ring. The rear end is supported by an expansion plate.

The cab, in accordance with the most recent practice for Wootten boiler locomotives on this road, is placed at the rear end instead of over the middle of the barrel. The sides of the cab are cut away in front in order to permit easy access to the stay-bolts.

Further particulars are presented in the following table of dimensions and data:

General Data

Gage	4 ft. 8½ in.
Service	Freight
Fuel	Hard and soft coal, mixed
Tractive effort	61,260 lb.
Weight in working order	281,100 lb.
Weight on drivers	250,800 lb.
Weight on leading truck	30,300 lb.
Weight of engine and tender in working order	462,000 lb.
Wheel base, driving	17 ft.
Wheel base, total	27 ft.
Wheel base, engine and tender	63 ft. 11 in.

Ratios

Weight on drivers ÷ tractive effort	4.1
Total weight ÷ tractive effort	4.6
Tractive effort × diam. drivers ÷ equivalent heating surface*	966.5
Equivalent heating surface* ÷ grate area	37.1
Firebox heating surface ÷ equivalent heating surface.* per cent	8.4
Weight on drivers ÷ equivalent heating surface*	71.3
Total weight ÷ equivalent heating surface*	79.9
Volume both cylinders	18.2 cu. ft.
Equivalent heating surface* ÷ vol. cylinders	193.5
Grate area ÷ vol. cylinders	5.2

Cylinders

Kind	Simple
Diameter and stroke	25 in. by 32 in.

Valves

Kind	Piston
Diameter	13 in.

Wheels

Driving, diameter over tires	55½ in.
Driving, thickness of tires	6½ in.
Driving journals, diameter and length	11 in. by 13 in.
Engine truck wheels, diameter	33 in.
Engine truck, journals	7 in. by 11 in.

Boiler

Style	Wootten conical
Working pressure	200 lb. per sq. in.
Outside diameter of first ring	79¼ in.
Firebox, length and width	126¼ in. by 108¼ in.
Firebox plates, thickness	Sides, back and crown, ⅜ in.; tube, ½ in.
Firebox, water space	Front, 5 in.; sides and back, 4 in.
Tubes, number and outside diameter	239—2 in.
Flues, number and outside diameter	36—5¾ in.
Tubes and flues, length	13 ft. 6 in.
Heating surface, tubes and flues	2,359 sq. ft.
Heating surface, firebox†	296 sq. ft.
Heating surface, total	2,655 sq. ft.
Superheater heating surface	575 sq. ft.
Equivalent heating surface*	3,518 sq. ft.
Grate area	94.9 sq. ft.

Tender

Tank	Water bottom
Wheels, diameter	36 in.
Journals, diameter and length	6 in. by 11 in.
Water capacity	9,500 gal.
Coal capacity	15 tons

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.
† Includes combustion chamber.

War Situation and Service of European Railways

Physical Condition of British and French Lines—Service Has Deteriorated—Great Crowding of Trains

By Samuel O. Dunn,
Editor of the *Railway Age*

The war imposed heavy new burdens on the railways of all the countries involved in it, and at the same time made it impossible to maintain the physical properties as had been done before. It caused the private railways of Great Britain and France as well as of the United States to be taken under government control. It caused many of their most efficient employees to volunteer or be drafted for military service. These things produced marked effects upon the service and the physical condition of the railways.

To most of those who have used the service of American railways the deterioration of their physical condition has hardly been perceptible. There have been complaints regarding the service and regarding the decline in the efficiency of their employees.

For several weeks after the armistice was signed the writer traveled somewhat extensively upon the railways of Great Britain and France. While motoring along them, as well as riding upon them, he had opportunity to observe the effects of the war upon their physical condition. Since Great Britain and France were in the war much longer than the United States, and since a large part of the mileage of the French lines was actually within the zone of heavy fighting, the service and physical condition of the railways of Great Britain and France, especially the latter, show the effects of the war much more than have the service and physical condition of the railways of the United States. The writer was in both England and France, as well as in Germany and Switzerland, in 1914, having sailed from Liverpool for home only two weeks before the war began in Europe. Having returned there just before the armistice was signed, and been there several weeks after it was signed, he had opportunity to observe the effects of the war upon the British and French railways, and also to compare and contrast railway service in Europe both in time of peace and in time of war with railway service in the United States.

Comparison of European and American Service

Before the war the service of the railways of the leading countries of Europe was in some respects superior and in some respects inferior to that of the railways of the United States. The writer remarked after his first experience as a traveler in Europe that the most effective means the railways of the United States could adopt to cause the American people to stop criticising their service would be to give them all a free ride through Europe. The first-class service of the railways of Great Britain, France and Germany before the war was quite comfortable. The third-class service in Great Britain and the second-class service in France and Germany were about equal to our ordinary day coach service. But the American traveler missed many comforts and luxuries to which he was accustomed at home. There were no observation cars or buffet smoking cars. Many of the European passenger cars were without vestibules, making it impossible on many trains to move from one car to another. In such cases if the traveler wished to go to a restaurant car he had to wait until the train stopped, run along the platform to reach the dining car, and then when he had finished his meal wait until the train stopped and run back along the platform to the car

in which he had been riding. In rainy or cold weather this was not pleasant.

Practically all the European passenger cars are divided into compartments. The so-called "corridor" cars are designed like our compartment sleeping cars. The passenger enters at the end of the car and goes down the corridor to the door of his compartment. There is always a toilet at one end of the compartment car. These cars are quite convenient and satisfactory. There are many cars in Europe which are divided into compartments that extend clear across the width of the car, there being doors into the compartments on each side of the car. When the traveler gets into one of these compartments and the train starts he is locked in and cannot leave his compartment until the train stops. There are no toilet accommodations in compartments of this kind, which ordinarily seat six to eight people, and to the American they seem extremely inconvenient.

What seemed inconvenience and discomfort before the war would have seemed like convenience and comfort during the war and since the signing of the armistice. The writer on his recent trip was in a party whose members were guests of the British government. The government, being in control of the British railways, spared no effort to provide good service for the members of this party. Seats on the trains in Great Britain always were reserved, and in some cases special cars were provided. Even in France the British, French and American army officers who took care of the wants of the party, spared no effort to provide every comfort and convenience for it. Therefore, nothing that is said herein is said in a spirit of complaint, because we had nothing to complain about and were placed under lasting obligations; but we took note of conditions, and the conditions of travel for those who were not especially favored were far from pleasant.

Great Overcrowding of Trains

During the war it was necessary, and during the subsequent period of demobilization it has continued to be necessary, for the governments to use a large part of the passenger train equipment for handling troops. Furthermore, thousands of individual soldiers on leave were constantly traveling to and from their homes. Finally, during the war, the civilian population, especially in Great Britain, took to traveling more than ever.

In France a substantial part of the mileage of the railways became entirely unavailable for ordinary passenger service. About 45 per cent of the mileage of the Northern, one of the principal lines, was at one time in the hands of the Germans. Literally hundreds of miles of railway was partially destroyed by bombing and shelling. For example, before the war the Eastern railway rendered good service on its direct line from Paris to Rheims. This line was so largely destroyed that in order to go from Paris to Rheims it became necessary to go over the main line of the Eastern railway to Epernay and thence over a branch from Epernay to Rheims. Of course, there were periods of heavy troop movements when commercial passenger traffic on the northern and eastern railways of France had to be practically or entirely suspended.

The result of the various conditions was that in Great Britain the passenger trains became terribly overcrowded. All the people who could be put into them were put into the compartments, and oftentimes the corridors of the corridor cars had people standing in them. The conditions in this respect were worse in France. The crowding on most passenger trains was almost as bad as it is during rush hours on the elevated railways of Chicago and the subways in New York. It was not uncommon to see all the compartments in a French train crowded with people and the corridors jammed with them, either sitting on their baggage or lying on the floor. Those who have complained about the crowding of trains in the United States have complained about conditions which to those who have recently been in Europe seem by comparison anything but imperfect.

No Heat in Passenger Cars

One thing which every traveler from the United States noticed as soon as he entered a train in Great Britain was that there was no heat. The coal shortage, owing to the decline in the production of coal and to the necessity for shipping a large part of that produced to the Continent, was so serious that it was necessary as a war measure to operate the trains entirely without heat. A passenger from America who got into a British train and took off his overcoat soon found it expedient to put it on again, and soon became accustomed to keeping it on. It was still more comfortable to wear not only an overcoat, but a sweater in addition. Many Europeans traveled with rugs which they spread over their legs and feet. Even with all this protection one's hands and feet often got very cold.

This absence of heat was also noticed in every hotel bedroom and private house. It is a notable fact that although the British were sending to France a substantial part of the coal they produced, there was more heat in trains and hotels in France than there was in Great Britain. Even on trains in Scotland and in hotel rooms in Edinburgh and Glasgow there was no heat. To the American who has been accustomed to steam-heated trains, hotels and houses, the absence of heat at first was very uncomfortable and disagreeable. However, travelers soon got used to it and after returning to the United States found the superheated trains and hotels in this country even more disagreeable than the unheated trains and hotels of Europe.

The slowness of the trains in France as compared with their speeds before the war was at once noticed. There had been a marked reduction of train speeds in Great Britain, and an even greater reduction in France. Before the war it was possible to leave Paris at about noon and reach London at about seven o'clock in the evening. As a result of the war it took about this long to go from Paris to Boulogne. This reduction of speeds was made partly to enable the locomotives to haul more cars and partly, in France, because deterioration of the physical properties rendered it desirable. The operation of all trains at something approaching uniform speed rendered it possible to handle a larger traffic.

Remarkable Passenger Train Loads

The number of passengers carried per train on some of the French and British railways during the war would make an American railway manager open his eyes. It became nothing uncommon for the principal British railways to carry 800 passengers in a train, and there were cases where as many as 1,500 passengers were carried in a single train running as two sections. Troop trains on the railways of the United States during the war often handled 500 men, but it is doubtful if there have been any instances where so many persons have been carried on single trains in this country as have been carried on single trains in Europe. Of course, the trains which have carried these large numbers of passengers have not only been crowded but have contained large numbers of cars. It was not uncommon to see trains containing 15 to 20 cars.

The passenger cars in Europe are much lighter than in the United States, both because they are smaller, especially narrower, and because comparatively little steel is used in their construction. Those who have advocated, and even attempted to force by law, the universal use by our railways of all-steel cars may be surprised to learn that the all-steel car is practically unknown in Europe. All-steel cars have been advocated and generally adopted in this country as a measure of safety. The railways of Europe continue to use wooden cars, and at the same time many of them, especially those of Great Britain and France, have an accident record which the railways of America may well envy. Of course, when there is a serious accident over there the wooden cars are often crushed and sometimes catch fire with disastrous

results, but wrecks are relatively less frequent than here. This is principally due to the superior discipline of the employees. The speeds of trains before the war were quite as fast in England and France as in the United States.

Railways Have Stood Up Well

The railways of Great Britain and France were obliged during the war to reduce to the minimum their outlays for maintenance of track and equipment, and very little new equipment was bought. Neither the materials nor the labor required for adequate maintenance and replacements were available. The effects of these drastic economies are plainly visible, especially on the railways of France. In Great Britain stations, cars, and so on, look quite dilapidated as compared with their appearance before the war. This is partly due to the fact that it has been impracticable to get enough labor to keep things clean. In France the evidences of the destructive effects of war and of the inability to get labor and materials for maintenance and replacements are visible on every hand. In large areas the Germans destroyed the railway bridges, and these have been replaced only with temporary wooden structures. It was impossible to get enough glass, and many car windows which have been broken have not been repaired. The Germans bombed and shelled many railway lines which they were unable to take, and along such lines as that of the Northern from Boulogne to Paris, and that of the Eastern from Paris to Epernay, one constantly sees shops which have been partly destroyed by bombs, pieces of track which have been destroyed by bombs and repaired, and stations which have been hit.

The most remarkable thing about the condition of both the British and French railways is not that they show some of the effects of war, but that outside the zone of actual fighting they show the effects of it as little as they do. While the effects of inadequate maintenance of tracks and equipment are visible, the tracks ride remarkably well and the equipment is in remarkably good condition considering how little has been done to maintain them. The fact that they are in relatively as good condition as they are bespeaks the skill with which they were originally constructed and with which they were maintained up to the time of the war. The British use the term "permanent way" where we use the term "roadway and structures." The manner in which their track has stood up during the war justifies the use of that term. Nevertheless there has been great deterioration in the railways of both countries which it will take years to offset.

While the British and French people bore patiently with the deterioration of railway service during the war there has been no lack of complaint since the signing of the armistice because the service has not been restored to normal. The complaints in Great Britain have been especially numerous and loud. It has been explained, however, that it will be months before the service can possibly be restored to normal. In the first place, the railways are short of equipment and it will take a long time to provide the needed additional equipment. In the second place, the railways ever since the armistice was signed have had to handle many thousands of troops which have been in process of demobilization.

Advances in Passenger Rates

Both the British and French governments made special railway rates for soldiers who were traveling "on their own." In France these special rates were allowed to American soldiers. Therefore, the soldiers from the United States who have traveled in Europe probably have not thought much about the passenger rates they had to pay. As a result of advances in rates during the war, however, the rates which civilian travelers have to pay are relatively high. The first-class rate in Great Britain averaged before the war about three cents, and the third-class rate, on which a large majority of the people travel, about one and a half cents. Therefore, the advance of 50 per cent, which was made on January 1, 1917, made the first-class rate about four and a half cents and the third-class rate about two and a half cents.

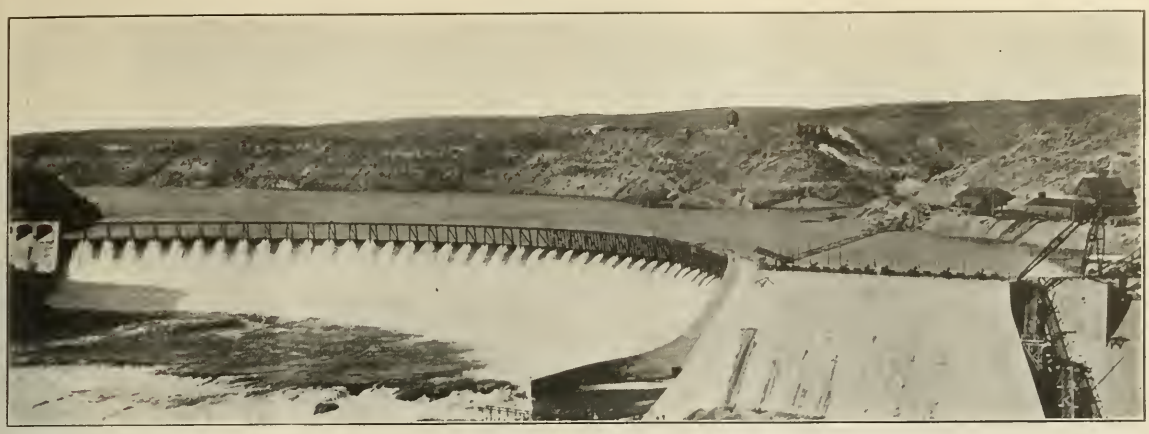
It is impossible to see how these rates can be reduced except at the expense of the taxpayers, whether government ownership is adopted or the railways are returned to private operation. The advance in passenger rates increased passenger earnings, but there has been no advance in freight rates, and the increase of operating expenses, mainly due to advances in wages, has been so much greater than the increase of earnings that at the present time, although no detailed official figures are available, it is safe to say that the British railways are paying out one dollar in operating expenses for every dollar they are earning. Premier Lloyd George said recently in a speech in the House of Commons that the increase of operating expenses of the British railways during the war was £90,000,000, or approximately $450,000,000. Since the net earnings before the war were only $250,000,000, it will be easily seen that British taxpayers already are paying a large deficit on the operation of the railways, and that to restore passenger rates to the old basis would largely increase this deficit. There have been large increases of both passenger and freight rates in France.

The service of the European railways before the war, as already indicated, was in some respects equal or superior to that of the railways of the United States. The trains in France and England were scheduled to make as good speeds as our trains and they were more regularly on time. With their lighter passenger equipment passengers were less frequently given violent shocks in setting and releasing the brakes on stopping and starting. The dining car service was table d'hote and many persons thought that the meals were better than the a la carte meals which were served under private operation in this country or the table d'hote meals which were served here under government operation. Most persons also liked the European system of issuing to passengers tickets giving the hour and the table at which they were to get their meals. The British sleeping cars, with their small compartment for each passenger, rendered a more satisfactory service than can be obtained on our sleeping cars, except in compartments and drawing rooms, and a passenger on the British railways can get a compartment by buying one railway ticket.

In many respects, however, our passenger service was superior to theirs before the war, and mainly because they went through four years of war while we went through only a year and a half of war, their service has deteriorated much more than ours. Probably it will take years to restore it to what it was before the war.

Will Government Ownership Be Adopted?

Whether government ownership actually will be adopted is not yet settled. The British government has announced that it intends to keep the railways two years longer at least, and that meantime a solution of the problem will be worked out. It has been positively stated by Winston Churchill, who is a member of the Cabinet, that the government has decided on nationalization. On the other hand, Lord Claude Hamilton, chairman of the Great Eastern Railway, recently issued a statement, saying that he had conferred with officers of the government and that they had assured him no final decision regarding the government's railway policy has been reached. All reports indicate that there is less probability of the adoption of a permanent policy of government ownership and operation in France than in Great Britain. The French got some experience when the government took over the Western railway in 1908 and assumed its operation, and they have not relished the effects either on expenses or service. The five large private railways in France are still under government control, but apparently an attempt is being made to work out a program of readjusting their expenses and rates so that they can be restored to private operation.



Great Falls Dam at Volta; Chicago, Milwaukee & St. Paul Electrification

The Real Problem of Railway Electrification*

Exponents of Electrification Are Learning to See With the Eyes of the Railroad Man

By Calvert Townley

ELECTRICITY NOW PERFORMS every railroad service previously rendered exclusively by steam locomotives and in every case does it better than it was done before. But in order to use electricity a large investment in equipment and installation must be made and electrification has proceeded slowly because railroad executives were not convinced that the advantages to be gained are always worth the cost.

The progress of electrification has also been impeded, first, before the war by the difficulty in financing, due to conditions other than the merits of electrification, and second, since the war began, because every one has been too busy to consider any work that could be deferred and because the government's taking over the railroads has created an unsettled situation not conducive to the investment of new capital for future returns. Now, however, there seems to be ground for hoping that these bars to progress will be removed in the not distant future so that electrification can be again studied on its merits, therefore our consideration of the subject is timely.

In reviewing the past twenty years' history of this question, I cannot escape the conclusion that we electrical men, and not our steam road colleagues are responsible for the slow progress made. We have not known enough about either the science or the art of railroading. Our belief in, and our zeal for our own profession has led us, albeit with entire honesty of purpose, to make more or less extravagant claims as to what we could do and to underestimate the cost of doing it. The inevitable reaction of mind which followed an accurate determination of facts of course disturbed confidence in our judgment. But if at times we have injured the cause of electrification by claiming too much, strange as it may sound, we have injured it a great deal more by not claiming enough.

Electrical engineers not having always been railroad men have been unable to study railroad problems as they should have been studied, that is to say with only real and not with any arbitrary limitations before them. It has been natural for the electrical man to ask the railroad man for a statement of the conditions he was expected to meet. It was equally natural for the railroad man to prescribe the conditions upon which his steam service was predicated. Under these circumstances the problem became largely one of replacing one sort of locomotive with another, and of balancing hoped-for economies in operation and maintenance on the one hand, against fixed charges for the additional investment required, on the other. Right there comes the mistake. A perfectly natural but a fundamental mistake, for which no individual or class should be censured but for which the unusual development of the art is responsible. We cannot blame railroad men for not being electrical engineers nor electrical engineers because they are not railroad men, but the progress of electrification has had to lag until both should be able to see, each with the eyes of both. It is only by combining the railroad man's knowledge of the fundamental requirements of his service with the electrical man's skill in applying electricity to perform that service that all the possibilities of any specific problem may be developed.

The electrification of a railroad is not simply the substitution of one kind of locomotive for another. It is far more than that. It is the adoption of a fundamentally different method of train propulsion It is conservative to say that, within the bounds of ordinary practise, electricity can furnish every train with all the pulling power that can be used. The limitations of the steam locomotive in this respect disappear and ruling grades rule no longer. A strictly limited motive power is replaced by one that is practically unlimited.

Kind of Equipment Not Important

There are a number of so-called "systems" of electric traction and heavy emphasis has been laid by the advocates of each upon its points of difference from every other. So much has been said about these differences and so little about the points of similarity as to create an entirely misleading impression. It is a fact that there are more kinds and types of steam locomotives in use many times over than there are

*A paper presented at the 348th meeting of the American Institute of Electrical Engineers, Boston, Mass., March 14, 1919. Copyright, 1919, by A. I. E. E.

electric systems. It is a fact that except for the storage battery locomotive, which has but a limited field of application, all electric systems have many more common features than differences. It is a fact that they agree on fundamentals and differ in detail only. Their costs may not be the same, their efficiencies may vary, but they all do their work and do it successfully and well. The possibility of unlimited electric power is a characteristic not of any one system but of all. It is due to basic differences between steam and electric equipment. A steam locomotive is a complete independent unit which not only generates but also utilizes its power. The electric locomotive generates no power at all. It is only a translating device receiving energy from an outside and a remote source. The electric power house always having much greater capacity than any one locomotive, can supply ample power for the heaviest train on the steepest grade. The steam locomotive, which carries its own power house with it, is limited to the capacity of its one boiler. By the multiple unit principle, as many electric locomotives as may be needed can be coupled together and operated in synchronism by one crew from any cab. Any required tractive effort can thus be exerted without slipping the wheels, without imposing undue strains on the rails or bridges and without increasing the number of engine crews.

Track Capacity Is Increased

The business of a railroad is to transport freight and passengers. I put freight first because on the average it produces 73 per cent of the revenue. Unlimited motive power permits longer trains and higher schedule speeds. On the Elkhorn grade of the Norfolk & Western the schedule speed was doubled. It cuts the operating cost by hauling more cars with the same or a smaller crew. The Norfolk & Western uses two electrics to do the work of three Mallets. These new opportunities at one fell swoop banish many of the railroad's time honored traditions. The traffic possibilities must be studied from a new angle and advantage taken of every facility. It is a new thought to realize that train length is limited not by motive power but by the yard tracks and length of sidings, or that all the trailing tonnage that the draw bars will stand can be hauled. Nor are these new limits fundamental. Sidings can be extended, draw bars can be made stronger, if it pays to do it. In a word electrification opens up tremendous possibilities of increasing the freight capacity of a road and without it being necessary to build additional tracks.

Aerial Rights Made Valuable

While not as important as freight, passenger traffic likewise comes in for its share in the widened horizon and the vanishing tradition. Unlimited power of course is available but the absence of combustion is another basic advantage. Smoke and cinders disappear. Tunnel operation loses its terrors. Unobscured signals permit normal speeds with undiminished safety. Projects like the Pennsylvania terminal in New York, depending entirely on submarine tunnel operation and previously impracticable, become immediately possible. Railroads owning valuable realty in cities can erect buildings thereon, where before smoky locomotives made any structure above the ground level impracticable. The aerial rights are now valuable. Multiple unit operation has in fact made suburban traffic. The rapid acceleration made possible by electric traction has directed attention to the equal value of rapid retardation and has quickened the study of braking accordingly; also of modified coach design to bring about the more efficient loading and discharge of passengers. These combined possibilities secure increased schedule speeds and attract patronage. The people not only get over the line in a shorter time but as a corollary more people get over it in the same time. Again it is seen therefore that in passenger as in freight traffic the ability to do something that could not be done before, rather than to do the same thing at a lower cost is the most valuable attribute of electrification, and again we find a greatly augmented capacity without the need of additional tracks.

It is not my purpose to make an exhaustive comparison of the relative advantages of steam and electric operation. That has been done often and well by others. What I have said about the expanding opportunities for electrified service is by way of illustration to emphasize my plea that the question should always be viewed in its broader aspect and not hampered and restricted within any narrower limitations than properly belong to it.

Complete Electrification of All Roads Impossible

I am going to assume, then, the broadest possible treatment and to suppose that every electrification project is to have its pros and cons most fully examined. The real and vital question then is, "How far will this lead us?" "To what extent may we expect complete electrification of all our roads?" Parts of a number of them have already been equipped. Many of these are numbered among our prominent roads, successful corporations which have had the advice of the most highly skilled executives and engineers, and which are progressive. The service performed on the electrified sections comprises practically every kind of railroad transportation. The Bluefield division of the Norfolk & Western in West Virginia is an example of an important coal road operating through the mountains. The Chicago, Milwaukee & St. Paul 440-mile main line, through Idaho and Montana, demonstrates what can be done by a transcontinental carrier on a large scale with through traffic, both freight and passenger. The New York, New Haven & Hartford 73-mile stretch between New York and New Haven shows how through freight and a heavy passenger traffic can be taken care of on the most congested four track section of an important eastern carrier and what is possible for complicated freight yard operation, while the New York Central and the Pennsylvania out of New York city are splendid examples of our greatest modern passenger terminal electrifications. There are, of course, many other electrifications, but even if there were not, those named are of a character to command the respect and attention of the railroad world. Now, every one of these projects has been successful. Every one has justified itself. Nearly every one in its present scope represents an extension of the zone initially electrified, the most convincing evidence possible as to what views the operating companies hold regarding these several projects. Railroad officials are generally glad to give others the benefit of their experience so it is reasonably safe to say that operating statistics are available covering long enough periods so that the results to be expected from any proposed undertakings may be predicated on established facts and not upon theories. In the light of present day knowledge, therefore, what answer can we make to the question, "Should all railroads be electrified?"

Taken together in 1910 there were in the United States 240,000 miles of railroad main line regardless of the number of tracks. Of this mileage approximately 1,250, or one half of one per cent, has been electrified or is today in process. The remaining 99½ per cent comprises of course, roads performing every variety of service. They range from the back country branch line built by some over enthusiastic promoter and now perhaps, operated as part of a large system, only because operation cannot be avoided and regularly contributing its annual deficit, up to the most important through arteries of travel upon which the commerce and industry of the nation depend. Every sort of community is served; every kind of railroading has its place in this vast aggregation of effort and the variables in the problem are so

multitudinous and their nature often so profound as to well daunt the courage of one who seeks to formulate them for incorporation in a general statement.

Fortunately or unfortunately, depending on the point of view, it has been my lot to have to deal with the electrification problem from both sides. At one period from the standpoint of an intimate affiliation with the development and manufacture of electrical apparatus and at another from that of one charged with official responsibility on the railroad's behalf. I am a thorough believer in the virtues of electrification and an enthusiast about the wonders which it can accomplish but I also have a keen appreciation of the almost infinite variations in the railroad problem and a very wholesome respect for the dollar. I do not believe that all railroads will ever be electrified. I am not sanguine even that all the tracks of any one really big system will be so equipped in our time. It is a question of economics, and the results will not justify the expenditures even when considered with such broad vision as that which guided the Pennsylvania in spending millions to put their passenger terminal in New York City without the prospect of a direct return. Electrification will increase the track capacity. But there are thousands of miles of railroad that have sufficient capacity now, frequently several times over, and where the wildest stretch of imagination fails to picture a future need of this kind. Electrification works wonders in suburban and interurban passenger service. I have ridden for hours across the western prairies without seeing a single town, much less a city where these advantages would count. Electrification effects marked economies in fuel, in maintenance, in labor and otherwise through a long list; but electrification calls for a heavy investment and unless these economies bulk large enough, the interest on such investment will wipe them out and turn the enterprise into a losing venture. I do not believe the cause of electrification is helped by undue optimism on the part of its advocates., Rather should there be an enlightened partisanship, enthusiastic where enthusiasm is justified but tinged with the sober conservatism of the man who has to put his own dollars to work.

Plenty of Work for Engineers

There need be no discouragement to the electrical engineer in the views just given, nor to the railroad man who has looked toward the new motive power for salvation. There are so many cases where electricity should be used, where its advantages are clear and conclusive, that once the railroads escape from the financial slough of despond in which they are now wallowing and are again able to get capital for their needs, there will not be enough engineers, there will not be enough electric factories in the country to serve them. Every big system has need of electricity somewhere. For some small roads it may mean the difference between solvency and bankruptcy. I electrified a short derelict line for the New Haven Road between Meriden and Middletown, long before given over into the one-train-a-day-annual-deficit class, and turned it into a good earner.

There can be no rule established. Generalities are sure to be misleading but electrification is now firmly intrenched and successful. It is recognized by railroads generally as an effective agency with great possibilities and one which is particularly valuable for certain specific purposes. Time alone will tell how broad its application is to be but I am confident we can await developments with tranquility assured that the art is in a healthy condition and that progress will be along the right lines.

Discussion

The paper was discussed by representatives of the General Electric Company, the Westinghouse Electric & Manufacturing Company, and a number of men representing railroads in the United States and Canada. All of those discussing the paper heartily endorsed Mr. Townley's attitude toward the problem and W. F. Murray of the Connecticut Light & Power Company outlined a plan for electrifying a large section, including lines on six eastern railroads. This plan has been given serious consideration at Washington. The substance of Mr. Murray's discussion was as follows:

Plan for Electrification Proposed

We must not selfishly think of the electrification of one or two large roads. It is very true that we may reap a great money interest from that electrification, but it seems to me that this is not the right way to go after this matter. We must, if we are going to make electrification a success in this country, get after many roads, and we must do that on a district basis. In 1914, I had the pleasure of discussing with one of our prominent electrical engineers, a plan for electrification which I think will appeal to you. It involved six roads, Hudson River, Lehigh Valley, Central New Jersey, West Shore, Erie and Pennsylvania.

It seems to me that there was at that time a magnificent opportunity of what may have been called the formation of a power and equipment company with the idea in mind that a standard equipment be used on these railroads for service in the metropolitan districts, for freight service and for switching service in the large terminal yards in that section and for the distribution of power to that district for those railroads. At that time the railroads were tremendously embarrassed as they are now in the matter of finances. Yet if a standard equipment could be produced, the finances could be taken from the embarrassed railroad hands and smoothed out by bankers who would have jumped at the opportunity, and taken care of the purchase and equipment. Of course, the power house which would furnish the power would be compensated for by their contract for power and such profits as they would make would easily put them in a position for the bankers to finance these buildings. The shifts that would be necessary to take care of this equipment could also be taken care of in a financial scheme, and so the proposition could be financed. In fact, I have discussed the matter with several people in New York, who were very much interested in it and it seemed that a serious consideration would be possible when the war broke out in 1914. Naturally, it was then impossible to talk of these things.

Government's Investigation for Transmission Line

We have been doing a very wonderful work for the government in connection with the investigation of a superior 150,000 volt power transmission line which would extend from Boston to Washington. The opportunity offered itself for development of large power stations at the mouths of mines, tidewater steam stations and water power stations. Into this transmission trunk line system therefore would be fed this highly economic power. You might say right away "what would be the advantage of such a line, and could we not on account of the very large stations we have developed produce power as economically, and therefore why go to this expense of investment of money in a superior power transmission line?

Our investigations show that with units of from 25,000 to 40,000 kw. we can safely figure on being able to produce a kw.-hour with something between ten and fifteen pounds of steam, and be sure of it. I venture to say that in the district between Boston and Washington the amount of steam required to produce a kw.-hour as applied to the railroads and to the factories, will average 25 to 30 pounds, and consequently there is offered an enormous saving in production. This, however, is not to pre-empt any stations in central districts that are merely contributing their quota.

This was seriously considered in Washington, and I do not

know but what you may have all noticed in the papers the plan which Secretary Lane has proposed which comprehends practically what I have tried to describe. There was submitted through the secretary-treasurer to the Appropriation Committee of the Senate, a bill calling for the investigation of this matter—a bill reading "This amount of money to be appropriated for the investigation of the economies to be obtained by a power generation and transmission system covering the district between Boston and Washington." On account of the great number of bills being held up in Congress, this, together with others, has been laid over, but it is to be hoped that the new Congress will appropriate a sufficient amount of funds to make this investigation.

I want to leave with you this thought. In discussing this matter of a superior power line with a number of engineers, I have not found a single dissenting voice. Some one may say that the idea is all imagination, but that is wrong. I must confess there is imagination in it: I think the man who has no imagination needs a guardian. Let us admit that there is some imagination. You must imagine a patent before you can make it. I claim that the scheme is practical. There is nothing in it that is impractical. Let us make the investigation and find out.

Do not let us get behind England, who is doing just this thing. We have as much area in this regional district as England has. If we have got to compete with the world's markets and maintain a world standard we must have some superior scheme by which these powers can be made and used.

Progress Toward Financing Railroad Requirements

Railroad Administration Borrows $50,000,000—Arrangements for Warrants and Acceptances Being Worked Out

THE IMMEDIATE PROBLEM of temporarily financing the obligations of the Railroad Administration to the railroads and to the equipment companies appears now to be solved except for the working out of details. Conferences have been held between the administration, Howard Elliott as head of a committee of the railway executives, and the bankers. The Railroad Administration is to issue warrants to the railroad companies for part of the amounts due them to enable them to meet interest and dividend payments, and it is proposed that the bankers loan railroad companies money on the security of these warrants. The railroad companies' own credit, where this is good, will also be used. This would leave the War Finance Corporation free to help the weaker roads.

The War Finance Corporation has loaned $50,000,000 to the Railroad Administration to replenish working capital in the hands of federal treasurers. This $50,000,000 represents all that the administration, itself, can get from the War Finance Corporation, but individual companies may secure loans.

The Navy Department has made a payment of $10,000,000 on account of the money it owes the Railroad Administration.

The War Department owes the administration about $100,000,000. Efforts are being made to collect some of this.

Equipment to Be Financed by Trade Acceptances

The plan by which the equipment builders and those who furnished the materials and specialties are to receive their pay for the cars and locomotives ordered by the Railroad Administration last year, in the form of trade acceptances running for 90 days and bearing interest, has been practically completed except for the arrangement of details which is in charge of a committee headed by F. N. Hoffstot, president of the Pressed Steel Car Company and including J. E. Dixon, vice-president of the Lima Locomotive Works, W. H. Woodin, president of the American Car & Foundry Company, and Mr. Pigott, president of the Pacific Car & Foundry Company.

As briefly reported last week, Director General Hines conferred on March 13 with a group of representatives of the car and locomotive companies to which the Railroad Administration owes money for equipment already delivered and will owe additional amounts for cars and locomotives to be delivered during the current year. A preliminary meeting was held in the morning and a second one late in the afternoon, which was also attended by H. B. Spencer, director of the Division of Purchases, and C. B. Eddy, associate director of the Division of Finance, after which the Railroad Administration issued a statement Thursday evening in substance saying that the director general is considering giving permission to the equipment companies to draw drafts on the director general for amounts due, the drafts to be accepted by the director general. The Federal Reserve Board holds that such drafts, running for not more than 90 days, are eligible for re-discount by the federal reserve banks at the prevailing rates of discount for trade acceptances.

It is estimated that the amount which will fall due to equipment and specialty manufacturers to June 30 will be $183,681,965. The question of whether the specialty manufacturers should draw direct on the director general or on the locomotive builders has not been decided.

A statement of the contractual obligations of the Railroad Administration to the car and locomotive builders as of December 31, 1918, which, incidentally, gives the unit prices paid for the various types of locomotives and cars ordered, is given in the following table, which has been filed in the record of the hearings before the Senate Committee on Interstate Commerce and appears in the printed reports of the hearings, having been inserted following Mr. Hines' testimony before the committee on February 3, 4, 5 and 6. It shows the make-up of the $286,000,000 which Mr. Hines has explained will become payable to the equipment companies during the year as fast as the cars and locomotives are delivered. A large part of this amount is payable in turn by the locomotive and car builders to the companies furnishing the materials and the specialties for the equipment. The statement is as follows:

THE STANDARD LOCOMOTIVE ORDERS
RECAPITULATION.

Number	Type	Price	Amount
150	Light switchers	$36,029.00	$5,404,350.00
50	Light switchers	38,416.33	1,920,816.50
150	Heavy switchers	43,966.00	6,594,900.00
150	Heavy switchers	46,199.03	6,929,854.50
43	Light Pacific	50,867.00	2,187,281.00
25	Light Mikado	57,178.25	1,429,456.25
530	Light Mikado	53,619.00	28,418,070.00
150	Light Mikado	60,613.27	9,091,990.50
20	Heavy Pacific	53,924.00	1,078,480.00
35	Light mountain	56,995.00	1,994,825.00
217	Heavy Mikado	56,761.00	12,751,137.00
50	Heavy Mikado	63,686.90	3,184,345.00
5	Heavy mountain	61,929.00	309,645.00
150	Light Santa Fe	62,277.00	9,341,550.00
20	Light Santa Fe	68,918.16	1,378,363.20
50	Heavy Santa Fe	67,543.00	3,377,150.00
5	Heavy Santa Fe	73,395.81	366,979.05
100	Light Mikado	60,486.00	6,048,600.00
30	Light mallet	78,339.00	2,350,170.00
20	Heavy mallet	92,195.00	1,843,900.00
75	Heavy mallet	98,155.60	7,361,670.00
30	Consolidation	53,619.00	1,608,570.00
2,055			$114,972,103.00

CONTRACTUAL OBLIGATIONS, DECEMBER 31, 1918—CONTRACTS FOR 100,000 STANDARD CARS

RECAPITULATION

Number	Type	Price	Amount
20,000	C. G.	$2,697.20	$53,944,000.00
25,000	Hopper	2,916.67	70,416,750.00
25,000	D. S. box	2,918.88	72,972,000.00
25,000	S. S. box	3,050.05	76,251,250.00
5,000	70-ton	3,173.89	15,869,450.00
100,000			$289,453,450.00
Balance due on locomotives			$74,370,918.62
Balance due on cars			212,266,942.37
Total			$286,637,860.99

Capital Expenditures Program to Be Reviewed

The entire program of capital expenditures for this year, including the carry-over from last year, is to be reviewed in the light of the financial situation caused by the failure of the railroad appropriation bill, and not only will new work not be started without further approval both by the corporate officers and the Division of Capital Expenditures but work already under way will be discontinued, except with their approval, except where necessary to insure safety or where it would cost more to stop it than to continue. This plan was

CONTRACTUAL OBLIGATIONS DEC. 31, 1918—CONTRACTS FOR 1,930 STANDARDIZED LOCOMOTIVES

Name and type	Number	Price	Amount	Total cost	Less payment on account	Balance due
American Locomotive Co.:						
Light Mikado	25	$57,178.25	$1,429,456.25			
Light switchers	130	36,029.00	4,683,770.00			
Heavy switchers	75	43,966.00	3,297,450.00			
Light Pacific	10	50,867.00	508,670.00			
Light Mikado	287	53,619.00	15,388,653.00			
Heavy Pacific	10	53,924.00	539,240.00			
Light mountain	20	56,995.00	1,139,900.00			
Heavy Mikado	130	58,761.00	7,638,930.00			
Heavy mountain	3	61,929.00	185,787.00			
Light Santa Fe	75	62,277.00	4,670,775.00			
Heavy Santa Fe	40	67,543.00	2,701,720.00			
Light Mallet	15	78,339.00	1,175,085.00			
Heavy Mallet	5	92,195.00	460,975.00			
				$43,820,411.25	$30,488,037.22	$13,332,374.03
American Locomotive Co. (1919 contract):						
Light Mikado	150	$60,613.27	$9,091,990.50			
Heavy Mikado	50	63,686.90	3,184,345.00			
Light Santa Fe	20	68,918.16	1,378,363.20			
Heavy Santa Fe	5	73,395.81	366,979.05			
Light switchers	50	38,416.33	1,920,816.50			
Heavy Switchers	150	46,199.03	6,929,854.50			
Heavy Mallet	75	98,155.60	7,361,670.00			
				30,234,018.75	.....	30,234,018.75
Baldwin Locomotive Works:						
Light switchers	20	$36,029.00	$720,580.00			
Heavy switchers	75	43,966.00	3,297,450.00			
Light Pacific	33	50,867.00	1,678,611.00			
Light Mikado	183	53,619.00	9,812,277.00			
Heavy Pacific	10	53,924.00	539,240.00			
Light mountain	15	56,995.00	854,925.00			
Heavy Mikado	87	58,761.00	5,112,207.00			
Heavy Mountain	2	61,929.00	123,858.00			
Light Santa Fe	75	62,277.00	4,670,775.00			
Heavy Santa Fe	10	67,543.00	675,430.00			
Light Mallet	15	78,339.00	1,175,085.00			
Heavy Mallet	15	92,195.00	1,382,925.00			
Consolidations	30	53,619.00	1,608,570.00			
				31,651,933.60	8,000,000.00	22,651,933.00
Lima Locomotive Works:						
Light Mikado	60	$53,619.00	$3,217,140.00			
Light Mikado	100	60,486.00	6,048,600.00			
				9,265,740.00	2,112,147.16	7,152,592.84
Total	2,055	.....	.....	$114,972,103.00	$40,601,184.38	$74,370,918.62
Less units completed and delivered	640	.....	.....	33,769,997.76	33,769,997.76	
Balance uncompleted	1,415	.....	.....	81,202,105.24	6,831,186.62	74,370,918.62

CONTRACTUAL OBLIGATIONS, DEC. 31, 1918—CONTRACTS FOR 100,000 FREIGHT CARS

Name	Number	Type	Price	Amount	Total cost	Less payment on account	Balance due
American Car & Foundry Co.	9,000	S. S. box	$3,050.05	$27,450,450			
American Car & Foundry Co.	11,000	D. S. box	2,918.88	32,107,680			
American Car & Foundry Co.	5,000	C. G.	2,697.20	13,486,000			
American Car & Foundry Co.	6,000	Hopper	2,816.67	16,900,020			
					$89,944,150.00	$26,069,876.83	$63,874,273.17
The Bettendorf Co.	3,000	S. S. box	3,050.05	.....	9,150,150.00	1,622,220.42	7,527,929.58
Cambria Steel Co.	3,000	Hopper	2,816.67	.....	8,450,010.00	285,634.68	8,164,375.32
Haskell & Barker	6,000	S. S. box	3,050.05	18,300,300			
Haskell & Barker	2,000	C. G.	2,697.20	5,394,400			
					23,694,700.00	6,848,149.38	16,846,550.62
Keith Car & Manufacturing Co.	1,500	D. S. box	2,918.88	.....	4,378,320.00	1,022,653.46	3,355,666.54
Laconia Car Works	1,000	D. S. box	2,918.88	.....	2,918,880.00	853,522.96	2,083,357.04
Lenoir Car Works	2,000	D. S. box	2,918.88	.....	5,837,760.00	1,303,771.81	4,533,988.19
Liberty Car & Equipment Co.	1,000	D. S. box	2,918.88	.....	2,918,880.00	447,763.72	2,471,116.28
Magor Car Corporation	1,000	C. G.	2,697.20	.....	2,697,200.00	587,681.53	2,109,518.47
Mount Vernon Manufacturing Co.	4,000	D. S. box	2,918.88	.....	11,675,320.00	1,172,396.20	10,503,123.80
Pacific Car & Foundry Co.	2,000	D. S. box	2,918.88	.....	5,837,760.00	1,217,693.32	4,620,066.68
Pressed Steel Car Co.	6,500	C. G.	2,697.20	17,531,800			
Pressed Steel Car Co.	5,000	Hopper	2,816.67	14,083,350			
Pressed Steel Car Co.	2,500	70-ton	3,173.89	7,934,725			
					39,549,875.00	13,540,747.86	26,009,127.14
Pullman Co.	6,000	S. S. box	3,050.05	18,300,300			
Pullman Co.	2,000	Hopper	2,816.67	5,633,340			
					23,933,640.00	5,539,212.94	18,394,427.06
Ralston Car Co.	4,000	Hopper	2,816.67	.....	11,266,680.00	3,847,869.47	7,418,810.53
St. Louis Car Co.	1,000	S. S. box	3,050.05	.....	3,050,050.00	93,744.21	2,956,305.79
Standard Steel Car Co.	2,000	D. S. box	2,918.88	5,837,760			
Standard Steel Car Co.	5,000	Hopper	2,816.67	14,083,350			
Standard Steel Car Co.	5,500	C. G.	2,697.20	14,834,600			
Standard Steel Car Co.	2,500	70-ton	3,173.89	7,934,725			
					42,690,435.00	12,277,168.85	30,413,266.15
McGuire-Cummings Manufacturing Co.	500	D. S. box	2,918.88	.....	1,459,440.00	456,399.99	1,003,040.01
Total	100,000	.....	.....	.....	$289,453,450.00	$77,186,507.63	$212,266,942.37
Less equipment complete and delivered	9,524	.....	.....	.....	26,736,451.55	26,736,451.55	.....
Balance uncompleted	.....	.....	.....	.....	$262,716,998.45	$50,450,056.08	$212,266,942.37

agreed upon at a conference held last week between T. C. Powell, director of the Division of Capital Expenditures, and Howard Elliott, chairman of the railway executives committee, which had previously conferred with Director General Hines.

Mr. Powell, in his D. C. E. circular No. 20, addressed to regional directors, dated March 13, says in part:

"Will you please instruct each federal manager to afford the proper corporate officer upon application full opportunity to review projects chargeable to capital account, whether in progress or contemplated, including not only the items in the 1919 budget and on D. C. E. Forms approved since January 1, 1919, but also all uncompleted items in the carry-over from 1918.

"If the corporate officer withdraws or withholds approval of any project for financial reasons or otherwise, please proceed as follows:

1. Work not started shall not be commenced without further approval by this division.
2. As to projects already started and actually under way, please see that no further work is done, except:
   (a) When necessary to insure safety.
   (b) Where the project is so far completed that to stop work would be more expensive than to continue it
   (c) Where a job is covered by bona fide contract and stopping the work would seriously demoralize conditions, especially as to working forces.

"In all cases where the federal manager and regional director believe the work should be done, whether as to new work or as to continuing work now in progress, even though the railroad company withholds or withdraws its approval, a full report should be promptly made to the Division of Capital Expenditures (with a copy thereof to the president of the company) stating the objections or disagreements that cannot be overcome, with the definite recommendation of the federal manager and regional director; and, pending further approval by this division, no such work should be started, and, except as provided in Section 2 above, no such work in progress should be carried on."

In addition to the temporary requirements, there are others as shown by the following table which is an unofficial estimate of immediate and future needs:

1.	Rentals to railroad for 1918 unpaid	$380,000,000
2.	To pay for expenditures on inland waterways	13,000,000
3.	To finance Boston & Maine reorganization	20,000,000
4.	Equipment ordered in 1918 for delivery in 1919	286,000,000
5.	Other additions and betterments for 1918	491,000,000
		$1,190,000,000
6.	Less portion of 1919 rental to apply on No. 5	150,000,000
		$1,040,000,000
7.	To finance 1919 maturities	220,000,000
8.	Estimated deficit for 1919	240,000,000
		$1,500,000,000
	Less No. 7, which can be financed by renewals, etc.	220,000,000
		$1,280,000,000

Director General Hines has filed with the Senate Committee on Interstate Commerce to be printed in connection with the report of his testimony before the committee in February the following approximate statement of cash receipts and disbursements for the year 1918, which shows that the amounts actually paid to the railroad companies on account of their compensation during the year was $253,000,000, of which $138,000,000 was taken from the revolving fund and $115,000,000 from income from operation.

STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS FOR THE YEAR 1918

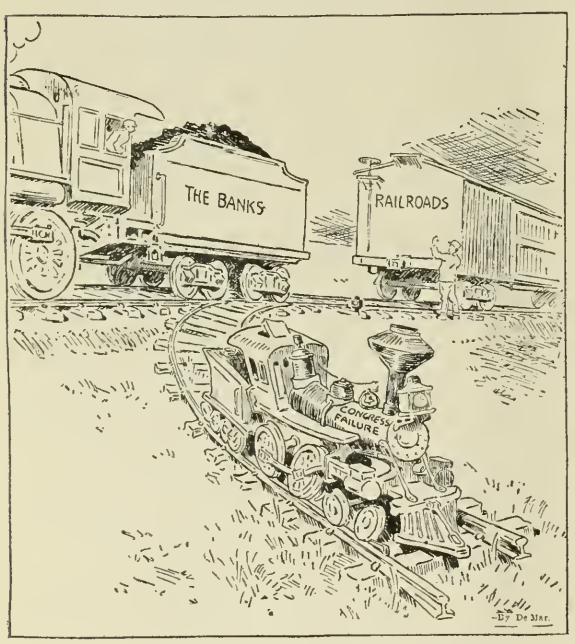
	Revolving fund	Operation	Total
Receipts—			
Original appropriation	$500,000,000	.....	$500,000,000
American Railway Express Co.	.....	$42,157,416	42,157,416
Wells, Fargo Co. Express	.....	4,759,000	4,759,000
Net operating income (note)	.....	785,397,956	785,397,956
Total	$500,000,000	$832,314,372	$1,332,314,372
Disbursements—			
Loans to railroad companies:			
Secured	$110,317,500	$34,185,460	$144,502,960
Unsecured	15,500,250	34,932,863	50,433,113
Advances on compensation	138,331,660	114,946,140	253,277,800
Payment of corporate liabilities in excess of corporate assets received or collected	.....	68,743,883	68,743,883
Additions and betterments expenditures	.....	455,817,710	455,817,710
Purchase of standardized equipment	114,514,400	.....	114,514,400
Advances to inland waterways	.....	4,361,486	4,361,486
Advanced to Federal managers	74,791,000	(74,791,000)	.....
Miscellaneous (note)	.....	(6,436,980)	(6,436,980)
Total	$453,454,810	$631,759,562	$1,085,214,372
Balance	$46,545,190	$200,554,810	$247,100,000

Note.—This statement presupposes that all the income was actually collected in cash; this is not actually the case, partly because substantial amounts of freight and passenger fares were not actually paid in cash, and in part materials and supplies have necessitated the employment of a part of the cash. The inclusion of the item of ($6,436,980) (in parentheses) is a rough way of reflecting these and other similar factors.

STATEMENT OF ACCOUNT WITH RAILROAD COMPANIES WHOSE PROPERTIES WERE IN FEDERAL CONTROL AS OF DECEMBER 31, 1918

Credit to Companies		
Compensation—standard return		$928,314,372
Less—		
Advances	$253,277,800	
Loans, excluding New Haven loan	143,461,073	
		396,738,873
Balance due on compensation		$531,575,499
Deductions		
Other items in account with the corporations which may be retained in payment of balance of compensation:		
Surplus income which can be applied to additions and betterments		$214,211,190
Balance due companies in open account which is estimated can be retained from compensation on settlement thereof		55,929,620
		$270,140,810
Less—		
Balance payable to companies on open account	$20,372,215	
Depreciation accruals payable to companies	100,000,000	
		$120,372,215
Net amount to be retained		$149,768,595
Balance payable to companies in settlement of compensation for the year 1918, and on open account, and for additions and betterments to the companies' property to the extent that compensation suffices therefor		$381,806,904

Note.—The figures with reference to open account are based on report as of September 30, 1918, the latest available; it is believed that those figures will not be materially changed December 31, 1918. All other figures shown are of December 31, 1918. The date as to amounts which can be retained from companies' income to apply on additions and betterments are, of necessity, estimated.



From the Philadelphia Record

Changing Engines

119 Roads Earned Less Than Standard Return

Comparison of Net Operating Income for Last Year With Pre-War Results Shows Striking Changes

A TOTAL OF 119 RAILROADS out of a list of 184 Class I roads under federal control earned less than the amount of their standard return during the calendar year 1918, while 65 roads earned net operating income greater than their standard return and so contributed some $80,000,000 toward making up the deficiency in meeting the standard return of the other roads, although the net result was a deficiency for all the Class I roads of $202,135,602 as compared with the standard return for those roads of $890,335,685.

The so-called "standard return" is approximately the average net operating income for the three years ending June 30, 1917, and, as certified by the Interstate Commerce Commission, is the basis for the rentals to be paid by the government for the use of the railway property. Thirty-seven of the roads had actual operating deficits for 1918, while only six of the 184 had average deficits during the three-year period. Most of the 37 are included in the 119, but two are not because their deficits were less than their average deficits for the three-year period.

In the eastern district 22 roads earned more and 52 less than their standard return; in the southern district 18 earned more and 17 earned less; in the western district 25 earned more and 50 less, while of the roads having deficits 15 were in the east, four in the south and 18 in the west.

The accompanying table, showing a comparison of the net operating income for 1918 with the standard return, has been compiled by the Bureau of Railway Economics. An examination of the figures shows some interesting facts regarding the effect on the net operating income of the changes in the character of traffic in 1918 as well as of the policy of the Railroad Administration in treating the roads as a single system and in diverting traffic to and from various lines either for the purpose of securing more direct routes or in order to confine certain lines largely to certain classes of traffic. In some instances the net operating income for 1918 greatly exceeds the standard return—frequently it is more than double; in other roads that had a large net operating income during the three-year period earned only a small percentage of the amount in 1918. The Erie is probably the most conspicuous example of the effect of a change in the character of its traffic, because whereas its standard return was $15,503,939, it had an operating deficit in 1918 of $1,079,618 or a reduction of $16,583,557. The Chicago, Milwaukee & St. Paul earned only $3,643,192, or $23,511,359 less than its standard return of $27,154,551. The Baltimore & Ohio, which had a standard return of $25,611,892, earned net operating income in 1918 of only $7,187,683, or a reduction of $18,424,209, and the Pennsylvania Railroad earned only $18,317,171, as compared with a standard return of $51,361,262, while the Pennsylvania Company earned $4,284,827 as compared with a standard return of $14,992,785. On the other hand, the Southern Railway earned for the government $29,291,870 or $10,695,890 more than its standard return, while the Union Pacific earned $35,616,554 as compared with a standard return of $23,700,009.

The discrepancy between the net operating income for 1918 and the three-year average does not necessarily mean a diversion of traffic because increases in the case of roads serving the ports are frequently attributable to the increase in exports, and an unusually large increase in expenses, which might have been caused by an unusual amount of maintenance work, would affect the comparison. In one case the increase in wages alone was twice the amount of the standard return. Therefore an analysis of the earnings and expenses in 1918 as compared with those in the test

COMPARISON OF 1918 EARNINGS WITH STANDARD RETURN—EASTERN DISTRICT

Road	Standard return	Net operating income 1918	Amount by which net operating income was greater or less than standard return
Ann Arbor	$526,883	$175,134	—$351,749
Atlantic City	222,066	1,018,479	796,413
Baltimore & Ohio Chicago Terminal	1,254,546	d 158,175	—1,412,721
Baltimore & Ohio	25,611,892	7,187,683	—18,424,209
Baltimore, Chesapeake & Atlantic	86,647	d 21,323	—107,970
Bangor & Aroostook	1,555,775	592,229	—963,546
Belt Railway of Chicago	869,442	1,581,682	712,240
Bessemer & Lake Erie	4,674,714	4,913,766	239,052
Boston & Maine	9,478,075	1,733,008	—7,745,067
Buffalo & Susquehanna R. R. Corp.	592,628	104,570	—488,058
Buffalo, Rochester & Pittsburgh	3,276,410	1,027,518	—2,248,892
Central New England	1,468,124	53,036	—1,415,088
Central R. R. of New Jersey	9,352,301	6,268,096	—3,084,205
Central Vermont	779,098	d 647,358	—1,426,456
Chicago & Eastern Illinois	2,946,001	1,539,112	—1,406,889
Chicago and Erie	225,129	d 1,189,262	—1,414,391
Chicago, Indianapolis & Louisville	1,620,259	746,739	—873,520
Chicago, Terre Haute & Southeastern	922,785	766,068	—156,717
Chicago, Indianapolis & Western	422,213	d 165,412	—587,625
Cincinnati Northern	317,628	255,971	—61,657
Cleveland, Cincinnati, Chicago & St. Louis	9,938,597	14,688,938	4,750,341
Cumberland Valley	1,228,967	1,846,859	617,892
Delaware & Hudson	7,409,600	2,446,556	—4,963,044
Delaware, Lackawanna & Western	15,749,477	16,011,656	262,179
Detroit & Mackinac	310,664	31,289	—279,375
Detroit & Toledo Shore Line	456,512	460,195	3,683
Detroit, Toledo & Ironton	210,169	d 722,551	—932,720
East St. Louis Connecting Ry.	127,220	d 385,023	—512,243
Elgin, Joliet & Eastern	2,862,177	4,717,973	1,855,796
Erie	15,503,939	d 1,079,618	—16,583,557
Fonda, Johnstown & Gloverstown	359,583	321,183	—38,400
Grand Rapids & Indiana	929,385	247,581	—681,804
Grand Trunk Lines in New England	d 4,271	d 1,088,669	—1,084,398
Grand Trunk Western	1,354,841	188,792	—1,166,049
Hocking Valley	2,637,167	2,718,733	81,566
Indiana Harbor Belt	296,054	d 1,603,434	—1,899,488
Kanawha & Michigan	1,295,141	1,651,579	356,438
Lake Erie & Western	1,548,542	379,653	—1,168,889
Lehigh & Hudson River	519,371	357,550	—161,821
Lehigh & New England	1,135,761	1,178,658	42,897
Lehigh Valley	11,321,233	6,683,313	—4,637,920
Long Island	3,221,949	3,891,092	669,143
Maine Central	2,955,697	d 595,895	—3,551,592
Maryland, Delaware & Virginia	49,543	d 76,025	—127,568
Michigan Central	8,052,127	13,606,480	5,554,353
Monongahela	583,086	648,042	64,956
Monongahela Connecting	33,620	139,827	106,207
Newburgh & South Shore	75,831	215,626	139,795
New York Central	55,802,631	48,291,878	—7,510,753
New York, Chicago & St. Louis	2,218,857	3,834,512	1,615,655
New York, New Haven & Hartford	16,867,128	7,534,334	—9,332,794
New York, Ontario & Western	2,103,589	548,583	—1,555,006
New York, Philadelphia & Norfolk	996,051	972,603	—23,448
New York, Susquehanna & Western	800,387	419,034	—381,553
Pennsylvania Company	14,992,785	4,284,827	—10,707,958
Pennsylvania Railroad	51,361,262	18,317,171	—33,044,091
Pere Marquette	3,748,196	3,814,052	65,856
Philadelphia & Reading	15,868,331	8,847,389	—7,020,942
Pittsburgh & Lake Erie	8,980,219	9,839,555	859,336
Pittsburgh & Shawmut	482,817	130,256	—352,561
Pittsburgh & West Virginia	237,010	d 328,012	—565,022
Pittsburgh, Cincin., Chicago & St. Louis	11,334,094	2,973,777	—8,360,317
Port Reading	235,698	489,964	254,266
Rutland	1,023,883	35,559	—988,324
South Buffalo	141,160	125,016	—16,144
Staten Island Rapid Transit	356,824	31,042	—325,782
Toledo & Ohio Central	1,086,651	738,970	—347,681
Toledo, St. Louis & Western	994,294	1,241,182	246,888
Ulster & Delaware	128,009	d 57,850	—185,859
Union R. R. Co. of Pennsylvania	1,370,290	1,455,665	85,375
Wabash	5,857,772	3,721,029	—2,136,743
Western Maryland	3,079,593	d 492,469	—3,572,062
West Jersey & Seashore	952,682	d 168,966	—1,121,648
Wheeling & Lake Erie	1,586,037	1,048,583	—537,454

period is required to ascertain how much of the difference from the pre-war results was affected by changes in traffic.

The Southern district was the only one in which the number of roads earning the amount of their standard return or more exceeded the number that failed to do so. The Atlantic Coast Line earned $1,445,215 more than its standard return of $10,180,915. The Chesapeake & Ohio earned $5,815,422 more than its standard return of $13,226,983, the Louisville & Nashville earned $2,057,137 more than its standard return of $17,310,495. The Richmond, Fredericksburg & Potomac and the Washington Southern, which handled an unusually large percentage of troop traffic, both earned greatly in excess of their pre-war average.

In the east more than two-thirds of the roads failed to earn the standard return, and in the west just two-thirds had a similar result. Some of the more conspicuous examples of the roads that exceeded the amount of the guarantee in the east were the Cleveland, Cincinnati, Chicago & St. Louis, the Elgin, Joliet & Eastern, the Michigan Central, and the New York, Chicago & St. Louis, while the Boston & Maine earned only $1,733,008 or $7,745,067 less than its standard return of $9,478,075; the Delaware & Hudson earned only $2,446,556 or $4,963,044 less than its standard return of $7,409,600 and the New York Central earned $7,510,755 less than its standard return of $55,802,631. In the western district the Atchison, Topeka & Sante Fe earned $3,114,578 more than its guarantee of $38,443,725, the Duluth & Iron Range and the Duluth, Missabe & Northern earned amounts greatly in excess of the standard return; while the Chicago & North Western earned only $12,441,437 as compared with $23,201,016, the Chicago, Burlington & Quincy earned $25,016,100 as compared with $33,360,683, the Chicago, Great Western earned only $21,457 as compared with $2,953,450 and the Great Northern earned $11,978,791 as compared with $28,666,681.

The total standard return for the Class I roads amounts to $890,335,685. Forty-three of the roads have executed contracts with the Railroad Administration providing for a total compensation of approximately $485,000,000. Some of these contracts include several other Class I roads. A statement recently made by Director General Hines shows that $253,277,800 was actually paid in 1918 on account of compensation, of which $138,000,000 was taken from the revolving fund and $115,000,000 from operating income. A total of $214,000,000 was deducted from the rental to apply on capital expenditures and after various other adjustments between the companies and the Railroad Administration it owed the companies on January 1, $381,806,904.

COMPARISON OF 1918 EARNINGS WITH STANDARD RETURN—WESTERN DISTRICT

Road	Standard return	Net operating income 1918	Amount by which net operating income was greater or less than standard return
Arizona Eastern	$1,242,475	$1,472,292	$229,817
Atchison, Topeka & Santa Fe	38,443,725	41,558,303	3,114,578
Beaumont, Sour Lake & Western	d 33,489	244,762	278,251
Chicago & Alton	3,178,315	1,776,749	—1,401,566
Chicago & Northwestern	23,201,016	12,441,437	—10,759,579
Chicago, Burlington & Quincy	33,360,683	25,016,100	—8,344,583
Chicago, Great Western	2,953,450	21,457	—2,931,993
Chicago Junction	916,804	133,513	—783,291
Chicago, Milwaukee & St. Paul	27,154,551	3,643,192	—23,511,359
Chicago, Peoria & St. Louis	127,540	d 529,254	—656,794
Chicago, Rock Island & Gulf	971,512	968,722	—2,790
Chicago, Rock Island & Pacific	14,912,379	8,211,683	—6,700,696
Chicago, St. Paul, Minneapolis & Omaha	4,934,790	2,624,720	—2,310,070
Colorado Southern	2,481,212	2,941,746	460,534
Denver & Rio Grande	8,319,377	5,434,321	—2,885,056
Denver & Salt Lake	353,290	d 961,458	—1,314,748
Duluth & Iron Range	2,355,242	3,803,620	1,448,378
Duluth, Missabe & Northern	5,122,051	12,465,248	7,343,197
Duluth, South Shore & Atlantic	594,637	263,948	—330,689
El Paso & Southwestern	4,145,102	4,936,392	791,290
Fort Smith & Western	82,194	186,732	104,538
Fort Worth & Denver City	1,891,386	1,745,880	—145,506
Fort Worth & Rio Grande	1,301	d 61,592	—62,893
Galveston, Harrisburg & San Antonio	3,230,645	5,347,757	2,117,112
Galveston Wharf	526,070	227,315	—298,755
Great Northern	28,666,681	11,978,791	—16,687,890
Gulf, Colorado & Santa Fe	2,828,218	2,824,146	—4,072
Houston & Texas Central	1,717,506	2,286,307	568,801
Houston, East & West Texas	375,566	404,017	28,451
International & Great Northern	1,394,946	1,372,281	—22,665
Kansas City, Mexico & Orient / Kansas City, Mexico & Orient of Texas	9,073	d 334,318 / d 361,531	—22,665 / —704,922
Kansas City Southern	3,216,698	2,782,977	—423,721
Kansas City Terminal	1,998,642	2,184,424	185,782
Los Angeles & Salt Lake	3,420,417	2,746,635	—673,782
Louisiana & Arkansas	407,987	77,637	—330,350
Louisiana Ry. & Navigation Co.	357,353	198,746	—158,607
Louisiana Western	895,178	1,823,579	928,401
Midland Valley	444,346	750,888	306,542
Mineral Range	147,432	9,740	—137,692
Minneapolis & St. Louis	2,639,857	235,782	—2,404,075
Minneapolis, St. Paul & Sault Ste. Marie	10,573,291	3,858,722	—6,714,569
Minnesota & International	202,455	d 57,885	—260,340
Missouri & North Arkansas	13,146	d 117,046	—130,192
Missouri, Kansas & Texas	5,853,831	5,213,798	—640,033
Missouri, Kansas & Texas of Texas	621,773	d 800,095	—1,421,868
Missouri, Oklahoma & Gulf	d 83,603	d 470,167	—386,564
Missouri Pacific	14,206,814	11,764,562	—2,442,252
Morgan's Louisiana & Texas Pacific R. R. & Nav.	1,188,526	2,357,330	1,168,804
New Orleans, Texas & Mexico	218,773	445,112	226,339
Northern Pacific	30,057,760	28,209,373	—1,848,387
Northwestern Pacific	1,235,101	1,498,908	263,807
Oregon Short Line	10,196,750	10,703,193	506,443
Oregon-Washington R. R. & Nav Co.	4,519,352	4,488,494	—30,858
Pan Handle & Santa Fe	1,330,664	d 8,171	—1,338,835
Peoria & Pekin Union	306,514	d 105,315	—411,829
St. Joseph & Grand Island	373,811	d 106,527	—480,338
St. Louisville, Brownsville & Mexico	983,890	1,245,345	261,455
St. Louis, Merchants Bridge Terminal	412,428	d 106,556	—518,984
St. Louis, San Francisco	13,690,213	11,199,410	—2,490,803
St. Louis, San Francisco & Texas	d 327,035	d 117,556	209,479
St. Louis Southwestern	3,355,749	3,672,695	316,946
St. Louis, Southwestern Ry. of Texas	555,165	d 343,124	—898,289
San Antonio & Aransas Pass	373,052	d 129,476	—502,528
Southern Pacific / Southern Pacific Steamship Lines	38,021,938	33,970,453 / 4,034,653	—16,832
Spokane, Portland & Seattle	1,871,083	2,679,866	808,783
Terminal R. R. Ass'n of St. Louis	2,574,511	1,856,682	—717,829
Texarkana & Fort Smith	318,730	310,033	—8,697
Texas & New Orleans	715,136	964,627	249,491
Texas & Pacific	4,107,432	3,707,266	—400,166
Toledo, Peoria & Western	159,740	d 10,955	—170,695
Trinity & Brazos Valley	d 238,905	d 387,752	—148,847
Union Pacific	23,700,009	35,616,554	11,916,545
Utah Ry.*b*	.....	589,157	.....
Vicksburg, Shreveport & Pacific	337,948	322,495	—15,453
Western Pacific	1,900,350	2,575,300	674,950
Wichita Falls & Northwestern	145,245	d 489,516	—634,761

b Road operated as a lessor company prior to December 1, 1917.
d Indicates deficit.

COMPARISON OF 1918 EARNINGS WITH STANDARD RETURN—SOUTHERN DISTRICT

Road	Standard return	Net operating income 1918	Amount by which net operating income was greater or less than standard return
Alabama & Vicksburg	$322,854	$323,995	$1,141
Alabama Great Southern	1,703,180	2,038,471	335,291
Atlanta & West Point	252,995	647,348	394,353
Atlanta, Birmingham & Atlantic	358,058	d 584,761	—942,819
Atlantic Coast Line	10,180,915	11,626,128	1,445,213
Birmingham Southern	138,815	309,612	170,797
Carolina, Clinchfield & Ohio	1,585,159	1,098,306	—486,853
Central of Georgia	3,450,903	3,905,339	454,436
Charleston & Western Carolina	466,921	548,532	81,611
Chesapeake & Ohio	13,226,983	17,042,405	3,815,422
Cincinnati, New Orleans & Texas Pacific	3,541,040	3,047,946	—493,094
Coal & Coke *a*	282,323	d 101,522	—383,845
Florida East Coast	2,842,842	1,601,838	—1,241,004
Georgia R. R. Lessee Organization	858,622	2,246,569	1,387,947
Georgia Southern & Florida	511,457	347,861	—163,596
Gulf & Ship Island	597,456	363,665	—233,791
Gulf, Mobile & Northern	558,338	191,160	—367,178
Illinois Central	16,282,374	12,907,466	—3,374,908
Louisville & Nashville	17,310,495	19,367,632	2,057,137
Louisville, Henderson & St. Louis	343,916	640,222	296,306
Mobile & Ohio	2,578,203	247,368	—2,330,835
Nashville, Chattanooga & St. Louis	3,182,089	4,119,127	937,038
New Orleans & Northeastern	1,607,931	975,440	—32,491
New Orleans Great Northern	575,952	409,221	—166,731
Norfolk & Western	20,534,163	18,256,481	—2,277,682
Norfolk Southern	1,166,991	289,942	—877,049
Richmond, Fredericksburg & Potomac	1,137,374	3,016,827	1,879,453
Seaboard Air Line	6,497,025	3,636,725	—2,860,300
Southern	18,595,980	29,291,870	10,695,890
Southern Ry. in Mississippi	d 75,843	d 40,794	35,049
Tennessee Central	162,734	d 4,745	—167,479
Virginian	3,247,603	1,848,259	—1,399,344
Washington Southern	468,433	1,721,555	1,253,122
Western Ry. of Alabama	288,238	614,106	325,868
Yazoo & Mississippi Valley	3,862,318	4,499,956	637,638

a Returns for 1918 cover nine months to September 30; road merged with Baltimore & Ohio on October 1.
d Indicates deficit.

Unification of Car Inspection and Maintenance*

Backing of Operating Officers Needed by Car Department to Perform Its Functions Effectively

By J. J. Tatum
General Supervisor of Car Repairs, United States Railroad Administration

IT HAS GENERALLY been found by railroad managements that the inspection and maintenance of car equipment is not uniform and they have frequently urged unification of inspection and repairs, deeming it to be an important factor of safety, good performance and economical operation.

Unification of inspection and repairs to equipment was found by the United States Railroad Administration to be such an important requirement of good railroad performance that it soon began to lay plans and make instructions effective that would unify inspection and repairs, as well as to standardize equipment.

For this reason Circular No. 7 was issued, June 8, 1918, by C. R. Gray, former director of the division of operation, to insure that inspection and repairs would be properly made to car equipment. Mechanical Department Circular No. 7 was issued October 17, covering repairs to refrigerator cars for the purpose of standardizing the repairs to refrigerator cars to such extent that they would be suitable for the service they are intended to perform. Mechanical Department Circular No. 8 was issued November 1, 1918, for the purpose of standardizing materials for freight car repairs in order that repairs could be made promptly and uniformly.

Knowing that certain things must be done and issuing instructions to do them does not always mean they will be done, or that the instructions issued will be complied with. Something more is required. The men in charge should be capable not only of issuing instructions but capable of knowing when instructions are being complied with. They should also be capable of issuing workable instructions and selecting men who are capable of complying with their instructions.

If this statement is true then we should have thorough, capable and efficient men at the head of car departments, who know when a car is properly inspected and how to inspect it. They should know when a car is properly repaired and how to repair it. If they are capable of doing this, they should then be capable of selecting the right men to see that this work is properly performed. They should know that the foremen they have placed in charge of their repair shops are not only capable of repairing cars and knowing that they are properly repaired but that they are also capable of seeing that the men doing the work do it properly.

When selecting a man as foreman car inspector or leading inspector, it should be known that the man selected is not only capable of inspecting a car and knowing when it is properly inspected but that he is capable of selecting men as inspectors who are able to inspect cars properly.

After these requirements are met, we may look with confidence for unified inspection and maintenance of equipment, but not until then.

Even after this is done there will still continue to be improper inspection and maintenance of equipment and a variance from the unification requirements if those in charge of these men do not respect their action. I mean by this statement that inspectors should be given all trains to inspect and they should be permitted to hold them a sufficient length of time to give each car the needed inspection and repairs, or to shop the defective car out for repairs. After a car inspector has shopped a car for defects which make it unsafe to be continued in service, no one should be permitted to cause such car to be placed back in service until the repairs for which the car was shopped have been made properly, or improper repairs corrected. One giving or assuming such authority, will by his act, become an enemy to safety and a promoter of disaster that may result in loss of life or limb and destruction of property.

It should be considered just as serious and dangerous for one to remove a shop card from a defective car and permit it to go into service without necessary repairs being made, or permit a car to go into service with a shop card on it without the repairs being made, as it would be for one to change a red signal to white before an approaching train, without knowing whether or not the block into which the train is to move is safe and clear. In my opinion, one act is just as serious and just as liable to cause disaster as the other.

Therefore, Mr. Railroad Manager, it is with you to see to it that your car inspectors are given your trains to inspect, with the time to make needed inspection and repairs. If this is not done you should be responsible for the failure of such cars and not the head of the car department or his inspector. It also lies with you to see that the car inspector's action, when shopping a car out for repairs, is given your full support, to the extent that, should anyone remove a shop card from a defective car and permit it to go into service before necessary repairs are made, or place a car in service with a shop card on it, such person should be relieved from the service for the good and safety of all concerned. If this is not done, then the motto we have established—"Safety First"—is only a mockery and you are deceiving yourself as well as the public, in your efforts to promote such a doctrine.

The protection of millions of passengers using the railroads of our country, as well as railroad employees, and the protection of billions of dollars' worth of railroad property and billions of dollars of freight hauled in cars operating over our railroads depends upon the thorough and careful inspection made to our cars. There also depends upon their careful inspection and the repairs to equipment the protection of foodstuffs needed to feed hundreds of millions of people. With this great responsibility upon the inspectors, their value cannot be discounted.

To bring about these desired conditions it is necessary that we first select for the heads of our car departments men who have been thoroughly trained and well experienced. They should see to it that inspectors selected are capable of making safe and proper inspection of car equipment. This can only be established by requiring inspectors to pass an examination that will insure that after once passing the examination they are capable of performing the work assigned to them.

They should also see that inspectors are given all trains to inspect and permitted to hold them until inspection is made. Cars once inspected and passed as being fit for service should be in such condition that, when inspected again at next inspection point, they will not be shopped out for defects that existed at the time of the previous inspection; neither should they fail while in movement due to such defects. In other words, should an inspector pass a car as being safe and fit for loading at St. Louis that car should be in condition to continue through to New York or any destination without being shopped out or breaking down in movement, due to

*Abstract of a paper read before the Central Railway Club at Buffalo, N. Y., March 14, 1919.

defects existing when the car was inspected at St. Louis. When a car repaired on shop tracks at Chicago is moved to New York for loading it should not be necessary to shop it for defects that existed when it was placed on the shop tracks, or for improper repairs made at Chicago, on or before its arrival at New York. No car should be placed for loading until first inspected and given needed repairs.

Unless we are able to obtain these desirable conditions our inspection or our repairs are not uniform, or our supervisors are not capable and efficient, or someone is removing shop cards or causing cars to leave inspection points or repair yards before they are in proper condition for service.

Unless such practices are corrected (if they exist) we cannot expect to establish the unified requirements which would result in safe and economical operation. Unified inspection and repairs will mean to our railroads less loss of life and limb of passengers and trainmen, greater car mileage, fewer accidents, less destruction of equipment and property, less repeated shopping of cars, greater car supply, less need for purchase of new equipment, decrease in cost of operation, less maintenance cost, prompt handling of business, greater satisfaction to shippers, better earnings for railroads and a more satisfactory dividend for the stockholders.

Discussion

In presenting his paper Mr. Tatum referred to the fact that of the more than two and a half million freight cars in the country about 125,000 cars are being held for repairs and more than 100,000 cars are being repaired per day. There are on 80 railroads, or about 57.6 per cent of the railroads reporting to the Railroad Administration, less than four per cent bad order cars. On February 15 there were 141,000 men employed in car repairs on 139 Class I railroads, which were holding an average of slightly over five per cent of their cars in bad order.

F. W. Brazier, superintendent rolling stock, New York Central, questioned the significance of the figures given by Mr. Tatum as to the number of cars actually in bad order condition, owing to the fact that instead of giving cars thorough repairs too many of them had only received sufficient repairs to get them temporarily back into service. He endorsed the requirements for unification outlined by Mr. Tatum, stating that the instructions are clear enough, but that little attention is paid to some of them; when business is rushing there is a great demand for equipment and only such repairs are made as will keep the cars running, instead of giving them the thorough repairs they need, when they are empty and on the repair track. M. C. B. Circular 4-A, now in effect, was quoted to show that it is not so much instructions that are needed as some way of securing their full observance. This circular alone, if carried out, would greatly improve the condition of equipment not now suitable to meet modern service conditions. In this connection Mr. Brazier stated that the New York Central on August 1, 1918, had 7,000 cars yet to be equipped with safety appliances. Since that time only eight cars have been reported as being equipped with the safety appliances on foreign lines, as compared with 370 foreign cars which have had the appliances brought up to standard on the New York Central Lines. The need of adequate force behind instructions, if they are to be carried out, was further emphasized by Mr. Brazier, who cited the case of the safety appliance standards now adopted and enforced by the Interstate Commerce Commission. The Master Car Builders' recommendations for the ladder location were complied with by about 85 per cent of the railroads, but the other 15 per cent of the roads persisted in applying their ladders in exactly the opposite location. The Interstate Commerce Commission did not formulate new standards, but it required the force behind the Safety Appliance Acts to bring about 100 per cent compliance with the standards formulated by the association.

The need of the highest type of supervision in the car department was emphasized, its importance being indicated by the fact that in 1917 the New York Central spent $8,000,000 in the maintenance of locomotives, whereas the car department's expenditures totaled $17,000,000. But labor conditions have been such during the past year that it has been difficult to keep men in the service long enough to develop good inspectors.

Commenting on Mr. Tatum's remarks as to the need of holding trains for thorough inspection, Mr. Brazier advocated that no car be placed for loading until it has passed a thorough inspection. Such inspection should apply particularly to the running gear, brake rigging and draft gear, which must be in first-class condition on all cars, while some other parts of the car need not necessarily be in perfect condition to receive certain classes of lading.

Mr. Brazier called attention to the air brake situation, which is one of the most serious conditions affecting the proper operation of freight cars. He suggested as a subject for investigation how many railroads have proper yard facilities for testing the brake equipment and making necessary repairs to it. Referring to this matter, Mr. Tatum mentioned an instance in which a railroad was endeavoring to economize in the purchase of material by reclaiming old cylinder gaskets, no new ones being purchased. An inspection was made of some of the brakes thus overhauled after the work had been completed and the brakes stenciled ready to return to service; the fact was disclosed that the brakes leaked off so fast that it was impossible for the inspector to read the gage quick enough to say whether they had applied or not. A question as to the proper life of air hose in its relation to brake conditions was raised by H. C. Woodbridge, regional supervisor of the Fuel Conservation Section of the Railroad Administration, who stated that it costs as much to stop a train as to renew an air hose. This was cited as an indication of the false economy of attempting to retain air hose in service beyond the period during which they may reasonably be expected to remain tight. It was suggested that if road foremen and enginemen would report excessive train line leakage these reports might serve as a means of keeping the car department advised as to tendencies in the condition of air brake equipment. L. D. Gillette, inspector of the Canadian Dominion Railway Commission, also referred to the question of porous hose as being a source of great danger to the safe movement of traffic,—the proper place to locate the porous hose being in the yard and not on the road. In reply, Mr. Tatum stated that he considered the safe life of an air hose to be about one year, and referred to the fact that the Master Car Builders' Association is now considering the formulation of rules covering the question of air brake maintenance.

R. S. Miller, master car builder of the New York, Chicago & St. Louis, raised the question as to what constitutes a serviceable car. Various interpretations of this expression are being adhered to in different localities, which causes difficulty under present conditions in the free movement of equipment. If a uniform interpretation were available it would materially assist in securing unified inspection. Mr. Miller also advocated the universal use of the Master Car Builders' rules for the examination of car inspectors rather than the individual sets of such rules instituted by various car department heads. In answer to the question as to what constitutes a serviceable car, Mr. Tatum stated that he considered a car serviceable when it was in condition to carry the class of freight for which it was built, but that this did not preclude the use of box cars not in serviceable condition for first-class merchandise to carry rough freight.

W. H. Sitterly, general car inspecter, Pennsylvania Railroad, emphasized the air brake situation, stating that the brakes contribute very largely to bad car conditions. The one difficulty is that time enough is not given to the car inspector to properly do his work, and it is also necessary that

adequate time be given to making the needed repairs disclosed by the inspection. Cars should not be delivered in interchange with a clean bill of health merely to get rid of them. Facilities should be available for repairing the cars. There should be only about one and a half times the day's work ahead of the car repair forces and to keep within this figure adequate facilities and enough men must be provided. Great assistance in securing proper compliance with rules relating to car repairs in interchange has been rendered by the Railroad Administration in holding the individual responsible for failure to make needed repairs or for making improper repairs, instead of the matter being, as it formerly was, a subject for adjustment between the railroad companies involved. Mr. Sitterly referred to an analysis of 787 box cars which had been made at Buffalo to ascertain their suitability to be coopered for grain. Of these cars only 55 per cent were found fit to carry grain. He stated that this situation could be improved by using cars which were not suitable to be coopered for grain for loading such commodities as fertilizer, hides, oil, etc., which leave the car in a condition unsuitable for grain service.

In referring to Mr. Brazier's discussion Mr. Tatum called attention to Circular No. 20, which specified that when a car is repaired it should be put in service to give two years' service, barring accidents. In this connection he emphasized the need for more facilities. Operating officers and managers often complain about the condition of the equipment, but they seldom offer to furnish shop facilities adequate to carry out the amount of work which must be done to keep the cars from returning frequently to the repair tracks. It is not conducive to an ideal condition of rolling stock when a shop becomes somewhat congested with bad order cars to relieve the congestion by taking off the bad order cars without performing the work required.

T. J. O'Donnell, chief joint inspector, Niagara Frontier Car Inspection Association, referring to Mr. Tatum's statement that it should not be necessary to shop a car for defects that existed prior to the time of the last shopping, said that the Buffalo gateway had at least 1,000 loaded cars every morning, loaded from 24 to 48 hours earlier, which it was necessary to condemn, as high as 150 pairs of wheels having to be changed in one day. It is the endeavor at Buffalo to get cars through the terminal in three hours, but to do this the equipment must be in first-class condition.

A. R. Ayers, superintendent motive power, New York, Chicago & St. Louis, advocated the adoption of a regular periodical program of general overhauling of cars similar to that followed in the maintenance of locomotives. He also considered it best to allow the owning roads to handle the heavy repairs and betterments to their own equipment, as they are in a position to live up to the requirements of Circular No. 8. Furthermore, they are in a position to lay out the program for betterments to a whole class of their own equipment and then carry it out on a quantity basis rather than one car at a time. Mr. Ayers emphasized the need of carrying out such betterments by referring to a study which had indicated that steel cars or cars with steel frames came on the repair track on account of the draft gear less than once a year, whereas wood underframe cars appear on the repair track for the same class of repairs about two and a half times a year. In other words, it is a physical impossibility to repair a wood underframe car so that it will run two years, on account of draft timbers.

A question was raised if the Railroad Administration had any program in view for returning cars to the owner for such work. The difficulty of carrying out this work was indicated by the situation on the Delaware, Lackawanna & Western, which had less than six per cent of its own cars on its line, where formerly the average was 60 to 65 per cent. In answer to this Mr. Tatum called attention to the fact that cars can now be sent home at the owner's discretion when the cost of making repairs exceeds $200 and that cars on connecting lines can be sent to the home road for repairs. It is the policy of the Administration, however, that repairs be made wherever the cars are located when such repairs can be made in kind.

P. J. O'Dea, chief car inspector of the Erie Railroad, inquired as to what conditions had actually been found throughout the country and what might be expected in the future in the carrying out of betterment programs for equipment not now fully able to meet modern service conditions. In replying, Mr. Tatum called attention to the fact that the war had taxed the equipment as well as the other railroad facilities far beyond what has been considered its normal capacity. At the present time preparations are being made to carry out reinforcement programs on thousands of cars. It is, however, unreasonable to expect immediate results, as little of this work can actually be carried out within less than a year. Under present conditions it takes from three to six months to get together the material, such as center sills, bolsters, truck side frames, steel ends, etc., for a single lot of 1,000 cars. At the present time some 20 roads are preparing to reinforce about 20,000 to 25,000 cars, which will eventually result in an improvement in conditions.

The Problem of the British Railways

SALIENT FACTS AS TO THE PLIGHT of the English roads are given by Frank H. Fayant, assistant to the chairman of the Association of Railway Executives, who recently returned from Europe where he made an investigation of the effect of the war on the railways of England and France.

"The English railway employees, including workers in coal mines and industries supplying materials to the roads, have, in effect, confiscated the property," said Mr. Fayant. "The whole English railway system today is potentially bankrupt. The burden of meeting the deficit in operation and paying the rental to the owners is being carried by the public treasury; that is, the increased labor cost is being met by the English people through taxation.

"When the English government took control of the railways for war purposes in 1914, guaranteeing as rental to the owners the pre-war net income, the annual receipts were $680,000,000 and the operating expenses were $430,000,000 —of which $250,000,000 was the payroll, $25,000,000 covered taxes, and $155,000,000 paid for coal and materials. This left a net income of $250,000,000 to pay interest and dividends on invested capital giving a return to the owners of less than 4 per cent.

"English railway wages before the war were very low—too low for decent living conditions. At that time the average annual wages earned per employee were less than $350, while in this country our average was then more than $800. The rapid rise in the cost of living and in wages paid munition workers created great unrest among the English railway men. The government attempted to deal with the problem by giving 'war bonuses' based on the rise in the cost of living. The workers gladly accepted the money but they objected to the way it was tagged. They wanted wages that would continue after the war and not bonuses. The government accordingly dropped the word.

"Instead of giving the larger increases to the less well paid men and smaller increases to the better paid as our Railroad Administration has been doing, the English government gave identical increases to all employees. Beginning in October, 1914, and running to November, 1918, there were eight successive wage increases varying from 3 shillings to 6 shillings a week, and totaling 33 shillings, or $7.90. These increases in the weekly wage added $275,000,000 to the payroll. Then at the end of the war, when Lloyd George appealed to the country for a vote of confidence, the

railway unions made a renewed demand for an eight-hour day. Lloyd George granted the demand, and this added $125,000,000 more to the payroll, making the total increase in wages $400,000,000 or 160 per cent.

"This brought the payroll up to $650,000,000, as compared with total railway revenue before the war of $680,000,000. There was also, as in this country, a very large increase in the cost of coal, steel and other materials, which added $140,000,000 more to the operating expenses. The greater part of this item, of course, is made up of increases in wages to coal miners and steel workers. The increase in the cost of materials added to the increase in wages brings the operating expenses of the English roads up to $970,000,000 a year; including the rental, or the interest on the investment, the total cost of producing transportation is now $1,220,000,000 a year as compared with $680,000,000 before the war—an increase of about 80 per cent. There has been no increase in freight rates in England to meet the great increase in the cost of operation. Passenger fares were raised 50 per cent early in the war, more for the purpose of reducing travel than for producing revenue. The increase in passenger rates, together with the increase in freight traffic, has probably added $100,000,000 to the revenues, bringing them up to $780,000,000.

"The gross receipts of the English roads therefore are $190,000,000 less than the operating expenses and $440,000,000 less than the total cost of producing transportation—the return on capital included. It is this $440,000,000, amounting to about one and one-quarter million dollars a day, that Sir Eric Geddes referred to in Parliament in his speech on Monday, when he showed that the war control had virtually bankrupted the roads. Included in this deficit met by the Treasury is, of course, the value to the government of carrying government traffic, which, before the end of the war, was estimated at $150,000,000 a year. This item is now much less.

"The English government must continue under the war control act to operate the roads for two years more, and pay the rental to the owners. If returned to the private companies on their present basis of rates and costs, they could earn neither dividends nor interest, and most of them could not even earn their operating expenses. A freight rate increase of 100 per cent would be necessary to enable the companies to survive, and the feeling in England is that with rates already high, no government would have the courage to grant such a large increase to the private companies. For this reason it is believed that nationalization of the English roads will be the only way out of the muddle, and the general public, through taxation, will then make up the revenues unprovided by shippers and passengers.

"Fortunately, the American railways are in no such plight as the English roads. While England, at the beginning of the war, had high freight rates and low wages, we were fortunate in having low freight rates and high wages. In this country we were not obliged to make such an enormous percentage in wages, although our labor cost has risen greatly and we could raise freight rates. . . . Since 1915 the annual average earnings of American railway workers have been advanced from $800 to $1,400; in England they have risen from $350 to $900."

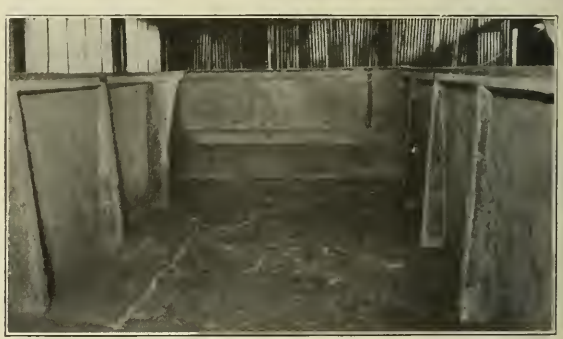
Gondola Car of Reinforced Concrete Construction

Design Incorporating Steel Center Sills With Concrete Floor, Sides and Ends—New Aggregate Used

An innovation in railway equipment is a reinforced concrete car of the gondola type, invented and designed by Joseph B. Strauss, C. E., president of the Strauss Bascule Bridge Co., and recently built by the R. F. Conway Company, Chicago. The plans for the car were drawn up several years ago and patents were secured covering the important features of the design. The actual construction was started during the war when it was thought that, due to the shortage of steel, it might be possible to relieve the car shortage materially by developing concrete construction.

The fundamental feature of the design is a steel skeleton body mounted upon the standard center sills and bolsters of the U. S. R. A. 40-ft., 50-ton gondola car. Concrete walls and floors are contained within the skeleton steel frame and together with the reinforcement in the floor are connected to the underframe in such a manner that the buffing and pulling stresses are distributed throughout the car body. The car was designed for a capacity of 100,000 lb. plus the usual 10 per cent overload. The end load was assumed at 200,000 lb. with an allowance of 25 per cent for impact, equivalent to an end load of 250,000 lb. The unit stresses in the steel were limited to 16,000 lb. per sq. in., and in the concrete to 1,000 lb. per sq. in. The gondola type was chosen for this experimental concrete car because equipment of this type is subjected to the severest handling. Dumping devices were omitted merely to simplify the construction, but this feature can be incorporated in the car without any difficulty of design or construction.

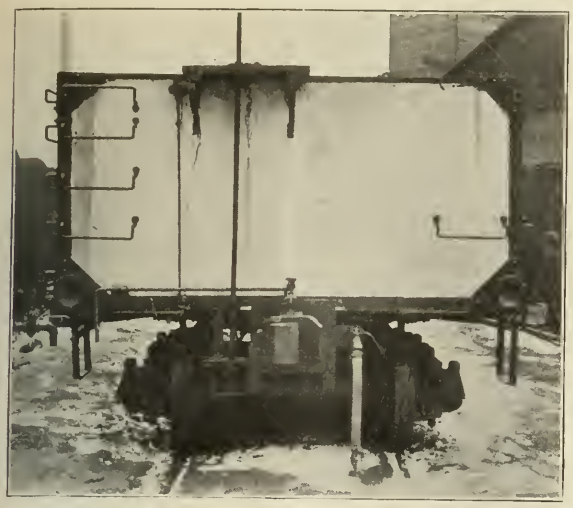
The car has an over-all length of 41 ft. 6½ in., and over-all width of 10 ft. 2⅞ in., with sides 4 ft. 10½ in. high. The steel members of the underframe consist only of the center sill, which is of two 12-in. 35-lb. ship channels, with a ¼ in. by 20½ in. cover plate, and the body bolsters and diagonal corner braces, which conform to the U. S. R. A. standard design. There are six reinforced concrete cross



Interior of the Car Body

bearers in the car spaced approximately 4 ft. 6½ in. apart. The size of the section varies from 4 in. by 12 in. at the sides to 4 in. by 1 ft. 4⅛ in. at the center sill. The floor is 2⅛ in. thick, reinforced with longitudinal and transverse rods ¼ in. in diameter. Along the outer edge of the floor is a 3½ in. by 3½ in. angle and at the top of the sides there is a 4-in. channel.

This steel frame serves as the tension members of the truss and also furnishes a means of attachment for the reinforcing, the side reinforcing rods extending through holes drilled in the angles and channels. The sides are 1¾ in. thick and are strengthened at the bolsters and at the cross bearers by



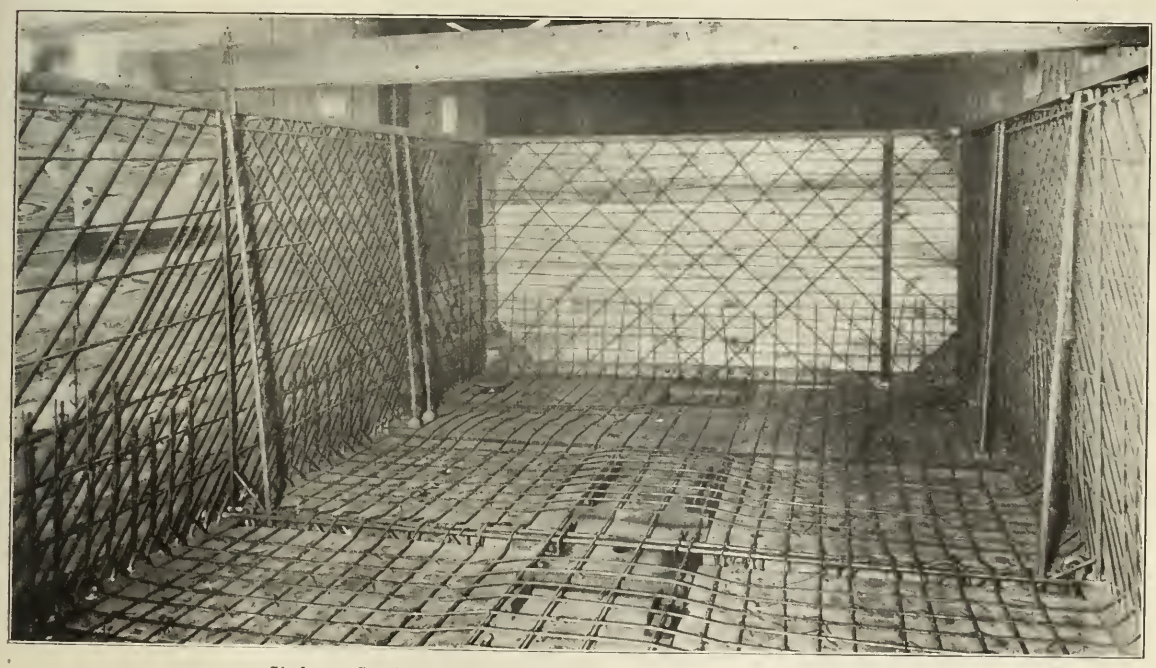
Brake Staff End of the Reinforced Concrete Car

reinforced concrete posts. Across the end of the car there is a reinforcing rib 6 in. by 1¼ in. located 1 ft. 11¾ in. from the floor. There is also a diagonal rib extending up to the end from the lower end of the body bolster.

The concrete work on this car represents the first commercial application of a new light weight aggregate known as Haydite. This material produces a concrete having a weight of 104 lb. per cu. ft., and a compressive strength of 4,450 lb. per sq. in. in 28-day tests. It is the result of a manufacturing process developed by Stephen J. Hayde, of Kansas City, Mo. The concrete sections in this car are thinner than have ever before been attempted in similar work and for that reason it was decided to use the cement gun for the walls and floors. The cross bearers, however, were poured in the usual manner. The forms were placed on the outside of the car and the skeleton frame and reinforcing were put in position as shown in the illustration. The concrete was then shot on from the interior. The resulting concrete was exceedingly dense and the finish remarkably smooth on the surface which was against the form. The interior surfaces were left practically as produced by the cement gun.

The use of the cement gun increased the specific gravity of the concrete above that computed. This fact, together with the necessity for using heavier steel sections than required in some cases brought the total weight of the car up to 53,600 lb., or 3,600 lb. more than the computed weight. It is evident, however, that with proper facilities for construction another car of this size and design can be made to weigh between 46,000 and 48,000 lb. The conditions under which the first car was built did not permit of certain refinement of design and details of construction, but the plans as now developed for commercial production of such cars have been so advanced in these refinements that future cars will represent a reduction in weight, simplification of manufacture and lower cost.

This car was built with the sanction and co-operation of the United States Railroad Administration, and it was inspected during construction by J. J. Tatum, supervisor of car repairs. It was turned over to the Illinois Central Railroad on March 17, to be used on that line 30 days, after which it will be delivered to the United States Railroad Administration for such service as it may be desired to place it in. Meantime the further development of the concrete car will be handled by the Concrete Car Company of America, Chicago, which has plans completed for the various classes of cars with a view to manufacturing concrete cars on a commercial scale.



Skeleton Steel Frame and Reinforcing in Position in the Forms

Doings of the United States Railroad Administration

Director General Will Issue His Own Statements of Earnings and Expenses With Explanation of Changes

WASHINGTON, D. C.

THE ESPECIAL INTEREST which has recently been displayed in the monthly statistics of railway revenues and expenses has led to a sort of three-cornered competition in statistics between the Railroad Administration, the Interstate Commerce Commission and the unofficial estimators. The commission gives out its monthly statement usually about six weeks after the close of the month. The commission has no press agent and its statement is in the form of a large table containing too many details for newspaper publication and without any interpretation. As a result, the idea which the public gets from these figures varies widely with the newspapers which the public reads the next morning. As it is always possible to get a pretty accurate estimate before the returns of all the roads are in, the newspaper reader may have received his impression from a preliminary estimate and not see the complete returns at all.

In an effort to improve this situation, the Railroad Administration recently decided to give out its own statement of earnings and expenses with some explanation thereof, and for the month of December we had two sets of statistics. As these reached the newspapers on different days the result was merely an addition to the confusion. For the month of January the commission gave out its figures at four o'clock in the afternoon of March 13, showing a net operating income of $18,783,702, after preliminary estimates of approximately $19,000,000 had been widely published. The Railroad Administration thereupon got out its own figures about eight o'clock in the evening and included with them the Interstate Commerce Commission statistics, so that the reading public or the newspaper man who edited the statements might take their choice.

The commission's figures cover 181 Class I roads (those having annual operating revenues above one million dollars), and 17 large switching and terminal companies. This includes a number of Class I roads and switching and terminal companies which are not under federal control. Ten of the Class I roads were relinquished. On the other hand, the statement does not include a large number of Class II and Class III roads and small switching and terminal companies which are under federal control. The Railroad Administration's statement, compiled by the Operating Statistics Section, covers the Class I railroads under federal control and excludes switching and terminal companies, representing a mileage of 230,262, as compared with 233,055 miles covered by the commission's statistics. The Interstate Commerce Commission figures, which are published herewith because they give the subdivisions of revenues and expenses not included in the Railroad Administration's statement, show a net operating income comparable to the standard return guaranteed by the government of $18,783,702, as compared with a deficit of $4,097,117 for the same roads in January, 1918. The term "standard return" does not apply to the roads included in this statement which are not under federal control, but the commission appends a note saying that the average railway operating income for the month of January in the three years 1915, 1916 and 1917 included in the test period of three years ended June 30, 1917, was $254 per mile of line for the United States. Multiplying this by the operated mileage gives an item roughly corresponding to the standard return for the month of about $60,000,000. The net operating income of the Class I railroads under federal control, representing approximately 95 per cent of the net revenues of all properties in federal operation, was $19,350,354, as compared with a deficit of $3,570,299 for the same roads in January, 1918. The standard return applicable to January was $55,331,013, so that the government's deficit as compared with its guarantee to the railways was approximately $36,000,000. The standard return for January is less than one-twelfth of the standard return for the year because traffic is usually lighter in January than in several of the other months, and expenses during the winter are likely to be higher than in some of the other months. The standard return for the Class I railroads for a year is $890,000,000. For the Class I roads and large terminal companies, or approximately the list of roads covered by the Interstate Commerce Commission statistics, it is $904,000,000. For all the roads under federal control it is $928,000,000. The Railroad Administration's compilation for the Class I roads under federal control is as follows:

	January, 1919	January, 1918	Increase or Decrease Amount	Increase or Decrease Per cent
Operating revenues....	$390,745,675	$280,919,510	$109,825,565	39.1
Operating expenses....	354,305,915	266,102,459	88,203,456	33.1
Net operating revenue.	36,439,160	14,817,051	21,622,109	145.9
Taxes, rents, etc.....	17,088,806	18,387,350	(d) 1,298,544	(d) 7.1
Net federal income comparable to standard return guaranteed by Government	19,350,354	(d) 3,570,299	22,920,653	....
Standard return applicable to January.....	55,331,013	55,331,013	.....	....
Operating ratio	90.7	94.7	(d) 4.0	(d) 4.2

(d) Decrease.

The commission's statement includes the following:

Item	Amount 1919	Amount 1918	Per mile of road operated 1919	Per mile of road operated 1918
1. Average number miles operated	233,054.74	233,482.93	.....	.....
Revenues:				
2. Freight	$277,914,392	$188,753,476	$1,192	$808
3. Passenger	86,851,823	66,493,870	373	285
4. Mail	4,346,037	4,574,891	19	20
5. Express	6,334,779	8,797,331	27	38
6. All other transportation....	9,452,933	7,606,611	41	32
7. Incidental	11,468,937	8,867,084	49	38
8. Joint facility—Cr.....	580,867	389,849	3	2
9. Joint facility—Dr.....	163,232	123,769	1	1
10. Railway operating revenues.	396,786,536	285,359,343	1,703	1,222
Expenses:				
11. Maintenance of way and structures	58,274,720	40,882,750	250	175
12. Maintenance of equipment.	99,546,390	67,221,222	427	288
13. Traffic	3,492,403	4,917,663	15	21
14. Transportation	185,720,069	147,476,406	797	632
15. Miscellaneous operations ...	3,607,543	2,980,890	16	13
16. General	10,225,466	8,464,949	44	36
17. Transpn. for investment—Cr.	400,776	422,288	2	2
18. Railway operating expenses.	360,465,815	271,521,592	1,547	1,163
19. Net rev. from ry. operations	36,320,721	13,837,751	156	59
20. Railway tax accruals (excluding "war taxes").....	15,325,889	14,784,037	66	63
21. Uncollectible ry. revenues..	58,056	42,815	.....	.....
22. Railway operating income..	20,936,776	*989,101	90	*4
23. Equipment rents	*824,613	*1,946,604	*3	*8
24. Joint facility rents (Dr. Bal.)	1,328,461	1,161,412	6	5
25. Net of items 22, 23 and 24.	18,783,702	*4,097,117	81	*17
26. Ratio of operating expenses to operating revenues...%	90.85	95.15	.....	.....

*Debit item.

The Railroad Administration's statement says that in comparing the results for January, 1919 and 1918, it should be borne in mind that the 1918 results were very adversely affected by the extreme weather conditions and the serious traffic congestion which obtained at that time; also that neither the increases in freight and passenger rates nor the increases in wages made effective during 1918 are included

in the January, 1918, figures, while both of these factors are present in the January, 1919, figures. Furthermore, the expenses for January this year included approximately $1,500,000 back pay applicable to prior months.

The Railroad Administration's statement also gives a summary of the monthly reports of freight traffic movement and car performance compiled by the Operating Statistics Section for the month of January, showing an increase in the net ton miles of revenue and non-revenue freight of 10 per cent. The detailed statistics were published in the *Railway Age* of March 7. The statement notes that on account of better weather conditions and the relief in traffic congestion it was possible to handle 10 per cent more ton miles with no increase in train miles. There was an increase in the average train load of 58 tons, or 10.2 per cent. There was a slight decrease in carloading from 29.4 tons to 29 tons, which is attributed to the fact that there was a decrease in the percentage of the heaving loading coal tonnage to the total tonnage handled. The decrease in the percentage of loaded to total car miles of 5.4 per cent is ascribed to the freer movement of returning empties this year on account of better weather and traffic conditions.

Railroad Administration and Department of Commerce Disagree on Rates

Contending that the Railroad Administration is operating a public service and is not organized for profit, Secretary Redfield of the Department of Commerce has filed a brief with the Interstate Commerce Commission intervening in behalf of the Solvay Process Company in a complaint against an increase in rates on limestone from Jamestown, N.Y., to Solvay on the Delaware, Lackawanna & Western. The brief, which establishes a precedent of one government department intervening on behalf of a private litigant against another government department, attacks the increased rate on the ground that it is excessive for the railroad and for the shipper, although authorized by the Railroad Administration because of the general need for greater revenues. On May 16, 1918, the 15 cent rate per gross ton was increased to 17 cents. On June 25, 1918, at the time of the general increase in rates, it was further increased to 40 cents, and on September 16 it was reduced to 30 cents per net ton. Secretary Redfield declares in the brief that the 15 cent rate per gross ton was profitable to the railroad, which, he says, has long been one of the most profitable in the United States, and that no complaint appears from either party to the transaction to the effect that the rates were not just and reasonable, and that the only possible reason for more than doubling the rate and the reason definitely stated to the Department of Commerce by the Railroad Administration was the need for greater revenue on the part of the railroads of the country as a whole. It is urged that the action of the administration in doubling a rate "which, in my belief, the testimony shows to be profitable, is an oppressive act, injurious not only to the parties directly concerned, but to the commerce of the country through its normal reactions; that it cannot be justified by the need of general revenues for the entire federal railroad system, and that it should be revoked and a rate substantially the same as the original rate should be established."

The secretary declares that it is the department's duty to foster transportation facilities as well as commerce, and that it is clearly its normal duty to take such steps as are within its power to insure that transportation is not encumbered with unjust and unreasonable restrictions and is facilitated as much as possible. The brief declares that the secretary appears for the whole people of the United States, and he says:

"It cannot be argued that it is the obligation of the Railroad Administration to operate at a profit. It has the support of public funds and has, as have other public services, the basis of the taxing power on which to rest. It has, as a matter of fact, received a large sum from the public treasury. Its relation, therefore, to the commerce of the country is that of a servant of that commerce, and in so far as for the purpose of revenue it may take steps injurious to the commerce of the country it departs from its essential duty and it becomes the obligation of that branch of the government which is charged with the fostering and promotion of commerce to point out the facts and ask for their correction. It may not be justly pleaded on behalf of the Railroad Administration in the present cause that a sufficient reason for the act complained of is the need for revenue. The essential purpose of the Railroad Administration as a public service is not to get revenue, but to serve the commerce of the country."

Railroad Administration officers believe that Secretary Redfield has failed to read the provisions in section 10 of the federal control act, which authorizes the President to initiate rates, that in determining any question concerning rates initiated by the President the Interstate Commerce Commission "shall give due consideration to the fact that the transportation systems are being operated under a unified and co-ordinated national control and not in competition," and "that when the President shall find and certify to the Interstate Commerce Commission that in order to defray the expenses of federal control and operation fairly chargeable to railway operating expenses, and also to pay railway tax accruals other than war taxes, net rents for joint facilities and equipment, and compensation to the carriers, operating as a unit, it is necessary to increase the railway operating revenues, the Interstate Commerce Commission in determining the justness and reasonableness of any rate, fare, charge, classification, regulation, or practice shall take into consideration said finding and certificate by the President, together with such recommendations as he may make."

Statement to Clerks Threatening Strike

Director General Hines issued a statement on March 13 regarding the threatened strike of clerks in the Southeast, saying in part:

"I regret to learn that efforts are being made to prevail on various railroad employees in the Southeast to quit the service of the government and thereby hamper the operation of the railroads because of a dispute which has arisen between certain clerks and their superior officers. I call attention of the employees to the fact that adequate machinery has been provided by the United States government through the Railroad Administration to deal with all cases of disputes and grievances and that employees ought to submit their grievances in accordance with this machinery and not otherwise.

"The trouble arose through certain local organizations of clerks on the Nashville, Chattanooga & St. Louis demanding the immediate discharge of the federal auditor of that railroad. These clerks did not resort to Board of Adjustment No. 3 in Washington, which consists of four representatives of the employees and four representatives of the management, and which has been created to deal with all such grievances. They refused to resort to this machinery notwithstanding the fact that the Brotherhood of Railway Clerks of which they are members agreed to submit all grievances to that board and has a representative on that board.

"It is indispensable that these problems shall be handled in an orderly way. It is of the highest importance to the employees themselves that this orderly procedure shall be adopted in all cases and that they shall exercise the patience and self-restraint necessary to permit of the carrying out of these orderly practices. If this is not done the effort which the United States Railroad Administration has made to recognize and promote the just interests of labor will be rendered unsuccessful and the employees who are responsible for interfering with these orderly processes will put themselves in a

position before the public which will react injuriously upon the employees and their future interests.

"I believe that any employee who will think over this matter will agree that during the last 10 months more progress has been made toward improving the wages and working conditions of railroad employees as a whole than was ever made before. This has been practicable because the railroads have been under a unified management, which has had as one of its leading purposes the recognition of the just interests of the employees and the provision of reasonable wages and conditions for them. Necessarily, conclusions must be reached in cases of dispute by the machinery thus provided. While in specific cases there may be some delay in dealing with such matters the delay is far less than would have been involved under former conditions. In fact, in the past labor movements have in many cases taken from one to two years, have involved enormous costs to the labor organizations, and even then have frequently produced exceedingly small benefits. Whatever delay is incident to the method of the central administration is relatively small compared with the delays which would have been experienced under other conditions. No business can be successfully conducted without the exercise of proper authority and discipline. This is true particularly of the railroad business. Ample machinery has been created by the central administration to correct instances of abuse of authority or the exercise of disciplinary measures in an unfair way. It is indispensable that these orderly methods of settling these questions shall be followed pending disposition of these matters in the reasonable ways which have been carefully worked out. There must be a recognition of authority and a submission to discipline. Otherwise the railroad business would become chaotic and the public, which in the last analysis has to pay the bill, would resent the resulting excessive costs and inefficient service and the reaction would be exceedingly unfavorable to the employees themselves."

Passenger Traffic Statistics

The Operating Statistics Section has also compiled its monthly statement showing the number of passengers carried one mile for the month of December and the calendar year 1918. The passenger mileage for December shows a decrease of 4 per cent. For the year there was an increase of 3,125,000,000 passenger miles or 7.9 per cent. The figures by regions and districts are as shown in the double-column table.

PASSENGERS CARRIED ONE MILE

Railroad	Average miles operated	Month of December, 1918	Month of December, 1917	Increase or decrease	Per cent	Twelve months ended December 31, 1918	Twelve months ended December 31, 1917	Increase or decrease	Per cent
Total, New England District	8,143	289,164,888	299,520,945	d 10,356,057	d 3.5	3,383,880,976	3,453,028,601	d 69,147,625	d 2.0
Total, Central District	21,928	491,657,970	491,035,144	622,826	0.1	5,780,421,930	5,771,951,663	8,470,267	0.1
Total, Ohio-Indiana District	7,767	90,687,405	99,456,807	d 8,769,402	d 8.8	1,064,725,085	1,061,986,025	2,739,060	0.3
Total, Eastern Region	37,838	871,510,263	890,012,896	d 18,502,633	d 2.1	10,229,027,991	10,286,966,289	d 57,938,298	d 0.6
Total, Allegheny Region	19,593	745,932,726	702,396,451	43,536,275	6.2	9,112,978,679	7,979,091,979	1,133,886,700	14.2
Total, Pocahontas Region	4,776	82,740,530	74,010,541	8,729,989	11.8	892,376,054	691,272,153	201,103,901	29.1
Total, Southern Region	37,308	605,074,525	594,172,894	10,901,631	1.8	6,471,033,501	5,073,165,885	1,397,867,616	27.6
Total, North Western Region	46,353	363,141,850	421,650,311	d 58,508,461	d 13.9	4,560,600,656	4,771,663,459	d 211,062,803	d 4.4
Total, Central Western Region	51,170	606,363,669	706,531,284	d 100,167,615	d 14.2	7,558,445,439	7,296,193,588	262,251,851	3.6
Total, South Western Region	31,683	327,796,287	364,023,394	d 36,227,107	d 10.0	3,781,440,028	3,381,843,921	399,596,107	11.8
Grand total, all regions	228,721	3,602,559,850	3,752,797,771	d 150,237,921	d 4.0	42,605,902,348	39,480,197,274	3,125,705,074	7.9

d Decrease.

Wage Increase for Railroad Police

The director general has approved the recommendation of the Board of Railroad Wages and Working Conditions pertaining to patrolmen and others of the police department, effective as of January 1. A variety of police organizations on the railroads under federal control having been in effect, the first problem confronting the administration was to work out a uniform organization in order that adjustments in pay might be arrived at for corresponding positions; and also in order that the employees in this department might have their pay adjusted to conform with the rates of pay in other departments.

The order provides a minimum hourly rate of 45 cents per hour and a maximum of 55 cents per hour for patrolmen who are assigned to a restricted territory, with a minimum of eight hours per day and overtime at the pro rata rate for the ninth and tenth hours and time and one-half thereafter. These men formerly received monthly wages ranging from $60 to $110. Under the new rate these men receive pay ranging from $85 to $112 a month on an eight-hour day basis. Proportionate increases, but on a monthly basis, are provided for lieutenants and for sergeants whose duties require traveling and whose hours cannot be regulated. The regional directors will have authority to apply the monthly wages according to the responsibility of the individual positions.

The order will apply to approximately 7,000 patrolmen and 1,000 lieutenants and sergeants.

Signalmen Ask Wage Increase

A request for further increases in wages and improved working conditions was submitted to Director General Hines on March 14 by representatives of the Brotherhood of Railroad Signalmen, claiming to represent 15,000 employees, after a convention held in Washington attended by about 100 delegates.

Contracts Signed

The Railroad Administration has signed a compensation contract with the Central of Georgia providing for an annual rental of $3,444,158.

Contracts have also been executed this week with the Louisville & Nashville providing for a compensation of $17,310,494, the Pennsylvania Lines West for $15,154,719, the Louisville, Henderson & St. Louis for $343,915, the Salina Northern for $15,000 and also co-operative short line contracts with the South Manchester and the Greene County.

Purchasing Division to Be Reorganized

Following the resignation of John Skelton Williams as director of the Division of Finance and Purchases and the creation of two new divisions, the purchasing organization of the Railroad Administration is being reorganized. An advisory committee on purchases will be created with Mr. Williams as chairman and R. S. Lovett, president of the Union Pacific, and Henry Walters, chairman of the Atlantic Coast Line, as the other members.

Campaign Against Car Thefts

The activity of the Railroad Administration in its campaign against car thefts is indicated in a report showing that in the 10 months ended February 1 a total of 14,114 arrests for car thefts were made by the railroad secret service. Of these, 5,475 were of railroad employees. There were 9,891 convictions and $838,000 of the $1,120,000 worth of stolen property was recovered.

General News Department

The Fourteenth Engineers, a railroad regiment composed of men from the Boston & Maine, the Boston & Albany, and the New York, New Haven & Hartford, is expected to reach home from France about April 1.

The American Train Despatchers' Association, D. L. Darling, secretary-treasurer, Northern Pacific Railway, Spokane, Wash., will hold its annual convention at the Hotel La Salle, Chicago, June 17, 18, 19 and 20.

Thirteen new passenger trains appear on the timetables of the Cleveland, Cincinnati, Chicago & St. Louis, which are to be put into effect on April 6. It is said that these trains will increase the annual train mileage by 412,224 miles.

As a token of respect to the memory of Edward F. Kearney, late president of the Wabash, all trains on that road were stopped for five minutes at 2 p. m., on March 13, at which hour his funeral was held at New Orleans, La.

By a fire at the Inman yard of the Southern Railway, near Atlanta, Ga., on the night of March 16, eighty loaded cars, twenty empty cars, the freight transfer shed, and other property were destroyed; estimated loss, $1,500,000.

The car repair shops of the Delaware & Hudson at Carbondale, Pa.—two buildings known as No. 18 and No. 20—were destroyed by fire on March 15. About 200 men are out of work temporarily. These buildings were of brick, 400 ft. long and 40 ft. wide.

Three hundred workmen, engaged in laying a second track for the Cleveland, Cincinnati, Chicago & St. Louis, near Winchester, Ind., were dismissed by the contractors on March 13, for the reason, it is said, that the Railroad Administration has held up the appropriation for the work.

Better looking uniforms will be required of the passenger trainmen on the Pittsburgh Division of the Pennsylvania Railroad this season; in other words, according to a notice which has been issued by the trainmaster, inferior grades of cloth, which were tolerated last year, will not be acceptable this year.

The State Tax Commission of Minnesota reports that railroads operating in the state, paying under the state law a tax of 5 per cent on gross earnings, in lieu of other taxes, earned in 1918 a total of $150,548,762 and are assessed a tax of $7,527,438, as compared with $124,505,394 earnings and a tax of $6,225,270 in 1917.

Excessive demurrage charges is the subject of a letter which has been sent to the Division of Public Service, Washington, by the National Bureau of Wholesale Lumber Distributors, C. W. Campbell, secretary, Washington, D. C., recommending the abolishment of the present demurrage charges, as promptly as possible, and "a reduction of the rates to the normal pre-war condition." The lumbermen believe that 75 per cent of the delays to cars are chargeable to inefficiency on the part of the railroads, or to embargoes, congested terminals, etc. They say that when cars of lumber are delayed the consignee frequently has to supply his needs in some other market, and then has to refuse the car; and the wholesale distributor has to dispose of it at a great disadvantage. These protestants submitted to the high rates during war wholly from the motive of patriotism; and they feel sure that now all other lumber interests will join them in the present requests.

Thomas F. Blewitt, division superintendent of the Brooklyn Rapid Transit Company, Brooklyn, N. Y., tried in the Supreme Court of the State on a charge of manslaughter in connection with the derailment on that road in Brooklyn, on November 1, last, when 92 passengers were killed, was acquitted on March 18, the jury having deliberated about three hours. The court (Justice Seeger), in charging the jury, said that Blewitt was charged with the responsibility of securing competent motormen by lawful means, but that a mere violation of the company's rules in this respect was not to be interpreted as a violation of statute. If the jury found that the passenger upon whose death the indictment was based, was killed because of Blewitt's failure to exercise the utmost care, so far as foresight could go, Blewitt should be found guilty. Blewitt was responsible for knowing whether Luciano (the motorman who ran at excessive speed, causing the derailment at a sharp curve) was competent, but could not be held responsible if Luciano, though generally competent, had been careless on this occasion. Evidence adduced by the prosecution to show that other motormen put on as strikebreakers were incompetent or inexperienced could not be taken into account in judging Luciano's competence.

Folkestone to Paris in 74 Minutes

According to a press despatch of March 18, Major General John E. B. Seely, of the British War Office, on March 16, flying with a favorable wind, made an airplane trip from Folkestone, England, to Paris, France, 172 miles, in one hour, fourteen minutes.

State R. R. Commissions

Following a conference of the railroad commissioners of Washington, Oregon, and Idaho, the Public Service Commission of the State of Washington has decided to bring suit at once against the Railroad Administration to test the legality of the administration's control of purely intra-state freight rates. W. D. Tanner, attorney general of the State of Washington has resigned from his office to take charge of this litigation.

Railroad Clocks to Be Set Ahead March 30

Director General Hines has issued General Order No. 61, similar to that which was issued last year, ordering all railroad clocks to be set ahead one hour at 2 a. m. on Sunday, March 30, in accordance with the Daylight Saving Law. The instructions for making the change are so worded as to provide a standing rule for both Spring and Autumn as long as federal control continues.

Employment for Soldiers

For the purpose of meeting the emergency caused by the radical curtailment of the machinery of the United States Employment Service because of lack of funds, the Council of National Defense has announced the formation of an Emergency Committee on Employment for Soldiers and Sailors, including representatives of the various government departments. The chairman of the committee is Col. Arthur Woods, and the secretary will be E. H. Greenwood, who has been associated with the Department of Labor in its employment work. A representative of the Railroad Administration probably will be added to the committee.

Safety Rally at Detroit

Officers and employees of the Pere Marquette, the Grand Trunk, the Wabash and the Detroit & Toledo Shore Line had a safety rally at the Detroit (Mich.) Board of Commerce on February 25. The meeting was attended by about 1,750 railroad men and members of their families. There were three or more delegates from each of the 25 safety committees on the associated lines. S. M. Nowell, superintendent of the Wabash-Pere Marquette Joint Terminals, presided. Addresses were made by F. H. Alfred, federal manager, A. F.

Duffy, manager of the Safety Section of the Railroad Administration, R. S. Jarnagin, regional supervisor of safety, and other officers and employees of the above-named lines.

General Foremen's Association

The annual convention of the International Railway General Foremen's Association will be held at the Hotel Sherman, Chicago, September 2, 3, 4 and 5. The topics to be discussed are as follows:

1. Welding of locomotive cylinders and other autogenous welding
2. Safety-first in shop and enginehouse service.
3. Draft gears.

The association has received permission from the Railroad Administration to hold this convention and a large attendance is to be desired from both the locomotive and the car departments.

Space for June Convention Exhibit Well Taken

The Railway Supply Manufacturers' Association announces that at the assignment of space in Pittsburgh, February 14, there was sold and assigned over 80,000 square feet. The available space is a trifle less than 89,000 square feet, leaving less than 10 per cent for such exhibitors as will come in. This available space includes all of the space heretofore used in previous years together with a number of additions, which the committee found possible to use. The committee is looking over the pier with view of providing additional space if possible, as indications are that it can be sold to exhibitors if provided. Edmund H. Walker, president of the association, in announcing the above, says that "the success of the June meeting from an exhibition standpoint is assured."

Rock Island Outlines Railroad Legislation

Charles Hayden, president of the Chicago, Rock Island & Pacific, has sent out, on behalf of the Board of Directors of the road, a circular letter calling on stockholders to embrace the present opportunity for the enactment of favorable railroad legislation and asking that they co-operate with their congressmen for the passage of legislation based upon the principles contained in Mr. Hayden's circular.

These principles are briefly as follows:

1. No necessity for extension of the present control beyond 21 months after the final declaration of peace, which should be ample time for the legislators of this country to pass such legislation as is necessary. Naturally, perfecting legislation should be passed from year to year thereafter, just as perfecting legislation has been passed in respect to the Federal Reserve Bank Act. . . .
2. Private operation and ownership of the railroads rather than government ownership, but such private operation to be under efficient regulation, that shall be constructive rather than merely punitive.
3. The railroads should not be returned to their owners without new legislation looking to improved conditions, including:
   (a) To avoid unnecessary and wasteful competition, the Sherman law should be amended to permit mergers, consolidations and the pooling of facilities, equipment and traffic, under supervision of the federal government.
   (b) Federal control over rates and regulations should be in the same hands as control over wages, and the law should require that wages be taken into account in fixing rates.
   (c) The federal government should have exclusive jurisdiction over the issue of securities necessary for improvements and refunding purposes; also over rates and other matters affecting carriers, leaving only strictly local matters to state regulation.
4. Owners of railroad securities should have representation on the federal governing body.
5. If private capital is to be depended upon for developing and extending the railroads, any scheme of legislation must be so framed that sufficient incentive will be offered to such private capital. It is necessary not only to protect private capital that already is invested, but to make it attractive for additional capital to seek railroad investments. In order to accomplish this double object it will be absolutely necessary either to guarantee a fixed interest return on investments or to establish and maintain a rate structure which will permanently assure an ample return on property investment of the railroads as a whole.
6. Federal government supervision should extend to water routes and other trade routes that compete with the railroads.

Mrs. Calhoun

[Atlanta Constitution, March 15]

Defying alleged threats of strikers who Tuesday morning at 10 o'clock laid down their pens and closed up their typewriters when the Brotherhood of Railway Clerks walked out, Mrs. Lowndes Calhoun, the pretty little golden-haired clerk at the information desk at the Terminal station, is still on the job, directing thousands of puzzled travelers who daily call at the desk. Keeping guard over her are several plain-clothes men, and backing her up in her stand is the Southern railway. Wednesday and Thursday when there were no ticket agents, no train callers and no gatekeepers as a result of the walkout, hundreds of worried passengers groped hopelessly about in the resulting chaos; and the little information lady, the only employee in the station, stood serenely behind her desk, directing, advising, assuring the masses who crowded about her. On Friday, though her face betrayed the fact that the extra work had wearied her, she was still directing and still smiling. The new workers who had been gathered from the passenger service to take the places of the strikers were in strange surroundings with strange tasks to perform and the only one to turn to for advice was the little woman at the information desk.

Pointers for the Yard Master

[From a Paper by H. D. McKee.]

Be reasonable, respectful and considerate with your men and they will respect and obey you.

Have no favorites and permit no one to cater to you; and thereby avert petty animosities. Beware of the man that kow-tows and scrapes his feet; he can't be trusted.

There is no more important factor in the yard than your call boys. The call boy is frequently in position to add to or lessen your troubles. Respect the boy and make him feel that he is of some importance to you, and instead of being a boy he will prove up as one of your best men. See that the men treat him in like manner.

Make a big effort to cultivate friendly relations between all the members of your force and the roadmen entering your yard. You may wish a car picked up or set out after the train is made up and in charge of road crew at a time when yard engine is unavailable; it is at this particular time that trainmen are either your best or your worst friends.

Get on the inside with the roundhouse foreman and his men, particularly the car inspector; try to get your men inside with you also. If you succeed you will get your power faster and have fewer cars to throw out of the middle of made-up trains.

Be good to the engineers; many of them are good workmen and fine fellows; besides, you need them in your business.

Strike of Clerks on the N. C. & St. L.

Clerks in the employ of the Nashville, Chattanooga & St. Louis, and the Tennessee Central, members of the Brotherhood of Railway Clerks, several hundred in number, left their work on Tuesday, March 11, at 10 a. m., striking because of the refusal of the federal manager to dismiss the federal auditor, A. P. Ottarson, who, the clerks claimed, had dealt unfairly with them in the interpretation of orders respecting increases in wages. Freight service was seriously interrupted and embargoes were issued against live stock and perishable freight. Officers of the road employed new men in place of the strikers so far as they could, and on Friday it was reported that many of the vacancies had been filled. At Nashville conditions were reported "improving."

In Atlanta the clerks of other roads struck in sympathy with those of the Nashville, Chattanooga & St. Louis; but on Monday, the 17th, it was reported that these other clerks, 1,500 of them, had returned to their desks. They had been out, however, two or three days and had caused serious disturbance to traffic, passenger as well as freight. Important ticket offices were without attendants for two days.

W. L. Mapother, federal manager of the road, issued a statement to the effect that the action of the clerks on his road was not approved by the chief officers of their brotherhood. A statement by Director General Hines admonishing the clerks to abandon their irregular proceedings and attend to their duties is printed in another column of this paper. At some small places strikers were reported as returning to work, but as to how many heeded Mr. Hines' appeal no information is available. On Wednesday and Thursday of this week representatives of the clerks were in conference with the director general and his lieutenants at Washington.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY, 1919

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Maintenance of: Way and structures.	Equipment.	Operating expenses: Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Denver & Salt Lake	255	$113,129	$17,814	$136,684	$55,102	$96,719	$921	$93,750	$7,104	$253,597	185.53	—$116,913	$9,000	—$125,924	—$25,416
Detroit & Mackinac	381	63,954	29,166	100,785	18,191	44,153	5,058	65,135	19,542	152,078	150.89	—51,292	7,073	—58,367	—24,854
Detroit & Toledo Shore Line	61	193,433	.....	205,124	11,807	16,242	386	60,385	1,449	90,271	44.01	114,853	7,250	107,603	79,692
Detroit, Grand Haven & Milwaukee		Included in Grand Trunk Western.					.....	.....	.....	.....	.....	.....	.....	.....	.....
Detroit, Toledo & Ironton	457	328,921	11,697	362,987	96,109	106,752	2,602	186,675	13,727	405,865	111.81	—42,878	8,900	—51,778	83,241
Duluth & Iron Range	292	61,408	23,654	102,528	47,465	88,827	299	124,222	11,978	272,786	266.06	—170,258	6,087	—176,463	—14,488
Duluth, Missabe & Northern	410	127,233	38,082	192,050	154,339	121,660	2,506	156,405	24,524	460,892	239.98	—268,843	9,000	—277,844	—3,558
Quincy, Omaha & Kansas City	255	60,565	24,347	84,483	21,332	24,447	168	55,628	940	102,515	121.34	—18,032	3,003	—21,065	—2,464
South Buffalo Ry	35	54,353	.....	167,743	12,894	21,372	282	77,746	1,758	114,052	67.99	53,691	2,800	50,891	59,091
Duluth, South Shore & Atlantic	599	231,844	79,177	328,127	49,209	68,182	5,942	194,549	10,311	332,646	101.38	—4,519	19,000	—23,519	23,827
Duluth, Winnipeg & Pacific	175	138,851	23,995	166,747	15,252	31,163	2,259	83,054	6,523	138,366	82.97	28,381	8,358	20,023	25,163
East St. Louis Connecting Ry	3	.....	.....	98,596	10,954	45,287	372	66,851	3,223	126,686	128.45	—28,090	2,000	—30,090	—2,023
El Paso & Southwestern Co	1,027	859,356	167,313	1,080,832	133,356	211,628	8,629	306,334	24,380	691,008	63.93	389,825	90,899	298,891	—180,941
Elgin, Joliet & Eastern	810	1,616,124	9	1,952,205	150,506	466,956	4,831	756,911	25,966	1,404,980	71.96	547,225	53,250	493,974	748,079
Erie	1,989	5,514,407	928,247	6,954,626	745,434	2,529,945	57,023	3,862,287	201,782	7,434,488	106.89	—479,863	197,350	—679,602	648,498
Florida East Coast	764	553,703	354,492	1,008,152	157,961	186,105	8,662	430,632	20,721	819,866	80.43	197,293	38,816	158,297	—114,078
Ft. Smith & Western	253	80,844	27,121	114,334	18,498	28,490	3,489	46,633	6,048	103,372	90.41	10,965	5,000	5,963	—5,090
Fort Worth & Denver City	454	530,206	185,983	773,786	75,678	186,786	939	323,675	20,853	610,705	7,892	163,080	19,250	143,825	—18,075
Fort Worth & Rio Grande	2,135	40,454	43,399	91,089	21,148	20,574	2,782	71,971	3,545	114,456	125.65	—23,367	3,195	—26,575	—14,462
Fonda, Johnstown & Gloversville	88	26,861	62,967	93,504	9,802	9,102	469	38,975	4,987	63,333	67.73	30,171	4,900	25,271	—365
Galveston, Harrisburgh & San Antonio	1,382	1,301,651	413,585	1,815,651	275,392	340,781	21,506	688,066	53,551	1,393,700	76.76	421,952	52,205	369,460	—284,518
Galveston Wharf	13	.....	.....	86,013	12,111	715	24	38,893	1,233	62,699	72.89	23,314	11,400	11,914	—8,674
Georgia	328	283,700	223,345	545,491	55,645	84,291	5,189	244,934	16,482	406,703	74.55	138,789	6,950	131,837	19,019
Georgia & Florida	348	54,059	20,180	78,846	21,869	17,210	1,762	48,619	5,437	94,897	120.35	—16,052	4,200	—20,268	—21,688
Georgia, Southern & Florida	402	235,461	140,547	408,907	65,133	100,986	5,297	173,524	9,016	352,718	86.25	56,189	13,750	42,439	18,665
Grand Rapids & Indiana	569	335,762	133,146	514,778	99,602	152,539	10,407	298,885	23,125	585,767	113.79	—70,989	24,798	—95,794	—13,914
Grand Trunk Lines in New England	172	269,389	22,412	336,770	83,145	40,216	2,830	304,458	13,044	474,861	141.00	—138,091	11,500	—149,591	—42,235
Grand Trunk Western	1,002	1,224,676	269,524	1,623,464	212,593	412,867	8,666	802,346	33,570	1,481,492	91.25	141,972	50,150	91,704	466,588
Great Northern	8,258	6,888,697	1,296,383	8,874,400	1,232,728	2,018,054	44,384	3,877,818	156,245	7,426,610	83.68	1,447,790	510,414	936,707	1,234,280
Gulf & Ship Island	307	119,694	39,039	175,865	52,014	40,156	2,980	78,109	8 254	181,878	103.42	—6,012	10,471	—16,485	—46,934
Gulf, Colorado & Santa Fe	1,917	1,015,956	374,011	1,440,013	278,411	235,954	11,042	585,794	46,165	1,154,493	80.17	285,114	71,168	213,816	—191,611
Gulf, Mobile & Northern	424	142,217	39,630	194,666	40,793	51,975	4,709	94,381	9,694	200,944	103.22	—6,278	9,929	—16,208	—38,685
Hocking Valley	350	396,667	91,284	509,764	134,192	316,507	5,668	261,507	22,355	739,552	145.08	—229,787	57,066	—286,855	—105,908
Houston, East & West Texas	190	143,327	40,509	192,978	31,678	13,303	626	83,117	4,218	132,944	68.89	60,035	6,158	53,861	—686
Houston & Texas Central	856	468,037	175,437	685,635	129,564	114,273	10,226	301,463	18,664	574,047	83.72	111,588	34,024	76,955	—126,847
Illinois Central	4,783	6,023,206	2,016,312	8,503,957	1,508,755	2,344,005	59,148	4,004,447	234,716	8,217,705	96.63	286,252	407,500	—122,434	235,127
Indiana Harbor Belt	116	.....	.....	605,846	84,946	117,347	1,556	345,662	14,643	564,155	93.11	41,691	10,104	31,587	258,116
International & Great Northern	1,159	795,233	250,650	1,105,736	256,982	211,665	13,563	560,719	35,457	1,082,754	97.92	22,981	30,000	—7,020	—221,964
Kanawha & Michigan	176	193,915	61,569	267,965	61,045	133,327	2,182	149,377	12,080	359,012	133.98	—91,047	17,885	—108,933	—102,320
Kansas City, Mexico & Orient	272	46,507	11,341	60,791	33,027	48,605	967	57,666	6,420	146,686	241.29	—85,895	6,281	—92,197	—77,048
Kansas City, Mexico & Orient of Tex	465	57,270	13,503	75,004	32,705	52,060	1,398	62,699	6,013	154,876	206.49	—79,872	4,985	—84,857	—79,149
Kansas City Southern	774	954,949	210,426	1,263,651	226,714	256,392	16,957	521,783	42,054	1,060,602	83.93	203,050	89,029	113,529	—159,575
Kansas City Terminal Co	24	.....	.....	107,670	9,973	31,571	.....	63,209	1,474	107,348	99.70	323	20,400	—20,077	—10,191
Lake Erie & Western	900	675,341	53,232	764,567	136,622	258,839	12,500	375,230	24,302	804,723	105.25	—40,156	25,000	—65,249	—11,567
Lehigh & Hudson River	96	196,632	4,030	206,406	20,408	67,669	1,254	105,820	5,726	200,872	97.31	5,534	6,000	—467	—12,507
Lehigh & New England	224	274,394	1,662	307,128	44,863	58,502	2,036	116,357	9,685	231,396	75.34	75,732	8,610	67,121	81,921
Lehigh Valley	1,436	4,217,229	390,276	5,062,565	551,270	1,459,188	31,777	2,612,026	116,457	4,786,015	94.54	276,550	146,725	129,717	1,115,016
Long Island	398	432,384	915,404	1,499,583	264,150	295,404	9,795	967,571	45,404	1,597,783	106.54	—98,200	103,052	—201,447	144,439
Louisiana Ry. & Nav. Co	349	217,905	42,022	273,245	62,831	55,960	4,239	152,574	7,915	283,518	103.75	—10,273	14,000	—24,273	52,208
Los Angeles & Salt Lake	1,168	938,786	315,956	1,300,742	166,034	258,861	15,831	446,713	29,183	950,942	73.11	349,799	60,572	289,073	160,519
Louisiana & Arkansas	302	114,014	34,246	156,193	36,146	35,024	2,448	74,793	5,765	154,178	98.70	2,014	10,340	—8,327	—35,733
Louisiana Western	207	218,770	110,235	338,092	40,811	57,535	4,282	108,793	11,392	224,662	66.44	113,429	10,656	102,734	—41,940
Louisville & Nashville	5,013	5,713,706	2,086,049	8,256,212	1,368,394	2,162,613	84,688	3,670,745	179,899	7,502,813	90.87	753,399	260,736	491,073	—100,065
Louisville, Henderson & St. Louis	199	174,184	55,419	238,688	50,134	31,045	7,498	91,660	7,572	187,908	78.72	50,780	4,000	46,701	33,398
Maine Central	1,216	1,031,037	319,881	1,416,416	202,673	347,192	10,161	922,141	42,845	1,525,375	107.69	—108,960	75,623	—184,583	119,230
Maryland, Delaware & Virginia Ry. Co.	82	57,355	24,946	83,469	8,354	11,118	525	61,783	1,922	83,703	100.28	—235	1,733	—1,968	—33,241
Michigan Central	1,862	4,210,511	1,365,139	5,900,537	809,644	1,157,070	65,036	2,388,712	99,826	4,596,123	77.89	1,304,414	160,000	1,143,960	1,397,308
Midland Terminal Ry. Co	56	45,531	3,554	50,727	—1,863	7,829	807	22,262	2,900	31,936	62.95	18,791	3,000	15,791	(c)
Mo., Kansas & Texas Ry. of Texas	1,796	993,962	568,715	1,740,155	314,055	393,219	19,902	1,030,847	77,597	1,850,499	106.34	110,345	51,377	—162,422	—247,852
Midland Valley	387	213,642	76,961	304,452	59,990	64,519	1,437	132,558	11,826	270,330	88.78	34,122	6,713	27,410	—10,402
Mineral Range	101	97,759	695	100,252	9,984	28,095	301	47,290	1,072	86,742	86.52	13,510	3,300	10,210	15,120
Minneapolis & St. Louis	1,646	685,278	209,115	925,822	190,469	289,980	13,871	577,955	30,516	1,103,012	119.14	—177,190	57,003	—234,361	—305,909
Minn. & International Ry. Co	194	47,908	24,682	76,837	14,455	14,854	505	45,349	3,974	79,137	102.99	—2,300	3,822	—6,125	—11,063
Minn., St. Paul & Sault Ste. Marie	4,243	2,462,042	565,801	3,175,355	368,049	741,940	21,149	1,406,715	65,429	2,609,719	82.18	565,646	187,693	377,943	488,314
Missouri, Kansas & Texas R. R	1,714	1,904,133	618,973	2,623,358	674,350	703,335	20,695	1,078,509	82,318	2,567,416	97.86	55,942	95,355	—39,524	—96,077
Missouri, Okla. & Gulf	332	76,807	18,658	101,089	37,970	43,681	1,347	75,496	7,471	166,175	164.38	—65,087	8,500	—73,621	—49,953
Missouri Pacific	7,108	4,769,223	1,578,739	6,810,632	1,606,454	1,655,571	75,379	3,318,983	262,014	6,889,019	101.15	—78,387	280,000	—360,413	—959,482
Missouri & N. Arkansas	365	91,309	37,520	139,885	82,167	39,908	1,004	61,601	7,166	191,678	137.02	—51,794	6,242	58,049	46,160
Mobile & Ohio	991	956,202	191,375	1,215,144	174,955	421,633	24,752	592,489	39,041	1,257,284	103.46	—42,140	47,151	—89,307	—76,467

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of—									
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Monongahela	108	$278,171	$20,118	$305,361	$84,474	$28,537	$733	$109,157	$7,248	$230,148	75.36	$75,214	$5,000	$70,214	$72,305
Monongahela Connecting	5	.....	.....	213,515	36,444	75,613	519	132,103	7,402	252,081	118.06	—38,567	2,215	—40,782	—40,496
Montour R. R.	54	77,677	1,730	84,158	23,666	52,370	1,677	9,539	6,351	114,746	136.34	—30,588	2,286	—32,873	—14,349
Morgan's La. & Tex. R. R. & S. S. Co.	400	489,736	164,879	696,359	89,594	149,313	6,948	304,197	18,956	571,020	82.00	125,340	30,157	95,061	—93,168
Nashville, Chattanooga & St. Louis.....	1,247	933,494	446,610	1,513,977	306,885	482,248	32,863	762,191	38,926	1,638,146	108.20	—124,169	50,000	—174,310	—237,041
Nevada Northern	168	163,289	14,054	182,836	17,565	26,152	1,030	50,451	4,996	100,387	54.91	82,449	18,320	64,129	—52,364
Newburgh & South Shore R. R. Co....	7	.....	.....	129,675	16,318	30,096	.....	70,541	3,575	120,530	92.94	9,144	7,299	1,844	32,015
New Orleans Great Northern.....	284	126,441	36,112	176,214	36,059	35,795	1,354	73,087	5,862	152,535	86.56	23,678	10,225	13,384	7,547
New Orleans & North Eastern.....	203	341,253	104,287	505,694	35,943	115,622	6,547	251,058	13,278	428,771	84.78	76,923	28,357	48,559	—21,033
New Orleans, Texas & Mexico.....	191	62,200	27,347	96,640	33,469	35,577	2,457	53,045	6,935	133,250	137.88	—36,611	10,000	—46,611	—97,321
New York Central	6,075	16,018,486	6,006,312	24,821,606	3,348,917	4,982,111	197,999	11,040,805	608,029	20,536,171	82.74	4,285,435	1,021,947	3,263,314	4,276,242
New York, Chicago & St. Louis.....	572	1,869,519	128,957	2,069,363	260,318	427,166	28,358	887,825	56,528	1,663,456	80.38	405,907	55,000	350,903	654,413
New York, New Haven & Hartford....	1,965	3,456,429	3,279,601	7,336,774	999,529	1,935,428	36,319	4,254,268	285,689	7,649,367	104.26	—312,594	266,000	—583,226	—523,183
New York, Ontario & Western.....	567	553,450	126,428	793,523	117,337	255,230	6,647	429,278	29,362	837,854	105.58	—44,331	24,700	—69,031	—66,633
New York, Philadelphia & Norfolk.....	121	448,453	119,134	615,810	52,547	129,820	8,698	263,819	11,267	485,718	78.87	130,092	17,020	113,072	155,489
New York, Susquehanna & Western..	135	243,003	50,881	333,066	30,462	41,826	1,233	213,303	7,373	294,198	88.33	38,868	12,747	26,109	60,350
Norfolk & Western	2,087	4,989,617	275,143	6,100,013	857,785	1,845,119	33,153	2,420,687	71,995	5,247,770	86.02	852,243	260,000	592,185	196,676
Norfolk Southern	907	318,513	129,675	481,422	96,936	114,776	7,917	260,237	22,535	502,785	104.43	21,363	20,000	41,377	—37,067
Northern Alabama	112	95,805	12,574	111,656	27,362	4,129	1,145	89,051	1,902	123,589	110.68	—11,933	3,400	—15,333	—32,871
Northern Pacific	6,566	6,104,209	1,456,702	7,934,352	960,947	1,365,232	71,421	3,275,599	186,903	5,965,100	75.18	1,969,252	524,232	1,444,647	641,193
Northwestern Pacific	507	226,662	125,552	383,405	106,019	65,303	5,228	204,833	12,587	396,071	103.31	—12,666	22,069	—34,736	—89,408
Oregon Short Line	2,347	2,289,022	465,627	2,945,533	540,151	491,378	11,616	947,150	85,839	2,129,717	72.30	815,816	177,964	637,707	—102,088
Oregon-Washington R. R. & Nav. Co..	2,069	1,359,440	470,378	2,033,603	404,277	333,190	28,076	873,888	91,290	1,766,251	86.85	267,352	114,531	152,637	—36,391
Panhandle & Santa Fe.....	772	314,530	73,473	403,437	110,280	147,447	4,924	261,965	15,326	539,626	133.75	—136,189	16,213	—152,513	—239,296
Pennsylvania Co.	1,754	5,273,007	1,477,755	7,472,887	1,208,488	2,358,844	65,302	3,943,294	178,949	7,803,453	104.42	—330,566	287,395	—618,167	—975,973
Pennsylvania Railroad	5,359	19,708,657	7,926,649	30,477,483	3,824,020	9,098,129	230,290	15,487,535	734,048	29,910,328	98.14	567,155	856,501	—289,972	—2,424,099
Peoria & Pekin Union.....	19	34,582	6,506	104,722	17,111	36,383	890	86,858	6,748	147,991	141.31	—43,269	9,500	—52,769	—20,486
Pere Marquette	2,232	1,940,479	377,042	2,473,433	356,591	515,753	20,753	1,185,459	62,240	2,145,031	86.72	328,403	49,678	278,618	579,554
Phila, Bethlehem & New England.....	71	.....	.....	115,284	18,693	14,210	208	57,575	1,207	91,893	79.71	23,391	2,550	20,841	2,335
Philadelphia & Reading.....	1,127	4,584,995	914,036	5,950,981	604,487	1,579,287	51,930	3,485,933	139,879	5,860,470	98.47	90,511	143,228	—52,717	—77,267
Pittsburgh & Lake Erie.....	224	2,320,438	205,534	2,792,840	414,531	676,184	11,895	902,558	42,700	2,049,560	73.38	743,280	75,500	667,780	531,034
Pittsburgh & Shawmut	103	113,962	4,837	120,546	29,210	41,169	2,321	44,940	3,293	120,933	100.32	—387	974	—1,361	—17,541
Pittsburgh, Shawmut & Northern.....	204	90,690	7,418	100,502	21,734	46,202	846	41,744	9,429	119,959	119.35	—19,457	1,848	—21,304	—2,002
Pittsburgh & West Virginia.....	63	99,398	10,650	122,255	52,153	56,073	884	55,885	5,346	178,383	145.91	—56,129	14,285	—70,426	—60,146
Pittsburgh, Cincinnati, Chic. & St. Louis.	2,387	4,874,507	1,760,129	7,377,274	903,585	2,315,568	84,279	3,610,476	144,397	7,126,208	96.59	251,066	233,120	17,771	976,344
Port Reading	21	152,393	.....	224,437	33,266	39,567	.....	126,242	1,282	200,358	89.27	24,079	9,000	15,079	78,016
Quincy, Omaha & Kansas Ry.....	255	60,565	24,347	84,483	21,332	24,447	168	55,628	940	102,515	121.34	—18,032	3,003	—21,065	—2,464
Richmond, Fredericksburg & Potomac..	87	324,458	387,026	760,371	45,521	79,860	3,747	220,732	13,065	365,979	48.13	394,392	15,300	379,087	228,140
Rutland	415	175,580	94,784	327,564	72,491	102,335	7,093	174,931	10,567	367,416	112.17	—39,852	17,579	—57,441	—44,394
St. Joseph & Grand Island.....	258	183,496	37,376	230,563	51,789	13,137	2,070	153,202	10,988	233,362	101.21	—2,800	8,811	—11,611	—31,715
St. Louis, Brownsville & Mexico.....	548	292,252	87,109	400,709	74,382	73,314	8,433	121,709	18,701	296,539	74.00	104,170	10,000	94,169	—7,827
St. Louis, Merchants Bridge Terminal..	9	.....	734	255,875	43,798	67,892	762	190,563	4,838	307,852	120.31	—51,977	8,000	—59,977	30,799
St. Louis-San Francisco	4,761	3,911,546	1,629,946	5,803,741	1,117,974	1,376,724	38,119	2,556,123	180,735	5,237,404	90.24	566,336	219,517	343,133	—146,631
St. Louis, San Francisco & Texas.....	134	66,202	23,628	99,464	28,360	16,885	753	74,706	4,420	123,620	124.28	—24,155	537	—24,692	—76,980
St. Louis Southwestern	968	798,417	170,383	999,277	217,726	209,178	14,627	325,932	34,101	818,287	81.88	180,990	37,140	143,239	—121,331
St. Louis Transfer R. R.....	6	.....	.....	99,623	8,805	21,096	253	46,375	2,222	78,752	7.905	20,871	100	20,771	15,667
San Antonio & Aransas Pass.....	732	242,118	86,918	349,573	97,617	102,782	6,908	191,333	21,846	419,806	120.09	—70,224	15,000	—85,224	—142,456
Seaboard	3,563	2,150,905	907,875	3,340,298	505,323	718,983	56,803	1,613,616	103,067	3,017,388	90.33	322,910	135,000	187,789	—97,560
South Buffalo Ry. Co.....	35	54,353	.....	167,743	12,894	21,372	282	77,746	1,758	114,052	67.99	53,691	2,800	50,891	59,091
Southern	6,982	6,263,309	3,035,552	10,126,429	1,510,355	2,422,643	114,365	4,512,085	244,886	8,872,759	87.61	1,253,669	319,787	926,481	—264,818
Southern in Mississippi	278	75,290	57,509	145,357	34,164	22,532	1,977	81,315	3,768	143,757	98.89	1,600	9,000	—74,000	—27,295
Southern Pacific	7,049	8,952,314	3,151,299	12,923,802	2,216,555	2,313,900	106,463	5,043,874	292,481	10,185,187	78.80	2,738,614	614,015	2,121,571	—22,632
Spokane International Ry. Co.....	156	60,816	14,931	77,707	11,539	6,909	1,258	27,299	4,740	51,579	66.37	26,128	4,012	22,116	4,755
Spokane, Portland & Seattle.....	554	374,262	122,667	553,084	145,832	101,749	7,429	227,470	19,906	504,148	91.15	48,935	59,200	—10,320	355,772
Staten Island Rapid Transit Co.....	23	91,965	59,581	184,507	19,756	21,854	1,036	95,781	8,843	147,270	79.81	37,237	14,000	23,232	70,020
Tennessee Central	293	180,938	46,299	243,038	73,187	71,835	1,108	99,992	7,122	253,245	104.19	—10,207	5,135	—15,440	—5,543
Terminal R. R. Ass'n of St. Louis....	36	.....	3,911	300,711	83,170	95,714	987	151,598	5,909	340,717	113.30	—40,007	28,250	68,257	—70,689
Texarkana & Ft. Smith.....	81	73,587	15,933	98,108	14,916	38,157	373	37,311	3,477	94,171	95.98	9,337	6,458	—2,521	—33,784
Texas & New Orleans.....	469	376,329	163,506	580,960	136,709	183,490	5,046	235,493	15,062	592,292	101.95	—11,333	21,086	—34,456	—165,734
Texas & Pacific	1,946	1,983,784	671,493	2,731,259	446,831	607,454	27,896	1,409,154	67,715	2,579,770	94.45	151,489	82,540	68,849	—287,393
Toledo & Ohio Central.....	435	502,415	68,759	600,982	146,105	242,866	5,713	303,152	15,820	715,763	119.09	—114,782	32,293	—147,074	10,321
Toledo, Peoria & Western.....	247	107,325	47,534	161,733	27,176	34,722	2,167	65,171	5,539	132,589	81.98	29,143	8,500	20,643	46,434
Toledo, St. Louis & Western.....	454	526,193	26,985	575,623	92,645	124,848	5,125	249,068	12,589	484,072	84.09	91,551	26,000	65,551	137,392
Trinity & Brazos Valley.....	368	92,772	18,430	116,212	39,793	39,598	1,788	62,176	8,436	151,792	130.62	—35,581	5,715	—41,295	—14,876
Ulster & Delaware	128	27,917	15,279	57,989	13,353	18,451	1,103	45,494	4,580	83,558	144.09	—25,569	4,600	—30,169	—12,839
Union Pacific	3,614	6,467,468	1,519,450	8,594,474	1,055,639	2,569,051	45,019	2,642,807	221,950	5,720,730	66.56	2,873,745	284,765	2,588,526	1,271,702
Union R. R. of Penn.....	35	.....	.....	582,956	43,865	159,180	250	315,706	7,748	525,904	90.21	57,052	6,428	50,624	276,658
Utah Railway	48	100,194	216	101,670	16,999	24,750	235	22,766	2,070	66,820	65.72	34,851	4,030	30,820	—31,868
Vicksburg, Shreveport & Pacific.....	171	170,041	82,844	271,586	50,792	60,515	1,441	115,151	8,004	238,152	87.68	33,434	9,417	24,002	—32,283

Commission and Court News

State Commissions

The North Carolina Corporation Commission has filed with the Interstate Commerce Commission a complaint asking for the readjustment of freight rates in the southeastern territory, on the ground that North Carolina towns are discriminated against. Nearly two hundred different railroad companies are made defendants in the suit.

Personnel of Commissions

Harold M. McClure, member of the Pennsylvania State Public Service Commission, died at his home in Lewisburg, Pa., on March 1, at the age of 59.

Clyde B. Aitchison has been elected chairman of the Interstate Commerce Commission in accordance with the custom of that body of rotating its members in the chairmanship in the order of seniority. Mr. Aitchison was appointed a member of the commission by President Wilson on September 29, 1917, for a term ending in 1921 as one of the two additional commissioners authorized by the law of August 9, 1917, to increase the membership from seven to nine. Mr. Aitchison was born February 22, 1875, at Clinton, Ia. He practiced law at Council Bluffs, Ia., from 1896 to 1903 and at Portland, Ore., from 1903 to 1907. He was a clerk of the State Tax Commission of Oregon from June, 1905, to July 1, 1906, and was one of the joint authors of the Oregon Railroad Commission law, adopted February 18, 1907. He was appointed a member of the Railroad Commission of Oregon at that time for a short term, was elected a member in June, 1908, was elected chairman in January, 1911, and re-elected on November 5, 1912. In 1916 he resigned from the Oregon commission to become solicitor for the valuation committee of the National Association of Railway Commissioners, and in that office he maintained an office in Washington and took an active part in representing the interests of the state commissions in connection with the valuation of railroads being made by the Interstate Commerce Commission.



C. B. Aitchison

Court News

Injury to Passenger—Lurching of Train

The Circuit Court of Appeals, Fourth Circuit, holds that the fact that a passenger on a fast train fell from her chair in the dressing room of a sleeping car from the mere movement of the car does not make out a prima facie case of negligence or of unskillful and careless handling of the train. The mere characterization by the passenger of the movement as a "terrific" or "violent" lurch adds nothing from which negligence can be legitimately inferred. After reviewing the cases on the subject, which contain no authority supporting the plaintiff's contention, the court said that "it was simply one of those unfortunate accidents which sometimes happen for which the law holds no one responsible. In our opinion a verdict should have been directed for the defendant, as was done in the almost identical case of Azaune v. Illinois Central, 151 Fed. 900." Judgment for the plaintiff was reversed.—Norfolk & Western v. Birchett, 252 Fed. 512. Decided July 15, 1918.

Telegraph Lines on Right of Way

The Circuit Court of Appeals, Sixth Circuit, holds that where the Western Union Telegraph Company, after terminating the arrangement under which it maintained lines on the Louisville & Nashville's right of way, was denied the right of condemnation in Alabama, preliminary injunction against the railroad's interference with telegraph lines would not be granted because the government has assumed control of the railroads. It appeared that the Secretary of War had requested that nothing should be done to interfere with the operation of the telegraph system until he approves, and the railroad company had promised full observance of this request.—L. & N. v. Western Union, 252 Fed. 29. Decided June 4, 1918.

Safety Appliance Act—Grabirons

The Circuit Court of Appeals, Second Circuit, holds that section 4 of the federal Safety Appliance Act was not violated by using a car having a grabiron at each side at one corner for use while operating the pin-lifting lever, and grabirons on each end of the car on the side opposite to the pin-lifting lever. A railroad's failure to warn either an experienced brakeman or a green man that some cars of an older style had grabirons on only two corners, while others were equipped on all four corners, was held not negligence, as such warning would have added nothing to their observation, and as the railroad might assume either that they would not act without looking or had already learned that they could not rely on a safe support.—Boehmer v. Pennsylvania, 252 Fed. 553. Decided May 10, 1918.

United States Supreme Court

Employers' Liability Act

A trackman on the New York Central was struck and killed by an engine attached to a passenger train moving along the main track, the man being engaged in shoveling snow between the track and a platform in Camden, N. Y. At this point the company's tracks are used for the purpose of transporting both interstate and intrastate cars and both interstate and intrastate commerce. On appeal from an award of compensaion under the New York Workmen's Compensation Law the Supreme Court of the United States holds that when killed the deceased was employed in interstate commerce, and judgment affirming the award was reversed. N. Y. C. vs. Porter. Decided March 3, 1919.

Moving Lumber to Mill; When Interstate

In an appeal in a freight tariff case the question arose whether shipments of rough lumber from the forest to the milling point, followed by the forwarding of the finished product to points outside of the state, constituted interstate commerce. The Supreme Court of the United States holds that, upon the facts shown, the movement of the rough lumber from the woods to the milling point was intrastate, and not interstate, commerce. It was not merely that there was no continuous movement from the forest to the points without the state, but that when the rough material left the woods it was not intended that it should be transported out of the state, or elsewhere beyond the mill, until it had been subjected to a manufacturing process that materially changed its character, utility, and value. The raw material came to rest at the mill, and after the product was manufactured it remained stored there for an indefinite period—manufacture and storage occupying five months on the average—for the purpose of finding a market. Where it would eventually be sold no one knew. And the fact that previous experience indicated that 95 per cent of it must be marketed outside of the state, so that this entered into the purpose of he parties when shipping the rough material to the mill, did not alter the character of the movement. Hasty vs. St. Louis Southwestern and St. Louis, Iron Mountain & Southern. Decided March 3, 1919.

Foreign Railway News

The reports of an Australian embargo on all imports not originating in Great Britain have proved untrue. The order which was at the base of the report, referred merely to dyestuffs and not to merchandise in general.

Exports from the port of New York in January, 1919, according to figures compiled by the National City Bank, included steam locomotives to the value of $751,865, car wheels to the value of $112,651 and steel rails valued at $1,456,012.

A French commission which was appointed last September to study the subject of the Channel tunnel has begun its meetings to frame definite plans for a Franco-British agreement. Albert Claveille, French Minister of Public Works, presided.

Germany has completed the delivery to the Allies of 5,000 locomotives and 150,000 cars as provided for in the armistice, according to Associated Press despatches quoting from the Tages Zeitung. The value of the rolling stock, it is said, is 3,000,000,000 marks. The Prussian railways furnished three-fourths of the locomotives and cars.

The British Labor Difficulties

The negotiations between the Board of Trade and the Railway Executive Committee on the one hand and the National Union of Railwaymen and the associated Society of Locomotive Engineers and Firemen on the other are continuing in London, but as yet without definite results.

Press despatches from London on March 15 referred to a statement by J. H. Thomas, general secretary of the National Union of Railway Men, to the effect that a serious situation had arisen in the negotiations. Mr. Thomas said, however, he was still working to reach a settlement. He also announced that so-called triple alliance representatives were to meet Friday for final decision as to co-operation of miners, transport workers and railway men.

Personnel of Boards on Siberian Railroads

Complete lists of the members of the Inter-Allied Committee and the Technical and Military Boards, which have undertaken the rehabilitation of the Siberian Railway, were received by cable Wednesday by the state department. The American members are Charles H. Smith, on the Inter-Allied Committee; John F. Stevens, president of the Technical Commission, and Colonel Hugh J. Gallagher, on the Military Board. The work will be mainly in charge of Mr. Stevens.

Following is the complete personnel of the committees:

Inter-Allied Committee, to supervise the railway system: Oustrougoff, Russia (chairman); Charles H. Smith, United States; Liou Tsin Jen, China; G. Bourgeois, acting for De Martel, France; Sir Charles Eliot, Great Britain; Consul General Gasco, Italy, and Matsudaira, Japan.

Technical board in charge of the technical and economic management of the railways: John F. Stevens, United States (president); Dr. Hama Tien Yeu, China; Colonel Leverve, France; Colonel Jack, Great Britain; Major Garibaldi, Italy; H. Nabso, Japan, and Danielevsky, Russia.

Military board, to co-ordinate transportation matters concerning military forces of the United States, the Allies and Russia: Lieutenant Kia Tsien Cbich, China; Colonel Tessier, France; Colonel Jack, Great Britain; Captain Schonrolli, Italy; General Takeuchi, Japan; Major Vladimiroff, Russia, and Colonel Hugh J. Gallagher, United States.

Differ on China's Railways

Japanese official disapproval of the contemplated internationalization of the Chinese railways, which has been recommended by other allied legations and the Chinese Government, is responsible for the development of a new plan aiming at the isolation of the Japanese railway interests in China according to a copyright despatch to the New York Times.

It is expected that the Shantung Railway, together with the German interest in the Tientsin-Pukow line, will be considered as indemnity and awarded either to Great Britain or France. Such an award would undoubtedly offset Japanese projects in that province.

The American Siems-Carey Company's possession of rights for the extension of the Peking-Suiyuan Railway, which antedates the Japanese contract, will be insisted upon, says the despatch, America will also insist, when further lines are needed in Manchuria, that the Kuhn, Loeb & Co. contract of 1909 shall have priority. Such a program would confine Japan to the Liaotung Peninsula.

Besides America, Britain, it is said, will decline to recognize the treaties extorted from China under the 21 demands of 1915. Consequently, if Japan does not yield the South Manchurian Railway to the consolidation scheme, China will be put in a position to redeem this line in 1933 according to the original agreement.

American Machinery in Australia

The Far Eastern Division of the Bureau of Foreign and Domestic Commerce has issued Circular No. 13 on American machinery in Australia. The report is of particular interest to readers of this paper because of the fact that as brought out in Frank Rhea's report on markets for American railway materials in Australia, the railroad shops represent an important part of the market for American machine tools.

Australia, the circular says, is rapidly becoming a manufacturing country, and the demand for certain American machinery and machine tools is increasing. As a majority of the engineering establishments are also jobbing shops, the engineers in charge are averse to buying from catalogues, but desire actual demonstrations, especially of new machines, and the majority of sales are accordingly made after a sample machine has been received by the agent or importer. A substantial additional discount on introductory orders should be allowed, particularly in highly specialized lines, as otherwise there is not sufficient incentive to warrant the importer taking the risk of the machine not being a success. Types of American machines, which have subsequently enjoyed exceptional sales, have been kept off the Australian market for years because the manufacturers did not put a sample machine into the hands of a good agent and were finally introduced by the importer who took a chance on their success.

Exclusive Agency Most Acceptable

The exclusive agency is accepted as the most satisfactory method of selling machinery and accessories in Australia. Some of the established agencies have a certain circle of customers, but progressive agencies make themselves of general service to all customers. Moreover, in a country like Australia, where vast distances must be traveled in seeking orders and where modern machinery is just being introduced, it is only fair to the agent who has stocked a machine, which may sometimes prove unsalable, that he be protected by an exclusive contract. If proper care is taken in the selection of a progressive house there is little fear that such an arrangement will be used to stifle competition, such firms generally being as anxious to develop business as the manufacturer.

Method of Financing Orders

Since the war, Australian importers have arranged for cash payments against documents in New York, and there is little probability of an early return to the old method of sight drafts with documents.

The price list in almost universal use in Australia is made on a small loose sheet punched with three ¼-in. holes at 3-in. centers. The advantage of conforming to such styles of price lists and insuring the maintenance of complete files of prices is apparent. This same suggestion holds good with reference to delivery information sheets and sheets showing machines in stock.

American War Deliveries

The Australian import agent seems to have legitimate fault to find with the American manufacturers' optimism in making delivery promises. It is, of course, open to question whether under the abnormal war conditions any industry can function with the same precision as in peace times, and now that peace is at hand, American manufacturers will be quick

to convince Australian importers that they are as ready and willing to make as satisfactory deliveries as other countries. All the Australian agent seems to request is that orders be delivered in the same rotation as received, any other treatment is not only unfair but a source of embarrassment and expense to the importer who has given his customer a specified date of delivery. Perhaps the importers would not complain if they were quoted definite dates of delivery even three times as long as those given, as they would then know what to expect and could explain to their customers, but a short-sighted policy of accepting all orders at delivery dates impossible of execution is to be avoided.

Information and Instructions Wanted

Foundation plans, instructions for setting up, and information regarding the working of machines are all greatly desired. Such information is usually the sole guide of employees who work the machines, and in many cases newly introduced types of machines can be satisfactorily set up in no other way than by following printed instructions. In one instance a fairly intricate automatic gear cutting machine was ordered and instruction specifically requested, but no attention was paid to the request, and when five more of the machines were ordered the same thing occurred, so that the matter could not be attributed to oversight.

Advertising and Catalogues

The Australian importer is a close reader of the leading American machinery trade journals and information regarding new types of machines is often requested on the strength of these advertisements. Naturally the importer who writes for a particular machine is interested in other types and a sale of some other machine might be effected at once if other catalogues were sent, whereas the order for a similar machine is placed with a competitor of the manufacturer because of this lack of business foresight. This situation is better appreciated when it is realized that under present conditions it requires 10 weeks for a letter to reach Australia and a reply be received. For this reason it is sometimes advisable in case of unstable price conditions to state that prices will hold until a definite date so that the Australian merchant will be able to cable his order in case the letter is delayed.

Practically all machinery is subject to customs tariff in Australia and must undergo inspection, and for this reason it is preferable to leave one board on the top of the case not hoop ironed and nailed, but simply screwed down. This board should be located so as to allow a good view of the machine. The loading and warehousing facilities in Australia are not the best and few cranes are employed, so that strong packing is desirable.

Lathes in Demand

Lathes are the most important essential in the machine shops which are springing up in Australia. As the majority of the work of these shops is jobbing, the machine tools should be universal. Gap lathes, for instance, permit one machine to cover a large range of work and are very popular in Australia. One American machine of this universal type has enjoyed a very large sale. Most of the American gap lathes before the introduction of this one were cheap, and light tools are not in demand. Another popular lathe of English manufacture has very large bearings and a rugged headstock which appeals strongly to the Australian market and is in more universal favor in large mining shops than any other tool.

Planers, Punches, Shears and Rolls Too High Priced

The price of American planers as compared with that of English makes is disproportionately high. Though the American planers are very high grade with a number of automatic and convenient feeds, these conveniences have made the price too high for the Australian market, and at present there are not half a dozen of these machines in use in that country. A moderate-priced simple planer could be introduced to advantage. This is equally true of punches, shears, rolls, and other tools used in shipbuilding and structural work, our price of which is out of all proportion to the prices of British makes.

American Imports Increased

The following statistics show the increase by countries in imports of machine tools since the beginning of the war:

Imported from	1914	1916-17
United Kingdom	$265,039	$424,846
United States	226,307	407,618
Germany	9,081	.....
Sweden	6,964	1,883
Belgium	4,993	.....
New Zealand	1,153	5,767
Canada	3,236	4,803
All other countries	346	8,370
Total	$517,119	$853,287

The statistics given with the circular also give figures as to imports of locomotives as follows:

1912	$2,280,306
1913	2,070,185
1914	1,620,228
1915-16	534,609
1916-17	381,976

Of the total of $381,976 imported in 1916-17, $315,018 worth came from the United Kingdom, $64,608 from the United States, and $2,351 from other countries.

Of the total of all kinds of machinery amounting to $15,317,304 in 1916-17, 50 per cent came from the United States, 36 per cent from the United Kingdom, 8 per cent from Canada, and 6 per cent from other countries.

Promising Outlook for American Trade

The United States is, therefore, the report concludes, the leader in the machinery market of Australia, according to latest available statistics. Whether this leadership is maintained will of course depend upon a great many considerations, not the least important of which are closely related to the suggestions made above. The Australian machinery merchant is fully alive to the advantages and good points of American machinery, just as he appreciates most keenly the weakness in our export methods, the brunt of which eventually must be borne by him. The closest attention should be paid to his wishes if we are to encounter a full measure of success.

Ministry of Ways and Communications Proposed in England

The British Cabinet on February 27 introduced in Parliament, as briefly noted in this column in the issue of March 7, page 561, a bill providing for the establishment of a Ministry of Ways and Communications, to have entire charge of all means of transportation in the United Kingdom and providing for an extension of the government control of railways for an additional two years during which time their ultimate status may be considered. In introducing the bill in the House of Commons, Mr. Shortt explained the reasons for the bill. He contended that the day for unfettered railway competition had gone, and that the introduction of mechanical traction had made the highways essentially a national question. These were among the considerations which had weighed with the government in deciding to set up a ministry to co-ordinate the whole of these important means of transport. He made it clear at the start that the ministry would maintain for the two years during which the government guaranteed the receipts of the railways the control which they had during the war, and would be given power during that period to consider the whole question and to make such changes as and when it thought desirable. "Does that mean," he was asked by Sir Edward Carson, "that they can nationalize the railways?" "Not without the consent of this House," Mr. Shortt replied.

One of the important provisions of the bill gives the Ministry control over the supply of electricity.

Mr. Shortt admitted that there might be a considerable difference of opinion on this proposal. He suggested, however, that as transport was the greatest customer for electricity, and as it depended entirely for its successful management upon the development of the industries of the country, the House would recognize how important it was that the Ministry should have control of electricity.

Sir Eric Geddes, Minister without portfolio, speaking in favor

of the bill on March 17, and that with the exception of the street railways the transportation system of the country financially was in a semi paralyzed state, and physically ill-equipped to meet the strain of the demands made upon them partly owing to lack of men and capital during the war. The country had to face the fact today that with the railways there would be a loss of over a quarter of a million pounds daily, while the government was pledged to continue its guarantees for two years.

If transportation was not to continue to run at the cost of the taxpayer, there must be a real transportation policy, and the government had come to the conclusion that some measure of unified control was necessary. There must be some body which should be responsible for the transportation policy.

In the present conditions, it would be criminal to permit the old system of competition. The government must have a say in the conditions under which labor worked and with regard to the discipline to be expected in trade unions. The state must step in at once and make possible an economic balance, which was impossible in the present condition of things.

In order to get rid of empty haulage, continued Sir Eric, the government would take over the power to acquire privately owned cars on the railways, which constituted nearly half the cars employed. During the next two years the same organization would be continued that existed during the war, but thereafter there was certain to be some central control—commissions on which the government and labor would be represented. It would also be necessary to have a central control over docks and canals. Nationalization of railways might care for the present conditions—he did not know. He looked upon nationalization as a means to an end, which might have to be adopted finally.

Text of the Bill

The complete text of the bill is given in the London Times of February 28, and some of the important sections of it are as follows:

1. For the purpose of improving the means of, and the facilities for, locomotion and transport, it shall be lawful for his Majesty to appoint a Minister of Ways and Communications. . . .

Powers and Duties

2. (1) It shall be the duty of the Minister to take steps to carry out the purposes aforesaid, and there shall as from such date or dates as his Majesty in Council may by Order determine, be transferred to the Minister all powers and duties of any Government Department in relation to—

(a) railways;
(b) light railways;
(c) tramways;
(d) canals, waterways, and inland navigations;
(e) roads, bridges and ferries, and vehicles and traffic thereon;
(f) harbors, docks and piers;
(g) the supply of electricity;

including any powers and duties of any Government Department in relation to any railway, light railway, tramway, canal, inland navigation, harbor, dock, pier, electricity, or other undertaking concerned with any of the matters aforesaid, and any powers of any Government Department with respect to the appointment of members or the procedure of the Railway and Canal Commission or of any commissioners, conservancy board, or other body having jurisdiction with respect to any such matters as aforesaid:

Power to Control Temporarily Railways, Etc.

3. (1) With a view to affording time for the consideration and formation of the policy to be pursued as to the future position of undertakings to which this section applies, the following provisions shall have effect for a period of two years after the passing of this Act:

(a) Where at the passing of this Act possession has been taken of any railroad undertaking or part thereof in pursuance of section sixteen of the Regulation of the Forces Act, 1871, or otherwise, possession thereof may be retained without any renewal of the warrant granted by the Secretary of State in pursuance of that section upon the same terms as to payment as those heretofore in force, and the Minister may exercise over all such undertakings all such powers as have hitherto been exercised by the Board of Trade under the said Act or with the consent of the owners of the undertakings or otherwise, and such other powers as may be conferred by this section or agreed to by the railway companies concerned:

(b) The Minister may take possession in the name or on behalf of his Majesty of the whole or any part of any other railway undertaking or of any light railway, tramway, canal, inland navigation, harbor, dock or pier undertaking, or of any plant belonging thereto or used thereon, and of the railway wagons of any private owner required for use on any railway of which possession has been taken, and of any barges, tugs, and other craft required for use on any canal of which possession has been taken.

(c) The directors, officers, and servants, of any undertaking of which, or of the plant whereof, possession is retained or taken shall obey the directions of the Minister as to the user thereof and any directions of the Minister

(i) as to the rates, fares, tolls, dues, and charges to be charged:

(ii) as to the salaries, wages, and remuneration and conditions of employment of persons employed on or in connection with any undertaking of which possession has been taken:

(iii) as to the working or discontinuance of the working of the undertaking or any part thereof including directions as to keeping open or closing of any stations:

(iv) for securing that the permanent way, rolling stock, plant, appliances, or equipment, whether fixed or moving, are satisfactory in type and design:

(v) as to the carrying out of alterations, improvements, and additions which the Minister considers necessary for the public safety or for the more efficient and economic working of the undertaking:

(vi) for securing co-operation between undertakings and for securing the common user of facilities, rolling stock and equipment whether fixed or movable:

(vii) for affording running powers over their system, or any part thereof, to the owners of any other undertaking:

(viii) for securing that manufacturing and repairing facilities, and auxiliary and ancillary services shall be used, and the purchase and distribution of stores shall be conducted, in such manner as may be most conducive to economy and efficiency:

(ix) as to the preparation and submission to the Minister at such times and in such form and manner as the Minister may require of statistics and other returns, and of accounts at such times and in such form and manner as the Minister, with the consent of the treasury, may, by regulations, prescribe:

(d) For enabling any directions given by the Minister as to alterations, and improvements and additions to be carried into effect the Minister may, by order, authorize the owners of any undertaking to acquire any land and to construct any works, and the order may incorporate the Lands Clauses Acts, subject to such modifications as may be specified in the order, being modifications of those acts made or authorized to be made by the Development and Road Improvement Funds Act, 1909, or any other enactment, and may incorporate or apply any of the provisions of any enactment relating to the construction, maintenance, or working of railways, light railways, tramways, canals, harbors, docks and piers:

(e) Any rates, fares, tolls, dues, and other charges directed by the Minister shall be deemed to be reasonable, and may be charged, notwithstanding any statutory provisions limiting the amount of such charges or increases therein.

(4) Where by reason of the exercise of the powers under this section the value of any undertaking has been depreciated or enhanced, the owners of the undertaking shall, so far as any loss is not provided for by the payments mentioned in paragraph a, be entitled to be recouped or liable to pay the amount by which that value has been so depreciated or enhanced, and if any question arises as to that amount or otherwise with respect to the financial relations between the Minister and any person affected by the exercise by the Minister of any of his powers under this section, the question shall be determined by the Railway and Canal Commission; and without prejudice to any other form of payment or satisfaction, the Treasury on the recommendation of the Minister may, as or as part of the consideration for exercising any powers of control under this section, guarantee the payment of any dividends on any stock or other securities issued by the owners of an undertaking up to such amount as may be agreed, or the payment of any working expenses of the undertaking, and any sums required to fulfill any such guarantee shall be paid out of moneys provided by Parliament.

4. (1) His Majesty in Council may at any time after the passing of this Act by order authorize the Minister—

(a) to purchase by agreement or compulsorily and work the whole or any part of any railway, light railway, tramway, canal, waterway or inland navigation, harbor or dock undertaking the acquisition of which is, in the opinion of the Minister, expedient for improving facilities for locomotion and transport:

(b) to enter into and carry into effect agreements with the owners of any such undertaking for the placing of the undertaking or any part thereof under the control of the Minister to such extent and subject to such financial arrangements as with the consent of the Treasury may be agreed:

(c) himself to establish any such undertaking and to work and maintain the same and for that purpose to acquire any lands either by agreement or compulsorily, and the order may incorporate the provisions of the Lands Clauses Acts, subject to such modifications as may be specified in the order, being modifications of those Acts made or authorized to be made by the Development and Road Improvements Funds Act, 1919, or any other enactment, and the Order may incorporate or apply any of the provisions of any enactment relating to the construction, maintenance, or working of railways, light railways, tramways, canals, harbors, docks and piers:

(d) to lease the whole or any part of any undertaking so acquired or established:

(e) to purchase or take on hire and lease railway wagons belonging to any private owners:

(f) to establish, maintain, and work transport services by land or water:

and it shall be lawful for the owners of any undertaking to which any such Order applies to enter into and carry into effect

any agreement authorized by or required for the purposes of the Order.

(2) An order in Council under this section authorizing the purchase of any undertaking or part thereof may provide for vesting the undertaking or part in the Minister either subject to any mortgages, debentures, debenture stock, or other charges and obligations affecting the undertaking or discharged therefrom, or from any of them, and for preserving the rights and security of the persons entitled to such charges, or for giving them a substituted charge on the consideration paid for the undertaking.

(3) The consideration for the undertaking or property so acquired shall, in default of agreement, be determined by a court of arbitration constituted in accordance with the provisions of the Order authorizing the acquisition.

(4) Any capital sum payable under an agreement or award may be discharged in whole or in part, if the Treasury so direct, by the issue of securities, and the amount of such securities equivalent to such capital sum shall, in default of agreement, be determined by a court of arbitration constituted as aforesaid.

For that purpose the Treasury may create and issue securities the interest on which shall be charged on the revenues of the undertakings transferred after the payment thereout of working expenses, and if and so far as such revenues are insufficient on the Consolidation Fund of the United Kingdom, or the growing produce thereof, and which shall bear interest at such rate and shall be subject to such conditions and regulations as to repayment, redemption, or otherwise as the Treasury may direct or prescribe, and the regulations may apply with the necessary modifications and of the enactment relating to Local Loans Stock.

(7) Before an Order to Council is made under this section, a draft thereof shall be laid before each House of Parliament for a period of not less than 30 days during which that House is sitting, and if either of those Houses before the expiration of those 30 days presents an address to his Majesty against the draft, or any part thereof, no further proceedings shall be taken thereon without prejudice to the making of new draft order.

5. (1) The Minister may, subject to the approval of the Treasury, make advances out of the moneys provided by Parliament to any authority, company, or person, either by way of grant or by way of loan, or partly in one way and partly in another, and upon such terms and conditions as he thinks fit for any of the following purposes:—

(a) The construction, improvement, or maintenance of railways, light railways, or tramways:

and the power of the Treasury on the recommendation of the Development Commissioners to make advances for any of the purposes aforesaid shall cease and determine.

Power To Require Statistics and Returns

6. It shall be the duty of the owners of any railway, light railway, tramway, canal, inland navigation, dock, harbor, pier or electricity undertaking, and the authority or person liable to maintain any road or bridge, to furnish to the Minister at such times and in such manner and form as he may require for the purposes of his powers and duties under the Act.

Staff and Remuneration.

8.—(1) The Minister may appoint such secretaries, officers, and servants of the Ministry as the Minister may, subject to the consent of the Treasury as to number, determine.

(2) There shall be paid out of moneys provided by Parliament to the Minister an annual salary not exceeding five thousand pounds, and to each of the Parliamentary secretaries of the Ministry an annual salary not exceeding fifteen hundred pounds, and to the other secretaries, officers, and servants of the Ministry such salaries or remuneration as the Treasury may from time to time determine.

10.—(1) The office of Minister of Ways and Communications, or of the secretary in the Ministry of Ways and Communications, shall not render the holder thereof incapable of being elected to or sitting or voting as a member of the Commons House of Parliament, but not more than two such secretaries shall sit as members of that house at the same time.

(2) The person who is first appointed to be Minister shall not by reason of such appointment, if a member of the Common House of Parliament, vacate his seat as such member.

Equipment and Supplies

The committee representing the steel interests conferred with the Industrial Board of the Department of Commerce, Washington, on Wednesday, in an effort to reach an agreement on steel prices. No definite agreement was reached at the first day's conference, but it was hoped it would be possible to announce a schedule of prices on Thursday.

Locomotive Deliveries to March 8

The following new locomotives were shipped during the week ending March 8:

Works	Road	No.	Type
American..	Maine Central	6	USRA Mikado.
	Erie R. R.	2	USRA St. Fe.
	Penn, L. W.	3	Santa Fe.
	Central R. R. of Ga.	2	Mallet.
	Chicago & North Western	2	USRA 6W. Sw.
	Chicago & North Western	1	Mikado.
	Ches. & Ohio	1	10-W. Sw.
	A. C. L.	1	USRA Pacific.
	Texas & Pacific	2	USRA 6W. Sw.
		20	
Baldwin...	Union Pacific	3	Pacific.
	C. B. & Q.	2	Mikado.
	Lehigh Valley	1	Pacific.
	A. T. & St. Fe.	2	Mikado.
	Ill. Cent.	1	Mikado.
	Great Northern	2	8-w. Sw.
	C. C. & O.	2	Mikado.
	P. R. R.	1	Mikado.
	P. & R.	1	Consol.
	Total	35	

Freight Cars

The United States Government is inquiring for one flat car for the Navy Department.

Mayer & Lage, New York, are inquiring for four to eight 20-ton, type E. S. T. platform cars for France.

The Deschanel International Corporation, New York, is inquiring for 10-ton and 20-ton standard French type box cars for France.

Iron and Steel

Rail for Sale by War Department

The director general of military railways has 45,000 tons of steel rail, both Bessemer and open hearth, with the necessary angle bars, bolts, spikes, tie plates, rail braces, frogs, switches and crossings for sale. The rail is of the A. R. A. Type "B" 80 lb. section. The specification for the Bessemer rail is not given, but that for the open hearth is substantially the same as the A. R. E. A. specification as given in the 1915 edition of the manual. About one-third of this material is stored at New York (Kearney, N. J.), and the remainder at Norfolk, Va. Regional directors are asking the federal managers to see if any of the roads under their jurisdiction can use any of this material.

Miscellaneous

Commerce Reports in a recent issue contained the following trade opportunity:

28712.—An American company about to open up an industry in Honduras proposes to reconstruct the present wharf of reinforced concrete, to reconstruct and maintain the roadbed of a railway, to build a new railway line, to erect one steel bridge, and to open up new lands. It desires to purchase machinery and supplies for this work. Quotations should be given f. o. b. New Orleans. References.

Further details may be obtained from the district or cooperative offices of the Bureau of Foreign and Domestic Commerce or from the head office in Washington.

Supply Trade News

The Chicago Pneumatic Tool Company, Chicago, has opened offices and warehouses at Tulsa, Okla.

Clyde P. Benning, service manager of Mudge & Company, Chicago, has been appointed assistant general manager with headquarters at Chicago, in which position he will assist the railroad companies in developing motor car organizations. Mr. Benning was born at Atchison, Kan., on September 20, 1888, and received his education in the public schools of that city. His business career dates back to 1903, at which time he entered the employ of the Missouri Pacific, serving in several clerical positions with that company until April, 1905, when he entered the shops of that road as a machinist apprentice, later being promoted to machinist. In 1910 he resigned from the Missouri Pacific in order to accept a position with the Tool & Railway Specialty Company at Atchison, Kan., with which concern he remained until December 15, 1914, leaving at that time to enter the employment of Mudge & Company as shop inspector. Previous to his recent appointment as assistant general manager, Mr. Benning was service engineer and in 1916 western manager, with headquarters at San Francisco, Cal., and during the latter part of 1918 held the position as service manager, with headquarters at Chicago, until his appointment as stated above.



C. P. Benning

Jean K. Vanatta, mechanical engineer of Mudge & Company at Chicago, has been appointed service manager in which capacity he will have charge of the company's service engineers, who are working with the motor car men on the various railroads throughout the country, as well as the developing of the service idea. Mr. Vanatta was born at Colorado Springs, Colo., on June 2, 1888, and received his education in the Colorado Springs High School and the University of California, where he graduated from the College of Engineering in 1910. He began his business career immediately after his graduation as special apprentice of the Washington Air Brake & Machine Company. During the year 1914 he was supervisor of the engineering and development work of the Great Western Mining and Milling Company at Hayman, Colo., and the following year he was in the employ of the Bell Telephone Company on outside construction work. Mr. Vanatta joined the forces of Mudge & Company as shop and material inspector in September, 1916, which position he held until his present promotion to the office of service manager.



J. K. Vanatta

Nelson B. Gadch has been appointed district manager of sales for the Chicago Pneumatic Tool Company, with headquarters in the Metropolitan Bank building, Minneapolis, Minn.

Fred H. Waldron, Minneapolis representative of the Chicago Pneumatic Tool Company, has been appointed manager of the pneumatic tool sales division, to succeed **J. D. Osgood,** who has resigned.

John W. Foyle, vice-president of the Gustin-Bacon Manufacturing Company, Kansas City, Mo., who has been a major in the United States Army, has been released from service and returned to his duties with his company on March 1.

J. I. Edwards has been appointed manager of the Rock Drill Sales division of the Chicago Pneumatic Tool Company, succeeding **E. Eklund,** who has been appointed special foreign representative, and who will leave shortly for Europe in the interest of that company.

J. A. Farris, who has been connected with the **Whiting Foundry and Equipment Company,** at Chicago, as crane engineer in the engineering department for the past ten years, has entered the employment of Scully-Jones & Co., at Chicago, as special sales engineer on cranes.

A. N. Willsie has resigned from the Chicago, Burlington & Quincy, with which company he has been connected for the past 29 years, to accept the position of district engineer of the Locomotive Stoker Company, with headquarters at Chicago. Mr. Willsie was born in Galesburg, Ill., where he received his primary school education. He entered the service of the Burlington on April 20, 1880, as an errand boy in the master mechanic's office, and later filled the position of chief clerk to the master mechanic in this same office. In 1890 he became a locomotive fireman, and then was engineman for six years when he became road foreman of engines, from which position he was promoted to division master mechanic at Brookfield, Mo., Aurora, Ill., and Omaha, Neb. Mr. Willsie left the mechanical department to take the position of division superintendent in the operating department, and for two years filled this position at St. Joseph, Mo., and three years at Hannibal, Mo. Since June, 1912, Mr. Willsie has been permanent chairman of the fuel economy committee and superintendent of fuel economy of the Burlington, with headquarters in Chicago, reporting direct to the general superintendent of motive power, and vice-president in charge of operation.



A. N. Willsie

Chicago Pneumatic Tool Company

The Chicago Pneumatic Tool Company, Chicago, in its annual report for the year ending December 31, 1918, shows net earnings of $535,833.56, which is equal to 8.32 per cent on the stock. The report for the year previous shows net earnings of $1,169,390, or 18.3 per cent on the stock.

In discussing the financial status of the company, H. A. Jackson, the president, said in part:

"The great volume of business of an imperative nature which had accumulated on the company's books because of the country's war activities, produced a condition disclosing certain deficiencies which the directors took steps to correct. An entire reorganization was effected and was practically completed in June, 1918.

"In the meantime, the Emergency Fleet Corporation called upon the company for increased production. An inspection of the plant by the new management revealed that in order to obtain the additional output required, the equipment must be scientifically balanced, further facilities provided, and improved shop management applied. Considerable quantities of material, found to be obsolete, were disposed of. Moreover, an investigation of the company's accounting methods made by the new management indicated the desirability of certain substantial changes, especially in the basis of writing off depreciation.

"An immediate and general revision of the old methods of production was undertaken, resulting in a greatly increased volume of output, which more nearly met the requirements of the industry concerned in the government's war program. The company's cost and accounting systems were revised. There has been charged off on account of depreciation in inventories, machinery, etc., together with bad debts and shrinkages due to discrepancies in cost accounting and other items, an amount of $872,413.16.

"Though a heavily increased production has been marketed at prevailing prices, the resultant earnings have been affected by the substantial increase in the cost of labor and materials.

"On account of depreciations necessary because of the transition from a war to a peace basis, the British and Canadian subsidiary companies are not showing a large return for the year. The British subsidiary was heavily involved in Russia, and the unfortunate developments in that country have made necessary the setting aside of relatively large reserves on the books of that company.

"The balance sheet of the company is as follows:

ASSETS

Capital Assets:	
Lands, buildings, machinery, equipment, etc., plus additions during the year less reserve for depreciation	$7,662,177
Investment in foreign subsidiary company	58,309
Special funds for redemption of 6 per cent bonds	31,161
Current Assets:	
Inventories, accounts and notes receivable, etc., cash	9,073,885
Deferred Charges:	
Discount on bonds, interest, insurance, etc., prepaid	393,306

LIABILITIES

Capital Liabilities:	
Capital stock	$6,448,800
First mortgage bonds	3,250,000
Current Liabilities:	
Notes payable, accounts payable, including payrolls, accrued liabilities, etc.	2,329,771
Reserves:	
For contingencies and for first mortgage bond sinking fund	408,162
Appropriated Surplus:	
For investment in additions to property and working capital	2,000,000
Unappropriated surplus	2,782,107

Trade Publications

BLAW-KNOX PRODUCTS.—The Blaw-Knox Company, Pittsburgh, Pa., has issued a diminutive booklet on its products, 2½ in. by 3¼ in. in size. There are eight pages printed in three colors illustrating and describing the fabricated steel work, plate work, transmission towers, furnace equipment, Blaw buckets, Blaw forms and Blaw mixers produced by this company.

THE BEST YARD MASTER is the man who knows human nature and who can do the things he would have his men do just a little better than they can, and do it just a little quicker than they can; also he is considerate of his men. Kind when kindness is needed, severe when it is necessary to be severe, and absolutely a tyrant when nothing else will bring results. The best yard master is one that instead of telling his men how to do switching or to handle certain trains in and out of his yard, will ask them how they are going to do it, prefacing his request for knowledge with some pleasant remark, evidencing good will. If he is a good yard master he will listen to what his men propose to do, especially if it is a difficult task, and will carefully weigh what they suggest. If he knows no better way he will let them do it their way, though it may differ somewhat from his. By so doing he can feel assured that he has encouraged individuality in his men and will reap the benefit, as it becomes a matter of personal pride with the yardmen to make good their suggestion. Such a yardmaster gains the good will and loyalty of his men.—*H. D. McKee, Benwood, W. Va.*

Financial and Construction

Railway Financial News

CHICAGO, ROCK ISLAND & PACIFIC.—The New York Stock Exchange on March 12 listed this company's $29,422,100 7 per cent preferred stock, $25,108,100 6 per cent preferred stock and $75,000,000 common stock.

ERIE.—J. P. Morgan & Co. have announced a new offering of $15,000,000 three-year 6 per cent notes to refund an equal amount of two-year notes maturing April 1. Holders of the maturing notes will have the privilege of exchanging them for the new notes at 98 and interest, a price which will bring the owners a return of 6¾ per cent. The War Finance Corporation stands ready to take any amount of the notes which are left after the exchange privilege is closed and after the public offering has been concluded. The price to the corporation will also be 98 and the funds will be used to pay off holders of the two-year 5 per cent notes who elect to receive cash. The railroad company agrees to maintain collateral behind the issue with a market value of 125 per cent of the amount of the notes.

GRAND TRUNK.—The directors have decided that, owing to immensely increased expenses, caused by war conditions, the company was unable to earn any dividends on guaranteed or preference stocks for the past year. These dividends have not been paid since the first half of 1917.

ILLINOIS CENTRAL.—Robert S. Lovett has been elected a director to succeed R. W. Goelet.

PENNSYLVANIA.—President Samuel Rea has announced that the directors of the company had authorized him to borrow $22,000,000 from bankers to be used in the payment of overdue federal vouchers for expenditures incurred in governmental operation of the Pennsylvania system, including purchases of fuel, materials and supplies, and expenditures for improvement and betterment work. The funds will be used exclusively in paying these vouchers. Arrangements have been made for immediate payment of the more pressing of these debts. Director General Hines has approved of the foregoing plan and is willing, upon appropriation by Congress of funds available for that purpose, to promptly make payment of the $22,000,000, if then due the companies in the Pennsylvania system on account of compensation.

TEXAS & PACIFIC.—The stockholders have elected a new board of directors consisting of Henry A. Bishop, Harry Bronner, B. D. Caldwell, Kingdon Gould, George G. Haven, Alexander J. Hemphill, C. C. Huitt, A. A. Jackson, Alvin W. Krech, J. H. McClement, N. S. Meldrum, Dunlevy Milbank, S. T. Morgan, Wm. Church Osborn, Finley J. Shepard, John I. Waterbury and Wm. H. Williams.

The election of a new board is the first step in a plan to effect a financial readjustment and release the property from receivership. Although a majority of the new directors have affiliations with the Missouri Pacific, the board is the result of a compromise of all interests. Of the Texas & Pacific's $25,000,000 second mortgage income bonds, the Missouri Pacific owns $23,703,000.

Railway Construction

QUEBEC CENTRAL RAILWAY.—This road has awarded contracts for a car shop with concrete substructure and a brick and steel superstructure to be built at Newington, Que. It will be 75 ft. by 225 ft. and one-story high, cost about $42,000.

POINTS FOR THE YARDMASTER.—If the company will afford a good wardroom for your switchmen, arrange for laborers to give it a good cleaning occasionally; have it provided with a stove, during cold weather, and have a good fire going when the men come to lunch. This requires but a little effort and the majority of the men will appreciate it; furthermore, they will have no occasion to leave work to prepare a fire—*H. D. McKee.*

Railway Officers

Railroad Administration

Central

W. A. Webb, heretofore general manager of the Missouri, Kansas & Texas of Texas, has been appointed a member of Railway Board of Adjustment No. 1, with office at Washington, vice **John G. Walber**, who was recently appointed labor assistant to the director of operation.

Federal and General Managers

George E. Johnson has been appointed assistant to the general manager of the Denver & Rio Grande, the Rio Grande Southern, the Denver Union Terminal, the Pueblo Union Depot and the Salt Lake City Union Depot, with headquarters at Denver, Colo.

Morris S. Hawkins has been appointed federal manager for the Norfolk Southern, the Carolina Railroad and the Kinston Carolina Railroad, with office at Norfolk, Va., to succeed **J. H. Young**, who has been appointed senior assistant director of the division of operation, with office at Washington, D. C.

Charles N. Whitehead, general manager of the Northern lines of the Missouri, Kansas & Texas, who has been appointed federal manager of the Katy system, with headquarters at St. Louis, Mo., was born at Princeton, Ill., in 1876, and received his early education in the public schools of that city. In 1893 he entered the employ of the Missouri, Kansas & Texas as a messenger, after which he was consecutively to 1905 clerk and stenographer in the freight and ticket office, stenographer and clerk to the superintendent, stenographer and clerk to the general freight agent, stenographer and clerk to the general attorney, chief clerk to the superintendent, stenographer and clerk to the general counsel. In 1905 he was appointed assistant secretary, becoming secretary in 1909, and soon after secretary and treasurer of the same road. In April, 1913, he was appointed assistant to the president of the Missouri, Kansas & Texas, and in 1914 was elected vice-president, with headquarters at St. Louis, Mo. When the railroads came under government control, Mr. Whitehead was appointed general manager of the Missouri, Kansas & Texas, Northern Lines, with headquarters at St. Louis, which position he held until his recent appointment as federal manager of the Missouri, Kansas & Texas, the Missouri, Kansas & Texas of Texas (including the Trinity branch and the Beaumont & Great Northern), the Missouri, Oklahoma & Gulf, the Oklahoma Belt and the Wichita Falls & Northwestern.



C. N. Whitehead.

Operating

J. G. Fitzhugh has been appointed superintendent of safety and fire protection of the Gulf, Colorado & Santa Fe and associated lines, with headquarters at Galveston, Texas.

John Connors has been appointed trainmaster of the Racine and Southwestern division of the Chicago, Milwaukee & St. Paul, with headquarters at Beloit, Wis., vice **C. E. Corcoran**, deceased.

George E. Johnson has been appointed assistant to general manager of the Denver & Rio Grande, the Rio Grande Southern, the Denver Union Terminal, the Pueblo Union Depot & Railroad, and the Salt Lake City Union Depot and Railroad, with headquarters at Denver, Colo.

William Elmer, acting superintendent of the Philadelphia division of the Pennsylvania Railroad, Eastern Lines, with office at Harrisburg, Pa., has been appointed superintendent of the same division, and **C. D. Young**, acting superintendent of the Schuylkill division, with office at Reading, has been appointed superintendent of the Schuylkill division.

Traffic

William Warner, assistant general freight and passenger agent of the Los Angeles & Salt Lake, has resigned, effective April 1. Mr. Warner's entire business career has been in the railroad service, beginning in 1900. Before joining the forces of the San Pedro, Los Angeles & Salt Lake, which is now the Los Angeles & Salt Lake, he was with the Chicago, Milwaukee & St. Paul, and later with the Kansas City Southern as contracting agent. He was general agent of the San Pedro, Los Angeles & Salt Lake, with headquarters at Chicago, for several years prior to his appointment as assistant general freight and passenger agent of the same road, with headquarters at Salt Lake City, Utah. Mr. Warner has accepted a position with Lederer & Dickson Company, grain commission merchants, Chicago.

Engineering and Rolling Stock

Lieutenant William H. Hobbs, 332nd Field Artillery, U. S. A., has returned from France and received his discharge from the army. On March 1, he resumed his position as assistant engineer on the Louisiana division of the Missouri Pacific, with headquarters at Monroe, La.

Louis Warren Duffee, whose appointment as chief engineer of the Gulf, Mobile & Northern, with headquarters at Laurel, Miss., has already been announced in these columns, was born in 1884, at Mobile, Ala., and was educated in the Alabama Polytechnic Institute. He began railway work in August, 1904, with the Bay Minette & Ft. Morgan Railroad. The following year he was appointed an assistant division engineer on the Louisville & Nashville, and then after three years of varied engineering work in Alabama and Indian Territory, he entered the service of the Mobile, Jackson & Kansas City, now part of the Gulf, Mobile & Northern, as resident engineer on maintenance and construction. In 1911, he was appointed locating engineer on the same road, which then became the New Orleans, Mobile & Chicago. Mr. Duffee was engaged in conducting new surveys and carrying out some construction work until 1917, excepting about two years, 1912 and 1913, when he was chief engineer of the Meridian & Memphis. In 1917, he was appointed special engineer of the Gulf, Mobile & Northern and had charge of federal valuation work and special engineering projects on that road. On December 1, 1918, he was made acting chief engineer, which position he held until his recent appointment as chief engineer of the same road as above noted.

E. Bruce Ford, whose appointment as assistant engineer in the Northwestern Region with office at Seattle, Wash., was announced in the *Railway Age* of March 7 (page 567), was born at Laceyville, Pa., on August 21, 1881, and received his education in the high school of that place and the State Normal School at Mansfield, Pa., later attending Lafayette College. Mr. Ford began railway work in July, 1902, as a tapeman and rodman on the Delaware, Lackawanna & Western, and one year later he entered the employ of the Pittsburgh, Shawmut & Northern and the Buffalo & Susquehanna as a draftsman. In 1905 he became a draftsman and masonry designer with the Syracuse Railroad Construction Company, at Syracuse, N. Y., and in 1906 was appointed assistant division engineer on the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Middletown, Ohio. The following year he was employed on the Chicago, Milwaukee & Puget Sound

as a resident engineer, and in 1909 he went with the Grand Trunk Pacific as a construction foreman. From 1910 to March 1, 1919, he served consecutively on the Great Northern; as draftsman and assistant engineer, on the Marcus division; assistant engineer at Vancouver, B. C., on terminal developments at that place; and office engineer in the principal assistant engineer's office at Seattle, Wash., which latter position he held prior to his appointment as assistant engineer of the Northwestern Region.

Warren Y. Scott, who has been appointed signal engineer of the Boston & Maine, with office at Boston, Mass., as has already been announced in these columns, was born on September 23, 1877, at South Boston, Mass., and graduated from Hyde Park High School in 1894. From the spring of 1895 to 1896, he worked for the Union Switch & Signal Company, on the New York, New Haven & Hartford, during signal changes, on account of the New Haven changing from left to right hand running. On January 13, 1896, he entered the service of the Boston & Maine as a helper. He subsequently served consecutively as general helper, signalman, maintainer, foreman and general foreman. In April, 1907, he was appointed supervisor of electric signals, and in October, 1911, was appointed general inspector of signals. Since September 1, 1916, he has served as assistant signal engineer until his recent appointment as signal engineer of the same road and subsidiary lines.



W. Y. Scott

E. L. Martin, engineer of maintenance of way of the Missouri, Kansas & Texas, at Parsons, Kan., who has been appointed chief engineer of the Missouri, Kansas & Texas, the Oklahoma Belt and the Missouri, Oklahoma & Gulf, as was announced in the *Railway Age* of March 7 (page 553), graduated from the Agricultural and Mechanical College of Texas in June, 1899, and began his railway career as an axman on location work with the Texas & New Orleans. In September, 1899, he went to the Southern Pacific and served in various capacities in the engineering department until he became assistant engineer. In 1902, he was appointed assistant engineer on the Kansas City Southern, at Pittsburgh, Pa., and left that position in 1905 to become division engineer and assistant engineer on construction for the Gulf, Colorado & Santa Fe, in Texas. In 1912 he was appointed assistant superintendent of the Southern Pacific at Lafayette, La., and the following year was made division engineer on the Missouri, Kansas & Texas, at Denison, Texas. Later he was appointed engineer of the Missouri, Kansas & Texas in charge of the construction of the San Antonio terminals, which position he held until his appointment as engineer of maintenance of way for the same road in April, 1917. As chief engineer of the Missouri, Kansas & Texas, the Wichita Falls & Northwestern and the Missouri, Oklahoma & Gulf, with headquarters at Dallas, Texas, Mr. Martin succeeds **F. G. Jonah,** chief engineer of the Missouri, Kansas & Texas and the Missouri, Oklahoma & Gulf, and **F. Merritt,** chief engineer of the Missouri, Kansas & Texas Railway of Texas and the Wichita Falls & Northwestern, both of whom were assigned to other lines in connection with the regrouping of roads in the Southwestern Region, as mentioned in our issue of March 7, on page 552.

Purchasing

George W. Snyder, who has been appointed general storekeeper of the Pennsylvania Railroad, eastern lines, with headquarters at Philadelphia, Pa., as has already been announced in these columns, was born at Pottsville, Pa., on January 9, 1866, and was educated in the public schools of Pottsville and at Lehigh University. Mr. Snyder began railway work with the Pennsylvania Railroad on November 1, 1884, as rodman on the Renovo division. He was appointed assistant supervisor of the same division on January 1, 1886, and in August, 1890, was promoted to supervisor. On June 10, 1897, he was appointed supervisor on the Northern Central at Baltimore, and three years later was transferred to the Altoona yard. He was promoted to division engineer of the Monongahela division in January, 1901, and in June, 1903, was transferred to the Pittsburgh division. On April 1, 1907, he was appointed principal assistant engineer of the Western Pennsylvania division; in October, 1917, he was made assistant engineer, maintenance of way, in charge of bridges and structures, and served in that position until his recent appointment as general storekeeper of the Pennsylvania Railroad, eastern lines, as above noted.

Corporate

Operating

J. J. Horn, whose appointment as superintendent of the Kenora division of the Canadian Pacific, with headquarters at Kenora, Ont., was announced in the *Railway Age* of February 28 (page 522), was born at Carleton Junction, Ont., on November 26, 1873, and began railway work on January 12, 1892, with the Canadian Pacific in the capacity of agent and operator on the Lake Superior and Manitoba division. Previous to his recent appointment as superintendent of the Kenora division, Mr. Horn served from 1895 to 1911 as train despatcher of the Fort William and Kenora division; from 1911 to 1912 as chief despatcher of the Kenora division and from 1912 to 1913 as inspector of transportation, with headquarters at Winnipeg, Man. From 1913 to 1915 he was chief despatcher of the Kenora division; then to 1916 was trainmaster, and from 1916 to the date of his recent appointment was chief train despatcher of the Kenora division of the same road.



J. J. Horn

F. A. Rutherford has been appointed trainmaster on the Grand Trunk, with office at London, Ont.; **H. R. McLennan,** chief despatcher at Brantford, has been appointed trainmaster with office at Brantford, succeeding **R. E. Newcomer,** resigned, and **W. K. Rogers** has been appointed chief despatcher with office at Brantford, succeeding Mr. McLennan.

Executive, Financial, Legal and Accounting

Colonel E. M. Heigho, president of the Pacific & Idaho Northern, has resigned on account of ill health. Mr. Heigho was born at Grays, Essex, England, on October 23, 1867, and began railway work in 1882 as an office boy in the general freight office of the Michigan Central at Detroit, Mich., since which he was employed consecutively to 1886 in various clerical capacities in the local offices of the Erie & North Shore Dispatch, the Wabash, St. Louis & Pacific, and the Michigan Central, all at Detroit, Mich. In 1887 he was made chief clerk to the assistant freight claim agent of the Union Pacific at Kansas City, Mo., and later clerk in the freight auditor's office of the same road at Omaha, Neb. From 1887 to 1890 he served as chief clerk to the superintendent of the Idaho Central at Boise City, Idaho. In 1892 he was a rate

clerk in the freight traffic manager's office of the Missouri Pacific at St. Louis, Mo., leaving that position to become chief bookkeeper for a foundry company at Detroit, Mich. He returned to railway service as clerk in the freight traffic department of the Oregon Short Line at Salt Lake City, Utah, in 1899. Early in 1904 he was made auditor of the Pacific & Idaho Northern. In July of that year he was elected vice-president, general manager and treasurer of the same road, and in December, 1909, he was elected president, general manager and traffic manager. In September, 1915, he was appointed receiver of the Pacific & Idaho Northern, at which time he combined the duties of the offices of the general manager, traffic manager, treasurer and purchasing agent, with those outlined above. Mr. Heigho suffered a severe stroke of paralysis in November, 1917, but continued in intimate touch with his duties as president and general manager until October, 1918, when he resigned as general manager, but retained the presidency.

Purchasing

J. M. Velasco, local purchasing agent of the National Railways of Mexico, at New York, has been appointed assistant to the general purchasing agent, with office at Mexico City, Mex., and **F. P. de Hoyos**, general agent of the traffic department, at New York, is now also local purchasing agent, with office at New York.

Railway Officers in Military Service

Major C. P. Stembel, who was general superintendent on the Virginian Railway during 1917 and 1918, is now American delegate of a sub-commission, with headquarters at Saarbrucken, Germany, in the French zone of occupation.

Obituary

William H. Pleasants, president of the Ocean Steamship Company, with office at New York, died on March 18, at the age of 56. Mr. Pleasants served several years as general freight agent at Jacksonville, Fla., on the Florida Central & Peninsular, now a part of the Seaboard Air Line.

M. J. Greeney, supervisor of the Lehigh Valley, with office at Buffalo, N. Y., died on February 28, at the age of 55. He was born at Reading, Pa., in June, 1864, and entered the service of the Lehigh Valley as a water boy at White Haven, Pa., in 1880. He was appointed roadmaster, at Sayre, in 1896, and since 1899 served as supervisor of track at Buffalo.

V. T. Kissinger, formerly superintendent of telegraph for the Chicago, Burlington & Quincy, and later connected with the Western Union Telegraph Company, died, on March 13, of heart failure at his home at Siloam Springs, Ark., at the age of 60 years. Mr. Kissinger was connected with the Western Union for many years as chief operator at St. Paul, Minn., and in 1890 he was appointed general wire chief and electrician, with headquarters at Chicago. In 1904 he entered the service of the Chicago, Burlington & Quincy as assistant superintendent of telegraph, at Lincoln, Neb., and later was advanced to the position which he held at the time of his death. He was retired on a pension by the Western Union Telegraph Company on last October.

J. P. Bradfield, formerly assistant general manager of the New York Central, died in Buffalo, N. Y., on March 12 at the age of 66. He was born at St. Catharine, Ont., and previous to November, 1882, served as despatcher on the Wallkill Valley, now part of the West Shore, and as agent and operator on the Lake Shore & Michigan Southern. He was then to March, 1885, train despatcher on the Hudson River division of the West Shore. In March, 1885, he was appointed superintendent of the same division and held that position until November 1890. He later served as superintendent of the New York, Ontario & Western and in February, 1895, was appointed superintendent of the Western division of the New York Central & Hudson River. From January to July, 1903, he was assistant general superintendent, and from July, 1903, to June, 1906, was general superintendent. He was promoted to assistant general manager of the same road in June, 1906, remaining in that position until March, 1907. He had been in poor health since his retirement from active service.

Thomas Fletcher Oakes, formerly president of the Northern Pacific, died at Seattle, Wash., on March 14, at the age of 76 years. Mr. Oakes was born at Boston, Mass., on July 16, 1843, and entered railway service on June 1, 1863, as purchasing agent on the Kansas Pacific, which position he held for two years when he became purchasing agent and assistant treasurer. The following six years he was general freight agent of the same road when he was elected vice-president, in which capacity he served one year, until his appointment as general superintendent. From April, 1879, to May, 1880, he was general superintendent of the Kansas City, Fort Scott & Gulf and the Kansas City, Lawrence & Southern, and from May, 1880, he was vice-president and general manager of the Oregon Railroad & Navigation Company for one year. The next two years he acted in the capacity of vice-president of the Northern Pacific, and the following five years he held the position of vice-president and general manager of the same road. On September 20, 1888, he was elected president of the Northern Pacific, combining the duties of the general manager with his office from the date of his appointment to May 16, 1889. On August 15, 1893, he was appointed receiver of the Northern Pacific in which capacity he acted until October 25, 1895.

George Hodges, manager of the troop movement section of the Division of Operation of the Railroad Administration, died suddenly at Washington on March 14, of pneumonia.



G. Hodges

Before the taking over of the railroads by the government, Mr. Hodges was general secretary of the Railroads War Board, and was also in general charge of the troop movement for the railroads. He has also been for several years chairman of the Committee on Relations between Railroads and affiliated committees of the American Railway Association, and he was recently appointed chairman of a temporary war committee of the transportation section of the reorganized American Railroad Association. Mr. Hodges entered railway service in 1886, with the Erie and remained with that road until 1903, when he entered the service of the Baltimore & Ohio. In 1908 he was appointed assistant agent for the receivers of the Seaboard Air Line, and in 1910 he became connected with the Special Committee on Relations of Railway Operation to Legislation, of which he became secretary and later chairman. In 1912 he was also appointed assistant general agent of the American Railway Association, with headquarters in Chicago, and in April, 1916, he was elected chairman of the Committee on Relations between Railroads.

POINTERS FOR THE YARDMASTER.—Train your men to keep their eyes open for cars of perishable or important freight when moving about the yard. They often can spare a few minutes to place or switch out an important car when you are not about; and when they do so give them credit for it. If they should ever make a mistake and get out the wrong car don't look wise and raise trouble, but pass it over in a tactful manner; there are two sides to the ledger.—*H. D. McKee.*

EDITORIAL

Railway Age

DAILY EDITION

The Value of Large Committees

It is to be hoped that the American Railway Engineering Association will not adopt the suggestion which has been made that it follow the practice of the old American Railway Association in the appointment of small committees. Much of the success of the committee work of the Engineering Association has resulted from the exchange of ideas between the relatively large number of men on the committees incident to the consideration of their subjects and the preparation of their reports. It has been said that it is generally the case that a few members of a committee do most of the work. Even though this may be true the detrimental results of inactive members is much greater on a small than on a large committee. Furthermore, the active identification of a large proportion of the members of an organization doing committee work is a source of great strength to that organization. It is also of educational value to the members who have the opportunity of serving on the committees and participating in the discussions.

Water Service Organization

The reports submitted to the convention year after year by the Committee on Water Service are the best possible evidence of the necessity for a radical change in attitude towards this department on the part of many of the railroads. Each year the reports are evidence of the fact that they are the work of experts and that experts must necessarily be employed if the railroads are to derive the benefits that should accrue to them as a consequence of the work and findings of the committees. In the face of these facts it is surprising to note that the common practice of railroads is to organize the water service department as an addition to some other department or branch of the service, and without a responsible directing head. When the importance of the water service to the other departments, notably the motive power and operating departments, is considered it seems that common prudence would suggest the placing of this department on the plane its importance warrants.

Low Unit Stresses

The discussion of the report of the Committee on Iron and Steel Structures developed emphatic opposition to the continuation, in the new rules, of the prevailing method of proportioning structures through the use of low unit stresses in combination with moderate live loadings. The committee made very clear what its reasons were for adhering to this practice, namely, to avoid setting up a high unit stress as standard usage by persons who may or may not be qualified to assume the responsibility thereby incurred. This position is probably justified by the committee's realization of the exceedingly wide use which its specifications have received in the past. However, it is well to call attention to the fact that the practice of making due allowances for future ultimate loadings is not uncommon among railway bridge engineers in their individual practice, and as regards the specific method suggested by Messrs. Irwin and Motley, it is but just to recall that the late C. A. Cartlidge, once chairman of this same committee, put this idea into actual use on his greatest work, the Metropolis bridge.

The Length of Engine Districts

The Committee on Economics of Railway Operation presented an interesting and valuable discussion of the economic length of operating districts in its report submitted yesterday. By implication it approves districts considerably in excess of 100 miles in length. This is in contrast with the marked tendency towards the shortening of engine runs. In the early days of railway operation, particularly on the Western prairie roads, runs of 200 miles were not uncommon. The passage of the 16-hour law, the increasing density of traffic and resulting delays to trains and other influences have tended to shorten these districts until on many of the lines built in recent years, such as the Western Pacific and the Pacific Coast extension of the St. Paul, the average length of district is approximately 110 miles. The present tendency is distinctly towards the shortening of hours of work and this in turn leads to shorter engine districts. For this reason the attitude of the committee is somewhat surprising.

Prompt Publication of Specifications

The preparation of specifications for maintenance of way practices and materials is one of the most important and valuable functions of the American Railway Engineering Association. At the same time it is one which the association must perform with the utmost care, for many of the specifications tend to establish fundamental principles of practice whose influence is far-reaching. For this reason every effort should be made to secure the most complete discussion and consideration of specifications before their final adoption. This in turn requires that the membership be given an adequate opportunity to study the specifications before they are required to pass upon them. The association was called to pass upon no more important question this year than the specifications for steel bridges presented by the committee on Iron and Steel Structures, yet many members of the association were unprepared to pass upon them yesterday owing to the fact that they had received these specifications only a few days in advance of their departure for the meeting, and in many instances they had no opportunity to consider them at all. This is a mistake which has led frequently in the past to action by the association referring the recommendations of committees back for reconsideration and resubmission the following year, owing to the desire of the members to play safe and take no action which further consideration might show to be unwise. Some associations require all matters on which action by the

association is desired to be distributed to the membership at least 60 days before the meeting. Such a provision may or may not be wise, but it has much to commend it. The past year presented many difficulties to committees in the conduct and completion of their work and an unnecessarily heavy load has been thrust upon the secretary's office because of the late receipt of reports. The committees can promote the interests of the association in no more effective way than by completing their reports in ample time for their distribution to the membership well in advance of the annual meeting.

Senator Pomerene's Address

The progress which has been made within recent years in the education of leading public men regarding the railway question was very well illustrated by the address which Senator Pomerene of Ohio delivered at the dinner of the American Railway Engineering Association on Wednesday evening.

With some criticisms of the Railroad Administration which Senator Pomerene made, it is impossible to agree. The senator evidently had placed too much reliance upon alleged information regarding the advance in rates which had been furnished to the Senate committee by Clifford Thorne. He evidently had also accepted Mr. Thorne's well known views regarding the purpose and effect of some other things the Railroad Administration has done. The public man who takes either Mr. Thorne's information or views at their face value is pretty sure to go wrong regarding the particular matters to which they relate.

Senator Pomerene's address made it clear, however, that he has got a comprehensive grasp of the railroad problem and if the minds of the majority of the members of Congress are moving in the same direction that his is, a satisfactory solution of the problem should be reached in a comparatively short time in case Congress is convened early in extra session. Senator Pomerene very properly criticised the attempt to continue government operation for the purpose of making an experiment when government control was adopted, not to prove or disapprove the advantages of government operation, but solely as a war measure. He recognized the fact that the laws need to be changed so as to permit such agreements and consolidations between the railways in the same territory as the Interstate Commerce Commission may deem not prejudicial to the public interest.

He advocated government regulation of the issuance of railway security issues, a policy which all students of the subject now favor. He implied that he would favor similar provision which would establish a definite standard by which the regulating bodies in fixing rates should be required to measure their reasonableness and adequacy and it seems reasonable to infer from his address that he would be in favor of requiring the railways to be permitted to earn an average of six per cent upon the investment of their properties. There was little criticism of private management of the railways in his address and much criticism of government management.

Senator Pomerene is a Democrat, but he and many of the other leading Democrats in Congress agree with the leading Republicans in opposing government ownership and in favoring the return of the railways to private operation under legislation which will enable them to render better service and operate more efficiently and at the same time adequately increase their facilities. There is a striking difference between the addresses on the railroad question which were being made by leading public men a few years ago and the addresses which are being made now. This change must, and in fact does, reflect a great change in public opinion and with public opinion what it is now, there is good grounds for hoping that a satisfactory solution of the railroad problem will soon be found in spite of the fact that the situation existing at this particular time is the worst, as a whole, that has existed for 25 years.

Automatic Train Control

The Automatic Train Control committee appointed by the Railroad Administration has been in attendance at both the stated meeting of the Signal division of the A. R. A. and the annual meeting of the A. R. E. A. The instructions to the committee were to make a study of and report upon automatic train control devices which have been installed or which may be practicable. The work of the committee includes among other things the study of plans covering such devices; the drawing up of requisites as a guide for such study; the inspection of such devices as have been installed, and the making of recommendations covering the installation and further test of such apparatus. Certain requisites in the past have been so drawn that they have hampered the development of devices of this character, but it has been realized to be a mistake to attempt to draw up stringent requisites on theoretical assumptions which are not backed by practical experience.

The tentative requisites presented by the present committee are along more proper lines and instead of restricting should tend to encourage development work. They may perhaps not include all that is desired and may appear to be conflicting in certain instances, but they are good as a basis for a start and can be revised or added to as occasion demands. The committee inspected the automatic train control exhibits at the Coliseum yesterday afternoon and to-day it starts on the first of its inspections of the automatic stops already installed.

Progress in Scientific Knowledge

The material presented by the Committee on Masonry on considerations affecting the strength of concrete, when considered in the light of other information brought forth during the past 20 years, drives home the fact that the pioneers in the use of concrete were compelled to proceed in their work with extremely limited knowledge of the materials with which they were dealing. As the result of facts developed from time to time, practices in construction have gone through numerous transitions. We have turned from dry concrete to wet concrete and now appear to be turning again to dry concrete. In view of some of the startling developments brought out in the course of experimentation, one is inclined to wonder at the courage of the early builders in concrete. Perhaps they enjoyed a condition of blissful ignorance. At any rate most of their structures have withstood the tests of use and time, but the large factors of safety which their caution (in the absence of exact data) urged them to use, may be largely responsible for their success. This raises the question of the justification for proceeding with such limited information that efficient designs were not practicable. Has an economic waste resulted from the use of what we now consider wasteful designs? The answer is that more economic waste would have resulted if engineers had refrained from using concrete until more of its real properties were known. In fact, the properties would never have become known had men been too cautious in the use of the material. Progress comes from using the resources at hand, however imperfect, since the ideal will never be attained.



American Railway Engineering Association Proceedings

A Report of Thursday's Sessions, Including the Presentation of Seven Committee Reports and Closing Business

THE TWENTIETH ANNUAL CONVENTION of the American Railway Engineering Association drew to a close on Thursday. The morning session was called to order at 10 o'clock by Vice-President Stimson, President C. A. Morse still being confined to his room by illness. Reports were presented on Iron and Steel Structures, Masonry, Water Service, Wooden Bridges and Trestles, Uniform General Contract Forms, Economics of Railway Operation and Economics of Railway Location. These were followed by routine business and the installation of the new president, Earl Stimson. Abstracts of the reports and the discussions are given below.

Report of Committee on Masonry



THE COMMITTEE has no recomendations to make at this time. The question of revising the definitions in the Manual has received consideration and it was decided to completely revise this portion of the Manual next year.

A report on different methods of depositing concrete under water is given in Appendix B.

A report on specifications for slag aggregate is given in Appendix D.

A report on: (1) The effect upon the strength and durability of concrete not having a sufficiency of moisture present throughout the period of hardening as compared with concrete fully supplied with moisture. (2) Methods of providing moisture during the period of hardening and (3) Remedy for concrete hardened with insufficient moisture, is given in Appendix E.

Committee: F. J. Thompson (I. C.), chairman; J. J. Yates (C. R. R of N. J.), vice-chairman; R. Armour (G. T.), G. E. Boyd (D., L. & W.), H. A. Cassil (P. M.), C. S. Coe, T. L. Condron (Cons. Engr.), J. K. Conner (L. E. & W.), C. S. Davis (Pa. Lines), J. L. Harrington (Cons. Engr.), W. K. Hatt (Purdue Univ.), L. J. Hotchkiss (Cons. Engr.), Richard L. Humphrey (Cons. Engr.), Noah Johnson (Wab.), M. S. Ketchum (Univ. of Colo.), W. M. Kinney, W. S. Lacher (Ry. Age), A. E. Owen (C. R. R. of N. J.), W. M. Ray (B. & O.), C. P. Richardson (C., R. I. & P.), G. H. Scribner Jr., F. P. Sisson (G. T.), J. E. Smith (Univ. of Ill.), Job Tuthill (P. M).

Appendix B—Depositing Concrete Under Water

The committee does not feel that any definite conclusions can be presented at this time. There is, however, some data which it believes desirable to present as representing its opinion as to the best practices to be followed in depositing concrete under water.

In general, where it is possible, the depositing of concrete under water should be avoided, even if such action results in aditional expense and possible delay to the work. The need of close supervision by men competent to handle this class of work is of the utmost importance, and concrete should never be deposited under water without experienced supervision. Many failures which have occurred in concrete deposited under water, especially where the structure is located in sea water, can be directly traced either to ignorance or lack of supervision.

Of the methods used, the following seem to give the best results:

1. The concrete is lowered in large buckets having a hinged bottom which sets sufficiently far above the lower edge of the bucket so that it may open freely downward when the bucket reaches the surface upon which the concrete is to be deposited. The top of the bucket is left open, and care is taken to see that the bucket is completely filled before lowering.

2. The concrete may be passed through a vertical tube or tremie reaching down to the surface upon which the concrete is to be deposited.

3. Jute or cloth bags, from two-thirds to three-fourths

filled, have been used successfully. These are placed in a header and stretcher system so that the whole mass is interlocked.

4. Where it is difficult to construct a cofferdam or monolithic work is not required, premolded concrete blocks of large dimensions have been used successfully.

5. A concrete depositing bag made of canvas or other suitable material is a variation of the bucket system. This is filled and the mouth of the bag closed by one turn of a line so looped that a pull on the line will release it. The bag is lowered mouth down to the surface upon which the concrete is to be deposited, and a sharp pull on the line opens the bag and permits the concrete to be deposited. This method does not have the disadvantage of the closed top bucket, since the bag will collapse as the concrete flows out.

There are a number of other methods that have been used, such as depositing directly through the water; depositing a portion of the concrete by one of the above methods in the corner of the form and the balance progressively from wheelbarrows or buckets on the sloping surface, thus gradually filling the form; allowing the concrete to partially set in air and then depositing it in a plastic condition; depositing the concrete dry without the use of water; attempting to grout a foundation composed of riprap or coarse gravel by means of pipes sunk at intervals into the foundation. Although occasionally fair results have been obtained, all of these methods are dangerous, as they almost uniformly result in segregation of the materials or the washing out of the cement.

In depositing with drop bottom buckets, the drop bottom bucket should be so arranged as not to discharge the load until the bucket reaches the surface upon which the concrete is to be deposited. In lowering the bucket, care should be taken that unnecessary wash is not produced. This may be avoided by slowing up the operation when the bucket is passing through the water. The bucket, when the load is discharged, should be withdrawn slowly until clear of the concrete. In depositing concrete under water by this method it is imperative that the work be continuous and sufficiently rapid to insure bonding of the successive layers.

In depositing through tremie or vertical tubes the device should be about 14 or 16 in. in diameter, made up in sections so that the length may be adjusted to the depth of the water. The joints should be made flanged and the tube put together with gaskets, in order to avoid leakage of the water into the tube. The top should be flared, in order to receive the concrete properly. The tube should be suspended in such manner that it may be moved laterally as required. The upper end is placed near the level of the working platform, while its lower end rests on the surface upon which the concrete is to be deposited. When the operation starts the tube should be filled in such manner that the concrete is not permitted to drop down through the water. This is accomplished in several ways: One is to place the bottom of the tube in a box, partially filling it with concrete so as to seal the bottom, then lowering the box into the position in which it is to be used. One requisite of this method is that the tube must at all times be kept filled with concrete and the greatest care exercised to see that the charge is not lost in moving it about the bottom.

While the bagging method insures good concrete and will prevent the formation of laitance, it is open to the objection that a monolithic foundation is not secured. Where the walls of the foundation formed by the bags will not be exposed to scour, the opinion is that the method will give satisfactory results. This method can be used to advantage in sealing the foundations of cofferdams where it is impracticable to prevent inflow of water through crevices in the bottom. In using this method it must be borne in mind that satisfactory results cannot be obtained unless the bags are carefully placed by hand.

Premolded concrete blocks can be used to advantage on a prepared foundation in any heavy construction where the units can be large enough not to require bonding.

Concrete to be deposited in water should be of a richer mixture than when deposited in air, and a leaner mixture than 1-2-4 should not be used. It is the opinion of the committee that only so much water should be used as will make the concrete of a plastic consistency. It is the opinion of the committee that washed gravel of somewhat smaller size than used in the open air concrete will give the best results. The aggregate should be capable of producing dense concrete.

In depositing concrete under water it is imperative that the water be still and that the concrete shall not be exposed to current until it is fully set. One of the essentials of depositing concrete by any of the above methods is that the concrete be disturbed as little as practicable during the depositing, thus avoiding the formation of laitance. When a job is started the concrete should be deposited continuously until the finished surface is reached or the concrete brought above the water level so that the laitance may be removed in the air. The formation of horizontal construction joints under water should be avoided. Concrete should be thoroughly mixed before it is deposited in water and, therefore, hand mixing should never be permitted.

Appendix D—Specifications for Slag Aggregate

After a study of the data available on the properties of slag and of specifications for slag as an aggregate in concrete, your committee does not feel warranted in submitting a specification for adoption by the Association. The following discussion of this subject is submitted as information. This applies to the use of slag as the *coarse* aggregate only.

The committee believes that the general requirements for coarse aggregates for use in concrete as specified in paragraph 4, page 282, of the Manual, may be applied to blast furnace slag without modification.

Further requirements for slag in current specifications examined cover such matters as origin, method of cooling, age, weight, strength and chemical limitations. At the end of this report a table is presented which lists the requirements of ten specifications for slag to be used in concrete and which demonstrates a marked lack of uniformity. We offer the following comments:

As to origin, only two specifications definitely called for blast furnace slag, all others read so as to permit the products of the steel furnace as well as the blast furnace.

Air cooling is general and represents the type of material desired. This can be required without causing any commercial difficulties. When it comes to the matter of age or time of seasoning, the case is not so clear and the requirements vary. Some specifications demand a year's seasoning, others permit the use of the material after two or three weeks. The necessity for this depends on the nature of the slag. According to Sanford E. Thompson, a limestone slag (one containing only 1 to 2 per cent of magnesia) is not stable until seasoned for considerable periods, while a magnesia slag (one containing 4 per cent or more of magnesia) is commonly used within two or three weeks after banking, as no chemical change is apparent on exposure.

The weight is the most definite requirement and concerning which there is the greatest uniformity. Seventy pounds per cu. ft. would seem to be a conservative yet reasonable figure.

Strength requirements are considered as impractical and without adequate precedent. Those discovered apply only to materials to be used in pavements where resistance to abrasion or surface impact is important.

Chemical limitations are placed in specifications for slag presumably to exclude materials containing unstable compounds or elements of a disintegrating or corrosive nature. The content of sulphur receives the widest attention in this regard and the limitation has been variously stated at from 1 to 2 per cent where it is covered in the specification.

The presence of unslaked lime seems to be of more vital importance since the presence of this material would obviously tend toward unsoundness of the slag on exposure to moisture unless neutralized by acid ingredients. It is because of this that some specifications place the limitations on the lime content and specify a minimum amount of silica to insure that enough of the SiO_2 radical shall be present to stabilize the CaO. As some users of slag are of the opinion that the seasoning of the material in a bank exposed to the weather would insure the elimination of any free lime and as there appear to be no test data available tending to demonstrate the adequacy and efficacy of these chemical requirements for sulphur, lime or silica, the committee does not feel qualified to make any definite recommendation in this regard.

In using slag in concrete it is necessary to include a requirement in the specification for the concrete that will insure proper proportions. Very strong concrete may be made with slag if the proportion of cement and fine and coarse aggregates are such as to provide high density, but owing to the porous nature of most slags, somewhat larger quantities of cement and fine aggregate will be required to obtain the desired density than is the case of most ordinary materials used as coarse aggregates.

Specification Requirements for Slag

Authority	Strength	Origin	Air Cooled	Age	Weight lb. per cu. ft.	Sulphur Not Over Per Cent	Lime, Not Over Per Cent	Silica, Lot Less Than Per Cent
New York Central	.....	Blast Furnace	Yes	2 mo.	70	1.7*	48	33⅓
Sanford E Thompson	...	..	Yes	...	65†	1 7	48	32
Central of Georgia	.....	...	...	1 yr.	...	.....	...	.....
Viaduct Cuyahoga County, Ohio	‡	...	...	...	74	.....	.....	.....
Bldg. Spec. Philadelphia	.....	Blast Furnace	Yes	...	75	1 3	.....	.....
Ohio State Highways (A)	Toughness not less than five	...	...	.....	70	1 5	45	32
Ohio State Highways (B)	Toughness not less than five	...	...	...	65	2.0	45	32
Ohio State Highways (C)	....	.....	.....	.....	.....	2.0	45	30
Youngstown City Engineer	....	.....	Yes	Lime slag 3 months Mag. slag less	68	.....	.....	.....
U. S. Department of Agriculture	.....	.....	...	.....	70	.....	.....	.....

*No free sulphur, chemical analysis every 2,000 cu. yd.
†After shaking to refusal.
‡Abrasion loss not more than ten. Factor of hardness not less than twelve. Factor of toughness not less than six.

Appendix E—Effect of Quantity of Mixing Water and Curing Conditions on the Strength and Wear of Concrete

A series of tests made by Professor D. A. Abrams at the Structural Materials Research Laboratory, Lewis Institute, Chicago, show the importance of proper storage during the early hardening period, both on the wearing qualities and strength. The results of these tests indicate that with small specimens a few days' moisture is helpful to the strength and wearing qualities, while provision for moisture for several weeks will produce results almost equal to those which would be obtained with continuous favorable storage conditions.

While the results on small specimens only approximate the results to be expected where large masses of concrete are used, it is not unreasonable to assume that particularly where the concrete is to be used as a wearing surface, great improvement in the strength and wearing qualities can be obtained by providing moisture to the hardening concrete for several weeks after the concrete is mixed and placed. In mass concrete, while provision for moisture is desirable and should be encouraged where practicable, it is not absolutely imperative as mass rather than high strength is sought.

In all reinforced concrete structures, however, some provision should be made to prevent the rapid drying out of the concrete, which almost invariably occurs during the summer months. All concrete should be protected from the direct rays of the sun and unless the expense is absolutely prohibitive, sprinkled for from several days to several weeks, depending upon the character of structure.

Moisture can best be provided to hardening concrete by covering the concrete with earth, sand, straw or other moisture-retaining material and sprinkling this covering at least night and morning for from one to two weeks after the concrete has been placed. If the days are real hot, additional sprinklings during the day will be required and the covering should be thicker so that drying out will take place less rapidly.

Concrete which has hardened with insufficient moisture can be improved somewhat by sprinkling even after it is several weeks old. The most serious result from failure to provide moisture occurs with sidewalks, floors, station platforms, etc.

Discussion

(F. L. Thompson (chairman) presented the report.)

Prof. A. N. Talbot (U. of Ill.): Concrete is a complex material. There are many elements entering into its strength and quality. I have jotted down a few items concerning some of the elements which go into the making of concrete at the beginning, and I want to present them to you. They may seem elemental to some, and yet it does seem to be worth while to give consideration to the question as to why additional water gives reduced strength, why voids in the aggregate reduce strength, why surface area of the aggregate itself, a larger amount of that, will tend to reduce strength. Here are the items.

1. The cement and the mixing water may be considered together to form a paste, which becomes the glue that holds the particles of aggregate together.

2. The volume of the paste is approximately equal to the sum of the volume of the particles of the cement and the volume of the mixing water.

3. The strength given this paste is dependent upon its concentration; the more dilute the paste, the lower its strength; the less dilute, the greater its strength.

4. The paste coats or covers the particles of aggregate partially or wholly and also goes to fill the voids of the aggregate partially or wholly. Full coating of the surface and complete filling of the voids are not usually obtained.

5. The coating or layer of paste over the particles forms the lubricating material which makes the mass workable; that is, makes it mobile and easily placed to fill a space compactly.

6. The requisite mobility or plasticity is obtained only when there is sufficient paste to give a thickness of film or layer of paste over the surface of the particles of aggregate and between the particles sufficient to lubricate these particles.

7. Increase in mobility may be obtained by increasing the thickness of the layer of paste; this may be accomplished either by adding water (resulting in a weaker paste) or by adding cement up to a certain point (resulting in a stronger paste).

8. Factors contributing to the strength of concrete are then the amount of cement, the amount of mixing water, the amount of voids in the combination of fine and coarse aggregate, and the area of surface of the aggregate.

9 For a given kind of aggregate the strength of the concrete is largely dependent upon the strength of the cement paste used in the mix, which forms the gluing material between the particles of aggregate.

10 For the same amount of cement and same voids in the aggregate, that aggregate (or combination of fine and coarse aggregates) will give the higher strength which has the smallest total area of surface of particles.

11 For the same amount of cement and the same surface of aggregate, that aggregate will give the higher strength which has the less voids, since additional pore space will involve a more dilute paste.

12 Any element which carries with it a dilution of the cement paste may in general be expected to weaken the concrete—smaller amounts of cement, the use of additional mixing water to secure increased mobility in the mass, increased surface of aggregate, and increased voids in the aggregate all operate to lower the strength of the product.

A certain degree of mobility is necessary in order to place concrete in the forms in a compact and solid mass, the degree varying considerably with the nature of the work; and we must accept it as true that generally it will be found necessary to sacrifice strength to secure the requisite mobility.

More thorough mixing not only mixes the paste and better coats the particles, but it makes the mass mobile with a smaller percentage of mixing water and this results in higher strength. Any improvement in method of mixing which increases the mobility of the mass will permit the use of less dilute paste and thereby secure increased strength.

B. R. Leffler (N. Y. C.): The report recommends one minute and a half as the time for mixing the concrete. We tried that on a large job. We finally compromised by cutting it down to a minute. Our observation showed that under the ordinary loose methods the time of mixing was ordinarily about 15 or 20 sec. The time of mixing is an important feature in regard to the lubrication of the particles of the aggregate, so as to produce plasticity and ready flowing of the concrete. I think within certain limits it will be found that the desired plasticity can be attained with the least amount of water and the proper time of the mixing. The use of excess water is purely a contractor's method of placing the concrete with the least expense. The question of the proper time of mixing is dependent on the kind of concrete mixer used, and I think that is an important subject for investigation.

G. W. Kittridge (N. Y. C.): I want to say a word in commendation of the report and the discussion by Prof. Talbot. I think such a discussion as Prof. Talbot has given is what makes the proceedings of this association of such great value to its members and the public generally.

(The committee was dismissed with thanks.)

Report on Wooden Bridges and Trestles



THE COMMITTEE HAS no recommendations to make as to the subject-matter in the Manual except in the way of intensive revision and re-writing of the entire chapter on Wooden Bridges and Trestles. It is not thought expedient to advise such revision at this time or at least until a new edition of the Manual is issued.

The especial consideration of expanding the table of allowable stresses on page 244 to include treated timber has been given extensive study during the past year. An investigation of experiments for determining the comparative strength values of untreated and treated timber in large sticks discloses the fact that there are extant only two published records of such experimental tests. One of these is to be found in Bulletin Number 286 of the United States Department of Agriculture, and the other consists of a monograph by H. B. McFarland, engineer of tests for the Atchison, Topeka & Santa Fe, beginning on page 281, Volume 17, of the Proceedings of the Association.

Until further experiments have been conducted in the way of comparing treated and untreated timber in large sticks, it is perhaps best for each engineer to use his own judgment as to the lower values of allowable stresses which should be applied in the design of treated timber trestles, keeping in mind that such values may be as much as one-third lower than for untreated material.

Specifications for Timber and Building Lumber

Our investigations and studies during the past year lead us to believe that an entire rearrangement of the chapter on Wooden Bridges and Trestles, as now published in the Manual, would be profitable. We also are of the opinion that a separate chapter to be headed "Timber and Lumber," which should contain general specifications and classification and grading rules for all kinds of timber and lumber to be used for each of the different classes of work on railways, might well be published in the Manual.

To this end the committee submitted tentative general specifications and classification and grading rules developed during the study of this work for the past year. These specifications have been drawn up after careful consideration and a thorough study of the work now standing in the Manual; recommendations and reports of committees as published in the Proceedings, especially the Special Committee on Classification and Grading Rules; the specifications of the American Society of Testing Materials; the work of the United States Forestry Board; reports of laboratory studies from various scientific institutions; a detailed study of the Standard Specification and Grading Rules of all the lumber manufacturers' associations, and various other sources.

It has been the attempt to draw up such general specifications that they might be referred to as standard for material of this kind under all circumstances. Special attention has been given to standard manufacturing processes so that no decided changes will be necessary in the best practices now followed by the manufacturers, yet satisfactory material may be obtained by the railways at reasonable prices. (These suggested tentative specifications were then presented as information.)

Committee: W. H. Hoyt (D. M. & N.), chairman; A. O. Ridgway (D. R. & G.), vice-chairman; H. Austill, F. Auryansen (L. I.), A. D. Case, E. A. Frink (S. A. L.), W. L. Darden (S. A. L.), E. A. Hadley (U. S. R. R. A.), G. A. Haggander (C. B. & Q.), F. F. Hanly (B. & O.), H. T. Hazen (C. N.), C. S. Heritage (K. C. S.), F. S. Schwinn (I. & G. N.), C. S. Sheldon (P. M.), I. L. Simmons (C. R. I. & P.), D. W. Smith (H. V.), A. M. VanAuken (B. & O. C. T.), W. H. Vance (St. L. S. W.), D. R. Young (D. L. & W.).

Discussion

W. H. Hoyt (Chairman): With regard to the report of the sub-committee considering the question of unit stresses for treated timber, I wish to bring out the fact that there have not yet been at this time any extensive tests made anywhere upon large-sized sticks, comparing the treated timber with untreated timber. We found we

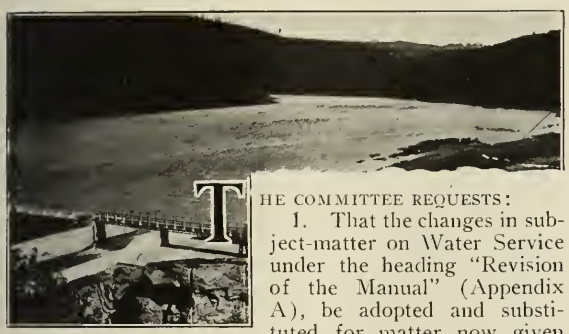
had only two sets of tests and these varied considerably. In the matter of a unified form of specifications for construction timbers and building lumber for use on railways, the question was raised as to just what was meant or how this question should be handled. The committee attempted to draw up a general specification that might be used as a basis for drawing up any particular specification that might be needed. This was for the purpose of trying to keep down in volume the size of the specification as published in the Manual. In other words, we tried to standardize the specification. The thing that we wanted to do was not to draw details that would be hard to manufacture, or would be subject to and require special arrangements, and consequently higher cost. Therefore, we consulted carefully the specifications of all the manufacturers' associations and tried to embody in this general specification a basis from which we could draw any particular specification required. One can very easily see that if we attempted to draw up a special specification for every kind of timber and lumber being used, a specification complete in itself, it would make a much larger book than our present Manual.

W. H. Courtenay (L. & N.): The committee points out that some railways use one kind of timber, supposed to be convenient to them, and have specifications for that particular kind of timber. Other railroads may use various kinds of timber.

Mr. Hoyt: Of course, that is true. In different parts of the country different kinds of timber are used on different railroads. If we were to attempt to draw up a detailed specification of each kind of timber, it would not only be bulky, but would only cover particular locations. It was that point of view that the committee had in mind in trying to concentrate and draw a general specification that might be used as a basis from which detailed specifications could be drawn to cover particular locations and particular roads. The committee simply submits this report for this year as a progress report and study, and hopes to continue it next year.

(The committee was dismissed with thanks.)

Report of Committee on Water Service



THE COMMITTEE REQUESTS:

1. That the changes in subject-matter on Water Service under the heading "Revision of the Manual" (Appendix A), be adopted and substituted for matter now given in the Manual.

2. That the report on progress of regulations with reference to purity of drinking water furnished on trains and premises of railroads (Appendix B), be received as information.

3. That the final report on impounding reservoirs (Appendix C) be received as information.

4. That the matter of plans and specifications for typical water station layouts be given more definite title.

5. That the report on meters (Appendix D) be received as information.

6. That the report on locomotive flue failures and methods of correcting water conditions (Appendix E) be received as information.

7. That the report on rules and examination questions for care of pumping stations (Appendix F) be adopted by the association and inserted in the Manual.

Suggested Subjects for Next Year's Study and Report

1. Report on suitable methods for chemical storage at water softening plants.

2. Report on progress of regulations and methods for supplying pure water for drinking purposes on trains and premises of railroads.

3. Study of economies to be derived from impounding reservoirs.

4. Report on methods of supplying drinking water to passenger equipment with smallest possible opportunities for contamination.

Committee: A. F. Dorley (M. P.), chairman; J. L. Campbell (E. P. & S. W.), vice-chairman; J. T. Andrews (B. & O.), R. C. Bardwell (M. P.), J. M. Brown (C. R. I. & P.), C. Bucholtz (Erie), E. M. Grime (N. P.), W. C. Harvey (C. G. W.), C. R. Knowles (I. C), E. G. Lane (B. & O.), E. H. Olson (A. T. & S. F.), W. A. Parker (St. J. & G. I.), H. N. Rodenbaugh (Sou.), R. W. Willis (C. B. & Q.).

Appendix A—Revision of Manual

Pages 450 and 451—Suggested Revision: Foaming and Priming

"Foaming" is the term applied to the action of a boiler when the steam bubbles up over the surface of the water to such extent that the steam space and dome are filled, and syphoning action is started which causes water to be carried over with the steam into the engine cylinders. Under these conditions steam loses much of its expansion properties and the effective operation of the locomotive is thereby materially impaired.

This action is due primarily to the presence of suspended matter in the water. The suspended matter gives a mechanical strength or tenacity to the liquid in the thin films over the steam bubbles, which, rising to the surface, retain their films and collect to produce foam. It is aggravated by the concentration of alkali salts present in the natural waters or added by the process of water softening, which increases the viscosity of the surface films.

The concentration of foaming salts reaches a critical point between 100 and 200 grains per gallon, depending upon the character of the alkali salts and the amount of suspended matter in the water. To prevent foaming the concentration must be kept below this point. The best results are obtained by the systematic and frequent blowing off of the boilers, and occasional complete blowing down and washing boilers at terminals. The cost of maintaining the concentration below the critical point equals the cost of pumping, treating, and heating to boiler temperature the amount of water necessary to be blown out.

When the unavoidable concentration of foaming salts is so great that the required amount of blowing off is impractical or uneconomical, anti-foaming compounds can be used with good results.

"Priming" is the sudden evolution of steam from a heating surface which throws water in sudden, large volumes up into steam space, and is due either to poor design of the boiler and to its being worked beyond capacity, or to the sudden opening of the throttle. While the effect upon the locomotive is temporarily the same, priming is different from foaming and can be mechanically

controlled to large extent by proper handling of the engine.

Appendix C—Design of Impounding Reservoirs and Conditions Under Which They Are Economical

Reservoirs used for supplying water for railroad purposes generally require comparatively small drainage areas and obviously stream flow operations are very limited and probably in the majority of cases entirely lacking, consequently the application of some method based on other obtainable physical data is highly desirable; but this should be supplemented by at least some short term stream flow records. Generally impounding water supply reservoirs are economical and justified at such points or places where the cost of the water so furnished does not exceed that of any other usable and equally dependable supply. They are the chief source of water supply in localities where the surface streams have intermittent flow, where the water in surface streams is too bad for treatment, where the sub-surface supply is insufficient or untreatable, and where there is sufficient rainfall to produce an adequate surface run-off.

The classes of impounding reservoirs referred to in this article relate to those situated in draws or small valleys supplied by surface run-off only and having comparatively small drainage areas, and where the watershed contains no bodies of water other than the reservoir. If possible a site should be chosen for the reservoir which is higher than the point at which the water is to be delivered, thereby securing the much-desired gravity pipe line. The gravity feature of a reservoir is worth the capitalized value of pumping which can either be put in pipe line or reservoir.

In general no site should be selected which has a drainage area of less than 2.50 square miles, with a deep and steep storage basin permitting a water depth of at least 25 ft. However, local conditions may vary this. The ratio between the land area of a watershed and the high water contour in a proposed reservoir should be not less than 35, preferably not less than 40. The surface character of the watershed should be such that a maximum surface run-off is secured. This condition in general calls for a drainage area of rather steep slopes of impervious material and non-cultivated surface and of principally short grass vegetation, thereby reducing silt to a minimum. Matters of watershed jurisdiction, possible water pollution and water diversion should be carefully considered, as well as favorable dam and spillway sites.

The capitalized value of the cost of furnishing water should be ascertained both for present consumption and twice and three times present supply, being sure to take all cost items into consideration, the following being suggested items, viz.: Cost of present plant and equipment. Cost of future additions. Interest on cost. Renewals. Maintenance. Operation (includes treatment). Cost of water when purchased. Economical benefits from improved quality.

Knowing the actual total present cost of water and having estimated the cost of double and three times the present consumption, we will then have figures serving as guides in determining the approximate limiting permissible expense that might be profitably invested in an impounding reservoir.

Approximate estimates should now be prepared and if the project is found to be feasible, more detailed study should be made of all contributary factors in somewhat the following order:

The maximum present and near future demands should be known. The history of the increase in traffic on the particular line on which the water station is to be located should be known. If traffic history is not available, it is reasonably legitimate practice to design the reservoir for at least twice the immediate or near future demands for intermediate main line stations and at least three times for terminals. On some main lines the terminals or division points double their water requirements about every ten years, while at intermediate points this occurs every 20 to 25 years. No reservoir (even on branch lines) should be constructed that is not capable of supplying at least twice the present or near future demands.

The size and character of the drainage area will necessarily be largely governed by the local topography and precipitation. The surface should be of non-porous soil and steep slopes, as previously mentioned, thereby securing a high rate surface run-off. The watershed should include no closely inhabited area. The sub-surface run-off is neglected in this discussion as far as it pertains to the furnishing of a water supply to the reservoir. Excessive drainage area should be avoided as this is conducive to lack of control or jurisdiction, thereby increasing liability to pollution; also an excessive watershed may entail a large and costly spillway. The size of the drainage area should be carefully ascertained. The elevation of the water table should be determined at several places, including a point near the dam site.

The site should be as close as possible to the point of consumption. Its shape should be such that a minimum water surface is exposed to evaporation. It would be desirable to have it surrounded with timber to break up the winds and throw a maximum amount of shade on the water surface. The reservoir should be carefully examined as to the impervious character and dip of the strata of material that constitute its bed and banks, having in mind the securing of as nearly as possible a water-tight storage basin. Its shape should be deep and contracted with steep banks and flat bottom, generally the minimum water depth should be three times the water evaporation plus the seepage, but in no event less than 25 feet. This gives a little leeway for silting.

One of the first things to do is to establish a relation between rainfall and surface run-off to serve a check on the computations. Some method of gaging the discharge from the particular drainage area should be maintained during at least several successive rains. Get the average and the annual rainfalls from the oldest weather station in the district. Examine for occurrences of two successive or single drought years and whether they were preceded by one or two or more years of average rainfall, then do likewise for several of the nearest surrounding weather stations. Then compare the monthly rainfalls at the same stations for the prospective period to be studied. Now select from the data collected two successive years having average rainfall and succeeded by one or two drought years and if there is reasonable agreement between the several stations get the daily rainfall records from the one nearest to the watershed and most likely to be in the path of the rainstorms reaching the drainage area for the two average years and the drought period. It is generally a good plan to go back one extra year and to include the year succeeding the drought period.

The evaporation from land areas usually is the most important factor in determining run-off from a watershed. It varies with the rainfall, season, temperature, slope, humidity, vegetal cover, wind, topography, surface and subsoils. Of these, temperature is the most important factor governing the rate of evaporation, as the rate of evaporation from land varies closely with the temperature.

Frequent light rains keep the surface soil and vegetation moist, thus favoring greatest evaporation, while

slow, steady rains favor ground percolation. Torrential rains favor surface run-off. All forms of vegetation reduce the rate of evaporation of free moisture, particularly due to the shading produced. The annual land evaporation loss varies from about one-quarter to two-thirds of the yearly rainfall.

Transpiration is a process of evaporation of water from the breathing pores of leaves and other vegetable surfaces. It is practically limited to daylight hours and to the growing season. The amount of water used by plants during the growing season depends mainly on the quantity available within reach of the root system. In estimating the transpiration loss from a watershed the exact character of the vegetation is not as important a factor as it might first appear except for lands in arid and semi-arid regions. Nearly all watersheds have mixed vegetation and consequently it does not vary between considerable limits. For tentative purposes 6 to 10 in. may be used for the entire area for the season.

Heavy rates of precipitation cause large surface flow. Substantially all of the rain falling upon frozen, ice-covered ground will run off into the water course and when carrying ice and snow with it in sufficient quantities the surface flow may exceed the rainfall.

In spring and fall when the land evaporation and transpiration losses are small all soils, as a rule, carry substantially the entire possible amount of capillary water, between rains. Under such conditions the capacity of sand for gravity water is about four in. per vertical ft., while the capacity of heavy clay is but a little more than one in. per vertical ft. In consequence of which clay soils quickly become saturated and thereby permit large surface flow. Tilled land will facilitate ground absorption of the rainfall, thus reducing the surface flow. Surface flow resulting from moderate rains is retarded and to some extent diminished by lakes, ponds or holes no matter how small they are.

On the Mississippi River watershed (except possibly near the Gulf of Mexico) and throughout the greater part of the United States, the normal rainfall is insufficient to supply the needs of transpiration and land evaporation at the prevailing temperatures; consequently, a large portion of any increased rainfall goes to supply unsatisfied needs of transpiration and land evaporation and hence a comparatively small portion of the increased rainfall, within certain limits, appears as run-off.

The water contributed to streams as seepage flow consists of ground water supplied by percolation. Not all the percolating water, however, reaches the streams; portions are lost through evaporation, transpiration and a small varying amount to deep seepage. When the capillary water has become wholly or partly depleted through evaporation and transpiration, percolation must first replenish the capillary water before the soil will permit gravity to draw water down into the ground water reservoir which supplies the seepage flow of streams. Capillary water amounts to about ½ in. sand and 3 in. in heavy clay per foot in depth. Clay soils retard percolation and facilitates surface run-off.

When the rainfall is insufficient to keep the ground continually moist, which is usually the case, the character and rate of rainfall are the factors which most largely influence seepage flow. When there is no frost in the ground, or the ground was relatively dry when it froze, slowly melting snow permits of the greatest percolation. On the whole, a greater proportion of snowfall than rainfall eventually percolates into the ground to supply seepage flow. Next to snowfall in effectiveness in replenishing the ground water supply are the slow, drizzling rains that occur over large portions of the country during spring and fall, when both evaporation and transpiration demands are relatively small.

The increase in seepage flow which will result from a given increase in the ground water supply, through percolation, will depend upon the slope of the ground water surface and the resistance of the subsoil to the flow of water. Fine grained subsoil will maintain a steeper water table than coarse grained material, due to the difference in resistance to flow.

Appendix D—Suitable Types of Water Meters for Use in Railway Water Service

Many devices have been proposed for measuring water. Some devices measure water by volume, that is to say, a chamber of a given size is filled and emptied continually, and the number of times it is filled and emptied. A second class of meters is that known as "current" meters. These meters measure water by recording the velocity of the fluid as it flows through a passage of a definite size, this velocity being indicated by a recording device. A third class of meters is that known as "proportional" meters. These meters measure a definite portion of the main stream by passing it through a measuring device, and by thus measuring a percentage of the total flow, the whole is known and recorded on the counter.

Each of these various classes of meters has advantages peculiar to itself, and no one class will meet the requirements of all kinds of service; therefore, they are each used largely for those conditions of service for which they are found to be the best adapted. The displacement type of meters may be divided into several classes. In one class the displacing member is a reciprocating piston, while in another the piston has a continuous or rotary motion; in another the piston has a motion of oscillation, and in another class the displacing member is a disc and has a motion called one of nutation.

The placing of meters on private fire service lines should be avoided if possible, where such lines are used exclusively for fire protection, as there is danger of interrupted service if a meter is installed with any mechanism whatever that will obstruct the free flow of the water. It is assumed that there will be no charge for water used for extinguishing fires; therefore, if the service is used for fire protection alone there is no necessity for installing a meter, unless the owner of the private fire service is suspected of using the water dishonestly. The illegitimate use of water through private fire lines appears to be the exception rather than the rule, and should be controlled by proper inspection.

Meter reading is the foundation of water bills and too much emphasis cannot be placed upon the importance of knowing that the meter readings are correct. Only familiarity with the work and with the appearance of the dials under various conditions of moisture, dirt, etc., will enable the meter reader to do his work accurately, and accuracy is of the greatest importance in meter reading.

Whenever possible or practical to do so a railroad should standardize its water meters, as by so doing employes are enabled to familiarize and perfect themselves in the knowledge of the mechanical construction which is necessary to maintain a system of meters at least expense, and greatest efficiency. It also permits of carrying a smaller stock of repair parts than would be the case where different types of meters were used.

Appendix E—Flue Failures Due to Improper Water Conditions

The operating efficiency of the modern locomotive is largely dependent upon the condition of its boiler, and to derive full service from the boiler it is necessary that water of such quality be used as will permit no liability of flue failures.

The arbitrary limit of time now allowed between flue renewals by the Federal boiler inspection regulations has

been raised from three to four years. This period is, at present, much longer than the ordinary life of flues, especially in the Central and Middle West territory. With the increase in size of power and the larger evaporating capacities per unit of heating surface with the greater water consumption, the flue failures caused by mineral and other agencies in the water have become more pronounced. Not only are the immediate effects of the failures serious with respect to the increased cost for boiler repairs and overtime to crews, but the intangible expense due to delays to traffic, immediate and en route, are considerable.

The most common failures experienced are those due to leaking. These are caused principally by scale collecting at the joints of the flues and the flue sheet and hardening while the metal is hot and expanded. Consequently when cooling takes place and the sheets contract, there will be no contraction in the hard scale and the joints are opened. Other failures which are becoming increasingly frequent of late are those due to pitting. These are usually the result of "scab-pitts" or local corrosion working through the metal in spots. As a rule they are not sufficiently serious to cause a complete failure on the line, but the expense of delays and inconvenience to traffic is considerable. In the case of water tube boilers at stationary plants the most common flue failure is the result of bagging and blowouts. This is usually caused by sludge or sediment settling into the lower rows of tubes, baking on the bottom section, and causing a mud burn or blowout through overheating of the metal.

In general, all waters contain similar substances in solution, although varying considerably in amounts and proportions. These are usually divided for identification purposes as incrusting and non-incrusting solids. In occasional instances from mine drainage regions, free acid waters may be found. At times surface supplies carry sufficient mud and suspended matter to cause trouble. In some waters the dissolved gases, usually carbon dioxide or oxygen, but occasionally hydrogen sulphide, demand attention. However, the common constituents of the incrusting solids, namely, the carbonates and sulphates of calcium and magnesium, are those responsible for the large majority of flue failures attributed to water conditions.

The scale formed on the flues is of considerably varying quality, depending upon the total amount of incrusting solids and the ratio of the component radicles, together with the rate of evaporation. It is known that if the incrusting sulphate content is high, especially with a large magnesium ratio, the scale formed will be, as a rule, hard and tenacious, and very destructive to the boiler. If, on the other hand, the predominate part is calcium carbonate, especially with slow evaporation, the scale will be soft and porous and more easily removed by mechanical means with less damage to the flues and boiler. A muddy water or one high in suspended matter causes trouble from baking and mud burning, but in cases of high mud and suspended matter the visible evidence of prospective trouble is continually present, urging suitable corrective steps of either filtration, sedimentation, or abandonment of the supply. High rate of evaporation will tend to bake any incrustants into a hard scale.

The cure of boiler troubles is, in a great measure, similar to the cure of diseases, in that each problem has a specific remedy and it is impossible to lay down general directions which will fit all cases. Boiler compounds of all natures have been exploited, some acting mechanically, others supposedly mechanically, while others are definitely chemical. A few manufacturers of boiler compounds have gone into the matter on a scientific and legitimate basis and have had considerable success in altering the scaling solids into loose non-crystalline, non-adhering sludge. However, except in exceptional instances, it is poor practice and uneconomical to make a sludge tank out of the boiler.

Where flue failures are common the water conditions should be thoroughly investigated, and it is a good general rule that at points where trouble originates the water should be properly softened and the objectionable constituents absolutely removed before the water is delivered to locomotives for steam purposes. At present prices it has been found that lime and soda ash are the least expensive chemicals which can be used to advantage, and with a water treating plant, properly operated, the harmful impurities can be precipitated and removed as sludge in the softener with a clear, soft, safe water delivered for steam purposes.

It has been found generally advisable to so adjust the treatment that a slight excess of hydrate alkalinity due to caustic soda be maintained in the boiler at all times. This precludes the formation of any hard sulphate scale; neutralizes any acid tendencies; assures absence of magnesium compounds due to the insolubility of magnesium hydrate; neutralizes carbon dioxide, and minimizes the effects of galvanic action.

Appendix F—Instructions for the Care of Water Stations

The committee presented a detailed set of instructions for the care of water stations. These were practically the same as those submitted last year and published in the daily edition of the *Railway Age* for March 20, 1918, page 634. They were followed by a series of examination questions on the care of boilers, internal combustion engines and electrically operated pumps.

Discussion

A. F. Dorley (Chairman): There is one paragraph in the Manual which the committee wishes to revise, and that is the section on "Foaming and Priming." The committee feels that the explanation of the phenomenon commonly called foaming, which causes so much trouble in locomotive boilers is not quite satisfactory, and there is a revision given under "Appendix A."

In addition to this, this section of the Manual is unsatisfactory, in that it does not differentiate between what is called "foaming" and "priming." I move, Mr. Chairman, that this revision of the Manual be adopted.

(Motion carried.)

Mr. Dorley: The report on subject 3 will be found in Appendix C: "Design of impounding reservoirs and conditions under which they are economical."

The committee feels that there is great need of information on the subject of the design of reservoirs. There is a great amount of data available in the literature on the subject of rainfall and run-off and percolation and transpiration, and other factors that have to be considered in designing a reservoir, but the committee does not know of any definitely outlined method for assigning values for these various factors and an attempt is being made by the sub-committee, to work out such a method. This report is one of progress and we consider it a splendid start in that direction. We hope to have the report in final shape for next year.

Subject No. 4, "Plans and specifications for typical water station layouts," will be assigned during the coming year to the Committee on Yards and Terminals. This is a progress report also.

Subject No. 5 is simply a report of progress. The title of this subject is "Suitable types of meters for use in railroad water service, methods followed in testing

and reading meters, and checking the consumption of city water.

Subject No. 6 is: "Locomotive flue failures which may be due to improper water conditions and methods of treatment to correct such conditions." The committee feels that there is need of some information on this subject. As we all know, flue failures are becoming an increasingly troublesome and expensive part of locomotive maintenance. As a matter of fact, there is an epidemic of flue failures on practically all roads.

A part of these failures which really result in the reduced life of flues, is undoubtedly due to the change from the old style charcoal iron flue to the spellerized steel flue, which is now in use, part of it due to the higher steam pressure that is being carried in modern locomotives as compared with the lower pressure in smaller locomotives; but the committee is prepared to admit that a part of this reduced life is undoubtedly due to harmful and deleterious impurities in the water, and the present epidemic is probably due to these three causes combined. Mr. Bardwell, who has had charge of this sub-committee, has given us the chemistry of these flue failures, so far as they are due to water conditions.

The Chairman: If there is no objection, the report on subjects 2, 3, 4, 5 and 6 will be received as information, as a progress report.

Mr. Dorley: I move that the report on instructions for the care of water stations be inserted in the Manual.

(The motion was carried and the committee was dismissed with thanks.)

Report on Iron and Steel Structures



THE ASSOCIATION'S General Specifications for Steel Railway Bridges were adopted in 1906, and are printed in the Manual, pp. 482 to 505, inclusive. The Specifications for Erection were adopted in 1912 and are printed in the Manual, pp. 508 to 513, inclusive.

The revised specifications (Appendix A to this report) are submitted by the committee as a conclusion, to be printed in the Manual in place of the specifications referred to above.

The rules and unit stresses for classifying and rating the capacity of existing bridges are given in the Manual, pp. 506 and 507. The committee is not ready to report any changes, but expects to be able to report at the next convention revised rules for rating based upon the live load diagram used in the specifications and with details of unit stresses, impact, etc. The committee invites suggestions from the members of the association and others on this subject.

The committee has under observation some experimental applications of plastic compounds for the protection of structures of steel and concrete exposed to direct action of the blast from locomotive stacks, but has no report to make to this convention.

Specifications for movable bridges were submitted to the 1918 convention and printed in the Proceedings, Vol. 19, pp. 814 to 866, inclusive. The committee is engaged in a revision of these specifications and expects to submit them to the 1920 convention for adoption and printing in the Manual. The committee invites suggestions and criticisms of these specifications for movable bridges in order that the revision, when submitted to the convention, may be as satisfactory as possible.

The conclusions of the committee with reference to secondary stresses are embodied in the specifications. No experimental work on impact has been done during the past year and none is contemplated. The conclusions from the experimental work already done have been presented to the association from time to time, and the association has adopted an impact formula based upon them. The conclusions already reached have been based upon a large amount of experimental work, and are not likely to be modified by any further work of that kind which the committee might be able to do in the near future. The sub-committee on this subject has been discharged, effective with the presentation of this report to the convention, and the committee requests that this subject be discontinued by the Board of Direction.

On account of war conditions the committee has been unable to make any further tests on columns, and the committee requests the Board of Direction to continue the subject in order that further study may be made when the conditions will allow it.

A report on the principles for detailed design of flashing, drainage and reinforcement for waterproofing purposes is being worked upon by the sub-committee and is expected to be ready to present to the convention with the report of 1920.

In the report of the Committee on Yards and Terminals to the 1918 convention the Committee on Iron and Steel Structures was asked to approve the data of scale superstructures contained in Tables 1 and 2 on pp. 330 and 331 of the Proceedings, Vol. 19. These tables contain the data for designing and the resultant recommended girder section for weigh-bridge girders and transverse floor beams for track scales of three different standard sectional capacities.

After conference with the Yards and Terminals committee and careful study of the sections proposed, the committee approves the recommended sections.

RECOMMENDATIONS

The committee recommends:

1. That the Revision of the General Specifications for Steel Railway Bridges, be adopted and the Specifications, Appendix A, printed in the Manual.

2. That the approval of the sections for track scales, weigh-bridge girders, and transverse floor beams recommended by the Committee on Yards and Terminals be recorded in the Proceedings.

Committee: O. E. Selby (C. C. C. & St. L.), chairman; F. E. Turneaure (Univ. of Wis.), vice-chairman; F. Auryansen (L. I.), J. A. Bohland (G. & N.), W. S. Bonton (B. & O.), A. W. Carpenter (N. Y. C.), Charles Chandler (I. C.), J. E. Crawford (N. & W.), F. O. Dufour, W. R. Edwards (I. C. C.), A. Chas. Irwin, B. R. Leffler (N. Y. C.), W. H. Moore (N. Y. N. H. & H.), P. B. Motley (C. P. R.), C. D. Purdon (St. L. S. W.), Albert Reichmann (Am. Br. Co.), J. W. Reid, A. F. Robinson (A. T. & S. F.), H. N. Rodenbaugh (U. S. R. R. A.), H. B. Seaman (Cons. Engr.), C. E. Smith (Cons. Engr.), I. F. Stern (Cons. Engr.), H. B. Stuart (G. T.), G. E. Tebbetts, L. F. VanHagan (Univ. of Wis.), J. A. L. Waddell (Cons. Engr.), H. T. Welty (N. Y. C.).

Appendix A—General Specifications for Steel Railway Bridges

(For Fixed Spans Less Than 300 Ft. in Length.)

1919

PROPOSALS AND DRAWINGS

1. **Definitions of Terms.** The term "Engineer" refers to the Chief Engineer of the Company or his subordinates in

authority. The term "Inspector" refers to the inspector or inspectors representing the Company. The term "Company" refers to the Railway Company or Railroad Company party to the contract. The term "Contractor" refers to the manufacturing or fabricating contractor party to the contract. The term "Erector" refers to the erecting contractor party to the contract.

2. **Proposals.** Bidders shall submit proposals to conform with the terms in the letter of invitation. The proposals preferably shall be based upon plans and specifications furnished by the Company showing the general dimensions necessary for designing the structure, the stresses and the general or typical details. Invitations covering work to be erected by the Contractor shall state the general conditions at the site, such as character of foundations, traffic conditions, etc.

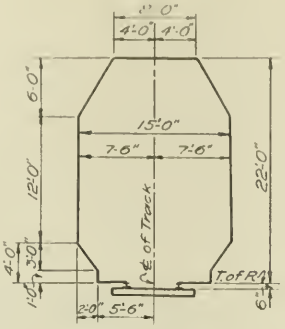


Fig. 1

3. **Drawings to Govern.** Where the drawings and the specifications differ, the drawings shall govern.

4. **Patented Devices.** The Contractor shall protect the Company against claims on account of patented devices or parts.

5. **Drawings.** After the contract has been awarded and before any shop work is commenced, the Contractor shall submit to the Engineer for approval duplicate prints of stress sheets and shop drawings, unless such drawings shall have been prepared by the Company. The tracings of these drawings shall be the property of and be delivered to the Company after the completion of the contract. Shop drawings shall be made on the dull side of the tracing cloth, 24 by 36 in. in size, including margins. The margin at the left end shall be 1½ in. wide, and the others ½-in. The title shall be in the lower right-hand corner. No changes shall be made on any approved drawing without the consent, in writing, of the Engineer.

6. The Contractor shall be responsible for the correctness of his drawings, and for shop fits and field connections, although the drawings may have been approved by the Engineer.

7. Any material ordered by the Contractor prior to the approval of the drawings shall be at his risk.

General Features of Design

8. **Materials Used.** Structures shall be made wholly of structural steel except where otherwise specified. Cast steel may be used for shoes and bearings. Cast iron may be used only where specifically authorized by the Engineer.

9. **Types of Bridges.** The different types of bridges may be used as follows:

Rolled beams for spans up to 35 feet.
Plate girders for spans from 30 feet to 125 feet.
Riveted trusses for spans from 100 feet to 300 feet.
Pin-connected trusses for spans from 150 feet to 300 feet.

10. **Number of Trusses.** Unless otherwise specified, double-track through bridges shall have only two trusses or girders, and four-track bridges three.

11. **Dimensions for Calculation.** The dimensions for the calculation of stresses shall be as follows:

Span Length

For trusses and girders, the distance center to center of end bearings.

For floor beams, the distance center to center of trusses or girders.

For stringers, the distance center to center of floor beams.

Depth

For riveted trusses, the distance between centers of gravity of chord sections.

For pin-connected trusses, the distance center to center of chord pins.

For plate girders, floor beams and stringers, the distance between centers of gravity of flanges, but not to exceed the distance back to back of the flange angles.

12. **Spacing of Trusses, Girders and Floorbeams.** The width center to center of girders or trusses shall not be less than one-twentieth of the effective span, and not less than is necessary to prevent overturning under the assumed lateral loading. Panel lengths shall not exceed 1½ times the width c. to c. of trusses or girders.

13. **Clearances.** If the alinement is straight, clearances shall be not less than shown on the diagram, Fig. 1. If the alinement is curved, the width of the diagram shall be increased so as to provide the same minimum clearances for a car 80 ft. long, 14 ft. high and 60 ft. center to center of trucks, allowance being made for curvature and superelevation of rails. The height of rail shall be assumed as 6 in.

14. **Deck Spans on Curves.** Deck spans on curves shall have the center line of the span placed, usually, so as to bisect the middle ordinate of and be parallel with the chord of the curve.

15. **Skew Bridges.** In skew bridges without ballasted floors, the backwalls for each track shall be square with the track.

16. **Ambiguity of Stress.** Structures shall be designed so as to avoid, as far as practicable, ambiguity in the determination of the stresses.

Loads

17. **Loads.** The structures shall be proportioned for the following loads:

a. The dead load.
b. The live load.
c. The lateral load.

Stresses due to these loads, as hereinafter specified, shall be shown separately on the stress sheets.

18. Members shall be proportioned for that combination of stresses which gives the maximum total stress, except as otherwise provided.

19. **Dead Load.** The dead load shall consist of the estimated weight of the entire suspended structure. Timber shall be assumed to weigh 4½ lb. per foot B. M., ballast 120 lb. per cu. ft., reinforced concrete 150 lb. per cu. ft., waterproofing 150 lb. per cu. ft., and rails and fastenings 150 lb. per linear foot of track. If ballast is used, it shall be assumed level with the base of rail and the weight of ties neglected.

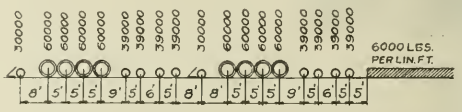


Fig. 2



Fig. 3

20. **Live Load.** The minimum live load for each track shall be as shown in Figs. 2 and 3.

The loading that gives the larger stresses shall be used.

21. **Heavier Loading.** Heavier loadings shall be proportional to the specified minimum loadings with the same wheel spacing.

22. In calculating the maximum stresses due to live load and centrifugal force when two, three or four tracks are simultaneously loaded, use the following percentages of the specified live load:

For two tracks loaded, 95 per cent.
For three tracks loaded, 90 per cent.
For four tracks loaded, 85 per cent.

23. **Floors.** Wooden ties shall be designed for the maximum wheel load specified distributed over three ties and with 100 per cent impact added. The fiber stress shall not exceed 2,000 lb. per sq. in. Wooden tie floors shall be secured to the stringers or girders. The ties shall be not less than 10 ft. in length. They shall be placed with openings not to exceed 4 in. in width and shall be secured against bunching. The maximum dap of ties shall be 1½ in.

24. Floors consisting of beams transverse to the axis of the structure shall be designed for a uniform live load of 15,000 lb. per linear foot for each track, when the minimum live load specified is used. When heavier loadings are used, this uniform load shall be increased proportionately. Floors consisting of longitudinal beams shall be designed for the wheel loads specified.

25. In ballasted floor bridges, the live load shall be considered as uniformly distributed laterally over a width of 10 ft.

26. Ballasted floors shall have at least 6 in. of ballast under the ties.

27. **Reduced Dead Load for Solid Floors.** In bridges with ballasted floors, only three-fourths of the computed dead weight of the floors shall be considered.

28. **Impact.** The dynamic increment of the live load shall be added to the maximum computed live load stresses and shall be determined by the formula,

$$I = S \frac{300}{300 + \frac{L^2}{100}}, \text{ in which}$$

I = impact or dynamic increment to be added to the live-load stress.

S = computed maximum live-load stress.

L = the following values in feet:

a. For spans, the distance center to center of end bearings.

b. For stringers, the distance center to center of floor beams.

c. For hip verticals and similar suspenders, floor beams, and transverse girders and their supports, the sum of the adjacent panel or span lengths.

d. For floors with transverse beams, zero.

29. For bridges designed exclusively for electric locomotives, the impact stresses shall be taken as one-half of those given by the formula in paragraph 28.

30. Impact shall not be added to stresses produced by longitudinal or lateral forces.

31. **Eccentricity of Load on Curves.** For bridges on curves, provision shall be made for the increased load carried by any truss, girder or stringer due to the eccentricity of the load.

32. **Lateral Forces.** The lateral force shall consist of a moving load equal to 30 lb. per sq. ft. on 1½ times the vertical projection of the structure on a plane parallel with its axis (but never less than 200 lb. per linear foot at the loaded chord, and 150 lb. per linear foot at the unloaded chord), and a moving load of 600 lb. per linear foot applied 8 ft. above the base of rail.

33. In calculating the stresses in viaduct towers due to lateral force, the viaduct shall be considered as loaded on either one or both tracks, with empty cars weighing 1,200 lb. per linear foot.

34. If a moving load of 50 lb. per square foot on 1½ times the vertical projection of the unloaded structure on a plane parallel with its axis produces greater stresses than the lateral force defined in paragraph 32, it shall be provided for.

35. The bracing between chords or flanges shall be capable of resisting a transverse shear in any panel equal to 2 per cent of the total axial stress in the two chords in that panel.

36. **Centrifugal Force.** On curves, the centrifugal force (assumed to act 6 ft. above the rail) shall be taken equal to a percentage of the live load according to the following table:

Degree of Curve..	0° 20′	0° 40′	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°
Percentage of live load.....	2½	5	7½	10	10	10	10	10	10	10	10	10	10	10
Speed in miles per hour.....	80	80	80	65	53	46	41	38	35	33	31	29	28	27

37. **Longitudinal Force.** Provision shall be made in the design for the effect of a longitudinal force of 20 per cent of the live load on one track only, applied 6 ft. above the top of the rail. Where, by reason of continuity of members or frictional resistance, the longitudinal force will be largely absorbed before it reaches supporting members, its effect on such members shall be taken as one-half that specified above.

38. **Applications of Live Load.** The stresses shall be shown for the following applications of the live load:

a. As a dynamic load acting vertically, the static stresses and the dynamic increments or impact stresses being shown separately and designated as the live-load static stresses and the live-load impact stresses respectively.

b. As a state longitudinal force, due to tractive effort or braking, the stresses being designated as longitudinal force stresses.

c. As a lateral force on curves, the stresses being shown separately for this force acting as a static load and designated as the centrifugal force stresses.

Unit Stresses and Proportioning of Parts

39. The several parts of structures shall be so proportioned that the unit stresses will not exceed the following, except as modified in paragraphs 47 and 48:

	Pounds per sq. inch
Axial tension, net section	16,000
Axial compression, gross section. l = the length of the member in inches.. r = the least radius of gyration of the member in inches.	$16{,}000 - 70\left(\frac{l}{r}\right)$, but not more than 13,000 and not less than 4 $\left(\frac{l}{r}\right)$
Tension in extreme fibers of rolled shapes, built sections and girders, net section	16,000
Tension in extreme fibers of pins	24,000
Shear in plate girder webs, gross section	10,000
Shear in power-driven rivets and pins	12,000
Bearing on power-driven rivets, pins, outstanding legs of stiffner angles, and other steel parts in contact	24,000

The above mentioned values for shear and bearing shall be reduced 25 per cent for countersunk rivets, hand-driven rivets, floor-connection rivets, and turned bolts.

Bearing on expansion rollers, per linear inch ..... $600d$

d = the diameter of rollers in inches.

	Pounds per sq. inch
Bearing on granite masonry	800
Bearing on sandstone and limestone masonry	400
Bearing on concrete masonry	600

40. For cast steel in shoes and bearings, the above mentioned unit stresses shall apply.

41. The diagonal tension in webs of girders and rolled beams at sections where maximum shear and bending occur simultaneously, shall not exceed 16,000 lb. per square inch.

42. **Effective Bearing Area.** The effective bearing area of a pin, a bolt or a rivet shall be its diameter multiplied by the thickness of the piece, except that for countersunk rivets half the depth of the countersink shall be omitted.

43. **Effective Diameter of Rivets.** In proportioning rivets, the nominal diameter of the rivet shall be used.

44. **Reversal of Stress.** Members subject to reversal of stress under the passage of the live load shall be proportioned as follows:

Determine the resultant tensile stress and the resultant compressive stress and increase each by 50 per cent of the smaller; then proportion the member so that it will be capable of resisting either increased resultant stress. The connections shall be proportioned for the sum of the resultant stresses.

45. **Stresses in Web Members.** In proportioning web members of trusses, use two-thirds of the dead load stress plus one and one-sixth times the live load stress, including impact, where this sum is greater than the sum of the dead load stress and the live load stress, including impact.

46. **Combined Stresses.** Members subject to both axial and bending stresses (including bending due to floor beam deflection) shall be proportioned so that the combined fiber stresses will not exceed the allowed axial stress. In members continuous over panel points, only three-fourths of the bending stress computed as for simple beams shall be added to the axial stress.

47. Members subject to stresses produced by a combination of dead load, live load, impact and centrifugal force, with either lateral or longitudinal forces, or bending due to lateral action, may be proportioned for unit stresses 25 per cent greater than those specified in paragraph 39; but the section shall not be less than that required for dead load, live load, impact and centrifugal force.

48. **Secondary Stresses.** Designing and detailing shall be done so as to avoid secondary stresses as far as possible. In ordinary trusses without subpanelling, no account usually need be taken of the secondary stresses in any member whose width measured in the plane of the truss is less than one-tenth of its length. Where this ratio is exceeded, or where subpanelling is used, secondary stresses due to deflection of the truss shall be computed. The specified unit stresses may be increased one-third for a combination of the secondary stresses with the axial stresses.

49. **Compression Flanges.** The gross area of the compression flanges of plate girders shall not be less than the gross area of the tension flanges, but the stress per square inch shall not exceed

$$14{,}000 - 200\frac{l}{b}, \text{ in which}$$

l = the length of the unsupported flange, between lateral connections or knee braces.

b = the flange width.

Details of Design

50. **Limiting Lengths of Members.** The ratio of length to least radius of gyration shall not exceed 100 for main compression members nor 120 for wind and sway bracing.

51. The lengths of riveted tension members shall not exceed 200 times their least radius of gyration.

52. **Depth Ratios.** The depth of trusses preferably shall be not less than one-tenth of the span. The depth of plate girders preferably shall be not less than one-twelfth of the span. The depth of rolled beams used as girders and the depth of solid floors preferably shall be not less than one-fifteenth of the span.

53. **Parts Accessible.** Details shall be designed so that all parts will be accessible for inspection, cleaning and painting. Closed sections shall be avoided wherever possible.

54. **Pockets.** Pockets or depressions which would hold water shall have efficient drain holes, or shall be filled with concrete.

55. **Eccentric Connections.** Members shall be connected so that their gravity axes will intersect in a point. Eccentric connections shall be avoided if practicable, but, if unavoidable, the members shall be proportioned to resist the additional stresses so produced.

56. **Counters.** Riveted counters are preferred. If counters are subject to reversal of stress, their end connections preferably shall be riveted. Adjustable counters shall have open turnbuckles.

57. **Strength of Connections.** Connections shall have a strength at least equal to that of the members connected, regardless of the computed stress. Connections shall be made, as nearly as practicable, symmetrical about the axis of the members.

58. **Limiting Thickness of Metal.** Metal shall not be less than ¼-inch thick, except for fillers. Metal subject to marked corrosive influences shall be increased in thickness or protected against such influences.

59. **Effective Area of Angles.** The effective area of single angles in tension shall be assumed as the net area of the connected leg plus 50 per cent of the area of the unconnected leg. The effective area of double angle members connected by both legs shall be assumed as 90 per cent of the net area of the angles. Single angles connected by lug angles shall be considered as connected by one leg.

60. **Sizes of Rivets.** Rivets shall be ⅞-in. in diameter unless otherwise specified.

61. **Pitch of Rivets.** The minimum distance between centers of rivet holes shall be three diameters of the rivet, but the distance preferably shall be not less than 3½-in. for 1-in. rivets, 3 in. for ⅞-in. rivets and 2½ in. for ¾-in rivets. The maximum pitch in the line of stress for members composed of plates and shapes shall be 7 in. for 1 in. rivets, 6 in. for ⅞-in. rivets and 5 in. for ¾-in. rivets. For angles with two gage lines and rivets staggered, the maximum pitch in each line shall be twice the amounts given above. If two or more web plates are used in contact, stitch rivets 12 in. in gage and pitch shall be provided to make them act in unison. In tension members composed of two angles in contact, a pitch of 12 in. may be used for riveting the angles together.

62. **Edge Distance.** The minimum distance from the center of any rivet hole to a sheared edge shall be: 1¼ in. for 1 in. rivets, 1½ in. for ⅞-in. rivets and 1¼ in. for ¾-in. rivets; to a rolled edge 1½ in., 1¼ in. and 1⅛ in., respectively. The maximum distance from any edge shall be eight times the thickness of the plate, but shall not exceed 6 in.

63. **Size of Rivets in Angles.** The diameter of the rivets in any angle whose size is determined by calculated stress shall not exceed one-fourth of the width of the leg in which they are driven. In angles whose size is not so determined 1 in. rivets may be used in 3½ in. legs, ⅞-in. rivets in 3 in. legs, and ¾-in. rivets in 2½ in. legs.

64. **Long Rivets.** Rivets which carry calculated stress and whose grip exceeds four diameters shall be increased in number at least one per cent for each additional ⅛-in. of grip. If the grip exceeds six times the diameter of the rivet, specially designed rivets shall be used.

65. **Pitch of Rivets at Ends.** The pitch of rivets at the ends of built compression members shall not exceed four diameters of the rivet for a distance equal to one and one-half times the maximum width of the member.

66. **Compression Members.** In built compression members, the metal shall be concentrated in the webs and flanges. The thickness of each web shall be not less than one-thirtieth of the distance between the lines of rivets connecting it to the flanges. The thickness of cover plates shall be not less than one-fortieth of the distance between the nearest rivet lines.

67. **Outstanding Legs of Angles.** The width of the outstanding legs of angles in compression (except when reinforced by plates) shall not exceed the following:

a. For stringer flange angles, ten times the thickness.

b. For main members carrying axial stress, twelve times the thickness.

c. For bracing and other secondary members, fourteen times the thickness.

68. **Stay Plates.** The open sides of compression members shall be provided with lacing bars and shall have stay plates as near each end as practicable. Stay plates shall be provided at intermediate points where the lacing is interrupted. In main members, the length of the stay plates shall be not less than 1¼ times the distance between the nearest lines of rivets connecting them to the flanges, and the length of intermediate stay plates shall be not less than three-quarters of that distance. Their thickness shall be not less than one-fiftieth of the same distance.

69. Tension members composed of shapes shall have their separate segments stayed together. The stay plates shall have a length not less than two-thirds of the lengths specified for stay plates on compression members.

70. **Lacing.** The lacing of compression members shall be proportioned to resist a shearing stress of 2 per cent of the direct stress. The minimum width of lacing bars shall be 3 in. for 1 in. rivets, 2¾ in. for ⅞-in. rivets, 2½ in. for ¾-in. rivets, and 2 in. for ⅝-in. rivets. The thickness shall be made as required by paragraph 39, in which "l" shall be taken as the distance between connections to the main sections.

71. In members composed of side segments and a cover plate, with the open side laced, one-half the shear shall be considered as taken by the lacing. Where double lacing is used, the shear in the plane of the lacing shall be equally distributed between the two systems.

72. In connecting lacing bars to flanges, ⅝-in. rivets shall be used for flanges less than 2½ in. wide, ¾-in. rivets for flanges from 2½ to 3½ in. wide, and ⅞-in. rivets for flanges 3½ or more in. wide. Lacing bars with at least two rivets in each end shall be used for flanges over 5 in. wide.

73. The angle of lacing bars with the axis of the member shall be not less than 45 deg. for double lacing, and 60 deg. for single lacing. If the distance between rivet lines in the flanges is more than 15 in. and a single rivet bar is used, the lacing shall be double and riveted at the intersections.

74. Lacing bars shall be so spaced that the $\frac{l}{r}$ of the portion of the flange included between their connections will be not greater than 40.

75. **Splices.** Abutting joints in compression members faced for bearing shall be spliced on four sides. The gross area of the splice material shall be not less than 50 per cent of the gross area of the member.

76. Joints in riveted work not faced for bearing, whether in tension or compression, shall be fully spliced.

77. **Net Section at Pins.** In riveted tension members in pin-connected trusses, the net section across the pin hole shall be 135 per cent and the net section back of the pin hole 100 per cent of the net section of the body of the member, and there shall be sufficient rivets to make the material effective.

78. **Net Section Defined.** The net section of riveted members shall be the least area which can be obtained by deducting from the gross sectional area the areas of holes cut by any plane perpendicular to the axis of the member and parts of the areas of other holes on one side of the plane within a distance of 4 in., which are on gage lines 1 in. or more from those of the holes cut by the plane, the parts being determined by the formula:

$$A\left\{1-\frac{P}{4}\right\}, \text{ in which}$$

A = the area of the hole.

P = the distance in inches of the center of the hole from the plane.

79. In determining the net section, the diameter of the rivet hole shall be taken ⅛ in. larger than the nominal diameter of the rivet.

80. **Pin Plates.** Where necessary to give the required section or bearing area, pin holes shall be reinforced on both sides of each segment by plates, one of which on each side must be as wide as the outstanding flanges will permit. These plates shall contain enough rivets to transmit and distribute the bearing pressure uniformly over the full cross section. At least one full-width plate on each segment shall extend to the far edge of the stay plate and the others not less than 6 in. beyond the near edge.

81. **Indirect Splices.** If splice plates are not in direct contact with the parts which they connect, rivets shall be used on each side of the joint in excess of the number required in the case of direct contact to the extent of two extra lines for each intervening plate.

82. **Fillers.** Where rivets carrying stress pass through fillers, the fillers shall be extended beyond the connected member and the extension secured by additional rivets sufficient to develop the value of the filler.

83. **Forked Ends.** Forked ends on compression members will be permitted only where unavoidable. Where forked ends are used, a sufficient number of pin plates shall be provided to make the jaws of twice the sectional area of the member and they shall be extended as far as necessary in order to carry the stress of the main member into the jaws, but shall not be shorter than required by paragraph 80.

84. **Pins.** Pins shall be long enough to secure a full bearings of all parts connected upon the turned body of the pin. They shall be secured by chambered nuts or be provided with washers if solid nuts are used. The screw ends shall be long enough to admit of burring the threads.

85. Pin connected members shall be held against lateral movement on the pins.

86. **Bolts.** Where members are connected by bolts, the turned bodies of the bolts shall be long enough to extend through the metal. A washer at least ¼ in. thick shall be used under the nut. Bolts shall not be used except by special permission.

87. **Upset Ends.** Bars with screw ends shall be upset so that the area at the root of the thread will be at least 15 per cent larger than in the body of the bar.

88. **Sleeve Nuts.** Sleeve nuts shall not be used.

89. **Expansion.** Provision shall be made for expansion and contraction at the rate of 1 in. for every 100 ft. in length. The expansion ends shall be secured against lateral movement. In spans over 250 ft. in length, provision shall be made for expansion in the floor.

90. **Expansion Bearings.** Spans 70 ft. or more in length shall have turned rollers or rockers at one end. Spans of less length shall be arranged to slide on smooth surfaces. Expansion bearings shall be designed to permit longitudinal motion only.

91. **Fixed Bearings.** Fixed bearings shall be firmly anchored to the supports.

92. **Rollers.** Expansion rollers shall be not less than 6 in. in diameter. They shall be coupled together with substantial side bars, which shall be so arranged that the rollers can be cleaned readily. Rollers shall be geared to the upper and lower plates.

93. **Pedestals and Shoes.** Pedestals and shoes shall be made of plates and angles, or cast steel. The difference between the top and bottom bearing widths shall not exceed twice the depth. For hinged bearings, the depth shall be measured from the center of the pin. The web plates and the angles connecting them to the base plate shall be not less than ¾ in. thick. If the size of the pedestal permits, the webs shall be rigidly connected transversely. The minimum thickness of the metal in cast steel pedestals shall be 1 in. Pedestals and shoes shall be so constructed that the load will be distributed uniformly over the entire bearing. Spans 70 ft. or more in length shall have hinged bearings at each end.

94. **Inclined Bearings.** For spans on an inclined grade and without hinged bearings the sole or masonry plates shall be beveled so that the masonry surfaces will be level.

95. **Name Plates** There shall be a name plate, showing in raised letters and figures the name of the manufacturer and the year of construction, bolted to the bridge near each end at a point convenient for inspection.

Floors

96. **Types of Floors.** The floors may consist of steel floor-beams and stringers, with timber cross-ties supporting the rails, or of one of the solid floor types with ballast.

97. **Floor Members.** Floor members shall be designed with special reference to stiffness, and the depth of floor-beams and stringers shall, as a rule, be not less than one-eighth of their length.

98. Specifications for plate girders shall also apply to floor-beams and stringers.

99. **Spacing of Stringers.** Stringers usually shall be spaced 6 ft. 6 in. center to center. If four stringers are used under one track, each pair shall be spaced symmetrically about the rail.

100. **Stop Angles.** Stringers which frame into floor-beams shall have an angle riveted to the top flange at each end to space the end ties at least 1 in. from the flanges of the floor-beams.

101. **I-Beam Girders.** Rolled beams supporting timber decks shall be arranged with not less than two nor more than four beams under each rail. The beams in each group shall be placed symmetrically about the rail, and shall be spaced sufficiently far apart to permit cleaning and painting. They shall be connected by solid web diaphragms near the ends and at intermediate points, spaced not over twelve times the flange width. Bearing plates shall be continuous under each group of beams. End stiffeners shall be used if required by the provisions of paragraph 39.

102. **Floor-Beam Connections.** Floor-beams preferably shall be square to the girders or trusses. They shall be riveted directly to the girders or between the posts of through and deck truss spans. End floor-beams shall be used in square end bridges.

103. **End Connection Angles.** The legs of stringer connection angles shall be not less than 4 in. in width, and not less than ⅝ in. in thickness. Shelf angles shall be provided to support the stringers during erection, but the connection angles shall be sufficient to carry the whole load. Stringers preferably shall be riveted between the floor-beams. Rivets in connection angles shall be spaced closer at the bottom of the angles than at the top.

104. **Stringer Frames.** Where two lines of stringers are used under each track in panels more than 30 ft. in length, they shall be connected by cross frames.

105. **Solid Floor Connections.** Solid floors shall be connected to the girders or trusses by angles not less than ½ in. thick; one angle on each side of the web of I-beams and one on each of the vertical members of troughs.

106. **Proportioning Solid Floors.** Solid floors shall be proportioned by the moments of inertia of the sections, using the net areas of the component parts.

Bracing

107. **Design of Bracing.** Lateral, longitudinal and transverse bracing shall be composed of shapes with riveted connections. Lateral bracing shall have concentric connections to chords at end joints, and preferably throughout. The connections between the lateral bracing and the chords shall be designed to avoid, as far as practicable, any bending stress in the truss members.

108. When a double system of bracing is used, both systems may be considered simultaneously effective if the members meet the requirements, both as tension and compression members.

109. **Lateral Bracing.** Bottom lateral bracing shall be provided in all bridges except deck plate girder spans less than 70 ft. long from which it may be omitted.

110. Top lateral bracing shall be provided in deck spans and in through spans having sufficient head room.

111. **Portal and Sway Bracing.** Deck truss spans shall have vertical sway bracing at each panel point. They shall also have bracing in the planes of the end posts, proportioned to transfer the end reaction of the top lateral system to the masonry.

112. Through truss spans shall have portal bracing, with knee braces, as deep as the specified clearance will allow.

113. Through truss spans shall have sway bracing at each intermediate panel point if the height of the trusses is such as to permit of a depth of 6 ft. or more for the bracing. When the height of the trusses will not permit of such depth, the top lateral struts shall be of the same depth as the chord and shall have knee braces.

114. **Cross-Frames.** Deck plate girder spans shall be provided with cross-frames at each end proportioned to resist centrifugal and lateral forces, and shall have intermediate cross-frames at intervals not exceeding 18 ft.

115. **Laterals.** The smallest angle to be used in lateral bracing shall be 3½ by 3 by ⅜ in. There shall be not less than three rivets at each end connection of the angles. Angles shall be connected at their intersection by plates.

116. **Clearance.** Lateral bracing beneath the track shall be low enough to clear the ties.

117. **Tower Struts.** The struts at the base of viaduct towers shall be strong enough to slide the movable shoes when the track is unloaded.

Plate Girders

118. **Spacing of Girders.** The girders of deck bridges shall be spaced 6 ft. 6 in. between centers, except that:

a. In single-track deck spans 75 or more ft. in length, the girders shall be spaced in accordance with paragraph 12, but not less than 7 ft. 6 in. between centers.

b. In bridges on curves, the girders shall be spaced as shown on the plans.

119. **Design of Plate Girders.** Plate girders shall be proportioned either by the moment of inertia of their net section including compression side, or by assuming that the flanges are concentrated at their centers of gravity. In the latter case, one eighth of the gross section of the web, if properly spliced, may be used as flange section.

120. **Flange Sections.** The flange angles shall form as large a part of the gross area of the flange as practicable. Side plates shall not be used except when flange angles exceeding 1 in. in thickness otherwise would be required.

121. Flange plates shall be equal in thickness to the flange angles or shall diminish in thickness from the flange angles outward. No plate shall have a thickness greater than that of the flange angles.

122. Where flange cover plates are used, one cover plate of the top flange shall extend the full length of each girder. Other flange plates shall extend at least 18 in. beyond the theoretical end.

123. **Thickness of Web Plates.** The thickness of web plates shall be not less than $\frac{1}{20}\sqrt{D}$, where "D" represents the distance between flanges in inches.

124. **Flange Rivets.** The flanges of plate girders shall be connected to the web with a sufficient number of rivets to transfer to the flange section the horizontal shear at any point combined with any load that is applied directly on the flange. One wheel load, where ties rest on the flange, shall be assumed to be distributed over 3 ft.

125. **Flange Splices.** Splices in flange members shall not be used except by special permission of the Engineer. Two members shall not be spliced at the same cross-section and, if practicable, splices shall be located at points where there is an excess of section. The net section of the splice shall exceed by 10 per cent the net section of the member spliced. Flange angle splices shall consist of two angles, one on each side.

126. **Web Splices.** Web plates shall be symmetrically spliced by plates on each side. The splice plates for shear shall be the full depth of the girders between flange angles. The splice shall be equal to the web in strength in both shear and moment. There shall be not less than two rows of rivets, staggered, on each side of the joint.

127. **End Stiffeners.** Plate girders shall have stiffener angles over end bearings, the outstanding legs of which will extend as nearly as practicable to the outer edge of the flange angles. These end stiffeners shall be proportioned for bearing on the flange angles, and shall be arranged to transmit the end reaction to the pedestals or distribute it over the masonry bearings. They shall be connected to the web by enough rivets to transmit the reaction. End stiffeners shall not be crimped.

128. **Intermediate Stiffeners.** The webs of plate girders shall be stiffened by angles at intervals not greater than:

(a) Six feet.

(b) The depth of the web.

(c) The distance given by the formula.

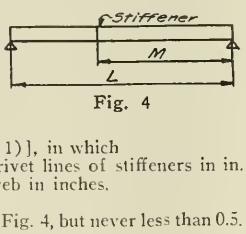


Fig. 4

$$d = 50t\,[6 - k\,(4k + 1)],$$ in which

d = the distance between rivet lines of stiffeners in in.

t = the thickness of the web in inches.

k = the ratio $\frac{M}{L}$, shown in Fig. 4, but never less than 0.5.

129. For girders in which the load is applied to the girders at floor-panel points, the stiffener intervals in any panel shall be uniform and based on the value of "k" at the end of the panel toward the nearer support.

130. If the depth of the web between the flange angles or side plates is less than 50 times the thickness of the web, intermediate stiffeners may be omitted.

131. Stiffener angles shall be placed at points of concentrated loading. Such angles shall not be crimped.

132. Intermediate stiffeners shall be riveted in pairs to the web of the girder. The outstanding leg of each angle shall not be less than 2 in. plus one-thirtieth of the depth of the girder, nor more than 14 times its thickness.

133. **Gusset Plates in Through Girders.** In through plate girder spans, the top flanges shall be braced by means of gusset plates or knee braces with solid webs connected to the floor-beams and extending usually to the clearance line. If the unsupported length of the inclined edge of the gusset plate exceeds 18 in. the gusset plate shall have one or two stiffening angles riveted along its edge. The gusset plate shall be riveted to a stiffener angle on the girder. Preferably it shall form no part of the floor-beam web.

134. In through plate girder spans with solid floors there shall be knee-braces with 3/8-in. webs, extending usually to the clearance line, at intervals of about 12 ft. Each knee brace shall be well riveted to the floor and the girder, especially at the top, and shall have its edge reinforced by one or two angles.

135. **Ends of Through Girders.** If through plate girders project two feet or more above the base of the rail, the upper corners shall be rounded to a radius of about one-third of the depth of the girder, but not less than 18 in., the radius to be a multiple of 6 in. In multiple span bridges only the extreme ends shall be rounded. If adjacent spans have different depths and the difference in depth does not exceed 18 in., the top flanges of the deeper girders shall be curved at the ends to a radius equal to one and one-half times the depth of the girder, so that the depth of the ends will be the same as that of the adjacent girders. If the difference exceeds 18 in., the corners of the higher girders shall be rounded to a radius not greater than the difference in depth and not greater than one-third of the depth of the deeper girder. Exposed ends of through girders shall be neatly finished with end plates.

136. **Spans Shipped Riveted.** Deck plate girder spans less than 50 ft. in length shall be shipped riveted complete, unless otherwise specified.

137. **Central Bearings.** Plate girders 50 ft. or more in length shall be designed with central bearings.

138. **Masonry Bearings.** End bearings on masonry shall preferably be raised above the coping by metal pedestals.

139. Sole plates shall be not less than 3/4 in. thick and not less in thickness than the flange angles plus 1/4 in.

140. **Anchor Bolts.** Anchor bolts shall be 1 1/4 in. in diameter and shall extend 12 in. into the masonry. There shall be washers under the nuts. Anchor bolt holes in pedestals and sole plates shall be 1 5/8 in. in diameter, except that at expansion points the holes in the sole plates shall be slotted.

Trusses

141. **Type of Truss and Sections of Members.** Trusses shall have single intersection web systems and, preferably, inclined end posts. The top chords and end posts shall be made usually of two side segments with one cover plate and with stay plates and lacing on the open side. The bottom chords of riveted trusses shall be symmetrically made, usually of vertical side plates with flange angles. Web members shall be made of symmetrical sections. In pin-connected trusses, the tension chords shall be non-continuous for bending at pin joints.

142. **Camber.** The length of members of truss spans shall be such that the camber will be equal to the deflection produced by the combined dead and static live loads.

143. **Riveted Members in Pin-Connected Trusses.** Hip verticals (and members performing similar functions) and the two end panels of the bottom chords of pin-connected trusses shall be riveted members.

144. **Eye-Bars.** The cross sectional area of the head through the center of the pin hole shall exceed that of the body of the eye-bar by at least 40 per cent. The thickness of the bar shall be not less than one-eighth of the width nor less than 1 in., and not greater than 2 1/2 in. The form of the head shall be submitted to the Engineer for approval before the bars are made. The diameter of the pin shall be not less than seven-eighths of the width of the widest bar attached.

145. **Packing.** The eye-bars of a set shall be packed symmetrically about the plane of the truss and as nearly parallel as practicable, but in no case shall the inclination of any bar to the plane of the truss exceed 1-16 in. per foot. They shall be packed as closely as practicable and arranged so as to produce the least bending moment on the pin. They shall be held against lateral movement, and arranged so that adjacent bars in the same panel will not be in contact.

146. **Gusset Plates.** The thickness of gusset plates connecting the various members of the truss shall be proportionate to the stress to be transferred, but shall not be less than 1/2 in.

147. **Facilities for Jacking.** The end pins of trusses shall project a sufficient distance outside of the faces of the chords to permit making attachments for jacking the span.

148. **Masonry Plates.** Masonry plates shall not be less than 1 in. thick.

Viaducts

149. **Type of Viaduct.** Viaducts shall consist usually of alternate tower spans and free spans of plate girders or

riveted trusses supported on bents. The tower spans usually shall be not less than 30 ft. long.

150. **Bents and Towers.** Viaduct bents shall be composed preferably of two supporting columns, and the bents usually shall be united in pairs to form towers. Towers shall be braced, both transversely and longitudinally, with riveted members. In double track towers, riveted diagonal bracing in a horizontal plane shall be used at the top.

151. **Single Bents.** Single bents shall have hinged ends, or else have their columns proportioned to resist the bending stresses produced by changes in temperature.

152. **Bottom Struts.** The bottom struts of viaduct towers shall be proportioned for the calculated stresses, but in no case for less than one-fourth of the dead load reaction on one pedestal.

153. **Batter.** The columns usually shall have a batter transversely of one horizontal to six vertical for single track viaducts, or one horizontal to eight vertical for double track viaducts.

154. **Spacing of Girders.** In single track viaducts, the girder spacing usually shall be uniform throughout, and shall be determined by the spacing for the longest span in the viaduct, according to the rules specified for deck plate girder spans.

155. In double track viaducts, the girders under each track shall be spaced 6 ft. 6 in. between centers, and the inner lines of girders shall be supported by cross-girders framed between and riveted to the posts.

156. **Girder Connections and Bracing.** Girders of tower spans shall be riveted at each end to the tops of the posts or cross-girders. Girders between towers shall have one end riveted, and shall be provided with an efficient expansion joint at the other end. No bracing or sway frame shall be common to abutting spans.

157. If neither of the girders under a track rests directly over a tower post, bracing shall be provided to carry the longitudinal force into the tower bracing without producing lateral bending stress in the cross-girders or posts.

158. **Sole and Masonry Plates.** Sole and masonry plates shall not be less than ¾ in. thick.

159. **Anchorage for Towers.** Anchor bolts for viaduct towers and similar structures shall be designed to engage a mass of masonry the weight of which is at least one and one-half times the uplift.

160. Anchor bolts, washers and other anchorage or grillage materials shall be furnished by the Contractor in time for them to be built into the masonry.

These specifications were followed by detailed specifications for materials, including structural and rivet steel, cast steel and cast iron; workmanship; weighing and shipping; painting; inspection; full size tests and erection.

Discussion

O. E. Selby (Chairman): The secretary tells me there is a great demand for these specifications for steel bridges. It has become known, of course, that they are under revision, and naturally people will demand the revised specifications. For that reason we ought to have the specifications as revised adopted in form to promulgate. Furthermore, there is every probability that the Engineering section of the A. R. A. will, under the relations newly established, be calling upon this association through this committee for specifications for the use of the U. S. R. A. I move the adoption of the conclusion, which includes the specifications printed.

F. E. Schall (L. V.): I find the old specifications had 163 paragraphs, and that the new ones have 317 paragraphs. It is impossible to form a correct idea of the great number of changes that were made in the specifications bearing on the sections required or the design of the bridges. It seems to me there are some things which must be changed before we adopt them. I move as an amendment that the specifications be discussed on the floor as long as possible, and that the rest be handled by correspondence, and the whole matter laid over until the next annual meeting.

Mr. Selby: I might give briefly the features in which the specifications proposed differ from the old ones. In the first place, they have been greatly amplified, as pointed out by Mr. Schall, and the number of paragraphs has about doubled. The amplification consists largely in parts covering workmanship and details of design. Those are not adequately covered in the old specifications. Specifications for erection have been added, so that the separate specifications for fabrication and erection which the association adopted at different times have been combined into one complete specification. In the matter of loads, there has been no change in the form of the loading, but we have specified E-60 loading as the minimum. In the column formula there is a change. We have introduced a parabolic column formula which is not self-limiting, and which has many advantages over the straight line formula in use in the old specifications. The impact formula is the one adopted by the convention a year ago. The clearance diagram is the general clearance diagram adopted by the convention two years ago. Those are the principal features that I think of which have been radically changed. Aside from that, however, a great many details have been amplified and some have been changed.

A. C. Irwin (Port. Cem. Assoc.): The specifications for steel railway bridges of the American Railway Engineering Association have had a wider and more universal use than any other specialized work produced by the association. However, the fact that we have never had a bridge failure is not proof that our designs have been economical and of the best. Very few railway bridges erected 25 or 30 years ago are now in service where they were originally constructed. Wheel loads in that time have so increased on main lines that the safe carrying capacity of parts of the structures was surpassed long before the physical condition of the bridges required their relegation to the scrap heap. This situation has brought about a very thorough investigation of the strength of what we choose to call old bridges. It was desired to retain the bridges in service at their original locations as long as practicable and we therefore began to apply to them *maximum safe unit stresses* and the heavy loading which it was desired to run over the line. And indeed for what ultimate purpose was the bridge design in the first place? We say to carry safely the heaviest loads that would be allowed to pass over it. Truly, but what was this load, and the answer is Cooper's E-40, 50 or 60, as the case may be. And what was the unit stress which was used in proportioning the various parts? The reply will range anywhere from 12,000 to 18,000 lb. per sq. in. with an "explanation" to the effect that this low unit stress was used to allow for a very considerable future increase in the live load. Then, after all, the bridge wasn't designed in the first place to fulfill the ultimate purpose of carrying safely the heaviest loads that were expected to pass over it.

The practical result of this logical or psychological error is almost humiliating to the engineering profession. You have had to move, scrap or sell many bridges whose chords were amply strong to carry the augmented loads, simply because of weakness in some web members or the absence of counters or because the floor beams or stringers or connections were not equally strong with the chords. In other words, you evolved an unbalanced design.

Now there is a cure for this, but the specifications presented here for your adoption do not give it. That cure is to design the bridge in the first place for the fulfillment of its ultimate purpose, namely, to carry maximum load, that is, use the maximum loading and the maximum unit stress in proportioning the various parts of the bridge—not two-thirds of the expected load or two-thirds of the maximum unit stress, but all of them.

Mr. Selby. The committee gave careful consideration to the points raised by Mr. Irwin in meetings at which Mr. Irwin was not present. It is recognized that the low unit stress design does not give a balanced uniform margin for increase in live loads. Both the technical and psychological aspects of that feature and the feature of design for an enormous increase over the existing live loads were carefully considered, and Prof. Turneaure is better prepared to tell why the specifications were presented in this form.

E. A. Frink (S. A. L.): There are a number of things in the specification that do not seem to be right, the principal one being the loading. The committee has proposed as a minimum live loading Cooper's E 60 loading. If we use an E 60 loading for the engines that are in use to-day, we get too much metal in the super-structure, and too little metal in proportion in the floor system for structures of fairly long span; the Cooper loading is so entirely different from the engines in use to-day that it is no longer a fair measure by which to design the strength of our bridges. It seems to me that the time has come when this association should attempt at least to devise a standard load. Perhaps that is more of a problem than it might seem, but still I think we ought to attempt it.

As to prescribing a minimum of Cooper's E-60 for bridges when this specification goes into our Manual, it almost has the effect of a law. Any company which departs from this specification materially in designing its bridges might find the after-effects decidedly adverse. Therefore, we should be very cautious what loading we specify for our bridges.

J. R. Ambrose (Toronto Ter. Ry.): It is only fair to the members that they have sufficient time to express their views before you ask them to vote. I think it would be very interesting if you should ask Mr. Motley to let us know if there is any great difference between this specification which you are proposing now and the one which was proposed in the Engineering Institute of Canada.

P. B. Motley (C. P. R.) The Canadian Society's attempts at a specification are considerably different from this in various ways, in general principles. It is different in its order; it has completely revised its previous specifications in order of proceeding. For instance, loadings are mentioned first after general clauses, and then each process of design is allowed to rule in using the order of the various clauses. This specification does not apparently do that completely. In detail, it differs in many points, and I do not think it necessary to take up the time of this meeting in going into too many of those. As far as principles are concerned, I must say that I am in full accord, or mostly in full accord, with Mr. Irwin. We are not yet down to brass tacks in the method of applying our design. The Cooper's system of loading scarcely answers the condition of all locomotives to-day, but if we change to something like a Mallet, for instance, in 10 years we will have something different. It seems to me—this is my personal opinion only—that we will have to lean towards the European system of using a wisely arrived at uniform load. It seems to me that that is the tendency of our various thoughts and discussions. Probably the committee will discuss that in the next year's work.

Prof. A. N. Talbot (U. of Ill.): Mr. Chairman, it seems that all members of the Association and engineers generally will agree that it would be very undesirable to adopt specifications which have been in the hands of the members only two or three days. I feel the motion made by Mr. Schall is, therefore, one that should be adopted, the first part of it at least. As I understand, he put in at the end something considering these as tentative specifications during the year. It hardly seems that we should take these as tentative specifications, for they have no standing in the association for that term.

Mr. Schall: Mr. Chairman, with your permission, I will withdraw that second part of the motion that Prof. Talbot refers to, with the consent of my second.

Prof. F. E. Turneaure (U. of Wis.): Mr. Irwin's suggestion goes to the point of designing structures, having in mind more exactly the ultimate safe stress to which bridges may be subjected, and in proportioning the structure so that it will be what is called a balanced design when loaded to its maximum safe load.

In the rules for the examination of old structures adopted by the association some years ago an ultimate safe stress of 26,000 lb. was suggested as the stress up to which a structure might be loaded if the details were in satisfactory condition, and if the bridge showed no signs of over-stress. In accordance with that idea of ultimate safe stress, the committee discussed this particular method of arriving at a design, assuming that 24,000 lb. might be considered a safe stress with details all satisfactory and the load a perfectly static load. Should such a method be adopted, it would amount to this, that for a dead load we would design for that stress of 24,000 lb. per sq. in., or possibly 22,000 lb. per sq. in., and that for the live load we would take, not the load as indicated in the specification that is now passing over the structure, or that is anticipated in the near future, but the load that we would estimate might pass over the structure 30 or 40 years hence, and use 24,000 lb. for that live load, increased by the proper amount for impact, and in that way get a structure which would carry that load 30 years hence, say with a stress of 24,000 lb. per sq. in.

Is 24,000 lb. per sq. in. a satisfactory stress to put before the association, before engineers generally and before the public as a safe stress for all kinds of structures subjected to static load only? At the present time 16,000 lb. per sq. in. is the common ordinary stress used in a great variety of structures. I think any experienced engineer would be perfectly willing to design a structure, if he had supervision of all the details for a load perfectly static, which never would increase, using an ultimate safe stress of 22,000 to 24,000 lb. per sq. in., and be able to sleep nights.

The committee did not feel that it was desirable to set forth 24,000 lb. per sq. in. as a safe stress for dead loads. That line of argument was carried on in the committee with reference not only to 24,000 lb. per sq. in., but with reference to 18,000 to 20,000 lb. per sq. in. as a basic dead load stress. The result that the committee arrived at after a good deal of discussion is indicated in the specifications. The difficulty, of course, arising from that method of design is well known, and many structures have been analyzed for increased live loads which have shown that the web members are the weakest elements in the structure when it comes to permitting the passage of an extremely heavy live load. That difficulty is met fairly well, in the minds of the committee, by Article 45, which provides just this: If we take 24,000 lb. as the ultimate safe stress for an overloaded structure, this rule will provide precisely 75 per cent overload capacity for the live load part of the load. That is practically the same percentage of overload capacity that is provided in the chord members of a 200-ft. span.

B. R. Leffler (N. Y. C.): Mr. Chairman, I wish to call the attention of the members of the association to the first line in this specification, "These specifications are limited to spans of less than 300 ft." One of the reasons for that was, that it was recognized that when long

spans are to be designed some method of using higher unit stresses must be used, and such long spans also require special engineering features. Another paragraph that has not been mentioned as tending to make a balanced structure is paragraph 27. It was recognized that in heavy ballasted floor bridges this load was of such great importance that some adjustment should be made to take care of it.

Mr. Irwin: I agree entirely with Mr. Leffler that these are steps in advance. They are attempts to cure this proposition of an unbalanced design that have met every man who has had to figure out whether or not such and such a locomotive could pass over such and such portions of the line, and it is an attempt to relieve him of the embarrassment that he meets when he finds that because of certain small weaknesses in this bridge the large expense incurred in building it in the first place must be largely thrown away, because the man who designed the bridge did not have in mind the fulfillment of the things that that bridge was supposed to do with the biggest load that ever came upon it. These are steps in the right direction, but if you consider the fact that your bridges will have spans from very small ones up to 300 ft. according to this specification, you will have a perfectly enormous problem. There is just one way to do it, that is to consider and proceed from the fundamental proposition of designing the bridge for the maximum load and maximum unit stress.

(The original motion as amended by Mr. Schall was put to a vote and carried.)

The Chairman: The report is received as a progress report.

Mr. Selby: I talked with a member of the Bureau of Standards yesterday and asked him what the prospects were for a continuation of the column tests in the Bureau of Standards now that the war conditions have passed. Mr. Brooks told me he was in touch with that part of the work of the bureau and he felt sure that some progress could be made this year on those tests. The work of making the tests is in the hands of the subcommittee, headed by W. H. Moore, and we are only waiting for an opportunity to conclude the tests.

(Mr. Selby then read the matter on design of turntables and recommended that the subject be dropped.)

Mr. Frink: Why should the subject be dropped?

Mr. Selby: For the reason that the principal materials for turntable rollers and disc bearings are steel for the rollers and phosphor bronze for the disc. The phosphor bronze specifications have been carefully considered and adopted by the association and the matter of steel for the rollers is included in the movable bridge specifications which have been printed in the proceedings and will be offered next year for adoption.

(Mr. Selby read the matter on ballast floor bridges.)

Mr. Selby: The details under this heading are expected to be presented to the convention in the report of 1920.

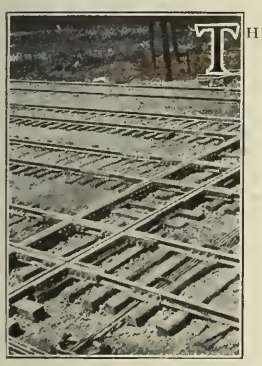
(Mr. Selby read the matter on track scales.)

Mr. Selby: The committee will ask that this subject be continued, for the reason that the track scale question is a very live one and has been referred to this association by the Railroad Administration, and this committee would like to keep in touch with the structural features, at least, of the track scale.

I move the adoption of Sec. 2 of the recommendations.

(The motion was carried and the committee dismissed with thanks.)

Report on Uniform General Contract Forms



THE COMMITTEE CONSIDERED the form of agreement for railway crossings at several meetings. The Form of Agreement for Railway Grade Crossings herewith submitted is the result of action taken at these various meetings. No attempt has been made to specify a basis upon which the expense for construction, maintenance and operation shall be divided. In this respect the submitted Form of Agreement conforms with the Form of Agreement for Interlocking Plant, submitted by this committee and approved by the Association at the last annual meeting. Similarly while articles covering liability and arbitration are incorporated in the submitted form in order to complete the same, it is recognized that these two articles will doubtless be modified in many cases to meet local conditions and the views of various legal departments of railroads.

It will be noted that seniority as between companies has been given no specific recognition in the submitted form. The committee has assumed that seniority will be given due weight in concluding the bargain which will be made in each case. The committee further assumes that in general the senior company will prefer to retain the actual work of constructing, maintaining and operating the grade crossing in its own hands.

Committee: E. H. Lee (C. & W. I.), chairman; C. A. Wilson (Cons. Engr.), vice-chairman; C. Frank Allen, O. P. Chamberlain, A. O. Cunningham (Wabash), Thos. Earle (Beth. Steel Br. Corp.), W. D. Faucette (S. A. L.), G. E. Gifford, J. C. Irwin (B. & A.), R. G. Kenly (M. & St. L.), A. S. Kent (C. I. & L.), H. A. Palmer (G. T.), C. J. Parker (N. Y. C.).

Appendix A. Agreement for Grade Crossing

THIS AGREEMENT, made this.....day of..... in the year....., by and between..... party of the first part, hereinafter called..... and....., party of the second part, hereinafter called.....

(Note.—During Federal control terminology should conform to requirements of Federal Administration.)

HISTORICAL. WHEREAS, ...

.....

(Note.—Include brief description of conditions, including the location of existing or proposed grade crossing, an enumeration of all existing agreements, if any, the name of the companies between which agreements are made, their dates, their purpose, et cetera.)

WHEREAS, ... desires the right to construct, maintain, use and operate a grade crossing across the tracks and right-of-way of..... to permit the passage of its trains over and across the right-of-way and tracks of ..... and ..... is willing to grant said right; the location of said crossing and its proposed arrangement being shown upon a blueprint marked "Exhibit A," dated ....., identified by the signature of the ..... of ..... and of .... of ..... hereto attached and hereby made a part of this agreement; and

WHEREAS, The parties hereto have agreed upon the

terms and conditions upon which said crossing as shown upon said "Exhibit A" shall be constructed, maintained and operated.

Now, Therefore, In consideration of the premises and in further consideration of the mutual covenants and agreements hereinafter stipulated to be kept and performed, it is mutually agreed between the parties hereto, for the purpose of defining the terms and conditions upon which said crossing shall be constructed, maintained, renewed and operated, as follows:

1. Definition. The term crossing as herein contained shall include rail, crossing frogs, track fastenings, crossing timbers, and other track appliances, included between the outer joints of one or more crossings installed or hereafter installed; together with ballast, drainage, side ditches, subdrainage, and other substructure appliances, devices or supports on the right-of-way ..... Company in so far as affected by said crossing; all necessary buildings, including flagmen's houses, shanties or towers; gates, semaphores and other safety devices or appliances; all as may be required to keep said crossing in safe and suitable condition for the operation of trains, as required by ..... Company or by lawfully constituted public authority.

2. Grant. ..... hereby grants to ..... subject to the conditions and stipulations of this agreement, the right to construct, maintain, renew and operate at grade....., track ..... of the ..... Railroad, over and across the right-of-way and tracks of ..... at the point of crossing, as shown on "Exhibit A."

3. Construction. The ..... Company agrees to construct a grade crossing as shown upon said "Exhibit A" and according to detail plans and specifications, which have been approved by the ..... Engineer of the ..... and identified by ..... signature. The said ..... Company agrees to begin the construction of said crossing within ..... days after the execution of this agreement and to carry the same forward continuously to prompt completion.

4. Apportionment of Cost. The cost of constructing, maintaining, renewing and operating said crossing shall be borne by the respective parties hereto as follows:

.....

In the cost of maintaining and renewing said crossing shall be included the expense for taxes, assessments, and insurance; any losses by fire, floods and other damage caused by the elements; also any change made necessary by an act or ordinance of a lawfully constituted public authority, except as herein otherwise provided.

5. Extensions and Changes. (a) The ..... Company reserves the right to construct, maintain, renew and operate upon its right-of-way from time to time such other additional track or tracks as it may deem necessary or desirable crossing the track or tracks of the ..... Company, the right to construct which is herein granted, and all the provisions and stipulations herein contained shall apply to such other additional track or tracks.

(b) The ..... Company reserves the right to change the grade of its track or tracks as shown on said "Exhibit A" not to exceed ..... feet, and the grade of the crossing shall be changed to conform thereto. The expense of so changing shall be borne as follows:

.....

(c) Either company shall have the right at its own expense to make minor changes in alinement at said crossing, provided that this shall not materially interfere with the tracks of the other party, but nothing herein contained shall be interpreted to cover major changes in grade or alinement, such as separation of grade or elevation of tracks required or brought about by laws or ordinances of properly constituted public authorities.

(d) Improvements or devices which may be necessary in order to conform to the standard practice of the ..... Company shall be provided as required by that Company, and the expense shall be borne in accordance with the provisions of Section No. 4 hereof.

(e) The privileges hereinbefore granted are granted upon the further express condition that whenever anything may be done or may be required to be done by the Chief Engineer of ..... Company, or under and in pursuance of any of the laws of the State of ....., or of any lawful action of proper public authorities in respect to the said crossing, including the installation of gates, signals or interlocking, the ..... Company shall make all changes at said crossing and in present or future tracks of both companies and their appliances, necessary to comply with or carry out the requirements of the Chief Engineer of the ..... Company or of law, or action of such authorities, and the cost thereof shall be apportioned in accordance with Article 4 hereof.

(f) It is further understood and agreed that the ..... Company will pay the cost of any connecting or transfer track or tracks that may, at any time, be required at or near the point of the crossing aforesaid, whether such track or tracks be ordered by competent authority, or put in by agreement between the parties hereto. If the junction switches of the said connecting track or tracks in the main track or tracks of either of the parties hereto shall be or come to be within the limits of an existing interlocking plant, said junction switches shall be taken into the protection of said interlocking plant and the cost shall be borne as follows:

.....

6. Maintenance and Renewal. The crossing shall be maintained by the ..... Company. In case .....Company shall remove its tracks or any of them at said crossing, the track or tracks of the ..... Company shall be restored by the ..... Company to their original condition, to the satisfaction of the Chief Engineer of the ..... Company, and at the sole cost and expense of the ..... Company.

7. Control. The maintenance, renewal, operation and protection of said crossing shall be under the sole charge and control of the ..... Company, and it shall employ competent persons to maintain, renew and protect the same, and such parties from time to time so employed shall be removed for good and sufficient reason upon request in writing of a general managing officer of the ..... Company.

Each of the parties hereto, through its authorized employes and representatives, shall have the right at all times to inspect said crossing, as well as the accounts covering the construction, maintenance, renewal and operation of the same; and in the event that the ..... Company shall notify the ..... Company in writing of renewals and repairs that may be necessary for the safe and proper operation of said crossing, and if the ..... Company neglects for a period of thirty days to make said necessary renewals and repairs, then the ..... Company shall have the right to make such renewals and repairs, and the .....Company shall, upon presentation of proper bills, and within the time provided in Section 11 hereof, pay its proportion of the amount so expended.

8. Protection. During construction and thereafter, flagmen or signalmen shall be furnished for the proper protection of said crossing, and such persons from time to time so employed shall be removed for good and sufficient reasons, upon request in writing of a general managing officer of the .....Company. The expense

for their wages, together with the cost of materials and supplies required in connection with their work, shall be apportioned as herein in Article 4 provided. Until interlocking protection shall have been provided, all trains shall approach said crossing under full control, and shall come to a full stop within ..... feet from said crossing, and shall not proceed until the receipt of a proper signal so to do.

9. Precedence. In the use of said crossing, passenger, mail and express trains shall have precedence over freight or work trains and light engines, and freight or work trains shall have precedence over light engines. The trains and engines of the ..... Company shall have precedence over the trains and engines of like class of the ..... Company.

10. Ownership. Each of the respective parties hereto shall participate in the ownership of the crossing in the proportion which the payments made by it for construction of same bear to the total cost of construction.

11. Payment of Bills. The payment of all bills under this agreement shall be made not later than the twenty-fifth day of the month following the month in which said bills are rendered. The bills for expense of construction shall be made as a final bill, unless otherwise mutually agreed and understood.

Bills covering maintenance, renewals and operation, taxes and assessments shall show total expenditures, and proportions chargeable to each of the respective parties hereto, and shall be rendered monthly; those covering insurance, taxes and assessments annually.

Should any dispute arise as to the correctness of any of the items included in bills rendered, under this agreement, the party against which any such bill is rendered, shall pay as herein provided, an amount equal to the sum of all items in said bill, the correctness of which is unquestioned. The remainder, covering disputed items, shall be paid promptly as herein provided, upon an adjustment of the dispute.

12. Added Percentages. In making bills for the cost and expense of constructing, renewing, maintaining, operating and protecting said crossing, all labor and material shall be charged for at actual cost, plus ..... per cent added to material, and ..... per cent to labor to cover freight charges or accruals, handling, superintendence, use of tools and accounting, except that work done by contract shall have no percentages added.

Such of said bills as are based upon payroll cost of labor and stock prices of material shall include a fair arbitrary charge to cover supervision, inspection, handling, transportation, accounting and similar undistributed items of expense. Such fair arbitrary charge shall be agreed to by the parties, or determined by arbitration as hereinafter provided.

The provision as to actual cost herein contained shall not be considered or held as a warrant for charging excessive prices or freight rates on material, for hauling the same unreasonable distances, nor for the payment of unreasonable arbitrary charges of any kind.

13. Liability. Each party hereto assumes for itself the responsibility and risk of using and operating its own trains and engines over the space covered by the said crossing, and also responsibility for the negligent acts and omissions or the alleged negligent acts or omissions of its own officers, agents, servants and employes engaged in connection therewith; and in performance of any of its separate duties under this contract; and will pay to the other party and to third persons all damages which may arise and for which it may be liable arising from such negligence and in such operation.

The party having special charge of the management and operation of said crossing shall not be liable to the other party for the negligent acts or the omissions, or the alleged negligent acts or omissions of any person employed in the operation, maintenance or repair of said crossing, but all persons so employed shall, as respects any injury caused by such negligence, be regarded and treated as the agents or servants of each party hereto, and each of said parties hereby assumes the responsibility for all damages resulting from the negligence of such agents or servants in the operation of its own engines, cars and trains, and those of its tenants, lessees and licensees, at the said crossing, and shall indemnify and save each of the other parties harmless therefrom. Any expense caused or growing out of the injury of any workman or employe engaged upon the construction of said crossing shall be held and considered to be a construction expense, and shall be divided as herein in Section 4 provided.

14. Arbitration. In case of any differences or dispute arising under this agreement or concerning the subject matter thereof, the parties hereto agree to submit such difference or dispute to three arbitrators, one of whom shall be appointed by the ....Company, and another by the ..... Company, and each party shall give to the other party written notice of appointment of its arbitrator, together with his name and address. The two arbitrators so chosen shall select a third arbitrator. If either party shall fail to choose an arbitrator as herein provided, the arbitrator selected by the other party hereto, at the expiration of ..... days after the date of its said written notice, shall select a second arbitrator, and the two arbitrators so chosen shall select a third arbitrator. If within ..... days after the appointment of a second arbitrator, as herein provided, the two so chosen shall have failed to select a third arbitrator, either party hereto may apply to any judge of the District Court of the United States for the District which shall then include ..... or who shall thereupon appoint the third arbitrator. The three arbitrators so chosen in any manner as herein provided, or a majority of them, shall hear and decide said difference or dispute, and their decision, or that of a majority of them, shall be final and binding on the parties hereto.

The expense of an arbitration under the terms hereof shall be borne by the parties hereto in the proportions fixed by the arbitrators.

15. Cancellation of Conflicting Agreements. It is mutually understood and agreed that any and all agreements relative to said crossing, existing between the parties hereto or their predecessors, so far as they conflict, or are inconsistent with the terms and provisions of this agreement, are hereby annulled, but in all other respects they shall continue in full force and effect.

16. Duration and Succession. This agreement shall remain in full force and effect as long as the tracks of the respective parties cross at grade at the location shown upon "Exhibit A."

The provisions of this agreement shall be binding upon and inure to the benefit of the parties hereto, their successors, lessees and assigns.

In Witness Whereof, the parties have caused these presents to be executed in duplicate by their respective officers as of the day and year first above written.

Attest: .....Company

..... By.....,

Secretary. .....(Title)

Attest:

....Company

Secretary. By.....,

.....(Title)

Discussion

E. H. Lee (Chairman): The agreement which the committee offers to the association is shown in Appendix A, and we wish to add two additional sections to that agreement. Your committee feels that under all the conditions, taking the country over, a really uniform contract form is difficult to provide, one which will adequately meet all the various conditions in the various sections of the country. Some of the provisions must be suggested and with that in mind, these two additional paragraphs which we wish to offer, are to be incorporated in the agreement as shown in Appendix A, as sections 9 and 10, covering two matters which should be covered in certain cases. It might be well to run through the "Agreement for grade crossings," which is submitted.

(Mr. Lee then read Appendix A, down to and including "Protection.")

Mr. Lee: At this point we wish to offer to the association two additional paragraphs, one to cover the cattle guards and fence, and another to cover the question of electrification of lines as follows:

Section 9—The ..... Company reserves the right so long as it maintans fence up to the point of intersection of the ..... company's track with the respective boundary lines of the ..... company's premises, to require the ..... company to build and maintain in good order, proper cattle guards at the point of intersection aforesaid, for the purpose of preventing trespass upon said company's premises from the track or grounds of said ..... company.

Section 10—If the ..... company shall (during the life of this contract) electrify its railroad at the said crossing, upon ..... days written notice to the ..... company, the said ..... company agrees to furnish, maintain and install such electric appliances, fixtures and appurtenances at said point of crossing as many be necessary for the safe and convenient operation of said crossing, and to the satisfaction of the company's engineer.

If there is no objection, that will be incorporated. With those two additions, and with the further stipulation that Articles 9 to 16, inclusive, be set further back so that they shall be 11 to 18, inclusive, your committee wishes to offer the form submitted in Appendix A. I move that this form be adopted by this association for incorporation in the Manual.

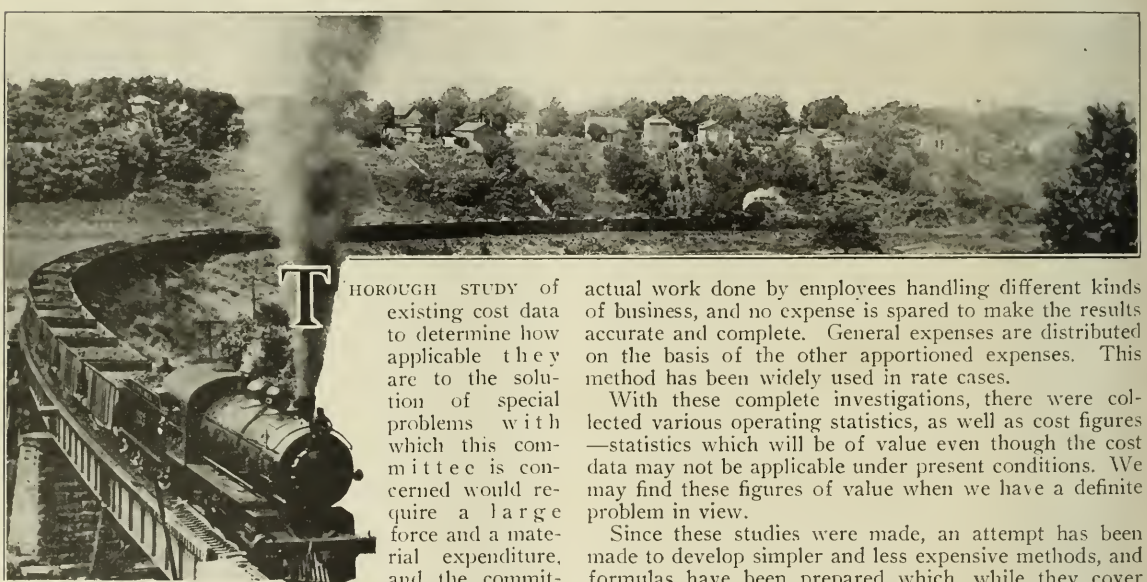
G. W. Kittridge (N. Y. C.): I have been making contracts a good many years. The day before I left home to come here I had submitted a contract which read the same as this one does, in one particular, and it came back. They told me that if I wanted to make a blue print and have it identified by signature of the blue print hereto attached, it should not appear in the whereas, but after "It is mutually agreed.". There may be some legal reason why that should come after "Therefore it is mutually agreed" than to put it in one of the whereases.

Mr. Lee: The committee would like to take this under consideration.

The Chairman: The motion before the house is the adoption of this tentative form of report, and insertion in the Manual.

(The motion was carried and the committee was dismissed with thanks.)

Report on Economics of Railway Operation



THOROUGH STUDY of existing cost data to determine how applicable they are to the solution of special problems with which this committee is concerned would require a large force and a material expenditure, and the committee feels that it should study the methods of analyzing costs rather than the costs themselves.

The Minnesota Rate Case made an epoch in cost accounting by insisting on more accurate information as a basis for rates. The "Arkansas Formula" was developed as a result of the decision, and was first used to find the cost of handling intrastate freight business. The "Formula" is a detailed method of assigning operating costs to the different services performed. Records are kept of actual work done by employees handling different kinds of business, and no expense is spared to make the results accurate and complete. General expenses are distributed on the basis of the other apportioned expenses. This method has been widely used in rate cases.

With these complete investigations, there were collected various operating statistics, as well as cost figures —statistics which will be of value even though the cost data may not be applicable under present conditions. We may find these figures of value when we have a definite problem in view.

Since these studies were made, an attempt has been made to develop simpler and less expensive methods, and formulas have been prepared which, while they cover only about one-third of the primary accounts, take care of about 85 per cent of the expense. The items which are omitted are mainly the unimportant ones which cannot be easily classified and which can fairly be divided on the basis of other costs.

New operating statistics are being prepared under the direction of the U. S. Railroad Administration. It seems probable that the methods adopted will lead to valuable results, and it is to be hoped that the work may be continued and where found to be an improvement over old

methods, it should be adopted by the Interstate Commerce Commission. It is not thought necessary here to discuss these new statistics. Reference is made to the article by William J. Cunningham, in the *Railway Age* of January 3, 1919, page 43.

Economic Length of Operating Districts

Operating District—The section of a railroad extending between terminals where yard and enginehouse facilities are provided which is covered by slow freight trains in single runs, trips, turns or day's work.

The economic length or lengths of operating districts of a given railroad are those with which the sum of interest on first cost, depreciation and maintenance of road and equipment, and cost of operation, may be the minimum.

On account of varying speeds the economic length of engine districts for (a) through passenger trains, (b) local passenger trains, (c) preference or quick dispatch freight trains, (d) local and pick-up freight trains, and (e) slow freight trains handling full engine rating, are not always the same, and for this reason it is essential to draw a distinction between engine districts and operating districts. To a large extent the present practice is for passenger engines and engine and train crews to cover more than one operating district in a turn or day's work, either by longer straight-away runs or by doubling one or more operating districts or portions thereof. To a considerably less extent the same is true of fast freight trains, and local and pick-up freight trains frequently have runs shorter than the operating districts. Therefore, in determining the economic length of operating districts it will be sufficient to consider the term "operating district" as applying only to slow freight trains.

The factors affecting the length of operating districts of existing lines are:

(1) Location of existing yard and enginehouse facilities.

(2) Topographical conditions affecting the construction of new yards and enginehouse facilities.

(3) Character of grade line.

(4) Capacity of railroad for handling business to be moved.

(5) Density of (a) passenger traffic; (b) fast freight traffic; (c) slow freight traffic.

(6) Location of labor supply and of housing facilities of employees.

(7) Location of connections with important feeders where there is heavy transfer of traffic from one to another, commonly termed "gateways."

All of these except No. 1 apply equally to new lines to be constructed except that the quantity of traffic frequently has to be estimated rather than determined from actual records.

The change in length of operating districts on existing lines has in the past been brought about by existing yard and terminal facilities being outgrown and on account of their inadequacy causing serious congestions of traffic rather than by any other cause. There are very few cases, if any, of new terminals on existing lines having been established solely for the purpose of changing the length of operating districts to promote economy. Usually a terminal becomes congested and topographical conditions are such that it is not practicable to increase its capacity. After a study of the situation it is found advisable to build a terminal in a new location, and this changes the lengths of the operating districts.

The disposal of existing terminal properties, the cost of new terminals and the breaking-up of established places of residence of employees are questions of such importance that it is rarely the case that any considerable change in the length of operating districts on an existing road has been justified alone by the resulting economies, and it is not possible to establish any rules or formulas which can be followed with any degree of certainty.

Aside from the questions of providing facilities for increased business, the principal items of operating and maintenance expense affected by the length of operating districts are: (1) Wages of train and engine crews. (2) Fuel and supplies for engines. (3) Cost of dispatching engines. (4) Cost of switching at additional terminals. (5) Train dispatching and telegraph expenses. (6) Maintenance of yards and engine terminals. (7) Maintenance of locomotives (locomotives required, both road and yard, increase as the number of operating districts increase). (8) Inspection and maintenance of cars, as affected by switching at additional terminals.

Take as a simple example a railroad of 500 miles operated under

Scheme A—Four operating districts of 125 miles each.

Scheme B—Five operating districts of 100 miles each.

(1) Under favorable conditions many freight trains will cover the 100-mile districts in from six to eight hours and a part of the wages of train and engine crews will be for "constructive" hours, and hence unproductive. With 125-mile districts this will not be so, or there will be less of it, and the wages of train and engine crews will be reduced accordingly, excepting as to such overtime as might be made on a longer district.

(2) Then if freight trains move at an average speed of 12½ miles per hour between terminals it will take a locomotive

$$\text{Scheme A} — \frac{500}{12.5} + 6 \times 4 = 64 \text{ hours}$$

$$\text{Scheme B} — \frac{500}{12.5} + 6 \times 5 = 70 \text{ hours}$$

to move a train over the 500 miles, one way. It will therefore require

$$\frac{70 - 64}{64} = .09375 = 10 \text{ per cent (approximately)}$$

more road locomotives with Scheme B. Switching at the additional terminal will require at least two switch engines, so that if 60 road engines are required with scheme A, then $60 + .10 \times 2 = 8$ additional engines will be required with scheme B and the cost of fuel and supplies for these engines will be additional expense with this scheme.

(3) With scheme B there will be 6 terminals, 4 intermediate, while with scheme A there will be 5 terminals, 3 intermediate. The number of engine dispatchments under scheme B will be approximately one-fifth more than under scheme A and an additional supervisory and working force will be required, embracing ashpit, engine house, coal dock, power house and miscellaneous labor.

(4) Incident to the additional intermediate terminal under scheme B there will be a certain amount of switching and a force of yardmasters, yard-clerks, switchmen, etc., required, adding to the expense of operation under this scheme.

(5) On account of there being an additional operating district another set of train dispatchers will be required under scheme B and the additional terminal will add at least one telegraph office.

(6) The yard tracks, buildings and appurtenances of the additional terminal under scheme B will have to be maintained and will add to this expense approximately one-fifth.

(7) There will be, as developed above, 6 road and 2 yard locomotives more required under scheme B. These will have to be maintained at approximately the average cost of maintenance of all locomotives under scheme A.

(8) A force of car inspectors will be required at the additional terminal and there will be a certain amount of damage to equipment in switching there, requiring repairs to the cars. This will add to the cost of repairs to cars under scheme B.

This indicates briefly the result on the cost of operation of the establishment of additional terminals, so long as the lengths of the operating districts are held within practicable limits. However, the exercise of care and good judgment is necessary in making the decision between very long or moderately long districts. If the districts are very long, the average time of the crews on the road will be too great and there will be great likelihood of having to relieve them to avoid violations of the Hours of Service law. Moreover, the factors affecting the length of operating districts Nos. 2 to 7, inclusive, have such an important bearing on the location of terminals and the economic length of operating districts that it is plainly evident that each case presents a problem in itself, which can be solved correctly only after a careful study of its own peculiar conditions. There are, however, certain principles which should be kept clearly in mind in determining the economic length of operating districts. These may be stated as follows:

(a) The number of terminals at which trains are switched and engines dispatched has a direct bearing on the cost of operation and should be a practicable minimum.

(b) It is advantageous to so locate terminals that locomotives will haul full tonnage rating over the entire operating district.

(c) It is advantageous to locate terminals at the intersections of natural railroad routes which will develop into important gateways.

Conclusions

The committee recommends the acceptance of this report as information, it being considered unnecessary to insert any portion of the report in the Manual at this time.

The committee recommends the assignment for the coming year of four subjects, as follows:

(1) Report on methods for increasing the capacity of a railroad, collaborating with the committee on Signals and Interlocking.

(2) Report on method of analyzing costs, for the solution of special problems with which this committee is concerned.

(3) Effect of speed of trains upon cost of operation. (This year's subject covered effect upon track maintenance only.)

(4) Report upon the allocation of maintenance of way expense to passenger and freight service.

Committee: F. W. Green chairman; V. K. Hendricks (St. L.-S. F.), vice-chairman; H. H. Brewer (G. T. P.), G. D. Brooke (B. & O.), Ralph Budd (G. N.), M. Coburn (Pa. Lines), C. E. Denney (N. Y. C. & St. L.), J. M. Egan (I. C.), L. C. Fritch (C. R. I. & P.), U. E. Gillen (G. T.), M. V. Hynes (C. I. & W.), C. M. Himmelberger (C. R. R. of N. J.), W. J. Jenks (N. & W.), P. M. LaBach, Frank Lee (C. P. R.), J. de N. Macomb (A. T. & S. F.), Jos. Mullen, H. A. Osgood, R. J. Parker (A. T. & S. F.), J. H. Prior (Cons. Eng.), W. G. Raymond (Univ. of Ia.), H. E. Riggs (Univ. of Mich.), S. S. Roberts (U. S. R. R. A.), L. S. Rose (C. C. C. & St. L.), E. F. Robinson (B. R. & P.), Mott Sawyer (C. M. & St. P.), Edward C. Schmidt, J. E. Teal (B. & O.), G. S. Ward (S. P.), C. C. Williams (Univ. of Kan.).

Discussion

V. K. Hendricks (Vice-Chairman): The report of the committee is merely a report of progress on subjects (1) methods of increasing the capacity of a railroad, (3) effect of speed of trains upon cost of track maintenance, and (5) allocation of maintenance of way expenses to passenger and freight service. The investigation on the collection of data on operating costs indicates that a thorough study of existing cost data would be a very expensive proposition. It would require a paid force to make it, and while the committee recommended last year that such study should be made, it feels that the cost data would be of questionable value, on account of the changing in unit prices, and that it would be better to study the methods and analyzing costs, rather than to study costs themselves, and on this subject merely report progress.

On Subject No. 4, "Report on the economic length of operating districts," the question has been gone into at some length, but it seemed that this question was dependent on a full consideration of all the varying features entering into it, and the application of good judgment, and no definite recommendation is made.

J. L. Campbell (E. P. & S. W.): It is doubtless true that this is a subject in which the association should have the benefit of the co-operation and experience of distinctly operating men, and I suppose that they are properly represented on this committee. If they are not, the committee might be enlarged so that the strictly operating men who are members of the association could work on this subject. I believe that it is going to be recognized by this association that this is perhaps one of the very important, perhaps the most important, of committees.

Mr. Hendricks: In this connection the personnel of the committee does include a good many operating men, but unfortunately during the past year the conditions have been such that they could not devote time to this work, and I am sure that we all regret that they have not been able to do so to a greater extent.

Col. F. W. Green (Chairman): The speaker regrets that his military obligations were such that he has had no time to give consideration to these matters heretofore. It seems to him that just at the present time the work of this committee is going to be especially difficult, for several reasons; First, we are in a period of flux, as we all know, labor costs and material costs are reaching unheard of figures and it is almost impossible for anyone to estimate today with any degree of accuracy what these costs will be tomorrow, or a year from now, or three years from now.

The true significance of the term "economics of railway operation" is, of course, to secure that combination of facilities and the operating organization which will result in the least total expenditure of money. Both of these items will be variable and uncertain, and it seems to me for the next year or two, possibly, the work of this committee will have to be confined to the establishment of principles, rather than the development of any definite method for ascertaining costs.

Mr. Hendricks: I move that the report be received as information.

(The motion was carried, and the committee dismissed with thanks.)

Report on Economics of Railway Location

Sub-committees were appointed to consider each of the five subjects assigned to the committee for study, but four of the chairmen of the sub-committees asked to be relieved and only one advised that he would undertake the work. As a result, only one sub-committee did any work. This committee made a study of the effect of curvature on the cost of maintenance of way and equipment. A letter of inquiry was addressed to the officers of a few lines asking for information bearing upon this subject. Several replies were received, but the only information obtained was from the Pennsylvania Lines (published in the *Railway Age*, November 8, 1918, page 813). This data showed that the average increase in rail wear on curves as compared with tangent is about 100 per cent for a 6 deg. curve, 25 per cent for a 3 deg. curve, etc., or approximately as the square of the degree of curve. The importance of this information is evident when it is remembered that heretofore it has been customary to estimate curve expenses directly with the central angle or with the degree of curve when a given length is considered.

Committee: R. N. Begien (B. & O.), chairman; C. P. Howard (I. C. C.), vice-chairman; F. H. Alfred (P. M.), A. S. Baldwin (I. C.), Willard Beahan (N. Y. C.), E. J. Beugler, Ralph Budd (G. H.), W. J. Cunningham (U. S. R. A.), C. F. W. Felt (A., T. & S. F.), R. D. Garner (Soo N. E.), A. S. Going (G. T.), A. J. Himes (N. Y. C. & St. L.), H. C. Ives (Wov. Pdy. Inst.), W. A. James (C. P. R.), J. A. Lahmer (M. P.), Fred Lavis (Cons. Engr.), E. H. McHenry, G. A. Mountain (Can. Ry. Cons.), Edward C. Schmidt, A. K. Shurtleff (Asst. Secy.), C. H. Splitstone (Erie), M. F. Steinberger (B. & O.), A. F. Stewart (C. N.), L. L. Tallyn (D., L. & W.), Robt. Trimble (Pa. Lines). W. F. Tye (Cons. Engr.), W. L. Webb (Cons. Engr.), H. C. Williams (L. & N.), M. A. Zook (I. C. C.).

Discussion

C. P. Howard (Vice-chairman): Five subjects were assigned to this committee, but only one sub-committee submitted a report—Subject 3 (a) "Effect of curvature on cost of maintenance of way."

(Mr. Howard here read the report of the committee.)

I would like to call attention to the fact that though the text of this report is brief, the conclusion indicated by the data submitted is entirely new and altogether different from the theory heretofore accepted, that curve expenses, including rail wear generally, vary directly with the degrees of central angle, irrespective of the degree of curve. It has been known a long time that sharp curves were very objectionable, Wellington to the contrary notwithstanding; but this is the first time as far as known that any data has ever been submitted tending to show that excess rail wear on curves and perhaps some other curve expenses, vary with the square of the degree of curve.

This data and the conclusion that might be drawn from it would necessitate a radical change in the ordinary rules for the negative value of curvature, and it is hoped that discussion of the subject and especially the submission of additional data from the railroads will throw further light on the subject and enable us to reach a positive conclusion in the matter.

G. J. Ray (U. S. R. A.): I would like to ask whether in considering the data received any attention was paid to the question of elevation in the curves in making comparison. That has a very vital influence in considering the matter for this reason. In the case of all freight traffic you would have very low elevation. In the case of combined freight and passenger traffic, if you have a high elevation with freight trains, probably moving at a slow rate of speed, which is the worst possible condition, we know that the rail wear has a very damaging effect.

Mr. Howard: This does not give the elevation on curves. It covers two divisions of the Pennsylvania, and I suppose the elevation is such as is usual. We have only been able to get data from one railroad, though we have circularized various roads.

C. E. Lindsay (U. S. R. A.): I happen to know that these particular tracks are used for both freight and passenger, and are probably elevated for about forty miles per hour.

Mr. Howard: It is not so much the amount of wear as the fact that it increases as the square of the degree of curve.

W. H. Courtenay (L. & N.): I appreciate the very great value to all railroad men of getting as precise data as is possible pertaining to the wear of rails on different curves, but in the ordinary maintenance and operation of a railroad it is difficult to get data which is scientifically precise for the simple reason that rails are sometimes renewed on a given railroad in a less state of wear than they are on another railroad. Our experience on coal-carrying lines with 10-deg. curves is that the rail on the curves ought to be renewed at intervals of about four years. On 6-deg. curves we can count on a life of eight years, and for straight track about twelve or thirteen years. While those are very rough figures, I apprehend it will be very difficult to get figures which are so nearly correct as to be reasonably scientifically precise upon which this association could base any general conclusion.

E. B. Katte (N. Y. C.): In studying this question of rail wear I should think that co-operation with the motive power engineers might be helpful. We know that the flange wear on certain types of electrical locomotives is very much greater than on other types.

Mr. Courtenay: There is one other thing that I omitted. The wear on the curves was so great that we went to oiling the flanges, and at certain curves we actually oiled the gauge of the outer rail. That is a laborious undertaking, but it apparently reduced the wear. To what extent I cannot say.

Mr. Howard: I might say for Mr. Courtenay's information that this report from the Pennsylvania was originally made on just that subject, to find out whether or not it paid to oil rails, and this data and the study of the rail wear was gotten from that investigation. All that part about oiling the rail has been left out of this report. As to ascertaining the time a rail has lasted in a curve, the Interstate Commerce Commission is doing that now every day. They go over miles of railroad and look at the brand on the rail to find out how long it has been there on a curve or on a tangent. And it is not a difficult matter to find out how long it has been there.

Mr. Ray: It is difficult to tell exactly how long rail will wear on a curve. It must be remembered that you must have the same identical kind of rail on the curves that you are comparing. On the Lackawanna we have several curves that we use as test curves, and we make comparison by laying alternate rails around the curves, 10 of one kind, 10 of another and 10 of another. We find, for example, that 10 rails of one sort will wear off about half as fast as the next 10 rails, and you can readily see, if you are going to make a fine calculation, the rate of wear on different degrees of curvature. You have got to have the conditions the same, you have got to have the same kind of rails.

Mr. Howard: We did not intend to offer that as a conclusion. We simply stated that the data submitted by the Pennsylvania Railroad seemed to indicate that,

and we have asked for additional data which will either corroborate or disprove it. That is the only data we have, and that is what it seems to indicate.

J. L. Campbell (C. P. & S. W.): I don't believe that the case for this diagram is quite as uncertain or bad as Mr. Ray seems to think, for the reason that, as I understand, it is the result of observations on two operating divisions and a variety of curves, and no doubt a variety of rails and quality of rails; but in so far as this data has been correctly gathered and studied it helps to get the result of the whole thing, consequently it does have some value.

J. G. Sullivan: When I was making a little study of curve resistance and tried to find out about what percentage of ordinary freight car wheels were removed from the cars for sharp flanges, in cases where one flange only was sharp, I got that information and it averaged about 75 per cent. In connection with that study, it would lead me to believe that the friction wear is a little less on high elevated track than on lower, contrary to what a good many of us, at least what I had in mind, there was not sufficient coning of the wheels to take up the difference in length say of a 12 or 14 or 16 deg. curve.

Mr. Campbell: Just as a matter of information, I may say on the subject of lubricating the rail that we have a branch line going up a mountain about 4,000 ft. in 26 miles. It is built on a 5 per cent grade and has about 230 curves in it. That road was built twenty years ago, and 60-lb. rail were laid there. That original rail is still in the track. When the road was put into operation the rail began wearing so fast that it attracted attention. Since that time, the rails of that track have been lubricated with water. After that had been in operation for perhaps ten years, the management ordered the lubrication discontinued. Immediately the wear of the rail became aggravated with constant derailments. The result was that we put the lubricator back on the engine, and it is working there today with very satisfactory results.

(Mr. Howard's motion was then put to a vote and carried, and the committee was excused with the thanks of the association.)

Closing Business

The Chairman: The chair will announce the ballot preliminary to the installation of officers. (The Chairman then read the result of the ballot.)

The Chairman: I will ask Mr. Wendt and Mr. Sullivan to escort the newly-elected president to the platform. (Applause.)

Mr. Stimson was then escorted to the chair and installed. After a few remarks, he declared the convention adjourned.

W. A. Webb on Board of Adjustment

W. A. Webb, until recently general manager of the Missouri, Kansas & Texas Railroad of Texas, has been appointed a member of the Railroad Administration Board of Adjustment with office in Washington.

Conference on Steel Prices

A committee representing the steel interests was in conference with the Industrial Board of the United States Department of Commerce at Washington on Wednesday and Thursday in an endeavor to reach an agreement on steel prices. No definite agreement was reached on Wednesday, but an early conclusion of the negotiations is expected.

A. R. E. A. Registration

Following is the registration of the members and guests at the convention of the American Railway Engineering Association on Thursday:

Members

Bachelder, F. J., Consulting Engineer, Chicago, Ill.
Bettle, F. W., Gen. Roadmaster, Texas & Pacific Ry., Marshall, Tex.
Busch, Harry F., District Eng., St. L. S. F. Ry., Springfield, Mo.
Dawley, W. S., St. Louis, Mo.
Hawthorne, F. M., Asst. Div. Eng., Penn. Lines, Pittsburgh, Pa.
Heggie, W. G., Office Engineer, Grand Trunk Ry., Western Lines, Detroit, Mich.
Hopkins, A. T., Field Eng., Val. Dept., M. C. R. R., Detroit, Mich.
Sarvey, A. L., Val. Eng., M. C. R. R., Detroit, Mich.
Smith, C. E. (In military service.)
Snyder, G. D. (In military service.)
Stradling, D. W., Asst. Val. Eng., D. T. & I. R. R., Springfield, Ohio.
Taylor, D. M., Asst. Val. Eng., W. & L. E. R. R., Cleveland, O.
Tuthill, G. C., Acting Br. Eng., M. C. R. R., Detroit, Mich.
White, R. C., Asst. Ch. Eng., M. P. R. R., St. Louis, Mo.
Wonson, S. L., Bridge Eng., M. P. R. R., St. Louis, Mo.
Wood, B. A., Chief Engineer, M. & O. R. R., Mobile, Ala.

Guests

Austill, H., Br. Engr., M. & O. R. R., Mobile, Ala.
Stewart, Geo. H., Supvr., P. R. R., Greensburg, Pa.
Andrews, A. G., Supvr., Penna. R. R., Osceola Mills, Pa.
Tefft, J. F., Asst. Eng., P. M. R. R., Saginaw, Mich.
Abrams, D. A., Lewis Institute, Chicago.

Record Breaking Convention Attendance

President Stimson announced at the close of the session yesterday afternoon that the total registration of members aggregated 509. This is the largest number which has ever been present at a convention, the previous record being 425.

Coliseum Attendance

The attendance at the Coliseum aggregated 23,295, by far the largest in the history of the Appliances Association. It was divided as follows: Monday, 2,612; Tuesday, 6,457; Wednesday, 7,246; Thursday, 5,980.

Col. F. W. Green Returns

Interest was added to the presentation of the report of the Committee on Economics of Railway Operation yesterday, when its chairman, Col. F. W. Green, presented the report. He has been overseas 19 months and only landed in this country on March 7. In the course of his remarks he took occasion to comment on the prestige which the American Railway Engineering Association has built up for itself in France. He stated that in his talks with French engineers he used to ask them if they read any engineering literature published in America, and he did not find one who was not a regular reader of the proceedings of the association. In their estimation the A. R. E. A. is the outstanding and prominent association in the United States.

C. & N. W. Division Signal Foremen Banquet

On Wednesday evening 21 division signal foremen of the C. & N. W. participated in a banquet and get-together meeting at the Winter Gardens, Chicago. Many of these men were heretofore unknown to each other, so that the meeting was planned for the purpose of enabling them to become acquainted with one another and discussing problems of mutual interest.

EDITORIAL

Railway Age

Freight House Equipment

Americans have assumed for many years that the application of labor-saving equipment has been much more general in this country than in Europe. In fact, they have been inclined to take this condition for granted, assuming it to be a natural consequence of American progressiveness in overcoming the higher cost of American labor. It will, therefore, be a matter of no little surprise to most railway men in this country to note, as outlined on another page of this issue, the extent to which power freight handling equipment has been applied in a new freight terminal in Glasgow, Scotland. Obviously, that station has been designed to meet British conditions, and there is probably much in the installation that would not apply to an American freight house. Nevertheless, the article should give food for thought on the character of equipment that would be applicable to the needs here. In this country, the pioneer work in freight terminal facilities has been confined to a few roads, the others being content to adopt what the few have perfected. As a consequence, power devices in freight houses are restricted to one or two types of transportation or lifting equipment. More independent thinking and experimentation along these lines may bring forth other labor- and time-saving machinery that will repay the development costs many times over.

Railroad Annual Reports for 1918

The Pennsylvania, some weeks ago, sent to stockholders a brief financial statement for the year, 1918, accompanied by an announcement that the customary complete statistical report for the year was not within the province of the owning corporation since the road was being operated under lease by the government. The Boston & Maine has now followed with a somewhat similar announcement, and it may be that there are compelling reasons which will prevent the corporations from obtaining and compiling the usual statistical statements which are sent to the stockholder with the annual report. If this is so, however, it is most unfortunate for railroad security owners, and a holder of securities of a railroad corporation owes it to himself to make every effort to obtain a knowledge of the detailed operating expenses, the average train and car loading, the ton and passenger mileage handled, tonnage of commodities carried, etc., of the roads in which he is interested. Never has it been more important for the individual investor to study the figures showing the character of maintenance, cost of handling freight and passengers, and efficiency of operation than it is now. The corporate officers of the railroad companies have, to the best of their ability, been watching out for the interests of the security holders and for this purpose have been keeping in close touch with the federal managements of their properties; but it should be borne in mind, however, that in many instances there has been shown, on the part of the Railroad Administration when under Mr. McAdoo, a suspicion of the corporation officers. The administration has pursued a policy of secrecy about many matters, especially in regard to labor, and even if a corporation officer had good reason to believe that certain unfavorable developments had taken place in the management of the property which he was, in duty bound to his stockholders, required to protect, he could not make a full, frank statement of his opinion to the general public. There is another thing of great importance; where a property has been under the management of one man for a number of years, the annual reports naturally reflect something of the way in which this man views the operations of the property. Furthermore, it reflects the conditions which are, to a certain extent, the outcome of the will and desire of the board of directors and the president. Now, however, we have had a year of operation of railroad properties without this artificial molding of conditions. Of course, there are numerous temporary conditions which affected a particular railroad property because of the war, which must be allowed for, but the fact remains that this year a security holder who studies the statistics of operation of his railroad will get a view of the property from an entirely new angle. He has a chance to apply new tests unhampered by any desire on the part of the compiler of the annual report to follow traditions.

Important Reduction in Steel Prices

It is most unfortunate that the Railroad Administration should have been forced, by the failure of Congress to pass the revolving fund appropriation, to issue orders for drastic curtailment of improvement work just at the time that the steel manufacturers announced important reductions in the prices of their products. The railways are among the largest users of steel, and under ordinary conditions reductions in the costs of these materials such as those made last week would have led to greatly increased activity. For instance, it has been understood that the Railroad Administration has been prepared for some time to place orders for over one-half million tons of rails as soon as its demands for concessions in price have been made. Similarly large tonnages of track fastenings, bridge materials and other steel products are urgently needed. The problem of reconstruction is now a critical one for the entire country. At the same time the railways are urgently in need of repair and improvement work. It is therefore to be hoped that the Railroad Administration may find some way of overcoming its financial difficulties so that the roads may take advantage of the lower costs of construction and at the same time provide employment directly and in the plants of the supply companies for the surplus labor now available.

Report on A. S. A. Brake Tests

The elaborate series of tests of the Automatic Straight Air brake system conducted by the Bureau of Safety of the Interstate Commerce Commission, has, according to the report abstracted elsewhere in this issue, demonstrated to the satisfaction of the Bureau the substantial accomplishment of the functions for which the equipment was designed. There were several features of the equipment as furnished for these tests which were not considered ideal for the best results. None of these, however, was considered inherent in the principles of the design or functions of the brake. Among these are the ratio of cylinder pressure rise to brake pipe reduction, which

should be higher than the two to-one ratio of the equipment tested; the requirement of practically full depletion of brake pipe pressure before obtaining the automatic emergency application; the difficulty of securing proper emergency action with the compensating valve, and the design of the equipment. The first two difficulties mentioned were considered to be matters of adjustment, and their elimination is contemplated in a simplified design. A modification of the engine equipment during the tests removed the third difficulty, and with the redesigned equipment it is proposed to demonstrate the ability to perform its functions without the use of the compensating valve on the locomotive. Aside from the comprehensive nature of the tests, they are remarkable from the fact that a complete graphic record was taken of the performance on the brake on every car in each of the trains tested, and when its formal presentation to Congress makes the entire report available it will offer an unusually complete fund of data on the subject of train control.

Contributions to Railroad Efficiency by the Railway Supply Industry

The New York Railway Club performed a most important service at its meeting last week in outlining clearly and forcefully the intimate relationship that must necessarily exist between the railway managements and the railway supply interests in the matter of improving the efficiency and economy of railway operation. It is well that the important —indeed, almost immeasurable—contributions which have been made by the railway supply companies toward this end should be more generally and more fully appreciated.

The railway supply companies are in sharp competition, one with another. To live and prosper they must constantly strive to produce better products than their competitors and at the lowest possible prices. This requires them to keep in intimate contact with the requirements of the roads and with the development of that phase of railroading in which they are particularly interested. Not only is it necessary to build up strong engineering departments but, in many cases, it has been found desirable and even absolutely necessary to install service departments to follow the devices or equipment after they have been placed in service and see that they are properly operated and maintained. These service departments have had to carry on extensive and intensive educational programs; this fact is not sufficiently appreciated by the railways. It is not uncommon, for instance, for a railway supply engineer or expert to be called upon for advice on problems which have little, if anything, to do with the devices or equipment in which he is specially interested. The air brake expert is not infrequently called upon for advice as to train operation—questions which are not always directly related to the use of the air brakes but which he is usually competent to answer because of his broad experience and his contact with the practices on other roads. Experts having to do with devices to produce better combustion often make valuable practical suggestions as to factors involved in combustion as a whole which have little, or nothing, to do with the particular device in which they are specially interested, but which do contribute to the securing of better results.

The engineer on a railway must necessarily cover a wide range of activities; there are comparatively few railway designers or experts that can give an unlimited amount of time for concentration on one particular problem. The railway supply engineer or expert, on the other hand, can give his undivided attention to the development or improvement of one particular device and may even find it necessary to build up a strong staff of experts about him. This staff finds it necessary to study conditions on many roads having widely varying characteristics. Any improvement that may be suggested by special conditions at one place can be followed up and studied critically. It may be found wise to incorporate the new feature as a permanent improvement in the device, thus making it more valuable for use even under ordinary conditions.

It is well that railroad men should understand the value and extent of these services. It is exceedingly important that those in charge of purchasing should realize what these things mean to the railroads and should take them into consideration. There is an impression on the part of many of the railway supply men that those in authority, had they thoroughly understood these matters, would, in many cases, have adopted a somewhat different attitude in dealing with the railway supply men during the past year. It is well, therefore, that the New York Railroad Club focused attention upon the matter as well as on the necessity of a closer co-operation between the railroads and the supply companies looking toward a more uniform production of material, thus aiming to make it possible to maintain more uniform and stronger manufacturing organizations, increasing the efficiency of production and, of course, reducing the cost of the equipment to the railroads to a minimum.

Railroad Men's Terms of Subscription to the Victory Loan

The Railroad Administration has announced that railroad officers and employees may subscribe to the Victory Loan through the federal treasurers of their companies on a 10 per cent per month installment plan. Walker D. Hines director general, has issued a circular (No. 63) urging officers and employees to subscribe to the loan either through the railroad federal treasurers or through any local bank. Interest will be allowed on installments at the same rate as the interest carried on the Victory Loan.

The railroad organization for handling the loan consists of a general committee headed by the federal manager for each road, assisted by a general office committee, divisional committees, terminal committees, and shop committees. The committees are to report daily to the general committee, which in turn is to report to the regional director. Every officer and employee of the roads under federal management will be solicited personally, but the director general especially cautions against allowing any employee to feel that his action is influenced by fear of coercion or of criticism. The loan drive begins on April 21 and lasts until May 10.

As previously announced, the loan is to be divided into four classes, presumably bearing different rates of interest, the lowest rate being for a class of notes entirely tax free, except for inheritance taxes, while the highest rate of interest, the fourth class, is for notes tax free from income taxes only, and from these taxes only up to $40,000. Secretary Glass recently said, "We are not going to approach the last popular war loan strictly in a commercial spirit. . . . We must and will appeal to the patriotism of the American people. . . ." It is well to remember that our country's obligations are our obligations and that the raising of the Victory Loan is merely carrying out obligations already entered into.

Put purely on a commercial basis, however, the Victory Loan should appeal particularly to railroad men. There are thousands of railroad employees and probably hundreds of junior officers of railroads who have been successfully and systematically saving money—becoming capitalists—for the first time in their lives through their purchase, on the installment plan, of the various issues of Liberty Loans. The terms offered by the Railroad Administration are very

liberal. When a man stops to think how large a proportion of his first premium payments on life insurance goes to pay the cost of soliciting the policyholder—commissions to solicitors—he can appreciate better the liberality of the Railroad Administration now, and of the railroad companies in the past, in undertaking, free of all charge or commission, this work of solicitation.

Every subscriber to the Liberty Loans on the installment plan knows that, except for emergencies, the regular saving, month by month, of a fixed percentage of his pay is a habit not hard to acquire and one which gives a feeling of satisfaction and self-respect that is priceless.

In making the first four Liberty Loans the great successes that they were, certain classes of citizens gave of their time and energy more than others, but no amount of giving on the part of bankers and a few other restricted classes would have made the bond sales the success that they were had not all classes of citizens, consciously or unconsciously, aided in the distribution of these bonds. There were 21,000,000 subscribers to the $7,000,000,000 Fourth Liberty Loan, and it cost the government just $8,727,658 for the campaign, a cost of less than ⅛ of 1 per cent of the total amount.

Such a great majority of all the railroad men in the country were subscribers to one or more of the Liberty Loans that the work of introducing the investment to them should, in the case of the Victory Loan, be almost nil. It is rather a question of arousing enlightened self-interest and yet this should not be difficult. Systematic saving is an absolute requirement for success in life whether a man be earning $100 a month or $1,000 a month. Never before has there been such an opportunity to save on such advantageous terms, or in so easy a way.

The Price of Development

NO ONE WILL QUESTION the statement that the path of the promoter of automatic train control devices has been a hard one. Each recurring collision has brought a demand for devices which will make their repetition impossible, but up to the present time the devices of this kind have with few exceptions received scant recognition and support from railway men. Instead, the general attitude has been such as to discourage the development of such devices rather than to lend sympathetic co-operation sufficient to demonstrate their possibilities or weaknesses. It is true that many of the devices have been so evidently impracticable as to render demonstration unnecessary, but on the other hand the railways have set up requirements so rigid as to be almost if not entirely impossible of fulfillment with a new and necessarily imperfect device.

The Railroad Administration is to be commended for its recent action appointing a committee to investigate the devices which have been developed, while the committee itself has shown a laudable desire to accomplish real results by drawing up a set of requirements, which, while rigid, are within the possibility of attainment in the present state of development of automatic train control apparatus. The committee has also indicated that it does not expect to find a perfect and practical form of control at once, but it is looking for those systems which most nearly approach this ideal. With this in view, it is now making an inspection of those systems which are in actual use.

In connection with its first inspection, which was made of the installation on the C. & E. I. last week, attention may also well be called to the necessity of complete co-operation on the part of the railways, for this support is essential to the development of a device the practicability of which must be demonstrated, not in the laboratory or shop, but under actual service conditions in the track. In this instance the management of the C. & E. I. has co-operated fully, both in the four-year period of initial experiments and in the four years following, during which the apparatus has been perfected in actual service on a complete engine district. Not only has the road lent its sympathetic support to this development, but it has suffered interferences to traffic and other conditions inherent in the early stages of important developments of this character. For this contribution to the science of railroading the management of the C. & E. I. deserves commendation.

New Books

American Methods in Foreign Trade. By George C. Vedder. Size 5½ in. by 8 in., 205 pages. Bound in cloth. Published by McGraw-Hill Book Company, 239 West 39th Street, New York. Price, $2.00.

If this book did nothing more, it would make itself worth while for the emphasis it places on the idea that the American manufacturer who engages in foreign trade will make the most of his opportunities by following out the same policies that brought him success at home. When all is said about German or other competition, says Mr. Vedder, the fact remains that the successful American manufacturer in foreign trade has come out the better because, unlike his competitors, he has sold not on a price or quantity basis, but on the basis of quality and service which characterizes the most successful businesses in domestic industry. Mr. Vedder in his book has outlined in readable fashion the best methods to be followed in developing a foreign trade.

He is more or less iconoclastic in his views, but most of his readers will agree with him that most of the obstacles that have been alleged to exist against American export trade are chimerical. Mr. Vedder, in particular, demolishes the idea that the Germans were excellent exporters. He says that many American concerns were competing successfully against German merchants before the war. He has no respect whatever to express in favor of the much vaunted German foreign banking system which he says made more ill-feeling than good will with those with whom it dealt.

There will be those who will disagree, however, with some of Mr. Vedder's ideas, and particularly with his views on the Webb-Pomerene bill permitting combination in export trade. He says that it is contrary to our own beliefs as expressed in the anti-trust laws in this country. "That two measures (this and the Sherman Law), so contradictory morally can long remain on the books and be effective, is incredible." In his chapter on this subject, Mr. Vedder seemingly misses the point that the reason the Webb-Pomerene bill was pased was not so much to relieve exporters from the operation of the Sherman law, although that, of course, was intended, as to clear up the darkness and uncertainty surrounding the operation of that bill. Mr. Vedder also apparently misses one of the big points of all our anti-trust legislation. He will admit that it has been directed at restraint of trade but apparently forgets that one of its biggest aims has been also to restrict monopoly. He does not see that the Webb-Pomerene bill has much in common with this legislation. It is aimed to encourage, not restrain export trade, by permitting the manufacturer to go out into the markets of the world fully armed in an organization of manufacturers like himself not hindered at every step by fear of persecution under a statute of very uncertain interpretation. As for monopoly, America cannot achieve monopoly while England, France, and other countries are selling in the same market, no matter if the American manufacturers are all combined. And does Mr. Vedder forget the fact that before the war for lack, among other things, of a Webb-Pomerene bill, the copper market was controlled outside instead of in the country?

Letters to the Editor

Wages in the Signal Department

West-of-the Mississippi.

To the Editor:

How is it that in some departments of the service very good railroads pay very poor wages? I have worked for several railroads in the West and at present am working for one of the best lines in the Pacific Northwest; it is a road with the best co-operation between officers and employees that I have seen anywhere; it has better cars and locomotives, better safety efforts, better harmony between the railroad and its patrons, and good conditions all around. I have boasted about the road and its service; have got some good men to come here from other roads, and I have now and then promoted the business of the company by getting a passenger to take a long trip over its lines. Nevertheless I do not get enough pay. The increases which have been granted, and which are so thoroughly enjoyed by most everybody else in the service have not hit the signal department to amount to anything. A year ago last spring I received, as maintainer, $92.50 a month, with 10 per cent bonus. About a year ago I was appointed acting signal inspector at $110, with 10 per cent bonus. Now I get but little more than a maintainer. They receive $123.25, while I receive $146. There is some talk of an increase, but I cannot find anybody who will tell me what it is to be, or anything definite.

Among the powers that be there seem to be none who appreciate the difference between an inspector and a maintainer. The maintainers live in small towns where expenses are not so high as in cities. Some of them even live in dwellings made from old box cars, furnished by the company. In these small places a maintainer can go out after working hours and get in his wood, old ties and old building material being plenty; and in the timber country logs are exceedingly cheap. The maintainer who prefers to buy his fuel, instead of wielding the axe after hours, can usually buy from the farmers at $1.50 to $1.75 per rick; but I, living in a city, have to pay $10 a cord for four-foot wood and $11.50 a ton for coal. A five-room house fit for a decent family to live in costs $22.50 a month. I have to have a telephone, which costs $2.50 a month on a two-party line. The high prices of food are already familiar to you and I need not make the comparisons; but it is proper to remark that, even when working, I have to wear presentable clothes and shoes, a point which is not important with many employees who get much higher pay, proportionately, than I do. My wife is a marvel of economy, while at the same time she maintains a neat house and presents a reasonably stylish appearance. I have to forego some things which I really need, but I cannot lay this condition to my wife. This winter she is wearing for the third winter a plush coat, fur trimmed, that cost us $45.

I do not object to the payment of high wages to the maintainers, but I do think that the inspector should at least be allowed enough to take care of the unavoidable extra expenses incident to his position. From the employer's viewpoint it is no more than fair to say that he ought to take into consideration the extra effort which a careful and conscientious inspector ought to be expected to put into his work.

Sometimes I am tempted to listen to the fellows who are all the time saying, "Get into something else." Speaking generally, it seems to me that the signal department employees do not enjoy as good treatment as those in other departments. There seems to be an impression among some officers that anybody can be a signal man. A railroad officer was mentioned to me lately by name—I do not know him—who said that he could go around with a maintainer for two weeks and then would be competent to take up his work. Any man who knows the conditions would say that this officer would be absolutely unsafe with that limited experience; he could not even learn to take proper care of the lamps of the semaphores in several times two weeks. In the winter the running and repair of a maintainer's motor car is a job that no green man can take up. I have run a motor car over my territory for four summers and five winters without accident; but I am free to confess that to do this implies a good deal of care as well as experience.

The maintainers in this territory are a conscientious lot of workers. They have to hop onto their gas car at any time, day or night, regardless of the weather, and chase trouble—many times trouble which is not really chargeable to their department. I have had charge of twenty of these men now for about a year; have assisted the officers at investigations, have helped clear up wrecks, and have attended safety committee meetings, where I found officers who, with regard to a great many questions, lacked many kinds of information. I spent three years as a locomotive fireman and thereby acquired, I believe, many points which the signalman coming from outside does not understand.

And when payday comes around and I get my pay and deduct the necessary expenses I have less money to put in the bank than does the maintainer.

Pete Bogg.

The Railroad Question

Chicago.

To the Editor:

The main thing is to have transportation furnished. Without question, transportation, next to the monetary system, is the most important facility that is in civilization.

Before rail transportation was well developed, people could only live in communities along the edge of water. Rail transportation has developed the interior of whole continents, resulting in millions of people being able to carry on their activities and develop their resources wherever they might be. Cheap and plentiful rail transportation has resulted in these people being able greatly to extend their markets and enlarge their activities.

Without a constant growth in railroad facilities, and a constant increase in their efficiency, the life of all the people is seriously affected. It may be that there is a way to keep an activity of this kind in advance better than with the constant spur that rivalry and profit provides, but no such a better way has been brought out yet. No human activity of a large kind has so far been carried forward strongly without the spur of rivalry and profit, and there is no rivalry in the operation of all the railroads in a country as one unit.

This reasoning and this conclusion are either correct or incorrect. If they are correct, then the rivalry should be extended as far as practicable to the point where it will not produce destructive effects on those involved. There is no good thing but that can be carried to the extremes that result in death.

If the reasoning is incorrect, then all the railroads should be operated together by one man, and some means presumably will have to be found eventually to have some control over him. If there is to be a proper and healthful rivalry, it should be carried on with organisms that exist, and any radical changes in such organisms should not be made. They could only result in loss to the people.

An immense number of theories are being indulged in now, as to what should be done with this most vital of our material activities. It is not something to be experimented with. The life of the nation depends upon it. Surgical operations at the present time to remodel this body are not needed simply because it is stretched on the operating table at the mercy of those who have knives and somebody has not been well pleased with the appearance of the body in the past.

F. H. R.



Masonry Viaduct on One of the Spanish Lines

An Important Development in the Railways of Spain

With an Account of a Project for a Proposed New Trunk Line from France to the Straits of Gibraltar

By F. Lavis *

In Three Parts: PART I.—General Description.

For many years the project has been talked of for a trunk line from France through Spain, with a connection by car ferry or otherwise across the Straits of Gibraltar to Africa and thence through Morocco to Dakar, from whence a short ocean trip would enable connection to



Fig. 1—Masonry Viaduct

be made with Pernambuco, in Brazil, and from that city eventually, through railroad connections, with all points in Brazil, the Argentine and Chile—in fact to all South America.

This ambitious project is hardly likely to be realized in the immediate future, but the northern section of the line from Madrid to the French frontier was studied by the writer a year or so ago and some account of this is given farther on. In connection with these studies, data in regard to the existing railways and the country generally were obtained, and these with some account of the topography and the industrial development of Spain will be briefly touched on to give some idea of the general railway situation.



Fig. 2—Masonry Retaining Wall and Culvert at Jaca on the Line to Canfranc

Topography

Generally speaking, the interior of Spain is an elevated plateau, about 1,500 to 2,000 feet above sea level, crossed

*Consulting engineer, 120 Broadway, New York City. This article has been prepared by Mr. Lavis at our request, and is a résumé of a report by him, printed in Spanish, entitled "El Ferrocarril Directo, de Madrid a la frontera de Francia," which was specially prepared for the king of Spain, for members of the Spanish government and for private circulation.—Editor.

by several mountain ranges and deep river valleys, presenting an accidented terrain, not very densely populated. The transportation problem is, therefore, difficult and the cost of transportation high, by reason of the necessarily high cost of railway construction compared with the volume of traffic. Most of the important cities of Spain, the most densely populated districts, and the manufacturing centers are on or near the coast, so that distribution by water is natural and convenient; hence there has been little if any need for lines adapted to heavy freight traffic. It will be remembered that Spain is almost entirely surrounded by water and has a coast line with many good harbors.



Fig. 3—General Map of Spain Showing Railways and Coal Areas

Coal Supplies

These features have a considerable bearing on one important item of transportation, namely, coal. Spain has many mines of coal of good quality but it is, or was with some few exceptions, before the war, as cheap or cheaper to bring coal from England to the coast towns than to mine it in Spain and transport it by rail. Of a total consumption of about 7,000,000 tons per annum, about 2,500,000 were imported from England. The Spanish coal was largely distributed by sea, and when the effect of the war on shipping was realized, the railroads, with their heavy gradients and small capacity cars and locomotives, were absolutely unable to meet the emergency.

Industries

Sketched very roughly, the principal industries of Spain are distributed as follows: Manufacturing of textiles in Catalonia around Barcelona, and iron and steel along the north coast near Bilbao. Mining of coal and iron principally in the north, near Bilbao, Santander and Gijon, and iron all along the south coast to a smaller extent. Large mines of copper, iron pyrites, and quicksilver in the southwest, around Seville. Fruits and vegetables on the east coast in the vicinity of Valencia, and wines in many parts.

Wine to the value of $12,000,000 to $15,000,000 is exported annually to France; Valencia, among other things, exported in 1912: onions, 140,000 tons (16,000 tons to the United States); oranges 87,000 tons, etc., besides olives, olive oil, almonds and other nuts. The values of the principal minerals exported from Spain in 1915 were, roughly:

Iron ore	$12,000,000
Iron pyrites	7,000,000
Iron metallic	8,000,000
Copper	9,000,000
Lead	13,000,000
Mercury	1,500,000
Silver	500,000

Generally speaking, Spain is not a manufacturing country, and probably manufacturing will not play a large part in the development of the country in the near future. Agriculturally, Spain produces wines and fruits for export; could, but does not quite, produce enough cereals for its own use; has a large and only partially developed mineral wealth.

The country has recovered rapidly under the enlightened and progressive guidance of the present king, Alphonse XIII, and since the war with America relieved her of the drain of both men and money in her colonies. The following



Fig. 4—A Station on the Central Aragon—Typical of the Ordinary Station for Small Towns

figures show its progress previously to the war, and since 1914 Spain has materially benefited from the high prices received for her mineral products, which have been vitally necessary to the Allies. The values of the imports and exports before the war were as follows:

	Imports	Exports
1903	$195,200,000	$189,200,000
1913	283,000,000	239,000,000

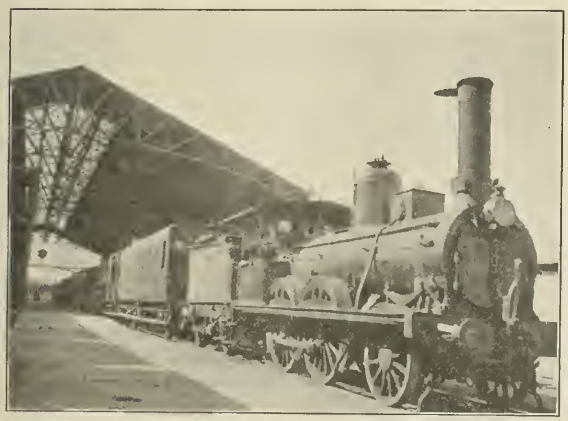


Fig. 5—Passenger Train Leaving Cadiz on the Andaluces Railway

During the war the imports of gold and silver bullion and coin to even up the trade balances have been as follows:

1915	$41,000,000
1916	65,000,000
1917	117,800,000
	$223,800,000

Spain, therefore, finds herself, at the end of the war, over $200,000,000 richer in actual cash, richer still in credits and with no burden of a large war debt. With the continuance in power of a steady and progressive government, which now seems reasonably well assured, Spain today seems likely to be well along the road to resume her place among the important nations of Europe before many decades.

The population of Spain was about 20,000,000 in 1910, and the principal cities are as follows:

	Population 1910		Population 1910
Madrid	599,807	Valladolid	71,066
Barcelona	587,411	Palma de Mallorca	67,544
Valencia	233,348	Cadiz	67,174
Seville	158,287	Cordova	66,831
Malaga	136,365	Santander	65,046
Murcia	125,027	Alicante	55,300
Zaragoza	111,704	Oviedo	53,269
Vizcaya	93,536	San Sebastian	49,008
Granada	80,511	Almeria	48,407

The Railways

During the latter part of 1917 the railway transportation system practically collapsed under the added burden of the



Fig. 6—Freight Train on the Madrid, Zaragoza & Alicante

distribution of coal, made necessary on account of the interruption of maritime traffic, and there was a general demand for more railways, double tracks, more rolling stock, etc. It was known that the commerce of Spain had increased 50 per cent or more during the preceding ten years, and the railway mileage less than 5 per cent during that period, and this was considered to be all that was necessary to show the need of new lines and more tracks on the old ones; interest was also revived in the proposed "Direct" line to France.

It may be worth noting in this connection that European engineers do not seem to give that consideration and study which American engineers and traffic men do, to the possibilities of increasing the capacity of railways by introducing heavier or different motive power, or the better utilization of

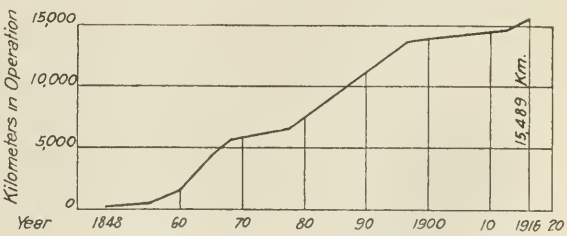


Fig. 7—Progress of Railway Construction in Spain

rolling stock, and double tracking is advocated long before the single track lines attain the capacity which many single track lines have in the United States.

The progress of railway construction in Spain is shown by the diagram in Fig. 7.

Besides the fact that railway development in Spain has not kept pace with the really considerable commercial development, it is to be noted also that it is less than that of any country of importance in the world on the basis of population and area, as is shown by the following table:

COMPARISON OF RAILWAY MILEAGE OF VARIOUS COUNTRIES ON BASIS OF AREA AND POPULATION

Country	Per 1,000 square kilometres	Kilometres of railway per 10,000 population
Belgium	298	12.3
France	120	16.8
Great Britain	119	9.6
Germany	118	12.2
Switzerland	117	16.3
Holland	99	6.9
Denmark	96	16.3
Austria-Hungary	69	10.3
Italy	62	5.6
Portugal	34	5.8
Sweden	32	29.5
Spain	30	8.6
United States	45	59.4
Canada	5	92.4
Mexico	13	20.6
Argentine	11	71.1
Brazil	3	15.3
Chile	8	16.9

There are several reasons for this lack of railway development in Spain besides the generally accepted, off-hand one, that Spain is one of the most backward countries in Europe in matters of modern commercial development. This was, to some extent, true up to the end of the 19th century, but since then there has been an awakening and a very considerable increase in commercial activity and a general development along certain lines as has been indicated above.

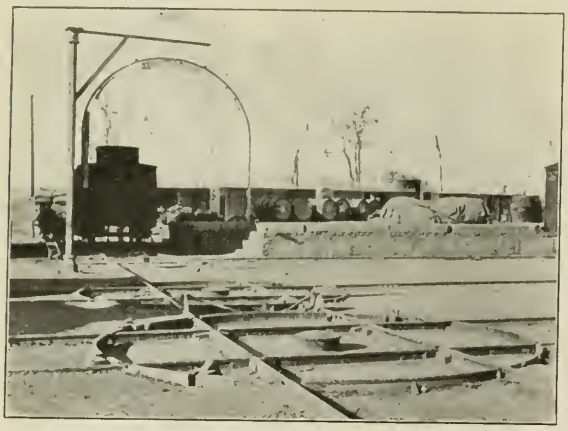


Fig. 8—Transfer Tables for Shifting Freight Cars at Stations

The two most important of these reasons for the backwardness of railway development, are the difficulties of the topography in the interior, making construction difficult and expensive, and the character of the commercial development. This latter has been largely along the coast where water transportation is available, thus making the need of interior lines of communication less necessary in Spain than in many other countries.

A third reason has been an apparent lack of appreciation on the part of the government of the economic principles governing the construction and operation of railways, which has resulted in the construction of unnecessarily expensive lines, even for the somewhat difficult country in which they have been built, and especially, in view of the comparatively small volume of traffic, many of them are called upon to handle, and expensive in ways which do not result in corresponding efficiency of operation.



Fig. 9—Water Tank and Water Softening Apparatus

The first railways in Spain were of 5 ft. 6 in. gage and this and the type of rolling stock used, caused regulations to be adopted limiting the curvature, and requiring stone ballast and certain expensive types of structures which considerably increased the cost without adequate, compensating advantages. This caused the usual reaction to a narrower

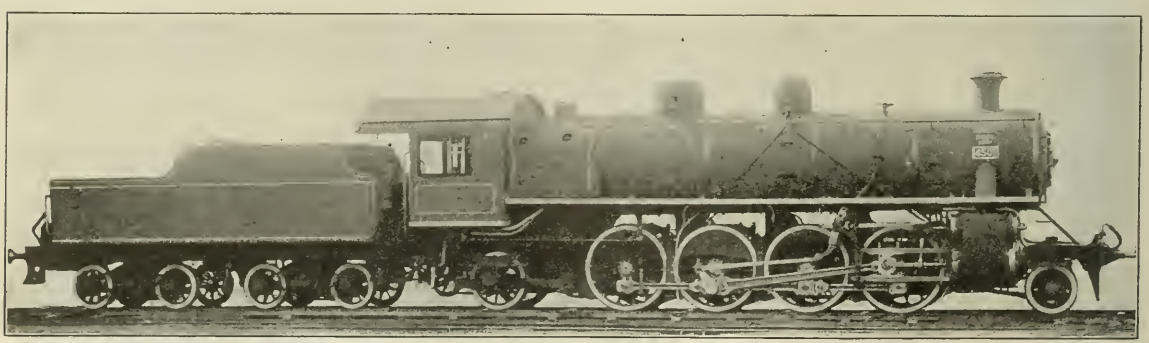


Fig. 10—One of the Locomotives Recently Built by the American Locomotive Company for the Northern Railway

gage * to decrease the cost, and although the first cost of these narrow gage lines has been decreased by the use of sharp curvature and steep gradients, these have so increased the cost of operation that the resulting ton mile cost is as great or even greater than on the lines of wider gage. There is also the great disadvantage of not only two different gages, but also that of two gages, both different from the general European standard (4 ft.-8½ in.).

The realization of the difficulties of this situation and the desire for a more intelligent appreciation of the economic relation between first cost and cost of operation, have led to



Fig. 12—Passenger Coach on the Central Aragon

the proposal by certain engineers and others for the adoption of the European gage and the desire for the introduction of American methods of design and operation for the railways of Spain.

Generally speaking, the track is well built, the better lines—of fairly heavy traffic—with rails of 80 to 90 lb., using screw spikes and tie plates on untreated oak ties. Ties are of about the same dimensions as ours, but usually a little thinner and with wider face. They are quite expensive and so fewer are used. The rolling stock is much lighter than ours, but the usually heavier rail compensates for the fewer ties (1,500-1,800 per mile). Stone ballast is used almost invariably. The bridges, stations and structures are generally of stone masonry, which costs very little. (See Figs. 1, 2 and 4.) Where steel bridges are used they are usually designed for lighter loadings, (E35 to E40 about), than is customary in the United States.

Photographs of typical passenger and freight train equipment are shown in Figs. 5, 6 and 8. The freight cars, as will be noted, are of the usual European type of 10 to 15 tons capacity. Some of the passenger trains have fairly modern cars with bogie trucks, but many are of the rigid 3 axle type. The transfer tables shown in Fig. 8 are used for shifting the cars from one track to another in the station yards. Fig. 5 shows an "express" train ready to pull out of the station at Cadiz on the Andalusian Railway, but Figs. 10 and 11 show the modern American locomotives built for the Norte and M. Z. A. during the last 3 or 4 years, their principal dimensions being as follows:

	Norte	M. Z. A.
Engine weight in working order tons metric	87.5	85.3
Tender weight in working order tons metric	55.8	46.7
Driving wheel base, milimetres	57.00	49.50
Cylinders hp. diam., milimetres	4.20	5.84
Cylinders l.p. diam., milimetres	6.40	...
Cylinders stroke diam., milimetres	6.50	6.40
Tractive power, kg	161.00	150.60

The two most important systems are those of the "Norte" (Compania de Caminos de Hierro del Norte) and the M. Z. A. or Mediodia (Compania de los Ferrocarriles de Madrid á Zaragoza y á Alicante).

The Norte covers practically the whole of the territory to the north and west of Madrid, and has also an important line running from Miranda down the valley of the Ebro to Zaragoza and from there, by a line through Huesca to Jaca and Canfranc, where connection will eventually be made to France by the Somport tunnel, a line through Lerida to Barcelona, and another line from this latter city to Tarragona and from there all along the coast to Valencia.

The M. Z. A. has a main line from Madrid to Barcelona, with a line to the west from Ariza to Valladolid through the valley of the Duero, towards the southeast a line from Madrid to Valencia, Alicante and Cartagena, and towards the south the main line to Linares, Cordoba and Seville and another to Ciudad Real and Badajoz for Portugal.

These two systems, therefore, cover practically the whole of Spain except the extreme south, in which the Ferrocarriles Andaluces, a comparatively small system, operates. Both were originally quite largely developed by French capital—the Norte through the Periers and the M. Z. A. through the Rothschilds, but since the war, control is said to have been obtained by Spanish interests.

The Northern Railroad

The lines of the Norte, which are of most interest in connection with the study of the "Direct" line to France, are: the main line from Madrid to Irun and the branches from this to Bilbao, Santander and Gijon (Oviedo).

Leaving Madrid, (elevation 2,000 ft.), the main line of the Norte runs directly towards the west and almost immediately crosses the Guadarama Mountains by two lines, which unite at Medina del Campo. These crossings are at elevations of approximately 1,350 meters (4,460 ft.). This mountain barrier which separates the "Plains of Old Castile" from Madrid and all the east and south of Spain, must be

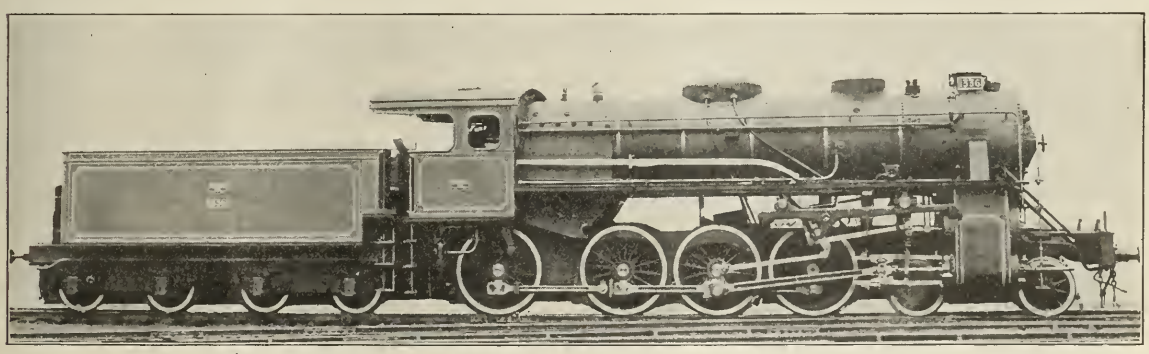


Fig. 11—One of the American Locomotive Company's Engines Built for the Madrid, Zaragoza & Alicante

*There are now 4,000 kilometres (2,480 miles) of metre gage out of a total of 15,500 kilometers (9,610 miles) of railway, the rest being all 5 feet 6 inches.

kept in mind in comparing the route of the Norte with that of the "Direct" line.

From Medina del Campo the Norte follows across the plains through Valladolid and Burgos with good alinement and easy work until just before reaching the valley of the Ebro, but from there on to the frontier the work is fairly heavy.



Fig. 13—In the Cantabrian Mountains Between Pamplona and San Sebastian

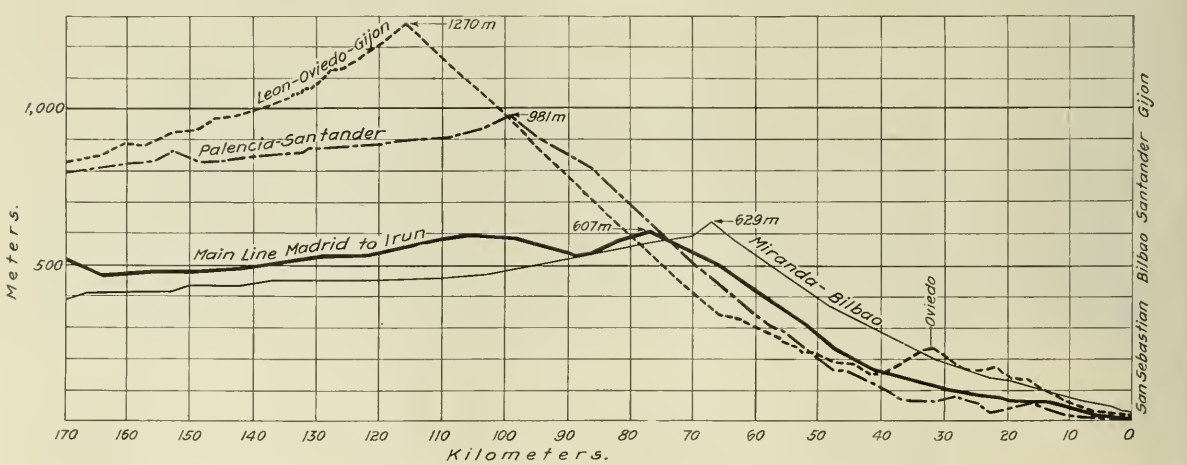
The plains of Old Castile are separated from the North Coast of Spain by the Cantabrian Mountains, which are a continuation of the Pyrenees. Both ranges are generally much steeper and the elevation to be overcome greater on their northern sides, on account of the elevation of the Central Plateau on the south. This is shown by the comparative profiles, Fig. 15, of the four lines of the Norte across the mountains to the coast, and for convenient reference the heights of the passes are given in feet as well as in meters in the following table:

	Metres	Feet
Main line to San Sebastian	607	2,003
Line to Bilbao	629	2,076
Line to Santander	981	3,237
Line to Gijon (Oviedo)	1,172	3,868



Fig. 14—Another View on the Line Between Pamplona and San Sebastian

Typical scenes showing a line in the Cantabrian Moun-



Note that the lines are shown from the coast inland to points 170 km. distant

Fig. 15—Profiles of the Lines of the Northern Railway Across the Cantabrian Mountains

tains are shown in the photographs in Figs. 13 and 14.

Bilbao is the center of the steel industry of Spain, the blast furnaces and rolling mills being located there. Much iron ore is exported from Santander, and Gijon and Oviedo are the centers of the Asturias coal fields. There is also a large steel plant at Mieres near Oviedo.

The Madrid, Zaragoza & Alicante

The only line of the M. Z. A. which is of much interest in connection with the investigation of the "Direct" line to France is the line between Madrid and Zaragoza, at which latter place connection is made with the line of the Norte to Huesca and Jaca. Beyond Jaca the new line across the Pyrenees through the Somport tunnel is nearing completion and this will open up a new route to France by connections through Pau and Tarbes.

The distance from Madrid to the frontier by this route is, however, some 555 kilometers and the connections on the French side are not very good. The elevation of the Somport tunnel is 1,200 metres (4,000 ft.), and the gradients on the French side are 4 per cent (3.4 per cent in the tunnel). It seems unlikely, therefore, that this route will ever be a serious competitor for through travel and will have only a local benefit. The gage is 5 ft. 6 in. on the Spanish side and 4 ft. 8½ in. in France.

The Somport (Canfranc) tunnel is 8 kilometers long and the frontier is almost in the center of it. The international station at Canfranc is wholly in Spain, and the French are to operate through the tunnel into the international station. Figs. 3 and 4 show some of the masonry structures on this line.

On the main lines of both the Norte and M. Z. A. some first class express trains are operated, with diners and sleepers of the Wagons Lit Co. The Andalusian Rys. are, however, generally speaking, rather poorly equipped and maintained, with light rails and rolling stock adapted only for a light traffic. The daily express leaving Cadiz for Seville is shown in Fig. 5 and is typical of the rolling stock of this system.

A Possible Solution of the Railroad Problem

Weak and Strong Roads Combined End to End So as to Increase Competition and Greatly Strengthen All Railroad Credit

By F. J. Lisman

THIS PLAN IS INTENDED to accomplish the following:

1. Provide for the immediate return of the railroads to the companies on a basis which will protect the companies.
2. Assure the government of a return within a reasonable time of any advances made by it to the railroad companies.
3. Provide for supervision of all railroad securities.
4. Provide for proper railroad regulation.
5. Provide for fair valuation which is just to the public and to the companies.
6. Provide ample competition; in fact, more than previously existing, but will prevent same from being wasteful.
7. Very important, it will put all the railroads immediately on a basis of excellent credit.
8. Stimulate rehabilitation work on part of the railroads and thus stimulate business in general.

To accomplish these results, it is proposed that an act of Congress be passed providing that railroad companies agreeing to consolidate with other railroad companies, in accordance with the instructions of the Interstate Commerce Commission, as explained later, shall receive back their properties and shall receive a federal charter which will protect them against rate regulation of any kind on the part of the states, and which will provide that they shall be entitled to earn 6 per cent on their legitimatized value, when this is ascertained, and, in the meantime, to receive the present standard return.

To arrive at a valuation it is proposed to create a valuation commission, with headquarters at Washington, which can determine on broad principles of valuation to be carried out by regional valuation boards. These regional boards should be composed of representatives of the different interests of their respective sections; that is, farming, labor, etc., and are to determine promptly the "legitimatized value" of properties in their district on a basis of fair, physical value and earning capacity.

The Interstate Commerce Commission's functions should be made largely judicial and six regional commissions should be created, each to be composed of representatives of different interests in the region, and to have a mandate authorizing the railroad companies to fix rates so as to enable them to earn not less than 6 per cent on their legitimatized value. The Interstate Commerce Commission, through a separate bureau on which there should be representatives of the railroad companies, would determine which railroad companies are to be consolidated so as to form from six to twelve national railroad systems.

It is proposed that a new United States Railroad Court of Appeals be created to deal with all litigation under the railroad control law of March 25, 1918, as well as that arising under the new laws.

Consolidation

By consolidating the various railroad companies and merging the weak companies with the strong systems, the credit of all railroad companies as a whole, as well as in detail, is promptly rehabilitated and put on a very sound basis. Practically all railroad securities, especially bonds, will as a sequence become readily marketable. This will help not only with the financing of government loans, but will also greatly help in the rehabilitation of business. The new national railway systems will promptly strengthen the weak part of their properties and will want a large amount of material and labor for that purpose. The public's position will be greatly improved because all communities now located on weak roads will hereafter be on strong roads. The plan provides for competition and creates some new through routes not now existing.

Companies taking out federal charters must consolidate with such other companies in accordance with instructions of a special bureau of the Interstate Commerce Commission. Companies on consolidating shall issue certificates of beneficial interest to the stockholders and junior bondholders of the corporations which join in a consolidation. These holders of certificates of beneficial interest are to be entitled out of earnings to the same payment of interest and dividends which they have received as the standard return under the law of March 25, 1918, and after the necessary valuation of

each property has been completed they are to be entitled to stock in the consolidated company in accordance with the legitimatized value as then determined. To give an example, if the Chicago, Burlington & Quincy, the Great Northern and Erie should be merged, the stockholders of the Great Northern would receive for their stock beneficial certificates of interest and would be entitled to a continuance of 7 per cent dividends out of earnings the same as received hitherto. If their equity as represented by $250,000,000 of Great Northern preferred stock now outstanding should, when valuation is completed, be certified as representing a legitimatized value of $150,000,000, then the Great Northern stockholders would be entitled to 60 per cent in the capital stock of the consolidated corporation. If, on the other hand, the legitimatized value should be $300,000,000, then the stockholders of the Great Northern would become entitled to 120 per cent in the stock of the new company.

Bond issues the interest charges of which require more than 70 per cent of the standard return shall be exchanged for beneficial certificates of interest, so that their status may be changed in case the valuation of the property on which they are a lien shall be found to be insufficient to cover such issue, and also that money spent for rehabilitation of the property may be given priority in lien to such an issue.

The holders of stock of the Erie Railroad, as well as junior bond issues, would also have to exchange their securities for beneficial certificates, and if, after the valuation is completed, it shall be determined that the properties are worth less than the entire bonded debt, then the junior mortgage would receive only its pro rata of stock of the consolidated company. If, on the other hand, the physical value should be in excess of the entire bonded debt, but less than the total amount of capital stock outstanding, then the bonds shall be left undisturbed and the proportion which each class of stock should receive of the new stock shall be left to an arbitration committee which shall be composed as follows: A member of the Interstate Commerce Commission and a representative of each of the different classes of stock involved. If this committee cannot agree on the distribution the matter is to be submitted to the United States railroad court of appeals, the decision of which shall be final.

Any money spent for the rehabilitation of a weak company between the time of the organization of the consolidated company and the final determination of legitimatized value shall be an obligation of the new consolidated company and a lien prior to the junior securities of the weaker company, which will be represented by certificates of beneficial interest. The intent of this is to protect the consolidated company for expenditures for prompt rehabilitation of its weaker parts, so as to encourage it to proceed with this work promptly, thus stimulating industries and assuring better transportation facilities to the public located along the weak lines.

Valuation

The public and Congress still want a physical valuation, as they have the idea that railroads are over-capitalized. Physical valuation will therefore have to go on; but it should be on fair basis. The valuation problem is such an important one that a special board of valuation should be created with headquarters in Washington. The country should be divided into, say, twelve districts, to be in charge of regional boards, which should be selected very much in the manner in which the board of the Federal Reserve bank is selected; that is, each valuation board should consist of, say, seven members, to be selected in the following manner. Each one of the following interests shall submit three names to the president:

1. The wholesale and retail merchants of the region, say, through the chambers of commerce.

2. The manufacturers of the region, say, through the manufacturers' associations.

3. The farmers, say, through farmers' alliances.

4. The banking interests, through the Federal Reserve bank or the bankers' associations.

5. The laboring interests, through the labor unions.

6. The railroads themselves, say, through the presidents of the corporations, voting in proportion to mileage, with the proviso that the roads having 1,000 miles or more should be entitled to cast a vote for not exceeding 1,000 miles.

7. The state railroad commissions within the district.

The president shall nominate one from each of these classes to act as a valuation board. The regional valuation board is to value the companies' properties in each region, taking all factors of cost into consideration. The central valuation board in Washington shall be selected in a similar manner from the country at large. It shall be the function of the central valuation board to lay down rules for the regional valuation boards, pass on doubtful questions, and to see that the valuation boards carry on everywhere the valuation work on the same principles.

The present valuation act of Congress provides that the railroads should be valued on a basis of what it would cost to reproduce same as of July 1, 1914, plus cost of additions since that date. Large sums of money have been expended under this act, and there has been much friction over the valuation of the few properties where this work has been completed.

Under the right of eminent domain the government must pay a fair value for property. A determination of a fair value for railroad property as of July 1, 1914, has no bearing on the fair value of this property at this time. The new valuation work should be entirely separate from the work of the Interstate Commerce Commission, because the commission is, under this proposed plan, to have a mandate permitting the railroad companies to earn fair interest on their value, and, therefore, should not, at the same time also, determine that value. The present officials in charge of the valuation work have construed the law very literally and have, for example, refused to allow the railroads for the cost of cutting down trees because there were no trees on the right of way on July 1, 1914, on the theory that if the road were to be rebuilt on July 1, 1914, no trees would have to be removed. Similarly, there have been cases where a railroad moved a highway from one side of the right of way to the other side in order to avoid two grade crossings of the same highway. The valuation engineers have refused to allow the railroads for the cost of this work because these highway crossings did not exist as of July 1, 1914. In another case a railroad which was being valued had erected a heavy overhead bridge and passed underneath in order to avoid a crossing with an important line. The valuation engineers would not give the credit to the railroad which built this bridge, stating this was part of the property of the other company. Valuations of real estate have in many cases been on a par in intelligence and breadth of view with these decisions. It certainly is not surprising that the companies have objected. No business man would think of valuing properties on this basis.

Final legitimatized valuation should be the mean or average between the developed earning capacity, capitalized at 6 per cent, and the fair physical value; that is to say, that if a company's physical property is determined to be worth $125,000,000, and it is earning 6 per cent interest on $100,000,000, it should be taken over on a basis of $112,500,000. If, on the other hand, it is earning 6 per cent interest on $140,000,000 and its physical valuation is $125,000,000 it should be taken over on a basis of $132,500,000. Companies which have no earning capacity whatsoever shall be taken over at one-half of their physical value, provided the valuation board and the Interstate Commerce Commission deem the property necessary in order to serve the adjacent communities.

Future earning capacity shall also be taken into consideration by the valuation board, provided that no company which

heretofore has failed to earn 6 per cent interest on its cost shall be allowed for earning capacity an amount which would bring its total legitimatized value to a sum in excess of its physical value. If the valuation board should determine that a company has a certain undeveloped earning capacity which it will take ten years to develop, such company should be allowed an increase of one-tenth of this expected development for each year for ten years. For example, if a property has a physical valuation of $10,000,000, and its standard return should be $400,000, and if it should be determined it has an undeveloped earning capacity of $100,000 additional, the company should be entitled to issue securities as follows:

$400,000 capitalized at 6 per cent would be a valuation of	$6 666,600
Average of earning and physical value	8,333,333
Interest on this amount at 6 per cent	500,000

If the valuation board should find that the company has strong probabilities of developing its business sufficiently to develop a net earning capacity in excess of $500,000, say, up to $580,000, then this $80,000 expected increase in earnings might be represented by an additional stock issue of $1,333,-000, which shall be issuable to the stockholders of the existing company at the rate of $133,000 per annum.

Differences of opinion as to valuation between companies and valuation boards shall be submitted to an arbitration committee, consisting of two railroad officials, two members of the regional valuation board, and a United States district judge. Either side, however, should have the right of appealing from this arbitration committee to the central valuation board, and also to the railroad court.

The valuation board shall go out of existence as soon as the work of valuing and appraising the various railroad properties is completed.

Regulation

The function of the regional interstate commerce commissions shall be as follows:

To approve of capital expenditures and of all future security issues.

To regulate competition between the railroad systems, preventing an excess of competition but at the same time securing ample competition in service and facilities.

Pooling among the systems shall be permitted, but any pooling agreement must be subject to the approval of the regional interstate commerce commission.

Appoint arbitrators whenever questions arise between the railroad companies; for instance as to the rental payable by railroad companies for terminal facilities belonging to each other and to terminal companies, or for trackage rights which railroads may rent from each other; divisions of rates, etc.

Listen to and pass on appeals of rates whenever arbitration committees, hereinafter mentioned, cannot agree on rates.

They shall have a mandate in accordance with which the general rate structure must provide a revenue which will be sufficient to enable the companies to earn the standard return, and after valuation is completed not less than 6 per cent interest on the legitimatized value, plus a reasonable amount to take care of depreciation and obsolescence.

Arrange the settlement of questions arising between the railroad companies and state authorities.

Deal with other problems as same may arise from time to time.

The function of the Interstate Commerce Commission in Washington shall be:

To pass on appeals from the rulings of the Regional Commissions.

Pass on questions arising between the state commissions and the regional commissions.

Pass on all questions where more than one region is involved.

Lay down general rules so that all regional commissions will deal with their problems in a similar manner.

The special bureau of the Interstate Commerce Commission which is to determine which railroad companies are to consolidate with each other is to be composed of seven members, of which three shall be appointees or members of the Interstate Commerce Commission, three shall be appointees of the railroad companies, and the seventh member shall be from time to time selected by the other six, or be nominated by the United States railroad court of appeals.

Other Provisions

A United States railroad court of appeal does not need any elaboration. It might be pointed out, however, that the court of claims will rapidly become clogged with suits arising out of the war, and the new court would, on the other hand, soon familiarize itself with railroad matters.

Each railroad company should have nine directors, of which five should be nominated by the stockholders and two by the government and two by the employees of the railroad companies, the same as in the case of the regional valuation board and commerce boards.

The five directors representing the stockholders shall select two each of these classes from the six names suggested to be directors to represent the government and the employees. Any director representing the employees must have been a railroad employee continuously for at least ten years, except for absence on account of the war or ill health, and an employee of the company for which he is to be a director for at least five years.

Each director shall be entitled to an annual salary of $2,000 as long as the company pays only the minimum dividends guaranteed by the government, and shall be entitled to $1,000 additional salary for every ¼ per cent increase in dividend which the company may disburse to stockholders.

Provisions should be made under which the companies must keep separate accounts of all earnings and expenses in each region.

Provisions should also be made for the joint use of terminals of all the systems under the regulation of the regional and federal commerce commissions. Independent terminal companies in each of the various cities should be consolidated and the interest on their bonds and dividends on their stocks, according to the proper valuation, shall be paid pro rata by the various railroad companies, according to their use. For instance, in the Chicago district there might be a consolidation of the Chicago terminals of the Chicago & Western Indiana, the Chicago Junction Railway, the terminal property of the Baltimore & Ohio, and some of the other lines and included therein might also be some of the outer belt lines, like the Chicago, Milwaukee & Gary, and the Elgin, Joliet & Eastern.

In congested cities like Cincinnati and Pittsburgh the construction of a proper belt line should be promptly taken up, existing lines to be used as far as possible.

Disputes as to the fairness of rates should be submitted to arbitration. Parties interested in rate reduction should select from their line of business two men to represent them, the railroad companies to select two men, who shall endeavor to settle the matter. If they are unable to do so they shall select as a fifth man some member of the regional commerce commission and if they fail to agree on some man the United States district judge shall select a fifth man.

Any decision of such an arbitration committee, however, may be appealable to the regional commerce commission, to the federal commerce commission in Washington and to the railroad court of appeals.

Labor disputes as to wages should be settled in a similar manner.

A pension system for all employees is to be established at once and is to go into full effect within five years; the cost of this system to be fairly prorated between the companies and the employees.

Net earnings above 6 per cent on the legitimatized value, after allowing a proper amount for non-productive improvements or obsolescence, to be used as follows:

One per cent per annum may be set aside in a reserve fund to meet any deficiency below 6 per cent during any subsequent year; any surplus above that to be divided to the extent of one-third to the company, one-third to the employees and one-third to the government.

After a surplus fund of 5 per cent has been accumulated, all earnings above 6 per cent are to be divided on the basis of one-third each to the company, the government and the employees.

If the earnings in any one region have averaged above 7 per cent for two years in succession, but not before then, the regional commission may at its option take up the matter

of rate reduction so as to reduce the average incomes of the companies to 6 per cent.

On the other hand, if the average return of the companies should fall below 6 per cent for two years in succession the railroads may at their own initiative advance rates. If the income should fall below 5 per cent in any one year the companies need not wait two years, but may advance rates after the expiration of one year, so as to be sure of an income of 6 per cent.

(To Be Concluded Next Week.)

Orders of Regional Directors

CHINESE ALIEN PASSENGERS.—File 60-1-12 of the Northwestern regional director similar to file 1600-115A599, of the Eastern Regional director, abstract of which was published in the *Railway Age* of March 21 (page 759). The Southwestern regional director, in Order 180, has issued similar instructions.

Standing Orders from Consignees.—Order 177 of the Southwestern regional director similar to file 5600-19-A600 of the Eastern regional director, abstract of which was published in the *Railway Age* of March 21, (page 758).

Regulations for the Movement of Cotton.—Order 182 of the Southwestern regional director cancelling Order 82 and supplements, gives instructions for the handling of cotton to avoid accumulation at compresses and to secure proper loading of cars.

Issuance of Passes to Non-Government Roads.—Supplement 15 to Order 109 of the Southwestern regional director, quotes a letter from W. T. Tyler, director of the Division of Operation, to the regional directors, abstracted in the *Railway Age* of March 14 (page 602), and adds that it is the intention of the latter order that independently operated railroads shall obtain trip transportation over other than their own connection in accordance with past practice.

Classification of Material.—Northwestern Regional Purchasing Committee Circular 66 contains the material classification which has been adopted for use on roads under federal control. Roads which now use a classified form of accounting for material should substitute this classification for the work now in use before taking the next material inventory. There is in course of preparation a standard form of monthly classified stock report or balance sheet for use in connection with this classification of material, which can be supplied railroads to serve as a guide in the making of monthly stock reports.

Intensive Loading of Fertilizer and Agricultural Lime.—Circular 192 of the Southwestern regional director cancels a letter of February 17, similar to Supplement 1 of Circular 67 of the Northwestern regional director, abstract of which was published in the *Railway Age* of February 28 (page 486), relative to securing a copy of the bill-of-lading covering fertilizer and agricultural lime shipments from manufacturers to be forwarded by railroad agents to the Car Service Section. Where it is not possible to secure an extra copy of the bill-of-lading from the shipper, the railroad agent should forward direct to the Car Service Section at Washington on the 7th, 14th and 21st and last day of each month, beginning March 21, either a copy of the way-bill, bill-of-lading or abstract giving the following information covering every carload shipment of fertilizer and agricultural lime when not loaded to the minimum of 60,000 lb.; date, car initial, number of consignor, consignee, destination, contents, weight and car capacity.

Loading and Unloading of Tank Cars.—Order 181 cancelling Order 123 of the Southwestern regional director, states that instructions regarding switching service Sundays, holidays and Saturday afternoons for loading and unloading tank cars is canceled. The Oil Division of the Fuel Administration advises necessity for this service no longer exists.

Cotton Embargo.—Order S. D. No. 21 of the Southern regional director, which cancels Order S. D. No. 14, provides that hereafter, cotton (except when moving under transportation orders of the War Department), from points west of Chattanooga, Birmingham, Montgomery and Pensacola, destined to Jacksonville, Fla., Brunswick, Ga., Savannah, Ga., Charleston, S. C., and Wilmington, N. C., proper, or for export through these ports, will not be moved except under permits from the Southern Export Committee.

Handling of Automobile Cars.—In Circular Letter No. 430, the Southern regional director calls attention to the universal scarcity of freight cars for automobiles. Special care must be taken on each railroad to conserve the use of automobile cars for the purpose for which they were built, and to get them into the territory where most needed. In loading these cars in their return movement care must be observed to permit loading only when it will serve the purpose of expediting the return movement of the car to automobile loading points. If any question exists as to the territory to which empty cars should be forwarded, information should be requested of the regional director.

Return of Cars to Non-Federal and Canadian Roads.—The Northwestern regional director in Freight Car Distribution Notice 7 cancelling Freight Car Distribution Notice 3, augments the later notice, abstract of which was published in the *Railway Age* of February 28 (page 486) by stating that under an arrangement between the Canadian War Board and the Car Service Section, Canadian roads will accept the home delivery of any Canadian owned freight car of any kind at any junction point, regardless of home route. And in a similar manner, railroads under Federal control will accept from Canadian roads at any junction point any cars belonging in the United States or Mexico, including both federal controlled and non-federal controlled cars. Cars so received belonging to non-federal or Mexican roads will be moved home in accordance with the above instructions.



From the Louisville Courier-Journal

The Railroader—"Never Again"

Pocahontas Region—Study of Operating Conditions

Converted a Condition of the Acute Coal Famine Into a Condition of Ample Reserves and Growing Surplus

THERE WERE FOUR immediate tasks that were undertaken by the roads now in the Pocahontas region when war was declared. New England was in direst need of coal, and this need was becoming more unendurable every day; materials and supplies had to be brought to Hampton Roads for the construction of the great naval base established there; troops had to be moved to Norfolk, Va., the port of embarkation next in importance to New York, and materials and supplies brought for an embarkation camp; and the United States Navy in home waters had to be coaled.

When the Pocahontas region was created it was felt both in New England and at Washington that if New England could be furnished with a sufficiency of coal by January, 1919, the situation would be saved, but there was a hope only for such a happy ending. By October, New England had plenty of coal, and was full up with coal by January.

The Naval Base at Sewalls point on Hampton roads was constructed to have a capacity of 20,000 sailors, this being on the site of the old Jamestown exposition, and afterwards the government authorized an extension to a capacity of 30,000 sailors. The work being done there by the government, making this a permanent naval base, required a large amount of construction material. Permanent tracks have been laid into it, connected with the Virginian and the Norfolk & Portsmouth Belt Line. A large quartermaster's terminal on Hampton roads waterfront, with large and well equipped warehouses, docks, and open piers, has also been constructed, with classification yards inside and a classification yard outside into which the railroads delivered the construction material for the piers and warehouses, and which will be used for the war department's supplies so long as forces are kept in France. The Norfolk navy yard was large increased in capacity, and considering all of the war activities at Hampton Roads on the north side from Old Point Comfort to the upper end of the Elizabeth river, and on the south side from Willoughby Spit to Norfolk, Hampton roads has been established as one of the best land-locked harbors on the Atlantic coast, with every facility for shipping, including coaling facilities.

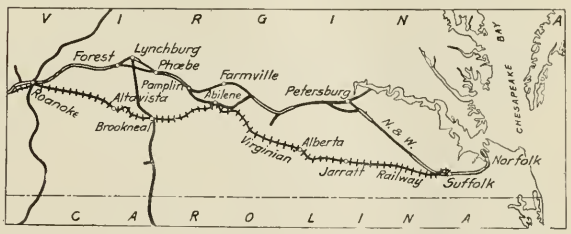


N. D. Maher
Regional Director, Pocahontas Region

The Pocahontas region was carved off from the Eastern region in June, 1918, and was placed under the jurisdiction of N. D. Maher, formerly president of the Norfolk & Western and federal manager. A. C. Needles, vice president (operation) of the Norfolk & Western, succeeded Mr. Maher as federal manager, and George W. Stevens, president of the Chesapeake & Ohio continued as federal manager of the Chesapeake & Ohio. The region includes the Norfolk & Western, the Chesapeake & Ohio, and the Virginian—the three carriers of bituminous coal from the West Virginia coal fields to Norfolk, Newport News and Hampton roads.

The Virginian, having no western outlet for its coal, and no western connections for the interchange of other traffic, was before the war almost exclusively a carrier of tidewater coal. Nearly all of this coal has to be hauled up over Clark's Gap, a very heavy grade which, with its numerous single track tunnels, limited the capacity of the whole road. East from the summit of Clark's Gap, however, the grade is slightly descending. It was obvious that the western side of Clark's Gap must be double-tracked if the full capacity of the mines on the Virginian was to be developed.

There was presented here a clear-cut case of capital expenditures required by war conditions, and which would be required in the course of time under the ordinary conditions of the development of the country. The work was undertaken by the administration and the necessary funds



The Norfolk & Western and the Virginian East of Roanoke

were advanced to the corporation. The greater part of this double track work has now been done, but after the signing of the armistice further expenditures stopped. The corporation is left, therefore, with the burden of interest charges on capital expenditures made to meet war conditions, and presumably without the credit to complete the double track work and thus derive the full operating advantages and economies of completed improvement. The case well illustrates how necessary it will be for the government to take a broad and generous attitude toward the corporations when the roads are returned to them. The Railroad Administration was entirely justified in making the capital expenditures it did on the Virginian in view of the paramount importance of increasing the coal output, but in so doing forced the corporation into a difficult financial situation.

Both the Chesapeake & Ohio and the Norfolk & Western were very highly developed trunk line railroads capable of carrying coal either west or to tidewater at remarkably low cost—three to four mills per ton mile. The Chesapeake & Ohio had spent large sums for double tracking, heavier rail, etc., and especially for reducing the cost of hauling coal west. When the European war broke out, hauling coal east became of first importance, and a certain amount of readjustment became necessary, but this was soon made. It was only necessary for the Railroad Administration, when it took hold, to complete the new coal pier at tidewater, which it did.

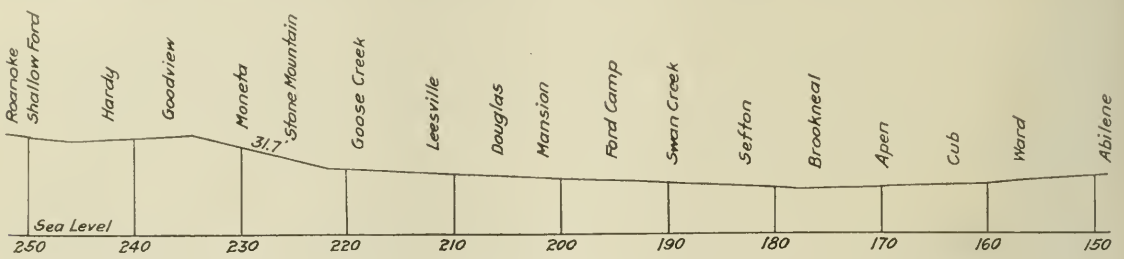
The Chicago line of the Chesapeake & Ohio was taken away from it and placed in the Ohio-Indiana district of the Eastern region. This line from Cincinnati to Chicago is not of very great importance and it is probable that the Chesapeake & Ohio did not greatly need it under war conditions. However, the reasons for separating it from the main lines

east are not very obvious and the separation worked a hardship on the corporation. It has now been restored to the Chesapeake & Ohio and is, therefore, in the Pocahontas region.

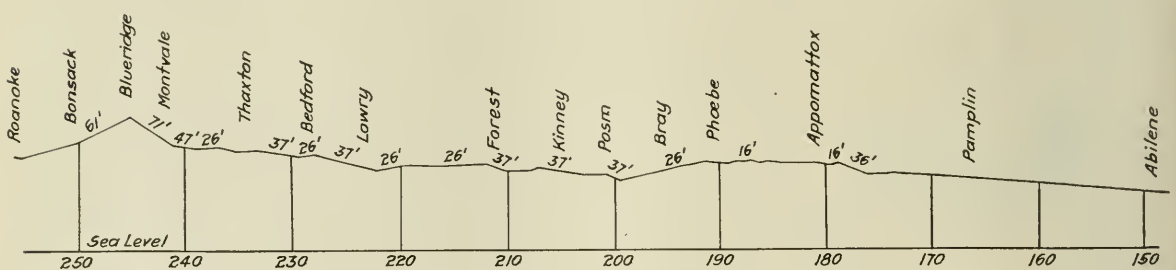
The Norfolk & Western had just completed a fifteen-year program of development and improvement when the United States entered the war. It was one of the most evenly developed properties in the country, comparing in this respect with the Atchison, Topeka & Santa Fe and the Union Pacific. Its ore dock was the first of its kind built at Norfolk, and it has proved thoroughly satisfactory, and the indispensability of some such dock is now everywhere recognized. Not only did the government find in the Norfolk & Western a perfected tool of enormous capacity, but it found even some of its own extraordinary needs forestalled. The company had just completed two large docks and warehouses outside of Norfolk. These were taken over as part of the storage plant

point of destination of the first operator's coal. Under the pooling arrangement a few telegrams and a bookkeeping entry permitted the coal on the ground to be delivered to the purchaser, the completion of the transaction and the immediate release of ten coal cars. The power to do this sort of thing added at tidewater and the lakes almost 100,000 cars to the car capacity of the country.

Pooling of coal necessitated the mixing of coals and regrading. While the war lasted the coal operators stood it fairly patiently from a sense of patriotism. Pressure is now being brought to put an end to this great economy. The point of view of the coal operator is easy enough to understand. To get an order in the open market he must convince the buyer that his coal is better than that of his competitors at the same price. He cannot do this under present conditions where the buyer may have his order filled from any of a dozen different operators' coal.



Virginian Railway.



Norfolk & Western Railway.

Comparative Profiles

which the army built under the direction of Colonel Samuel Felton.

Here, then, were as good tools as could be asked for by the new regional director; nor was there any elaborate superstructure of organization that had to be created. Mr. Maher took jurisdiction without getting up from his desk. The new power to pool facilities, cars, and, above all, coal, increased the potential capacity of the roads brought into the new arrangement to an extent that can hardly be appreciated.

A glance at a large scale map of the region will show the great number of tendril-like branches of the railroads into different coal fields, but will hardly give an adequate idea of the number of separate mines operated by independent operators and by a multiplicity of companies. The so-called zone orders restricted the field in which these mine operators could seek a market for their coal. There still remained the fact that while one operator might have an order for ten cars of coal at a certain point which would be unloaded immediately on arrival, but which coal he was just beginning to load onto cars at his mines, another two or three operators would have an aggregate of ten cars within a few miles of

The most important and most interesting joint use of main line facilities in the Pocahontas region is the routing of freight trains, principally coal trains, over the Virginian from Roanoke to Abilene, eastbound, and the routing of empties, westbound, over the Norfolk & Western. The map and profile show plainly the advantages of this arrangement. The distance is about 105 miles on the Norfolk & Western and a little shorter on the Virginian. When the Norfolk & Western was originally built it was carried through Lynchburg, the most important city in that section of the country, and the junction with the main line of the Southern Railway. There is a big dip down at Lynchburg into the valley of the James river. Later a freight cut-off was made between Clay and Phoebe, and it is the profile of this freight line which is shown herewith. Later, also, a freight line was built from Pamplin through Abilene, rejoining the old main line near Burkeville.

The Virginian, built with the primary purpose of getting the best possible grade from the coal fields to tidewater, was run slightly south of east from Roanoke, crossing the main line of the Southern at Altavista, thus leaving Lynchburg

far to the north. The joint use of the two main lines makes for a very considerable economy. They are just the right length for a freight-train crew run and deadheading can be very largely eliminated. The difference in grades against eastbound traffic is very large. Such a cut-off as this could, of course, have been built by the Norfolk & Western, but it would have been difficult to have justified so large an expenditure to give the Norfolk & Western additional and more economical facilities alone; but, actually, the line is a part of a through road from the coal fields to tidewater, the existence of which and the expenditures on which are justified by reasons other than that simply of bettering the grades between Roanoke and Abilene. The joint use of it is a pure gain in the economy of railroad operation. About ten trains of the Norfolk & Western eastbound are now being sent each day over this piece of the Virginian.

As we look back now with the coal bins of industrial New England full, the needs of the army at Norfolk completely satisfied and the coaling of the navy no longer a war problem, the operation of the Pocahontas region, with its three low-grade bituminous coal roads, seems a comparatively simple piece of railroading; if we go back to the state of mind of a fuelless Monday last January we get a clearer conception of how successful operation of the Pocahontas region has been.

National Industrial Traffic League Spring Meeting

Max Thelen, Director of Public Service, Tells Delegates of Plans of the Railroad Administration

The National Industrial Traffic League held its spring meeting at the Hotel Grunewald, New Orleans, La., on March 11 and 12, with R. D. Sangster, vice-president, presiding in the absence of G. M. Freer, president, whose new duties as secretary of the Central Coal Association would not permit him to attend. Mr. Freer, however, will complete his term as president. The meeting was attended by 200 representatives from the largest boards of trade and chambers of commerce in various parts of the country.

Max Thelen Speaks

Max Thelen, director of public service, was the principal speaker at the convention, addressing the delegates at the Tuesday morning session. He stated that though he might not always be able to do for them what they wanted, he wanted them to tell him their troubles, and that he could at least promise them sympathetic attention. He said the function of the Railroad Administration had changed, now that the war was over, and its purpose should be to give the public the best service possible. In his explanation of the veto power in the matter of rates now held by the director of public service, he stated that, while it could not give shippers the rates they wanted, it could at least prevent rates they do not want from going into effect, unless overruled by the director general himself, and that the making of general advances or readjustments that might disturb business conditions at this critical time was against the policy of the Railroad Administration.

Using the changes that have recently been made in General Order No. 57 as reference, he informed the members that other general orders were also under scrutiny, and that other changes might be expected. Consideration was now being given to the matter of import and export rates, and that of differentials between water and rail rates, and that some conclusion might be expected soon. He advised the shippers that whatever plan they might present as to off-line agencies would be considered carefully; that the so-called "sailing day" plan would be a subject of further study with the view of forming a definite plan that would be satisfactory, and to accomplish this he suggested the appointing of a committee by the league to assist the Railroad Administration with advice as to what should be done.

Referring to the freight traffic committees, he stated that his mind was open on the question of whether this plan of making rates ought to be continued, and he pointed out that there might be consideration as to whether the representation of the shipper of these commodities ought not to be increased so as to give them an even chance.

In his statement regarding the recent action by the Railroad Administration to improve conditions he brought out especially the proposed reform in the policy of handling claims, and asked the league to give him their constructive suggestions, that the work of the committee, of which he is chairman, charged with the duty of working out a new policy, may have the best possible results.

Sailing Day Plan

The "sailing day" plan was the subject of a lively discussion, which finally resulted in the adoption of a resolution, a substitute for the executive committee resolution on the same subject, and offered by C. E. Childe, of Omaha, Neb., which stated that the attitude of the league was opposed to the plan as at present administered, and, in accordance with the suggestion of Mr. Thelen to work in co-operation with him, made provisions for the appointment of a committee to present the views of the league on this subject to the proper officials of the Railroad Administration. The Childe resolution was an attempt to satisfy the delegates from all sections of the country whose views were divergent. Mr. Childe's sailing day resolution stated that the sailing day plan is a restriction upon commerce and causes the carriers to fail in their legal obligations of receiving and forwarding freight with all reasonable despatch; that this failure lays a heavy burden of extra expense upon the shipping public, and that the operation of this plan causes undue discrimination between markets. The resolution further stated that the league endorses the establishment of through package car service on schedule days throughout the country whenever traffic and commercial conditions reasonably warrant it; provided, however, that the lawful right of the shipper to deliver freight to any carrier for transportation on any day during business hours be in no way curtailed and that the committee to be appointed be instructed to take up immediately with each member of the league and obtain all possible information as to the working of the "sailing day" plan throughout the country and the practicability and necessity of providing through package car service where such is warranted.

Continuing the report of the executive committee, Mr. Barlow, on the subject of passing reports on the l. c. l. and c. l. freight and transfer records at junction points said that the plan of the Western Freight Traffic Committee for off-line representation had just been approved at Washington. His motion that the subject be referred to the special committee to be appointed on the "sailing day" plan was adopted. That committee was also made the agent of the league to take up

at Washington a number of other matters treated in the reports of the executive committee.

Four other resolutions were presented by Mr. Barlow and adopted by the league. On the matter of closing of freight stations, resolutions were adopted asking that the Railroad Administration be requested to issue an order immediately requiring a restoration of the pre-war opening and closing time at all freight stations, and that investigations be initiated by the Railroad Administration at points where congestion of less than carload freight obtains, and where it is found that terminals are not being used to maximum efficiency and capacity, that the hours for the delivery and the forwarding of freight be increased so as to utilize such freight stations to the maximum capacity and furnish maximum facilities for the convenience of the public.

The resolution adopted with respect to the shipper's right to route freight stated that the director general of railroads be requested to withdraw, cancel and annul any and all instructions or restrictions as to the routing or diversion of freight shipments that are at variance with published tariff provisions. A copy of these resolutions will be presented to the Director General of Railroads, with the urgent request that he give the matter his prompt consideration. The resolution maintains that there is no longer any necessity for the arbitrary routing and diversion of freight traffic by the Railroad Administration, and that it is of vital importance to the shipper that he should have control of the routing of his shipments so as to be able to direct the movement of them.

Rates on Export Traffic

The subject of export rates was handled by the league by the adoption of resolutions which indorse the principle of making lower rates on export traffic than are made on domestic traffic when such rates are necessary to enable industries in the United States to compete in foreign markets.

Mileage Scales

In regard to mileage scales, Mr. Barlow said that in the western and southern territories not much vitality had been observed in the last two or three months though they might still be alive. As to trunk-line territories, where mileage scales have also been out, he said it might be advisable to consolidate the half-dozen distance tariffs into one. Mr. Williamson, chairman of the committee on rate construction and tariffs, moved that this resolution as offered by the executive committee be deferred until after his committee had reported. After some discussion Mr. Williamson's motion prevailed. Mr. Barlow's committee offered a resolution opposing the submission of any further mileage scales, either class or commodity, for consideration by regional or district committees, or the adoption of any such scales by the Railroad Administration which will increase charges now in effect.

Mr. Barlow closed his report for the executive committee by stating that 59 new members had been received since the meeting last November, and reported, as a member of the Western Freight Traffic Committee, that the whole subject of increased minimum waste on foodstuff had been removed from docket, but that there would be some consideration given to the subject in individual cases.

Demurrage Rules

Charles Rippin, traffic commissioner of the Merchants Exchange of St. Louis, Mo., and chairman of the committee on car demurrage and storage, submitted a report of his committee on the recodification of demurrage rules. The report shows the result of much work by this committee in conjunction with a committee representing the American Railroad Association. The league adopted the report with slight exceptions. The purpose of this recodification is to bring the existing instructions, explanations and interpretations into the rules themselves, to clarify the rules in accordance with lawful practice, to obviate the necessity for future interpretations and to insure uniform application, but it is not intended to change or modify any of the principles in the present rules.

Mr. Ripley's Resolution

Paul Ripley, traffic manager of the American Sugar Refining Company of New York, offered resolutions bearing on the league's attitude with respect to the railroad problem, which had been presented by President Freer (after action by a special committee approved by the executive committee) to the Senate Committee on Interstate Commerce. Mr. Ripley's proposal did not agree, in some respects, with the action of the league, especially with respect to pooling.

A special meeting to consider the subject will be called when it is learned when Congress will be called into session. This meeting is to be called in time so that its deliberations can be presented to the proper committee of Congress.

Mr. Ripley's resolution stated that the National Industrial Traffic League has recorded unqualified opposition to government ownership, management or operation of railroads, has expressed disapproval of any extension of federal control beyond the limited period now prescribed by law, and has declared itself in favor of the prompt enactment by Congress of such legislation as will provide a uniform system of regulation in essential matters, safeguard the public interest, ensure adequate revenue to provide for equitable treatment of all questions affecting wages and working conditions of employees and attract sufficient capital to maintain and develop transportation facilities which shall meet the necessities of the commercial, manufacturing and agricultural interests of the country and proposed the following plan of procedure be recommended in regard to the future status of railroads.

(1) That the policy of the Government shall be manifested by restoring the individual organization of each system to operate the property for account of the Government, subject only to such supervision by the Director General of Railroads as may be necessary to protect the interests of the Government.

(2) That the final relinquishment of the properties should not be delayed longer than is absolutely necessary for the enactment of remedial legislation, and that such legislation should be expedited by an extra session of the Congress to be convened at the earliest practicable date.

(3) That remedial legislation to be enacted should recognize the following principles:

(a) That all rates, regulations and practices of carriers under Federal control which shall have been filed with the Interstate Commerce Commission, whether on interstate or intrastate traffic, and which have not been superseded by action of the Interstate Commerce Commission or of the Director General of Railroads on the date on which Federal control of said carriers shall be relinquished, shall remain in effect on the lines of all carriers subject to the Interstate Commerce Act until changed by action subsequently taken according to law.

(b) That a guarantee to the carriers of a specified return upon either capital or investment should not be undertaken because it would discourage individual initiative, stifle incentive to efficient management and destroy competition, but that the regulating agency shall take into consideration the cost of labor and other operating costs in reaching a conclusion as to the reasonableness of rates, and that the carriers shall be permitted to earn sufficient revenue to provide safe and sufficient service, to protect existing investment and to attract new capital necessary in the public interest.

(c) That any undue discrimination between state and interstate rates, rules, regulations or practices, that places an undue burden upon Interstate traffic shall be declared unlawful and that the Interstate Commerce Commission shall be authorized and required, upon complaint of shipper, State Railroad or Public Utility Commission, carrier, or any other interested party, to determine the propriety of the relation existing or contemplated between the rates, rules, or practices upon traffic wholly within one State and upon interstate traffic, and make final decision with respect thereto.

(d) That the carriers shall be authorized to make such agreements for the co-ordination of their practices and facilities as may be in the public interest when approved by a national governmental agency.

(e) That the *exclusive* jurisdiction over the issuance of securities shall be vested in the same national governmental agency by which rates are controlled and regulated.

On Tuesday night an informal dinner was given by the league at the Hotel Grunewald. Among the speakers were Francis B. James, of Washington, D. C., who gave a talk on the interpretation of laws in general bearing particularly on common law, and M. J. Sanders, of New Orleans, federal manager of the Mississippi-Warrior River Section of the Inland Waterway Section of the Railroad Administration, who spoke on the developments of river traffic.



General Pershing and Brigadier General Atterbury

General Pershing Compliments Work of the Railway Men

Congratulations Expressed in Letter to Brigadier General Atterbury—The Latter's Reply

FRANCE, February 20, 1919.

BRIGADIER GENERAL WM. W. ATTERBURY,
Director General of Transportation,
Headquarters, S. O. S., American E. F.

MY DEAR GENERAL ATTERBURY:

Permit me to take this opportunity of expressing to you, to your officers and soldiers of the Transportation Corps my appreciation of their services to the American Expeditionary Forces.

From its inception in September, 1917, I have watched with the greatest interest the progress you have made. You have been called upon to organize base ports and to operate them in connection with the terminal yards and the necessary road train service connecting these yards; to instruct and assign railway transportation officers at all important stations in France; to erect cars and locomotives; to arrange and perfect details for troop movements and to maintain through all a most varied and difficult liaison service with the French.

All this you have done with a shortage of personnel, equipment, and with facilities that were lacking, due to unavoidable delays in construction.

Please convey to your officers and enlisted men my personal congratulations and appreciation, and that of their comrades of the American Expeditionary Forces for the splendid work they have done.

Each member of the Transportation Corps, whether stationed at a base port or at an advanced railhead, has contributed to the victory of our armies, and I want each man to understand my full appreciation of this.

Sincerely yours,
(Signed) JOHN J. PERSHING.
24 February, 1919.

GENERAL JOHN J. PERSHING,
Commander-in-Chief,
American Expeditionary Forces,
General Headquarters, France.

MY DEAR GENERAL PERSHING:

It is a pleasure to acknowledge the receipt of your l . r of February 20th.

Needless to say, it is highly gratifying to me—as it will be, I am sure, to the officers and soldiers of the Transportation Corps as a whole, each of whom will be furnished a copy of your letter—to note the generous terms in which you speak of the service that has been rendered by the Transportation Corps toward the success of the American Expeditionary Forces.

To know that their Commander-in-Chief is familiar with the work they have done, and gives due credit to the part they have played in helping to win the war, will be to both officers and soldiers full reward for their efforts, and at the same time will stimulate them to maintain during the remainder of their service in France the zeal and energy that uniformly has characterized their performance.

No body of men has worked harder, nor with a keener spirit of intelligence, energy and patriotism, and I am more than proud to have been in charge of such an organization.

Personally and on behalf of the entire Transportation Corps I desire to express to you our grateful appreciation of the tribute that you have paid the Corps.

Yours very sincerely,
(Signed) W. W. ATTERBURY,
Brigadier General, U. S. A.

Report on the Automatic Straight Air Brake

Synchronous Operation With Brake Apparatus Now in Common Use Secured in Extensive Tests

The Interstate Commerce Commission on March 4 submitted to Congress the report of a series of tests conducted by the Bureau of Safety of the air brake system of the Automatic Straight Air Brake Company of New York, as a result of which the bureau submitted the following conclusion: "In the tests of the automatic straight air brake system, both Westinghouse and automatic straight air locomotive apparatus was used with trains made up of various arrangements of Westinghouse and automatic straight air triple valve equipment, and the tests were made under varied operating conditions. Synchronous operation of the automatic straight air brake system with brake apparatus now in common use was secured in all of these tests. On trains equipped entirely with automatic straight air triple valves the reliability and flexibility of the automatic straight air brake system were sufficiently demonstrated." This conclusion, together with a report submitted to Congress June 29, 1916, is the result of a study and test of this system during a period of several years, beginning in 1910, when the triple valve was presented to the Block Signal and Train Control Board, and including experimental tests on the Atchison, Topeka & Santa Fe in 1915 and extensive rack tests and service tests on the Virginian Railway during the period from March to July, 1918.

The apparatus recently tested is a development of that formerly controlled by the California Valve & Air Brake Company of Los Angeles, Cal., tests of which were made by the bureau in November, 1915, which were the subject of the report to Congress in 1916. The tests which are the subject of the new report were made first with the apparatus installed on a 100-car test rack in New York City and later on the Virginian Railway with the same brake apparatus installed on cars used in coal service between the mines in West Virginia and the docks at Sewalls Point, Va.

As presented to the commission for test, the apparatus comprises a triple valve, a high volume feed valve and a compensating valve. The triple valve tested is of the 3-unit type,* the three units being a service section, an emergency section and a change-over section; the equipment also includes a quick action reservoir and a service reservoir in addition to the present auxiliary reservoir and brake cylinder.

This apparatus is designed to produce essentially the following operating results:

(1) Rapid serial action in service applications and in quick release.

(2) The maintenance of uniform and constant brake cylinder pressure, irrespective of piston travel or cylinder leakage. The cylinder is fed from the brake pipe, the pressure in which in turn is maintained by the compensating valve while the brake valve is in lap position.

(3) Graduated release, permitting a variation of brake cylinder pressure at the will of the engineman.

(4) Quick release when desired.

(5) Emergency applications of the brake available at any time during or after any service application, and an automatic emergency application on depletion of train pipe pressure to approximately five pounds.

As is suggested by the name, the design of this system combines features of the automatic air brake and the straight air brake. Apart from its use to obtain quick release of brakes, auxiliary reservoir air is used only in emergency application. In service application brake cylinder air is obtained from the brake pipe and service reservoir, the auxiliary reservoir serving as a constant pressure chamber to regulate and govern brake cylinder pressure in proportion to brake pipe reduction. The design of the triple valve is such that in a service application the build-up of brake cylinder pressure as compared with the reduction of brake pipe pressure is in the ratio of 2 to 1.

The high volume feed valve and the compensating valve of this system form a part of the brake equipment installed on the locomotive. The high volume feed valve performs the functions and takes the place of the feed valve commonly used, the purpose of this valve being to remove any restriction between brake valve and brake pipe when brake pipe pressure is below the pressure for which the feed valve is adjusted. The compensating valve is designed to compensate for brake pipe leakage during service application, as well as for depletion of brake pipe pressure by action of the triple valves in automatically compensating for brake cylinder leakage; its function is to maintain brake pipe pressure equal to the equalizing reservoir or chamber *D* pressure. It may also be used to perform the functions of the equalizing discharge valve.

Tests on Virginian

The report includes a description and analysis of standing and running tests on the Virginian Railway from June 4 to July 9, 1919.* In the first tests, series A, the entire 100 cars were used and tests were made before the brake equipment was changed in any respect. When the A. S. A. equipment had been installed on 10 cars, standing and running tests were made, series B, with a train of 50 cars, 40 equipped with the original Westinghouse equipment and 10 with A. S. A. equipment in blocks of four Westinghouse and one A. S. A. In series C, standing tests only were made with 90 cars, 81 equipped with Westinghouse triple valves and 9 with A. S. A. equipment, in blocks of nine Westinghouse and one A. S. A. In series D, E and F a 50-car train was used, 25 cars having each type of triple valve equipment. In series D the cars were arranged in blocks of five Westinghouse and five A. S. A.; in series E and F, the cars of each kind were grouped together, in one case with the A. S. A. ahead and in the other with the Westinghouse ahead. For the standing tests, series G, a 100-car train was used, 81 cars equipped with A. S. A. apparatus and 19 with Westinghouse, with the latter on every tenth car and on cars 20 to 30 inclusive. In series H all cars were equipped with A. S. A. triples, and standing tests were made with two trains consisting of 50 and 100 cars, respectively, and running tests were made with a 50-car train. In series I, 100 cars were equipped with A. S. A. apparatus; standing tests were made and the train was run from Princeton to Roanoke. At Roanoke the A. S. A. triples were removed from 50 cars and replaced by the original Westinghouse K-2 triples for the series K tests, which consisted of a test trip from Roanoke to Victoria with the first 49 cars and the rear car equipped with A. S. A. apparatus. Series L consisted of a trip from Victoria to Sewalls Point with the Westinghouse cars on the head end. In all, the schedule included about 70 tests, standing, terminal and running.

In series A, brake cylinder leakage tests and retaining valve tests were made for the purpose of securing a record

*For a detail description of this equipment see the *Railway Age Gazette* for October 19, 1917, page 697.

*For a description of the test equipment and an account of the final test runs from Princeton to Sewalls Point, see the *Railway Age* for July 26, 1918, page 173.

of the condition of the brake equipment. The purpose of the tests in series B, C, D, E, F and G was to demonstrate the operation of both types of triple valves in trains of mixed brake equipment, with and without the A. S. A. engine equipment.

The purpose of the test run from Princeton to Roanoke was to demonstrate the ability of the A. S. A. brake equipment to control a long train on heavy grades, as well as the flexibility of the system for controlling a train on undulating and level grades.

Leaving Princeton, the A. S. A. locomotive apparatus was in service, and on all cars the brakes were operated in graduated release. In making the first brake application after starting down the grade, three brake pipe reductions were made, the total reduction being from 87 to 70 pounds, as indicated by gages on the locomotive; as a result brake cylinder pressures of 36, 29, 35 and 38 pounds were developed on the 1st, 29th, 60th and 95th cars. Following these reductions, the brake valve was not moved to release position in time to restore brake pipe pressure quickly enough and the train stopped before the brakes were released. As soon as pressure was restored the train was again started and a speed of 10 or 11 miles per hour had been attained when an emergency application occurred, due to an air hose being blown off from the 94th car. The train did not part, and was stopped without shock on either end. When the hose had been replaced and pressure restored, the train was started and a reduction of brake pipe pressure from 86 to 70 pounds was made for the purpose of controlling speed. Following this application, as the brakes were being graduated off when speed had been considerably reduced, the train parted, due to the coupler on the 85th car slipping over the top of the coupler on the 84th car, the carrier iron having fallen. This caused an emergency application, and although the speed was very low both portions of the train stopped without shock. Repairs were made and the train proceeded to Kelleysville without stop; the brakes were applied and graduated off and on as required to control the speed, which varied from 16 to 22 miles per hour. No difficulty was experienced in controlling the rate of speed, and the operation of the train was notably free from shock.

At Kelleysville the brakes on all cars were placed in quick release and the train was operated with brakes in that condition from Kelleysville to Whitethorne. Approaching the New River bridge as the brakes were being released following an application, the train parted between the 66th and 67th cars on account of a broken knuckle. The emergency brake application brought both portions of the train to a stop without damage or shock. Again, approaching Rich Creek the train parted between the 89th and 90th cars, due to a broken knuckle, while the brakes were being released, and the brakes on the head end back to about the 60th car had been released. Brake pipe pressure having been restored at the head end, higher brake cylinder pressure on the cars at the head end was built up in the emergency application than on the cars farther back. Notwithstanding this emergency application originated near the rear end, serial action of the brakes from that point to the head end was so rapid that the higher brake cylinder pressure developed on the head end stopped that end of the train first, causing a rather severe run-in of slack. However, the shock was not severe enough to cause any damage and when the coupler had been repaired the train proceeded.

At Whitethorne the brakes of all cars were again placed in graduated release. After passing Merrimac the first two applications of the brakes which were made on the grade east of that point were heavy, and each time the train was stopped before the brakes were released. Subsequently lighter brake applications were made and the speed of the train was controlled properly.

At Roanoke the A. S. A. triple valves were removed from 50 cars and the Westinghouse triples were replaced. On the trip from Roanoke to Victoria the train was made up with the first 49 test cars and the rear test car equipped with A. S. A. apparatus and cars 50 to 99, inclusive, were equipped with Westinghouse triple valves; from Victoria to Sewalls Point the first 50 test cars were equipped with Westinghouse triples and the last 50 with A. S. A. The purpose of these arrangements was primarily to determine what, if any, slack action there would be between cars with different types of brake apparatus grouped together in large numbers in different parts of the train and whether proper synchronous and serial action would be obtained under varied braking conditions encountered.

The trip from Roanoke to Victoria was made on July 8. Leaving Roanoke the brakes on 49 A. S. A. cars were operated in graduated release. On the grade between Goodview and Huddleston very light brake pipe reductions were made for the purpose of controlling speed, the reductions varying from two to four pounds each. At Stone Mountain approximately half-way down the grade the train was brought to a stop to meet an opposing train. From that point it proceeded to the bottom of the grade without a stop, the operation being remarkably smooth and free from shock.

At Taber, 54 miles east of Roanoke, the brakes on the A. S. A. cars, except the first 25, were placed in quick release and the trip from Taber to Victoria was completed with the brake apparatus in that condition. Near mile post 129, about 9 miles west of Victoria, while running at a speed of about 20 miles per hour, the train parted between the 99th and 100th test car, due to a short knuckle pin and the top coupler lug being broken off. Before the break-in-two the brakes were not applied. The emergency brake application brought it to a stop without damage or shock.

The run from Victoria to Sewalls Point was made on July 9. A box car loaded with equipment and tools was hauled next to the locomotive, and there were four cabooses on the rear end; the brakes on the cabooses were not used. Approaching Purdy, approximately 40 miles east of Victoria, there is an ascending grade eastbound of .2 per cent followed by a descending grade of .21 per cent for a short distance and then by a descending grade of .5 per cent. Approaching Purdy an application of the brakes was made and before the rear end had reached the crest of the ascending grade, the head end being on the descending grade, the brake valve was placed in full release position for a period of nine seconds and then returned to running position. The train parted between the 82nd and 83rd cars, the knuckle on the rear end of the 82nd car being broken. Trainagraph charts indicated that prior to the break-in-two the brakes had been released back to about the 50th car, and it is apparent that the contour of the line, together with the short release period and a bad flaw in the knuckle caused the break-in-two. After the knuckle had been repaired the trip to Sewalls Point was completed without noteworthy incident.

Discussion

In the discussion of the tests, the report says the A. S. A. brake equipment is considered, first, as used in mixed trains with other types of brake apparatus now in common use, and, second, when A. S. A. brake equipment exclusively was used in the test trains. In mixed trains, in both standing and running tests, synchronous operation with the Westinghouse apparatus was obtained, and the control of mixed trains having a large percentage of A. S. A. triple valve equipment under varied braking conditions, including heavy, undulating and level grades, was, with but one or two exceptions, notably free from shock.

The design and construction of the A. S. A. triple valves used in the Virginian tests provided for low brake cylinder

pressure for a given brake pipe reduction, as compared with the Westinghouse triple values, particularly in view of the short piston travel maintained on the Virginian Railway. In mixed trains better braking conditions would be provided and more harmonious operation with other types of brake apparatus if the A. S. A. brake provided higher brake cylinder pressure in proportion to brake pipe reduction. It is noted that this is merely a detail of construction and an increase in the present ratio can easily be obtained.

In mixed trains with the A. S. A. triple valve equipment on the head end the functions of graduated release were accomplished and tests demonstrated that the graduated release feature of the A. S. A. triple when used on the head end of mixed trains is very desirable under operating conditions similar to those encountered on the Virginian Railway, also emergency operation of the A. S. A. cars on the head end of mixed trains was obtained following a service application when the initial reduction was not too great. The use of A. S. A. triple valves in mixed trains on account of locally reducing and increasing brake pipe pressure results in some degree in more positive operation and an improvement in serial action both in applications and in releasing the brakes, the degree being dependent upon the number and location of the A. S. A. triple valves in the train.

On cars equipped with A. S. A. apparatus, the A. S. A. triple valves supplied comparatively uniform brake cylinder pressure which was not affected by piston travel, brake cylinder leakage or pressure retained in the brake cylinder at the beginning of an application; but under present practices of controlling trains the brakes ordinarily are not held applied long enough to obtain the full advantage in mixed trains of the feature of compensating for brake cylinder leakage.

In the standing tests with trains having all cars equipped with A. S. A. triple valves, practically all the intended functions were accomplished. In general, proper serial action in both application and release was obtained; when operating in graduated release the brakes were graduated on and off as desired, being fully released as intended when normal brake pipe pressure was restored. Comparatively uniform brake cylinder pressure was obtained regardless of piston travel or of pressure retained in the brake cylinders by the retaining valves, and it was maintained notwithstanding ordinary brake cylinder leakage. Emergency operation following a service application was not secured in every case when desired; after the installation of the special emergency valve on the locomotive, emergency operation was secured when the initial service reduction was 20 pounds or less. The emergency tests demonstrated that after a full service reduction followed by a full release period as short as 10 seconds emergency operation of the triples throughout the train can be secured. The automatic emergency feature of the triple valves tested, which becomes effective when the brake pipe pressure had been depleted to five pounds or less, was so much delayed as to be of little or no practical value; to make this feature of the brake system useful the period of time required before the automatic emergency operation occurs must be materially decreased, which can be accomplished by making this function operative at a higher brake pipe pressure. In the test providing for an angle cock on the rear end of the train to be opened with the brake valve in running position, the emergency operation carried to the head end of the 100-car train.

In the running tests on the grade between Princeton and Kelleysville with 50 and 100-car trains equipped exclusively with A. S. A. triple valves the operation of the brakes was precise and uniform and the control of the slack action during application and release of the brakes was practically ideal. The speed restriction for freight trains on this grade is 12 miles per hour, but was not observed in common practice. The test trains were in several cases permitted to attain speeds more than double the maximum authorized before the brakes were applied, necessitating a heavy brake application to control them. The pressure developed in the brake cylinder was comparatively uniform except on the head end, where high brake cylinder pressure resulted from an overcharge of the brake pipe while the brake valve was in full release position. The release of the brakes even at as low speed as two miles per hour resulted in no bad effects from slack action, but, on the contrary, was very uniform.

In the two cases when the train parted between Kelleysville and Rich Creek the brakes had been released on the forward portion of the train and the break-in-twos occurred between cars farther back in the train on which the brakes were still applied. In neither case was there any noticeable shock or slack action at either end of the train prior to the break-in-two. At the time of these break-in-twos all of the triple valves were operated in quick release and no retaining valves were used. None of the emergency operations on the 100-car train on the trip from Princeton to Roanoke, originating at different points in the train, caused excessive shock and no damage to train or equipment resulted, notwithstanding the low rate of speed in the first two instances. After turning the summit of the grade at Merrimac, all cars being in graduated release, an excessive brake pipe reduction was made; in attempting to release the brakes the brake valve was held in full release position long enough to fully release the brakes on the head end, but the train was stopped before release on the rear end was secured. This resulted in slack running out, and a comparatively severe shock on the rear end, but this shock was not severe enough to cause any damage. When the break-in-two occurred at Purdy the brakes had been released on the first half of the train only and the rise in brake pipe pressure had barely reached the first A. S. A. car when the train parted; this break-in-two was also clearly due to improper manipulation of the brake valve rather than to any arrangement or feature of the triple valve equipment.

The A. S. A. feed valve and the compensating valve included in the A. S. A. locomotive equipment operated as designed and intended. The tests demonstrated that it was not necessary to use any special locomotive brake equipment in order to secure proper action of the A. S. A. triple valve, but the maintaining and compensating functions of the A. S. A. triple valves can be more fully accomplished and utilized when the compensating valve on the locomotive is used. Some alteration in the detail arrangement of the compensating valve on the locomotive as used in these tests is necessary in order not to interfere with emergency operation following a service application. When the compensating valve is in service in case of the train parting or a break in train line the engineer's brake valve must be placed in emergency position in order to prevent depletion of the main reservoir pressure.

In the tests of the A. S. A. brake system particular attention was devoted to principles of design and the functions accomplished. Some improvements, particularly in regard to the feature of securing emergency operation following a service application, can be effected and the construction of the A. S. A. triple valve can be materially simplified. An application of the principle of automatic straight air brake valves to meet the conditions of passenger train breaking was not considered in connection with these tests, which were entirely with freight equipment.

The removal of the purchasing office of Morgan's Louisiana & Texas Railroad & Steamship Company from New Orleans, La., to Houston, Texas, "smacks of inexcusable favoritism" by the Railroad Administration, according to a telegram sent by Martin Behrman, mayor of New Orleans to the director general of railroads.



Exterior View of the Station Before Completion

North British Railway Improvements at Glasgow

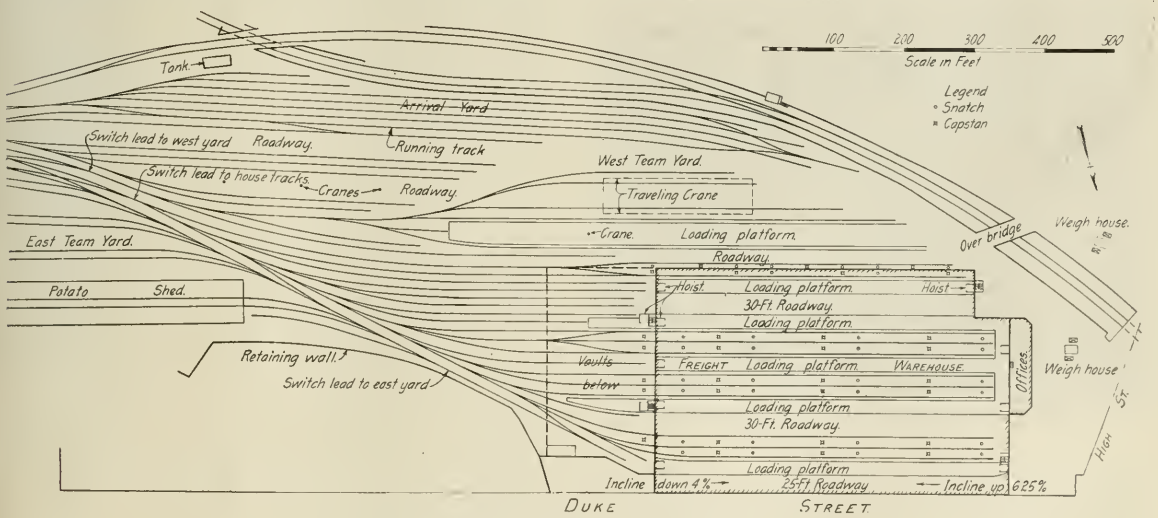
The New Central Freight Yard and House Is the Largest and Best Equipped Terminal in Scotland

By Frederick C. Coleman

TRANSPORTATION FACILITIES throughout the Glasgow district of Scotland have been materially improved by the opening by the North British Railway of a new freight yard and warehouse at High street, Glasgow. This large and modern development utilizes mechanical equipment to such a large extent to handle the freight that it provides interesting precedent for similar freight house design in this country. For that reason it is described in detail below.

This project involved an outlay exceeding $3,400,000 and tions as well as the facilities for handling the general daily freight traffic. Half a million tons of traffic are now being handled monthly at the new station, the total number of cars in and out being approximately 400 each way daily, while 600 cars are exchanged daily with the Glasgow & South Western railway.

The building, the location of which is shown in the map, is 499 ft. long and 315 ft. wide. It consists of three floors and basement. The two upper floors and the basement are re-



Layout of the Freight House and Team Yards

comprises the entire reconstruction and the considerable extension of the old freight station and terminal yard at that point; the establishment on an adjoining site of a new coal yard, and the widening for a distance of two miles of the approach lines to the new terminal; that is to say, as far on the Coatbridge line as Parkhead station. The new freight station, which is the largest and best equipped freight terminal in Scotland, provides extensive storage accommoda- served for storage purposes, while the track level floor is used solely for the general daily station traffic. This floor is served by 10 tracks inside the warehouse, as well as 5 double-sided loading platforms, with a standing capacity for 160 cars and having a superficial area of about 31,950 sq. ft., and three roadways providing 2,340 lin. ft. of standing room for the loading and unloading of trucks. The roadway area exceeds one acre.

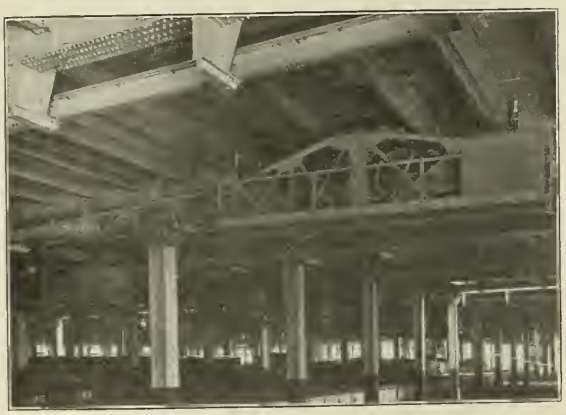
The storage accommodations on the two upper floors and the basement are on the same liberal lines, the area of the second floor being 150,350 sq. ft., while that of the third floor is 142,850 sq. ft., or nearly 3 1/3 acres. The basement is more extensive, as it has been carried beyond the east end of the warehouse proper by means of arched vaults under the yard tracks. The area of this floor is 185,310 sq. ft.

In order to facilitate team traffic to and from these storage floors special driveways, independent of the general station accesses, have been provided. That to the basement is brought in on a descending grade from Duke street, at the east end of the warehouse, while that to the upper floors enters at the west end, rising from the junction of Duke and High streets to the required level, and being continued along inside the north wall of the warehouse for its full length on the level of the second floor. A series of large openings in these upper floors serve to give light and ventilation over the entire area of the building.

For the purpose of comparison it may be said that the total area occupied by the new yard and warehouse is 16 acres as against 12½ acres occupied by the old yard and warehouse; that in the old building there were only 18,000 sq. ft. of loading platform area as compared with 155,070 sq. ft. provided on the track level floor of the new warehouse and that the old yard provided capacity for 56 cars only while in the new one provision is made for 81 cars.

The outstanding feature of this warehouse is its equipment for the handling of traffic, and the unusually large electrical plant which is provided with a view to the rapid and easy disposal of a heavy volume of freight. The tracks inside the building are arranged in sets of three, the two outside tracks of each set being used for loading purposes, while the center track is used for removing the empty cars from or feeding the loaded cars to the outer tracks.

As no locomotives are permitted inside the warehouse building the cars are handled by 30 electric capstans, each



The Revolving Electric Crane

capable of exerting a pull of one ton and hauling about 100 tons on the level at a speed of 250 ft. per min. Each capstan is worked by a 26-hp. motor running at 400 r. p. m., driving the capstan head through a worm gear reduction. An automatic solenoid brake is fitted on the armature shaft, capable of stopping the capstan instantly when the current has been cut off. The controller, of the capstan type, is worked from the ground level by means of a foot plunger.

Thirteen 1½-ton and two 3-ton overhead revolving cranes have been provided, all arranged to work over the ground floor, and used for loading and unloading both cars and trucks and for general lifting and transport purposes about the various loading platforms. The cranes are placed parallel to each other and at right angles to the railway tracks, so that whenever the necessity arises a number of cranes may be concentrated on one line of cars, insuring a rapid discharge with a minimum number of cranes. Each crane consists of a traveling gantry of 24-ft. 10 in. span, from which is suspended the balancing revolving jib, having a radius of 23 ft. Lateral, vertical and horizontal movements are provided in the cranes and each movement is controlled by separate electric motors at the following speeds:

Three-ton Cranes.—Lifting 3 tons at 50 ft. per min.; motor 17½ hp. at 400 r. p. m. Horizontal, 3 tons at two r. p. m.; motor 2¾ hp. at 670 r. p. m. Traveling, 3 tons at 300 ft. per min.; motor 7½ hp. at 625 r. p. m.

One and one-half-Ton Cranes.—Lifting 1½ tons at 100 ft. per



The Goliath Yard Crane

min.; motor 17½ hp. at 400 r. p. m. Horizontal, 1½ tons at 2.3 r. p. m.; motor 2 hp. at 800 r. p. m. Traveling, 1½ tons at 360 ft. per min.; motor 4½ hp. at 650 r. p. m.

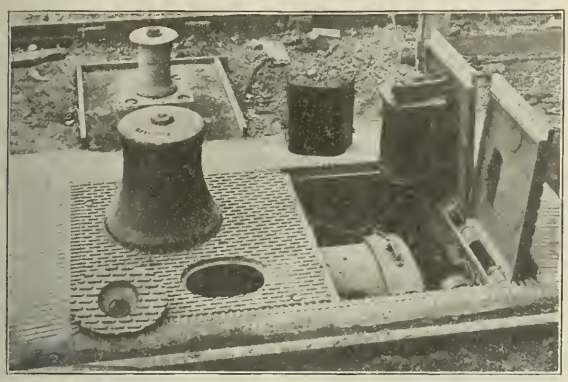
The framework of the cranes, including the jib and gantry, is of steel. The jib is connected to the gantry by means of a steel center pillar rigidly fixed in the steel center framing on the gantry. The dead weight of the jib is carried on a ball bearing fixed at the bottom of the pillar, while the horizontal thrust is taken on the rollers located at the top of the jib framing. A cage for the operator is provided immediately in front of the pillar, where he has an uninterrupted view of the operations and is within easy reach of the various controller handles. The lifting and traveling motions are fitted with automatic limit switches. By means of a series of trap doors in the loading platforms, freight arriving by rail for storage in the basement can be lowered readily by the cranes, while freight in the basement requiring shipping by rail can be similarly handled.

Facilities are also provided on the upper floors for the rapid handling of freight by means of electric traveling cranes mounted on a runway suspended from the roof girders. The loads are lifted from the railway trucks in the loading way through wells in the floors, and are distributed by the travelers over the area of the floor covered by the respective tracks. Each track is 280 ft. long. There are four of these cranes for each floor, each capable of lifting 3,000 lb. The hoisting speed under full load is 100 ft. per min., accelerating to about double this speed for light loads, and the traveling speed is 350 ft. per min. The height of lift for the cranes on the first floor is 34 ft., and for those on the second floor 50 ft. The motors are of the totally enclosed series-wound type, of 17 and 2 hp. respectively. The travelers are under the control of an operator, who is accommodated in a small cage attached to one end of the framework. An emergency switch is provided in each operator's cage. The framework of the travelers consists of rolled steel channels and angles.

The vertical motion is fitted with the Royce patented auto-

matic governor lowering gear, a safety device by which the speed of lowering of all loads is automatically prevented from exceeding a safe limit, and which thus provides an additional safeguard in the event of an accident occurring to the solenoid brake provided on the first motion shaft of the hoisting motion. The normal position of the brake is always "on" and is released only when the motor is started. An oil dashpot is provided for the brake to regulate its rate of operation. A special hand release device is provided for the brake by which it can be released by hand by the operators from the cage, thus allowing loads to be lowered by gravity without the expenditure of current.

The hoisting motion is fitted with an overwinding safe-



One of the Electric Capstans

guard, consisting of a striker rod connected to a circuit-breaker, by which, in the event of the load being lifted too high, the circuit is broken, the hoisting motor is stopped, and the brake applied. A further safeguard is provided by the fitting of one of the wheels on the hoisting motion with a special slipper device, which permits the hook being lifted against a dead stop on the crane framework, although at the same time it prevents any load on either the hoisting motor or gearing. So if the hook, when being lifted, catches in the side of the wells in the floor, no damage to any part of the crane results. This device is also fitted on the traveling motion, so that in the event of the traveler getting "jammed" through any cause, the motor and gearing will not be damaged by overload.

To prevent the over-running of the travelers a circuit breaker is used which is actuated by stops fixed at each end of the tracks at a safe distance from the end. The circuit breaker is fixed immediately over the operator's cage, so that after over-running it can be reset by the operator and the machine restarted.

Six jiggers or short-travel cranes, also of 3,000-lb. capacity, are provided on the upper floor. These serve the roadway on the floor below along the north side of the warehouse, through the trap doors in the floor, while three others placed in outside walls on the south side of the building are used for raising goods from the yard to either floor, and conversely. The general design of these is similar to that of the travelers, with the exception that the controllers are fixed on the warehouse floor near each track, and the operator's cage is thereby dispensed with. Furthermore, the travel is only 10 ft., and the height of lift 50 ft. The hoisting speed for the full load of 3,000 lb. is 100 ft. per min., and the traveling speed 200 ft. per min. The motors are similar in size to those in use on the cranes.

In addition to these appliances, nine electric hoists, each of 3,000 lb. capacity, have also been provided, four at the west and five at the east end of the building, and are available for use on all the floors, communicating directly with the loading tables on the rail floor. Two other hoists of the same capacity have been added for the use of the portion of the basement lying to the east of the building proper under the yard; they communicate directly with two loading platforms provided with special siding accommodations, apart altogether from the warehouse platforms and sidings. All of these lifts are arranged to carry the maximum load at a speed of 150 ft. per min. and are each driven by 26-hp. motors running at 400 r. p. m. The cages are steel framed, lined with timber, and kept in position by suitable guides fixed to the sides of the lift shaft. Automatic safety gear is provided and so arranged that in the event of the lifting rope breaking, the cage will be held in the guides safely. The lifting gear is driven through machine cut spur gear, and is provided with an automatic solenoid brake and a mechanical brake to control the lowering speed, either brake being capable of holding the full load independently. The dead weight of the cage is partly counterbalanced by the cast iron weights which run in separate guides fixed in the shaft. The controllers, which are of special lift type, can be worked from the cage in any position.

Originally, the movement of cars from the outer road to the center road and vice versa was effected by means of electric traversers running on rails laid at right angles to the tracks. The cars were placed on to the traversers by means of the electric capstans, one at a time, and traversed across to the required track, where they were then run off, the traverser thereafter being removed back out of the way. Eleven of these machines were provided at the rail level, but experience proved that the electric crane equipment was able to deal with all loads from cars inside the warehouse.

The traversers were of the surface type, 12 ft. long exclusive of the ramps, and were arranged to travel on three lines of rails. The traverser frame was constructed entirely of steel, and mounted on nine cast steel wheels. The driving gear consisted of two sets of enclosed worm gears



One of the Traversers

driven direct from the motors and provided with an automatic solenoid brake. The return pulleys, situated under the opposite platforms, were fitted with straining and adjusting gear. Suitable means were provided to enable the traverser to be stopped readily in line with the rails on either side. The traversers were capable of carrying loads of 20 tons at a speed of 100 ft. per min., and they were driven by 10-hp. motors, running at 400 r. p. m.

Structurally the warehouse building is of steel, and the floors are constructed of concrete. The danger of fire has thus been minimized but as a precautionary measure, a system of hydrants complete with hose and nozzles has been

fitted throughout the building, and a liberal supply of water buckets and chemical fire extinguishers has been provided.

In addition to the warehouse, which is the outstanding feature of this improvement scheme, extensive facilities have been provided in the yard for dealing with other than warehouse traffic. The general loading platform, capable of accommodating more than 60 cars at one time, is located to the south of the warehouse. A considerable portion of this platform is roofed over, so that to all intents and purposes it forms an extension of the warehouse proper. A 40-ton Goliath electric traveling crane has been provided for dealing with heavy machinery and special loads, while small loads, requiring the use of crane power, are handled by means of hand cranes having capacities of from 5 tons downwards.

The Goliath crane is of the 4-motor type with a span of 50 ft. The height from the floor to the underside of the crane girders is 22 ft., and the length of track 200 ft. The hoisting speed with the full load of 40 tons is 7 ft. per min., accelerating to 14 ft. for light loads, and the hoisting speed on the auxiliary barrel for 6 tons is at the rate of 50 ft. per min. The traveling speed for the full load is 150 ft. per min. and the traversing speed 100 ft. per min. Both hoisting motors are of 31½ hp., while the traveling and traversing motors are of 21 and 6½ hp. respectively. The full load speed of all the motors is 400 r. p. m. The special feature of the crane is that it is provided with one leg only, the end of the crane being carried on an end carriage similar to what is adopted for an ordinary overhead traveling crane.

The crane is driven by a motor fixed in the center of the span of the crane girders, thus giving an equal driving power at each end. The bottom traveling carriage is connected to the cross shaft by means of cast steel bevel bearing enclosed by cast iron covers. The traveling wheels are of rolled wrought steel and have a diameter of 39 in. They are forced on their axles under pressure, and turned on their threads to exact diameters.

A shed has been provided at the east end of the yard for the accommodation of potato traffic. This has a track capacity for 40 cars and ample loading platform space for the handling and sorting of vegetables. Access is had by an entrance from Hunter street.

In order that this new yard and warehouse might be reserved exclusively for merchandise, a new yard, known as Barracks Yard, occupying the site of the old barracks at Glasgow, has been provided for the mineral traffic. Public entrance to this yard is by way of Gallowgate.

This scheme for the improvement of its freight terminal facilities in the city of Glasgow has been in hand by the North British Railway for more than 30 years, the land to the old college warehouse facing Duke street, now taken up by the new building, being acquired in 1875. The design and construction of the plant were carried out under the direction of James Bell, the late engineer-in-chief of the railway company. The contractors were Robert McAlpine & Sons of Glasgow. The details of the electrical plant in the yard and warehouse were worked out by A. W. Stewart, of Glasgow, under whose supervision the various machines were constructed. The electrical equipment of the new warehouse buildings, including the revolving cranes, capstans, 3,000-lb. lifts, and freight car traversers, were constructed by Cowans, Sheldon & Co., Ltd., of Carlisle, England, and the eight 3,000-lb. traveling cranes, the six 3,000-lb. jiggers, and the 40-ton overhead Goliath crane were supplied by Royce, Ltd., of Manchester, England. The writer is indebted to James Calder, general manager of the railway company, for the information given above and for the illustrations.

Exhibition of Automatic Train Stop on the Chesapeake & Ohio

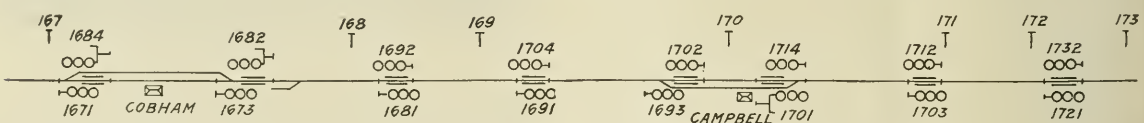
Between Gordonsville and Charlottesville on the main line of the Chesapeake & Ohio on Tuesday, March 25, the automatic stop and cab signal of the American Train Control Company, of Baltimore, Md., was demonstrated before a party of railroad men, bankers and other visitors. This portion of the line is single-track and is operated by the manual block system, but in connection with the installation of the train control apparatus, three-position automatic visual block signals (light signals) have been installed. The track circuits and control wires, as developed by Charles Stephens, signal engineer of the road (and patented by him) are arranged on the "absolute permissive block" plan and the test runs which were made were designed to demonstrate the adequacy of the apparatus for all required conditions.



Ramps for Automatic Train Stop and Cab Signal, Chesapeake & Ohio

Two trains were used, each consisting of a Pacific type locomotive with one passenger car. The first test was to show the behavior of the apparatus in the case of one train following another, the runs being made from signal 1732 eastward to Cobham. The second demonstration was to show the behavior of the apparatus with the locomotive running backward. The third was to demonstrate absolute protection through the block section from meeting point to meeting point.

The fourth test was with two trains running toward each other so timed that they would meet at Campbell. Each



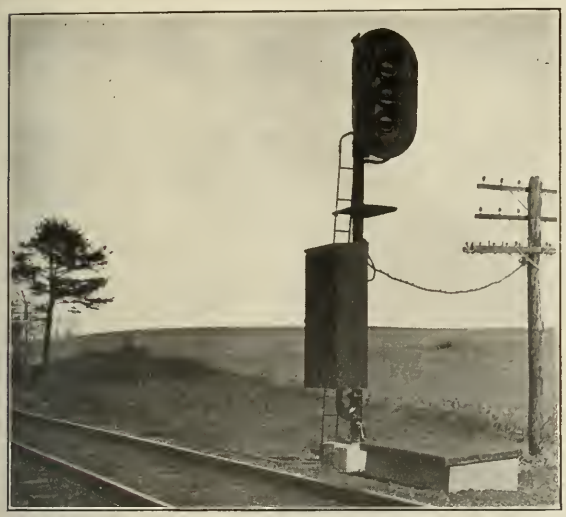
Visual "Light" Roadside Signals; Ramps for Cautionary Visual Indications in Cab, and for Applying Brakes at Stop Signals

Automatic Block Signals, Chesapeake & Ohio

train was instructed to pass the roadside signal indicating stop, at the approach to the passing track at Campbell, and each was stopped by the automatic apparatus at the ramp adjacent to the visual roadside stop signal.

All of the tests went off in satisfactory shape. The length of road which has been equipped aggregates about six miles, and the number of locomotives fitted with the apparatus is 32, half of them freight and half passenger. The system is being extended westward to Charlottesville.

This apparatus was first developed on the Maryland & Pennsylvania Railroad and was brought before the Interstate Commerce Commission in 1907. It was not fully developed, however, until the apparatus was installed on the Chesapeake & Ohio. The first complete tests made on that road were carried out in March, 1916. The committee



Light Signal, Chesapeake & Ohio

appointed by the president of the road to take charge of the matter, drew up a list of requirements, the first one of which was that a satisfactory service application of the brakes should be made, either on a passenger train or a freight, and up to train lengths of 100 cars. In the cab these requirements call for both an audible and a visual signal. Following the tests of three years ago numerous modifications and improvements were made by the railroad company; and the officers appear to be satisfied that their requirements have been met. Tests have been made under service conditions of all kinds and during cold weather. The apparatus has worked well when the shoe on the locomotive was encased in ice, and on three occasions broken rails have been detected.

The system is of the "intermittent contact" or ramp type. The ramp is fixed to the ties 27½ in. outside the gage line of the running rail. On the right hand side of the track all of the ramps are arranged to apply the brakes (when the block ahead is not clear); while on the left hand side all of the ramps are arranged to give only the cautionary indication in the cab. In connection with each three-indication signal, there are two ramps, one on the left hand side corresponding to the cautionary indication of the signal and one on the right corresponding to the stop indication of the signal.

The engine apparatus or "shoe" is fixed to the frame of the front truck of the tender, each ramp causing an upward movement of the "shoe." A battery on the roadside conveys current to the ramp, and, with the ramp energized, this current is carried by the shoe to the apparatus on the locomotive; and by controlling electric magnets it prevents the application of the brakes at the stop ramps and the giving of the cautionary signal in the cab at cautionary ramps. With the ramp de-energized, the lifting of the shoe opens a circuit, de-energizing a magnet; and thus air is exhausted from the train line so as to apply the brakes. The bottom of the contact shoe is in the form of a circular disk, and is arranged so as to make contact even when a little out of line. The ramp rail is of inverted T shape.

Two of the locomotives have automatic AD equipment, 17 have ET 5 equipment, five have combined automatic and straight air equipment, five have New York air brake, No. 6, and three have the ET 6 Westinghouse equipment. The train stop apparatus was connected to all these different designs without difficulty.

A vibrating bell in the cab is arranged to sound whenever the shoe rises as much as ¼ inch, so that the engineman thus receives notice every time a shoe goes over a ramp, without regard to whether the indication is or is not against him. If the vertical movable member of the shoe is broken there is provision made for opening the train line and applying the brakes; if it is bent the first contact with a ramp will tend to cause it to stick in its upward position, thus causing a continual ringing of the bell in the cab. If the shoe should be broken off completely the electrical connections would be broken so as to cause application of the brakes.

To provide for running in either direction and also to provide for using the left hand apparatus in place of the right hand, or vice versa, all of the wires on the locomotive are run through a box containing circuit reversers. Thus in case either shoe is lost or disabled the engineman, by a single operation, can change all of the circuits and substitute either shoe for the other.

The cab signal has a proceed light and a cautionary light, but none for stop; but always on the dropping of the stop valve both lights go out, thus indicating that an automatic stop contact has been made.

After the brakes have been applied the apparatus can be restored to normal position only by lifting the armature of the stop valve; and this must be done by pushing a knob which can be reached only by a person standing on the ground.

The circuits from the engine are fed from an Edison storage battery, B4, of eighty ampere hours capacity. The normal voltage is from 10 to 12 volts, furnished by 10 cells of this battery.



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In this Accident at Weesp in Holland a Dyke Gave Way Because of Heavy Rains and Resulted in 50 Fatalities

The Railroad Problem*

By Walker D. Hines
Director General of Railroads

BY THE GOVERNMENT taking possession of the railroads as a war emergency in December, 1917, three important results were accomplished:

The elimination of conflicting priorities and the unified control of traffic even to the extent of preventing shipments except when they could be disposed of at destination averted serious congestion. Despite the enormous volume of traffic in the fall of 1918 there was practically no congestion and in this respect the condition was radically different from what it had been in previous years. This was of material assistance in the conduct of the war, and prevented tremendous delay and injury to commerce and industry.

In December, 1917, railroad labor regarded itself as grossly underpaid because of the tremendous increase in the cost of living and because of the very high wages paid in nearly every other industry. The demand was insistent for radical increases in wages and improvement in working conditions. No adequate machinery existed to deal with these demands. Suspicion and distrust on the part of railroad labor towards railroad companies was at its high water mark. There appeared no reasonable hope of getting an adequate solution of this fundamental problem without government control. By means of government control and the assurances which were given to labor and later carried out, uninterrupted carrying on of the work in a cordial spirit was assured.

The financial situation of the railroads was most unfavorable. Their costs were mounting rapidly and any possible solution of the labor problems under private management would have created an enormous additional burden. At the same time the difficulties in obtaining corresponding increases in rates were almost insurmountable on account of the different jurisdictions, interstate and state, which had to deal with the subject and on account of the general public distrust of the necessity for substantial increases in rates. This financial situation was restored by government control and the consequent guaranty of adequate rentals.

I believe there will be general assent that these three important objects could not have been adequately dealt with except through government control. But even if there is dissent on that proposition it is still true that government control has become a fact. Moreover, the railroad wages which have been established as a result of the war constitute a fact which will exert a continuing influence upon the railroad situation. Nobody can deny that, broadly speaking, the wage increase and also the eight-hour day would have taken place under any circumstances. Industries under private control were not immune from heavy increases in wages and great improvement in working conditions. These were things toward which the world was moving and the war merely made the world move faster in that direction and brought about in 12 months what otherwise might have taken a longer time.

I believe thoughtful people, no matter what they think about the abstract principles of permanent government ownership, will realize that it was fortunate in the extreme for railroad investors that the government was in position to step into the breach and temporarily stand the shock of this great and inevitable improvement of railroad wages and working conditions.

My appeal is for support and understanding in the vastly difficult task of rendering an adequate public service during the temporary period of federal control. I believe that support and understanding will be forthcoming more completely if the public appreciates the important respects in which the government control promoted the objects of the war and also protected temporarily railroad investors. With these inevitable conditions understood, the way ought to be open for a more friendly appreciation of the earnest efforts which my associates and I are making to discharge to the satisfaction of the public the heavy responsibility temporarily placed upon us. I wish to assure this audience that I am doing all in my power to promote a good and adequate service, and to stimulate efficiency on the part of both officials and employees, and I am encouraged to hope for important improvements in these directions.

Our efforts in this direction are being pressed to the limit of our strength regardless of the embarrassment which suddenly confronted us by the failure of the railroad appropriation. The fact that we are temporarily meeting this difficulty does not, however, mean that the appropriation is not sorely needed, and everyone who has an interest in the welfare of the railroads or in the welfare of the country should support the necessary appropriation so that it will be passed at the earliest possible moment after Congress meets.

Meanwhile the financial situation resulting from the failure of the appropriation is being dealt with as adequately as possible and every effort is being made not to interfere with the industrial and financial equilibrium. Unfortunately the impression has gone out that the Railroad Administration has decided to cut off all improvement work, including additions and betterments and maintenance. This is not a fact. What has happened is that we are taking steps to give the railroad corporations full opportunity to determine whether they should assent to the work which they must finance. It is the intention of the Railroad Administration to carry forward just as much additions and betterments and maintenance work as possible in order that labor may not be thrown out of employment unnecessarily and in order that the railroads be kept in good repair and extended to meet the needs of the situation.

I wish to submit the following suggestions bearing on the subject of a permanent solution of the railroad problem:

I do not believe in government ownership as a permanent policy and I wish to see a policy adopted which will preserve, if possible, the advantages and economies of private initiative while meeting the public necessities for adequate control.

A great many arguments on this subject seem to proceed on the assumption that we have an unlimited choice of methods and that it is easy to find a satisfactory solution. It requires only a little thought to realize that this is not the case. We cannot go back to unrestricted private management and we ought not to go back to a method of regulation that proved unsuccessful. The condition of railroad regulation prior to federal control was so far from satisfactory as to be almost hopeless. This indicates that there was something fundamentally wrong and therefore we cannot expect an adequate solution without fundamental changes.

The object which any successful plan of regulation must accomplish is to attract adequate capital for the great development which must yet be brought about in order to meet the wonderful expansion which the commerce of this country is likely to have. No plan which fails to accomplish this result will successfully deal with the situation. There is no use in urging some makeshift treatment when we are forced to admit that such treatment will fail to accomplish the result.

We cannot accomplish this by resorting to the old method with merely a series of patches put upon the especially noticeable holes which have been worn in it. Under the old method there is the difficulty that no standard whatever is prescribed by which to measure the return to be given upon capital invested in the railroads. The question of return was always subject to dispute. There was no agreement as to the investment, not even an agreement as to a proper rate of return, and what would produce an ample return on one railroad meant poverty or bankruptcy for another. Morover, under the old form of regulation, there was no sufficient contact between the regulating body and the business regulated.

*Abstract of address before the Traffic Club, Pittsburgh, Pa., on March 26.

The managers would see adverse conditions develop and would appreciate the necessity for prompt action. But the regulating body was not in position to have a corresponding insight into the situation and could not act until after the conditions had been developed and then proved in a formal controversy and then argued and briefed and conferred about and decided, and perhaps by that time conditions had begun to change so that the relief which had been badly needed and not accorded might be denied because not still needed for the future. Such uncertainties defeated any adequate assurance to the capital in the railroads. All the conditions favored delay and hesitation and non-action except in extreme cases.

We must not deceive ourselves as to how things worked in the past and as to how they will work in the future unless there is a fundamental change. Consider the public utilities throughout the country. Doubtless in every city the public has a reasonably good intention and the people in office do not desire to destroy the utilities. But there is suspicion as to capitalization, distrust as to the necessity for the expense, extreme hesitation on the part of the people to increase their own expenses by making the necessary increase in rates, and consequently there is non-action. This illustrates in a small way the same conditions which operated in the country as a whole with respect to the railroads. Unless there can be fundamental changes which will change these conditions, there can be no reasonable and continuing assurance of an adequate return for capital.

One of the fundamentals is a standard of return so that the regulating body will have a definite statutory protection for any action taken on this subject. Whenever you get to the point of prescribing a standard of return which must be realized, you have created a sort of government guaranty. To my mind, the great problem is whether to have this guaranty certain or uncertain. Of course the more certain the guaranty, the less initiative on the part of the management. On the other hand, while a less certain guaranty stimulates initiative, it also is less promising to capital and tends to defeat the ultimate objective which is the attraction of adequate capital into the business.

The combination of these great factors is the thing to be accomplished. It is far from easy. It cannot be dealt with by a reproduction of the old conditions with a few palliating amendments. We have got to decide upon how definite we shall make the governmental assurance of an adequate return and how we can accomplish this to a sufficient extent while preserving a sufficient measure of private initiative.

My own view is that a moderate guaranty on capital should be prescribed, so as to give a reasonable assurance to capital; and that there should be a right to participation in any profits made in excess of that guaranty so as to furnish the needed stimulus to private initiative.

I further believe that the government should be strongly represented on the boards of directors and that these government directors should constitute an important part of the regulating body which prescribes the rates so that this regulating body will know as necessities develop that the necessities are developing and will be able to meet the needs of the situation much more nearly at the time the needs arise than is possible at present.

I do not believe these fundamental changes can be successfully carried through except by the construction of a comparatively few great railroad corporations each of which will so combine the prosperous and unprosperous roads as to present a fair average result and get away from the hopeless diversity in earnings which has existed in the past; and upon each of which it will be practicable to have ample governmental representation.

Waterproofing Railway Ties to Preserve Them*

New Method of Treatment Contemplates Thorough Drying and Then Sealing Against Moisture

By H. K. Wicsteed
Chief Locating Engineer, Canadian National Railways

Dry woods or cellulose are almost indestructible by any ordinary agency such as a tie is exposed to. The bacterial growth requires moisture and oxygen for its development. It would appear, therefore, that if we thoroughly dry a piece of timber, and keep it dry, it will last indefinitely. We know from actual experience that this is so. Everyone has used or seen old timber in the form of beams and joists taken from buildings two or three centuries old and perfectly sound. In these cases moisture has been excluded. Again, every one has seen, or at any rate read, of piles and foundation timber many centuries old in a perfect state of preservation. In these cases oxygen has been excluded. We all know that exposed timber will generally last longer when coated with paint or tar or some waterproofing material. The exceptions are where the timber has been waterproofed before it was seasoned, with the effect of retaining the moisture already in the stick and preventing its evaporation. Timber, even when air-dried for a considerable length of time, still contains 15 per cent or more of moisture, the percentage varying with the nature of the material and the size of the stick.

Another point not so well recognized or understood is that seasoning timber increases its strength by as much as 80 to 100 per cent in some cases over that of the green stick. It will be seen at once that, consistent with reasonable expense and loss of time, it is well worth while to dry not only ties, but timber of any kind used as a beam or strut, where strength is necessary. If we increase the strength by even 60 per cent, we require only 62 per cent of the amount of material, and, as this percentage is dry, while the other contains a very large amount of moisture, the saving in freight is very much more than the apparent 38 per cent. In Eastern Canada, at any rate, transportation is a very large item in the cost of our timber and is compelling us, as a matter of expediency, to use steel and concrete where we should use timber if it were readily available.

It being granted that drying or seasoning is extremely desirable, the question is as to the means. In the case of ordinary lumber, air-drying supplemented by a few hours in a kiln is fairly satisfactory. In that of dimension timber this is not so. First, because the air-drying in the case of large sticks takes years to accomplish, because the temperatures used in the ordinary kiln are so high as to injure the strength of the timber; third, because, even when carried on with the greatest care and deliberation, the outside laminae dry first

*Abstract of a paper read before the Canadian Railway Club, Montreal, Canada.

and shrink before the heart of the stick has any chance, and this shrinkage causes checks and cracks which, for many purposes, render the stick useless.

When the "wooden walls of England" were a reality, the seasoning of large sticks was carried on by immersion in sea water for a period of three years, more or less, the saps and resins were dissolved and washed out, and the pores of the wood left open and filled only by water. The subsequent drying was then easily, quickly and uniformly carried on throughout the stick, and the resultant deposits of salt acted as antiseptics just as the creosote does in the modern process. This was perhaps the most perfect seasoning possible, or ever accomplished.

In experiments made in the last two years involving an entirely new process of drying timber an effort was made to use the same process that nature does, and dissolve, neutralize or wash out the sap and other liquids or semi-liquids which obstruct and close the pores, and to do this within a reasonable time, much faster than nature unassisted can accomplish the work. Hot water is more effective than cold water, and hot vapor of water is, in some cases, still more so. In the new process, which is simplicity itself in theory, although the best form of mechanical application took much time and thought to study out, warm vapor, or in other words, warm air, saturated with moisture, is circulated among the ties. This opens and cleans the pores of the wood just as a Turkish bath does in the case of a man. The liquid components of the saps and resins filling the vesicles themselves, expand with the heat and force their way out, to be diluted and carried away by the warm vapor. After some hours of this treatment, the amount of moisture is reduced by very slow degrees, until, at the end, it is practically dry and the timber is removed with not more than 5 per cent of moisture left in it. The rapidity with which this is done depends upon the size of the sticks and the nature of the timber, just as it does in other methods, but no subject has yet been found which did not, in the end, yield to treatment. Care is taken not to let the temperature of the kiln get above 160 deg. F. so that no injury may be done to the fiber of the wood.

Timber so treated is, I believe, indestructible, except by fire, so long as it is kept dry. Even without further treatment, it will undoubtedly long outlast unseasoned material. It is, in this shape, in pre-eminently good condition to receive creosote, but we believe that creosote is absolutely unnecessary and that the elements of decay being altogether removed from the inside, all that is necessary is to keep them from entering the outside. Some waterproofing coating is desirable, and in the case of ties a cheap one is the only one which can be used economically. In the experiments conducted a heavy oil tar was found which is an almost worthless by-product of refineries. The ties were merely dipped in a hot bath of this material for a few minutes and, on coming out, were sanded by a sand blast to absorb any superfluous stickiness and make them easier to handle.

As a result of our experiments with these ties we concluded that they were in the right direction in the main, but that the asphaltic waterproofings were imperfect. They melted and ran under a strong hot sun; and when abraded, as was inevitable in the case of ties, the waterproofing was gone. Some of the more tarry products which penetrated the grain of the wood were much better, and we believe them to be very good.

We are unable to give accurate figures on the cost but estimate it about 30 cents. It may be that this could be brought down, but the cost of the plant would be much higher now than before the war. One of the principal items of cost is for fuel for drying and we all know the price of coal at present. I have some figures of the tests made at Trenton to show the weight of the ties and the amount of moisture that has been absorbed. The whole problem was whether or not we could successfully waterproof the tie and keep it dry. We tried asphalt, also coal tar pitch. We found that the asphalt was useless in many cases. Some poplar ties treated with it are rotten now, but poplar ties that had pitch applied are all right. The pitch has a penetrating quality which the asphalt does not possess. The ties now under test have been over three years in service. After 8 months ties examined had increased in weight about 2½ per cent. The next tie, taken out after 14 months, had been treated with asphalt. It had increased 13 per cent, while two pitch-treated ties taken out at the same time had increased 1½ per cent and 7 per cent. This last was a spruce tie. When in for two years two pitch-treated ties had increased 7½ per cent and 2.9 per cent, while a couple of asphalt-treated ties had increased 14 per cent and 16 per cent, showing the difference in the two treatments.

In November, 1917, one pitch-treated tie had gone up 7 per cent and another 17 per cent, but in this last case there had been a strip of bark left on one side of the tie, which allowed it to become exposed. In May, 1918, one had increased 12 per cent, one 5 per cent and one 10 per cent. In our kiln dried ties the moisture is down to 5 to 8 per cent, so that apparently we have, up to the present, kept most of the ties down below 15 per cent moisture, which we figure is required to even start bacterial action.

The prospect which is opened up by this process is something more than merely getting the equivalent of the creosoted tie at a less cost. It is, besides, the potentiality of using for ties timbers which are now useless for the purpose, or nearly so. The northern birch, for instance, is a strong reliable wood, used by the Indians for every purpose requiring a hard wood, but unavailable for ties or bridge timbers on account of its superabundant sap and its consequent tendency to rot rapidly. The poplar and balsam are others for which there is at present practically no demand. These timbers are particularly interesting to us just now on account of the recent opening up by the railways of thousands of square miles of northern forests, of which, with spruce and jack pine, these are the main constituents. The use of these woods for commercial purposes means millions of dollars to the railways in reduced cost of ties and in freight.

A number of these ties have been put in the Canadian Northern track. Some of them have been taken up and tested for absorption of moisture and for signs of rot. I have one sample of a tie dug up only a few days ago which has been under the track in the Trenton yard for over three years, and I have also another sample of a birch tie which has never been under the track at all, but which shows how perfect the drying part of the process is and what a valuable timber birch is. All of you probably know what an absolutely worthless timber it is if used in outside work without seasoning, and the reason is unquestionably the amount of sap which it contains. If this is dried out and the wood sterilized it is as strong and lasting as most other hardwoods and better than some. It is incidentally the only hardwood in Northern Ontario and Quebec.

The Chamber of Commerce of the State of New York has adopted resolutions asking Congress to have the railroads returned to their owners as soon as it will be safe to do so; to allow private capital to earn more than a minimum in order to preserve the spirit of enterprise, and to provide federal regulation of wages as well as of transportation rates. The resolution recites seven principles which Congress is urged to adopt. The Chamber also went on record in favor of increasing fares on New York City railroads. The Traffic Club of New York city has adopted a resolution disapproving government ownership, management or operation of railroads, and has sent copies of it to traffic interests throughout the country.

Railway Supply Industry and the Railroads

What the Railway Supply and Equipment Companies Have Done to Improve Railway Operation

A UNIQUE and interesting program was provided at the March 21 meeting of the New York Railroad Club. An innovation was introduced in the form of an opportunity for the "Railway Supplymen" to tell what they have done and are attempting to do in improving the service and efficiency of the railways. Abstracts of the papers presented follow:

The Work of the Supply Engineer

By W. E. Woodard
Vice-president, Lima Locomotive Works, Inc.

Any attempt adequately to review the contribution of the engineers of the railway equipment and supply companies to the railways of the country leads into all branches of engineering activities. Engineers and specialists in every line have aided in the wonderful advance of the past few years, from the steel makers, who have worked upon the problem of improved rail production, to the electrical engineers who have given us electrical locomotives, train lighting, signal apparatus, and even train wireless. One single development alone, that of the air brake, has been so far-reaching in its influence that the steps in its evolution and perfection have very largely controlled progress in heavier trains, larger locomotives and higher speeds.

Steel car developments have come so quickly and so far as the general public is concerned, with such apparent ease, that the vast amount of engineering work involved is apt to be overlooked. With it came electric car lighting, a noteworthy development in itself, the introduction of rolled steel wheels, the all-steel car trucks, vestibules, and improved brake beams and shoes.

The debt of the public to the art of railway signaling is almost equal to that it owes to the air brake. Signaling has more than doubled the capacity of many roads in this country, to say nothing about the element of safety. A signal engineer of wide experience has said that the Grand Central Terminal without interlocking and signals would require ten times the number of tracks it now has simply to accommodate the traffic without any consideration of the safety element.

No branch of railroad engineering has had a more noteworthy advance than that of locomotive designing, and probably a greater number of individual organizations contributed to the results than in any other single field of railroad work. This development is the best example of a group of supply and equipment companies working together to refine and perfect one of the most essential elements in railroad operation. To the locomotive builder belongs the credit for improved designs and increased capacity of locomotives as a whole. To them is also due the credit for starting some of the improvements made for increased capacity and for improved economy. But to the supply concerns is due a larger degree of credit for the patience and courage which has been required to put many individual improvements in the position which they now occupy. A review of the advance in locomotive building will show that the engineering work of the builders has been most closely related to and dependent upon the engineering activities of the supply and equipment companies.

In certain lines entirely new developments have been projected and carried out by the supply and equipment companies, as for example, the locomotive stoker, and the use of pulverized fuel. Thus we have come to see the supply and equipment companies no longer simply building and selling accessories, but occupying a much broader and more important field. Some of the railway supply concerns have spent enormous sums of money to build up fine engineering organizations, with a view not only to refine their developments to the highest degree, but also to forward the art from an entirely scientific standpoint. There is a question whether the public appreciates the spirit and energy back of the majority of these large supply companies. Both the builder and the supply companies have been working toward one end: increased safety of operation; improved efficiency and greater capacity for our locomotives.

A measure of what has been accomplished is a history of locomotive developments in the past few years. Weights of typical passenger locomotives have increased 50 to 75 per cent since 1900 and freight engines in about the same proportion. Such advances would have been out of the question had it not been possible to have taken advantage of engineering developments effecting increased economies which have more than kept pace with the increase in the size of the engines. Perhaps it would be more accurate to say that the engineering developments in the past few years have effected such economy of operation as to make possible these increases in size. This is the real measure of the advance; it is due to the combined engineering experience and work of the supply and equipment companies and locomotive builders.

Let me illustrate my statement by some test plant figures obtained from a good design of Consolidation locomotive of about 1904, and a modern design of Mikado locomotive built in 1915. We may regard 5,000 pounds of coal an hour as about the limit of a fireman for continuous work—I will take this as a basis for comparison. The Consolidation required 4,700 pounds of coal per hour to obtain an output of 1,050 hp. and this was about the limit of the engine. With the same amount of coal, the Mikado engine produces 1,900 hp. These are actual test plant figures, but the everyday experience of the railway men bear them out. It is because of this that railroads recognize that it pays to scrap light and obsolete locomotives or to reconstruct them on modern lines, using the refinements and developments which have brought about these improvements.

This class of developments can be grouped under three general heads: Improvements affecting the combustion of the fuel, steam generation, and cylinder performance. The improvements under these heads are as follows:

COMBUSTION OF FUEL.

Introduction of wide fireboxes with grate areas sufficiently large to keep the rate of combustion within economical figures.

Provision of proper air openings into the ash pan—an item which was for many years given little attention, but one of vital importance.

A better knowledge of the principles of combustion which has led to the wide use of the brick arch and the proper proportioning of combustion spaces to grate area, the latter item involving the use of combustion chambers.

Better draft conditions largely made possible by the use of outside steam pipes, which came in with the superheater.

Improved front ends, stack and nozzle designs.

STEAM GENERATION.

Greater care in proportioning boilers to suit the cylinder horse power. The boilers of many older locomotives under normal operating conditions were overtaxed and were consequently inefficient.

Improved design of water spaces which insure good circulation of water in the boiler, in which result arch tubes are a material help.

A better understanding of the relation of tube lengths to diameters which has eliminated inefficient tube heating surface and promoted the use of combustion chambers.

Feed water heating, which is just now being introduced upon locomotives, the saving from which is not included in the test figures mentioned above.

CYLINDER PERFORMANCE.

Superheating, the most important single element in the list.

Mallet locomotives.

Superheating aided very materially in bringing Mallet locomotives into favor.

Valves and valve motions.

Better proportions of steam and exhaust passages, particularly the latter.

The importance of these improvements is evident by the following figures taken from the same engines as mentioned above. For every 5,000 lb. of coal the boiler of the typical Consolidation of 1904 delivered to the cylinders 26,000 lb. of steam. The Mikado locomotive, for the same amount of coal delivered 38,000 lb. of steam. The Consolidation locomotive, to develop 1,500 hp. in the cylinders, required 26,000 lb. of steam per hour, whereas the Mikado developed the same horsepower with only 19,000 lb. of steam.

Even with these improvements there was a well defined limit to locomotive capacity set by the physical limitations of the fireman. The stoker and pulverized fuel gave the answer. Both of these developments have had and will have a far-reaching influence on locomotive designs. They have made possible sizes of locomotives not thought of before their introduction. At no distant date the importance of pulverized fuel will become more evident as this country is forced to practice greater coal conservation.

Locomotives having a tractive power of 147,000 lb. compound and 176,000 lb. simple have been built and several designs are in operation in road service having a tractive power of over 100,000 lb. Such work calls for coal, the demand at times running as high as 12,000 lb. per hour. Locomotives of the latter class are hauling 3,100-ton trains over a division of 113 miles having 1.2 per cent grades at an average running speed of 18.7 m. p. h. These figures prove better than any amount of argument the vital importance of the stoker on locomotive design and the possibilities of pulverized fuel.

Along with these developments, directly affecting economy of operation and increased capacity, comes another class of improvements of no less importance, i. e., those which aim at increasing the safety and ease of operation and reducing the maintenance. Many developments in this class also more or less directly improve the economy of operation. For example; power reverse gears which permit the engineman easily to adjust the cut-off at any speed, while with the old style of reverse gear he would not dare to make a change. Also, automatic firedoors and grate shakers contribute directly to improving the firing conditions and thus promote the economy of coal. In the safety class of developments may be mentioned electric headlights, improved connection between engine and tender, flexible stay-bolts, bell ringers, low water alarms, water glasses and improved cab fittings. In the class directly affecting maintenance are improved lubrication for cylinders and journals, self-adjusting driving box wedges, throttles, drifting valves and the application of cast steel parts. The use of cast steel has been extended to cover many elements in the locomotive which were previously built up of a number of parts. For example: truck frames, both engine and tender, engine frame cradles, tender frames and bumpers, and even the two main engine frames have been made in one casting. Cast steel cylinders were produced some time ago. This extended use of cast steel is not only working toward the betterment of maintenance on account of the reduction in the number of parts and connections, but also means a saving of weight. Every pound of material which can be taken out of the running gear goes into the boiler where it is of the maximum use.

In about 1900 apparently the limit of permissible rigid driving wheel base had been reached and progress by the addition of driving wheels seemed stopped. This was met in two ways: by the articulated locomotive and by the lateral motion driving box used with engine trucks capable of large displacements, but with sufficient resistance properly to guide the heaviest engines.

Thus one by one limitations have been removed, and one by one new elements effecting economy of operation, promoting safety or reducing maintenance have been introduced.

To some the commercial side of these developments may seem to have obscured the engineering side but without the spur of competition and the possibilities of a fair recompense the results would never have been obtained. The same is true of every great industrial development and does not detract from the engineering significance of what has been done. The same is true of railroad building.

In the light of what has been accomplished, what are to be the future developments? I have already mentioned the possibilities of pulverized coal, but in addition to the economic side it permits of certain design developments not possible with coal fired locomotives. The firebox can be placed over the drivers, the ash pan space reduced and a driving wheel arrangement secured which for coal-burning engines would be unsatisfactory if not entirely impracticable. In the matter of boiler capacity, we have available the economy which the feed water heater offers by its conservation of heat that is now wasted. We will always have limitations of wheel loads, but so far as driving wheel loads are concerned there are certain possibilities which so far have only been touched. These limitations have always been stated in terms of the allowable static weights, without reference to the effect of the rotating and reciprocating parts due to speed. This question is beginning to receive some of the attention which it deserves, and enough has already been done to show that we can materially increase the power of the locomotive by the use of reciprocating and rotating parts, and still keep the dynamic weights within the limitations which now obtain. Ten per cent increase is a conservative figure for heavy freight locomotives. Consider what this means in increased capacity of locomotives and in conservation of track and bridges.

The railway companies have contributed much to these developments, broad-minded and far-seeing railway men have pointed out the requirements to be met. They have given their time and facilities for experiment and trial, but the major credit is due to the inspiration, the perseverance and the courage of the men who kept pushing the developments on to the point where the railways of the country have seen their importance and could not afford to be without them. They had to meet discouragements and sometimes even opposition, but they never lost faith in what they were striving to accomplish for the betterment of the railways. These men say little about obstacles, about discouraging years and about the almost superhuman efforts which were required to bring a new idea to fruition.

What have been the impelling forces back of these improvements? The absolute need on the part of the individual railroad companies to meet the increasing transportation demands of the country and not "go broke"; on the part of the supply companies, a group of men of highly specialized experience, many of them with railroad training, who are devoting their lives and energies to aid in the solving of these problems. Are the advances to stop because of the lack of incentives or because the demands for economy from the railroad companies may not be so insistent as in the past?

The situation requires a broad-minded, clearly defined policy which will encourage the trial of new devices, the perfecting of those under development and will justify venturing the money which is needed.

New conditions confront the transportation interests of the country. The help of the same men who have been active in the developments of the past is needed now as never before. They have contributed brains, time and money to the art of railroading. Their contributions should be recognized and acknowledged and the same relations between the railroads and the supply companies which have produced the developments of the past should be continued and greatly strengthened. In this way only will the experience and energy of these men be made fully available in solving the problems of the future.

In the opinion of your speaker the steam locomotive has not by any means reached its limit of capacity or economy. The wonderful improvements of the recent past themselves suggest further possibilities that will put past and present achievements in the shade. Like a deposit in a strong bank these prospective improvements lie ready to hand. These are the means wherewith to meet the transportation problems of the future, the like of which have never before been faced.

The Consulting Specialist and Service

By A. L. Humphreys

Vice-president, Westinghouse Air Brake Company

Prior to the opening of the War in August, 1914, the railroads of the United States were able to demonstrate, and had demonstrated for many years, their ability to operate at a lower cost per ton mile than the railroads of any other country in the world. It is with this enormously important fact that I wish to begin, for beyond any question the low cost of transportation which prevailed prior to the war—an economic fact of the greatest influence and value to every business interest in this country—was largely the result of two factors. First: railroad managers of enterprise and ability, with vision, initiative and courage, on the one hand; and, second, the tireless energy, persistence and understanding of conditions limiting development on the part of the railroad man's greatest ally, the so-called railroad "supply-man."

In analyzing the problems that attach to railroad operation, we touch upon more principles vital to our national prosperity and we influence and affect a larger proportion of the population than in any other line of business activity—agriculture alone excepted. Successful railroad management and operation is a complex and highly specialized business in itself, requiring long experience, training and skill. It has been true always, but more so today than ever before, that railroad officials have full use for all their resources of mind and body to carry the responsibilities arising exclusively in connection with freight and passenger traffic handling. But a thousand separate and independent arts and sciences enter into, and are absolutely essential to, the most successful solution of railroad problems.

Nothing is more striking than that business and human activity in every form grows constantly more complex—and with a larger and more intensive specialization. The natural and inevitable result is—and this has been emphasized in recent years—the physical impossibility of the railroad man acquiring on his own account the same detailed specialized knowledge, practical experience and research information that the manufacturers possess in their respective lines of business.

If this conception of the situation is accurate, it follows absolutely that if transportation efficiency in this country is to continue to lead the world as was the case prior to 1914, there must also continue to be a comprehensive and far-reaching appreciation on the part of both the railroad man and the supply man of their mutual and reciprocal functions and responsibilities in improving railroad practice, railroad service, railroad costs, and railroad revenues. On the one hand we must have the trained, skilled, experienced and specialized railroad man, and on the other, the trained, skilled, experienced, and specialized railroad supply man, or manufacturer, whose part is indeed that of the "Consulting Specialist."

There is in fact no department of railroad work to which the consulting specialist has not contributed large value, and my experience as a railroad executive for long years has convinced me that the railroad man of understanding and vision, wide-awake and alert to the utmost possibilities of his opportunities, has been first and foremost to take advantage of what the consulting specialist has to offer as applied to his own local conditions and the first to express his appreciation and to encourage the specialist to further progress in his line.

Speaking from the standpoint of the consulting specialist —may I mention a few of the concrete forms of service rendered the railroads:

Wheels: One of the most important evolutions in railroad practice during the past 20 years has been to produce cast iron and steel wheels capable of standing up under tremendously greater loaded car weights, when subjected to heat developed from brake shoe friction on long mountain grades.

Brake Shoes: A vast amount of research and endless experiments have been made by manufacturers of brake shoes. The making of brake shoes, simple as it may appear to the uninformed, is a fine art requiring a precision of process few appreciate, to produce shoes for different brake pressures and service conditions.

Air Brake and Block Signals: The development in these two separate but related arts has gone far to expand old limits of operation, referring particularly to traffic density. Economy of operation and safety in handling life and property are insured by modern braking and up-to-date block signal equipment, entirely beyond what was previously possible. A hint of what is involved in the art of braking, for example, is contained in the simple statement that acceleration of a heavy railroad train from rest to 60 m. p. h.—in about six minutes of time—is due to an enormous flow of energy (from heat to motion). The modern brake is required to return this train to rest in 20 *seconds.* To do so, the flow of energy, from motion to heat, *must be eighteen times faster.*

Superheaters: In recent years the rising cost of fuel has led to the development of superheaters by which locomotive horsepower is materially increased for a given fuel consumption. The fuel bill for the railroads of this country is the largest single item of expense and second only to the cost of labor. Savings possible by the use of superheaters are therefore enormous in the aggregate.

Automatic Stokers: This is another illustration of a development which has contributed largely to railroad tonnage capacity through ability to develop the maximum tractive power of the locomotive.

I have selected these particular illustrations, out of many, chiefly to show the inter-dependence and inter-relation of many separate developments. Wheels make possible modern large capacity cars; superheaters increase locomotive horse power per unit of fuel consumption; mechanical stokers insure maximum capacity of the locomotive as designed; both are required to haul long trains of heavy cars—freight, and at high speed, passenger.

The necessity of co-operating with the railroads on some *systematic* basis has brought about naturally and inevitably the organization of service departments by some of our larger consulting specialists. These departments are made up of men trained in the particular business in which they are

engaged, with duties confined to inspection, analysis, the study of service conditions, suggesting and developing ways and means for improvement, and in general by a close and specialized study of railroad problems, demonstrating to the railroad man how to make the most efficient use of his equipment in service. The possibilities that attach to a properly trained and organized service department are without limit as to the value to the railroad.

If you will pardon what may appear to be a personal reference—but mentioned by way of illustration simply because it is the field with which I am most familiar—I would refer to some of the activities of the service organizations of the companies with which I am connected.

Organization. The companies to which I refer have developed an organization of trained specialists who are not only thoroughly familiar with designs and construction, but who are experienced in the very much larger and more important problem of the practical application of the apparatus we manufacture to the control of moving trains. The value of this organization to the railroads lies not alone in the fact of their long and experienced training in an important industry and art, but in the ability to assist the railroads in securing the most efficient and therefore the most economical results possible from train control as accomplished by the air brake and kindred devices in both freight and passenger service. The personnel of such an organization—and this is true of any properly developed service department—must not only include a scientific and expert practical knowledge of the business concerned, but must have the further vital faculty of being able to teach others and to secure a friendly interest and co-operation in attaining the results desired.

It is, I believe, permissible to state that this organization is not commercial in any sense; that is to say, the specialists attached to the service departments do not approach their problems from the commercial point of view, but primarily and first of all on the basis of the facts involved and what can be accomplished by scientific or mechanical ingenuity to improve conditions.

Laboratory and Experimental Equipment: In any engineering organization that is a pioneer in a particular field, a very considerable element of expense is involved in laboratory and experimental organization and equipment. The facilities comprised in this division of our organization are both directly and indirectly at the service of the railroads; that is, directly in that individual inspections, demonstrations and tests can be made at any time by arrangement; and indirectly, because the invention and development originating in this department are adding betterments constantly to our product as a whole.

Field Equipment: The service department of the companies to which I refer also includes, as an extension of these other divisions of the organization, special forms of service; as, for example:—

(a) An instruction car completely equipped with brake apparatus and related devices and arranged for the purpose of instructing railroad employees, not so much in the details of construction, but in the broad principles of train handling; to avoid break-in-twos; to eliminate damage to rolling stock and lading; to get trains over the road on time, etc., etc. This instruction car has been over practically every railroad in this country—and on many roads more than once—and is credited with a record of 150,284 miles travelled and nearly 400,000 railroad employees instructed.

(b) A dynamometer car completely equipped with the most intricate and modern apparatus for recording stresses in buff and stretch; drawbar pull; brake pressures and action in both application and release; and other information invaluable to the railroad man who is making a scientific study of his own particular conditions. This car has been used in developing data and establishing proper tonnage ratings for locomotives on many of the leading railways of the country.

Instructions: Not the least important work of our service organization as distinguished from the commercial side, is the division devoted to the preparation of printed instruction matter, isometric diagrams, charts and other guides to the study of equipment and the proper use of such equipment in service. Prior to 1914 the practice was becoming general on the part of the larger roads of issuing instruction matter in their own way and under their own authority. In this, our educational division has collaborated to such extent as desired by the railroads.

Government control of railroad operation has of course brought changed conditions in many respects. Whatever else may be said by fair minded critics, we believe temporary government operation during the war period has resulted in benefit in the direction of emphasis on standardization, on simplicity, on the value of interchange, on the necessity of co-ordinating not only the efforts of the railroads themselves, but the relations to the railroads of the army of consulting specialists. The world war was won by unity of purpose and co-ordination of material forces, and present railroad problems will not be solved satisfactorily until and unless the railroad man and the consulting specialist combine and co-operate as in the days of the past; and every education of all of us along that line, every written article, every meeting of this kind, cannot fail to be helpful and constructive in the direction desired, and which is important not only to the railroads, not alone to the business of the consulting specialist, but to our whole people.

Irregularities in Rate of Purchasing Equipment

Dr. W. F. M. Goss, president of the Railway Car Manufacturers Association, spoke of the difficulties encountered by the railway equipment manufacturers because of the unscientific way in which railway purchases are made. The railways flock to the market in times of prosperity and in times of depression orders for equipment very materially decrease. He referred to this particular feature as waves of business and illustrated the amplitude of these waves by saying that, considering the crest as 100, the trough would not amount to more than 30. Such fluctuations in volume of business disrupt the organization of the manufacturers and greatly affect the employment situation. It is a case of feast or famine, and under such conditions maximum efficiency in equipment manufacture cannot be obtained.

The car and locomotive builders are primarily assembling concerns. The ramifications of the business are extensive and many industries draw from the equipment manufacturers. Therefore variations in rates of purchase not only affect the companies directly related to the railroads, but all the allied industries, such as steel manufacturers, lumber merchants, etc. Doctor Goss emphasized the harmful effect of all this on the development of business, on the relations to labor, and on the educational and social service that every employer should supply.

While it is difficult to suggest a remedy for this irregular flow of business, Doctor Goss said there are some constant factors that have a very large bearing on the subject. The two most important factors are depreciation and increased needs of the country. It has been found that in the neighborhood of 100,000 freight cars must be built each year to make good the depreciation losses and, further, that there is a need for new cars each year to meet the increased demands of the country. While it is hard to say just what number of cars will take care of this increased demand, it is believed to be between 100,000 and 150,000 cars per year. Inasmuch as both of these factors are constant and have become fairly well established, it is easy to determine that there should be a demand which would average, say, 16,000 cars per month. If it were possible to let the car manufacturers

proceed with the construction of cars at this as a minimum program, it would do much to improve working conditions. It would permit greater efficiency in the operation of the car building plants and the allied industries and it would maintain the organizations of these industries in effective operation, so that any sudden increase in demands could be well taken care of. It is to be hoped, he said, that with changed conditions some solution of the problem will be found in order to accomplish these ends.

Discussion

W. G. Besler, president and general manager of the Central Railroad of New Jersey, said railway men should be willing to give credit and praise to the railway supply men for what they have done to improve and investigate methods for more efficient railroading. They have done a great deal to improve railroad conditions and the more progressive roads have likewise been of great assistance to them in trying out their devices in actual service. He said that the railway supply companies have done all that the speakers have said and more; they have spent a large amount of money in developing their particular devices, and in a number of cases only to find their inventions or materials impractical for railroad use. In commenting on the cycles of depression and prosperity in the supply business he said that this was common to all industries. When the roads needed equipment, business was good and they had money to spend, and many times when they did not need equipment they did not have the money to spend. Those roads that could spend money in times of depression made some very profitable purchases, as the equipment companies were glad of the opportunity to keep their organizations together and their shops going. He spoke particularly of the Philadelphia & Reading and the Central Railroad of New Jersey as having followed this practice.

Doings of the United States Railroad Administration

Director General on Trip of Inspection—Issuance of Certificates of Indebtedness Begun

WASHINGTON, D. C.

DIRECTOR GENERAL HINES and several members of his staff left Washington on March 25 for a week's trip of inspection over several railroads and for conferences with the regional and local officers at Pittsburgh, Chicago and Atlanta. Mr. Hines addressed the Pittsburgh Traffic Club on Wednesday and was to reach Chicago on Friday. He was accompanied by W. T. Tyler, director, and Frank McManamy, assistant director, of the Division of Operation; Edward Chambers, director, and Gerrit Fort, assistant director, of the Division of Traffic; W. S. Carter, director of the Division of Labor; Max Thelen, director of the Division of Public Service, and Brice Clagett, assistant to the director general.

Certificates Issued for April 1 Requirements

Certificates of indebtedness of the Railroad Administration have been issued this week to the railroad companies for part of what is due them on account of rental and other transactions arising out of federal control sufficient to take care of the April 1 requirements of the companies for interest, dividends and other corporate needs. On the security of these certificates the War Finance Corporation is making advances to the railroad companies payable at the Federal Reserve Bank at New York on demand notes of the railroad companies at 6 per cent for 80 per cent of the face of the certificates or 100 per cent if acceptable collateral is added for the amount of the difference, and a number of roads were expected to receive their money on Thursday. This is in accordance with a plan announced by Director General Hines after a conference with the committee representing the Association of Railway Executives on March 20. The April 1 requirements are estimated at approximately $70,000,000. The certificates are payable "when and as soon as the director general shall have funds available."

Applications amounting to something over $44,000,000 had been received by the Railroad Administration from railroad companies up to March 21 and additional applications were made from day to day this week as the necessary formalities were complied with. Up to Wednesday certificates had been issued to the Boston & Maine for $910,000, the Nashville, Chattanooga & St. Louis for $250,000, the Philadelphia & Reading for $500,000, the Maine Central for $312,000, the New York Central for $2,500,000, the Missouri Pacific for $1,400,000, the Atchison, Topeka & Santa Fe for $6,625,000, the Northwestern Pacific for $675,000, Western Maryland $1,165,000, Washington Southern $100,000, Richmond, Fredericksburg & Potomac $180,000 and Chicago, Burlington & Quincy $4,972,000. Certificates were ready to be issued to the Lake Erie & Western for $78,000, Cleveland, Cincinnati, Chicago & St. Louis $425,000, Michigan Central $1,240,000, Great Northern $480,000 and Erie $3,125,000. In addition, applications had been received from the following roads:

Chesapeake & Ohio for	$1,000,000
Alabama & Vicksburg	200,000
Bangor & Aroostook	475,000
Colorado & Southern	177,000
Lehigh Valley	3,125,000
Minneapolis, St. Paul & Sault Ste. Marie	510,000
St. Louis, Brownsville & Mexico	475,000
Southern Pacific	7,875,000
Ocean Steamship Co	138,000
New England Steamship Co	313,000
San Antonio & Aransas Pass	67,000
St. Louis-San Francisco	1,875,000
Perkiomen	280,000
Central of New Jersey	969,000
Buffalo, Rochester & Pittsburgh	261,000
Georgia Railroad	388,000
Chicago, Milwaukee & St. Paul	2,000,000
Vicksburg, Shreveport & Pacific	197,000
Mississippi, Louisiana Railroad & Transfer Co	52,000
Wheeling & Lake Erie	773,000
Baltimore & Ohio	5,750,000
Chicago, Rock Island & Pacific	3,332,000

The matter of preparing applications, resolutions to be passed by the directors of the various railroad companies, and information as to obtaining certificates from the director general of railroads is in charge of Alfred P. Thom, secretary of the railroad executives' committee. A form of certificate which is acceptable to the War Finance Corporation was prepared by Alfred A. Cook, Esq., special counsel for the War Finance Corporation, and this form has been approved by the railroad committee and by the general counsel for the director general. A statement issued by the War Finance Corporation said in part:

"As each application is presented to the War Finance Corporation it will be considered by the directors of that corporation upon its merits and in strict compliance with the provisions of the War Finance Corporation act as to adequacy of security, margin of security and in all other respects. The policy of lending money to railroads is by no means a new one for the War Finance Corporation. As early as March, 1918, when the bill to create the War Finance Corporation was pending in Congress, the Secretary of the Treasury, Mr. McAdoo, expressly pointed out in his

testimony before the committee that loans to railroads would be among the functions of the War Finance Corporation. In fact, section 9 which was passed on April 15, 1918, expressly contemplates that advances will be made by the War Finance Corporation to railroads while in the possession and under the control of the President. In pursuance of this authority the War Finance Corporation, beginning with the autumn of 1918, began to lend money on a large scale to railroads on their offering of adequate security, and in this way a material part of the War Finance Corporation was engaged in railroad loans, even before January 1, 1919.

"The policy, therefore, which is now being pursued in loaning funds for the operation of railroads is entirely in line with the original intention of Congress, as expressed by the statute, and also in line with the settled procedure of the Finance Corporation throughout the course of its brief history. The number of applications from railroads for advances has been greatly augmented by the failure of Congress to provide the appropriation asked by the director general just before the adjournment of Congress."

The form of application states that the advance is required for the purpose of enabling the company to meet its obligations and other pressing corporate needs in amounts approved by the director general of railroads, that the railroad company is unable at this time to obtain the funds requested on reasonable terms through banking channels or from the general public and the railroad company agrees to repay the advance as soon as it can obtain funds elsewhere on reasonable terms without any demand for payment by the War Finance Corporation. The form also states that any and all sums that shall be paid by the director general upon or with respect to the certificate are to be collected by the War Finance Corporation and applied by it in reduction of the principal; also that the War Finance Corporation shall have the right to sell the certificate through banking channels or in the general market at its option, at not less than the principal amount and accrued interest, retaining from the proceeds an amount sufficient to pay the principal of the note and paying over any excess to the railroad company and delivering to the company the collateral remaining, if any. A certificate of approval of the director general is appended and the statement also includes a form of resolutions of the executive committee or board of directors of the company.

The instructions to the railroads for filling out applications for advances were as follows:

"The company should if possible give as security certificates to the principal amount of 125 per cent of the sums requested as an advance. If certificates to the amount of 125 per cent of the advance requested are not available, the balance should be supplied by additional collateral, preferably in the form of bonds or other securities with a quoted market value, so as to make the total collateral worth, accepting the certificates at par and the additional collateral at market value, 125 per cent of the advance desired.

"Market value should be construed as the latest bid price, or in the event of recent sales, one or two points under the last sale. In case securities without quoted market are offered, the estimated value based on market quotations for securities of similar character should be given.

"The additional collateral furnished by the company should be worth not less than the price used in valuing it, and the belief of the company as to such worth must be stated.

"Applications and resolutions of the board should be filed in triplicate."

The question of meeting the further requirements of the railroads after April 1 needs have been met will be considered later and consideration is still being given to the details of the methods to be adopted for meeting obligations due from the Railroad Administration to the equipment companies by the use of trade acceptances. No announcement on this subject was made by Mr. Hines before he left for a western trip Tuesday evening, and the committee representing the equipment companies is still negotiating on the matter with officials of the Division of Finance and with the specialty and material companies, some of whom are understood to have expressed some reluctance to receiving their pay in acceptances from the Railroad Administration, with which they had no contracts, instead of in cash from the equipment companies who had the contracts.

The cash situation of the Railroad Administration has been materially improved by the receipt of $10,000,000 from the Navy Department and $100,000,000 from the War Department on account of bills for freight and passenger transportation and by the loan of $50,000,000 from the War Finance Corporation. This money is being apportioned by the Railroad Administration among the federal treasurers and will put them in a better position to meet their current bills, with some of which they had fallen behind.

The Railroad Administration has as yet displayed no activity in the direction of entering the market for rails or other steel products in spite of the agreement reached between the Industrial Board of the Department of Commerce and the representatives of the steel industry on reduced prices for steel. The theory of the agreement was that prices should be fixed which should apply to purchases by the government and set a precedent for general application but the Railroad Administration, which represents the largest consumer of steel, is not in a position to do much toward starting a buying movement. T. C. Powell, director of the Division of Capital Expenditures, was a member of the Industrial Board which accepted the revised steel prices and presumably consented to the price fixed for rails, which is $10 a ton less than that of last year, but $10 a ton above the prices of the last railroad orders. It has been understood that the Railroad Administration would at least place an initial order for 500,000 tons and the matter is under consideration but no decision has been announced.

Progress Toward Restoration of Normal Conditions

Considerable progress has been made in many directions by the Railroad Administration in restoring the transportation service to the normal basis which existed before the war. The most noticeable changes naturally are in the way of increased and improved passenger service, because during the war it was necessary to subordinate the comfort and convenience of passengers to a considerable extent to the demands of the freight traffic. In his testimony before the House Appropriations Committee in February, Director General Hines stated that since the armistice was signed it had been the policy of the Railroad Administration to try to get the service back to normal as to convenience and adequacy, the purpose being to meet the necessities of the situation. While the purpose still is to view the operations as a whole, he said, and to try to get the best results, it is necessary to give more consideration to what is done on a particular railroad than during the war period. Also, he said, realizing the probability that in the reasonably near future the railroads may go back to their owners, the administration is endeavoring to pursue a policy of considerateness so as not to needlessly interfere with the sort of traffic that would be handled by the corporation if it were in control of its own lines.

The statistics published in last week's issue of the *Railway Age,* comparing the net operating income of the railroads in 1918 with the standard return representing the net operating income for the three years before the war, indicated some marked changes in the volume or character of the traffic of many roads after they were taken over by the government, although a part of the difference between the results for 1918 and those for the pre-war period must be

attributed to increases in expenses. Apparently the Railroad Administration, while not taking active steps to restore to a railroad traffic which might have been diverted from it during the war period, is doing little in the direction of further diversion and is rather letting the traffic follow its own channels. At the hearing a question was addressed to Mr. Hines as to whether the shippers are being left free in the matter of routing their freight. C. A. Prouty, then director of the Division of Public Service and Accounting, who was present, was called upon to answer the question and said that theoretically they are not, but as a practical matter in most cases they are.

While the Railroad Administration has announced no change in the instructions to route freight by the most direct routes, it is understood that shippers are being given more discretion than they were last year as to the routing of their freight and where a preference is expressed it is not interfered with except for some special reason. The volume of export traffic is now in some cases greater than it was during the war and it is still necessary to exercise supervision to prevent congestion. Mr. Prouty said that usually all the shipper asks is a certain terminal delivery and when that is given he is usually satisfied. In some cases, as in the routing of perishable commodities, such as vegetables, citrus fruits, etc., from Florida, the shipper has insisted on routing the traffic through a certain Ohio river gateway and in one case that was denied. Subsequently, the subject was reconsidered and the shipper was given the privilege. In some instances the fact that terminals have been unified has made it unnecessary for the shipper to route by certain lines in order to secure the desired terminal delivery. A number of roads that formerly increased their proportion of the traffic by solicitation have lost traffic by the discontinuance of solicitation to some other road and many railroads apparently are worrying as to the condition they would be in if the railroads were restored to their owners without any steps having been taken to restore the former traffic conditions, because after shippers have acquired the habit of routing in a certain way great efforts would have to be exerted by some roads to recover the traffic which they had enjoyed under the former competitive condition.

The reduction in the amount of expedited traffic required for war purposes has of itself restored more normal conditions in the freight service, particularly as to the service accorded to kinds of frerirght which were classified as non-essentials. Many of the restrictions formerly enforced by the embargo and permit systems have also been gradually withdrawn, as has the zone routing system for coal shipments. In the passenger service the principal change in the direction of the restoration of normal conditions has consisted of putting additional trains in service, restoring observation, lounge and club cars, and increasing the amount of service to winter resorts such as Hot Springs and Florida. A limited campaign of advertising for winter tourist traffic was inaugurated on January 1 and the director general recently announced the intention to engage in a limited advertising campaign in newspapers and national magazines for the purpose of promoting travel to the national parks and principal health and pleasure resorts. This will be accompanied by the restoration of reduced summer tourist rates to many points where they were not in effect last year. The a la carte dining service was restored on a large number of trains in various parts of the country during the month of March replacing the table d'hote service which was put into effect as a war measure. The use of special and private cars which was discontinued during the war has again been permitted and the minimum requirement for a special car has been reduced from 30 to 25 fares. Passenger schedules in many parts of the country have been readjusted in view of the new conditions and service has been increased in many instances where it appeared necessary. Additional lines of sleeping car service has been put on. Some of the recent changes in this direction, include the restoration of a special parlor car with an extra fare of $1.00 between New York and Atlantic City, the restoration of observation lounge cars on the Chicago, Burlington & Quincy train between Chicago and Lincoln and Chicago and Denver, the restoration of observation cars on the Burlington and Northern Pacific between Chicago and St. Paul and St. Paul and the Pacific Coast, the restoration of the New York Flyer between New York and Harrisburg, club cars being placed in service between New York and Plainfield, replacing of parlor cars on through trains between Richmond and Norfolk, additional dining car service on the Pennsylvania Limited between New York and Pittsburgh, and in many other places where a specific announcement has not been made. The winter tourist travel to Florida resorts has been unusually heavy and appears to have been well taken care of and passenger traffic has been generally heavy in most parts of the country.

Aside from matters of service, the Railroad Administration has taken several other steps in the direction of restoring former conditions. The Division of Capital Expenditures had given up a large amount of its control over capital expenditures and had announced a general policy of not undertaking capital improvements without the approval of the corporations before the failure of the railroad appropriation bill and before the acute financial condition of both the railroad companies and the Railroad Administration caused by the inability of the latter to meet all of its obligations promptly had developed.

There has been some "unscrambling" of railroads by transferring parts of systems from one region to another so as to bring the entire system into the same region in several instances. The most noteworthy changes of this kind were in the Allegheny and Eastern regions and the transference effective on March 1 of the Illinois Central line north of Cairo to the Southern region and of several other railroads from the Southwestern to the Central Western region, accompanied by a regrouping of the lines in the Southwestern region.

A circular recently issued by the director of the Division of Operation providing for a relocation of equipment more in accord with ownership than has been practicable during war conditions and providing to a greater extent for use by the owner of equipment of its accepted standards was also in the direction of restoration of pre-war conditions.

Passenger Fares

A large part of the general revision of local passenger fares which has been in progress for several months was completed with tariffs filed to become effective on March 15 or on April 1. When the general advance of passenger fares to 3 cents was put into effect last June temporary tariffs were used at first and the more permanent tariffs have been filed from time to time, using the new distance table which was worked out last summer. In the new rates less attention is paid to the competitive influence which affected passenger fares before the period of federal control and rates via circuitous routes which were formerly made to meet the short line fares have in a large number of instances been increased in proportion to the mileage, although between common points where the difference in mileage of various lines is slight the rates are made the same. The Railroad Administration has announced its intention of making a campaign to cultivate passenger traffic, particularly during the summer, now that passenger equipment is more plentiful than last year and, as announced in last week's issue, reduced summer tourist rates will be made to the Pacific Coast and to summer resort points. However, the former practice of publishing special convention fares, which was gradually being eliminated by the railroads even before federal control, is not to be re-established this year, although

travelers to conventions will be given the advantage of the summer tourist rates. A large number of reduced convention fares were formerly allowed because one railroad which saw an opportunity to develop a considerable business would agree to make a reduced rate and the others would follow in line. Under government control it is felt that there should be no discrimination between the various organizations or classes of organizations which petition for special fares and to grant a special reduced basis of fares for all conventions would unduly deplete the passenger revenues. This is an important consideration because the cost of operation has not been materially reduced since the cessation of the war.

The Railroad Administration has been besieged by shippers for reductions in rates on the theory that the traffic cannot stand the increases imposed as a war necessity and some reductions in rates have been allowed, as in the case of the export rates to the Orient via the Pacific Coast, to meet particular situations, but the administration has naturally declined to give consideration to any idea of reducing the general level of rates, taking the position that the higher rate level imposed during the war is necessary to meet the decreased purchasing power of money. The extra fare charged for Pullman passengers was taken off shortly after the signing of the armistice, but apparently no consideration has been given to any idea of reducing the general level of passenger fares.

Reorganization of Divisions of Finance and Purchases

As previously announced, the Division of Finance and Purchases is being reorganized as two divisions.

A finance committee has been appointed consisting of: John Skelton Williams, chairman; Franklin Q. Brown, Harry Bronner, Frederick W. Scott and James N. Wallace. This committee will submit to the director general from time to time its advice on matters of financial policy and will also make to the director general preliminary reports on any proposed railroad reorganizations which may require his approval. Mr. Brown, Mr. Scott and Mr. Wallace have heretofore been members of an advisory committee in the finance section.

Also an advisory committee has been appointed consisting of John Skelton Williams, chairman; Robert S. Lovett and Henry Walters. This committee will submit to the director general from time to time its advice regarding matters of policy with respect to purchases and for that purpose is authorized to make the necessary investigations.

Circular No. 1 of the Division of Purchases announces that Samuel Porcher and George G. Yeomans, heretofore members of the Central Advisory Purchasing Committee, are appointed assistant directors of the Division of Purchases, and William W. Morris, heretofore secretary of the Central Advisory Purchasing Committee, is appointed assistant to the director, Division of Purchases.

H. C. Pearce, manager, Procurement Section; M. E. Towner, manager, Forest Products Section; E. J. Roth, manager, Stores Section; and B. P. Phillippe, fuel distributor heretofore reporting to the chairman of the Central Advisory Purchasing Committee, will report to the director of the Division of Purchases.

Agricultural Section Plans Development Work

The Railroad Administration's agricultural section, in cooperation with the Department of Agriculture, is making plans to resume its agricultural development work throughout the country, which, on account of the war, was, of necessity, curtailed to a great extent.

A call has been issued for a general meeting of some 200 representatives of railroads engaged in this particular class of endeavor, who will assemble at Memphis, Tenn., on April 2, for a three days' session. Agents of the Department of Agriculture have been invited to take part in the deliberations. The problems to come before the gathering will include those of marketing, agricultural extension methods, raising of more and better livestock and poultry, dairying, fruit growing, information for homeseekers, best methods for assisting new settlers, farm credits, and co-operation of local organizations.

During the war railroad agricultural agents were engaged principally in helping to increase the food production of the country. When hostilities ceased the Railroad Administration arranged for a reorganization of the forces of the individual roads which did so much to help in building up the country before the outbreak of the war. A more thorough co-operation with the Department of Agriculture than previously had obtained was also brought about.

Reports from chambers of commerce, bankers, associations of farmers, newspapers, and business men received by the Railroad Administration indicate that there is a strong sentiment manifest throughout the country toward better farming, which means heavier and more economic production, with improved marketing conditions.

At the Memphis meeting a program will be adopted for utilizing this sentiment to the best advantage in order that the general development of the agricultural resources of the country may be carried on with even greater energy than was displayed before the war.

Advertising Campaign and Reduced Fares to Promote Passenger Travel

Director General Hines has announced the intention of the railroads under federal control to engage in a limited advertising campaign in newspapers and national magazines for the purpose of promoting travel to the National Parks and principal health and pleasure resorts. This campaign, which will be nation-wide in its scope, will be supervised in every detail by the three Committees of Passenger Traffic Officers, located in New York, Chicago and Atlanta, respectively.

Reductions in Rates on Road and Building Materials

In a statement issued on March 20, the director general said:

"Various inquiries have been received as to whether the Railroad Administration contemplates a reduction in freight rates on materials used in construction of buildings and therefore it becomes important to make it clear that no such reductions are in contemplation.

"The Railroad Administration is, however, giving consideration to the question of making reduced rates on crushed rock, stone, sand and gravel for road construction when consigned to and the freight thereon is paid by a federal, state, county, parish or township government.

"Before the matter can or will be definitely determined, it is intended to ascertain what, if any, reduction necessary to establish a stable price, will be made in the price by those producing and supplying the materials."

Four Standard Forms of Waybills Prescribed

General Orders Nos. 11 and 21 provide for the adoption of universal interline waybilling. A standard form of waybill was prescribed in General Order No. 11, which is now amended, and General Order No. 60 has been issued prescribing four forms of waybills.

A—Single consignments.
B—More than one consignment.
C—Astray freight.
D—Live stock.

Form AC No. 506 is for all single c. l. or l. c. l. consignments, local or interline; but a single waybill may be made for a special train moving at a lump-sum charge or for shipments which, on account of their length, require more than one car. The size of this waybill is 8½ ins. by 11 ins., but for special classes of traffic may be 8½ ins. by 22 ins. Paper

must be equal to 60 lb. (or heavier), No. 1 manila, 24 in. by 36 in.

Form AC No. 507 is for blanket waybilling of more than one consignment of l. c. l. freight, local or interline, sizes same as preceding; paper equal to 40 lb. (or heavier), No. 1 manila, 24 in. by 36 in.

Form AC No. 508 is for waybilling astray freight; size 8½ in. by 11 in.; paper equal to 40 lb.

Form AC No. 509 for livestock c. l. when special stub is required at destination stock yards; size 8½ in. by 11 in., to be printed in two parts, the additional part for the use of destination agents at livestock centers in collecting transportation charges; paper equal to 60 lb.

Necessary copies of waybills may be made on forms like those or on plain paper, but on paper of lighter weight. All waybills must be prepared with typewriter, pen and ink, or indelible pencil. The practices and blanks used by carriers in preparing underlying forms at the time of making the waybill must be adjusted to meet the arrangement and requirements of the new forms.

Regulations are prescribed for notations at transfer stations. Paster scale tickets must not be larger than 2 in. by 4 in.

These new forms must be used not later than June 1, 1919, but may begin earlier. The astray freight waybill must be used not later than June 1, 1919.

Stocks of old waybills on hand may be used after June 1 in waybilling local l. c. l. shipments.

Where weight of a carload shipment cannot be given at the time of making waybill, and it is not desired to complete waybill by using an estimated weight, 110 per cent of marked car capacity should be used; and in proper space show the point where car is to be weighed.

This order does not discontinue the so-called mani-bill, uni-bill, or the consolidated billing and abstracting plan. These forms of billing when they are economical and efficient in their operation, may, until further advised, be continued in use for l. c. l. local traffic.

Conditions in Eastern Region

In marked contrast to conditions which prevailed in the Eastern region during the month of January and February, 1918, when the most severe winter weather in history was experienced, the railroads in this territory during the first two months of 1919 were in a position to handle a much larger traffic than was offered, according to a report from A. H. Smith, regional director for the Eastern region, to Walker D. Hines, director general of railroads. While there was a falling off in business, due to the signing of the armistice, 1,105 special export trains were handled from western termini during the first two months of 1919, containing 28,116 cars of export freight. During the month of January 15,092 cars of export freight were delivered to steamers at New York, and in February 12,590 cars, a total of 27,682, of which 5,802 were flour.

The movement of livestock, dressed beef, provisions and other perishables from the west was heavy, the average daily movement for the first 20 days of January being 1,118 cars, the highest average for any similar period except October, 1918. On February 13, 1,146 cars were handled east from Chicago, the largest day's movement of which there is any record.

Mr. Smith reports that 100 per cent car supply was furnished for all business offering in the two months mentioned. He also states that approximately 85 per cent in January and 96 per cent in February of all passenger trains arrived at terminals less than 30 minutes late. Applications for export permits have been heavy throughout February, particularly on provisions and foodstuffs, and a total of 16,341 cars of foodstuffs were permitted, the indications being for a continued heavy movement of this character. Outside of foodstuffs, iron and steel are moving in the heaviest volume, February permits totaling 9,594 cars to New York.

A change in the shipping conditions with the assignment of ships for commercial export business has resulted in a rapid increase in commercial export shipments, 18,719 cars of commercial export freight being permitted during January and 20,709 in February for movement through the ports of New York and Boston. Through the re-routing of carload traffic to eliminate circuitous routes for the period from January 1 to February 7, 4,531 cars have been diverted, resulting in a saving of approximately 301,714 car miles in the region.

A shipping day guide for New York City was issued to take effect March 10, the plan having received the unanimous approval of the Merchants' Association of New York. Preliminary figures indicate that at New York alone approximately 1,000 tons per day formerly loaded transfers will be loaded direct to destination with attendant saving in transfer expense and improved service.

Accounting Circular

In Accounting Circular No. 81 the Division of Accounting says that consideration is being given to the need for establishing a uniform date for stating operating revenues, operating expenses and other income accounts, and for closing the accounts monthly, so that reports of results shall reach the division and be tabulated within the month succeeding that for which the reports are made. To the end that such a date may be ascertained and fixed, federal auditors of Class I roads are directed to promptly make reply to the following queries:

(1) What is the earliest date after the end of the month that revenues, expenses and other income items can be stated from the accounts as they are now kept?

(2) What is the earliest date after the end of the month that revenues, expenses and other income items can be stated from accounts built up from estimates based on data reasonably consistent and safe for making such estimates?

(3) If statements of expenses, revenues and income items are required to be reported to this division by the tenth of the month following that for which they are made, what is your opinion of the reasonableness and feasibility of basing such statements upon accounts, closed if necessary, at the end of the month upon estimates and adjusting the difference between estimates and regularly ascertained figures in the subsequent months' accounts and reports?

(4) What changes in your system of accounting will be necessary if you were obliged to state the accounts and determine the revenues, expenses and other income items by the 10th of the month following that for which the report is made?

(5) What would be the additional cost, if any, to close the accounts in time to submit therefrom a statement of income not later than the 10th of the month following that for which the report is made?

(6) Are you now making for the information of your federal manager or other officers, estimates, either weekly or monthly, of revenues, expenses, and other income items, and how do such estimates compare with the recorded figures when ascertained? If you were making such estimates prior to January, 1918, and have since abandoned them, what was the reason for so doing?

Freight in Central Western Region Moves Freely

According to a report from Hale Holden, regional director for the Central Western Region, to the director general, conditions generally were favorable to all railroad operation during the month of February and all traffic moved currently. The equipment of all classes in this region was plentiful during the month and a surplus of box and coal cars has accumulated. Mr. Holden states that the hog movement in the region is rapidly returning to a normal basis, which will

make possible the removal of embargoes at all primary markets within the near future. The Kansas City market handled a total of 10,906 cars of livestock inbound, an increase compared with February, 1918, of 769 cars. A total of 3,390 cars moved outbound, an increase of 723 cars for February, 1919, over the corresponding month last year. Four hundred and thirty-six special oil trains were operated from the Mid Continent field during the month with 10,904 cars, an average of 25 cars per train. One hundred and six special trains were employed in the transportation of troops, a total of 45,790 men being handled.

Terminal managers report favorable conditions with a free movement and interchange of traffic through all terminals. The Illinois Central railroad made several readjustments in its passenger train schedule in Illinois during the month in the interest of "on time" service, and was authorized to add an additional train between Clinton, Illinois, and St. Louis, Mo., which resulted in an increase of 105,850 passenger train miles per annum.

Export Rates to Orient to Be Reduced

Director General Hines has announced the purpose of the Railroad Administration to put into effect as soon as the tariffs can be prepared and filed, new rates on export traffic to China, Japan, Australia and Philippine Islands, applying from territory adjacent Missouri River and east through Pacific Coast ports. The new rates are reductions from the existing rates, but somewhat higher than those in effect before the export rates were cancelled last year. The proposed rates follow:

Commodity	Rate per 100 lb.
Articles described in Item 5 Trans-Continental Tariff 29-B	$1.75
Agricultural implements	1.00
Iron articles (general mixture)	.60
Car wheels and axles attached.	.60
Boiler iron	.60
Cast iron pipe	.60
Wrought iron pipe	.60
Roofing iron	.60
Machinery, including grading and road making machinery.	1.00
Sewing machines	1.10
Oil, lubricating	.90
Oil well supplies	1.00
Railway equipment (axles, beams, couplers, etc., comb.)	.75
Railway equipment (cars, passenger and freight)	.75
Railway equipment (locomotives, etc.)	.75
Tobacco, manufactured	1.35
Tobacco, unmanufactured	1.40
Automobiles and parts—	
Passenger	3.75
Freight	3.00
Canned goods	1.00
Chocolate	$1.50
Cotton piece goods	1.20
Glass, window, etc.	1.10
Glass, plate, no limit as to measurement not exceeding 120 united inches	1.40
Iron, pig	.55
Iron castings	.70
Lime, acetate of	.65
Milk, condensed	1.00
Paint, etc.	.70
Paper, etc.	.90
Pig lead	.75
Plumbers' goods	1.50
Roofing, etc.	.90
Wire rope	.70
Soap	1.00
Soda ash, caustic soda, etc.	.60
Spelter	.75
Starch	.90
Steam or hot water heating apparatus	1.25
Wheelbarrows	1.10
Wood pulp and wood pulp board	.75
Zinc plates and sheets	.80
Vehicles	1.40
Wax, paraffine	.90

War Department Pays $100,000,000 on Account

The Railroad Administration on March 21 received from the War Department $100,000,000 on account for freight and passenger transportation services heretofore rendered by the railroads under federal control for the War Department. In ordinary course these payments would have been spread over the next three months. While ordinarily such payments would have been made directly by the War Department to the federal treasurers of the various railroads which rendered this service, it was arranged in order to meet more conveniently the present financial situation that the money be paid directly to the Railroad Administration at Washington. The sum thus received will therefore in substance be subtracted from what the railroads would otherwise have received in approximately the next three months, and hence must be distributed by the central administration to meet the current cash requirements of the federal treasurers.

Offices of Managers of Inland Traffic Being Discontinued

The offices of manager of inland traffic in the various government departments, created by the appointment of traffic representatives of the Railroad Administration last year for the purpose of co-ordinating the traffic requirements of the government, have now been discontinued, and the officers have been assigned to other positions in the Railroad Administration or are returning to their former positions. H. P. Anewalt, who has been manager of inland traffic of the Navy Department, has been appointed assistant director of the Division of Traffic, succeeding C. B. Buxton, resigned to return to his former position as vice-president of H. L. Edwards & Co., of Dallas, Tex. F. M. Whittaker, manager inland traffic of the Fuel Administration, will return to his office of traffic manager of the Chesapeake & Ohio; H. M. Adams, manager inland traffic of the War Department, has been appointed traffic assistant to the regional director of the Southwestern region, at St. Louis, succeeding W. B. Biddle; D. L. Gray, manager inland traffic for the Shipping Board, will become traffic assistant to the regional director of the Eastern region at New York; O. M. Conley, manager inland traffic of the oil division of the Fuel Administration, has returned to his former position on the St. Louis-San Francisco; C. E. Spens, manager inland traffic of the Food Administration, became assistant director of the Division of Traffic on March 1, and T. C. Powell, manager of inland traffic of the War Industries Board, became director of the Division of Capital Expenditures in January.

Contracts Executed

The Railroad Administration has executed compensation contracts as follows: St. Joseph & Grand Island, $373,-811; Louisiana & Mississippi Railroad & Transfer Company, $41,689; Georgia, Florida & Alabama, $57,637; Bangor & Aroostook, $1,575,171, and Detroit, Bay City & Western, $85,967, also cooperative short line contracts with the Randolph & Cumberland, Ironton, the Oneida & Western, Williamsport & North Branch, and St. Louis, Kennett & Southwestern.

Conditions During February in Allegheny Region

According to a report from C. H. Markham, regional director for the Allegheny region, transportation conditions in that region for the month of February showed continued improvement. Owing to the mild winter experienced, coal loadings in the region decreased 61,804 cars compared with February of last year. Tidewater coal dumped amounted to 1,660,730 tons, an increase of 104,494 tons compared with February, 1918.

This region was practically clear of all embargoes on domestic freight by the end of February, and permits were freely issued for grain coming from the West on account of the resumption of overseas movement.

The railroads in this region received 10 locomotives built in their own shops during February, 1919, 13 from the locomotive builders to be applied against the 1918 program and 15 from builders to be applied against the 1919 program, a total of 38 locomotives during the month.

Posters to Illustrate Firing Methods

The Fuel Conservation Section has prepared two colored posters showing the interior of a locomotive firebox for the purpose of illustrating the effects of irregular firing methods, to be posted in roundhouses, foremen's offices, Y. M. C. A. buildings and other places where they may readily come to the attention of railroad enginemen. The method of illustration was employed in the presentation of a paper by D. C. Buell on "The Proper Method of Firing Locomotives" at the fourth annual convention of the International Railway Fuel Association and was amplified and enlarged upon by the University of Illinois engineering experiment station in a circular from which the illustrations were taken.

The British Transport Bill Severely Criticized

Proposed Establishment of Ministry of Ways and Communications Meets Strong Opposition by Many Interests

THE BILL to establish a ministry of ways and communications which was introduced in the British House of Commons on February 27, as noted with the abstract of the bill in last week's issue of the *Railway Age,* page 787, has resulted in an amount of discussion in the British press in keeping with the broad provisions of the bill and its somewhat striking proposals.

The discussion of the bill, at least in the papers that have reached the office of the *Railway Age,* shows that much opposition by influential interests has already developed. Opinion is divided as to the general idea of combining under one head all the means of transport in the United Kingdom, but all those who treat of the subject bring out points in the measure that they think need correction.

Sir Eric Geddes Expected to Be Minister

All those who discuss the matter agree that the first minister to be chosen will be Sir Eric Geddes. All recognize his ability as an organizer, but several doubt whether as a railroad man he will not treat the other means of transport with a railroad man's point of view only, while others fear that a change of government may result in the appointment as minister of ways and communications of a man of much smaller calibre.

Sir Eric Geddes was formerly deputy general manager of the North Eastern Railway of England. In the early part of the war he was engaged in organizing the supply of munitions. Thereafter he became director-general of military railways, and then director-general of transportation. In March, 1917, he was appointed inspector-general of transportation in all theatres of war, following which, in May, 1917, he became vice-admiral and controller of the Navy, and in July, 1917, first Lord of the Admiralty. He is at present in the cabinet as Minister Without Portfolio.

The thing in the bill that has received the most consideration, of course, is its all-inclusive nature, whereby control is vested in one man, the Minister of Ways and Communications over railways, light railways; tramways; canals, waterways, and inland navigations; roads, bridges and ferries, and vehicles and traffic thereon; harbors, docks and piers; and the supply of electricity.

Drawbacks Likely to Be Serious, Says the Statist

"Theoretically there is a very great deal to commend such a proposal as that the whole transportation traffic of the country should be supervised by one instead of by many bodies," says the Statist in its issue of March 8. "But, the drawbacks in practice are likely to prove very numerous and very serious. It is not surprising that very considerable opposition has been aroused to such a sweeping proposal, which may be counted upon to have far-reaching consequences, whether for good or for ill. If one could imagine such a department being under the control of a passionless, absolutely impartial being, possibly the placing of the control of the whole transport business of the country in one hand would be an ideal solution of an admittedly difficult problem. It has to be remembered, however, that such a Board has to be administered by human beings very much like the rest of us; and, consequently, absolute impartiality, however honestly it may be aimed at, is not likely to be attained in practice.

"The most serious objection so far raised has been the placing of the control of the railways and the roads under one single authority. A careful examination of the facts will, we think, disclose to the reader that the interests of the railways and the interests of the roads are very far from being identical, and that in all probability, if they are controlled by one single authority, the interests of one will be sacrificed to those of the other. It may not prove to be so; but it is certainly desirable to bear the probability in mind."

Bill Said Not to Be Inclusive Enough

The Railway Gazette (London), takes an entirely opposite view as to the scope of the bill, but it is one of those that fears that a less able man than Sir Eric Geddes may become minister before the expiration of the two years provided as the term of the bill's provisions. "The one serious omission," it says in its issue of March 7, "appears to be that, whilst the cross-channel steamship services of railway companies come under its control, coastwise shipping is not included. In an island country such as this coastwise shipping has had a greater effect on railway policy and the flow of traffic than is generally realized. But despite this apparent omission, the powers vested in the proposed new ministry are tremendous. To accomplish all that could be achieved under the wide powers it is intended to vest in this ministry will require not only a great staff, but many men with big brains, practical experience, much tact and much imagination as consultants and directing heads of departments.

"If the bill is not spoiled in its passage through Parliament by whittling down its scope, much may be accomplished with Sir Eric Geddes as Minister of Ways and Communications. He has big ideas, much courage, and can get things done. He is a keen judge of men and will select his staff with a single eye to their suitability for the posts he wishes them to fill. One danger to be faced is that, as a result of opposition by those who are temperamentally incapable of taking big views of anything, the Act may be such an emasculated edition of the bill, and the powers of the proposed ministry so crabbed and confined, that Sir Eric Geddes may see that there is no possibility of 'delivering the goods' and, at the eleventh hour, refrain from embarking on this great adventure. But even if Parliament does not spoil the measure, there is the ever present danger that a change of government may mean a less progressive Minister of Ways and Communications. The task is so great and its possibilities so tremendous, that to have this office filled in a year or two's time by a small-minded politician would be calamitous. We can only hope that these risks will not materialize. The greatest danger lies in a change taking place in the early years before the new Ministry had got properly to work. Once a concern is organized and running smoothly it is easier to find others who can carry on. Nevertheless, there will be difficulty in the avoidance of the bureaucratic environment which stifles enterprise and initiative.

"To remove such transport, docks and harbors, or the generation of electrical power from the control of the new ministry, would at once frustrate any attempt to co-ordinate and improve the country's transportation facilities. If canals were not included they would be the greater losers. Much has been written about the wasteful competition between railways in the past. To avoid a repetition of this with mechanical road transport is presumably one of the reasons for placing roads and road transport under the Ministry of Ways and Communications. We understand that great de-

velopments are contemplated in the extension of electric traction, and the super-power plants can be utilized for supplying electric power to the railways, to the factories adjacent thereto, to barges for the canals, and for charging electrically-propelled road vehicles."

Bill Will Encourage New Construction

The Engineer (London), finds much of value in the bill but is much opposed to the great power that is given to the minister, and also expresses its belief that a minister less able than Sir Eric Geddes might do much harm. "Opposition to the bill is appearing in many quarters," it says, "and we shall be surprised indeed if various modifications are not introduced before it finds its way to the statute book."

In speaking of the good points of the bill it says: "The situation of British railways today is hopeless. In 1913 the railways of the United Kingdom distributed fifteen million pounds in interest on debenture stock and other miscellaneous fixed charges, and thirty-five millions in dividends on guaranteed, preference and ordinary stock. As last year, the expenditure was about sixty millions more than in 1913, the whole surplus is more than wiped out. It must be observed, too, that before the war, capitalists had little sympathy for the railway market, and the companies were, therefore, afraid to embark on necessary new works, and consequently waited for the better days that have not materialized. It is obvious then that the companies cannot return to the status quo.

"The bill cannot be said definitely to propose nationalization. The minister may, under clause a of sub-section 1 of section 4, purchase any railway or part of a railway, but under clause d of the same sub-section he may, on the other hand, lease the whole or any part of any undertaking so acquired or established. Thus a similar condition to what prevails and is admittedly successful, in India, would be brought about. Our deduction that the railways will not be nationalized in the usual acceptance of the term is further confirmed by section 5, which authorizes the minister to make grants for the construction, improvement and maintenance of railways—other forms of transport are mentioned similarly, but here and elsewhere we allude to railways in particular, as they are the principal means of transport. Yet another gleam of hope is seen in the opening words of section 3, wherein we find the words: 'With a view to affording time for the consideration and formulation of the policy to be pursued as to the future position of undertakings.' These are features that should appeal to the railway interests, which may find also some comfort in the paragraphs V, VI, VII and VIII of clause c of sub-section 1 of section 3. The railways are instructed there to obey the directions of the minister as to alterations, improvements and additions for the more efficient and economical working of the undertakings; for securing the common user of facilities, rolling stock and equipment; for securing running powers over other undertakings, and that the purchase of stores shall be conducted in such a manner as may be most conducive to economy and efficiency. These betterments begin at once—after the act is passed—and may be continued for the two-year period during which the government guarantees the net receipts on the 1913 basis. What a splendid opportunity is thus offered for getting necessary new works done, obtaining improved equipment for goods stations, electrifying busy passenger sections, and so on. Again, clause IV would allow the permanent way, rolling stock, plant, appliances and equipment to be modernized, seeing that the railways have to take any directions of the minister as to these things being satisfactory in type and design. It is true that many of these concessions have to be bought at a price. No longer, for instance, will directors be able to appoint, promote, or advance the salaries of officers, nor will officers be able to do these things for their staff. A company in a favored position as to route or in its station facilities must share these advantages with its less favored neighbor. Yet another point the companies must remember is that after the two-year period the minister is not bound to take them over. A company which may have been set on its feet during the two-year period may not wish to be taken over, and, apparently, if the minister does not insist in absorbing it, it will not be disturbed. Lastly, there is the shareholder. He has no new cause for complaint. By the present bill he gets for two years the same guaranteed net receipts as in 1913, and should his undertaking be absorbed he will be entitled to just as much as under the act of 1844. Were the purchase made under that act, the terms would, no doubt, be the amount awarded by arbitration; under the new bill they would be fixed by agreement, or, failing agreement, by arbitration."

To Rush Measure Unjustifiable

Engineering, (London), finds much to oppose in the bill. "To rush through Parliament a measure which not only confuses control with purchase, but is calculated to extend governmental bureaucratic methods to the transport industry, is, in our opinion, wholly unjustifiable," it says.

"We have set out this series of powers in detail. They are extremely far reaching. If exercised—and Sir Eric Geddes is not the man to leave power unused—the first result will be to reduce railway boards of directors to the position of ciphers so far as the control of the shareholders' property is concerned; the Minister of Ways and Communications would be in the position of managing director of the railways, harbors, etc. A company's line might be closed wholly or in part; its engines and rolling stock, and even fixed appliances and equipment might be inextricably mixed up with those of other lines; its organization might be upset; in short, the value of the undertaking might be seriously affected. All this on a guarantee for two years of the same terms as to payment as during the past four years, while at any time the minister might decide to force a purchase of the whole or any part of the undertaking, in the manner to which we shall refer later.

"We quite agree that it is necessary promptly to deal with the question of railway rates and charges which need to be overhauled not only with the object of raising revenue to meeting the enormous increase in the cost of working the lines, due to concessions granted by the government to the employees, but to remove anomalies and to improve the system of charging. Power might also be given to facilitate and co-ordinate inter-railway working, and to authorize and finance works for the more efficient and economic working of the railways, but so long as there is the possibility of a complete return to private ownership there should be some respect for the property and corporate existence of the systems which have been built up on the basis of Acts of Parliament. From this point of view we regard the provisions of the bill as excessive. In this we are supported by the Federation of British Industries, . . . etc. These bodies have placed on record their opinion that in any form of control which it may be decided to adopt, the government should not in any case be concerned with the detailed administration of the railways. The bill certainly provides for very considerable interference in administrative matters, and should it emerge as an act in anything like its present form there will be an enormous extension of the civil service. The Ministry of Munitions—with whose organization Sir Eric Geddes was associated—expanded to enormous dimensions largely on borrowed staff, and it is significant that the bill with which we are now dealing contemplates the transfer to the minister of any officer or servant of an undertaking of which possession is taken whose services the minister may require, 'either permanently, with the consent of the officer or servant, or temporarily, with the consent of the undertakers.' Moreover, the bill is far from specific as to the payment of staff transferred to the Ministry. During the war hundreds—if not thousands—of men have worked in

various departments of the state but have been paid by railway and other companies. What may have been justifiable in war time should not be tolerated in future.

"We now come to the question of State purchase. As has been pointed out, there is the astonishing proposal that so important a matter shall be done by an Order in Council. We cannot think that this will be sanctioned by Parliament, but it is seriously proposed. The bill provides that the minister may purchase by agreement or compulsorily and work the whole or any part of any railway, light railway, tramway, canal, waterway, or inland navigation, harbor or dock. The only limitation is that a tramway, belonging to a local authority, shall only be acquired with the consent of the authority. Railway companies will doubtless have noticed that the basis of any purchase is not defined; the minister is to have the right to specify the financial arrangement, the only appeal being to a court of arbitration 'constituted in accordance with the provisions of the Order authorizing the acquisition.' Railway directors and shareholders may well contemplate this scheme with misgivings. But in addition to purchasing railway and other undertakings, the minister may establish new ones, for which purpose he may compulsorily acquire land; he may lease the whole or any part of an undertaking which he acquires or establishes; he may purchase, hire or lease railway wagons belonging to private owners; and may establish, maintain and work transport services by land or water—all by Order in Council. Over undertakings acquired or established the minister would have absolute control. 'He shall be entitled to fix such rates, fares, tolls, dues and other charges as he thinks fit, notwithstanding any statutory provision limiting the amount of such charges or increase therein affecting the undertaking, and shall have all such other powers of management as may be necessary for the purpose,' and he may 'discontinue the working of any part of the undertaking where he considers such discontinuance is expedient in the national interest.' When it is remembered that railway companies own large engineering works, manufacturing anything from furniture to locomotives; operate steamboat services; run hotels, motor cars, and goods and parcels road services; such diverse branches of industry as laundries, printing establishments, gas works, etc., the potentialities of this project for nationalization, and state competition with private enterprise will be apparent.

"In our opinion, the association of roads and the supply of electricity with railways is wholly unjustifiable. . . . It is the most unconvincing special pleading to suggest that the control of electric supply should be vested in the Ministry of Ways and Communications because the railway property might be used for lines of overhead high-tension wires, while as regards railway electrification we are far from sharing the opinion of a labor correspondent of a non-technical journal that 'railways will in the near future be electrified and canals will carry electrically driven barges.'

"What has to be secured is that the financial position of the railway companies shall be restored. This can be done by reducing expenditure or increasing the revenue, and it might be facilitated by a well-considered form of government control. The Board of Trade have always had considerable powers over the railways, and there is no harm in transferring those powers to a new authority, especially if that authority proves to be broader minded and less bound by red tape than the Board of Trade. It is also necessary to invest some department of the state with the power of varying railway rates and charges and simplifying the present basis of charging. Further, as the railway companies will not be in a position to raise capital, it is necessary that, under certain conditions, the state should finance schemes of improvement, but having said this, we hold strongly to the opinion that the detailed administration of the railways should be vested in the individual companies, and that the state should not embark on a scheme of nationalization until the whole matter has been threshed out in a much more complete manner than has, so far, been the case."

Mexican Railway Executives Visit New York

By P. Harvey Middleton,
Executive Assistant, Railway Business Association

THE VISIT to New York City on March 26 of two of the principal operating officials of the Carranza Railway Administration, M. Muñoz, general superintendent of the National Railways of Mexico, and Rafael Zerecero, assistant general manager of the southwestern lines of Mexico, afforded an opportunity of obtaining at first hand a few facts to supplement my article in the *Railway Age* of March 14.

"We are handling," said Mr. Muñoz, "16,000 tons of freight daily on a 3½ to 4 per cent grade. About 7,000 tons of this is on the Interoceanic route from Mexico City to Vera Cruz, Puebla, and branch lines. The principal commodities carried are sugar, flour, oil, coffee, corn, rice, cattle, lumber, rubber plant and tobacco. We export all our high grade lumber such as mahogany to the United States.

"Our locomotives are principally from the Baldwin Locomotive Works. We have a number of Mallet compound locomotives and also some double header Fairlie engines of English manufacture. We are fairly well supplied with equipment, but we need tank cars. At present only 5 per cent of our tonnage is export or import, the rest of it being domestic. Our tracks are in first class condition with good solid beds. We use principally hardwood ties, but we have some steel ties, although I don't like them. Some of our roadbed is ballasted 5 meters deep; it is good and solid.

"Señor Fontes, our general manager, is doing everything possible to encourage traffic into Mexico through the Pacific ports, and English steamers are making regular calls at the Gulf ports. It may interest you to learn that it takes an average of only 68 hours to unload a 5,000 ton steamer at Salina Cruz on the Pacific and carry it across the Isthmus of Tehuantepec to Puerto Mexico on the Gulf coast.

"The Mexican government has recently acquired by purchase from the Pearsons of London the National Railway of Tehuantepec, and this railroad, on the narrowest part of the continent with the exception of Panama, has been put in first class condition. We have two steamers running from Vera Cruz to Puerto Mexico making three trips a week carrying passengers and express packages. We have an ice plant at Salina Cruz and we have refrigerator cars for perishable freight like fish and fruit. The Tehuantepec Railway furnishes the electric light service in Salina Cruz and Puerto Mexico and we are going to establish competitive rates from Salina Cruz to Mexico City to meet the same rates as those from Manzanillo, which is the port of entry for traffic from the western ports and from Asia.

"Through our purchasing offices in America we buy rolling stock, cars, locomotives, rail fasteners, bridge material, brake equipment and tires. We make our own rails and we also operate machine shops at Orizaba, Mexico City, Vera Cruz and in several other places. We are now building hospitals at different points on our lines and we are getting prices from American firms for the necessary equipment. There are now no rebels on our lines, for we have just captured the town of Cuautla, in the state of Morelos, which was Zapata's former headquarters, and we have daily passenger service there. There is, of course, an occasional bandit raid in an out-of-the-way place, but I am told that even in New York City there is an occasional holdup. Generally speaking, Mexico is today normal and business is proceeding briskly. American manufacturers are sending their repre-

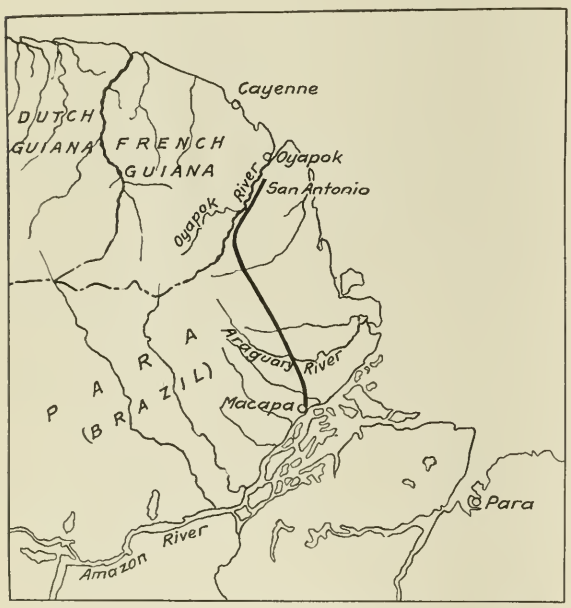
sentatives in increasing numbers, and a party of several hundred American business men representing the Mississippi Valley is leaving for Mexico in a few days to be the guests of President Carranza on a trip to Mexico City, Vera Cruz and Tehuantepec. We are most anxious to have American manufacturers come to Mexico and see for themselves the progress we are making. I can assure you that foreign capital will be protected by the Carranza Administration. One of the great obstacles at present is the delay on the part of the American government in granting passports. Everything should be done to facilitate commercial intercourse between Mexico and the United States."

Railway Developments in Foreign Countries

Proposed New Railway in Pará, Brazil—Interesting Figures of Exports from United States by Countries

Concession Granted for Railway to Be Built in Pará, Brazil

A CONCESSION has recently been granted to Antonio Amorin do Amaral for the building of a railroad from Amapá to Oyapock, both in the State of Para, Brazil, the latter town being located on the boundaries of French Guiana and called San Antonio, according to a report from Consul George H. Pickerell, Para. The region covered by this concession, which also embraces a strip of land estimated to be 9⅗ miles on either side of the line, is said to be rich in lands suitable for cattle raising, and to possess immense forests of timber of all kinds, especially that containing essences. The



Approximate Line of the Proposed Railway in Para

famous gold mines of the Guianas which have produced so much alluvial gold in the past are crossed by this line, and it is proposed to build a branch line that will touch the famous French Guiana mines, which are still producing large amounts with the most primitive machinery.

The consul quotes from the Estado do Para of December 15, 1918, commenting upon the benefits to be derived from the concession:

The State congress of Pará voted and made public the law which grants to Mr. Antonio Amorim de Amaral, or the company organized by him, the concession for the construction of a railway line starting from the left bank of the Amazon River from a port, accessible at all times to ships of deep draft, near the town of Macapá, and continuing by the right bank of the Oyapock, in the neighborhood of a settlement known as Santo Antonio, crossing the Araguary River below the first waterfall from its mouth.

The railroad shall have, besides, a branch line to the last navigable port of the Calcoene River, thus bringing great advantages to all the vast and rich region above the falls which is at present inaccessible to exploration. This undertaking will be, as may be easily noted, one of the most gigantic steps toward the progress of this State.

The plan for the railroad lines reaches all the latitude of Brazilian Guiana, crossing the richest and most fertile regions of Brazil, the same that old explorers used to refer to as the El Dorado of the New Continent.

In an article published in the Jornal do Brazil, in Rio de Janciro, Senhor Otto Prazeres says: "In those Brazilian regions can be found enough gold to serve as security to numberless issues of paper currency." Three ports have been constructed by France at her old colony, viz, Cayenne, Lourenço, and Oyapock, which are the outlet of all products from the Amapá (Guyana), causing thus considerable loss to our budget.

According to the statistics published in the "Association Française," for 1917, products worth 24,719,302 francs were exported through these ports. Before such splendid results the French Government which has already spent 1,000,000 francs in improving the harbor at Cayenne, is prepared to continue this work, its conclusion being estimated at 8,000,000 francs.

The Revista Commercial do Pará says: "The export of gold from the French Guiana for 1916-17 came to the stupendous total of 177,000,000 francs.

Not gold alone, but also other products which are its equivalent, valueless to us through lack of transport, have their outlet through the French ports.

To ease our financial condition, and to aequire a good security for our issues, it would suffice to explore or to give an outlet to the gold and other products accumulated in our territory and which are being exported to foreign countries through foreign channels.

What the South African Railways Buy

The South African railways in normal years purchase in the neighborhood of $63,000,000 of supplies yearly, but in the last two years their purchases have amounted only to about $20,000,000. These figures are taken from an article in the February issue of the British and South African Export Gazette, which contains the following interesting information:

Many factors contributed to make the volume of stores bought by the South African Department of Railways and Harbors during the 12 months ending March, 1918, smaller than in preceding years, particularly in regard to imported goods. The total purchases from all sources—in normal years they have amounted to over $63,000,000—were valued at $19,619,300, as compared with $19,676,800 in 1916. Out of this sum the High Commissioner's "list," representing purchases made through his office in London, amounted to no more than $3,041,820, against $6,155,270 in the previous fiscal period, and between $15,000,000 and $20,000,000 in the years before the war.

The extent to which the war reduced the proportion of purchases from overseas and correspondingly increased that of goods obtained locally may be judged from the fact that in 1913, 49 per cent of the purchases were of oversea origin and 51 per cent were bought in South Africa, whereas in 1917-18, 15 per cent of the purchases were made overseas and 85 per cent in South Africa; but as the general manager of the South African Railways states in his report, "The present position has been influenced in some measure by deferred deliveries of material unobtainable locally." For example, it has been exceedingly difficult to obtain rails, as they have been in demand for the various theatres of war in quantities beyond the present output.

Wide Range of Purchases.

Such being the case, there can be no wonder that South Africa has been unable to obtain delivery of goods long ago on order in the United Kingdom. Indeed, the purchases of

rails through the High Commissioner's Office in London during the year 1917-18 amounted to only $2,740, comparing with $1,022,500, 1916, and with amounts ranging up to half a million sterling in the years before the war. That is an extreme case, but it does not stand alone. Cement worth $16,335 was purchased through the High Commissioner in 1917-18, against $257,950 worth in 1916; electric gear to the extent of only $1,155, against $40,485; iron and steel, $26,475, against $77,750; locomotive, carriage, and wagon spares $359,620, against $552,450; machinery, $11,200, against $37,870; oils, $6,300, against $31,315.; piping, $1,385, against $9,810; and uniform clothing, $43,970, against $139,410.

On the other hand, rolling stock was represented by a figure which stood out among the rest, viz., $1,210,435, which though it showed a decrease on the $2,550,820 for 1916 and on the amounts for other years, was more comparable with them. Some items actually showed increased purchases, as, for example, brake gear, $26,425, against $11,445; copper, $49,320, against $36,625; fencing material, $6,400, against $975; and rope, $26,545, against $19,615. There were no oversea purchases of galvanized iron, timber, telegraph material, cotton and wool waste, and signal material, though all of these showed amounts in previous years.

Big Purchases When Normal Conditions Are Resumed

Quite apart from the interest attached to such figures as revealing the effect of the war on South Africa railway buying respectively from overseas and locally, these returns are of value to manufacturers as indicating the varied requirements of this great Government buying department, while they also suggest how much leeway will have to be made up when normal commercial and industrial conditions return. Indeed, the indents placed through the High Commissioner during the year under review are in themselves proof of this. They include rolling stock to the extent of $7,791,025; permanent-way material, $29,400; materials for tarpaulins, $426,140; locomotive spares and tires, $327,835; tin and metals, $72,525; carriage and wagon spares, $216,385; new machinery, $98,725; clothing, $504,025; catering, $53,500; stationery, $84,915; signal and telegraph material, $12,825; harbor and lighthouse material, $54,120; vacuum brake gear, $84,650; steam-heating gear, $2,870, and other goods, $96,285. These indents make a total of no less than $9,855,225, or two and a half times as much as the actual deliveries through the High Commissioner's Office in the same year.

[The South African Railways have been large buyers in the American market in the past three years. In 1917 they ordered 8 Mallet and 30 Mountain type locomotives in this country; in 1918, 20 Mountain type locomotives, and in February additional orders for 70 more were reported.—Editor.]

A Madrid-Valencia Direct Line

Following upon the Bill for the proposed direct line from the French Frontier to Algeciras (See the *Railway Age* of March 14, Page 611), a "Project of Law" has been published in the Gazette of February 15, by the Spanish Minister of Public Works, for the construction of the much talked of direct line from Madrid to Valencia, with a branch to Pasajes in Asturias. The proposed line is to be of standard 4 ft. 8½ in. gage, and in other respects is to follow the scheme authorized by the Royal Order of December 13, 1917, under the law of December 18, 1914, for the construction of various secondary railways. "The most extraordinary feature of these proposals, which mean spending $100,000,000 in second tracking existing railways," says the Railway Gazette (London, "is that they should come from a man like the Marques de Cortina, who in private life is a lawyer and banker, and who showed himself, on the occasion of his visit to England in connection with the 'Cortina' convention, to be endowed with the average amount of common sense. It is hardly to be expected that Congress will pass the schemes, in view of the formidable deficit, accumulated during the past five years, which must be liquidated by the 1916 budget. The cortes will surely recognize that if money is to be spent on railways there are plenty of blanks in the map without duplicating existing lines and creating a question of different gages. If a second line of railway is required between Madrid and Valencia, this could be obtained at relatively small cost, by connecting Cuenca and Utiel. Possibly the new schemes simply mean that the Minister wants to make a show of doing something during his brief term in office."

Exports of Locomotives in January Total $3,076,543

During the month of January, 1919, there were exported from the United States 87 steam locomotives, valued at $3,076,543, according to figures prepared by the Special Statistical Service Section, Division of Statistics of the Bureau of Foreign and Domestic Commerce. Well over half, both from the standpoint of number and value, were destined for eastern Asia, namely, 28, of a value of $1,077,898 for Russia in Asia, and 17, valued at $959,260, for Japanese China. Italy received 19, valued at $931,000. The figures in detail follow:

United States Exports of Steam Locomotives, by Countries, During January, 1919

Countries.	Number	
France	1	$7,050
Italy	19	731,000
Spain	1	30,700
Canada	4	53,213
Nicaragua	1	5,000
Mexico	5	52,805
Cuba	6	110,650
Colombia	1	23,200
Japanese China	17	959,260
Japan	1	10,927
Russia in Asia	28	1,077,898
Australia	2	11,615
Philippine Islands	1	3,225
Total	87	$3,076,543

Exports of railway track material during January included totals of $4,221,563 in rails, $189,408 in spikes, and $543,330 in switches, frogs, etc. In the case of rails, France, Japan, Russia in Asia and Cuba were the largest buyers. The figures in detail follow:

United States Exports of Railway Track Material, by Countries, During January, 1919

	Railroad spikes		Rails of steel	switches, frogs, etc.	
Countries	Pounds		Tons		
Belgium	422,920	$16,606	1,271	$113,590	$10,850
France	1,016,800	75,427	25,848	1,539,257	102,765
Italy	.....	.....	13,025	865,920	142,575
Netherlands	.....	.....	293	18,196	385
England	.....	.....	373	20,079	.....
Canada	587,840	16,965	2,638	107,338	31,390
Costa Rica	800	68	.....	.....	.....
Honduras	2,000	100	11	1,200	1,296
Nicaragua	1,300	100	7	500	104
Salvador	500	33	20	1,949	400
Mexico	98,545	6,241	101	8,845	10,365
Barbados	14,118	800	81	7,626	.....
Jamaica	6,000	416	33	2,066	338
Trinidad and Tobago	.....	.....	.....	.....	1,350
Other British W. Indies	3,000	210	14	906	2,164
Cuba	542,669	24,124	5,125	324,318	27,444
French West Indies	800	65	.....	.....	73
Haiti	.....	.....	.....	.....	355
Dominican Republic	14,850	1,547	56	4,000	773
Brazil	75,200	6,428	105	7,860	10,074
Chile	151,160	9,405	.....	.....	20,945
Colombia	12,300	950	545	30,239	1,240
Ecuador	20,000	1,340	.....	.....	81
British Guiana	.....	.....	38	5,082	.....
Peru	103,900	7,157	294	19,379	13,455
Uruguay	.....	.....	.....	.....	47
Venezuela	2,496	420	22	1,580	165
China	.....	.....	899	61,169	10,358
British India	.....	.....	.....	.....	168
Straits Settlements	18,817	1,124	99	6,778	3,550
Dutch East Indies	.....	.....	372	36,277	14,727
Japan	257,823	13,161	7,533	627,748	44,936
Russia in Asia	100,890	3,312	5,538	363,638	43,469
French Oceania	3,290	285	.....	.....	.....
Philippine Islands	51,126	3,124	663	46,023	44,328
Belgian Congo	.....	.....	.....	.....	3,160
Total	3,509,054	$189,408	65,024	$4,221,563	$543,330

The Special Statistical Service Section has also compiled figures showing that in the same month there were exported

car wheels and axles to the value of $278,393, of which nearly half went to Canada. The figures follow:

U. S. Exports of Car Wheels and Axles, by Countries, January, 1919

Countries		Countries	
France	$26,173	Colombia	$1,070
Greece	1,762	Ecuador	878
England	2,789	British Guiana	3,480
Canada	119,566	Peru	857
Honduras	2,031	British India	2,400
Mexico	17,606	Dutch East Indies	9,435
Other Br. W. Indies	55	Japan	2,997
Cuba	18,507	Russia in Asia	17,384
Virgin Islands	192	Philippine Islands	645
Argentina	46,001	British South Africa	3,500
Brazil	1,065		
		Total	$278,393

British Railway Supply Firms Secure Foreign Orders

The railway supply field in the United Kingdom is apparently busily engaged in getting back on its feet in export business in supply materials. The Railway Gazette (London), in a recent issue notes the following items, representing orders placed principally by railways in India:

The East Indian Railway has recently placed an order for 14 locomotives, 0-6-0 type, broad gage, with the Vulcan Foundry Company, Newton-le-Willows.

The Rohilkund & Kumaon Railway (India) has placed an order for two engines, 4-6-0 type, metre gage, with Kerr, Stuart & Co.

The South African Railways have, we understand, placed an order with the Gloucester Railway Carriage & Wagon Company, Ltd., for 16 second class bogie carriages, and 25 day and night sleeping saloons.

The Great Eastern Railway (England) is considering tenders for 40 bogie carriages.

The Nizam's Guaranteed State Railways (India) have recently placed an order for five engines, 4-8-0 type, with Nasmyth, Wilson & Co.

The Eastern Bengal State Railways (India) have an order on hand with Head, Wrighton & Co., Stockton, for 300 four-wheeled covered goods wagons (broadgage).

American Builder Gives Best Price and Delivery

American competition in the supply of locomotives in what have hitherto been British markets, has excited attention in the British House of Commons. The Times (London), recently gave the following item in its Parlimentary news:

"Colonel Amery, Under-Secretary for the Colonies (Birmingham, Sparkbrook, C. U.), replying to Sir R. Cooper (Walsall, N. P.), said: 'An order for 12 locomotives for the Federated Malay States was placed in the United States of America in January last; the contract sum was $28,450 each, or £71,723 approximately in all. No British firm quoted a firm price. The lowest offer mentioned, £8,600 each, or £103,200 in all, as a probable sum, but was on a time and cost basis; and therefore liable to variation. This order was not secured to Great Britain because early delivery of the engines was of urgent necessity, and British firms could not begin delivery till November next, and could not definitely promise that; whereas the American firm promised delivery in six months.'"

[The order in question included 12 Pacific type engines, and went to the Baldwin Locomotive Works, as mentioned in the *Railway Age* of February 7.]

Standard Specifications for Industrial Materials

Four additional publications in the Industrial Standards Series of the Bureau of Foreign and Domestic Commerce are ready for distribution. These pamphlets contain standard specifications of the American Society for Testing Materials in English and Spanish, and are designed primarily for distribution in Latin American countries to assist in introducing American construction and engineering materials. The serial numbers of the specifications just issued and the products to which they relate are: No. 15, wrought solid carbon-steel wheels for steam railway service; No. 17, steel castings; No. 22, boiler rivet steel; No. 25, engine-bolt iron. Copies are for sale by the Superintendent of Documents, Government Printing Office, at 5 cents each.

Railway Development in Ecuador

Commerce Reports, issued by the Bureau of Foreign and Domestic Commerce in a recent issue contains a communication on trade conditions in Ecuador, from Consul General Frederic W. Woding, Guayaquil, in which he says:

There are four railways under construction, which will be completed in the near future. The one to the coast is being constructed by the municipality of Guayaquil, under the direction of an American engineer, extending from this city to Salinas on the coast, with a branch line from Amens to Playas. More than two-thirds of the roadbed is finished, including most of the culverts. All explosives and tools used are purchased in the United States. The Quito-Esmeraldas Railway extends north from Quito, eventually to reach Tulcan, then west to Esmeraldas; about 20 miles of the roadbed have been finished, including many concrete bridges and culverts. It is a government work. The Ambato-Curaray Railway starts at Ambato, the eastern terminal to be at Curaray on the eastern side of the Andes Mountains. It is completed to Pelileo, about 30 miles, and is in operation. All materials used were purchased in the United States, and it is being built by American engineers. The Babahoyo Railway is to extend toward Quito. The grading for some 15 miles is finished.

Japanese Railways Will Guarantee Freight Delivery On Time

The Japanese Government Railways Bureau has inaugurated a new system of freight transportation as from January 16. This new system consists in guaranteeing the delivery within a fixed period of time of all shipments. This innovation on the government railway service has been considered for some time, with a view to facilitating commercial transportation overland. On application the government railways guarantee the delivery of consignments in a fixed period, which is worked out on the basis of the time required for preparations for forwarding, the time required for transportation on lines, the time required for ferry transportation in case of cargo being carried beyond the main island of Japan, and the time required for delivery. When cargo is overdue or delay is caused in delivery, freight charges are rebated at officially fixed rates; when delay is within two days, 10 per cent of charges is rebated; when overdue beyond 10 days, 10 per cent of the charges is repaid. However, when the delay is caused by unavoidable circumstances, such as examination by the police officers of customs authorities, or accidents, the railways do not take any responsibility. Under this system baggage signed at Tokio will reach Osaka within four days. Ordinary cargo will reach there within six days. By express train, cargo will reach Osaka within four days. The full text of the new regulations was published in the Official Gazette of December 12. An increase of about 20 per cent in freight rates and passenger fares came into force on the Imperial Japanese Railways on September 1 last.

Concession for Projected Peruvian Railway

By a Government decree dated December 27, 1918, advises Consul General W. W. Handley, Callao-Lima, Felipe Marincovich has been granted a concession to make the studies and surveys necessary for the construction of a railway from the town of Sayan, the present terminus of the Northwestern Railway of Peru (a narrow-gage railway which runs from Ancon on the coast to Sayan via Huacho, and operated by the Peruvian corporation) to the Checras coal fields.

The preliminary plans are to be presented within one year. On the basis of these plans it is expected that arrangements will be made with the concessionaire for the construction and exploitation of this railway.

General News Department

The Montana House of Representatives has passed a joint resolution requesting Congress to return the railroads to private operation as soon as possible.

The Virginian Railroad has abolished the office of general manager, and has dismissed about 100 men, because of dullness in the coal traffic, which normally furnishes 90 per cent of the road's business.

The loans to be made by the War Finance Corporation to railroads, secured by the Railroad Administration certificates of indebtedness, will be on demand notes at 6 per cent for 80 per cent of the face of the certificates or 100 per cent if additional collateral is furnished.

Two employees of the claim department of the Virginian Railroad were arrested at Norfolk, Va., on March 19, charged with selling unclaimed freight at private sale, instead of by auction as is required by the rules, and also with having retained money realized from such sales. One of the men is divisional claim agent, and the other is a chief clerk.

Telephone rates in Massachusetts, established by the postmaster general, will not be disturbed by the Supreme Court of that state. Acting on a petition for reduction of toll rates presented by the Massachusetts Public Service Commission, against the New England Telephone & Telegraph Company, the court held that the United States was a party involved and could not be sued.

One hundred and forty-seven train despatchers of New York City and vicinity held a meeting at Hotel Biltmore, New York, on Monday last and organized the New York Assembly of the American Train Despatchers' Association. The purpose of the assembly is to promote sociability and educate despatchers by debates on co-operation, efficiency, economy, safety, train rules, etc. O. H. Braese (N. Y. C.), was elected chairman of the Assembly.

The striking clerks of the Nashville, Chattanooga & St. Louis, the Tennessee Central and the Western & Atlantic have been ordered back to work by the officers of the Brotherhood of Railway Clerks, who held that the strike was unauthorized, and large numbers of them appeared at the railroad offices on Monday morning of this week seeking reinstatement. The policy of the Nashville, Chattanooga & St. Louis, as announced by W. L. Mapother, federal manager, is to reinstate the men as fast as they can be assimilated, but not to take the strikers back in a body. Officers of the clerks' brotherhood held a conference with officers of the Railroad Administration at Washington last week, and it is understood that the grievances of the clerks against the federal auditor of the Nashville, Chattanooga & St. Louis system, which were the cause of the strike, will be given consideration by the Railroad Administration's Board of Adjustment No. 3. A press despatch from Chattanooga says that but a small percentage of the men and women who walked out were taken back by the road, as their places had been pretty well filled with substitutes, who will be retained. In one office it was stated there were open only fifteen places for the 48 who walked out.

Livestock Losses on Railroads in the Southwestern Region

At a conference of claim agents representing the railroads of the Southwestern region called for the purpose of solving the problem of livestock losses that annually run into millions of dollars, the statement was made that during 1918 railroad trains in Louisiana killed enough livestock to furnish meat for an entire army division for three months, or enough to furnish two pounds of meat to each man, woman and child in the state. Proportionate losses have been sustained in other states of the Southwest region, including Texas, Oklahoma, Arkansas and Missouri. A campaign of education for railroad employees is to be inaugurated as a result of the conference.

Inspection of Automatic Stops on C. & E. I.

The Automatic Train Control Committee which was appointed by the Railroad Administration on January 14 to investigate train control devices made its first inspection trip on Friday and Saturday of last week when it went over the installation of the Miller train control system which is in service on the main line of the Chicago & Eastern Illinois, between Chicago and Danville, Ill. The committee examined the apparatus in the shops of the train-control corporation at Danville on Thursday afternoon, and on the following day a number of tests were made on the road by stopping trains, etc. The committee then visited the railway shops and roundhouse where the engines in service are inspected and maintained. All of the members of the committee were present except C. A. Morse, chairman, who was confined to his room at his hotel in Chicago by illness. Because of Mr. Morse's sickness the further trip to inspect other train control installations in the West was postponed until about the middle of April.

Chicago Commerce Association on Railroad Regulation

The executive committee of the Chicago Association of Commerce has adopted a resolution addressed to Congress containing 11 points embracing the question of railway ownership, operation and control. The reforms recommended are, briefly: (1) that railroad legislation should be the first that may be enacted, (2) that the ownership of the railroads should be in private hands, (3) that operation of the railroads should be left in the hands of experienced men with the government having no part or influence in the appointment of such officers, (4) that existing lines and companies be consolidated to induce economy of equipment, terminal facilities and operation, (5) that recognition be given the transportation needs of sparsely populated districts, (6) that freight and passenger rates be fixed at a figure that will give a fair return on a proper capital valuation, (7) that a regulatory body be provided to fix rates and provide good service, (8) that this regulatory body approve extensions of existing lines or the construction of new lines, (9) that this body also consent to the issuance of new securities, (10) that all questions of wages and conditions of service be placed in the hands of a commission, whose findings shall be final, and (11) that measures be adopted to protect the railways from state laws that interfere with the operation of the lines.

Liability of Railroads to Capital Stock Tax

Under section 407 of the Act of Congress of September 8, 1916, every domestic corporation was required to pay annually a special excise tax with respect to the carrying on or doing business, equivalent to 50 cents for each $1,000 of the fair value of its capital stock. The act approved February 24, 1919, increased the tax to $1 for each $1,000, and reduced the exemption from $99,000 to $5,000. Questions have been raised as to the liability to the capital stock tax of corporations owning railroads controlled and operated by the federal government, and for the purpose of determining the matter the Secretary of the Treasury has announced a decision that:

(1) A corporation owning a railroad operated by the federal government may, without incurring liability to this tax, (a) maintain its corporate organization; (b) own property; (c) collect and distribute the income therefrom; (d) purchase stocks and bonds of other organizations; (e)

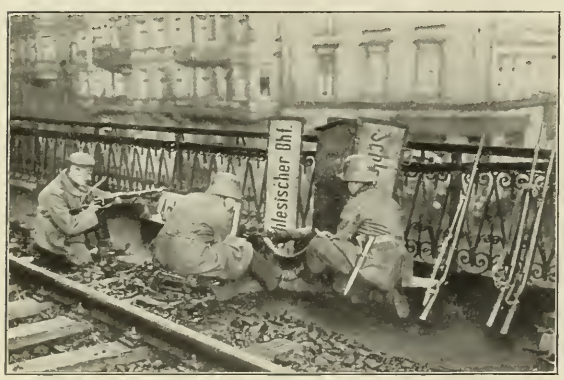
sell all or part of the property used in the operation of its railroad or other business; (f) enter into long-term leases whereby it is divested of control of and is not obligated to maintain the property; and (g) borrow money for the purchase of government bonds or for the financing of obligations previously incurred

(2) A corporation will incur liability if it (a) manages, (b) maintains, or (c) purchases railroad or other tangible property; (d) sells property not used in the conduct of the railroad or other business; (e) borrows money for the financing of new operations; or (f) makes leases of property held for renting purposes, or whereby it is obligated to maintain the property. The extent of the activity, if it is of a kind causing liability to incur, is unimportant. Each corporation owning a railroad under federal control and claiming exemption from the tax will be required to file an affidavit supplying certain information.

Engineering Advertisers' Association Formed

Advertising and sales managers representing manufacturers in various engineering lines, at a meeting recently held in Chicago, formed the Engineering Advertisers' Association as a means of friendly interchange of ideas and business methods pertaining to the advertising and selling of engineering products and to provide a medium where there might be free discussion of problems arising in this particular field. Active membership in the association is open only to those in responsible charge of advertising or sales of companies selling engineering products. Meetings of the association will be held monthly except during July and August and the annual meeting will be held in March. Provision has been made to accept as associate members publishers and their representatives, solicitors and service agency men whose interests are confined to engineering projects.

H. L. Delander, advertising manager of the Crane Company, Chicago, was elected president, H. Colin Campbell, director of advertising for the Portland Cement Association, Chicago, vice-president; G. H. Eddy, publicity manager of the Green Engineering Company, East Chicago, Ind., secretary and Edward J. Pratt, advertising manager of the Kellog Switchboard & Supply Company, Chicago, treasurer. The board of directors is composed of G. S. Hamilton, advertising manager of the American Steam Conveyor Corporation, Chicago, J. J. Arnsfield, advertising manager of Fairbanks, Morse & Company, Chicago, A. P. Hauck, director of advertising of the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., H. W. Clark, advertising manager of the Chicago Pneumatic Tool Company, Chicago, C. A. Powers, advertising manager of the Benjamin Electric Manufacturing Company, Chicago, and J. C. Kinsley, secretary of the C. M. Davis Regulator Company, Chicago.



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Spartacus Soldiers Defending the Silesian Station in Berlin

Traffic News

The Chicago Passenger Club, an organization of about 450 passenger ticket men of Chicago and surrounding suburbs, claims the distinction of being the only railway club that remained intact during the war.

William H. Spears, district passenger agent of the American Express Company at Chicago, has resigned that position and has been appointed secretary and manager of the T. & S. Tours Company at Chicago. The offices of the new organization will be in the Western Union building, and the company will conduct a national parks and general steamship ticket business.

The Wholesale Merchants' & Manufacturers' Association of Buffalo, N. Y., L. W. Elias, president, is preparing to run a special train through western New York and Pennsylvania on May 20, 21, 22 and 23, to renew friendships between Buffalo merchants and retailers in that region. About 35 towns will be visited and it is expected that 150 representatives of Buffalo business concerns will go on the trip.

The Traffic Bureau of Savannah, Ga., has been abolished. It appears that the bureau was maintained by the city, and the city administration is now being criticized by business men for taking away an element vital to the prosperity of the city. At a largely attended meeting on March 21 a strong plea was presented for the restoration of the bureau.

Consolidation of the army embarkation service and its inland traffic service has been announced by the War Department. Brigadier General Frank T. Hines, chief of embarkation, has been appointed chief of the consolidated service (which will be known as the transportation service) "with responsibility for and authority over the transportation of supplies and the personnel of the army by rail and water."

The Wisconsin Poultry, Butter & Egg Association at a recent meeting adopted resolutions advocating the placarding of cars laden with eggs in order to notify train men to take care in switching. The economic loss to the country because of breakage and damage to eggs in transit from western farms to eastern markets is large and these losses are a serious indirect tax upon the entire trade. The resolutions will be sent to Washington and to the regional directors.

Despite the continued unsettled labor conditions at the port of New York, grain is being cleared actively in considerable quantities at all North Atlantic ports with the exception of Newport News. The Railroad Administration reports, for the week ended March 20, 21,491,000 bushels of grain in elevators at these ports, or about 90 per cent of capacity. There were received during the week 4,473,000 bushels, while 3,935,000 bushels were cleared. At South Atlantic and Gulf Ports there were 12,585 carloads of export freight on hand as against 11,821 for the week previous.

Major-General William M. Black, Chief Engineer, United States Army, speaking before the New York Traffic Club on March 25 declared that the railroads of the country had exterminated inland water traffic. Continuing, he said:

"Are not our common carriers simply agencies of the people for the general good? One class of our carriers has been permitted so to order its business as practically to wipe out another class. As a general proposition inland water transportation has been killed. This has been accomplished by a manipulation of railroad freight rates, rendered more easy by an arbitrary system of freight classification. In what other class of business is a scale of charges permitted which is independent of the scale of values of the service rendered? Where else within our country is it permitted to make one charge to one community and a different charge to another for the same article? Is there any insuperable difficulty in devising a just system of rates, a freight classification based on the cost of handling and moving freight? In the case of competing roads of unequal length, cannot the scales of charges be adjusted to the cost by the cheapest line? Would not this be exactly in line with the practice of manufacturers in general?"

Equipment and Supplies

Trade Acceptances Not to Be Used

It was announced Thursday that the plan of financing the obligations of the Railroad Administration to equipment companies by means of trade acceptances had been abandoned because of complications, and that a substitute plan would be adopted somewhat similar to that of issuing certificates of indebtedness to the railroads.

485 Locomotives and 1,986 Cars Sold to French Government

The French government, through the French High Commission, has bought from the Director General of Military Railways 485 standard gage, Pershing type locomotives now being built by the Baldwin Locomotive Works and 19,860 freight cars of various types that were under manufacture in the United States when the armistice was signed. There remains a comparatively small number of locomotives and cars yet to be disposed of and it is expected that they will be sold to some of the Allied governments.

Locomotive Deliveries to March 15

The following new locomotives were shipped to railroads under federal control during the week ended March 15:

Works	Road	Number	Type
American	G. R. & I.	5	USRA Mikado.
	Penn. L. W.	5	Santa Fe.
	Erie R. R.	5	USRA S. Fe.
	Chic. & N'w.	4	USRA 6W. Sw.
	P. & L. E.	5	USRA Mikado.
	Cent. of Ga.	2	Mallet.
	P. McK. & Y.	5	USRA Mikado.
	A. C. L.	3	USRA Pacific.
	Cent. of Ga.	1	Mountain.
	T. & P.	2	USRA 6W. Sw.
	Chic. G. W.	1	USRA 6W. Sw.
		38	
Baldwin	A. T. & St. Fe.	2	Mikado.
	Union Pacific	1	Pacific.
	Ill. Cent.	2	Mikado.
	Great Northern	2	8W. Sw.
	Penn. L. W.	1	Mikado.
	C. C. & O.	1	Mikado.
		9	
Total		47	

Delivery of Standard Cars to March 1

The Railroad Administration has issued the following statement of the delivery of U. S. R. A. standard cars as of March 1:

Car Deliveries to March 15

The following is a statement of the new standard cars accepted during the week ended March 15:

Road	Number	Type	Manufacturer	Total accepted for given roads
C. C. & O.	31	50-ton S. S. Box	Bettendorf Co.	124
N. Y. C.	140	50-ton S. S. Box	Haskell & Barker	917
Norfolk & Western	36	50-ton S. S. Box	Pullman Car Co.	36
L. & N.	20	50-ton Comp. Gon	Am. Car & Fdy. Co.	129
N. Y. C.	110	70-ton L. S. Gon	Pressed Steel Car	345
Total	337			

Locomotives

The Pennsylvania Equipment Company, Philadelphia, Pa., is in the market for a second hand, 4-ton, Westinghouse narrow gage electric locomotive.

Freight Cars

The A. J. Alsdorf Company, Chicago, is inquiring for the iron work for 100 to 200 twenty-ton freight cars for export.

The Magnolia Petroleum Company has ordered 5 10,000-gallon tank cars from the American Car & Foundry Company.

The Pennsylvania Equipment Company, Philadelphia, Pa., is in the market for 50 steel hopper and 50 steel gondola cars of 100,000 lb. capacity.

Passenger Cars

The Pennsylvania Equipment Company, Philadelphia, Pa., is in the market for three combination passenger and baggage cars.

Iron and Steel

Steel Rails for Sale By War Department

The office of the chief of engineers of the War Department, Washington, advises that the government plans to sell at prevailing market prices, the surplus stock of 80-lb. rail and 25-lb. rail ordered for the American Expeditionary Forces overseas, but not required due to the signing of the armistice. There are about 50,000 tons of 80-lb. rail and about 7,000 tons of 25-lb. rail. There are large quantities of crossings, slip switches, and turnouts. The bulk of this material is at port readily accessible for loading. All sales are being conducted through the office of the director general of military railways, Washington, where further information can be obtained.

Delivery of Standard Cars to March 1

Type	Manufacturer	A. C. L.	B. & L. E.	B. R. & P.	C. C. & O.	C. & W. C.	C. & N'n.	C. B. & Q.	C. C. & St. L.	C. & S.	Georgia	I. C.	K. M.	L. & N.	M. C.	M. P.	N. C. & St. L.	N. Y. C.	N. Y. N. H. & H.	P. M. & Y.	T. & O. C.	Total
40-ton	D. S. Box	906	...	...	...	300	1250	500	1000	...	...	...	...	...	...	16	...	1000	...	...	250	....
50-ton	S. S. Box	...	...	...	...	...	500	...	...	...	...	...	...	...	500	...	...	...	...	430	...	....
50-ton	S. S. Box	...	...	...	...	...	500	...	...	...	300	...	...	...	...	...	...	625	...	...	...	....
50-ton	S. S. Box	...	...	...	...	...	...	...	...	...	...	...	...	...	500	...	...	...	...	...	...	....
50-ton	S. S. Box	...	...	...	61	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....
50-ton	Comp. Gon	...	...	...	...	...	500	250	...	...	...	...	...	336	400	...	58	500	...	...	...	....
50-ton	Comp. Gon	...	...	...	...	...	...	...	...	...	...	150	...	...	...	...	...	...	...	...	...	...
50-ton	Comp. Gon	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....
50-ton	Comp. Gon	250	...	...	...	...	500	...	...	...	...	50	...	...	200	...	...	...	...	...	...	....
50-ton	Comp. Gon	...	...	...	...	...	...	500	...	...	100	500	...	400	200	...	...	500	...	...	...	....
50-ton	Comp. Gon	...	...	...	...	...	...	250	...	...	...	300	...	200	200	...	...	...	...	...	...	....
55-ton	St. Hopper	...	250	...	250	...	...	...	200	...	...	...	...	...	...	...	...	...	...	...	500	....
55-ton	St. Hopper	...	...	...	...	...	...	...	...	...	...	150	...	...	...	...	...	...	...	...	...	...
55-ton	St. Hopper	...	...	500	250	...	...	...	200	...	...	200	300	400	...	...	...	500	400	...	...	....
55-ton	St. Hopper	...	...	300	...	...	...	...	200	300	...	250	...	200	...	...	...	...	500	...	...	....
55-ton	St. Hopper	...	...	...	...	...	...	...	200	...	...	200	200	...	...	...	...	...	200	...	...	....
55-ton	St. Hopper	...	250	...	250	...	...	...	200	...	...	200	...	400	...	...	...	500	400	...	...	....
70-ton	St. Hopper	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	145	...	...	...	....
Total		1206	500	800	811	300	3250	1500	2000	300	400	2000	500	1936	2000	16	58	3770	1500	430	750	24,027

Iron and Steel Prices Reduced

Representatives of the steel industry and the Industrial Board of the Department of Commerce at a conference in Washington last week reached an agreement on a schedule of reduced prices for the principal articles of iron and steel which will apply to all purchases by the various government departments and below which the board says the public should not expect to buy during the current year. The purpose was to bring about such a lower level of prices as will effect stability and stimulate trade to the end that business and industry can proceed and build up with confidence a profitable maximum employment. The price schedule is of especial interest to the railroads, which are the largest purchasers of steel, and as the government is operating most of the railroads the prices will apply to purchases for railroad use. The reduction in standard rail prices is from $55 for Bessemer and $57 for open hearth, to $45 and $47, respectively, which sets the price at approximately the figure which was set before the United States entered the war, although practically all railroad contracts were placed at a lower figure under the option given on orders for future delivery at the time the prices were increased. No orders were placed by the Railroad Administration during 1918 and the prices of $55 and $57 applied only to some comparatively small purchases by the Army and Navy Departments. The schedule agreed upon, which is effective at once, is as follows:

	November 11 price	Present price	New price	Reductions From November 11	Reductions From present
Pig iron basic	33.00 G.T.	30.00	25.75	7.25	4.25
Billets 4-inch	47.50 G.T.	43.50	38.50	9.00	5.00
Billets 2-inch	51.00 G.T.	47.00	42.00	9.00	5.00
Sheet bars	51.00 G.T.	47.00	42.00	9.00	5.00
Slabs	50.00 G.T.	46.00	41.00	9.00	5.00
Skelp sheared	3.25 cwt.	3.00	2.65	12.00 N.T.	7.00 N.T.
Skelp universal	3.15 cwt.	2.90	2.55	12.00 N.T.	7.00 N.T.
Skelp grooved	2.90 cwt.	2.70	2.45	9.00 N.T.	5.00 N.T.
Merchant bar—base	2.90 cwt.	2.70	2.35	11.00 N.T.	7.00 N.T.
Sheared plates	3.25 cwt.	3.00	2.65	12.00 N.T.	7.00 N.T.
Structural—base	3.00 cwt.	2.80	2.45	11.00 N.T.	7.00 N.T.
Wire rod	57.00 G.T.	57.00 G.T.	52.00 G.T.	5.00 G.T.	5.00 G.T.
Plain wire	3.25 cwt.	3.25	3.00	5.00 N.T.	5.00 N.T.
Nails	3.50 cwt.	3.50	3.25	5.00 N.T.	5.00 N.T.
Black sheets, No. 28	5.00 cwt.	4.70	4.35	13.00 N.T.	7.00 N.T.
Blue annealed No. 10	4.25 cwt.	3.90	3.55	14.00 N.T.	7.00 N.T.
Galvanized sheets No. 28	6.25 cwt.	6.05	5.70	11.00 N.T.	7.00 N.T.
Tin plate No. 100 box	7.75	7.35	7.00	15.00 N.T.	7.00 N.T.
Tubular products	3½ points off card				7.00 N.T.
Hoops—base	3.50 cwt.	3.30	3.05	9.00 N.T.	5.00 N.T.
Light rails	3.00 cwt.	2.70	2.45	11.00 N.T.	5.00 N.T.
Rails standard Bessemer	55.00 G.T.	55.00 G.T.	45.00 G.T.	10.00 G.T.	10.00 G.T.
Nails standard O. H.	57.00 G.T.	57.00 G.T.	47.00 G.T.	10.00 G.T.	10.00 G.T.
Ore	No change				

Basing points and differentials unchanged. Prices effective at once.

After careful consideration and full discussion relating to cost of production and all other facts and circumstances relating to the iron and steel industry, the committee of steel men submitted a schedule of proposed reduced prices which, after modifications suggested by the board and accepted by the industry, was approved by the board. A statement issued by E. H. Gary, of the United States Steel Corporation, said the object was to secure a basis which, so far as practicable, would yield a moderate and reasonable return to the investors and at the same time would not disturb wage rates or interfere with wage agreements and, having determined upon prices which it is expected will not be reduced during this year, it is believed that the volume of business will be promptly increased and that furnaces and mills will be operating at a largely increased capacity. A statement issued by the board said it had asked the industry to take the first step toward the readjustment and voluntarily make temporary sacrifices in the interest of all and that while the reduction may involve the necessity of some high cost plants either shutting down temporarily or running at a loss for a period, it is expected that with an increased volume of business soon to be developed a reasonable return to the average and better than average producers will be effected. In view of the higher costs developed throughout the world as a result of the war a return to anything like pre-war prices was regarded as out of the question.

Similar conferences are to be held by the board with representatives of other basic industries. Representatives of the lumber trade met with the board on March 22.

Supply Trade News

George Walter Spahr, formerly sales manager of the Tabulating Machine Company, New York, has been appointed sales manager of the Elliott-Fisher Company.

J. J. Haigh has been appointed assistant district manager of sales for the **Chicago Pneumatic Tool Company,** with headquarters at 175 First street, San Francisco, Cal.

The Chicago Pneumatic Tool Company announces the removal of its Boston, Mass., office to 182 High street. **F. F Eggleston,** district manager of sales, will represent the company in that territory.

The Pollak Steel Company announces that the G. F. Cotter Supply Company, Houston, Texas, will represent it as Southwestern sales representatives. They will endeavor to sell the products, consisting of forgings of all kinds, axles, locomotive parts, as well as the Pollak special heat treated products. This covers the material produced both at the Cincinnati as well as the Chicago works.

C. E. Hague, formerly production engineer of the Mid-West Engine Company, Indianapolis, Ind., has been appointed sales manager of the American Steam Conveyor Corporation, Chicago, manufacturers of the American steam ash conveyor and other ash handling equipment. Mr. Hague assumed his duties March 17.

F. R. Still, vice-president and secretary of the **American Blower Company,** of Detroit, Mich., has left on an extended trip for the far East where he will investigate trade conditions in connection with export work. Mr. Still's itinerary includes Japan, China, Australia and most of the European countries, and he expects to cover approximately 36,000 miles before returning, about November 1.

Captain A. C. Nell, who has been in charge of the purchase of power and mechanical equipment for the construction division of the United States Army, has been released from active duty in the army and has been appointed district manager for the Lea-Courtenay Company and the Schutte-Koerting Company, with offices in the Conway building, Chicago. Mr. Nell was formerly connected with the Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

P. Harvey Middleton, executive assistant of the Railway Business Association, was invited by Señor M. Muñoz, general superintendent of the Mexican National Railway Administration, during his visit to New York this week, to make a trip with him over all the lines under the control of the Carranza government. Mr. Middleton has accepted the invitation and will leave for Mexico shortly. He will be met at Laredo, Texas, by Señor Muñoz and will visit all points of interest, including the steel mills and railway machine shops. Mr. Middleton speaks Spanish, which will aid him greatly in his investigations.

W. J. Austin, general manager of **The Austin Company,** industrial engineers and builders, Cleveland, Ohio, has just returned from a three-months' trip to France, Belgium and England. Mr. Austin, in company with J. K. Gannett, export sales manager of the Austin Company, sailed from New York City on December 5. The party which included Alvin T. Fuller, member of Congress from New England, were for a time the guests of the British Government and were taken on a thousand-mile trip over the battlefields. The 13 buildings which were erected by the American forces for the U. S. Army Transport Service, under the Austin Company's supervision, were inspected by the party. The first building was erected at St. Nazaire by the 17th Engineers in December, 1917, and the remaining buildings were erected at Verneuil, 30 miles east of Nevers.

Financial and Construction

Railway Financial News

BALTIMORE & OHIO.—This company has sold to Baltimore bankers $3,000,000 five-year 6 per cent collateral trust notes. The security given is the Coal & Coke Railway, which the Baltimore & Ohio acquired about two years ago. The proceeds of the notes, together with other funds borrowed from the War Finance Corporation, will be used to pay off at their maturity, on April 1, an issue of $5,000,000 Coal & Coke Railway 5 per cent mortgage bonds.

The notes are being offered at 97½ and interest, to yield about 6.60 per cent. Holders of the maturing bonds have the prior right to take the new notes. The Baltimore syndicate is headed by the Mercantile Trust & Deposit Company, Robert Garrett & Sons, Baker, Watts & Co., and Townsend, Scott & Sons.

NEW YORK CENTRAL.—The Court of Appeals has handed down a decision unanimously affirming, without opinion and with costs, the judgment dismissing the complaint on the merits in the action brought by Clarence H. Venner against the New York Central Railroad and other companies constituting the New York Central lines. The purpose of the action was to prevent or undo the consolidation of the New York Central & Hudson River Railroad with the Lake Shore & Michigan Southern Railway, which was accomplished in December, 1914. The plaintiff Venner also sought, in case his effort to undo the consolidation was unsuccessful, to destroy the unity of control of all the railroads of the Vanderbilt system and attacked not only the Harlem Railroad lease made in 1873, the West Shore lease made in 1885, the Michigan Central control obtained in 1878, the Nickel Plate control obtained in 1882, but that of the Big Four, the Lake Erie & Western, the Toledo & Ohio Central and other lines. His contention briefly stated was that the unity of control of those lines violated the Sherman act and the anti-trust and anti-monopoly statutes of the six states through which the railroads of the New York Central system extend.

PENNSYLVANIA.—At the annual meeting held in Philadelphia on March 25, George Wood, C. Stuart Patterson and Clement B. Newbold were elected directors to serve for four years. The resolution approving of the increase of the company's indebtedness to the extent of $75,000,000, upon which, at the stockholders' annual meeting, a stock vote was ordered to be taken at the same time, was adopted.

WESTERN MARYLAND.—J. Kemp Bartlett, of Baltimore, has been elected a director.

Railway Construction

OREGON, CALIFORNIA & EASTERN.—Robert E. Strahorn, president of the Oregon, California & Eastern with offices at Spokane, Wash., is supervising the completion of a 20-mile railroad from Klamath Falls, Ore., to Dairy, which will be the first link of a projected railway into Central Oregon. The new line will extend from Bend, Ore., to Silver Lake, at which point it will branch, one line running to Klamath Falls and the other line to Lake View, Ore. Another line will extend from Bend to Crane and will connect the Oregon Short Line at the latter point with the Oregon Trunk and the Oregon-Washington Railroad & Navigation Company at Bend. The new line will connect the Oregon Trunk and the Oregon-Washington Railroad & Navigation Company at Bend with the Southern Pacific at Klamath Falls and the Nevada, California & Oregon at Lake View. The company also plans to complete a seven-mile spur from Dairy, Ore., to Bonanza this fall, the farmers having agreed to furnish the grade and ties if the company will lay the steel and operate train service.

Railway Officers

Railroad Administration

Federal and General Managers

George E. Johnson, who has been appointed assistant to the general manager of the Denver & Rio Grande, the Rio Grande Southern, the Denver Union Terminal, the Pueblo Union Depot and the Salt Lake City Union Depot, with headquarters at Denver, Colo., began his railway career in August, 1897, as a clerk in the freight agent's office on the Minneapolis & St. Louis, at Minneapolis, Minn. Until December, 1907, Mr. Johnson served in various positions with the Great Northern, including clerk and chief clerk to the superintendent, the assistant general superintendent and the general superintendent; assistant superintendent, inspector of transportation, and assistant to the general superintendent. During the following ten years he served as chief clerk to the general superintendent and to the general manager; trainmaster and superintendent on the Spokane, Portland & Seattle and affiliated lines. Prior to his recent appointment he was general superintendent of the Gales Creek & Wilson River (under construction), with headquarters at Portland, Ore.

Operating

A. M. Smith has been appointed superintendent on the Western Maryland, with headquarters at Hagerstown, Md.

J. D. Stack, general manager of the Virginian Railroad, with office at Norfolk, Va., has resigned and his former position has been abolished.

H. E. McGee, general superintendent of the Missouri, Kansas & Texas of Texas, with office at Dallas, Texas, has had his authority extended over the Wichita Falls & Northwestern.

H. C. Ferris, receiver and chief operating officer of the Missouri, Oklahoma & Gulf, with office at Muskogee, Okla., has been appointed general superintendent of the same road, with office at Muskogee.

W. M. Whitenton, superintendent of the Missouri, Kansas & Texas, with office at Muskogee, Okla., has been appointed general superintendent of that road and the Oklahoma Belt, with headquarters at Parsons, Kansas, vice **W. E. Williams** resigned to accept service with other lines.

Major Mott Sawyer, who served in the aviation service of the United States Army, has been discharged from military service and has been appointed assistant to the general superintendent of the Chicago, Milwaukee & St. Paul, lines west of Mobridge, with office at Seattle, Wash. Major Sawyer was superintendent of the same road, with office at Tacoma, when he entered military service.

Captain Frank O. Fernald, Engineers, U. S. A., commanding Company F., 147th Engineers, has received his honorable discharge from the army and has been re-appointed superintendent, operating department, Pullman Car Lines, U. S. R. A., at Dallas, Texas. Captain Fernald was formerly engaged in railway construction and maintenance of way in the Northwest.

C. L. Beals has been appointed trainmaster on the Illinois Central, at Fordham, Ill., to succeed **T. Whitby,** who has been transferred to trainmaster of freight service south of Twenty-seventh street, Chicago, with headquarters at Fordham, succeeding **C. R. Smith,** who has been transferred to the territory north of Twenty-seventh street, with headquarters at Chicago, in place of **F. Ehretsman,** deceased.

The following appointments have been made on the Missouri, Kansas & Texas and all the roads under the jurisdiction of **C. N. Whitehead,** federal manager, with headquarters at St. Louis, Mo.: **O. C. Smith,** superintendent of transpor-

tation, at Dallas, Tex., W. H. Hall, superintendent of telegraph, at Denison, Tex., and J. L. Walsh, superintendent of safety, at Dallas, Tex.

W. Mosby, superintendent of car service of the St. Louis-Southwestern of Texas, the Missouri, Kansas & Texas of Texas, the International & Great Northern and the Galveston, Houston & Henderson, has been appointed superintendent of transportation of the St. Louis-Southwestern, the St. Louis-Southwestern of Texas, the Eastern Texas, the Dallas Terminal & Union Depot, the Southern Illinois & Missouri Bridge and the Louisiana & Arkansas, with headquarters at Tyler, Texas; W. J. Williams, assistant superintendent of telegraph of the Louisiana & Arkansas, has been appointed superintendent of telegraph of the St. Louis Southwestern and affiliated roads, with headquarter at Tyler, Texas; E. Richards, assistant superintendent of safety of the Louisiana & Arkansas and the St. Louis-Southwestern, has been appointed superintendent of safety of the above roads, with headquarters at Mount Pleasant, Texas; L. M. Hill, superintendent of dining and parlor cars of the Missouri Pacific and the St. Louis-Southwestern, has been appointed superintendent of dining cars of the latter road and its affiliated lines, with headquarters at St. Louis, Mo.

Financial, Legal and Accounting

Ernest Gent, chief clerk in the accounting department of the Illinois Terminal and the Missouri & Illinois Bridge & Belt, has been appointed acting federal treasurer of these roads, with headquarters at Alton, Ill., to succeed K. E. Wilson, resigned.

E. T. Nelson, paymaster of the Missouri, Kansas & Texas, with office at Parsons, Kan., has been appointed acting federal treasurer of the Missouri, Kansas & Texas of Texas, with headquarters at Dallas, Texas, vice W. O. Hamilton resigned to accept service elsewhere.

Traffic

W. V. Galbreath, general live stock agent of the Missouri, Kansas & Texas of Texas, with office at Ft. Worth, Texas, has had his authority extended over all the other roads under the jurisdiction of C. N. Whitehead, federal manager, with headquarters at St. Louis, Mo.

J. R. Wells, whose appointment as assistant general passenger agent of the Southern Railroad lines, with headquarters at New Orleans, La., has already been announced in these columns, was born on December 17, 1870, at New Orleans, and was educated in the Jesuits College of his native town. He began railway work in November, 1896, in the passenger traffic department with the New Orleans & North Eastern, part of the Queen & Crescent Route. He served continuously in that department and with the Southern Railroad lines, after the consolidation, until the present time, consecutively as assistant ticket agent, city passenger agent, city ticket agent, district passenger agent and as division passenger agent, at New Orleans.



J. R. Wells

R. H. DeButts, division passenger agent of the Southern Railroad, has been promoted to assistant general passenger agent, with office at Washington, D. C.; S. E. Burgess, division passenger agent at Charlotte, N. C., has been promoted to division passenger agent, with office at Washington, D. C., and R. H. Graham, division passenger agent at Greenville, S. C., has been promoted to division passenger agent, with office at Charlotte, N. C.

W. M. Fenwick, assistant general passenger agent of the Missouri, Kansas & Texas, has been appointed general passenger agent of that road, and the Oklahoma Belt, with office at St. Louis, Mo. Randolph Daniels, division passenger agent of the Missouri, Kansas & Texas of Texas, with office at Dallas, Texas, has had his authority extended over the Wichita Falls & Northwestern. W. A. Kellond is now general baggage agent of the Missouri, Kansas & Texas, the Oklahoma Belt, the Missouri, Kansas & Texas of Texas and the Wichita Falls & Northwestern, with offices at Parsons, Kan., and at Dallas, Texas. W. G. Crush, passenger traffic manager of the Missouri, Kansas & Texas of Texas, and the Wichita Falls & Northwestern, with headquarters at Dallas, Texas, has had his authority extended over the Missouri, Kansas & Texas and the Oklahoma Belt.

Engineering and Rolling Stock

W. J. McDermott, roadmaster on the Northern Iowa division of the Chicago & North Western, with headquarters at Eagle Grove, has retired from active service after a period of 36 years in the employment of this road. Mr. McDermott is succeeded by J. Bolan.

H. H. Johntz has been appointed engineer maintenance of way of the Missouri, Kansas & Texas and the Oklahoma Belt, with headquarters at Parsons, Kan., and A. E. Triplett, district engineer of the Missouri, Kansas & Texas of Texas, has been appointed engineer maintenance of way of the same road and the Wichita Falls & Northwestern, with headquarters at Dallas, Texas.

W. H. Vance, engineer maintenance of way of the St. Louis-Southwestern and the Louisiana & Arkansas, has been appointed engineer maintenance of way of the St. Louis-Southwestern lines, including the St. Louis-Southwestern of Texas, the Eastern Texas, the Dallas Terminal & Union Depot, and the Southern Illinois & Missouri Bridge, with headquarters at Tyler, Texas.

The following appointments have been made on the Missouri, Kansas & Texas, and all the roads under the jurisdiction of C. N. Whitehead, federal manager, with headquarters at St. Louis, Mo.: H. P. Anderson, superintendent of motive power of the Missouri, Kansas & Texas, at Parsons, Tex., has been appointed mechanical superintendent with office at Denison, Tex.; W. H. Maddocks has been appointed mechanical engineer, with office at Parsons, Kans., and R. W. Burnett has been appointed assistant mechanical superintendent, with office at Denison.

Purchasing

J. E. Anderson, purchasing agent of the Ft. Worth & Denver City; the Ft. Worth & Rio Grande; the Gulf, Colorado & Santa Fe.; the International & Great Northern; the Missouri, Kansas & Texas; the Missouri, Kansas & Texas of Texas, and the Texas Midland, with office at Dallas, Texas, has been appointed assistant purchasing agent of the St. Louis-San Francisco; the Kansas City, Clinton & Springfield; the Paris & Great Northern; the West Tulsa Belt, and the Rock Island-Frisco Terminal, with headquarters at St. Louis, Mo.

Corporate

Engineering and Rolling Stock

Richard W. Moore, general car foreman on the Canadian National, at Cochrane, Ont., has been promoted to district car foreman, with headquarters at Saskatoon, Sask. He was born at Listowel, Ont., on October 20, 1882, and received his education in the Brandon high school of that place. He entered railway service in July, 1906, as a car repairer on the Grand Trunk Pacific, which position he held for two years when he was promoted to car foreman, serving in that capacity for nine years at Melville, Sask., Rivers, Man., and Fort William, Ont. When the National Transcontinental was taken over by the Canadian Government, Mr. Moore was transferred to that road as car foreman. In November, 1917, he was appointed general car foreman, with headquarters at Cochrane, Ont., which position he held until his recent appointment as district car foreman of the Canadian National, with headquarters at Saskatoon.

EDITORIAL

Railway Age

Indiana Repeals Fare Law

The seventy-first General Assembly of Indiana has repealed the two-cent fare law. The state of Indiana is to be congratulated upon taking this step in the direction of fairness and justice in the treatment of its railroads. It is to be congratulated because it is a move which will bring stabilizing influences to the public, to commerce and to industry; because it has opened the way for other states to repeal laws inimical to progress and the growth of transportation facilities, and because it has voiced the need of constructive methods rather than a policy of restriction. The passage of this law brings to light a four-year educational campaign carried on by the passenger traffic officers of the Indiana lines together with the operating legislative committee. This campaign was presented first to the people and business interests of the state and later to the assemblies in order that an understanding might be reached as to the needs of the steam roads which were serving them. Under government control the efforts in this campaign were redoubled and success was finally attained with the repeal of the two-cent fare law. With the action of the Indiana General Assembly in taking the lead in this reform it is to be hoped that other states, which still retain arbitrary laws that fail to meet the increased costs of material and labor, will follow. However, it may be necessary for the roads in the other states which hope to follow the lead of Indiana to duplicate its educational campaign.

The Mechanical Conventions

The convention of the American Railway Engineering Association which was held in Chicago two weeks ago was, in every respect, one of the most successful in the history of that organization. The indications are that the same thing will hold true of the June conventions of the Master Car Builders' and Master Mechanics' Associations. The Railroad Administration is co-operating in the preparations for the meeting and will undoubtedly follow the same course as has been done in the case of other conventions in asking federal managers to see that as many of the mechanical officers as possible attend the meetings. This will do much to insure a record-breaking registration. The secretary of the associations is already receiving the reports from the committees and the prospects are that advance copies will be in the hands of the members much earlier than in previous years. In order that the best results may be secured, the members should attend the conventions prepared to discuss the reports and papers freely, and it will be wise also to thoroughly thresh out the questions and perplexities in the minds of many as to the amalgamation of the associations. A thorough and frank discussion of these things will do much to clear the atmosphere and make it possible for the new association to function to the best possible advantage. The reports received from the Railway Supply Manufacturers' Association indicate that the exhibits will surpass those of any previous year both in number and scope. It is expected that the exhibitors will give special attention to preparing their exhibits so as to make them as effective as possible from an educational standpoint. This is particularly important since the meetings will undoubtedly be attended by a large number of mechanical department officers and foremen who have never before had that privilege, many of whom are young men who have been promoted to positions of importance since 1916.

The Standard Locomotives

A striking illustration of the difficulty in adapting common standard locomotives to all conditions is illustrated by the experience of the Pittsburgh & Lake Erie. While this road uses fairly heavy freight locomotives it has never felt the necessity of equipping them with mechanical stokers because the line is almost level and high-grade Pittsburgh coal is used for locomotive fuel, thus making the fuel consumption comparatively light. The Railroad Administration has furnished this road with some of the heavy Mikados having a tractive effort of 60,000 lb., a weight on drivers of 240,000 lb. and a grate area of 70.8 sq. ft. Ordinarily, such locomotives would burn considerably more than 4,000 lb. of coal per hour and stokers could be used upon them to advantage. The average fuel consumption per hour for these locomotives drawing full tonnage trains (6,000 tons) is only about 2,000 lb. of coal per hour, thus bringing them well within the limits of efficient hand firing. The introduction of the stoker under these conditions cannot be justified, and, indeed, has caused a great deal of trouble in the way of delays because the men are not familiar with stoker operation, and there have been a very considerable number of stoker failures. The experience emphasizes what the *Railway Age* has consistently pointed out, and that is that in order to secure the greatest efficiency, the locomotives must be carefully designed and equipped to suit the conditions under which they are to be used.

Government Control and Maintenance Work

It is now the season when maintenance of way and improvement work should be getting actively started. Yet it is practically at a standstill with no immediate prospect of active inauguration and with greater uncertainty regarding the volume to be done than in any recent year. Owing to the desire to make a favorable financial showing it has been the custom of some roads in the past to do the minimum amount of work until the close of the fiscal year on June 30 and then endeavor to make up for lost time later in the summer. Because of a recognition of the waste resulting from this practice, the Interstate Commerce Commission changed the fiscal year a few years ago to terminate on December 31. This gave a marked impetus to the starting of work as early as the season permitted and has been the means of effecting important economies, the nature of which is familiar to all railway men. One of the advantages which the advocates of government ownership of the roads have claimed for it has been the removal of the incentive for financial showing which has led to interference with orderly programs of work under private management. It has also been contended that the roads would be kept in repair with the sole consideration

of their best and most economical maintenance. While it is true that recent experiences have made government ownership a dead issue insofar as this country is concerned, it is not out of place to call attention to the stagnation in the maintenance and improvement of the railway properties which now exists, at a time when there is more than the usual demand for such work to bring them up to their proper standards. Although the stagnation and delay in starting work is not the result of deliberate intent on the part of the Railroad Administration, and, in fact, is contrary to the desires of those in control and to what they know is good railroad practice, it is nevertheless the result of the system under which they are working, which makes possible the submerging of the interests of economical railway operation to those of political considerations.

A New Cycle of Railway Wages

WE ARE ENTERING a new cycle of changes, or proposed changes, in railway wages.

Less than a year ago the Railroad Wage Commission made its report recommending advances in wages to all classes of employees which it was estimated would amount to about $300,000,000 a year. There were numerous complaints that the advances made were too small. The first employees to be granted an additional advance were those in the shops, who had been given more in General Order No. 27 than the Commission had recommended. Director General McAdoo appointed a Wage Board composed of three railway officers and three officers of employees' organizations. After receiving the recommendations of this board, the director general made advances in the wages of the shop employees roughly estimated at $150,000,000 to $200,000,000 a year. This was the first of a series of advances made to special classes of employees which have amounted to $500,000,000 a year, and which, with the advances made on the recommendation of the wage commission, have made the total advances to date under government control $800,000,000 a year.

The shop employees who were granted the first special advance last year have recently presented a petition for another large advance. It is estimated that the advance now asked would amount to $150,000,000 a year. The action taken on their petition will be important in itself, but still more important as a precedent. If another advance in wages should be granted to the shop employees, of whom there are over 500,000, there would immediately be received petitions for at least proportionate advances to the other million and a half employees. If another advance should be granted to the shop employees, it is hard to see how it could be refused to other employees, since the shop employees are both absolutely and relatively among the highest paid men on the railways. To begin another cycle of advances in wages would mean further increases of hundreds of millions of dollars annually in railway expenses. It is only necessary to recall the experience of the last year to show that this statement is justified.

Are the shop employees entitled to higher wages? They base their petition on the grounds that the rates established last year are inadequate and that a further increase is needed "to meet the ever-rising cost of living and to maintain a more equitable differential between classes of railroad employees and those engaged in similar capacity in other industries." But the cost of living will continue to tend upwards rather than downward if vast advances of wages in the various industries are to continue. It may be that mechanics employed in shipbuilding are paid higher wages than railway shop employees; but practically all other mechanics are now paid less, and substantially less than those of railways; and comparison should be made with mechanics of all classes working under conditions comparable to those on railways, not merely with the one class, which, because of exceptional conditions, happens to be the highest paid.

The expenses of the railways are now out of all proportion to their earnings, in spite of the large increases in rates. The government incurred a deficit of over $110,000,000 in operating them in the months of November, December and January. It will have to advance the rates again to avoid a huge deficit in 1919 even if wages stay where they are. Every further advance in wages will mean a corresponding increase either in the deficit that the taxpayers will have to pay or in the rates that travellers and shippers will have to pay. Have railway employees, whose wages now average 45 per cent more than a year ago, a better right to still further advances than the public has to protection from the increases of taxes, or rates, or both, that further advances in wages would render necessary? That is the question really raised by the beginning of a new movement for advances in railway wages.

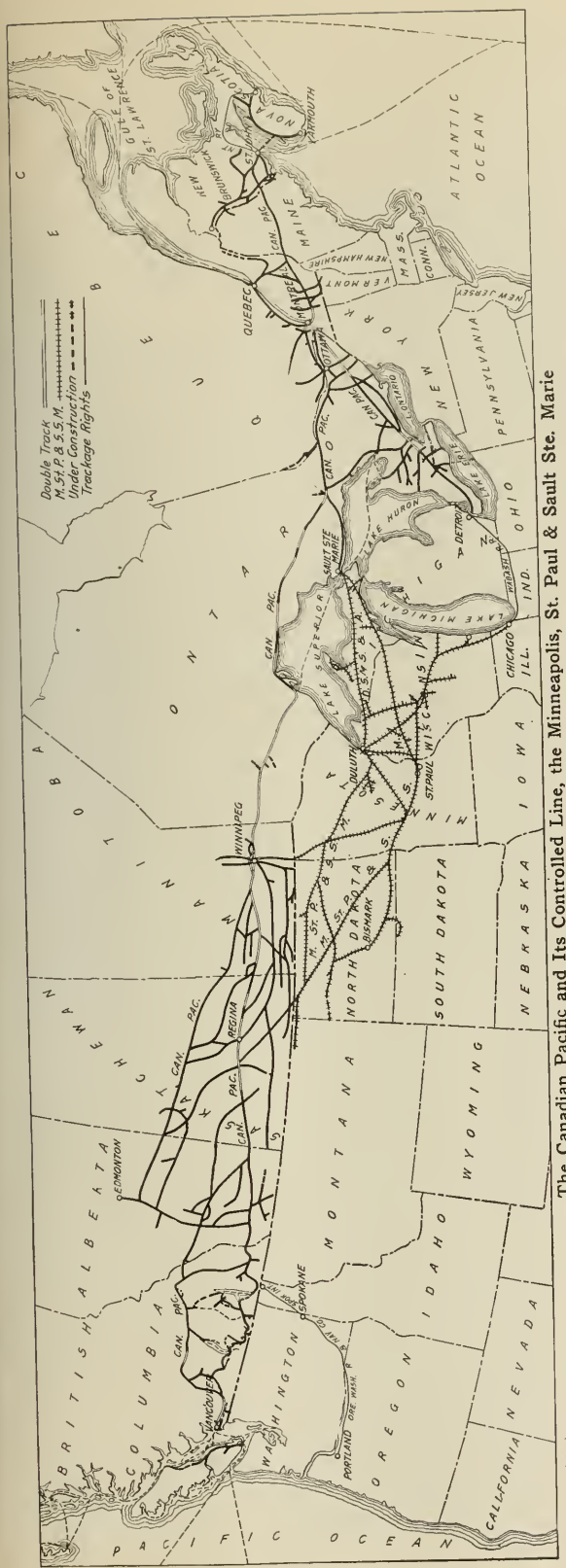
The enormous advances in wages following those made on the recommendation of the Railroad Wage Commission last year were made in such a way that the press and public were not informed, and do not know now the exact grounds upon which they were asked for and granted. The failure to give adequate publicity to these matters was not justifiable even in time of war; it would be still more unjustifiable in time of peace. The public has to pay the bill and has a right to know what and why it is asked to pay. The United States, we are occasionally reminded, is a democracy, and it is not consistent with the principles of a democracy for wage advances that will cost the public hundreds of millions to be made as advances in railway wages amounting to over a half billion dollars a year have been made within the last year.

The Railroad Administration should see that the public is informed as to exactly what the railway shop employees are asking; as to the reasons advanced for and against granting their demands; and as to the reasons for the decision finally reached by the Administration. Then the public will be able to form an intelligent opinion as to the reasonableness and justice of what is demanded and what is done; and there will be less danger that things that are neither reasonable nor just will be done.

Canadian Pacific

THEY CALL THE INCREASED railway wage scale in Canada the McAdoo scale of wages. As a matter of fact, the Canadian roads, in so far as rates and wage scales were concerned, followed the course adopted in the United States. There is one fundamental and vitally important difference, however, between the conditions in Canada as regards the Canadian Pacific and the conditions in the United States as regards the government operated railroads. The Canadian Pacific's wage scale is dependent on that of the United States Railroad Administration, but the Canadian Pacific management is free to deal effectively with labor in regard to efficiency, whereas the federal manager of each American road under the administration is nearly helpless in this respect. Thus, the Canadian Pacific may hope to reduce operating expenses, if not in full proportion to a reduction in traffic, at least in some reasonable measure.

The most striking thing about the Canadian Pacific situation to a man going there from the United States is the contrast between the way the Canadian public regards the service of the Canadian Pacific during the past year and the way the American public regards the service of the roads under the United States Railroad Administration. There is almost an entire lack of hostile criticism of the Canadian Pacific's service under war conditions. The Canadian Pacific was



The Canadian Pacific and Its Controlled Line, the Minneapolis, St. Paul & Sault Ste. Marie

called upon to perform many extraordinary services in connection with the war but the machine under the management of the private corporation officers functioned smoothly and effectively; troop movements were conducted with a minimum of discomfort either to the troops or to the traveling public. There was no such disruption of the natural flow of traffic on the Canadian Pacific as occurred in the eastern and southern parts of the United States especially and, to some extent, on most of the larger United States railroad systems.

In the calendar year, 1918, gross earnings of the Canadian Pacific amounted to $157,538,000. This compares with $152,389,000 gross in 1917, but in 1917 a total of $1,969,000 was included in this gross from the earnings of the Pacific coast steamships, the commercial telegraph and the news department, whereas in 1918 only $194,000 (the net earnings of the commercial telegraph for two months were included in gross), so that the actual increase in 1918 over 1917 was nearly $7,000,000 instead of the apparent $5,000,000. Operating expenses in 1918 amounted to $123,035,000, comparing with $105,843,000 in 1917.

The Canadian Pacific got an increase in freight rates of something less than 15 per cent in March, 1918, and the increase in July, following the adoption of the new McAdoo scale of wages, was only sufficient to bring the general freight rate structure up to the level of the increased United States rates. During nearly the entire year, the Canadian Pacific had the benefit of passenger rates which were as high as those put into effect by the United States Railroad Administration in July, 1918. Furthermore, whereas wage increases in the United States were retroactive to January 1, 1918, wage increases on the Canadian Pacific were retroactive in some cases to March, and in others were not put into effect until August.

Fixed charges on the Canadian Pacific were substantially the same in 1918 as in 1917 and after making the usual $500,000 contribution to the pension fund, there was $23,631,000 earnings from the railroad, exclusive of steamships and telegraph, available for dividends in 1918, comparing with $33,848,000 available in 1917. Special income, so-called, which includes net revenue from investments in ocean and coastal steamship lines, the commercial telegraph, interest, etc., amounted to $8,129,000 in 1918 and, in 1917, to $10,703,000. The decrease in 1918 was due entirely to smaller net earnings from ocean and coastal steamship lines. The Canadian Pacific was peculiarly fortunate in the first years of the war in the smallness of its losses of ships sunk by submarines but in 1918 it suffered rather severe losses and of the total of 15 steamers lost through enemy action or from accidents at sea during the war, a very considerable part were lost in 1918. The Canadian Pacific, however, wrote off as part of expenses of the steamship lines the present cost of replacement, so that there is no profit and loss debit which will have to be absorbed in later years. At the end of the year, the company had 28 steamers in service with a gross tonnage of 264,000 tons and six others with a gross tonnage of 80,000 tons ordered and soon to be delivered. When these vessels are delivered, the Canadian Pacific's fleet will have an aggregate tonnage somewhat larger than it had at the outbreak of the war.

The Canadian Pacific paid its regular 4 per cent on the preferred stock and 10 per cent on the common. This common dividend is paid 7 per cent from railroad earnings and 3 per cent from special income. After dividend payments, the company had a surplus from railroad earnings of $2,204,000, which has been placed in reserve to meet the requirements of the special dominion tax imposed on the Canadian Pacific. It will be remembered that the Canadian Parliament passed a law imposing a tax on the Canadian Pacific equal to all of the surplus from railroad operations above dividend requirements up to $7,000,000. After

$7,000,000 surplus had been paid as a tax, any remaining surplus was to be divided equally between the company and the Canadian government. In 1917, the Canadian Pacific had a surplus from railroad earnings above dividend requirements of $12,424,000 so that the Canadian tax in 1918 would have been, if the company had done as well in that year as in 1917, approximately $9,500,000. As it is, the government will get $2,204,000 unless some flaw is found in the law.

The Canadian Pacific has always adhered to a high standard of maintenance. This policy was pursued in 1918, and $22,646,000 was spent on maintenance of way as compared with $17,470,000 in 1917. It is an interesting fact that in figuring replacements the Canadian Pacific has scrupulously charged to expenses the full present cost of steel and other materials. Thus, if a steel bridge is replaced by a concrete structure, operating expenses are charged not with the book cost of the steel structure, less scrap value, but with the amount that it would cost today to build the steel bridge, less scrap value; on the other hand, a very conservative policy is pursued in regard to scrap value as, for instance, when rails are taken up their scrap value is figured not at the present cost of steel but at the original cost.

During all the four years of the war the Canadian Pacific has been restricted in its maintenance expenditures by a shortage of labor, but apparently in 1918 it managed to get sufficient labor to put the property in fine shape. Thus, $2,073,000 was spent for ties in 1918 as against $1,600,000 in 1917; and $1,559,000 was spent for rails as against $500,000 in 1917. Both of these are materials accounts but the unit costs of materials in Canada did not increase by any means as much as this difference between 1918 and 1917 tie and rail expenditures, so that more material was actually used and more work done in 1918 than in 1917. Track laying, a labor account, amounted to $6,840,000 in 1918 as against $5,071,000 in 1917. There is a decided contrast between the Canadian Pacific's policy toward maintenance of way in 1918 and that of most of the roads under federal control in the United States.

On the other hand, maintenance of equipment on the Canadian Pacific did not take the big jump in cost that it did on many American roads. Total maintenance of equipment expenditures in 1918 were $28,227,000 for the Canadian Pacific, comparing with $23,404,000 in 1917. The following figures which, so far as we know, have never been published heretofore, show the average cost of repairs per unit of equipment, exclusive of renewals and overhead charges.

	1918	1917
Locomotives	3,814	2,964
Freight cars	91	68
Passenger cars	1,677	1,366

In December, 1918, the Canadian Pacific had, on the lines east, 17.1 per cent of its locomotives awaiting or under repairs and on the lines west 16.8 per cent. The Canadian Pacific has no locomotives stored; this fact should be remembered when comparing percentage of equipment under repair and needing repair with the figures given out by the United States Railroad Administration since there are a large number of locomotives in the United States in storage, many of them in need of repairs.

Transportation expenses, the out-of-pocket cost of handling the business, amounted to $59,109,000 in 1918, as compared with $51,350,000 in 1917. Compare this increase of a little over 15 per cent in transportation expenses with an increase of 40 per cent in the transportation expenses of the Pennsylvania, 35 per cent of the Erie, 36 per cent of the Chicago & Northwestern, 26 per cent of the St. Paul, 28 per cent of the Atchison, Topeka & Santa Fe, and 48 per cent of the Illinois Central. A difference of from three to six months in the effective date of wage increases is hardly sufficient to account for the contrast between the increases in Canadian Pacific transportation expenses and the others which are fairly typical of the larger American roads, and some other circumstances furnish an explanation. One of these other circumstances is the more effective work which the Canadian Pacific has been able to get out of its employees under private management as compared with the work gotten out of the American railroad employees reporting nominally to federal managers but actually dealing direct on labor questions with the central administration. It is interesting to note how well the Canadian Pacific was able to hold down loss and damage and injury expenses. Loss and damage to freight cost $1,229,000 in 1918 as against $967,000 in 1917, and injuries to persons cost $405,000 in 1918 as against $458,000 in 1917.

The Canadian Pacific is a financial institution of tremendous strength. It came to the financial aid of Canada and the empire in the war and it is today a shining example of a North American railroad privately owned and operated with a credit comparable to the strongest companies engaged in other industries. At the end of 1918, the company had $39,548,000 cash on hand and had loaned $40,000,000 debenture stock to the imperial government and it bought and owned $30,682,000 imperial and dominion government securities, besides having $60,704,000 deferred payments on lands and townsites due to it. The company has no mortgage bonds except about $3,500,000 on the Algoma branch, and its 4 per cent consolidated debenture stock has no power to put the company into the hands of a receiver although its holders can take over the operation of the property if their dividends are not paid. The Canadian Pacific carries on its balance sheet a surplus of $127,275,000 from operation of the railroad and $106,724,000 surplus in other assets.

The company did not very much more than earn its dividends in 1918. If additional wage increases are made to the brotherhoods in the United States, the Canadian Pacific will have to follow suit probably with increases to its engine and trainmen. This would apparently mean an increase of about $800,000. Assume that there are some further increases in wages in the states which would necessitate further increases in Canada and assume also that the pressure of public opinion or some other reason prevents the increase of freight rates in the United States and, therefore, in Canada, is there any danger of the Canadian Pacific's failing to earn its dividends in 1919? Traffic is falling off to some extent in Canada, but not to the extent that it is on most of the larger roads in the United States, nor is the Canadian Pacific dependent, to any great extent, on coal traffic.

There is small chance of any serious surplus of labor in Canada. The 400,000 Canadian troops who volunteered and have seen service in France are being absorbed quite easily as they return without as yet, at least, displacing the women who entered such industries for which women have proved to be well adapted. The serious danger which threatened Canada from the war was being bled white of man-power. This danger has been averted by the armistice and the introduction of women into industry has actually increased the available "man-power." Furthermore, the cost of materials in Canada is decreasing fairly rapidly and on a scale which would suggest that further increases in wages could be almost entirely offset by the lowered cost of materials. The Canadian Pacific has been so conservative in its accounting methods and so liberal in its policy toward upkeep and has written off so promptly the full extent of losses due either to the increased cost of material or the direct effect of the war that it faces the future with no aftermath of financial difficulties to be taken care of. It is conceivable that a crop failure would so reduce revenues as to prevent the earning in full of the 10 per cent dividend, but even were some unforeseeable disaster such as this to occur, the company's current assets and great reserves are amply suffi-

cient to warrant the payment for a year or two years of dividends out of surplus. No such necessity, however, confronts the road at present. It stands a monument of financial strength in striking contrast to the English, French and most of the United States roads.

The following table shows the principal figures for operation in 1918 as compared with 1917:

	1918	1917
Mileage operated	13,380	13,389
Freight revenue	$110,187,288	$103,635,795
Passenger revenue	30,837,254	30,238,986
*Total operating revenue	157,537,698	152,389,334
Maintenance of way expenses	22,646,106	17,470,069
Maintenance of equipment expenses	28,226,991	23,404,263
Traffic expenses	3,011,579	3,084,944
Transportation expenses	61,047,813	53,029,260
General expenses	5,421,601	5,023,609
Taxes	2,518,727	2,129,604
Total operating expenses	123,035,310	105,843,317
Net operating income	34,502,388	46,546,018
Interest, including debenture charges	10,177,513	10,229,143
†Railroad income available for dividends	23,630,898	33,848,129
Other income	8,129,750	10,703,298
Net corporate income	31,760,648	44,551,427
Dividends	29,227,276	29,227,276
Surplus	2,533,372	15,324,151

*Including commercial telegraph and miscellaneous expenses for the whole year in 1917 and for two months only in 1918.

†The net from commercial telegraph and Atlantic steamship lines is deducted before arriving at this figure and is included in the other income in the next item.

New Books

The Earning Power of Railroads; 1918-19 edition. Compiled and edited by Floyd W. Mundy, of James H. Oliphant & Co., 61 Broadway, New York.

In this little volume, which, although it contains 422 pages, is printed on such thin paper that it is but half an inch thick and can be slipped into a coat pocket, there is contained a simple, clear statement of the Interstate Commerce Commission's system of railroad accounting, an analysis of what constitutes earning power of a railroad and security for the holder of bonds or stocks; a set of tables for 144 railroads in the United States, Canada and Mexico, showing mileage operated, gross earnings and surplus for a series of years, capitalization, income account for 1917 and the percentage of maintenance, of other operating expenses, and of fixed charges to total income, with a statement of freight and passenger density and second-track and siding mileage; and, in addition, notes in regard to each one of these 144 roads, describing something of the characteristics and history of the road. If an investor desires to get a picture of the main characteristics of a railroad property there is probably no reference work published to which he could turn to find the information so easily and quickly as to this. It makes no pretense of being comprehensive in the sense that Poor's Manual of Railroads is, but it is admirably adapted to the needs of a man or woman who does not have the time or the knowledge to go into an exhaustive and analytical study of a particular railroad property.

The introductory chapters, describing the Interstate Commerce Commission's accounting system and commenting on railroad earning power, are especially good.

The notes in general are painstaking and intelligent commentaries on the characteristics of the property and its financial structure which should be thoroughly understood by an investor in its securities. Occasionally a bit of information is omitted that, if included, would seem to have been of value. For instance, in the notes on the Boston & Maine, while the leased lines are mentioned, there is no statement showing the proportion of mileage operated for these leased lines, although the fact that of the total 2,259 miles of road operated by the Boston & Maine 1,520 miles are leased under high guaranteed rentals, is one of the fundamentals which have shaped the history of the property; but this is an exception, and in general the notes are remarkably comprehensive, considering the space which they occupy.

Letters to the Editor

Are the Railroads Fair to the Public?

London, England.

To the Editor:

It may interest "A Thinking American," whose letter you published in your issue of January 10, to know that his statement as to lax practices on English railways in reference to season tickets no longer holds good.

Since the war season ticket holders are required to produce their tickets on all occasions just like ordinary passengers. Further, if a holder leaves his ticket behind, he is required to pay the fare (at least on short distance travel, I cannot speak as to the practice in other cases), and it is not refunded. Allowance for non-use during holidays or illness has also been restricted. As every season ticket is issued subject to these conditions, there is surely no question of the railway company "taking advantage of the passenger on technicalities."

I cannot think that the statement of the "head of one of the great English railroad systems," to the effect that frauds were unimportant, would be generally accepted in the English railway world. So far from spending $500,000 a year to detect $50,000 worth of fraud, one company with whose affairs I am acquainted, in addition to prosecuting to convict many scores of exceptionally bad cases per annum in the police courts, recovers in excess payments from passengers who are not prosecuted enough to pay the wages of the whole force of traveling inspectors employed.

W. M. Acworth.

Value of a Personnel Department

St. Louis, Mo.

To the Editor:

I was very much interested in an article appearing in your February 14 issue, in regard to the necessity for railroads having a personnel department. Two or three years ago I addressed a letter to several railroad executives, presenting to them the desirability of a department of this kind, but was unable to secure any satisfactory replies, all seeming to think that such a department was a development of the future, with the single exception of the president of one company, who was interested, but not sufficiently so to go forward with the proposition.

My suggestion was that a department be formed to canvass all employees, find out their ages, size of families, when they entered the service, at what salary they started, what promotions they had, education, special training, etc. Then add similar information regarding new employees entering the service. All of this information was to be placed on a regular service card, together with notations regarding habits, personalities, physical and mental qualifications or disqualifications, etc., and was to be used as a basis not only for a study of the possibilities for increasing efficiency in the personal element, but was to be used in filling vacancies at various points on the line, especially in the line of promotions. In other words, to cite an example, if Bill Smith was holding down a revising desk at a local freight office, and his record showed him to be a man worthy of promotion, when a vacancy occurred at a larger station, or in the general office, the management would be in a position to tell from the card record whether his family affairs, together with his personal habits, would render it desirable to promote him to the vacancy.

Another feature I had in mind was to use such a department as a sort of educational clearing house to assist ambitious employees to better their condition, by investigating various mail and personal training schools, so that the department would be in position to tell any ambitious young man or woman where training along a certain line would be best secured, and at what cost, under what circumstances, etc.

Another thought was to use the department to prepare articles that could be presented to high schools, colleges and other educational institutions, presenting the matter of transportation in its more elemental phases, and possibly bringing about an increased understanding and appreciation of the necessity for transportation, and its relation to every phase of human endeavor. In connection with this feature, I had thought of attempting to bring to the attention of young men in the high schools, colleges, etc., the wonderful opportunity afforded by the transportation field, for those well equipped to enter it, and thus endeavor to bring about an increased desire on the part of the brighter young men to enter this field.

It seems to me that a department of this kind, properly conducted, would go far toward bringing about a better feeling between the public and the carriers, and of equal importance, it would bring about a better feeling between the companies and the employees, because in the practical working out of the idea every employee would come to realize that the matter of promotion had become one of merit, rather than personal influence.

T. Erson.

The Question of Safety

Chicago, Ill.

To the Editor:

Much has been said lately concerning the safety of the railroads, both material and personal, under government operation. No less than the Hon. James Hamilton Lewis, senator from Illinois, stated not long ago that "we see now no railroad collisions and deaths of passengers and crews." Nevertheless there have appeared from time to time newspaper reports of wrecks which somehow seldom failed to contain a fair-sized casualty list. The divergence between the opinion of certain advocates of government control of the railroads and the opinions one forms from periodicals and newspapers, led me to compile the following statement of accidents, comparing the year 1918, when the roads were under government operation, with 1917, when the roads were privately operated. My only source of information in compiling this was the statement of wrecks which appears monthly in the *Railway Age*. I realize that this statement is not entirely complete, but since the records for both years were obtained from the same source, I believe it is representative of the true relations of the accident and casualty list for the two years.

I do not believe that any explanation of these figures is necessary other than the qualification already stated.

—Observer.

Inspectors of Locomotives, at $3,000 a year, are called for by the United States Civil Service Commission and examinations will be held on May 21 and 22 to fill vacancies under the Interstate Commerce Commission. Applicants must have reached their 25th but not their 55th birthday on the date of the examination, and must have not less than three years' railroad experience in the capacity of master mechanic, road foreman of engines, locomotive boiler maker, locomotive boiler inspector, roundhouse foreman, shop foreman, locomotive machinist, or locomotive engineer; not less than five years as locomotive inspector or locomotive fireman; and must have been within three years next preceding the date of application in active service in any such capacity or in the capacity of inspector of locomotive equipment under the government of the United States or of a state or territory.

	Butting collisions						Rear collisions						Other collisions					
	1917			1918			1917			1918			1917			1918		
	Number	Number killed	Number injured	Number	Number killed	Number injured	Number	Number killed	Number injured	Number	Number killed	Number injured	Number	Number killed	Number injured	Number	Number killed	Number injured
January	3	2	6	2	7	5	4	6	24	4	3	16	1	0	49	5	11	33
February	2	0	3	2	1	20	3	20	10	6	24	64	1	0	0	1	1	4
March	0	0	0	2	2	3	1	3	0	1	1	2	1	3	6	1	2	0
April	1	0	14	3	7	12	0	0	0	2	5	5	1	2	1	0	0	0
May	1	3	0	2	2	4	4	6	9	3	2	29	1	2	0	0	0	0
June	5	8	32	3	15	23	1	1	0	2	81	129	1	1	1	0	0	0
July	2	2	9	1	92	88	3	0	5	1	1	49	3	2	9	1	1	2
August	7	14	26	1	1	3	1	2	11	2	5	0	4	5	3	0	0	0
September	6	35	158	3	24	73	2	7	12	1	3	16	3	0	17	0	0	0
October	2	2	10	1	3	2	2	5	43	2	3	4	2	3	2	1	0	17
November	1	1	4	2	8	16	1	3	16	0	0	0	1	0	6	0	0	0
December	3	11	22	2	3	23	5	52	43	1	5	23	3	7	5	1	0	1
Total	33	78	284	24	165	272	27	105	173	25	133	337	22	25	99	10	15	57
1918—Increase	..	..	..	..	87	..	..	..	..	..	28	164	..	..	..	..	..	..
1918—Decrease	..	..	..	9	..	12	..	..	..	2	..	..	..	..	..	12	10	42
Per cent	..	..	..	27	111	4	..	..	..	7½	27	95	..	..	..	55	40	42

	Miscellaneous accidents, derailments, explosions, etc.						Total					
	1917			1918			1917			1918		
	Number	Number killed	Number injured	Number	Number killed	Number injured	Number	Number killed	Number injured	Number	Number killed	Number injured
January	13	11	83	15	30	117	21	19	162	26	51	171
February	20	21	175	9	7	23	26	41	188	18	33	111
March	10	6	36	9	13	33	12	12	42	13	18	38
April	7	4	12	12	7	112	9	6	27	17	19	129
May	8	2	27	10	26	128	14	13	36	15	30	161
June	11	8	48	11	5	188	18	18	81	16	101	340
July	10	6	79	8	13	62	18	10	102	11	107	201
August	10	13	40	7	8	74	22	34	80	10	14	77
September	14	13	53	5	12	9	25	55	240	9	39	98
October	12	7	78	1	4	0	18	17	133	5	10	23
November	5	2	7	7	9	122	8	6	33	9	17	138
December	13	9	135	8	9	119	24	79	205	12	17	166
Total	133	102	773	102	143	987	215	310	1,329	161	456	1,653
1918—Increase	..	..	..	..	41	214	..	..	..	..	146	324
1918—Decrease	..	..	..	31	..	..	..	..	..	54	..	..
Per cent	..	..	..	23	40	28	..	..	..	25	47	24

Railway Buying and Industrial Readjustment*

The Barometers of General Business and Equipment Purchases Show an Interesting Relationship

By E. B. Leigh
President of the Chicago Railway Equipment Company, Chicago

EMPLOYMENT OF LABOR during the transition from war to peace is complicated by the fact that the government itself, through the Railroad Administration, has greatly reduced its purchases of equipment, material and supplies. The director general has proposed estimates for 1919, which the House Committee on Appropriations has approved. Apparently the sums named would provide additions and betterments in quantity much less than the actual provision in recent years. Indeed, Mr. Hines has stated that no large program of capital improvements could be expected, unless Congress grants the five-year extension.

As a result of meagre purchases since the armistice was declared, unemployment has already manifested itself in the railway supply industries, while new orders are abnormally low. This in due course will increase the prevalence of short time and shutdowns in these industries.

Soldiers coming home are greeted with posters on every fence urging employers to give them jobs. These are proclamations by the United States government. Yet the government itself, through the Railroad Administration, is withholding the orders upon which employment for soldiers and others depends. It is being urged upon the director general and upon Congress that the railways under governmental control should have at least a normal program of additions and betterments.

A representative of the Railroad Administration, we are told, is to be a member of the new government price conference board, the function of which is to determine prices at which the government departments, including the railways, will enter the market.

In this situation it seems of highest consequence that those in authority at Washington should be aided in grasping the relation between railway purchases and the employment of labor, in general industry and trade. For many years past I have observed the effect of railway purchases upon general business prosperity—induced by the fact that in my business (a portion of which is that of railway supplies) I had noted that when the railways of the country entered the field of substantial capital purchases, there invariably followed a period of general business prosperity; and, likewise, the cessation of such purchases was invariably followed by a decline in general business.

In 1913, and with data carefully collected from the year 1904 to that time, I set to work to test out this principle.

Rolling Stock the Index

As the iron and steel industry has long been recognized as being the truest index of general business conditions, and as prior to 1914 it was reliably estimated that the railways consumed, directly and indirectly, between 40 per cent and 50 per cent of the iron and steel production of the country, it is manifest that the expansion or restriction of railway consumption must vitally affect this barometer.

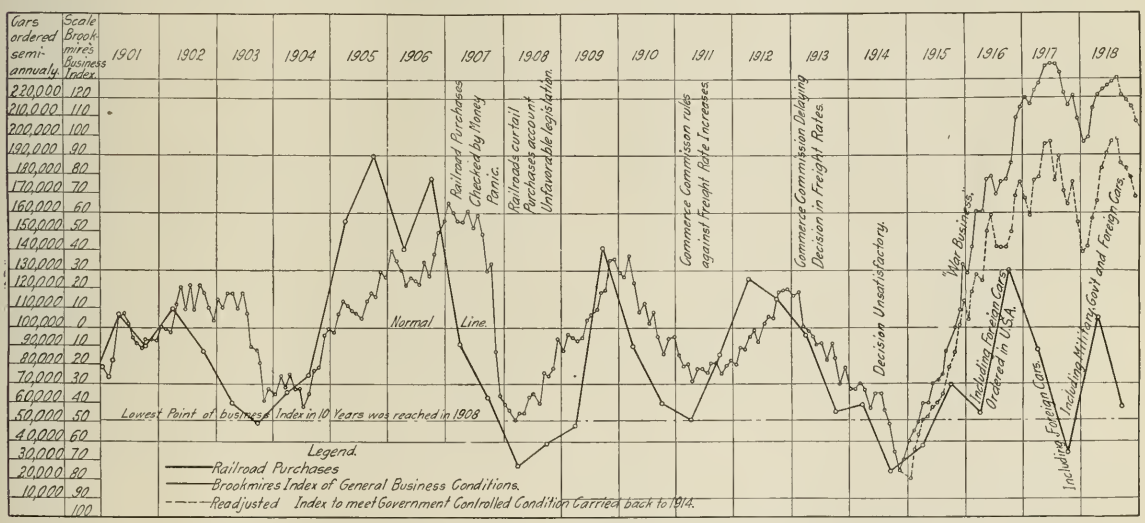


Chart Showing Relation of Railway Purchases to General Business Conditions

The ramifications of railway purchases make it impossible to classify them in the aggregate. But few of the more important items, such as rails, for example, are made the subject of public information and statistical compilation. However, the conditions under which rail purchases are made are not believed to be such as to reflect the railways' prosperity, their purchasing ability in a broad sense, or their influence upon general business.

Many years of observation led to the belief that of those items officially compiled, tabulated and made public, perhaps no one so clearly and typically reflects the railways'

*Abstract of an address delivered February 20, 1919, before the National Industrial Conference Board.

general purchasing ability as that of new equipment, and no other tabulation has been as regularly and accurately kept. When the railways bought freely of new equipment, they were generally likewise buying freely of all other articles essential to maintenance, operation and betterment. During the past 10 or 15 years the purchasing of new equipment had a greater influence upon the iron and steel industry because of the transition from wooden to steel construction.

Accordingly, the number of freight cars built each year taken as a unit and termed "railway purchases," was projected on the chart of the Brookmire Economic Service for the period of 1904 to October, 1914, inclusive—and later, as shown on the accompanying chart, brought up to date, and extended back to the year 1901.

The general business line is shown in monthly periods, while the railway purchase line is given in six-month periods.

Prior to 1907 railway purchases were influenced by and preceded under normal conditions. In this earlier period one of the important factors influencing advanced car orders and the business outlook was the "crop prospects." In the days of the so-called "granger" roads the crop prospects of Iowa, Kansas, Nebraska and the Northwest almost determined the market prices of these "granger" stocks. Necessary betterments and new equipment were determined in the light of money conditions, and the probable needs of the roads.

The period preceding 1907 was one of increasing net income for the railways. Their revenue keeping pace with expenses, it was the custom of railway managers generally to discount future requirements in ordering equipment, and they felt they could with prudence count upon resources warranting these large operations. The chart shows that car orders reached a maximum in 1905 and 1906.

But in 1908 a new condition or factor appeared, due to the investment of the rate-making power in the hands of the Interstate Commerce Commission—the beginning of a regulation which had in it no element of responsibility for transportation development. Thus, for the first time were "railway purchases" controlled by abnormal rather than normal conditions; and have so continued, more or less, from 1908 to the present time.

Three Elements for Good Business

The year 1908 was notably the leanest of business years up to 1914, notwithstanding bumper crops, plentiful money and absence of disturbed political conditions—the three recognized elements making for good business. It likewise recorded the smallest number of cars ordered during the period, 62,999, and the minimum of railway purchases for many years prior.

The conditions of 1908 were continued well into 1909, but the last half of the year witnessed a substantial buying movement by the railways, the total cars ordered for the year aggregating 193,874, nearly 70 per cent of which, however, were ordered within the last four months, with particularly heavy orders in November and December. This gave a fairly good business year, with a heavy "carry over" to 1910.

In 1910 general business promptly followed, and with the heavy "carry over" business from 1909 referred to, coupled with fairly good buying on the part of the railways during the first six months, made the year 1910 a still better year than 1909, although the total of car purchases was only 145,085. The falling off in car orders after the middle of the year was duly reflected in the decline of business until at the end of 1910 the probabilities of 1911 were clearly foreshadowed.

In 1911 the decline in general business, together with the falling off of railway purchases, continued throughout almost the entire year, but at its close a buying movement on the part of the railways set in. The total number of cars ordered for the year was 135,740, nearly 30 per cent of which were placed at the very end of the year, and necessarily carried forward into 1912.

A Complete Test

We reached a high point in railway purchases about May, 1912, continuing with normal purchases for most of the remainder of the year, again reaching a high point at the very end of the last quarter, the total car purchases being 238,400, the largest number in any year since 1906. It is here significant to note that the foregoing conditions in railway purchases were followed by a phenomenal revival of general business during the last half of 1912; this too in the face of a national election fraught with more uncertainties as to its outcome than any we had had for years. Business seemed to ignore these conditions, however, while the heavy purchases made by the railways filled the steel mills of the country with orders toward the close of the year, so overtaxing their capacity as to compel buyers to anticipate deliveries by orders placed four, six and even nine months in advance of shipping dates—a condition theretofore unprecedented, while general business assumed almost the aspect of a boom.

At this point it may be interesting and illuminating to note a comparison of conditions prevailing in 1908 and 1912:

In 1912 we had only normal reserves, normal crops and very disturbed political conditions—on the other hand, notwithstanding these unfavorable conditions, we had an almost boom year, with the railways buying heavily.

Just why was "1912" the exceptional year? Why were the political conditions and political policies almost ignored? If there had been any doubt as to the basic factor of railway purchases, it was brought into bold relief in 1912, and that year furnishes an answer.

Repression

Heavy purchases of new equipment continued during the first three months of 1913, but sharply declined at the beginning of the second half of the year—almost immediately sinking to a very low level.

It was here that the "danger signal" was set by this barometer; but, naturally, general business did not immediately feel this falling off of railway purchases at the time (because of the accumulations), being sustained by the unfilled orders or what might properly be termed the "unspent momentum."

The condition clearly foreshadowed at the middle of the year eventuated, and brought to us the memorable depression of 1914, and when railway purchases reached their lowest mark.

War

It was stated in 1913 that it was believed railway purchases were and would continue to be the controlling factor in general business until or unless some other great purchasing power developed or came to take their place.

Then the unexpected happened; the great European war broke out, resulting in war buying supplanting railway buying. It was not until well within 1915 that the effect of foreign, munition and warwork orders was substantially felt by us; but the chart shows a gradual yet steady climb of the business line during the first six months, somewhat accelerated throughout the last half of the year, and not measurably accounted for by railway purchases.

In 1916 we find the phenomenon of steadily advancing general business with declining railway purchases during the first six months, although railway purchases were greatly augmented during the last half of that year, aided by the foreign cars bought in this country.

Up to 1913 the highest point of possible record of the business index shown on the chart was 100. This, you will

see, was pierced by the business line in 1916, and when a "Mansard" was built on, up to 130. Even this had not sufficed to record the business line of 1917 and 1918.

Further Proof

The years 1917 and 1918 are interesting; and, with 1916, would seem to more surely confirm the doctrine stated. The greater part of the railway buying—particularly during 1918—has been that of the United States government order for 100,000 cars placed in April last, and the United States military railway cars, and the cars for the French, Italian and Russian governments.

In August, 1918, Brookmire readjusted his barometer index owing to the government control of prices of a number of basic or fundamental commodities, and then he carried this readjustment back to the year 1914. This I have shown in the open spaced lines; but for the purposes of uniformity and comparison, have continued the business index in the solid line, as shown.

One of the most natural questions, and one frequently raised, has been: "Is it cause or is it effect?" That is to say, in times of depression do railway capital purchases precede and initiate an upward trend to general business, or on the other hand must business prosperity precede to initiate railway capital buying?

There is one point on which there can be no question—that is: that munition and war orders were the cause of the revival of business after the great depression of 1914, as they likewise were the great sustaining factor during 1916, 1917 and 1918. War buying simply supplanted railway buying.

However, whether you are, or are not, convinced that railway capital purchases habitually precede or initiate general business activity, there is something in which you will have no difficulty in concurring, and that is this—that once the country enters upon a period of general business depression, however caused, such condition is aggravated and protracted by the absence of railway buying; and that once general business activity is resumed, no matter through what stimulus, the presence of railway buying is a major factor in sustaining and prolonging such activity.

This appears to be evidenced even in the lines of 1917 and 1918, where it is noted that the force and effect of railway capital purchases are reflected in a continuing trend in their relation to general business—although naturally, and because of the extraordinary conditions, in a considerably reduced degree.

Even the upheaval of the war has failed to obscure the principle of the doctrine; while on the other hand its manifest presence in this situation seems only to further emphasize its soundness.

The railway system of the United States is the greatest in the world—our own largest industry excepting agriculture. Our iron and steel industries have been developed to meet the railways' enormous requirements, and hence the railways have constituted the one industry whose purchases are upon such a scale as necessarily to affect the great barometer of iron and steel.

Buying is contagious; and particularly is this true of initial buying which, when upon a large scale, stimulates still greater buying and in the many directions of its influence, thus inspiring confidence—one of the most essential of the underlying factors of high and sustained prosperity.

Capital and Operating Purchases

Strange to say, railway men themselves have been those least willing to believe that railway purchasing is the "cause" of increased business activity. Their view is, that it is increase of traffic which stimulates their railway buying and that, accordingly, buying follows traffic.

This arises from their failure to discriminate between "capital" and "operating" buying. It is undoubtedly true that operating buying is, and very logically, the result of traffic conditions and traffic needs.

Capital buying, however, is of another character; it generally precedes operating buying, and is by no means entirely controlled by the then existing traffic demands. Cars cannot be obtained in a day: they must be anticipated, and contracted for long in advance of probable or possible delivery.

In periods of depression and when prices were low, car buying has been inaugurated by the larger and more far-seeing roads; and when on a considerable scale, it has almost at once prompted other roads to do likewise, thus giving initial momentum to a general buying movement.

Pulse of General Business

If the iron and steel industry, heretofore broadly recognized as the great barometer of general business conditions, and as basic to them, is dependent upon "railway purchases" to the extent of the absorption of 40 to 50 per cent of its production, how much more really basic are "railway purchases" as the initial force in starting and sustaining the circulation of general business? Are they not manifestly the pulse of general business?

Had I the time I might trace for you, in graphic form, the flow of this controlling current. Issuing forth from the railways, it proceeds first to the great car-building plants; thence on to the iron and steel plants and to the very large number of railway supply industries. By the latter it is again directed toward the iron and steel and other industries—thence in turn influencing a highly increased number of other and contributory industries, until this influence has reached or set in motion the entire industrial machinery—while at every turn and in every direction it has furnished employment to labor.

Thus, labor as a matter of fact is more directly and vitally concerned in this great problem than any other single element.

Increased Industrial Capacity

At the present time we have an interesting problem due to the greatly increased capacity of our iron and steel industry. Just what proportion of this increased capacity can or will be taken up by the railways is yet to be determined. Exports may take up this excess, or, if the hope of many people can be realized, they may, like war work, become the element that will sustain, if not control, the business situation.



German Prisoners Working at the Salvage Depot, Tours, France

Distribution of Railroad Security Holdings

THE NUMBER OF STOCKHOLDERS for 572 Class I railroads and their non-operating subsidiaries was on December 31, 1917, 627,930, and the aggregate number of shares was 97,475,776, according to a report compiled by the Bureau of Statistics of the Interstate Commerce Commission. The number of shares held by the 20 largest holders in each road, aggregating 8,301 names of persons, estates, corporations or partnerships, was 50,873,322, or a little more than one-half of the total. This means that 1.3 per cent of the number of stockholders in railroads of this country hold about one-half of the number of shares of stock. The subdivision of the holdings of the 8,301 stockholders is shown in the following statement:

Classification of 8,301 Largest Stockholders	Number of shares	Per cent
1. Individual females	1,082,868	2.1
2. Estates	1,333,961	2.6
3. Other railway companies	24,638,407	48.4
4. Other corporations or partnerships	11,565,838	22.7
5. Individual males	6,945,205	13.7
6. Voting trustees	5,307,043	10.4
Total shares held by 8,301 largest security holders, reported as 20 largest on each road	50,873,322	100.0

The number of holders counted under Item 1 in the table is 958, and under Item 2, 1,092.

The annual reports of steam roads to the commission give the number of stockholders and the names of the 20 largest stockholders, or holders of other securities where these have voting rights. The figures have been compiled from these returns for all Class I roads and their non-operating subsidiaries which filed reports for the calendar year 1917. These two classes of roads have about 97 per cent of the stockholders of all steam roads.

"What the distribution is among the stockholders below the 20 largest we cannot say," the report says. "The average holding of the 619,629 remaining stockholders on the basis of the preceding facts was 75 shares. It is obvious that if the roads are regarded as one system, the inter-railway holdings being disregarded, the proportion of the stock not held by railways in the hands of so small a percentage of stockholders would be considerably less than one-half. However, an exact statement could be made only after the holding of stock by the same individual in more than one railroad had been considered.

"There are great variations among the individual roads in the extent of distribution of their stock. The following statement is illustrative:

Name of road	Total number of stockholders	Per cent of shares held by 20 largest holders
Pennsylvania	100,038	8.9
New York Central	27,062	25.1
Baltimore & Ohio	29,360	17.4
New York, New Haven & Hartford	25,249	15.3
Pennsylvania Company	17	100.0
Erie	9,571	19.7
Philadelphia & Reading	13	100.0
Lehigh Valley	12,325	18.1
Southern	9,564	38.7
Illinois Central	10,783	41.6
Southern Pacific	37,853	23.0
Atchison, Topeka & Santa Fe	44,561	14.3
Chicago, Milwaukee & St. Paul	20,549	18.5
Chicago & North Western	12,770	20.9
Chicago, Burlington & Quincy	326	99.5
Great Northern	26,716	18.5
Northern Pacific	25,780	19.8
Union Pacific	33,875	17.8

"The Erie; Philadelphia & Reading; Wabash; Southern; Chicago, Milwaukee & St. Paul; Great Northern; Northern Pacific; Chicago, Rock Island & Pacific, and Union Pacific are cases in which the holdings of corporations or partnerships other than railways are more important than the holdings of other railways. Thus, of the Wabash stock, 46,642 shares were held in Amsterdam, Holland, and 36,321 were held by 14 New York and 1 Boston companies or partnerships. Of the stock of the Chicago, Milwaukee & St. Paul, 216,528 shares were held by 11 New York concerns. The Philadelphia & Reading stock is all held by or for the Reading Company. That of the Virginian is largely held by The Tidewater Company. The stock of the Bessemer & Lake Erie is held for the United States Steel Corporation.

"Among the cases in which a part of the stock is in the hands of voting trustees are the following: Pere Marquette; Chicago & Eastern Illinois; Chicago, Terre Haute & Southeastern; Cincinnati, Indianapolis & Western; Buffalo & Susquehanna; Southern Railway; Mobile & Ohio; Gulf, Mobile & Northern; Atchison, Topeka & Santa Fe; Missouri Pacific; Saint Louis-San Francisco; Chicago Great Western; Missouri, Kansas & Texas Railway of Texas; Los Angeles and Salt Lake; Midland Valley; Chicago, Peoria & Saint Louis; Denver & Salt Lake; Missouri, Oklahoma & Gulf; New Orleans, Texas & Mexico; Missouri & North Arkansas.

"The preceding figures are subject to certain limitations. As above indicated, they take no account of the fact that one person may be a stockholder in more than one railroad. The individuals named as stockholders may represent other corporations, although that fact may not be a matter of record in the books of the reporting carrier.

"The names of large bondholders are not given in the annual reports of carriers. The following figures as to the holdings of banks and life insurance companies are of interest. The figures regarding bank holdings are from the annual report of the comptroller of the currency and refer to 1917 conditions:

	Investment in railroad bonds
State banks	$1,626,298
Mutual savings banks	406,272,169
Stock savings banks	2,663,188
Loan and trust companies	33,753,533

"To obtain an approximation of the railroad bonds owned by life insurance companies, a compilation has been made of the par value of the railroad bonds shown in the assets of the life insurance companies reporting to the superintendent of insurance of the state of New York, as shown in his report for 1918. The aggregate is $1,681,242,371. The New York Life heads the list with $337,885,211. The Mutual Life has $304,498,457, the Equitable $222,696,748 and the Metropolitan $210,875,682.

"Thus, savings banks and life insurance companies have over two billions of railroad bonds. A further $2,135,086,517 was held by other railroad companies on December 31, 1916. The bonds actually outstanding on December 31, 1916, amounted to $11,202,607,096."

In an attached table details are given for each of the large railroads included in the tabulation of stockholders. The information is taken from page 109 in the annual reports of the railroads to the Interstate Commerce Commission for the year ending December 31, 1917. The distinction between males and females is not required in the report, but was made in the tabulation from the given name.

William D. Carroll, signal supervisor, and Joseph Christian, maintainer, employees of the Baltimore & Ohio, were charged with manslaughter by a coroner's jury at Pittsburgh, Pa., on March 27, and were committed to jail without option of bail. These men were held responsible for a train wreck at Laughlin Junction, near Pittsburgh, on February 22, when ten persons were killed. They were in charge of, or connected with, the repairing of a switch where a freight car had been derailed some hours before. While the repair work was going on and while the track was insecure a locomotive came along and was derailed and fell against a passing passenger train, wrecking passenger cars. Reports indicate that the light locomotive had passed an automatic signal set against it; also that it had been flagged in sufficient time to allow it to be stopped before running upon the insecure track.

A Possible Solution of the Railroad Problem

Weak and Strong Roads Combined End to End So as to Increase Competition and Greatly Strengthen All Railroad Credit

By F. J. Lisman

PART II

THE EIGHT MAPS show the possible combinations of railroad systems, and are, of course, tentative, merely indicating the possibilities of combining strong and weak systems, so that the strong will easily be able to carry the weak. These combinations, however, are not only worked out from a point of view of credit, but traffic relations, geography, etc., have also been taken into consideration.

The Central System

Map No. 1, called the Central system, shows the combination of the strong New York Central and Northern Pacific systems, each with about $250,000,000 of capital stock, on which substantial dividends are earned and paid. The Rock Island system supplements these lines to the west and southwest and with its present fixed charges could hardly be called a burden. The Denver & Rio Grande and Western Pacific are the legitimate extensions of this system to the west to the Pacific coast and the present fixed charges of these companies are not an overburden, though their credit is poor.

Connecting with the Rock Island lines to the southwest there is added the El Paso & Southwestern, a strong company which takes the system to the borders of Mexico and also might form a new line to southern California in connection with the San Diego & Eastern, now in course of construction.

In southern Texas there is added to this system, the New Orleans, Texas & Mexico, which will furnish long haul vegetable and other tonnage, and will get a large Mexican tonnage whenever Mexico is rehabilitated. This line connects with the Louisiana division of the Rock Island and would give the system a line into New Orleans from the west and also give lumber tonnage to the Rock Island lines in Arkansas and Oklahoma.

By adding the Mobile & Ohio to the system, a large lumber tonnage is provided for the Illinois and Indiana lines forming a through route to the Gulf from Chicago to Mobile and New Orleans, and also a line from the northwest to the Gulf.

By adding the Virginian to the system, access is had by the New York Central system to Hampton Roads for the grain traffic and to a coal field producing the highest quality of coal. This coal would be hauled not only to the Lakes at Toledo, but also to Chicago and points beyond.

The Chicago, Peoria & St. Louis is added to this system, because the Rock Island is weak in coal resources and the mines along the Chicago, Peoria & St. Louis are naturally tributary to the Rock Island system.

The Lake Erie & Western is left out of this system, although at present controlled by the New York Central.

The Northern System

Map No. 2, the Northern system, might almost be called the Hill system. Its backbone is the Great Northern with $250,000,000 of capital stock, paying 7 per cent dividends and earning more, and the Chicago, Burlington & Quincy, with $110,000,000 capital stock, paying 8 per cent and earning more. To these roads is added the Erie, in which the late James J. Hill was at one time interested.

The Shawmut road is added to the Erie in order to strengthen its hold on the bituminous traffic for the East. With short running rights from the southern end of the Shawmut for about thirty miles from Freeport the system would have access to the city of Pittsburgh.

The Hocking Valley would strengthen the Erie's coal traffic for Chicago and points beyond.

The Ann Arbor, together with the Green Bay & Western, makes a trans-lake line for coal and other commodities from Toledo practically straight to St. Paul.

The Toledo, St. Louis & Western forms a direct connection for the Erie to St. Louis and the Southwest.

The Kansas City Southern furnishes a through route for the Chicago, Burlington & Quincy's grain to the Gulf and furnishes lumber northbound.

By adding the Louisiana Railway & Navigation to the Kansas City Southern, an entrance for the system is secured into New Orleans, making an excellent Kansas City-New Orleans line. The Louisiana Railway & Navigation is also added to this road in order to strengthen its hold on the lumber situation.

The Midland System

Map No. 3, called the Midland system, has as its backbone the Illinois Central, with $110,000,000 of stock, on which 6 per cent is being paid and more earned and the Lehigh Valley with $60,000,000 of stock, on which 10 per cent is being paid.

The Nickel Plate is the logical connection of the Lehigh Valley between Buffalo and Chicago, and forms an excellent New York-Chicago line.

By adding to this system the Lake Erie & Western, out of the New York Central system, it secures an entrance into Indianapolis and also in connection with the Illinois Central lines a fairly good line from eastern points to St. Louis.

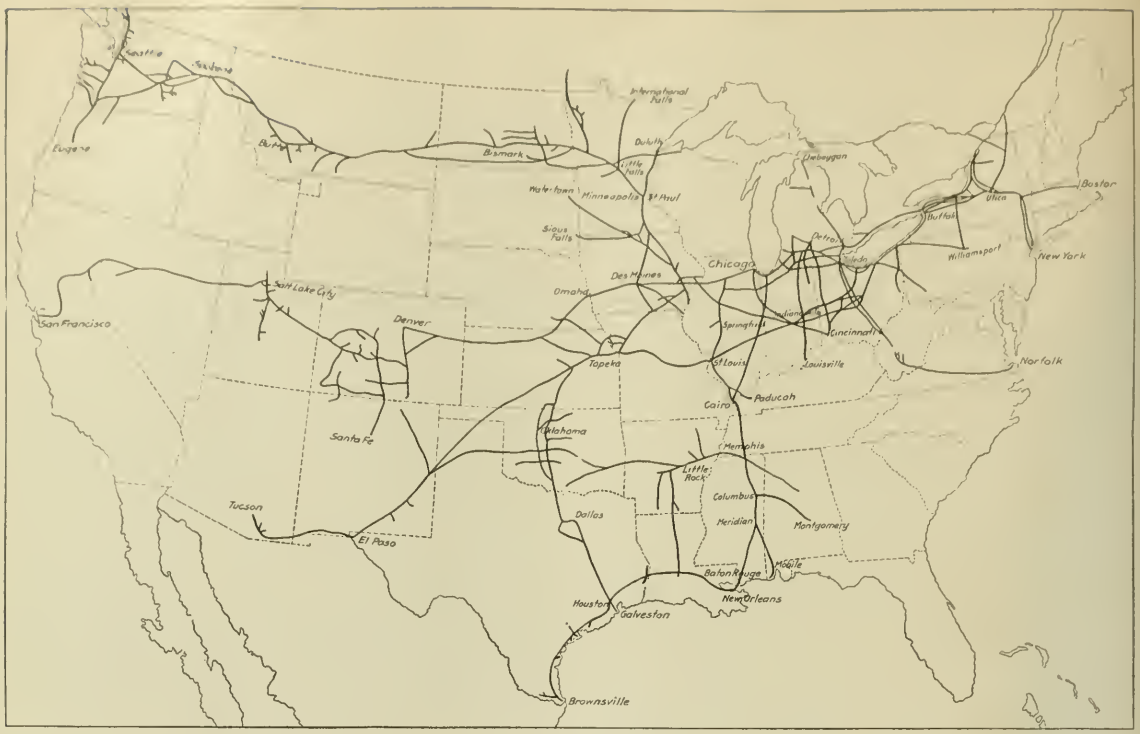
The Minneapolis & St. Louis forms the logical extension of the Illinois Central lines to the northwest and makes a fairly good line from Chicago to the Twin Cities.

By adding the Chesapeake & Ohio lines the old Newport News and Mississippi Valley route of C. P. Huntington would be realized. The Chesapeake & Ohio would feed heavy coal tonnage to the Lake Erie & Western and the Illinois Central lines and will in return take grain to Hampton Roads.

The Chesapeake & Ohio in connection with the Carolina, Clinchfield & Ohio and the Seaboard Air Line makes an excellent through line from Chicago and all points in the Middle states to the Southeast and whenever the Illinois Central builds its long contemplated line from Birmingham to Jackson, Miss., through the Pearl River valley, a New York-New Orleans through line is created in competition with the present line over the Atlanta & West Point and the Louisville & Nashville roads. This combination also makes a direct line from St. Louis, Mo., to Savannah, Ga., and Jacksonville, Fla.

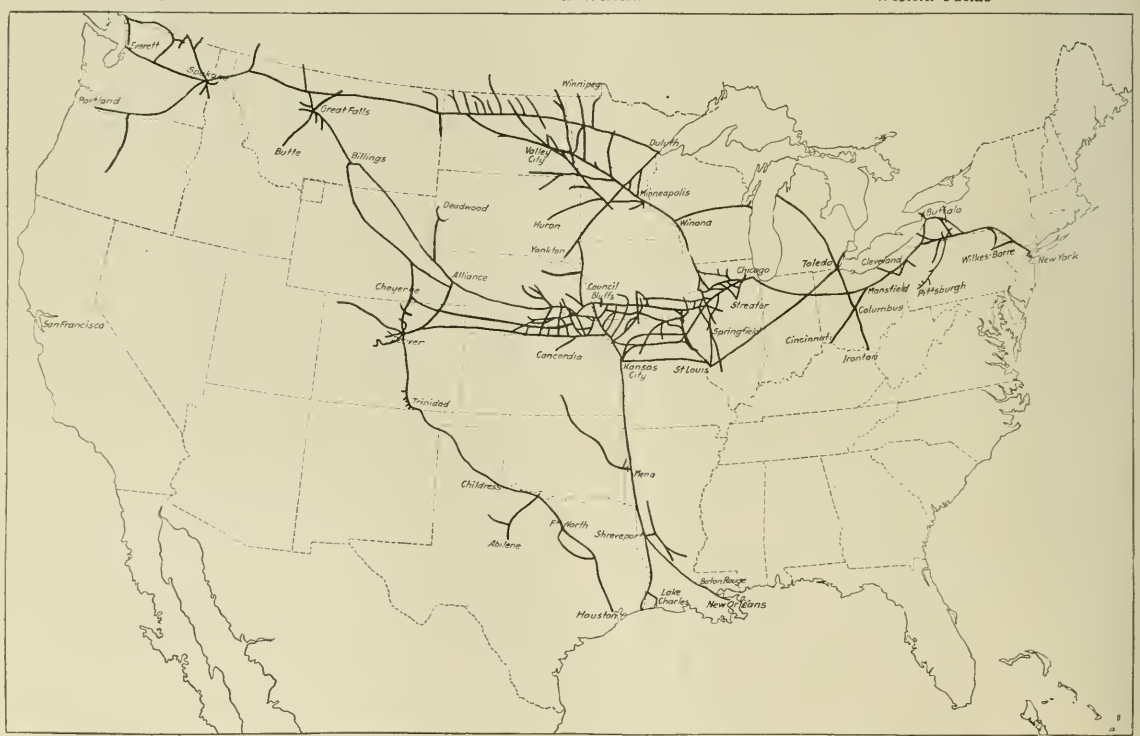
The St. Louis Southwestern, together with the San Antonio & Aransas Pass form a logical extension of this system to the extreme southwest.

By adding the Missouri & North Arkanses, with running rights from Joplin to Kansas City, Kansas City secures a



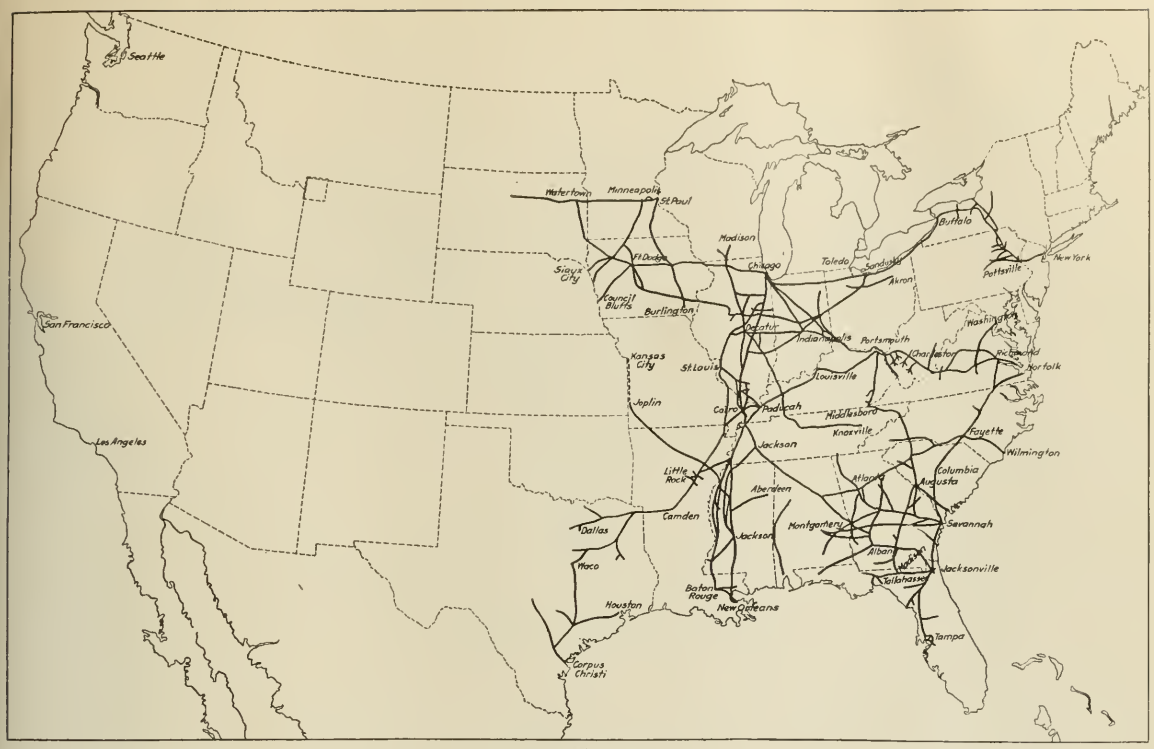
The Central

Chicago, Peoria & St. Louis
Chicago, Rock Island & Pacific
Denver & Rio Grande
El Paso & Southwestern
Mobile & Ohio
New Orleans, Texas & Mexican
New York Central, exc. Lake Erie & Western
Northern Pacific
Virginian
Western Pacific



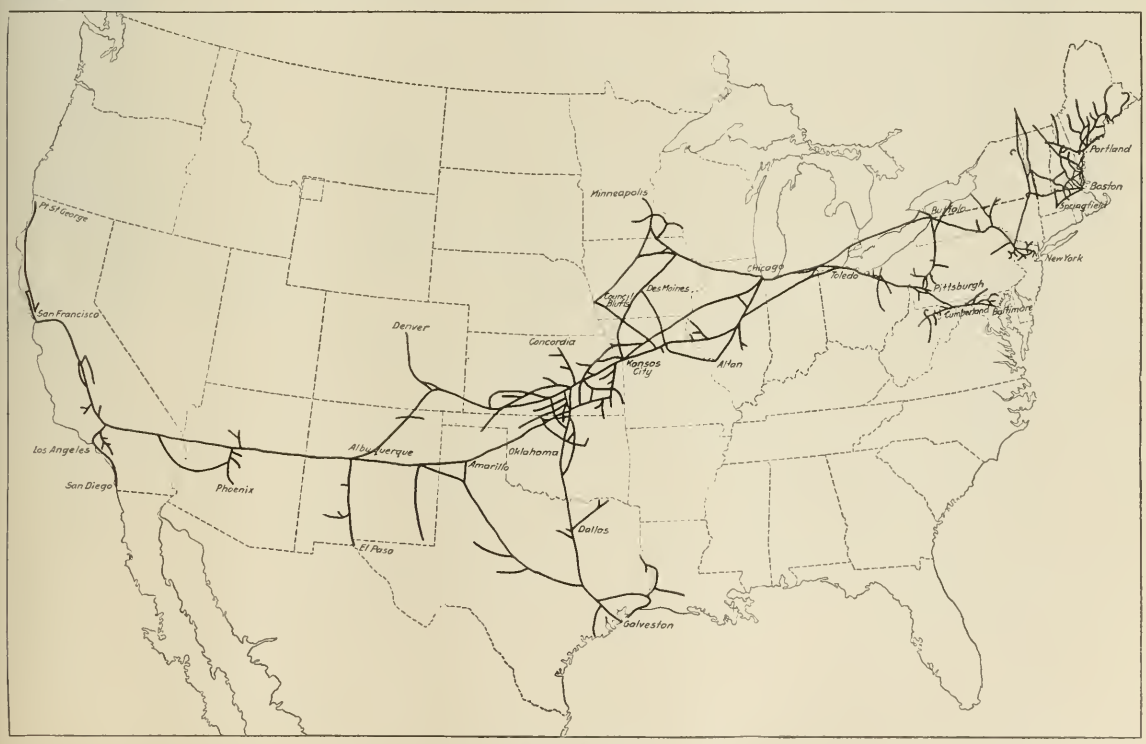
The Northern

Ann Arbor
Chicago, Burlington & Quincy
Colorado & Southern
Denver & Salt Lake
Erie
Great Northern
Green Bay & Western
Hocking Valley
Kansas City Southern
Louisiana & Arkansas
Louisiana R. R. & Navigation
Midland Valley
Pittsburgh & Shawmut
Pittsburgh, Shawmut & Missouri
Toledo, St. Louis & Western



The Midland

Alabama, Tennessee & Missouri
Carolina, Clinchville & Ohio
Central of Georgia
Chesapeake & Ohio
Cincinnati, Indiana & Western
Georgia & Florida
Georgia Coast & Piedmont
Illinois Central
Lake Erie & Western
Lehigh Valley
Minneapolis & St. Louis
Missouri & Northern Arkansas
New York, Chicago & St. Louis
San Antonio & Arkansas Pass
St. Louis Southwestern
Seaboard Air Line
Tennessee Central



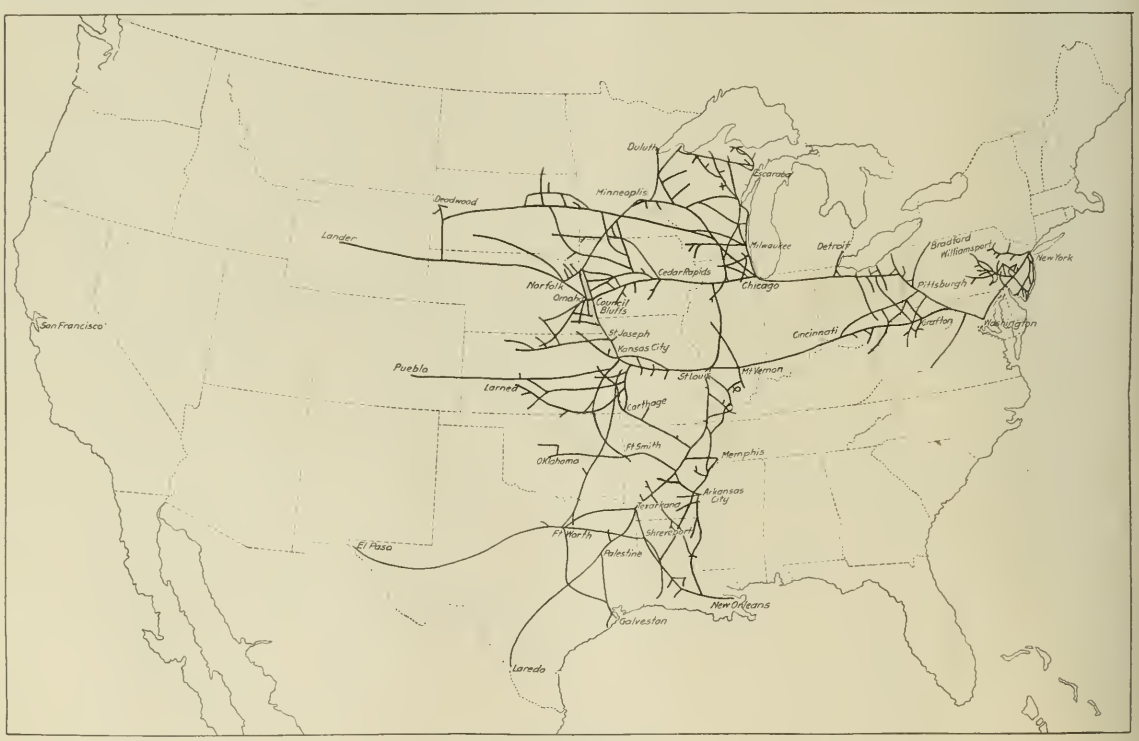
The Interocean

Atchison, Topeka & Santa Fe
Boston & Maine
Buffalo, Rochester & Pittsburgh
Chicago Great Western
Delaware & Hudson
Delaware, Lackawanna & Western
Maine Central
Pittsburgh & Western Virginia
Rutland
Wabash
Western Maryland
Wheeling & Lake Erie



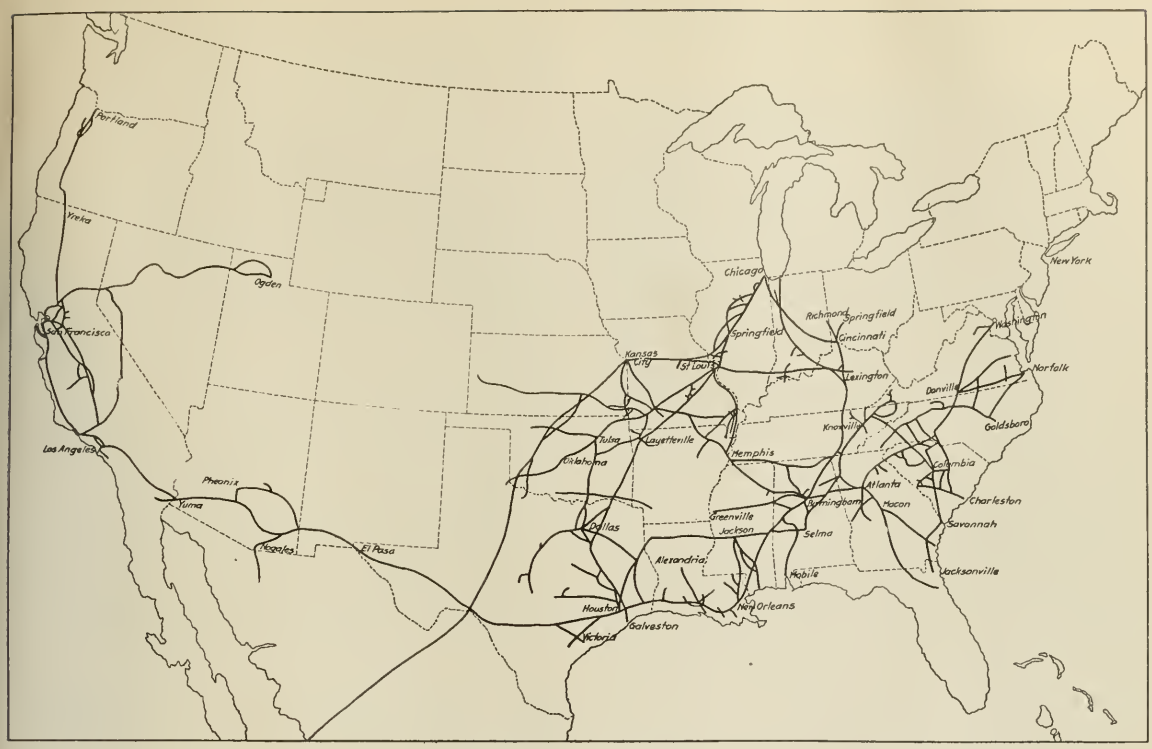
The Union

Buffalo & Susquehanna
Chicago, Milwaukee & St. Paul
Chicago, Terre Haute & Southeastern
Lehigh & New England
Los Angeles & Salt Lake
Missouri, Kansas & Texas
New York, New Haven & Hartford
New York, Ontario & Western
Pennsylvania Railroad
Pere Marquette
Union Pacific



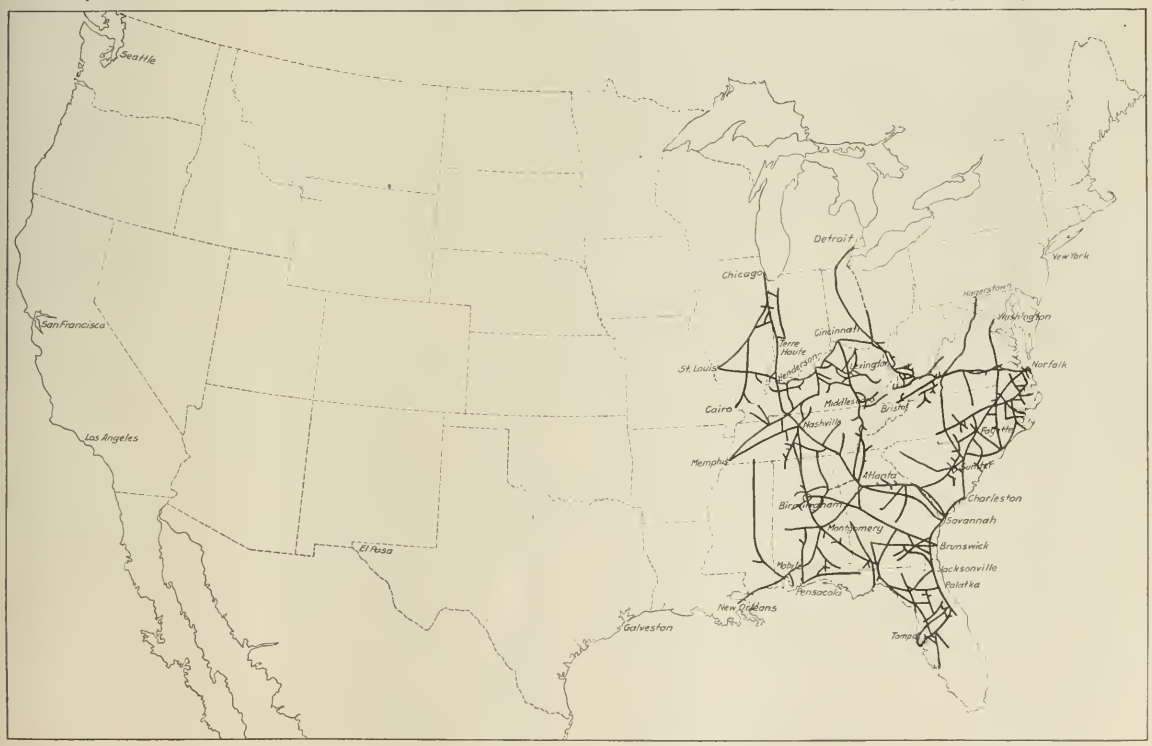
The Continental

Baltimore & Ohio
Central of New Jersey
Chicago & North Western
Chicago, St. Paul, Milwaukee & Ohio
Fort Smith & Western
International & Great Northern
Litchfield & Madison
Missouri, Oklahoma & Gulf
Missouri Pacific
Reading
St. Louis, Iron Mountain & Southern
Texas & Pacific



The Southern—Pacific

Alabama & Vicksburg
Chicago & Alton
Gulf & Ship Island
Kansas City, Mexican & Orient
Chicago, Indianapolis & Louisville
New Orleans Great Northern
St. Louis-San Francisco
Southern Ry. excepting Mobile & Ohio
Southern Pacific
Texas Midland
Vicksburg, Shreveport & Pacific



The Southeastern

Atlanta & West Point
Atlanta, Birmingham & Atlantic
Atlantic Coast Line
Chicago & Eastern Illinois
Detroit, Toledo & Ironton
Georgia Railroad
Georgia, Florida & Alabama
Gulf, Mobile & Northern
Louisville & Nashville
Louisville, Henderson & St. Louis
Nashville, Chattanooga & St. Louis
Norfolk & Western
Norfolk Southern
Rights, Toledo-Columbus
Savannah & Atlanta
Western of Alabama

new connection toward New Orleans, via the Illinois Central route and also a connection with the St. Louis Southwestern system.

The Interocean System

Map No. 4, called the Interocean system, has as its backbone, the Atchison, Topeka & Santa Fe, with $222,000,000 of common stock on which 6 per cent dividends are paid and much more earned and $125,000,000 of preferred stock, paying 5 per cent dividends; also the Delaware, Lackawanna & Western, with $42,000,000 stock on which 20 per cent is being paid, and the Delaware & Hudson, with $42,000,000 of stock on which 7 per cent is being paid. This huge system can easily carry the Boston & Maine, which is to have running rights from Albany to Buffalo, at which point it would connect with the Wabash, and thus secure a direct route to the West.

There is also added the Buffalo, Rochester & Pittsburgh to strengthen the Lackawanna's hold on the bituminous tontage of the East and also to give an outlet to the Boston & Maine direct to the Pittsburgh district.

The Wabash forms an excellent connection for the Lackawanna to the west, touching as it does the most important points in the Middle West.

There is added to this system the Western Maryland, the Pittsburgh & West Virginia and the Wheeling & Lake Erie, making a through line from Toledo to Baltimore on Chesapeake bay. Thus the eastern end of the system, the Boston & Maine, would become part of a system with its own rails into the anthracite region as well as into the bituminous region of western Pennsylvania and also forming water connection with another coal road running to the Fairmount, Somerset and Georges Creek regions.

The Chicago Great Western would form the logical line for this road to the northwest and would also give access for the Santa Fe system to the Twin Cities.

The Union System

Map No. 5, called the Union system, has as its backbone the Pennsylvania Railroad, with $500,000,000 of stock, on which 6 per cent is being paid and more earned and the Union Pacific with $100,000,000 of preferred stock, on which 4 per cent is being paid and $222,000,000 common on which 8 per cent is being paid, and more earned.

There is added to this system the New York, New Haven & Hartford and the New York, Ontario & Western, also the Lehigh & New England. New England thus gets direct access via the Poughkeepsie bridge with both the anthracite and bituminous regions.

The New Haven and Ontario & Western lines should also have running rights from near Poughkeepsie to Buffalo, where they would connect with the Pere Marquette lines and thus the New Haven would have a direct through route to Chicago through the manufacturing districts of Michigan. Thus the large manufacturing interests there would be brought directly on a railroad running to the coal and iron districts of Pittsburgh and, as stated, also have their New England connections improved.

As a connection between the Union Pacific and the present Pennsylvania system, the Chicago, Milwaukee & St. Paul road with its double track line between Chicago and Omaha serves admirably.

The Oregon-Washington part of the Union Pacific system makes an excellent connection for the Chicago, Milwaukee & St. Paul at Spokane for Portland and the competition between the present Union Pacific system and the Chicago, Milwaukee & St. Paul in Eastern Washington, is not important.

The Missouri, Kansas & Texas is a natural extension of the Union Pacific to the Gulf of Mexico. There is added to this system in the Middle West the Chicago, Terre Haute & Southeastern, which handles about 5,000,000 tons of coal annually which would strengthen the St. Paul system which is weak in its coal supply. This system also serves the Bedford stone district and would give the Pennsylvania lines a hold on this traffic which they now do not possess.

The Continental System

Map No. 6, called the Continental system, has as its backbone the strong Chicago & North Western, with $145,000,000 of common stock, paying 7 per cent and earning more, and $23,000,000 of preferred stock, paying the same rate.

The eastern end of the system is formed by the Baltimore & Ohio, which is paying 4 per cent dividends on $160,000,000 common and 4 per cent on $60,000,000 preferred. There are added two strong roads in the East, which form a natural connection with the Baltimore & Ohio, that is the Reading, with $70,000,000 of 4 per cent preferred stock and $70,000,000 of common stock, on which 8 per cent dividends are being paid, and also the Central of New Jersey.

In the southwest there are added to these roads the original Missouri Pacific system, consisting of the Missouri Pacific, the St. Louis, Iron Mountain & Southern and the International & Great Northern and Texas & Pacific.

There is also added, in order to strengthen the Missouri Pacific system, the Missouri, Oklahoma & Gulf, running from Joplin southwest to Denison and forming a through line from Kansas City to the southwest. This forms a very strong system with a heavy coal, grain and lumber traffic.

The Southern-Pacific System

Map No. 7, called Southern-Pacific system, consists of the present Southern Pacific with its $275,000,000 of stock, on which 6 per cent is being paid and more earned, together with the Southern Railway, which of late years has grown much stronger, also the St. Louis-San Francisco, which is more or less supplementary to both of these lines, forming a direct line to St. Louis and Kansas City for the Houston & Texas Central division of the Southern Pacific, and also forming a direct line via Memphis to Kansas City, for the Southern Railway system from Birmingham, and from Chattanooga.

The Kansas City, Mexico & Orient, in connection with the Southern Pacific at Alpine, and the 'Frisco at Wichita, forms a short connection for the Southern Pacific into Kansas City and also an excellent line to Mexico, whenever things settle down in that unfortunate country.

The Chicago & Alton forms the logical connection for this system from Kansas City and St. Louis to Chicago.

The Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific form a line into Texas through the Shreveport gateway.

The Texas Midland is a link between the Paris Division of the Frisco and the Houston & Texas Central and the Gulf & Ship Island, should be a natural feeder to the New Orleans & Northeastern Division of the Southern Railway.

Southeastern System

Map No. 8, called the Southeastern system, has as its backbone the Norfolk & Western, paying 8 per cent on $120,000,000 common and 4 per cent on $22,000,000 preferred stock; the Atlantic Coast Line, paying 7 per cent on $67,000,000 common stock, and the Louisville & Nashville, also paying 7 per cent on $72,000,000 of common stock.

There is added to this system the Norfolk Southern on the southeast, which forms the natural supplement to both the Coast Line and the Norfolk & Western, Atlanta, Birmingham & Atlantic, which makes a better through line from Birmingham easterly.

The Georgia, Florida & Alabama is the natural feeder of the Atlantic Coast Line.

The Savannah & Augusta makes a new through line in

connection with the Georgia Railroad from Savannah via Atlanta to all Ohio river points.

The Chicago & Eastern Illinois forms the logical entrance for this system into Chicago via Evansville and in connection with the Gulf, Mobile & Northern and Paducah division of the Nashville, Chattanooga & St. Louis, makes a new Chicago-New Orleans through line.

The Detroit, Toledo & Ironton brings the Norfolk & Western into Detroit and also in connection with the Norfolk & Western via Roanoke and the Winston-Salem Southbound makes a good through line from all points in the Southeast to points in Middle West. This would be a system touching all points on the Atlantic Gulf coast from Washington to New Orleans, forming a strong through line from the East, Middle West and Chicago and St. Louis to all points in the Southeast.

Terminals and Belt Lines, Canadian Lines, Etc.

The matter of consolidating the terminals and the building of belt lines for joint use has been dealt with separately in the body of the plan.

There are a number of comparatively short railroads, as well as lines controlled by the three large Canadian railroad systems, which have not been apportioned under the above plan.

Some method can undoubtedly be worked out, under which the consolidated railway companies may be allowed to increase their dividends above 6 per cent whenever rates are reduced below a certain level; in other words, in order to maintain the inducement for close operation the railroad companies might be allowed for their stockholders one-third or one-half of reductions given to the public.

Undoubtedly the personal initiative to operation officials will be perpetuated under the above plan, because the subordinate will always look for promotion as a reward for successful results.

This whole plan will probably be objected to on the ground that these railroad systems seem entirely too big and that it is beyond human ken for any set of officials to manage and supervise 40,000 miles of railroad, earning annually nearly one billion dollars. This should be no more difficult than the management of the United States Steel and other large corporations earning usually around a billion dollars or more. The public wants fewer railroad companies; it wants them to be strong financially and in every other way so it may be well served, and it wants competition. The above plan appears to be the only one under which the weak lines can properly be co-ordinated with the strong lines without reducing competition.

The question of physical valuation has been the bugbear of the railroad situation for many years. Earning capacity is probably the best test of a fair value of properties, but judging from the testimony before the Congressional Committee the bulk of the people and members of Congress themselves still seem to think the railroads are over-capitalized; therefore, the time and expense necessary for valuation must be spent.

Work of American Railway Forces in France*

A Review of the Problems Encountered by the Sixteenth Engineers in Building Transportation Facilities

By Major O. C. F. Randolph

Manager of Sales, Building Department, H. K. Ferguson Co., Cleveland, O.

THE SIXTEENTH ENGINEERS was recruited from railway engineering and operating men principally from Cincinnati, Cleveland, Toledo, Detroit and Grand Rapids, immediately after war was declared. H. Burgess, United States district engineer at Detroit, was made colonel, and G. H. Webb, chief engineer of the Michigan Central, lieutenant colonel. The regiment was mobilized at the Detroit fair grounds under a war department order of June 5, 1917. On July 27 it left for Is-sur-Tille, France, via Halifax and England. On arrival at its destination, the regiment was assigned immediately to the construction of needed facilities for an advance base at this point.

The distribution of material across the front for the northern sector in France was to be made from Gievre and for the southern sector from Is-sur-Tille. Gievre was at the same time to serve as a main storehouse. Each depot was to hold reserve supplies for a million men—Gievre for six months and Is-sur-Tille for one month. In addition, each one necessarily maintained a mobile supply, so that they could constantly keep a million men operating in the field without disturbing the permanent reserve.

This was our problem: the building of docks of sufficient size to handle supplies; a terminal at the base to facilitate their handling; an intermediate base at Gievre and an advance base at Is-sur-Tille, and engine terminals and divisional yards to handle the increased traffic.

All materials and tools had to be bought in the same manner that they would in this country. Of course, some of the supplies were secured from some of our own forces, but this involved as much trouble as buying them here. For a large job, the source had to be located, availability determined upon and the initiative for that necessity rested upon the man desiring the supplies. In this connection it is worthy of note that we never caught up with lumber, or rather, it never caught up with us, as up to the time I left we still had a man looking for lumber and were taking every stick that we could secure. At Is-sur-Tille the vast majority of the lumber was secured from Switzerland. The Swiss Government several times threatened to shut down on it, but never did. We even received numerous cars from German railroads, some of them having shipping tags on them which indicated they had come from Germany and at a recent date. Our agreement with the Swiss mills called for our furnishing cars and they returning them to us. Probably the Germans had the same arrangement, and they possibly secured some of our cars as we secured some of theirs. Lumber was also secured in large quantities from Scandinavia. Toward the latter part of the work at Is-sur-Tille we began to secure lumber from the American mills. These mills were operated by the 10th and 20th Engineers, who were foresters recruited from the lumber regions of this country. They brought their own equipment, and set up the mills in the French forests.

Although our men were experienced lumbermen and operated in the forests they could only cut, even under the stress of war conditions, such trees as were indicated by French

*Abstracted from an address delivered before the Cleveland, Ohio, Engineering Society on March 25. Major Randolph joined the army in July, 1917, as second licutenant with the Sixteenth Engineers, Railway, with which unit he was connected until discharged on December 15, 1918.

forestry authorities. We could not cut a single tree, although we bought the land, or made proper arrangements with the owners, without receiving the consent of the government forestry officials. When the lumber started coming, it came by the train load and contained nothing but 3 in. by 9 in. and 1 in. boards. The boards had not been edged, but were delivered just as they came from the gang saw.

Our labor was supplied by the 1,700 men in our regiment, 3,000 infantrymen and 2,000 other engineers. There were also 600 Spanish contract laborers present.

In order to secure the maximum output of work from these men, every project was scheduled and time was the reward given the men. A portion of work was given to a man and any time saved was his own. This really produced wonderful results. The man day output for 4,000,000 board feet of lumber was 350 ft. per man. That includes all overhead hanging of warehouse doors, excavation and other labor. When in Washington I looked over the costs for American camps, and using their rate of wages, they averaged about one-half that output on their carpentry. Their work was but little more difficult than ours and their figures included carpentry alone with no overhead.

On one occasion we had a camouflage factory to build in Dijon. We were notified one Thursday to get ready to build it, the site was indicated, and we shipped the lumber from Is-sur-Tille at once. On Saturday we received word that we might go ahead with the work. The project was to include two buildings of the warehouse type, one 300 ft. and one 400 ft. long, also an open shed 40 ft. by 500 ft., with nothing except a roof. Our gangs were well organized at that time and the camouflage company was at full strength of 250 men.

The superintendent and I went to Dijon Sunday and laid out the buildings on the ground, also scheduled the work. Monday at 8 o'clock our men arrived from Is-sur-Tille and at 9 were working. The lumber had arrived on Saturday and we had started six trucks hauling it the two miles to the site, at 7 a. m. Monday. The project was finished on Thursday, and on the same day we received a request from the chief of engineers to submit monthly progress reports on the work and to send him the date of completion.

We left Is-sur-Tille in March for the British front. There we built a narrow gage track and a standard gage rail head, the narrow gage connecting the rail head, an engineering dump, an ammunition dump with the front, with leads to light artillery positions. The ruling grade was 2 per cent and the sharpest curve was of 30-meter radius. I believe the speed limit was supposed to be 8 miles per hour, though they ran 15 and 20. In 20 miles of track, a cut of 4 ft. and a fill of 5 were the largest; a 2-foot cut was heavy and most of the grading consisted of 6-in. cuts or fills. The cuts were 9 ft. wide and the fills 10. We used corrugated iron in half segments for culverts. Everything except the large cut and fill mentioned was waste and borrow.

As this work progressed we were short of labor for the excavation. The British had a number of Chinese companies scattered around the country, there being a camp of them not far from us. We convinced the British commanding officer that we could stake out the dirt work and give them piece work. We finally secured one company of about 500 Chinese for one end of the work. We cross sectioned it all and laid the work out each morning for the Chinese. They worked in groups of 60 and we gave them as close to 4½ yards each as possible, a little over, if anything. They usually finished around 4 o'clock.

On the completion of this work, we had to double track a section of the railroad from Abberville to Revent. Our section was from St. Requet to Coulevilles. This was the only line of lateral communication left after the March drive. The line from Annes to Arras was not actually taken, but it was under shell fire and certainly was threatened. A good example of what, in our Yankee assuredness, we were pleased to call European stupidity and lack of progressive methods, was exhibited here. The section we were on was heavy work, the cuts and fills being about 50 or 60 ft. Most of the fills had been made for double track as well as part of the cuts. The single track ran down the center of the grade and the British and French authorities would not permit us to throw the track, so a great part of this good grade had to go to waste. They would not permit the existing main to be touched, claiming that if we attempted to throw it the interference to traffic would be more than they could afford. It follows, of course, that they refused to let us use the main line to haul dirt over. The only time we could use it was to unload ties and rail. We handled all the dirt by hand on meter-gage track with ½-yd. and 1-yd. Decauville cars.

After completing this double track we went back to the Nevers cutoff, which was quite a project. The line was 5½ miles long and was a short cut across a meander of the Loire river, which the Paris, Lyons, Mediterranean line from San Mojan had to negotiate on the way to Is-sur-Tille. The saving in mileage was slight, but the saving in elapsed time because of terminal congestion was from 12 to 24 hours. The line to be built involved about 200,000 yards of rock excavation and 300,000 yards of fill. There was also a bridge over the Loire river, which was perhaps 3,000 ft. long, the approach to which constituted one of the heavy fills, most of which was secured from side borrow.

The bridge across the Loire was built with pile approaches and had 14-ft. spans. The river spans were 60 ft. girder spans on pile clusters. River piles were driven from either end with two steam hammers on scows and the approaches were driven by a steam track driver.

We placed the girders over the P. L. M. main line with a Bay City crane. The girders weighed about seven tons, so this was no particular problem, but it was of great interest to the French. They had their superintendent on the job with their division engineer; they came with many misgivings as to what might happen to their track. They left, much impressed with our boys. They were never, however, sufficiently impressed to permit us to put a switch into their main line. Whenever it became necessary to cut the main line it became necessary to have the P. L. M. men do it.

What is to become of these projects we built was always a problem to us, and probably is a big problem to the men that are now in France. Our contract with the French for the railroad work was made with the provision that if they operated over the lines, or the yards, or both, for a period of five years after the war, they should pay the actual cost of the construction as the purchase price for the properties. If they did not so operate over them, they were not to become involved at all. In other words, the lines were thrown back on our hands.



Railway Engineers' Supply Train

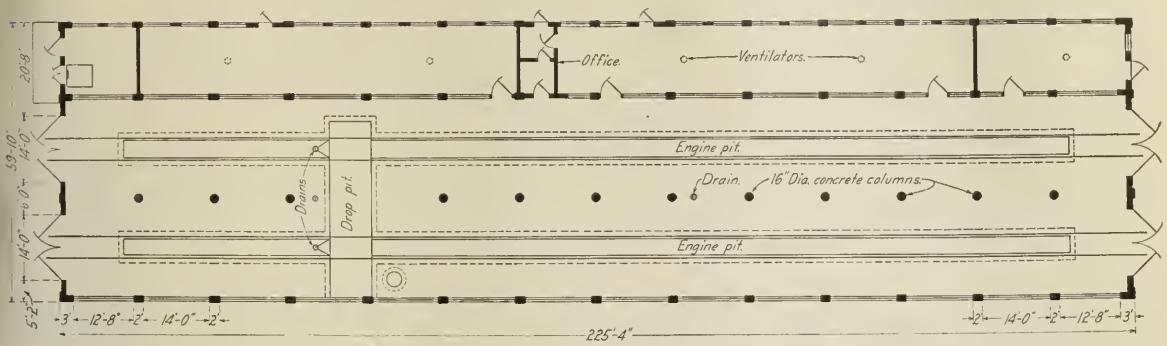
A Rectangular Reinforced Concrete Enginehouse

This Design Was Particularly Adaptable to a Location Where Space for Expansion Was Restricted

THE LONG ISLAND RAILROAD recently completed at Long Island City, N. Y., a rectangular reinforced concrete enginehouse to replace an old brick and timber building, also rectangular in shape, erected in 1888, which had become obsolete. The old building was one of a number of facilities at this terminal, and because of the restricted space available for expansion any relocation of the building would require changes in the other facilities.

To meet this situation it was decided to build a rectangular house on the site of the old building. The new structure is 225 ft. 4 in. long by 44 ft. 4 in. in width with a lean-to 15 ft. 6 in. wide also of reinforced concrete construction, extending the full length of the north side of the house proper. Like the old house, the new structure accommodates light repairs only, the lean-to housing the air compressors, generators, machine shops, storeroom, office and oil house.

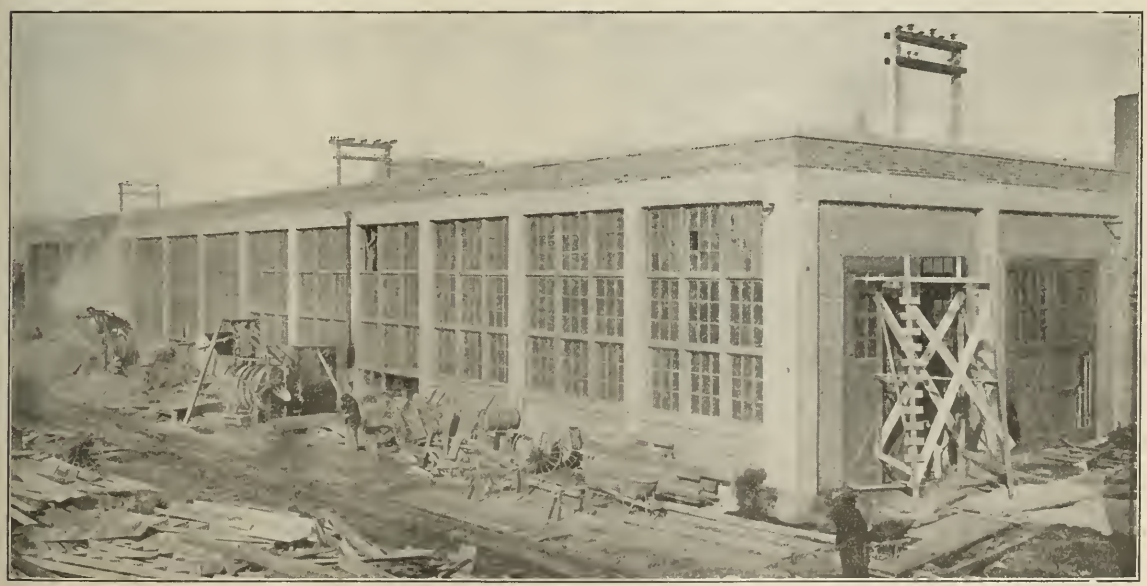
The new enginehouse provides for two tracks spaced 20 ft. center to center and supported over the pits to within 10 ft. of each end of the building. It is designed to accommodate three locomotives on each track and consists of 14 panels spaced 16 ft. center to center of columns, the space between columns being occupied by windows and brick curtain walls.



Floor Plan of the Engine House

The building is located within 150 ft. of tidewater and is on made land. The entire structure is carried on wood piles 30 to 35 ft. long, some of which supported the old building. New piles were driven where necessary.

The character of the foundation made it necessary to support the tracks in the house and to make provision for jacking foundations. To provide this support, piles, spaced 5 ft. between centers, were utilized or driven along the lines of the rails. The manner in which this single line of piles



An Exterior View of the House Shortly Before Completion

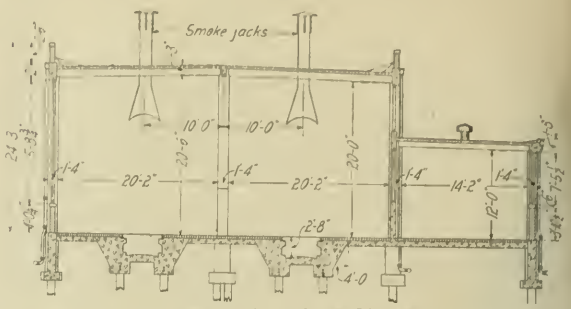
was utilized to provide support also for jacking by extending the engine pit walls laterally and the provision of a batter inwardly is indicated on the drawing showing a section through the engine pits. A drop pit 8 ft. 8 in. wide and 5 ft. 6 in. deep connects the two track pits.

The floor in the house proper consists of an 8-in. concrete mat upon which vitrified paving blocks were placed on edge to accommodate the heavy trucking. The lean-to has the same paving as the engine house and the entire building is steam-heated and electric-lighted.

The roof, like the building, is of reinforced concrete construction, and consists of three panels in each 16-ft. bay. The roof beams are 1 ft. 3 in. deep, while the slab is 3½ in. thick and is protected by Barrett specification roofing. The roof supports two pairs of reinforced concrete poles carrying electric light and power lines and a pent house for the accommodation of the transformers and the electrical equipment.

Owing to the proximity of salt water and the atmospheric conditions obtaining wooden sash were installed instead of metal. Copper flashing was specified instead of galvanized iron for the same reason. The 12 smokejacks are of the Johns-Manville asbestos-board type.

Outside of the building and to the east, two wash-out pits of reinforced concrete construction, 40 ft. long, have been installed adjacent to an installation of the National Boiler Washing Company. The area occupied by this facility is also paved with vitrified brick on a concrete base.



Cross Section of the House

The plans for this project were prepared and the building constructed by the Austin Company, Cleveland, Ohio, under the supervision of L. V. Morris, chief engineer of the Long Island, and G. C. Bishop, superintendent of motive power.

An Important Development in the Railways of Spain

With an Account of a Project for a Proposed New Trunk Line from France to the Straits of Gibraltar

By F. Lavis

In Three Parts—PART II.—Statistics and Laws

General railway statistics for Spain are published by the government in the "Statistics of Public Works," and an abstract of the results for some of the principal lines is given below. These figures, for the years 1908, 1909, 1910 and 1911, will give an approximate idea of conditions before the war, and some of the data for the Norte, M. Z. A., Andaluces and Central Aragon for 1914, 1915 and 1916, obtained from other sources, will show what changes have been caused by the increased costs of operation, principally the higher cost of coal in those years. No figures were available for the year 1917, but it is known that the operating costs were much higher in 1917 than in 1916, and even in this latter year evidence of an increased operating ratio and consequent decrease in net returns were observable. On the Central Aragon Railroad, where the operating ratio had been approximately 50 per cent, the greatly increased cost of coal was expected to bring it up to nearly 80 per cent in 1917, although the gross revenue was higher.

F. C. Del Norte

This is the most important system in Spain; it operates principally to the north and west of Madrid but has a line through the Ebro valley to Barcelona and down the coast from Tarragona to Valencia.

	Kilometres	Miles
The total length is	3,692	2,289
Second track	426	264
Total main line track	4,118	2,553
Under construction	67	42
	4,185	2,595

The revenues from operation, and expenses for 1915 and 1916, the last two years available, were as follows (in pesetas):

	Gross receipts	Expenses	Net	Ratio
1915	154,309,816	78,402,533	75,907,283	48.5
1916	172,713,940	100,225,800	72,488,140	58.1

Railways of Spain

Revenues of some of the principal lines

	Length kilometres 1911	Net revenue from operation Pesetas* per kilometre 1908	1909	1910	1911	Operating ratio 1908	1909	1910	1911
M. Z. A.	3,664	7,256	17,737	18,609	18,693	44.6	43.0	41.7	43.0
Norte, whole system	3,687	19,795	19,134	20,877	21,480	43.8	45.5	44.2	43.8
Main line to Irun and branches	910	28,105	27,258	29,871	28,654	39.2	42.1	41.4	43.1
Lerida-Tarragona	103	7,193	8,448	7,422	10,255	63.2	59.7	62.9	55.0
Alsasua-Zaragoza	776	19,596	18,617	17,847	19,454	41.4	43.3	44.1	42.6
Andaluces	1,084	9,240	9,188	13,287	13,752	53.9	54.1	56.4	56.9
Madrid, Caceres, Portugal	775	4,683	4,401	4,692	4,131	59.5	61.8	61.4	64.8
Central Aragon	298	4,823	5,285	5,710	6,577	57.9	52.6	49.9	47.6
Medina-Vigo	295	6,497	5,199	5,727	6,183	58.6	63.9	61.6	60.6
Average of all lines, 5 ft. 6 in. gage	11,384	14,059	13,887	15,284	15,376	47.7	48.0	46.1	46.7
Meter gage—Vascongada	159	11,531	8,858	11,442	23,656	45.6	59.0	46.2	43.8
Rubla—Valmaseda	.....	.....	.....	30,743	30,550	....	....	57.6	57.9

Normally about five pesetas equal one dollar. A kilometre equals 0.62 miles.

The total revenue per kilometre for the last 14 years has been as follows:

	Pesetas per Kilometre				
	Passengers	Express	Freight	Various	Total
1903	8,428	2,854	20,852	102	32,236
1904	8,742	2,819	20,310	103	31,974
1905	8,533	3,040	20,030	184	31,787
1906	8,676	2,987	21,000	252	32,915
1907	8,963	3,203	21,670	396	34,232
1908	9,283	3,214	22,366	444	35,307
1909	9,163	3,244	22,304	427	35,138
1910	9,529	3,094	23,058	406	36,087
1911	9,850	3,226	23,884	329	37,289
1912	10,346	3,336	26,797	425	40,904
1913	10,832	3,437	27,299	483	42,051
1914	10,440	3,380	25,490	453	39,763
1915	10,083	3,473	27,839	462	41,857
1916	11,171	4,006	31,190	491	46,858

Other statistics of operation of the Norte are as follows:

Passenger kilometres	936,528,651
Average distance	56
Average fare ....Pts.	2.493
Average fare per kilometre	.043

	Division by classes	
	Proportion number	Per cent earnings
First	2.63	13.86
Second	8.73	15.23
Third	88.64	70.91

Freight ton kilometres	1,656,227,772
Average haul, kilometres	174
Average receipts per ton ....Pts.	11.211
Receipts per ton kilometre	.643

The net earnings per kilometre and the operating ratios for each part of the system are as follows, for the years 1914, 1915 and 1916, and to some extent show the effects of the war, though this was more marked in 1917.

F. C. Del Norte

per kilometre of line—pesetas

	Net revenue			Operating ratio, per cent		
	1914	1915	1916	1914	1915	1916
Main Line, Madrid to Irun	28,129	29,977	29,836	48	45	50
Santander branch	11,224	12,260	11,450	58	55	62
Barcelona branch	18,050	18,665	17,165	50	52	60
Bilbao branch	24,253	26,210	27,211	45	43	50
Asturias, Galicia & Leon	13,404	14,131	10,837	60	57	70
Lerida, Reus & Tarragona	6,348	5,953	4,483	74	73	78
Villabona—Aviles	8,016	20,821	3,389	78	61	92
San Juan de las Abadesas	17,363	17,958	13,147	50	50	67
Soto del Rey	7,786	13,586	4,920	71	61	83
Almansa, Valencia, Taragona	19,170	21,603	23,810	50	50	54
Valencia, Uttel	6,719	5,307	6,739	63	69	66
Entire system	19,187	20,561	19,633	50	51	58

Madrid Zaragoza & Alicante

per kilometre, pesetas

	Gross revenue	Expenses	Net revenue	Operating ratio
1908	31,142	13,886	17,256	44.6
1909	31,119	13,382	17,737	43.0
1910	31,911	13,301	18,609	41.7
1911	32,796	14,102	18,693	43.0
1912	.....	15,113	.....	....
1913	.....	17,570	.....	....
1914	34,993	17,493	17,500	50.0
1915	36,753	18,259	18,494	49.7
1916	41,301	22,518	18,783	54.5

The annual report for the year ending December 31, 1916, gives the following figures, showing the increase in the cost of coal during the past eight years. (The M. Z. A. gets a large part of its coal from its own mines near Seville.)

	Average cost of coal per ton pesetas
1910	27.62
1911	28.88
1912	29.50
1913	32.72
1914	33.68
1915	44.62
1916	61.64
1917, probable	69.00

	Per cent of each class	
	Number	Receipts
Passenger Statistics—		
1st	4.5	26.5
2nd	11.5	12.5
3rd	84.0	61.0

Average Length of Journey

1st class	180.5 kilometres
2nd class	46.2 kilometres
3rd class	46.4 kilometres
All classes	52.5 kilometres

Receipts per Passenger Kilometre

1st class ....Pts.	0.079
2nd class ....Pts.	0.057
3rd class ....Pts.	0.038
All classes ....Pts.	0.046

Freight—	
Total ton kilometres	1,406,405,174
Average haul....kilometres	152.8
Receipts per ton....Pts.	10.48
Receipts per ton. per kilometre....Pts.	0.69

It will be noted that the average receipts per ton mile are equivalent to approximately 2.3 cts., as compared with about 0.7 cts. per ton mile in the United States.

Ferrocarriles Andaluces

This railroad operates in the south of Spain between Seville and Cadiz, Cordoba, Algeciras, Malaga, Alicante, etc.; it has a total length of 1,261 kilometres. The earnings and expenses of the entire system and some of the more important lines are as follows:

	Pesetas			
Year	Gross revenue	Expenses	Net	Operating ratio, per cent
Entire System, 1,261 Kilometres—				
1914	23,364	12,680	10,684	50
1915	24,690	13,388	11,302	54
1916	28,388	17,127	11,261	60
Seville-Jerez-Cadiz, 171 Kilometres—				
1914	34,700	18,187	16,513	53
1915	36,029	19,604	16,425	51
1916	41,519	25,252	16,267	63
Cordoba-Malaga, 196 Kilometres—				
1914	39,969	21,403	18,566	54
1915	42,540	21,170	21,370	50
1916	48,590	28,526	20,064	60
Puente-Genil Linares, 176 Kilometres—				
1914	21,203	10,556	10,647	50
1915	22,813	11,556	11,257	51
1916	26,396	14,408	11,988	54

Railway Laws

The following is a very brief outline of some of the general conditions governing the construction of railways under the laws of Spain.

Spanish railway law is based on the broad theory that the State is the owner of all lines conceded, whether for general service or private use, the concessionaires whether private individuals or companies being solely usufructs for the time of the concession.

Foreign capital employed in railway construction as well as loans for this object are under the safeguard of the State, and are exempt from reprisals, confiscations, or embargoes on account of war.

Railway construction is governed by the provisions of two "general" laws, modified in detail by many "Royal Orders" and decrees, and by the regulations promulgated from time to time by the General Direction of Public Works.

The original basic law was that of 1855; this however, after the revolution of the late 60's was superseded by the *Law of November 23rd,* 1877, which with the *Regulations of May 24th,* 1878, constitutes the general law relating to the construction of railways.

This law, however, was intended to govern only the construction of the main system of railways. It specified in detail certain lines, including those already in existence at that time which were to form the "General plan of railroads," and to which this law applied. The regulations of May, 1878, however, provided means for, and the conditions under which, other lines might be added to this system, and on December 25, 1912, a law of complementary lines was passed, the object of which was to procure the prompt construction of certain specified lines.

Besides this main system, it was proposed to build other lines of lesser importance as branches and feeders, and the construction of these lines is provided for in the *Law of Secondary and Strategic Railroads* of *February* 23, 1912, and the *Provisional regulations* for the application of this law of *August* 12, 1912. This law and the regulations "reformed" the original law of 1908 and the complementary

law of 1909. (*Note*—A detailed list of secondary and strategic lines authorized under this law with additions to June, 1916, will be found in the Railway Annual for 1916, p. 241, et seq.)

In general the law of 1877 was designed to provide lines of 1.67 meter (5 ft. 6 in.), gage for fast heavy traffic, as this was then understood. The secondary railways were to be of narrower gage and lighter construction, though there is nothing in the provisions of the law of secondary railways which would prevent its application to the construction of more substantial lines of any gage, and in any event the provisions of the law of 1877 provide for a type of construction much lighter than that necessary to meet modern main line traffic conditions.

Subsidies

Both laws provide for the construction of lines, with and without government aid, the latter having certain privileges which the former do not have. Lines receiving subventions in any form carry the mails free of charge.

The law of 1877 makes provision for the payment of a subvention equal to 25 per cent of the estimated cost, but in no case can this subvention exceed Pts. 60,000 per kilometre. The law of complementary railways of 1912 provides for an advance (Anticipo reintegrable) of Pts. 15,000 per kilometre in addition to the Pts. 60,000. This Pts. 15,000 is, however, to be returned to the state from "the first products obtained from operation."

The secondary and strategic railways may receive from the government a guarantee of interest of 5 per cent on the cost of construction up to an amount not exceeding Pts. 250,000 per kilometre unless the guarantee on a larger amount is specially authorized by the Cortes. The total amount payable under this law must not exceed Pts. 15,000,000 per annum.

If payments under this guarantee are still necessary after ten years from the date of commencing operations, the government may nominate a delegate to intervene in the management; this delegate ceasing his functions as soon as the line produces at least 5 per cent for three successive years.

When the net earnings exceed 6 per cent for three successive years, one-third of the excess after the third year shall be used toward reimbursing the government for any payments made on account of the guarantee of interest.

All concessions for lines built under the provisions of the law of secondary and strategic railways of 1912, and for all those receiving government aid, are for a period not exceeding 99 years, after which the lines revert to the State without compensation to the owners. (Some of the first lines built in 1850 and 1860 are beginning to look with some anxiety to the comparatively near approach of the termination of their concessions, as on none of them has provision been made for amortization within the specified period.)

No concession constitutes a monopoly.

The general supervision of railway construction and operation is a function of the Minister of Public Works (Fomento) acting through the General Direction of Public Works, and this in turn through five "Divisions of Railways."

On presentation of the application for a concession, which must be accompanied by detailed maps, plans, estimates, etc., in specification form, this is passed for "confrontacion y informe" to one of these railway divisions, designated by the General Direction of Public Works. This involves the checking of the maps and profiles on the ground, and of the general design of the railway, track layouts, stations, amount and kind of rolling stock, etc., etc. Modifications or changes are suggested, if necessary or desirable, and finally all these things being in order, the project is approved. This examination is at the expense of the applicant for the concession.

Up to this point the procedure is the same for any railway, but where the project receives government aid, the estimates of quantities and costs, have also to be checked and approved by the government.

Tariffs

The maximum tariffs chargeable on the proposed lines are submitted by the author of the project, and if not acceptable to the Council of Public Works, must be authorized by the Cortes. Generally speaking, the tariffs are regulated entirely by distance.

When the State guarantees the interest, the tariff rates cannot be reduced or changed without the consent of the government.

During the time the State pays any part of the guaranteed interest, it reserves the right to fix the maximum tariffs on minerals, poultry, cattle and in general, on foodstuffs, fertilizers and seeds.

Secondary lines not receiving guarantees of interest may fix their tariffs without intervention of the government, and apparently by Article 26 of the law of 1912, those lines receiving a subsidy may come under this provision, if this condition is fixed before the letting, that is, specified in the concession.

Status of Concessionaires

All corporations formed for the construction of railways must be domiciled in Spain, and are subject to Spanish laws.

All plans, etc., must be signed by a duly qualified engineer, which usually means the employment of an "Engineer of Caminos Canales y Puertos" for this purpose, notwithstanding the professional standing, etc., of any foreign engineer.

Traffic Performance in 1918

THE VOLUME of traffic handled in 1918, on which the railroads fell short of earning their standard return by approximately $200,000,000 in spite of increased rates during the latter half of the year, shows an increase compared with the test period on which the standard return is based of more than one-fifth in ton miles of freight and one-fourth in passenger miles. These results are shown by a preliminary study of the statistics of Class I railroads compiled by the Bureau of Railway Economics. Freight traffic performance in 1918 approximated 440,000,000,000 revenue and non-revenue ton miles, an increase of 1.8 per cent over 1917 and of 21 per cent as compared with the average for the test period, the years ending June 30, 1915, 1916 and 1917. This freight performance was the greatest in the railway history of the United States, surpassing even the excellent performance of 1917, nine months of which was accomplished under the supervision of the Railroad's War Board.

The following percentage comparisons of the several months of 1918 with the corresponding months of 1917 are of interest:

TOTAL TON-MILES

Month of 1918	Per cent of increase over 1917
January	d 16.4
February	2.9
March	7.1
April	8.3
May	d 4.5
June	d 3.6
July	4.4
August	6.7
September	8.8
October	3.5
November	d 2.4
December	5.3
The year	1.8

The passenger business for 1918 approximated 43,000,000,000 passenger-miles, an increase of 7.9 per cent over 1917 and of 25.7 per cent over that of the test period. As in the case of freight, this was a record-breaking achievement.

As a result of the increased freight and passenger rates made effective during the year 1918, the average receipts per ton-mile rose from 7.15 mills in 1917 to 8.56 mills in 1918. This average does not reflect the full effect of the increase in freight rates, the greater proportion of the new rates being in force only half the year. During January, 1918, the average was 7.26 mills and during December 9.85 mills, the latter month more nearly reflecting the extent of the increased rates than the year's average. The spread between January and December was 2.59 mills, or more than 35 per cent.

Average receipts per passenger-mile increased from 2.09 cents in 1917 to 2.40 cents in 1918. Here again the full effect of the increase in passenger fares is not reflected, since the increases were only in force a little over one-half the period. Statistics are not available for the month of January, but the average for December was about 2.55 cents, an increase over 1917 of 0.46 cent, or slightly over 22 per cent. It should be noted in connection with this average for December that there was an unusually heavy movement during the month of soldiers and sailors on holiday furlough, who were granted a special rate of one cent a mile, while a large number of men discharged from service were proceeding home at a special rate of two cents a mile. These factors tended to keep the December average below what would be the normal average of the passenger rate level now in effect.

The statistics of earnings and expenses of the Class I roads, which have already been published, show an increase in operating revenues as compared with the test period of 44.9 per cent, and of expenses of 74.7 per cent, while the net operating income was 23.7 per cent less than that of the test period, which represents approximately the standard return. The average receipts per ton-mile in 1918, 8.56 mills, represent an increase of 20 per cent over the average for the test period, 7.13 mills. The average receipts per passenger-mile, 2.4 cents, represent an increase of 19.4 per cent as compared with the average for the test period, 2.01 cents.

Temporary Treating Plant Pays Big Returns

Facilities Installed for Contractor Building Yard at Homewood, Ill., Reduced Boiler Repairs and Delays

Saving of the entire cost of a water softening plant in less than two months' time through the resultant economy in the fuel used in locomotives constitutes an unusual demonstration of the value of water treatment. This, in short, is the nature of the results secured by a contractor on railroad construction in the boilers of two steam shovels, six locomotives and two hoisting engines. The demonstration is especially conclusive because the isolation of the equipment limits its supply of water to a single source and because the record of performance gives a check not only on the total quantity of fuel but also on the relative amount of fuel used per unit of equipment performance.

The Walsh Construction Company of Davenport, Ia., contractor for the grading for the new Markham yard of the Illinois Central at Homewood, Ill. (near Chicago), found the water upon which it was dependent for its boiler supply so unsatisfactory as to cause serious difficulty in the operation of equipment. As a result, a water softening plant was installed which has treated all the water used in the boilers after October 27, 1918, and records of the fuel used before and after the installation of the softener constitute the basis for the conclusions reached with regard to the fuel economy. Some data were also secured on the cost of the boiler repairs, which also bear out established conclusions on the value of water treatment.

The water used was taken from a drilled well 170 ft. deep, the consumption being about 40 gal. per min. An analysis of this water made on September 26, 1918, which is reproduced below, shows that the water contained a considerable quantity of incrusting solids.

Silica	0.677	grains per gal.
Oxides of iron and aluminum	0.093	grains per gal.
Carbonate of lime	9.794	grains per gal.
Sulphate of lime	3.916	grains per gal.
Carbonate of magnesia	10.776	grains per gal.
Sodium and potassium sulphates	13.704	grains per gal
Sodium and potassium chlorides	1.360	grains per gal.
Loss, etc.	.209	grains per gal.
Total mineral solids	40.529	grains per gal.
Organic matter	Trace	grains per gal.
Total incrusting solids	25.256	grains per gal.
Total non-incrusting solids	15.273	grains per gal.

This water was used in six 46-ton, six wheel switching-type locomotives, having 155 2-in. flues, 13 ft. 6 in. long, operated at 180 lb. pressure. There were also two 70-ton steam shovels equipped with locomotive type boilers approximately equal in fuel and water consumption to the locomotives in use. In addition there was one 40 hp. locomotive-type boiler and one 25 hp. upright boiler, both used for hoisting engines. All of the boilers were in good condition when the work was started on July 24, 1918. The normal operation of the plant on the day shift was two steam shovels, four locomotives hauling dirt, one locomotive switching and spreading, and one locomotive for reserve. On the night shift one steam shovel was operated and three locomotives were used in hauling and spreading.

With water of the kind available, trouble was experienced in a short time because of the formation of scale in the boilers, which had attained a thickness of ⅛ in. to ¼ in. by the time it was concluded to install a water softener. As matters grew worse, there were engine failures almost daily, and practically all stay and crown bolt flues and mud-rings were leaking more or less. Repairs were good for about three days on the average, the time to make the repairs being from three to five hours on each boiler. One of the engines was in need of new flues and it was estimated that it would be necessary to remove all flues and many stay bolts in the rest of the boilers within two or more months. Electric welding of the flues helped for some time, but in three weeks the leaky condition was about the same as before the welding, although undoubtedly it would have been worse had no welding been done. Trouble was also being encountered with leaky boiler checks, pumps and lubricator valves, while the throttle packing was eaten or corroded by the water. Matters were not as bad as they might have been owing to the fact that there was practically one locomotive on reserve at all times, so that the boiler work on the locomotives did not interfere seriously with the operation.

As a consequence of these conditions studies were made of the possibilities of installing a water softener, and a plant was finally arranged for, which was completed ready

for operation on October 27. This consisted of temporary equipment supplied by the Railroad Water and Coal Handling Company of Chicago. It was composed essentially of a tank of 10 ft. diameter inside, an 18-ft. diameter tank, both tanks being 18 ft. high. In addition to these tanks there was a shallow mixing box mounted on top. The operation of this equipment is simple. Raw water and reagents are pumped independently into the mixing box, from which they pass as a mixture through a 10-in. pipe extending almost to the bottom of the inside tank. The water escaping in this tank rises upward in the tank slowly while the chemical action is taking place, the solid matter precipitated in the meantime being deposited for the most part in the bottom of the tank, which is equipped with a sludge valve through which the sludge may be allowed to escape at intervals. As the treated water approaches the top of the interior tank it encounters a filter which consists of a diaphragm of excelsior interposed between two grids of wooden slats. Passing through this filter the water reaches the top of the interior tank, where it is allowed to escape into the outside tank through two 4-in. pipes extending from the top of the inner tank to near the bottom of the outer tank, the latter serving as storage for the treated water.

The treating plant was placed in service on October 27. In the period from September 6 to October 27 there were a total of 650 boiler shifts in the course of which an average of 4.2 tons of coal per boiler shift was used. Comparing this with the quantity of earth moved by the contractor during this period, it was found that the cost of the coal used per cubic yard of earth handled amounted to $.0306 per cu. yd.

For a period of not quite two months following the installation of the water softener, the coal consumed amounted to 3.1 tons per boiler shift at a cost of only $.0204 per cu. yd. of material graded.

As in all other cases where water softeners have been installed, supplying water for equipment that has been badly incrusted with water that had not been treated, considerable trouble was experienced with foaming as the scale in the boilers was loosened. This necessitated the use of anti-foaming compounds. Some difficulty in the treatment has arisen from the fact that the water obtained from the well is muddy. An increased consumption of water of from 40 gal. per min. to 100 gal. per min. about the time that the softener was installed may be responsible for this condition.

Later information on the coal consumption shows that in the period from December 23 to February 1, during which a total of 437 boiler shifts were worked, the average consumption of coal was 3.8 tons per boiler shift. In a fourth period from February 1 to February 28, inclusive, during which 314 boiler shifts were used, the average coal consumption was 3.3 tons of coal per boiler shift.

Aside from the data on fuel economy the following information is available with respect to the boiler work done on the engines before and after the inception of the water treatment:

Boiler Work Cost on Boilers Used by Contractor in Markham Yard

Untreated water period, for two months previous to using treated water:

	Average per day	Per Boiler day
Boilermaker, 12 hr.	$7.85	
Boilermaker's helper, 12 hr.	4.80	
Total cost	$12.65	$1.405

Treated water period during January and February:

	Average per day	Per Boiler day
Boilermaker	$0.62	$0.07

Aside from the above there were several items of special expense on the boilers that cannot be included readily in these statistics. For instance, before the water was treated considerable expense was incurred in electrically welding the flues, amounting to $233.33 per boiler.

Saving Labor in Shop Accounting

By a Traveling Auditor

The accounting department of the railroad was not the least to be affected by the lack of men due to the demands of war. The question of using women was put aside for the reason that in accounting, especially at the shops, getting the reports in on time, entailed more or less overtime, and we were "tied" by state laws so that we could not work female employees in excess of a certain number of hours each week. It behooved us, therefore, to systematize to the point where we could get a greater amount of work out of the individual without greatly increasing his labor—increase his efficiency, as it were.

We were all requested to endeavor to systematize, and in this effort the honors fell to the chief accountant at our central shops; it will be my endeavor clearly to describe his plan (which, by the way, has worked out better than we ever dreamed it would) for the benefit of others. There were 4,500 men in these shops with a total pay roll disbursement of $300,000 and a total material disbursement of $410,000. He first considered the foundation of the accounting system, i. e., the daily time slips made out by each employee and the individual material ticket filled in by the gang foreman.

Under the old system the time slips were sorted by shops, then by rates, then by account, then posted in the first distribution, after which the totals were obtained with considerable labor. The same course was followed in the handling of the material tickets. They were priced, turned over to the accounting department, sorted, totaled by lots and posted in the distribution books. The greatest loss of time was suffered through arriving at the totals, this being done by "mental man power" and the first step therefore was in the direction of reducing the time consumed. As an experiment a calculating machine was procured. A junior clerk was put to work on the machine, and the results shortly justified the elimination of an $80 position and the employment of an experienced operator at $55 per month.

The original idea was to use the machine for handling the daily time and material tickets, but step by step the experienced operator took over additional work until at the present time not only these features are covered but all calculations, pro-rata included, are expeditiously handled by machine. As an example, classification of accounts provides that shop expenses (overhead charges) be spread over the various accounts in the individual department where the expense is incurred. As a result we find it necessary at the end of the month to make approximately 4,000 to 5,000 prorations. Calculating machines are now doing this for us, and one need only give this a passing thought to appreciate the efficiency with which machines handle these intricacies of accounting, to say nothing of the reduction in brain fag.

Having systematized the distribution details the next move was to reduce the time put in on the pay-rolls. (Keep in mind the fact that the average number of men handled by this department was 4,500.) This meant that by "man power" it was necessary to write the name, occupation and check number of 4,500 men twice each month.

After casting about for some time the bright idea of an addressing machine was thought of. One was purchased, and in a test case, with an inexperienced operator, this machine in one hour and twenty-five minutes performed work that formerly consumed 50 man hours. The first move after employing a man is to make up a plate (from approved employment application) showing his name, occupation and check number. His service record card is then stamped; a loose leaf time record sheet is next stamped; the time sheet is stamped and the plate is then put in a plate cabinet in its proper place. Thus the name, occupation and check number is always the same on all records.

The progress thus far made did not satisfy our chief accountant. He still felt there was room for improvement, especially on the pay-rolls. The purchase of a pay-roll machine was his next recommendation. Due to his previous success he had little trouble in getting a requisition through. It was necessary that some additional features be incorporated in the standard pay-roll machine in order to meet his requirements, and this was done, with the result that we now turn out our pay-rolls as indicated in the form shown.

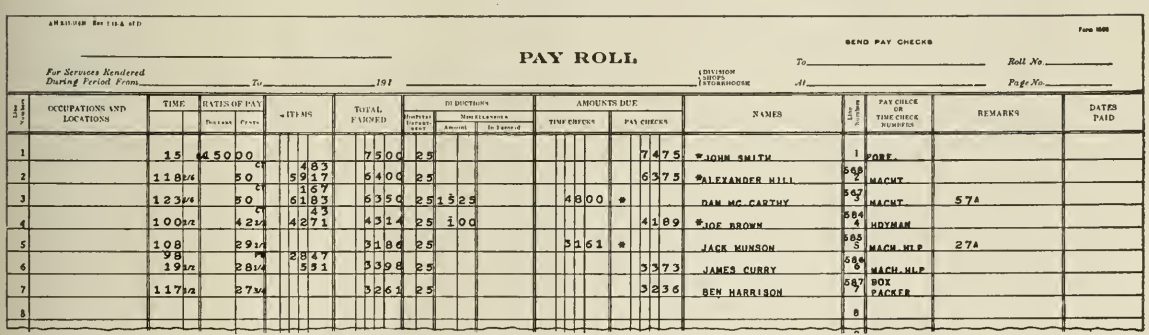
As only the one central shop was using the addressing machine the standard form pay-roll sheet is used as it would not have been economy to make a new form to accommodate the one point. It will be noted that occupation is placed on the right of the sheet instead of on the left. The addressing machine takes care of the name, check number (which appears under the caption "line numbers") and the occupation. The pay-roll machine handles all other details on the form. The entire pay-roll is first run through the addressing machine, after which it is turned over to the pay-roll machine operator for listing the time.

The time-keepers close their time-books, the earnings being determined by use of regular rate tables and the figures appearing in the first four columns are those which have already been determined, but in putting these items through the listing machine the figures are checked; that is, the total items under the caption "items" are automatically derived and printed in the "total earned" column. Next the deductions are set in and the amounts are automatically deducted from the "total earned" and placed in either of the columns "amount due." If time check has been issued the time check numbers are set in the "remark column," as shown on lines 3 and 5. By use of portable stops on the machine the carriage automatically travels from column to column. For example: The first figures in the column are set in, the lever timekeeper to be in the vicinity of the employees whose time records he maintained. This made it necessary to have a timekeeper in each of the large departments. It was found that the segregation of these men, putting them in one office under the direct supervision of the chief accountant, would be beneficial for two reasons: First, it would keep the men under a direct head at all times; second, it would permit one man helping another in case his particular work was not up to date. The only inconvenience brought about by this segregation was that of having someone watch the check boards at 7:00 a. m., 12:00 noon, 12:30 p. m. and 4:30 p. m. The timekeepers in the various shops took care of this work, and in the rearranged system it was put up to apprentice boys with very good results, as it only took a very few moments at the hours mentioned.

The saving effected by this segregation and the adding machine, plus the addressing machine, is shown in the following list of employees in the department:

	Original Force	Present Force
Main office	1 Chief accountant	1 Chief accountant.
	1 Asst. chief account.	1 Asst. chief accountant.
	3 Asst. accountants.	3 Asst. accountants.
	2 Statement clerks.	2 Statement clerks.
	1 Stenographer.	2 Calculator operators.
	1 Calculator operator.	1 Loco. timekeeper.
Station No. 1	1 Timekeeper.	1 Car timekeeper.
Station No. 2	1 Timekeeper.	1 Lead distribution clk.
	2 Asst. timekeepers.	4 Distribution clerks.
Station No. 3	1 Timekeeper.	1 Clerk.
	1 Asst. timekeeper.	1 Stenographer.
Station No. 4	1 Timekeeper	
	1 Asst. timekeeper.	Total .. 18
Station No. 5	1 Timekeeper.	
	1 Asst. timekeeper.	
Station No. 6	1 Timekeeper.	
Station No. 7	1 Timekeeper.	
	1 Asst. timekeeper.	
Total	22	

By the reduction of five men and the employment of one additional calculating machine operator, a monthly saving


PAY ROLL.

SEND PAY CHECKS

For Services Rendered During Period From _____ To _____ 191 _____ Division Shops Storehouse _____ To _____ At _____ Roll No. _____ Page No. _____

Line Number	Occupations and Locations	Time	Rates of Pay	Items	Total Earned	Deductions	Amounts Due	Names	Line Number	Pay Check or Time Check Numbers	Remarks	Dates Paid
1		15	45 00	7500	25		7475	*JOHN SMITH	1	FORE.		
2		118 1/4	50 CT	483 5917	6400	25	6375	*ALEXANDER HILL	568 2	MACHT		
3		123 1/6	50 CT	167 6183	6350	25 15 25		DAN MC CARTHY	567 3	MACHT.	57A	
4		100 1/2	42 1/2	43 4271	4314	25 100	4189	*JOE BROWN	584 4	HDYMAN		
5		108	29 1/2		3186	25	3161 *	JACK MUNSON	585 5	MACH. HLP	27A	
6		98 191/2	28 1/4 PW	2847 551	3398	25	3373	JAMES CURRY	586 6	MACH. HLP		
7		117 1/2	27 3/4		3261	25	3236	BEN HARRISON	587 7	BOX PACKER		
8									8			

Pay Roll Form Made Out by Machine

pressed and the carriage moves to the second column, then to the upper portion of the third column, then it moves backward and up one line in order to put the figures in the lower part of column three, etc., until it reaches the end of the line, after which the carriage rolls up one space and travels back to column one. A few seconds to a line are all that is necessary, and after becoming acquainted with the machine the entries are made with much greater speed than by hand.

Attention is called to the special features of the machine which show by abbreviations *DA, CT* and *PW,* meaning days, constructive time and piece work, respectively; also to the fractions of 2/6, 4/6, 1/2, 1/4 and 3/4. These hieroglyphics and fractions are special details of the machine included for our special purpose. The ribbons in both machines are copy ribbons and a number of tissue copies can be made.

In its inception the system of keeping time required the of $340 was effected. The office appliances needed to effect this saving were:

1 pay-roll machine.
2 calculators.
1 addressing machine (including a machine for making plates and one cabinet for filing the plates).

One-half of the annual saving more than pays for the cost of the machines. Added to this is the uniformity in which the work is handled, the neatness, the elimination of errors (so costly in locating) and the fact that not only can the machines be used in the accounting department, but they can and are being used by the numerous other clerks in the same office.

The change from the old to the new system was gradual; a man dropped from time to time and now, eight months from date of inauguration of the system, we find it working out in every detail with absolutely no negative features.

Orders of Regional Directors

GAS MASKS.—V. H. Smith, regional director, Eastern region, in a circular dated March 26, and referring to his circular of a month ago on this subject, advises federal managers that gas masks are not to be used for tunnel and similar work. It appears that some railroad men have worn these masks in tunnels, and have been overcome by smoke or gases, and have with difficulty been resuscitated. C. H. Markham, regional director, Allegheny region, has made a thorough investigation, and concludes that the gas masks which have been investigated are not sufficiently promising to warrant further consideration.

Eastern Freight Inspection Bureau.—The regional directors, Eastern region and Allegheny region, in a circular dated March 25, announce the establishment on April 1 of the Eastern Freight Inspection Bureau, C. C. McCain, manager, 143 Liberty street, New York City, which is a consolidation of the bureaus in Eastern trunk line and Central territories. This bureau will attend to inspection, weighing, demurrage, storage, transit arrangements and other similar work.

Bill-of-Lading Forms.—C. H. Markham, regional director, Allegheny region, by Circular No. 127, sets forth the changes which must be made in the headings of the uniform bill of lading—and in the substitution of "carrier" for "company" in the body of the document—when printing new supplies of blanks. As the Interstate Commerce Commission is to make recommendations concerning the terms to be printed on bills of lading, it is desirable at present to supply only as many blanks as may be needed during four months.

Use of Lock Nuts and Grip Unit Nuts on Boilers.—Order 186 of the Southwestern regional director calls attention to the fact that lock nuts and grip unit nuts are being used on studs which are screwed into boilers, and instructs that hereafter lock nuts and grip unit nuts must not be used in this manner, and that where a lock nut is required a jam nut is to be used.

Light Weighing of Cars.—The Central Western regional director finds that freight cars are not being light weighed within the time specified by Master Car Builders' Rule 30 and calls for observance of this rule.

Routing Via Non-Controlled Roads.—Supplement 1 to Circular 234 of the Central Western regional director states that in some instances freight is being diverted from non-controlled lines on account of the route being unduly circuitous, although there is a reasonably direct route in connection with the non-controlled lines by way of another junction or with other lines under federal control, and instructs that in such cases the non-controlled line should be given a haul by way of the reasonably direct route.

Routing in Connection with Boat Lines.—Circular letter No. 432, issued by the Southern regional director, calls attention to the amendment to the federal control act, contained in the rivers and harbors act, approved March 2, that "No provision of this act shall be construed to prevent the routing of freight by a shipper or consignee over any inland canal or coastwise waterway, or part way over such waterway and part way by rail. In case the shipper or consignee shall so route the freight, no provision of this act shall be construed as giving power to change the routing." The circular says that this provision relates merely to the acceptance of shipper's routing from rail line points in connection with water lines; it does not in any way deal with rates, issuance of bills of lading, and similar matters.

Embargo Regulations.—Circular 75 of the Northwestern regional director outlines regulations for the method of handling embargoes in the Northwestern region under the new plan to be instituted by the Car Service Section on April 1.

Embargo Rules.—The regional director, Eastern Region, by circular 2000-15A642, promulgates the revised rules governing embargoes which went into effect on April 1. Zone embargo committees are to be discontinued as soon as possible. Federal managers and terminal managers are cautioned to issue embargoes only as a last resort, and to see that great care shall be taken to make them as little burdensome as possible.

The regional director authorizes federal directors and terminal managers to issue embargoes, when promptness is necessary, without first asking permission, but the reasons must be promptly telegraphed to him so that he may take any practicable measures to have the embargo cancelled at the earliest possible day.

Maintenance Budget for 1919.—The Eastern regional director, by circular 2700A628, announces that the assistant director of operations will allow until May 1 for the completion of these budgets; but the utmost effort must be made to finish them before that time, and they must be submitted as soon as completed.

Reports from Freight Claim Department.—The Eastern regional director, by circular 1801-126A620, sends to federal managers a form to be used in reporting the work done on loss and damage claims. Each freight claim agent is to make this report for the month of March and for each month thereafter, showing the number of unsettled claims on hand at the beginning of the month, new claims received, claims reopened, claims paid, claims not allowed and claims remaining unsettled at the end of the month; with comparisons with previous periods showing amounts in suspense and amounts realized from sales of unclaimed freight.

No-Accident Month Campaign.—Circular 194 of the Southwestern regional director announces that during the month of May a campaign will be carried on in this region which will be referred to as "no accident month."

Cross Tie Inspection.—Supplement 16 to Northwest Region Purchasing Committee Circular 19, quotes rules issued by the director of the Division of Purchases relative to the responsibility of the exporting railroad for the proper inspection of railroad ties shipped by them to importing railroads.

Payment for Ties.—The Northwestern regional director, in file 113-1-10, quotes a letter from the director of the Division of Purchases which states that railroads are not paying promptly for ties, and that this failure to pay promptly is affecting production. Railroads in the Northwestern region are directed to report on the situation at once to the regional director's office.

Removal of Whiskey Placards.—Circular 196 of the Southwestern regional director calls attention to the fact that shippers of liquors are placarding cars with cards that read "Whiskey" and the firm name. Because of the fact that these placards invite pilferage due to the increased value of liquor and the extension of "dry" territory, their use is now forbidden. Such placards already on cars should be promptly removed.

American Lumber Congress

The first "American Lumber Congress" will be held in Chicago, April 14, 15 and 16, under the auspices of the National Lumber Manufacturers' Association. The question of zone freight rates on lumber, which has been proposed by the Railroad Administration, and the details of which have been entrusted to the Portland (Oregon) District Freight Traffic Committee and J. B. Baird, general traffic manager of the Northern Pacific, will be one of the topics to be discussed. It is proposed by these readjustments in trans-continental lumber rates to simplify the eastbound lumber tariffs, but the lumber men claim that the proposed rates would increase their freight burden a million and a half dollars a year.

Doings of the United States Railroad Administration

Director-General Has Declined to Accept Prices for Steel and Coal Suggested by Industrial Board

WASHINGTON, D. C.

DIRECTOR GENERAL HINES is much concerned over the freight claim situation throughout the country, which was the cause of considerable complaint by representatives of shippers at the recent hearings before the Senate committee, and has brought the matter to the personal attention of the regional directors in a letter asking them to take the matter up with the federal managers in a vigorous effort to clean up the immense number of accumulated claims as well as along the line of prevention.

The matter resolves itself into three aspects, he says, the prevention of loss and damage to freight, the assessment of correct charges, and the prompt disposition of claims for loss and damage and for overcharges. "The need for energetic and sustained effort under each of these three heads is apparent," Mr. Hines says, "but without minimizing the importance of the first two items, the imperative need is to 'clean up' the immense number of accumulated claims. I realize that these matters have already received more or less attention, but to accomplish the results which are absolutely necessary from now on we must maintain an intensive campaign of prevention and prompt disposition of claims." This agrees with what has been said by some of the critics of the Railroad Administration who have claimed also that if the roads had paid their claims more promptly last year the deficit would have been much larger than it was. Each regional director is asked to take action as follows:

1. Take up with each federal manager the necessity of giving immediate attention to both the prevention and the disposition of freight claims and enlist his personal interest in the establishment or perfection of adequate organizations to accomplish these ends.

2. Instruct each federal manager to submit to the regional directors promptly a report as to the steps which he proposes to take to accomplish these purposes, including his organization and his proposed policies and procedure.

3. Instruct each federal manager to submit to the regional directors monthly a report showing as to loss and damage claims the following information covering the month for which report is rendered: (a) number of claims received; (b) number of claims disposed of; (c) number of claims unsettled at end of month. Overcharge claims are now being reported under P. S. & A. Circular No. 60.

4. Send to the director general as promptly as possible copies of the reports submitted by the federal managers together with any additional suggestions and, thereafter, monthly tabulations of the reports, so that the director general may be in a position to give credit where credit is due.

"These matters," Mr. Hines says, "vitally affect the quality of service rendered by the railroads. They are of great importance both because of their effect on our relations with the shipping public and of the conservation of our revenues."

BASIS OF SETTLEMENT OF LOSS AND DAMAGE FREIGHT CLAIMS

At the present time there is lack of uniformity in determining the measure of damages under section 3 of the uniform bill of lading in the adjustment of claims for loss and damage to freight paragraph 2, of section 3, of the uniform bill of lading provides that—

"The amount of any loss or damage for which any carrier is liable should be computed on the basis of the value of the property at the place and time of shipment under this bill of lading, including the freight charges, if paid."

Circular No. 6 issued by the Claims and Property Protection Section says:

It is intended to clear up this situation and to dispose of promptly such claims as come within the rules hereinafter set forth. The following rules shall apply on all unsettled claims under federal control pending decision by the Interstate Commerce Commission in the bill of lading investigation.

RULE 1.—The measure of railroads' liability shall be the value of the property at the place and time the property is received by the carrier for transportation, except where the property is reshipped from the original destination under a new bill of lading, the measure of liability shall be the value of the property at the place and time the new bill of lading is issued.

In either case such value shall be arrived at from the bona fide invoice price, if any, to the consignee, provided the date of the invoice concurs substantially with the date of shipment; and the invoice price to the consignee shall govern, whether the invoice is made by the consignor, the jobber, or wholesaler.

RULE 2.—When claim is filed upon the invoice price of the property delivered at destination, the freight charges shall not again be included in the claim.

RULE 3.—Where property is shipped for sale on consignment from points at which there is no established market value, and where no invoice is made, the measure of railroads' liability shall be the market value of the property at destination at time shipment should arrive, less the transportation charges, cartage and commissions.

RULE 4.—Where the property shipped includes articles, commonly called premiums, which are not included in the invoice, the railroads' liability for such articles shall be the cost price of the articles to the shipper.

CASH AND TRADE DISCOUNT ALLOWANCES

RULE 5.—In the settlement of claims for value of shipments lost or destroyed while in possession of the railroad, the railroad shall receive the benefit of any cash discount or allowance contemplated by the terms of sale to the consignee, provided the claim is paid within the time limit for such discount or allowance.

RULE 6.—When shipments are partially damaged while in possession of the railroad and delivery is taken by the consignee, thus enabling him to obtain benefit of any discount or other allowance, such discount or allowance shall be given the railroad, provided settlement of the claim is made within the time limit for such discount or allowance.

RULE 7.—In case of either loss or damage, the railroad should have the benefit of all trade discounts.

This circular is not in any way intended to establish a liability, but is intended to be used as the basis of settlement when liability has been otherwise established.

CIRCULAR NO. 7

The Claims and Property Protection Section has issued Circular No. 7, prescribing regulations covering the disposition of loss and damage freight claims on fresh meats and packinghouse products.

At the present time there is lack of uniformity in the disposition of loss and damage freight claims presented on carload shipments of fresh meats and packinghouse products. In order to establish certainty and uniformity in the handling of this class of freight claims, the following rules are prescribed:

Rule 1.—All shipments of fresh meats and packinghouse products shall be made under the conditions provided by published tariffs, and bills of lading issued accordingly.

Rule 2.—The agent at loading station shall insert on waybills accompanying cars, instructions as given by shipper on shipping order and bill of lading, and agent at each icing station shall insert on billing, date and time iced and amount of ice and salt used.

Rule 3.—Loss or damage existing at destination at time of unloading must be reported by consignee to railroad agent prior to or during the time of unloading, or as soon thereafter as discovered, and a record kept by consignee of time and date of such notification and name of party notified. Railroad agent

shall inspect the car and make permanent record as to its physical condition, amount of ice in the bunkers after tamping, and the condition of the commodity.

Rule 4.—When the protection given a shipment by the railroad conforms to the shipper's instructions, as provided in published tariffs, and additional icing is properly performed to offset delay and there is no negligence with the railroads, claims for damage will not be paid.

NOTE. In case of delay, which might be termed unreasonable, all facts presented by shippers shall be given due and proper consideration and claims disposed of upon their merit and in conformity with legal liability.

Rule 5.—One lapse of an hour or two in icing over and above the regular icing schedule, in itself, will not be considered as a basis upon which to pay claims for damage to fresh meats and packinghouse products. However, when this lapse occurs in two or more of the icings, then such facts as presented by the shippers should be given full consideration and claims disposed of upon their merits and in conformity with legal liability.

Rule 6.—Claims for loss or damage to fresh meats and packinghouse products must be supported by a statement of an officer or an authorized representative of the firm presenting the claim. This statement to show the value of the property at place and time of shipment, also the actual amount realized from the sale of such property in a damaged condition. The original account of sales, or a certified copy of same, must be attached to the claim.

Rule 7.—Where property is shipped from points at which there is no established market value and where no invoice is made, the measure of railroad's liability shall be the market value of the property at destination at time shipment should arrive, less the transportation charges, cartage and commissions.

Rule 8.—When the railroad negligently fails to perform its services properly, resulting in damage and a loss is sustained, claims for such loss will be paid or adjusted upon the merits of the case.

These rules shall be applied in their entirety to carload business moving on and after March 15, 1919. They shall also be applied to all unsettled claims on carload business which moved during federal control and prior to March 15, 1919, except that portion of the rules as to the inspection at destination and the statement in substantiation of the claims.

Cases Before Wage Board

Committees representing the shop craft organizations affiliated with the American Federation of Labor and the United Brotherhood of Maintenance of Way Employees and Shopmen are still negotiating with committees of representatives of the regional directors regarding uniform agreements as to rules and working conditions to be applied on all railroads under federal control. The committees in each case consist of 14 representatives of the employees and two representatives of each of the seven regional directors, and they are to submit recommendations to the Board of Wages and Working Conditions which makes recommendations to the director general. The proceedings are confidential until the decision of the director general is announced, but a cartoon published in an official circular issued by the Railway Employees 'Department of the A. F. of L. indicates a belief that an agreement will result in its case at least. It shows Mr. Organized Labor listening outside the door of the conference room and a voice from within says: "I'm on the inside but can't slip you any dope, but you're gonna get an agreement, and when the censor permits I'll have some funny things to tell." The maintenance of way employees also submitted with their proposed rules and working conditions a request for a further increase in wages, but it was declined by the director general and has been withdrawn or postponed by the organization. The Order of Railroad Telegraphers has also presented a similar request which will be given consideration at an early date.

In reply to many inquiries from its members "relative to the delay in the settlement of wage increases" asked of the director general by the shop craft organizations on January 7, the Railway Employees' Department has explained that after having presented its arguments to the wage board on March 12, 13 and 14, its committee was notified that the representatives of the regional directors were not prepared to present their side of the matter, and the hearing was postponed by the board till April 14. The employees committee protested vigorously against this delay, but the board declined to alter its decision. This case is also being presented by 14 representatives of the employees, with B. M. Jewell, acting president of the Railway Employees' Department, as chairman, and 14 representatives of the regional directors, with C. E. Chambers, mechanical assistant to the regional director for the Allegheny region, as chairman.

Back Pay for Short Line Employees

Director General Hines has recently announced a decision that employees of the short line railroads which were not taken under federal control because the general counsel of the Railroad Administration ruled that they were not "systems of transportation," are not entitled to back pay under General Order No. 27, and that employees of railroads relinquished and subsequently taken under federal control are not entitled to back pay for the period back of the date of the contracts subsequently executed. As to the employees who might have been induced to subscribe for Liberty bonds by the appeal sent to all railroad men early last year by Director General McAdoo, calling attention to the fact that they were about to receive increases in wages and back pay, Mr. Hines says that unfortunately these assurances were not restricted, as they ought to have been, to employees of railroads operated by the government, but that there was no intent to mislead any employees, and that those who bought Liberty bonds on the strength of such assurances have only done what every class of citizenship was urged to do; and have made a splendid investment unless they have lost because it became necessary to sell the bonds at a discount.

These conclusions, adhering to the position formerly taken by Mr. McAdoo, were expressed by Mr. Hines in a letter to the chief executives of the organizations representing railway employees, who had asked for back pay for the short line employees back to January 1, 1918. "I am frank to say I do not see any escape from the conclusion that the only procedure practicable in these cases is to begin paying the increased wages only from the date the standard contract taking a short line railroad under federal control is made," said Mr. Hines, "because prior to that time the director general had nothing whatever to do with the expenses of operating the railroads in question and has assumed no responsibility therewith, and has always refused to assume any. The mere fact that these employees purchased bonds of their government to help in the war is not a sufficient reason for the director general assuming responsibility for additional pay to all employees of all short line railroads back to January 1, 1918, in the face of the position he has always taken with the owners of these roads." The letter was not made public, but was communicated to the employees by officers of the organizations.

Disposition of Unclaimed Freight

General Order No. 34-B, issued on March 29, amends General Order No. 34-A to read as follows:

Carriers subject to federal control shall sell at public auction to the highest bidder, without advertisement, carload and less than carload non-perishable freight which has been refused or is unclaimed at destination by consignees after the same has been on hand 60 days. Consignee, as described in the waybilling, shall be notified of arrival of shipments in all cases, and such notice shall contain provisions that after freight is unclaimed or undelivered for 15 days after expiration of free time at destination it will be treated as refused and will be sold without further notice 60 days from date of notice of arrival.

Consignors shall be notified when freight is refused or is

unclaimed, as provided above, when the consignor can be determined from the billing or when shipments are marked with the consignor's name and address; such notice to contain provisions that unless proper orders for disposition are received on or before a specified date, not earlier than 60 days from date of arrival and notice to consignee, the shipment will be sold for charges without further notice.

Perishable freight may be sold in the discretion of the carrier whenever necessary to prevent waste without notice except that such reasonable effort shall be made to notify both consignor and consignee, as described in the waybilling, as the circumstances will permit.

Deposit in the mail of notices in accordance herewith shall be construed as sufficient notice to all concerned, and a record shall be made thereof by the employee who mails the same.

The place of sale of both perishable and non-perishable freight shall be determined by the carrier; the net proceeds, if any, after deducting freight and other legitimate expenses, will be paid to the owner on proof of interest.

Nothing herein contained shall affect the provisions for notice to consignor of unclaimed or refused shipment of explosives or other dangerous articles, or for telegraphic notice to consignors of unclaimed and refused shipments at his expense and on his request, or other special provisions for notice to consignors, where such provisions are contained in the storage rules of the carrier, or other rules contained in tariffs on file with the Interstate Commerce Commission, except that when notice of refusal is given to the consignor under such tariff rules, it shall include the notice of sale after 60 days above provided for, and notice need not be repeated under this order.

Economy in Consumption of Coal in 1918

Good results attained in 1918 as a result of the campaign for fuel economy are shown in a compilation prepared by the Fuel Conservation Section of the Railroad Administration comparing some of the principal statistics relating to the consumption of coal for 1916, 1917 and 1918. The tons of coal consumed in freight service in 1918 amounted to 86,634,345 as compared with 79,454,966 in 1916 and 86,795,339 in 1917, but the pounds of coal per 1,000 gross ton miles show a decrease in 1918 as compared with 1917, although an increase compared with 1916. The amount was 199.7 in 1918, 200.9 in 1917 and 192.1 in 1916. In passenger service the tons of coal consumed in 1918 amounted to 30,570,030 as compared with 32,583,171 in 1917 and 30,494,233 in 1916. The pounds of coal per passenger train car mile used in 1918 averaged 19.3 as compared with 19.4 in 1917 and 18.5 in 1916. In the last six months of 1918 the pounds of coal per 1,000 gross ton miles were only 190.7 as compared with 201.8 in 1917, a decrease of 5.5 per cent, and the pounds per passenger car mile were 18.2 as compared with 18.8, a decrease of 3.2 per cent.

The report also compares the average cost of coal per ton in December, 1918, and December, 1917. The figures for some of the principal roads, which do not include the cost of the haul on the user's rails, are as follows:

Road	December, 1918	December, 1917
New York, New Haven & Hartford	5.78	5.25
Delaware & Hudson	3.99	3.61
Boston & Maine	6.21	5.44
Erie	3.49	3.77
Lehigh Valley	3.62	3.06
Michigan Central	3.78	3.63
New York Central	3.43	3.07
Baltimore & Ohio—Eastern Lines	2.66	2.30
Baltimore & Ohio—Western Lines	2.65	2.30
Pennsylvania Eastern Lines	2.88	2.48
Pennsylvania Western Lines	2.76	2.48
Philadelphia & Reading	3.75	3.51
Atlantic Coast Line	4.25	4.00
Louisville & Nashville	3.13	2.15
Southern	3.48	2.68
Chicago & North Western	3.01	2.19
Chicago, Milwaukee & St. Paul	3.42	2.87
Atchison, Topeka & Santa Fe	3.53	2.97
Southern Pacific	6.02	6.72
Union Pacific	2.77	2.48
Missouri Pacific	3.09	2.51
St. Louis-San Francisco	3.32	2.69

New Embargo Regulations

The Car Service Section, W. C. Kendall, manager, in Circular CS-57 has issued revised regulations regarding the handling of embargoes, effective on April 1, which place the issuance of embargoes under the direction of the regional directors.

A road desiring to place an embargo will notify regional director, specifying what, if any, exceptions are desired. If regional director approves, he will authorize the embargo and transmit it to all federal-controlled roads in his region, to the car service section, and to all regional directors and embargo bureaus interested. Each federal-controlled road will notify its own agents and the non-federal-controlled roads assigned to it. Embargo information will be interchanged with Canadian roads through zone chairmen at Montreal and Winnipeg.

Embargoes and extensions of embargoes must be promptly transmitted by wire, and become effective 24 hours from 11.59 p. m. of the date of issue; freight in transit will be accepted. In the event of strikes, washouts, or similar contingencies the embargo may stipulate that it will become effective immediately.

Each embargo must state the reason why it is placed and be given an identifying number. A telegraphic cipher is prescribed.

Each railroad must have a practical system for filing embargoes which should be uniform at all stations. A complete file of outstanding embargoes must be maintained at all freight loading stations for guidance of shipping public. When necessary to cover more than one kind of freight, each item must be specified.

Freight for export is subject to control of designated committees who are empowered to issue permits authorizing the movement of export shipments against embargoes. For domestic shipments permits may be issued by the car service section, the regional directors and by special committees.

Rules for Issuance of Passes

The Division of Operation has issued Circular No. 19-A, giving revised rules for the issuance of passes, superseding Circular No. 19, dated September 1, 1918, as follows:

Annual and Time Passes

1. The issuance of annual and time passes will be confined to the offices of the director general, director of operation, the several federal managers, the general manager on lines where there is no federal manager, and the federal manager of Pullman car lines.

2. Annual and time passes issued over the facsimile signature of the federal managers (or general managers on lines where there is no federal manager) and countersigned by the person indicated thereon will be limited to—

(a) For, or on account of, their own officers and employees who do not require annual or time transportation on lines beyond their jurisdiction.

(b) For, or on account of, such officers and employees of the corporation as may be specifically authorized by the director general.

(c) To officers and employees of the American Railway Express Company whose duties are confined solely to lines under their jurisdiction.

3. Annual and time sleeping or parlor car passes will be issued by the federal manager of Pullman car lines to officers and employees under his jurisdiction.

4. All annual and time passes not included in paragraphs 2 and 3 will be issued only by the director general or director of operation.

5. Annual passes bearing the personal signature of the director general will be good on all lines under federal control, on all trains, and for seats in railroad-operated parlor or chair cars.

6. Annual and time passes bearing the facsimile signature of the director general will be issued by the director of operation and will be good on all lines under federal control or

within the territory covered by the lines specified thereon, and will bear express limitation as to certain trains upon which the pass will not be honored. Such passes will bear the countersignature of W. T. Tyler, director; J. H. Young, senior assistant director, E. H. DeGroot, Jr.; or L. L. Lapp.

7. Annual and time sleeping or parlor car passes, other than for officers and employees of the Pullman Car Lines, and annual and time steamship passes, bearing the facsimile signature of the director general, will be issued by the director of operation with the same countersignature as provided in preceding paragraph.

8. Federal managers, and general managers on lines where there is no federal manager, will forward to the director of operation, on or before November 1, a list of annual or time passes (including sleeping-car or steamship passes), required for officers or employees over lines other than those under their control, indicating the lines or territory over which the passes are desired.

Trip Passes

9. Trip passes will be issued over the facsimile signature of the director general or of the federal managers (or of general managers on lines where there is no federal manager) and the federal manager of Pullman car lines, and will be countersigned by the person indicated thereon. Trip passes issued by the federal and general managers and federal manager of Pullman car lines will be limited to the lines under their respective jurisdiction.

10. Trip passes bearing the facsimile signature of the director general, with countersignature of person indicated thereon, will be issued by the director of operation, regional and district directors. Such trip passes will be honored for transportation over the lines indicated thereon.

11. Federal managers, and general managers on lines where there is no federal manager, and the federal manager of Pullman car lines desiring trip passes for, or on account of, their officers or employees over other lines under federal control, will make request for same to the federal or general manager of such railroad in the same manner that exchange trip passes have heretofore been handled.

General

12. Passes will not be issued which include the privilege of free meals in dining cars, at restaurants, or on steamships.

13. The current regulations of the Interstate Commerce Commission covering the issuance and record of passes must be observed.

Steel Prices to Be Reconsidered

The plan fostered by Secretary Redfield and approved by President Wilson to stabilize prices and stimulate industry by voluntary agreements between the basic industries and the Industrial Board of the Department of Commerce on reduced prices to be paid by the government as an example for other consumers, has encountered a serious obstacle in the refusal of the Railroad Administration to play the part of a self-starter for the scheme. Not only did the Railroad Administration decline to accept the steel prices fixed by the board, but without waiting for the action of the board it allowed the individual railroads to go into the market for coal at the best prices it could get. The result was a conference of various representatives of the government on Wednesday, at which it was decided to re-commit the scale of steel prices agreed upon by the board and the steel interests to the board for further consideration with the Railroad Administration, which has been making an investigation of costs, preliminary to accepting the prices. It is understood that the Railroad Administration has not given its final decision but that it protested against the prices before they were fixed and also against the price-fixing plan; and it is now inclined to hold out for a further reduction.

The scale, which included a price of $45 for Bessemer rails and $47 for open hearth rails was published in last week's issue.

Mr. Redfield and his coadjutors had counted on the Railroad Administration to start the buying movement by making the large purchases that might be expected of the railroads as the largest consumers of steel, coal, lumber, etc., at the prices fixed, and T. C. Powell, director of the Division of Capital Expenditures of the Railroad Administration, was made a member of the board; but apparently the plan was inaugurated without any definite assurance that the administration would consider itself bound by it and the Railroad Administration has been hoping to save some money as compared with its fuel bill for last year, which amounted to approximately $473,000,000 for 180,000,000 tons.

An agreement was reached two weeks ago on reduced prices for rails and other steel products, but the Railroad Administration, forced by the political exigencies that have delayed its appropriation to be conservative in its expenditures, withheld its orders. Therefore, when the board called in representatives of other industries whose prices it proposed to stabilize, including coal, lumber, cement, sand and gravel, they expressed some curiosity as to whether the government would buy at the prices when fixed, particularly after they learned that individual railroads, during the time the coal men were in conference with the board, were asking for bids for coal for the year beginning April 1 without reference to the possible action of the board.

The coal men, after being in conference with the board for two days, withdrew and issued a statement that the Railroad Administration had failed to extend its co-operation, and the sand and gravel people declared that their attitude toward reducing prices would depend somewhat on what the Railroad Administration would do in the direction of reducing freight rates. Director General Hines recently announced that a reduction in rates on road materials when the freight is paid by a government was under consideration, but that it was proposed to ascertain what, if any, reduction in price will be made by those producing and supplying the materials.

The statement issued by the National Coal Association explained that approximately 40 per cent of the bituminous coal is consumed by the railroads and therefore would be purchased by the Railroad Administration. "Under these circumstances," it said, "the operators consider it vital for the board and the industry to know at the outset whether or not the Railroad Administration would accept the decision of the conferences as to prices and make its purchases at those prices. It developed at the meeting that in spite of Director General Hines' publicly announced policy in the purchase of railroad fuel, the Railroad Administration had adopted unfair practices, which would drive the price of railroad fuel below the cost of production. This would necessitate advancing the price of coal for the general consuming public to a point sufficient to absorb the loss involved in the production of coal for railroad use. It was therefore apparent that, unless the Railroad Administration would lend its co-operation and bind itself to accept the findings of the conference, no beneficial results for the general public could be secured. Such assurance of co-operation on the part of the Railroad Administration was not forthcoming. The operators accordingly made clear to the board their readiness to resume the consideration of the question of prices whenever the co-operation and support of the Railroad Administration and other governments buying coal had been secured."

H. B. Spencer, director of the Division of Purchases, denied the statement that the administration had adopted unfair practices. "We have requested the members of this association to bring to the attention of the Railroad Administration any failure to carry out the instructions issued by the director general so that we could investigate the matter and remedy the fault, if any existed," he said. "So far as we are advised, the purchasing departments are absolutely adhering to the policy laid down by Mr. Hines. The Railroad Administration has co-operated to the fullest extent with the National Coal Association."

As a result, the activities of the board were practically suspended for several days. Chairman Peek of the board went to Chicago for a conference with Mr. Hines on Friday, and it is reported that a cablegram was sent to President Wilson on Saturday asking him to instruct the government departments to observe the prices fixed. When Mr. Hines returned to Washington on Wednesday an effort was made to secure an understanding with him as to what the Railroad Administration proposed to do, and a conference was held presided over by the secretary of the treasury and attended by Secretary Redfield, members of the Industrial Board, the War Finance Corporation and representatives of the various government purchasing departments, including Mr. Hines and H. B. Spencer, director of the Division of Purchases. Fuel Administrator Garfield and a representative of the Food Administration were also present but after it had been announced that the Railroad Administration would not accept the steel prices but was holding out for lower prices, there was no particular object in discussing the coal or other prices. The views of the Industrial Board, whose first action has now been repudiated, were expressed by Secretary Redfield, Mr. Peek and other members of the board, while Mr. Hines spoke for the Railroad Administration.

The indications following the meeting were that the board would soon cease to exist unless the President intervenes and that it had to some extent exceeded its authority. It was stated that the original plan was not that the board should fix prices that would be binding on any one but that it was hoped they could induce prices that would be sufficiently attractive to induce buying. It is also stated that the department of justice considers the fixing of minimum prices in violation of the anti trust law.

February Increases Railroad Deficit

The net operating income of the railroads in February again fell short of the standard return guaranteed by the Railroad Administration, according to preliminary returns to the Interstate Commerce Commission, covering about 223,000 miles of operated line. For these roads the net operating income was $9,747,050, a decrease of 0.1 per cent as compared with February, 1918. The total operating revenues amounted to $336,880,496, an increase of 21.7 per cent, showing the effect of the increased rates which have been in effect since last June, as the volume of traffic during the month as measured by net ton miles was 13½ per cent less than for February, 1918. Operating expenses were $310,465,245, an increase of 23.9 per cent.

The standard return for the month of February is about $47,000,000, so that the Railroad Administration's deficit for the month was approximately $37,000,000 on top of a deficit of $35,000,000 as compared with the standard return in January. While the standard return averages approximately $75,000,000 a month, seasonal variations in the volume of traffic are so great that it is inaccurate to compare monthly returns with that figure. The Association of Railway Executives has compiled a table showing what the average monthly return of the carriers in the pre-war test period was, as follows:

January	$55,000,000	July	$76,000,000
February	47,000,000	August	88,000,000
March	68,000,000	September	92,000,000
April	67,000,000	October	95,000,000
May	77,000,000	November	84,000,000
June	83,000,000	December	73,000,000

By quarters, the average net income in the test period compares with the quarterly payment of about $226,000,000, which the government has to make, as follows: First quarter, $170,000,000; second quarter, $227,000,000; third quarter, $256,000,000, and last quarter, $252,000,000. For the first half of the year in the test period the average was $397,000,000, while in the second half it was $507,000,000. These figures are for the Class I roads and the principal switching and terminal companies.

Taking into consideration only the Class I railroads under federal control, the net operating income for 1918 was $688,-200,083, which was 77.3 per cent of the standard return. An article recently published in the *Railway Age* gave comparisons of the net operating income of the various roads with their standard return. The percentages of the standard return earned by the railroads in the various regions created by the Railroad Administration were as follows: Eastern region, 69.4 per cent; Allegheny region, 46.4 per cent; Pocahontas region, 101.8 per cent; Southern region, 108.8 per cent; Northwestern, 61.8 per cent; Central Western, 95.4 per cent, and Southwestern, 93 per cent.

Temporary Financing for the Railroads

The War Finance Corporation up to Wednesday had made loans to railroad companies on demand notes at 6 per cent to the amount of $27,700,200, on the security of certificates of indebtedness issued by the Railroad Administration. This represented loans for the purpose of enabling the roads to meet their April 1 requirements. The finance corporation had previously made railroad loans amounting to $116,555,-270, including $50,000,000 to the Railroad Administration. The new loans were for 80 per cent of the face of the certificates of indebtedness unless additional collateral was deposited and in making their application for certificates the companies made them for 125 per cent of the amount desired. The certificates bear interest at only 5 per cent, while the loans from the War Finance Corporation bear 6 per cent, but it is understood that an arrangement will be made by which the companies will lose nothing as a result of the difference. Five per cent on the face of certificates issued for 125 per cent of the amount of the advances made by the finance corporation amounts to 6.25 per cent on the face of the loans.

The advances made by the War Finance Corporation were as follows:

Chicago, Burlington & Quincy	$4,000,000
Western Maryland	931,000
Boston & Maine	728,000
Chicago, Rock Island & Pacific	2,800,000
New York Central	2,000,000
Lehigh Valley	2,400,000
Chicago, Milwaukee & St. Paul	1,600,000
Michigan Central	992,000
Chesapeake & Ohio	800,000
Wheeling & Lake Erie	618,800
Cleveland, Cincinnati, Chicago & St. Louis	340,000
Buffalo, Rochester & Pittsburgh	208,800
Lake Erie & Western	62,400
Baltimore & Ohio	6,600,000
Erie	2,500,000
Missouri Pacific	1,120,000

The Baltimore & Ohio received $4,600,000 on the security of a certificate of indebtedness for $5,750,000 and $2,000,-000 additional secured by its refunding and general mortgage 6 per cent gold bonds.

In order to meet the increased drafts units resources the War Finance Corporation has issued $200,000,000 of short term bonds at 5 per cent.

Equipment Financing

The plan of issuing trade acceptances to pay for equipment fell through, as announced in last week's issue, largely because of the refusal of the federal reserve banks to rediscount them and also because of the reluctance of the specialty companies to accept them from the equipment companies. The car and locomotive builders who have contracts with the Railroad Administration and who attended the conference with Director General Hines, at which the acceptance plan was proposed, were willing to take them, but proposed to pay the specialty manufacturers with them in turn. The latter, whose contracts were with the equipment builders, although the prices and terms were fixed by the purchasing committee of the Railroad Administration, were not represented at the conference, but were dealt with by the committee of equipment builders, and some of them thought that the equipment companies ought to get the money from the

banks on the acceptances and pay them in cash. This brought up the question of the possibility that the acceptances might have to be renewed at the expiration of 90 days in case the appropriation should not have been passed in that time, and as they were to be secured only by the contingency of the appropriation, the responsibility might be transferred to the endorsers.

The certificates issued to the railroads are not dependent merely upon the appropriation, since they represent money the administraiton has guaranteed to the roads under the standard contracts, and payable "whenever and as soon as the director general shall have funds available . . . whether received by appropriation of the Congress or by virtue of moneys arising out of the use and operation of the railroads . . . or otherwise." The proposed acceptances for equipment were not to be backed by the operating income and were therefore less secure than the certificates upon which the War Finance Corporation will make loans.

Therefore it was decided to try to meet the equipment obligations in some similar way and the subject was discussed at a meeting between the Railroad Administration representatives and the equipment builders at Washington on Tuesday.

Director General Hines, in a speech before the Pittsburgh Chamber of Commerce on March 27, tried to remove any impression that the $750,000,000 appropriation was needed to make up for losses sustained by the Railroad Administration and also to emphasize the fact that it is still needed. He also sought to emphasize that in the last analysis it is needed to help the railroads finance capital expenditures. He said that after allowing for a $200,000,000 deficit in 1918 the balance of the two appropriations represents money only temporarily tied up as follows: About $340,000,000 for working capital which will be released upon the termination of federal control; $340,000,000 advances to railroads in 1918, which will be returned when they can refinance it, and about $370,000,000 to be advanced to railroads this year pending opportunities to refinance. When the accounts for 1918 are settled, he said, the administration will be carrying additions and betterments which the roads were unable to finance to the amount of $290,918,283, together with long time loans and deferred collections from some of the railroad companies amounting to $151,866,104.

Freight Traffic in February

Freight traffic during the month of February as measured by net ton miles fell off 13.5 per cent as compared with February, 1918, according to the monthly report of freight traffic movement and car performance compiled by the Operating Statistics Section. The net ton miles amounted to 25,681,943, as compared with 29,678,260. This was handled with a decrease of 15 per cent in train miles but the saving in loaded car miles was only 11.3 per cent and the empty car mileage increased 4.5 per cent. The average tonnage per train increased from 618 to 629, or 1.8 per cent, but the tonnage per car fell off 2.5 per cent, from 28.4 to 27.7. The percentage of unserviceable freight cars was about the same as in February, 1918. The car miles per car day declined from 21.6 to 20.3 and the net ton miles per car day from 435 to 379 or 12.9 per cent.

Contracts Executed

The Railroad Administration has executed a standard contract with the Union Freight Railroad for $32,009 and also co-operative short line contracts with the Urcina & North Fork and the White River.

Pointers for the Yardmaster—Be careful in districting your crews. If they are assigned to classification tracks you can usually satisfy yourself as to the extent of their work. At industrial plants, take care that mill foremen do not encourage them to spot around the mill doing an unimportant job under pretense that work is anticipated.—*H. D. McKee.*

Railroad Men*

By T. C. Powell

Director, Division of Capital Expenditures, U. S. Railroad Administration

WE HEAR THE PHRASE, "Railroads operated by the government." The railroads are being operated by railroad men from top to bottom and all the credit and all the blame will be given to railroad men.

When the director general of military railways organized his engineer regiments for service abroad, he hired *railroad* men, and when he wanted to set men to handle the boats and barges on the canals and rivers of France, he cabled over for expert tow-boat men. These railroad men in France got down to brass tacks and built docks and terminals, operated trains and transported men and ammunition like the loyal and enthusiastic railroad men they were and are.

When Commander Buell told of the work of mounting the big guns that bombarded Metz, he said that the trouble was not to get the railroad men to *work*, but to get them to take the necessary rest. They started up before the whistle blew in the morning and kept at it at the rate of 16 to 18 hours per day. And so when General Pershing sent in his report to the secretary of war he felt that the formal commendation of the engineer corps was not enough, but made a separate and special reference to their splendid services.

The first civilian in the history of this country to receive the distinguished service medal of the United States was a railroad man—S. M. Felton, president of the Chicago Great Western. That is the record we have before us.

The public will not be deceived, and any departure from the high standard of which we are capable cannot be blamed on "government operation." It will be blamed on us. You cannot fool your neighbors. The neighboring public knows that the men who are operating the railroads today, from the highest to the lowest, are practically the same men, with only a slight change in personnel, who were operating the railroads two years ago, before the war.

A short time ago I saw a picture which wasn't very much of a picture. There was a fence, and a woman looking through the fence, and a small boy on the pavement outside. The woman was calling—"Violet Marie! Come into the house!" The small boy helped out by calling, "Hey, Carrots, your mother wants you!" We may try to fool the public by calling out "Violet Marie"—otherwise "government operation"—but the public will respond, "Hey, Carrots" —otherwise "railroad men."

I like the military phrase "carry on!" Somehow it expresses vigor and continued forceful action, and if it were not stealing army thunder, I would like to adopt it as our motto. Few of those here actually operate the railroads, but all of us enter into the general scheme. The prompt delivery of a letter may be *the* thing in a day's work.

I never had much sympathy for the man who bet on a horse for "place." If he hasn't the nerve to bet on a horse to *win*, he is simply playing safe, and if our marines had merely played safe on the St. Mihiel salient, where would their honor and glory be, and what would be the status of the war today?

You have all heard of "The Message to Garcia," the story of Andy Rowan, who, in spite of all obstacles, delivered to General Carcia the vital message he was charged with. The account written of it has become a classic, but we have as the head of our organization one who in his early business life carried through with the same promptness and effectiveness the errand with which *he* was charged.

I was told the following story by M. H. Smith, president

*From an address before the Railroad Club of Washington, D. C., February 12, 1919.

of the Louisville & Nashville Railroad. At that time it was reported to Mr. Smith that a bill had been prepared for presentation to Congress, giving the Interstate Commerce Commission extended powers, and which bill, as the report reached Mr. Smith, would have been injurious to the prosperity of the railroads. Mr. Smith felt that it was necessary for him to have a copy of the draft of the bill, and he sent for the general counsel of the railroad to find out if he could make the trip from Louisville to Washington immediately and secure this copy. The general counsel could not spare the time as he was engaged on a lawsuit of a pressing nature, but said that perhaps one of the younger men in his office could do the work as well, and he sent this young man in to President Smith. Before that the two had not met except in a casual way. Sufficient to say that the trip was made; a copy of the bill secured and delivered to Mr. Smith even more promptly than he required.

This was an incident in the career of Walker D. Hines, afterwards vice-president of the Louisville & Nashville, general counsel and chairman of the board of the Santa Fe, and now director general of railroads.

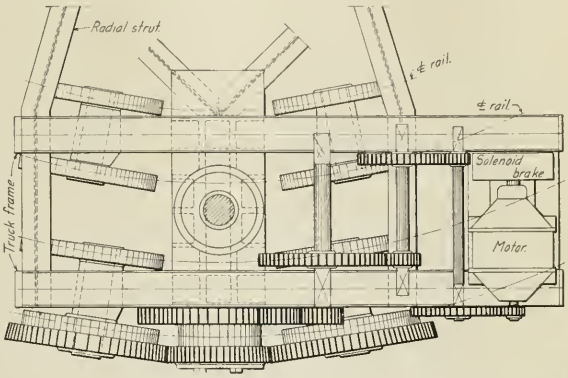
With that example before us, we must "carry on" as railroad men and "deliver the goods."

A Radical Departure in Swing Bridge Design

A SWING BRIDGE EMBODYING several radical departures from the designs in common use has been submitted to the consideration of railway men by the Strauss Bascule Bridge Company of Chicago. This design was originated and patented by Joseph B. Strauss, president of this company, some years ago, but had not been offered to the public until the present time. The design is unique in several ways; the truss system, the turning machinery and the means of supporting the span on the pivot pier under both dead and live loading and the method of clearing the end bearings when ready to swing, all embody unusual features.

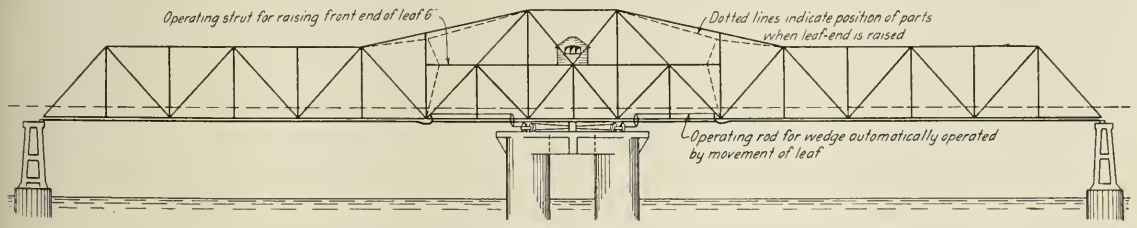
The truss system consists of a combination of a double cantilever over the pivot pier with semi-suspended simple spans on either side. In place of two simple spans extending from the pivot pier to the end piers and made partially continuous by means of the tower structure over the pivot pier, the two simple spans in this case do not extend over the entire clear distance between the piers, but are supported at an intermediate point at some distance from the pivot pier by the cantilever portion of the span which overhangs the pivot pier on each side. By this arrangement a more economical design of the truss system is obtained. This arrangement also is of considerable importance in connection with the manner of clearing the end piers when swinging. Instead of lowering the end bearings to obtain the necessary deflection for cantilever action of the entire structure, the ends of the spans are lifted clear of the bearings by means of a toggle system in the truss framing. But instead of providing these toggles at the top of the tower as has been done previously, a double toggle system is provided at each end of the cantilever trusses where the semi-suspended spans are supported. As a consequence of this, the load to be lifted is considerably less than if the full half spans had to be lifted, as is the case with the toggles directly above the pivot pier. These toggles are actuated by a set of operating struts provided with racks and extending horizontally from pinions forming a part of the machinery in the operating house.

The most radical departure in the design is the manner



Trucks Carry the Dead Load When the Span Is in the Swinging Condition

of supporting the span on the center pier, both for carrying the traffic and for swinging the span. The span is supported under both conditions at the four corners of the tower, that is, directly under each of the main posts, thus dispensing entirely with loading girders. Under the swinging condition the dead load is carried at each of these points on a truck of either four or eight wheels operating on two to four lines of circle rails. One drawing illustrates the character of these trucks. Each one is attached to the superstructure by means of a center pin, thus allowing considerable independence of movement. Two of the trucks are provided with power machinery for the movement of the span and considerable simplification with respect to this is accomplished by mounting the motor directly on the truck frame, so that it is a simple matter to provide a train of gears from the motor to the wheels. There is thus eliminated the usual circular rack with its difficulty of maintenance.



General Elevation of the Span

For the closed condition the load is removed from the wheels by means of a simple wedge arrangement directly under the center pin which transmits the load directly into a bearing shoe. The general elevation of the span illustrates one form of substructure applicable to this type of span in which four cylinder piers are provided, one under each point of loading, these piers being connected at the top with a system of reinforced concrete girders to carry the turning track.

Train Accidents in February[1]

THE FOLLOWING is a list of the most notable train accidents that occurred on the railways of the United States in the month of February, 1919:

COLLISIONS

Date	Road	Place	Kind of accident	Kind of Train	Kil'd	Inj'd
5	N. Y., N. H. & H.	Danbury	xc	P. & F.	0	20
†24	L. & Nashville...	Sylacauga	xc	F. & P.	1	12
	C. of Georgia. ...					
26	G. R. & I.	Cadillac	bc	P. & F.	2	20
†28.	Minn. & St. Louis..	Norwood	bc	P. &2F.	2	7

DERAILMENTS

Date	Road	Place	Cause of derailment	Kind of train	Kil'd	Inj'd
4.	Pennsylvania	Birm'ghm, Pa.	d. coupler	F.	0	0
4.	Pennsylvania	Birm'ghm, Pa.	acc. obst.	P.	3	1
†8.	Piedmont & N.....	Chick Spgs.	d. eq.	P.	6	20
8.	West Shore	Jersey City	unx.	F.	3	0
9.	Seaboard A. L.....	Anderson	malice	P.	1	5
14.	Pennsylvania	St. George	b. wheel	P.	0	3
†17.	Pennsylvania	Sturgeon, Pa.	unx.	F. & P.	1	9
*19.	Louisville & N.....	Versailles, Ky.	exc. speed	F.	0	0
†22.	Balt. & Ohio.....	Pittsburgh	neg.	P.	9	10
†23.	Chi., Mil. & St. P...	Latham Park	neg.	P.	2	20

The trains in collision on the fifth were a westbound passenger, running at about 30 miles an hour, and a train consisting of a locomotive and a caboose, which was at a standstill. Both locomotives were thrown off the track. About twenty passengers were injured. The inferior train was on the main track without right, and with no flag protection.

The trains in collision at Sylacauga, Ala., on the 24th were a southbound passenger of the Louisville & Nashville, and a through freight train of the Central of Georgia, the freight train running into the side of the passenger train at the crossing of the two roads. One passenger car was damaged and one passenger was killed. Twelve passengers were injured. The freight approached the crossing at uncontrollable speed in disregard of the law requiring a full stop.

The trains in collision near Norwood, Minn., on the 28th were eastbound passenger train No. 12 and westbound freight No. 417. The westbound train was stalled in a snowdrift and the engine, which had been sent forward to Young America with a part of the train, was returning for the rear portion and had nearly reached it when the collision occurred. Of twelve stockmen riding on the freight, two were killed and seven were injured.

The trains in collision on the Grand Rapids & Indiana near Cadillac, Mich., on the 26th, were northbound passenger No. 5 and southbound freight No. 52. The freight had become stalled in snow and a flagman had been sent forward to stop the passenger train, but his flag was not seen by the engineman. The day was clear but there was some snow blowing in the air. The flagmen threw a fusee at the engine but with no result. The flagman had not used a torpedo, but from the engine of the passenger train the freight was visible at a distance of 1,000 ft. Both engineman and fireman, however, appear to have been working on some part of the engine in the cab and keeping no lookout; and their engine was working when it struck the freight. Both of these men were killed. Twenty passengers were injured. Estimated damage to engines, cars and roadway, $10,000. The engineman is said to have had the reputation of being one of the most careful on the road.

The freight train derailed near Birmingham, Pa., on the 4th was a westbound extra. Three loaded cars were wrecked by the emergency application of the brakes and fell on the eastbound track, derailing eastbound passenger train No. 18. The brake application was caused by a break-in-two, due to the opening of a knuckle, the lock of which had become worn.

The passenger train derailed near Birmingham, Pa., on the night of the 4th was eastbound Chicago mail No. 18. The locomotive fell down a bank and seven baggage cars were thrown off the track. The engineman, fireman and one other employee riding on the locomotive were killed, and one passenger was injured. The cause of the derailment was as noted in the preceding paragraph.

The train derailed near Chick Springs, S. C., on the 8th was a northbound passenger. The rear coach ran off the track on a high trestle and fell to the ground about 90 ft. below. The car was demolished and every person within it was injured. Four were killed outright, two fatally and 20 less seriously injured. The cause of the derailment was the failure of a steel brakebeam which was caught in a guard rail.

The train derailed at Jersey City, N. J., on the night of the 8th, was a northbound yard train of the Lehigh Valley running on the track of the West Shore. The engine was badly damaged and one freight car was wrecked. Three trainmen were killed. The cause of the derailment was not determined.

The train derailed at Anderson, Ga., on the 9th was northbound passenger No. 4. The engine and first three cars were badly damaged. The fireman was killed and the engineman and four other trainmen were injured. The derailment occurred at a switch, believed to have been tampered with.

The train derailed at St. George, Pa., on the 14th was northbound express passenger No. 907. Four coaches ran off the track and 16 passengers were injured. The cause of the derailment was a broken wheel.

The trains involved in the accident on the Pennsylvania Lines near Sturgeon, Pa., on the 17th were a westbound work train and eastbound express passenger No. 114. The tender of the work train (the engine running backward), was derailed and thrown against the side of the passenger train which was moving eastward at full speed on the adjacent track. The sides of nine cars, including three passenger coaches, were badly torn; 10 passengers were injured, one of them fatally. The cause of the derailment of the tender was not determined.

The train derailed near Versailles, Ky., on the 19th was a westbound through freight. Thirteen cars of oil, two cars of coal, and one of coke, were destroyed by fire. The cause of the derailment was excessive speed over a soft spot in track, and an overloaded high hopper dump car. The cause of the fire was not determined.

The trains involved in the accident at Pittsburgh, Pa., on the evening of the 22nd of February were the Versailles local passenger train and a freight locomotive, without train, which was derailed at a point where the track was being repaired, and fell against the passenger train. The passenger train was moving at about 40 miles an hour, and three coaches were wrecked. Nine passengers were killed, and several were injured.

The train derailed near Latham Park, Ill., on the 23rd was a southbound local passenger train. Two persons were killed, a passenger riding in one of the coaches, and G. G. Corcoran, trainmaster of the division; and twenty passengers were injured. Two coaches fell down a bank. The derailment was due to insecure track, shims having been used without sufficient spikes and braces, though an experienced foreman was in charge.

Electric Car Accidents.—Accidents to electric cars—including two cases where locomotives ran into cars at crossings, and one collision on an elevated line in New York City—were reported in February from Terre Haute, Philadelphia, New York City and Cincinnati; but in no case was there any fatal injury. The number of injured, altogether, including serious and minor cases, was 72.

[1]Abbreviations and marks used in Accident List:
rc, Rear collision——bc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch—ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc. ——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

Railway Developments in Foreign Countries

The Channel Tunnel Project Excites Discussion in England—Transportation Demoralization in Russia

THE ANNOUNCEMENT by Bonar Law in the House of Commons, March 10, that the British government was considering beginning immediately the construction of the English Channel tunnel (*Railway Age,* March 14, page 611), had an additional factor of importance in the eyes of Englishmen than was given the project at the time in this country. That factor is that this is the first time that the British government has decided in favor of the construction of the channel tunnel in principle. The French government, on the other hand, has been favorable to the tunnel for many years, but in England the fear that the tunnel might be a means of invasion has always ruled against the project.

"There are few subjects on which the policy of British governments has up to now been so consistent as on this," says the London Times editorially. "It was considered and condemned by a committee of both Houses in 1883, and year after year bills were regularly introduced into Parliament, and all were decisively rejected. The Liberal Prime Minister in 1907 made an announcement on the project, based on an exhaustive inquiry by the Committee of Imperial Defence, and it was hostile. A fortnight before the beginning of the war the committee again condemned the project. Since then government spokesmen have several times fenced with proposals, but never a word has been said until yesterday to show that the government had changed their mind. . . .

"The military arguments against the tunnel are very familiar, and there is no need to rehearse them. On the whole our experience in this war has not strengthened them. We should have been better off if there had been a tunnel, for at critical moments we could have reinforced our armies more promptly, and we should have saved a great deal of shipping. German tactics at sea were singularly unenterprising in this war, and in consequence our communications were never seriously threatened. We could never count on having such luck again, and the risk of interruption of our sea communications across Channel must be reckoned as much more serious than the risk of a sudden surprise attack by way of a tunnel that would give the enemy control of the bridgehead on our side of the water. . . ."

The Times, speaking in its news columns of the fact that this is the first time the British government has decided in favor of the construction of the channel tunnel in principle, says that instructions have been issued in this sense to Sir H. Llewellyn Smith and a Board of Trade delegation who are now in Paris examining the question. The Committee of the Peace Conference on which they are serving is considering not only the channel tunnel, but projects for constructing tunnels under the Straits of Gibraltar and the Bosporus.

"As the French government has long been in favor of the channel tunnel, the moment for action seems to be approaching," it continues. "Surveys have recently been made on both sides of the channel, and it is asserted that the construction of the tunnel does not present any exceptional engineering difficulties. The recent falls of cliff between Dover and Folkestone have led to a modification of the original plan. When the tunnel is built its British mouth will be some miles from the coast, and a new railway to make the connection with the existing trunk lines will have to be built. The tunnel will be about 30 miles in length, and the proposal which finds most favor is that two tubes should be built and electric traction used. The cost of the scheme is now put at £20,000,000 ($100,000,000)."

By means of the tunnel London will be put in rail communication with almost all of Europe, except Russia and Spain. It is expected, according to a recent statement by Sir Arthur Fell, M. P., chairman of the House of Commons Channel Tunnel Committee, that construction will take almost five years. Of the total length of 30 miles, 20 miles will be under water. It will be possible to traverse the tunnel in 40 minutes, and the trip from London to Paris on the best trains will require about six hours.

"The tunnel," Sir Arthur Fell said, "would run from a point near Dover to the village of Wissont, between Boulogne and Calais. The railway through it would be electrified. There would be two tubes—one for outward and one for the return journey.

"Each tube would be about 150 ft. under the sea, and it was estimated that without pressure it would be possible to transport in both directions 30,000 passengers and 30,000 tons of goods every 20 hours, leaving four hours a day for repairs, renewals, etc."

Railway Conditions in Mexico

According to information obtained at the general offices of the Southern Pacific Railroad of Mexico, at Empalme, Mex., writes a correspondent, that road is now in regular operation between Nogales and Mazatlan. Train service will soon be re-established to the end of the line just beyond Tepic, it is stated. An enormous amount of rehabilitation work is necessary to bring the road up to the physical standard it was before the long period of revolutionary disturbances began. The company has a claim of $12,000,000 gold for damages to its property pending against the Mexican government. Considerable quantities of steel rails are being imported from the United States for relaying stretches of track.

If the Mexican government revives its former policy of granting concessions for the construction of railroads several important projects of this character will be undertaken by American financial interests when the internal conditions here become more stable, according to advices from the City of Mexico. It is stated that an application has just been made by a syndicate of Americans and Mexicans for a government concession to construct an extensive system of railways in the northern part of Mexico. The proposed line is to follow a route closely paralleling the border between Mexico and the United States, with several branches. It is to run from Ensenada on the west coast of Lower California, to Tia Juana; thence eastward to Mexicali; thence crossing into Arizona just above the head of the Gulf of California; thence south into the state of Sonora, with branch lines to several mining districts and towns; thence eastward along the border into the state of Chihuahua to Juarez, opposite El Paso; thence southeastward to Ojinaga, opposite Presidio, Tex. The main line and branches will be more than 2,000 miles long. The National Chamber of Commerce of Mexico, with headquarters in the City of Mexico, is lending assistance to the project, and it is said that the granting of the application for the concession is practically assured.

If the Mexican government is able to put through its plans for extending the old Mexican International Railroad to the Pacific port of Mazatlan it will have accomplished something that the late Collis P. Huntington, for many years head of the Southern Pacific Railroad, was unsuccessful in

doing, the correspondent adds. Mr. Huntington's failure to carry out the project was due to the inability of expert American engineers to locate a feasible route over the rough range of Sierra Madres that mark an almost impassable barrier between the high plateau and the lowlands bordering the Pacific Ocean. He inspired and built the Mexican International from Eagle Pass, Tex., to Durango, where the rail-head remained because the way to Mazatlan was blocked by the mountains. After the Mexican International passed into government control and became a part of the National Railways of Mexico, a railroad was constructed from Durango to Llano Grande for the primary purpose of affording a transportation outlet for a large area of commercial forest that was owned by José Ives Limantour, who was at that time minister of finance of Mexico. This road is 75 miles long, and is now a part of the government railway system. According to announcement of Engineer Manuel Rodriguez Gutierrez, sub-secretary of the Department of Communications and Public Works of the Carranza government, the route for a proposed extension of the line across the mountains to Mazatlan has been located and construction is now in progress. He says that extensive improvements will also be made to the port of Mazatlan in order to accommodate the prospective increase of railroad traffic and ocean-going shipments.

Railroad Disorganization in Russia

Lack of fuel for locomotives and lack of factories for repairing them are responsible to a considerable extent for the present condition of the railways of Russia, according to a despatch from Stockholm under date of March 20 which is given in a recent issue of Commerce Reports. At the beginning of 1917 the length of the Russian railways was 64,000 versts (42,000 miles); when the government of Kerensky fell (November, 1917), the length of railways in operation had been reduced by 19 per cent. The length of railways in operation and the usable locomotives and cars further decreased under the Bolshevik régime. In October, 1917, the length of railways was 52,000 versts (34,000 miles), the number of locomotives in working order, 15,000, and the number of cars, 520,000; in October, 1918, the length of railways in operation was 22,000 versts (15,000 miles), the number of locomotives in working order was 5,000, and the number of cars 227,000. These latter figures refer only to those portions of Russia under the control of Bolsheviks. At the end of 1918 only 4,500 locomotives were in working order and of these 1,500 are expected to become unfit for use during the current year.

In October, 1917, one locomotive was in good condition for every 3.47 versts (2.3 miles) of railway, one damaged locomotive for every 9.79 versts (6.5 miles), and 10 usable cars per verst. A year later for every 4.4 versts (2.9 miles) there was one locomotive in good condition, one locomotive damaged for every 5 versts (3.3 miles), and 10.3 cars per verst. The percentage of damaged locomotives is growing rapidly and the supply of skilled labor for repair work is decreasing. In 1916, 559 locomotives were repaired; 396 in 1917, and 80 in 1918. Even with this record, it is proposed to repair 700 to 800 in 1919; but it is doubtful whether the figures for 1918 can be exceeded.

Lack of Fuel and Food—Defects of Administration

There is only 1½ months' supply of crude oil at Soromovo, one of the best railway machine works, and the other shops are beginning to use wood. The bread ration given to workmen from July to October in the three most important railway machine shops varied from 2 pounds per person per month to 26 pounds. The condition of semi-starvation partly explains the fact that out of 8,000 locomotives ordered only a few were turned out, as well as 3,500 freight cars, 30 special cars, and 170 passenger cars

There are many reasons for the present deplorable state of the Russian railways. The principal ones are lack of food, fuel, and iron, and added to these is the disorganization in the administration of the railways. The Supreme Council of National Economy is supposed to control all railway questions and the Commissar of Ways and Communications to conduct actual operations; but, in fact, the railways are run practically by the railway men and the railway unions, which have men of small caliber vested with great authority. These organizations, as well as private individuals, have too much to say on questions of railway management. There is no co-ordination between the central and the provincial authorities. There is no central administration, no efficient utilization of usable rolling stock, and no practical distribution system. On some small branch lines with small junctions 40 per cent of the locomotives remain idle and great numbers of cars, with supplies that are most essential for the economic life of the starving country, are sidetracked by local agents. These cars, sometimes unknown to the higher officials, often remain for six months.

Labor Conditions—Railroad Crisis Imminent—Attempts at Improvement

Discipline in labor has decreased enormously. The wages of railway mechanics and laborers are lower than those in any other lines of industry and the result is that the best technical men, specialists, etc., find more profitable work in others of the numerous institutions of the Soviet Government.

It will be seen from the conditions described that unless immediate improvement be made the entire railway traffic of Soviet Russia will be practically at a standstill in a short time.

Realizing the critical condition of railway transportation, the All-Russian Central Executive Committee recently appointed a committee representing all persons actively engaged in railway repair work and railway operations. The question of rolling-stock repairs is to be concentrated in a special department of the Supreme Council of National Economy. These measures are well meant and would accomplish something if carried into effect, but up to the present time the excellent and practical decisions of the cleverest authorities of Soviet Russia remain on paper to a considerable extent.

Railways of Portugal in Poor Repair

Portugal has two state-owned railways, says an item in Commerce Reports, totaling 1,180 kilometers (733 miles) in length, and five privately owned lines with an aggregate trackage of 2,167 kilometers (1,314 miles). General conditions of the railroads in Portugal are bad. Owing to the war, practically no repairs have been made on the roads; part of the rolling stock had to be taken out of service and could not be replaced. Owing to the lack of coal the locomotives mostly use wood for fuel; the service is slow and many trains have had to be suppressed, as, for instance, the Sud express to Paris and the express trains to Spain and Oporto. The passenger and freight rates have been raised several times during the war, amounting on certain lines to 100 per cent over the pre-war tariff. It is expected that when normal conditions return the government and private companies will be able to improve the roads as well as replace and repair the rolling stock, thus restoring more frequent service.

Similar conditions prevail in regard to the railways in the colonies, where government construction enterprises had been provided for by large appropriations, but had to be suspended because of war contingencies.

The most important railways in the colonies are Companhia dos Caminhos de Ferro atravez d'Africa and the state-owned Mossamedes line and Malange line, all in Angola. The traffic on these roads is intensive—large quantities of colonial products being transported from the interior to

the ports—and they are able to handle only a small part of the cargo awaiting shipment. Angola could produce vast quantities of cotton, wheat, corn, cattle and all kinds of colonial products if the railway system were developed. Under the present conditions the transport of the goods from the interior is mostly by river boats and ox-carts. It is planned to connect the railway system of Angola with that of British Central Africa, and by this connection arrange communication between Portuguese West and East Africa.

Russian Railway Commission Sells 6,500 Tons of Rail

The Russian Railway Commission has sold to K. J. Joyce, 32 Nassau street, New York, acting for interests in China, 6,500 tons of rails and accessories which it finds it will not be possible to include in the large shipments of railway material it is now forwarding to Siberia for use by the Stevens commission. In explaining the sale, A. I. Lipetz, who heads the commission in New York, representing the Ministry of Ways Communication of the Provisional (Kerensky) government, issued the following statement:

"Upon consideration of the amount of rails stored in Vladivostok and the available space in steamers from this country to Russia, we have promised to the war department, in order to help the common allied cause, to sell all rails and accessories in excess of the amount needed to be shipped to Russia, and have allotted to the war department a considerable quantity of rails and accessories.

"After the armistice was declared the war department began to return to us unused rails, and has returned up to this time 13,100 tons of rails and accessories; we have, therefore, found it possible to dispose of about 6,500 tons of rails and accessories, which is only a part of the rails returned to us by the war department."

Discussing his statement, Mr. Lipetz also said it was the intention to sell only the rails returned by the war department and that the mission would retain all other supplies in this country in anticipation of successful rehabilitation of the railways in Russia and Siberia. He said that about 20,000 tons of rails remained in storage in Seattle and Vancouver awaiting transportation to Siberia, and that shipments are being made from this total from time to time.

Other property in this country includes about 88 locomotives of an original consignment of 110, about 4,000 freight cars and accessories, making a total weight of more than 60,000 tons and a value of more than $12,000,000. Mr. Lipetz said that all these stores would be retained and shipped to Siberia as soon as ships were available. The United States Shipping Board has agreed to furnish ships for the transportation of these railroad materials to Siberia, as they are needed there, and three vessels have sailed from Seattle since January 1 with locomotives and accessories.

By agreement with the United States Government after the Russian revolution, Mr. Lipetz said, about 150,000 tons of rails and materials and 200 locomotives were turned over to the Allies for military use here and abroad. He added that the rails now being returned by the war department were included in this agreement.

It was the belief of the Russian Railway Mission, Mr. Lipetz said, that when all the rails had been returned there would be a surplus, because shipping would be available in the next few months only for transportation of about 50,000 tons, including the 20,000 tons of rails. If the work in Russia progressed so that more would be needed, he said, the rails could be bought in a few months at lower price. He asserted that the sale of the 6,500 tons of rails had been negotiated at a profit, the price being higher than the present price delivered at Seattle.

The money paid for the rails under the terms of the agreement, Mr. Lipetz said, would be put into the fund of the Russian Embassy in this country. It is estimated that the amount will be nearly half a million dollars.

Discussing the reasons for the sale, Mr. Lipetz denied that it was carried out because of any fear that the Bolshevist government would be recognized or that any other political change was impending. If another Russian government were recognized, he declared, the money on deposit for the Russian government in this country, as well as supplies, would revert to it immediately, so that sales of materials now would withhold nothing from the Soviet régime because the money arising from the sale was to be included in the Embassy fund here.

Belgian Transportation Difficulties

Wrecked factories, lack of materials, and wholly inadequate railway transportation are impeding the work of restoration in Belgium to such an extent that but little activity along this line is yet to be found in that stricken country, says Herbert Samuel, president of the Anglo-Belgian Union, writing in the Times, London. Speaking particularly of the transportation difficulties, he says:

"There are overwhelming difficulties of transport. They impede every measure of industrial revival. Through large tracts of country, railway bridges and culverts have been blown up; the signaling system has been dismantled; the Germans have carried off the connecting hose of the Westinghouse brakes, so that the trains dare not travel at more than a snail's pace; hundreds of Belgian locomotives were withdrawn behind the Army to France at the beginning of the war and have been lent to the French and American military authorities, who have not yet consented to return them; of the few that are still available, a large proportion are in a state of disrepair and continually break down. I was advised that I should find railway traveling impossible, and made my journeys entirely by motor car. On arriving at Charleroi, I was told by the manager of a bank, to whom I had a letter of introduction, that in order to return there that morning from Brussels, a distance of 35 miles, he had been obliged to start at 5.15 a. m. and had not arrived till 11. A railway manager informed me that it had recently taken some of his own officials 14 hours to reach Courtrai from Brussels, a journey of about 50 miles. Although the waterways for the most part are still available, the present condition of the railways is a severe handicap on the restoration of industry, as well as on the distribution of supplies."

French Railway Deficits

Some striking figures as to the three French railways were given recently in a paper read by the head of the financial department of the Paris, Lyons & Mediterranean Railway at a recent meeting of the Statistical Society in Paris. The railways selected were the State, the P. L. M. and the Midi. It appears that in 1917, out of 1,000 fr. of receipts, the expenditure on personnel amounted, respectively, to 469 fr., 216 fr. and 242 fr.; on fuel to 283 fr., 266 fr. and 234 fr. For each 1,000 fr. of receipts the State Railway spent 1,536 fr., the P. L. M. 1,134 fr., and the Midi 1,175 fr., and the deficits for 1917 were 220,500,000 fr., 94,000,000 fr. and 34,000,000 fr. The situation grew so much worse in 1918 that in April the commercial community readily agreed to the raising of the general tariff by 25 per cent. In June the "petite vitesse" tariff was raised 10 per cent. Yet in spite of this rather belated relief the total deficit for 1918 amounted to 1,000,000,000 fr., and in 1919 it is expected to be 1,200,000,000 fr. Presumably the above figures relate to the entire State railway system (i. e., the former Western as well as the earlier State lines), but in any event the State expenditures under both headings are far the highest, and their deficits are the largest. This is considered the more noteworthy, as the State system has advantages which the companies do not possess, that of being able to load its coal at the ports which it serves and being in a position to raise money at less than 2½ per cent.

What Brazil Buys and Sells

The *Railway Age* is in receipt of a booklet issued by the Brazilian Ministry of Agriculture, Industry and Commerce, entitled "What Brazil Buys and Sells." The booklet, printed in English, is intended for circulation in the United States. In its introduction it says that, "It is not an exhaustive manual of information about Brazil, its purpose being rather to place before the American reader the important facts regarding the foreign trade of Brazil, in two distinct periods, namely before and since the beginning of the great war."

The booklet gives details concerning the possibilities of trade between the United States and Brazil, practical suggestions to exporters to Brazil, and information about the country itself, in the way of area and population, finances, railways, shipping, industries, tariffs, consular invoices, etc. Very detailed figures are given concerning the imports into and exports from the country, it being the object of this data to show the possibilities of the Brazilian market.

The figures for imports of railway materials are quoted from the tables in the booklet. It will be noted that even before the war the United States had a large share of the railway supply business in Brazil. The large totals under "other countries" in 1913 refer chiefly to exports from Belgium:

IMPORTS INTO BRAZIL

Merchandise	Unit	United States		United Kingdom		Germany		Other countries		Total imports	
		1913	1917	1913	1917	1913	1917	1913	1917	1913	1917
Sleeper	Tons	.....	.....	.....	.....	.....	.....	690	.....	690	.....
	Dollars	.....	.....	.....	.....	.....	.....	11,000	.....	11,000	.....
Coal	Tons	274,799	642,428	1,927,387	172,866	3,541	.....	56,621	3,033	2,262,348	818,327
	Dollars	2,158,000	19,707,000	16,701,000	4,340,000	56,000	.....	616,000	65,000	19,531,000	24,112,000
Ry. cars and wagons	Tons	25,318	148	9,557	.....	1,665	.....	32,482	2	69,022	150
	Dollars	2,721,000	53,000	2,079,000	.....	178,000	.....	4,211,000	.....	9,189,000	53,000
Axles, wheels and appurtenances for railway cars and wagons	Tons	2,108	3,843	2,937	144	3,372	.....	2,567	27	10,984	4,014
	Dollars	237,000	766,000	441,000	27,000	244,000	.....	280,000	6,000	1,202,000	799,000
Rails, fish plates, and railway accessories	Tons	46,639	5,353	13,928	108	46,859	.....	154,121	66	261,547	5,527
	Dollars	1,959,000	754,000	719,000	22,000	2,021,000	.....	6,546,000	4,000	11,245,000	780,000
Locomotives	Tons	9,204	3,870	750	60	3,148	.....	602	8	13,704	3,938
	Dollars	2,274,000	1,280,000	239,000	12,000	836,000	.....	81,000	6,000	3,430,000	1,298,000

Figures are given in United States dollars.

Railway Repairs Necessary in Egypt

In writing in Commerce Reports on industrial conditions in Egypt, Consul Arthur Garrels, Alexandria, says concerning the railways that they are in need of rehabilitation and expresses his belief that American manufacturers should be able to get considerable of the business necessary for such work.

"The railroads of Egypt," he says, "are state-owned. The road beds, rolling stock and equipment have been taxed to the utmost during the war by the movement of troops and supplies for the various campaigns for which Egypt was the base. Not only have the wear and tear been very extensive, but a great deal of material in actual use on small side lines and sidings has been removed for the use of military lines in belligerent territory. The rehabilitation of the entire railroad system of Egypt will be one of the important works to be undertaken as a part of reconstruction in Egypt. It is believed that the United States could furnish a large proportion of the needed material and equipment, and it is suggested that preliminary correspondence be taken up with Sir George McCauley, K. C. M. G., director general of the Egyptian State Railways, Cairo, Egypt. The unsatisfactory conditions of the railways, however, will in no way hinder the adequate movement of cotton and the supply of the general demand for internal transportation."

Paris-Orient Line to Be Opened May 1

The operation of through trains between Paris and the Orient will begin over part of the line on April 15, and the whole system will be inaugurated by May 1, according to an official statement issued by the Commission on the International Regime of Ports, Waterways and Railways March 26. The statement on the meeting of the commission that day said in part:

"M. Claveille, French Minister of Public Works, reported to the Commission the protocol conveying to the representatives of the interested nations a new transportation agreement, designed to assure relations between England, France and Italy, and to secure a route to the Orient by railroad without passing through territories of the Central Empires. To this end a train de luxe, to be called the 'Simplon-Orient Express,' will be run between Paris and the Orient via Lausanne, Simplon, Milan, Venice, Triest, Laibach, Agram and Vinkovce. At Vinkovce the road will divide, one branch connecting with Bucharest, Constance and Odessa, and the other with Belgrade, Constantinople and Athens. The train will connect at Paris with the London-Calais-Paris train and at Milan with a fast train for Rome.

"Part of this program will be put into operation commencing April 15, and the other part beginning May 1."

Proposed Railway Tunnel Under Shimonoseki Strait

The long-talked-of building of a railway under the waters of the Shimonoseki Strait is at last to be undertaken, according to the Japan Advertiser, issue of December 29, 1918, writes Consul-General George H. Scidmore, Yokohama, Japan, in Commerce Reports. The strait is at present crossed by ferryboats, a method which is inconvenient and results in considerable waste of time. The ferry traffic is, moreover, subject to frequent interruption on account of storms. The railway authorities have, therefore, decided to construct a tunnel 3½ miles in length, one mile of which will be under water, by means of which the towns of Shimonoseki on the mainland and Moji on the island of Kiushu, will be connected by rail. The estimated cost of this undersea railway is 18,000,000 to 20,000,000 yen ($8,973,000 to $9,970,000). The work will take ten years' time and will be in charge of Dr. Tanabe, of the engineering college of the Imperial University, Kyoto.

* * *

GREECE is another country whose railroads need considerable quantities of equipment and supplies to bring them up to their pre-war standard. Consul General Alexander W. Weddell, writing on trade conditions in Greece, says concerning the railroads: No new railways or extensions are now under discussion, but, without doubt, large quantities of material of all kinds will be needed for the rehabilitation of existing lines as soon as deliveries can be effected. In general, conditions of railway traffic are bad, there is a sad lack of fuel, and equipment is worn out; while, because of reduced train service and troop and supply movements, the density of traffic has increased.

* * *

THE FIRST DETACHMENT of American railroad troops destined for work on the Murman Railway has arrived on the Murman coast, according to an Associated Press despatch from Archangel on March 28. Other detachments are expected to follow soon.

What Yardmen Can Do To Save Fuel

An interesting bulletin as to the possibilities of saving fuel has been issued by A. E. West, general yardmaster of the Baltimore & Ohio Western Lines at Hamilton, Ohio, to the men under his jurisdiction. It came as a direct result of an enthusiastic employees' meeting held at Hamilton a short time before, at which the opportunities of the transportation men for saving fuel were thoroughly discussed. The bulletin covers the following points:

1. Agents should get the billing to the yards promptly so that cars coming from the industries can be properly switched and thus save re-handling from the "no bill" tracks to the train yards, and also furnish immediately reconsigning orders on all cars in order to save unnecessary switching.

2. Yard clerks should mark all cars promptly as soon as the bills are received from the agent so that the cars may be properly switched and not lined up as "no bill" cars to be switched again. If yard clerks fail to mark these cars immediately on the receipt of the billing it makes unnecessary switching.

3. Yard crews switching industries and cuts in transportation yards will not train up cars known to be "no bills," nor cars not properly marked even though they are not shown on "no bill" list, as this would cause delay to outbound trains while cars were again cut out of such train, causing loss of time and fuel to both road and yard crew engines.

4. The yard crews and the assistant yardmaster should see that the cars are not "kicked" too hard while switching as this is liable to crack or break the drawheads and the train lines, which might be overlooked by the car inspectors. This would cause a delay to both the train and yard crews in switching the defective cars out of the train and thus cause a waste of fuel.

5. When making up trains care should be taken to see that all couplings are made, and as much of the slack as possible pulled out of the train so that leaks in the train lines can be detected and repaired before the train is ready to go. If the slack is bunched in the train when the inspections are made many of the leaks will be closed and thus will not be detected before the train starts. If this is watched very closely there will be a big saving both in the delay to the train and the cost of fuel.

6. Yard conductors should tell the locomotive engineman as near as they can about the time the engines will go to the roundhouse so that the fireman will not load his firebox with green coal which will be wasted in cleaning the fires. If this is done a large saving of fuel will result.

7. The yard crews before entering upon the main track should consult the despatcher or look at the indicator which is located at each main track switch, and be assured that they are not going to be in the way of any heavy tonnage freight trains. A large amount of fuel is wasted whenever a heavy tonnage freight train is stopped or retarded unnecessarily.

8. When a locomotive is relieved in the train yard, or when any engine is going to the roundhouse, it should be given a clear track if it is possible to do so, as every minute of delay means so many pounds of coal lost.

9. Of two trains leaving a terminal at the same time bound in the same direction, the last one should be given any cars that are to be switched out on the line. If the switching is done by the first train the second one will of necessity be delayed, which means wasted fuel.

10. It has been observed that some firemen make a habit of using a certain number of shovels of coal each time they fire. Now, if the fire is carefully watched and only the amount of coal that is actually needed is fired, at least one shovelful of coal could be saved each time the fire is fixed.

11. Coal should be used as if it belonged to the man using it and he did not know where the next ton was coming from.

12. Everyone should seek to save fuel, and any wastage noted should at once be reported to the general yardmaster's office.

13. To co-operate means good railroading, and good railroading means the saving of fuel.

14. Everyone can do something to save fuel; let us pull together and show our superintendent and his staff that we are going to help and save coal. At the next fuel meeting I want you all to come prepared with a good answer to the question as to what are you doing to save coal.

Experience of French Argument Against Guaranteed Incomes

The French policy of guaranteeing the income on railroad investments has deadened private initiative and put the railroad problem in France in the forefront of politics, and the same policy, if adopted in this country, may likely result similarly and ultimately bring about government ownership and operation. These are the conclusions reached by Frank H. Fayant, assistant to the chairman of the Association of Railway Executives, in a report which he has made public on the French railways. Mr. Fayant spent some months last year in France, where he was attached to General Pershing's headquarters.

The report follows:

The experience of France with a government guarantee of income on private capital invested in railroads is now of special interest to us because of the proposals recently made in this country for a permanent guarantee from the government when the carriers are returned to their owners.

In studying the French guarantee system these fundamental facts must be kept in mind:

(1) The guarantee of income in France is not a free guarantee, like the war control contract in the United States; it is a loan by the state to the railroad company to make up the amount needed to pay interest, minimum dividends and amortization, and must be repaid out of future earnings.

(2) The guarantee plan was adopted early in the development of the railroads to attract private capital into what was considered a more or less hazardous enterprise, and to bridge the companies over the construction period to the time when they were expected to rise above the need for any help from the state.

(3) Government ownership of all the roads comes automatically at the expiration of the concessions, from 1950 to 1960.

While the guarantee plan has been in operation in France for more than a half century, the contracts now in force date from 1883. The conventions of that year provided:

(a) Six regional monopolies, radiating from Paris.

(b) State participation in the first cost of a number of weak lines to be absorbed by the great companies, and in the construction of certain new lines.

(c) State guaranty of interest and amortization of bonded debt, and guarantee of minimum dividends and amortization of share capital; funds advanced by the state under the guarantee to be loans at 4 per cent to be repaid from future earnings or to be balanced against the rolling stock at the end of the concession, or in case of purchase by the state.

(d) Earnings in excess of the guarantee (after payment of any debt to the state) to go to the shareholders up to a certain level; two-thirds of any excess to go to the state.

(e) At the expiration of the hundred-year concessions (1950-60) the properties to revert to the state, the companies to be paid for their rolling stock and supplies.

(f) The state (after 1898) to have the option of purchasing any system by paying for the rolling stock and supplies, and by paying the company for the remaining years of the concession an annual sum equal to the average net income of the best five out of the preceding seven years.

The expectation was that, after a few years of development, during which time the state would be obliged to advance the companies' funds with which to pay charges on capital not yet yielding a profit, there would follow a period of expanding business and rising earnings that would enable the companies, first, to repay their advances from the public treasury and, later, increase their dividends to the point of profit sharing with the state. It was confidently anticipated that at the end of the concessions the six great lines, developed to the point of perfection under private ownership and operation, would automatically become the property of the state, free of all capital charges, and with such profit-making possibilities that they would provide the funds to meet a large part of the general expenses of the state.

But the results of the French guarantee system have been disappointing. There has been no profit-sharing. The Western, after 44 years' continuous appeal to the state on account of its guarantee, became so hopelessly involved in the treasury finances that the state in 1908 was compelled to exercise its purchase option. Incidentally it has become a greater burden to the treasury under state operation than it was under private operation. The Midi (Southern) in the half century prior to the war, was able in only a dozen years to meet its interest and dividends out of earnings. The Paris-Orleans, which at one time had some hopes of becoming self-supporting, was just before the war making large appeals to the treasury. The Est (Eastern) was self-supporting before the war. The Nord (Northern) and the Paris-Lyon-Méditerranée have always been prosperous and had no need of a guarantee.

State aid in the pioneer days of railroad building in France was of great assistance in providing the capital needed for these enterprises, and in bridging the companies over the early lean years, but in later years the guarantee has only served to entangle the weaker roads in politics and public finance. It has been a handicap to progress and has stunted private initiative. The spirit of the initiative is killed, and there is lowering of operating efficiency.

The war, of course, immediately upset French railway finance. The territory of the Northern and the Eastern was invaded by the enemy, hundreds of miles of line and great quantities of equipment were lost, and these two prosperous companies piled up in the next four years deficits aggregating 650,000,000 francs. The rails of the other companies were not in the war zone, and, after the first shock of war, their business expanded beyond what it had been before the war. Their annual receipts rose to 1,575,000,000 francs in 1917, as compared with 1,378,000,000 in 1913, but the great rise in operating costs absorbed all their new gross and piled up in four years 900,000,000 francs in deficits.

The effect of the war on French railway earnings is shown in the following summary, giving the figures for the prosperous year 1906, the two years immediately before the war, and the four years of the conflict:

FINANCIAL RESULTS OF THE FRENCH RAILWAYS

	Net Earnings	Charges	Deficit
1906	Fr. 771,000,000	722,000,000	49,000,000 (Surplus)
1912	731,000,000	800,000,000	69,000,000
1913	744,000,000	824,000,000	80,000,000
1914	480,000,000	846,000,000	366,000,000
1915	497,000,000	867,000,000	370,000,000
1916	505,000,000	886,000,000	381,000,000
1917	483,000,000	937,000,000	454,000,000

The above figures are for all roads, 5,600 miles of state railways and 18,700 miles of private lines. Taking the reports only for the five private companies, it is seen that, while in 1913 their total debt on account of advances to pay interest and dividends was 636,000,000 francs, at the end of 1917 it had reached 1,400,000,000 francs. This debt of $270,000,000 to the State for guarantee advances is very large when it is considered that these five companies have gross earnings of less than $350,000,000 as compared with $5,000,000,000 for American railroads. It would be the equivalent of upward of two and a half billion dollars for the American roads.

The uneven working of the French guarantee plan before the war made the administration of the railways a continuously discussed political problem, with a constantly recurring agitation for the repurchase of the companies and their operation by the state. The opponents of state operation, of course, pointed to the failure of the state to make any success of its experiment with the Western and urged that what was demanded was not an extension of state meddling in an industry that was being better conducted by the private companies, but a modification in the light of experience of the conventions of 1883. The plight in which all the companies now find themselves, as a result of the heavy burdens of the war, has again placed the railway problem in the forefront of the domestic political questions that France must at once grapple with.

The experience of one country is seldom an unfailing guide for another, because of differences in economic conditions, racial characteristics, and national traditions and ideals, but if in this country we embark on a policy of government guarantee of income on railroad investments, we must do so with our eyes open to the possibilities it invites. If the government directly guaranteed the income on private investments, how long would it be before the government assumed control of the business, especially if the private managements failed to earn the income guaranteed, and the public treasury had to make up the deficit? And would not a guarantee of this character inevitably deaden private initiative?

It is the fear of failure as well as the hope of reward that drives men to do their best: to give insurance against failure is to remove one spur to achievement. If Congress inaugurated such a partnership between the government and private capital, and a large burden eventually fell on the treasury, as has been the case in France, how long would it be before Congress would turn the whole arrangement upside down? Instead of getting the railroads out of politics, would not such a partnership inevitably drag them more deeply into the meshes of partisan struggles? In a word, would not direct guarantee of railroad income inevitably lead to government ownership and operation?

If we are to retain the advantages of private initiative, and save our transportation system and all our machinery of production from the deadening blight of political meddling, we ought to consider well the dangers involved in any proposal for a financial partnership between the railroads and the government. While, before the war our system of public control had its obvious faults, under it was developed the most perfect transportation machine in the world. The best railroads of Europe are many years behind ours in engineering development and operating efficiency. With this achievement before us, should we not attempt to correct the recognized faults in our system of regulation, and build on the sure foundation of the past, rather than enter on an era of political experimenting with new and untried policies? If we are to have a more definite guarantee that capital and brains devoted to the production of transport shall be fairly rewarded, let us find a formula that will not admit of too easy translation into government ownership.

General News Department

W. G. McAdoo, of New York City, former director general of railroads, has been appointed special counsel to the Railroad Administration on matters arising in the state of New York, to serve without pay.

The United States Supreme Court on Monday affirmed a decision of the Court of Claims sustaining a claim of the Union Pacific for payment for the transportation of discharged, retired or furloughed soldiers, military prisoners and applicants for army enlistment at the usual rates of fare. The case arose before the period of government control. The decision holds that such men are not troops entitled to reduced rate on land grant railroads.

Clocks were changed on March 30 by the railways of Canada, to correspond with changes made by their connections in the United States, notwithstanding the decision of the Canadian Government to order no daylight saving this year. Without this change of clocks the Canadian roads would have been obliged to change schedules of trains crossing the border, and of those making important connections at the border. Reports from Ottawa say that the Government has called upon the railroads to explain.

Representatives of railroad commissions in Northwestern states have formed a committee of five to advance as rapidly as possible pending litigation seeking to establish the exclusive right of states to regulate intrastate commerce. Representatives from Iowa, Nebraska, North Dakota, South Dakota, Minnesota, Washington, Oregon and Idaho, gathered in a meeting, have adopted a resolution directing this committee to keep in touch with the progress of all litigation involving the rights of states to prescribe state rates, regulations and charges and to co-operate with all other state commissions and assist any effort of the National Association of Railroad & Public Utilities Commissioners in the prosecution of similar cases. The committee is composed of commissioners from five states: John A. Guiher, Iowa, chairman; Fred W. Putnam, Minnesota; V. E. Wilson, Nebraska; S. J. Aandahl, North Dakota, and J. J. Murphy, South Dakota.

Rates for telegrams have been increased 20 per cent. This increase in domestic commercial telegraph rates, put into effect on April 1, was made by the postmaster general over the protest of the Postal Telegraph Company. The higher rates were declared to be necessary to meet the increased cost of operation occasioned by increases in wages. The rates also apply to government telegrams, but not to press messages, although leased wires are to be charged for at an advance of 20 per cent over existing leased wire rates. Clarence H. Mackay, president of the Postal Company, declares the new rates unwarranted. He says: "The total telegraph business of the country is approximately $80,000,000, and this 20 per cent increase ordered by Mr. Burleson means an increase of $16,000,000 to telegraph users. If we had been allowed to keep our property and operate it we would not have thought of increasing the rates. The real fact is that Mr. Burleson has agreed to pay the Western Union more than he should have agreed to, and in order to realize that amount he has to raise the rates. A second reason is that the Western Union is not administered carefully and economically. Even now, when the government is supposed to be in control of both companies, the Western Union has a horde of solicitors running around trying to get business away from the Postal. These solicitors are as useless as would be solicitors for a street railway. What Mr. Burleson intends to do with the profits which he is taking away from us we do not know. As it is now, the Western Union is ahead of the game, but the public loses $16,000,000 a year, and we lost about $2,000,000 under Mr. Burleson's award to us. If Mr. Burleson will return our lines to us at once we will carry on the telegraph business at the old rates."

Walker D. Hines Visits Chicago

Walker D. Hines, director general of railroads, and party spent Friday, March 28, in Chicago in conference with regional directors and federal managers of the Central West. On Friday evening he was the guest of the Chicago Press Club, where he repeated portions of his speech made at Pittsburgh the night before. R. H. Aishton, regional director of the Northwestern region; Hale Holden, Central Western regional director, and W. T. Tyler, director of the Division of Operation, also addressed the members of the Press Club. Mr. Hines and his party left Chicago the following day, for Atlanta.

Y. M. C. A. Campaign

The Railroad Y. M. C. A. is planning an intensive all the year round campaign among its 300 local railway associations to bring its facilities more directly to railway men and to make the association a more important factor in the community life of railroad towns in which it is working. A "membership drive" will be inaugurated on May 18 and will extend for one week. It has been found that the war has reduced the membership in the Railroad Y. M. C. A. in America from 130,000 to 110,000 and the goal of the May drive will be to bring it up to 150,000. It is proposed that all memberships shall be made to expire on April 30 of each year. This campaign has been developed at recent conferences of association leaders in New York, Philadelphia, Atlanta, St. Louis, Chicago and other places.

U. S. R. A. Before Ohio Courts

General Order No. 18 of the director general of railroads was held invalid as applied to state courts by Common Pleas Judge William E. Duncan, of Ohio, in over ruling a motion to dismiss the case of J. R. Eyestone, against the Cleveland, Cincinnati, Chicago & St. Louis and the Hocking Valley for $515 personal injuries. The plaintiff lives in Wyandot county, where the cause of action arose, but suit was brought in Hancock county. The railroad attorneys cited General Order 18, requiring all suits against carriers while under federal control to be brought in the county or district where the plaintiff resided, or in the county or district where the cause arose. The court held the order invalid as applied to state courts for the reason that its effect would be to suspend operation of a section of the Ohio general code fixing the territorial jurisdiction of the court of common pleas of Ohio and specifying that an action against the railroad company owning or operating a railroad within this state may be brought in any county through or into which such railroad extends. The fact that the accident occurred in 1917, prior to the government taking over the railroads, is believed to have influenced the decision.

State May Purchase Colorado Midland

To prevent the Colorado Midland from being scrapped the government of the State of Colorado is contemplating the purchase of the property. This road traverses the central part of the state, and its principal competitor is the Denver & Rio Grande. Two years ago it was bought at foreclosure for $1,450,000 by interests representing the Porphyry Copper Companies, terminating a receivership. By a system of through routing between eastern and western points, the business of the road had been built up to a point where it was earning a small profit. When the Railroad Administration assumed charge the traffic was diverted to the Denver & Rio Grande with the result that the small monthly profit which the road had been earning was transformed to a deficit which amounted to $750,000 in six months. Upon relinquishment of control by the Government, the copper men, who had invested approximately $2,000,000, started to scrap it as the through business was gone and nothing remained but unprofitable local business.

A bill for the operation of the Denver & Salt Lake (Moffat road) by the state and construction of the James peak tunnel has been passed by the Colorado House of Representatives by vote of 31 to 30.

Conference of Tie Producers

A meeting of the regional vice presidents comprising the board of directors of the National Association of Tie Producers met at the Planters' Hotel, St. Louis, last week, to receive reports from the different tie producing regions and to consider conditions confronting the industry. The Railroad Administration's lack of money is already having its effect upon tie production. Some roads are said to be adopting a policy of forcing loans from the larger tie producers while giving preference to producers who are less able to carry an account. It is felt that the Railroad Administration thus discredits its declaration, made earlier in the year, that large and small producers would be treated alike.

Considerable interest was expressed in the outlook for an export demand for cross ties, some of the producers showing much concern about the inquiry which is now out for 10,000,000 cross ties for British and French railroads. One member of the board of directors of the Tie Producers' Association has also received an inquiry for 2,000,000 ties for export to Italy.

A resolution was adopted authorizing the president of the Association to appoint a committee to confer with the Railroad Administration at Washington.

Valuation Progress

In a statement issued under date of March 11, by Frederick H. Lee, secretary of the Presidents' Conference Committee on the Federal Valuation of the Railroads, there are published abstracts from statements made by Director C. A. Prouty before the Appropriation committee of the House of Representatives on February 3, 1919. In this statement Director Prouty said that the road and track parties in all districts will substantially complete their work this year and that four parties have already been disbanded in the Pacific district and five in the Southern district. The land and the field accounting work will be completed in about two years, while the office work will be completed in about three years.

The complete engineering, accounting and land reports for the Boston & Maine system have been received, while the director stated that similar reports had been completed for the Rock Island. It is estimated that the division will receive completed reports from the engineering section on 50,000 miles of road during 1919, similar reports having been received on 25,000 miles of road up to January 1 of this year. The inventory of the Western Union properties has been practically completed while the most important part of the inventory of the Postal Telegraph properties will be completed in about six months. Work is just about to begin on the properties of the American Telephone & Telegraph Company. Up to December 31, 1918, $13,706,197 had been expended by the Federal Valuation Department, of which $13,206,831 had been expended on the valuation of the railroads. The Commission has authorized the appointment of about 1,525 men and the average force of the Division of Valuation during 1918 was about 1,325 men.

Preparations for Railroad Legislation

Representative John J. Esch, the next chairman of the House Committee on Interstate and Foreign Commerce is making preparations for beginning active consideration of proposed railroad legislation as soon as Congress is called in extra session, which it is now believed in many quarters will be by June 1. Mr. Esch's views, in a general way, correspond to the plan suggested by the Interstate Commerce Commission before the Senate Committee. He wants the roads returned to their owners as soon as legislation can be provided and he has also discussed the idea of including legislation for the future regulation of telegraph and telephone lines and of motor truck freight routes. He proposes to hold a series of hearings.

Representatives of the organized railroad employees, headed by the officers of the train service brotherhoods and of the Railroad Department of the American Federation of Labor, who have joined hands, are planning an active campaign to exert their influence on the proposed legislation and it is reported that headquarters will shortly be opened in Washington for the purpose of carrying on their propaganda under the direction of Glenn E. Plumb, counsel for the brotherhoods. A bill to carry out the provisions of the so-called Plumb plan of government ownership is being drafted and will be supported by the organizations, but it is understood that if congressional sentiment against government ownership appears too strong they will demand, as a minimum, representation for labor on the Interstate Commerce Commission or whatever body is put in control of the railroads.

Organization of the American Welding Society

The first meeting of the American Welding Society was held on March 2, 1919, at the Engineering Societies building, 33 West 39th street, New York, and the constitution and by-laws were adopted as recommended by the Organization Committee. The outline of the organization, its aims and activities, and the qualification requirements for members were published in the March 14, 1919, issue of the *Railway Age*. The following officers were elected:

President—C. A. Adams, President American Institute of Electrical Engineers, Cambridge, Mass.
Vice-President (for 1 year)—J. M. Moorehead, Union Carbide Company, New York.
Vice-President (for 2 years)—G. L. Brunner, Brunner Manufacturing Company, Utica, N. Y.
Directors for 1 year—
W. M. Beard, Linde Air Products Company, New York.
M. H. Roberts, Air Reduction Sales Company, New York.
M. M. Smith, Commercial Acetylene Company, New York.
L. D. Loveкin, American International Ship Building Corp., Philadelphia, Pa.
Alexander Churchward, Wilson Welders and Metal Company, New York.
W. H. Patterson, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa.
Walter J. Jones, Chester Shipbuilding Company, Philadelphia, Pa.
C. A. McCune, Page Steel & Wire Company, New York.
Directors for 2 years—
R. R. Browning, Oxweld Acetylene Company, New York.
A. S. Kinsey, Professor of Experimental Mechanics, Stevens Institute, New Jersey, N. J.
Victor Mauck, John Wood Manufacturing Company, Conshohocken, Pa.
E. L. Hirt, Bethlehem Shipbuilding Corporation, South Bethlehem, Pa.
J. F. Lincoln, Lincoln Electric Company, Cleveland, Ohio.
H. M. Hobart, General Electric Company, Schenectady, N. Y.
D. C. Alexander, Quasi Arc Weldtrode Company, New York.
H. R. Swartley, Jr., Davis-Bournonville Company, Jersey City, N. J.
Directors for 3 years—
L. H. Davis, Linde Air Products Company, New York.
E. L. Mills, Air Reduction Sales Company, New York.
D. B. Rushmore, General Electric Company, Schenectady, N. Y.
James Burke, Burke Electric Company, Erie, Pa.
D. H. Wilson, Jr., Wilson Welders & Metal Company, New York.
Hermann Lemp, General Electric Company, Erie, Pa.
C. J. Nyquist, Torchweld Company, Chicago, Ill.
Alexander Jenkins, Alexander Milburn Company, Baltimore, Md.

It was voted that the charter should be held open for ten days, and that those applying for membership in the American Welding Society before April 8 should be considered charter members.

At a meeting of the directors in the afternoon, W. E. Symons, Galena Signal Oil Company, Franklin, Pa., was appointed treasurer, and H. C. Forbes, consulting engineer, New York City, was appointed secretary.

American Gear Manufacturers' Association

The annual convention of the American Gear Manufacturers' Association will be held at the Hotel Statler, Cleveland, Ohio, April 14, 15 and 16.

The organization includes in its membership representative companies engaged in making gears in the United States and Canada. For some years past it has been striving to effect an organization that would develop definite means for standardizing products. The coming convention will center its attention on this problem.

Papers will be presented as follows:

(1) "Gear Steels," by Dr. Parker, of the Carpenter Steel Company.

(2) "Proper Sizes and Materials for Gears."

(3) "Worms and Worm Wheels," by a representative of the Timken-Detroit Axle Company.

Officers of the association are: President, F. W. Sinram, of the Van Dorn & Dutton Company, Cleveland, Ohio; vice-

president, H. E. Eberhardt, of the Newark Gear Cutting Machine Company, Newark, N. J.; secretary, Frank D. Hamlin, of the Earle Gear & Machine Company, Philadelphia, Pa., and treasurer, Frank Horsburgh, of the Horsburgh & Scott Company, Cleveland, Ohio.

American Foundrymen's Association

The 1919 convention and exhibit of the American Foundrymen's Association will be held in Philadelphia, Pa., from September 29 to October 4. It is planned to make this convention an international one and invitations will be sent to foundrymen and industrial engineers all over the world. Details of the program will be announced later.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

Air Brake Association.—F. M. Nellis, 165 Broadway, New York City. Next convention, May 6-8, 1919, Chicago.

American Association of Demurrage Officers.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

American Association of Dining Car Superintendents.—E. H. Thayer, St. Louis-San Francisco R. R., St. Louis, Mo.

American Association of Freight Agents.—R. O. Wells, Illinois Central, Chicago.

American Association of General Baggage Agents.—J. E. Quick, Port Huron, Mich.

American Association of Passenger Traffic Officers.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

American Association of Railroad Superintendents.—J. Rothschild, Union Station, St. Louis, Mo.

American Electric Railway Association.—E. B. Burritt, 8 W. 40th St., New York.

American Electric Railway Manufacturers' Association.—F. C. J. Dell, 50 E. 42nd St., New York.

American Railroad Master Tinners', Coppersmiths' and Pipe Fitters' Association.—Otto E. Schlinck, 485 W. 5th St., Peru, Ind.

American Railroad Association.—J. E. Fairbanks, 75 Church St., New York.—
- Operating Section (including former activities of Association of Railway Telegraph Superintendents and Railway Storekeepers' Association).
- Engineering Section (including former activities of Railway Signal Association).
- Mechanical Section (including former activities of Master Car Builders' and Master Mechanics' Association).
- Traffic Section (including former activities of Freight Claim Association).
- Transportation Section (including former activities of Association of Transportation and Car Accounting Officers).

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Austin Station, Chicago. Next convention, October 21-23, 1919, Cleveland, O.

American Railway Engineering Association.—E. H. Fritch, 910 Michigan Ave., Chicago.

American Railway Master Mechanics' Association (see American Railroad Association, Mechanical Section).—Acting Secretary, V. R. Hawthorne, 735 Transportation Bldg., Chicago. Next annual convention, June 23-25, 1919, Atlantic City, N. J.

American Railway Perishable Freight Association.—E. F. McPike, 135 E. 11th Place, Chicago. Regular meetings, 2d Wednesday in March and September.

American Railway Tool Foremen's Association.—R. D. Fletcher, 6202 Greenwood Ave., Chicago.

American Society for Testing Materials.—C. L. Warwick,, University of Pennsylvania, Philadelphia, Pa. Next meeting, June, 1919, Atlantic City, N. J.

American Society of Civil Engineers.—Charles W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York.

American Short Line Railroad Association.—T. F. Whittelsey, 708 Union Trust Bldg., Washington, D. C.

American Train Despatchers' Association.—D. L. Darling, Northern Pacific Ry., Spokane, Wash. Next convention, June 17-20, Hotel La Salle, Chicago.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md.

Association of Manufacturers of Chilled Car Wheels.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Semi-annual meeting with Master Car Builders' Association.

Association of Railway Claim Agents.—Willis H. Failing, C. R. R. of N. J., Jersey City, N. J.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Next meeting, October, 1919, Chicago.

Association of Railway Telegraph Superintendents (see American Railroad Association, Operating Section).—W. L. Connelly, N. Y. C. R. R., Gibson, Ind.

Association of Transportation and Car Accounting Officers (see American Railroad Association, Transportation Section).—G. P. Conard, 75 Church St., New York.

Bridge and Building Supply Men's Association.—M. J. Trees, Chicago Bridge & Iron Company, Chicago. Next annual convention, October 21-23, 1919, Cleveland, O.

Canadian Railway Club.—James Powell, 46 Aberdeen Ave., St. Lambert (near Montreal), Que. Next meeting, 2d Tuesday in May, 1919, Windsor Hotel, Montreal, Que.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

Central Railway Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November, and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.

Chief Interchange Car Inspectors' and Car Foremen's Association.—W. R. McMunn, New York Central, New York.

Chief Interchange Car Inspectors' and Car Foremen's Supply Men's Association.—D. B. Wright, Lehon Company, 45th and Oakley Sts., Chicago.

Eastern Railroad Association.—D. G. Stuart, Washington, D. C. Next annual meeting, May 8, 1919, Railroad Club, New York.

Freight Claim Association (see American Railroad Association, Traffic Section).—Lewis Pilcher, R. F. & P., Richmond, Va.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 856, Insurance Exchange Bldg., Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, B. & O., Lima, O.

International Railway Fuel Association.—J. G. Crawford, 702 E. 51st St., Chicago. Next meeting, May 19-22, 1919, Hotel Sherman, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 1061 W. Wabasha Ave., Winona, Minn.

Maintenance of Way and Master Painters' Association.—F. W. Hager, 1323 Hurley Ave., Ft. Worth, Tex. Next annual convention, October 21-23, 1919, St. Louis, Mo.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Next meeting, May 26-29, 1919, Hotel Sherman, Chicago.

Master Car and Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass. Next meeting, September, 1919, Chicago.

Master Car Builders' Association (see American Railroad Association, Mechanical Section).—Acting Secretary, V. R. Hawthorne, 746 Transportation Bldg., Chicago. Next annual meeting, June 18-21, Atlantic City, N. J.

National Association of Railway and Utilities' Commissioners.—James B. Walker, 49 Lafayette St., New York. Next annual convention, October 14, 1919, Indianapolis, Ind.

National Foreign Trade Council.—O. K. Davis, 1 Hanover Square, New York. Next convention, April 24-26, Congress Hotel, Chicago.

National Railway Appliances Association.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—George A. J. Hochgrebe, 623 Brisbane Bldg., Buffalo, N. Y. Regular meetings, 3d Tuesday in each month, Teujost Hall, Buffalo, N. Y.

Pacific Railway Club.—W. S. Wollner, 64 Pine St., San Francisco, Cal.

Railway Accounting Officers' Association.—E. R. Woodson, 1116 Woodward Bldg., Washington, D. C. Next annual meeting, June 11, 1919, Hotel Commodore, New York.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York.

Railway Club of Pittsburgh.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month except June, July and August, Colonial Annex Hotel, Pittsburgh, Pa.

Railway Development Association.—D. C. Welty, Missouri Pacific R. R., St. Louis, Mo.

Railway Electric Supply Manufacturers' Association.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

Railway Equipment Manufacturers' Association.—D. L. Eubank, Galena Signal Oil Company, Richmond, Va. Next annual meeting, September, 1919, Hotel Sherman, Chicago.

Railway Fire Protection Association.—G. L. Ball, St. Louis-San Francisco Ry., St. Louis, Mo.

Railway Real Estate Association.—James P. Nelson, President, C. & O., Richmond, Va.

Railway Signal Association (see American Railroad Association, Engineering Section).—H. S. Balliet, Ass't Terminal Manager, Grand Central Terminal, New York. Stated meeting, on Monday, before 3d Tuesday in March, Chicago.

Railway Storekeepers' Association.—J. P. Murphy, N. Y. C. R. R., Box C, Collinwood, Ohio.

Railway Supply Manufacturers' Association.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Next annual meeting, June 18-25, 1919, Atlantic City, N. J.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.

Roadmasters' and Maintenance of Way Association.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Next annual convention, September 16-18, 1919, Chicago.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

Signal Appliance Association.—F. W. Edmunds, West Nyack, Rockland County, New York.

Society of Railway Financial Officers.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.

Southern and Southwestern Railway Club.—A. J. Merrill, P. O. Box 1265, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

Southern Association of Car Service Officers.—E. W. Sandwich, Western Ry., of Ala., Atlanta, Ga.

Supply Association of American Railway Tool Foremen's Association.—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Next annual convention, September 16-18, 1919, Auditorium Hotel, Chicago.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. R. R., Cleveland, O. Next annual meeting, September, 1919, Hotel Sherman, Chicago.

Western Association of Short Line Railroads.—Clarence M. Oddie, Mills Bldg., San Francisco.

Western Railway Club.—A. F. Steubing, 750 Transportation Bldg., Chicago. Regular meetings 3d Monday in month, except June, July and August.

Western Society of Engineers.—Edgar S. Nethercut, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except July and August.

Traffic News

Territorial and district freight traffic committees will hereafter make monthly reports to Washington of the subjects which they have on their dockets.

A traffic association has been organized in connection with the Massillon (Ohio) Chamber of Commerce. The president is S. S. Swaney; secretary, M. L. Underwood.

A bill has been introduced in the Illinois legislature to give railroads the right to grant transportation privileges in exchange for advertising space in newspapers or magazines.

Export rates on cotton via the Pacific coast ports will not be reduced below the basis established by the last 15 per cent increase. A delegation of representatives of the coast cities asked the Railroad Administration to establish a lower rate but was told that the 15 per cent increase must be maintained.

With the reopening of the season of lake navigation the Railroad Administration has announced its decision to establish differential freight rates by lake and rail. Compared with the pre-war situation the differentials will be somewhat smaller and the territories of origin and destination somewhat modified.

Manufacturers of Illinois represented by the Illinois District Traffic League and the Illinois Manufacturers' Association are planning to contest any attempt of the Railroad Administration to take control of Illinois intrastate freight rates from the Public Utilities Commission. The controversy has grown out of the complaint of Indiana shippers regarding Illinois intrastate rates. Thomas E. Demcy, chairman of the Public Utilities Commission has asked that the Illinois shippers be heard by the Western Freight Traffic Committee before any action is taken to put in effect, in Illinois, Central Freight Association class rates and official classifications.

At the annual election of the Traffic Club of Chicago, held in the club rooms on March 25, Carl Howe, traffic manager of the Michigan Central, was elected president; E. L. Dalton, traffic manager of Montgomery Ward & Co., first vice-president; William Gourlay, general agent of the American Railway Express Company, second vice-president; Captain A. Fletcher Marsh, secretary of the Marsh & Truman Lumber Company, third vice-president; C. B. Singer, freight representative of the Nickel Plate of Chicago, secretary; and J. F. Coykendall, federal treasurer of the Chicago Great Western, treasurer. The directors elected for two years were J. H. Brinkerhoff, terminal manager of the Chicago District; C. G. Burnham, federal manager of the Chicago, Burlington & Qiuncy; Charles Deitrich, freight claim agent of the Chicago, Milwaukee & St. Paul; Robert C. Ross, traffic manager of Joseph T. Ryerson & Sons; and Luther M. Walters, commerce counsel for Morris & Co.

Ohio State Industrial Traffic League

The Ohio State Industrial Traffic League was permanently organized at Columbus, Ohio, on March 24. A temporary organization was created several months ago for the purpose of considering interstate transportation problems until a permanent organization could be perfected. The officers of the new organization are: President, F. H. Baer, traffic commissioner of the Cleveland Chamber of Commerce; first vice-president, Guy L. Cory, manager of the Springfield Traffic Association; second vice-president, H. D. Rhodehouse, traffic commissioner of the Youngstown Chamber of Commerce; secretary, J. G. Young, traffic commissioner of the Columbus Chamber of Commerce; treasurer, L. G. Macomber, traffic commissioner of the Toledo Commerce Club.

POINTS FOR THE YARDMASTER.—If you are not an operator at least learn the office call; this will enable you to know when to tell your operator to get busy. * * * See that your clerks keep the office in a thoroughly clean and neat condition; desks and drawers should be entirely free from books and papers that are of no current interest. File closed records and papers methodically in a convenient place, but out of the way, and do not allow useless junk to accumulate.—*H. D. McKee.*

Commission and Court News

United States Supreme Court

Taxation of Leasehold Interests

The Supreme Court of the United States has reversed the judgment of the Supreme Court of Georgia, refusing an injunction sought by the Central of Georgia against the collection of certain taxes upon the leasehold interests in the roads leased from the Augusta & Savannah and the Southwestern, which by the charters of the lessors were to be taxed only in a certain way and to a certain amount. The leases were for 101 years, renewable in like periods on the same terms forever. It was argued that if the leases produce a profit in excess of the rental the value is required by the state Constitution to be taxed. But the United States Supreme Court holds that the Constitution, being subsequent to the charters that created the exemption, must yield to them if they apply to the present attempt. The court adopted the reasoning in the case of Wright v. Central of Georgia, 236 U. S. 674, where an attempt to tax the real estate, roadbed and franchise value of the two lessors was held unconstitutional. Central of Georgia v. Wright. Decided February 3, 1919.

Necessity for Notice of Claim for Damage to Live Stock

In an action for damages sustained en route by cattle carried from St. Louis, Mo., to Georgetown, Ky., the railroad in defense set up non-compliance with a provision in the bill of lading requiring claims to be made in writing, verified by affidavit, to the company's general freight agent at Cincinnati. This averment was not denied; but the shipper replied that he promptly advised the agent at Georgetown of all essential facts and maintained that the requirement in respect of written notice to the general freight agent had been waived. The Kentucky Court of Appeals affirmed judgment for the shipper.

The point involved has been discussed in recent opinions of the United States Supreme Court and it finds nothing which takes this case out of the rule requiring compliance with a provision in a bill of lading like this. (St. L. I. M. & So. v. Starbird, 243 U. S. 592; Southern Pacific v. Stewart, decided January 13, 1919). The judgment below was therefore reversed. B. & O. v. Leach. Decided March 10, 1919.

State Taxation of Interstate Commerce Cars

The Supreme Court of the United States, in an appeal by a tank line from tax assessments in Georgia, was called upon to consider the power of a state to lay and collect taxes upon instrumentalities of interstate commerce.

The Union Tank Line has never carried on business or had an office in Georgia. It owns 12,000 oil tank cars, which it rents to shippers. The roads over which the cars move also pay therefor stipulated compensation. Under contract the Standard Oil Company of Kentucky ran certain of these cars into Georgia. They were not permanently within that state, but passed "in and out." The Tank Line for 1913 made a tax return of an average of 57 cars in the state during the year, at a value of $47,310. The Comptroller General assessed the company's property for the year at $291,196. The company contested the validity of the assessment. The trial court adjudged the assessment good. The Supreme Court has now reversed that judgment for the following reasons:

A state may not tax property belonging to a foreign corporation which has never come within its borders—to do so under any formula would violate the due process clause of the Fourteenth Amendment. Insofar, however, as movables are regularly and habitually used and employed therein, they may be taxed by the state according to their fair value along with other property subject to its jurisdiction, although devoted to interstate commerce. While the valuation must be just it need not be limited to mere worth of the articles considered separately, but may include as well "the intangible

value due to what we have called the organic relation of the property in the state to the whole system." How to appraise them fairly when the tangibles constitute part of a going concern operating in many states often presents grave difficulties; and absolute accuracy is generally impossible. The Supreme Court has accordingly sustained methods of appraisement producing results approximately correct—for example, the mileage basis in case of a telegraph company, and the average amount of property habitually brought in and carried out by a car company. But if the plan pursued is arbitrary and the consequent valuation grossly excessive it must be condemned because of conflict with the commerce clause or the Fourteenth Amendment or both.

In the present case the Comptroller General made no effort to assess according to real value or otherwise than upon the ratio which miles of railroad in Georgia over which the cars moved bore to total mileage so traversed in all states. Real values—the essential aim—of property within a state, cannot, it is held, be ascertained with even approximate accuracy by such process; the rule adopted has no necessary relation thereto. During a year two or three cars might pass over every mile of railroad in one state while hundreds constantly employed in another moved over lines of less total length. The court considered the company's property was appraised according to an arbitrary method which produced results wholly unreasonable, and that to permit the enforcement of the proposed tax would deprive it of property without due process of law and also unduly burden interstate commerce. Justices Pitney, Brandeis and Clarke dissented. Union Tank Line vs. Wright. Decided March 24, 1919.

Terminals and Hours of Service Act

The Supreme Court of the United States holds that an independent freight terminal may be a common carrier and subject to the Hours of Service Act.

In proceedings in the Federal District Court for the Eastern District of New York against the Brooklyn Eastern District Terminal for alleged violation of the Hours of Service Act, the defendant contended that it was not a common carrier; that it was not engaged in interstate commerce by railroad; and that its employees were not "connected with the movement of any train." Upon facts which were agreed the trial court entered judgment for the Government. The Circuit Court of Appeals reversed the judgment on the ground that, while the Terminal was engaged in interstate commerce and the employment in question was connected with the movement of trains, it was not a common carrier. (239. Fed. 287.)

The substantial question before the Supreme Court was whether the Terminal was within the scope of the act, as being a common carrier. The court held that it was. In no respect does the service actually performed by the Terminal for or in respect to shippers differ from that performed by the railroad companies at their other stations. True, the service is performed by the Terminal under contracts with the railroad companies as agent for them and not on its own account. But a common carrier does not cease to be such merely because the services which it renders to the public are performed as agent for another. The relation of connecting carriers with the initial carrier is frequently that of agent. The relation of agency may preclude contractual obligations to the shippers, but it cannot change the obligations of the carrier concerning the physical operation of the railroad under the Hours of Service Act, which as the Supreme Court has said, must be liberally construed to secure the safety of employees and the public. (A., T. & S. F. v. U. S., 244 U. S., 336.)

It is now admitted that the Terminal is engaged in interstate commerce; and it is held clear that at least "switching crews" engaged in moving at one time a locomotive with seven or eight cars between the docks and the warehouses or team tracks, a distance of nearly a mile, are engaged in the movement of a "train." Those decisions under the Safety Appliance Acts, which do not support this view, depend upon the particular context in which the word "train" there occurs, and are held not applicable here. United States v. Brooklyn Eastern District Terminal. Decided March 24, 1919.

Equipment and Supplies

Certificates of Indebtedness to Supply Companies

A telephone message from Washington, just as we are going to press, advises that Director General Hines has entered into an agreement with the equipment companies to issue certificates of indebtedness similar to those issued to the railroads and for the amounts now due. It is understood that these certificates may be used as collateral on loans from the banks.

Standard Locomotive Deliveries for Week Ended March 22

The following new locomotives were shipped to railroads under federal control during the week ended March 22:

Works	Road	Number	Type
American	A. C. L.	4	USRA Pacific
	C. of G.	2	Mallet
	C. & Nw.	4	USRA 6W. Sw.
	C. & Nw.	1	Mikado
	C. St. P. M. & O.	4	USRA Mikado
	Erie R. R.	5	USRA St. Fe
	G. N.	4	USRA Mikado
	Penn. L. W.	3	Santa Fe
	Penn. L. W.	7	USRA S. Fe
	T. & P.	4	USRA 6W. Sw.
		38	
Lima	L. & N.	1	USRA Mikado
		1	
Baldwin	C. B. & O.	3	Mikado
	P. & L. E.	6	USRA Mikado
	Ill. Cent.	1	Mikado
	P. R. R.	1	Mikado
	P. & R.	1	Mallet
	A. T. & S. Fe.	1	Mikado
	G. N.	2	8W. Sw.
	C. C. & O.	1	Mikado
	L. V.	1	Pacific
		17	
	Total	56	

Standard Car Deliveries to March 22

The following new standard cars were accepted during the week ended March 22:

Road	Number	Type	Manufacturer	Total accepted for given roads
C. C. & O.	38	50 Ton S. S. Box	Bettendorf Co.	162
N. Y. C.	83	50 Ton S. S. Box	Haskell & Barker	1,000
Sou. Pac.	49	50 Ton S. S. Box	Haskell & Barker	49
N. & W.	364	50 Ton S. S. Box	Pullman Car Co.	400
L. & N.	21	50 Ton Comp. Gon.	Am. Car & Fdy. Co.	150
N. Y. C.	98	70 Ton L. S. Gon.	Pressed St. Car Co.	443
Total	653			

Locomotives

The South Manchurian Railways have ordered 26 Decapod locomotives from the American Locomotive Company. These locomotives will have 23 by 28 in. cylinders, and a total weight in working order of 202,000 lb.

The Kaijama Mining Company, China, has ordered two 6-wheel switching locomotives from the American Locomotive Company. These locomotives will have 12 by 18 in. cylinders, and a total weight in working order of 60,000 lb.

Freight Cars

The Worthington Pump & Machinery Corporation, Cudahy, Wis., is inquiring for 25 scoop ore cars.

Passenger Cars

The Canadian National Railways are inquiring for a private car.

Supply Trade News

The **American Blower Company**, Detroit, Mich., has purchased a plot of ground containing approximately 15 acres upon which it intends to build a new plant. Plans are now being prepared for the construction of a foundry upon which work will be started in the near future.

Frederick G. Zimmerman, assistant secretary of Harry Vissering & Company and the Okadee Company of Chicago, has been appointed secretary, to succeed **Marshall E. Keig**, who has resigned to accept the office of assistant to the president of the Consumers Company at Chicago.

Frank Walsh Haskell, president of the Carborundum Company, Niagara Falls, New York, died April 2 at his winter home at Daytona, Fla. Mr. Haskell was born in Brooklyn, New York, in 1861, and was educated in the schools there and in Bloomfield, N. J. He was for a time in railroad service as a rodman in the engineer corps, which laid out the Chicago, St. Paul, Minneapolis & Omaha. In 1885 he moved to Pittsburgh and there affiliated himself with Henry C. Frick as secretary and treasurer of the Southwest Connelsville Coke Company, owned jointly by the Frick and Illinois Steel Companies. In 1897 he moved to Niagara Falls, representing the Mellon interests of Pittsburgh, and becoming president of the Carborundum Company, then in its infancy. This company under his leadership became the greatest abrasive manufacturing concern in the world. It is not generally known that at the request of H. C. Frick and E. H. Harriman in 1905 Mr. Haskell made the investigation of the Equitable Life Assurance Society, which later brought before the public the disclosure resulting in the entire change in the method of life insurance business in the United States. The Armstrong and Hughes Investigating Committees, so-called, were the subsequent results, their facts being largely based on Mr. Haskell's masterly accomplishment.



F. W. Haskell

The Chicago Pneumatic Tool Company has discontinued its branch office at Wichita, Kan., and has transferred the stock from that place to Eldorado, Kan., where an office and warehouse have been established. A new office has also been opened by the company at Tulsa, Okla.

The Firth Sterling Steel Company, McKeesport, Pa., announces the removal of its New York and Boston warehouses to new quarters. The New York warehouse will henceforth be at 310 Hudson street and the Boston warehouse at 35 Oliver street. The latter was previously occupied by the company from 1873 to 1914.

I. H. Cohn, formerly of the **National Steel Rail Company**, has become associated with the Standard Rail & Steel Company, St. Louis, Mo., and will be in complete charge of the rail department, handling all matters relative to relaying rails and railroad equipment. The company's plant of 15 acres in Madison, Ill., is now nearing completion.

Lieut. Joseph P. Schneider, who for the past nine months has been on duty with the Railway Transportation Corps, U. S. A., as railway transportation officer with headquarters at Paris, France, has received his honorable release from the service and has resumed his duties as Western office assistant with the Locomotive Superheater Company at Chicago.

C. F. Massey, president of the **Massey Concrete Products Corporation**, Chicago, has been elected chairman of the Board of Directors of that company, and **J. S. Hobson**, western manager of the **Union Switch & Signal Company**, at Chicago, has been elected president of the Massey Concrete Products Corporation, to succeed Mr. Massey. Mr. Hobson will retain his position with the Union Switch & Signal Company.

Samuel T. Fulton, vice-president of the **Railway Steel Spring Company**, died in New York, March 29, at the age of 52 years. He was born in Topeka, Kan., and spent many years in railroad service in the west, becoming assistant to the president of the Chicago, Rock Island & Pacific Railroad in 1904. He resigned in 1909 to become associated with the Railway Steel Spring Company.

Lieut.-Colonel Merrill G. Baker has been elected president of the **American International Steel Corporation**, effective April 1. Colonel Baker was formerly assistant manager of sales of the Cambria Steel Company and has been for many years one of J. Leonard Replogle's right hand men. He succeeds the late Edward M. Hagar, who died over a year ago. The American International Steel Corporation is a subsidiary of the American International Corporation.

The Onondaga Steel Company, Inc., Syracuse, N. Y., announces the addition to its board of directors of Morton D. Whitford, treasurer of the Semet-Solvay Company, and Charles H. Canfield, general auditor of the Onondaga Steel Company. The company is planning to remove its offices and remaining furnace and melting equipment this spring from its original plant in Syracuse to a large tract of land recently acquired at Eastwood on the outskirts of Syracuse, and plans have been made for the immediate construction of a large temporary office building and an addition to the main building, 40 ft. by 40 ft., which will house the blacksmith shop and the small hammer shop.

Elected President of Westinghouse Air Brake Co.

At the annual meeting of the stockholders of the **Westinghouse Air Brake Company**, held Monday at the general office of the company in Wilmerding, Pa., **A. L. Humphrey**, who has been vice-president and general manager of the company since 1909, was elected president, succeeding John F. Miller. This action was taken at the solicitation of Mr. Miller, who after a service of thirty years, during which period he rose from the position of real estate agent for the company to its highest executive office, is desirous of being relieved of some of the active duties in the management of the air brake interests. He will remain, however, a member of the board of directors of the company and hold the position of vice-chairman of the board, with H. H. Westinghouse as chairman.



A. L. Humphrey

Mr. Humphrey has been connected with the Westinghouse Air Brake Company since 1903 when he was appointed western manager with headquarters at Chicago. He was born in Buffalo, New York, and his family moved to Iowa when he was less than a year old. At the age of 14 after the usual amount of country schooling he struck out for himself and engaged in various occupations. At the age of 22 he organized a general machine shop and foundry in Seattle which afterwards became the present Moran Iron Works. He then entered railroad service and became constructing division foreman of the Mojave division of the Cen-

tral Pacific, then master mechanic and later superintendent of motive power of the Colorado Midland. At about this time he took an active part in politics and was twice elected to the Colorado House of Representatives and during his second term served as speaker of the House. He then went back to railroad service on the Colorado & Southern in 1899 and went to the Chicago & Alton in 1903 as superintendent of motive power, soon after which he was appointed western manager of the Westinghouse Air Brake Company at Chicago. He went to Pittsburgh in 1905 as general manager of the air brake works, and was elected a director of the company in 1909 when he was also given the dual position of vice-president and general manager, which he has held ever since. When the Union Switch & Signal Company was taken over by the air brake company in 1916, Mr. Humphrey was also elected president of that corporation. In addition he has been active in an executive capacity in all the other interests associated with the Westinghouse Air Brake Company, such as the Locomotive Stoker Company, Pittsburgh; the National Brake and Electric Company, Milwaukee; the American Brake Company, St. Louis, and the Westinghouse Pacific Coast Brake Company, San Francisco.

During the war the companies of which Mr. Humphrey is in charge accepted from the British and Russian governments, contracts for the manufacture of shrapnel and explosive shells as well as time fuses numbering approximately four to six million units and component parts of war material, involving the expenditure of about $20,000,000 which contracts had to be completed in a specified time. Mr. Humphrey not only put up factory buildings, installed special machinery and created an entirely new and separate organization for the construction of this work, but he also finished the job on time without having a single piece rejected. When the United States entered the war Mr. Humphrey received for the Union Switch & Signal Company a contract to produce 4,100 aeroplane engines of the Le Rhone type. Besides his activity as a manufacturer, Mr. Humphrey also acted in a consulting and advisory capacity to the government in Washington on many committees and boards. He was industrial "staff expert" for Brigadier General C. C. Williams, chief of the Ordnance Department, he was a member of the committee on Labor of the Council of National Defense, as well as a member of the War Industries Board and the War Resources Committee in Washington.

He is president of the Employers' Association of Pittsburgh and a director of the Chamber of Commerce.

Besides the election of a president, the stockholders also completed the regular business of the annual meeting Monday by electing the following board of directors: Ben V. Becker, James D. Callery, E. M. Herr, A. L. Humphrey, John F. Miller, John R. McCune, John R. McGinley, Charles McKnight, M. S. Rosenwald, W. D. Uptegraff and H. H. Westinghouse.

American Steel Foundries

R. P. Lamont, president of the American Steel Foundries Company, in a statement to stockholders explaining the proposal of the company to issue $25,000,000 of 7 per cent, cumulative, non-voting preferred stock and the cutting of the par value of the common stock in three, increasing the number of shares proportionately, presents some interesting financial history of the company. The statement, in part, says:

"In 1908 in the recapitalization and readjustment of the securities, the net worth of this company was placed at $17,184,000. Since then over $2,000,000 has been spent on fixed properties, after ample allowance for depreciation, and the capacity of the plants has been increased over 30 per cent. Bonds to the extent of $3,398,913.68 have been paid off; the outstanding debentures have been reduced from $3,436,800 to $1,372,800; the working capital has increased from $4,799,546.02 to $10,547,593.64—all resulting in an increase in net worth of about $13,000,000. The undivided surplus has increased $7,182,845.75.

"The annual net earnings of the company for the past seven years are as follows:

1912	profit	$962,000
1913	"	1,490,000
1914	"	241,000
1915	"	264,000
1916	"	3,969,000
1917	"	5,532,000
1918	"	2,696,000

"With this condition of the company's resources and earnings, it is deemed wise and essential to take means looking to the enlargement, development and diversification of the activities and products of the company, the stabilization of its earnings, and as nearly as may be freed from the vicissitudes and fluctuations heretofore experienced, as also to steady and strengthen its standing in the security market; and to that end the company be enabled, if the occasion arises, to acquire other properties and means making for a prompt realization of this purpose."

The change in the capitalization will be acted upon at a meeting of the stockholders in Jersey City, N. J., on April 22. According to Mr. Lamont's statement the change is being made in order to afford an opportunity to acquire other properties. It is believed that the smaller units of common stock will stimulate and encourage the buying of shares by small investors and particularly by employees of the company.

Westinghouse Air Brake Company

As a change has been made in the fiscal year of the Westinghouse Air Brake Company to correspond with the calendar year, the figures given in the report for 1918 cover a period of 17 months. The additional fact that earnings of the Union Switch & Signal Company, now owned by the Air Brake company, are included in the Air Brake's statement, makes it impossible to compare earnings and expenses with previous years.

The net profits of the Union Switch & Signal Company for 12 months and of all other companies for 17 months, less taxes, aggregated $7,461,900. Deducting Westinghouse Air Brake dividends paid during this period leaves balance to surplus account of $2,384,923.

Federal taxes paid for the calendar year 1917 by all companies, including the Union Switch & Signal, totaled $549,638. For the year 1918, the liability set up to cover estimated federal taxes of the same companies amounts to $2,250,000, an increase of over 325 per cent.

Haskell & Barker Car Company

The net earnings of the Haskell & Barker Car Company for the fiscal year ended January 31, 1918, as published in its annual report show a substantial gain compared with the preceding year, before making allowances for federal taxes. However, after tax reductions and reserve for renewals, the amount left available for dividends totaled $1,366,916, equal to $6.21 a share on the 220,000 shares of stock, as compared with $1,599,743, equal to $7.27 a share, the previous year. The gross earnings for the year ending January 31, 1918, were $4,409,210, an increase of $1,775,017 as compared with the previous year. Edward S. Cary, president of the company, in his statement to the stockholders, said: "The industrial situation in this country is deeply involved in uncertainty due to transition from intensive war time production to peace time pursuits and the equipment business is further affected by the uncertainty that surrounds the railroad situation. This company is particularly fortunate, however, in having business on its books approximating $30,000,000 to tide it over the period of reconstruction. Due to various causes the railroads have not kept their equipment up to standard and it is only a question of time till normal conditions return and the equipment business comes into its own."

The company's balance sheet is as follows:

BALANCE SHEET

Current assets	$11,077,520
Property and plant account	5,222,596
	$16,300,116

LIABILITIES

Current liabilities, taxes, etc.	$2,083,761
Reserves: For renewals and replacements	653,078
Capital and surplus	$13,563,277
	$16,300,116

Trade Publications

AIR TRANSPORT SYSTEM.—The Quigley Furnace Specialties Company, New York, has developed a system of carrying pulverized fuel which differs from screw conveyor and high pressure blast systems in that the fuel is transported in bulk from

the pulverizing plant through small diameter standard wrought iron or steel pipe by compressed air to bins at the furnace, without the use of return piping. This system and the various apparatus used for the transport, distribution and burning of the fuel are described and shown in a diagrammatic drawing in bulletin No. 11, containing 14 pages.

TIME ZONES.—A large calendar and wall map of the United States and the greater part of Canada, 28 in. by 40 in., is being issued by the Metal & Thermit Corporation, New York, the map showing the new railroad time zones in the United States, which went into effect on January 1, 1919.

ROLLER BEARINGS.—The distinctive features, together with price lists for the different sizes of its type "C" roller bearings, which are recommended for use under conditions of medium loads at medium speeds, such as inspection cars, baggage trucks, etc., are set forth in bulletin No. 1004, issued by the American Roller Bearing Company, Pittsburgh, Pa.

CREOSOTE OIL.—The Barrett Company, New York, has issued a 16-page booklet with the sub-title "When and How to Use Barrett Carbosota Grade-One Liquid Creosote Oil." Two pages are devoted to a description and detailed plan of a simple and inexpensive wooden treating plant and several photographs of home made plants are shown. The booklet includes full directions for the application of creosote oil and its various uses are treated of in detail, special attention being given to the treatment of poles and fence posts.

Railway Financial News

BOSTON & MAINE.—The Massachusetts Public Service Commission has voted approval of the proposed reorganization of this company, and has authorized the issuance of $13,306,000 of bonds to fund the outstanding notes.

Judge Morton on March 26 authorized the receiver to accept from the director general certificates of indebtedness amounting to approximately $919,416, or such part thereof as he may be willing to issue, and to apply to the war finance corporation for an advance of $735,532 needed to meet payments coming due. The receiver was also authorized to issue notes for the advance and pledge the certificates as security, as well as other securities which may be required.

CANADIAN PACIFIC.—See editorial comment elsewhere in this issue.

ERIE.—The New Jersey Public Utility Commission has approved the application of this company for authority to pledge $8,372,000 of its series D bonds, issued under its general mortgage of April 1, 1903, as collateral security for a proposed issue of its three-year 6 per cent collateral gold notes to the amount of $15,000,000.

Canadian Pacific Railway Company—Thirty-Eighth Annual Report

DIRECTORS OF THE CANADIAN PACIFIC RAILWAY COMPANY.
YEAR ENDED DECEMBER 31ST, 1918.

To the Shareholders:

The accounts of the Company for the year ended December 31st, 1918, show the following results:—

Gross Earnings		$157,537,698.05
Working Expenses		123,035,310.38
Net Earnings		$34,502,387.67
Deduct Fixed Charges		10,177,512.98
Surplus		$24,324,874.69
Contribution to Pension Fund		500,000.00
		$23,824,874.69
Deduct Net Earnings of Commercial Telegraph, January and February, transferred to Special Income Account		193,976.64
		$23,630,898.05
From this there has been charged a half-yearly dividend on Preference Stock of 2 per cent., paid October 1st, 1918	$1,613,638.42	
And three quarterly dividends on Ordinary Stock of 1¾ per cent. each, paid June 29th, 1918, October 1st, 1918, and December 31st, 1918	13,650,000.00	
		15,263,638.42
		$8,367.259.63
From this there has been declared a second half-yearly dividend on Preference Stock, payable April 1st, 1919	$1,613,638.42	
And a fourth quarterly dividend on Ordinary Stock of 1¾ per cent., payable April 1st, 1919	4,550,000.00	
		6,163,638.42
Leaving net surplus for the year (which amount has been placed in reserve to meet special taxes imposed by the Dominion Government)		$2,203,621.21

In addition to the above dividends on Ordinary Stock, three per cent. was paid from Special Income.

SPECIAL INCOME FOR YEAR ENDED DECEMBER 31st, 1918.

Balance at December 31st, 1917	$15,785,750.86	
Less: Dividend paid April 1st. 1918	1,950,000.00	
		$13,835,750.86
Net Revenue from Investments and Available Resources, Exhibit "C"		1,928,483.50
Interest on Deposits, and Interest and Dividends on Other Securities		2,779,854.22
Net Earnings Ocean and Coastal Steamship Lines		1,214,869.22
Net Earnings Commercial Telegraph and News Department, Rentals and Miscellaneous		2,205,544.57
		$21,964,502.37
Less: Payments to Shareholders in dividends: June 29th, 1918, October 1st, 1918, and December 31st, 1918		5,850,000.00
		$16,114,502.37
From this a dividend has been declared payable April 1st, 1919		$1,950,000.00

2. The working expenses for the year amounted to 78.10 per cent. of the gross earnings, and the net earnings to 21.90 per cent., as compared with 69.46 and 30.54 per cent., respectively, in 1917.

3. There were no sales during the year of Four per cent. Consolidated Debenture Stock, Four per cent. Preference Stock, or other Capital Securities.

4. In consequence of the provisions of the Order of the Governor-General-in-Council passed in March of last year, imposing Special Taxes upon the Company, the net surplus from railway operations for the year has been placed in reserve to meet such special taxes, and a notation to that effect appears in the accounts.

5. The sales of agricultural land in the year were 842,191 acres for $15,375,996, being an average of $18.25 per acre. Included in this area were 64,424 acres of irrigated land which brought $42.94 per acre, so that the average price of the balance was $16.22 per acre.

6. Pursuant to the policy adopted by your Directors in 1916 one hundred farms for returned soldiers were prepared for occupation and qualified men have already been placed on a number of them. In the opinion of your Directors it is desirable that the Company should continue, as conditions warrant, the preparation of farms and the sale of them on favorable terms to soldiers who have served in the Canadian or Imperial Forces and to Canadians who have served in the Allied Armies.

7. At the outbreak of hostilities your Company had in commission in Atlantic and Pacific service 38 steamers, with an aggregate gross tonnage of 342,000 tons. Since August, 1914, the construction of 4 steamers previously authorized, having a gross tonnage of 54,000 tons, has been completed, and 12 steamers of 69,000 gross tonnage have, in the same period, been purchased. During the war 15 steamers were lost by enemy action or through accidents at sea, and 9 have been sold to the British Admiralty after having been requisitioned. The construction at the yards of the Fairfield Shipbuilding Company of a ship 625 feet in length between perpendiculars, having a gross tonnage of 21,000 tons, is to be proceeded with pursuant to the authorization previously given, and three passenger ships of what is known as the intermediate class, for Atlantic service, two of which have been previously authorized, will be put under construction as soon as possible at the yards of John Brown & Son and the Fairfield Shipbuilding Company. At the end of the fiscal year your Company had in ocean service 28 steamers having a gross tonnage of 264,000 tons, and 6 steamers under order or purchased but not delivered having a gross tonnage of about 80,000 tons. On their delivery the total tonnage of the fleet will be slightly in excess of aggregate tonnage of the vessels in commission on 3rd August, 1914.

8. In May of last year, in consequence of the demands for increases in wages made to the Railroad Administration of the United States, substantial increases in all wage scales on American Lines were authorized, and were accompanied by increases in freight and passenger rates. Demands for wage increases were likewise made in Canada, and, by Orders-in-Council passed under the War Measures Act in July last what is known as the McAdoo Scale of Wages was made effective in Canada, and increases in freight rates generally similar to those granted in the United States were made effective on all Canadian railways.

9. There will be submitted for your consideration and approval a lease of the Kaslo and Slocan Railway, extending from a point of junction with the Whitewater Creek Branch of the Nakusp and Slocan Railway at Retallack to Kaslo, in the Province of British Columbia, a distance of 17.7 miles, the control of which was secured by your Company with your approval under agreement with the Province of British Columbia in 1912.

10. With your approval the Directors in 1893 concluded an agreement for the leasing of the railway of the Nakusp and Slocan Railway Company at a rental of 40 per cent. of the gross earnings. Bonds of the Nakusp and Slocan Company to the amount of £132,960 were issued, guaranteed as to principal and interest by the Province of British Columbia and matured on July 1st, 1918. The rental paid by this Company has not been sufficient to pay the interest on the Bonds, and $321,698 has been advanced by the Province for this purpose up to December 31st, 1917. The lease of the railway of the Nakusp and Slocan Company will expire in 1920, and during its existence your Company has expended very substantial amounts in necessary betterments and improvements. In consequence of representations made by the Provincial Government your Directors have agreed to the purchase by the Company from the Government of Bonds of the Nakusp and Slocan Company to the above amount at the

actual cost to the Province of acquiring them, but not exceeding their face value, upon conditions which involve the extinguishment of all claims of the Province against the railway. All the issuel capital stock of the Nakusp and Slocan Company is held by your Company, and the arrangement is, in the opinion of your Directors, warranted by the value of the railway as a traffic contributor to your Company's system.

11. Subject to your approval your Directors have concluded an agreement with the Grand Trunk Pacific Railway Company providing for the use by that Company of your Company's railway from a point east of Sutherland to a point west of Saskatoon, together with the use of your Company's passenger, express and freight facilities at Saskatoon station. The agreement is for a term of 21 years from the 2nd September, 1918, the rental payable by the Grand Trunk Pacific being based upon interest at the rate of 5 per cent. per annum on half the agreed capital account and the payment of maintenance expenses on a wheelage basis.

12. You will be asked to sanction the issue and sale of Consolidated Debenture Stock to defray the cost of construction of that portion of the Moose Jaw Southwesterly Branch from Mileage 35 to Mileage 66, to an amount not exceeding £6,000 per mile.

13. Your Directors are of the view that the construction of additional branch line mileage in the West will be necessary in the near future, and your authority will be asked for proceeding with the construction of the following lines when conditions warrant such construction, and for the issue and sale of a sufficient amount of Four per cent. Consolidated Debenture Stock to meet the expenditure, viz.:—

Empress to Milden Branch, 132 miles.
Empress to Acme Branch, 132 miles.
Vidora East Branch, 35 miles.
Russell North Branch, 15 miles.
Lanigan North Branch, 150 miles.

14. Subject to your approval your Directors have authorized expenditures on capital account during the present year of $4,482,000, apportioned to the following works, namely:—

Replacement and enlargement of structures in permanent form..	$545,000
Additional stations, roundhouses, freight sheds, ice houses and extensions to existing buildings	525,000
Additional terminal and side-track accommodation	400,000
Tie plates, rail anchors, and miscellaneous roadway improvements	1,017,000
Lining tunnels, British Columbia district	185,000
Automatic block-signal protection	112,000
Surveys for new lines and power possibilities	125,000
Miscellaneous improvements, and additions designed to improve the facilities of the Company and to effect operating economies	1,103,000
Improvements in connection with telegraph service	470,000

15. Your Company subscribed to $17,000,000 of the Second Victory Loan and was allotted $12,447,000 of its subscription. Included in this latter amount was $4,866,666 allotted in exchange for the surrender by the Company of £1,000,000 Dominion of Canada 3¾ per cent. Bonds maturing in 1919.

16. The gross earnings of your transportation system in the fiscal year exceeded those of any previous year in the history of the Company, and exceeded those of 1917 by $5,148,363, but the net earnings were less by $12,043,630 This large addition of $17,191,993 to the working expenses is principally due to the great advances in wages, though the increased cost of fuel and materials of every description also added a substantial amount to the year's expenses.

17. The Board of Railway Commissioners having amended in certain respects the general train and interlocking rules effective upon the lines of all railway companies subject to the jurisdiction of the Parliament of Canada, the appropriate changes in the existing By-laws of your Company will be submitted for your confirmation and approval.

18. The Right Honorable Lord Shaughnessy, K. C. V. O., who has been President of the Company for the past nineteen years, expressed his desire to retire from office in October last and his resignation was accepted with the deepest possible regret. During his tenure of office the Company has enjoyed extraordinary and uninterrupted prosperity and now stands among the foremost transportation companies in the world. Your Directors appreciate that this result has been due to Lord Shaughnessy's able and most devoted services which have earned the admiration of the community and the gratitude of the shareholders. Your Directors learned with gratification of Lord Shaughnessy's willingness to continue as Chairman of the Company, and that the benefit of his counsel and advice will not therefore be lost to the Company. Mr. E. W. Beatty was elected President of the Company.

19. You will be asked to approve verbal amendments to By-laws of the Company passed by your Directors and made necessary by the separation in the positions of Chairman of the Company and President.

20. In order to give his entire time to your Steamship interests, Mr. George M. Bosworth, who for twenty-two years has been in charge of the Company's freight traffic and for seventeen years Vice-President in charge of Traffic, resigned his office and will hereafter be exclusively identified with the Company's Steamship enterprises as Chairman of the Canadian Pacific Ocean Services Limited. Mr. W. R. MacInnes, formerly Freight Traffic Manager, was appointed Vice-President in charge of Traffic in succession to Mr. Bosworth.

21. Vice-President Sir George Bury, after a service of over thirty-five years during which he held many positions of increasing responsibility and importance and in all of which he showed energy and ability of a very high order, resigned from the Company's service in October. He at the same time retired from the Board and from the Executive Committee. Mr. Grant Hall, Vice-President of Western Lines, was elected Vice-President, a member of the Board of Directors and of the Executive Committee in succession to Sir George Bury.

22. The undermentioned Directors will retire from office at the approaching Annual Meeting. They are eligible for re-election:—

Mr. Richard B. Angus,
Sir Edmund B. Osler,
Sir Herbert S. Holt,
Brig.-Gen. Frank S. Meighen, C.M.G.

For the Directors,

E. W. BEATTY,
President.

Montreal, March 19th, 1919.

CANADIAN PACIFIC RAILWAY COMPANY GENERAL BALANCE SHEET, DECEMBER 31ST, 1918.

ASSETS

PROPERTY INVESTMENT:		
Steamers		$542,656,974.97
Railway, Rolling Stock Equipment and Lake and River		
OCEAN AND COASTAL STEAMSHIPS, Exhibit "A"		27,509,419.67
ACQUIRED SECURITIES (COST):		
Exhibit "B"		123,195,564.18
ADVANCES TO CONTROLLED PROPERTIES AND INSURANCE PREMIUMS		6,660,746.99
INVESTMENTS AND AVAILABLE RESOURCES:		
(Including amount held in trust for 6% Note Certificates, $57,131,199.06)		
Deferred Payments on Lands and Townsites	$60,704,530.48	
Imperial and Dominion Government Securities	30,682,057.44	
Provincial and Municipal Securities	2,031,721.29	
Debenture Stock loaned to Imperial Government	40,000,000.00	
Miscellaneous Investments, Exhibit "C," Cost	26,897,558.49	
Assets in Lands and Properties, Exhibit "D"	105,109,626.47	
Cash	13,482,364.53	
		278,907,858.70
WORKING ASSETS:		
Material and Supplies on Hand	$22,135,952.44	
Agents' and Conductors' Balances	4,040,562.96	
Net Traffic Balances	442,991.84	
Imperial, Dominion and United States Governments, Accounts due for Transportation, etc.	3,797,886.56	
Miscellaneous Accounts Receivable	6,377,139.05	
Cash in Hand	39,548,416.63	
		76,342,949.48
		$1,055,273,513.99

LIABILITIES

CAPITAL STOCK:		
Ordinary Stock	$260,000,000.00	
Four Per Cent. Preference Stock	80,681,921.12	
		$340,681,921.12
FOUR PER CENT. CONSOLIDATED DEBENTURE STOCK		216,284,882.10
MORTGAGE BONDS:		
Algoma Branch 1st Mortgage 5 per cent		3,650,000.00
NOTE CERTIFICATES 6 PER CENT		52,000,000.00
CURRENT:		
Audited Vouchers	9,188,177.61	
Pay Rolls	5,216,537.81	
Miscellaneous Accounts Payable	8,960,573.10	
		23,365,288.52
ACCRUED:		
Rentals of Leased Lines and Coupons on Mortgage Bonds.		539,282.64
EQUIPMENT OBLIGATIONS		8,930,000.00
RESERVES AND APPROPRIATIONS:		
Equipment Replacement	3,959,931.83	
Steamship Replacement	18,649,395.98	
Reserve Fund for Contingencies and for Contingent War Taxes	21,929,788.37	
		44,539,116.18
PREMIUM ON ORDINARY CAPITAL STOCK SOLD		45,000,000.00
NET PROCEEDS LANDS AND TOWNSITES		84,079,684.88
SURPLUS REVENUE FROM OPERATION		127,275,369.58
SPECIAL RESERVE TO MEET TAXES IMPOSED BY DOMINION GOVERNMENT		2,203,621.21
SURPLUS IN OTHER ASSETS		106,724,347.76
		$1,055,273,513.99

J. LESLIE,
Comptroller.

AUDITORS' CERTIFICATE.

We have examined the Books and Records of the Canadian Pacific Railway Co. for the year ending December 31st., 1918, and having compared the annexed Balance Sheet and Income Account therewith, we certify that, in our opinion, the Balance Sheet is properly drawn up so as to show the true financial position of the Company at that date, and that the relative Income Account for the year is correct.

PRICE, WATERHOUSE & CO.,
Chartered Accountants (England).

Montreal, March 10th, 1919.

RECEIPTS AND EXPENDITURES.
YEAR ENDED DECEMBER 31ST, 1918.

Cash in hand, December 31st, 1917		$31,424,893.61
RECEIPTS:		
Surplus Revenue as per statement	$23,630,898.05	
Special Income as per statement	8,128,751.51	
		31,759,649.56
LAND DEPARTMENT:		
Lands and Townsites:		
Proceeds of Sales and Interest, less cancellations	14,376,745.01	
Less Sales Expenses and Irrigation	3,664,358.41	
	10,712,386.60	
Deferred Payments on previous year's sales	3,289,257.01	
	14,001,643.61	
Amount remaining in Deferred Payments on the sales of the year	8,167,588.96	
		5,834,054.65
Amount of repayment of Advances to Governments		12,960,100.00
Amount applied in reduction of Cost of Mining and other Properties, Exhibit "D"		25,449.46
		$82,004,147.28
DEDUCT:		
Agents' and Conductors' Balances	4,040,562.96	
Net Traffic Balances	442,991.84	
Imperial, Dominion and United States Governments	3,797,886.56	
Miscellaneous Accounts Receivable	6,377,139.05	
Advances to Controlled Properties and Insurance Premiums	6,660,746.99	
	21,319,327.40	
Amount at December 31st, 1917	20,648,558.74	
		670,768.66
		$81,333,378.62

EXPENDITURES:

Dividends on Preference Stock:		
2 per cent. paid April 1st, 1918	$1,613,638.42	
2 per cent. paid October 1st, 1918	1,613,638.42	
		$3,227,276.84
Dividends on Ordinary Stock:		
2½ per cent. paid April 1st, 1918	6,500,000.00	
2½ per cent. paid June 29th, 1918	6,500,000.00	
2½ per cent. paid October 1st, 1918	6,500,000.00	
2½ per cent. paid December 31st, 1918	6,500,000.00	
		26,000,000.00
Additions and Improvements, main line and branches, Exhibit "E"		2,903,019.08
Expenditures on leased and acquired lines, Exhibit "F"		1,195,334.42
Shops and Machinery		48,058.23
Ocean and Coastal Steamships:		
Payments on Steamships acquired and under construction	7,236,659.52	
Less amount paid from Steamship Replacement	6,537,787.25	
		698,872.27
Deposited with Trustee, Special Investment Fund		6,015,630.98
SECURITIES ACQUIRED:		
Alberta Stock Yards Co. Stock	4,800.00	
Kingston & Pembroke Ry. Stock	12.50	
Public Markets, Ltd., of Manitoba, Stock	53,400.00	
Lake Erie & Northern Ry. 1st Mortgage Bonds	10,000.00	
Manitoba & North Western Ry. 1st Mortgage Bonds	425.83	
West Kootenay Power & Light Co., 1st Mortgage Bonds	35,283.33	
Trustee Securities	1,396,822.18	
		1,500,743.84
Payment on subscriptions to Government Loans		10,275,648.47
Payment of Equipment Obligations		1,100,000.00
Increase in Material and Supplies on hand		4,232,996.93
		57,197,581.06
DEDUCT INCREASE IN LIABILITIES:		
Current Liabilities	23,365,288.52	
Interest on Funded Debt	539,282.64	
Reserves and Appropriations	44,539,116.18	
	68,443,687.34	
Amount at December 31st, 1917	53,031,068.27	
		15,412,619.07
		41,784,961.99
Cash in hand		39,548,416.63
		$81,333,378.62

STATEMENT OF EARNINGS FOR THE YEAR ENDED DECEMBER 31st, 1918.

From Passengers	$30,837,253.89
" Freight	110,187,288.10
" Mails	1,354,570.91
" Sleeping Cars, Express, Telegraph and Miscellaneous	15,158,585.15
Total	$157,537,698.05

STATEMENT OF WORKING EXPENSES FOR THE YEAR ENDED DECEMBER 31st, 1918.

Transportation Expenses	$61,047,812.79
Maintenance of Way and Structures	22,646,105.94
Maintenance of Equipment	28,226,991.04
Traffic Expenses	3,011,578.67
Parlor and Sleeping Car Expenses	1,214,389.52
Expenses of Lake and River Steamers	1,181,589.41
General Expenses	5,421,601.38
Commercial Telegraph	285,241.63
Total	$123,035,310.38

DESCRIPTION OF FREIGHT FORWARDED.

	Years Ended December 31st		
	1916	1917	1918
Flour .....Barrels	11,119,890	13,727,970	13,301,740
Grain .....Bushels	256,106,690	213,340,507	137,070,428
Live Stock .....Head	2,172,437	2,190,596	2,364,870
Lumber .....Feet	3,017,964,134	3,178,554,667	3,241,312,802
Firewood .....Cord	289,471	295,277	339,631
Manufactured Articles, Tons	8,871,928	10,148,568	9,718,373
All other articles...Tons	8,847,785	8,788,423	9,798,523

FREIGHT TRAFFIC.

	Years Ended December 31st		
	1916	1917	1918
Number of tons carried	30,168,798	31,198,685	29,856,694
Number of tons carried one mile	14,931,739,090	14,882,991,224	13,014,665,922
Earnings per ton per mile	0.65 cents	0.70 cents	0.85 cents

PASSENGER TRAFFIC.

	Years Ended December 31st	
	1917	1918
Number of passengers carried	15,576,721	14,502,546
Number of passengers carried one mile	1,488,974,821	1,289,280,061
Earnings per passenger per mile	2.03 cents	2.39 cents

TRAIN TRAFFIC STATISTICS—FOR TWELVE MONTHS ENDED DECEMBER 31st, 1918 AND 1917

EARNINGS OF LAKE AND RIVER STEAMERS AND OF KETTLE VALLEY RAILWAY NOT INCLUDED IN THIS STATEMENT.

	Year ended December 31st, 1918.	Year ended December 31st, 1917.	Increase or *Decrease** Amount or number.	Per Cent.
TRAIN MILEAGE.				
Passenger trains	16,665,928	18,093,554	d 1,427,626	d7.89
Freight "	22,326,115	25,182,863	d 2,856,748	d11.34
Mixed "	1,966,362	2,056,414	d 90,052	d4.38
Total trains	40,958,405	45,332,831	d 4,374,426	d9.65
CAR MILEAGE.				
PASSENGER.				
Coaches and P. D. and S. cars	82,747,310	93,745,444	d 10,998,134	d11.73
Combination cars	2,366,268	2,769,677	d 403,409	d14.57
Baggage, Mail and Express cars	40,903,961	43,327,370	d 2,423,409	d5.59
Total Passenger cars	126,017,539	139,842,491	d 13,824,952	d9.89
FREIGHT.				
Loaded	539,157,440	617,479,662	d 78,322,222	d12.68
Empty	199,157,368	245,513,721	d 46,356,353	d18.88
Caboose	25,343,851	28,211,955	d 2,868,104	d10.17
Total Freight cars.	763,658,659	891,205,338	d 127,546,679	d14.31
Passenger cars per Traffic Train Mile	6.76	6.94	d.18	d2.59
Freight cars per Traffic Train Mile	31.44	32.72	d 1.28	d3.91
FREIGHT TRAFFIC.				
Tons of revenue freight carried one mile	12,885,684,625	14,677,957,266	d1,792,272,641	d12.21
Tons non-rev. freight carried one mile	1,423,459,482	1,496,188,006	d72,728,524	d4.86
Total tons (all classes) freight carried one mile	14,309,144,107	16,174,145,272	d1,865,001,165	d11.53
Tons of revenue freight carried one mile per mile of road	991,680	1,129,908	d138,228	d12.23
Tons of non-rev. freight carried one mile per mile of road	109,549	115,176	d5,627	d4.89
Total tons (all classes) freight carried one mile per mile of road	1,101,229	1,245,084	d143,855	d11.55
Average amount received per ton per mile of revenue freight .....cts.	0.847	0.698	0.149	21.35
Average No. of tons of revenue freight per train mile	530.44	538.85	d8.41	d1.56
Average No. of tons of non-rev. freight per train mile	58.60	54.93	3.67	6.68
Average No. of tons of (all classes) freight per train mile	589.04	593.78	d4.74	d.80
Average No. of tons of revenue freight per loaded car mile	23.90	23.77	.13	.55
Average No. of tons of non-rev. freight per loaded car mile	2.64	2.42	.22	9.09
Average No. of tons of (all classes) freight per loaded car mile	26.54	26.19	.35	1.34
Freight train earnings per loaded car mile .....cts.	20.24	16.59	3.65	22.00
Freight train earnings per train mile.dollars	4.49	3.76	.73	19.41
Freight train earnings per mile of road .....dollars	8,398.25	7,885.40	512.85	6.50
PASSENGER TRAFFIC.				
Passengers carried (earning revenue)	14,396,753	15,462,276	d 1,065,523	d6.89
Passengers carried (earning revenue) one mile	1,280,533,734	1,480,023,872	d 199,490,138	d13.48
Passengers carried (earning revenue) one mile, per mile of road	98,550	113,932	d 15,382	d13.50
Average journey per passenger .....miles	88.95	95.72	d 6.77	d7.07
Average amount received per passenger .....dollars	2.12	1.93	.19	9.84
Average amount received per passenger mile .....cts.	2.38	2.02	.36	17.82
Average number of passengers per train mile	68.73	73.45	d4.72	d6.43
Average number of passengers per mile	15.04	15.33	d.29	d1.89
Revenue from passengers per passenger car mile....cts.	35.81	30.98	4.83	15.59
Total passenger train earnings per train mile	2.15	1.92	.23	11.98
Total passenger train earnings per mile of road ....dollars	3,078.88	2,973.92	104.96	3.53

* d Indicates decrease.

Railway Officers

Railroad Administration

Central

C. F. Stewart has been appointed manager of the Troop Movement Section, with office at Washington, succeeding **George Hodges,** deceased. Mr. Stewart has been an assistant to Mr. Hodges in charge of passenger routing. He was formerly general passenger agent of the Western Maryland.

Regional

H. M. Adams, manager of inland traffic, Division of Traffic, has been appointed traffic assistant to **B. F. Bush,** regional director of the Southwestern region, to succeed **W. B. Biddle,** who has been assigned to other duties.

Federal and General Managers

W. L. Mapother, federal manager of the Louisville & Nashville and associated roads, with headquarters at Louisville, Ky., has had his authority extended over the Cumberland Railroad (Artemus, Ky., to Anchor, Ky.).

F. P. Pettibone, federal manager at Dallas, Texas, has had his jurisdiction extended over the Beaumont Sour Lake & Western, the Houston Belt & Terminal, the Iberia, St. Mary's & Eastern, the new Iberia & Northern, the New Orleans, Texas & Mexico, the Orange & Northwestern, and the St. Louis, Brownsville & Mexico. These roads have been released from the jurisdiction of **W. B. Scott,** federal manager at Houston, Texas.

W. E. Williams, whose appointment as general manager of the Missouri, Kansas & Texas (exclusive of the Trinity branch, Beaumont & Great Northern and lines west of Whitesboro, Texas), the Union Terminal of Dallas and the Houston & Texas Central, with headquarters at Dallas, was announced in the *Railway Age* of February 28, was born at Houston, Texas, May 29, 1864. He began railway work in 1881 with the International & Great Northern as clerk to the roadmaster, and was subsequently in the bridge department, clerk in the superintendent's office, time keeper, transportation clerk, chief clerk to the superintendent of transportation, to the general superintendent and to the general manager, and secretary to the receivers, until June, 1895. Mr. Williams was then appointed purchasing agent and general storekeeper, in which position he continued for two years. He entered the employ of the Missouri, Kansas & Texas in September, 1897, as chief clerk to the general superintendent, and was consecutively car accountant and trainmaster. In November, 1902, he was promoted to superintendent at Greenville, Tex., and from December, 1905, to October, 1911, he was successively superintendent at Denison, Tex., McAlester, Okla., and Sedalia, Mo. He was then appointed general superintendent, which position he held until his recent appointment as general manager.



W. E. Williams

Operating

W. B. Veazey, treasurer and general manager of the Gainesville Midland, has been appointed superintendent, in charge of operation and traffic, with office at Gainesville, Ga.

W. A. Gore, superintendent of the Norfolk & Portsmouth Belt Line, with office at Portsmouth, Va., has been appointed superintendent of the Norfolk division of the Virginian Railroad, vice **B. E. Nevins,** transferred.

F. C. Smith has been appointed assistant superintendent of the Salt Lake division of the Southern Pacific, lines south of Ashland, with headquarters at Ogden, Utah, vice **H. W. Wistner,** who has been transferred to Sparks, Nev., vice **J. T. Bell,** assigned to other duties.

L. C. Sauerhammer, superintendent, office organization on the Baltimore & Ohio, at Baltimore, Md., has been appointed assistant to federal manager of the Baltimore & Ohio, Eastern Lines; the Coal & Coke; the Morgantown & Kingwood; the Western Maryland; the Cumberland & Pennsylvania; the Cumberland Valley, and the Wheeling Terminal Railroad, with office at Baltimore, vice **E. E. Hamilton,** resigned.

J. Cannon, general superintendent of the Eastern district of the Missouri Pacific, with headquarters at St. Louis, Mo., has been appointed general superintendent of transportation of the same road and the Memphis, Dallas & Gulf, the Natchez & Southern, and the Arkansas Central, with headquarters at St. Louis, succeeding **J. A. Somerville,** resigned to go to another road. **C. B. Wildman,** superintendent of the Eastern division of the Missouri Pacific at Jefferson City, succeeds Mr. Cannon, with headquarters at St. Louis; **W. E. Merrifield,** superintendent of the Omaha division, at Falls City, Neb., succeeds Mr. Wildman; **L. A. David,** superintendent of the Southern Kansas division at Coffeyville, Kan., succeeds Mr. Merrifield, and **Phil Carrol** has been appointed superintendent of the Southern Kansas division, with headquarters at Coffeyville, to succeed Mr. David.

J. W. Deneen, superintendent of the Cumberland division of the Baltimore & Ohio, with office at Cumberland, Md., has had his authority extended over the Keyser division, which has been consolidated with the Cumberland division, and the new division is now known as the Cumberland division. **C. B. Gorsuch,** relief superintendent, has been appointed superintendent of the Pittsburgh division, with headquarters at Pittsburgh, Pa.; **T. J. Brady,** superintendent of the Keyser division, has been appointed superintendent of the Connellsville division, with headquarters at Connellsville, Pa., vice **H. R. Hanlin,** transferred, and **J. D. Beltz,** acting superintendent of the Pittsburgh division, has been appointed assistant superintendent of the same division, with office at Pittsburgh, Pa., vice **C. P. Angel,** transferred.

Financial, Legal and Accounting

H. H. Dean, general counsel of the Gainesville Midland, has been appointed general solicitor; **G. H. Purvis,** auditor, has been appointed federal auditor, and **W. E. McKinney** has been appointed acting federal treasurer; all with offices at Gainesville, Ga.

R. G. Shorter has been appointed auditor of the Carolina, Clinchfield & Ohio; the Carolina, Clinchfield & Ohio of South Carolina, and the Black Mountain Railroad, vice **J. M. Featherston,** transferred to other duties; **G. A. Masengill** has been appointed auditor of revenue, and **L. J. Hopper** has been appointed auditor of disbursements, vice R. G. Shorter; all with offices at Johnson City, Tenn.

Traffic

W. C. Staley has been appointed supervisor of oil traffic of the Southwestern region, with headquarters at Kansas City, Mo., to succeed **B. L. Swearingen,** who has resigned.

W. J. Mullin, general freight and passenger agent of the Delaware & Hudson, has been appointed traffic manager of that road and the Greenwich & Johnsonville; the Wilkes-Barre Connecting; the Schoharie Valley; the Lake Champlain Steamboat Line, and the Lake George Steamboat Line, with headquarters at Albany, N. Y.

John S. Hershey, whose appointment as freight traffic manager of all roads under the authority of **F. G. Pettibone,** federal manager in the Southwestern region, with headquarters at Dallas, Tex., as announced in the *Railway Age*

of March 7, page 554, was born at Nebraska City, Neb., on June 30, 1868 and received his education in the public schools at Nebraska City. Mr. Hershey entered railway service on August 21, 1890 as a clerk in the local freight depot of the Chicago, Burlington & Quincy at Chicago, remaining in that position until 1893 when he became a clerk in the auditing department of the Elgin, Joliet & Eastern. The next year he was employed as rate clerk in the general freight department of the same road and from 1896 to 1902 he served in the office of the freight traffic manager of the Atchison, Topeka & Santa Fe at Chicago. From January, 1902, to June of the same year he was general freight and passenger agent of the Gulf, Beaumont & Kansas City and the following two years he was in the employ of the Gulf, Colorado & Santa Fe as assistant general freight agent until his appointment as general freight agent of the same road, and in addition the Texas Midland and the Houston Belt and Terminal, in which capacity he remained until his recent appointment as noted above.

Engineering and Rolling Stock

A. A. Schenck, engineer of maintenance on the western lines of the Chicago & North Western, with headquarters at Omaha, Neb., has been appointed assistant to the chief engineer, with jurisdiction over lines west of the Missouri river, with offices at Omaha. **A. K. Gault** has been appointed division engineer of the Eastern division of the western lines of the Chicago & North Western and the Missouri Valley & Blair Bridge, with headquarters at Omaha, Neb. **W. T. Main** has been appointed division engineer of the Black Hills division of the Chicago & North Western and the Wyoming & North Western, with headquarters at Chadron, Neb.

Walter Shepard, consulting engineer of the Boston & Albany, with headquarters at Boston, Mass., retired under the pension rules on March 1, after 44 years of continuous service in the engineering department of that road. He was born on March 1, 1849, at Dorchester, Mass., and was educated in the Dorchester grammar and high schools, Boston Latin School, and in 1870 graduated from Harvard University. In 1872 he graduated from the Massachusetts Institute of Technology, and in June of the same year began railway work with the Boston & Albany as an engineer's assistant. He was then out of railway work until March, 1875, when he returned to the service of the Boston & Albany. In April, 1882, he was promoted to division engineer and was made assistant chief engineer in December, 1886. He served as chief engineer from November, 1891, until May, 1908, and since that time as consulting engineer of the same road.



W. Shepard

Orlando H. Frick, whose appointment as district engineer of the Middle district of the Chicago, Milwaukee & St. Paul, with headquarters at Milwaukee, Wis., was announced in the *Railway Age* of March 14 (page 619), was born at Manitowoc, Wis., on September 25, 1879, and graduated from the University of Wisconsin in 1902. Mr. Frick began his railway career in the same year as a levelman with the Louisville & Nashville, and after a short time he entered the employ of the Chicago, Rock Island & Pacific as assistant engineer, in which capacity he served until early in 1904 when he was appointed resident engineer of the Missouri, Oklahoma & Gulf, in which position he remained until September of the same year. The following two months he served as resident engineer on the Appalachicola Northern and then entered the employment of the Chicago, Milwaukee & St. Paul, with which road he has served consecutively until his recent appointment as assistant engineer for ten years, pilot engineer and field engineer on valuation.

Corporate

Operating

W. Culligan has been appointed chief despatcher on the twentieth and twenty-first districts of the Grand Trunk, with office at Stratford, Ont.

Executive, Financial, Legal and Accounting

G. W. Muller has been appointed transfer agent and assistant secretary of the Kansas City Southern, with headquarters at New York, succeeding **D. W. Leitch**, who has resigned.

William H. Williams, chairman of the board of the Wabash Railway Company, with headquarters at New York, has been elected also president to succeed Edward F. Kearney, deceased. A portrait of Mr. Williams and comments on his career were published in the *Railway Age Gazette* of December 10, 1915, page 1092.

Traffic

R. F. Clark, general agent of the Canadian Northern, with office at Chicago, has been appointed general agent of the Canadian National Railways, with office at Chicago, and **J. A. Boak**, western United States agent of the Canadian National Railways, with headquarters at Chicago, has resigned. **D. O. Wood** has been appointed traffic manager of the export and import department, with office at Toronto, Ont.

Engineering and Rolling Stock

M. K. Barnum, assistant to general superintendent maintenance of equipment of the Baltimore & Ohio, with office at Baltimore, Md., has been appointed mechanical engineer for the corporation.

C. S. Ogilvie has been appointed assistant engineer of the Grand Trunk, with headquarters at Ottawa, Ont., vice **H. Mowat**, assigned to other duties. Mr. Ogilvie was formerly assistant engineer of the Grand Trunk, at Belleville, but went overseas with the first contingent of the Canadian Expeditionary Force in the 13th Royal Highlanders. He was a prisoner in Germany for more than three years, being released after the signing of the armistice.

Harold R. Miles, assistant engineer on the Canadian Pacific, with headquarters at Montreal, Que., has been promoted to division engineer with headquarters at Winnipeg, Man. He was born at Lethbridge, Alberta, on March 14, 1879, and entered railway service in March, 1899, with the Washington County Railway Company in the state of Maine. The following year he was employed by the Algoma Central on location work, and in 1901 he entered the service of the Canadian Pacific as assistant engineer of maintenance, with headquarters at North Bay, Ont. Later he was appointed resident engineer of maintenance on the Lake Superior division, in which capacity he served until July 1, 1915, when he was transferred to Montreal, Que., as assistant engineer which position he held until his appointment as division engineer, with headquarters at Lethbridge. Mr. Miles succeeds **H. K. Yorston**, who has been appointed locating engineer of the Canadian Pacific, Western Lines.

Obituary

Edward Lawless, master mechanic of the Illinois Central, with office at Freeport, Ill., died at his home in that city on March 9, at the age of 51.

Allen T. Fraser, chief engineer of the Canadian National Railways, Western lines, with office at Winnipeg, Man., was killed by a snow slide near Mount Robinson, in the Yellowhead Pass, on March 31.

EDITORIAL

Railway Age

The idea that a sale completes a business transaction is out tune with modern business methods. Nowadays it is almost universally accepted as a fact that the sale is only the beginning and that it must be backed up by service. Generally speaking a railroad has nothing to sell but transportation, freight and passenger. That the organizations built up by the railroads under private control for the sale of freight transportation were founded on the service idea was amply demonstrated to shippers. They, however, constitute but a small proportion of those who come in direct contact with the railroads when the general traveling public is considered. Unfortunately the "service" idea has not been so clearly demonstrated to the traveler. Unless seriously inconvenienced by a lapse in the service, the traveler is apt to take everything for granted. It is the lapses, however, that stick in his mind, and as it is not practical to force on his attention all that is being done to insure him a pleasant trip, a special effort should be made to reduce these lapses to a minimum. There are many means which suggest themselves to accomplish the desired end. One of the most obvious is to place responsible representatives of the railroad in the traveler's shoes, so to speak. Their duties would be to travel, making use of the various conveniences set up for aid to the traveler, putting questions to trainmen, to the attendants at information bureaus and to other employees having duties of informational character. If the service rendered is satisfactory, well and good. If not, the remedy will suggest itself. There is no doubt that such measures will more than pay for the trouble.

The Service Idea and Railroading

The article on "Railroad Purchases as a Stabilizer of Business," by F. B. Ernst, on another page, is of more than ordinary interest because it amplifies and supplements the address on this subject which was made by Dr. W. F. M. Goss at the March meeting of the New York Railroad Club (*Railway Age,* March 28, 1919, page 854). While railway supply manufacturers are, of course, the greatest sufferers from the "feast and famine" conditions in that industry, the railroads, the industries generally and the public as a whole are also affected. The problem is so great and such a large percentage of the population of the country is affected that it should be given the most serious consideration. E. H. Harriman, when he was alive, did much to stabilize conditions by buying heavily of the equipment manufacturers when business was light; while he was probably actuated largely by the fact that prices were at their lowest point, he not only did a service to his own properties but gave a real impetus to an increase of business in other lines of industry. As Dr. Goss pointed out, the depreciation of equipment goes on at a fairly regular rate, and this is also true of the growth of the country and the increased demands upon the railroads. These factors enter so largely into the demands for equipment that it would seem that they must have a most important bearing upon the final solution of the problem. E. B. Leigh, president of the Chicago Railway Equipment Company, has for a long time insisted that general industrial prosperity was dependent upon and followed closely on periods of heavy buying of equipment on the part of the railroads. His reasons for this belief are given clearly in the article entitled "Railway Buying and Industrial Readjustment" which was published in the *Railway Age* of April 4. While the Railroad Administration, under the present conditions, is more or less handicapped in the ordering of equipment, it would seem that it might properly give critical consideration to the relation of railway purchases to general prosperity and that it might prepare plans to develop a greater regularity in the purchasing of equipment and be in a position to make recommendations in this respect to the American Railroad Association when the railroads are turned over to the private managements at the end of government control.

Stabilizing Industrial Conditions

The Transport Bill, providing for the establishment of a Ministry of Ways and Communications in control of practically all means of transportation in the United Kingdom and Ireland passed its second reading in the House of Commons on March 18, although it was only introduced by the government on February 27, not three full weeks earlier. This does not mean that it has progressed so rapidly for lack of strong opposition—a fact which makes all the more striking the contrast between the rapidity with which this bill is moving to its passage and the slowness with which the plans for the disposition of the railroads have matured in our own country. The British Ministry of Ways and Communications bill is all-inclusive from the standpoint of transportation. From the abstract of the bill in the *Railway Age* of March 21, page 787, it will be seen that it puts under the control of the ministry which it is proposed to establish, not only railroads, but light railways, canals, waterways and inland navigations; roads, bridges and ferries, and vehicles and traffic thereon; harbors, docks and piers; and the supply of electricity; (a provision to include tramways also was dropped before the second reading). As has been mentioned in the *Railway Age,* there has been much opposition to the bill, particularly on the part of the road transportation and dock interests, who object to having these facilities put under the control of the railway man or, at any rate, of a man who will look at their problems from the railroad point of view. These objections, however, as strongly as they were presented in the House of Commons on March 17 and 18 following the explanation of the necessity for the bill by Sir Eric Geddes and his motion for its second reading, were not sufficient to impede the progress of the bill. It is interesting, however, to observe that but little opposition has been evinced by the railroad interests. The railroad situation in Great Britain is exceedingly serious—Sir Eric Geddes pointed out that at present the railroads are suffering a deficit of £100,000,000 a year and that the transportation services "are financially in a semi-paralyzed state." The government is pledged for two years more to pay the guarantee of earnings on the basis of 1913. The term of the bill is for two years and, therefore, merely takes up, as it were, this guarantee. There was serious opposition manifested to a provision of the bill which provided in brief that the minister might "purchase the whole or any part of a railway," by authority

The British Transport Bill

of an order in council which should lie before the Parliament for not less than 30 days, etc., which it was feared might lead to nationalization without sufficient opportunity for consideration, but this was amended before the second reading. But enough has been said to show that the bill is of epoch making character and deserves careful consideration on the part of American students of the railway problem.

Liquidation of War Contracts

A VALUABLE AND IMPORTANT SERVICE for the business interests of the country is being performed by the Federal Liquidating Association, recently formed to facilitate and hasten the liquidation of reduced, suspended, terminated or cancelled war contracts, formal and informal, many of which are held by companies primarily engaged in the railway supply field. Thousands of contracts were suspended by the government following the signing of the armistice in the midst of performance, and as a result billions of dollars, a substantial part of the currency of national commerce, is frozen in the treasury pending liquidation of these agreements, under circumstances such that there is little precedent to guide. The Association of Manufacturers of War Materials, whose officers constitute the directing personnel of the new association, was largely instrumental in procuring the enactment of a satisfactory bill validating informal war contracts and in obtaining a modification of the rulings of the war department affecting settlements with sub-contractors. Now that a plan of settlement has thus been afforded, experience has demonstrated the necessity for a co-operative agency for presenting the case of the contractors in respect of the whole matter of liquidation.

The tedious process of litigation must be avoided and settlement must be made just as the contracts were made, by newly negotiated settlements and agreements fair to the government and to the contractor. This negotiation cannot proceed with the freedom of private business. Government departments are necessarily restricted by statutory and regulatory limitations which are intricate and involved. Official action on each separate negotiation must be had in Washington by responsible officers with full authority. Yet the field is so vast that the government has been forced to set up a complicated mechanism radiating from the capital, so that each case must be followed through from the field to Washington. Moreover, the settlement of so vast a number of suddenly terminated contracts presents a new problem, each contract presenting an infinite variety of terms and conditions. To meet this situation, the Federal Liquidating Association has been formed by a process of reorganization to meet the new conditions of the former co-operative Association of Manufacturers, with a view to obtaining the same kind of centralized organization with a decentralized auxiliary organization as has been formed by the government.

While the installation of an adequate organization entailed a considerable sacrifice, the officers of the association were persuaded to undertake it as a public service of such difficulty and magnitude that its successful accomplishment must challenge general attention. Every effort has been made to secure the services of the best men for the work and to create an organization which will make their services available to all contractors. Brig. Gen. Hugh S. Johnson is president of the association, and the personnel throughout has been carefully selected for its familiarity through service in governmental bureaus with department methods and with war contracts. W. S. Symington, Jr., general counsel for the Symington interests, and C. J. Symington, president of the Symington Machine Corporation, also share in the direction of its affairs. The secretary is H. H. Dinneen, who was secretary of the Association of Manufacturers of War Materials. The Washington headquarters will keep in close touch with the various governmental departments, presenting the contractors' point of view generally and attending to the expedition and presentation of all matters pending before any departmental agency. Local officers have also been established in the principal large cities convenient to the local boards of adjustment.

The war department has this week announced that it is now able to adjust and settle all of its war obligations, both formal and informal, and is prepared to do so with the greatest possible speed. It has issued complete instructions regarding the process and basis of effecting settlements and the character and the spirit of the men who are representing the business interests seem to assure the sort of co-operation needed to bring about the speediest possible settlement of this important question.

Train Service Employees' Wage Settlement

DIRECTOR GENERAL HINES this week granted an advance in wages to the four classes of train service employees—engineers, conductors, firemen and other trainmen. It is estimated that the advances granted will average about 9 per cent and that their total cost will be $55,000,000 a year. The same order which grants these advances refers to Adjustment Board No. 1 of the Railroad Administration, which is composed of four officers and four employees, the question as to whether and, if so, under what conditions, overtime at the rate of time and a half shall be granted to road train service employees for work in excess of eight hours a day.

This order raises two very interesting questions. The first is, as to the justifiability of an advance in wages to the train service employees at this time. The second is, as to the wisdom of the action taken in referring the consideration of the question of punitive overtime to a board of officers and employees.

The advance in wages made was expected by those who have been familiar with recent developments in railroad affairs. The Railroad Administration takes the position that it practically closes a cycle of advances in wages under government operation and that it was necessary, in order to place the compensation of the train service employees on a parity with that of other employees.

The question of when the present cycle of advances in wages began is open to discussion. The Adamson law went into effect on January 1, 1917. By establishing the principle of the "basic eight-hour day," it gave the train service employees an advance in wages of about $60,000,000 a year. This, in the opinion of many who closely follow railway developments, was the real beginning of the new wage cycle, and on that theory the cycle really was ended before the advance made to the train service employees this week. As a matter of fact, however, the passage of the Adamson act was followed, under private operation, by advances to many other classes of employees. When government control went into effect on January 1, 1918, there were still pending demands for advances in wages from many classes of railway employees, including those in train service, and advances to practically all classes of employees undoubtedly would have had to be made under private operation. In accordance with the recommendations of the Railway Wage Commission, Director General McAdoo issued order No. 27 which made general advances in the wages of the employees, including an advance of 29 per cent to those in train service.

While this order at first looked like a reasonable one, its application disclosed the fact that it provided for relatively much larger advances to some classes of employees than to

others, and that it substituted many glaring inequalities for the inequalities which had been known to exist before. The advances made to some classes of employees were insufficient to hold an adequate number of them in railway service against the competition from other industries in which much larger advances to similar classes of workers had been made. In consequence, it was immediately found necessary to make a large additional advance to the employees in shops.

From the standpoint of the Railroad Administration, this really opened the latest cycle of railroad wages. It made the wages of the shop employees relatively much higher than those of almost all other classes of employees. In consequence, other classes of employees demanded further advances and they were granted; and it is unquestionably true that, until the advance to the train service employees was made this week, their wages were lower in proportion to those of other classes of employees than they were before government control was adopted. The order issued this week makes their wages approximately 40 per cent higher than they were before government control, and practically re-establishes, except in some extreme cases, the relationship between their wages and those of other employees, which formerly existed. Assuming that the other advances which have been granted are reasonable, it would be difficult to show that this advance to the train service employees is unreasonable.

The reference of the question of punitive overtime to a board of officers and employees promises to result in some developments which will be more interesting and important than these advances in wages. Under the terms of the director general's order, the board is instructed to make a study of and to report upon the practicability and propriety of granting punitive overtime at this time. It is to consider, in connection with this matter, what rules and working conditions should be eliminated or changed in consideration of granting punitive overtime in case it is decided that it should be granted. While the representatives of the employees may attempt to get punitive overtime while retaining the existing rules and working conditions, it is difficult to believe that any rational person, familiar with the facts, can actually believe that it would be reasonable or just both to grant time and a half for overtime and retain some of the most important rules and working conditions now in effect.

For example, in numerous cases, under the existing rules, train service employees may be paid two days' wages for work, all of which is done within eight hours, merely because they rendered in a single working day two classes of service which are held to be different kinds of work. If the employees are to be paid time and a half for any work done in excess of eight hours or any mileage run in excess of 100 miles, there surely can be no good reason why they should, under any circumstances, be paid for more than a day's work when they have not worked more than eight hours or run more than 100 miles. In other words, if they are to be paid time and a half for working more than a day they should not be paid, under purely arbitrary rules, for working more than a day when they actually have not worked more than a day. It is very questionable whether punitive overtime should be paid in train service at all because it is manifestly impossible, without a revolution in railway operation, actually to limit the working day in train service to eight hours; and certainly, unless the employees are willing to make concessions in respect to other matters which will save many millions of dollars, they should not be granted punitive overtime, which would be sure to cost much more than all the savings which could be effected by the abolition of all the arbitrary rules and working conditions.

Punitive overtime is to be granted to train service employees engaged in yard work upon the theory that the working day in yard service actually can be limited to eight hours. Even in yard service, the working day cannot be limited to eight hours without a large increase in railway expenses, and before punitive overtime in road service is granted, if it ever is granted, there should be a very clear understanding as to what it is going to cost and as to what savings are to be effected by the concessions granted by the employees.

The wage advances which have now been granted under government operation run to a very large total. Principally as a result of them there has been an enormous increase in railway expenses, which the public must pay. The Railroad Administration and the public are entitled to expect that in return for the present high wages, employees will do the most efficient work of which they are capable. It is universally conceded that, for many months, the efficiency of railway labor has been not high but low. Reports indicate that this condition is improving. Let us hope that it will continue to improve, for the present situation in respect to railway expenses and earnings is extremely serious and the public, which is paying higher rates than ever before and, in addition, bearing a large deficit which has to be met from taxes, has a right to demand a great increase in the efficiency of operation.

The Need for Another Advance in Rates

An early and substantial advance in rates must be made if the Railroad Administration is to stop piling up a large deficit. This fact is clearly demonstrated by the statistics of earnings and expenses for the last five months for which they are available, and especially for the months of January and February. The Class I railways earned in February a net operating income of only $10,000,000, whereas the average net operating income earned by them in February, 1915, 1916 and 1917, was $47,000,000. In other words, in February they incurred a deficit for the government of $37,000,000. Their deficit in January was $36,000,000, making a total deficit for the first two months of this year of $73,000,000. The armistice was signed early in November. In the four months immediately following it, the railways should have earned $259,000,000 net operating income in order to have covered the guaranteed standard return to the companies. They actually earned only $114,000,000.

It is useless to try to dodge the plain implication of these figures. During the first four months following the signing of the armistice the railways earned only 44 per cent of the guaranteed standard return to the companies. During the first two months of the year they earned only 30 per cent of the standard return guaranteed to the companies. It is not conceivable that the results throughout the year would continue to be so bad, but it is probable that, if existing rates should be continued, the deficit for the year would be at least $400,000,000. In some respects the conditions have been abnormally unfavorable. For example, traffic has been declining very greatly. On the other hand, some of the most important conditions were abnormally favorable. Never in the history of railroad operation in America were there four winter months when the conditions were more conducive to economical operation than they were in the four months under review.

The statistics reflect a situation which it is hardly an exaggeration to describe as appalling. The standard returns guaranteed to the companies are based upon the average net operating income earned in the three years ending on June 30, 1917. Therefore, to say that the railways are earning only about one-third of their guaranteed standard returns is equivalent to saying that they are earning only one-third as much net operating income as they earned in those

three years. Nothing is to be gained and everything is to be lost by not squarely facing the facts. The facts are that the government as a railroad manager is bankrupt, and that if the railways should now be returned to private operation, many of the companies would be bankrupted.

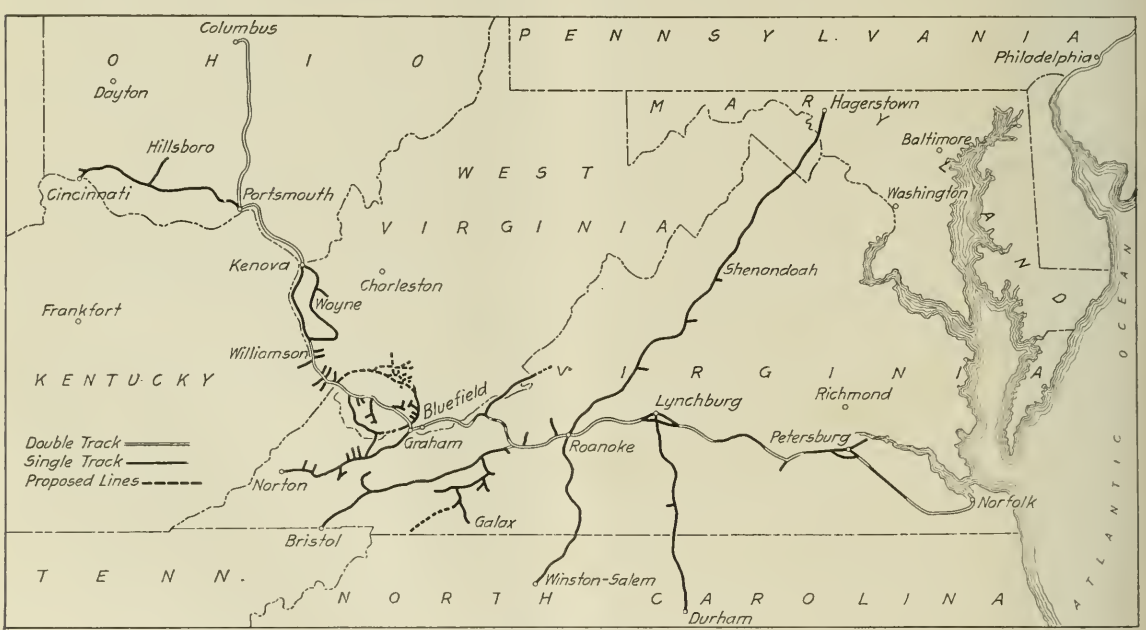
There is only one remedy for this situation, and in the interest of the national welfare it must be applied and applied promptly. The margin between earnings and operating expenses must be greatly increased. This can be done by reducing operating expenses or by advancing rates, or by both. We believe that even on the basis of present wages operating expenses can be reduced, but we do not believe they can be substantially reduced under government operation. In the first place, the system of centralized management adopted by Mr. McAdoo was fundamentally wrong. Really good operating results will never be obtained until it is abandoned. It is impossible under this system to create the needed competition and emulation between the officers of individual lines and to re-establish the needed discipline among employees. In the second place, the very fact that the roads are in the hands of the government militates against efficiency. Theorists may denounce with all their might the operation of the railways for private profit, but the desire and opportunity to make profits constitute the greatest incentive to efficiency known, and until that incentive is restored the greatest operating efficiency will not be restored.

In view of the results of operation within recent months, however, it is perfectly evident, as the *Railway Age* has said before, that with present wages and present rates the railways cannot be made under either government or private operation to earn an adequate net operating income. If the government continues to operate them it will, unless rates are advanced, continue to incur a large deficit. Unless rates are advanced many of the companies, if the railways should be returned to private operation, would be ruined.

The Railroad Administration should not continue to impose additional burdens upon the taxpayers by continuing to operate the railways at a heavy loss. Already the deficit which it has incurred, and which the taxpayers must pay, exceeds $500,000,000. The shippers and travelers of the country should be made to bear the expense of operating the railroads. The burdens under which the taxpayers are staggering are heavy enough. The rates should immediately be advanced at least 10 per cent, and as soon as practicable legislation should be enacted under which the railways can and will be restored to private operation. Furthermore, now that the advance in wages to the train service employees has been made, advances in wages to large classes of railway employees should be stopped. There doubtless will remain some readjustments in the salaries of the lower ranks of railway officers which should yet be made, but with the railroads in the condition they are now the public has a right to insist that no more advances to large classes of employees involving increases in expenses of many millions a year shall be made until a very different relationship from that now existing has been established between railway earnings and expenses.

Norfolk & Western

THERE IS NO RELATION between the income account of a railroad corporation in 1918, the property of which is being operated by the government, and the earnings and expenses of the property. The income account of the corporation is a simple statement of the rental due from the government, other income, cost of maintenance of the corporate organization, interest charges, dividends, etc. From this the security holder can get no inkling of what the property itself is doing under government management. For instance, the Norfolk & Western in 1918 receives (only part payment has so far been made) $20,634,000 rental from the government and, after having paid $1,716,000 war taxes and taken into its account other income such as dividends and interest on security owned, has $19,918,000 gross income. From this it paid its interest charges, leaving $15,805,000 available for dividends. This compares with $18,946,000 available for dividends in 1917, when the corporation was itself operating the property.



The Norfolk & Western

What investors and Norfolk & Western officers and other railroad officers want to know is the revenues and expenses resulting from the actual operation of the property itself. President L. E. Johnson sums up the point in his annual report to stockholders for 1918. He says: "The agreement stipulates that the director general shall, during federal control, furnish the company copies of the operating reports relating to its property. The results of these operations do not directly concern your company and do not affect its annual compensation, but they are interesting and important for the series of yearly comparisons and will, therefore, be set out in this report and in the accompanying tables."

The actual operation of the property came pretty near furnishing enough net operating income to meet the government's rental requirements. Total operating revenues—we are now talking about the property itself, not the corporation—amounted to $82,004,000, an increase of $16,095,000 or 24.42 per cent over 1917. Operating expenses amounted to $61,579,000, an increase of $20,418,000 or 49.60 per cent over 1917. Net revenue amounted to $20,425,000; this compares with $20,634,000, the rental which the government pays, but from the net revenue must also be subtracted all taxes other than war taxes. No estimate is made of what these will amount to, but the Norfolk & Western's taxes in 1916, before war taxes were assessed, amounted to $2,480,000. Thus the property has failed by only about two to three million dollars to earn its rental, and this notwithstanding the fact that money was spent freely for both maintenance of way and maintenance of equipment in 1918. There was apparently a quite generous co-operation between the Railroad Administration and the Norfolk & Western corporation in doing everything possible to provide railroad facilities to move the business offered and, above all, to move coal. Evidences of the government's part are to be found in the large amounts spent for maintenance, and the company, from its corporate funds, spent large sums for additions and betterments, chargeable to capital account.

The company spent $5,585,000 in 1918 for additions and betterments to roadway and structures. Of this amount, $1,030,000 was for sidings and spur tracks and $1,217,000 for terminal yards. Further extensions of the electrical operation of the road were held up, but $646,000 was spent on capital account for additions to the electric power transmission plants. There was $333,000 spent for additions and betterments to shops, enginehouses and turntables. Besides the amount spent for additions to road, there was $8,271,000 spent for additions to equipment, the net charge to capital account for equipment being $7,930,000 after making a credit of $341,000 for equipment retired. These are large capital expenditures, especially in view of the fact that the Norfolk & Western had, just prior to 1918, completed a 15-year program of additions and betterments to the property. As President Johnson points out, however, "While your company has at all times aimed to protect the interests of its security holders, the great emergencies created by the declaration of war with Germany in the spring of 1917 have made co-operation with the federal government its paramount duty." In all, the corporation has approved of the expenditure for additions and betterments of about $27,000,000, of which, as noted above, $13,515,000 was charged to property account in 1918. The annual rental is figured without the full interest on capital expenditures made in 1918, and the 1919 rental, therefore, will not only include interest on this amount for one year and on the additional amount spent in 1919, but will also include a certain amount of the 1918 interest not as yet determined upon.

The personnel of the Norfolk & Western was little disturbed by the change to government operation, except that N. D. Maher, president of the road in 1917, resigned in June, 1918, to accept the regional directorship of the newly created Pocahontas Region. A. C. Needles, who had been vice-president in charge of operation, was appointed federal manager. The imperative need for adding in every way possible to the facilities for carrying coal, recognized so fully by the corporation, led the Railroad Administration to authorize expenditures for maintenance which were probably limited only by the need for maintenance work and by the availability of men and materials.

The total maintenance of way expenses in 1918 amounted to $9,525,000, an increase of $3,348,000 over 1917, or 54.21 per cent. There was $1,370,000 spent for ties, an increase of 97.80 per cent over 1917. Roadway maintenance cost $1,455,000, an increase of 102.77 per cent. Track laying and surfacing cost $2,011,000, an increase of 68.55 per cent. The Norfolk & Western has been one of the roads which, following the permission and suggestion of the Interstate Commerce Commission, has in recent years been charging depreciation on structures. It is particularly interesting, therefore, to note that the Railroad Administration has continued this practice and has, apparently, approved of the rate of depreciation determined upon by the company, since under the administration the charges for depreciation are fairly close to the charges made by the company, although in the case of station and office buildings, the administration has made a considerably larger appropriation than the company did. The maintenance of way expenses per mile of road averaged $4,563 in 1918 as against $2,960 in 1917. The Norfolk & Western, operating 2,087 miles of road, has 557 miles of second track and 1,410 miles of siding and yard tracks, but even with this large proportion of other than first tracks, the maintenance charges in 1918 appear to be generous.

Maintenance of equipment cost $21,273,000 in 1918, or $9,221,000 more than in 1917. The Norfolk & Western has maintained its equipment in first-class condition, and an increase of 76.51 per cent in maintenance of equipment expenditures seems high. In maintenance of equipment as in maintenance of way, the Railroad Administration apparently accepted the rate of depreciation used by the company as substantially correct and made charges only a little higher in 1918 than in 1917. The repairs, including depreciation and retirements of equipment per unit in 1918 and 1917 were as follows:

	1918	1917
Steam locomotives (freight)	$9,220	$4,681
Electric locomotives (freight)	21,179	16,254
Steam locomotives (passenger)	8,154	4,397
Passenger train cars	1,679	1,006
Freight train cars	198	123

The increase in transportation expenses was large—38.11 per cent. The freight business handled in 1918 was less, measured either in number of tons or ton miles, than in 1917, and the passenger business handled was more only because the average length of passenger journey was longer in 1918 than in 1917, the number of passengers carried being less last year than the year previous. The transportation expenses that stand out as having greatly increased are yard enginehouse expenses which amounted to $434,000 in 1918 or to more than twice as much as in 1917; train enginehouse expenses which amounted to $1,663,000 in 1918, an increase of nearly 90 per cent; and loss and damage to freight which amounted to $420,000, an increase of 76 per cent.

The character of traffic handled did not change greatly except for the falling off in tonnage of lumber and of bituminous coal. Of the total 51,404,000 tons of freight carried in 1918, 58.77 per cent was bituminous coal and 4.46 per cent lumber. In 1917, of the total 53,089,000 tons of freight carried, 60.18 per cent was bituminous coal and 5.62 per cent lumber.

The Norfolk & Western was able to maintain the high

standard of train load and car loading that had been set for it under private management. The train load averaged 1,041 tons in 1918, an increase of nearly 20 tons over the previous year, and the average loading per loaded freight car was 37.37 tons in 1918, an increase of 2.50 tons or 7.17 per cent over 1917. The Norfolk & Western has 1,669 100-ton capacity gondola cars, but even so, an average car load per loaded car of over 37 tons is quite remarkable.

The following table shows the principal items of income and expense for operation of the property under federal management, in 1918 as compared with 1917. It must be remembered that this is not the income account of the corporation:

	1918	1917
Mileage operated	2,087	2,086
Freight revenue	$68,752,260	$56,381,036
Passenger revenue	10,237,600	7,023,153
Total operating revenues	87,904,034	65,910,247
Maintenance of way and structures	9,524,659	6,176,369
Maintenance of equipment	21,273,002	12,051,912
Traffic expenses	536,709	809,723
Transportation expenses	28,739,291	20,808,290
General expenses	1,309,866	1,217,101
Total operating expenses	61,579,297	41,161,503
Net operating income	20,524,737	24,748,739
CORPORATION INCOME ACCOUNT.		
Rental	$20,634,142	$24,062,445*
War Taxes	1,716,000	2,134,440
Gross income	19,918,302	22,998,881
Net income	15,804,526	18,946,137
Dividends	9,357,103	10,552,297
Surplus	6,447,423	8,393,840

*Corresponding income from operation in 1917.

New Books

Test of a Flat Slab Floor, by Arthur N. Talbot and Harrison F. Gonnerman. Bulletin No. 106, Engineering Experiment Station, University of Illinois, Urbana, Ill. Price, 25 cents.

The tests reported in this bulletin have the distinction that they were carried practically to destruction, this being possible because the building in which they were made was about to be removed to make room for the new Chicago Union Passenger Station. Because of this, and the fact that the concrete was afterwards broken away so as to expose the exact position of the reinforcement, it was possible to learn more concerning the action of flat slab floors under heavy loads than in previous tests. The conclusion reached by the authors, tends to confirm the more generally accepted assumptions on flat slab design; and, to use their own words "should give added confidence in the suitability and reliability of flat slabs as a load carrying structure."

Boston & Lowell, Nashua & Lowell, and Salem & Lowell, Railroads. By F. B. C. Bradlee. 64 pages, 6¼ in. by 9¼ in. Illustrated. Bound in cloth. Published by the Essex Institute, Salem, Mass.

This is a well written monograph filled full of interesting data, gossip and local miscellany concerning the railroads named, and with much collateral local matter concerning railroad life in Eastern Massachusetts from 1830 down to the time that these roads were absorbed in the Boston & Maine System. The illustrations consist of portraits of prominent railroad officers of that time and reproductions of timetables, pictures of old locomotives, etc. The Tyler switch, an attachment to stub switches to prevent derailments, was in use as early as 1850. Interlocking, however, was not even thought of. At Lowell, where the Nashua & Lowell joined the Boston & Lowell "a lantern in the night placed on the switch frame shows the switch is wrong. Absence of lantern signifies the switch to be right." Block signaling also, had not been heard of, and the author tells of the practice—name of road not given—of keeping trains apart by a show of fingers. The station agent held up to the engineman as many fingers as would indicate the number of minutes which had elapsed since the passage of the last preceding train.

Letters to the Editor

Standard Freight Car Repairs

PITTSBURGH, PA.

TO THE EDITOR:

I have read with interest the article written by a Mechanical Engineer on Government standards for freight car repairs, published in the *Railway Age* of February 28, page 487, and I wish to first note that Mechanical Department Circular No. 8, in my opinion, is a step in the right direction. The requirements, however, in some parts may be thought by some engineers to be a step too far; but if there are any mistakes in these requirements, the proposal to use friction draft gears in repairing old cars is not, in my opinion, one of them. I am sure that a friction draft gear is a good thing upon new cars, and it is doubly necessary upon old cars that are in constant use, mixed up with new cars.

The conclusion of the writer of the article above mentioned is that spring draft gears are a better appliance for old cars that are repaired with draft arms. I wish to point out what I think to be a fact in regard to the use of friction gears in connection with draft arm appliance to wooden underframes. The writer says that draft arms have proved satisfactory. I am sure that this has been the case, but if, as he says, draft arms have proved their worth with the use of spring gears, they have also doubly proved their worth with the use of friction gears. So far as the car being better protected with a spring gear when the line of draft is below the sills, as when draft arms are applied to wooden underframe cars, I am sure if a little thought is given to this, the error of this conclusion will be appreciated. All of the draft arms which I have seen are of greater strength than the final force necessary to close any friction draft gear recommended by the authors of Circular No. 8 and the statement that after the spring gear goes solid the horn of the coupler will transfer the line of force more nearly to the center of the sills is probably true if the support for the horn of the coupler is strong enough; but as it usually is made of a block of wood or of metal supported by wood, it soon is pounded back and the draft arm gets all of the force even after the draft gear has gone solid. The M. C. B. recommended practice of making the draft arm extend 30 in. or more behind the center line of bolster makes the draft arm of sufficient strength to well support the downward tendency of the average wooden car.

The small capacity of a twin or tandem spring draft gear gives practically no protection to the car and as soon as this spring gear goes solid the underframe or sills of the car must absorb the balance of the energy in an impact between two cars. This remaining energy often is enough to cause several hundred thousand pounds' pressure on the end of the car; while if a car of this description is equipped with a friction draft gear having three or four times the capacity of the spring gear there will be many shocks that would overstrain the car equipped with the spring gear which would not close the friction gear and thus the end force would be kept below that necessary to close the friction gear. In any case if the force of impact was enough to close the gear, the line of draft would be the same in both cases, that is, on the center line of draft, after the horn of the coupler had imbedded itself into the striking block. I, myself, think that those who originated Circular No. 8, which recommends friction draft gears, took a step that is bound to protect cars and their lading.

LOUIS E. ENDSLEY,
Professor of Railway Mechanical Engineering,
University of Pittsburgh.



Campo Creek Viaduct

Heavy Railway Construction Along Mexican Border

San Diego & Arizona Is Driving 17 Tunnels in 11-Mile Gap Nearing Completion in 148-Mile Line

The San Diego & Arizona Railway is now completing a line extending east from San Diego, Cal., 148 miles to a connection with the Southern Pacific at El Centro, which involves an expenditure of approximately $16,500,000 and includes some exceedingly heavy and difficult construction work. This line, which provides a direct eastern outlet for San Diego, is owned half by the Southern Pacific and half by J. D. and A. B. Spreckels. Its construction was undertaken 12 years ago, but its completion has been delayed by a series of unexpected obstructions so that progress has been slow until the past year.

Leaving San Diego, the road passes in a southerly direction for a distance of 15 miles to Tijuana, where it enters the Republic of Mexico. It then turns in an easterly direction, generally parallel to the International border, passing through Mexico for a distance of 44 miles before again entering California at Lindero, from which point it continues to El Centro, 148 miles from San Diego, where it connects with the Southern Pacific line in the Imperial Valley. The road is now completed from San Diego to the head of Carriso gorge, a distance of 98 miles and from El Centro to the foot of Carriso gorge, a distance of 39 miles, leaving 11 miles yet to be completed in the gorge.

The construction through this gorge involves some of the most expensive railway work that has ever been undertaken in the United States. This 11-mile section contains 17 tunnels, ranging from 180 ft. to 2,650 ft. in length, and with an aggregate length of 13,392 ft., while the line between the tunnels is carried on a bench cut in the side of the mountain from 250 ft. to 350 ft. above the bottom of the gorge. This heavy work is compensated for in a measure by the contour on the western end of the line where it crosses a level plain for 30 miles.

Starting from San Diego the line rises on a practically continuous grade for 85 miles to the summit which is at an elevation of 3,657 ft. above sea level. The maximum grade eastbound is 1.4 per cent which is practically continuous for 47 miles. Westbound the line rises from an elevation of 44 ft. below sea level at Seeley, 10 miles west of El Centro, with a maximum grade of 2.2 per cent for 15.28 miles near the foot of the slope and again for 6.91 miles at the summit and with a 1.4 per cent grade for 15 miles between. This line through the gorge possesses unusual scenic attractions, the coloring resembling that of the Grand Canyon of the Colorado in appearance. The section of the line through the gorge will be protected by block signals.

The completion of this line will enable through train service to be inaugurated between San Diego and the East in connection with the Southern Pacific and its eastern connections and will form a new transcontinental line into San Diego, effecting a saving in distance of approximately 135 miles between Chicago and San Diego. This line also affords a direct outlet for the Imperial Valley of Southern California, one of the most productive valleys in the world. The

area now under irrigation in this valley is 523,600 acres while the acreage under cultivation is 400,000. An additional 100,000 acres are "under the ditch" but not yet actually irrigated while approximately 100,000 acres are now under cultivation across the line in Mexico. The total irrigable area in this valley is 800,000 acres while 200,000 acres additional can be reached by pumping. In January, 1901, there

and lemon culture. This purchase also includes a line from San Diego to Coronado and to North Island, the government army and navy flying field being located at the latter point.

The San Diego and Arizona Railway line crosses the Laguna range in the passage of which it traverses some exceedingly rugged country requiring heavy construction, particularly in the vicinity of Carriso Pass as referred to above.



Map Showing the Location of the San Diego & Arizona

was no white man in the Imperial Valley. Today it has 10 towns and a population of 50,000. The crops for 1918 were valued at $40,000,000, and included 11,330 cars of barley, 3,300 cars of corn, 32,540 cars of hay, 1,925 cars of cotton, 3,560 cars of canteloupes and 1,100 cars of cattle.

Much of the traffic from the Imperial Valley will move to San Diego for export to China and Japan and for loading on seagoing vessels for shipment through the Panama Canal, San Diego being the nearest port in the United States to the canal. The city of San Diego has recently completed a municipal dock with 53,200 sq. ft. of floor area and other docks are soon to be built to handle this export traffic.

In October, 1917, the San Diego & Arizona Railway pur-



A Section of the Line in Mexico

chased the San Diego & Southeastern Railway, with 43 miles of line serving the country immediately tributary to San Diego, including El Cajon Valley, noted for its raisin, orange

Through this pass the maximum grade was held down to 1.4 per cent because the cost of reducing this at a later date would be prohibitive. Elsewhere grades up 2.2 per cent were permitted. The maximum curvature on the permanent line is 10 deg.

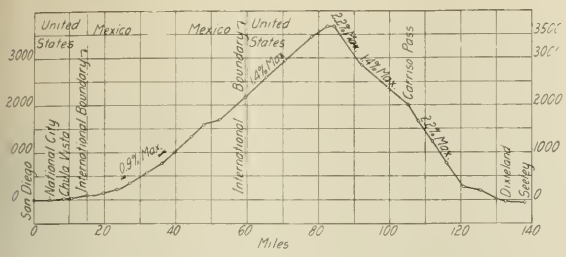
In the section between Jacumba and Carriso gorge there



Interior of a Timber Lined Tunnel

are 17 tunnels with a total length of 13,392 ft. Of these, two are about 2,650 ft. long, and about 1,200 ft. respectively and the remaining 15 are between 180 and 900 ft. in length. Although the rock was quite hard, the formation was loose so that 75 per cent of the total length in tunnel required timbering. In Carriso gorge itself there was ten miles of almost continuous rock cut so that altogether the section of the line near the pass had exceptionally heavy construction costs. Another item of additional cost, resulting from

the rugged territory traversed, was the fact that no road had previously been built along the route followed by the railway. A wagon road, therefore, had to be constructed on



Profile of San Diego & Arizona

which to bring in supplies. The cost of the roadway serving this section of the line was about $100,000.

In one instance a compressor plant for construction purposes was located at the bottom of Carriso gorge, the machinery, lumber and other materials for which had to be hauled in over the wagon road and then over another road built down the side of the mountain to the site of the plant, for there was not sufficient space available to erect the plant on the side of the mountain. At this point the railroad is about 700 ft. above the bottom of the gorge.

The largest structure on the line is a steel viaduct at Campo Creek which is 580 ft. long and 180 ft. high, costing $112,000. In planning for the placing of the large girders of this structure an ordinary locomotive crane had been provided with a 60-ft. boom, reinforced with cables and set up on a freight car to which the locomotive crane truck was attached. When the towers were completed an endeavor was made to place the long girders, holding them steady in the wind by means of block and tackle attached to each end.

Before the work had progressed far it was noticed that as soon as the steel work had been carried up some distance from the ground, a wind velocity was encountered which did not exist near the ground. As the work advanced, this became more serious and caused delay. Even the painting was held up by the high winds.

The first attempt to erect the girders was unsuccessful, because of the wind and it was decided to await more favorable conditions. The wind proved to be almost continuous however during daylight hours at least, and the attempt was repeated many times before the girders were finally set. When this was accomplished 300 hr. time had been charged against the locomotive crane in the work of handling the girders, instead of the 40 or 50 hr. that would have been sufficient had it not been for the high winds.

The same difficulty with wind affecting other parts of the work so delayed the erection of the viaduct that the construction required three times what it should have under ordinary conditions; that is, the viaduct required 6 months for completion instead of 60 days.



A Section of the Line Under Construction in Carriso Gorge

In designing this viaduct, it was decided to use 100-ft. girders on one of the spans and to lift them bodily into position. Considerable interest attached to the job because no girders of equal length had previously been so placed on the lines of the Southern Pacific.

The viaduct has a total length of 580 ft. and consists of six spans, two of which are 80 and 100 ft. long respectively. At the central point the track is about 180 ft. above the bed of the stream, the highest tower having a base length of 50 ft. parallel to the track. The towers were designed to be self-sustaining during construction and were erected by the usual structural method, piece by piece. Materials were delivered to the site of the viaduct by motor truck, and were hoisted by a donkey engine with two lines running to a carrier on a cableway spanning the viaduct site.

At the present time it is expected that the entire line will be completed and placed in operation during the latter part of the coming summer. The tunnels in the 11-mile section remaining unfinished are over 75 per cent completed. The shops, engine houses and other buildings necessary for operation are nearly ready while work on the remaining buildings will be undertaken within the next few weeks.

This line is being built under the direction of J. D. Spreckels, president; D. W. Pontius, general manager, and E. J. Kallright, chief engineer. We are indebted to Mr. Kallright for the information contained in the above article.

Railroad Purchases as a Stabilizer of Business

Fluctuations and Uncertainties Seriously Affect General Industrial Situation

By F. B. Ernst

An average annual purchase of materials and equipment by the railroads of the United States would assist appreciably in the stabilization of business. Under their own control, railroads, like individuals, bought when they had money and curtailed drastically as soon as earnings began to decrease. No other alternative was open to railroads of uncertain financial standing and in recent years it has been necessary even for roads in stronger positions to follow this plan due to the greater difficulty of obtaining money and in the *Railway Age*. Consider, for the purpose of illustration, freight cars only. The great variation from year to year in the number of these cars purchased is amazing. The greatest variation is shown during the period from 1905 to 1908, when from more than 340,000 cars purchased in 1905 the number decreased three years later in 1908 to less than 65,000 cars—18.4 per cent of the number purchased three years before. While this is somewhat extreme, the chart shows a series of wide fluctuations from "feast to famine"

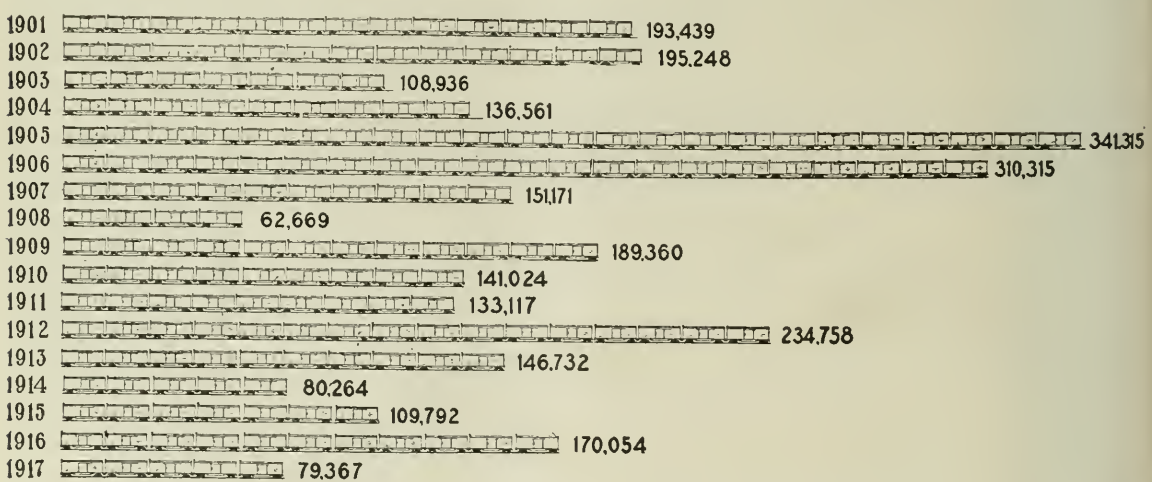


Chart No. 1—Showing Graphically the Number of Freight Cars Ordered for Domestic Use During the Past 17 Years

the none too friendly attitude of the public. During times of depression in business few cars were purchased, while during boom times cars were ordered far beyond the capacity of the carbuilding plants. A more uniform program of buying alike over good and bad times would have resulted in considerable economy and great industrial advantages to the manufacturers and employees as well.

In Charts Nos. 1, 2, 3 and 4 are shown the number of freight cars, passenger cars, and locomotives purchased and built per year during the period 1901 to 1918 inclusive. These charts were prepared from statistics published yearly over the entire period of 19 years. The difficulties of the manufacturer in regulating his organization to meet these fluctuations and the disadvantages to the railroads of operating on this basis are apparent.

The Manufacturers' Problems

The manufacturer during normal or boom times builds up a complete organization and the shops are operated to full or even beyond their rated capacity. A year or two later there may be only sufficient work to operate the plant at 50 per cent, or even 30 per cent of capacity. This necessitates

the laying off of a great number of men and disrupting the organizations which had required years to build up. Entire communities surrounding large carbuilding or railway specialty plants are in a state of depression; the workmen who had become trained in the carbuilding industry must seek employment in other lines. These men are naturally not available a year or two later when the plants are again

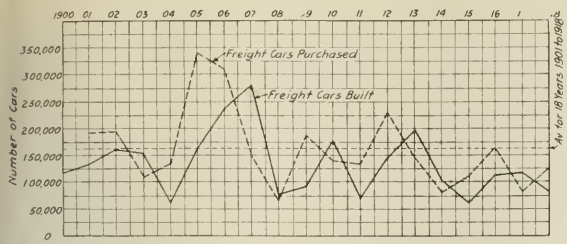


Chart No. 2—Showing Variations in the Number of Freight Cars Purchased and Built During the Past 19 Years

placed in operation, and it is necessary to train new and inexperienced men for the work.

The conditions are unfair to the men in that their work is not permanent and their living is transient. Difficult financing is necessary and workmanship, particularly of new men, in the rush of plants running beyond their rated capacity, naturally is not satisfactory. With a more uniform output, the same laborers would continue in one line of work,

Table No. 1—Freight Cars Ordered and Built for Each Year Since 1901

Year	Domestic orders per year	Cars built per year
1899	.....	117,982
1900	.....	113,070
1901	193,439	132,591
1902	195,248	161,747
1903	108,936	153,195
1904	136,561	60,955
1905	341,315	162,701
1906	310,315	236,451
1907	151,711	280,216
1908	62,669	75,344
1909	189,360	91,077
1910	141,024	176,374
1911	133,117	68,961
1912	234,758	148,357
1913	146,732	198,066
1914	80,264	104,541
1915	109,792	59,984
1916	179,054	113,692
1917	79,367	119,363
1918	123,770	81,767

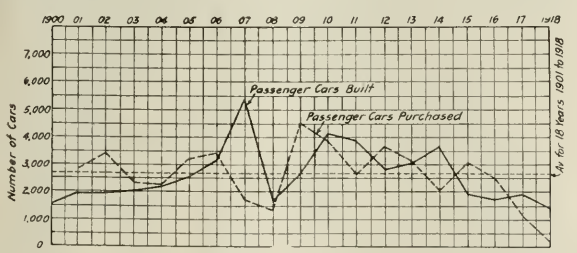


Chart No. 3—Showing Variations in the Number of Passenger Cars Purchased and Built During the Past 19 Years

become more efficient, and a better class of work and lower costs would result. Carbuilding companies would benefit further in having uniform financial obligations from year to year.

The average number of freight cars purchased for the entire 19-year period, 1901 to 1918, including the lean years at the opening of the war, was 161,635 per year. Assume for the purpose of illustration that the yearly requirements of the railroads, to take care of their normal business, is approximately 170,000 freight cars. While the tonnage to be hauled increases from year to year, this has been largely provided for in the larger capacity of the individual units of equipment and the greater efficiency, at the present time, in the method of handling freight.

To meet this annual program of car construction the car-

Table No. 2—Passenger Cars Ordered and Built for Each Year Since 1901

Year	Domestic orders per year	Cars built per year
1899	.....	1,201
1900	.....	1,515
1901	2,879	1,949
1902	3,459	1,948
1903	2,310	2,007
1904	2,213	2,144
1905	3,289	2,551
1906	3,402	3,167
1907	1,791	5,457
1908	1,319	1,645
1909	4,514	2,698
1910	3,881	4,136
1911	2,623	3,938
1912	3,642	2,822
1913	3,179	3,076
1914	2,002	3,691
1915	3,101	1,935
1916	2,544	1,769
1917	1,167	1,969
1918	131	1,481

building capacity of the United States should be approximately 170,000 cars per year. As a matter of fact the capacity in the United States is almost double this figure, made necessary in providing for the larger number of cars

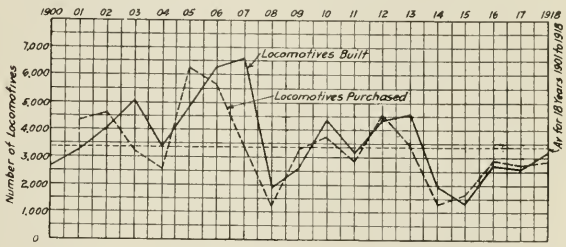


Chart No. 4—Showing Variations in the Number of Locomotives Purchased and Built During the Past 19 Years

ordered during prosperous years. This excess represents an economic waste, as many of these plants stand idle during all but boom times. If, however, a definite number of cars were ordered each year the carbuilding industry could adjust

Table No. 3—Locomotives Ordered and Built for Each Year Since 1901

Year	Domestic orders per year	Locomotives built per year
1899	.....	1,951
1900	.....	2,648
1901	4,340	3,384
1902	4,665	4,070
1903	3,283	5,152
1904	2,538	3,441
1905	6,265	4,896
1906	5,642	6,232
1907	3,482	6,564
1908	1,182	1,886
1909	3,350	2,596
1910	3,787	4,441
1911	2,850	3,143
1912	4,515	4,403
1913	3,467	4,561
1914	1,265	1,962
1915	1,612	1,250
1916	2,910	2,708
1917	2,704	2,585
1918	2,802	3,668

itself to take care of the normal amount of equipment required and there would be eliminated the overwhelming peaks of prosperous times and the discouraging recessions of poor times. Inasmuch as the carbuilding plants on this basis could operate more economically, the results would

eventually be lower prices to the railroads, better workmanship and more uniform equipment.

How the Railroads Are Affected

The situation from the standpoint of the railroads is equally unsatisfactory. With business at a low ebb, the railroads contribute further to this depression by withholding orders and depriving themselves of the great tonnage incident to the building of cars and locomotives. This tonnage at such times could be hauled at little additional expense, as train crews must be maintained and cars and locomotives are available. With the freight movement below normal, this additional tonnage would come when badly needed and would increase very materially gross and net receipts. As it is, large numbers of cars and locomotives stand idle, and there is not sufficient freight fully to utilize the carrying facilities of the roads.

A year or two may pass. The country may then enter on a period of increased business activity. The railroads find themselves confronted with great quantities of freight to be moved and do not have the necessary equipment to move it, owing to the fact that during the two or three previous years of depression few new cars or locomotives were built and the equipment on hand had not been kept in good repair. The railroads are embarrassed and the business of the country is handicapped by the fact that the roads do not have sufficient equipment for moving the freight that is offered. Yards and terminals are congested, and as a consequence freight not only moves slowly but is carried uneconomically. All the roads enter the market for cars and locomotives and, allowing for the time required to build up new organizations in the carbuilding plants, train new men, and secure materials, most of the cars are not actually available for service for six months or even a year after they are ordered.

In Chart No. 2, it may be seen that the peaks and depressions of carbuilding occur about six months to a year later than the corresponding peaks and depressions of car buying. If there had been uniform annual buying, equipment ordered during poor times would be immediately available for the increased tonnage resulting in boom times. To the already over-burdened roads is now added the great quantities of material required in the building of equipment. This additional tonnage comes at a time when it is not needed by the roads already operating at 100 per cent capacity. In fact, the additional revenue obtained is largely given out in overtime and premiums which must be paid because of the roads operating on an over-capacity basis. It would have been infinitely better if the railroads could have had this extra freight at less prosperous times when they were badly in need of tonnage.

Effect Upon Allied Industries

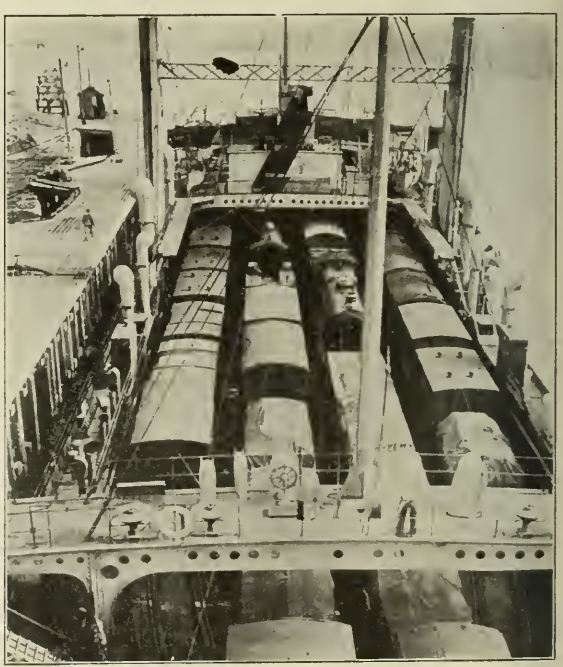
The building of railroad equipment in poor times would stimulate many other dependent lines, as in the building of ordinary freight cars there are required considerable quantities of structural steel, cast steel, forged steel, malleable iron, cast iron, lumber, brass, springs, bolts, nuts, etc. In an ordinary 50-ton steel gondola car, for example, there would be required about 12 to 15 tons of structural and plate steel. In connection with the manufacture and use of this steel, pig iron, coal, coke, limestone, scrap and other ingredients, representing several times the tonnage of the finished steel, must be handled by the railroads. Stimulation of these various lines of industry, dependent upon the steel industry, likewise stimulates other lines in turn dependent upon them, so that the effect is far-reaching in its fan-like extensions to the various dependent lines.

It is estimated that in the manufacture of steel castings, such as couplers, bolsters, side frames, wheels, etc., the tonnage of raw materials, etc., to be hauled is three to four times the weight of the finished product, and it would probably not be far wrong to assume that a finished freight car weighing 20 tons, would be productive of not less than 60 to 80 tons of freight to the railroads. Stimulation of other dependent manufacturing lines would add materially to this figure. On this basis, the total tonnage involved would help considerably during periods of depression and would also be of material relief to the railroads in freeing them of this additional tonnage during boom times when it is not wanted.

The above discussion has dealt largely with freight cars, and incidentally with passenger cars and locomotives; that is, with motive power and rolling stock. The plan would apply equally as well to the maintenance of way department, as well as shops, roundhouses and terminals, and would add to the stabilizing effect which the railroads could exert.

The principal reason why railroads when under their own management, did not avail themselves of the advantages of a more uniform program of purchasing, was, in most cases, that of finance. Even those roads that were financially able, as a rule followed the conservative curtailment which always accompanies periods of uncertainty and depression. While the carbuilders of the United States, now operating largely on the recent lot of Railroad Administration cars, still have a reasonable amount of work ahead, many of the railway supply companies have already begun to curtail operations, with apparently no relief in sight in the way of new orders which will be available in time to prevent practical shutdown. Carbuilders will be in a similar position a few months hence.

Whatever the future of the railroads, the government should continue to exercise supervision that will perpetuate certain practices in administration and operation that have unquestionably proven of value. To these should be added some plan providing for more uniform annual purchases of equipment and supplies. The idea of equalized purchases by the railroads could be extended to a much broader field, in fact, to the government itself, and the opportunities are such as possibly to justify a branch of "Business Stabilization" in some one of the departments at Washington.



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The English Channel Train Ferry at Its Berth

Doings of the United States Railroad Administration

Prices Recommended by Industrial Board of Department of Commerce Still Under Discussion

WASHINGTON, D. C.

THE CONTROVERSY over the price to be paid for steel, which also involves the entire question of the policy to be pursued by the Industrial Board of the Department of Commerce, has occupied the attention of a large part of official Washington during the past week. The question of steel prices, and particularly the prices to be paid for rails, was discussed at a meeting of the Industrial Board on Saturday, April 5, with R. S. Lovett and Henry Walters, members of the Advisory Committee on Purchases of the Railroad Administration, H. B. Spencer, director of the Division of Purchases, and Commissioner McChord of the Interstate Commerce Commission, at which the railroad representatives presented arguments for lower prices for rails than those of $45 and $47 a ton agreed to by the Industrial Board, but no conclusion was reached. Director General Hines also discussed the subject with George N. Peek, chairman of the Industrial Board, on Tuesday, but no conclusion was reached and another conference was arranged for Thursday, at which it was hoped some definite development would be reached.

Mr. Peek had issued a statement on April 4, denying that the board had adopted hard and fast policies that would not be subject to change under any circumstances. "I have never said or intimated that the Industrial Board would stand pat on the prices formulated with the steel industry no matter what objections were brought up by other departments," Mr. Peek said. "Shown a good and sufficient reason for doing so, the board will reconsider." One of the principal points made by the Railroad Administration is that the Industrial Board had officially announced the steel price schedule over the protests of the Railroad Administration and before such reconsideration. The Railroad Administration has been studying the figures on steel production costs as compiled by the Federal Trade Commission and believes that the prices announced are too high to offer it any inducement to enter the market.

On the other hand it is understood that the Industrial Board has laid before the Railroad Administration data showing that of the five principal steel companies involved in the production of rails, two have production costs in excess of the rail prices agreed upon, two can produce at the price without counting overhead, and one, which has an output exceeding by more than 50 per cent the combined production of the other four, can produce at a cost low enough to show some profit at the price named, but a narrower margin of profit than it received during the pre-war period. It is understood that the steel companies also have stated to the board that in some instances the rails produced during the past year on pre-war contracts have been delivered at a loss to the steel companies.

Railroad men, however, point to the fixed price of $28 a ton which prevailed before the war as having given the steel companies a handsome profit for years. The Federal Trade Commission's figures show that the U. S. Steel Corporation's cost for producing rails in October, 1918, was $40 a ton, for open-hearth, including $4 of inter-company profits, so that $47 a ton would give a profit of $11. E. H. Gary was quoted in a New York paper on Tuesday as saying the cost in January was $40 for open-hearth and $46 for Bessemer. The price for steel billets named by the Industrial Board was $38.50 a ton, and it has been calculated that adding 50 per cent more than the pre-war differential to this would give $41.36 as a price for open-hearth rails.

As a result of the conference of the representatives of the government purchasing departments with the Secretary of the Treasury and the Secretary of Commerce on April 2, the entire question of the policy to be pursued by the Industrial Board was reopened for further consideration. The vague statement issued by Secretary Glass at the close of the conference indicated that this would be done, but it was amended later in the evening by Chairman Peek of the board to indicate only that the question of steel prices was to be further discussed with the Railroad Administration. Secretary Glass made it plain on the following day that Mr. Peek's amendment of the statement was unauthorized. The entire plan of price stabilization in an effort to stimulate industry was originated by Secretary Glass, who turned it over to Secretary Redfield to carry out. The controversy which has arisen, with Secretary Glass and the Railroad Administration on one side and Secretary Redfield and his Industrial Board on the other, springs from a difference of understanding as to the function of the board, as well as over the price of steel. The Railroad Administration and Secretary Glass understand that it was appointed to act as a mediator rather than as an arbitrator, to attempt to bring about an agreement with the producers on prices which would be sufficiently attractive to the government purchasing agencies, of which the Railroad Administration is the largest buyer, to induce them to buy freely on the assumption that the general public would regard the prices accepted by the government as fair. The first public statements regarding the formation of the board bear out this idea, but apparently the board had a larger view of its authority and assumed to establish official prices. T. C. Powell, director of the Division of Capital Expenditures of the Railroad Administration, and its representative on the board, distinctly notified the board that the Railroad Administration would not buy steel at the prices fixed. The Railroad Administration takes the position that until a price was reached which would be satisfactory to it, the board had failed to accomplish its intended functions and that there was nothing to announce, but the board gave out a scale of prices, proposed by the steel interests and somewhat modified by the board, as the official scale, while Mr. Powell's membership on the board created the general impression that the Railroad Administration was a party to the agreement. The fact was that the announcement was not made until nearly two weeks after the prices had been announced nor until after the administration had come in for considerable criticism for its failure to give effect to the plan by placing orders at the prices fixed.

On January 1 there were on order undelivered about 1,100,000 tons of rails, which were being delivered at the rate of about 40,000 tons a week. This has now been reduced to about 35,000 tons, as one of the steel companies has completed its orders and another company will soon be out of orders.

At this rate the administration still has about 600,000 tons to come, which would run till about September 1.

The question of steel prices as affecting the Navy Department has also come up. Acting Secretary of the Navy Roosevelt announces that under the laws the department is required to advertise for bids, but when bids were opened on April 4 for a considerable tonnage of structural steel they were all found to be based on the prices announced by the board, and the department has not yet announced its acceptance or rejection. The Shipping Board has announced

its acceptance of the scale as a basis for future contracts, but stated that few new contracts are now being let because its requirements have been so largely contracted for ahead. The War Department has asked for bids on coal to be opened on May 7.

In relation to sand, gravel and crushed stone, the Industrial Board has announced that owing to the large number of firms and individuals engaged in the business, and the local character of their operations, competitive conditions within the industry are so definite and persistent that nothing more can be done by the board than to recommend a continuation of the practice of competitive bidding in governmental purchases.

The Railroad Administration was also criticized by the National Coal Association for not awaiting the action of the board before proceeding to make purchases in the open market under competitive conditions. It is understood that Mr. Hines takes the position that he can manage his own purchases without the assistance of the board and that it has no purpose unless it can secure better prices than he can. Under the theory that the board should act as an arbitrator of prices, he regards the plan as illegal and it is understood that the Department of Justice takes the same position, although the question has not yet been put up to it in concrete form. Secretary Redfield cabled to the President asking him to instruct the government departments to accept the board's prices, but there have so far been no indications that the President would intervene in any way.

Pending the settlement of the steel price question, a decision in the controversy with the coal association has also been held in abeyance while the administration continues to pursue its policy in negotiating for coal without reference to any proposed price-fixing. This has led to the issuance of various statements by both sides. Mr. Hines on April 3 issued a statement which was in effect a reply to the coal operators' charge, in which he referred to "the interesting fiction that the Railroad Administration is conducting its purchase of coal in such a way as to force producers to sell to it below the cost of production, thus in turn forcing them to increase their prices to the rest of the community."

"The assertion of this fiction," he said, "seems to carry with it the suggestion that in order to prevent the Railroad Administration from accomplishing this purpose, it is important to find a way to remove all competition in bidding for such government business and instead to fix in the respective mining districts uniform prices at which all producers would be willing to sell and at which the Railroad Administration would have to buy. The remedy thus suggested for this fictitious evil would, of course, have the result of giving the coal operators the relatively high prices fixed without any competition, which they could use as a basis for selling to the general public, so that the element of competition would fade from the picture and virtually the whole consuming public would be paying prices which in the aggregate would be far in excess of what would be necessary to maintain existing wages and pay sufficient profits.

"While it hardly seems necessary to do so, I wish to give the country the assurance that the Railroad Administration has no such unjust and shortsighted purpose as to force producers to sell below cost or impose a burden on the rest of the public. There is no institution—public or private—in the country that has a greater interest in the promotion of prosperity than the Railroad Administration has, because the more the business of the country increases the more net revenues the Railroad Administration will enjoy. At the same time I believe it would be opposed to the interests of the general consuming public, as well as of the government, to forego absolutely all benefits of competition and buy coal for the government at unnecessarily high prices, which in turn will immediately become the standard prices for all purchasers. Such a course would have a strong tendency to continue to preserve in the present period following the war, profits having entirely too strong a resemblance to the extraordinary profits which were realized during the war."

As an illustration of the caution which the Railroad Administration is observing in this matter, Mr. Hines said, it has established the policy that each railroad shall buy its own coal, thus avoiding any greater concentration of purchasing power than existed under private management. It has also instructed that in purchasing coal, railroads must take into consideration the director general's policy to make as wide a distribution of the tonnage bought as conditions will permit, considering quality, transportation and price, at the same time confining so far as practicable, purchases to producers on the individual roads. It has also directed that no railroad should accept any bid which would involve the cutting of the existing scale of mining wages. It has further provided that coal prices actually contracted for shall not be secret, but shall be available for the information of any interested coal operator and also of the miners. Very few specific instances have been brought forward of failure on the part of any railroad to observe these policies, and the complaints which have been brought forward have been and are being properly adjusted. Most of the complaints appear to have been made to the press rather than to the Railroad Administration.

"It must be remembered that the purchasing power immediately available of the Railroad Administration with respect to coal is by no means as great as is generally assumed in discussions on this subject," Mr. Hines added. "To a large extent the Railroad Administration's current supply of coal must be taken on unexpired contracts which were made many months ago and which have yet several months to run. Again, the volume of coal currently consumed by the Railroad Administration at the present time is decidedly below the normal, because in the present readjustment period the business handled is below normal. A further factor which cannot be ignored is that the railroads, like enterprises generally, stored unusually large quantities of coal last April to be prepared for the exigencies of a long continued war. To meet the present situation the railroads are using this stored coal with caution so as not to interfere unduly with current coal production, but a considerable storage of coal still exists, which eventually will have to be used by the railroads."

The National Coal Association then issued another statement, saying that a request that all bids on railroad coal be made public had been refused and that the only information made public is as to the price at which the business is finally placed. "Despite the director general's public statement of February 19 that this information would be available to any interested party," the statement added, "it has been refused coal operators and their accredited representatives as late as the 28th day of March on the ground that local representatives of the Railroad Administration have no instructions to give out such information.

"In short, the bituminous coal operators have endeavored to obtain the co-operation of the United States Railroad Administration in an effective manner to deal with a question which they consider of vital interest to the general public. The Industrial Board appears to them to afford a medium by which a practical solution of the difficulties could be obtained with all the rights and interests of the general consumers of coal entirely safeguarded. They are still ready to co-operate with this board and the director general of railroads in what to them seems an eminently broad and sensible program to meet an extraordinary condition."

To this Mr. Hines replied in part as follows:

"It is of the highest importance that every consumer of coal and every person interested in the high cost of living

should understand exactly what is involved in the effort of the National Coal Association to escape competition and get its members again under cover of government prices for coal. The statement issued last night by the coal association makes it perfectly clear that it is trying to prevent competition or, as it euphemistically expresses it, its members have 'declined to discuss prices,' and instead is trying to get some governmental agency to assume the responsibility for naming a uniform price for coal in each district. Such a uniform price will have to be high enough to take care of the greater costs of the high cost producers and thus produce an excessive profit for the low cost producers. The Fuel Administration removed its prices some time ago. The question is whether the public now wants other government prices established so as to continue to keep coal at high price levels which will keep up the cost of living and continue to produce in the aggregate abnormal profits to the coal operators.

"Their present proposal is that the government fix in each district a uniform price (without any opportunity for competition) at which the Railroad Administration and other government agencies must purchase. But the effect of this will immediately be to create a standard which the coal operators will try to maintain in selling to everybody else and the government will be giving its support therefore to a price level which will be unnecessarily high and far more than is necessary to yield a handsome profit for the low cost producers. I firmly believe that any such policy is opposed to the interest of every member of the community who is suffering instead of profiting by the present high cost of living.

"In an enterprise involving the operation of 250,000 miles of railroad and perhaps 150 different railroad organizations, it is natural that there may be specific instances where there will be temporary shortcomings in carrying out the definite policies of the administration. Such shortcomings will be promptly corrected as they arise and will become less frequent as the policy is more clearly understood. But the mere fact that they may arise is no reason why the American public should continue to be deprived of the opportunity for all competition in the coal business and I have therefore been unwilling to comply with the suggestion that the Railroad Administration withdraw requests for bids and instead undertake to buy its coal at uniform prices for the various districts fixed by some government agency."

The Southern Pine Lumber Manufacturers' Association at a meeting in New Orleans on April 2 announced that it had declined a proposal of the Industrial Board that they enter into a joint price agreement. In reply to this, Mr. Peek stated that neither the Southern Pine Association nor any other representative industry has ever been invited to enter into a price agreement, but that they had been invited to co-operate with the board in an effort to stabilize prices by getting industries voluntarily to make prices as low as present cost and labor conditions will justify.

Plans for Additional Temporary Financing

The most pressing April 1 requirements of the railroad companies having been met by temporary financing on certificates of indebtedness issued by the Railroad Administration, the committee representing the Association of Railway Executives, of which Howard Elliott is chairman, has been conferring this week with Director General Hines, the War Finance Corporation and the bankers, on the measures to be adopted to take care of the further requirements until the Railroad Administration can secure its appropriation from Congress. Although it is hoped that Congress will be called in extra session, possibly by June 1, it is necessary to provide for the contingency that the date may be later and that there will be some delay before the bill is passed, and the conferences with the director general have been based on the probable requirements up to August 1. It is estimated that the requirements of the railroad companies up to that time for interest, dividends and other corporate expenses, as well as maturing notes and payments for additions and betterments, will be between $400,000,000 and $500,000,000. The amount depends to a considerable extent upon the amount of additions and betterments which it will be possible to provide for.

This $400,000,000 to $500,000,000 it will be necessary to provide for by temporary financing and as the resources of the War Finance Corporation are not sufficient to provide more than $150,000,000 to $200,000,000, it will be necessary to arrange for the balance through the banks, which have already taken care of a large share of the April 1 requirements. These were estimated at approximately $70,000,000 and the Railroad Administration has issued its certificates to the roads making application to the amount of about $54,000,000, but the War Finance Corporation has found it necessary to make loans on their security only to the amount of approximately $30,000,000, while the balance has been taken care of by the banks. The Railroad Administration also advanced about $10,000,000 in cash. The conferences this week have had to do with the arrangements to be made with banks before making loans on further issues of certificates.

The executives' committee held some meetings with Mr. Hines on Monday and both the committee and Mr. Hines conferred with the War Finance Corporation, after which the executives' committee held a meeting with five leading bankers in New York on Tuesday. This was to be followed by a later meeting with Mr. Hines and the bankers. The executives asked Mr. Hines to make an appeal to the bankers to lend their assistance in meeting the situation caused by the failure of the appropriation and the plan discussed was that the War Finance Corporation and the banks should divide the loans made on the director general's certificates under some plan by which the bank loans may be pro-rated among the federal reserve banks by districts. It is understood that the arrangement will be continued by which Mr. Hines will protect the railroad companies against any loss occasioned by the difference between the rate of interest which the certificates bear, 5 per cent, and the rate which they must pay for loans, which has been 6 per cent in the case of loans made by the War Finance Corporation. Mr. Hines has also agreed to make no distinction between the companies which have signed contracts with the Railroad Administration and those which are willing to do so, except that in the latter case he cannot issue certificates for more than 90 per cent of the standard return, after making the deductions for additions and betterments chargeable to the company. In the case of roads that have executed contracts, it is not necessary for the director general to make this deduction and it is hoped that any plan enacted by Congress for the return of the roads will provide a period for repayment to the government of amounts charged against the companies for additions and betterments.

A list of the loans made to the railroad companies by the War Finance Corporation on the security of certificates issued by the director general was published in last week's issue. A large number of the roads, instead of asking loans from the War Finance Corporation, made their loans through local banks.

Standard Freight Cars Held in Storage

Freight cars have come to be about a drug on the market since the signing of the armistice. In addition to the large number of idle cars which have been in service, several thousand of the new standard cars built on the orders placed by the Railroad Administration last year have been completed by the builders, but cannot be stencilled because the railroad companies, which are expected to take them and pay

for them, have not yet accepted them. Over 26,000 of the 100,000 standard cars ordered had been accepted by the roads to March 31, according to a statement compiled by the Railroad Administration, but this does not account for at least 10,000 more that have been built, and are being held in storage until it can be ascertained whether the Railroad Administration can force the companies to take them at the high prices. The administration takes the position that it can, because they were ordered under war conditions and allocated to the various roads, but many of the companies are not in a position to finance them, and meanwhile the Railroad Administration is paying for them at the contract price minus an amount to cover the cost of stencilling. The standard locomotives, on the other hand, are being accepted as fast as they are turned out.

Committee on Automatic Train Control

The Committee on Automatic Train Control will hold its next meeting at Washington on April 15 and on the following day will inspect the automatic stop and cab signal of the American Train Control Company on the Chesapeake & Ohio between Gordonsville and Charlottesville, Va. The committee expects to resume its western trip, which will include Spokane, Wash., San Francisco and Oroville, Cal., about April 28. The committee started on this trip last month and inspected the train control system on the Chicago & Eastern Illinois, but postponed the rest of the trip because of the illness of C. A. Morse, chairman. Some 75 or 80 plans for train control devices have been submitted direct to the committee in addition to those which had previously been submitted to the Interstate Commerce Commission, but the number believed to be worthy of further consideration has gradually been reduced and there are now about 36 different devices before the committee for further consideration.

Arrangements for Equipment Financing

Arrangements have been completed for temporarily financing the amounts now due the car and locomotive builders by the Railroad Administration, amounting to approximately $40,000,000, by the issuance of certificates of indebtedness, bearing interest at 5 per cent, which may be used as collateral for loans from the banks or possibly from the War Finance Corporation, but up to Wednesday the certificates had not actually been issued. Some of the certificates, which are to be in convenient denominations for that purpose, will be passed by the equipment companies to the sub-contractors who furnished materials and specialties, but whose contracts are with the builders rather than with the government. For this reason the specialty people were not admitted to the conferences between the builders and the Railroad Administration representatives, but conferences between the sub-contractors and builders were held afterward Some of the specialty men were inclined to insist on being paid in cash rather than certificates, but it is stated that if they insist on cash they will have to wait until it is available, as the companies to whom the certificates are issued will have to give their own notes to the banks and might thus be left "holding the bag" for a time in case of unexpected delay to the railroad appropriation.

Whatever interest above 5 per cent is charged by the banks will be reimubursed by the government.

A sub-committee was appointed to represent the equipment companies at Washington in connection with the issuance of the certificates, consisting of George Shaw, Standard Steel Car Company; H. W. Wolf, American Car & Foundry Company; L. O. Cameron, Pressed Steel Car Company, and F. O. Riener, Haskell Barker Car Company. Companies having contracts with the builders were requested to telegraph their bills as of April 1 to J. M. Hansen, secretary of the car and locomotive manufacturing committee, at Washington.

The form of certificate issued to the equipment companies is practically the same as that issued to the railroads, and certifies that the director general is indebted for the amounts "due and payable for motive power, cars and other necessary equipment or parts thereof, or materials and supplies therefor, furnished to the director general for use on or in connection with the property of carriers under federal control . . . which sum the director general hereby promises to pay to or upon the order of the corporation . . . whenever and as soon as the director general shall have funds available for the payment of this certificate and of all other like certificates issued by the director general and then outstanding, whether received by appropriation of the Congress or by virtue of moneys arising out of the use and operation of the railroads . . . or otherwise."

Fifty-eight Contracts Executed

Contracts with railroad companies which cover more than half of the standard return to be paid by the government as rental for the use of railroad properties had been executed up to April 5. A total of 58 contracts had been signed for a total of $524,290,351. Although the number would indicate only a small portion of the number of railroads involved, the contracts in most instances cover a large number of subsidiary companies, some of which are themselves Class I railroads.

In addition to those previously mentioned, contracts have been executed with the Chicago, Milwaukee & St. Paul, providing for $27,946,771, and also with the Alabama, Tennessee & Gulf; Delaware & Northern; Rome & Northern; Tennessee Railroad; New Orleans, Natalbany & Natchez; and the Atlanta Northern.

Payments to Railroad Companies

The total payments to the railroad companies on account of compensation and loans which can be regarded substantially as payments on account of compensation during the 15 months of federal control ended March 31 aggregated $494,478,265, according to a statement authorized by Director General Hines, explaining the cash receipts and disbursements by the Railroad Administration treasurer at Washington. The total amount loaned the railroad companies by the director general for the 15 months was $231,911,459 and of this amount $61,356,000 has been repaid. The statement explains that all of the balance, practically speaking, can be deducted in settlement of the compensation so that these items, while termed loans, can be regarded substantially as payments on account of compensation. The total standard return for all roads is approximately $928,000,000 and for the Class I railroads, whose statistics are the ones usually used, the standard return is approximately $890,000,000. The usual statement of the cash transactions of the Railroad Administration for the month of February was not issued, but a statement in a new form was given out on April 5 for the month of March and in some instances for the 15-month period. According to this statement the cash receipts from all sources, including payments on account of transportation furnished the War and Navy departments, loans by the War Finance Corporation, repayments of loans by the railroad companies, amounts transferred from railroad treasuries, and collections from express companies, aggregated $176,973,719.

Cash disbursements, including payments to railroad companies on compensation, and on account of loans, advances to federal treasurers, payments to waterways and canals, and for standardized equipment, amounted to $98,487,977.

Of the foregoing amount, $78,142,925 represented payments to federal treasuries for current requirements, and these are still being further supplemented.

The total payments for standardized equipment during the 15-month period amounted to $163,950,402.

The above relates to the cash receipts and disbursements of the central administration, and does not include the receipts and disbursements of the federal treasurers in connection with the operation of the properties under federal control, as these figures are not yet available.

Plans for Agricultural Development

More than 100 heads of agricultural development of railroads under federal control held a conference in Memphis, Tenn., April 2, 3 and 4 for an exchange of views regarding methods of obtaining the best results and to make plans for their activities during the reconstruction period. The program adopted includes four general propositions, as follows:

1—To collect the latest information about opportunities for farming, stock-raising, dairying, fruit-growing, etc., in the several states having undeveloped resources, and furnish it free to those who wish to engage in such pursuits, special attention to be given to discharged soldiers and sailors.

2—To co-operate with county farm agents and other government and state authorities in looking after the interests of newcomers through the dissemination of information regarding methods of soil preparation, seeding, cultivation, etc., in order that they may be successful in the localities in which they have settled.

3—To improve marketing conditions by the widest circulation of information about where and when farm products will be ready for sale and where and when there will be need of such products, thus enabling the farmer to send his stuff to markets which are not glutted, and to obtain for it a price that will mean a profit on his investment, rather than a loss.

4—To conduct a campaign in co-operation with government and state authorities with the view of increasing the livestock output, not only because it is a profitable feature of the farming business, but also for the purpose of building up the soil.

J. L. Edwards of Washington, manager of the Agricultural Section, who called the Memphis conference, expects much good to come of the marketing feature of the program.

According to Mr. Edwards' report for the first three months of 1919, approximately 12,000 homeseekers have written to

FREIGHT TRAFFIC MOVEMENT AND CAR PERFORMANCE, FEBRUARY, 1919, COMPARED WITH SAME MONTH OF PREVIOUS YEAR

	Average miles of road operated		Net ton miles revenue and non-revenue (thousands)			Net ton miles per mile of road per day		Train miles (thousands)		
	This year	Last year	This year	Last year	Per cent change	This year	Last year	This year	Last year	Per cent change
Total, New England District	8,116	8,143	692,761	719,232	d 3.7	3,048	3,155	1,519	1,949	d 22.1
Total, Central District	22,389	22,474	4,401,857	5,093,986	d 13.6	7,022	8,095	6,019	6,837	d 12.0
Total, Ohio-Indiana District	6,847	6,829	810,431	1,209,525	d 33.0	4,227	6,326	1,150	1,618	d 28.9
Grand total, Eastern Region	37,352	37,446	5,905,049	7,022,743	d 15.9	5,646	6,698	8,688	10,404	d 16.5
Total, Allegheny Region	19,751	19,682	4,779,874	4,991,879	d 4.3	8,643	9,058	6,358	7,044	d 9.7
Total, Pocahontas Region	5,065	5,059	1,475,076	1,986,427	d 25.7	10,401	14,023	1,360	1,776	d 23.4
Total, Southern Region	37,318	37,422	3,448,985	3,969,462	d 13.1	3,301	3,788	6,552	7,856	d 16.6
Total, Northwestern Region	47,179	47,200	3,337,303	3,796,760	d 12.1	2,527	2,807	5,754	6,898	d 16.6
Total, Central Western Region	51,143	51,233	4,730,753	5,442,287	d 13.1	3,304	3,794	7,918	9,178	d 13.7
Total, Southwestern Region	31,396	31,709	2,004,903	2,468,702	d 18.8	2,281	2,780	4,227	4,897	d 13.7
Grand total, all regions	229,204	229,751	25,681,943	29,678,260	d 13.5	4,002	4,591	40,857	48,053	d 15.0

	Net ton miles per train mile			Freight car miles (thousands)								
				Loaded			Empty			Total		
	This year	Last year	Per cent change	This year	Last year	Per cent change	This year	Last year	Per cent change	This year	Last year	Per cent change
Total, New England District	456	369	23.6	29,626	31,022	d 4.5	12,532	11,507	8.9	42,158	42,529	d 0.9
Total, Central District	731	745	d 1.9	165,135	176,281	d 6.3	89,185	72,371	23.2	254,320	248,652	2.3
Total, Ohio-Indiana District	705	748	d 5.7	27,808	38,108	d 27.0	13,908	16,436	d 15.4	41,716	54,544	d 23.5
Grand total, Eastern Region	680	675	0.7	222,569	245,411	d 9.3	115,625	100,314	15.3	338,194	345,725	d 2.2
Total, Allegheny Region	752	709	6.1	143,940	147,503	d 2.4	88,664	80,200	10.6	232,604	227,703	2.2
Total, Pocahontas Region	1,085	1,118	d 3.0	37,316	47,835	d 22.0	22,547	31,801	d 29.1	59,863	79,636	d 24.8
Total, Southern Region	526	505	4.2	133,691	154,917	d 13.7	57,408	60,143	d 4.5	191,099	215,060	d 11.1
Total, Northwestern Region	580	550	5.5	127,065	149,627	d 15.1	50,525	44,033	14.7	177,590	193,660	d 8.3
Total, Central Western Region	597	593	0.7	179,702	200,045	d 10.2	77,663	76,866	1.0	257,365	276,911	d 7.1
Total, Southwestern Region	474	504	d 6.0	82,075	98,792	d 16.9	34,137	33,996	0.4	116,212	132,788	d 12.5
Grand total, all regions	629	618	1.8	926,358	1,044,130	d 11.3	446,569	427,353	4.5	1,372,927	1,471,483	d 6.7

	Average number of freight cars on line daily						Net ton miles per loaded car mile		
	Serviceable		Total			P. ct. unserviceable				
	This year	Last year	This year	Last year	Per cent change	This year	Last year	This year	Last year	Per cent change
Total, New England District	89,574	105,781	94,610	110,855	d 14.7	5.3	4.6	23.4	23.2	0.9
Total, Central District	381,862	480,170	406,675	505,294	d 19.5	6.1	5.0	26.7	28.9	d 7.6
Total, Ohio-Indiana District	77,880	90,502	82,472	96,527	d 14.6	5.6	6.2	29.1	31.7	d 8.2
Grand total, Eastern Region	549,316	676,453	583,757	712,676	d 18.1	5.9	5.1	26.5	28.6	d 7.3
Total, Allegheny Region	437,208	464,297	469,556	496,816	d 5.5	6.9	6.5	33.2	33.8	d 1.8
Total, Pocahontas Region	92,700	80,600	97,654	85,009	14.9	5.1	5.2	39.5	41.5	d 4.8
Total, Southern Region	300,308	291,737	315,168	303,616	3.8	4.7	3.9	25.8	25.6	0.8
Total, Northwestern Region	349,371	275,511	371,925	293,789	26.6	6.1	6.2	26.3	25.4	3.5
Total, Central Western Region	342,663	311,332	361,062	327,275	10.3	5.1	4.9	26.3	27.2	d 3.3
Total, Southwestern Region	212,401	202,553	219,752	211,082	4.1	3.3	4.0	24.4	25.0	d 2.4
Grand total, all regions	2,283,967	2,302,483	2,418,874	2,430,263	d 0.5	5.6	5.3	27.7	28.4	d 2.5

	Per cent loaded to total car miles			Car miles per car day			Net ton miles per car day		
	This year	Last year	Per cent change	This year	Last year	Per cent change	This year	Last year	Per cent change
Total, New England District	70.3	72.9	d 3.6	15.9	13.7	16.1	262	232	12.9
Total, Central District	64.9	70.9	d 8.5	22.3	17.6	26.7	387	360	7.5
Total, Ohio-Indiana District	66.7	69.9	d 4.6	18.1	20.2	d 10.4	351	448	d 21.7
Grand total, Eastern Region	65.8	71.0	d 7.3	20.7	17.3	19.7	361	352	2.6
Total, Allegheny Region	61.9	64.8	d 4.5	17.7	16.4	7.9	364	359	1.4
Total, Pocahontas Region	62.3	60.1	3.7	21.9	33.5	d 34.6	539	835	d 35.4
Total, Southern Region	70.0	72.0	d 2.8	21.7	25.3	d 14.2	391	467	d 16.3
Total, Northwestern Region	71.6	77.3	d 7.4	17.1	23.0	d 25.7	320	451	d 29.0
Total, Central Western Region	69.8	72.2	d 3.3	25.5	30.2	d 15.6	468	594	d 21.2
Total, Southwestern Region	70.6	74.4	d 5.1	18.9	22.5	d 16.0	326	418	d 22.0
Grand total, all regions	67.5	71.0	d 4.9	20.3	21.6	d 6.0	379	435	d 12.9

him, asking about farm opportunities in various states. These inquiries are answered by the Homeseekers' Bureau, which is an organization of agricultural representatives of federal controlled railroads working as state committees under Mr. Edwards' supervision. The state committees are prepared to give homeseekers the specific information they want. About 15 per cent of the inquiries are from discharged soldiers and sailors. The Memphis conference adopted a resolution urging Congress to assist soldiers and sailors to obtain farms on easy terms of payment.

Modification of Shipping Day Plan Agreed On

At a conference held under the direction of Max Thelen, director of the Division of Public Service, of representatives of the railroads, the shippers and the state commissions, at Washington this week, an agreement was reached on a modification of the "shipping day" plan for handling less than carload merchandise, which removes many of the objections made by shippers while still preserving the principle and advantages of the plan. The shippers, represented by a committee of the National Industrial Traffic League, and a committee of state commissioners, agreed to support the principle of the plan and to co-operate to make it a success. The shipper is given the right to deliver his freight to the carrier on any day, but the railroads may continue the plan of "staggered service" by agreement. The railroads were represented by the chairman of the sailing day committees for each region and by Fred Zimmerman, representing the Division of Traffic, and F. M. Lucore, representing the Division of Operation. The plan as drawn up by a subcommittee representing the various interests and approved is as follows:

1. The shipper shall not be deprived of his right to route his freight over any line at the legal rates applicable and to deliver his freight at point of origin to such carrier on any business day during regular business hours.

Except as to freight specifically routed by shipper preferred routes should be established based on the following considerations:

(a) Convenience to shippers and consignees.
(b) Economy and expedition of movement.
(c) Proper recognition of non-federal controlled roads.

2. Daily service will be given to the greatest possible extent.

At shipping points where it can be mutually arranged by representatives of the shipping public and the carriers, schedules will be published covering the movement of L.C.L. freight, tendered at freight houses, to be forwarded in through cars or set-out cars on specified days.

The specified days shall be known as "Shipping Days."

3. Peddler cars shall be operated daily, except where more limited service is agreed upon between shippers and carriers or authorized by lawfully constituted regulating authorities, and schedules shall show peddler car service maintained from shipping points.

4. It is earnestly recommended by the committee that in order to secure improved service for the shipping and receiving public and to make possible economical and efficient operation by the carriers, the fullest co-operation should be observed in carrying out the principles agreed to herein, and the committee pledges itself to this end.

Two thousand employees of the Pere Marquette and the Grand Rapids & Indiana attended a safety rally at Grand Rapids, Mich., on April 3. N. Ferris, ex-governor of Michigan; Frank H. Alfred, federal manager of the Pere Marquette and associated lines; R. C. Richards, chairman of the central safety committee of the Chicago & North Western, and George Bradshaw, supervisor of safety of the Pere Marquette, addressed the employees.

Orders of Regional Directors

Guessing at weights.—A. H. Smith, regional director, Eastern Region, in a circular to Federal managers, calls attention to the importance of showing the gross weight of car and contents on every running slip, for the purpose of calculating the gross weight of trains, and adjusting this weight to the capacities of locomotives. In the absence of the figures, the yardmaster must guess at the weight. A recent examination of a large number of running slips on one of the Eastern railroads showed that approximately 75 per cent of the bills on hand in yard offices failed to show the weight in the space provided on the bill.

Fire Protection.—Circular 198 of the Southwestern regional director calls for the burying of gasoline storage tanks outside of tool houses or other structures because of frequent losses sustained by fire.

Light Weighing of Freight Cars.—Order 187 of the Southwestern regional director similar to an order issued by the Central Western regional director (*Railway Age,* April 4, page 898).

Embargoes.—Circular 248 of the Central Western regional director similar to Circular 75 of the Northwestern regional director (*Railway Age,* April 4, page 898).

National Travelers' Aid Society.—The Northwestern regional director, file 8-1-52, promulgates rules for the co-operation of employees on roads in this region with representatives of the National Travelers' Aid Society. Permission is extended to representatives of this society for desk room in terminals, to put up properly worded signs advising of their presence, to use the station facilities and to place notices in time table folders. No extension to present telegraph service between workers at various points will be authorized.

Grain Embargo—Primary Market.—Circular 197 canceling Circular 96 and all supplements thereto of the Southwestern regional director states that the embargo placed against the movement of grain to primary markets has been entirely lifted. It is now permissible to ship all grains to primary markets without grain control committees' permits.

Automobile Cars.—Order 191 canceling Order 184 of the Southwestern regional director similar to Circular 430 of the Southern regional director (*Railway Age,* March 28, page 834).

Embargo Regulations.—Order 189 of the Southwestern regional director similar to Circular 75 of the Northwestern regional director (*Railway Age,* April 4, page 898).

Bill of Lading Form.—Supplement 7 to Circular 6 of the Northwestern regional director similar to Circular 127 of the regional director of the Allegheny region (*Railway Age* of April 4, page 898).

April Estimates.—A. H. Smith, regional director, Eastern Region, has called on federal managers for an estimate of earnings for April; estimate of operating ratio; of number of men employed, of the number of man hours, and an estimate of the total payroll for each department; all to be shown compared with the actual figures obtained for the month of April, 1918.

Per Diem Allowances to Short Line Railroads.—Circular 78 of the Northwestern regional director states that the per diem allowance of two days free time under the standard contract with short line railroads will only apply when a contract has been executed between the short line and the Railroad Administration. When this is done the free time allowance will apply retroactively to April 1, 1918, and The Car Service Section will instruct the assigned federal railroads to make prompt settlement. Such allowances are in lieu of reclaims already made or provided for in the local agreements.

Specifications for Cross Ties.—Supplement 17 to North-

western Regional Purchasing Committee Circular 19 contains diagrams of those types of ties which are acceptable under the Standard U. S. R. R. Administration specifications as well as some that should be rejected.

Public Health Placards.—The regional director, Eastern Region, by order No. 1600-38A665, authorizes compliance with requests from the Bureau of Public Health Service, Treasury Department, and from State Boards of Health, for permission to post placards listing the locations and hours of treatment of the free government and state clinics for venereal diseases. These notices are to be worded substantially as prescribed by the Division of Operation and are to be not larger than 6 in. x 10 in. in size. They are to be posted only in men's toilets at stations and not, under any circumstances in men's waiting rooms or in cars.

Errors in Interchange Reports.—The regional director, Eastern Region, by circular 2000-19-43A661, calls attention to the large number of errors found in interchange reports, vitiating the accuracy of car records. The Car Service Section requests that interchange points, especially at large industrial centers, be carefully supervised and a report rendered monthly of errors in interchange reports. A form is given showing the number of errors of different kinds and the percentage of erroneous entries. One or more traveling men must be assigned to properly police interchange points, and these traveling men will meet at interchange points for the purpose of making joint analyses and application of remedies. Each road will make its report to the Car Service Section on or before the close of each month, and also distribute same information to such local agents as may be necessary.

Separation of Accounts between Federal and Corporate Interests.—The regional director, Eastern Region, by circular 700-26A664, promulgates a letter from C. A. Prouty, director, Division of Accounting, requesting that each federal manager of a Class 1 road delegate one or more experienced accountants to the work of inspecting the separation of the accounts between federal and corporate interests as of December 31, 1917; the period of service being estimated at about six months and the men to return to their positions at the end of such service. Each railroad is to continue to carry its employees so designated upon its payroll and pay their expenses while engaged in this special work.

This order contemplates the establishment of a temporary accounting organization at Washington, and a competent accounting force cannot be secured from sources other than the railroad accounting departments. The men to be detailed to this work must be above the ordinary clerical grade, one, at least, of whom must have had some experience in the general accounting features in the separation of accounts as well as the lap-over features. Men having experience in disbursements and freight accounts may act as assistants. In the event that any of the men detailed for this work are not properly qualified therefor, they will be returned to the office of the federal auditor who assigned them, and more experienced men called for.

These accountants will be required to take service upon any line determined upon by Director Prouty. In the event that the Accounting Department of one railroad falls behind in its work, because of this temporary assignment of men to this work, it is proposed to assign some of the force of other lines in the same region to the office of the line which has fallen behind.

Employees killed and injured on the New York Central in the twelve months ending with December, 1918, totaled fewer than in 1917; five less killed and 1,154 less injured. This improvement was made notwithstanding that conditions in 1918 were very unfavorable throughout the year; a large increase in traffic and many inexperienced employees.

The Ticket Agent as a Salesman*

By George A. Cullen

General Passenger Agent, Delaware, Lackawanna & Western

In a much larger degree than is generally realized, the man behind the ticket counter (and only to a less extent behind the ticket window) serves in three capacities which rank him high as a salesman in the best sense of that word.

First: He is a creator of business. It is universally recognized that a very considerable proportion of railroad travel is what may be expressed as volatile, or better yet, as vaporous in the sense that it is not tangible and may become entirely dissipated unless condensed by the actual purchase of a ticket. The volatile traveler is one, for example, who has a vacation ahead of him which he may spend in his automobile or by a railroad trip to Atlantic City, yielding the railroads $7 revenue, or by a trip to Glacier National Park, for which the railroad fare is $150. The vaporous individual is one who needs a rest from his business, but who does not know where to go if he should take a vacation and so is likely to remain at his desk, let his health run down and instead of contributing $300 or so to help the director general overcome the deficit by buying a ticket to California, compels his heirs to spend a like amount with the undertaker to convey his remains to Woodlawn.

Now, let either of these men go to a ticket office and fall into the hands of a listless and inattentive ticket seller of the vendor class and the potentialities of the situation remain entirely undeveloped. Let him, however, approach a real live transportation salesman and note the difference. He is immediately shown the attractions of this or that resort, the excellent facilities for getting there, the Pullman accommodations, the ease with which his baggage will be handled from home to hotel, etc. Just the right literature is placed in his hands so that he can talk it over with his wife, the agent's personal card is handed him, and a cordial invitation is given him to return and buy his ticket, and, lo, the seed is sown that will bear golden fruit in railroad dividends.

Second: Important as is the feature just mentioned, I do not know but that even more so is the element of salesmanship which a ticket man possesses as a creator of good will. There is no one spot at which the traveling public comes into contact with the personnel of the railroad so intimately as at the ticket counter or windows. Here it is that a soft answer may turn away wrath. Here the perplexities of the aged and the ignorance of the young may alike be relieved. Here the busy man of affairs may get his ticket to Chicago and his "choice upper berth near the wash room" at the same time that he gets his impression of the great courtesy and real interest in endeavoring to furnish him a drawing-room which the tactful agent has displayed and consequently go on his way with a determination to vote for whoever at the time, administration or corporation, is running the roads.

Third: He is a creator of service. Every business house in these enlightened days looks to its selling organization not only to induce the public to purchase the goods it has manufactured, but to keep its finger on the public pulse to ascertain what the public demands and is willing to buy if the house will only manufacture it. Here the ticket agent is and can in increasing measure be of vital service to the railroad management. He listens every hour of the day to the comments of the public and should be encouraged to analyze those comments and report them to his higher officers. The intelligent and progressive managements have so encouraged him in the past, and when this practice has pre-

*From an address at the Railroad Ticket Agents' dinner, Hotel Astor, New York, March 29, 1919.

vailed the men have shown a high intelligence in discriminating between the idle suggestions of the habitually dissatisfied and the genuinely helpful comments of the sober minded and reasonable among the traveling public. Reports of ticket salesmen on business lost on account of inconvenient hours of trains, on infrequency of service, improper equipment, absence of necessary Pullman accommodations, etc., are the best guide a railroad management can have as to how to develop passenger traffic.

Railroad Construction in Spite of Snow, Glaciers, Floods and Forest Fires

RAILROAD CONSTRUCTION and operation in Alaska have been impeded by extraordinarily adverse weather conditions during the past year. Some idea of the difficulties encountered is conveyed by a recent report from the Seward division and an annual report by William Gerig, engineer in charge of construction work on the Anchorage division.

Ice on the track of the Seward division between Mile 57 and Mile 68 interfered with the operation of the trains during the week ended December 7, states the Alaska Railroad Record of December 10. Warm weather, accompanied by rain, early in that week caused a flow of water over the flats between Mile 57 and Mile 68, and then a sudden change to cold weather left about an inch of ice on the rails. Trains could not run until the ice had been picked away by hand labor, as no machinery was available to remove it.

A train which left Anchorage for Seward on Saturday, December 7, with 82 passengers reached Mile 58 on the night of that day, and being unable to proceed farther over the iced rails returned to Kern Creek, Mile 71, where there were roadhouse accommodations for the passengers. In returning to Kern Creek, the train experienced a difficult trip, for since the cars had run over the rails from that point to Mile 58 the track had glaciered again. Leaving Kern on the forenoon of the following day, the train reached Mile 54 late Sunday night, December 8, where the passengers and their baggage were transferred around a 1,200-ft. snow slide and then entered another train that got them into Seward at seven o'clock Monday morning. Gangs of laborers, with the temperature at 12 deg. below zero and a strong wind blowing, worked continuously in relays on Saturday, Saturday night, Sunday and Sunday night picking the ice ahead of the trains.

The glaciered route between Mile 57 and Mile 68 is low and flat. In the opinion of government railroad officials, the most feasible method of preventing ice blockades is to raise the tracks four or five feet. This improvement, of course, cannot be made this winter.

In a report on the construction work on the Anchorage division, William Gerig, engineer in charge for the Alaskan Engineering Commission, states that the winter of 1917-1918 was the coldest and longest experienced since the beginning of work on that part of the Alaskan line. Cold weather, he says, set in during the latter part of October, 1917, and continued until late in May, 1918. Considerable snow fell in the Turnagain Arm district, causing many snow slides on the south end of the district. This created such a dangerous situation that it was necessary to suspend all grading during the month of March. It was not until the last week in April that the danger was past and that the men returned to work.

Thawing weather late in April caused mud slides and soft tracks. Track forces were increased for maintenance work, but as the ground was still frozen, permanent repairs could not be made. During May the ground had thawed sufficiently in the Turnagain Arm and Matanuska districts so that forces were increased and permanent repairs to track were made. When the weather did moderate the temperature rose rapidly, causing floods in the Matanuska and other rivers. As these glacial streams change their channels rapidly during floods, it became necessary to do an excessive amount of riprapping, which ordinarily would have been done with the maintenance forces. On the branch to Chickaloon some ten miles of track was protected by placing riprap, and a steam shovel with two trains was employed here during two months. The thawing weather came at the same time as the maximum high tides and two pile trestles on Turnagain Arm were badly damaged by ice frozen to the piles which lifted them.

From Houston northward in the Talkeetna district, the roads were practically impassable during the month of May on account of the depth of snow during the earlier part of the month and subsequently on account of heavy rains and thaw, which made them very muddy. Throughout nearly the entire month the Susitna river was frozen over and ice did not commence breaking up until May 26. It formed gorges and floods and did damage to both roadbed and supplies.

There was a big flood in the Knik river, extending over a period of three weeks, which required constant patrolling by a large force in order to prevent damage to railroad bed and bridges. Little damage was done outside the loss of some 8,000 ties which had been stored on ground supposed to be above high water. During July and August, there was little rain and consequently many forest fires occurred. One very destructive fire at Mile 83 destroyed a construction camp and supplies valued at about $40,000, but fortunately no lives were lost. In September at highest tide, a wind storm damaged the road bed between Mile 83 and Mile 88.

On the southern end of the division favorable working conditions extended over a period of five months and on the Talkeetna district about four months. Labor of all kinds were short on account of the war, as many men volunteered and others were drafted and no outside labor was brought in. Rails which should have been delivered in June and July, were not received until August and September, and consequently track laying was considerably delayed. Lumber and material for bridge construction were also delayed owing to the conditions in Seattle and to the scarcity of vessels. There were several periods when no vessels arrived for three weeks.

The Trainmen's Wage Increase

A GENERAL ORDER allowing further increases in wages to the train service employees, as a revision of General Order 27, for the purpose of restoring to some extent the former relationship between the wages of train employees and other classes, is expected to be issued by Director General Hines shortly, to be retroactive to January 1.

The order was practically completed several days ago but has been somewhat modified following conferences between the director general and his staff and the executive officers of the brotherhoods, who have been in Washington since Monday. It is understood that one of the results of the conferences has been to refer back to the Board of Wages and Working Conditions the question of time and one-half for overtime, and other matters relating to rules and arbitraries, also that in order to secure satisfactory revisions of the compensated wage schedule the brotherhoods consent to waive the saving clause they have always insisted upon in arbitration agreements, and that they have surrendered some rates or rules in return for general increases.

Train employees were included in the general advances which were ordered last May, but action on their request for a revision was postponed until after some other classes of employees had been dealt with. The new order practically completes the 1918 cycle of wage increases.

An Important Development in the Railways of Spain

With an Account of a Project for a Proposed New Trunk Line from France to the Straits of Gibraltar

By F. Lavis

In Three Parts—PART III.—The Proposed Line

Madrid is now connected with France and the rest of Europe by two lines of railway, which cross the northern frontier at its extreme ends, at Irun (France-Hendaye) on the west and at Port Bou on the east. Between these lies the main range of the Pyrenees Mountains which forms a formidable barrier as well as the boundary between France and Spain.

Port Bou is the gateway into France from Barcelona, and would naturally be used from Madrid only for traffic to the south of France and Italy. From Madrid, Paris is now reached via the line of the "Norte" railroad through Irun.

ago by American engineers, among others, P. W. Henry and John F. Stevens, but for various reasons nothing further was actually done. Interest in the project was, however, revived a few years ago by King Alphonso, and a government commission to study the project was appointed in 1914, which made a report a year or so later recommending a line running through Soria and Pamplona which would connect with the French railways at Dax (Fig. 3, Part I, *Railway Age* of March 28, page 826.

The instructions to this commission were such that they felt they were limited in many ways, and the project set forth

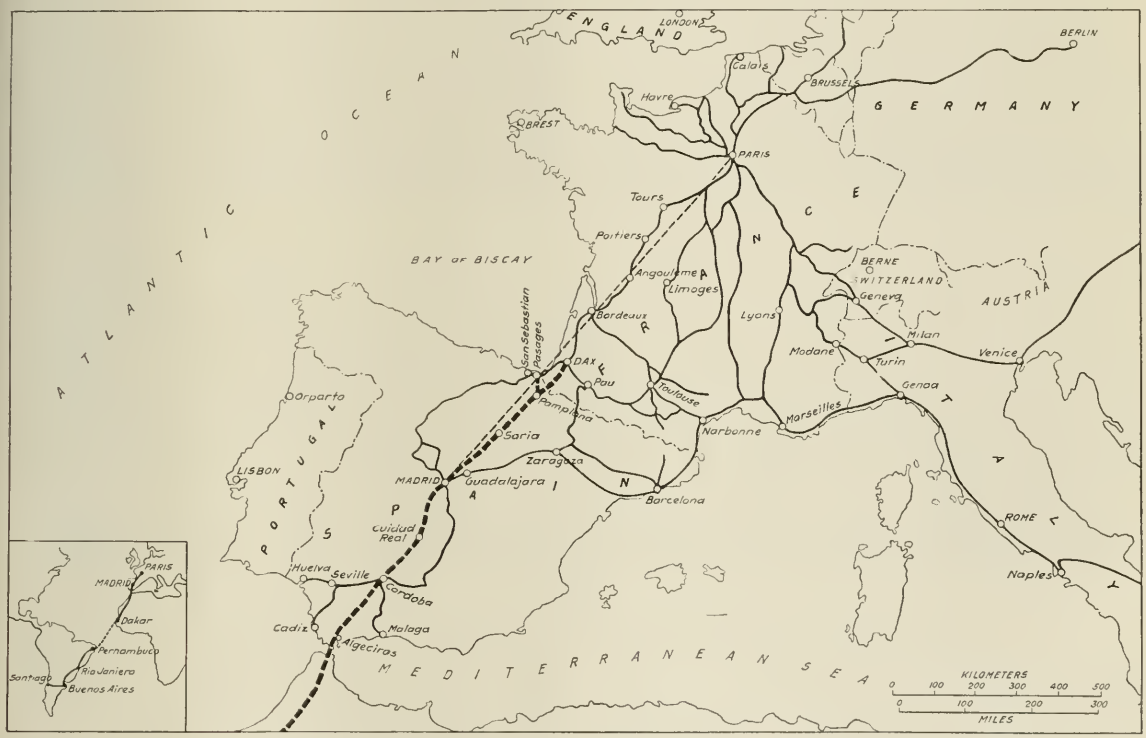


Fig. 16.—The Proposed Direct Line Through Madrid and Its Relation to the Other Railways of Europe and, as Shown in the Insert, to Those of South America

This line, as will be seen by the map in Fig. 16 first runs westerly from Madrid for nearly 125 miles to Medina del Campo, crossing the Guadarrama mountains, then follows the plains of Old Castile northerly through Valladolid, Burgos, etc., to the Cantabrian mountains, which are crossed to reach San Sebastian and Irun on the Bay of Biscay. This line is 628 kilometres (389 miles), in length and follows a very roundabout route.

For many years (since as long ago as 1853) various attempts have been made to build a more direct line, and studies of this project and variations of it were made several years

in their final plans was for a double track line of first class construction, equipped for electric traction, which involved a cost of approximately $257,000 per mile, as shown in detail in the following table:

	Per kilometre, pesetas	Per mile, dollars
Structures and stations	536,652	173,113
Track	127,742	41,206
Rolling stock	55,139	17,785
	719,533	232,104
Electrification of line	49,666	16,020
Development of power	29,030	9,364
	797,229	257,488

The General Council of Public Works and the responsible heads of the government, thought that this large expenditure was hardly warranted by the expected traffic or by the political benefits which might be derived from the construction of the line, but in the spring of 1918 the matter was brought to the attention of the American International Corporation and the writer was requested to make a detailed study of the whole project. It was thought that perhaps, not being hampered by limiting instructions, a less costly line might be found, which would still fill the requirements for a through line for fast express service, and it was felt that the more general application by American railway engineers of economic principles to problems of this kind, and their better knowledge of the relation between cost of construction and cost of operation, might be of value.

As a result of these investigations a route was selected, the cost of which was expected to be much less than that given above, and which compared very favorably with that of the existing railway, as shown by the following table and the comparative profiles, Fig. 17.

Comparison of Physical Characteristics F. C. del Norte and the Direct Line, Madrid to the French Frontier

	Existing Railway Norte	Direct line: Spanish Commission	Direct line: Survey of 1917
Length Kms.	641	443	427
Rise and fall meters	1,620	2,221	2,018
Curvature degrees metric*	17,680	16,931	13,271

*20 meter chords.

Other Proposed Routes

There have been several proposals for the construction of other connections between the railways of Spain and those of France; and a few years ago a Trans-Pyrenean railway commission was organized in Spain to construct three lines, across the border, which had been agreed upon by the governments of the two countries, which are the following: (See also Fig. 3.)

Barcelona-Toulouse via Puigcerda and the valleys of the Llobregat and Ariege.

From Lerida via the valley of the Noguera Pallaresa.

From Zaragoza via Jaca and Canfranc.

The last is nearly completed and should be opened for traffic within the next year or two. By reason of its heavy gradients, rise and fall, alignment, etc., it probably will not carry much through traffic. No work has been done on the second of these lines but some progress has been made on the Pyrenees section of the first, the summit tunnel having recently been completed. There seems to be some justification for this line as Barcelona is the largest and commercially the most important city in Spain and the proposed line will afford direct communication between Barcelona and Toulouse, and through this latter city, direct to Paris and all parts of France. The work, however, is said to be very heavy and the gradients and alinement rather bad. The need for the second line is not very apparent and the construction, it is said, will be very difficult.

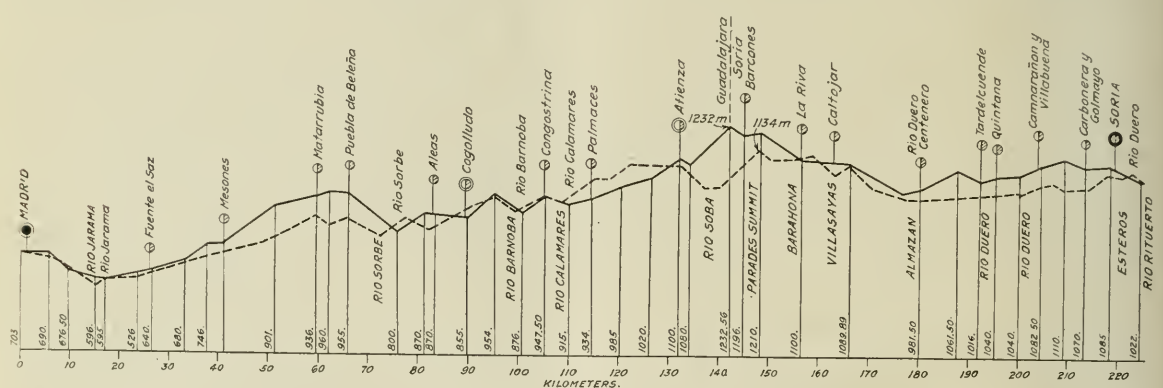
Through Route to Africa

As already noted, the proposed "Direct" line, if built, besides furnishing more direct communication between Madrid and Paris, may eventually form part of a through transcontinental route from western Europe to Africa and South America.

The report of the original commission discussed at considerable length the question not only of the desirability, but also the need of a direct line of railway from north to south through Spain, as a means of easy sure communication between the countries of western Europe and the northwestern part of Africa.

Sr. Echarte, the chief engineer, in his report, referred to the long discussed plan of a railway from Paris and, incidentally, of course, from Germany, Holland, Belgium, etc., through Spain and northwestern Africa to Dakar and thence by a short ocean trip to Pernambuco in Brazil. That such a route is an inevitable development of the future, seems almost sure, and the experience of the great war is likely to create a tremendous impulse in the development of transportation facilities everywhere, especially in Spain, so that its realization may not be so far in the future as may seem at first thought to be likely and considering the matter solely from a purely commercial standpoint.

The development of this through route as a whole is, however, probably too large a plan and too far ahead of the needs of Spain or the world to be undertaken just now, but it is mentioned in passing as an incidental though not unimportant feature of the project under consideration.



It Will Be Noted that the Names in Capitals Relate to the Broken Line and Those in Lower Case Letters to the Full Line

Fig. 17. Profile of the Proposed Direct Line from Madrid to the French Frontier. Showing in the Full

The "Direct" Line

A straight line drawn from Madrid to Paris (see Fig 16), will pass close to the western end of the frontier and near the city of Pamplona, the capital of the province (and former kingdom) of Navarre. This is the only important city in this section of Spain, except San Sebastian on the coast, and every indication points to it as a controlling point on any proposed direct line between Madrid and Paris, unless topographical conditions interfere.

In some respects the Pyrenees form the most important topographical feature in the consideration of a through route between Madrid and Paris. Given the fact that it is desired to cross near their western end, the pass of Urtiaga, just north

of Pamplona, and reached on the Spanish side by the valley of the Arga and on the French side by that of the Alduides, is the most easily accessible. There are two passes to the east, those of Roncesvalles and the valley of the Roncal, and one to the west, the pass of Otsunda, but for reasons which are discussed in detail in the report, Pamplona and the Urtiaga pass are shown to be the controlling objective points at the northern end. The problem, therefore, was the location of a line between Madrid and these points.

Methods of Investigation

The object of the investigation was to determine, without going into too much detail, the best route, between Madrid and the French frontier, adapted for fast passenger traffic, and whether such a line could be obtained at a reasonable cost compared with the traffic to be expected and in view of the political advantages and other controlling circumstances.

The writer had the advantage of the surveys of the original commission and of the advice of Sr. Gonzales Echarte, the former chief engineer. It was decided to make a stadia reconnaissance of such variations of the original route as might seem to be desirable or necessary, and the writer took with him to Spain three assistants: W. L. Gibson, F. O. Pease and H. A. Ayres, all of whom had had considerable experience in railway location and construction in South and Central America as well as in the United States. The party left New York on July 18, 1917, and arrived in Madrid on August 1. The field work was completed early in December and the office work by the last of the year, the party reaching New York again a little more than six months after sailing.

Preliminary investigations of the territory were immediately commenced on arrival in Madrid, and as soon as possible after complying with the necessary formalities, three field parties were organized, with Mr. Gibson in general charge, and Messrs. Pease, Ayres and Lacroix (the latter a Frenchman resident in Spain), each in charge of a party of five Spanish assistant engineers and the necessary peons, all obtained in the country. An office with necessary draftsmen and assistants was established in Madrid for the compilation of the necessary maps and data.

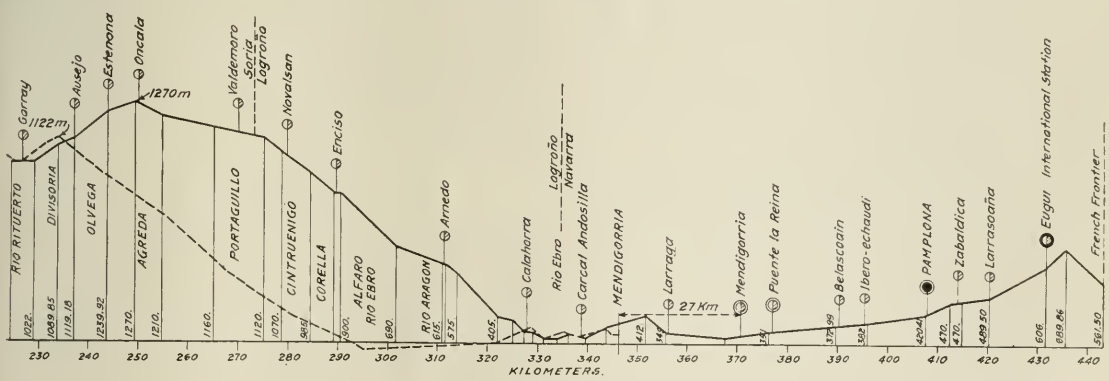
Stadia lines were run over the route selected, which involved an entirely new line for some 345 kms. (215 miles) from Madrid north. The topography obtained was platted on a scale of 1:4000 (about 333 feet to the inch), and a line projected on this map, from which the quantities of earthwork, bridging, etc., were calculated.

This study, while developing the main controlling features of the route and a close approximation of the final location, was, of course, far from detailed enough or sufficiently thorough to permit the assurance that absolutely the best line had been obtained. The estimates of quantities and cost, however, are believed to show within reasonable limits the approximate cost of building a line through this territory, and although further studies will undoubtedly show the desirability of modification of details, some of which may lessen the cost, and others possibly improve the alinement or gradients, at a somewhat increased cost of construction, on the whole this should not change materially the general aspect of the situation.

Both the writer and his assistants have all been accustomed to work in Spanish-speaking countries and in South and Central America, but found in Spain many differences, due principally to the more strongly established customs of the older European country, which were generally less susceptible of modification than those of the newer countries of North and South America. This is mentioned, not only because it involved some little delay from time to time and modifications of the plans for the prosecution of the work, but it is important to keep in mind in connection with any enterprise which may be undertaken in the future in Spain. It will be quite feasible, under proper management, to introduce some American ideas, but there are many which will either not be admitted at all, or only after considerable modification.

Location and Design

The primary object of the line is to obtain fast, convenient passenger service between Madrid and Paris and also, incidentally, with London, Brussels, Amsterdam, Berlin, etc. In passing it may be noted that convenient access to Bordeaux is desirable on account of the wine traffic. To avoid the necessity of changing cars at the frontier it was proposed that



Line the Spanish Survey and in the Dotted Line the Survey by the American International Corporation

A secondary object is the usual local freight and passenger business of a railway which in the case of this line, will probably not be very large for the first 10 or 15 years, unless there is some, at present, unexpected mineral or industrial development. There may be developed an additional express passenger service from Valencia and Madrid to San Sebastian and to Pasages, in connection with an ocean steamship service. There may be developed a fairly large business also in the haulage of iron ore between Mt. Moncayo (Soria) and Pasages, and coal from Pasages to the interior, and possibly also to Madrid and Valencia.

There is a possibility of eventually building a line from a point near Soria westerly to Burgos and to the coal fields of Leon and Palencia, which can be used for the distribution of coal to Madrid, Valencia and Barcelona.

Traffic

The traffic estimates show that aside from the thorough traffic the business will probably not be very heavy during the first 10 or 15 years, and the estimate of the number of trains and the character of the rolling stock indicate that these will be comparatively light, compared with modern practice in the United States, though considerably heavier than anything now in use in Spain.

Design

The general characteristics controlling the design are, therefore, a country with a rather badly accidented topography, a line for fast passenger service with only moderately heavy rolling stock and the possibility of a fairly heavy low-grade freight service on the northern half of the line.

This indicates a line of first-class construction, with the best gradients and curvatures reasonably obtainable in a difficult country.

The standards of construction adopted for the purpose of the investigation were as noted, briefly, below. They are a compromise between good American practice, the requirements of the Spanish authorities, and the existing conditions in Spain.

A single track line, with provision for the location of passing sidings 1 km. in length every 10 kms., but it was expected that only half of these would be built at first; tunnels to be excavated for double track and bridges to be so located that the abutments can be extended when required. In consideration of this procedure, it should be noted that the cost of tunnel excavation and masonry construction is very low in Spain.

Track to be laid with 90 lb. rails, with 2,000 ties to the mile. Ties of oak are very expensive, so fewer were used with a somewhat heavier rail than would otherwise be necessary. Screw spikes were proposed, with tie plates on the sharper curves. Stone ballast was estimated 12 ins. under the tie and of a typical American cross-section. The European practice is to cover the ends of the ties outside the rails level with the top of the rail.

Bridges were estimated in accordance with A. R. E. A. specifications. Coopers E 50 loading, solid floors. On account of the cheapness of masonry and in accordance with the custom in Spain, masonry viaducts were estimated for many crossings where steel would ordinarily be used in the United States.

In accordance with American practice the quantities of steel, masonry, etc., were calculated from tables and diagrams, and the excavation quantities scaled from the profile. In Europe even for a preliminary estimate it seems to be customary to draw more or less detailed plans of each structure and actually calculate all the quantities, cross-sections being platted from the topography for estimating the earthwork, and this is necessary in the submission of plans to the government.

A 2 per cent grade compensated for curvature was adopted tentatively for the reconnaisance survey, but it is expected that this can be bettered at little additional expense when the final studies are made; the minimum radius of curvature adopted was that of a 5 degree metric curve, i. e., about 230 metres (760 ft.) radius.

A discussion of the reasons which will probably control the final choice of the proper rates of gradients on this line were given in the report, but this is a matter with which engineers are generally familiar, but in regard to curvature European engineers, largely, perhaps, on account of the types of rolling stock available, are generally prejudiced against the use of sharp curvature on main lines, and the following extract from the report may, therefore, be of interest; as it was written for the purpose of attempting to overcome this prejudice.

Curvature

The minimum radius of curvature for our surveys, namely, 230 metres (760 ft.), while not unduly sharp for American practice in heavy country, is rather less than that customary in Europe. The minimum permitted for the main lines in Spain is 300 metres (practically 1,000 ft.). It must be admitted, of course, that curves with as short a radius as 760 ft. cannot be traversed at high speeds, i. e., at speeds much over, say, 40 miles per hour, but they can be at 30 to 35 miles per hour.

The nature of some of the country traversed by this line, however, is such that the use of flatter curves would quite considerably increase the cost without any commensurate advantage in operating economy. As a concrete example the difference was calculated on a certain given section.

On this section two and a half kilometres (1.5 miles) in length, by the use of 3 degree (metric) curves instead of 5 degree, the excavation quantities would be increased by some 40,000 cubic metres with probably some increase in the masonry for culverts. This may be assumed to involve an additional cost of, say, $25,000. There will be, however, a saving of about 75 degrees of curvature, but even assuming 10 trains daily in each direction and the additional cost of operation at, say, 60 cents per train, per degree, per annum (which is reasonably high for operating conditions in Spain, with comparatively light trains and low wages), will be only $450 per annum. Assuming that capital is worth 7 per cent, the saving of this amount of curvature would only justify an expenditure of about $6,500.

These values, of course, are subject to such revision as more careful and detailed study of the traffic and characteristics of the line may indicate, but the figures tend to confirm the writer's opinion that in a country of this nature the minimum radius adopted for our surveys should be retained, though on the other portions of the line the minimum radius could probably easily be established at 382 metres (1,200 ft.), or that of a 3 degree metric curve.

It was recommended that the use of the shorter radius curves be confined to three sections having a total length of 85 kilometres, as follows:

KM. 78 to Km. 108
KM. 253 to Km. 275.
Pamplona to the frontier.

On all the rest of the line the minimum radius can be that of a 3 degree metric curve (1,260 ft.), and by thus confining the heavy curvature to certain sections the objection from the point of view of speed is reduced to a minimum.

So far as this line in Spain is concerned, we are rather handicapped by the need of having the rolling stock conform to French practice in the matter of couplings, and the use of side buffers, which does not permit the flexibility on sharp curves which our center couplings do.

The use of bogie trucks, however—i. e., the common American practice—permits much greater flexibility than the stiff frame 3-axle coaches with long rigid wheel base, still quite generally used in Europe today. (See Fig. 12, Part I, *Railway Age*, of March 28, page 829.

It is impossible within the limits of an article of this kind to discuss the location in detail. Practically an entirely new line was located for a distance of 345 kms. north of Madrid to Mendigoria. From that point to the frontier, a further distance of 71 kms., the general route of the original commission was adopted. An approximate comparison of the physical characteristics of the two lines between Madrid and Mendigoria is as follows:

	Spanish Government Commission	Survey of 1917
Length Kms.	372	345
Curvature degrees	15,095	10,000
Rise and fall meters	1,709	1,500
Rise and fall on 2 per cent gradients	1,093	690
Tunnel Kms.	55	11

In connection with this proposed direct line to France it is proposed to build a branch from a point near Soria to Calatayud, where connection would be made with the Central of Aragon Railway permitting through service from Valencia to the north coast of Spain and to France. It was proposed also to build a line from Pamplona to San Sebastian and to Pasages, on the north coast.

San Sebastian is the well-known summer resort on the Bay of Biscay, and Pasages, a small hand-locked harbor just east of San Sebastian, has possibilities of development as a point of export for the iron ore of Mt. Moncavo, for the importation of coal either from Gijon or England, and as a terminus for a transatlantic steamship line.

Besides facilitating the through traffic between the capitals of France and Spain, and serving as a link in a new transcontinental route, the "Direct" line is of extreme importance from a military strategic point of view. It offers also an opportunity to further develop the iron ore resources of northern Spain, and would be an important factor in the distribution of coal from the north coast to the interior plateau and the eastern Littoral. The statistics of commercial development show that the railroad and port facilities have not kept pace with the requirements of business and this line with the development of Pasages will overcome at least partially this lack of transportation and terminal facilities.

The writer was given every facility in his investigations and every courtesy was extended by officials of all kinds, both of the national and provincial governments, and while some of the regulations were thought vexatious at times on account of the delays involved, it is realized on looking back that they were not more so than might be expected in attempting to do things differently in any country with fairly fixed notions of procedure, and possibly no more so than are often experienced here at home in dealing with our own officials. It is believed that Spain will welcome the co-operation of Americans in carrying out public works which are needed, if the financial participation can be satisfactorily arranged.

American Railway Engineering Association Committee Work

The American Railway Engineering Association has just issued a bulletin giving the personnel of committees and assignment of committee work for the 22 regular committees and 2 special committees of that association, as organized for the coming year. Duplicate information is contained in Circular No. S II-I, issued by the American Railroad Association, Section II—Engineering. Only four new chairmen have been selected for the standing committees of the association, 20 chairmen having been held over. J. R. W. Ambrose, chief engineer, of the Toronto Terminals Company, Toronto, succeeds W. M. Dawley, assistant engineer of the Erie at New York City, as chairman of the Committee on Roadway. H. L. Ripley, valuation engineer of the New York, New Haven & Hartford, Boston, Mass., succeeds H. E. Hale, group engineer for the Presidents' Conference Committee on Valuation, New York City, as chairman of the Committee on Ballast. J. J. Yates, bridge engineer of the Central Railroad of New Jersey, New York, succeeds F. L. Thompson, chief engineer of the Illinois Central, Chicago, as chairman of the Committee on Masonry. Arthur Crumpton, assistant valuation engineer of the Grand Trunk, Montreal, Can., succeeds W. F. Strouse, assistant chief engineer, Public Service Commission of Maryland, Baltimore, Md., as chairman of the Committee on Signs, Fences and Crossings.

Owing to the nature of the subjects assigned to the committees for investigation and to the fact that not more than two can be reported to the convention for action any one year, many of the subjects submitted last year have been carried over. Among the new subjects assigned to the committees for investigation during the present year are the following:

Ballast—Report on the use of reinforced concrete slabs or other devices to assist the ballast in distributing the load on soft roadbed.

Rail—Present revised specifications for steel rails. Present sections for rails heavier than 120 lb. per yd. Report on the effect of usage on the physical properties of rail steel.

Track—Investigate and report upon the design and use of a "clamp" type of frog.

Buildings—Review recommendation as to the applicability of the high platform.

Masonry—Investigate the distribution of loads through ballast and embankment as affecting the design of masonry structures. Report on methods of conveying and depositing concrete.

Signals and Interlocking—Investigate and report upon the effect of the use of ties treated with any solution which affects the length of signal track sections.

Water Service—Report on the water service organization. Submit definitions applicable to water service. Report upon plans and specifications for typical water station layouts, collaborating with the committee on Yards and Terminals and on Economics of Railway Operation.

Yards and Terminals—Report on unit operation of railroad terminals in large cities, revising the catechism as a statement of principles for inclusion in the Manual.

Wood Preservation—Report on the availability and use of sodium fluoride as a preservative for cross ties. Report on creosote treatment to be used in the protection of piles and timbers in teredo-infested water, specifying the amount of creosote to be used. Report on comparative value of grades 1, 2 and 3 creosote oil and creosote coal tar solutions as preservative agencies.

Electricity—Continue collecting statistical data relative to clearances of third rail and overhead working conductors and submit revised tables at the next annual meeting. Cooperate with the Bureau of Standards in the preparation of the proposed National Electrical Safety Code and other safety codes of similar character. Submit specifications for insulated wire and cables.

Economics of Railway Labor—Study and report upon methods for training and educating engineering and maintenance department employees.



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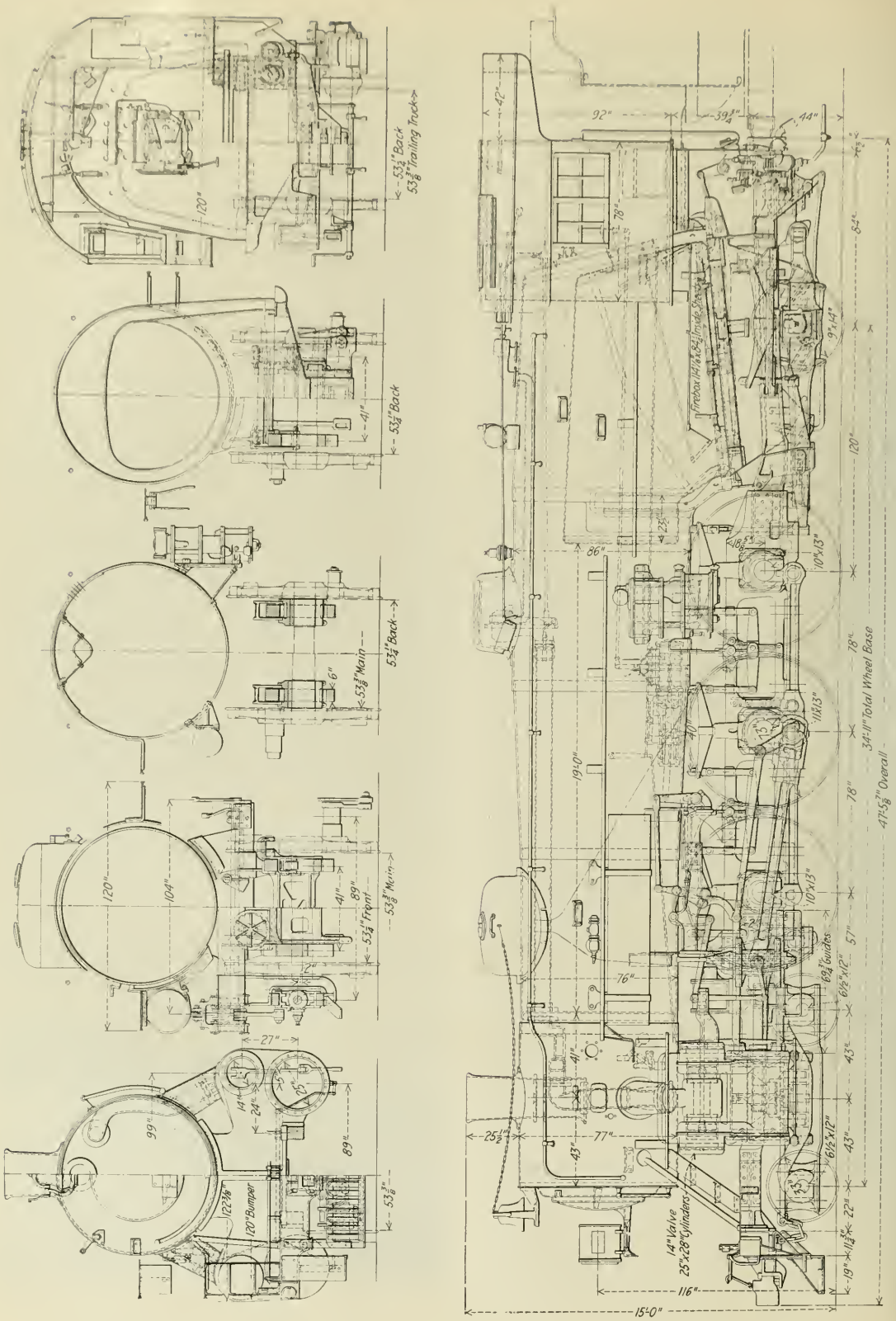
Headquarters Siding on the Archangel Front

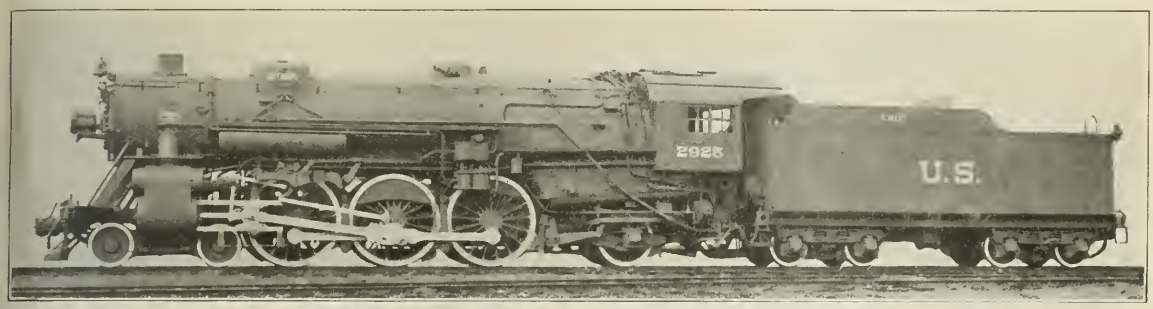


Elevation and Sections of the Standard Light Pacific Type Locomotive

Light and Heavy Standard Pacific Type Locomotives

Straightforward Designs Having Many Details Interchangeable with the Other Standard Types

THE FIRST OF THE TWO CLASSES of Pacific type locomotives built to the United States Railroad Administration's standard designs have recently been turned out of the Richmond Works of the American Locomotive Company, the light locomotive for delivery to the Atlantic Coast Line and the heavy locomotive for delivery to the Erie. The light locomotive is one of a total of 59 of these locomotives which have been ordered by the Railroad Administration, 26 to be built by the American Locomotive Company and 33 by the Baldwin Locomotive Works. Orders have been placed for a total of 20 of the heavy locomotives, 10 with each of the above mentioned builders.



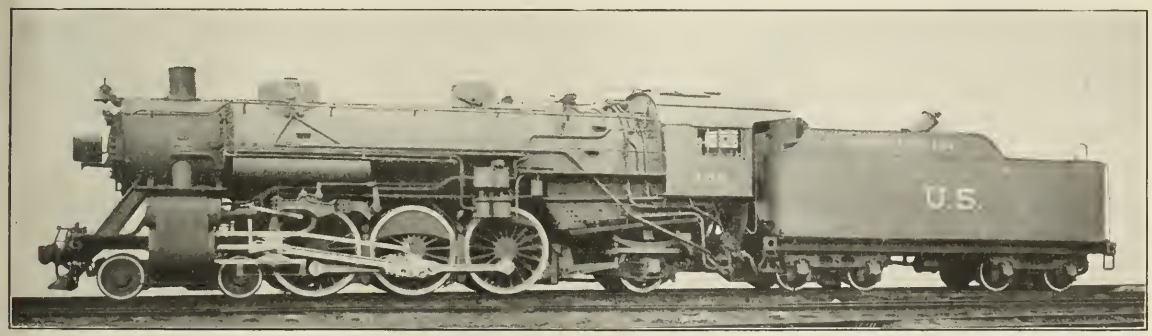
The Railroad Administration Standard Heavy Pacific Type Locomotive

The light Pacific type was designed on the basis of driving wheel loads of 55,000 lb. per axle and has a total weight of 277,000 lb. in working order. The actual driving axle loads are 54,000 lb. each, and a tractive effort of 40,700 lb. is developed. In Table I will be found a comparison of this locomotive with a number of others of the same type designed on the basis of approximately the same axle loads. It will be seen that the standard locomotive is somewhat similar in its proportions to the Missouri, Kansas & Texas locomotive, which, however, has more heating surface, but a considerably smaller grate and a smaller ratio of firebox heating surface to total heating surface.

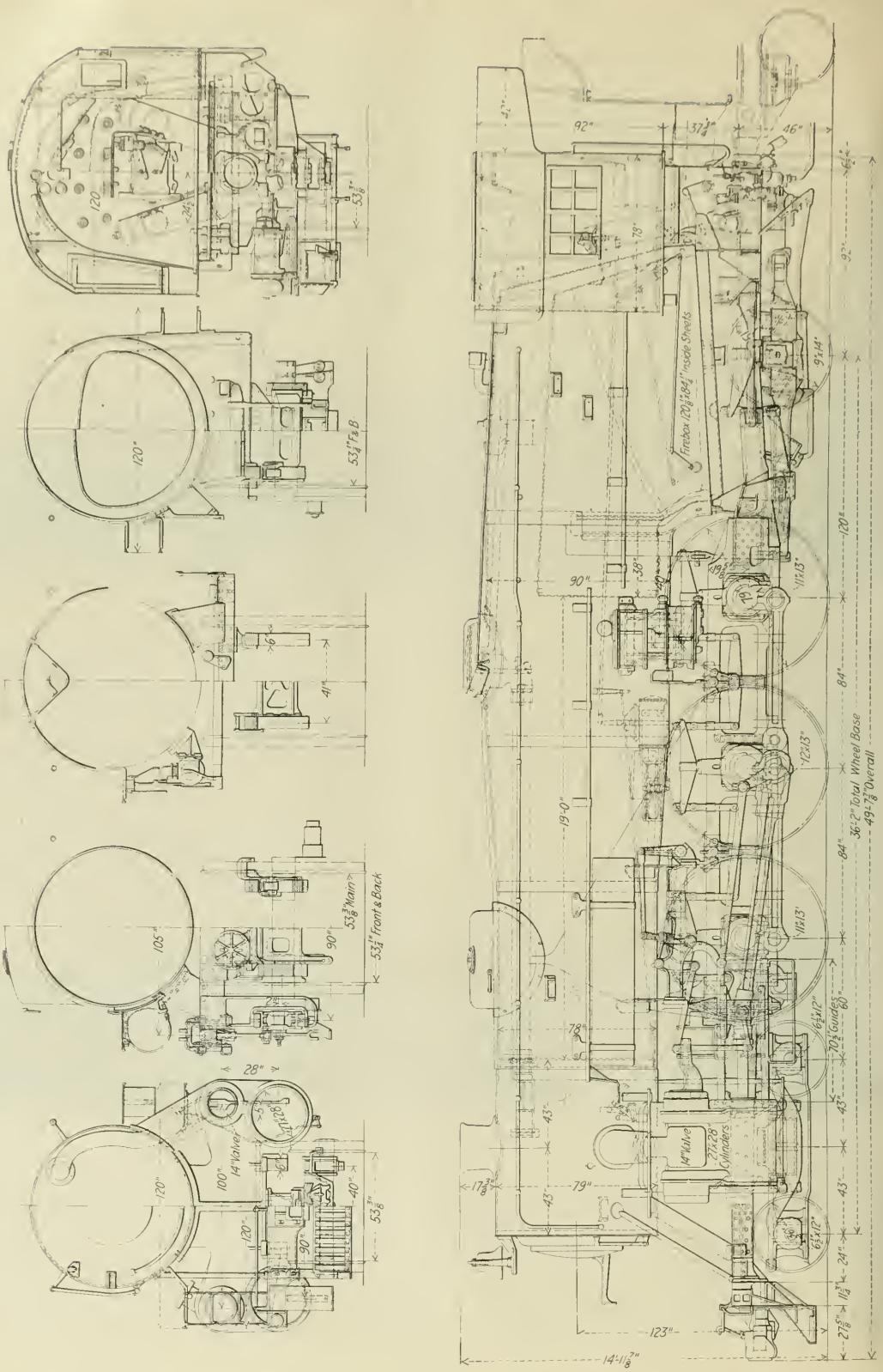
The design of the heavy Pacific locomotive was based on driving axle loads of 60,000 lb. The actual weight on drivers, however, is 197,000 lb., equivalent to slightly less than an average of 66,000 lb. on each axle. The total weight of this locomotive in working order is 306,000 lb. and it has a maximum tractive effort of 43,900 lb.

In Table II will be found a comparison of this locomotive with several other heavy Pacific type locomotives. The heavy standard locomotive compares more closely with the Pennsylvania K4s Pacific than with any of the others. It has about 4,000 lb. less weight on drivers than the Pennsylvania locomotive, with a total weight 3,000 lb. less, and on a comparative basis is rated at 600 lb. less starting tractive effort. A comparison of the heating surfaces of the two locomotives would indicate that the Pennsylvania locomotive had a considerably greater capacity for high sustained speed when handling similar loads.

The boilers of the two standing Pacific type locomotives are generally similar in construction, both being of the conical wagon top type with combustion chamber fireboxes. The outside diameter at the first ring of the two boilers is 76 in. and 78 in., respectively, increasing to 86 in. and 90 in., respectively, at the dome course. The light locomotive has 188 2¼-in. tubes and 36 5½-in. flues, while the heavy locomotive has 216 tubes and 40 flues of the same diameters. The tubes of both locomotives are 19 ft. long, while the combustion chamber of the light locomotive is 23½ in. long and that of the heavy locomotive 38 in. long. The maximum diameter of the boilers at the dome course is 86 in. for the light locomotive and 90 in. for the heavy locomotive. The



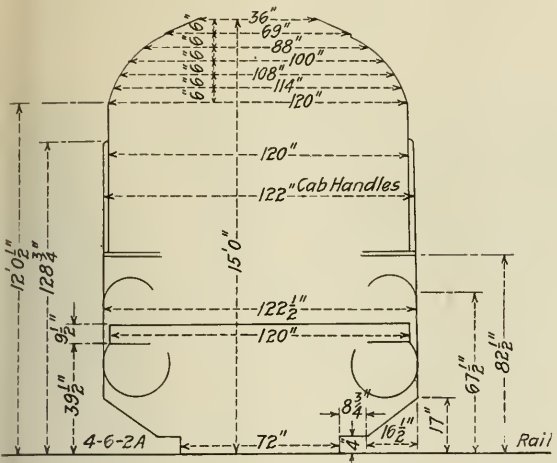
The Standard Light Pacific Type Locomotive



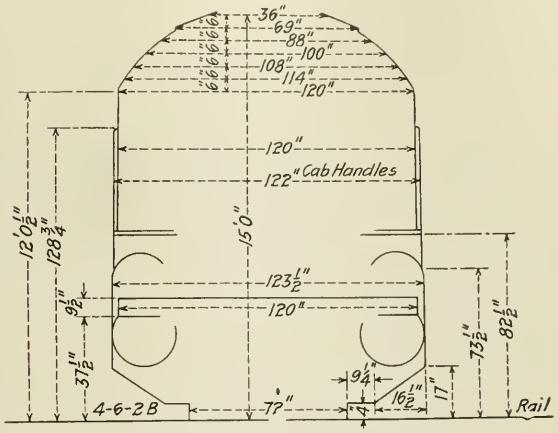
Elevation and Sections of the Standard Heavy Pacific Type Locomotive

light locomotive is hand fired, while the heavy engine is equipped with a Duplex stoker.

The design of the frames for both types is essentially the same. Both are of the single front rail type, each frame being cast in one piece with a splice back of the rear driving wheels for Commonwealth cradle castings. In both cases the frames are six inches wide. The lighter frames have a depth of top rail of 6⅛ in. over the driving boxes and a minimum depth of 5⅛ in. between the drivers. The maximum and minimum depths of the lower rail are 4¼ in. and 3¾ in., respectively. The frames for the heavy Pacific have a depth over the driving boxes of 7⅛ in. and a minimum depth of top rail of 6 in., while the maximum and minimum depths of the lower rail are 4¾ in. and 4¼ in., respectively.

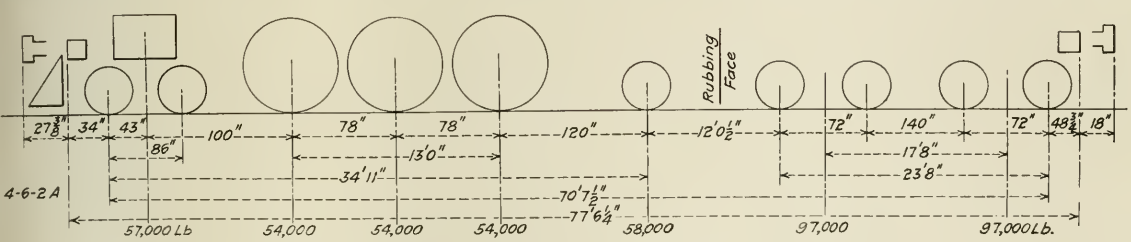


Clearance Diagram for the Light Pacific Type Locomotive

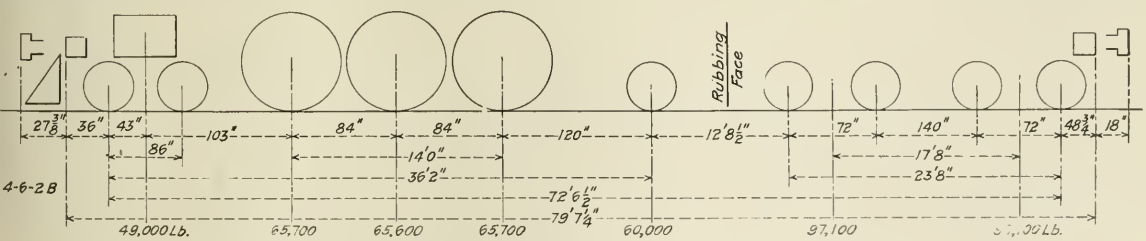


The Heavy Pacific Type Clearance Diagram

The design of the cylinders for both types is similar in all respects except that the light Pacific type are 25 in. in diameter, while the heavy locomotives have 27-in. cylinders, the stroke being 28 in. in both cases. The pistons are of the single plate dished type, the specifications calling for either cast or rolled steel, with a cast iron bull ring and packing rings of Hunt-Spiller gun iron. In both cases the cylinders and valve chambers are fitted with the Hunt-Spiller gun iron bushings. The piston and rod of the light Pacific type are interchangeable with those of the Eight-wheel switcher, while the piston on the heavy Pacific type interchanges with that used on the heavy Mikado and Mountain type locomotives and the light Santa Fe type. The crosshead is also essentially the same as that used on all the other locomotives and that of the light Pacific interchanges with the crosshead of the Eight-wheel switcher and the light Mikado type locomotive. While none of the cylinder designs are interchangeable, the front and back heads have been made interchangeable where the diameter of the cylinders is the same, those for the light Pacific interchanging with the Eight-wheel switcher, and those for the heavy Pacific interchanging with the heavy



The Distribution of the Weight of the Light Pacific Type Locomotive



Weight Distribution Diagram for the Heavy Pacific Type Locomotive

The cylinders of both types are similar in design to those on all of the other single unit standard locomotives and both are designed for the use of 14-in. piston valves. Those of

Mikado and the light Santa Fe and Mountain type locomotives.

Both the main and side rods are of channel section, the main rod design for all of the standard locomotives being the same in all details with the exception of the necessary variation in dimensions. The two Pacific type locomotives are the only ones having the channel section side rods, the others all being of slab section.

Wherever the journal sizes permit, the driving boxes have been made interchangeable on all of the locomotives. The light Pacific type locomotive has main journals 11 in. in diameter by 13 in. in length, while the front and back journals are one inch less in diameter. The front and back driving journals of the heavy Pacific are the same size as those of the main journals on the light Pacific, while the main journals of the heavier locomotive are 12 in. in diameter by 13 in. in length.

Table I—Comparison of Light Pacific Type Locomotives

Road	A. C. L.	M. K. & T.	C. B. & Q.	N. Y. N. H. & H.
Year built	1919	1915	1915	1916
Tractive effort, lb.	40,700	40,700	42,000	40,800
Total weight, lb.	277,000	272,000	266,400	266,000
Weight on drivers, lb.	162,000	165,000	169,700	165,000
Diameter, drivers, in.	73	73	74	79
Cylinders, diameter and stroke, in.	25 by 28	25 by 28	27 by 28	26 by 28
Boiler pressure, lb.	200	200	180	200
Heating surface, total, sq. ft.	3,333	3,838	3,364	3,315
Superheating surface, sq. ft.	794	870	751	776
Grate area, sq. ft.	66.7	57.5	58.7	59.2
Tractive effort × dia. drivers ÷ equivalent heating surface	656.7	577.0	693.0	719.6
Equivalent heating surface ÷ grate area	67.8	89.5	76.4	75.7
Firebox heating surface ÷ equivalent heating surface, per cent.	5.8	4.8	6.5	6.7

Table II—Comparison of Heavy Pacific Type Locomotives

Road	Erie	P. R.R.	D. L.& W.	L. V.
Year built	1919	1914	1915	1916
Tractive effort, lb.	43,900	44,500	47,506	48,800
Total weight, lb.	306,000	308,900	305,000	301,500
Weight on drivers, lb.	197,000	201,800	197,300	192,200
Diameter drivers, in.	79	80	73	73
Cylinders, dia. and stroke, in.	27 by 28	27 by 28	27 by 28	27 by 28
Boiler pressure, lb.	200	205	200	205
Heating surface, total, sq. ft.	3,824	4,035	3,680	4,103
Superheating surface, sq. ft.	887	1,154	760	75
Grate area	70.8	70	91.3*	75
Tractive effort × dia. drivers ÷ equivalent heating surface.	672.9	580.6	719.4	639.2
Equivalent heating surface ÷ grate area	72.8	82.3	52.8	74.3
Firebox heating surface ÷ equivalent heating surface, per cent.	6.3	5.0	7.7	6.6

* For anthracite coal.

The trucks as a whole has not been maintained in every case.

The tenders of both locomotives are built with Commonwealth cast steel frames and have tanks of 10,000-gal. capacity. The tender trucks for both are of the Commonwealth equalized type, differing from the trucks under the heavy Mountain type, which were equalized swing motion trucks of the locomotive builder's design.

Aside from the parts already mentioned a large measure of interchangeability has been carried throughout the various standard designs, including a large number of minor details, such as rod brasses, grate frames, bumper beams, many of the small castings, and in a number of cases, crank pins, axles and springs as well. A complete list of the specialties on all of the standard locomotives was published in the January 3, 1919, issue of the *Railway Age* on page 91.

The clearance diagrams and wheel load diagrams were prepared by F. P. Pfahler, chief mechanical engineer, division of operation, of the Railroad Administration. The distribution of wheel loads as shown are actual weights of the completed locomotive.

The principal dimensions and data for the two Pacific type locomotives are as follows:

	Light 4-6-2	Heavy 4-6-2
General Data		
Gage	4 ft. 8½ in.	4 ft. 8½ in.
Service	Passenger	Passenger
Fuel	Bit. coal	Bit. coal
Tractive effort	40,700 lb.	43,900 lb.
Weight in working order	277,000 lb.	306,000 lb.
Weight on drivers	162 000 lb.	197,000 lb.
Weight on leading truck	57,000 lb.	49,000 lb.
Weight on trailing truck	58,000 lb.	60,000 lb.
Weight of engine and tender in working order	471,000 lb.	500,200 lb.
Wheel base, driving	13 ft.	14 ft.
Wheel base, total	34 ft 9 in.	36 ft. 2 in.
Wheel base, engine and tender	68 ft. 7½ in.	70 ft. 8½ in.
Ratios		
Weight on drivers ÷ tractive effort	4.0	4.5
Total weight ÷ tractive effort	6.8	7.0
Tractive effort × diam. drivers ÷ equivalent heating surface*	656.7	672.9
Equivalent heating surface* ÷ grate area	67.8	72.8
Firebox heating surface ÷ equivalent heating surface,* per cent	5.8	6.3
Weight on drivers ÷ equivalent heating surface*	35.8	38.2
Total weight ÷ equivalent heating surface*	61.2	59.4
Volume both cylinders	15.9 cu. ft.	18.6 cu. ft.
Equivalent heating surface* ÷ vol. cylinders	284.4	277.1
Grate area ÷ vol. cylinders	4.2	3.8
Cylinders		
Kind	Simple	Simple
Diameter and stroke	25 in. by 28 in.	27 in. by 28 in.
Valves		
Kind	Piston	Piston
Diameter	14 in.	14 in.
Wheels		
Driving, diameter over tires	73 in.	79 in.
Driving, thickness of tires	.....	.....
Driving journals, main, diameter and length	11 in. by 13 in	12 in. by 13 in.
Driving journals, others, diameter and length	10 in. by 13 in.	11 in. by 13 in.
Engine truck wheels, diameter	33 in.	36 in.
Engine truck, journals	6½ in. by 12 in.	6½ in. by 12 in.
Trailing truck wheels, diameter	43 in.	43 in.
Trailing truck, journals	9 in. by 14 in.	9 in. by 14 in.
Boiler		
Style	Con. W. T.	Con. W. T.
Working pressure	200 lb. per sq. in.	200 lb. per sq. in.
Outside diameter of first ring	76 in.	78 in.
Firebox, length and width	114⅛ in. by 84¼ in.	120⅛ in. by 84¼ in.
Firebox plates, thickness	.....	.....
Firebox, water space	.....	.....
Tubes, number and outside diameter	188-2¼ in.	216-2¼ in.
Flues, number and outside diameter	36-5½ in.	40-5½ in.
Tubes and flues, length	19 ft. 0 in.	19 ft. 0 in.
Heating surface, tubes	2,091 sq. ft.	2,407 sq. ft.
Heating surface, flues	981 sq. ft.	1,090 sq. ft.
Heating surface, firebox†	261 sq. ft.	327 sq. ft.
Heating surface, total	3,333 sq. ft.	3,824 sq. ft.
Superheater heating surface	794 sq. ft.	887 sq. ft.
Equivalent heating surface*	4,524 sq. ft.	5,154 sq. ft.
Grate area	66.7 sq. ft.	70.8 sq. ft.
Tender		
Tank	Water Bot.	Water Bot.
Frame	Cast Steel	Cast Steel
Weight	194,000 lb.	194,200 lb.
Water capacity	10,000 gal.	10,000 gal.
Coal capacity	16 tons	16 tons

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.
†Includes arch tube heating surface.

The directors of the Illinois Manufacturers' Association have telegraphed to President Wilson that they strenuously protest against the present attitude of the director general of railroads in refusing to make purchases of supplies and material "necessary to the due maintenance of the railroads and to the public safety." They declare that "the elements which enter into prices today are fundamental and should be maintained, including the present standard of wages; and the government should take the immediate initiative in this matter."

Increasing Trainloads By Reducing Grades

By S. S. Roberts

Engineer, Office of Regional Director, Southern Region, Atlanta, Ga.

IN AN ARTICLE in the issue of the *Railway Age* of January 17, 1919, entitled "The Railroad Problem and Economics," by Charles A. Morse, assistant director in charge of engineering and maintenance, Division of Operation, and particularly under the captions "Financing Capital Expenditures" and "Ignorance as to Economics", some simple facts are very plainly stated which have influenced the writer to submit the accompanying table showing the relative efficient hauling power of the U. S. standard light Mikado locomotive on various grades and the number of trains required to handle like net tonnage, in the belief that consideration of this subject is timely and that the table will be helpful to some engineers and to those operating men who will ponder it.

The statement that one locomotive has a tractive effort of 54,000 lb. and that another has a tractive effort of 40,000 lb., is a clear cut expression which at once conveys the suggestion that by substituting the first for the second the hauling power will be increased approximately 35 per cent, and that the number of trains required to handle a like tonnage will be decreased about 26 per cent. The prospect of hauling with three trains that which now requires four is alluring. The saving being in terms of trains, appears to the operating man at once as a determined sum of money. Thinking in terms of locomotives only, all this good may be had for the cost of the new locomotives less the salvage on the old. The economy seems self-evident and the adoption of the proposal is urged on the maxim, "Res ipsa loquitur".

But does "the thing speak for itself"? How about the new bridges, new engine pits, enlarged engine houses, new

EFFECT OF GRADIENTS ON EFFECTIVE HAULING POWER OF U. S. STANDARD LIGHT MIKADO LOCOMOTIVES

Tractive effort = T = 54,600 lb.
Grade resistance = R_g = 20 (rate per cent grade).
Train resistance = R_t = 6.1 lb. per ton of 2,000 lb.
Weight locomotive, tender and caboose = W = 260 tons.

Columns give effective hauling power referred to gradient at top of column as 1 or 100 per cent.
Lines give number of trains on various gradients for one train on gradient shown at left of line.

Gradient per cent. | Rise in feet, per mile. | Gross rating = C × tractive effort I / C = T / (Rg + Rt) | Gross rating = T / (Rg + Rt) | Net rating in tons of 2,000 lb. T / (Rg + Rt) − W

Gradient per cent.	Rise in feet, per mile.	Gross rating = C × tractive effort I / C = T/(Rg+Rt)	Gross rating = T/(Rg+Rt)	Net rating in tons of 2,000 lb. T/(Rg+Rt) − W	0.00 %	0.10 %	0.20 %	0.30 %	0.40 %	0.50 %	0.60 %	0.70 %	0.80 %	0.90 %	1.00 %	1.10 %	1.20 %	1.30 %	1.40 %	1.50 %
0.00	0.00	0.16393	8951	8691	1.000	1.341	1.689	2.044	2.406	2.776	3.152	3.539	3.934	4.333	4.744	5.164	5.593	6.031	6.481	6.942
0.10	5.28	0.12346	6741	6481	.746	1.000	1.259	1.524	1.794	2.070	2.351	2.639	2.931	3.231	3.538	3.851	4.170	4.498	4.833	5.177
0.20	10.20	0.09901	5406	5146	.592	.794	1.000	1.210	1.425	1.643	1.866	2.095	2.327	2.565	2.809	3.058	3.311	3.571	3.837	4.110
0.30	15.84	0.08264	4512	4252	.489	.656	.826	1.000	1.177	1.358	1.542	1.731	1.923	2.120	2.321	2.524	2.736	2.951	3.171	3.396
0.40	21.12	0.07092	3872	3612	.416	.557	.702	.849	1.000	1.154	1.310	1.471	1.634	1.801	1.972	2.146	2.324	2.507	2.694	2.885
0.50	26.40	0.06211	3391	3131	.360	.483	.608	.736	.867	1.000	1.136	1.275	1.416	1.561	1.709	1.860	2.015	2.173	2.335	2.501
0.60	31.68	0.05525	3017	2757	.317	.425	.536	.648	.763	.880	1.000	1.123	1.247	1.374	1.505	1.638	1.774	1.913	2.056	2.202
0.70	36.96	0.04975	2716	2456	.283	.379	.477	.578	.680	.784	.891	1.000	1.111	1.224	1.341	1.459	1.580	1.704	1.831	1.962
0.80	42.24	0.04525	2471	2211	.254	.341	.430	.520	.612	.706	.802	.900	1.000	1.102	1.207	1.314	1.423	1.534	1.648	1.766
0.90	47.52	0.04149	2266	2006	.231	.310	.390	.472	.555	.641	.728	.817	.907	1.000	1.095	1.192	1.291	1.392	1.496	1.602
1.00	52.80	0.03881	2092	1832	.211	.283	.356	.431	.507	.585	.664	.746	.829	.913	1.000	1.089	1.179	1.271	1.366	1.463
1.10	58.08	0.03559	1943	1683	.194	.260	.327	.395	.466	.538	.610	.685	.761	.839	.919	1.000	1.083	1.168	1.255	1.344
1.20	63.36	0.03322	1814	1554	.179	.240	.302	.365	.430	.496	.564	.633	.703	.775	.848	.923	1.000	1.078	1.159	1.241
1.30	68.64	0.03115	1701	1441	.166	.222	.280	.339	.399	.460	.523	.587	.652	.718	.787	.856	.927	1.000	1.075	1.151
1.40	73.92	0.02933	1601	1341	.154	.207	.261	.315	.371	.428	.486	.546	.607	.668	.732	.797	.863	.931	1.000	1.071
1.50	79.20	0.02770	1512	1252	.144	.193	.243	.294	.347	.400	.454	.510	.566	.624	.683	.744	.806	.869	.934	1.000
1.60	84.48	0.02625	1433	1173	.135	.181	.228	.276	.325	.375	.425	.478	.531	.585	.640	.697	.755	.814	.875	.937
1.70	89.76	0.02494	1362	1102	.127	.170	.214	.259	.305	.352	.400	.449	.498	.549	.602	.655	.709	.765	.822	.880
1.80	95.04	0.02375	1297	1037	.119	.160	.202	.244	.287	.331	.376	.422	.470	.517	.566	.616	.667	.720	.773	.828
1.90	100.32	0.02268	1238	978	.113	.151	.190	.230	.271	.312	.355	.398	.442	.488	.534	.581	.629	.679	.729	.781
2.00	105.60	0.02169	1184	924	.106	.142	.180	.217	.256	.295	.335	.376	.418	.461	.504	.549	.595	.641	.689	.738
2.10	110.88	0.02079	1135	875	.101	.135	.170	.206	.242	.279	.317	.356	.396	.436	.478	.520	.563	.607	.653	.699
2.20	116.16	0.01996	1090	830	.095	.128	.161	.195	.230	.265	.301	.338	.375	.414	.453	.493	.534	.576	.619	.663
2.30	121.44	0.01919	1048	788	.091	.122	.153	.185	.218	.252	.286	.321	.356	.393	.430	.468	.507	.547	.588	.629
2.40	126.72	0.01848	1009	749	.086	.116	.146	.176	.207	.239	.271	.305	.339	.373	.409	.445	.482	.520	.559	.598
2.50	132.00	0.01782	973	713	.082	.110	.139	.168	.197	.228	.259	.290	.322	.355	.389	.424	.459	.495	.532	.569
2.60	137.28	0.01721	940	680	.078	.105	.132	.160	.188	.217	.247	.277	.308	.339	.371	.404	.438	.472	.507	.543
2.70	142.56	0.01664	908	648	.075	.100	.126	.152	.179	.207	.235	.264	.293	.323	.354	.385	.417	.450	.483	.518
2.80	147.84	0.01610	879	619	.071	.096	.120	.146	.171	.198	.225	.252	.280	.309	.338	.368	.398	.430	.462	.494
2.90	153.12	0.01560	852	592	.068	.091	.115	.139	.164	.189	.215	.241	.268	.295	.323	.352	.381	.411	.441	.473
3.00	158.40	0.01513	826	566	.065	.087	.110	.133	.157	.181	.205	.230	.256	.282	.309	.336	.364	.393	.422	.452

Gradient per cent.	Rise in feet, per mile.	Gross rating = C × tractive effort I / C = T/(Rg+Rt)	Gross rating = T/(Rg+Rt)	Net rating in tons of 2,000 lb. T/(Rg+Rt) − W	1.60 %	1.70 %	1.80 %	1.90 %	2.00 %	2.10 %	2.20 %	2.30 %	2.40 %	2.50 %	2.60 %	2.70 %	2.80 %	2.90 %	3.00 %	Gradient per cent.
0.00	0.00	0.16393	8951	8691	7.409	7.886	8.381	8.887	9.406	9.933	10.470	11.030	11.600	12.190	12.780	13.410	14.040	14.680	15.360	0.00
0.10	5.28	0.12346	6741	6481	5.525	5.881	6.250	6.627	7.011	7.407	7.808	8.225	8.653	9.090	9.531	10.000	10.470	10.950	11.450	0.10
0.20	10.20	0.09901	5406	5146	4.387	4.669	4.962	5.262	5.569	5.881	6.200	6.530	6.870	7.217	7.568	7.941	8.313	8.693	9.092	0.20
0.30	15.84	0.08264	4512	4252	3.624	3.856	4.100	4.348	4.602	4.859	5.123	5.396	5.677	5.964	6.253	6.562	6.869	7.182	7.512	0.30
0.40	21.12	0.07092	3872	3612	3.079	3.278	3.483	3.693	3.909	4.128	4.352	4.584	4.822	5.066	5.312	5.574	5.835	6.101	6.382	0.40
0.50	26.40	0.06211	3391	3131	2.669	2.841	3.019	3.201	3.389	3.578	3.773	3.973	4.180	4.391	4.604	4.832	5.058	5.289	5.532	0.50
0.60	31.68	0.05525	3017	2757	2.350	2.502	2.659	2.819	2.984	3.151	3.322	3.499	3.681	3.867	4.055	4.255	4.454	4.657	4.871	0.60
0.70	36.96	0.04975	2716	2456	2.094	2.229	2.368	2.511	2.658	2.807	2.959	3.117	3.279	3.445	3.612	3.790	3.968	4.149	4.339	0.70
0.80	42.24	0.04525	2471	2211	1.885	2.006	2.132	2.261	2.393	2.527	2.664	2.806	2.952	3.101	3.251	3.412	3.572	3.735	3.906	0.80
0.90	47.52	0.04149	2266	2006	1.710	1.820	1.934	2.051	2.171	2.293	2.417	2.546	2.678	2.813	2.950	3.096	3.241	3.389	3.544	0.90
1.00	52.80	0.03881	2092	1832	1.562	1.662	1.765	1.873	1.983	2.094	2.207	2.325	2.446	2.569	2.694	2.827	2.960	3.095	3.237	1.00
1.10	58.08	0.03559	1943	1683	1.435	1.527	1.623	1.721	1.821	1.923	2.028	2.136	2.247	2.360	2.475	2.597	2.719	2.843	2.974	1.10
1.20	63.36	0.03322	1814	1554	1.325	1.410	1.498	1.589	1.682	1.776	1.872	1.972	2.075	2.179	2.285	2.398	2.510	2.625	2.746	1.20
1.30	68.64	0.03115	1701	1441	1.228	1.308	1.390	1.473	1.560	1.647	1.736	1.829	1.924	2.021	2.119	2.223	2.328	2.434	2.546	1.30
1.40	73.92	0.02933	1601	1341	1.143	1.217	1.293	1.371	1.451	1.533	1.616	1.702	1.790	1.881	1.972	2.069	2.166	2.265	2.369	1.40
1.50	79.20	0.02770	1512	1252	1.067	1.136	1.207	1.280	1.355	1.431	1.508	1.589	1.671	1.756	1.841	1.932	2.023	2.115	2.212	1.50
1.60	84.48	0.02625	1433	1173	1.000	1.064	1.131	1.199	1.269	1.340	1.413	1.489	1.566	1.645	1.725	1.810	1.895	1.981	2.072	1.60
1.70	89.76	0.02494	1362	1102	.939	1.000	1.063	1.127	1.193	1.259	1.328	1.398	1.471	1.545	1.620	1.701	1.780	1.861	1.947	1.70
1.80	95.04	0.02375	1297	1037	.884	.941	1.000	1.060	1.122	1.185	1.249	1.316	1.384	1.454	1.525	1.601	1.675	1.752	1.832	1.80
1.90	100.32	0.02268	1238	978	.834	.888	.943	1.000	1.058	1.118	1.178	1.241	1.305	1.372	1.438	1.509	1.580	1.652	1.728	1.90
2.00	105.60	0.02169	1184	924	.788	.834	.891	.945	1.000	1.056	1.113	1.174	1.234	1.296	1.359	1.426	1.492	1.561	1.633	2.00
2.10	110.88	0.02079	1135	875	.746	.794	.844	.895	.947	1.000	1.054	1.110	1.168	1.227	1.287	1.350	1.414	1.478	1.546	2.10
2.20	116.16	0.01996	1090	830	.708	.753	.800	.849	.898	.949	1.000	1.053	1.108	1.164	1.220	1.281	1.341	1.402	1.466	2.20
2.30	121.44	0.01919	1048	788	.672	.715	.760	.806	.853	.901	.949	1.000	1.052	1.105	1.159	1.216	1.273	1.331	1.392	2.30
2.40	126.72	0.01848	1009	749	.639	.680	.722	.766	.811	.856	.902	.951	1.000	1.050	1.101	1.156	1.210	1.265	1.323	2.40
2.50	132.00	0.01782	973	713	.608	.647	.688	.729	.772	.815	.859	.905	.952	1.000	1.049	1.100	1.152	1.204	1.260	2.50
2.60	137.28	0.01721	940	680	.580	.617	.656	.695	.736	.777	.819	.863	.908	.954	1.000	1.049	1.099	1.149	1.201	2.60
2.70	142.56	0.01664	908	648	.552	.588	.625	.663	.701	.741	.781	.822	.865	.909	.953	1.000	1.047	1.095	1.145	2.70
2.80	147.84	0.01610	879	619	.528	.562	.597	.633	.670	.707	.744	.786	.826	.868	.910	.955	1.000	1.046	1.094	2.80
2.90	153.12	0.01560	852	592	.505	.537	.571	.605	.641	.677	.713	.751	.790	.830	.871	.914	.956	1.000	1.046	2.90
3.00	158.40	0.01513	826	566	.484	.514	.546	.579	.613	.647	.681	.718	.756	.794	.833	.873	.914	.956	1.000	3.00

turntables and, on occasion, heavier rails, additional cross ties and more ballast which may or will have to be provided before the advantages of the more powerful locomotives are available?

There are cases in which heavier power has been urged where, in addition to the above, even the embankments would first have to be strengthened, the excavations widened and the spouts on water tanks and the floors of existing coaling platforms would have to be raised to serve the heavier power, and this on roads having 1 per cent and 1.2 per cent ruling gradients. Suggest that the ruling gradients be reduced from 1 per cent to 0.7 per cent which may frequently be done without unusually heavy expenditure, for the ruling gradients generally occur in few places. In how many minds will this suggestion stir the thought that by this reduction in gradients the same increase in effective hauling power and the same decrease in number of trains will be effected as by the change in locomotives first considered? Or that the locomotives already in service will on the reduced gradients haul in three trains that which they before hauled in four. Should the reduction in gradients be from 1 per cent to 0.5 per cent the increase in hauling power of the present locomotives would be 71 per cent and the decrease in the number of trains required for like tonnage would be 41 per cent. In round numbers 10 trains could do the work which formerly required 17.

The anticipated saving accruing from a reduction in gradients is just as sure of realization and the certainty of predictions based on them is equally as reliable as those based on the increased tractive effort of the locomotive. It would seem logical to first improve, so far as practicable, the line and grades and thereby prolong the period of usefulness of existing power and structures to the fullest. Such improvement is permanent. The beneficial results obtained are unaffected by time and are independent of any other causes. Under present conditions this should be an important factor. On roads that have improved alignment and reduced gradients so far as is reasonably practicable, increased hauling power is properly obtainable through increasing the power of the locomotive. Otherwise there is the question whether to increase the power of the locomotive or to decrease the ruling gradient, and that man who decides this economic point without thorough investigation of each side of the question fails in his duty. Present increased returns is not necessarily economy. Economy is the selection of that thing or process which will perform the required service at the least ultimate cost.

The accompanying table was developed for the purpose of aiding in comparing the relative efficiency of different lines having different ruling gradients and gives a reasonable indication of what may be expected from the reduction of ruling gradients. It is comprehensive in that by means of it a broad field of comparison may be made by inspection without computations. And since it gives an answer in "trains", it offers a means for economic comparisons readily reducible to a money basis. The table is based on the net rating of the U. S. standard light Mikado locomotives. The columns give the effective hauling power (cars and contents, exclusive of engine, tender and caboose) on various gradients referred to the gradient indicated at the top of the column as a basis and which may be considered as 1 or 100 per cent. The lines give the number of trains required on the various gradients referred to the gradient indicated in the first or last column as a basis and which may be considered as 1 or 100 per cent.

For a given gradient divide the ascertained tonnage by the net rating in column five opposite that gradient, which gives the number of trains required to move that tonnage. This number of trains multiplied by the quantity on the same line under any other gradient gives the number of trains required to move a like tonnage on the new gradient.

Thus, in the column headed 1 per cent on the line opposite 0.5 per cent, the effective hauling power on a 0.5 per cent gradient is 1.709 times that on a 1 per cent gradient, or the locomotive is 171 per cent efficient on a 0.5 per cent as compared with 100 per cent on a 1 per cent gradient. Similarly on the line opposite 1.5 per cent, the effective hauling power of the locomotive is 0.683 times that on a 1 per cent gradient, or the locomotive is 68 per cent efficient on a 1.5 per cent as compared with 100 per cent on a 1 per cent gradient.

On the line opposite the 1 per cent gradient under the column 0.5 per cent, it is indicated that for each train on a 1 per cent gradient there will be required 0.585 trains on a 0.5 per cent gradient and under the column 1.5 per cent it is shown that for each train on a 1 per cent gradient there will be required 1.463 trains on a 1.5 per cent gradient.

The table may also be used to suggest reductions in gradients to balance trains for unequal tonnage. Thus say the tonnage is in the ratio of 3 in one direction to 4 in the other and the gradients are 1 per cent in each direction. To what gradient should reduction be made against the heavier traffic to balance the trains? The difference in tonnage is 33⅓ per cent of the lighter tonnage, so the efficiency of the locomotive must be 133⅓ per cent of that on the 1 per cent gradient. In the column for 1 per cent gradient on the line opposite 0.7 per cent is found an efficiency of 134.1. Therefore, a reduction to 0.7 per cent will balance the trains.

Or looking at it the other way: To balance the trains the locomotive should show an efficiency of 75 per cent on the 1 per cent gradient as compared with that on the new grade. On the line opposite 1 per cent 0.746 or 74.6 per cent is found in the column headed 0.7 per cent.

The above may be checked from the net ratings given in column four.

$$\text{Thus:—}\quad \frac{\text{Tons}_1}{\text{Rating}_1} = \text{Trains} = \frac{\text{Tons}_2}{\text{Rating}_2}$$ since the trains must be equal.

$$\frac{3}{1832} = \frac{4}{\text{Rating}_2} \quad \text{therefore} \quad \text{Rating}_2 = \frac{4 \times 1832}{3} = 2442\tfrac{2}{3}$$

but 2,456 is the rating on 0.7 per cent gradient, which indicates that 0.7 per cent in the nearest even one-tenth per cent to the gradient required to exactly balance the trains.

While the table is worked out for the light Mikado it is believed that it will not be sufficiently different from one worked out for other locomotives to make material difference in the results and it therefore will serve generally for a comparison of the efficiency of different gradients.



Train Wreck Caused Through a Turk Panic Results in Many Fatalities Outside Salonika

Railway Developments in Foreign Countries

British Transport Bill Passes to Its Second Reading—The Problem of Unification of the Railways in China

THE BILL proposing the establishment of a Ministry of Ways and Communications in control of practically all means of transportation in the United Kingdom and Ireland, introduced in the House of Commons on February 27, passed to its second reading without a division, and was committed to a standing committee on March 18, following a two days' discussion in the House and a detailed explanation of its terms by Sir Eric Geddes, who is slated to be the first minister.

Strong opposition was presented to the bill on the part of the road transportation and dock interests, both in the press and during the two days' discussion of the bill in the House of Commons, but without effecting a change in the bill or without impeding its progress. This opposition, as has been noted in the *Railway Age*, was chiefly centered around the idea of putting such extensive powers in the hands of one man—more particularly in the hands of a man who was likely to work out the problems concerning the road and dock interests from a railroad point of view.

Labor has been in favor of the bill, one labor member even going so far as to express his approval of it in the discussion because it would represent an important step in favor of ultimate nationalization. J. H. Thomas, member from Derby, and general secretary of the National Union of Railwaymen, said: "So far as the railwaymen were concerned, they would not consent to allow themselves to be sweated simply for the benefit of the traveling public."

The opposition that might have been introduced in the discussion on the part of the railway interests was largely forestalled by a very important change that the government made in the bill before the second reading by way of eliminating the provision that the minister might purchase any railway, etc., on authority of an order in council a draft of which should be laid before both Houses for 30 days, etc. This, it was feared, might lead to nationalization without opportunity for sufficient consideration, and so great was the opposition to the provision that it had to be radically changed.

The clause in question read in brief as follows:

> The minister may be authorized by order in council at any time after the passing of the act to purchase by agreement or compulsorily and work any railway, light railway, canal, waterway, or inland navigation, harbor or dock undertaking.
>
> The minister is also to have power to establish and work any such undertaking, to lease the whole or any part of any undertaking, acquired or established, to purchase privately-owned railway wagons, and to establish and work transport services by land or water.
>
> All such powers are to extend to any shipping or other services carried on as auxiliary to the principal business of the undertaking.
>
> Before an order in council is made a draft must be laid before each House of Parliament, for not less than 30 days, during which it is sitting, and, if either presents an address against it or any part of it, no further proceedings can be taken on it, without prejudice, however, to the making of any new draft order.

The changes mentioned were outlined in Sir Eric Geddes' speech in the following words:

> It was proposed to take any permanent action by order in council. That order in council would be discussed in this House. It was thought that it would afford reasonable facilities for discussion. But in view of the fact that there is undoubtedly a strong feeling in the House against that procedure the Government will now amend clause 4, eliminating the procedure by order in council On the other hand, dealing particularly with the provisions of clause 4, sub-section (1) (e) and (f), as regards (e) the Government will definitely seek power in the bill to acquire by purchase or hire and to maintain, work, or lease privately owned railway wagons on terms, failing agreement to be settled by the Railway and Canal Commission. The government will also seek under the bill powers to prohibit the use of privately-owned wagons in future except under license. It is also proposed to transfer the powers in clause 4, subsection (1) (f), which were permanent powers, and make them temporary powers under clause 3, and to provide that in addition during the two years the minister shall have the right, subject to treasury control, to construct such works as may be necessary. That is really essential, if we are to have powers to carry out the scheme—it may be railway development or something of that kind—which we could not reasonably expect the existing railway companies or other transport agencies to undertake.

Sir Eric Geddes' speech was abstracted very briefly in the *Railway Age* of March 21, page 787. Inasmuch as he spoke an hour and a half it is impossible for lack of space to reproduce what he said in detail. He emphasized the necessity for the bill, by showing that the means of transportation were "financially in a semi-paralyzed state," and brought out the point that the railways which had earned a return of 4.3 per cent before the war were now losing from 3 to 4 per cent, or suffering a loss of £90,000,000 to £100,000,000 yearly. He explained the necessity for a continuance of unified control of the several railroad companies and of the inclusion of all transportation facilities in general and expressed the opinion of the government that it must work out a definite "transportation policy" for after the war. As far as the two years control mentioned in the bill was concerned, he emphasized that this "temporary period of two years" "was really fixed for us by a letter of Mr. Runciman, president of the Board of Trade in the late government, to the railway companies, when he intimated to them that the cabinet approved the continuance of the guarantee for two years after the war." "Two years," he said, "seemed not an excessive time in which to consider in detail the whole of this very complicated problem," and then emphasized that after the government had had this time to consider a definite policy it could not proceed further without authority from the House.

Mr. Shortt, the home secretary, later added along the same line that: "The withdrawal of the system of orders in council made it clear that the question of nationalization or no nationalization must subsequently be determined by the House"; but that Sir Eric Geddes "had also made it equally clear that whether the railways were internationalized or not, they could never again go back to the system of unfettered competition which existed before the war," the last statement being greeted with cheers.

The London Times says editorially that it was not convinced by Sir Eric Geddes' reasons for taking over such extensive and broad powers as are proposed in the bill. Concerning the railroad problem, however, it says in its issue of March 18:

"When Sir Eric Geddes declares that we have no transportation policy, he is on far surer ground, and we are able to agree with him without reserve. If the great programs of reconstruction and betterment are to be carried into effect, the very first necessity is a drastic improvement and development of our facilities of transportation. Such reforms lie at the root of the schemes for better health, better housing, the expansion of our trade, and all the other projects now being hopefully initiated. The government is therefore right to put transportation in the forefront of their legislation for the new era. Their claim that the railways require some form of amalgamation and unification, in order to eliminate wasteful competition and reduce working expenses, is admitted by the companies themselves. We doubt whether there will be effective opposition in any quarter to the proposal to establish some form of state control over the railways. In no other way is real progress now possible. The intense hostility already visible regarding the bill, even in quarters wholly friendly to the government, is not in the least due to the proposal to place a minister in supreme charge of the railways. It arises, in the first place, from the most unwise attempt to subvert the rightful powers of Parliament, and, in the second place, from the vast scope of the bill itself. We

need not dwell upon the clause which originally gave Sir Eric Geddes an unprecedented degree of authority which he was to use by orders in council. The government have promptly amended the clause by eliminating the procedure in council. The storm this provision provoked should be a wholesome lesson. Henceforth, we may be sure, Parliament will watch most vigilantly any fresh proposals to extend the use of orders in council, a medieval expedient which is



Map Reproduced by Courtesy of Asia, Journal of the American Asiatic Society

Map of the Spheres of Influence in China, Showing Also the Railway Lines—Present and Proposed

entirely opposed to the spirit of Parliamentary government in peace time. The powers sought were in any case unnecessary, as the minister showed by implication. The bill is at present really experimental, as it should be. No question of 'nationalization' of the railways, or any other form of permanent control, arises under it. Sir Eric Geddes admitted that he fully agreed with the committee on transport that much more investigation and experience are required before the final shape of state control over the railways can be determined. It is therefore difficult to understand why such autocratic powers were ever introduced into the measure. What will happen, we gather, is that for two years the new Ministry will gradually and tentatively exercise a general centralized control over the railways, with authority to enforce improvements and to check wasteful working. At the end of two years, when the guarantees to the companies expire, Parliament will be invited to consider some scheme of permanent state control. This is the right way to set to work."

The Proposed Unification of Railways in China—Special Correspondence From Peking

PEKING, March 12.

No subject connected with China in recent years possesses more interest for Americans with railway affiliations than the current proposal for a general unification of all railways in China. For over a month, the topic has been discussed officially and unofficially with a great deal of heat,—being opposed by the subsidized Japanese press, the arms of the present government known to be under Japanese influence and by the Chinese press owing allegiance to such officials. The final decision of the cabinet to present the subject at the Paris Peace Conference indicates that Japanese opinion has veered to the support of the proposition, for only two weeks ago, the Minister of Communications announced that if the cabinet should over-rule his opposition, he would resign.

The motives which have impelled the Chinese government to take this step and the bearings which the move has upon American interests are many. It will be recalled that every principal line, except one, in China has been built by foreign money. At the conclusion of the Chino-Japanese war, Russia, Germany and France extorted from China (as a reward, partly, for forcing Japan to forego her claim to the Liaotung peninsula) the privilege of building railways as private ventures. England and Belgium (the latter with French and Russian backing) secured the privilege of lending China money to build railways in the Yang Ste valley and the interior. All of these privileges (it was considered a privilege then, to lend China money) were conceived to give to the nation holding them certain preferred rights in the territory occupied. When it is remembered that extra-territoriality takes foreign law into the interior with the foreign personnel of such railways, it will be appreciated how Chinese feared their sovereignty to be slipping away. Because of this the American government would not be a party to the intrigues for such concessions, and so although American companies first surveyed the Peking-Hankow line, made the first agreements for the Canton-Hankow line and the Tientsin-Pukow line, and later contracted for a line from the Siberian border through Manchuria south to the Gulf of Pechihli, the Americans were obliged to yield in every case, as the alternative to applying the same pressure to China as other nations were doing. By withdrawing thus, they gained the friendship of China, while others gained some part of China—at least so it seemed for the time being.

Each of the lines so built was constructed without any reference whatever to the standards and practices upon the other lines. There are three gages in China—standard, five feet, and metre. There are two heights of drawbar—the American standard and the English standard some five inches higher. The accounts followed the personal preferences of the chief accountant who happened to be employed. The practice thus followed English, German, French, Russian, Japanese, Indian, and purely Chinese practice. Equipment was invariably purchased in the home country of the loaning syndicate. This privilege is a term in every agreement. As a result the statement made by a railway supply man that "there are not films enough in China to take a picture of each of the different types of equipment," is not wide of the mark. This monopoly of the market upon each line possessed by some European country has had the natural result that American manufacturers could never get an order, unless the European factories were "full up." On the purely Chinese lines Americans have been able to get a good share of the orders, but purely Chinese lines are few and short—and there are no American lines.

And up to the present, it looked as if there would never be any American lines. A prominent American contracting firm came to China early in 1916. It had no difficulty in getting an agreement with the Chinese government to build 2,000 miles of line, the routes to be agreed upon later. Then it started out to locate a route. It found one that looked good in south China. But the French protested that they had had a letter from a former vice-minister promising them that route. Another line was located as an extension to the purely Chinese Peking-Suiyuan. But the Russians produced an agreement on the part of China not to build in the direction of the Siberian border without consulting Russia. Then a line into Szechuan was marked down, but the British clearly proved that this was a legitimate extension of a line which they proposed to build some day. There were still other minor projects which met the same fate, until in exasperation the American asked, "Where in hell is CHINA?"

During the past two years, the Japanese have been very industriously complicating the situation with respect to routes, by loaning the Chinese government large sums upon the undertaking to give Japanese contractors the privilege of building along most of these disputed routes. While not a spadeful of dirt has been turned or a blue print made to represent actual attempts at construction, at least $100,000,000 Mex. has been advanced upon such security. The sudden termination of the war with the unexpected victory of the Allies leaves the Japanese with this considerable sum out on very doubtful security. Nevertheless, they have such an influence over Chinese officialdom with a certain nebulous "special position" recognized by other powers, that it is difficult to see how the situation could be cleared up without a wiping of the slate clean.

With the beginning of the Republic modern minded Chinese clearly perceived that some order must be introduced into railway affairs, and straightaway attempted standardization of accounts. With surprising rapidity they succeeded in getting out uniform classifications of capital expenditures, operating revenues and expenses, income account, balance sheet and a form of annual report. An American adviser was employed in this connection, and a successor still keeps American influence present. But a reactionary ministry followed the death of Yuan Shih Kai and seriously crippled the continuation of that work, and it is charged that there are many ministerial orders directing what is in effect a disregard of the classification. At the same time, certain of the lines have maintained their privileges of deviating from the prescribed classifications in a few matters in which they conceived the foreign interest to be affected.

Some attempt has been made during the same period to weld the service of the same lines into a whole. Through passenger tickets were put into effect and a clearing house established to take care of the division of revenue. But

nothing has been done for goods and when the ministry tried to put through a plan for the general interchange of rolling stock during the past summer, the lines would have nothing to do with it. They make the point that the car supply on several lines is so inadequate that to let a car get off from the home line is to lose it forever, and that the types differ so much that not only are there no spare parts suitable for repair, but that the mechanics of foreign lines can not be trusted to make repairs properly. With the purchase of new equipment which will follow the reduction of war prices, this condition will be perpetuated and intensified. The ministry is powerless to prescribe uniform specifications. It can merely recommend them—but the recommendation is very likely to be ignored, for the new specifications will make it more difficult for the home manufacturer to bid successfully on the order.

The only remedy then is at a time when foreign sentiment is lenient toward changes to secure relief from these conditions. The Yunnan, Shantung, South Manchurian and Chinese Eastern lines have never been governed even by the attempts at uniformity which have been described above. They are private lines purely. But to the forward looking, the present situation if continued will be intolerable. Think of it! If a shipment be attempted from no farther than Harbin to Tientsin, at Changchun the cargo must be transferred from a car of five-ft. gage to one of standard gage, at Mukden it must be transferred again from a car with a low drawbar to one with a high drawbar. If the load went on to Shanghai it would have to be lightered across the Yang Ste river, for there is no ferry. What chance is there against water competition in such a situation. If the car were diverted, instead, to Kalgan, it would have to be transferred again at Peking in order to get into a car with air brakes, necessitated by the grades over the Nankow Pass. There is some reason, therefore, to the present objections toward a general interchange of rolling stock.

But in addition, there is the strong political desire of removing the cloud from the Chinese title to these outlying provinces. If, as it is proposed, these lines, government and foreign, all be redeemed by means of a large refunding mortgage, the whole to be under the trusteeship of an international board, the "sphere of influence" will automatically disappear. Right here is the biggest commercial factor in the whole situation. It has been the fashion to rail at the inability of the Chinese to make progress. As a matter of fact they are to be complimented for their ability in preventing progress. The silently pursued goal of the Chinese has been the prevention of foreign investment in anything, either good or bad, because every foreign investment by so much solidified the foreign power in the affected territory. While competitive armaments, competitive propaganda, competition for "places in the sun" were the order of things in China, there was no other way for foreign governments to advance their interests in China, than by "spheres of influence." But every one familiar with the situation knows that the results were not worth the cost. In 20 years of railway competition there were less than 7,000 miles of line built. During the last ten years there has been barely a thousand miles added, and of this a fifth was added by the Chinese themselves. But with the fear of putting themselves in bondage to the foreigner removed, we may expect to see within the next generation some realization of the hopes which have been entertained of the most numerous, the most industrious, the most patient, and the shrewdest of all peoples—the Chinese.

Orders for American Coal

Coal circles in Glasgow and the west of Scotland, says the London Times, are concerned over the report that the Swedish State Railways have purchased 30,000 tons of American coal for delivery over the next few weeks at Gothenburg, and that the Dutch government has bought 50,000 tons for delivery at Rotterdam. It is admitted that the lower free-on-board prices in America may compensate for the higher Atlantic freights, and developments will be closely watched in British centres.

Shortage of Railway Equipment in Germany

The difficulties Germany is having in fulfilling the terms of the armistice as to railroad equipment were shown in an article in the Vossische Zeitung of December 18, 1918, which has been translated and sent to Commerce Reports by Consul Wallace J. Young, Goteborg, Sweden. The article follows:

The new armistice negotiations in Treves make it necessary to publish exact figures regarding all available rolling stock in Germany, as the question of revising the agreement covering the delivery of locomotives and freight cars will be an important part of the negotiations.

The German national railroads are credited with possessing 36,008 locomotives and 782,529 freight cars. As a matter of fact, there are only 30,709 locomotives available at the present time, and according to a count made last October there are approximately 46,000 passenger cars, 12,000 baggage cars, and 459,000 freight cars. The remaining locomotives and cars were lost in consequence of war or are in the occupied districts or in allied or neutral foreign countries, from which it is not probable that they can be returned in the near future. Locomotives that require repairs figure from 30 to 50 per cent of the total. This is due to the strain put upon them by the war. In addition, there are approximately 43,000 freight cars that require repairs.

Railway Traffic Hindered

In consequence of these conditions it has not only been impossible to deliver our rolling stock to the extent that the allies required but the German railway traffic has been seriously hindered. The factories and roundhouses responsible for repairs should not bear the smallest part of the blame for this condition. Their numerous strikes and reduced working efficiency have made it impossible during the last few weeks to accomplish the absolutely necessary work that the changed conditions have brought about. The rolling stock on hand is still further reduced through the necessities of demobilization. To date it has been possible to furnish only 57 trains to return the Western Army from the front and 16 trains for the Eastern Army.

To this we must add the demands made by the Allies. To start with, they require that we return between 20,000 and 25,000 prisoners daily, which will require no less than 14 trains. Then they require the immediate delivery of 5,000 locomotives and 150,000 cars. This was the original demand, which was made even more severe after the conclusion of the armistice. The Entente now demands that 2,000 locomotives be of the heaviest type, 2,000 of heavy type, and 1,000 of a light type, and that the cars include 15,000 passenger cars, 6,500 baggage cars, 60,000 open gondolas, 40,000 covered freight cars and 28,500 cars of a special type.

Confiscated Rolling Stock

The following figures covering confiscated rolling stock prove conclusively that the Allies' demands are far greater than what we secured from enemy countries. From the Belgian railway system, the heaviest type of locomotives comprise only about 9.5 per cent of the total. Among the captured French and Belgian locomotives only 230—that is, 11.3 per cent—were of the heavier type. Among the German locomotives on hand, including those left in Belgium, we figure about 13,500; deducting 40 per cent as unfit for service, there are 8,100 available.

Our booty in Belgian and French railway cars is approximately 100,000 cars, including 9,000 passenger and

baggage cars and 71,000 open and 20,000 covered freight cars. The Allies demand the delivery of 150,000 cars, including 88,500 of the open or of a special type and 40,000 covered. Thus we lose 50,000 more than we confiscated. Herewith it is to be noticed that German freight cars usually have a much larger tonnage than the Belgian. In 1912 only about 45 per cent of Belgian cars possessed a tonnage capacity of 15 tons or more, whereas 85 per cent of German cars have this capacity.

DELIVERY OF EQUIPMENT TO ALLIES

The period set for delivery—that is, the 11th of December—has not been followed. It has become evident that the recent inquiries from the Entente regarding the prompt delivery of this rolling stock does not constitute an ultimatum. The German Armistice Commission has in fact made a counter proposition that will be considered in the new armistice negotiations. It is to be noticed that a not inconsiderable proportion of the rolling stock to be delivered is already in the hands of the Allies, as Germany left no less than 3,000 locomotives and 100,000 cars in the districts since occupied. According to the original demands of the Entente, we would have to deliver 2,000 locomotives and 50,000 cars in 10 days. Such an achievement of transportation, simultaneously with the return of the troops from the western front, would certainly have led to a stoppage of railway traffic to the districts in question. The new negotiations over the extension of the armistice are giving opportunities to get easier terms in the question of delivery.

REPAIRS NECESSARY—FURTHER REDUCTION IN TRAFFIC

According to the new armistice terms, the period for delivery of the locomotives and cars expires on the 16th of January. In the next 10 days 1,000 must be delivered; that is, 100 daily. The delivery of the freight cars also causes extraordinary difficulty. In the next few days 48 full trains must be turned over. This figure becomes 70 very soon. In addition to this, the Allies have shown themselves extremely strict in this proposition and positively refuse to accept anything not in perfect condition. Hence the railway management is forced to turn practically the entire rolling stock to the repair shops to have them put in fit condition to meet the requirements.

It is already customary to work in three shifts in both the railway and private shops. Under these circumstances, it seems absolutely certain that we will not be able to avoid a further reduction in military and passenger traffic. From now on the return of troops will be much slower, owing to the missing rolling stock. The Railway Ministry has instructed all branches to reduce present traffic 50 per cent. The manner of fulfilling this instruction is left to the discretion of the branches. Furthermore, hereafter no one may use the railways without a travel permit. It has not been considered advisable to enforce this restriction in the city of Berlin, but it may still be necessary to insist upon a travel permit even there. At present it seems impossible to make any further saving in freight traffic, inasmuch as it is doing practically nothing but transporting coal and provisions, but one must figure upon having postal matters delayed still more in the future.

An Important Bridge Project in Uruguay

Among the recommendations voted by the Fifteenth Annual Rural Congress of Uruguay, writes Consul William Dawson from Montevideo, was one providing for the building of three bridges, the most important of these being that over the bar of the Santa Lucia river in the vicinity of Montevideo. The width of the river at the point to be bridged is some 500 meters (1,640 feet).

The bridge, which would place the southern part of the Department of San José in easy communication with Montevideo and give new life to the state-owned Ferrocarril del Norte, has been under consideration for a number of years. Some time before the war a definite project was drawn up and contracts for the building of the bridge were let. About $400,000 was expended in the erection of the pillars, the work being done by a Montevideo firm. The superstructure was contracted for with a German firm, which was unable to secure shipment of its materials on account of the war. This contract has since been canceled by the Uruguayan government.

The consulate is informed that no decision has been taken with respect to a second call for tenders and that it is not known whether such a call would be based on the original or new specifications. Copies of the plans used for the first call may be obtained from the Dirección de Vialidad, Ministerio de Obras Publicas, Montevideo, at a cost of 3.50 pesos ($3.62).

Electric Railway Projected from Stockholm to Goteborg

Electrification of all the principal railroads of Sweden is most logical in view of the dearth of coal and the wealth of water power, writes Commercial Attaché Erwin W. Thompson, Copenhagen, Denmark. The plan recently discussed in the Danish press for an electric road connecting Goteborg and Stockholm, is most timely. Goteborg has many advantages as a port for the unloading of freight from the Atlantic, but Stockholm is a more advantageous center for the distribution of foreign goods. The proposed railway should therefore be of advantage to both cities. The following comment on the project appeared in the Berlingske Tidende (Copenhagen) for February 11:

> As economic life in the neutral northern countries resumes normal conditions efforts from all sides are directed toward becoming fully equipped for the enormous boom in commerce and traffic which is prophesied for all these countries. The American plans for making Copenhagen the center of food distribution to the hungry Baltic States have enhanced the expectations. Sweden has great chances for transit traffic in a new big north European main route. An important link in this work is the great plan for building a new electric express from Stockholm to Goteborg, at the head of which is the well-known Swedish traffic expert, Hjalmar Cassel. The present route is old and inadequate, and Mr. Cassel claims that the time is ripe for building a new railway. This would not only take care of the transit traffic between England and Finland-Russia and the express traffic from Stockholm to Goteborg and from Stockholm to Christiania, but also the express traffic south to Denmark and the Continent, and between Denmark, the Continent, and Norway. The new route would mean a considerably quicker connection between Sweden and Finland, Denmark and Norway. This would be of greatest importance in the general scheme for Scandinavian co-operation.

Mexican Government Proposes to Purchase Yucatan Railways

According to advices from Merida, the proposition of the Carranza government to purchase a controlling interest in the United Railways of Yucatan is received unfavorably by several of the larger stockholders of that company. It is considered doubtful if the plan of taking over the property by the government is put through. The system embraces 1,141 miles of road, including many branch lines that gridiron a considerable portion of the more developed parts of Yucatan. Besides affording a direct rail connection from the sea at Progreso to Merida, the chief city, it has a line running south to Campeche, 107 miles. It also extends into the territory of Quintana Roo, which was created out of Yucatan during the administration of the late President Diaz. The United Railways of Yucatan are owned by a syndicate of bankers and sisal fibre growers of Merida.

The announced plan of the Carranza government of constructing a standard gage railroad from Santa Lucrecia, on the National Tehuantepec Railroad, to Campeche, about 450 miles, is the same project which was promoted by a British syndicate eight years ago. The revolutionary troubles put a stop to the scheme. The route of the proposed line is through one of the richest and most remote parts of tropical Mexico.

Notwithstanding the revolutionary disturbances, the con-

struction of a 25-mile railroad from La Capilla, on the Guadalajara-Irapuato division of the National Railways of Mexico, to Lake Chapala has been accomplished. The road was recently opened for regular freight and passenger traffic. It affords a direct rail outlet for one of the most delightful pleasure and health resorts in Mexico.

After a long period of suspension traffic has been resumed on the Guadalajara-Manzanillo line of the National Railways of Mexico. Temporary repairs have been made to the track, bridges and other parts of the road and a large amount of permanent reconstruction work will be done as soon as the materials can be obtained, it is stated. The federal government plans to make important improvements to the port facilities at Manzanillo. In order to develop the transcontinental traffic between Manzanillo and Tampico low freight rates will be established. The line that runs from Guadalajara to Manzanillo was originally a part of the old Mexican Central system.

Railways in Morocco

The study of the Tangier-Fez Railway scheme was suspended at the outbreak of the war, says a recent issue of the Near East, as quoted in Commerce Reports, but lately the project has been taken up again, the plans, etc., have been proceeded with, and actual work has commenced on some sections in the French zone. The construction of the line will presumably be proceeded with as quickly as possible.

The public works in progress in the Spanish zone on the outbreak of the war were harbor works at Laraiche and a railway between that port and Alcazar, both of them in the hands of a German company. The former has been handed over to the Spanish authorities in an incomplete state, and the work on the railway has been practically at a standstill for some time. This railway, as also the Spanish zone section of the Tangier-Fez Railway, with which it will connect, will presumably be pushed on when circumstances permit. A light railway has been built connecting Centa with Tetuan, and a line to join up the latter place with the Tangier-Fez railway is contemplated, but it is not likely to be taken in hand for some time.

Russian Railway Paralysis

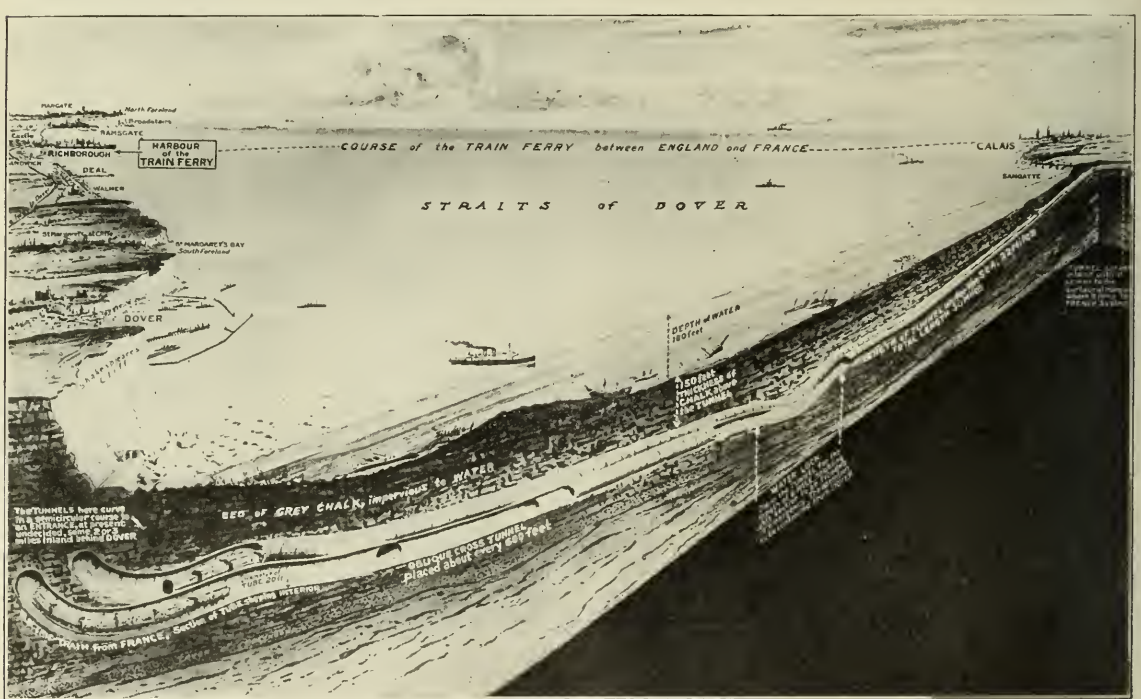
The paralysis of railway communications in the whole of Central and Northern Russia, it is officially admitted in Moscow, is rapidly approaching, writes a correspondent in the Times (London) from Helsingfors, under date of March 5.

The principal cause seems to be the lack of fuel, and then the dearth of skilled workmen for the repair of locomotives, and the huge masses of snow which have accumulated during the winter. From February 26 to March 1 only one passenger train arrived at Moscow from Petrograd, carrying exclusively Bolshevist delegates. On the Moscow-Kursk-Kharkov line many trains have been snowed up for 1 days. The official Severnaya Kommuna publishes an urgent order of the Soviet mobilizing all peasants up to the age of 55 exclusively for obligatory service on the railways.

Exports of Railway Supplies Through New York

Exports of railway material from the port of New York, during February, according to figures of exports compiled by the National City Bank of New York included the following:

Steam passenger cars	$40,708
Steam freight cars	211,151
Car wheels and axles	165,771
Steam locomotives	1,990,171
Railroad spikes	216,497
Steel rails	3,178,224
Switches, frogs, etc	445,933



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A Cross Section of the Proposed English Channel Tunnel

Professional Engineers Given Hearing

THE NEED FOR A CLASSIFICATION and standardization of conditions and salaries for railroad professional engineers was urged by representatives of the American Association of Engineers and the Engineering Council at a hearing before the Board of Wages and Working Conditions of the Railroad Administration at Washington on March 31 and April 1 and 2. The American Association of Engineers, represented by C. E. Drayer, secretary, presented the resolutions and schedule of salaries for engineers adopted at the Chicago conference on March 17, which were published in the *Daily Railway Age* of March 18, and also the following argument in support of its position:

"Two illustrations are mentioned for the purpose of making plain the need. From questionnaires recently sent out, the American Association of Engineers finds that three roads are paying instrumentmen $105 a month, while several other roads are paying the same class of help from $165 to $175 per month. An instrumentman on the Pennsylvania Railroad is doing resident engineer's work, consisting of the construction of engine terminal and is receiving instrumentman's pay.

"The benefits to be derived from classification and standardization are: 1. Elimination of the discrimination that exists between engineers in railroad service. 2. It will permit re-adjustment of salaries and working conditions on a definite and sound basis.

"It is admitted by all that there should be certain definite relations in pay among men who are doing the same kind of work; that there should be certain definite standards whereby a man who is qualified to perform a certain kind of work and does, should receive a certain pay.

"We find on the different roads, from the 1,200 questionnaires sent out and received last week from 60 different roads, that men doing precisely the same kind of work are being paid salaries differing by large percentages.

"The following principles should govern in classification and standardization of positions and salaries: 1. Standard and distinctive details of all positions having similar conditions and working requirements. 2. Definitions of duties and responsibilities of each position. 3. Definitions of classifications and requirements of each position. 4. Placing of positions into classification according to the character of duties and according to responsibility and division of work. 5. Positions of the same kind, made distinctive according to duties and responsibilities, should carry the same rate of pay.

"In view of the data submitted by the American association at this hearing showing lack of uniformity of rates being paid to engineers in railroad service;

"In view of the testimony as to lack of proper consideration of engineers as a class in any of the orders heretofore issued by the board;

"In view of the evidence introduced as to the desirability of defining and standardizing titles and positions,

"We respectfully ask the Board of Wages and Working Conditions to make a thorough investigation of the pay and working conditions of employee engineers of all classes, civil, mechanical, electrical, signal, testing and any others in order that exact justice shall be done.

"We ask that age, seniority, responsibility and ability be given consideration in determining a schedule of wages and in establishing rules governing promotion.

"We ask that the American Association of Engineers be given an opportunity to be represented in the final study of data and in the preparation of the schedule of wages and rules of promotion.

"We ask that a decision be reached as speedily as possible and that the new schedule of wages be made retroactive in the discretion of the board."

The following was also presented on behalf of the Engineering Council by Francis Lee Stuart and Frank H. Clark, of the Railroad Section Committee on Classification and Compensation of Engineers:

"Engineering Council is an organization of national technical societies of America, created to provide for consideration of matters of common concern to engineers, as well as those of public welfare in which the profession is interested, in order that united action may be made possible. The present member societies are the American Society of Civil Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, American Institute of Mining and Metallurgical Engineers and American Society for Testing Materials, representing some 40,000 members. A large number of the members of council's constituent societies are directly or indirectly connected with the transportation system of the country.

"Engineering Council has been advised: first—that engineers and engineering assistants of the more important classes on the railroads have been individually considered as belonging to the officer or supervisory force and certain increases of salary have been granted them by the Railroad Administration; second—that the men in subordinate positions in the civil, mechanical, electrical and signal departments not included in the above class, while not having been given a classification, have been granted certain increases under Order No. 27—Supplements 7 and 8.

"The Engineering Council through this committee desires to express to your board its belief that it is to the best interest both for the social and economic welfare of the railroad professional engineers of the United States that the case of these younger engineers or engineers holding these subordinate positions be further considered.

"Before the war the compensation of the engineers was notably inadequate and the increases which have been granted the men in the subordinate positions do not seem to them sufficient. Engineering Council, through this committee, asks that the employees of the engineering departments—civil, mechanical, electrical and signal, who were not considered in the officer or supervisory force, but who will, from their technical education or training, at some later date occupy the higher positions in these departments, be given a classification and the titles of these positions standardized, and a proper remuneration be given them in order that their physical welfare and mental interest may be provided for so as to insure efficient service to the public.

"The members of the founder societies of Engineering Council have occupied these identical positions in their day and hence speak to you from experience, but we recognize that Engineering Council has not the direct touch with these younger engineers employed by the railroads of the country, to handle the details of the matter in the way you may desire and we are therefore further requesting that your board have the necessary data collected and considered so that it may be certain that this particular class of employee has been treated with justice comparable with other classes of employees who have been given separate classification in the railroad service.

"Associated with Engineering Council in this hearing is the American Association of Engineers, a national engineering organization which includes in its membership a large proportion of the younger engineers in railway service who occupy subordinate positions. The American Association of Engineers has held a conference of railway engineers to consider wage matters, and comes before you with the direct support of the larger proportion of railway engineers in the country."

The clause in the resolutions against overtime pay for supervisory engineers was the subject of considerable discussion. H. E. Stevens, chief engineer of the Northern Pacific, testified regarding conditions in the railroad engineering field as a representative of the northwestern regional director.

General News Department

Pittsburgh to New York, 411 miles, in 11 hours, 20 minutes, is an automobile record recently reported. It was made by J. M Sterling in a Marmon 34 touring car. The average rate is 36.28 miles an hour.

The transportation conference called by the Railroad Committee of the Chamber of Commerce of the United States is to hold its final session at Washington on April 17, at which resolutions will be adopted for presentation at the annual meeting of the Chamber. The conference has already gone on record as favoring the return of the railroads to their owners.

The Interstate Commerce Commission on Thursday issued a modification of some of its rules for the inspection and testing of locomotives, restoring, effective May 1, some of the changes made in September, 1917, to assist carriers in meeting war conditions, but making permanent until otherwise ordered, some of the modifications then made which experience has shown may be retained without adversely affecting safety.

Train robbers stopped St. Louis-San Francisco passenger train No. 801 two miles west of Bridge Junction, Ark., on March 27, and forced the express messenger to open a safe from which they obtained about $6,000. The robbers uncoupled the baggage car and mail coach from the remainder of the train and ran some distance toward Memphis. Then the express messenger and his assistant were forced to turn over currency which they had in the car, and the two bandits got away.

Portable ticket cases are now in use at the Grand Central Terminal, New York City—large cases, each with room for all of the forms used at that station, mounted on casters so that they can be moved from one window to another. This office carries about 3,000 forms and under ordinary arrangements the ticket sellers have to do a large amount of walking from one case to another. In the new cases all very long tickets are folded so as to occupy the minimum amount of space. Each clerk, having a case assigned to his individual use, is provided not only with all forms of railroad tickets but also with Pullman tickets. The standard case, when shut up, is 3 ft. 9 in. wide, 2 ft. deep and 7 ft. high. By making all tickets with stubs, so as to simplify the accounting, one case is used, where necessary or desirable, by two sellers simultaneously. The simplification of the seller's work by the use of these cases has greatly relieved congestion at the ticket windows. The New York Central uses at the Grand Central Terminal 13 ticket windows.

Western Railway Club Will Discuss Electrification

The April meeting of the Western Railway Club will be held at the Hotel Sherman, Chicago, on April 21. W. B. Potter, chief engineer of the Railway and Traction Engineering Department of the General Electric Company, and S. T. Dodd, also of that department, will present a paper on the Electrification of Trunk Line Railroads. The meeting will be held in the Louis XVI room at 8 p. m. and will be preceded by a dinner in the Italian room at 6:30 p. m.

Pacific Railway Club

The April meeting of the Pacific Railway Club was held on the 10th at Oakland, Cal. The transportation of perishable freight was discussed. W. C. Phillips, general superintendent of ice plants of the Pacific Fruit Express, spoke on the production of ice and the icing of refrigerator cars; L. L. Yates, on the construction and maintenance of refrigerator cars; H. Giddings, on the transportation of perishable products; F. B. McKevit, on the assembling and shipment of fruit, and S. M. Fulton, on fruit train schedules.

National Chamber Asks New Trust Legislation

Reconsideration by Congress of all anti-trust legislation is recommended by the Chamber of Commerce of the United States as the result of a referendum vote. The membership of the chamber voted in favor of all of the four proposals advanced: (1) Congress should be asked immediately to consider the present situation of all statutes constituting our anti-trust legislation—for, 1,543; against, 51. (2) In reconsideration of existing legislation there should be formulation of standards of general business conduct, these to be administered by a supervisory body—for, 1,159; against, 389. (3) An enlarged federal trade commission should be made the supervisory body—for, 1,102; against, 437. (4) The membership of the federal trade commission should be increased to nine—for, 1,104; against, 422.

Double Tracking on the Big Four

It was erroneously reported in our issue of March 21, page 781, that 300 workmen engaged in laying a second track on the Cleveland, Cincinnati, Chicago & St. Louis, near Winchester, Ind., had been dismissed by the contractors because the Railroad Administration had held up the appropriation for the work. We are officially advised that if any workmen were dismissed it was because their part of the work had been completed. The work has proceeded without interruption and grading for the second track between Winchester and Union City is over 90 per cent completed and the track is actually in service except for a short distance. Beyond Union City and between that point and Ansonia, grading is about 60 per cent completed and track laying almost entirely completed.

Convention of Master Tinners', Coppersmiths' and Pipefitters' Association

The American Railroad Master Tinners', Coppersmiths' & Pipefitters' Association has announced that the next annual convention will be held on June 2, 3, 4 and 5, 1919, at the Marquette hotel, St. Louis, Mo. The officers of the association are: President, W. J. Moffett (N. Y. C.); first vice-president, G. B. Hosford (M. P.); second vice-president, W. W. Nash (I. C.); third vice-president, T. E. Holderby (C. & O.); secretary-treasurer, O. E. Schlink (C. & O. of Ind.).

Thirteenth Engineers Commended

The enviable record made by the 13th Engineers (railway) in France has earned for this regiment the following letter of commendation issued by Brigadier General Moseley, assistant chief of staff, at the order of General Pershing, commander-in-chief of the American Expeditionary Forces.

The letter says:

"Official report has just been received at these headquarters of the decorations and citations awarded you with the approval of the French High Command by the Commanders of the French Armies, Army Corps, Divisions, Brigades and Regiments under whom your regiment has served during its tour of duty in France. It is very gratifying to know that the efficient service of your regiment has been so recognized and rewarded.

"At the request of the French Government, presented in the spring of 1917, your regiment was organized at an early date and under the most favorable auspices. By reason of the great number of men who presented themselves for service in France and the selection which was thereby made possible, the character and qualifications of the officers and men composing the 13th Engineers were such as to make it a true representative of the very highest type of railway personnel in the United States.

"It was your good fortune to come to France in the formative

period of the American Expeditionary Forces, and you were at once placed on duty with the French Armies in the sector of Verdun—a name which is the apotheosis of the glory and honor of France. Here you took up the task of transporting men, material and supplies to our Allies under conditions of service utterly unlike anything in your previous experience. Railway equipment and methods of operations were entirely new to you, and the situation was made still more difficult by the lack of common language.

"The cheerfulness, the adaptability, the loyalty and the self-sacrificing devotion to duty, uniformly displayed under these trying circumstances by the officers and men from the regimental commander to the most recently arrived private, have added a new luster to the traditions of our railway service.

"I therefore take advantage of this occasion to express to you, and through you to the officers and men of your command, our high appreciation not only of the valuable service rendered by them, but for the great assistance they have been to one of our allies. As a token of its appreciation for these services, the military authorities of the French Republic have awarded you these decorations. These medals and citations should be more highly prized by you when you realize that in receiving them, you have won at the same time the real appreciation and gratitude of the French military authorities under whom you have served.

"By order of Commander-in-Chief,

"(Signed) GEORGE VAN HORN MOSELEY,
"Brigadier General, G. S.,
"Assistant Chief of Staff, G-4."

On February 22, 1919, thirty-one officers and men of the 13th Engineers were awarded the Croix-de-Guerre. The decorations were presented at Simmeilles-Nettencourt by Colonel Boquet, Director General of Military Transports of the French armies, in bestowing the decorations upon the engineers, Colonel Boquet said in part:

"I am very happy to have been directed to hand today the Croix-de-Guerre, which it has been Marshal Petain's good-will to award some of you in accordance with the proposals made by Lieut. Colonel Marchand, Military Commissaire of the Eastern Railroad, and myself.

"These rewards you fully deserve for the untiring zeal and devotion you have shown. . . . I have known the 13th Regiment of American Engineers ever since their arrival in France. I have constantly watched their work and efforts, and I have, better than anyone else, been in a position to appreciate their valor and good spirit."

Those to whom the decoration was presented were:

Colonel N. L. Howard, formerly division superintendent on the Chicago, Burlington & Quincy, at Hannibal, Mo.

Lt. Col. C. E. Whiting, formerly division superintendent on the Chicago, Milwaukee & St. Paul, at Lewistown, Mont.

Major E. Schultz, formerly division master mechanic on the Chicago & North Western, at Chicago.

Captain W. Haberlaw, formerly roadmaster on the Chicago, Rock Island & Pacific, at Rock Island, Ill.

Captain J. W. Kern, formerly supervisor on the Illinois Central at Mounds, Ill.

Lieut. Hugh MacKee.

Lieut. H. Halverson, formerly roadmaster on the Chicago & North Western at Eagle Grove, Iowa.

Lieut. E. E. Deyo, formerly yardmaster on the Chicago Great Western at Oelwein, Iowa.

Lieu. R. Harrisson.
Lieut. L. A. Weary.
Master Engr. F. Williams.
Master Engr. B. Berryhill.
Sergeant L. Face.
Sergeant O. Olsen.
Sergeant H. Lightner.
Sergeant Thomas J. Ross.
Sergeant J. E. Morrel.
Sergeant W. N. MacMahon.
Sergeant A. G. Crozier.
Sergeant W. Dreasher.
Corporal C. T. Barnes.
Corporal W. Lish.
Lorporal W. T. Mott.
Corporal M. H. Bootjer.
Private D. C. Steinmeyer.
Private V. Nicholls.
Private G. Tichy.
Private F. Bitte.
Private E. Vondeveld.
Private W. B. Muller.

Revenues and Expenses for February

Net operating income of the class I roads and 18 switching and terminal companies, as reported by the Interstate Commerce Commission for February, amounted to $10,106,268, as compared with $11,877,297 in February, 1918, and about $47,000,000 in the three-year test period. Operating revenues were $351,946,353, as compared with $290,021,416 in February, 1918; operating expenses were $324,520,617, as compared with $261,344,313; tax accruals were $14,938,289, as compared with $14,498,480, and railway operating income was $12,429,102, as compared with $14,132,407. For the two months, January and February, the net operating income was $28,835,957, as compared with $7,775,227 last year, but about $102,000,000 for the test period.

The eastern railroads for the two months had a deficit of $2,387,383, as compared with a deficit of $34,060,687 in 1918; the southern roads had net operating income of $8,632,827, against $15,360,218, and the western roads $22,590,513, against $26,475,696.

The details, as reported by the Commission, are shown in the double-column table.

RAILWAY REVENUES AND EXPENSES

Item	February				January and February			
	Amount		Per mile of road operated		Amount		Per mile of road operated	
	1919	1918	1919	1918	1919	1918	1919	1918
Average number miles operated	233,045.53	233,499.87	...	...	233,025.28	233,538.73	...	...
REVENUES:	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Freight	241,889,005	198,583,302	1,038	850	519,860,486	387,379,649	2,231	1,659
Passenger	79,115,183	62,294,450	339	267	165,967,004	128,788,320	712	552
Mail	4,165,053	4,382,556	18	19	8,511,096	8,957,445	36	38
Express	7,809,266	9,040,642	34	39	14,144,646	17,837,973	61	76
All other transportation	8,619,895	7,975,660	37	34	18,073,008	15,582,553	77	67
Incidental	9,946,354	7,453,027	43	32	21,423,885	16,330,166	92	70
Joint facility—Cr.	538,520	418,623	2	2	1,119,387	808,471	5	3
Joint facility—Dr.	136,928	126,844	1	1	300,162	250,611	1	1
Railway operating revenues	351,946,353	290,021,416	1,510	1,242	748,798,750	575,433,966	3,213	2,464
EXPENSES:								
Maintenance of way and structures	54,101,638	38,923,338	232	167	112,463,862	79,811,134	482	342
Maintenance of equipment	89,882,609	66,620,506	386	285	189,460,237	133,849,265	813	573
Traffic	3,557,993	4,574,618	15	20	7,050,462	9,493,232	30	41
Transportation	163,919,766	140,524,210	703	602	349,690,296	288,039,127	1,501	1,233
Miscellaneous operations	3,364,093	2,692,722	15	11	6,971,635	5,673,612	30	24
General	10,187,065	8,480,310	44	36	20,417,056	16,949,397	88	73
Transportation for investment—Cr.	492,547	471,391	2	2	893,324	893,679	4	4
Railway operating expenses	324,520,617	261,344,313	1,393	1,119	685,100,224	532,922,088	2,940	2,282
Net revenue from railway operations	27,425,736	28,677,103	117	123	63,698,526	42,511,878	273	182
Railway tax accruals (excluding "War Taxes")	14,938,289	14,498,480	64	62	30,269,147	29,284,494	130	126
Uncollectible railway revenues	58,345	46,216	...	...	116,400	89,031	...	...
Railway operating income	12,429,102	14,132,407	53	61	33,312,979	13,138,353	143	56
Equipment rents	*1,409,454	*1,154,252	*6	*5	*2,235,183	*3,100,857	*9	*13
Joint facility rents (Dr. Balance)	913,380	1,100,858	4	5	2,241,839	2,262,269	10	10
Net of Items 22, 23, and 24	10,106,268	11,877,297	43	51	28,835,957	7,775,227	124	33
Ratio of operating expenses to operating revenues	92.21	90.11	...	...	91.49	92.61	...	...

* Debit item.

REVENUES AND EXPENSES OF RAILWAYS

Month of January, 1919

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Maintenance of: Way and structures.	Equipment.	Operating expenses: Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Virginian	518	$829,661	$52,617	$957,410	$195,738	$239,406	$6,378	$414,765	$16,136	$859,452	89.76	$97,958	$[illegible]5,000	$62,758	—$23,7[illegible]
Wabash	2,519	2,729,812	717,356	3,741,718	512,156	734,610	49,200	2,159,224	111,321	3,584,205	95.79	157,513	96,422	60,[illegible]78	—84,[illegible]43
Washington Southern	35	153,514	240,078	446,806	31,040	33,05[illegible]	2,933	125,587	5,517	199,392	44.62	247,414	7,136	240,278	140,8[illegible]
West Jersey & Seashore	359	299,000	367,356	735,887	220,906	193,255	7,014	480,036	20,870	926,064	125.84	—190,177	40,063	—230,433	—29,[illegible]09
Western Maryland	707	1,153,735	77,413	1,331,668	298,495	434,666	23,136	668,446	42,220	1,476,020	110.99	—146,352	43,200	—189,551	—98,62[illegible]
Western Pacific	1,011	753,237	83,295	870,857	209,332	159,535	13,290	307,236	20,452	724,061	83.14	146,797	37,016	109,770	—133,[illegible]66
Western Ry. of Alabama	133	137,849	72,518	225,899	29,398	48,277	2,944	99,676	7,092	199,699	84.41	32,974	7,590	25,474	—21,126
Wheeling & Lake Erie	511	670,085	43,373	779,417	164,267	289,175	6,525	403,663	28,110	893,220	114.60	—113,803	56,300	—170,103	—88,109
Yazoo & Mississippi Valley	1,382	1,337,913	469,610	1,860,167	299,621	416,107	11,428	783,941	53,183	1,568,215	84.30	291,952	68,066	223,823	—84,414
Wichita Falls & Northwestern	328	92,789	32,321	131,655	35,078	20,871	587	70,914	6,339	133,790	101.62	—2,135	9,070	—11,258	—733

(c) Not operated.

MONTH OF FEBRUARY, 1919

Alabama & Vicksburg	141	144,611	50,366	206,985	37,581	51,421	1,280	101,912	8,304	201,709	97.49	5,185	11,217	—6,056	—26,731
Alabama Great Southern	312	553,617	145,969	735,517	91,803	222,914	12,271	357,874	18,092	703,744	95.67	31,773	24,561	7,205	—120,803
Ann Arbor	301	214,685	48,686	277,548	55,403	45,080	3,456	143,280	11,731	258,958	93.30	18,588	13,100	5,420	34,313
Arizona Eastern	377	268,506	50,063	336,887	72,480	54,614	1,527	99,574	3,726	242,831	72.08	94,055	16,282	77,738	—56,553
Atchison, Top. & Santa Fe	8,635	8,611,298	3,393,459	12,568,683	1,733,208	2,648,862	109,821	4,608,255	270,835	9,340,062	74.31	3,228,622	548,979	2,678,546	337,434
Atlanta & W. Point	93	111,119	88,481	217,638	27,009	39,909	2,835	82,371	6,532	162,259	74.55	55,379	8,500	46,879	6,135
Atlanta, Birmingham & Atl	639	273,177	60,760	358,429	120,584	132,801	6,751	253,913	11,781	496,021	138.38	—137,592	16,000	—153,832	—160,301
Atlantic City	177	89,290	111,393	215,919	36,074	51,384	505	149,774	617	238,432	110.42	—22,513	12,000	—34,513	5,066
Atlantic Coast Line	4,839	2,946,727	1,693,599	4,959,225	769,025	1,001,179	60,575	2,160,934	104,717	4,131,285	83.30	827,940	200,000	626,247	—684,258
Baltimore & Ohio	5,145	7,974,132	2,218,747	11,228,986	2,100,985	4,356,676	146,519	6,179,545	391,670	13,269,919	118.17	—2,040,933	329,771	—371,310	—1,130,401
Baltimore & Ohio Chicago Term	91	.....	.....	103,075	28,933	42,975	1,304	113,048	8,772	199,512	193.56	—96,437	31,876	—128,326	—31,252
Baltimore, Ches. & Atl	87	61,324	24,180	88,963	8,987	15,826	1,919	62,561	3,274	91,566	102.92	—2,604	3,160	—5,764	—20,031
Bangor & Aroostook	632	338,061	59,915	419,074	99,571	110,194	2,854	176,864	13,521	408,027	97.36	11,047	21,000	—9,997	8,857
Beaumont, Sour Lake & Western	118	88,139	19,911	113,483	24,024	19,550	1,096	50,432	4,112	99,213	87.42	14,269	2,700	11,569	—33,114
Belt Ry. Co. of Chicago	31	.....	.....	219,450	27,183	51,003	359	154,247	7,830	240,621	109.64	—21,171	16,442	—37,614	—12,903
Bessemer & Lake Erie	217	578,138	31,913	625,530	81,000	285,995	13,878	275,601	18,081	655,153	104.73	—29,623	14,500	—44,124	3,624
Birmingham Southern	27	37,555	.....	57,972	3,908	6,399	624	27,829	3,364	42,122	72.65	15,850	4,337	11,513	7,857
Boston & Maine	2,258	2,572,076	1,443,985	4,462,979	593,256	1,060,349	36,676	2,780,290	159,972	4,654,525	104.29	—191,546	172,385	—363,932	23,001
Buff. & Susquehanna	296	154,371	6,756	164,286	39,372	73,640	1,846	60,550	7,255	182,664	111.18	—18,379	3,250	—21,628	—54,972
Buff., Rochester & Pitt	589	916,582	114,265	1,067,602	141,768	403,574	13,603	539,293	32,691	1,133,267	106.15	—65,665	27,000	—92,965	—38,111
Brooklyn Eastern District	10	62,541	.....	68,352	16,054	28,179	28	50,035	3,824	98,118	143.54	—29,766	4,970	—34,736	—37,697
Canadian Pac. Lines in Maine	233	266,171	46,652	326,163	34,561	74,857	2,644	200,271	5,435	317,768	97.42	8,395	11,000	—2,605	56,853
Carolina, Clinchfield & Ohio	282	384,111	27,723	420,169	78,215	113,471	4,525	135,527	13,345	344,809	82.06	75,360	16,300	59,048	—36,084
Central of Ga	1,918	915,251	480,967	1,546,001	321,456	361,337	27,154	696,160	58,138	1,461,962	94.56	84,040	22,625	61,302	—440,570
Central of New Jersey	684	2,204,986	516,826	3,002,683	359,568	1,064,039	22,514	1,625,258	83,914	3,166,530	105.45	—163,847	157,689	—321,711	—455,005
Central of New England	301	410,843	22,051	459,431	77,928	118,950	2,278	231,325	13,093	445,040	96.86	14,392	16,000	—1,609	702
Central Vermont	411	256,531	75,630	366,505	36,878	105,076	5,646	264,915	17,908	430,570	117.47	—64,065	17,400	—81,471	22,863
Charleston & Western Carolina	342	169,603	57,412	237,035	42,643	38,284	4,460	113,637	5,405	204,430	86.24	32,605	8,500	24,106	—27,469
Chicago & Alton	1,050	1,276,384	462,414	1,823,758	286,831	474,206	22,660	820,244	45,103	1,659,452	90.99	164,306	55,506	108,740	98,121
Chicago & Eastern Ill	1,131	1,213,925	373,953	1,726,538	305,722	692,171	20,084	875,753	48,921	1,945,273	112.67	—218,735	79,500	—298,530	263,114
Chicago & Erie	269	683,132	59,837	804,897	96,385	138,316	11,159	430,742	32,452	711,595	88.39	93,392	47,465	45,908	122,124
Chicago & N. W	8,090	5,899,923	2,379,883	9,063,485	1,175,790	2,297,688	52,199	4,610,413	246,926	8,450,004	93.23	613,482	475,000	138,105	464,288
Chicago, Burlington & Quincy	9,372	7,351,659	2,306,683	10,479,346	1,313,255	2,120,375	76,182	4,301,151	305,999	8,198,318	78.23	2,281,029	476,182	1,797,750	431,782
Chicago Great Western	1,496	1,084,172	419,668	1,611,063	167,674	408,248	50,802	733,653	42,970	1,394,719	86.57	216,344	68,024	148,214	52,101
Chesapeake & Ohio	2,488	3,516,304	1,002,315	4,796,049	887,909	1,283,424	36,861	2,111,883	113,232	4,464,889	93.10	331,160	166,841	161,992	—509,976
Chicago, Ind. & Lou	657	597,220	179,479	857,079	134,399	200,938	11,702	332,089	22,119	707,615	82.56	149,464	32,501	116,822	75,444
Chicago Junction	12	.....	.....	251,631	74,867	33,213	153	223,932	9,437	341,582	135.74	—89,951	2,156	—92,106	—56,421
Chicago, Milwaukee & St. Paul	10,273	6,923,891	1,989,420	9,816,028	945,394	2,707,165	87,945	4,973,926	287,093	9,071,663	92.41	744,365	553,713	191,488	1,180,135
Chicago, Peoria & St. L	247	84,846	22,324	113,707	37,307	56,382	2,764	75,189	9,994	181,635	159.73	—67,928	7,360	—75,288	—57,933
Chicago, Rock Island & Gulf	474	256,184	77,764	354,328	64,827	54,223	5,625	160,695	11,208	297,543	83.97	56,784	13,155	43,595	—40,745
Chicago, Rock Island & Pac	7,731	5,033,803	2,046,559	7,503,341	1,265,665	1,949,180	88,177	3,539,171	196,152	7,076,696	94.31	427,245	353,327	73,569	—197,205
Chicago, St. Paul, Minn. & Omaha	1,749	1,204,178	520,155	1,853,156	190,342	353,454	21,904	940,772	56,739	1,578,905	85.20	274,251	99,369	174,860	108,897
Chicago, Terre Haute & S. E	374	265,352	20,891	291,941	63,603	143,704	3,378	112,164	10,356	334,696	114.65	—42,755	14,500	—57,256	55,260
Cin., Indianapolis & Western	321	142,290	43,960	206,498	33,085	70,717	4,071	120,661	11,500	240,314	116.38	—33,817	10,243	—44,060	82,142
Cin., New Orleans & Tex. Pacific	337	948,456	281,598	1,294,901	175,353	418,158	22,969	494,325	35,450	1,146,422	88.53	148,480	39,000	109,457	96,110
Cin. Northern	251	173,520	16,089	194,769	39,974	48,884	2,334	69,983	4,543	165,738	85.09	29,031	8,000	21,028	9,776
Cleveland, Cin., Chic. & St. L	2,395	3,445,636	1,108,102	4,970,524	711,427	1,149,258	66,834	2,035,605	90,687	4,088,227	82.24	882,297	185,000	695,658	223,702
Colorado & Southern	1,100	817,955	136,177	980,613	102,372	233,077	8,845	595,015	37,144	771,925	78.71	208,688	47,000	161,517	—80,078
Colorado & Wyoming	41	28,091	1,101	100,403	6,392	16,847	80	48,894	3,873	76,085	75.77	24,318	4,000	20,318	1,572
Cumberland Valley	163	290,919	58,210	374,408	104,062	98,821	6,629	202,931	10,673	423,567	113.12	—49,159	9,429	—58,592	—133,001
Delaware & Hudson Co	868	1,954,293	168,567	2,273,580	362,717	753,806	17,069	1,148,353	110,274	2,425,782	106.69	—152,202	60,000	—216,942	378,401
Delaware, Lackawanna & Western	955	3,878,703	900,865	5,355,451	445,356	1,114,576	40,588	2,358,046	114,435	4,120,499	76.94	1,234,953	340,956	893,851	292,374
Denver & Rio Grande	2,640	1,603,530	368,022	2,103,300	231,522	711,639	13,091	829,068	70,699	1,884,609	89.60	218,691	100,000	118,384	—222,620
Denver & Salt Lake	255	140,903	17,182	165,244	45,653	89,662	680	114,769	4,609	255,373	154.54	—90,129	9,000	—99,131	—17,499
Detroit & Mackinac	381	71,352	23,320	103,665	16,808	36,627	2,886	57,119	12,880	126,321	121.85	—22,656	7,430	—30,086	—21,199
Detroit & Toledo Shore Line	61	159,585	.....	160,707	13,747	13,321	386	46,307	2,831	76,903	47.29	84,705	7,250	77,455	17,393
Detroit, Toledo & Ironton	457	250,136	10,758	283,782	82,871	115,288	2,443	129,751	11,319	341,672	120.39	—57,889	8,532	—66,436	60,025
Duluth & Iron Range	424	135,168	37,139	180,495	40,272	56,259	5,266	88,468	10,005	200,310	110.97	—19,814	10,536	—30,363	—72,293

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of									
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Duluth & Iron Range	292	$94,262	$21,543	$123,439	$41,879	$89,909	$552	$123,585	$14,679	$270,598	219.21	—$147,160	$6,786	—$153,946	—$3,598
Duluth, Missabe & Northern	410	135,313	36,645	193,451	90,786	132,637	1,981	153,005	13,784	393,351	203.33	—199,901	10,914	—210,815	47,919
Duluth, South Shore & Atl	599	219,780	68,639	306,720	62,375	68,133	6,247	188,457	10,353	339,327	110.63	—32,607	19,000	—51,606	6,003
Duluth, Winnipeg & Pac	178	139,810	22,794	169,329	17,298	32,697	3,110	80,554	9,554	147,595	87.16	21,735	8,482	13,246	16,255
East St. Louis Connecting	3	.....	.....	93,522	12,303	29,497	308	61,917	3,071	107,097	114.51	—13,576	2,000	—15,574	5,095
El Paso & Southwestern Co	1,027	805,734	156,331	1,011,243	116,428	179,355	9,923	267,860	24,086	604,918	59.81	409,325	48,364	357,957	—169,647
Elgin, Joliet & Eastern	828	1,552,883	7	1,847,007	133,592	431,898	6,492	647,442	27,473	1,246,794	67.50	600,213	53,250	546,963	613,598
Erie	1,989	4,812,593	880,558	6,335,757	585,543	2,137,819	56,017	3,330,728	200,624	6,356,343	100.32	—20,586	236,897	—258,282	637,638
Florida East Coast	764	473,145	397,841	967,506	154,714	160,392	9,903	455,656	18,659	809,250	83.64	158,257	38,827	119,433	—236,812
Ft. Smith & Western	253	79,125	22,893	111,124	21,695	26,345	5,519	43,477	6,077	101,363	91.22	9,762	5,000	4,762	1,567
Ft. Worth & Denver City	454	597,791	216,496	844,760	104,674	163,967	7,673	314,801	27,790	621,155	73.53	223,604	19,250	204,352	90,797
Ft. Worth & Rio Grande	235	57,326	41,760	105,324	28,835	29,221	626	70,826	5,451	134,959	128.13	—29,635	3,358	—33,190	—60,871
Fonda, Johnstown & Gloversville R. R	88	18,696	57,826	80,378	8,956	8,856	402	34,681	4,569	57,465	71.49	22,914	4,900	18,014	—4,257
Galveston, Harrisburgh & Santa Ant	1,382	1,108,214	397,143	1,570,017	241,728	250,169	20,226	751,874	53,213	1,428,365	90.97	141,652	52,205	89,363	—392,833
Galveston Wharf	13	.....	.....	51,911	11,588	1,002	25	19,681	865	39,761	76.59	12,150	11,400	750	—10,813
Georgia	328	305,166	121,587	463,250	56,623	79,362	6,773	225,836	18,244	387,035	83.54	76,214	5,950	70,263	—65,644
Georgia & Florida	348	55,745	16,591	76,622	25,203	18,439	2,061	45,180	4,676	95,559	124.71	—18,937	4,200	—23,161	—33,539
Georgia, Southern Florida	402	228,738	107,488	366,517	5,943	78,635	5,096	159,027	9,538	312,213	85.18	54,304	13,500	40,699	16,962
Grand Rapids & Indiana	569	377,464	104,189	531,477	97,959	129,727	9,593	277,965	22,848	539,590	101.53	—8,114	25,951	—34,065	—14,324
Grand Trunk Eastern Lines	1,002	1,040,720	152,685	1,329,472	198,622	222,023	15,760	719,974	44,307	1,207,444	90.82	122,028	50,874	70,832	487,742
Grand Trunk Lines in N. Eng	172	234,865	32,586	315,993	97,859	55,640	2,831	205,556	16,643	402,238	127.29	—91,246	11,500	—102,746	34,161
Great Northern	8,252	4,375,254	1,243,972	6,209,835	1,029,871	1,353,623	46,303	3,180,147	145,319	5,836,932	93.99	372,903	489,078	—116,638	458,678
Gulf & Ship Island	307	112,158	38,413	168,300	55,747	33,881	3,351	74,762	8,857	176,940	105.13	8,840	6,661	—15,514	—59,515
Gulf, Colorado & Santa Fe	1,937	982,718	354,523	1,418,517	252,028	187,840	10,351	634,589	40,975	1,125,649	79.35	292,868	71,168	220,465	—113,254
Gulf, Mobile & Northern	424	135,168	37,138	180,495	40,272	56,259	5,266	88,468	10,005	200,310	110.98	—19,814	10,536	—30,363	—72,293
Hocking Valley	350	327,707	79,654	441,056	90,061	270,818	5,900	219,632	20,376	606,221	137.44	—165,165	57,067	—226,395	—181,789
Houston, East & West Texas	190	130,462	36,745	173,060	32,082	34,990	998	80,380	4,137	152,585	88.16	20,475	6,160	14,252	—35,589
Houston & Texas Central	856	426,948	159,524	608,835	127,220	132,647	6,346	277,710	18,407	561,180	92.17	47,655	34,024	13,434	—147,381
Illinois Central	4,782	5,487,671	1,796,091	7,925,216	1,471,834	2,206,978	69,942	3,293,188	226,837	7,245,437	91.42	679,779	424,003	255,310	—702,492
Indiana Harbor Belt	116	.....	.....	445,743	83,445	128,421	1,807	305,848	16,256	535,777	120.19	—90,034	10,104	—100,138	8,432
International & Great Northern	1,159	723,291	233,151	1,029,126	271,197	322,757	11,810	516,973	31,099	1,160,035	112.72	—130,627	30,000	—161,057	—357,403
Kanawha & Michigan	176	158,681	53,171	221,829	43,335	129,482	2,394	108,351	12,571	296,133	133.49	—74,305	17,885	—92,190	—101,977
Kansas City, Mexico & Orient	272	54,291	13,856	72,679	27,094	38,637	656	54,830	8,004	129,220	177.79	—56,541	6,250	—62,791	—29,254
Kansas City, Mexico & Orient of Tex	465	54,682	8,146	67,786	30,063	39,664	552	70,671	7,038	147,986	218.31	—80,201	5,000	—85,201	—74,725
Kansas City Southern	774	887,708	166,344	1,134,305	217,359	268,554	14,797	488,397	44,627	1,031,390	115.83	102,914	61,250	41,023	—332,282
Kansas City Terminal Co	24	.....	.....	97,076	11,534	24,919	.....	56,300	1,037	95,350	98.22	1,726	19,900	—18,179	—19,625
Lake Erie & Western	902	606,761	57,046	693,043	97,580	206,250	11,336	321,406	23,358	658,782	95.05	34,260	25,000	9,252	16,725
Lehigh & Hudson River	96	176,285	3,808	187,362	19,435	36,065	1,971	84,350	5,865	147,686	78.82	39,676	4,500	35,176	45,405
Lehigh & New England	224	143,437	1,440	162,827	34,857	57,656	2,753	90,432	9,217	194,889	119.69	—32,067	8,610	—40,677	—31,021
Lehigh Valley	1,435	3,267,817	382,722	4,101,561	491,289	1,338,611	31,951	2,172,048	94,053	4,143,338	101.01	—41,777	146,725	—188,505	337,693
Long Island	398	358,130	881,470	1,402,621	257,011	269,492	10,661	845,931	45,230	1,442,131	10.281	—39,510	85,804	—125,448	83,639
Los Angeles & Salt Lake	1,168	905,781	324,606	1,305,160	226,871	292,509	10,764	432,575	28,491	1,025,279	78.55	279,880	67,245	212,428	79,031
Louisiana & Arkansas	302	144,366	40,043	189,630	46,194	35,536	5,158	84,049	7,528	178,465	94.11	11,165	11,955	—817	—37,685
Louisiana Ry. & Navigation Co	349	237,980	36,265	284,779	67,496	52,524	3,625	186,320	6,985	316,949	111.29	—32,170	14,000	—46,189	—80,513
Louisiana Western	207	159,114	103,886	270,614	31,556	57,874	4,743	83,874	11,242	191,427	70.73	79,187	9,069	70,117	—99,938
Louisville & Nashville	5,013	5,487,145	2,036,620	7,954,799	1,346,029	2,003,107	115,510	3,285,491	181,998	6,961,325	87.51	993,474	246,768	746,286	—675,756
Louisville, Henderson & St. Louis	199	160,330	55,758	219,768	51,625	27,884	7,480	89,152	7,864	184,004	83.72	35,764	4,000	31,598	—24,361
Maine Central	1,216	868,744	313,982	1,271,707	185,694	339,920	9,292	795,057	35,809	1,365,797	107.39	—94,089	75,623	—169,722	44,364
Maryland, Delaware & Virginia Ry Co	82	50,449	20,685	73,559	6,161	13,338	471	57,496	1,914	79,379	107.91	—5,820	1,733	—7,553	—14,749
Michigan Central	1,862	3,596,645	1,164,469	5,229,848	798,484	1,116,042	58,694	2,134,639	104,645	4,277,434	81.78	952,414	160,000	791,839	501,405
Midland Valley	387	230,449	68,231	309,510	55,679	49,088	2,329	114,878	12,374	234,348	75.72	75,162	6,713	68,166	9,846
Mineral Range	101	74,984	417	77,323	10,650	19,755	354	45,404	992	77,156	99.78	167	3,300	—3,133	3,594
Minneapolis & St. Louis	1,647	614,546	205,133	865,746	186,894	222,465	9,841	523,935	29,709	968,847	111.90	—103,101	53,806	—157,261	—171,707
Minn. & International Ry. Co	194	60,472	20,996	85,374	11,533	13,800	600	56,425	3,551	85,709	100.39	—335	4,178	—4,520	—10,413
Minn., St. Paul & Sault Ste. Marie	4,243	2,111,907	516,225	2,790,644	366,947	672,483	22,381	1,290,090	70,806	2,435,411	87.27	355,233	187,693	167,535	269,282
Mississippi Central	164	40,991	23,860	67,901	19,661	27,308	1,262	33,875	5,374	87,478	128.83	—19,577	3,325	—22,704	—48,358
Missouri & North Arkansas	315	58,482	30,033	94,764	70,907	42,224	2,347	56,332	7,840	179,380	189.29	—84,616	6,242	—90,932	—97,835
Missouri, Kansas & Texas	1,714	1,629,387	612,533	2,374,860	428,798	745,794	23,193	880,495	73,432	2,160,920	90.99	213,940	85,355	128,517	28,332
Missouri, Kansas & Texas of Texas	1,796	1,094,114	536,562	1,741,738	340,816	331,650	14,232	961,028	74,139	1,735,977	99.66	5,961	47,864	—43,228	21,716
Missouri, Okla. & Gulf	332	70,036	16,343	91,526	45,184	37,860	1,672	62,233	5,882	153,039	167.21	—61,513	8,507	—70,389	—54,046
Missouri Pacific	7,108	5,019,704	1,572,365	7,054,732	1,361,110	1,741,220	77,156	3,135,253	194,814	6,537,554	92.66	517,178	260,893	254,027	—880,533
Mobile & Ohio	997	893,062	178,797	1,138,118	215,416	399,964	25,503	531,422	39,289	1,213,073	106.59	—74,956	55,174	—130,158	—109,138
Monongahela	108	215,611	19,234	240 803	40,215	36,412	738	88,586	5,313	171,762	71.32	69,041	5,000	64,022	24,381
Monongahela Connecting	5	.....	.....	174,940	30,497	64,998	511	98,388	6,501	200,896	114.83	—25,956	2,256	—28,212	—10,270
Montour R. R	54	52,677	1,598	61,432	20,339	58,096	1,241	22,823	6,160	108,876	177.23	—47,444	2,315	—47,758	—29,190
Morgan's La. & Texas R. R	400	346,897	160,084	530,965	75,145	127,786	9,356	259,757	18,943	402,950	75.89	38,016	31,033	6,472	—196,629
Nash., Chatt. & St. L	1,247	851,713	41,334	1,369,383	321,788	320,199	30,800	704,190	52,396	1,441,872	105.29	—72,490	50,000	—122,731	—379,632
Nevada Northern	168	111,914	11,709	127,786	17,009	22,972	899	37,633	3,991	82,607	64.64	45,179	18,323	26,856	—46,741
Northern Alabama	112	93,878	12,366	115,149	25,014	6,132	1,270	68,423	1,648	102,487	89.00	12,662	3,400	9,262	—10,335
Newburgh & South Shore R. R	7	.....	.....	127,714	15,614	25,562	.....	60,867	3,153	105,196	82.60	22,218	7,219	14,999	36,526
New Orleans & N. E	203	303,446	98,211	451,359	93,453	161,127	7,585	251,755	14,945	530,739	117.58	—79,380	28,357	—107,758	—179,159

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decrease) compared with last year
		Freight.	Passenger.	Total (inc. misc.)	Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.					
New Orleans Great Northern	284	$122,754	$37,985	$167,335	$36,200	$37,475	$2,367	$70,079	$7,841	$154,341	92.23	$12,994	$12,905	$27	$46,697
New Orleans, Texas & Mexico	191	98,476	27,682	146,277	25,184	34,615	1,264	55,859	5,071	124,026	84.78	22,250	19,000	1,218	—73,800
New York Central	6,075	13,447,557	5,173,518	20,513,580	2,913,812	4,751,071	229,511	9,772,742	590,315	18,592,657	90.63	1,920,923	1,004,920	914,003	44,122
New York, Chicago & St. L.	572	1,766,793	189,766	2,009,538	238,925	357,780	24,800	755,725	52,179	1,431,374	71.22	578,164	55,000	523,164	563,643
New York, New Haven & Hart.	1,965	3,082,651	2,951,698	6,954,768	997,404	1,695,020	34,958	3,843,654	265,317	6,994,162	100.56	—39,394	270,000	309,394	—672,278
New York, Ont. & Western	567	417,714	77,825	615,507	93,479	224,167	7,870	336,510	21,372	683,399	111.03	—67,892	24,700	—92,556	—118,452
New York, Phila. & Norfolk	121	417,012	113,509	576,666	55,076	120,525	9,092	287,635	11,624	498,901	86.51	77,765	17,021	60,745	—9,217
New York, Susq. & Western	135	185,764	48,983	271,377	23,650	52,714	2,062	188,158	7,369	273,953	100.94	—2,576	16,440	—19,048	—1,481
Norfolk & Western	2,086	4,667,754	887,774	5,832,320	758,650	1,657,935	37,001	2,138,158	112,909	4,724,607	81.07	1,107,713	260,000	847,597	131,857
Norfolk Southern	907	305,633	117,047	459,287	101,948	121,975	6,754	238,239	19,125	488,406	106.34	—29,119	20,000	—49,132	—134,277
Northern Pacific	6,366	5,026,366	1,316,572	6,844,713	947,227	1,258,851	61,861	2,595,796	183,036	5,145,682	75.17	1,699,031	509,153	1,189,361	360,314
Northwestern Pacific	507	196,066	130,365	363,072	103,388	58,190	4,117	200,118	12,399	379,876	104.62	—16,804	22,069	—39,056	—94,164
Oregon Short Line	2,347	1,852,310	461,800	2,485,770	498,298	438,930	15,040	847,841	84,950	1,936,787	77.91	548,983	177,964	370,848	—71,289
Oregon-Wash. R. R. & Nav. Co.	2,069	1,279,606	441,561	1,879,162	393,359	319,249	23,798	791,013	95,184	1,652,732	87.95	226,429	114,531	111,632	97,734
Panhandle & Santa Fe	772	274,531	72,786	366,074	112,531	136,225	3,359	214,706	17,257	478,992	130.85	—112,918	16,213	—129,201	—233,443
Pennsylvania Co.	1,754	4,656,918	1,377,991	6,775,759	974,142	2,135,984	69,860	3,558,471	186,932	6,978,329	102.98	—202,571	288,551	—491,291	—605,375
Pennsylvania Railroad	5,360	16,602,487	6,778,894	26,048,657	3,392,082	7,062,100	245,503	12,877,857	751,945	24,804,292	95.22	1,244,365	856,619	386,426	3,643,707
Peoria & Pekin Union	19	35,584	1,967	91,768	14,916	18,418	347	64,581	3,651	101,914	111.05	—10,146	9,500	—19,646	—5,922
Pere Marquette	2,332	1,713,030	345,647	2,236,941	348,860	447,805	26,230	1,037,041	71,313	1,935,450	86.52	301,491	—6,372	307,739	359,717
Phila. & Reading	1,127	3,614,866	709,470	4,695,025	494,976	1,531,219	29,835	2,879,558	128,392	5,080,832	108.21	—385,808	143,228	—529,036	390,492
Phila., Bethlehem & New Eng.	71	.....	.....	67,766	5,366	9,434	309	39,970	1,343	56,321	83.11	11,445	1,633	9,812	—10,399
Pitts. & Lake Erie	224	1,947,216	183,722	2,375,042	476,077	636,180	15,993	789,332	40,099	1,956,149	82.36	418,892	75,500	343,392	145,726
Pitts. & Shawmut	103	66,501	4,704	71,281	28,074	34,605	969	31,416	2,585	97,650	136.99	—26,369	969	—27,337	—22,137
Pitts. & W. Va.	63	77,137	8,574	98,312	60,357	23,365	1,128	42,662	4,978	139,392	141.79	—41,079	10,876	—51,944	—31,005
Pitts., Cinc., Chicago & St. L.	2,387	4,280,250	1,539,766	6,642,521	825,405	2,052,033	73,818	3,329,575	177,110	6,521,853	98.18	120,668	232,228	—112,040	—185,006
Port Reading	21	120,565	.....	245,591	21,932	22,112	20	106,524	224	150,814	61.40	94,777	9,000	85,777	125,59
Richmond, Fred. & Pot.	77	354,290	247,615	628,502	46,157	73,132	5,009	212,543	12,877	359,121	57.13	269,381	13,126	256,252	161,048
Rutland	415	164,387	85,765	298,286	62,941	94,112	8,571	167,438	10,918	343,979	115.31	—45,693	19,059	—64,768	22,076
St. Joseph & Grand Island	258	170,827	34,058	216,861	64,493	26,870	1,600	131,583	10,999	237,091	109.32	—20,229	8,811	—29,040	—62,587
St. Louis, Brownsville & Mexico	548	230,290	114,040	368,627	59,144	58,402	2,789	124,161	14,087	258,583	70.14	110,044	10,000	99,915	—9,858
St. Louis, Merchants Bridge, Terminal	9	.....	783	206,377	52,564	43,873	830	174,799	6,120	279,186	135.27	—72,809	8,000	—80,809	—95,949
St. Louis-San Francisco	4,761	3,868,689	1,576,374	5,797,250	1,033,883	1,267,159	45,008	2,274,962	175,055	4,777,582	82.41	1,019,667	226,997	789,886	552,571
St. Louis, San Fran. & Texas	134	75,142	12,909	94,127	19,538	21,000	753	65,275	5,250	111,818	118.79	—17,691	1,962	—19,664	—45,906
St. Louis Southwestern of Texas	814	346,019	103,774	471,175	145,317	172,765	5,104	207,822	26,697	557,361	118.29	—86,186	21,000	—107,219	—1,906,676
St. Louis Southwestern	93	795,685	135,168	971,498	249,203	251,326	21,947	316,188	43,821	882,131	90.80	89,367	37,149	51,965	—308,048
St. Louis Transfer	6	.....	.....	94,708	9,606	17,265	210	46,266	2,057	75,405	79.61	19,303	100	19,203	6,330
San Ant. & Aransas Pass	732	261,534	74,319	355,924	94,272	99,456	5,838	172,689	18,984	390,867	109.81	—34,943	15,000	—50,006	—70,841
Seaboard Air Line	3,563	2,166,319	903,911	3,368,612	543,154	774,823	64,602	1,644,702	105,366	3,163,176	93.90	205,435	135,000	69,784	—338,238
South Buffalo Ry. Co.	11	38,499	.....	136,469	11,950	18,811	279	56,824	1,432	89,296	65.44	47,172	2,306	44,872	57,388
Southern R. R.	6,982	6,164,215	2,631,292	9,507,704	1,583,333	2,642,014	115,793	4,157,739	267,564	8,809,021	92.65	698,683	322,216	370,101	1,401,766
Southern in Mississippi	278	94,921	46,644	151,164	39,252	15,703	2,067	70,993	4,459	132,475	87.63	18,689	9,000	9,688	—4,473
Southern Pacific	7,049	7,427,350	2,833,277	11,068,001	2,213,902	2,355,227	99,038	4,562,417	293,329	9,730,556	87.91	1,337,444	613,996	720,841	—889,574
Spokane International Ry. Co.	156	46,882	12,307	60,705	8,979	7,287	1,720	24,912	4,506	47,062	77.53	13,643	4,012	9,631	—10,211
Spokane, Portland & Seattle	554	391,409	91,175	520,384	113,604	87,443	4,160	179,270	18,968	405,203	77.86	115,181	59,200	55,946	—128,865
Staten Island Rapid Transit Co.	23	60,914	59,339	144,300	19,692	19,873	984	79,288	8,558	128,375	88.96	15,925	12,000	3,912	47,466
Tennessee Central	293	117,337	40,666	173,269	81,151	75,561	6,009	87,665	6,175	256,561	148.07	—83,292	5,135	—88,427	—87,016
Terminal R. R. Ass'n of St. Louis	36	.....	3,230	283,871	79,489	53,907	835	138,947	7,121	284,029	100.06	—157	28,250	—28,407	—43,344
Texarkana & Ft. Smith	81	86,213	15,643	110,975	34,031	7,549	571	35,273	3,584	70,854	63.85	40,122	6,458	33,650	15,912
Texas & New Orleans	469	357,421	145,468	529,715	113,180	212,216	5,556	217,488	14,945	574,893	108.52	—45,178	21,086	—66,592	—226,947
Texas & Pacific	1,946	1,614,718	621,637	2,367,239	447,466	578,069	24,290	1,308,880	73,777	2,451,929	103.58	—84,690	87,401	—172,100	—537,382
Toledo & Ohio Central	435	447,112	54,156	526,076	107,166	206,765	6,450	240,591	16,176	579,238	110.11	—53,163	30,238	—83,432	7,358
Toledo, Peoria & Western	247	59,778	45,721	112,116	23,491	41,300	2,238	61,318	5,359	133,706	119.26	—21,590	8,500	—30,090	—25,670
Toledo, St. Louis & Western	454	468,325	23,082	511,955	87,800	138,717	6,874	212,660	10,142	456,192	89.11	55,763	26,000	29,659	—8,274
Trinity & Brazos Valley	368	76,876	16,450	98,142	39,903	47,486	1,535	52,757	7,934	149,614	152.44	—51,473	5,715	—57,249	—24,515
Ulster & Delaware	128	35,862	11,573	69,389	10,391	21,544	1,110	50,760	4,632	89,022	128.28	—19,633	4,600	—24,233	—11,112
Union Pacific	3,614	5,706,436	1,369,434	7,615,256	1,034,479	1,462,438	44,121	2,353,287	228,020	5,294,285	69.52	2,320,971	—44,789	2,365,351	1,169,674
Union R. R. of Penna.	35	.....	.....	532,634	60,748	152,617	264	282,746	7,143	503,208	94.49	29,327	6,428	22,899	231,003
Utah Ry.	98	97,712	485	99,134	10,283	25,965	363	18,877	1,860	57,316	57.84	41,789	4,089	37,700	—6,478
Quincy, Omaha & Kansas City	255	49,519	23,039	78,867	25,036	—3,307	363	40,506	1,160	63,568	80.60	15,299	3,003	12,296	21,125
Vicks., Shreve. & Pacific	171	174,955	68,478	264,171	51,550	58,830	2,829	103,494	8,585	226,854	85.87	37,316	9,417	27,899	—30,448
Virginian	518	476,127	48,602	593,609	143,160	276,919	4,014	326,960	15,130	764,948	128.86	—171,339	38,000	—209,339	—369,948
Wabash	2,519	2,464,853	612,106	3,321,093	419,844	745,706	54,773	1,885,276	106,526	3,130,197	97.23	90,896	113,886	—23,073	143,061
Washington Southern	35	144,825	168,446	332,145	28,888	42,611	3,220	110,058	7,424	196,313	59.10	135,831	6,381	129,448	82,407
West Jersey & Seashore	361	242,700	379,504	677,793	185,229	131,811	7,550	422,662	21,795	772,841	114.02	—95,048	40,063	—135,111	—6,363
Western Maryland	707	732,434	73,093	883,077	199,675	314,201	17,594	398,560	42,486	980,842	111.07	—97,764	43,200	—140,964	—13,885
Western Pacific	1,011	627,736	70,623	727,577	235,367	177,685	9,014	283,273	21,057	740,292	101.75	12,716	48,777	—61,508	—209,979
Western Ry. of Alabama	133	118,524	69,492	199,348	23,915	43,503	2,734	82,352	6,533	162,143	81.34	37,205	7,500	29,704	4,376
Wheeling & Lake Erie	511	499,404	45,750	608,263	160,120	196,846	6,582	337,468	23,295	726,477	119.43	—118,213	54,800	—173,013	158,812
Wichita Falls & N. W.	328	111,296	33,135	150,947	61,060	24,949	1,875	57,383	6,043	161,310	106.86	—10,363	9,256	—19,619	3,534
Yazoo & Mississippi Valley	1,382	1,293,922	408,126	1,789,615	311,699	376,326	15,418	694,089	49,588	1,376,795	76.93	412,821	68,468	344,224	4,388

Traffic News

Harry F. Masman has been appointed manager of the Traffic Bureau of the city of Charleston, S. C.

Grain loading for the period from January 1 to March 22 amounted to 247,221 cars, as compared with 266,129 cars in the corresponding period of 1918

In Providence, R. I., sleeping car berths may now be ordered by telephone, on the understanding that payment shall be made at the ticket office within one hour from the time that the transaction by wire is completed. Berths sold in this way cannot be paid for on trains.

The Jackson (Mich.) Traffic Club has elected W. P. Hobart, agent of the American Railway Express Company, president; J. E. Manley, Mott Wheel Works, vice-president; H. A. Plummer, L. H. Field Company, secretary, and J. R. Gibbs, Michigan State Prison, treasurer.

Hearings will be held by the Public Utilities Commission of Illinois on four complaints made by Illinois dealers in sand and gravel against the rates to Chicago. The complaints are filed against the Chicago Switching Committee, the Chicago & North Western, the Chicago, Milwaukee & St. Paul and the Illinois Central.

The Railroad Administration has announced that because of the decision of the Grain Corporation to sell reserve stocks of wheat to local millers, the situation at interior elevators is now in such shape that the permit system on all grains, including wheat, will be temporarily suspended. Grain control committees will, however, be maintained so that further emergencies may be met promptly.

The directors of the Chamber of Commerce of Kansas City, Mo., have adopted resolutions urging the Railroad Administration to take immediate steps to restore railroads and other transportation facilities to private control. The resolution states that the service rendered by transportation facilities under federal control is not up to the standard existing under private control and has not improved, since the cessation of hostilities, to the extent expected.

A decision sustaining the right of the government, under the federal control act, to increase intrastate rates has been handed down by Judge Dickson of the district court of Ramsey county, Minn., in the case of the state of Minnesota against the American Railway Express Company. This decision was made on a motion of the plaintiff for a temporary injunction restraining the express company from charging the increased rates that have been in effect since January 1, 1919.

Production of both anthracite and bituminous coal stands at a total of about 50 per cent of full time output according to reports furnished by the Geological Survey and announced by the United States Fuel Administration. Production has been at a low ebb ever since the signing of the armistice on November 11, and the demand for coal has been gradually falling off, because of the mild winter. Consumers have been using from stocks accumulated last summer and fall, and are still holding back their orders.

At the New York City freight stations of the Pennsylvania Railroad and the Old Dominion Steamship Line a rule has been adopted that inbound freight shall be delivered only to the wagons of the consignee, other wagons being refused permission to enter the piers. It appears that consignees of perishable freight have disposed of goods to retailers before arrival, and the wagons of these retailers have been sent for the freight; and the carriers now say that heavy losses have been sustained by merchandise being wrongfully taken.

There has been a marked decrease in freight traffic in the Central Western region during the past month as compared with the same period last year. The traffic in grain, coal and livestock shows decreases of 27.3 per cent, 38.3 per cent and 18.3 per cent respectively. The roads in this region loaded 32,595 cars of grain during March this year as compared with 44,808 cars during the corresponding month last year; coal cars loaded, 70,791, as compared with 98,700 in 1918; carloads of livestock, 45,120, a decrease from 54,699 last year.

A hearing was held on April 2, before the Western Freight Traffic Committee on an appeal from the decision of the Chicago Eastern and Western District Traffic Committees that Central Freight Association class rates should apply on Illinois intrastate rates instead of the Illinois classification. This appeal has been made by Illinois shippers. R. B. Coapstick, traffic manager of the Indiana Chamber of Commerce, represented the Indiana interests, on whose complaint the decision of the district committees was made. R. W. Ropiequet, representing the Illinois District Traffic League, made the principal appeal for the Illinois shippers. Another hearing was held the following day before the district committees concerning the rates on commodities from and to Indiana points as compared with rates in Illinois. An effort was made by the Indiana Commission to withdraw from the case and let the Indiana Manufacturers' Association take its place as complainant, but inasmuch as the case had been formally heard with the Indiana Commission as complainant and as the case would die if this substitution were to be made, it was unsuccessful. The Indiana Chamber of Commerce includes in its membership individuals and associations interested primarily in this case.

Traffic Through the Sault Ste. Marie Canals

The total freight traffic passing through the American and Canadian canals at Sault Ste. Marie, Michigan and Ontario during the season of 1918 totaled 85,680,327 tons. This is a decrease of 5 per cent, or 4,133,571 tons, as compared with the traffic for the season of 1917. All the items of freight show a decrease, with the exception of oil. The total number of passengers was 34,990, or a decrease of 3,349. The American canal took 85 per cent of the freight, 84 per cent of the net registered tonnage and 23 per cent of the total number of passengers.

Export Traffic

The total number of carloads of export freight on hand at North Atlantic ports for the week ended April 1, was 36,023, compared with 36,250 for the week previous. With a total working capacity of 23,533,000 bushels, there were 20,315,000 bushels of grain in elevators at North Atlantic ports for the period mentioned. At South Atlantic and Gulf ports there were 11,651 carloads of export freight on hand, as against 11,420 cars on March 22.

Great Lakes Commerce Association

This association was organized at Milwaukee, Wis., at a recent conference of representatives of cities located on the Great Lakes. More than 60 delegates representing 18 cities in this district were present. The needs of the Great Lakes for transportation facilities were discussed and a resolution was adopted urging Congress to take steps to provide the facilities needed. A special committee was instructed to confer with the director general of railroads. The officers of the association are W. G. Bruce, Milwaukee, Wis., president; George A. Schroeder, Milwaukee, vice-president; F. E. Williamson, Buffalo, N. Y., vice-president; Frank Barry, Milwaukee, secretary and treasurer.

A Million for Advertising

The expenditure of $1,000,000 for advertising calculated to stimulate passenger travel has been authorized by the Railroad Administration. This money will be expended entirely in newspaper and magazine advertising and informative booklets, and will be devoted entirely to the exploitation of localities and not to the service of individual roads. As the advertising is to be national in character and its management must be closely coordinated, the work will be done under the supervision of the three territorial passenger traffic committees who have been instructed to prepare recommendations as to the localities.

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission has discontinued its investigation, started on February 5, 1912, into the use of passes and free passenger service.

Hearings were held before Examiner Attorney G. U. Brown, of the Interstate Commerce Commission, this week, at Washington, in the railway mail pay case, which has been pending since 1916. The commission is to render a decision as to the rates and as to the merits of the space or weight basis, or both, for compensating the railroads for carrying the mails.

New Classification for Freight Statistics

The Interstate Commerce Commission has called upon all railroads of class 1 and class 2 to report, beginning with January 1, 1919, in their annual reports, the weight of revenue freight transported divided into 59 classes, which will provide information in considerably greater detail than is now required. All commodities are to be stated in tons of 2,000 lb. each. Products of agriculture are divided into 20 classes; products of animals into 12 classes, products of mines into 10 classes, of forests into 2 classes and manufactures into 15 classes. Class 59, headed "Merchandise," is to include all less than carload freight. Under the head of manufactures empty packages are put in a class by themselves. Crude petroleum and salt will be reported under the head of products of mines.

Court News

North Dakota Acts Against Federal Freight Rates

The Supreme Court of North Dakota on April 2 issued a mandamus restraining the Northern Pacific and other roads from charging, within that state, the increased passenger and freight rates established last June by the director general. This action was taken on the application of the attorney general of the state, claiming that the act of Congress of March 21, 1918, did not confer on the president or the director general any authority to interfere with "'lawful police regulations of any state." It is understood that the Railroad Administration will appeal the North Dakota decision to the Supreme Court of the United States.

United States Supreme Court

Compensation for "Transportation of Troops" Within Land-Grant Acts

The Supreme Court of the United States has affirmed the judgment of the Court of Claims (52 Ct. Cl. 226) granting recovery of the 50 per cent deduction made from the Union Pacific's compensation under the land-grant statutes for the transportation of persons alleged to be "troops of the United States." The following classes of passengers were held not to be within the act: Discharged soldiers; discharged military prisoners; rejected applicants for enlistment in the army; accepted applicants for enlistment in the army (being forwarded for final examination and enlistment); retired soldiers and furloughed soldiers. The furloughed soldier is, of course, a part of the army or troops of the United States; but his transportation back to the proper station is held not "transportation of troops" within the meaning of the land-grant acts. The furloughed soldier travels for his own purposes. The government merely advances to him the cost of transportation and subsistence while on furlough, and does this only if the soldier lacks funds to bear the expense himself.—United States vs. Union Pacific. Decided March 31, 1919.

Equipment and Supplies

The Interstate Commerce Commission on Thursday issued a set of regulations prescribing the method of competitive bidding as provided in section 10 of the Clayton Law on all contracts with or purchases amounting to over $50,000 from companies or persons with which there is an interlocking relationship. The carriers and the director general are given until May 15 to file objections. The law has been suspended, but became effective January.

Steel Prices

At the request of Mr. Peek, a meeting was held between R. S. Lovett, Henry Walters and H. B. Spencer, representing the Railroad Administration, and a few of the members of the general committee of the American Iron and Steel Institute, in New York, on Wednesday of this week to discuss the subject of producing costs of certain lines of steel in which the railroads are especially interested. Nothing was given out as to the results of the discussion, but it was understood that the representatives of the Railroad Administration would report at once to Director General Hines.

Locomotive Deliveries Week Ended March 29

The following new locomotives were shipped to railroads under federal control during the week ended March 29:

Works	Road	Number	Type
American	C. M. & P.	21	USRA Mikado.
	P. L. W.	11	USRA Santa Fe
	Erie R. R.	6	USRA Santa Fe
	C. N'w'n.	4	USRA 6W. Sw.
	P. L. W.	2	Santa Fe.
	A. C. L.	2	USRA Pacific
	C. of G.	2	Mallet
	T. & P.	4	USRA 6W. Sw.
	C. & N'w.	1	Mikado.
		53	
Baldwin	C. B. & Q.	2	Mikado.
	P. & L. E.	4	USRA Mikado.
	C. C. & O.	1	Mikado.
	I. C.	1	Mikado.
	A. T. & S. F.	4	Mikado.
	L. V.	2	Pacific.
	G. N.	2	8W. Sw.
	U. P.	1	Pacific.
	O. W. R. & N. Co.	1	
		18	
Total		71	

Car Deliveries Week Ended March 29

New standard cars were accepted during the week ended March 29, as follows:

Road	Number	Type	Manufacturer	Total accepted for given roads
Sou. Pac.	55	50 Ton S. S. Box...	Am. Car & Fdy. Co..	55
C. C. & O.	66	50 Ton S. S. Box...	Bettendorf Co.	228
Sou. Pac.	140	50 Ton S. S. Box...	Haskell & Barker.	189
N. & W.	330	50 Ton S. S. Box...	Pullman Car Co.	730
N. Y. C.	57	70 Ton L. S. Gon...	Pressed St. Car Co...	500
P. McK. & Y.	23	70 Ton L. S. Gon...	Pressed St. Car Co...	23
Total	671			

Cars Constructed in Railroad Shops in February

The Railroad Administration has issued the following statement of new cars constructed in railroad shops during the month of February:

Class of cars	Steel	Steel underframe	Steel center sills	Wood	Total
Freight:					
Stock	..	6	92	9	107
Hopper	..	..	..	56	56
Gondola	..	..	..	24	24
Flat	..	24	..	25	49
Coke rack	..	..	..	4	4
Work car	..	2	..	6	8
Miscellaneous freight cars	..	..	..	3	3
Caboose	12	67	2	2	83
Box	146	16	62	24	248
Refrigerator	..	..	..	..	..
Total freight equipment	158	115	156	153	582

Large Purchases of Ties

The West Coast Lumbermen's Association announces at Seattle, that Oregon and Washington mills have sold to the United States Railroad Administration 175 million feet of Douglas fir ties to be sent by water to the Atlantic Coast; also that 40 million feet of ties have been ordered by French and English railroads. These figures mean about 4½ million ties for American railroads, and one million for Europe.

mechanical interlocking machine for an extension to an existing 52-lever machine at South Norfolk, Va. The extension will have 17 mechanical levers and 7 electrical units.

Delivery of Standard Cars to March 31

The Railroad Administration has compiled the following statement showing the delivery of U. S. R. A. standard cars as of March 31:

Type	Manufacturer	A	C. L.	B. & L. E.	B. R. & P.	C. C. & O.	C. & W. C.	C. & N'w.	C. B. & Q.	C. C. C. & St. L.	C. & S.	Georgia	I. C.	K. & M.
40 Ton D. S. Box	Am. Car & Fdy. Co.		450	...	...	...	...	1,250	500	...	...	...	...	...
40 Ton D. S. Box	Am. Car & Fdy. Co.		300	...	...	...	...	...	...	750	...	...	...	...
40 Ton D. S. Box	Am. Car & Fdy. Co.		200	...	...	...	300	...	...	...	...	...	...	...
40 Ton D. S. Box	Am. Car & Fdy. Co.		...	...	...	...	...	...	...	250	...	...	...	...
Total			...	...	...	...	...	...	...	...	...	...	...	...
50 Ton S. S. Box	Am. Car & Fdy. Co.		...	...	...	...	...	500	...	...	...	...	...	...
50 Ton S. S. Box	Haskell & Barker		...	...	...	...	...	500	...	...	...	300	...	...
50 Ton S. S. Box	Pullman Car Co.		...	...	...	...	...	...	...	...	...	...	...	...
50 Ton S. S. Box	Bettendorf Car Co.		...	...	...	238	...	...	...	...	...	...	...	...
Total			...	...	...	...	...	...	...	...	...	...	...	...
50 Ton Comp. Gon.	Am. Car & Fdy. Co.		...	...	...	...	...	500	250	...	...	...	...	...
50 Ton Comp. Gon.	Am. Car & Fdy. Co.		...	...	...	...	...	...	...	...	...	...	150	...
50 Ton Comp. Gon.	Am. Car & Fdy. Co.		50	...	...	...	...	...	...	...	...	...	...	...
50 Ton Comp. Gon.	Haskell & Barker		250	...	...	...	...	500	...	...	...	...	50	...
50 Ton Comp. Gon.	Pressed St. Car Co.		...	...	...	...	...	...	500	...	...	100	500	...
50 Ton Comp. Gon.	Std. Steel Car Co.		...	...	...	...	...	...	250	...	...	...	300	...
Total			...	...	...	...	...	...	...	...	...	...	...	...
55 Ton St. Hop.	Am. Car & Fdy. Co.		...	250	...	250	...	...	...	200	...	...	...	...
55 Ton St. Hop.	Am. Car & Fdy. Co.		...	...	...	...	...	...	...	...	...	...	150	...
55 Ton St. Hop.	Pressed St. Car Co.		...	...	500	250	...	...	...	200	...	...	200	300
55 Ton St. Hop.	Pullman Car Co.		...	...	300	...	...	...	...	200	300	...	250	...
55 Ton St. Hop.	Ralston St. Car Co.		...	...	...	...	...	...	...	200	...	...	200	200
55 Ton St. Hop.	Std. Steel Car Co.		...	250	...	250	...	...	...	200	...	...	200	...
Total			...	...	...	...	...	...	...	...	...	...	...	...
70 Ton St. Hop.	Pressed St. Car Co.		...	...	...	...	...	...	...	...	...	...	...	...
Total			...	...	...	...	...	...	...	...	...	...	...	...
Grand total			1,250	500	800	988	300	3,250	1,500	2,000	300	400	2,000	500

Type	Manufacturer	L. & N.	M. C.	M. P.	N. C. & St. L.	N. Y. C.	N. Y., N. H. & H.	N. & W.	P. M. & Y.	S. P.	T. & O. C.	Total
40 Ton D. S. Box	Am. Car & Fdy. Co.	...	...	16	...	500	...	...	...	...	...	2,716
40 Ton D. S. Box	Am. Car & Fdy. Co.	...	...	...	...	500	...	...	...	...	250	1,800
40 Ton D. S. Box	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	...	...	...	500
40 Ton D. S. Box	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	...	...	...	250
Total		...	...	...	...	...	...	...	...	...	...	5,266
50 Ton S. S. Box	Am. Car & Fdy. Co.	...	500	...	...	...	...	...	500	100	...	1,600
50 Ton S. S. Box	Haskell & Barker	...	...	...	...	1,000	...	...	...	204	...	2,004
50 Ton S. S. Box	Pullman Car Co.	...	500	...	...	...	...	780	...	...	...	1,280
50 Ton S. S. Box	Bettendorf Car Co.	...	...	...	...	...	...	...	...	...	...	238
Total		...	...	...	...	...	...	...	...	...	...	5,122
50 Ton Comp. Gon.	Am. Car & Fdy. Co.	250	200	...	250	...	...	...	...	...	...	1,650
50 Ton Comp. Gon.	Am. Car & Fdy. Co.	...	...	...	250	...	...	...	...	...	...	400
50 Ton Comp. Gon.	Am. Car & Fdy. Co.	150	200	...	...	...	...	...	...	...	...	400
50 Ton Comp. Gon.	Haskell & Barker	...	200	...	...	...	...	...	...	...	...	1,000
50 Ton Comp. Gon.	Pressed St. Car Co.	400	200	...	500	...	...	...	...	...	...	2,200
50 Ton Comp. Gon.	Std. Steel Car Co.	200	200	...	...	...	...	...	...	...	...	950
Total		...	...	...	...	...	...	...	...	...	...	6,600
55 Ton St. Hop.	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	...	...	500	1,200
55 Ton St. Hop.	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	...	...	...	150
55 Ton St. Hop.	Pressed St. Car Co.	400	...	...	...	500	400	...	...	...	...	2,750
55 Ton St. Hop.	Pullman Car Co.	200	...	...	...	...	500	...	...	...	...	1,750
55 Ton St. Hop.	Ralston St. Car Co.	...	...	...	...	...	200	...	...	...	...	800
55 Ton St. Hop.	Std. Steel Car Co.	400	...	...	...	500	400	...	...	...	...	2,200
Total		...	...	...	...	...	...	...	...	...	...	8,850
70 Ton St. Hop.	Pressed St. Car Co.	...	...	...	...	500	...	...	42	...	...	542
Total		...	...	...	...	...	...	...	...	...	...	542
Grand total		2,000	2,000	16	200	4,500	1,500	780	542	304	750	26,380

Signaling

The Chesapeake & Ohio has placed an order with the Federal Signal Company of Albany, N. Y., for an electro mechanical interlocking machine and other materials for installation at Kenova, W. Va. This machine will have 22 working machanical levers and 18 electric levers.

The New York Central has ordered from the Federal Signal Company of Albany, N. Y., a 68-lever frame style "A" mechanical interlocking machine with 51 working levers for Jordan, N. Y.

The Virginian Railway has placed an order with the Federal Signal Company of Albany, N. Y., for a 24-lever style "A" me-

Heavy Construction.—James O. Heyworth, engineer and general contractor, Chicago, has issued a 64-page album of photographs and short descriptions of various large construction projects carried on by his firm. Among these are included several railway construction contracts.

Pipe Threading Machinery.—An illustrated catalogue of pipe threading and cutting machines and pipe and nipple threading machines has been issued by the Landis Machine Company, Inc., Waynesboro, Pa. The catalogue contains a detailed discussion of all the machines, but aims principally to set forth the distinctive features of the Landis die and chaser as compared with other types. This is known as catalogue No. 25 and copies may be had upon request.

Supply Trade News

The Standard Railway Equipment Company of New York, Chicago and St. Louis has moved its New York offices from the Singer building to the Equitable Trust building.

S. V. Sargent has been appointed district manager of sales of the Chicago Pneumatic Tool Company, Chicago, with headquarters at Boston, Mass., to succeed F. S. Eggleston, who has resigned.

The Pacific Car & Foundry Company, Seattle, Wash., has expended approximately $400,000 in new buildings, tools and equipment in refitting their car building plants situated at Renton, Wash., and Portland, Ore.

The name of the Aspromet Company or Asbestos Protected Metal Company of Pittsburgh, Pa., manufacturer of roofing, siding, ventilators and skylights, was changed to the H. H. Robertson Company, effective April 1.

The Interstate Iron & Steel Company at Chicago has opened a branch office at Detroit, Mich., with R. B. Dutch in charge of sales in that territory. Mr. Dutch has been identified with the iron and steel industry for several years.

C. M. Schramm, chief clerk to the general mechanical superintendent of the Chicago, Rock Island & Pacific, with headquarters at Chicago, has been appointed assistant to the vice-president of the Vapor Car Heating Company at Chicago.

The entire executive staff of the Okonite Company was transferred on April 1 from 501 Fifth avenue, New York, to the company's plant at Passaic, N. J., where the main office will hereafter be located. A sales office will be retained at 501 Fifth avenue, New York.

William K. Stamets, Pittsburgh, Pa., announces the opening of an office in Cleveland, Ohio, under the management of Wm. S. Dickson, formerly general manager of the Greaves Klusman Tool Co., Cincinnati, Ohio. The Stamets organization will represent exclusively the majority of machine tool manufacturers that it now represents in Pittsburgh.

Ensign Donald Walker, U. S. Naval Aviation Corps, died in the Naval Hospital at Key West, Florida, on Monday, April 7, as the result of a fall of an aeroplane, of which he was the pilot, at Miami, Florida, on April 1. He was the son of Edmund H. Walker, vice-president of the Standard Coupler Company and president of the Railway Supply Manufacturers' Association. Ensign Walker was a student at Yale University when he entered the aviation service last year. He was 21 years of age.

The Wetmore Reamer Company is the new name of the Wetmore Mechanical Laboratory Company, of Milwaukee. This company has completed all of its contracts with various munition makers of Canada and this country to whom it supplied Wetmore expanding reamers, hobs, taps, lathe and boring bar tools. Since the completion of this work it has resumed its former tool business, specializing in a type of expanding reamer for all grades of industrial reaming operations. More floor space has been added and the offices enlarged. P. H. Door, recently released from the government service, has joined the organization as secretary and sales manager.

E. I. du Pont de Nemours & Co., Inc., announces the organization of E. I. du Pont de Nemours Export Company, a subsidiary corporation, created for the purpose of handling foreign business, effective April 1, 1919. The officers of the new company are as follows: F. W. Pickard, president; W. S. Gavan, vice-president and director of sales; F. D. Brown, treasurer; Alexis I. du Pont, secretary. The same staff which has previously been associated with the du Pont export business will be continued with some additions made necessary by the broader scope of the new corporation. The main offices will be located at 120 Broadway, New York, with branches in San Francisco, Mexico City, London and Rio de Janeiro.

H. H. Simmons, who has been connected with the Simmons-Boardman publications for the last 10 years, has severed his connection with that company to become associated with John H. Cross in the advertising service business under the firm name of Cross & Simmons, Inc., with offices in the Webster building, Chicago. Mr. Simmons was born at St. Joseph, Ill., on November 14, 1888. He attended the University of Illinois, graduating in civil engineering in 1909, and immediately joining the staff of the Simmons-Boardman Publishing Company. He was first employed as associate editor on news for the *Railway Age Gazette* in the Chicago office, later becoming assistant engineering editor. In May, 1915, he was appointed editor of the Railway Signal Engineer, and continued in active charge of the editorial work of that publication until November, 1917, when he was transferred to the business department of the Simmons-Boardman Publishing Company in the capacity of business manager of the Railway Maintenance Engineer, which position he held until his recent resignation.

D. P. Lamoreux, general manager of the Pratt & Letchworth Company, Ltd., Brantford, Ont., has been elected vice-president of the Canadian Car & Foundry Company, Ltd. Mr. Lamoreux has been connected with the Pratt & Letchworth Company since October, 1916. He was born in Mayville, Wis., December 12, 1873. He received his education at the University of Wisconsin, where he took a course in civil engineering as a member in the class of 1895. After leaving college he spent two years in the maintenance department of the Milwaukee Northern Railway, and the California Oregon Railway, and for the following three years was private secretary to the commissioner of the general land office at Washington, D. C. In 1900 he became associated with the Beaver Dam Malleable Iron Company and worked his way up through that organization until in 1913, when he left to take up another position, he was the company's general manager. During this period, also, he was on the executive and legislative committees of the Wisconsin Manufacturers' Association and for three years of this time, was also regent of the University of Wisconsin. In 1913 he entered the railway supply business in Chicago, and was connected with the Cleveland Steel Company and the Trumbull Steel Company. He became connected with the Pratt & Letchworth company in November, 1916, as general manager.



D. P. Lamoreux

Lieutenant Commander H. J. Elson, U. S. Naval Reserve Force, has been released to inactive status and has resumed his civilian work as secretary and treasurer of the Walter A. Zelnicker Supply Company, St. Louis, with which company he was in charge of internal management and manufacturing operations. Lieutenant Commander Elson was graduated from the U. S. Naval Academy in 1898, and after service in Cuba, the Philippines and China, resigned from the navy in 1902 to become interested in the Zelnicker company. He was chief engineer of the Missouri Naval Militia, with which organization he was mobilized into federal service upon the declaration of war, April 6, 1917. His assignment was as Inspector of Machinery, 9th, 10th and 11th Naval Districts, with headquarters at Chicago, where he had charge of the design and conversion to salt water use of the machinery of great lakes vessels taken over by the Navy, among which were the City of South Haven, Virginia and Puritan, as well as the rehabilitation and design and

installation of new machinery in the ill-fated Eastland, now named U. S. S. Wilmette and called by her crew "The Queen Gun-Boat Cruiser of the Navy."

J. S. Hobson, western manager of the Union Switch and Signal Company at Swissvale, Pa., with office at Chicago, has been elected president of the Massey Concrete Products Corporation of Chicago at the annual meeting of the board of directors, succeeding C. F. Massey, who has been elected chairman of the board. Mr. Hobson began his railway career as an engineer apprentice on the Great Southern & Western at Dublin, Ireland, in which capacity he was employed from 1884 to 1889. He came to this country in 1889 and entered the employ of the Chicago, Burlington & Quincy as locomotive machinist and draftsman. In 1892 he became associated with the Union Switch & Signal Company as a construction foreman in Chicago and St. Louis, and in 1896 he was appointed a signal supervisor on the Michigan Central, with headquarters at Detroit, Mich. The following year he entered the employment of the Atchison, Topeka & Santa Fe as signal engineer, with headquarters at Topeka, Kan., which position he held until 1901, when he returned to the service of the Union Switch & Signal Company as assistant engineer at Swissvale, Pa. In 1904 he was appointed assistant general manager, in which capacity he served eight years until he was promoted to western manager at Chicago. In 1914 he was made general sales manager, and in 1915 general manager, which position he held until 1916, when he was again appointed western manager at Chicago, in which capacity he will continue to serve the Union Switch and Signal Company, combining the duties of that office with those of president of the Massey Concrete Products Corporation.



J. S. Hobson

Federal Liquidating Association, Inc.

The Federal Liquidating Association has been formed to facilitate and hasten the liquidation of reduced, suspended, terminated or canceled war contracts, whether formal or informal.

Brig.-General Hugh S. Johnson will be president of the new association. General Johnson was largely responsible for the organization and administration of the draft and was also largely responsible for the reorganization of the Army supply system, and for the creation of the present system of purchase, storage and traffic. As author of the Army supply system, chairman of the War Department superior board of contract review and director of purchase, General Johnson naturally acquired great familiarity with the department's contracts.

Lieut.-Colonel R. H. Montgomery, of the accounting firm of Lybrand, Ross Bros. & Montgomery, who was a member of the War Department board of appraisal and of the War Industries Board price fixing committee, will have charge of the accounting for the association.

The officers of the Association for Manufacturers of War Material, whose efforts resulted in the passage of the war contracts validation bill, will share in the direction of the association. These are W. S. Symington, president of the Symington Chicago Corporation; C. J. Symington, president of the Symington Machine Corporation, and H. H. Dinneen.

The Washington headquarters of the association, Munsey building, Washington, D. C., will keep in close touch with the various governmental departments, presenting the contractors' point of view and attending to the expedition and presentation of all matters pending.

Local offices have been established at each of the following points selected because of their convenience to local boards of adjustment: New York, Boston, Philadelphia, Baltimore, Rochester, Pittsburgh, Cleveland, Detroit, Bridgeport, Cincinnati, Chicago and St. Louis. Each local office has a business manager, an accounting and engineering department, a local counsel and a competent office personnel.

The plan of having accounting engineering and legal departments is not intended to restrict the use by contractors of their own experts in these lines.

Trade Publications

Duff Jacks.—The Duff Manufacturing Company, Pittsburgh, Pa., has issued a new 16-page catalogue listing the various types of bridge, track and car jacks and other equipment manufactured by that company. The jacks are catalogued in regular order with a small illustration, short description and table of capacities and limiting dimensions of each type.

Frogs and Crossings.—The Indianapolis Switch & Frog Company, Springfield, Ohio, has issued a 12-page leaflet of information on its products, with special reference to solid cast manganese frogs for turnouts and crossings and solid manganese crossings, including the Eymon continuous crossing and the Balkwill articulated cast manganese crossing.

Reclaiming Railroad Frogs.—The Air Reduction Sales Corporation, New York, has issued a 24-page booklet illustrating and describing the process of reclaiming railroad frogs by the oxy-acetylene process. The process is described in detail, with diagrams and photographs. Considerable cost data and material and service records are also given.

Overhead Carrying Systems.—Catalogue 50, issued by the Coburn Trolley Track Manufacturing Company, Holyoke, Mass., manufacturers of overhead carrying systems for both "round trough" and I-beam, shows price lists, illustrations, plans and dimension drawings of overhead carriers and their details. The catalogue contains 56 pages, 8½ in. by 11 in. and illustrates a number of actual installations.

Pumping Machinery.—The National Transit Company, Oil City, Pa., manufacturers of special machinery to meet the requirements of pipe line companies, has begun the manufacture of other machinery for general service, including pumping machinery, gas and oil engines, which together with old lines are illustrated and described in various bulletins. These have been bound in heavy manila covers in such a way that others may be added from time to time as they are issued.

Twist Drills, Reamers, Etc.—A machinists' supply catalogue, No. 91, listing carbon and high speed twist drills and reamers, screw and drop forged wrenches, spring cotters and keys, etc., has been issued by the Whitman & Barnes Manufacturing Company, Akron, Ohio. The catalogue contains 183 pages and a distinctive feature of it is a thumb index marked to show the products listed in the various sections, making it an easy matter to find desired information.

Saw Mill Machinery.—The American Saw Mill Machinery Company, New York, has issued an attractive 48-page booklet under the title "How Americans Helped to Win the War," which contains an illustrated account of the part that saws and woodworking machinery played in the war, both in the construction of camps, ships, hospitals, etc., on this side and abroad and in connection with American lumbering operations in the French forests. A large number of photographs show the uses of this equipment under a wide variety of conditions, while in the latter part of the book appear reproductions of letters of commendation by contractors and others who used the equipment.

Repair of the German Ships.—A booklet of 24 pages, telling of the remarkable work of repairing and reclaiming by Plastic-Arc welding 288,780 gross tons of interned German ships which had been damaged apparently beyond repair by their German crews, is being distributed by the Wilson Welder & Metals Company, New York, manufacturers of the Plastic-Arc welding apparatus. Included in the booklet is the report of this work by the Secretary of the Navy, a description of the Wilson system of welding, and an article reprinted from Iron Age, entitled The Part of Electric Welding in Repairing the Damaged Ships, by Captain E. P. Jessop, U. S. N., who recommended that the broken cylinders be repaired by welding. The text is well illustrated.

Financial and Construction

Railway Financial News

BALTIMORE & OHIO.—See Staten Island Rapid Transit Company.

CHICAGO & NORTH WESTERN.—At the annual stockholders' meeting, John V. Farwell, Edward M. Hyzer and Homer A. Miller declined re-election, and were succeeded by Childs Frick, James A. Stillman and Samuel A. Lynde. The other directors whose terms had expired, Chauncey M. Depew, Henry C. Frick and David P. Kimball, were re-elected. The stockholders ratified the directors' acceptance of the government contract.

NEW YORK CENTRAL.—R. S. Lovett and Carl R. Gray have been elected directors to succeed C. B. Seger, resigned, and W. H. Newman, deceased.

NEW YORK, ONTARIO & WESTERN.—The payment of dividends on the common stock has been deferred until compensation for 1918 is received from the Railroad Administration.

NORFOLK & WESTERN.—See editorial comment elsewhere in this issue.

SOUTH CAROLINA & GEORGIA.—J. P. Morgan & Co. have announced that arrangements have been made by the Southern Railway, with the consent of the director general of railroads, to offer to holders of $2,250,000 South Carolina & & Georgia first mortgage 5 per cent bonds, falling due May 1, the right to extend their holdings for ten years with interest at the rate of 5½ per cent. Holders of the maturing issue may at the same time receive a cash payment of 2¼ per cent, so that the extended bonds will net them 5.80 per cent. Holders who do not extend will be given par and interest for their bonds at maturity.

SOUTHERN PACIFIC.—Samuel Rea, president of the Pennsylvania Railroad, has been elected a director to succeed W. B. Scott, a federal manager in the Southwestern Region, and Paul Shoup, vice-president of the Southern Pacific, has been elected to succeed William Sproule, district director of the Central Western Region.

SOUTHERN RAILWAY.—See South Carolina & Georgia.

STATEN ISLAND RAPID TRANSIT COMPANY.—The New York Public Service Commission has adopted an order permitting this company to issue at not less than par and interest $1,150,000, 4 per cent refunding bonds, due June 1, 1948, interest payable semi-annually. The bonds are redeemable at par and accrued interest on and after June 1, 1925. The issue is secured under the company's $5,000,000 refunding mortgage, executed June 1, 1905, to the Guaranty Trust Company of New York, as trustee. The proceeds are to be applied for the discharge or refunding of an equal amount of the company's obligations to the Baltimore & Ohio Railroad, for the acquisition and improvement of its property. The application stated that the Staten Island Rapid Transit Company was indebted to the Baltimore & Ohio to the amount of $1,625,000.

Railway Construction

LEHIGH VALLEY.—This road has awarded a contract to the Roberts & Schaefer Company, Chicago, for the construction of a 750-ton capacity, four track, automatic electric, reinforced concrete locomotive coaling plant and a 750-ton storage reinforced concrete sand handling plant at Ashmore, Pa. The contract price is $75,000 and installation will begin immediately.

TEMISKAMING & NORTHERN ONTARIO.—Separate bids are wanted for each section, April 15, by W. H. Maund, secretary-treasurer, Toronto, Ont., for the construction of the roadbed, except steel bridges, on the section between Swastika and Kirkland lake, 6 miles, and between Timmins and the Mattagami river, 2 miles. Separate bids for each section are also wanted for track laying, ballasting and fencing.

Railway Officers

Railroad Administration

Central

Swagar Sherley, who has been appointed director of the Division of Finance of the United States Railroad Administration, as was announced in our issue of March 14, page 596, was born on November 28, 1871, at Louisville, Ky., and graduated from the University of Virginia in 1891. He is a lawyer by profession, having begun practice in 1891, at Louisville. He has been a member of Congress since 1903, and for a number of years has been a member of the House Appropriations Committee. Mr. Sherley was chairman of that committee in the Sixty-Fifth Congress, and, effective about April 15, will enter upon his duties as director of the Division of Finance, to succeed **John Skelton Williams,** resigned.



Swagar Sherley

Regional

Harry M. Adams, whose appointment as traffic assistant to the regional director of the Southwestern region, with headquarters at St. Louis, Mo., was announced in the *Railway Age* of March 28 (page 860), was born at Camanche, Iowa, on January 3, 1867. He entered railway service in 1880 with the St. Louis-San Francisco as messenger at Cherryvale, Kan. He later held various positions on the Kansas City, Fort Scott & Gulf and the Southern Kansas and the Oregon Railway & Navigation Company. From 1889 to 1890 he was consecutively division baggage agent and advertising agent of the Union Pacific at Portland, Ore. After 3 years in other business and a year in South America he entered the traffic department of the O. R. & N. in 1894. On May 15, 1902, he was promoted to assistant general freight agent, with headquarters at Portland, Ore., and on June 18, 1905, left the Oregon Railway & Navigation Company to become assistant traffic manager of the Great Northern, with headquarters at Seattle, Wash. From December 1, 1907, to June 30, 1910, he was general freight and passenger agent of the Spokane, Portland & Seattle, at Portland, and from the latter date until March, 1914, freight traffic manager of the Western Pacific. On August 1, 1913, he was appointed also freight and traffic manager of the Denver & Rio Grande. In March, 1914, he was also appointed general traffic manager of the Missouri Pacific and the St.


H. M. Adams

Louis, Iron Mountain and Southern, and in May, 1914, he resigned as freight traffic manager of the Denver & Rio Grande. In May, 1917, he was elected vice-president in charge of traffic of the Missouri Pacific system, with headquarters at St. Louis, Mo. In January, 1918, Mr. Adams was appointed director of inland transportation of the war department, with offices in Washington, D. C., in which capacity he served until his recent appointment.

Federal and General Managers

George B. Perkins, who has been appointed assistant federal auditor of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., was born in Cincinnati, Ohio, on August 5, 1865, and received his education in the Woodward High School of that city. He entered railway service in the maintenance department of the Pittsburgh, Cincinnati, Chicago & St. Louis in 1890, remaining with that road until 1892 and then entering the employment of the Cincinnati, New Orleans & Texas Pacific in the engineering department. The following seven years he was engaged in the commercial field in Cincinnati, Ohio, and Kansas City, Mo. He reentered railway service in July, 1901, as a clerk in the accounting department of the Kansas City, Fort Scott & Memphis which position he held until the consolidation of that road with the St. Louis & San Francisco in September, 1901, when he was transferred to St. Louis, Mo. From that time to June, 1911, he was consecutively clerk, statistician and general bookkeeper for the St. Louis-San Francisco, resigning in the latter year to engage in agricultural work at Portland, Ore. One year later he entered the service of the Spokane, Portland & Seattle and in January, 1914, he was employed by the Interstate Commerce Commission as examiner of accounts, in which capacity he served until April, 1918, when he resigned to enter the employ of the St. Louis-San Francisco as special accountant. On August 1, 1918, Mr. Perkins was appointed assistant auditor, in which position he served until his recent appointment as above noted.

J. A Somerville, whose resignation as general superintendent of transportation of the Missouri Pacific, the Memphis, Dallas & Gulf, the Arkansas Central and the Natchez & Southern was announced in the *Railway Age* of April 4 (page 923), has been appointed general manager of the Texas & Pacific, the Trans-Mississippi Terminal, the Weatherford, Mineral Wells & Northwestern, the Gulf, Texas & Western, the Denison & Pacific Suburban and the Fort Worth Belt, with headquarters at Dallas, Tex. He was born at Carthage, Ill., on November 25, 1867, and received his education in the public schools of that place. He entered railway ervice on November 17, 1887, and was employed up to 1897 in the local office and yard of the Chicago, Burlington & Quincy at Keokuk, Ia. From that time to 1899 he served as general agent at Hannibal, Mo., and the following year as local agent at St. Louis, Mo. From 1900 to 1902 he was contracting freight agent at St. Joseph, Mo., and the next year became chief clerk to the general freight agent at St. Louis. In 1903 he was promoted to general agent, with headquarters at Keokuk, which position he held until 1905, when he became superintendent of terminals of the same road, with headquarters at St. Louis. The next five years he held the position of superintendent of the terminal division of the Missouri Pacific, with office at Kansas City, Mo., after which time he was appointed superintendent of transportation of that road and the St. Louis, Iron Mountain & Southern, with headquarters at St. Louis.



J. A. Somerville

Upon the resignation of E. F. Kearney in May, 1913, as general superintendent of transportation of the Missouri Pacific, the Memphis, Dallas & Gulf, the Arkansas Central, the Natchez & Southern and the Natchez & Louisiana, Mr. Somerville was promoted to that office. When the office of superintendent of transportation was abolished on January 15, 1917, he was promoted to general superintendent of transportation, with the same headquarters and in June, 1917, he was temporarily assigned to the commission on car service of the American Railway Association at Washington, D. C., in which capacity he served until January, 1919, when he resigned to return to his former position as general superintendent of transportation at St. Louis, in which position he remained until his recent appointment as general manager of the Texas & Pacific.

The jurisdiction of **G. L. Peck,** federal manager of the Pennsylvania Railroad, Western Lines, and associated lines, with headquarters at Pittsburgh, Pa., has been extended over the Wheeling Terminal Railroad, which line is released from the jurisdiction of **C. W. Galloway,** federal manager.

Operating

George Masten has been appointed superintendent of the Norfolk & Portsmouth Belt Line Railroad, with office at Portsmouth, Va., vice **W. A. Gore,** transferred.

L. R. Taylor has been appointed superintendent of the New River division of the Virginian Railroad, with headquarters at Princeton, W. Va., vice **H. W. Sheridan,** deceased.

J. B. McMann, superintendent of the Bangor & Aroostook, with office at Houlton, Me., has been transferred to the Southern division, with office at Bangor; **J. P. Darling,** trainmaster, has been appointed superintendent of the Northern division, with office at Houlton, Me. **F. A. Andrews,** superintendent at Bangor, has been appointed trainmaster of the Southern division, with office at Millinocket, and **Joel H. Curtis,** trainmaster of the Southern division, has been transferred to the Northern division, with office at Houlton, Me.

W. C. Ennis, division superintendent of the Chicago, Milwaukee & St. Paul, with office at Miles City, Mont., has been appointed assistant superintendent of the Coast division of the Tacoma Eastern Railroad, and that part of the Columbia division west of Othello, with headquarters at Seattle, Wash. **W. S. Johnson,** trainmaster on the Coast division, has been appointed trainmaster of the Columbia division, vice **T. E. McFarlane,** who has been appointed assistant trainmaster and traveling engineer of the Idaho division, vice **H. R. Calehan,** assigned to other duties. The position of trainmaster on the Coast division has been abolished.

Financial, Legal and Accounting

L. S. Smith, acting federal treasurer of the Texas & Pacific, with office at Dallas, Texas, has had his jurisdiction extended over the Fort Worth Belt.

E. K. Scott has been appointed federal auditor of the Kentucky & Indiana Terminal Railroad, with office at Louisville, Ky., vice **C. R. Arnold,** resigned.

The jurisdiction of the following Texas & Pacific officers has been extended over the Fort Worth Belt and the International & Great Northern (Spring to Fort Worth and Madisonville branch): **George Thompson,** general solicitor; **A. J. Biard,** federal auditor, and **W. L. Holder,** land and tax commissioner; all with headquarters at Dallas, Texas.

Traffic

E. A. deFuniak, general freight agent of the Louisville & Nashville, with office at Montgomery, Ala., has been appointed general freight agent, with office at Louisville, Ky., vice **D. M. Goodwyn,** promoted, and **J. A. Ridgely** has been appointed general freight agent, with office at Montgomery, Ala., vice Mr. deFuniak.

J. R. Wilson, traffic manager of the Sacramento Northern, with headquarters at Sacramento, Cal., has resigned, effective April 30. Mr. Wilson entered the employ of the Northern Electric Railway as traffic manager in 1914, which, after its reorganization, adopted the name of the Sacramento North-

ern. Prior to his service with the Sacramento Northern he was employed in the general freight office of the Southern Pacific at San Francisco, Cal., and later acted in the capacity of commercial agent for the Illinois Central at San Francisco.

J. B. Payne, traffic manager of the Texas & Pacific, with office at Dallas, Texas, has had his jurisdiction extended over the Fort Worth Belt and the International & Great Northern (Spring to Fort Worth and Madisonville branch).

The titles of **W. G. Story**, assistant general freight agent, and **M. J. Powers**, assistant general passenger agent of the Delaware & Hudson and associated lines, with headquarters at Albany, N. Y., have been changed to general freight agent and general passenger agent, respectively.

Engineering and Rolling Stock

E. F. Mitchell, chief engineer of the Texas & Pacific, with office at Dallas, Texas, has had his jurisdiction extended over the Fort Worth Belt and the International & Great Northern (Spring to Fort Worth and Madisonville branch).

Purchasing

R. L. Irwin, purchasing agent of the Texas & Pacific, with office at Dallas, Texas, has had his jurisdiction extended over the Fort Worth Belt and the International & Great Northern (Spring to Fort Worth and Madisonville branch).

Corporate

Executive, Financial, Legal and Accounting

William W. Tirrell has been appointed general auditor of the Maine Central Railroad Company (Corporate), with office at Portland, Maine.

Arthur B. Hoff, formerly industrial commissioner of the Erie, with headquarters at New York, and later in the United States naval service, has returned to railway work as assistant to president of the Erie Railroad Corporation.

Walter H. Ardley, controller of the Grand Trunk, with headquarters at Montreal, Que., retired from active service on April 1, under the superannuation plans of the company. He was born on April 24, 1858, in London, Eng., and was educated in the City of London College. In 1883 he entered the service of the Grand Trunk in the general auditor's office, and was in the continuous service of that road for 36 years. In November, 1893, he became chief clerk and general bookkeeper. He was appointed auditor of disbursements in 1907, and in 1908 served as acting general auditor, until December 31 of that year. He was then appointed general auditor of the Grand Trunk and the Grand Trunk Pacific, and since August, 1914, served as controller of the same roads, with headquarters at Montreal, Que.



W. H. Ardley

Alexander R. Lawton, general counsel of the Ocean Steamship Company of Savannah, has been elected president, with office at Savannah, Ga., in place of **William H. Pleasants**, deceased.

Reginald H. M. Temple, general solicitor of the Canadian National Railways at Toronto, Ont., has been transferred to Winnipeg, Man., and is now in charge of the legal department; **W. W. Evans** and **T. H. Gilmour**, solicitors at Winnipeg, have resigned, and the position of **O. H. Clarke**, western counsel, has been abolished.

Traffic

Bernard R. Marsales, division freight agent of the Canadian National, with headquarters at Calgary, Alberta, has been transferred to Saskatoon, Sask.

F. G. Frieser, export freight agent of the Canadian Pacific, has been appointed general agent of the freight department of the Canadian Pacific Ocean Services, Limited, with office at New York City.

M. S. Throne, district freight agent of the Canadian Pacific, with office at Cleveland, Ohio, has been appointed general agent of the freight department, with office at New York, to succeed **R. E. Larmour**, promoted, and **G. S. Hiam** has been appointed district freight agent, with office at Cleveland, to succeed Mr. Throne.

Engineering and Rolling Stock

W. F. Connal has been appointed mechanical engineer of the Canadian National Railways, with office at Toronto, Ont., vice **H. D. Cameron**, resigned to enter other service.

Obituary

Amos H. Watts, who was master mechanic of the Cincinnati Northern, with office at Van Wert, Ohio, previous to July, 1912, died on March 30, at his home in Walnut Hill, Ohio, at the age of 72.

Charles E. Henderson, formerly second vice-president of the Philadelphia & Reading, with office at Philadelphia, Pa., died on April 10, at his home near Easton, Md. He was born on September 25, 1844, in Jefferson county, West Virginia, and began railway work on January 5, 1870, as a clerk at the Fort Scott station of the Missouri River, Fort Scott & Gulf, now part of the St. Louis-San Francisco. He subsequently held various positions on a number of roads in the Middle West until December, 1889, when he was appointed general manager of the Philadelphia Reading Coal & Iron Company, and from October, 1903, to May, 1908, was first vice-president of the same company. From November, 1896, to May, 1908, he served also as second vice-president of the Philadelphia & Reading Railway, in charge of freight traffic.

Curtis Dougherty, chief engineer maintenance of way and structures of the Southern System, lines west, with headquarters at Cincinnati, Ohio, died at his home in that city on March 30. He was born at Otterville, Ill., on July 30, 1863, and received his education at Washington University, St. Louis, Mo., graduating in 1885. He began his railway career in 1887 in the office of the chief engineer of the Wisconsin Central and the following year he was appointed engineer of the Chicago & Western Indiana, in which capacity he served until March 1, 1892, when he entered the employ of the Illinois Central as assistant engineer. From June 1, 1893, to June 1, 1902, he was roadmaster of the Chicago division and upon the latter date was appointed superintendent of the Springfield division of the same road. On January 15, 1907, he resigned his position with the Illinois Central to become assistant chief engineer of the Cincinnati, New Orleans & Texas Pacific and the Alabama Great Southern, which position he held until the consolidation of these lines with the Southern system, when he was appointed chief engineer maintenance of way and structures.



C. Dougherty

EDITORIAL

Railway Age

Publicity Policy of the Railroad Administration

The Railroad Administration is inaugurating an advertising campaign in which it expects to spend about $1,000,000 in advertising intended to stimulate passenger traffic. This is a move in the right direction. Now that the war is over, there is just as much reason why advertising should be done under government operation to increase passenger traffic as there would be under private operation. The Administration also is increasing the number of really informing statements it is issuing to the public. For example, when the order regarding the advance in the wages of the train service employees was issued last week, it was accompanied by a statement from Director General Hines concerning the wage advances that have been made under government control which was very enlightening. In the future, there should be more publicity given to important labor cases while they are pending as well as after they are settled. With the railroads in the hands of the government, important questions arising on them are more decidedly public questions than ever; and the public has a right to be fully informed not only regarding important things that have been done, but also regarding important steps which are under consideration.

The Railways of the Argentine

The service which the Latin-American Division of the Bureau of Foreign and Domestic Commerce has been rendering to the railway supply field and others interested in export trade or investment abroad, by means of its circulars on railway development in Latin-American countries has been supplemented this week by another able report—this time on the railways of the Argentine. The report is of sufficient value to bring it to the attention of our readers in practically complete form, and on another page will be found the first two installments of it. The Argentine railways do not apparently offer to American exporters or investors comparable opportunities to those of Chile, Bolivia, Brazil or other Latin-American countries that might be mentioned. But the report will prove of especial value for the emphasis it cannot help but place on the important fact that "trade follows the investment." The railways of the Argentine have been developed to the greatest extent of those of perhaps any Latin-American country for the reason principally that they have not had to surmount the geographical barriers that exist in the other South American countries. They have been developed for the larger part by British capital, and were built primarily to bring to the seaports the raw materials that were needed by the industries of Great Britain. The result has been, as will be shown clearly in the figures of imports which are given in the latter part of the circular, that the larger share of the imports of railway material in the five-year period immediately preceding the war were from England. Germany supplied a fair quantity of locomotives and rails, but not as many as England; Belgium a fair quantity of freight cars, but Belgium made a very poor second to England, closely followed by Germany, while the United States and France together did not supply even one-half as much as Germany. There are few instances in the world where the advantages to the railway supply export companies of investment of capital abroad are so clearly shown. What the future holds out for this business is a question. The Argentine railways are working under many difficulties at present, but there is no doubt that a large additional development of transportation is a prime essential to as great and prosperous a country as the Argentine. And an equally important fact is that the Argentine railways have imported practically no railway material since the outbreak of the war and are greatly in need of supplies of all kinds.

Getting the Most From Conventions

The art of railroading in its various phases owes much to the inspiration and facts that have been developed by the different railroad associations, many of which have been managed and supported by individuals and have had little or no official recognition. Those who have followed the development of these organizations in recent years, have been more and more impressed with the far-reaching importance of their work. In an effort to more scientifically utilize these associations the *Railway Age* has, from time to time, suggested that the representatives of the various railroads should be instructed by their managements to report back in writing on those things that were brought to their attention at the meetings which might, in their opinion, be applied to advantage on their own roads. A small railroad having only one or two representatives present would, of course, find it necessary to give general instructions to its representatives as to the nature of the desired reports. On the other hand, a road which might have several representatives at the June mechanical conventions, for instance, should assign to each man certain features that he is specially well fitted to follow up and report upon. The reports and discussions at the meetings, the vast exhibit which promises to break all records this year, and the opportunity of meeting railroad officers and railway supply experts from all over this country and even from abroad, present marvelous opportunities for making an extensive investigation in a minimum of time and effort. The Railroad Administration is frankly doing all it can to make the June mechanical conventions the biggest possible success in all respects. It remains for the mechanical department officers and their subordinates to make the most of the opportunity, and to demonstrate beyond a doubt that the mechanical department is dominated by a breadth of vision and a determination that will give it the place in the railroad organization which so rightly belongs to it and which, generally speaking, it has never attained.

How About the Foremen?

John Calder of the Business Training Corporation recently made a most significant statement in speaking before an industrial conference held under the direction of the New York Editorial Conference of the Associated Business Papers. He said, "The art of management and supervision has been well worked out to date, so far as the chief executives are concerned, and it calls for an ever increasing and high order of ability. It has sometimes been inclined to belittle the

foreman and at other times to ignore him. Yet we have a fair supply of good managers today and are calling loudly not for them or for advisory engineers but for competent foremen, not merely to criticise but to supervise successfully and to 'deliver the goods' with the only kind of help now available, at a cost that makes good business and with due regard to the aspirations and interests of labor." The foremen deal directly with the men and are the vital points of contact between the management and its employees. And yet, comparatively little attention has been given to their selection or training. This is not because the way to do it has not been pointed out many times, but rather because of a real lack of vision on the part of the higher officers in not recognizing the importance of so doing. A striking example of this today in the railroad field is the delay in increasing the compensation of the foremen to a reasonable basis; true some roads have done so after long delays, but many have still neglected to pay these men on an adequate basis. The foremen in many cases are working under the most disappointing conditions because of the lack of proper recognition. As Mr. Calder said, "Liberal, forward-looking ownership and management inviting self-expression and self-determination on the part of the labor in its plants is everywhere handicapped today by the unenergized and unenlightened foremen and minor executives who make the intimate contacts with the workmen." What can be done to enlarge the vision and comprehension of those who are responsible for this condition?

After Piece Work—What?

Whatever opinions individuals may hold as to the merits or shortcomings of piece work and as to its efficiency compared to day work and other systems of wage payment, makes little difference so far as the railroads are concerned. Rightly or wrongly piece work has been thrown out and is, for the time being at least, a thing of the past. Obviously, a shop, enginehouse, or repair yard, organized on a piece work basis, must be entirely reorganized in order to go back to a day work basis. The nature and the amount of the supervision, the shop equipment, the records and accounting, and many other things all have to be modified. It is rather surprising that in the face of so revolutionary a change so little has been done in pointing out the best solution to the difficulty, and of presenting constructive suggestions for making the change. Unfortunately, the most disappointing results have followed in many instances so far as the efficiency and output are concerned. This is possibly excusable because of the strenuous conditions under which the railroads have been operating since it became evident that piece work was doomed. There are shops in this country which have secured excellent results in operating on the day work basis. There are men in the mechanical department who can do much to help out in the present distressing situation by way of advice and suggestions based on practical experience. It would seem that an important part of the program of the June mechanical conventions could profitably be given over to the study and discussion of those things that should be done in order to secure the greatest possible efficiency on the part of the shop, enginehouse, and repair yard forces under the new order of things. As a suggestion, what part should the more general introduction of shop schedules play in this program? How about introducing intensive educational methods for the men now on the job, as well as the more general introduction of real apprentice systems? How about the necessity of giving more attention to the selection and training of foremen? What changes or modifications should be made in the supervising forces? What records should be used in order to afford the best means of checking the efficiency of the shop? What changes or modifications should be made in the plant and equipment? These are only a few of the questions that might be discussed to advantage. An entire day could well be devoted to these questions and surely no more important problem confronts the mechanical department at this time!

Deferred Maintenance and the Labor Supply

LIKE MANY IMPORTANT QUESTIONS which come before the public, the proposal recently advanced that immigration be restricted for a period of five years can be argued pro and con. Without entering into a discussion of the merits of the suggestion itself it is pertinent to consider its probable effect on the railroads. With few exceptions it seems to be agreed that conditions will return to approximately normal in this country within a few months at the outside. That is to say, it is confidently expected by the great majority that the period of uncertainty in which we are now living will soon come to an end. When this time arrives, the country is expected to enter upon a period of remarkable prosperity. If this is the correct view it may not be an unmixed blessing to the maintenance of way departments of the railroads.

Under normal conditions it is axiomatic that the volume of maintenance work varies directly with the prosperity of the country. The reason for this is plain. It is occasioned by the fact that the prosperity of the country goes hand in hand with that of the railroads. With good times obtaining on the railroads, it has been the experience of the past that their prosperity will be reflected in increased activities in nearly every line of endeavor. It has also been the experience of the past that this general picking up in business is accompanied by brisk competition between employers, for both skilled and unskilled labor, and a shortage of men is the likely result. In spite of this fact it is true that it is in these prosperous times that the bulk of maintenance work is done by the railroads for they then have the money and the work is urgent.

At the present time the railroads have a vast amount of deferred maintenance. One of the most important problems facing them is to catch up with this work, and it seems to be beyond doubt that it must be done in the prosperous times that we are just approaching. If it is to be done then, it seems also to be beyond doubt, that, by comparison, past labor shortages will pale into insignificance compared with the one we must expect to face.

The statistics of immigration support this view. In 1914 more than 1,200,000 immigrants came into this country, while the total for the next *four* years was nearly 200,000 less. By the beginning of 1918 immigration had so fallen off that the net increase to our population from this source during that year was only about 16,000. In the past we have recruited maintenance of way forces largely from the immigrants reaching our shores, but these figures indicate that for the present at least this source of supply is lost.

It has been estimated that a total of more than 12,000,000 men, in large part prospective immigrants, were either killed or totally incapacitated during the war. The loss of manpower among civilians during the war period has been at least equal to the military loss. Summed up, these losses in the countries concerned are greatly in excess of the probable loss from emigration during the same period if conditions had been normal. This, coupled with the fact that there must be a great demand for labor in repairing war damages, leads to the conclusion that emigration from European countries will be greatly below normal for some years to come.

Now if it is true that this country faces a period of prosperity and that employers may be expected to engage in keen

competition for the available labor with the principal source of supply greatly depleted, it follows that the railways, particularly in the maintenance of way department, are facing a very serious problem. Unless all signs fail, maintenance of way officers must embark in the near future on the biggest task which they have ever faced, that of overcoming the vast amount of deferred maintenance, and doing it shorthanded. With this prospect before them it is hardly possible that they can view with complacency the proposed legislation to prevent immigration for a period of five years.

The Perplexing Dining Car Question

THE SHADES OF DIFFERENCES of opinion about the way dining cars ought to be run are infinite. A member of the *Railway Age* staff recently had occasion to take at least one meal a day on a dining car for a period of about two weeks, and by far the worst served and poorest meal was on the new a la carte service of a large railroad whose dining car service has aimed at a high standard, which simply goes to prove that no general conclusions can be drawn from single instances.

During the last few weeks, dining car service has been in a period of transition from table d'hote back to a la carte, and among men who have to spend a considerable part of their time traveling, there appears to be a general expression of satisfaction in the return to the a la carte meal. Yet the traveler cannot get as good a meal for $2.25 under the a la carte system as he could for $1.25 with the table d'hote. The able dining car steward under the table d'hote system could serve dinner to more than two complete cars full of diners without confusion, with the food well cooked and hot, table linen clean and waiters and cooks un-hurried. This is not possible, apparently, under the a la carte system.

It is perfectly true that where a traveler was compelled to take six or eight meals consecutively in dining cars, the standard lunch and dinner got to be very tiresome, but is it necessary to give up a right principle simply because in trying it out it did not prove entirely satisfactory to that class of travelers who, when they are not satisfied, know how to make their complaints heard? Would it not be far better to stick to the correct principle and to so modify details as to overcome the objections which were raised to the Railroad Administration's table d'hote meals?

The first criticism that suggests itself to anyone who studies the table d'hote system, introduced by the Railroad Administration, is in regard to the rigidity of the system. Some stewards were much more clever and diplomatic in carrying out their instruction than others. One, instead of inquiring more or less peremptorily whether the traveler wanted dinner at 5:30, 6:15 or 7 o'clock, made his inquiry sound more like an invitation to be present at a little affair given by the railroad company; but even a natural diplomat like this man could not vary from a set of hard and fast rules.

In some cases at least, one car served the same dinner and the same lunch each day for a week. In the shorter runs, such as that between New York and Boston, this would seem to be a mistake, since a man's chance of striking the same car, if he made a round trip to Boston, is pretty good. Furthermore, the variety as between different cars and different weeks of the standard meal was conspicuous by its absence. There are not simply two or three meats which can be served economically in a dining car; there are, as any hotel keeper knows, a great variety of entrees or roasts. The practice of giving the choice only between two meats at a meal was right, but the lack of imagination in varying the form of meats as between different days and different cars made for a monotony on an extended trip or on frequent trips that was bound to react disastrously against the table d'hote system.

Could not a table d'hote meal be supplemented with a very simple grill service that would not add greatly to the work in the kitchen, but yet permit the traveler who wanted a broiled steak or broiled chicken to take this instead of the table d'hote meal? This ought not to interfere at all with the service of meals at specified times—5:30, 6:15 and 7:00 o'clock—for dinner, since when the dining car steward inquires the time which the traveler desires to have his meal he could, at the same time, ask whether the table d'hote meal or a steak or chicken from the grill was desired.

With only a little less rigidity and more imagination and thought, the table d'hote service could, we believe, have been made a success.

The Alaskan Government Railway

VERY LITTLE ATTENTION is being paid by most people in the United States to the fact that the government is engaged in the experiment of building a railway of some importance in Alaska. From the information available there is reason to believe that the conduct of this work has been a decided credit to those who have it in charge. Administered under the general supervision of Franklin K. Lane, one of the ablest members of President Wilson's cabinet, and directed by a high grade engineering commission, it is doubtful whether private hands could have prosecuted the construction of this particular railroad with greater skill or efficiency, except insofar as they would have been more free from the red tape incidental to all government undertakings. The fact that the line will ultimately cost more than the $35,000,000 estimated before the war, is no reflection on the commission.

The conditions under which this project has been conducted are so entirely at variance with normal social and political conditions in the United States that it means little as a demonstration of the efficiency or inefficiency of government management under ordinary conditions. Rather, it is simply an instance of what may be done by government under political circumstances that permit of the unhampered application of business methods. In other words, it is a repetition in a minor way of what was done so admirably on the Panama canal. Except for small settlements near the two termini, the Alaskan Railway traverses an almost uninhabited region where there are no strong labor unions to deal with, no established financial, commercial or industrial interests that may seek to warp the plans of the commission to suit their own selfish ends, and no established communities with sufficient influence in national affairs to force unwarranted concessions in the way of extravagant service or lavish expenditures for passenger stations, etc. In other words, the commission has been able to proceed with its plans unhampered by the conditions usually surrounding public work in the United States.

The fact is, however, that the people of at least one community along the location of this road have voiced their disapproval of the manner in which the affairs of the railroad are being conducted. The Chamber of Commerce of Seward, Alaska, has recently objected because snow slides have obstructed the line during winter months and it has sent a despatch to Washington to "urge the Alaskian Engineering Commission be instructed to open its line at once for traffic . . . that sufficient funds be made available to put this division (from Seward to Anchorage) in position to operate." Any public work or utility is subject to demands for service and improvements which are entirely out of all relation to revenue. The only reason the government railway in Alaska has been able to proceed unhampered by such interference is that the possibility of the interference is present only to a limited degree.

Railroad Administration and Government Price Fixing

WHEN DOCTORS DISAGREE, and nothing is done, the patient, if seriously ill, is fortunate if he does not succumb.

The railways need rail, and need it badly. They need several millions of tons, not merely to enable them to maintain their tracks this year, but to make up maintenance which has been deferred from past years. They also need coal, although not so badly.

The price of rail was greatly advanced during the war, owing to increased costs of manufacture and to other causes. These increased costs were due to advances in wages and in the prices of materials. There were also large increases in the prices of coal. These also were due chiefly to advances in wages. In the cases of both steel and coal, however, parts of the advances in prices were permitted in order to enlarge production by enabling mills and coal mines to operate which could not have operated if prices had been kept on a lower basis. The revenue laws were purposely so framed that if low-cost concerns made too large profits the greater part of the excess would be taken by the government in taxes.

It was not assumed that price-fixing by the government would be continued after the war ended. Certainly it would not have been assumed that if it was continued prices which had been fixed largely to stimulate maximum production would be continued after the war need for maximum production in certain special lines was past.

After the signing of the armistice, however, the government found itself confronted with some conditions which were unexpected. The war ended sooner than anybody anticipated. Organized labor demanded that the high wages which had resulted from war conditions should be made permanent, and the government supported it in this. Large business concerns took the position that if wages stayed up, prices must stay up. But many business men refused to continue to pay the war prices. The result was, that industrial activity began sharply to decrease and unemployment to increase.

The government, through the Department of Commerce, then created the Industrial Board, to bring about readjustments of prices in basic industries, such as coal and steel. That board decided upon certain prices which it believed the government departments should pay, and the producers agreed to sell for those prices.

The largest of the government departments in point of volume of purchases is the Railroad Administration. It is both the largest buyer of steel and the largest buyer of coal in the country. And it refuses to buy at the prices proposed by the Industrial Board. The Industrial Board says it has investigated the costs of production, and that the prices proposed are reasonable. Director General of Railroads Hines says that in his opinion the prices are too high, and therefore he will not pay them.

Who is right in this controversy? The *Railway Age* confesses that, although it has read the statements issued by both sides, it is unable to form an opinion. Since the Industrial Board has investigated the subject and is convinced that the prices are reasonable, it undoubtedly is right in insisting upon the Railroad Administration paying them. Since Director General Hines is solely responsible for the management of the railroads, and since he has investigated the subject and feels sure the prices are too high, he is undoubtedly within his rights, and even performing his duty in insisting that the prices shall be reduced.

But—while these two departments of the same government are thus disagreeing, no rails are being ordered for the railroads. Railway maintenance is getting farther and farther behind; some of the steel mills are being closed down; others are working only part time; and men are being thrown out of employment. It is an old saying that two wrongs never made a right. Here, however, is apparently a case where two rights make a wrong.

This deadlock between two government departments, with its sinister consequences, is another development which will hardly be used by the advocates of government ownership in their arguments as an example of the advantages of government management. Mr. Hines says, in effect, that the producers of steel and coal are trying to "hold up" the railways because they are in the hands of the government and the taxpayers have to pay the bill. Chairman Peek of the Industrial Board says flatly that the Railroad Administration is trying to use the power of monopoly that its control of most of the railways gives it to force down prices unfairly. And both of them are acting in an official capacity for the government!

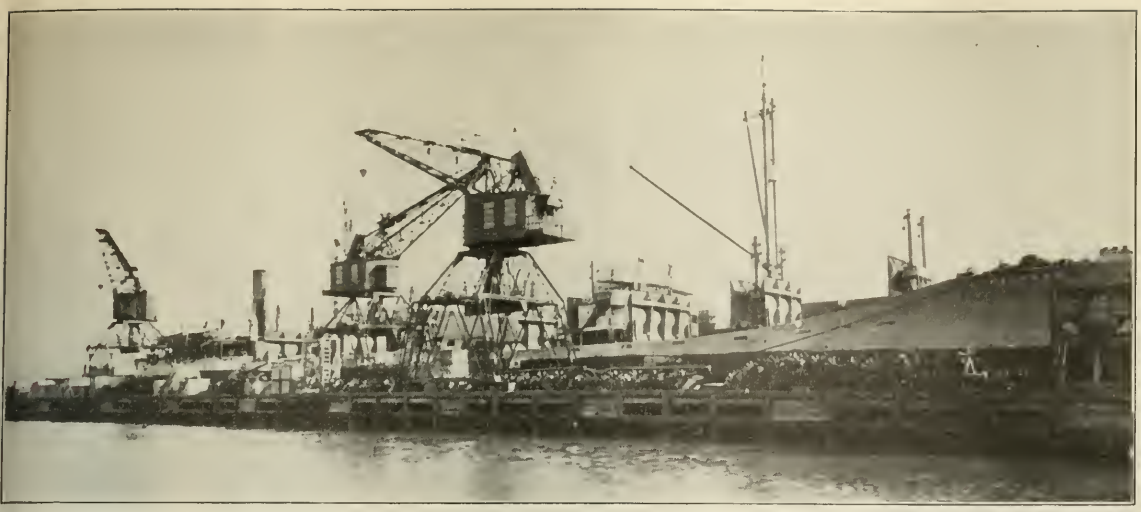
The public wants to see prices paid for rails and coal which will be sufficient to yield reasonable profits on the basis of existing wages to as many steel mills and coal mines as are needed in order to enable the United States to produce as much steel and coal as will be needed under normal conditions to supply our own demands and to do a substantial export business. The prices paid should not be based on the costs of either the highest cost or the lowest cost concerns, but on a mean between these extremes. The Railroad Administration should not use its monopoly power to force prices down unduly. If it does, wages will and must be reduced in consequence, thus defeating one of the principal policies of the administration. On the other hand, manufacturers (and precisely the same thing is true of labor) should not be allowed to hold up the railways merely because they are in the hands of the government. If the Railroad Administration was a little stiffer in dealing with labor, its consistency in dealing so stiffly with the manufacturers, who have labor problems of their own, would be less open to question.

And meantime, we repeat, the railways need millions of tons of rail and need them badly, and the business of the country is being injured and thousands of men are being thrown out of employment while the government departments at Washington continue to disagree. The government is hardly giving a perfect demonstration of the way the problems of reconstruction should be handled.

New Books

Proceedings of the American Railway Bridge and Building Association. Edited by C. A. Lichty, secretary, 228 pages. Illustrated, 6 in. by 9 in. Bound in paper and cloth. Published by the Association, C. A. Lichty, secretary, 143 Waller Ave., Austin Station, Chicago. Price, $1.

This volume contains the Proceedings of the twenty-eighth annual convention of the American Railway Bridge & Building Association, which was held in Chicago on October 15-17, 1918. The reports presented at this meeting were unusually practical in character and reflected the strenuous times through which maintenance of way men were passing last year. Among the reports of special value are those on the Repairing and Strengthening of Old Masonry; Sources of Railway Water Supply; Wooden Tanks, and Bridge Decks, and Guards. Several papers were also presented which were of unusual value. These papers included one on Essential Work, by C. A. Morse, assistant director of the Division of Operation of the United States Railroad Administration, and another on the subject of Carrying Bridges Over, by C. F. Loweth, chief engineer of the Chicago, Milwaukee & St. Paul.



Steamship Feltore Receiving Load of Locomotive Parts Direct From Pier

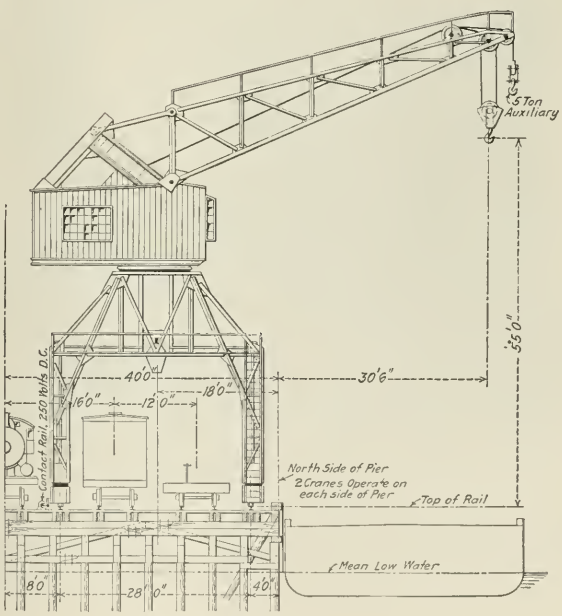
Radical Departure in Loading Ocean Freighters

Erie Railroad Utilizes Existing Equipment in Handling 50 Locomotives Direct from Pier to Ship

THE SUCCESSFUL LOADING of a shipment of 50 locomotives into the hold of an ocean liner without the use of lighters, which was accomplished this week, marks a significant and important step in the development of New York harbor, being the first time the direct loading from pier to ship of freight of the character described had ever been attempted here. The work was done with the standard pier equipment and no special preparations were necessary for its accomplishment. It had never been attempted because of the well founded impression that damage to fixed equipment would result. This impression is based on the fact that in many ships the hatches do not have sufficient area to permit free passage to packages of large dimensions, with the result that forcing methods in loading have had to be resorted to. That is to say, large packages often become wedged in the hatchway and when pried loose would drop and shift quickly, setting up strains sufficient to break rigid equipment. When such freight is loaded from lighters and forcing methods are resorted to, the strains are greatly reduced because of the free movement of the lighter in the water.

The freighter Feltore is of the single deck type with hinged hatches extending across the ship for almost its full width. For this reason this ship is particularly adapted for such methods of loading. This shipment, and several thousand tons of pig iron, were loaded during the week direct from Erie Railroad pier H at Weehawken, N. J., and by eliminating the use of barges, tugs and lighters, commonly required for work of this character, the expense of loading was materially decreased. Most important of all, however, was the saving of time.

Following usual methods, the ship would have been anchored off shore and the cargo moved from the pier by cranes and loaded on to barges. Then from the barges the cargo would have been transferred to the hold of the vessel by the usual lighterage methods. As no more time is required to load the ships direct from the piers than to place the cargo on to barges, the economy of the direct loading is apparent. When it is considered that approximately 50 per cent more time is required to transfer the cargo from the barges by the floating equipment than to load the barges by the pier equipment the importance of the new departure as an economic measure is still more evident, to say nothing of



Half End Elevation of Pier

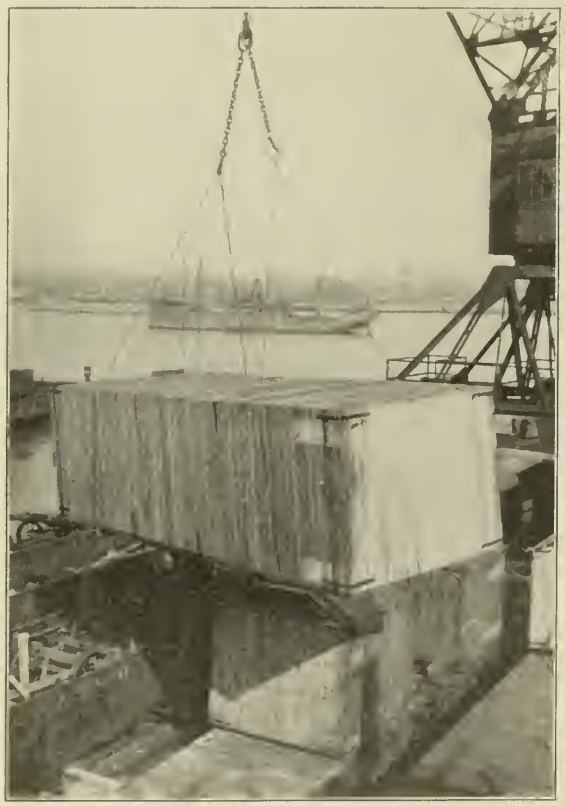
the benefits and savings accruing from the release of the floating equipment, thus making it available for other service.

The 50 locomotives were delivered unassembled to the pier

in 200 cars. The car loads were made up of 20 ton locomotive boilers, 14-ton tender tanks, 12-ton locomotive frames, 4-ton cabs, 1-ton drivers and 3-ton cylinders.

During the first day 19 of the 20-ton boilers were loaded in seven hours, a cycle being completed in about 22 minutes. After the seven hours the loading of boilers had to be discontinued while smaller cargo, chiefly pig iron, was placed to prevent shifting of the larger units. The pig iron was loaded with ship's crane and did not interfere with the operation of the pier equipment, then engaged in loading tender tanks and other locomotive parts. From the time-studies made it will apparently require four days to load the entire shipment of locomotives, the speed of loading being controlled by the capacity of the ship's facilities for handling the cargo delivered to it by the pier equipment.

As the cargo could not be loaded on to barges in less time than is required to load it into the ship the initial saving by the new method is four days. The time which would be required to transfer the load from barges to the ship would depend on the location of the ship in reference to the pier



The Box Contains a Tender Tank and Weighs 14 Tons. The Picture Shows the Box Suspended Over the Cars on the Pier Preparatory to Swinging It Over the Ship's Side

and cannot be arrived at definitely. As a comparison, however, it may be said that the estimated time for transferring a 20-ton locomotive boiler from a barge to a ship is about one hour as compared with the 22 minutes mentioned above. In other words, the time required to load from the pier to the ship is more than 50 per cent less than that required to load from the barge.

Pier H is of the open-type with timber construction. It is 80 ft. wide and 1,000 ft. long, providing space for five railroad tracks, which extend the full length of the pier, and have a combined capacity for 200 cars, and for two gantry tracks. The center line of railroad track No. 3 coincides with the center line of the pier. The two tracks on the south side of the pier and the two on the north side are spaced on 12 ft. centers. The distance from the center line of track No. 3 to the center line of adjoining tracks is 16 ft., and the distance from the centers of outside tracks to the edges of the



Type of Gantry Crane Used. Pier Is Equipped With Three Ten-Ton and One 20-Ton Cranes

pier is 12 ft. The gage of the gantry track is 28 feet., with the outside rail of each track 4 ft. from the edge of the pier.

The pier equipment comprises four electric traveling portal gantry cranes consisting of one 20-ton and one 10-ton crane operating on the south side of the pier, and two 10-ton cranes operating on the north side. The vertical clearance between the top of the gantry rails and the boom in its lowest position is 55 ft., an ample distance to clear the side of any vessel.

All of the cranes have a vertical or hook lift of 90 ft., ranging from 30 ft. below the level of the crane rails to 60 ft. above. They all have a rotating movement giving them a working radius of 48 ft. 6 in., permitting each crane to load or unload cars on any track and to reach 30 ft. 6 in. beyond the edges of the pier.

Three of the cranes have a maximum capacity of 10 net tons. These have a hoisting speed for loads up to five tons of 220 ft. per min., and for loads above five tons to ten tons of 110 ft. per min. The rotating speed is three revolutions per min. and the traversing speed is 150 ft. per min. The capacity of the main hoist of the fourth crane is 20 net tons and that of the auxiliary hoist 5 net tons. For loads up to 5 tons the hoisting speed is 220 ft. per min., and from 5-ton loads to 20 tons the speed is 55 ft. per min. This crane has a rotating speed of two revolutions per min. and

a traversing speed of 100 ft. per min. All of the cranes have a longitudinal movement for the entire length of the pier. Each crane is equipped with three electric motors, one each for traversing the crane; rotating the jib; raising and lowering the load and raising and lowering the jib. These motors



Box Containing Tender Tank Being Lowered Into the Ship's Hold. The Largest Parts Placed in This Manner Were the Boilers Which Weighed 20 Tons

are all 230-volt series wound direct current machines, and each one is protected by overload relays mounted on a panel in the crane cab.

The cranes are mounted on equalizing structural steel trucks, one 2-wheel truck being provided under each of the four corners of the portal. The truck connection to the portal structure is flexible, thus equalizing the load on both wheels at each corner.

A 25-hp. fully enclosed motor located on the portal and connected through cut steel gears to one wheel at each portal provides an equal tractive effort for traversing the machine irrespective of the direction of the wind. The motor is equipped with a drum type controller located in the cab. Whenever the power circuit is opened, by accident or by the operator, a magnetic brake provided on the armature shaft of the motor automatically stops the traveler.

The operator's cab is so located on the crane that the operator may have a plain view of the operations at all times. The cab is heated electrically.

The hoist motor consists of an 81-hp. open mill type motor connected through cut steel gearing to a cast iron drum hoist. A magnetic brake on the armature shaft of the motor automatically acts to hold the load whenever the power circuit is open. In addition, an H. & P. standard brake and friction clutch is provided in the drive to disconnect the hoisting drum and hold it stationary while raising or lowering the jib. The combined brake and clutch is so constructed that the brake will be normally set and the clutch released. The clutch is set and the brake released by means of a solenoid.

The controller for the hoisting engine is of the magnetic contactor type and gives either power or dynamic braking, whichever may be necessary for lowering the empty hook without any shift of the controller handle. Limit switches automatically prevent overhoist of the load.

The crane jib is hinged and is raised or lowered by a heavy forged steel screw running in bronze nuts connected to the top chord of the jib through steel links. Limit switches limit the travel of the boom in each direction.

The rotary movement is effected by a 33-hp. crane type motor connected through steel gearing to a heavy steel gearing bolted to the top of the portal. The motor is equipped with a drum type controller located in the cab and a magnetic brake on the armature shaft of the motor automatically stops rotation whenever the power circuit is opened.



This Type of Ship with a Single Deck and Large Hinged Hatches Is Particularly Well Adapted to This Method of Loading

The control equipment for operating the crane consists of drum controllers for the travel, and the rotating motors and a master controller for the hoist motor. The latter is provided with an auxiliary interlock having three positions, (1)

providing for operating the hoist engine; (2) for raising the hook; and (3) for lowering the boom.

Electric power for the operation of the crane motors is brought to a sub-station located near the shore end of the pier on a two-phase, four-wire, 2,300-volt circuit. This power is transformed to six-phase, 163-volt alternating current by two 105-kva. transformers and a rotary converter is used to change this to 250-volt direct current power for the crane motors. The rotary converter is a General Electric type HCC, six-pole, 200-kw. machine, running at 1,200 r.p.m.

The maximum rated current capacity of the rotary converter is 800 amperes. Momentary loads put upon it by the crane motors are frequently as high as 1,600 amperes, but the converter takes care of these without difficulty. A duplicate machine, however, has been placed on the floor of the sub-station, which will be connected in a short time to take care of excessive loads and to provide for emergencies and repairs to the other machine. A third rail is provided for carrying the direct current power to the crane. The crane and electrical equipment on the pier were furnished by Heyl & Patterson, Inc., of Pittsburgh, Pa.



The Crane's Boom Was Not Long Enough to Reach the Off-Pier Side of the Ship and to Place the Boxes on this Side the Ship's Hoisting Apparatus Was Used to Pull Them to the Side as Shown in the Picture

Orders of Regional Directors

War Department Posters.—The regional director, Eastern region, in a circular dated April 9, authorizes the posting in station waiting rooms of advertisements of the War Department, not over 28 in. x 38 in., calling for volunteers, for service in the regular army, to relieve drafted men now in service in Europe.

Pullman Passes for Ticket Sellers.—The regional director, Eastern region, by circular dated April 9, notifies federal managers that requests of ticket office employees for Pullman car passes should be made through the same channel as requests for railroad transportation. This supersedes the former custom under which the Pullman Company granted such passes on requests from the ticket agent in charge of the office where the applicant was employed, granting the free transportation in consideration of the fact that the employee handled Pullman tickets without extra compensation.

Repairs of Short Line Cars.—The regional director, Eastern region, by circular 500-14-5A669, announces that beginning with April 1 bills for repairs to cars and engines belonging to non-federal roads—the "short lines"—are to be made on the basis of actual cost of labor and materials, plus 15 per cent, with 10 per cent added to the total to cover superintendence and accounting. Material furnished by the road owning the car or locomotive is to be billed to the road making the repairs, which, in turn, should re-bill it at the same rate plus 15 per cent for handling. Proper credit is to be allowed for scrap at current prices.

Reclamation of Scrap.—The regional director, Eastern region, by circular 2900-99A-670 calls attention to carelessness in the gathering and sale of scrap material. Scrap material has been sold without assortment, and new articles, available for immediate use, have been sold as scrap. Federal managers are called upon to review the instructions and regulations now existing in order to make sure that the greatest possible care is exercised, and to take any action that may be found necessary to insure that the sorting, reclamation and sale of the scrap is being properly and economically handled.

Rental Charges for Cars and Engines.—The Southern regional director, answering a question, says that it is the intention that the schedule of rental charges shall apply to equipment loaned by federal controlled railroads to independently operated railroads, or to contractors or other outside parties, where, in the judgment of the federal manager, it is proper to lend such equipment.

Tax on Telegrams.—The regional director, Eastern region, by circular 2002-14A677, advises federal managers that on telegrams sent under a contract between a railroad company and a telegraph company, which provides for an interchange of services, for which no charges are made, there is no federal tax, provided the messages relate exclusively to the business of the railroad company. This is the substance of a decision by J. E. Walker, deputy commissioner of the treasury department.

Victory Liberty Loan.—The regional director, Eastern region, by circular 1500-1-7A679, announces, for the benefit of all railroad officers and employees, the terms of the Victory Liberty Loan notes.

Requests for Statistical Data.—The Eastern regional director, by circular 1801-118A678, advises federal managers what should and what should not be done in dealing with requests for statistical data presented by other branches of the government and by private parties. Such information should be given only where it is in the interest of the public to do so. The Geological Survey is to be furnished with statements of the number of cars of coal and other minerals shipped, and the Bureau of Standards may be told the designation and location of track scales, and the number of test cars owned by the railroads. As to a great variety of requests no exact rule can be laid down, but ordinarily any information which has been compiled by a railroad for its own purposes, or for the government, may be given out, if the federal manager deems it in the public interest.

Grain Embargo.—Supplement 22 to Circular 34 of the Northwestern regional director similar to Circular 197 of the Southwestern regional director (*Railway Age*, April 11, page 942).

Army Appeal Posters.—Supplement 3 to Circular 169 of the Central Western regional director authorizes the display of War Department posters calling for recruits for the regular army. The Southwesten regional director, in Circular 201, issues similar instructions.

Marking of Cotton.—Supplement 1 to Order 182 of the Southwestern regional director orders that uncompressed cotton or cotton linters must not be accepted at way stations unless, in addition to the shipping marks, there is firmly attached to each bale a waterproof shipping tag showing the name of shipper, point of origin, consignee and destination.

Train Employees Granted Wage Increase

Four Hundred Thousand Men are Affected; Total Increase Estimated About $60,000,000

GENERAL INCREASES in wages for the train service employees, which, with orders issued this week giving increases to the dining car and sleeping car employees, are estimated by the Railroad Administration to amount to about $67,500,000 a year, were ordered by Director General Hines on April 11, retroactive to January 1, 1919. This would make the increase for the train and engine employees somewhat over $60,000,000 a year. It was announced that the order was issued in pursuance of proceedings begun in September, 1918, for the purpose of putting the wages of train and enginemen on a basis which will give them the benefit of the same principles that were established by the Railroad Administration during the war and that were applied to practically all other classes of railroad labor. These adjustments involve approximately



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The Star Boarder

400,000 men and are based on recommendations of the Board of Wages and Working Conditions. The orders allow time and one half for overtime after eight hours in yard service, while the question of time and one half for overtime in road service insisted on by the brotherhoods, together with collateral questions affecting the schedules, has been referred to Railway Board of Adjustment No. 1, made up of four representatives of the managements and four representatives of the brotherhoods. This was done on recommendation of the Board of Wages and Working Conditions. It was erroneously stated in last week's issue that this question had been referred to the latter board.

Director General Hines authorized a statement explaining that this step practically completes what can properly be termed the war cycle of wage increases to railroad labor and recounting the procedure which the Railroad Administration has adopted throughout the war in dealing with its wage problems. The first increases were made in General Order No. 27 issued on May 25, 1918, by Director General McAdoo, and based on recommendations made by the Railroad Wage Commission. To take such supplemental action as might be necessary to complete the readjustment of wages, the Board of Railroad Wages and Working Conditions was created, consisting of three representatives of railroad managements and three representatives of railroad labor organizations. This board took up in turn the various classes of labor and its recommendations were considered by the directors of the Division of Operation and Labor and were then acted upon by the director general. As a result of this procedure practically all classes had received the necessary supplemental consideration and treatment at the time of the signing of the armistice, but the recommendation of the board as to the train and enginemen was not submitted until December 21.

When the report of the Board of Railroad Wages and Working Conditions on the readjustment for employees in train and engine service was made, the statement says, the director general was faced with the following alternatives:

(1) To refuse to make any readjustments whatever because of the present unsatisfactory condition of railroad revenues in spite of the fact that this class of employees had reason to expect readjustments because of readjustments which had already been made for other classes of employees.

(2) To establish relative justice between the various classes by cutting down the wages established for the other classes during the war.

(3) To make readjustments proportional with those which had been made for other employees.

Of these three possibilities the director general is satisfied that only the last was practicable and just and he therefore adopted it.

The statement continues in part as follows:

"Since the order now made as to train and enginemen and the orders about to be made as to dining car and sleeping car employees will establish in the opinion of the Railroad Administration a fair equalization on the basis of the standards adopted during the war by the Railroad Administration, it will of course be understood that the cycle of war adjustments is thus completed and that further wage questions will naturally be dealt with only in the light of conditions hereafter arising. While the foregoing deals with all classes of employees whose wages are part of railroad operating expenses, it is also true that the wages of express employees have not yet received final consideration and action.

"In this connection some points regarding wages of railroad employees in train and engine service should be remembered in view of the mistaken belief that they are unusually highly paid. In the report of the Lane wage commission, the following statement was made:

"It has been a somewhat popular impression that railroad employees were among the most highly paid workers. But figures gathered from the railroads disposed of this belief. Fifty-one per cent of all employees during December, 1917, received $75 per month or less. And 80 per cent received $100 per month or less. Even among the locomotive engineers, commonly spoken of as highly paid, a preponderating number receive less than $170 per month, and this compensation they attained by the most compact and complete or-

ganization, handled with a full appreciation of all strategic value. Between the grades receiving from $150 to $200 per month, there is included less than three per cent of all the employees (excluding officials) and these aggregate less than 60,000 men out of a grand total of 2,000,000.

"The higher paid men in train and engine service reach their favorable position only after long years of service. They are men who through the operation of the seniority rule reach the higher grades and better paid positions and thereby attain the goal of a life's work in an honorable and exceeding onerous trade. To their care are entrusted the lives of men, women and children and the protection of valuable property. Their work is at all hours of the day and night and it is exposed to all sorts of weather.

"Employees in engine and train service (except yard service) perform nearly all their work away from home, and a greater proportion of their individual living expense is incurred away from home, but no compensation for this item has ever been granted to this class of employees, and the expense ranging perhaps from $30 to $45 a month is paid out of the employees' wages.

"The train and enginemen earnestly insist that they should be paid time and a half for overtime in road service (instead of prorata overtime) for any excess time due to a failure to maintain a speed of 20 miles per hour in passenger service and 12½ miles an hour in road service, claiming that this is strictly analogous to the allowance of punitive overtime after eight hours in work which is paid for exclusively by the hour. The railroad managements, however, strenuously insist that there is no such analogy, because they say that work on the road is in the nature of piece work, also that the higher speed in freight service is frequently not economic and hence the failure to make it ought not to be penalized, and also that the employees while on the road cannot be under strict supervision, and can largely influence the time consumed and the speed of their trains. The Board of Railroad Wages and Working Conditions recommended that this question be submitted to a bi-partisan board of eight, i. e., four representatives of the managements and four representatives of labor for a thorough study and report on this question. This course will be pursued, and the question will be submitted to Railway Board of Adjustment No. 1, which is made up of four representatives of the managements and four representatives of labor. Effective steps will be taken to secure the promptest possible action upon this matter.

"The orders now issued allow time and a half after eight hours for overtime in yard service (which is strictly an hourly employment).

"This action upon the wages of train and enginemen leaves only two relatively small classes of railroad employees yet to be dealt with in the completion of the war cycle of wage adjustments, these two classes being the dining car employees and the sleeping car employees.

"It is estimated that if railroad labor throughout the war year 1918 had been paid the wages actually established by the end of December, 1918, (working the same hours and under the same conditions that they actually worked during the year) the wage increase in operating expenses for the year would have been $754,811,000 in excess of what the wage increases have been if (and this is an impossible assumption) the work could have been performed throughout the year for the low wages prevailing on January 1, 1918. If in addition the train and enginemen had been paid throughout 1918 the wages now established and the dining car and sleeping car employees had been paid the wages which are about to be established (and the police forces had been paid throughout 1918 the wages recently established for them), the additional increases on these accounts would have been about $67,500,000. Attempting thus to measure the matter by the labor actually performed during the calendar year 1918, the total increase in wages growing out of the war conditions and the resulting policies firmly established during the war by the Railroad Administration (and including the wage increases now being and about to be made to complete the war cycle), would have been $822,311,000, due however in substantial part to the excess hours and to the inexperienced labor which came about on account of the war. (The actual increase during the calendar year 1918 was only about $583,000,000 because many of the supplemental increases did not take effect until the latter part of the year.) It is anticipated that through the elimination of overtime which will be unnecessary under peace conditions and through ability to regain experienced employees who were lost during the war, the total increase in wages would be substantially less on the same volume of business than the foregoing based on the calendar year 1918 would indicate, and of course the increase will be less if the volume of business is less.

"As a result of the wage levels established and principles applied prior to the signing of the armistice to practically all other classes of labor, and as a result of the unusually thorough study of the rates of pay proposed for the train and enginemen, the present orders, known as Supplements Nos. 15 and 16 to General Order No. 27, have been issued.

"A fair illustration of the substantial effect of these supplements is suggested by the following comparison, which compares the rates of pay in effect immediately prior to federal control with the new rates of pay, a large part of the indicated increases having been made, however, by General Order No. 27, which was issued in May, 1918:

COMPARISON OF RATES*

Service	Occupations	1917 Average (Per month)	Now ordered Average (Per mo.)	Increase Average
Passenger	Conductors	$135.00 to $165.00	$180.00	$15.00 to $45.00
	Baggagemen	71.50 to 105.00	124.80	19.80 to 53.30
	Brakemen	68.75 to 90.00	120.00	30.00 to 51.25
		(Per day)	(Per day)	
	Engineers	$4.47	$5.79	$1.32
	Firemen	2.98	4.31	1.33
Freight	Conductors	4.09	5.40	1.31
	Brakemen	2.73	4.08	1.35
	Engineers	5.33	6.64	1.31
	Firemen	3.33	4.81	1.48
Yard	Conductors	3.87	5.33	1.46
	Brakemen	3.47	5.00	1.53
	Engineers	4.20	5.72	1.52
	Firemen	2.72	4.25	1.53

*Because of the wide variety of rates it is impossible to do other than show the increases on the average: ignoring both maximum and minimum rates.

"In the East 60 per cent of the passenger conductors, brakemen and baggagemen are now receiving the higher rate and will get the less increase as shown above. In the West and South 80 per cent receive the higher rate and will get the less increase.

"The comparisons given are between the new rates and the rates in effect immediately prior to federal control. A large part of the increases have already been made by General Order No. 27, issued in May, 1918."

Order for Enginemen

Supplement No. 15 to general order No. 27 provides as follows:

Effective January 1, 1919, except as otherwise provided herein, as to employees herein named, the following rates of pay and rules for overtime and working conditions upon railroads in federal operation are hereby ordered:

(b) In short turn-around passenger service, the earnings from mileage, overtime or other rules applicable, for each day service is performed, shall be not less than $6.00 for engineers and $4.25 for firemen.

(c) Engineers, firemen or helpers employed on electric locomotives in passenger service to be paid the rates shown in preceding table, based upon weight on drivers. In the application of the rates for various driver weights in electric locomotve service, the total weight on drivers of all units operated by one engine crew shall be the basis for establishing the rate.

(d) Electric car service, whether operated in multiple unit or single unit, to be paid minimum rate in preceding table.

(e) All motor cars used in passenger service operated under train rules by engineers, regardless of whether operated by gasoline, steam, electricity, or other motive power, to be paid minimum rate in preceding table.

(f) The term "helper" as used in this order will be understood to mean the second man employed on electric locomotives or other than steam power.

PASSENGER SERVICE.
ARTICLE I—(a) RATES OF PAY

Weight on Drivers	Engineers		Firemen: Coal		Firemen: Oil		Helpers Electric	
	Per Mile c.	Per Day $	Per Mile c.	Per Day $	Per Mile c.	Per Day $	Per Mile c.	Per Day $
Less than 80,000 lb.....	5.60	5.60	4.00	4.00	4.00	4.00	4.00	4.00
80,000 to 100,000 lb.....	5.60	5.60	4.08	4.08	4.00	4.00	4.00	4.00
100,000 to 140,000 lb.....	5.68	5.68	4.16	4.16	4.00	4.00	4.00	4.00
140,000 to 170,000 lb.....	5.76	5.76	4.32	4.32	4.16	4.16	4.00	4.00
170,000 to 200,000 lb.....	5.84	5.84	4.40	4.40	4.24	4.24	4.00	4.00
200,000 to 250,000 lb.....	5.92	5.92	4.48	4.48	4.32	4.32	4.16	4.16
250,000 to 300,000 lb.....	6.00	6.00	4.48	4.48	4.32	4.32	4.16	4.16
300,000 to 350,000 lb.....	6.08	6.08	4.56	4.56	4.40	4.40	4.16	4.16
350,000 to 400,000 lb.....	6.16	6.16	4.64	4.64	4.48	4.48	4.16	4.16
400,000 to 450,000 lb.....	6.24	6.24	4.72	4.72	4.56	4.56	4.32	4.32
450,000 to 500,000 lb.....	6.32	6.32	4.80	4.80	4.64	4.64	4.32	4.32
500,000 lb. and over.....	6.40	6.40	4.88	4.88	4.72	4.72	4.32	4.32
Mallets regardless of wt..	6.60	6.60	5.20	5.20	5.00	5.00	...	...

ARTICLE II—Basic Day

One hundred miles or less (straight-away or turn-around) five hours or less, except as provided in Article III, Section (a), shall constitute a day's work, miles in excess of 100 will be paid for at the mileage rate provided, according to class of engine.

ARTICLE III—Overtime

(a) Engineers, firemen and helpers on short turn-around passenger runs, no single trip of which exceeds 80 miles, including suburban and branch line service shall be paid overtime for all time actually on duty, or held for duty, in excess of eight hours (computed on each run from the time required to report for duty to the end of that run) within 10 consecutive hours; and also for all time in excess of 10 consecutive hours computed continuously from the time first required to report to the final release at the end of the last run. Time shall be counted as continuous service in all cases where the interval of release from duty at any point does not exceed one hour. This rule applies regardless of mileage made. For calculating overtime under this rule the management may designate the initial trip.

(b) Engineers, firemen and helpers on other passenger runs shall be paid overtime on a speed basis of 20 miles per hour computed continuously from the time required to report for duty until released at the end of the last run.

Overtime shall be computed on the basis of actual overtime worked or held for duty, except that when the minimum day is paid for the service performed, overtime shall not accrue until the expiration of five hours from the time of first reporting for duty.

Where a more favorable overtime rule exists, such rule may be retained, in which event this section will not apply.

Where the provisions of this section for continuous time on turn-around runs of over 80 miles one way, change existing overtime rules, the effective date will be April 10, 1919; otherwise January 1, 1919.

(c) Overtime in all passenger service shall be paid for on the minute basis at a rate per hour of not less than one-eighth of the daily rate herein provided, according to class of engine.

FREIGHT SERVICE

ARTICLE IV—Rates of Pay

(a) Rates for engineers, firemen and helpers in through and irregular freight, pusher, helper, mine run or roustabout, belt line or transfer, work, wreck, construction, snow-plow, circus trains, trains established for the exclusive purpose of handling milk, and all other unclassified service shall be as follows:

(b) For local or way-freight service, 52 cents per 100 miles or less for engineers and 40 cents per 100 miles or less for firemen shall be added to the through freight rates, according to class of engine; miles over 100 to be paid for pro rata.

(c) The term "helper" as used in this order will be under-

FREIGHT SERVICE

Weight on drivers	Engineers, Steam, electric or other power		Firemen: Coal		Firemen: Oil		Helpers Electric	
	Per Mile c.	Per Day $	Per Mile c.	Per Day $	Per Mile c.	Per Day $	Per Mile c.	Per Day $
Less than 80,000 lb.....	6.08	6.08	4.24	4.24	4.24	4.24	4.24	4.24
80,000 to 100,000 lb.....	6.16	6.16	4.32	4.32	4.24	4.24	4.24	4.24
100,000 to 140,000 lb.....	6.24	6.24	4.48	4.48	4.32	4.32	4.24	4.24
140,000 to 170,000 lb.....	6.48	6.48	4.64	4.64	4.48	4.48	4.24	4.24
170,000 to 200,000 lb.....	6.64	6.64	4.80	4.80	4.64	4.64	4.24	4.24
200,000 to 250,000 lb.....	6.80	6.80	4.96	4.96	*4.80	*4.80	4.40	4.40
250,000 to 300,000 lb.....	6.94	6.94	5.12	5.12	5.12	5.12	4.40	4.40
300,000 to 350,000 lb.....	7.08	7.08	5.28	5.28	5.28	5.28	4.40	4.40
350,000 and over	7.28	7.28	5.44	5.44	5.44	5.44	4.40	4.40
Mallets less than 275,000 lb.	7.78	7.78	5.44	5.44	5.44	5.44	...	...
Mallets 275,000 lb. and over	8.00	8.00	5.75	5.75	5.75	5.75	...	...

*Oil differential not to apply on engines weighing over 215,000 lb. on drivers.

stood to mean the second man employed on electric locomotives or other than steam power.

ARTICLE V

(a) Where rates below those for coal-burning locomotives are provided in this order for oil-burning locomotives, they shall apply only on the railroads where differentials have heretofore existed.

(b) If a type of locomotive is introduced on a railroad which formerly was not in use on that railroad, and the rates herein provided are less than those in effect on other roads in the territory the rates of the other roads shall be applied.

(c) Road engineers, firemen and helpers required to perform a combination of more than one class of road service during the same trip will be paid at the rate and according to the rules governing each class of service for the time or miles engaged in each, but will be paid for the entire trip not less than a minimum day at the highest rate applying for any class of service performed during such trip.

When two or more locomotives of different weights on drivers are used during a trip or day's work, the highest rate applicable to any engine used shall be paid for the entire day or trip.

ARTICLE VI

Wherever electric or other power is installed as a substitute for steam, or is now operated as a part of their system on any of the tracks operated or controlled by any of the railroads, the locomotive engineers shall have preference for positions as engineers or motormen, and locomotive firemen for the positions as firemen or helpers on electric locomotives; but these rights shall not operate to displace any men holding such positions on the date of issuance of this order.

ARTICLE VII—Basic Day and Overtime

(a) In all classes of service covered by Article IV (except where under mileage schedules a more favorable condition exists), 100 miles or less, eight hours or less (straight-away or turn-around) shall constitute a day's work; miles in excess of miles required for a minimum day will be paid at the mileage rates provided, according to class of engine or other power used.

(b) Where there is no existing agreement regarding overtime provisions more favorable to the employees, on runs of 100 miles or less overtime will begin at the expiration of eight hours; on runs of over 100 miles overtime will begin when the time on duty exceeds the miles run divided by 12½. Overtime shall be paid for on the minute basis, at not less per hour than one-eighth of the daily rate, according to class of engine or other power used.

ARTICLE VIII—Held Away from Home Terminal

Present rules in effect to be continued subject to provisions of Article XXIII; it being the intention that the propriety of a standard rule be considered by the board herein provided for.

ARTICLE IX—Monthly, Daily or Trip Basis

(a) All service which prior to the effective date of this order was paid on a monthly, daily or trip basis, shall be established upon the mileage basis and paid the rates according to class of service and operated under the rules herein provided.

(b) In branch line service where differentials now exist in either rates, overtime basis or other conditons of service, the main line rates shall be applied for the class of service performed. Miles in excess of the mileage constituting a day will be paid pro rata. If existing rates are higher than the revised main line rates they shall be preserved, but the excess in the rate over the main line rate may be applied against overtime. The passenger or freight overtime basis shall be applied according to the rate paid. Other existing conditions of service shall not be affected by the foregoing.

(c) On other than Class 1 roads, independently operated, the rates of this order shall be applied for the classes of service performed, but no change is required in the miles, hours or service for which the former rates compensated. Existing higher rates shall be preserved. This section does not apply to terminal and other roads where recognized standard rates and conditions are in effect.

(d) If this order in any case produces abnormally high earnings because of unavoidable long lay-overs such cases may be referred back to the director general for special disposition.

ARTICLE X—Arbitraries and Special Allowances

The same rates shall apply to all arbitraries and special allowances as are applicable to the service of which they are a part or upon which they are based, or if not related to any particular class of service, the increase applicable to through freight service shall apply, except that in no case shall they exceed the pro rata rate of the service upon which the increase is based. The minimum time or mileage allowances shall remain in effect.

ARTICLE XI—Beginning and Ending of Day

(a) In all classes of service engineers', firemen's and helpers' time will commence at the time they are required to report for duty, and shall continue until the time the engine is placed on the designated track or they are relieved at terminal.

(b) Engineers, firemen and helpers in pool or irregular freight service may be called to make short trips and turn arounds with the understanding that one or more turnaround trips may be started out of the same terminal and paid actual miles with a minimum of 100 miles for a day provided, (1) that the mileage of all the trips does not exceed 100 miles, (2) that the distance run from the terminal to the turning point does not exceed 25 miles, and (3) that engineers, firemen, or helpers shall not be required to begin work on a succeeding trip out of the initial terminal after having been on duty eight consecutive hours, except as a new day subject to the first in-first out rule or practice.

YARD SERVICE—Freight

ARTICLE XII—Rates of Pay

Weight on Drivers	Engineers, Per Day	Firemen, Steam, Per Day	Helpers, Electric, Per Day
Less than 140,000 lb.	$5.60	$4.16	$4.16
140,000 to 260,000 lb.	5.76	4.28	4.16
200,000 to 300,000 lb.	5.92	4.40	4.16
300,000 lb. and over	6.08	4.56	4.32
Mallets under 275,000 lb.	6.68	5.28	....
Mallets 275,000 lb. and over	6.92	5.52	....

ARTICLE XIII—Basic Day

Eight hours or less shall constitute a day's work.

ARTICLE XIV—Overtime

Except when changing off where it is the practice to work alternately days and nights for certain periods, working through two shifts to change off; or where exercising seniority rights from one assignment to another; or when extra men are required by schedule rules to be used (any rules to the contrary to be changed accordingly) all time worked in excess of 8 hours continuous service in a 24-hour period shall be paid for as overtime, on the minute basis at one and one-half times the hourly rate, according to class of engine.

This rule applies only to service paid on the hourly or daily basis and not to service paid on mileage or road basis.

This rule is effective April 10, 1919, but in calculating back pay from January 1, 1919, overtime accruing under former rules after eight (8) hours service shall be paid at one and one-half times the hourly rate.

ARTICLE XV—Assignments

Engineers, firemen and helpers shall be assigned for a fixed period of time which shall be for the same hours daily for all regular members of a crew. So far as is practicable assignments shall be restricted to eight hours work.

ARTICLE XVI—Starting Time

(a) Regularly assigned yard crews shall each have a fixed starting time and the starting time of a crew will not be changed without at least 48 hours' advance notice. Practices on individual roads as to handling of transfer crews are not affected by this section.

(b) Where three eight-hour shifts are worked in continuous service, the time for the first shift to begin work will be between 6:30 a. m. and 8:00 a. m.; the second 2:30 p. m. and 4:00 p. m.; and the third 10:30 p. m. and 12:00 midnight.

(c) Where two shifts are worked in continuous service the first shift may be started during any one of the periods named in Section (b).

(d) Where two shifts are worked not in continuous service the time for the first shift to begin work will be between the hours of 6:30 a. m. and 10:00 a. m. and the second not later than 10:30 p. m.

(e) Where an independent assignment is worked regularly the starting time will be during one of the periods provided in Section (b) or (d).

(f) At points where only one yard crew is regularly employed, they can be started at any time, subject to Section (a).

(g) Where mutually agreeable, on account of conditions produced by having two standards of time, starting time may be changed one hour from periods above provided.

ARTICLE XVII—Calculating Assignment and Meal Periods

The time for fixing the beginning of assignments or meal periods is to be calculated from the time fixed for the crew to begin work as a unit without regard to preparatory or individual duties.

ARTICLE XVIII—Point for Beginning and Ending Day

(a) Provisions of existing rules that there shall be a specified point for either going on or off duty, or both, are not affected by anything herein; but schedules having no such rules shall be modified to provide that yard crews shall have a designated point for going on duty and a designated point for going off duty.

(b) The point for going on and off duty will be governed by local conditions. In certain localities instructions will provide that engine crews will report at the hump, others report at yard office, others at engine houses or road tracks. It is not considered that the place to report will be confined to any definite number of feet, but the designation will indicate a definite and recognized location.

ARTICLE XIX—Lunch Time

(a) Yard crews will be allowed 20 minutes for lunch between 4½ and 6 hours after starting work without deduction in pay.

(b) Yard crews will not be required to work longer than 6 hours without being allowed 20 minutes for lunch, with no deduction in pay or time therefor.

(c) This article is effective April 10, 1919.

ARTICLE XX—Arbitraries and Special Allowances

Where it has been the practice or rule to pay a yard engine crew or either member thereof arbitraries or special allowances, or to allow another minimum day for extra or additional service performed during the course of or continuous after the end of the regularly assigned hours, such practice or rule is hereby eliminated, except where such allowances are for individual service not properly wthin the scope of yard service.

This article is effective April 10, 1919.

ARTICLE XXI—Hostlers and Hostler Helpers

Rates of Pay	Per day
Inside Hostlers	$4.16
Outside Hostlers	4.80
Helpers	3.60

The term "helper" applies to employees when used to assist outside hostlers.

Articles XIII and XIV of the yard rules shall apply to hostlers and hostler helpers.

ARTICLE XXII—Rules for Application of This Order

(a) Rules for overtime and working conditions which are in conflict with any of the provisions of this order, but no others, shall be changed to conform to the provisions hereof.

(b) Rates of pay in road, yard, or hostling service, which are not affected by Article IX, and which are higher than herein provided, shall not be reduced.

(c) Questions and answers on interpretations of certain articles of this order are listed below:

ARTICLE III

Question 1—Under certain conditions, crews operate round trip service in the morning and again late in the evening. Will it be permissible to pay for each of these services on the basis of a day subject to the rule, or will it be necessary to apply the rule regardless of whether the service is paid two days or more?

Answer—Pending the report and findings of board herein provided for, service is to be operated in accordance with present practice.

Question 2—Will it be permissible for the management to definitely assign crews on the basis of a minimum day in each direction?

Answer—Yes (in accordance with decisions of Commission of Eight and Arbitration Boards).

Question 3—May railroads which have a common overtime basis applicable to passenger service, as described in Sections (a) and (b) adopt Sections (a) and (b)?

Answer—Sections (a) and (b) of Article III apply to all passenger service.

ARTICLE XXIII

Question 1—A number of articles will unquestionably be subject to consideration by the board herein provided for. Pending conclusions by the Board and the final order by the director general, shall the existing bases be maintained or shall the bases provided for in this order be applied?

Answer—The bases provided for in this order shall be applied in the interim, except where such application causes a reduction in compensation, in which case, existing schedule rules and practices shall govern.

Question 2—In addition to the provisions of this order which are to be considered by a board, this article also provides for their consideration of "schedule rules and practices." What shall be the status of such schedule rules and practices during the interim?

Answer—They are to be applied in accordance with schedule agreements.

ARTICLE XXIII—Reclassification of Service. Arbitraries and Special Allowances

The director general is advised that the Board of Railroad Wages and Working Conditions feels that punitive rates for overtime for employees in passenger and freight road service should be studied in connection with and including the modification of certain rules and numerous arbitraries and special allowances which are intricate and important, and that it recommends the reference of this subject to a board made up of transportation wage schedule experts.

In order to dispose of this question as promptly as possible and to avoid the delay that must accompany the selecting and organizing of a new board specially equipped to deal with questions growing out of transportation wage schedules, the matter is hereby referred to Railway Board of Adjustment No. 1, which board shall begin at once the study of the practicability and the propriety of applying punitive overtime to road service at this time and of the further question of what abrogations or modifications of existing rules and practices which are affected thereby should be made in the event of the application of punitive overtime to road service, and shall at the earliest practicable date report its recommendations to the director general.

Following its report on the above subjects, the board shall also report as promptly as possible its recommendation upon the matters referred to it in Article VIII of this order.

ARTICLE XXIV—Interpretation of This Order

The rates of pay and rules herein established shall be incorporated into existing agreements and into agreements which may be reached in the future, on the several railroads; and should differences arise between the management and the employees of any of the railroads as to such incorporation, intent or application of this order, such questions of difference, when properly presented, shall be referred as hereinafter provided to the director of the Division of Labor, who will transmit them to the proper board for decision or recommendation, subject always to review by the director general.

Where differences arise, a concrete joint signed statement shall be prepared in triplicate, setting forth first, the article of this order involved; second, facts; third, the position of the employees; and fourth, the position of the management thereon. Where supporting documentary evidence is used it shall be attached in the form of exhibits. Such presentations shall be transmitted to the director of the Division of Labor in the manner provided for the submission of appeals to boards of adjustment.

Order for Trainmen

Supplement No. 16 to General Order No. 27 provides:

Effective January 1, 1919, except as otherwise provided herein, as to employees herein named, the following rates of pay and rules for overtime and working conditions upon railroads in federal operation are hereby ordered:

PASSENGER SERVICE

ARTICLE I—Rates of Pay

(a) Rates for trainmen on trains propelled by steam or other motive power except as provided in Section (b).

Class	Per mile	Per day	Per month
Conductors	4.00c.	$6.00	$180.00
Asst. Conductors or Ticket Collectors	3.20c.	4.80	144.00
Baggagemen—Operating Dynamo	3.00c.	4.50	135.00
*Baggagemen Handling Express	3.00c.	4.50	135.00
Baggagemen	2.77c.	4.16	124.80
Flagmen and Brakemen	2.66c.	4.00	120.00

*Rates specified for "Baggagemen handling express" apply to baggagemen in the employ of railroads who shall be paid exclusively by the railroads.

(b) The above rates apply on all roads except exclusively surburban roads doing passenger business only, upon which the following rates shall apply:

Class	Per mile	Per day	Per month
Conductors	3.00c.	$4.50	$135.00
Ticket Collectors	2.77c.	4.16	124.80
Guards performing duties of Brakemen or Flagmen	2.45c.	3.68	110.40

ARTICLE II—Basic Day

One hundred and fifty (150) miles or less (straight-away or turn-around) shall constitute a day's work. Miles in excess of 150 will be paid for at the mileage rates provided.

A passenger day begins at the time of reporting for duty for the initial trip. Daily rates obtain until the miles made at the mileage rates exceed the daily minimum.

ARTICLE III—Overtime

(a) Trainmen on short turn-around passenger runs, no single trip of which exceeds 80 miles, including suburban and branch line service, shall be paid overtime for all time actually on duty, or held for duty, in excess of eight hours (computed on each run from the time required to report for duty to the end of that run) within ten consecutive hours; and also for all time in excess of ten consecutive hours computed continuously from the time first required to report to the final release at the end of the last run. Time shall be counted as continuous service in all cases where the interval of release from duty at any point does not exceed one hour. This rule applies regardless of mileage made.

For calculating overtime under this rule, the management may designate the initial trip.

(b) Trainmen on other passenger runs shall be paid overtime on a speed basis of 20 miles per hour computed continuously from the time required to report for duty until released at the end of last run. Overtime shall be computed on the basis of actual overtime worked or held for duty, except that when the minimum day is paid for the service performed overtime shall not accrue until the expiration of seven (7) hours and thirty (30) minutes from time of first reporting for duty.

Where a more favorable overtime rule exists, such rule may be retained, in which event this section will not apply.

Where the provisions of this section for continuous time on turn-around runs of over 80 miles one way, change ex-

isting overtime rules, the effective date will be April 10, 1919; otherwise January 1, 1919.

(e) Overtime in all passenger service shall be paid for on the minute basis at a rate per hour of not less than one-eighth of the daily rate herein provided.

ARTICLE IV—Guarantees

(a) Regularly assigned passenger trainmen who are ready for service the entire month and who do not lay off of their own accord, shall receive the monthly guarantee provided for in Section a of Article I, exclusive of overtime, except that former higher monthly guarantees shall be preserved.

Extra service may be required sufficient to make up these guarantees, and may be made between regular trips; may be made on lay-off days; or may be made before or after completion of the trip. If extra service is made between trips, which go to make up a day's assignment, such extra service will be paid for on the basis of miles or hours, whichever is the greater, with a minimum of one hour. Extra service before or after the completion of a day's work will pay not less than the minimum day.

The basis of pay for extra service applies only in making up the guarantees. After guarantees are absorbed, schedule provisions for extra service apply.

(b) When a regularly assigned passenger man lays off of his own accord or is held out of service the extra man will receive the same compensation the regular man would have received, and the amount paid the extra man or men will be deducted from the amount the regular man would have received had he remained in service, the sum of the payments to the man, or men, who may be used on the run equaling the monthly guarantee.

(c) Reductions in crews or increases in mileage in passenger service from assignments in effect January 1, 1919, shall not be made for the purpose of off-setting these increases in wages, but nothing in this order is understood to prevent adjustment of runs in short turn-around and suburban service that are paid under minimum rules, for the purpose of avoiding payment of excess mileage, or overtime that would accrue under these rules without reducing the number of crews. Such runs may be rearranged, extended or have mileage changed by addition of new train service; separate pools or assignments may be segregated or divided; provided that crews are not taken off or reduced in number. Added mileage up to mileage equaling the mileage rate divided into the guaranteed daily rate does not change, take from or add to the minimum day's pay, and this added mileage is not to be construed as "increase in mileage" within the meaning of this article.

(d) For the purpose of avoiding payment of excess overtime on turn-around runs in passenger service when any part or leg thereof is over 80 miles, the railroads will be privileged to rearrange runs, combine pools or sets of runs, and may establish interdivisional runs excepting when this may be prohibited by provisions of existing agreements, such runs to be paid for in accordance with the mileage schedules of this order, but in no case less than the combination of trip rates in effect at the date of this order.

FREIGHT SERVICE

ARTICLE V—Rates of Pay

(a) For service paid the through freight rates under schedules in effect prior to January 1, 1919, the rates shall be as follows:

Class	Per mile	Per day
Conductors	5.40c.	$5.40
Flagmen and Brakemen	4.08c.	4.08

(b) For service paid the local or way freight rates under schedules in effect prior to January 1, 1919, the rates shall be as follows:

Class	Per mile	Per day
Conductors	5.92c.	$5.92
Flagmen and Brakemen	4.48c.	4.48

MILK, MIXED AND MISCELLANEOUS TRAIN SERVICE

(c) The same increases shall apply to milk, mixed and miscellaneous train service as are applied to the service in which they are now classified. Where there is a separate rate for milk, mixed or miscellaneous classes of service, it shall be increased in the same amount, compared with the rates in effect December 31, 1917, as the through freight or passenger rate, according to the overtime basis on which it is calculated.

ARTICLE VI—Basic Day and Overtime

(a) In all road service, except passenger service and where under mileage schedules a more favorable condition exists, 100 miles or less, eight hours or less (straight-away or turn-around), shall constitute a day's work. Miles in excess of miles required for a minimum day will be paid for at the mileage rates provided.

(b) Where there is no existing agreement regarding overtime provisions more favorable to the employees, on runs of 100 miles or less overtime will begin at the expiration of eight hours; on runs of over 100 miles overtime will begin when the time on duty exceeds the miles run divided by 12½. Overtime shall be paid for on the minute basis, at not less per hour than one-eighth of the daily rate.

ARTICLE VII—Guarantees

(a) Regularly assigned way freight, wreck, work and construction trainmen who are ready for service the entire month and who do not lay off of their own accord, will be guaranteed not less than 100 miles or eight hours for each calendar working day, exclusive of overtime (this to include legal holidays). If, through act of Providence, it is impossible to perform regular service, guarantee does not apply.

(b) Crews may also be used in any other service to complete guarantee when for any reason regular assignment is discontinued, but such service shall be paid for at schedule rates unless earnings from such rates would be less per day than would have been earned in regular assignment.

ARTICLES VIII, IX and X—(Same as in Supplement 15)

ARTICLE XI—Beginning and Ending of Day

(a) In all classes of service trainmen's time will commence at the time they are required to report for duty, and shall continue until the time they are relieved from duty.

(b) Trainmen in pool or irregular freight service may be called to make short trips and turn-arounds with the understanding that one or more turn-around trips may be started out of the same terminal and paid actual miles with a minimum of 100 miles for a day, provided, (1) that the mileage of all the trips does not exceed 100 miles, (2) that the distance run from the terminal to the turning point does not exceed 25 miles, and (3) that trainmen shall not be required to begin work on a succeeding trip out of the initial terminal after having been on duty eight consecutive hours, except as a new day subject to the first in-first out rule or practice.

YARD SERVICE

ARTICLE XII—Rates of Pay

Class	Per day: Denver Differential Territory	Per day: All other Territories
Foremen	$5.44	$5.33
Helpers	5.11	5.00
Switchtenders	4.00	4.00

Where rules of existing schedule agreements provide that switchtenders are paid helpers' rates, such rules will be continued.

ARTICLES XIII to XXIII—(Contain Provisions Similar to Supplement 15)

INTERPRETATIONS

(c) Questions and answers on interpretations of certain articles of this order are listed below:

ARTICLE 1

Question 1—Do train auditors or ticket collectors who are not transportation employees and who have no status as such, come within the provisions for ticket collectors?

Answer—No.

Question 2—Shall baggagemen, flagmen or brakemen who assist conductors in collecting tickets and fares receive the rate provided for assistant conductors or ticket collectors?

Answer—Only where designated and classified as assistant conductors or ticket collectors.

Question 3—In view of different rates being provided for baggagemen handling express, and baggagemen not performing such work, how will

baggagemen handling express on certain days and not handling it on other days be compensated?

Answer—On any day where express is handled the combination rate will apply for that day; in such cases minimum monthly guarantee shall apply.

Question 4—Does the provision for higher rates for handling express cancel all existing understandings between the managements and the men in regard to bonuses or special compensation that they have heretofore received from either their road or the express company for handling express?

Answer—Yes; provided the new rates do not reduce previous combined earnings.

ARTICLE III

Question 1—Under certain conditions, crews operate round trip service in the morning and again late in the evening. Will it be permissible to pay for each of these services on the basis of a day subject to the rule, or will it be necessary to apply the rule regardless of whether the service is paid two days or more?

Answer—Pending the report and findings of board herein provided for, service is to be operated in accordance with present practice.

Question 2—Will it be permissible for the managements to definitely assign crews on the basis of a minimum day in each direction?

Answer—Yes (in accordance with decisions of Commission of Eight and Arbitration Boards).

Question 3—May railroads which have a common overtime basis applicable to passenger service, as described in Sections (a) and (b), adopt Sections (a) and (b)?

Answer—Sections (a) and (b) of Article III apply to all passenger service.

Increases for Express and Sleeping and Dining Car Employes

Supplement No. 17 to General Order No. 27 was issued on April 14, covering employees in sleeping and parlor car service of the railroads in Pullman Car Lines and Supplement No. 18 to General Order No. 27, covering employees in dining car departments.

The order covering employees in sleeping and parlor car service provides increases of $25 per month above the basic minima in effect as of January 1, 1918. These basic minimas are practically the rates then in effect. There were some variations in monthly rates at that time and the basic minima are established for the purpose of producing uniformity.

Approximately 50 per cent of these advances were given by General Order No. 27, issued May 25, 1918. Approximately 12,000 employees are affected by this order.

The order covering employees in dining car departments also provides approximate increase of $25 per month above basic minima as of January 1, 1919. In this case also approximately 66 2/3 per cent of the increases were absorbed by General Order No. 27. Approximately 10,000 employees are affected by this order.

Both orders are effective May 1.

Supplement No. 19 to General Order No. 27 affecting employees of the American Railway Express Company, which is under federal control, was also issued on April 14.

The order provides an increase of $25 per month above the rates in effect January 1, 1918, or an average of about $15 per month per man over the rates now in effect. About 69,000 employees are covered by this order.

For sleeping and parlor car conductors basic minimum rates for a monthly mileage of 11,000 miles or less are established, ranging from $115 to $145 a month, according to length of service. Mileage in excess of 11,000 will be paid for at the rate of 1.1 cents per mile. For sleeping, parlor, buffet and club car porters, not required to perform kitchen service, a minimum rate of $60 is established for 11,000 miles or less, excess mileage to be paid for ot the rate of .55 cents per mile. Bonus payments in addition to established wages will be discontinued.

For dining car, buffet, cafe and club car employees minimum monthly rates are established ranging from $115 to $145 for stewards, $115 for assistant stewards, $100 to $130 for chefs or first cooks, $80 to $95 for second cooks, $55 to $70 for third and fourth cooks, $65 for waiters in charge without stewards and $55 for waiters, with minimum rates for excess mileage. Another scale of rates is prescribed for restaurant employees, boarding car employees and camp employees.

In addition to the above, schedules are prescribed for both sleeping, dining and express employees for terminal time.

Accident Bulletin No. 68

THE INTERSTATE COMMERCE COMMISSION has issued quarterly accident bulletin No. 68, showing the number of railroad accidents occurring in the United States during the months of April, May and June, 1918. In train accidents 79 passengers, 110 employees, and 26 other persons were killed; and 1,318 passengers, 937 employees, and 134 other persons were injured; a total of 215 persons killed and 2,389 injured. Of the passengers killed 65 were victims of collisions and 14 of derailments.* Other totals for the quarter are shown in the following comparisons with the quarter ending with June, 1917:

	1918	1917
Passengers killed in train accidents	79	1
Employees killed in train accidents	110	85
Total persons killed in train accidents	215	128
Total persons killed, all causes	2,043	2,264
Total persons injured, all causes	15,535	15,698
Non-train accidents—		
Industrial employees killed	103	100
Industrial employees injured	27,722	31,147
Other persons killed	24	26
Other persons injured	462	597

Of the 15,535 persons injured in this quarter the bulletin says that 165 have been reported by the railroads as dying more than 24 hours after the time the injuries were received.

The total number of collisions in the quarter was 2,216 and of derailments 3,296. These and other data are shown in tables No. 10 and No. 11, from which we take the following comparisons:

SUMMARY OF TRAIN ACCIDENTS, THREE MONTHS, WITH RATIOS TO MILEAGE

	1918	1917
Collisions, number	2,216	2,084
Number per million locomotive-miles	4.78	4.63
Damage to railway property	$1,450,980	$1,794,240
Derailments, number	3,296	3,070
Number per million locomotive-miles	7.11	6.81
Damage to railway property	$3,349,790	$2,730,130
Locomotive boiler accidents, number	66	71
Number per million locomotive-miles	0.14	0.16
Damage to railway property	$28,860	$79,240
Other locomotive accidents, number	74	71
Number per million locomotive-miles	0.16	0.16
Damage to railway property	$30,110	$23,190
Miscellaneous train accidents, number	542	341
Number per million locomotive-miles	1.17	0.75
Damage to railway property	$210,620	$250,750
Total number of accidents	6,194	5,637
Number per million locomotive-miles	13.36	12.51
Damage to railway property	$5,070,360	$4,877,550
Number of locomotive-miles	463,693,866	450,561,714

Of the 2,216 collisions, 236 were rear and 94 were butting; and of the 119 non-trespassers killed in collisions, 99 are charged against these 330 collisions; but of the total damage ascribed in the report to collisions—$1,450,980—more than 62 per cent is charged to the miscellaneous classes not included under the head of rear or butting.

From table 13, classifying accidents to shopmen, trackmen, etc., not connected with the movement of trains, we make the following extracts:

NON-TRAIN ACCIDENTS ON THE RAILROADS OF THE UNITED STATES: QUARTER ENDING JUNE 30, 1918

	Killed	Injured
1—Class 1 roads, industrial accidents	97	26,868
2—Shopmen (included in Item 1)	32	16,188
3—Trackmen (included in Item 1)	25	4,749
4—Class 1 roads, other non-train accidents	18	421
5—Class 1 roads, total	115	27,289
6—Roads of Class 2, Class 3 and Switching	12	895
7—Total non-train accidents	127	28,184
8—Millions of man-hours on Class 1 roads, shopmen	390.32	
9—Millions of man-hours on Class 1 roads, trackmen	261.57	
10—Casualties per million man-hours, shopmen	41.56	
11—Casualties per million man-hours, trackmen	18.25	

*Among the notable collisions occurring in this quarter were those at Schodack Landing, N. Y., May 13; Rittman, O., June 4; Burlington, Vt., June 5, and Ivanhoe, Ind., on June 22. In the last named collision 59 passengers were killed. Among the derailments reported is Columbia, S. C., May 10, in which nine passengers were killed. This derailment occurred on the tracks of the military reservation at Camp Jackson, and facts concerning the cause are now published for the first time. The inspector of the Interstate Commerce Commission finds that the derailment was due to a weak rail joint. The train was moving at only about ten miles an hour, but a wooden coach fell off a trestle and landed bottom side up. The track appears to have been insecure because of a lack of suitable angle bars, necessitating the use of spikes to hold the rails in line; and some of the spikes had worked loose. The collision at Rittman was caused by an operator making an error in copying a train order. This operator, about 3 a. m., received an order over the telephone giving an extra train the right from Silver Creek to Rittman; "he copied the order about ten times, for practice, and in doing so erroneously inserted Sterling in place of Rittman." This operator was sixteen years old and had been employed about two months and a half; he had no book of rules, and had had very little instruction as to his duties.

The percentages shown in items 10 and 11 include both the killed and the injured, and the shopmen appear to have suffered much worse than did the trackmen; but taking the killed alone, the numbers per million man hours are: shopmen .08198; trackmen, .09557. In the bulletin for the preceding quarter, bulletin No. 67, the number of shopmen killed on class 1 roads is given as 62, or nearly twice as many as in bulletin 68. Trackmen killed by being struck or run over by trains (the number of which is not shown in this bulletin) would largely increase the ratio of killed in this class.

Sixteen pages of the present bulletin are filled with reports of the investigations of accidents made by the Bureau of Safety.

Price Controversy Up to President

PRESIDENT WILSON has been called on to settle the controversy between the Railroad Administration and the Industrial Board of the Department of Commerce over the steel prices, which involves the entire price stabilizing policy of the board and which came to a head at a conference on April 10 when Director General Hines announced his final decision not to accept the steel and iron prices, proposed by the board, as being reasonable either for the present or for the future. Following the conference, which was attended by Mr. Hines and his advisers on purchasing matters, and George N. Peek, chairman of the Industrial Board, Mr. Peek declared that all the facts would be laid before the President by cable and announced his intention to maintain his contentions unless over-ruled by the President, although he stated that this would put a temporary check on the work of the board. Mr. Hines explained his position in a statement, saying in part:

"It has been perfectly clear to me throughout, and I think it is now generally understood, that no power was conferred on the Industrial Board to impose any prices upon the Railroad Administration, but that it retained the power and also was under a duty to exercise its own judgment in respect to this important matter. Throughout the discussion in the Industrial Board itself, Mr. Powell, the representative of the Railroad Administration, indicated that the final approval of any prices so far as the Railroad Administration was concerned rested with the director general himself. Mr. Powell objected that not only the prices on steel rail but the prices generally were unreasonably high, and before the committee announced its action he positively stated that the Railroad Administration would not agree to buy at the proposed prices."

Mr. Hines then recounted the various conferences which had been held on the subject. After the Industrial Board had announced the prices he took the matter under consideration with his advisers in purchasing matters, John Skelton Williams, R. S. Lovett and Henry Walters, members of the Advisory Committee on Purchases; T. C. Powell, director of the Division of Capital Expenditures, and Henry B. Spencer, director of the Division of Purchases, who, before taking action, consulted Chairman Culver of the Federal Trade Commission as to questions of cost of steel production, and expressed the unanimous opinion that the prices were too high.

Subsequently, the suggestion was made that a further conference take place between representatives of the Railroad Administration and the Industrial Board, and he arranged for Messrs. Lovett, Walters and Spencer to rediscuss the entire subject with the Industrial Board. He requested the Interstate Commerce Commission to delegate one of its members to attend this conference and Commissioner McChord was so designated. The result of prolonged discussion was that all his advisers, including Mr. McChord, were confirmed in the opinion that the prices were too high. Afterwards, Mr. Peek raised the question whether it would be worth while to get the views of the representatives of the steel industries, and Messrs. Lovett, Walters and Spencer met with Mr. Peek and such representatives at New York on April 9. As a result of this discussion the railroad representatives were again confirmed in the opinion that the prices were too high.

"In view of these considerations," Mr. Hines said, "I cannot do otherwise than to announce definitely that I must decline to endorse these prices as being reasonable either for the present or for the future. To the extent that the Railroad Administration finds it necessary to make purchases it will continue to make them on the best terms obtainable by fair and just methods, with full recognition of the principle that a government agency with large purchasing power must be particularly careful not even to attempt action which could be regarded as oppressive.

"The object of the Railroad Administration throughout has been to obtain a fair and reasonable price level. It has never contemplated that it should get a lower price level than the general public. If the Industrial Board can assist in bringing about levels of prices at which the Railroad Administration will feel justified in buying its co-operation will be welcomed.

"In the newspaper discussions of this matter the suggestion has at times occurred that the principal thing is to establish some price which the government will endorse to the end that the public will begin buying at that price, and that the mere establishment of a price for this purpose is more important than the intrinsic reasonableness of the price itself. I cannot agree with this principle. I am keenly alive to the great desirability of stimulating business in every reasonable way, but I believe in the long run that the endorsement by a government purchasing agency of an excessive price level would be harmful to the public interest and would not bring about confidence, and that the end sought to be obtained will come only by reaching a price level which the public itself shall consider to be reasonable.

"I believe one of the greatest problems that confronts this country is that of getting prices back to a reasonable level and I believe progress in that direction will be seriously retarded by the approval by a governmental purchasing agency of prices which it deems excessive."

Statement by Mr. Peek

After conference with Secretary Redfield of the Department of Commerce, Mr. Peek issued a statement charging in effect that the director general's reasons for refusing to accept the prices were based on opinion only and charging him with a purpose to exert a power of monopolistic buying.

"The public must be informed of the magnitude of the solemn responsibilities assumed by the director general in this important decision," he said. "The Industrial Board was formed to carry out a perfectly definite industrial policy to which the government, represented by the President, the cabinet and the director general, was fully committed. There is no ambiguity either in the record or in the minds of the people as to just what that policy is—it is to avoid industrial stagnation pending a return from war to peace prices, to start the wheels of industry, give employment to labor, to reduce the cost of living, to insure prosperity. Neither is there any ambiguity as to the methods to be employed. A scientific study of costs of production is to be made. Upon these studies prices are to be determined which shall be as low as cost of production will permit, which shall squeeze out all speculative or opportunist profit, and upon which industry can commence operations without fear of any considerable drop in the market. To the complete success of this plan, however, there was one absolute essential, that the govern-

mental departments should express the confidence of the government in the execution of this most important policy. Especially is this true in respect of steel rails, in the buying of which the government, through its control of the railroads, consumes a very large percentage of the output. At this late date this important essential to its success has been denied by the director general and by that denial the labor of the Industrial Board is set at naught and the government is exhibited as setting up an industrial policy with one hand and destroying it with the other."

Mr. Peek conceded the technical prerogative of the Railroad Administration to refuse to accept the prices, but said the board feels that the Railroad Administration is under a powerful obligation either to have the governmental policy abandoned by the same source that announced it and assume full responsibility for the inevitable effect of such a step, or to support the policy, or to demonstrate that the board has failed in its function and that the prices announced are not fair. He declared that, contrary to Mr. Hines' statement, the representative of the Railroad Administration on the board dissented only on the price of rails and that the figures representing costs of production had not been contested.

"In fairness to the Railroad Administration, it must be admitted," Mr. Peek said, "that by using the full effect of its power of monopolistic buying it might secure a price on rails somewhat lower than that announced by the Industrial Board. The figures stand to prove, however, beyond all question, that such a price would be lower than the production costs of any but one or two of the most highly organized, powerful and lowest cost producers. For example, the pre-war price of rails was $30. The increase over pre-war costs of production for the United States Steel Corporation in direct labor alone, excluding labor in transportation, is reported by that corporation to be $19.48 per ton. The price approved by the Industrial Board was $47, or $2.48 less than the increase of cost of labor alone would account for."

The inevitable result of the use of the buying power of the Railroad Administration to reduce any price, Mr. Peek said, would be either to increase prices to the public, throw all railroad business into a monopoly of powerful producers, or reduce wages, but these results are much less important than the frustration of the industrial policy of the government and the forced return to the period of commercial and industrial stagnation, which has continued since the signing of the armistice and which threatens to continue or grow worse in the absence of a strong governmental policy alleviating it. It is not the opinion of the board that governmental organization is such that important policies can be so lightly frustrated.

The facts were cabled to the President by both Mr. Hines and by Secretary Redfield. The President had not up to that time replied to any of the messages sent him in connection with the controversy.

Mr. Hines Replies to Mr. Peek

In reply to Mr. Peek's statement Mr. Hines said in part:

"The controlling point is that the director general has the personal responsibility of deciding whether he is justified in approving those prices or not, and being unable to escape the belief that the prices are excessive, he has not approved them.

"Mr. Peek says that the government has set up an industrial policy with one hand and torn it down with the other. The fact is ,however, that the industrial policy which has been interfered with is one which was not set up by the government, but appears through some misconception to have been initiated by the Industrial Board itself. The policy authorized by the government was the policy of establishing a committee which would endeavor to bring government purchasing agencies, including the Railroad Administration, and producers of certain commodities together, by voluntary action, on reduced prices at which the government purchasing agencies including the Railroad Administration would be justified in buying freely. Mr. Peek entered upon a very different policy of fixing prices with a virtual insistence that the Railroad Administration must buy at those prices regardless of its judgment. His committee even proposed the prices as being prices below which the general public ought not to expect to buy during the rest of this calendar year. His real cause of chagrin at the present time is that the policy thus set up without government authority is not supported by the Railroad Administration as to steel prices when the Railroad Administration is convinced that those prices are excessive.

"Mr. Peek also professes great alarm at the consequences that will result from the steel interests of the country being subjected to the monopolistic buying power of the Railroad Administration. If I am not mistaken, one of the gravest causes of concern to the people of this country for many years, has been the persistent suspicion that the country was subjected to the menace of a monopolistic selling power on the part of the steel interests and therefore I do not believe the country will share Mr. Peek's alarm that the Railroad Administration's purchasing power of steel will be prejudicial to the public interest. I believe the same considerations will keep the public from being alarmed by Mr. Peek's suggestion that all railroad purchases of steel will be thrown into a 'monopoly of powerful producers.' I have already made it clear that the Railroad Administration will make purchases on the best terms obtainable by fair and just methods, with full recognition of the principle that a government agency with large purchasing power must be particularly careful not even to attempt action which would be regarded as oppressive. The carrying out of this policy will not justify 'reductions in wages' as Mr. Peek indicates, nor 'increasing prices to the public.' On the contrary the public will greatly benefit by the Railroad Administration's refusal to approve these unreasonably high prices.

"It is important to emphasize that the interest of the Railroad Administration is not merely in the price of steel rail but in steel prices generally. This is true because the railroads purchase three or four times as much tonnage of other steel products as they purchase of steel rail. But further than this the Railroad Administration is vitally interested in prices on steel articles generally which will encourage a revival of industry. In the conferences Messrs. Lovett and Walters have constantly stressed the interest of the Railroad Administration in steel prices generally and emphasized the unreasonable differentials which have resulted in the prices of many steel articles of great importance both to the railroads and general industry being placed far too high in comparison with the price of billets proposed by the steel interests and adopted by the Industrial Board."

Secretary Redfield's cable asked the President to indicate whether the board should discontinue its efforts at once or whether it should continue until the President returns and a policy can be formulated. It was followed by a letter accompanied by the various documents. Fuel Administrator Garfield had previously cabled the President, supporting Mr. Peek's attitude. The cabinet officers generally, except Mr. Redfield, are supporting Mr. Hines.

The seventh annual meeting of the Chamber of Commerce of the United States is to be held at St. Louis, April 28 to May 1, and representatives of business from 48 states will express their views on policies and principles, and will advance detailed programs as to carrying them out. The subjects for discussion include the disposition and operation of the railroads and merchant marine; proposed revision of anti-trust legislation; the future of public utilities; foreign relations and foreign trade; agriculture; industrial production; waterways and highways; industrial relations; international commercial arbitration; finance and Victory Loan. Walter D. Hines is one of the speakers.



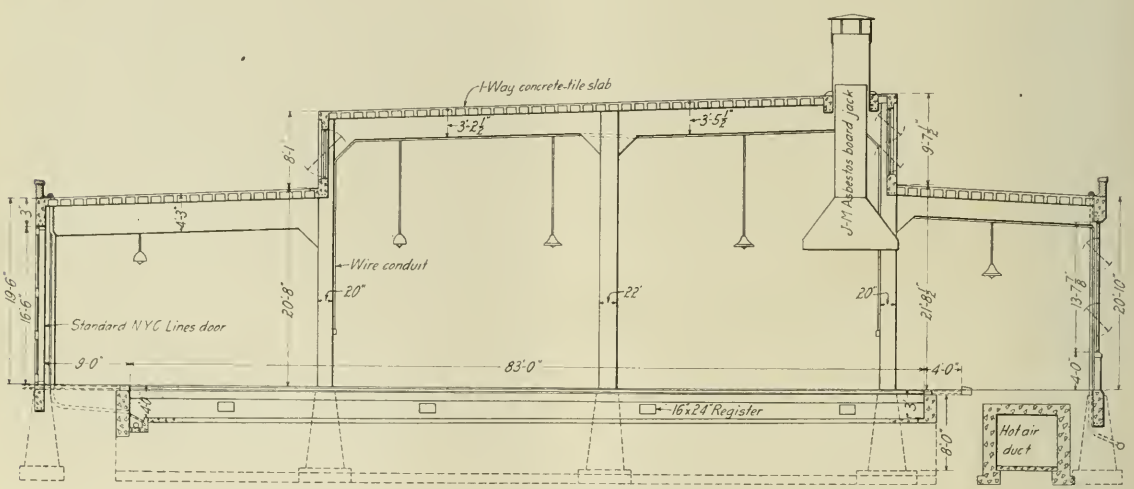
South Half of the Roundhouse with Office on the Left

A Complete Modern Engine Terminal Installation

Reinforced Concrete Roundhouse for the Toledo & Ohio Central Is an Example of Modern Construction

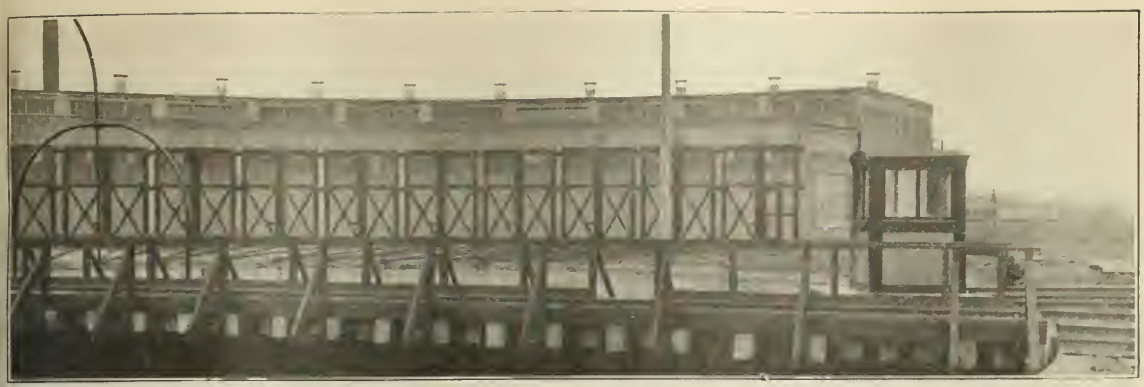
A NEW 20-STALL reinforced concrete roundhouse recently completed for the Toledo & Ohio Central at Columbus is one of a number of engine terminal projects undertaken since the advent of government operation of the railroads, and represents an interesting tendency of the present day in engine house design. It replaces a small engine terminal that has proven inadequate both as to the capacity of the house and the area and arrangement of the approach yard and auxiliary facilities. Three factors contributed to the successful completion of the project in spite of wartime difficulties—the completion of plans for the terminal in advance of the award of the contract, the entire avoidance of any interference between the construction of the new terminal and the operation of the old one, and the effectiveness of the contractor's organization.

The site of the terminal was particularly fortunate since adequate space was found available in close proximity to the freight terminal yard which permitted construction to proceed without any interference with the existing engine terminal, yet providing for an arrangement of the approach tracks in such a way as to require but little change in the routing of engines to and from the terminal. In fact the new routing is similar to the old one, and while the length of the approach is somewhat greater, this increased distance is taken up largely in providing greater track capacity. The old terminal is located at the east end of the McKinley avenue freight yard while the new one is at the west end, at the corner of McKinley and Grand View avenues. The entire plant consists of a roundhouse, a shop building and power plant, a coal, oil and locker building, two cinder conveyors, a 70,000-gal. water tank and a coaling station.



Longitudinal Section of a Stall

The lead to the terminal consists of four tracks, two inbound and two outbound, with the latter on the outside. These four tracks are independent all the way from the turnout to the table, it being the idea to provide a progressive movement in one direction on each track, with the engines receiv-

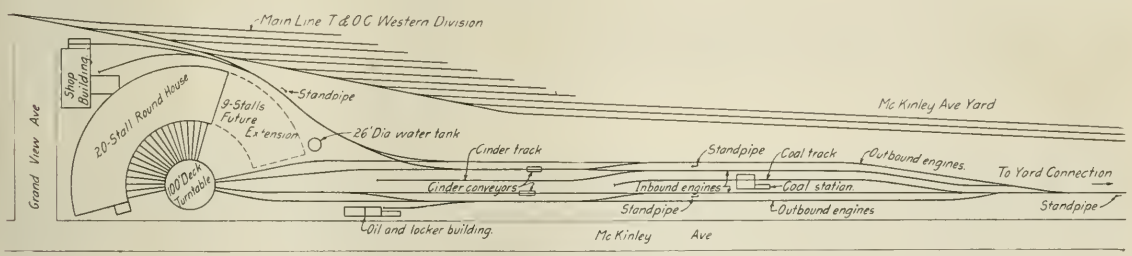


North Half of the Roundhouse

ing coal and water and dumping cinders while on the inbound movement and water only on the outbound movement. However, crossovers are provided between the inbound and outbound tracks of each pair so that engines may come in for coal and water or even to dump cinders and back out over the crossover onto the outbound track with a minimum of interference with the regular operation of the terminal. A track connecting with the north inbound and outbound tracks near the roundhouse affords a direct connection with the west end of the yard and serves also as a lead to the coal dock at the power plant.

The coaling station is a Roberts & Schaefer plant of 500-tons capacity with a complete sand drying plant in addition. The coal track for the station is located between the two inbound tracks and passes over a track hopper underneath the superstructure of the station. The cinder plant consists of two Robertson cinder conveyors, dumping into cars on a track between the two inbound leads. Provision has been made for installing two additional conveyors in case they are found necessary.

Water is delivered to the engines by four stand pipes. The water is stored in a 70,000-gal. redwood tank on a creosoted trestle frame. The new tank is supplied from the tank and treating plant located at the old terminal, but since the old tank is 10 ft. lower than the new one, the latter cannot be completely filled by gravity, so an automatic booster pump has been installed to supply the new tank. A further insurance against failure of supply is a direct connection with the city water supply.



Track Layout of the New Engine Terminal

Room for Future Extension

The roundhouse has been built for 20 stalls with provision for a future addition of 9 more. The stalls are 110 ft. deep with door posts 14 ft. center to center, while the width of the stalls at the rear is 25 ft. 11 in. The turntable is 100 ft. in diameter, designed for an equivalent of E-70 loading and supported on a conical roller center with an extra-heavy electric tractor furnished by George P. Nichols & Bro., Chicago. As shown in the photograph the tractor is supplied with electric current from an overhead collector.

For the purpose of obtaining fire proof construction the roundhouse was built of reinforced concrete with brick curtain walls. As shown in the longitudinal section of the house, the framing consists of a subdivision of the house into four circumferential bays. The roof over the two interior bays is raised to about 9 ft. above the two outside bays to give a monitor construction, affording better illumination and ventilation through the use of the maximum amount of window area in the two sides of the monitor. The same treatment is used in the outer wall of the roundhouse in which all of the space between the columns from a height of four feet to the underside of the wall girder is used as window space. United steel sash are used for the outer wall windows as well as for the monitor windows, horizontal pivoted sections being introduced to afford ventilation. An interesting detail in connection with the outer wall is the arrangement of the brick work under the windows in three independent parts, separated by vertical construction joints. In the event of an engine pushing out the rear of the house, the middle section of this wall would be carried away with little or no damage to the side portions.

An interesting adaptation of specialized reinforced concrete construction is the use of a one-way tile slab in the roof. The air spaces in these tiles are expected to affect a material reduction in the condensation from the underside of the roof in cold weather. The roof is covered with Barrett composition roofing.

In accordance with modern practice the roundhouse pits are of concrete 3 ft. 11 in. wide, by 3 ft. to 4 ft. deep and slope toward the door end where catch basins have been installed. Down spouts from the roof attached to the door posts drain into these catch basins which in turn empty into the

exterior drainage system consisting of a 12 in. sewer pipe leading to a settling basin in the yard. This was provided to remove sludge from the blowout water before allowing it to enter the sewers.

Stalls 17, 18 and 19 are intersected by a driver-removal pit, 7 ft. 6 in. wide by 6 ft. 10 in. deep, and stalls 18 and 19 by a truck wheel pit, 4 ft. wide by 4 ft. 9 in. deep. Each of these special pits is equipped with a 24-in. gage track for wheel trucks. An interesting detail has been worked out as shown in the drawing in connection with these special pits to facilitate the handling of the rail beams which carry the pit tracks over the special pits. The heavier of these girders weigh 690 lb. each, which is too great a load to be handled conveniently by hand. Accordingly T-bars have been provided to span across the pits as shown. The rail girder is pivoted on one side of the stall and the T-bar at the other side. When it is necessary to swing the girder out of the way, the T-bar is swung out across the pit and its upper surface serves as a support for the free end of the girder as it is swung across the pit. Rails are secured in place on the side walls of the pits by means of clip bolts fitted into slots imbedded in the concrete. The upper portions of the pit walls are broadened out to afford adequate space outside of the rails for the support of jacks.

Carefully Planned Illumination

Special attention was given to the lighting arrangement. Five lighting fixtures have been installed in the lines of columns between the stalls. As indicated on the longitudinal section of the house each fixture consists of a lamp socket attached to a section of pipe conduit and equipped with an enameled steel reflector. To light the passageways along the front and rear of the house every other lamp in the front row of lights is connected up in one circuit controlled by a master switch, while another switch controls the alternate lights in the outside row. The other four lamps in each row are controlled by local switches so that any stall may obtain additional light as needed. Supplementary to these lights there are outlets on two posts between each pair of stalls for extension cord lamps. There is also a socket at the rear of every second stall for an electric welding circuit. Illumination of the engine terminal outside of the roundhouse has been provided by installing flood lights on the top of the coaling station.

Hot Air Heating System

The roundhouse is heated by a hot air, forced draft system from a fan and heating coils in the power house. The air is conducted from this heating plant through a system of conduits having a main duct leading along the rear of the house with branches between the stalls terminating in registers of 16 in. by 24 in. size in the engine pits, equipped with adjustable shutters.

The power house and shop building is a structure 60 ft. by 120 ft. connected to the roundhouse proper by a wing 40 ft. by 55 ft. It has a steel frame with brick curtain walls and wooden roof construction following a standard design used by the contractor and for which he was able to supply the steel frame ready to erect. This building consists of a boiler room equipped with two 250-hp. Union Iron Works water tube boilers with Jones automatic stokers fed by hand. The coal is received from cars by dumping from a low trestle so that the hand work is limited to transferring the coal from the pit under the trestle to the stoker hoppers. Adjacent to the boiler room is an engine room containing a two-stage air compressor with a capacity of 1,250 cu. ft. of free air per min. to 110 lb. pressure. This air is used to supply the ash conveyors, sand plants and two miles of 1½-in. train charging line in the yard.

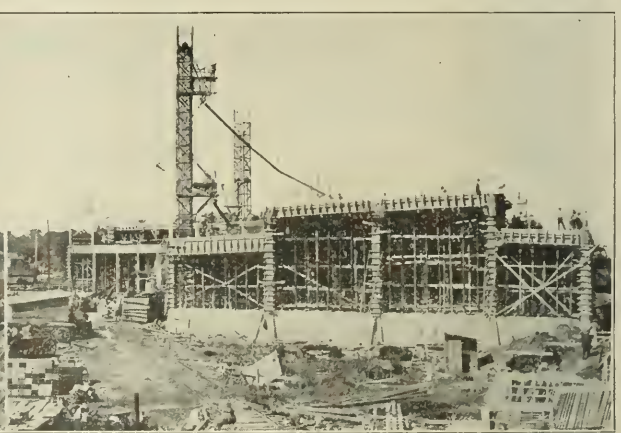
The heating plant consists of a Sturdevant fan blowing air through the coils, receiving exhaust steam from both the fan engine and the air compressor, although in cold weather



Interior of the Roundhouse During Construction



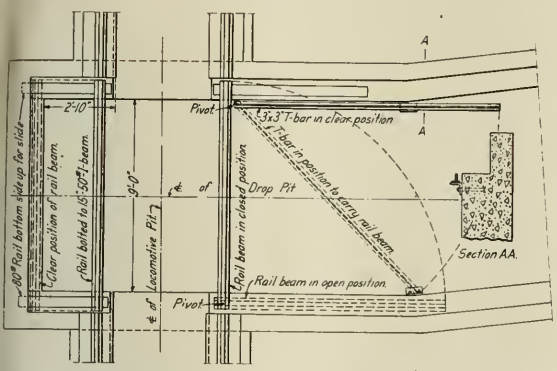
Engine Terminal Site on June 28, 1918



Progress on the Roundhouse on September 15, 1918

it will be necessary also to use live steam direct from the boilers. The fan and ducts are designed of adequate capacity to supply air to the nine additional stalls contemplated in the design of the engine terminal. The remaining space in the shop and power plant building is used as a machine shop, air brake room and store room, with a toilet for the roundhouse employees.

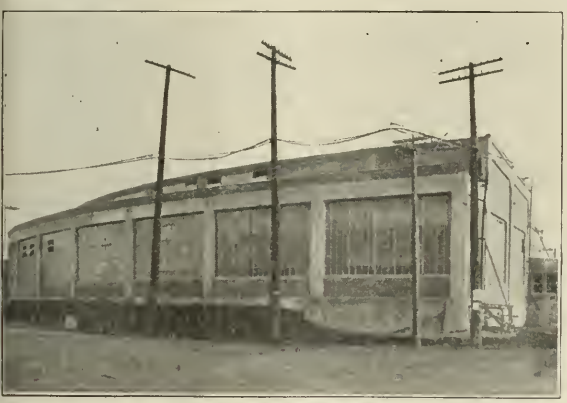
Another auxiliary facility of the terminal is an oil house and locker room for the enginemen. This consists of a building 76 ft. 4 in. long by 22 ft. wide, with a platform 40 ft. by 10 ft. 8 in. It is one-story high, with a basement,



Special Arrangement to Facilitate Handling of Rail Girders Over Drop Pits

and as it is located adjacent to McKinley avenue, and as the level of the engine terminal is considerably above that of the street, the structure is virtually two stories high on the street side.

One end of the first floor is used for a locker room for the enginemen, with a small space partitioned off for the engine despatcher, while the other end is used for an oil room



Rear of the Roundhouse Showing the Large Expanse of Glass

and the basement underneath for oil storage tanks. Further tank space is provided under the platform, which is supported on concrete walls extending to the natural ground level. The oil is handled by a complete installation of Bowser pumps. The walls of this building are brick and the floors and roof are of reinforced concrete, except in the enginemen's room, where the floor is on cinder fill.

Construction

The level of the ground in the engine terminal is about 7 ft. above the natural ground surface of that of the adjoining street and it was necessary to provide about 100,000 cu. yd. of filling material, about 50 per cent of which was granulated slag. Owing to this difference in elevation it was necessary to support the walls and columns of the roundhouse considerably above the original ground surface. To do this with any economy it was found desirable to support the walls on reinforced concrete girders spanning between pedestals. In the case of the roundhouse pits, however, the full section of the wall was extended to the foundation level but the floors of the pit were placed on back filled material. The excavation for the turntable pit was made with teams and slips, but that for the roundhouse pedestal foundation was done by hand.

Cement was delivered in cars but sand was brought to the work by motor trucks from the washing plant near by. Water was pumped from the Scioto river about 500 ft. away. The concrete for the roundhouse was poured from two concrete towers, one in the front and one in the rear of the house. In addition to these a third mixer was used for a part of the pits and the pedestals. The two towers are shown in the illustration on the preceding page. The tower on the inside of the house was used for concreting a large portion of the front of the building and about ten complete stalls on one end, whereas the tower in the rear was used for pouring the other 10 stalls of the superstructure and a considerable portion of the rear of the building.

The plans for this work were prepared by the engineering department of the Toledo & Ohio Central, at Columbus under the direction of J. A. Stocker, chief engineer and C. V. Bucher, assistant engineer, who were also responsible for the supervision of the construction. The Austin Company, Cleveland, Ohio, had the contract for the roundhouse and other building work with the exception of the coaling station and was later given a contract for the filling and the equipment work.



From the Buffalo Courier

Nothing to Do but Walk

Waterway Policy of the Railroad Administration

The Director General Outlines the Government's Intentions to a Number of Senators and Representatives

WALKER D. HINES, director general of railroads, has addressed a letter to Senators Duncan Fletcher, Joseph E. Ransdell, W. L. Jones, and Representatives John J. Esch, Samuel E. Winslow, J. Hampton Moore, John H. Small, and Charles A. Kennedy, in response to a letter addressed to him by them under date of March 12 containing a series of questions as to the waterways policy of the Railroad Administration. Mr. Hines says in part:

It is my conviction that water transportation lines, at least such as are financially and physically equipped to discharge the duties of common carriers, and to effect transfers of traffic on an economically sound basis, should be co-ordinated and correlated with the whole transportation system of the country. This necessarily implies that there should be no obstructions to an interchange of traffic between rail and water on terms substantially equal to those between rail carriers, and that through billing and through bills of lading should be adopted under such conditions between the rail carriers and responsible water carriers, but this, of course, would require that on such traffic the water carriers would be subject to the Act to Regulate Commerce. I have reference, of course, to waterways with permanent channels.

Each waterway and the service thereon presents a different problem; on some waterways there is no responsible organized transportation with which traffic could be interchanged by the rail carriers with any degree of regularity; on others the absence of transfer facilities would make the transfer of traffic between rail and water involve such a heavy labor cost as to render the rail and water traffic hopeless from an economic standpoint. On others, including the present government projects, joint through rates and billing have been or are in the process of being arranged to and from points which are reasonably tributary to the water lines, with the necessary divisions of the revenue applicable to each party carrier. I attach great importance to making a success of the present governmental experiments, because I believe success there will point the way to further developments of other waterways.

The attitude of the Railroad Administration with respect to the relation between water and rail competitive rates is that the rates should bear a relation to each other proportionate to the cost and desirability of the service by the respective routes and methods of transportation. There is no doubt that in the past the relations between the rail and water rates have not always been determined on this basis, and that application of this principle will necessitate modification of some existing rate adjustment. We have, however, to deal with an existing rate structure, which in most cases is many years old, as to the general relationship between rates, and to which, irrespective of whether the rate structure is altogether sound or not, the commercial and manufacturing interests have largely adjusted themselves, so that any general radical and quick remodelling of rate relationships would be exceedingly disturbing to business interests and to many communities. Furthermore, a change in the relationship between any two rates necessarily changes the relation of one or both of them to all of the other rates of the country, and the business of the country transacted at each business center is so interwoven with that transacted at others, that the effect of a change in rate relationship may be widespread and seriously affect the interests of communities not at all directly interested in the situation on account of which the original change in relationship is made.

For these reasons changes in the relationships between rates must be made with great care and after full consideration of the effects both direct and indirect. This, however, does not mean that no changes should be made, but merely that all those interested should be given an opportunity to be heard so that a decision may be reached on the basis of all the important facts, and that the decision when made should give fair consideration to all of the interests involved, many of which necessarily conflict with others. Experience has shown that the safest and fairest method of securing full information in such matters is to permit all those who are sufficiently interested to present their views of the facts in a public manner.

The above are the general principles on which the Railroad Administration intends to handle the difficult situation arising from disproportionate depression in the past of many rail rates on routes subject to water competition.

At present the principal district in which the question presents itself is the Mississippi valley. There is now being heard before the Interstate Commerce Commission a case originally involving rates between Memphis and points in southern Missouri, Arkansas, Oklahoma and Kansas, in which the issues have become extended until it involves the rates generally between points on the east bank of the southern Mississippi and points in the territory above described and between points in that territory, also the relationship of rates between the river towns and rates from points on the river to interior points. The issue as to the relationship between river point rates and interior rates has been brought into the case through the Interstate Commerce Commission having set down for hearing with this case numerous applications of the railroad corporations heretofore filed for permission to maintain rates between river points lower than rates to intermediate points. Under the provisions of the Interstate Commerce act such rate relationship has been maintained only by virtue of the pendency of these proceedings before the commission, or by virtue of permission of the commission heretofore granted in similar proceedings, which it has now set down for re-hearing in connection with the pending cases. The Railroad Administration is taking the position in this case that it does not urge the granting of permission by the Interstate Commerce Commission for the maintenance of this rate relationship, except as to certain rates which the rail carriers in the central section of the country from Chicago to the gulf are required to maintain on a lower basis than some intermediate rates in order to meet ocean competition from the Eastern seaboard. All the interested parties have a full opportunity to be heard before the commission, and the Railroad Administration will abide by the decision of the commission.

Along the New York Barge Canal route there is no present suggestion of any readjustment of the relationship of rail rates between points located on the canal route and rates between interior points.

On the Great Lakes the established common carrier water lines are operating under a differential rate basis approved by the Interstate Commerce Commission.

Along the Atlantic coast arrangements have been made for putting in rates via water and rail which will enable the water lines to participate in the traffic on a fair basis in competition with all rail. Such arrangements have for a long time been in effect on the Pacific coast, and no change has been made there by the Railroad Administration.

You recite that the Railroad Administration has authorized the construction of boats of various types for service on the lower Mississippi, the Warrior river and the New York State Barge Canal, and ask the future policy of the Railroad Administration with regard to these boat lines and the rates to be established with connecting rail carriers.

(a) A limited service on the lower Mississippi, with the maximum obtainable equipment, has been in operation since late in September, 1918. It provides one weekly sailing each from St. Louis and New Orleans. Joint rates and through bills of lading with rail carriers connecting at New Orleans and St. Louis, and covering a large territory in the Mississippi valley, and offering service at rates less than the cost of competing all-rail service, are in operation. The scope of these joint tariffs is being extended to cover other points available to waterways when the equipment is sufficient to give regular and continuous service and when requested by the communities concerned.

(b) Service on the Warrior river was delayed because of the difficulty in obtaining and equipping available craft. This service was inaugurated December last, chiefly for the transportation of coal. Joint through rates on coal, in connection with the rail carriers in that district, are being actively considered. The present service provides ample outlet for mines directly on the banks of the Warrior river and without rail connection. Equipment to make practicable the carriage of general merchandise by existing craft is now being designed. This will link the water service on the Warrior river with that on the lower Mississippi, and a comprehensive system of joint water, as well as water-and-rail rates between these two water projects is being developed.

(c) The New York State Barge Canal is a state owned waterway. The superintendent of public works of the state of New York has just announced that arrangements have been effected with the Railroad Administration whereby traffic will be interchanged between canal and railroad lines through all practicable water routes. The administration has agreed that, if the traffic justifies, it will establish joint rates between responsible independent canal lines and rail carriers under Federal control at connecting points on the canal.

For the lower Mississippi river operation approximately $630,800 has been applied to the purchase of 2 steel towboats and 9 steel barges of 550 tons average capacity, and the equipping of leased vessels (3 steel towboats and 20 steel barges) and the strengthening of the hull of an acquired barge and installation of machinery thereon, to be used in transfer service at New Orleans. All of this equipment is in operation except the transfer barge, which is being equipped. Contracts have been awarded for the construction of 6 steel towboats of 1,800 horse power each, and 40 steel barges of 2,000 tons capacity each, at an aggregate cost of $6,290,000, for use on the lower Mississippi river. It is expected that these towboats and barges will be completed and in service in mid-summer or early fall.

For the Warrior river $698,241 has been expended for the purchase of 3 wooden towboats, 23 500-ton wooden coal barges, 3 harbor transfer coal barges and 6 self-propelled steel barges of an average capacity of 825 tons each. Contracts have been awarded for the construction of 4 self-propelled steel barges, with a capacity of 1,800 tons for coal loading, but equipped to load up to 400 tons each of merchandise provided the coal loading is correspondingly decreased. These barges are for service between Cordova and New Orleans.

Bids have been received and contracts are about to be let for 3 steel towboats for service between Cordova and Mobile.

Contracts have been let for 20 500-ton wooden coal barges for service between Cordova and Mobile. The aggregate contract price under these contracts for Warrior river equipment is $1,508,300.

Most of the old equipment purchased as above stated, for use on the Warrior river, is now in operation.

The 4 self-propelled barges for which contract has been let are expected to be completed early in the fall. The 3 twin-screw towboats for which contracts are about to be let are expected to be completed about the same time. The 20 wooden barges will be completed between April 1 and June 1, and pending the completion of the towboats above referred to, towboats will be leased to propel these barges.

The total amount expended up to March 1, 1919, for the purchase of floating equipment, and to meet payments to contractors for new equipment for the Mississippi-Warrior river section, has been $1,930,941.37.

For the New York canal section 5 tugs, from 85 to 150 horse power each, and 3 wooden barges of 550-ton capacity each, were purchased in 1918, at a total cost of $110,860, including the repairs necessary to put the same in service.

Contracts have been let and the work is largely completed on 51 steel barges of 650-ton capacity, to cost about $1,898,218, and 21 concrete barges of 600-ton capacity each, to cost about $586,664.

Bids have been received and contracts are about to be let for the construction of 20 self-propelled steel barges of 550-ton capacity each, having 400 horse power. Each one of these towboats will tow 3 of the steel or concrete barges in addition to carrying cargo itself. The contract price for these self-propelled barges is $1,726,200.

Of the 72 steel and concrete barges under construction, nearly all are expected to be delivered in time for the opening of navigation May 1, 1919, and the rest very shortly thereafter.

The 20 self-propelled barges which are also to act as towboats are expected to be delivered in August and September. Meanwhile additional towboats will be temporarily hired to tow the steel and concrete barges.

You will see that in all of the three principal operations of the Railroad Administration on the inland waterways; namely, the Mississippi river, Warrior river and New York Barge Canal, the policy was pursued of purchasing equipment for temporary use in order to begin operations as soon as possible, with a view to substitution, in whole or in part, of modern equipment, the construction of which was authorized.

As soon as the equipment under contract can be completed it is expected that the use of leased equipment will be altogether discontinued, as the Railroad Administration is planning to own sufficient equipment to transport the traffic.

In addition to the items expended for new equipment referred to above, the Railroad Administration had constructed under contract in 1918, 10 wooden barges for service on the Chesapeake & Ohio Canal, at a total cost of $46,547.20. The differing arrangements under which these barges were operated last year and will be operated this year by a private corporation is stated below in response to your inquiry for details as to the Chesapeake & Ohio Canal.

The Delaware & Raritan Canal came under federal control as a part of the transportation system of the Pennsylvania Railroad, and after the establishment of federal control the maintenance of the canal and the operation of the locks was under the jurisdiction of the federal manager of the Pennsylvania Railroad until December, 1918, when it was transferred to the Division of Inland Waterways of the Railroad Administration, New York-New Jersey Canal Section. The Pennsylvania Railroad Company operated no boats on the canal, excepting tugs, prior to federal control, and had no through rates except on anthracite coal via Trenton to Philadelphia and nearby points. These through rates have been maintained under federal control, and during the season of 1918 the Railroad Administration operated some package freight service via the canal between New York and Philadelphia. My information is that independent compa-

nies propose to use the Delaware & Raritan Canal quite extensively during the season of 1919, and the Railroad Administration therefore does not contemplate placing any equipment on the canal, but will maintain the canal, operate the locks and provide towage as heretofore. The canal toll rates on vessels doing a common carrier business have been revised and placed on a basis of 15 per cent of the freight collected by the vessel from shippers, instead of the class rate basis of tolls heretofore in effect. The purpose of this change is largely to facilitate operation by simplification of the method of computing tolls, but it is estimated that it will also result in a reduction in toll charges, particularly on the higher classes of freight. Some of the towage rates have been increased, as they were considerably below the cost of operation.

The Chesapeake & Ohio Canal was never operated by the Railroad Administration. At the beginning of the season of 1918, on account of increase made by the canal trustees in toll rates and the increases in operating expenses, the Canal Towage Company, which was the only company operating boats on this canal, announced that it proposed to discontinue operations, as it could not pay operating expenses.

In order to avoid the loss of this means of transportation of coal to Washington and vicinity during the acute congestion which then existed on the railroads and the shortage of coal which then appeared imminent if war conditions continued, the director general of railroads at first made an arrangement whereby he assumed payment of the canal tolls on coal traffic on the Chesapeake & Ohio Canal. Later in the season, in connection with the increases made in rail freight rates on coal, this arrangement was revised so that for the balance of the season the director general of railroads assumed the actual deficit of the Canal Towage Company in operating its boats. This was substantially less per ton than the canal trustees charged for tolls, the Canal Towage Company under this arrangement paying such tolls.

For the same reasons which led it to pay part of the expense of operating the canal, the Railroad Administration constructed 10 new canal boats to increase the tonnage transported via this canal, these boats being leased to the Canal Towage Company for operation.

The Railroad Administration has made no arrangement with the Canal Towage Company to pay any part of its operating expenses for the present year. The same emergency does not exist as obtained last year. Arrangements, however, have been made for divisions between the railroad and the canal of the freight charges from the mines to destination which will make it possible for the Canal Towage Company to operate its boats on the canal during the coming season as heretofore, and the boats built by the Railroad Administration will be operated by the Canal Towage Company on a rental basis.

You request my views concerning disposition of the government owned vessels on inland waterways in the event the railroads are returned to private control. This is a broad question of governmental policy and involves, in a sense, a settlement of the entire inland waterways problem. I am a firm believer in the policy that the great inland waterways of the country can be made economically very useful and that means should be found for making them of more benefit to the nation than they have been in the past. For a number of years the government has been devoting a great deal of money and study to the improvement of these waterways, but no adequate utilization of them has ever been brought about. While we have had in existence some navigable inland waterways, we have never had the facilities for exchanging traffic between the railroads and the waterways.

Under the old form of private management railroads in this country had no substantial interest in acting as feeders to the waterways, and, of course, there was no other form of feeder available. It therefore seems to me that in any permanent solution of the railroad problem which may be adopted, it will be necessary to bring about close co-operation between the railroads and waterways, and the first element in this situation must be the desire or interest of co-operation and the next facilities for transferring traffic from the inland waterways to the railroads and vice versa. Were the railroads to remain under government control for any considerable length of time this would be a comparatively simple matter, granting that sufficient appropriations were available, but if the railroads are to go back to private control the problem becomes a more difficult one.

One of the objects of the Railroad Administration has been to make a sympathetic test of economic co-operation between the rail carriers and the waterways, and some progress has been made in this direction, but of course it is impossible to bring about such changes in a brief time, and therefore I do not feel that a fair test of the possibilities in this direction has yet been completed.

If the rail carriers are to go back to private control and the government is to sell its interest in the boat equipment already provided and authorized on inland waterways to private interest, there is grave danger that old conditions will again obtain with the likely result that there will be no proper development of inland waterways. Taking for granted that the rail carriers are to go back to private control, the question remains as to whether the situation would be better for the water equipment to be placed under the control of some other governmental agency at the time the present Railroad Administration is disbanded. My present view is that this should be done, at least through an adequate experimental period. I deem it highly important to preserve and strengthen in the public interest the beginnings already made in demonstrating the utility of our inland waterways.



From the New York Tribune

Looks As Though We Might Have to Give Uncle Along With Them



A Mixed Train at Corrientes

The Railroad Development of the Argentine

The Largest Market for Railway Equipment in South America —Regulation, Labor and Taxation Big Problems

In Two Parts.—Part I

The Latin-American Division of the Bureau of Foreign and Domestic Commerce has this week added to its reports on railway development in various countries in South America, Circular No. 55 dealing with the railways of the Argentine. The circular discusses the characteristics of the present railway development in that country, shows what difficulties the railways have been confronted with in the way of government regulation, labor and taxation, points out the possible trend of future development and concludes with detailed figures of imports of railway material and a discussion of the possible markets for such supplies. The Argentine railways, prior to the war, secured the greater part of their material and supplies from England owing to the fact that the larger portion of them were owned by British capital. Since the war cut off these imports, the Argentine railways have not been supplied and as a result "the equipment of all the roads has become very materially depleted."

Because of the length of the report it will be given in the *Railway Age* in two installments. The first follows:

At the outbreak of the war Argentina afforded the most inviting field in South America for railway investment and the largest market for railway equipment. With one-third the area of Brazil, Argentina had some 21,000 miles of railway in operation while Brazil had 16,000. This rapid development had been greatly facilitated by many factors, chief among them the absence of the coastal mountain barrier which had made railroad construction so difficult and so costly in the other republics.

Argentina may be divided into four sections, three of which are flat, fertile plains, and offer few difficulties to the engineer. The northernmost of the prairie sections, the Chaco, extending south to Cordoba and west to the foothills of the Andes, is a scantily populated territory with luxuriant vegetation and a warm, moist climate. The central division, the Pampas, stretches south from Cordoba to the Colorado River and west to the Andes It is the real Argentina of to-day; its cities—Buenos Aires, Rosario, Bahia Blanca, Santa Fe, and La Plata—are the chief ports and industrial centers of the republic; its grassy plains produce the major part of the nation's wealth. The southern part, Patagonia, extends south from the Colorado River, west to the Andes, and is a cold, arid region which has only recently been explored. The fourth section of Argentina, the narrow Andean belt, forms the western frontier of the country, reaching from the extreme north to the extreme south. It is characterized by scarcity of rainfall, is rugged and uninviting in comparison with the Pampas, and has not been developed to any great extent.

Other Factors in Development of Railways

Among the factors which have contributed to the growth of the railways should be noted the following: Argentina possesses a strong, stabilized central government, and this government offered every inducement to the investment of foreign capital. Also some means of rapid transportation between the ports and the interior became imperative because of the growth of the live-stock and agricultural industries in the Pampas.

Railway construction has, perforce, been suspended in all South American countries during the period of the war and imports of railway equipment have been curtailed. During this time new factors have entered the situation which may tend to reduce the relatively rapid development of Argentine railways in future. The meat packers of Argentina have worked overtime to feed the armies of the allies, the farmers have sold their grain at unheard of prices, and the railways have handled enormous quantities of grain and cattle at better rates. But these advantages have been overshadowed by the increased cost of fuel, suspension of traffic and damage to property occasioned by strikes, decrease of import freight, increased taxation, and advanced cost of labor, so that while the first two industries have benefited materially during the war, railway earnings have fallen off and the companies now find themselves confronted with problems which must be

solved before they can pursue their former prosperous courses.

For many years Buenos Aires was the only port in Argentina. To-day, in spite of the fact that Rosario, Campana, La Plata, Bahia Blanca, and Zarate all compete for a share of the foreign trade freight, Buenos Aires handles nearly 85



Map Reproduced from Article on Argentine Railways by F. Lavis, Railway Age Gazette, March 27, 1914

Map of the Argentine Railways

per cent of the imports and 60 per cent of the exports. Moreover, it has become the largest and most important city not only in Argentina but in all South America.

In the early days of railway construction short lines were pushed out from Buenos Aires to distribute supplies throughout the Province of Buenos Aires, to collect grain and other products for export. To-day Buenos Aires is the focus of the Argentine railway system. From this point a network of lines radiates north, west, and south, reaching the Paraguayan boundary on the northeast, the Bolivian on the north, and the Chilean on the west. These main lines emanating from Buenos Aires are supplemented by short cross-country connections and by one railway—the Rosario-Puerto Belgrano—which describes an arc through them.

The railways conform in general to the following plan of location:

I. Lines radiating from Buenos Aires:

(*a*) Northeast, the three links over which the international trains run from Buenos Aires to Asuncion, Paraguay.

(*b*) North through Rosario, Corrientes, Tucuman, and Jujuy to La Quiaca, on the Bolivian border, and Embarcacion, near the Bolivian border.

(*c*) Northwest to Cordoba and Tucuman.

(*d*) West through Mendoza to the Chilean border. Connections are made at Mendoza for Santiago and Valparaiso, Chile.

(*e*) Southwest to Toay.

(*f*) South to La Plata, Mar del Plata, and Bahia Blanca.

II. Patagonian railways listed from north to south.

The railways of the Pampas transport large quantities of grain and live stock, whereas oranges and semitropical fruits form an important part of the freight brought down from the northeast. Sugar is a leading item in the export freight of the Tucuman district and grapes and wine of the Mendoza section. Sheep and wool are the principal products of northern Patagonia and petroleum of the Comodor Rivadavia region. Quebracho and firewood of all kinds have formed profitable and important parts of the local and through freight handled since the war by the lines penetrating the northern provinces.

Name of railroad	Location	Length *Miles*	Gage *Ft.*	*In.*	Remarks
Buenos Aires Central	Main line, Buenos Aires to Rojas. Branch to Zarate.	252	4	8½	First of 3 lines over which international trains are run from Buenos Aires to Asuncion.
Entre Rios	Main line, Ibicuy on Parana River north to Concordia. Branches from main line west throughout Province.	831	4	8½	Main line forms second section over which international trains to Asuncion are run.
Argentine Northeastern	Concordia to Posadas on Paraguayan border; Concordia south to Concepcion.	752	4	8½	Third link in international service to Asuncion. Runs through Libras, port on Rio Uruguay, opposite Uruguyana, southern terminus of main line south from Rio de Janeiro.
Province of Buenos Aires General Railway	Buenos Aires to Rosario, with a branch to La Plata; Buenos Aires to Villegas and Salliquelo.	790	Meter		
Province of Santa Fe	Main line, Rosario north through Santa Fe to Corrientes. Branches throughout Province of Santa Fe.	1,188	Meter		
Formosa-Embarcacion	Northwest from Formosa, a port on the Rio Paraguay.	186	Meter		
Central Norte	Main line, Santa Fe through Tucuman and Jujuy to La Quiaca on Bolivian border. Branches to Embarcacion and Barranqueras.	*3,046	Meter		
Argentine del Norte	Main line, Lake Paiva, near Santa Fe, west to San Juan. Several branches, including one to Cordoba.	...	Meter		Connects with Central Norte at Lake Paiva. Connects with Cordoba Central at Dean Furnace.
Central Argentine	Main line, Buenos Aires north to Tucuman. Feeders in Provinces of Buenos Aires, Santa Fe, Santiago del Estero, Tucuman, and Cordoba.	3,305	5	6	
Cordoba Central	Original line, city of Cordoba to San Francisco on eastern boundary of Province.	1,205	Meter		Built by company. Connects with Santa Fe and with Cordoba-Rosario at San Francisco.
	Additional lines:				
	Cordoba to Rosario	...	.....		Purchased from Cordoba & Rosario Ry. Co.
	Rosario to Buenos Aires	...	.....		Purchased from Cordoba Central, Buenos Aires Extension (Ltd.).
	Cordoba north to Tucuman with branches to Chumbicha and Santiago del Estero.	...	.....		Purchased from Central Northern Ry. Connects with Central Norte at Tucuman.
Buenos Aires & Pacific	Original line, Buenos Aires to Villa Mercedes with branches.	3,535	5	6	Built and owned by Buenos Aires & Pacific.
	Additional lines:				
	Villa Mercedes west to Mendoza	...	.....		Leased from Argentine Great Western.
	Mendoza to Chilean boundary	...	.....		Leased from Argentine Transandine.
	Toay (station on Argentine Western) to Bahia Blanca. Nueva Roma to Huinca Renanco with feeders and branches (links original line with Bahia Blanca to Toay section).	...	.....		Leased from Bahia Blanca & Northwestern.
	Bahia Blanca south to Carmen de Patagonas at mouth of Rio Negro.	...	.....		Built and owned by Buenos Aires & Pacific.
	Rufino, on main line, north to Villa Maria, station on Central Argentine.	...	.....		Leased from Villa Maria & Rufino Ry. (lease expires 1920).
	Villa Mercedes north to Villa Dolores	...	.....		Purchased from Andine Ry.
Buenos Aires Western	Buenos Aires west, spreading through Provinces of San Luis and La Pampa.	1,882	5	6	
La Plata & Meridiano Quinto	La Plata to Mira Pampa	343	Meter		
Buenos Aires Midland	Suburb of Buenos Aires southwest to Carhue	322	Meter		Operated by Great Southern and Buenos Aires Western jointly.
Buenos Aires Great Southern	Connects Buenos Aires with ports of Bahia Blanca, Mar del Plata, La Plata, Ingeniero White. Has network of short lines radiating south and southwest from Buenos Aires. Short lines radiate from Bahia Blanca. Branch from Bahia Blanca west across Patagonian Plains through Neuquin to Zapala.	3,792	5	6	90 per cent of mileage in Province of Buenos Aires.
Rosario-Puerto Belgrano	Rosario in southerly direction to Puerto Belgrano, port just east of Bahia Blanca.	493	5	6	Affords connection between lines radiating southwest and west.
Central Railway of Chubut	Port Madryn to Trelaw and Gaiman	51	Meter		Serves Welsh colonies.
Patagonian State Railways	Port of San Antonio due west to Lake Nahuel Huapi.	281	5	6	
	Port of Comodoro Rivadavia to Lake Buenos Aires.	124	5	6	
	Puerto Descado to Colonia Sarmiento	176	5	6	

*Includes Argentine del Norte.

Location of Chief Railways, Mileage, Gage, Etc.

The foregoing table lists the important Argentine railway systems; gives the location, total mileage, and gage of each; the connections afforded between the various systems; and lists the companies which compose each one. Details of short or unimportant branches have been omitted, as the table is intended to present a picture of each system as a whole and

its position in the general scheme. As far as possible the lines have been listed in accordance with the foregoing plan of location.

State and Private Ownership

The relation between state and private ownership and operation is not so complicated in Argentina as in Brazil or Peru. Generally speaking, the private companies own their holdings in perpetuity and do not operate government-owned lines. The private companies are permitted to build short feeders, providing they observe certain conditions, without applying for government concessions, and to construct irrigation works adjacent to their holding for which they receive payment in government bonds. The provincial governments have the right to grant concessions for railway construction, to build and operate railways themselves.

Halsey estimates the value of the privately owned railways at 1,219,846,313 gold pesos, of which amount some 1,000,000,000 pesos consists of British investments. The following table lists the privately owned railways, classified by nationality of ownership, and gives the capitalization of each company. The figures are quoted in Argentine gold and are those given in the official 1917 reports of the companies.

	Gold pesos.
English:	
Central Argentine	286,097,200
Buenos Aires Great Southern	265,777,336
Buenos Aires & Pacific	260,877,735
Buenos Aires Western	144,716,319
Cordoba Central	101,653,645
Entre Rios	40,505,538
Argentine Northeastern	31,399,716
Central of Chubut	1,700,322
French:	
Province of Santa Fe	52,902,878
General Ry. of Province of Buenos Aires	45,335,932
Rosario to Puerto Belgrano	30,575,937
Argentine:	
Buenos Aires Central	16,893,700

The few government railways have been built primarily to hasten the development of remote portions of the republic and are usually divided into two classes—Los Ferrocarriles del Estado and Los Ferrocarriles de Fomento. In the former



Quebracho Ties Along the Santa Fé Railway

class are included the Argentine del Norte and the Central Norte, with a total capitalization of 155,895,474 gold pesos. These railways afford an outlet for portions of the country which otherwise would be wholly isolated, and the system north from Tucuman affords an important link in the proposed international line into Bolivia. The roads are well equipped and administered, and exchange cars with the Argentine Central at Tucuman and Cordoba so that freight from Jujuy and Salta can be shipped directly to Buenos Aires. Los Ferrocarriles de Fomento, or State development railways include the unfinished Formosa-Embarcacion line and the Diamante-Curuzu line, both situated in the Chaco, and the Patagonian State railways.

La Plata a Meridiano Quinto, owned and operated by the Province of Buenos Aires, is the only example of a railway entirely managed by a provincial government. It was constructed as part of a comprehensive system to compete with the proposed fusion of the Southern and Western.

Interpretations of Mitre Law and Pension Bill

The two much discussed railway bills which have been repeatedly presented to congress but which so far have failed to pass are the so-called explanatory law of the mitre law



In the Chaco Along the Santa Fé Railway

and the pension bill. During the past year, congress adjourned without passing even such necessary measures as the budget law. The recent special session has been little better but the minister of public works assures the railways that some definite action will be taken on both measures during the coming regular session.

In the early stages of railway development in Argentina most of the companies carried government guarantees of interest some of which were as high as 7 per cent. In 1895, these guarantees were relinquished by mutual consent and 4 per cent recission bonds issued to the railways in payment thereof. Freedom from customs duties and taxes in general was still granted. In 1907 the mitre law was passed, the terms of which were not compulsory, but were voluntarily accepted by most of the privately-owned lines. The Entre Rios still operates under the terms of its original concession.

Recently, a great deal of misunderstanding and trouble has arisen over article 8 of this law by which the railways agreed to pay a tax amounting to 3 per cent of their net receipts, based on 60 per cent working expenses, in lieu of customs duties, national and provincial duties until 1947. This sum was to be used to improve and construct roads and bridges to and from stations in the towns or districts served by the respective railways. The companies understood that this tax was to be the only one to which they were subject but the law has not been so interpreted by municipal authorities. The municipality of Cordoba sued the Central Argentine for recovery of street cleaning expenses claiming that they were rates, not taxes. The case was taken to the supreme court which rendered a decision in favor of the municipality with the result that many other municipalities are attempting to collect various sorts of assessments from the railway companies. In some cases the bills to be collected cover a period of 10 years and represent large sums.

The companies have resented the decision of the supreme court bitterly and have attempted repeatedly to obtain an exact explanation of the meaning of article 8 from the national congress. An explanatory measure was passed by the deputies, revised by the senate, and is now before the lower house.

The pension law of 1913 provides that 3 per cent be de-

ducted from the monthly salaries of employees and that a corresponding amount be paid to the pension fund by the companies, subject to certain exceptions—for instance, when the companies' profits fall below certain amounts. A new law was projected in 1915, but was satisfactory neither to the employers nor to the employees, and has never been passed. The railway companies have declared themselves willing to pay as much as 8 per cent of their wages sheet provided the workmen pay 5 per cent of their wages, the extra cost to the companies to be met by increased rates. The workmen are holding out for an increase in the amounts of the pensions to be received and for a reduction in the term of service necessary to procure a pension.

Labor Problem—Strikes

No Argentine industry has been free from the menace of strikes during the last 2 years, but the railways have suffered more than any other single class. Radical newspapers and trade journals have bitterly denounced the foreign capitalist; conservative periodicals have as hotly denounced the labor unions; and both classes of publications have denounced the inaction and the action of the government.

The railway employees have two organizations—La Fraternidad, composed of engine drivers, and Federacion Obrera Ferrovaria, made up of stokers, guards, and other employees. La Fraternidad has proved much more willing to arbitrate than La Federacion Obrera Ferrovaria. Both organizations are members of La Federacion Regional Argentina, reported to control 250 labor unions, and which in 1917 and again in January of the present year, has called general strikes.

Strikes on the more important English and French rail ways early in 1917 were succeeded by a general strike in the fall which affected not only the privately owned lines but the state railways also. The general strike lasted for 24 days and was characterized by destruction of property and by acts of violence. As a result, on October 11, the president of the republic issued provisional railway working regulations, which were agreed to by both the companies and the labor unions. One of the conditions on which the strike was terminated was the granting of a 10 per cent increase in all salaries under 300 paper pesos a month; another was the exaction of an 8-hour day. It is estimated that the salary increase is costing the companies about 8,000,000 pesos per annum and the 8-hour day condition 12,000,000 pesos.

The length of the working day and the wage scale were not the only bones of contention, however, and the provisional regulations have not succeeded in bettering conditions materially. The year 1918 was characterized by a succession of disturbances which culminated in a general strike early in January, 1919. This strike lasted only a few days, but relations between capital and labor remain excessively strained and are punctuated by constant disturbances.

There is no law in Argentina to provide for arbitration of disputes between employers and employees and there seems little chance of one's being enacted in the near future. Some of the companies feel that their interests and property have not been sufficiently well protected during the recent disturbances, and are sending representatives to Argentina to put their cases before the government to determine the future attitude of the government toward foreign investors.

On the other hand, the laborers claim that the companies have lost nothing by their concessions, but rather have been fully compensated by the recent increase in tariffs allowed the railways.

Doings of the United States Railroad Administration

Director General Hines on Western Trip; Regional Mechanical Officers Oppose Shop Wage Increase

WASHINGTON, D. C.

DIRECTOR GENERAL HINES and members of his staff, including Edward Chambers, director of the Division of Traffic; Henry B. Spencer, director of the Division of Purchases; Max Thelen, director of the Division of Public Service, and Brice Clagett, assistant to the director general, left Washington on April 14 for a trip of inspection over the western railroads. Mr. Hines addressed the Lumber Congress at Chicago on Wednesday and the itinerary also includes St. Paul, Minneapolis, Spokane, Seattle, Portland, San Francisco, Los Angeles, Denver, Kansas City and St. Louis, where Mr. Hines will speak at the annual meeting of the Chamber of Commerce of the United States on April 30, returning to Washington about May 1. He will be accompanied on parts of the trip also by the regional directors of the lines traversed. On his recent trip to Pittsburgh, Chicago and Atlanta, Mr. Hines had an opportunity to confer with all the regional directors and with most of the federal managers.

May 1 Requirements to Be Met

The Railroad Administration has arranged to take care of the most pressing financial requirements of the railroad companies on May 1 by following the policy adopted with reference to the April 1 requirements, that is, by issuing certificates of indebtedness to the railroad companies for amounts due on account of rental and other transactions arising out of federal control which may be used as collateral for loans from the War Finance Corporation or from banks. This was announced after a conference on April 11 between Director General Hines, Swagar Shirley, director of finance, and other members of the director general's staff, with members of the special committee of the Association of Railway Executives, of which Howard Elliott is chairman, a group of bankers from various parts of the country, and officers of the War Finance Corporation. At this conference the entire railroad financial situation was discussed, including the requirements up to about August 1, estimated at between $400,000,000 and $500,000,000. The May 1 requirements are estimated roughly at $100,000,000 and the June 1 requirements at a similar amount, while a much larger sum will become due during July, the amount depending to some extent on the amount of capital expenditures, which is uncertain.

It is understood that the Railroad Administration was unwilling to make arrangements beyond May 1 at this time, in the hope that a special session of Congress will be called and that an appropriation will be available before it is necessary to meet the full requirements. For the May 1 requirements the Railroad Administration will issue approximately $60,000,000 of certificates, which will take care of interest, dividends and other corporate expenses, and about $40,000,000 is represented by maturities which it is believed can be extended. It was the opinion of those present that these requirements would be cared for through the co-operation of all parties concerned in the same manner that was successful in

regard to the April 1 requirements, which were met by the issuance of certificates, about half of which were used as collateral for loans from the War Finance Corporation and about half for loans through the banks.

Coal Purchases

In reply to a statement made at Pittsburgh by John L. Lewis, acting president of the United Mine Workers, charging the Railroad Administration with unfair practices in connection with the purchase of coal, Director General Hines telegraphed Mr. Lewis, asking him to give him the benefit of specific cases so that he might correct any instances where it may appear that there has been a failure to carry out his policy. Mr. Lewis said the miners' organizations would be obliged to take drastic action unless there was a change of policy. His principal objection seemed to be that railroads were making contracts for coal covering only the month of April. It was stated at the office of the Railroad Administration that every railroad contract for coal is open for inspection by representatives of miners or by contractors and every contract is made at the prevailing scale of wages. It was stated that the making of preliminary contracts for April was no departure from past practices. Mr. Hines also asked Mr. Lewis to meet him in Chicago on Wednesday.

Representatives of Regional Directors Oppose Wage Increase for Shop Crafts

C. E. Chambers, mechanical assistant to the regional director of the Allegheny region, testified before the Board of Wages and Working Conditions at Washington on April 15, as chairman of a committee representing the regional directors, and asked the board to deny the increases in wages and allowances asked by the federated shop crafts affiliated with the American Federation of Labor, on the ground that their wages are now higher than those paid generally by industrial concerns not under government control. The rates asked by the shop crafts include a basic rate of 85 cents an hour for experienced mechanics in place of the present rate of 68 cents, 60 cents for helpers, and also differentials for certain classes of employees, 30 days holiday a year and other concessions in time. These increases, Mr. Chambers said, amount to 25 per cent in the basic rate, 46 per cent for second class electrical workers now paid 58 cents, 35 per cent for car men now paid 63 cents and 46 per cent for those now paid 58 cents.

He presented a set of exhibits comparing the rates of wages paid to railroad shop crafts with minimum, maximum, going and average hourly rates paid to employees performing similar work in 1,293 industrial plants. Ship yards and similar plants were not included, he said, because of the emergency character of the work. The information was received in reply to questionnaires, all of which have not yet been answered, so that the information is not entirely complete. The exhibits showed average hourly rates in the outside industries as follows: Machinists, 56.2 cents; boilermakers, 62.6 cents; blacksmiths, 58.4 cents; sheet metal workers ,54.7 cents; first class electrical workers, 55.8 cents; second class electrical workers, 46.3 cents; car men, 48.2 cents; molders, 60.6 cents, and helpers, 44.3 cents. The majority of the outside machinists receive rates of 50 cents and upward, while the prevailing rate for helpers is 45 cents. Mr. Chambers said that the pay rolls had also been increased by the classification of work made in Supplement No. 4 to General Order No. 27, because the first class rates are now paid in many instances for work formerly performed by helpers at a lower rate, as the craftsman rate is now paid for some of the work performed by men not fully qualified as craftsmen. Formerly a craftsman engaged in piece work made his helper do all he could, whereas now in the intervals between work assigned to the helpers, the helper frequently does nothing. Mr. Chambers also presented exhibits showing the labor turn-over, which he said now is about 50 per cent less than it was during the first half of 1918; in other words, it has been reduced to about normal.

A. O. Wharton, vice-chairman of the board, questioned the completeness of the figures because they did not include many industries on the Pacific Coast where high rates have been established, or in the inter-mountain territory, where he said he knew that many mechanics were receiving a minimum of $1 an hour. He also commented on the absence of figures from the Ford Motor Company, which he said had recently established a minimum of $6 a day for mechanics. Mr. Chambers said that many of the questionnaires from the more remote points had not yet been received, and that the committee had been unable to obtain the figures from the Ford plant. He remarked that the $6 minimum was 75 cents an hour.

The representatives of the employees testified before the board on March 12, 13 and 14.

Conditions in Allegheny Region

Railroads in the Allegheny region, according to a report from Regional Director Markham, continued to meet all the demands made upon them for the month of March. Due to the unusually mild winter weather, coal loadings decreased to a considerable extent. Permit restrictions on lumber and forest products were raised on April 1 and, with few exceptions, this region continued clear of embargoes on carload freight. The campaign for the prevention of loss and damage to freight is beginning to show results. In March the bureau operated in the Philadelphia district for bringing together astray freight and waybills on which freight was reported short amounting to $170,000. A similar bureau started its operations at Baltimore on April 1, and another one will be opened at Pittsburgh at an early date. On account of export traffic reverting from munitions and supplies to commercial freight, the freight traffic committee at North Atlantic ports was disbanded on April 1. Traffic control managers, appointed for New York, Philadelphia, and Baltimore, will hereafter issue permits for export freight. During the existence of embargoes, these managers will also have charge of issuing permits covering domestic freight destined for ports under their jurisdiction.

Maintenance Budgets Being Prepared

Figures on which the 1919 budgets of maintenance of way and structures expenditures are to be based are now being compiled by the railroads to be submitted to Washington by May 1, in accordance with instructions issued by C. A. Morse, assistant director of the Division of Operation, some time ago, which are being somewhat modified in order to reduce the amount of clerical labor required in complying with them. The upkeep this year is to be measured by the amount necessary to make the average for 1918 and 1919 equal to the average during the test period, after equating for the increases in labor and material costs, so that maintenance work is not being delayed until the budgets are approved, because the general standard to be reached is known.

Circular No. 28, issued by the Division of Operation, calling for detailed information for the purpose of affording a comparison of the expenditures for maintenance of way and structures in 1918 and in the test period, which is necessary to comply with the contracts between the government and the railroads so that each property may be returned in substantially as good condition as when taken over, is to be cancelled because it has been found that it would require a duplication of the work which will be necessary to furnish similar information under circulars to be issued by the Division of Accounting, which it is planned to have in by about July 1.

Statistics received by the maintenance department of the Railroad Administration show that the tie situation has been rapidly improving since the signing of the armistice. Tie

production during March showed a marked increase, amounting to about 8,000,000, as compared with an average production during the five years prior to 1917 of about 90,000,000 a year, and since October the monthly production has nearly doubled. In some regions it has more than doubled. The present outlook is that there will be plenty of ties produced this year not only to meet the current requirements but to provide for the usual amount of carry-over into the next year. Arrangements have been made for treating ties made from the inferior grades of wood and also for the transportation of 5,000,000 Oregon fir ties to the Eastern region. Reports received since the close of the year show that 79,000,000 ties were inserted in 1918 for renewals alone, as compared with 81,000,000 in 1917 and 90,000,000 in 1916.

Rail renewals last year also compared less unfavorably with previous years than preliminary estimates indicated. For the calendar year they amounted to 1,097,000 tons, as compared with 1,233,000 in 1917, 1,450,000 in 1916 and an average of about 1,600,000 for ten years. In 1918 there were about 460,000 tons of rail carried over from the previous year and about 369,000 tons were carried over from 1918 into 1919.

Contracts Executed

The Railroad Administration has executed compensation contracts as follows: Memphis, Dallas & Gulf, $28,295; Nashville, Chattanooga & St. Louis, $3,183,089; Abilene & Southern, $78,375; Cumberland & Pennsylvania, $255,692; Buffalo Creek, $409,397; Detroit & Mackinac, $310,664; Kansas City, Mexico & Orient, $150,000; Port Huron Southern, $11,025, and St. Paul Bridge & Terminal Railway, $67,509; also co-operative contracts with the Waycross & Southern, Rockingham, Alabama & Northwestern and Virginia Blue Ridge.

Reparation Claims on Special Dockets

The Division of Traffic has issued Circular No. 7 giving instructions as to the handling of reparation claims which may be dealt with on the special docket of the Interstate Commerce Commission (and of state commissions on intrastate passenger traffic handled prior to June 10, 1918, and intrastate freight traffic handled prior to June 25, 1918). It is intended to advise what claims may be made the subject of special docket proceedings, and in what manner.

Claims growing out of transactions subsequent to January 1, 1918, drawing in question the justness or reasonableness of any rate, fare, charge, classification, regulation or practice falling within the following classes, but not otherwise, should be considered and submitted:

(*a*) Where there was an error in publication.

(*b*) Where the claim is within the terms of section 3 hereof.

(*c*) Where, in special instances not covered by (*a*) or (*b*), a charge was exacted which was manifestly unjust and not fairly in contemplation. Each such claim will be considered on its merits.

Claims based upon the fact that through rates were charged which exceeded the aggregate of intermediate rates legally applicable at date of shipment via the route over which the shipment moved should be considered and submitted: *Provided, however,* That the total or through rate in effect upon the date of the application does *not* exceed the sum of the intermediate rates. It should be understood that rates which are restricted in their application to intrastate traffic can not be used as one of the factors of the combination applicable to an interstate shipment.

Except as to claims arising under paragraph (*c*), claims approved in accordance with the foregoing by a chief traffic officer of the initial or delivering carrier (other than the switching carrier) which is under federal control and which will participate in the refund, shall be submitted on special docket application form. This application should be signed by such officer and should contain a full statement of all the facts which, in his judgment, make it improper, under the conditions and circumstances existing at the time of the transaction, to retain the charge which it is desired to refund. Such applications should contain the statement that "it is admitted that the rates or rules legally applicable at the time and over the route shipment moved were, under all the circumstances and conditions then existing, excessive and unreasonable," but should *not* contain any agreement or promise to maintain any rate, fare, charge, rule, or relationship for the future. Such application need not be signed by any traffic official of a carrier under federal control, except a chief traffic officer of the federal carrier submitting it. Where a carrier not under federal control will participate in the refund, such carrier must concur in the application by proper indorsement.

A concise statement of the facts in connection with the claims arising under paragraph (*c*) should first be submitted by the carriers to the director, Division of Traffic, who will instruct whether the application should be prepared and submitted on the special docket. If the director, Division of Traffic, finds that a claim falls within the provisions of (*a*) or (*b*) or that a claim falling within the provisions of (*c*) shows the exaction of a charge which was manifestly unjust and not fairly in contemplation, the director will promptly forward such claim, when it has been put in proper form, to the Interstate Commerce Commission (or to the state commission) for approval.

Navy and War Departments Pay Bills to Administration Treasurer

The Navy and War departments are now paying direct to the treasurer of the Railroad Administration at Washington, all amounts due to federally operated railroads for the transportation of men and property covered by bills rendered by such railroads to the Navy and War departments. No such amounts will hereafter be paid to federal treasurers by the Navy or War departments whether covered by bills already presented or bills which will later be rendered.

When bills for transportation are audited by the Navy or War department and payment is made to the treasurer of the Railroad Administration, there will be issued by the auditor of the Railroad Administration to the federal auditor of the appropriate road a credit advice, which will show reference to the bill audited, the amount, and stating the month's accounts in which the amount shall be transferred to the account entitled "Administration Ledger Control Account." The federal auditor will thereupon transfer the amount from the asset account in which it is included to the administration ledger control account and include the amount in the analysis of that account as provided for that class of items.

The bills for the transportation of men and property are to be rendered by federally operated roads and charged to the Navy or War department as heretofore. All correspondence regarding the correctness of such bills will be conducted by the Navy or War department with each such road. Any adjustment made by the Navy or War department will be included in the advices furnished by the administration auditor, so that the accounts of the road presenting such bill may be corrected in accordance therewith.

For the present, at least, bills presented to other government departments will be settled as heretofore. As a result of this change in practice, it will be no longer necessary for settling carriers to withhold apportionment of interline passenger and freight revenues due from these departments. Such revenues are to be included in current months' reports and settlements will be accomplished in the same manner as for commercial traffic.

Report of Safety Section

The Railroad Administration has issued a notice regarding a report of the Safety Section, stating that since the government took control of the transportation facilities its record is one of which both employers and employees should have cause to feel proud. The statement indicates however, that a similar pride is not felt in the activities of the railroad safety departments before that time. On January 1, 1919, there were 20,156 railroad men serving on railroad safety committees under the direct supervision of the Safety Section "actively working for safety on the railroads; whereas a year ago there were comparatively few men thus employed." It is also stated that on certain typical roads, where, in the month of January, 1918, there were in the aggregate 212 persons killed, and 3,118 were injured, the record for the same month in 1919 shows the number killed as 94, and of injured 363. Apparently it is not the province of the Safety Section to note any difference in operating conditions in the two months.

Concerning the campaign directed to cleaning up yards and rights of way, one of the big roads reports:

"One division has picked up between 675 and 700 carloads of scrap and debris; and 92 cars of scrap iron were gathered along rights of way in yards. On the divisions that were cleaned up through the efforts of the safety department a number of old link and pin couplers were picked up, a proof that no clean up had been made for a number of years." One of the circulars issued by the brotherhood lodges reads: "We feel the safety movement is of the utmost importance to all employees and your hearty co-operation and earnest support is requested, that accidents and personal injuries to our fellow employees may be reduced to the lowest minimum." The Safety Section is planning a "No Accident Month" for May in the Southwestern Region.

Passenger Traffic Increasing

Passenger traffic during January increased by 11.5 per cent as compared with January, 1918, according to the monthly report of the Operating Statistics Section. The number of passengers carried one mile for the two months by regions and districts was as follows:

	January, 1919	January, 1918	Increase, per cent
Total, New England District	276,907,918	256,417,267	8.0
Total, Central District	485,561,079	416,278,740	16.6
Total, Ohio-Indiana District	73,782,065	66,542,908	10.8
Total, Eastern Region	836,251,062	739,238,915	13.1
Total, Allegheny Region	720,071,426	587,364,895	22.6
Total, Pocahontas Region	79,031,603	62,519,832	26.4
Total, Southern Region	519,221,957	477,846,209	8.7
Total, Northwestern Region	386,544,671	349,040,976	10.7
Total, Central Western Region	616,670,871	586,379,033	5.2
Total, Southwestern Region	300,219,314	299,654,824	0.2
Grand total, all regions	3,458,010,904	3,101,994,684	11.5

Rates on Road-Building Materials Reduced

Director General Hines has decided, after consultation with the department of agriculture, commerce and labor, to reduce the present regularly published tariff rates upon specified road-building materials when for use in federal, state, county, parish, township or municipal government road work.

All railroads under federal control are authorized to apply rates on carload shipments of stone (broken, crushed and ground) slag, shells, chatts, cherts, sand and gravel, shipped during the period from May 1 to December 31, 1919, inclusive, when for use in road building or road maintenance, and when consigned to and the freight thereon paid by federal, state, county, parish, township or municipal government, 10 cents per net ton less than the regularly published tariff rates in effect for the transportation of these materials for commercial uses at the time shipments move; but with a minimum charge of 40 cents per net ton, except that where the regularly published commercial rate is less than 40 cents per net ton then such regularly published rate shall apply. These reduced rates may be applied on shipments consigned as outlined above but in care of a contractor, provided the freight is paid by the government, and provided proper certification is made by the government through its properly accredited representative that the shipments are for the use of, and the reduction in the rate will accrue to the government.

The rates authorized are to be applied without publication in tariffs, but each railroad hauling such material is charged with the duty of seeing that the reduced rates are applied only on bona fide government material where the freight charges saved by the reduction will accrue to the government as indicated.

Contingent Fee Covenant Modified

Director General Hines has announced that, with the approval of Attorney General A. Mitchell Palmer, he has consented to a modification of the covenant inserted in purchase contracts under the direction of the Department of Justice issued June 18, 1918, prohibiting the payment to agents of fees contingent upon the procuring of contracts with the government in so far as it relates to railroad contracts.

Since this order was promulgated by the attorney general, there has been a good deal of complaint from railway supply houses that its provisions were working a hardship upon them, and that the government itself was losing the benefits of a system which, previously, had proved both economical and satisfactory in every particular.

Hereafter, the attorney general's order will not affect contracts made between the Railroad Administration and supply houses which, previous to government control, carried on their business through bona fide selling agencies.

At the suggestion of John Barton Payne, general counsel for the Railroad Administration, the following clause will be inserted in appropriate cases in future railroad contracts:

"Provided, however, that this covenant shall not invalidate a contract obtained through a bona fide commercial representative employed under a general contract covering designated territory and shall not prohibit or penalize the employment of the same agencies, rates and methods of compensation in dealing with the United States heretofore customarily employed by the contractor in the regular course of his business in similar dealings with the railroad corporations."

Financial Results in February

The financial results of the operation of Class I railroads (excluding terminal companies) by the Railroad Administration during the month of February, in comparison with those of February, 1918, are shown in a compilation by the Operating Statistics Section. As these figures cover the operation of 231,009 miles of Class I railroads under federal control and exclude switching and terminal companies, they do not exactly correspond with the figures published by the Interstate Commerce Commission for 233,045 miles of road, published last week.

Revenues and Expenses—Class I Railroads in Federal Control

	February		Increase or decrease
	1919	1918	
Operating revenues	$346,582,675	$285,867,230	$60,715,445
Operating expenses	318,693,877	256,495,399	62,198,478
Net operating revenue	27,888,798	29,371,831	D 1,483,033
Taxes, rents, etc.	15,965,925	15,337,911	628,014
Net operating income comparable to standard return guaranteed by government	11,922,873	14,033,920	D 2,111,047
1/12 of standard return	74,035,288	74,035,288	.....
Operating ratio	92.0	89.7	2.3

D—Decrease.

It is explained that operating expenses for February, 1919, included approximately $2,573,000 of back pay applicable

to prior months. If this amount were excluded from the operating expenses, the result would be a net federal income of $14,495,873, or an increase of $461,953 over last year. The operating ratio would have been 91.2 or only 0.5 over last year.

Mechanical Committee to Meet

The Committee on Standards for Cars and Locomotives will hold its next meeting at Washington on April 22.

Rules for Competitive Bidding Under the Clayton Law

The Interstate Commerce Commission, in an order issued on April 10, has prescribed a set of proposed regulations to govern the method of securing competitive bids, as required by Section 10 of the Clayton antitrust Law, in connection with dealings in securities, supplies or other articles of commerce, contracts for construction or maintenance of any kind, to the amount of more than $50,000 in the aggregate in a year, by a common carrier with another corporation, firm, partnership or association "when the common carrier shall have upon its board of directors or as its president, manager or purchasing or selling officer, or agent in the particular transaction, any person who is at the same time a director, manager or purchasing or selling officer of, or who has any substantial interest in such other corporation, firm, partnership or association."

This section of the law, which was twice extended by Congress, became effective on January 1, 1919, except as to corporations organized after January 8, 1918. It provides that such purchases, contracts, etc., shall not be made except from the most favorable bidder, to be ascertained by competitive bidding under regulations prescribed by the commission, and requires the carriers to file with the commission a full detailed statement of the transaction. If the commission, after investigation, shall have reason to believe that the law has been violated it shall transmit the papers and its views of findings regarding the transaction to the attorney general.

The following proposed regulations are served upon all common carriers subject to the act, including the director general of railroads, to show cause, by objections, if any, to be filed with the commission by May 15, why they should not be made effective:

When any carrier, subject to the act to regulate commerce, is required by Section 10 of the Clayton antitrust act to call for bids for securities, supplies, or other articles of commerce, or for the construction or maintenance of any kind or part of its carrier property, such carrier shall prepare specifications, form of proposals and contract, setting forth clearly and in detail a description or descriptions of the matters and things for which bids are requested, the terms, times and conditions of delivery and payment, the place or places where delivery or performance is to be made, the character, amount, and terms of securities offered or sought, and a full description of the supplies or other articles required or offered for sale, hypothecation, or purchase, and shall make and attach to such specifications such maps, drawings, and illustrations and state such other substantial facts or conditions as are or may be necessary to a full understanding of the premises and procedure by bidders. Such specifications, drawings and illustrations in each case shall be kept open at the principal office or offices of the carrier for full examination, free of charge, by persons desiring to examine the same with a view to bidding, and, upon request, such carrier shall furnish to any person or persons desiring the same true and accurate copies of such specifications, maps, drawings and illustrations; *provided* that the carrier may make a charge for such copies so furnished, the charge not to exceed the reasonable cost of making and forwarding the copies requested.

The carrier shall publish in each case a request for bids in at least two daily newspapers of general circulation, at least two publications in each week for two weeks, the first publication to be at least two weeks immediately preceding the day when the bids are to be submitted; one such newspaper shall be published in the city or town where the principal operating office of the carrier is located and the other newspaper shall be published in one of the following cities nearest to the operating office of the carrier or the place where the contract is to be performed, namely: New York, N. Y.; Boston, Mass.; Chicago, Ill.; St. Louis, Mo.; Atlanta, Ga.; San Francisco, Cal., and Portland, Ore.; and a printed copy of the published notice in each case shall be posted in plain view, for two weeks immediately preceding the day on which bids are to be received, on a bulletin board, designated for that purpose, in a public and conspicuous place in the building where the principal operating office of the carrier is located. Such published notices shall describe in general but intelligible terms the proposed contract, giving its serial number, and the special matter or things for which bids are requested, and the date on or before which the bids must be submitted, and the person by whom and the office at which the bids submitted will be received and opened as herein provided. The carrier may in said notice reserve the right to reject any and all bids and may, at its option, require each bidder to tender a bond in a reasonable sum to be therein named, with sufficient surety or sureties conditioned upon the faithful and prompt performance of the terms of the contract.

Every bid to receive consideration shall be submitted at the place specified in the notice on or before noon of the day on which the bids are to be opened, and the bids shall be opened afternoon and before six o'clock, on the day and at the place and by the person or persons designated in the notice. Each bidder may attend in person or by duly authorized representative at the opening of the bids, and shall be afforded an opportunity to do so and to examine each bid. The bids shall forthwith be tabulated in conformity with the form of proposal prepared and a copy of such tabulation shall be promptly furnished to any bidder or his authorized representative upon application therefor.

When required by the notice, each bid shall be accompanied by tender of a bond in the amount specified in the notice, with sufficient surety or sureties conditioned upon the faithful and prompt performance of the proposed contract. A bond shall be required only in cases where the notice for bids expressly calls for a bond.

Each bid shall be enclosed with accompanying papers in a plain envelope securely sealed bearing no indication of the name of the bidder or the amount of the bid, and shall be marked "Bid under proposed contract No. .....," and shall be addressed to the officer of the carrier designated in the notice to receive the same.

Each bid shall state the name and address of the bidder and, if the bidder be a corporation, the names and addresses of the officers, directors and general manager thereof and of the purchasing or selling officer or agent in that transaction and, if the bidder is a firm, partnership or association, the bid shall give the names and addresses of each member thereof, and of the manager, purchasing or selling officer or agent in that transaction.

After receiving and opening bids as aforesaid, the carrier receiving the same shall within 10 days after the opening of the bids, accept the most favorable bid considering (1) the lowest price or prices for the supplies, equipment, and other articles of commerce, and for the construction or maintenance work, described in the advertisement, and the highest price or prices offered for any securities or property, so

described, for sale by the carrier, and (2) the ability and reliability of the bidder, financial and otherwise, to deliver the property or to perform the work or transaction, or to pay for the securities, described in the advertisement, giving due consideration to any bond or security tendered by the bidder. If the right be reserved in the notice all bids may be rejected and the carrier may readvertise for bids. The carrier shall notify the successful bidder of the acceptance of his or its bid, and the bidder shall within 10 days execute the required contract, and, if required by the notice, execute a good and sufficient bond for the faithful and prompt performance of the contract. In case the successful bidder shall neglect or fail within said time to execute the contract or bond as aforesaid the carrier may within five days award the contract to the next most favorable bidder, ascertained as herein provided for determining the most favorable bidder. If neither the most favorable bidder nor the next most favorable bidder shall execute a contract and qualify as aforesaid, the carrier shall readvertise for new bids.

Each carrier after having made and executed a contract as and in the manner above specified shall within 30 days after the execution of such contract file with the Interstate Commerce Commission a statement of the transaction giving (a) a copy of the published notice, (b) the names of all bidders, and, if the bidder be a corporation, the names and addresses of the officers, directors and general managers thereof and of the purchasing or selling officer or agent in that transaction, or if the bidder be a partnership or firm, the names and addresses of the members of the firm, the general manager and purchasing or selling agent thereof, and the total amount of each bid; (c) the name of the bidder to whom the contract was awarded together with a copy of the contract; and (d) if any other than the lowest or the highest bid, as the case may be, is accepted as being most favorable to the carrier, the reasons for such acceptance. The statement shall be made in typewriting, in pamphlet form on pages not less than 8 by 10½ inches in size nor greater than 9½ by 12 inches, in size, bound on the longer edge of the page, the paper to be of durable quality, fit for permanent record.

In the case of each bid so taken as aforesaid, the carrier shall preserve and keep open for examination by the Interstate Commerce Commission or any duly authorized examiner thereof, (a) a copy of the resolution or order of the board of directors, executive committee, or officers of the said common carrier specifying the purposes and terms of the contract for which the bids were invited; (b) a copy of the specifications, maps, drawings, and illustrations upon which bids were made; (c) copies of the notices published, sworn to by or on behalf of the publisher of each paper, respectively, giving the dates and times of publication; (d) the original bids received, designating the bid accepted and giving a statement of the reasons for accepting the same; (e) a copy of the contract entered into between the carrier and the accepted bidder, together with a copy of bond if any; (f) a statement showing any relationship, or business relation if any of the accepted bidder to any officer, director, general managers or agents of the carrier; (g) references by number of volume and page to the records of proceedings of the stockholders, directors, or executive committee of the carrier. The files in each transaction shall be securely fastened together and given the contract number and each document therein shall be numbered consecutively and, at the conclusion there shall be a sworn statement by the president or the general manager of the carrier, stating that the files in No. ..... contain true and complete records and statements of all the negotiations had in connection with the contract therein set forth. Such files shall not be broken or any part destroyed by the carrier or any officer or agent of the carrier without written authorization from the Interstate Commerce Commission.

Report on South Byron Collision

THE INTERSTATE COMMERCE COMMISSION has issued a report, dated March 4, and signed by W. P. Borland, chief of the Bureau of Safety, on the rear collision of passenger trains on the New York Central at South Byron, N. Y., on the morning of January 12, in which 22 persons were killed and 71 injured. The circumstances and causes of this collision have been quite fully reported in the *Railway Age*—see the issues of January 17, page 212, and February 28, pages 477 and 491.

Mr. Borland in his conclusion says:

"This accident was caused by the failure of Engineman Friedley of train No. 11 properly to observe and be governed by automatic block-signal indications. A contributing cause was the failure of Flagman Groves to go back a sufficient distance properly to protect his train, and to display lighted fusees as required by rule. Engineman Friedley was employed as a water boy in 1873, promoted to fireman in 1876, and in 1885 was promoted to engineman. In January, 1906, he was dismissed for using the main track without flag protection, being reinstated in November of the same year. Flagman Groves was employed as brakeman in 1891. In 1907, he was suspended for 15 days for not protecting his train by flag when it remained at a regular stopping point longer than usual. The evidence indicates that all of the signal appliances intended to prevent an accident of this character worked properly, its occurrence being due solely to human error.

"In answer to a question as to what he would suggest for the prevention of accidents of this character, W. H. Elliott, signal engineer of the road, said that the only remedy would be an automatic train-control system. In his 25 years' experience as signal engineer he had made tests of three different types of train control, starting in 1893. Eight years ago a former president of the New York Central appointed a committee of four signal engineers from that system to investigate such devices and recommend one for trial. If this could not be done they were to devise one themselves. Up to the present time the work of this committee is uncompleted. Mr. Elliott stated that one of the principal objections to the use of an automatic train-control device was the idea of taking away from the engineman the control of his train, the belief being that such a practice, under stormy weather conditions, for example, would cause the engineman to take chances and to depend upon the train-control device. If it should fail under such circumstances and an accident should result then the railroad company would be in a very undesirable position.

"The committee felt that an automatic train-control system was not intended for such dependence as would be placed upon it by enginemen, and that it would be better not to have it unless it could work with the same degree of reliability as the signal system. Another objection was the Expense. Mr. Elliott stated that after careful investigation it seemed to this committee that greater protection would be afforded by spending an equal amount of money in installing automatic signals on the parts of the road not so equipped than by putting a train-control device into use on lines already equipped with automatic block signals. Mr. Elliott said that a device of the mechanical trip type was in use in the tunnels and subways of New York City, and was giving good service, but its use in open country where it would be exposed to snow and ice and to gravel or stone which might be dumped along the roadway had not proved a success, the result being that often there would be no application of the brakes when there should have been, or else there would be many stops when none was called for. Difficulties were also presented to steam roads operated in the open on account of the different types of trains operated over them at greatly varying rates of speed. Mr. Elliott further stated

that with one possible exception no device has been developed in which the objections from an operating and engineering standpoint were sufficiently overcome to warrant going ahead with such devices. He said, however, that a device can be had; but that everyone had been dodging it on account of the expense."

Commenting on the argument that a railroad will more effectively promote safety by extending automatic block signals and interlocking and introducing other safeguards, than by installing an automatic train stop, the report says: "This in substance is merely an argument for utilizing available funds so as to secure immediate returns and results; it can not properly be considered an argument against the development and use of an automatic train-control system, although it may temporarily serve as an excuse or reason for indefinite postponement of the consideration of that subject and of the practical development of automatic train-control devices. * * * While many of the problems of automatic train-control are serious, and the vision of the difficulties to be encountered has been allowed to obstruct the constructive development of such devices by railroad companies, these difficulties are not considered insurmountable. In its fourth annual report, in 1911, the Block Signal and Train Control Board in a discussion of this matter held that had the railroads directed the same effort toward the development of automatic train-control apparatus that has been devoted to the development of interlocking and block-signaling apparatus, 'we should now have adequate installations of automatic train-control devices which would permit an engineman to handle his train without interference as long as he did it properly, but would intervene to stop his train if he disregarded a stop signal or ran at excessive speed where speed restriction was prescribed.'"

The report repeats the discussion which was issued in connection with the similar collision at Mount Union, Pa., on February 27, 1917, concerning the construction of steel passenger cars with a view to mitigating the results of collisions at high speeds.

Railway Developments in Foreign Countries

British Government Makes Compromise with Railwaymen Resulting in $47,500,000 Increase-Wage Bill

THE LABOR DIFFICULTIES on the British railways which have threatened on a number of occasions to result in a general railway strike were amicably settled after extended conference and discussion on March 28, when the conference of delegates of the National Union of Railwaymen agreed to accept the government's compromise offer.

The men's demands and the developments during the war were outlined in the *Railway Age* of March 12, page 612.



The Board of Trade Confers with the British Railwaymen—Sir Albert Stanley, President of the Board, Presiding

By way of showing to how great an extent these demands were met in the government's offer, the following comparison is given:

GUARANTEED WEEK

Demand—Eight-hour working day or 48-hour week.

Offer—The standard week's work to consist of 48 hours (as granted effective February 1). The standard week's wages, exclusive of any payment for overtime or Sunday duty, to be guaranteed to all employees who are available for duty throughout the week, but turns commencing on a Saturday and finishing on a Sunday shall form part of the guaranteed week, and all turns commencing on a Sunday shall be excluded from the operation of the guaranteed week. In the event of a strike affecting the work of any grade, either generally or in any district, the question of suspending the operation of this article shall be referred to the Joint Committee to be set up under Article 7 of this Memorandum.

GUARANTEED DAY

This to be further discussed.

OVERTIME.

Demand—Double time (National Union of Railwaymen). Time and a half (Associated Society of Locomotive Engineers and Firemen).

Offer—All time worked on weekdays in excess of the standard hours to be paid for at the rate of time and a quarter, each day to stand by itself for overtime purposes.

SUNDAY DUTY

Demand—Double time.

Offer—12 o'clock midnight Saturday to 12 midnight, Sunday: Time and a half without addition to rate for overtime and/or night duty. The same to apply to Christmas Day and Good Friday. Hours worked on those days in excess of the standard number of hours shall not be computed as part of the hours of work of any other day.

NIGHT DUTY

Demand—Time and a half for all time worked between 6 p. m. and 6 a. m.

Offer—Week days: (*a*) All ordinary time worked between 10 p. m. and 4 a. m. to be paid at the rate of time and a quarter; (*b*) all overtime worked between 10 p. m. and 4 a. m. to be paid at an inclusive rate of time and a half.

REST

Demand—Not less than 12 hours between each turn.

Offer—In all regular duties a period of 12 hours' rest to be shown on the rosters at the home station, but in other cases a minimum of nine hours.

HOLIDAYS OR VACATIONS

Demand—14 days with pay.

Offer—One week's holiday with pay after 12 months' service, to include the casual employees who are regularly employed, without prejudice to those men who already have a longer holiday under their existing conditions of service.

MANAGEMENT

Demand—Equal representation on management.

Offer—The negotiating committees of the two unions (the National Union of Railwaymen and the Associated Society of Locomotive Engineers and Firemen) will be recognized as the medium for dealing with all questions affecting rates of pay and conditions of service while the present negotiations are proceeding.

A committee shall be appointed to consider and report:

(1) As to the setting up of a joint committee, consisting of representatives of the Railway Executive Committee and of the two unions, to deal with any questions that arise in regard to rates of pay and conditions of service of the men within the conciliation grades, as from the date when these negotiations are concluded, and the time until some final arrangement is arrived at in regard to the future position of railways.

(2) As to the continuance or discontinuance of the existing Conciliation Boards.

When the new Ministry of Ways and Communications is set up it is the intention of the Government to provide in the organization for, and to avail itself fully of, the advantage of assistance, co-operation and advice from the workers in the transportation industry.

WAGES AND STANDARD RATES OF PAY

Demand—War wage of 33s. to be converted into permanent wages and rates of pay to be standardized on all railways (National Union of Railway Men).

Drivers, 20s. a day; firemen, 15s. a day; cleaners, 10s. a day (Associated Society of Locomotive Engineers and Firemen).

Offer—The present wages to be stabilized till December 31, 1919, and any reduction of the war wage under the agreement of November, 1918, to be waived.

As regards standardization of rates of pay and removal of present anomalies, this can only be dealt with in connection with a general revision of permanent wages, and, therefore, it is proposed that the present negotiations shall be continued for fixing new standard rates so as to insure that all men throughout the country shall receive the same payment for the same work under the same conditions.

This will involve a transfer of a part of the war wage to the permanent wage, but the Government agrees that up to December 31, 1919, no man shall receive less in weekly rate of wage, *plus* war wage than he is receiving at present, while anyone to whom the new war wage and new rate yield more than they are receiving at present, shall receive the advantage as soon as an arrangement is arrived at.

At the end of the year the whole situation will be reviewed. The war wage will have to be looked at in the light of the circumstances of the time generally and it will be open to the men to ask for a revision of the new standard rates if they think a case can be made for it. But the anomalies of varying pay for similar work under similar conditions will have been removed, and future negotiations will be rendered much easier through there being only one set of figures to work upon.

OTHER ITEMS IN THE PROGRAMMES

These to be discussed at further meetings.

Discussion concerning these demands was postponed during the war, but began immediately after the signing of the armistice, and conditions became especially acute during the strike on the tubes and electric lines out of London in February. The discussion has been between the Railway Executive Committee and the Board of Trade on the one hand, and the National Union of Railwaymen and the Associated Society of Locomotive Engineers and Firemen on the other. Sir Albert Stanley, as president of the Board of Trade, presided at most of the conferences, and the railway men's case was presented by J. H. Thomas, general secretary of the N. U. R. The meetings were secret for the greater part of February and March, and but little account was given out concerning the decisions reached. In the meantime the so-called triple alliance was formed of the railwaymen, the miners and the transport workers, and fears were held for a time of a general sympathetic strike of all three classes of workers. Finally the Board of Trade made a compromise offer to the railwaymen, but this was promptly rejected and a strike resolution adopted. The final agreement came about when another offer was made which differed only in minor details, and after a conference was held in Downing street, at which the entire matter was gone over in great detail before Bonar Law, and at which the latter brought out the government's position and outlined how far it was willing to go. Mr. Thomas then took the matter to his union and then secured a vote to rescind the strike resolution and a favorable vote of the conference of delegates. It is understood, however, that the vote in favor was a narrow one and that fears were expressed that there might be local disturbances.

At the conference before Bonar Law, Mr. Thomas, who conducted the railwaymen's case, explained the railwaymen's position and went into great detail concerning a number of points. One of these was the status of the shopmen. About 100,000 of the railway shopmen belong to his union, but many belong to the Amalgamated Society of Engineers, and other craft unions. The government felt it would become involved in a jurisdictional dispute if it came to terms with the N. U. R. alone, but Mr. Law finally agreed to negotiate with a committee from all the railroad shopcrafts together.

It is estimated that the concessions which have just been accepted will add about £10,000,000, or approximately $47,500,000 annually to the railway wage bill, bringing the total increases in wages since before the war to about £85,000,000. This includes £60,000,000 in the form of war bonuses, now amounting to 33s. to all men over 18 years of age, £15,000,000 covering the introduction of the eight-hour day on February 1, 1919, and the £10,000,000 in the latest concessions. It is stated that the gross receipts of the railways before the war were only £139,000,000 annually, and the net revenue £50,000,000. In view of the fact that there have also been increases in the cost of materials amounting to some £25,000,000 yearly, it is evident that the cost of the new concessions will have to be borne either out of taxation or increased freight rates.

Swiss Railways' Coal Bill

The Swiss Federal Railway accounts show that the deficit has increased from $14,355,000 in 1917 to $41,510,000 in 1918. This is due to the increased wages, pensions, and cost of all materials, but above all to the enormously increased price of coal in the last six months of the year.

Railway Extensions in Peru

Hector F. Escardo, Minister of Finance and Commerce, recently made a statement in one of the leading newspapers of Lima, says Commerce Reports, to the effect that the first operations of the new Peruvian Railway Construction Co. (which company was created by a Government decree) will be directed toward the extension and improvement of existing railways. He states that with the revenues from the National Tobacco Monopoly they propose to finish the railway between Lima and Huacho, the latter being a small seaport town north of Ancon. The railway between these two points is at present managed by the Peruvian Corporation, a standard gage road existing between Lima and Ancon, and it is a narrow gage between Ancon and Huacho, which requires at present the transshipment of cargo and passengers at Ancon. In all probability this railway will be changed to standard gage throughout. He states that the next work of the company will be in connection with the extension of the existing railway from the port of Chimbote to the interior town of Racuay. This road will probably open up part of the Peruvian coal fields. One of the most important undertakings will be the extension of the Central Railway of Peru from Huancayo to Ayacucho. This extension was begun several years ago, but only about 20 kilometers have been finished. They expect work to begin this month (February, 1919). Another needed improvement in the development of railway facilities in the Republic will be the proposed con-

struction of the road from the port of Chimbote to Cajabamba. It is stated that this railway will pass through one of the richest mineral and agricultural sections of the country. The present indications are that this company will not undertake, for the present at least, the construction of new railways.

British Government Makes Concession on Transport Bill

The bill providing for the establishment of a Ministry of Ways and Communications in Great Britain and Ireland, which, as noted in last week's issue, passed to its second reading on March 18, came before the standing committee of the House of Commons for the first time on April 1, and was also considered in connection with the Money Resolution in the House itself the same evening. At the latter, considerable objection was brought up against the broad powers of the bill as relates to finances, it being feared that the control of the House would not be sufficiently retained over the actions of the new ministry. As a result, Bonar Law, for the government, made the very important concession of agreeing that the government would provide for a competent representative of the Treasury to watch the financial aspect of the schemes worked out by the ministry and to report on



From February 18 to 22 Floods in the Lea Valley, England, Resulted in Serious Operating Difficulties on the Great Eastern Railway. The Scene Shown Is at Tottenham Hale Station

such matters not to the Minister of Ways but to the Chancellor of the Exchequer. He also stated that the government proposed in the case of every scheme which involved an expenditure of as much as £1,000,000, not in any particular year, but upon the scheme as a whole, it would before the scheme was undertaken submit it to the House of Commons in an estimate or in some other way.

Both at the session in question and before the standing committee, the government has reaffirmed its intention to fight in every way any proposed changes in the bill which will take away control over any of the facilities of transport which are now included.

Proposed Railway in Andalusia, Spain

A railway from Zafra, Province of Huelva, to Villanueva del Fresno, Province of Badajoz, is about to be constructed, writes Consul Robert W. Harnden, Seville, in Commerce Reports. Its importance will consist mainly in the means it will afford for transporting the agricultural and mineral wealth of the provinces of Huelva and Badajoz, and as a connecting line between the port of Huelva and the Portuguese frontier.

This railway is to be over 100 kilometers (62 miles) in length and the cost of its construction is estimated at approximately $6,000,000, of which $500,000 is to be devoted to the purchase of rolling stock.

The mineral wealth of the region through which this railway will be laid is of considerable importance; productive iron-ore, manganese, nickel, and wolfram mines being located in its immediate vicinity. Over 56,000,000 tons of iron-ore alone have been mined in that district. The agricultural wealth of the region is of no less importance, consisting in large quantities of cereals, wines, olive oil, and cork bark. Cattle raising is also a factor of interest.

Zafra is connected by a railway with Seville and Huelva, and the terminus—at Villanueva del Fresno—with Lisbon, Portugal.

Walter Francis, a British engineer, has been commissioned by the British Government, through the British Commercial Office at Madrid, to construct this railway.

Special Correspondence from China

PEKING, March 5.

In the recent tenders for 100 goods wagons upon the Peking Hankow line, firms representing American builders were the successful bidders.

The Peking Syndicate has so nearly concluded arrangements for a loan to the Taokow Chinghua railway, that it is advertising for tenders on 100 open wagons of 40 tons capacity each.

On February 26, a joint protest was lodged with the Ministry of Communications by the foreign diplomatic corps, concerning the discomfort caused to travellers by soldiers on the Peking-Hankow line, the use of goods wagons by soldiers to the deprivation of foreign interests needing the use of them, and the distribution of wagons so as to discriminate in favor of a mining company in which the Minister of Communications is personally interested. It is alleged that one-fifth of the entire equipment of this line is being devoted to the exclusive service of this mine.



From the N. Y. Tribune

Scrambling and Unscrambling

Unified Shop Record and Management Conditions

A COMMITTEE WAS recently appointed from several roads in the Eastern Region, assisted by a representative from the mechanical department of the United States Railroad Administration, to visit a number of representative shops, collect data, and make a report as to the various methods of shop operation, supervision and shop records. Copies of the recommendations of the committee have been sent out to the federal and general managers of the Eastern Region by the regional director with Circular 1801-129A674, which states that while not mandatory, the recommendations if gradually adopted will secure uniformity in shop records and simplify many of the methods of procedure. The circular also suggests that, where no system is in use, the proposed plan may well be adopted. Reports are asked for as to what action is taken on the committee's recommendations.

The recommendations of the committee include the following:

Supervision

The committee has paid particular attention to that supervision which comes in direct contact with the men, and invariably where the number of men assigned to one supervisor exceeded 30, a lack of activity was noticed.

It is generally conceded that shops on a day-work basis require more supervision than those on piece work, and after careful consideration it is recommended that the plan of assigning not more than 30 men to one foreman be adhered to as closely as practicable. The committee further recommends that this supervision be relieved of office clerical work during the work period; that shop staff and other meetings be held at other than the working period and that these supervisors be given the title of foremen rather than leaders.

Checking In and Out

Your committee recommends a time clock system for checking men in and out; clock card should show employee's name, occupation and key number. Space should be provided on card for overtime as well as regular time. The same card should never be used beyond a payroll period and the one week card is preferable.

Clocks should be located convenient to the men's work and no clock should serve more than 125 employees. Unless existing agreements prohibit, clocks should be opened 15 minutes before starting time and closed promptly on whistle; opened promptly at quitting time and closed after all employees have checked out, with an attendant in charge of each clock during checking periods. This clock card should be used as a basis for payroll and checked against workmen's daily time cards.

Routing of Locomotive Work

Experience shows that any system of despatching or scheduling of work through the shop must be predicated upon: (1) A predetermined route; (2) a predetermined time limit.

With the above in view the general outline of a routing system is hereby made. In order to properly carry out the following routing it is necessary to have a competent schedule man, with authority, to follow up the system. The locomotive should be thoroughly inspected prior to entering the shop and the schedule man furnished with a copy of the inspection report from which the shopping schedule is prepared.

Separate forms should be made out by the schedule man covering parts to be repaired in various departments and furnished each foreman. These forms should show the locomotive number, class, date in and date scheduled out of shop and under the heading "Class of Work" the various units of the locomotive, condensed into not exceeding 30 items, to be listed in consecutive order in which the parts of the locomotive are dismantled and erected. Space should be provided opposite each of these items for the date the particular item is to be dismantled or repairs started, and the date the repairs are to be completed and erected. Space also should be provided opposite each of these items, for parts of the locomotive that it is necessary to send to the machine, smith or boiler shops, for the dates these parts should be received in the various shops and the dates they are to be completed. Space should also be provided opposite each item under the heading of "Remarks," for "Cause of delay," if any.

A "Daily Schedule Delay Report" should be furnished by the schedule man to the officers in charge, this form to cover all locomotives in shop on which any part is behind schedule. Opposite the individual engine numbers, space should be provided for the various units of repair, condensed into not exceeding 12 units of repair. Under the heading covering the units of repair space is to be provided for a check mark to show just what items are behind the schedule and delaying the work, together with the cause.

A blackboard should be provided in each department, located in a conspicuous place, for the observation of the workmen as well as the foremen. All locomotives in shop requiring work in this department are to be listed on this board. At the top of the board should be shown the units of repair with which the particular department is concerned. As the parts of the locomotive reach the department a check mark opposite the locomotive number and under the parts is made. When repairs to these parts are completed and ready for delivery to the erecting shop, another check mark is made. When they are moved from the department, the check marks are erased.

By the use of this board it is possible for any one concerned to readily ascertain in just what department the repairs to the locomotive are being delayed.

Shop Order System

Shop or work orders should be issued to obtain the cost of manufacturing parts, repairing machines, cranes, etc., or, when desired, to determine the cost of a specific unit of locomotive repair.

After ascertaining that the necessary raw material is on hand, a shop order number should be assigned and a form issued giving the shop order number, requisition number, date issued, description, drawing number, pattern number and storehouse section. The accounting office should be notified so they may open the account.

The shop order clerk should then issue a card showing departments in which the work is to be performed and then enter in a book with duplicate stubs, kept for the purpose in the foreman's office, the work necessary in that department. After the department completes the work, the foreman will detach and return to the shop order clerk the duplicate slip. By this method it can readily be seen just what department has completed its share of the work.

When all slips have been returned, signifying the completion of the work, the accounting office is notified so it can close the account and compute the cost.

Where there is a sufficient amount of shop order work, it is recommended that a competent man be appointed, with authority, whose duty shall be to see that the work is promptly handled through to completion.

Accounting

Of the 10 shops visited, eight have in use daily time slips (paper) and two, daily time cards (light cardboard). In all cases except one the daily time cards are made out by the

workmen and approved by the foremen. In the one case, the daily time card was also the clock card and the cards were filled out as to hours and distribution by shop timekeepers.

In all cases, locomotive numbers were shown and the number of hours spent on each, and distribution was drawn off to individual locomotives; arriving at a cost per locomotive as a unit.

The daily time cards in all but two cases provided space for description of work. In three of these cases some description was being shown and in the other seven none; but in no case were descriptions as shown considered specific and complete enough to form a basis of cost. Other than distribution to individual locomotives the only other information shown and the only other distributions made are those necessary to satisfy the requirements of the Interstate Commerce Commission classification of accounts.

Recommendations

It is recommended that one daily time card—size preferably 4 in. x 9¼ in.—of light cardboard paper be used. The card should show name, place, date, key number, occupation, department of shop and rate and should provide sufficient space for locomotive or shop order numbers, etc., description of work and hours worked. Total hours as shown by the daily time card of each workman should be checked with total hours as indicated by registerings upon his clock time card.

After a careful consideration of this subject it is the opinion of the committee that it would be impracticable to endeavor to arrive at the cost of a smaller unit of locomotive repair, from description of work on daily time card, than the locomotive as a whole, except by timing each individual workman, which practice the committee does not believe would be countenanced by the workmen. Therefore, it is suggested that when it becomes necessary or desirable to determine the cost of any specific unit of locomotive repair a shop order or work order be issued, to which all labor performed in connection with this specific unit of repair be charged and in this way determine its actual cost.

The American Railway Tool Foremen's Association will hold its ninth annual convention at the Hotel Sherman, Chicago, on August 27, 28 and 29, 1919.

Storage Battery Cars for Mexican Railroad

THE THREE CARS shown in the illustrations have just been delivered to the United Railway of Yucatan by the Railway Storage Battery Company. The cars are driven by motors geared to the axles and power is supplied to the motors by Edison storage batteries. The cars are designed to be operated singly or in multiple unit.

The schedule as laid out for service to be performed, covers the run from Merida to Progreso, a distance of 23.6 miles. There are six stops between terminals and the running time over the line is 45 minutes. The city of Merida has a population of 70,000, while that of Progreso is 8,000. The grade between the two cities is practically level and the total service per day is three round trips. The cars are fitted for passenger service and are able to draw a trailer carrying baggage and express matter.

Construction

The car is constructed according to M. C. B. standards and the car body and its appliances are all steel with the exception of doors and inside fittings. The over-all length of car body is 56 ft., the extreme width is 8 ft. 6 in., and the extreme height is 12 ft. Reversible seats upholstered with rattan are used and the seating capacity of the car is 66 persons. Brill 69E trucks are used and the couplers, draft gears, and wheels conform to M. C. B. standards.



Three Storage Battery Cars Just Shipped to the United Railways of Yucatan

The total weight of car without load is 28.3 tons; the batteries alone weigh 6.3 tons and the total weight of the motors and control equipment is about 3 tons. This makes a total weight per passenger of about 500 lb.

Motor and Control Equipment

Each car is equipped with four General Electric, No. 261, 250-volt, direct current motors. There is one motor for each axle and each motor is connected to the axle with a single reduction gear. These motors were supplied to meet the requirements of supplying a single car with 88 mechanical horse-power during acceleration and 28 mechanical horse-power when running free and to supply a car and trailer with 166 mechanical horse-power during acceleration and with 39 mechanical horse-power when running free. The motors are protected by Condit instantaneous, automatic,

overload circuit breakers. Double end multiple unit control is used and the cars are connected with a seven-point cable when used in multiple units. The cars are equipped with General Electric straight and automatic air brakes.

Battery

Each car is equipped with a battery of 252 Edison type A-12 cells; 240 of these cells are used for the power circuit



Interior of Car Showing Seating Arrangement

and eight for the lighting circuit. While the battery is being charged all of the cells are connected in series. A Sangamo ampere hour meter is installed in the charging circuit to insure the batteries the proper amount of charge.

Performance

These cars are capable of developing a speed of 45 miles an hour on level tangent track. It is possible for them to



The Car Bodies and Their Appliances Are All Steel, Except for the Doors and Inside Finish

negotiate grades of from 8 to 10 per cent and to haul loads of from 30 to 35 tons at a fair maximum speed. They may also be used to sort and drill loads up to 150 tons. Under ordinary service conditions their range of operation on one charge of the battery is about 120 miles.

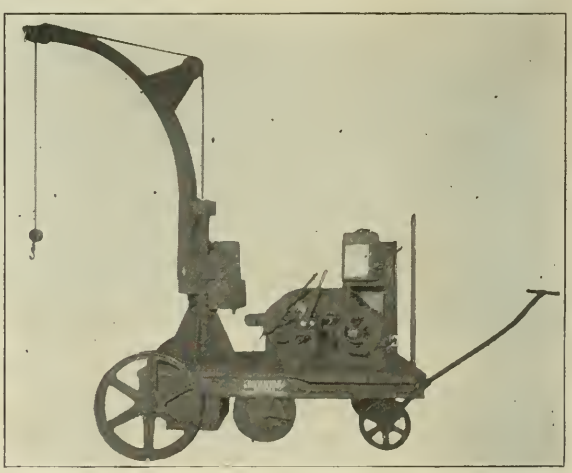
The particular advantage of this type of car as presented by the maker lies principally in the characteristic of the alkaline storage battery. As the battery is comparatively light in weight, the total weight of the car is not excessive and as the battery is strongly built and not affected by ordinary vibration and shock it lends itself particularly to this class of service. The only attention required for this class of storage battery is to keep it charged and filled with water.

A storage battery, of course, represents a loss of efficiency, but it does away with line losses and where 24-hour service is not required the cost of keeping power on the line with no cars running is eliminated. Furthermore, it is usually possible to charge batteries during an off-peak period and thereby obtain a lower charging rate.

Similar cars are in use on the Cambria & Indiana, the Lorain, Ashland & Southern, the Atlanta, Birmingham & Atlantic, the Chattahoochee Valley, the Long Island and the Pennsylvania. During the mechanical conventions to be held at Atlantic City next June a demonstration car of this type will be operated between Atlantic City and Ocean City.

A Portable Electric Stacking Crane

AN ELECTRIC STACKING MACHINE designed for use in freight terminals and warehouses which can be wheeled from place to place and which is equipped with a conductor reel so that the conductor may be connected with plugs in the various parts of the house and the current thus carried to the motor on the crane is shown in the photograph. These cranes can be operated either by direct or alternating current and are made in capacities up to one ton. They are designed for high speed work, usually



The Crane Is Readily Moved from Place to Place

having a hoisting speed of from 150 to 200 ft. per minute except for short lifts, when the speed is lower.

The boom or tower can be made up to 25 ft. high and may be swung either by motor or by hand. In special installations the truck can be driven by motor and the boom may be hinged so as to permit passage through low doorways.

The principal installation of these cranes in this country is on the Boston terminal wharf. Installations have also been made at various points in Cuba. The cranes are manufactured by the Northern Engineering Works of Detroit, Mich

New Type of Cinder Conveyor

At the Chase yards of the Chicago & North Western at Milwaukee, Wis., a cinder pit conveyor of a new type has recently been installed. The conveyor, designed and built by the American Steam Conveyor Corporation, Chicago, carries the cinders from the ash pit to a car by the action of a steam jet. The conveyor consists of a line of pipe, into which the ashes and small cinders are fed and through which they are carried to the discharge point by current action. This current is created by the action of a jet of steam discharged at high velocity into the center of the pipe line in the direction of travel of the material. This steam discharge tends to create a vacuum behind it, which in turn creates a current of air through the intake at the end of the line.

The ash or cinder intake is conveniently located in the cinder pit at a point where the material can be raked or shoveled into the intake with the least effort. The suction pulls the ashes through the pipe line toward the steam unit fitting where the steam is introduced into the conveyor system. Here the force of the steam itself ejects the material through the discharge line. One man in a cinder pit using



Conveyor Which Discharges Cinders Through a Pipe Line by the Action of a Steam Jet

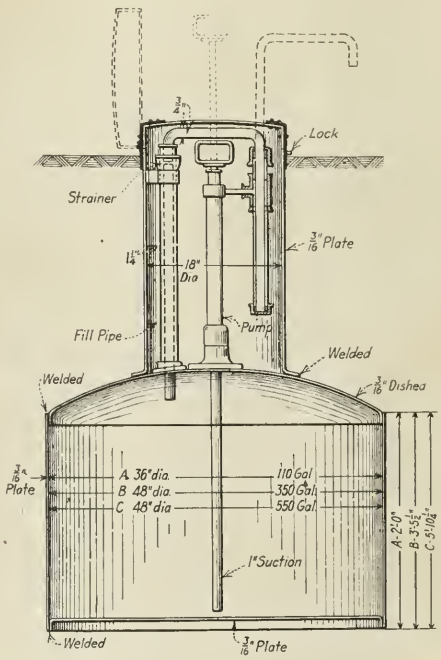
this conveyor can handle the ashes from locomotives as fast as they can be dumped, as his work is simply to shovel or rake the ashes into the intake. When all the ashes have been dumped from a locomotive, the ash handler turns on the valve which allows the steam to enter the steam unit and starts raking or shoveling steadily until the cinder pit is cleared.

One of the advantages of this system lies in its simplicity. It can be operated by the most ignorant type of labor as there are no complicated parts; the whole operation consists of turning the one valve and feeding the ashes into the hopper. So simple is the operation of these cinder pit conveyors that when male labor was scarce because of war conditions, women were placed in the pits and successfully kept them clear.

The system as installed in the Chase yards successfully handles the ashes from 45 to 60 locomotives each day, and effects a marked reduction in labor costs. Several men were previously employed in the two cinder pits in which the steam cinder conveyor has been installed and the saving in these two pits over hand operation is four men per shift. The amount of steam consumed per ton is surprisingly small, as it is used only when the conveyor is in actual operation. Steam for operating this conveyor may be secured from an adjacent power house, or it may be taken from the locomotive. The conveyor system is flexible in design and may be changed to suit the conditions at any cinder pit.

Underground Gasoline Storage

The storage of gasoline in a safe yet convenient manner is a problem arising whenever this fuel is used in appreciable quantities. On railroads it arises in connection with the operation of motor cars, water stations, coaling plants—in fact with all uses of gasoline outside of engine terminals equipped with a complete oil house. To meet this need a buried storage tank has been introduced by the Wm. Graver Tank Works, Chicago. As shown in the drawing it consists of a welded steel tank buried in the ground so that the top is covered to a depth of about 2½ ft., access being had by a steel plate shaft 18 in. in diameter



A Cross Section of the Tank

welded to the top of the tank and extending about 6 in. above the ground surface. This shaft contains all the equipment for filling and drawing off gasoline and is provided with a cover, so that the tank may be sealed against tampering.

The equipment consists of a 1¼-in. filling pipe, a pump and a ¾-in. discharge pipe. The latter is made to telescope into a 1½-in. pipe so that when it is to be used this discharge pipe may be drawn up out of the well and turned in a convenient position for filling a can or pail. This form of storage unit may be had in sizes varying from 110 to 1,000-gal. capacities.

The Red river division of the St. Louis-San Francisco has been abolished; the territory known as the Creek and Sherman sub-divisions, including the Sulphur branch, has been added to the Southwestern division, and the territory known as the Ardmore and the Arkinda sub-divisions, including the Platter branch, is added to the central division. The Ozark division will be abolished; the Memphis and Willow Springs sub-division, including branches, will be added to the Southern division, and the Clinton and Osceola sub-divisions will be added to the Eastern division. The office of the superintendent of the Southern division will be transferred from Birmingham to Memphis.

General News Department

Railroad bills pending in Congress when it adjourned on March 4 have been abstracted by the Chamber of Commerce of the United States and published in a special bulletin. This bulletin also contains the more elaborate plans for dealing with the railroads which were presented at the Senate committee hearings in January and February.

An extension of 45 days in the time for filing complete tax returns, in the case of corporations, has been granted by D. C. Roper, Commissioner of Internal Revenue. In announcing this extension (to June 15) the commissioner calls attention to the fact that it is to the interest of corporations to file their returns at the earlist possible moment in order to avoid the interest charge of ½ of 1 per cent per month.

The Committee on Automatic Train Control of the Railroad Administration held a meeting at Washington on Tuesday of this week, and on Wednesday inspected the operation of the automatic stops between Gordonsville and Charlottesville, Va., on the Chesapeake & Ohio. This apparatus is that of the American Train Control Company, of Baltimore, Md., and it was described briefly in the *Railway Age* of March 28, page 846.

Passenger schedules between Washington and New York City have been changed during the past week, and the running time of some trains is shortened by 25 minutes; day coaches are added to certain trains now carrying only sleeping cars, and a new train with parlor cars and coaches was put in service by the Pennsylvania, leaving Washington at 12:45 p. m. Some adjustments were also made in the Washington-Baltimore service.

William J. Wilgus has been awarded a distinguished service medal, by order of General Pershing. Mr. Wilgus served throughout the greater perior of our participation in the war as deputy director general of transportation in France, with the title and rank of colonel. He was a member of the first commission sent abroad to study the transportation features of the preparations to be made for handling a large army and its supplies in France.

Abolition of the Railroad Commission and the establishment of a new Public Utilities Commission of three elective members is the object of a bill which has been introduced in the Michigan legislature. This bill is part of a scheme looking to a constitutional amendment reserving to cities and villages the sole power to regulate, control and fix rates of all public utilities within their boundaries, unless radical changes in statutes can be accomplished at this sesson.

One hundred and eleven miles an hour from Washington to New York, with 157 lb. of mail, is the latest American airplane record. This is reported by the Post Office Department as having been made on the regular mail-carrying trip on April 11. The flyer was Leon D. Smith. The time from Washington to Philadelphia, 128 miles, was one hour, eleven minutes; and from Philadelphia to Belmont Park, 90 miles, 47 minutes. There was a stop at Philadelphia, time not given.

Railroad Y. M. C. A. Campaign

Arrangements for the "Continental Extension Movement" of the Railroad Y. M. C. A., which is to be inaugurated on May 18, have been completed and the slogan "Couple Up" has been adopted. It is significant that the 300 associations in this country will act as a unit in this extension movement. Another important factor is that the railroad men themselves are taking the leadership in the movement, and the secretaries are being utilized largely in an advisory capacity. While efforts will be concentrated at the opening of the campaign to increase the membership, this is only a small part of the extension program. The summer months will be utilized for assimilating the new members and perfecting the general organization of the different branches and then early in the fall there will be a series of campaigns, each lasting one week, and each devoted to stirring up interest and developing plans for the year to cover the various phases of the work. For instance, there will be a religious week, a thrift week, a health and happiness week, educational week and Americanization week. It is expected that a very large number of new members will be drawn into the work and that active work will be carried on among employees who are not now served by the association.

Highways Transport Committee

The Council of National Defense has announced a reorganization of its Highways Transport Committee. The work of the committee has been broadened to include direct representation from the office of public roads and rural engineering of the Department of Agriculture; the bureau of markets of the same department; the Post Office Department, and the Department of Commerce.

The committee as reorganized consists of the following: John S. Cravens, of the Council of National Defense, chairman; James I. Blakslee, Fourth Assistant Postmaster General; J. M. Goodell, Consulting Engineer, Office of Public Roads & Rural Engineering; James H. Collins, investigator in market survey, Bureau of Markets; R. S. MacElwee, second assistant chief, Bureau Foreign & Domestic Commerce; Charles W. Reid, executive secretary; Grosvenor B. Clarkson, director of the council, ex-officio. The committee will be assisted by the Highways Transport Committee Advisory Board, consisting of: William P. Eno, Prof. Arthur H. Blanchard, C. A. Musselman, Raymond Beck and John T. Stockton. It is the policy of the council to co-operate with all transportation agencies and to aid in the promotion of motor express lines through rural communities.

Material-Handling Machinery Manufacturers' Association

The Engineering Committee of this association met at the association quarters, 35 West 39th street, New York City, on April 9. The members of the committee as at present constituted are: W. B. Clarke, Manning, Maxwell & Moore, Inc.; S. H. Libby, Sprague Electric Works; R. W. Scott, Otis Elevator Co.; D. V. Jenkins, Watson Elevator Co; L. C. Brown, Elwell-Parker Electric Co.; A. F. Case, Wellman-Seaver-Morgan Co.; J. C. Walter, Alvey-Ferguson Co; J. A. Shepard, Shepard Electric Crane & Hoist Co.

The committee will make studies of large industrial plants, and a special study, based on the selection of one of the new port terminal projects, for consideration of a complete installation of equipment for general cargo handling. As the committee is made up of representatives of the different divisions of material handling equipment, such as cranes, hoists, winches, conveyors, telphers, elevators and elevating machinery, industrial trucks, tractors and trailers, mechanical bunkering equipments, chutes, etc., used in cargo and general and bulk material handling; these studies will include several lines of manufacturing plants and the special study will be made of a location and pier and warehouse development which would normally utilize all of this different equipment in the construction of one complete handling organization.

In taking up the requests presented by harbor commissions, manufacturing groups and chambers of commerce, the committee voted that for the present, in cases where manufacturers request recommendations and where terminal developments are in process, all the details will be secured

so far as possible and will be submitted to the members of the association for individual action. Plans will be made to develop a standard system of cost accounting for the handling of cargo. Zenas Carter, secretary and manager of the association, advises that interest in the association on the part of manufacturers and harbor commissions is daily increasing.

American Lumber Congress

The program for the first American Lumber Congress, which is to be held at Chicago, April 14, 15 and 16, and of the annual convention of the National Lumber Manufacturers' Association which will also be at Chicago on April 16 and 17, includes the following topics: Trade Extension and Advertising; Lumber Merchandising Service; Standards of Wood Construction; Organization for Trade Extension; Retail Service; Governmental Relations, including an address on "The Railroad Problem," by Walker D. Hines, Director General of Railroads (Wednesday morning); American Industry in Relation to National Policy; Annual Banquet of National Lumber Manufacturers' Association; Traffic Problems; Annual Report of National Lumber Manufacturers' Association; Request of Bureau of Internal Revenue for Co-operation of Industry in Administration of Revenue Law; Progress Toward Uniformity in Cost Keeping; Price Stabilization Plan; Service of Bureau of Lumber Economics, and the Lumber Industry's Opportunity in National Affairs.

The annual banquet will be held on Wednesday evening.

Report on Business Conditions

A report on general business conditions throughout the United States has been issued by the National Association of Manufacturers, based upon a canvass of 4,400 representative establishments in practically every line of industry. The report shows that business and industry are suffering from after-war uncertainty. Eleven obstacles tending to prevent general business activity are set forth, the fifth on the list stated being "continued government control, management and operation of railroads." The lack of railroad buying is also mentioned. An overwhelming percentage of manufacturers, the report states, recorded themselves as being in opposition to any form of government ownership of railroads or other public utilities and strongly in favor of returning the roads to their private owners. Furthermore, there is noted a demand for a more reasonable and limited form of government regulation than that which prevailed in the period prior to the taking over of the railroads by the government. Questionnaires were addressed to 22 principal groups of industries and with the exception of five of these groups, business activity was reported to be approximately between 25 and 50 per cent of normal. The five industries reporting a condition of prosperity include the producers of jewelry, silverware, musical instruments, automobiles, rubber and tobacco.

A. F. L. Calls for Government Ownership

Now is the time to be active in pressing the argument for government ownership of railroads, says a circular issued to railroad employees by the officers of the Railway Employees' Department of the American Federation of Labor. The circular says:

"Pending the calling of a special session of Congress to enact legislation for the future control and operation of the railroads, it devolves upon the railroad employees, in whatever capacity they are employed, to use their utmost efforts in promoting sentiment favorable to a continuation of government control. Now is the time to be active; do not overlook any opportunity in pressing this argument, not only with your Senators and Congressmen, but with the public at large.

"The future of the railroads depends very largely on the employees. Government ownership and control is now on trial and public sentiment is being molded for or against it, according to the service rendered. The majority of the railroad officials are not in favor of either—government control or ownership. This is in most cases not in accordance with their own personal opinion, but they must be governed by instructions from the higher officials, and there is ample evidence to show that they are not conducting matters with a view to promote sentiment favorable to government control.

"Many matters, no doubt, will come under your notice that are entirely at variance with what was formerly the practice under private control and which appear wasteful and deliberately extravagant. Report each case to your committee and urge them to take such matters up with the proper officials; and if the remedy is not applied we will be pleased to call the matter to the attention of the Railroad Administration."

Western Tie Producers Object to Centralized Purchasing

The methods of the central and regional purchasing committees of the United States Railroad Administration in the purchase of ties are strenuously objected to by the tie producers of Oregon and Washington. At a meeting of several lumber and tie producing associations in Portland, Ore., on March 29, a resolution was passed protesting against the present centralized purchasing system. Represented at this meeting were the West Coast Lumbermen's Association, the Western Oregon Tie & Lumber Association, the Willamette Valley Lumbermen's Association and the Lewis River Tie & Lumber Mills Association.

Elimination of competitive buying, too rigid specifications and inspections and low returns, were the main things objected to. The tie makers now must deal with the one road on which their mills are located. Specific objections were raised against the methods used by the purchasing agent of the Southern Pacific. It is stated that it has become the practice to consider the prices published and advertised by the Railroad Administration no longer as fixed prices, but as the maximum, below which the purchasing agent may negotiate in making new contracts. In degrading ties that fail to conform to the requirements of a given grade, the inspectors are so exacting in their requirements that only a very small percentage of ties which fall slightly below the standard measurement are accepted. Returns have been so reduced that a number of associations of local producers have voted to close operations this month or as soon as individual mills have completed contracts.

These conditions have been laid before the legislature of Oregon and the legislature has memorialized the Congress of the United States as follows:

"Whereas, since (November, 1918,) poster prices have been withdrawn and many orders canceled and by order of the United States Railroad Administration, said mills can only accept orders from the purchasing agent of the Southern Pacific Company, and said agent is now offering orders only at $3 less per thousand feet than said original poster prices, and said mills not being allowed to solicit or accept orders from other railroad companies must now accept said prices or close their mills; and

"Whereas, at a meeting on Saturday, February 15, 1919, at which were present over 60 owners of said tie mills representing a daily production of 1,500,000 ft. b. m. of ties, it was unanimously decided that under the present system it was impossible to operate without a loss. . . .

"Resolved, that the Congress of the United States be requested to take such action at once as will put an end to U. S. Government action that continually adds to our serious condition of unemployment and will provide some means by which the affairs of this nation may approach reconstruction without such disastrous results."

Threatened New York Harbor Strike

The Marine Workers Affiliation, which is the union representing captains and crews of the tugboats in the service of the Railroad Administration, and certain other captains and crews of tugboats in the New York harbor, voted to declare a strike beginning Thursday, April 17, at 6 o'clock in the morning. The strike order, however, was postponed for 48 hours. The demand of the Marine Workers Affiliation is that tugboat captains and crews who had refused to tow coal and grain barges who thereupon became severed from the service of the Railroad Administration should be reinstated. A. H. Smith, regional director of the Eastern region, had notified the union that the men would be reinstated in service if they go back to work and perform the work which they had agreed to do under the award of J. L. Hughes. Mr. Hughes had acted as mediator in the previous strike

for higher wages and shorter hours, after V. Everitt Macy's award in this controversy had been rejected by the men. The private boat owners in New York harbor had not settled their controversy with the men that they employed at the time of the Hughes award, but the agreement under the award was that the tugboat captains and crews were to perform the same service, having been granted higher wages and shorter hours, as before the strike. Another union, also representing workers in New York harbor, principally longshoremen and workers on coal and grain barges, had recently come to an agreement with the private boat owners. The private boat owners, therefore, notified the Railroad Administration that their coal and grain barges were ready to be moved, but when the Railroad Administration ordered tugs to do this work, some of the captains and crews refused. A. H. Smith gave out the correspondence between T. L. Delahunty, president of the Marine Workers Affiliation, and himself, and in one letter from Delahunty, the following appears:

We did agree that the Tidewater Boatmen be permitted to settle up with the individual boat owner at that time, but since then the situation has somewhat changed. John Brennan's and T. V. O'Connor's actions have brought about a change of heart among the Marine Workers' Affiliation through their strike-breaking proclivities and will not be permitted to continue this practice any longer.

The Marine Workers' Affiliation regret their inability to permit at this time the towing of coal barges by railroad towboats because of our lack of knowledge that there is an agreement in existence. We have only the statement of John Brennan for that, and as we have since learned Mr. Brennan and T. V. O'Connor have instructed to tow with either fair tugs or scabs.

We feel that it is essential for our own preservation at this time to demonstrate that neither of these two gentlemen will be permitted to sacrifice their fellow-workers without giving them the battle of their young lives.

I cannot see wherein we have violated the agreement with the United States Railroad Administration. I do not think we can prove an alibi on the grounds of misunderstanding in the issuance of orders. We do intend to carry out our contract with the United States Railroad Administration, March 15, 1919, but it is a debatable question as to a violation in refusing to tow private owned coal barges with non-union crews.

Director General Hines at Chicago

Walker D. Hines, director general of railroads, in an address before the annual convention of the National Lumber Manufacturers' Association at Chicago, on Wednesday of this week, outlined his ideas of a permanent solution of the railroad problem and summarized the administration's views on prices of steel, purchases of materials, maintenance questions and other railroad topics. The solution for the railroad problem, he says, must rest upon a direct government guarantee at a moderate rate. He would preserve the benefit of private initiative. These two fundamental principles, said Mr. Hines, have not been recognized in any of the plans so far submitted to the Senate Committee. Private initiative can be preserved by participation of roads in profits in excess of a low government guarantee. Mr. Hines suggested government representation on railroad boards of directors, also representatives to be members of rate-regulating bodies, and the consolidation of the railroads into a few large competitive systems, each one taking in strong and weak mileage.

On the subject of steel prices the speaker outlined his negotiations with the Industrial Board. He said that his action regarding steel prices was taken because he did not feel justified in giving the Railroad Administration's sanction to the prices presented. Regarding purchases of materials and supplies he said that railroads will continue to make purchases as before. The administration has no desire to bring about prices for itself which are below the prices paid by other purchasers of commodities in similar volume. The maintenance program for this year is much greater than that would probably be carried out by the railroads under private management at the present time. The increased cost of maintenance work will make the programs much larger than in past years, measured in dollars. It is the policy of the administration to bring about a readjustment of operating costs down to a peace basis. It is clearly understood that wage levels are not to be revised; but every practice which has grown up during the war is subject to revision. In order to avoid unnecessary costs there will be a careful readjustment of hours so as to avoid the additional burden of punitive overtime.

Regarding the service rendered the public Mr. Hines said that it was the policy of the administration to attempt as far as possible to restore railroad service to the sort of service rendered before the war. He believes that the present government control is purely temporary in character, and therefore it is his duty to get the railroad service on the best possible footing. Any readjustment of the rate structure should be approached with the greatest care. To carry out a wise policy in this matter the Division of Public Service and Accounts was divided so that public service and rates could be viewed from the public standpoint.

In the evening Mr. Hines addressed the Union League Club, amplifying portions of his speech before the lumber men in the morning.

Mr. Hines and his party, composed of Max Thelen, director of the division of public service; Edward Chambers, director of the division of traffic; B. L. Winchell, regional director, Southern region; H. B. Spencer, director of the division of purchases; T. C. Powell, director of the division of capital expenditures; M. B. Clagett, assistant to the director general; R. H. Aishton, regional director, Northwestern region, and Hale Holden, regional director, Central Western region, left Chicago for the Pacific Coast immediately after the evening address.

Following Mr. Hines' address before the lumbermen his position toward steel prices and the Industrial Board was assailed by R. A. Long, a Kansas City lumberman, and J. H. Kirby, president of the National Lumber Manufacturers' Association, who requested that he reconsider his decision, and make purchases of steel so as to stabilize the industry.

Exhibitors at the June Conventions

There has been a remarkable demand for exhibit space at the mechanical conventions which are to be held in Atlantic City, June 18-25. The Railway Supply Manufacturers' Association has furnished us with the following list of exhibitors to whom space has been assigned thus far. The president of the Railway Supply Manufacturers' Association is E. H. Walker, of the Standard Coupler Company, and the secretary is J. D. Conway, Oliver building, Pittsburgh, Pa.

Acme Machine Tool Co., Cincinnati, O.
A. G. A. Railway Light & Signal Co., Elizabeth, N. J.
Air Reduction Co., Inc., New York.
American Abrasive Metals Co., New York.
American Arch Co., New York.
American Automatic Connector Co., Cleveland, O.
American Brake Shoe & Foundry Co., New York.
American Flexible Bolt Co., Pittsburgh, Pa.
American Insulation Co., Philadelphia, Pa.
American Locomotive Co., New York.
American Malleable Castings Assn., Milwaukee, Wis.
American Mason Safety Tread Co., Boston, Mass.
American Rolling Mill Co., Middletown, O.
American Steam Gauge & Valve Mfg. Co., Boston, Mass.
American Steel Foundries, Chicago.
American Tool Works Co., Cincinnati, O.
Anchor Packing Co., Philadelphia, Pa.
Ashton Valve Co., Chicago.
Assn. of Mfrs. of Chilled Car Wheels, Chicago.
Atkins, E. C., & Co., Inc., Indianapolis, Ind.
Baker, R. & L., Co., Cleveland, O.
Barco Mfg. Co., Chicago.
Barrett Company, Philadelphia, Pa.
Besly, Chas. H., & Co., Chicago.
Bettendorf Co., Bettendorf, Iowa.
Bird-Archer Co., New York.
Blackall, Robert H., Pittsburgh, Pa.
Blevney Machine Co., Greenfield, Mass.
Boss Nut Co., Chicago.
Bowser & Co., S. F., Inc., Fort Wayne, Ind.
Bradford Draft Gear Co., Atlanta, Ga.
Buckeye Steel Castings Co., Columbus, O.
Buda Company, Chicago.
Buffalo Brake Beam Co., New York.
Bullard Machine Tool Co., Bridgeport, Conn.
Byers, A. M., Co., Pittsburgh, Pa.
Cambria Steel Company, Philadelphia, Pa.
Camel Company, Chicago.
Carbic Manufacturing Co., Duluth, Minn.
Carborundum Co., Niagara Falls, N. Y.
Carnegie Steel Co., Pittsburgh, Pa.
Chambers Valve Co., New York.
Chase, L. C., & Co., Boston, Mass.
Chicago-Cleveland Car Roofing Co., Chicago.
Chicago Pneumatic Tool Co., Chicago.
Chicago Railway Equipment Co., Chicago.
Chicago Varnish Co., Chicago.
Cincinnati Bickford Tool Co., Cincinnati, O.
Cincinnati Grinder Co., Cincinnati, O.
Cincinnati Milling Machine Co., Cincinnati, O.

Cincinnati Pulley Machinery Co., Cincinnati, O.
Clark Tructractor Co., Chicago.
Clipper Belt Lacer Co., Grand Rapids, Mich.
Commonwealth Steel Co., St. Louis, Mo.
Commonwealth Supply Co., Inc., Richmond, Va.
Consolidated Car-Heating Co., Albany, N. Y.
Crane Company, Chicago.
Crosby Steam Gage & Valve Co., Boston, Mass.
Curtain Supply Co., Chicago.
Damascus Brake Beam Co., Cleveland, O.
Davis Machine Tool Co., Rochester, N. Y.
Dearborn Chemical Co., Chicago.
Detroit Lubricator Co., Detroit, Mich.
Dickinson, Paul, Inc., Chicago.
Dixon, Joseph, Crucible Co., Jersey City, N. J.
Draper Manufacturing Co., Port Huron, Mich.
Dressel Railway Lamp Works, New York.
Duff Manufacturing Co., Pittsburgh, Pa.
Dunbar Manufacturing Co., Chicago.
Duntley-Dayton Co., Chicago.
DuPont Fabrikoid Co., Wilmington, Del.
Edison Storage Battery Co., Orange, U. J.
Edna Brass Mfg. Co., Cincinnati, O.
Edwards, O. M., Co., Syracuse, N. Y.
Electric Arc Cutting & Welding Co., Newark, N. J.
Electric Railway Journal, New York.
Electric Service Supplies Co., Philadelphia, Pa.
Electric Storage Battery Co., Philadelphia, Pa.
Elvin Mechanical Stoker Co., New York.
Elwell-Parker Electric Co., New York.
Enterprise Railway Equipment Co., Chicago.
Ewald Iron Co., Louisville, Ky.
Fire Gun Manufacturing Co., New York.
Flannery Bolt Co., Pittsburgh, Pa.
Flower Waste & Packing Co., Bayonne, N. J.
Ford, J. B., Co., Wyandotte, Mich.
Foster, Walter H., Co., New York.
Franklin Railway Supply Co., Inc., New York.
Frost Railway Supply Co., Detroit, Mich.
Galena-Signal Oil Co., New York.
Garlock Packing Co., Palmyra, N. Y.
General Electric Co., Schenectady, N. Y.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Gillespie, A. W., & Co., Chicago.
Globe Seamless Steel Tubes Co., Chicago.
Gold Car Heating & Lighting Co., New York.
Goodyear Tire & Rubber Co., Akron, O.
Gould & Eberhardt, Newark, N. J.
Gould Coupler Co., New York.
Grand Rapids Grinding Machine Co., Grand Rapids, Mich.
Greenfield Tap & Die Corporation, Greenfield, Mass.
Grip Nut Co., Chicago.
Hale & Kilburn Corp., Philadelphia, Pa.
Hammett, H. G., Troy, N. Y.
Harrington, Edwin, Son & Co., Inc., Philadelphia, Pa.
Hauck Mfg. Co., Brooklyn, N. Y.
Heald Machine Co., Worcester, Mass.
Heywood Bros. & Wakefield Co., Wakefield, Mass.
Hunt-Spiller Mfg. Corp., So. Boston, Mass.
Hutchins Car Roofing Co., Detroit, Mich.
Hyatt Roller Bearing Co., New York.
Illinois Steel Co., Chicago.
Independent Pneumatic Tool Co., Chicago.
Ingersoll-Rand Company, New York.
Jefferson Union Company, Lexington, Mass.
Jenkins Brothers, New York.
Johns-Manville, H. W., Co., New York.
Johnson Bronze Co., New Castle, Pa.
Joliet Railway Supply Co., Chicago.
Jones & Co., B. M., Inc., New York.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Joyce-Gridland Co., Dayton, O.
Justice, Philip S., & Co., Philadelphia, Pa.
Karry-Lode Industrial Truck Co., Long Island City, N. Y.
Keller Pneumatic Tool Co., Grand Haven, Mich.
Kershaw Corporation, Newark, N. J.
Keystone Drop Forge Works, Chester, Pa.
Landis Machine Co., Waynesboro, Pa.
Lansing Company, Lansing, Mich.
LeBlond, R. K., Machine Tool Co., Cincinnati, O.
Lehon Co., Chicago.
Liberty Steel Products Co., Chicago.
Locomotive Feed Water Heater Co., New York.
Locomotive Firebox Co., Chicago.
Locomotive Lubricator Co., Chicago.
Locomotive Stoker Co., S. Pittsburgh, Pa.
Locomotive Superheater Co., New York.
Lodge & Shipley Machine Tool Co., Cincinnati, O.
Long, Chas. R., Jr., Co., Louisville, Ky.
Lucas Machine Tool Co., Cleveland, O.
Ludlum Steel Co., Watervliet, N. Y.
Lunkenheimer Co., Cincinnati, O.
MacLeod Co., Cincinnati, O.
MacRae's Blue Book, Chicago.
Mahr Manufacturing Co., Minneapolis, Minn.
Manning, Maxwell & Moore, Inc., New York.
Massachusetts Mohair Plush Co., Boston, Mass.
Mead-Morrison Mfg. Co., E. Boston, Mass.
Metal & Thermit Corporation, New York.
Midvale Steel & Ordnance Co., Philadelphia, Pa.
Miner, W. H., Chicago.
Mudge & Co., Chicago.
Mutual Manifold Co., Baltimore, Md.
McCabe Mfg. Co., Lawrence, Mass.
McConway & Torley Co., Pittsburgh, Pa.
McCord & Co., Chicago.
Nathan Mfg. Co., New York.
National Car Wheel Co., Pittsburgh, Pa.
National Lock Washer Co., Newark, N. J.
National Malleable Castings Co., Cleveland, O.
National Railway Appliance Co., New York.
National Railway Devices Co., Chicago.
National Tube Co., Pittsburgh, Pa.
Newton Machine Tool Works, Inc., Philadelphia, Pa.
New York Air Brake Co., New York.
Niles-Bement-Pond Co., New York.
Norton, A. O., Inc., Boston, Mass.
Oakley Machine Tool Co., Cincinnati, O.
Oesterlein Machine Co., Cincinnati, O.
Okadee Co., Inc., Chicago.
O'Malley-Beare Valve Co., Chicago.
Oxweld Railroad Service Co., Chicago.
Page Steel & Wire Co., New York.
Paige & Jones Chemical Co., New York.
Pantasote Co., New York.
Parkesburg Iron Co., Parkesburg, Pa.
Paxton-Mitchell Co., Omaha, Neb.
Penn Iron & Steel Co., Creighton, Pa.
Penn Seaboard Steel Corporation, Philadelphia, Pa.
Pilliod Co., Swanton, O.
Pocket List of R. R. Officials, New York.
Pratt & Lambert, Inc., Buffalo, N. Y.
Pressed Steel Car Co., New York.
Pyle-National Co., Chicago.
Q & C Co., New York.
Quigley Furnace Specialties Co., Inc., New York.
Railway Materials Co., Chicago.
Railway Review, Chicago.
Railway Storage Battery Car Co., New York.
Reading Specialties Co., Reading, Pa.
Reliance Electric & Engineering Co., Cleveland, O.
Republic Iron & Steel Co., Youngstown, O.
Rich Tool Co., Chicago.
Rivet Cutting Gun Co., Cincinnati, O.
Robinson Co., Boston, Mass.
Robinson Connector Co., New York.
Rogers, H. A., Co., New York.
Rome Iron Mills, Inc., New York.
Ryerson & Son, Jos. T., Chicago.
Safety Car Heating & Lighting Co., New York.
Sargent & Co., Chicago.
Schaefer Equipment Co., Pittsburgh, Pa.
Schroeder Headlight & Generator Co., Evansville, Ind.
Sellers, Wm., & Co., Inc., Philadelphia, Pa.
Simmons-Boardman Publishing Co., New York.
Simmons Hardware Co., Philadelphia, Pa.
Simonds Mfg. Co., Fitchburg, Mass.
Smith Locomotive Adjustable Hub Plate Co., Chicago.
Smoke Jack Co., E. Boston, Mass.
Southern Railway Supply & Equip. Co., St. Louis, Mo.
Southern Wheel Co., St. Louis, Mo.
Southern Foundry & Machine Co., Philadelpia, Pa.
Speedograph Corporation, Newark, N. J.
Standard Asphalt & Refining Co., Chicago.
Standard Car Truck Co., Chicago.
Standard Coupler Co., New York.
Standard Stoker Co., Inc., New York.
Stone-Franklin Co., New York.
Strong, Kennard & Nutt Co., Cleveland, O.
Symington, T. H., Co., Rochester, N. Y.
Talmage Mfg. Co., Cleveland, O.
Underwood, H. B., Corp., Philadelphia, Pa.
Union Connector Co., Jackson, Miss.
Union Draft Gear Co., Chicago
Union Railway Equipment Co., Chicago.
Union Spring & Mfg. Co., Pittsburgh, Pa.
United Engineering & Foundry Co., Pittsburgh, Pa.
U. S. Light & Heat Corp'n, Niagara Falls, N. Y.
U. S. Metallic Packing Co., Philadelphia, Pa.
Universal Car & Hose Coupler Co., Oklahoma City, Okla.
Universal Draft Gear Attachment Co., Chicago.
Walworth Manufacturing Co., Boston, Mass.
Warner & Swasey Co., Cleveland, O.
Watson-Stillman Co., Aldene, N. J.
Waugh Draft Gear Co., Chicago.
Wayne Oil Tank & Pump Co., Fort Wayne, Ind.
West Disinfecting Co., New York.
Western Railway Equipment Co., St. Louis, Mo.
Western Steel Car & Foundry Co., New York.
Westinghouse Air Brake Co., E. Pittsburgh, Pa.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
Wheel Truing Brake Shoe Co., Detroit, Mich.
White American Loco. Sander Co., Inc., Roanoke, Va.
Whiting Foundry Equipment Co., Harvey, Ill.
Wilmarth & Morman Co., Grand Rapids, Mich.
Wilson-Imperial Co., Newark, N. J.
Wilson, J. G., Corp'n, New York.
Wine Railway Appliance Co., Toledo, O.
Wood, Alan, Iron & Steel Co., Philadelphia, Pa.
Woods, Edwin S., & Co., Chicago.
Wyoming Shovel Works, Wyoming, Pa.
Yale & Towne Mfg. Co., New York.

TRACK EXHIBITS

Gray & Davis, Inc., Boston, Mass.
Standard Car Truck Co., Chicago.

Traffic News

The North Carolina Pine Association at its thirtieth annual meeting at Norfolk, Va., recently, passed resolutions advocating the immediate return of the railroads to private ownership.

The Eastern Steamship Line announces the re-establishment of the Metropolitan line of steamers between New York and Boston. These boats will start at 5 p. m. and will make the journey by way of the Cape Cod canal, in about 14 hours

The Topeka (Kan.) Traffic Association complains of the methods of the Railroad Administration in handling freight and has asked Senators Capper and Curtis to aid in securing an improvement. The sailing day plan is the main point of attack. The association is unanimous in asking the return of the railroads to private ownership.

Betterment of shipping condition and cooperation in developing the foreign trade of the middle west, is the object of recent action of the Chicago Freight Forwarders' and Customs Brokers' Association. Committees have been appointed to investigate questions relating to export traffic by way of both Atlantic and Pacific ports. The officers of the association are: President, J. P. Collins, of the G. W. Sheldon Company; vice-president, Walter J. Riley, of the Judson Freight Forwarding Company; secretary, S. E. Boughton, of the Overseas Shipping Company.

On April 9 there were 33,619 carloads of export freight on hand at North Atlantic ports, compared with 36,023 for the same day of the preceding week. Exclusive of bulk grain, there were 10,390 carloads of export food on hand at these ports, compared with 10,589 carloads as of April 1. There were 21,306,515 bushels of grain in elevators at North Atlantic ports; received during the week, 5,910,992 bushels; cleared 6,024,250 bushels. Elevators at South Atlantic and Gulf ports held 4,009,408 bushels of grain. The situation is regarded as entirely satisfactory.

The transportation bureau of the Denver (Colo.) Civic and Commercial Association has filed a protest with the Railroad Administration against two proposed plans to change westbound freight rates, one of which is for a zone or mileage system, which it is claimed would be unfair to Colorado's mountain railroads, and the other for a new tariff of rates compiled jointly by the San Francisco and Portland freight traffic committees. The bureau recommends that Denver rates be fixed on a percentage basis in relation to through rates between Mississippi river points and the Pacific coast.

A joint resolution criticising the action of the Railroad Administration in proposing the division of San Francisco, Oakland and Los Angeles into zones for switching purposes, has been adopted by the California Senate. It is claimed this plan will greatly increase switching charges at these points. The proposition has not been submitted either to the Interstate Commerce Commission or to the Railroad Commission of the state and no justification has been offered for the proposed readjustment. The resolution further requests Congress to investigate the proposed attempt of the Railroad Administration to increase charges without first submitting the proposition to the regulatory bodies having jurisdiction over these matters for approval.

The number of revenue freight cars loaded in the Northwestern region in March was slightly less than in March, 1918. The grain and grain products, livestock, coal and coke, lumber and forest products, ore and miscellaneous cars loaded totaled 471,702 this year, as compared with 490,419 during the same month last year. The number of revenue freight cars received from connections in this region remain practically stationary, 302,318 cars being received this year as compared with 310,390 during the same period last year. Corn and oats show a substantial decrease but the total number of grain cars loaded remains practically the same, due to a substantial increase in wheat and miscellaneous grain. Bituminous coal loaded shows a decrease, 22,924 cars as compared with 32,701.

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission has discontinued its investigation into the rates and practices of various carriers of oil and other commodities by pipe lines or partly by pipe lines and partly by railroad or partly by pipe lines and partly by water, which was begun seven years ago.

In a decision in the case of the Public Utilities Commission of the State of Colorado, et al., vs. Atchison, Topeka & Santa Fe Railway, et al., the Interstate Commerce Commission finds that the record is not convincing that the class freight rates in effect April 21, 1916, between Chicago, the Mississippi river and the Missouri river, on the one hand, and Colorado common points on the other, were, or that the rates initiated by the director general and made effective June 25, 1918, are unjust, unreasonable or unduly prejudicial, although certain of the commodity rates from Chicago and the rivers to Colorado common points appear to have been and to be relatively high by comparison with rates to Utah common points. The commission finds that no adequate basis for readjustment has been put into the record. Class rates made effective June 25 which carry the increase ordered by the director general between Denver and Pueblo and certain points in interior Kansas and Nebraska; between Denver and points grouped therewith, and Galveston, Texas, and intermediate points in Texas; from Denver and other points in Colorado to certain stations in New Mexico, Arizona and Texas; and from Denver and Denver rate points in Colorado to certain stations in Nebraska, South Dakota and Wyoming, are held to be unjust, unreasonable and unduly prejudicial to the extent that they exceed the scale of maxima prescribed in the order.

Valuation Hearing

The Interstate Commerce Commission has assigned for oral argument at Washington on May 26 the valuation cases of the Texas Midland; Atlanta, Birmingham & Atlantic; Kansas City Southern; Winston-Salem Southbound, and Elgin, Joliet & Eastern, for the purpose of hearing such arguments as the parties may desire to present as to the final valuation which the commission should find and report; and as to the elements to be considered and the weight to be attributed thereto in finding the final valuation in any case.

State Commissions

A hearing will be held on April 22, before the Railroad Commission of Texas on plans to restore all passenger trains to a pre-war basis on the Missouri, Kansas & Texas, the Texas & Pacific and the International & Great Northern.

United States Supreme Court

The Supreme Court of the United States will be asked to make an early decision in the controversy between the Railroad Administration and various state governments as to the legality of increases in freight and passenger rates ordered by the director general, superseding rates made by state authority. The attorney general of the United States has filed appeals in the Supreme Court from the decrees of the North Dakota Supreme Court enjoining the railroads in that state from charging the increased rates and ordering them and the director general to show cause why the injunction should not be made permanent. Attorneys for the Railroad Administration filed motions asking the court to hear arguments at this term in the hope that a decision may be handed down before the summer adjournment.

Equipment and Supplies

Locomotive Deliveries for Week Ended April 5

New locomotives were shipped to railroads under federal control during the week ended April 5 as follows:

Works	Road	Number	Type
American	Penn L. W.	7	USRA Santa Fe.
	Penn. L. W.	1	Santa Fe.
	Erie R. R.	2	USRA Santa Fe.
	Erie R. R.	6	USRA Pacific.
	C. & N'w.	8	USRA 6W. Sw.
	T. & P.	2	USRA 6W. Sw.
		26	
Baldwin	C. B. & Q.	3	Mikado.
	L. V.	1	Pacific.
	O.-W. R. R. & N.	1	Pacific.
	L. C.	1	Mikado.
	A. T. & St. F.	1	Mikado.
	C. B. & Q.	2	USRA Mikado.
	P. & R.	1	Mallet.
	G. N.	2	8W. Sw.
		12	
	Total	38	

Locomotive Deliveries in March

The Railroad Administration has issued the following statement of locomotives shipped for the month of March:

For period March 1

Works	Road	Number	Type
American	C. of G.	1	Mallet.
	Erie	1	USRA S. F.
	Monong.	2	USRA Mik.
	P. L. W.	1	Santa Fe.
		5	
Baldwin	A. T. & S. F.	1	Mikado.
	C. C. & O.	1	Mikado.
	G. N.	1	Mikado.
	P. R.	1	Consol.
		4	
	Total	9	

For week March 2 to 8

Works	Road	Number	Type
American	A. C. L.	1	USRA Pac.
	C. of G.	2	Mallet
	C. & N'w.	2	USRA 6W. Sw.
	C. & N'w.	1	Mikado.
	C. & O.	1	10W. Sw.
	Erie	2	USRA. S. Fe.
	Maine C.	6	USRA Mik.
	P. L. W.	3	Santa Fe.
	T. & P.	2	USRA 6W. Sw.
		20	
Baldwin	A. T. & S. F.	2	Mikado.
	B. & O.	2	USRA Mik.
	C. C. & O.	2	Mikado.
	C. B. & Q.	2	Mikado.
	G. N.	2	8W. Sw.
	I. C.	1	Mikado.
	L. V.	1	Pacific.
	P. R. R.	1	Mikado.
	P. & R.	1	Consol.
	U. P.	3	Pacific.
		17	
	Total	37	

For Week March 9 to 15

Works	Road	Number	Type
American	A. C. L.	3	USRA Pac.
	C. of G.	1	Mount.
	C. G. W.	1	USRA 6W. Sw.
	C. of G.	2	Mallet.
	C. & N. W.	4	USRA 6W. Sw.
	Erie	5	USRA S. F.
	G. R. & I.	5	USRA Mik.
	P. L. W.	5	S. Fe.
	P. & L. E.	5	USRA Mik.
	P. McK. & Y.	5	USRA Mik.
	T. & P.	2	USRA 6W. Sw.
		38	
Baldwin	A. T. & S. F.	2	Mikado.
	G. N.	2	8W. Sw.
	I. C.	2	Mikado.
	C. C. & O.	1	Mikado.
	P. R.	1	Mikado.
	U. P.	1	Pacific.
		9	
	Total	47	

For week March 16 to 22

Works	Road	Number	Type
American	A. C. L.	4	USRA Pac.
	C. of G.	2	Mallet.
	C. & N'w.	4	USRA 6W. Sw.
	C. & N'w.	1	Mikado.
	C. St. P. M. & O.	4	USRA Mik.
	Erie	5	USRA St. F.
	G. N.	4	USRA Mik.
	P. L. W.	3	Santa F.
	P. L. W.	7	USRA St. F.
	T. & P.	4	USRA 6W. Sw.
		38	
Lima	L. & N.	1	USRA Mik.*
Baldwin	A. T. & S. F.	1	Mikado.
	C. C. & O.	1	Mikado.
	C. B. & Q.	3	Mikado.
	G. N.	2	8W. Sw.
	I. C.	1	Mikado.
	L. V.	1	Pacific.
	P. R. R.	1	Mikado.
	P. & R.	1	Mallet.
	P. & L. R.	6	Mikado.
		17	
		56	
	Grand total	231	

*This locomotive shipped in February. Information not received in time for February report.

For week March 23 to 29

Works	Road	Number	Type
American	A. C. L.	2	USRA Pac.
	C. of G.	2	Mallet.
	C. & N'w.	4	USRA 6W. Sw.
	C. & N'w.	1	Mikado.
	C. M. & St. P.	21	USRA Mik.
	Erie	6	USRA St. F.
	P. L. W.	11	USRA St. F.
	P. L. W.	2	Santa Fe.
	T. & P.	4	USRA 6W. Sw.
		53	
Baldwin	A. T. & S. F.	4	Mikado.
	C. C. & O.	1	Mikado.
	C. B. & Q.	2	Mikado.
	G. N.	2	8W. Sw.
	I. C.	1	Mikado.
	L. V.	2	Pacific.
	N. & W.	1	Mallet.
	O. & W. R. N. Co.	1	Pacific.
	P. & L. E.	4	USRA Mik.
	U. P.	1	Pacific.
		19	
		72	

For period March 30 to 31

Works	Road	Number	Type
American	C. & N'w.	2	USRA 6W. Sw.
	Erie	2	USRA St. F.
	Erie	2	USRA Pac.
	P. L. W.	2	USRA St. F.
	P. L. W.	1	Santa Fe.
		9	
Baldwin	C. B. & Q.	1	Mikado.
		1	
		10	

In addition to above the American Locomotive Company shipped 26 miscellaneous domestic locomotives and completed 32 foreign locomotives; and the Baldwin Locomotive Works shipped 1 miscellaneous domestic locomotive and completed 96 foreign locomotives.

Freight Cars

The Great Northern Refining Company, Chicago, is inquiring for 125 eight thousand gallon tank cars for lease for 90 days.

The Broken Hill Proprietary Company, has ordered 6, 50-ton steel hopper cars from the American Car & Foundry Company.

The Southern Alberta Refineries Company, has ordered one 40-ton, 8,000-gal. tank car from the American Car & Foundry Company.

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., is in the market for 20 second-hand, 30 to 40 ton capacity flat cars.

The Cuban American Sugar Company, New York, has ordered 100 narrow gage cane cars from the American Car & Foundry Company for export to Cuba.

Supply Trade News

The Union Asbestos & Rubber Company of Chicago will remove its general offices from 112 West Adams street, Chicago, to 2834 South Loomis street, effective April 22.

Jasper A. Writer, secretary and treasurer of the **Colorado Fuel & Iron Company,** died in Denver on March 31. Mr. Writer had been connected with the company for over 37 years.

The **Chicago Pneumatic Tool Company** has moved its Milwaukee office from room 1305, Majestic building, to room 1418 in the same building, where more convenient quarters necessitated by the growing business of the company in this district have been obtained.

The Chicago branch of the **General Asbestos & Rubber Company,** Charleston, S. C., has recently moved into new quarters at 14 North Franklin street, Chicago, the rapid growth of the business in Garco asbestos products having made the old quarters at 106 West Lake street inadequate.

A. M. Mueller, manager of the St. Louis branch of Joseph T. Ryerson & Son Company of Chicago, has been promoted to general manager of sales, in which capacity he will have charge of all warehouse and mill products for all territory west of Pittsburgh. He was born at Plymouth, Ind., on July 30, 1874, and received his education in the public schools at that place. His business career dates back to 1899 when he first entered the employment of the Joseph T. Ryerson & Son as a clerk in the credit and cashier department. During this period he served successively as traveling salesman, Texas representative for three years and manager of the New York and Minneapolis offices until 1911, when he was appointed assistant manager of sales. Later he went to St. Louis, Mo., as manager of the Ryerson-Hagar plant, being recalled at the end of three years to handle the sales at the main plant at Chicago.



A. M. Mueller

J. M. Borrowdale, formerly superintendent of the car department of the Illinois Central and for the past two years sales representative of the H. W. Johns-Manville Company at Milwaukee, Wis., has been appointed sales representative in the railroad department of the **Liberty Steel Products Company, Inc.,** with offices in the McCormick building, Chicago.

Philip K. Condict, who has until recently been in government service, has been elected vice-president of the **International Western Electric Company, Incorporated.** In the summer of 1917, Mr. Condict gave up his work as foreign sales manager for the company to take charge of the New York office of the War Trade Board, after a short stay with the Department of Commerce. In December, 1917, he received a commission as major in the Quartermasters' Corps, U. S. A., serving in that capacity until July, 1918. He was then detailed to the Signal Corps with the same rank, and served in France until January.

Willis B. Clemmitt and **George H. Ruppert** have entered the employ of the **Powdered Coal Engineering & Equipment Company** of Chicago as advisory engineers. Mr. Clemmitt was formerly associated with the Central Iron & Steel Company at Harrisburg, Pa., and Mr. Ruppert, before his entry into the chemical branch of the government military service, had charge of the sodium-ferro-cyanide department of the Semet-Solvay Company.

William H. Basse has been appointed manager of the Detroit (Mich.) plant of the **Joseph T. Ryerson & Son Company.** Mr. Basse has been in the employ of this company since November, 1900, and for the past ten years has held various positions in the sales department at Chicago. In August, 1918, he was transferred to the Detroit office as acting manager of the Detroit plant, succeeding Ralph J. Stayman, who left the company temporarily to fill a war vacancy existing at the Chicago office and who later resigned.

Captain C. A. Duntley, who recently received his honorable discharge from the army after serving as captain in the 27th Field Artillery, has been elected vice-president of the Duntley-Dayton Company, with headquarters in the Westminster building, Chicago. He was born in Chicago on October 21, 1892, and received his education in Armour Institute, Chicago and at Cornell University, from which latter school he graduated in 1914. Captain Duntley will have charge of the sales work of the pneumatic and electric tool department of the company.



Captain C. A. Duntley

F. J. Foley has been appointed general sales agent of **Railway Steel-Spring Company,** with headquarters at New York. Mr. Foley's connection with the company dates from its organization in 1902. For the past eight years he has occupied the position of general superintendent.

The Portland Cement Association announces the opening, effective April 1, of a new district office of the association at Des Moines, Iowa, room 404, Hubbell building, 9th and Walnut streets, with **L. R. MacKenzie** as district engineer in charge. Mr. MacKenzie recently held the rank of Captain and Engineer of Roads on the staff of the Commanding General of the Port of Embarkation at Newport News, Va., and has been identified with road work for 12 years in the middle west and on the Pacific coast, both as engineer and contractor.

F. V. Sargent, whose appointment as district manager of sales of the **Chicago Pneumatic Tool Company,** Chicago, with headquarters at Boston, Mass., was announced in the *Railway Age* of April 11 (page 973), was born in Belmont, Mass., on December 15, 1881. He began his business career in 1905 with the Bethlehem Ship Building Company as drafting clerk, and later in charge of the heat treatment department and physical laboratories. In 1914 he entered the sales department of that company, in which capacity he remained until 1918, when he resigned to accept the position as district sales manager of the Chicago Pneumatic Tool Company.

Captain L. R. MacKenzie, engineer of roads on the staff of the commanding general of the port of embarkation at Newport News, Va., and who for the past 12 years has been identified with highway work in the middle west and on the Pacific coast both as an engineer and as contractor, has been appointed district engineer of the Portland Cement Association of Chicago in charge of the new district office located in the Hubbell building, Des Moines, Iowa.

The Toledo Pipe Threading Machine Company, Toledo, Ohio, has organized a "Toledo Ten-Year Club," whose membership will be limited to owners of Toledo Pipe Threader machines that have been in service ten years. All applica-

tions for membership must be in by July 1, 1919, and on that date the six members owning the six oldest "Toledos" will be notified and given their choice of a "Toledo" Ratchet Threader complete or a "Toledo," No. O, tool.

The **William Graver Tank Works,** East Chicago, Ind., has published the first issue of a new house organ for the benefit of its employees, of which **K. W. Bartlett,** assistant general manager of the company, is manager, and **C. B. Swanson,** editor. Two interrogation points appear at the head of each page of the first issue in place of a name. A prize of $10 is offered to the employee suggesting the best title. For the present the paper will be published twice a month.

Colonel Robert Andrews, one of the pioneers in American railroad construction and a former president of the Safety Car Heating & Lighting Company, died at his home in East Orange, N. J., on April 7, in his 85th year. Col. Andrews was born August 2, 1834, at Andrewsia, near Wilmington, Del. His early schooling was at the Episcopal academy, of Cheshire, Conn., where he graduated in 1849. He then entered Trinity college, Hartford, Conn., graduating in 1853, and in 1854 completed a course at the Polytechnic college, Philadelphia. He adopted civil engineering as a profession, beginning his career as assistant engineer, Union Canal & State Canals of Pennsylvania.



R. Andrews

His long career of railroad engineering began in 1857 as principal engineer of surveys and construction on the Sunbury & Erie. In 1859 he went to the South Pennsylvania Railroad as principal engineer of surveys until the outbreak of the Civil War, when he was made a major of the 2nd Regiment, Delaware Volunteers. He was advanced to the rank of colonel in 1863. At the close of the Civil War he was made principal engineer of the Saratoga & Hudson River Railroad from 1863 to 1865; division superintendent of the Toledo, Wabash & Western from 1865 to 1873; chief engineer of the same road from 1873 to 1875; and general superintendent and consulting engineer of the Wabash System from 1875 to 1884. Then for one year he was consulting engineer of the Wabash, St. Louis & Pacific, and in 1885 was made general superintendent and engineer of the Virginia Midland. In 1889 he left railroad service to take the position of vice-president of the Safety Car Heating & Lighting Company. In December, 1901, he was elected president of this company, and from May, 1907 to 1915, he was chairman of the board of directors.

The American Steam Conveyor Corporation, Chicago, announces the appointment of **Charles H. Florandin,** formerly of the National Electric Welding Company, New York, as general manager of the eastern territory, with headquarters at the New York office, 110 West 40th street. Mr. Florandin, who assumes charge of his new duties May 1, was born in France and received his technical education at the famous Lycee de Marseilles. He is an engineer by profession, and upon coming to the United States did important work with the Brooklyn City Railway in the early days when the road was being electrified. After five years' service with this company, he joined the C. & C. Electric Company, New York, where he held a responsible position with them for many years. After a brief connection with the Western Electric Company, he returned to the C. & C. Electric Company, and later organized the National Electric Welding Company. During the war Mr. Florandin was a member of the welding committee of the Emergency Fleet Corporation.

Westinghouse Electric's European Interests

General Guy E. Tripp, chairman of the board of the Westinghouse Electric & Manufacturing Company, issued this statement recently concerning his trip abroad: "Subject to the successful accomplishment of certain legal details in Europe, which, however, may be waived by the Westinghouse Company if thought desirable, an agreement has been reached with certain important British interests under which the Westinghouse Company sells for cash its British holdings and enters into a commercial alliance looking to the development of export business.

"The commercial plan will be instituted immediately, upon the assumption that the whole deal will be consummated on one of the bases above indicated. No further details can be given out at this time."

Railway Business Association

This association's committee on government purchasing policies was organized in New York City this week. The chairman of the committee is Knox Taylor, president of the Taylor-Wharton Iron & Steel Company, High Bridge, N. J.; and the other members are Samuel G. Allen, vice-chairman, Franklin Railway Supply Company, New York; G. S. Brown, president, Alpha Portland Cement Company, Easton, Pa.; Andrew Fletcher, president, American Locomotive Company, New York; Howard A. Gray, manager railroad sales, Joseph T. Ryerson & Son, Chicago; A. L. Humphrey, president, Union Switch & Signal Company, Swissvale, Pa.; A. H. Mulliken, president, Pettibone, Mulliken & Co., Chicago; L. G. Parker, assistant manager of sales, Cleveland Frog & Crossing Company, Cleveland, Ohio; W. H. Woodin, president, American Car & Foundry Company, New York.

Trade Publications

Drills and Reamers.—The Clark Equipment Company, Buchanan, Mich., lists and briefly describes all of the standard tools comprising the Celfor line in catalogue No. 16. These include drilling and reaming tools of various kinds, drill chucks, drill sockets, lathe tool holders, tool bits, flue cutters and drill gages. In the back of the book are several pages of tables showing feeds and speeds for Celfor drills and decimal equivalents in inches of millimeters and fractions of an inch.

Perforated Metals.—The Hendrick Manufacturing Company, Carbondale, Pa., manufacturers of perforated metals, etc., has issued a catalogue of 127 pages which will be found useful for reference purposes to the user of perforated metals. Thirty-six pages are devoted to reproductions of standard perforated screen plates and 25 pages to illustrations of manufactured screens for various purposes in handling coal, cement, ore, etc., including strainers for locomotives and metal spark arresters for locomotive front ends. This company also manufactures elevator buckets, conveyor troughs and flights, stacks, tanks, hoppers, etc., which are also listed in this catalogue. Of special value should be found the tables showing the styles and sizes of perforations and the spaces between holes and maximum widths and gages in steel, according to the United States standard gage, and a number of tables of weights, measures, and gages for coal screens, decimal equivalents, metric conversion tables, etc.

Baldwin Locomotives.—In September, 1918, the Baldwin Locomotive Company completed the erection of its fifty-thousandth locomotive, which is the subject of Record No. 91. This locomotive is one of a group of 12 built for the Southern Railway Company and is of the Mallet articulated type with 2-8-8-2 wheel arrangement. The booklet gives some interesting facts regarding the Southern Railway System and a brief review and several illustrations of motive power built by the Baldwin Locomotive Works for this road, in addition to a description of the 12 Mallet locomotives represented by locomotive No. 50,000. It also contains interesting information regarding the growth of the locomotive industry and of the Baldwin Locomotive Company's plants, illustrations showing the shop in which the first Baldwin locomotives were constructed and the various plants in operation at the present time.

Railway Financial News

Boston & Maine.—Attorney James L. Doherty, of Springfield, Mass., has been elected chairman of the federal trustees of the New Haven stock interests in the Boston & Maine to succeed the late Marcus P. Knowlton. Mr. Doherty has been a trustee and is a New Haven director.

Chicago, Milwaukee & St. Paul.—The president has sent a letter to stock holders in part as follows:

On January 1, 1918, the United States government took over the possession, use and operation of the company's railway and system of transportation together with all balances due from agents and conductors, all cash on hand as working capital, and all materials and supplies, and has since continued to control and operate it. The rental for the Chicago, Milwaukee & St. Paul and its six subsidiary railways amounts to $27,506,771.

The company filed with the government claims somewhat in excess of $2,000,000 for extra compensation. The general policy adopted by the director general has been to deny all claims for extra compensation. However, due to the recent expenditures for the installation of the electrical operation of 440 miles of the company's railway between Harlowton, Mont., and Avery, Idaho, in February, he allowed the company as extra compensation of $440,000 per annum, making the total annual compensation $27,946,771.

For the purpose of acquainting you with the financial condition of the company the following statements of income, receipts, disbursements and obligations for the year ended December 31, 1918, are submitted:

Annual compensation due from the U. S. R. R. Administration for the year ended December 31, 1918		$27,506,771.45
Extra compensation		440,000.00
Total compensation due from U. S. R. R. Administration		$27,946,771.45
Other Income:		
Income from lease of road (Lake Minnetonka Line)	$1,833.34	
Rentals received—miscellaneous	234,213.71	
Non-operating property income	251,240.03	
Dividends on securities owned	170,344.00	
Interest on securities owned	9,295.00	
Miscellaneous interest on additions and betterments, and on advances to subsidiary companies	414,431.00	
Income from sinking and ins. res. funds	34,801.30	
Miscellaneous income	42,405.04	
Revenue earned prior to January 1, 1918, credited in account by the U. S. R. R. Administration	1,143,676.31	
		2,302,239.73
		$30,249,011.18
Income Deductions:		
Interest on bonds	$16,767,186.15	
Corporate organization expenses	163,214.77	
War taxes accrued	376,628.03	
Miscellaneous rentals paid	27,520.32	
Expense of separately operated properties	124,845.46	
Interest on notes	663,084.31	
Miscellaneous income charges	153,952.77	
Income appropriated to sinking fund reserves	147,104.19	
Expenses prior to January 1, 1918, charged in account by the U. S. R. R. Administration	5,583,965.45	
		24,007,501.45
Net corporate income		$6,241,509.73

While the amount of the annual compensation to be paid the company under the terms of the agreement with the director general is $27,946,771, only a small part of this amount, viz., $6,275,000, was paid by the United States Railroad Administration to the company during the year 1918. The company was, therefore, under the necessity of borrowing certain funds to meet interest payments and other corporate obligations, as follows:

Loan from the War Finance Corporation, Washington, D. C., to pay interest	$8,500,000.00	
Luans from New York banks, to pay interest	4,500,000.00	
Loan from United States Railroad Administration, to pay interest	857,000.00	
		$13,857,000.00

Besides the above loans there is due the United States Railroad Administration, for open accounts, $2,912,846, which will be deducted from the compensation for 1918.

In addition, the company was under the necessity of obtaining a loan from the War Finance Corporation to retire the trust certificates of the Puget Sound & Willapa Harbor, one of its six subsidiary railways, amounting to $3,000,000, which matured June 1, 1918, the payment of which the company had guaranteed. The United States Railroad Administration also has a charge against the company of $10,872,712, on account of expenditures made by it for additions and betterments to the company's property during the year 1918. Furthermore, the United States Railroad Administration has allocated to the company 100 heavy Mikado locomotives and 3,000 box cars (1,000 of which are to be built in the company's shop at Milwaukee), the cost of which the company is obliged to meet. These last three charges will be financed as soon as conditions will permit.

While your board is hopeful of better conditions, and more favorable results for the year 1919, the complications and uncertainties of the railroad situation in general render it impossible to make a definite forecast at this time. Meanwhile, the property of the company is being well maintained and with the return of normal conditions it is confidently expected that more favorable results will follow.

Denver & Salt Lake.—The bill for the acquisition of the Moffat road and the boring of the James Peak tunnel was signed by Governor Oliver H. Shoup on April 9.

Louisville & Nashville.—This company is preparing to issue shortly $7,323,000 series "B" equipment trust bonds, to bear interest at six per cent and mature in semi-annual installments over a period of fifteen years.

Missouri, Oklahoma & Gulf.—Judge William C. Hook, of the United States Court of Appeals, sitting at Muskogee on April 5, rendered the final decree in the case of St. Louis Union Trust Company against the Missouri, Oklahoma & Gulf. He rendered judgment to the bondholders for approximately $16,000,000 and appointed J. W. Sevly, of Muskogee, as special commissioner to sell the railroad property at public auction at some date to be designated by him. John H. Atwood, of Kansas City, was appointed special referee to determine the status of and adjust all unsettled claims.

Norfolk & Western.—The stockholders have voted to increase the common capital stock of this company by $100,000,000 to an aggregate of $250,000,000, and have authorized the directors to create, issue and sell from time to time convertible bonds to an aggregate of $108,431,000.

Western Pacific.—The executive committee of this company has refused to accept as its standard return the average operating income for the three test years ended June 30, 1917, which was $1,917,038. The company claims that its just compensation from the Railroad Administration should be $4,557,195 and bases its claim on the following items:

Net railway operating income for year ended June 30, 1917	$3,112,628
Est. net earnings from branch lines and other facilities not reflected 1917	623,500
Decrease in hire of equipment on account of purchase of new equipment delivered in July, 1917	235,888
Six p. c. int. on new equipment contracted for prior to December 31, 1917, but delivered in June and October of 1918 at cost of $4,120,000	247,200
Depreciation on equipment 2¼ p. c on $4,120,000	92,700
Yearly saving in water service	40,114
Six p. c. int. on $523,287 capital expended completed in 1918 or work still in progress	35,176
Six p. c. int. on value of construction material above normal on December 31, 1917, amounting to $308,206	18,492
Loss in express earnings March 1 to June 30, 1917	26,097
Annual expenses of maintaining corporate organization	94,000

The railroad company will ask that the entire question of federal compensation be submitted to a board of referees which will be appointed by the Interstate Commerce Commission in accordance with the provisions of the federal control act.

The construction of a tunnel, for automobiles, beneath the Hudson river, between New York City and Jersey City, seems to be assured by the action of the legislature of New York, which has made an appropriation of $1,000,000 for the beginning of the work. The governments of New York and New Jersey appear to be substantially agreed as to the general plans. The estimated cost of the tunnel is $12,000,000, and the time necessary for the construction about two years.

Railway Officers

Railroad Administration

Central

R. Walton Moore, assistant general counsel of the Railroad Administration and formerly commerce counsel for the Southern Railroad, has recently resigned to become a candidate for Congress.

Federal and General Managers

E. H. Utley, general manager of the Bessemer & Lake Erie, with offices at Pittsburgh, Pa., has been appointed federal manager.

A. M. Darlow, general manager of the Buffalo & Susquehanna, with office at Wellsville, N. Y., has been appointed federal manager.

A. G. Whittington, general manager and **A. R. Howard,** acting federal treasurer of the International & Great Northern, the Galveston, Houston & Henderson and the Houston & Brazos Valley have had their jurisdiction extended over the International & Great Northern (Spring to Fort Worth and Madisonville branch) which line was placed under the authority of **J. L. Lancaster,** federal manager at Dallas, Tex., upon the reorganization of the Southwestern region on March 1.

J. E. Callahan, whose appointment as general manager of the St. Louis Southwestern, the St. Louis Southwestern of Texas, the Eastern Texas, the Dallas Terminal and Union Depot, the Southern Illinois and Missouri Bridge and the Louisiana & Arkansas, was announced in the *Railway Age* of March 7 (page 553), began his railway career with the Chicago, Milwaukee & St. Paul. He resigned from that road after three years' service to enter the employment of the St. Louis-Southwestern in 1893 as an operator and agent, since which he has been consecutively train despatcher, assistant chief despatcher, chief despatcher and superintendent until his recent appointment.

Effective April 1, the jurisdiction of the following officers of the Gulf, Colorado & Santa Fe, the Atchison, Topeka & Santa Fe (Pauls Valley, Lindsay and Sulphur districts only), the Fort Worth Union Passenger Station, the Union Terminal of Dallas, the Texas Midland and the Galveston Wharf Company is extended over the Beaumont, Sour Lake & Western, the Houston Belt & Terminal, the Iberia, St. Mary's & Eastern, the New Iberia & Northern, the New Orleans, Texas & Mexico, the Orange & Northwestern and the St. Louis, Brownsville & Mexico. **W. E. Maxson,** general manager; **J. S. Hershey,** freight traffic manager; **J. W. Terry,** general solicitor; **F. Merritt,** chief engineer; **D. W. McLeod,** federal auditor. **M. Eckert,** auditor, and **J. H. Lauderdale,** acting federal treasurer of the Houston Belt & Terminal have had their jurisdiction extended over the same roads, effective on the same date.

Operating

R. C. Reid, trainmaster of the New Orleans & Northeastern, with office at Hattiesburg, Miss., has been appointed superintendent of the same road and the New Orleans Terminal, vice **A. A. Woods,** promoted.

W. C. Bevington, trainmaster on the Missouri Pacific, has been appointed superintendent of the Joplin division, with headquarters at Nevada, Mo., and **C. A. Clements,** trainmaster at Cornell, Kan., has been appointed superintendent of the Kansas City Terminals, with headquarters at Kansas City, Mo.

A. A. Woods, superintendent of the New Orleans & Northeastern, with office at Hattiesburg, Miss., has been appointed chief engineer maintenance of way and structures, of the Southern Railroad lines and associated railroads, lines west, with office at Cincinnati, Ohio, vice **Curtis Dougherty,** deceased.

Colfax B. Wildman, whose appointment as general superintendent of the Eastern district of the Missouri Pacific, with headquarters at St. Louis, Mo., was announced in the *Railway Age* of April 4 (page 923), was born in Shipman, Ill., on May 23, 1869. He began his railway career in 1883 with the Chicago & Alton as an operator since which he has been consecutively, from 1884 to 1885, agent and operator on the C & H line; 1887 to 1889 despatcher and copy operator on the Atchison, Topeka & Santa Fe; 1889 to 1890 operator on the Northern Pacific, and from 1890 to 1893 despatcher and night chief despatcher on the same road. The following year he was engaged in private business. He re-entered railway service in 1894 as a despatcher and chief despatcher on the Missouri, Kansas & Texas, in which capacity he served until 1898 when he entered the employ of the Chicago & Alton as chief despatcher. In 1904 he resigned from that road to enter the service of the Missouri Pacific as despatcher and chief despatcher, and from that date to 1916 he was consecutively with the same road as trainmaster, superintendent of the Central division and superintendent of the Eastern division, which position he held prior to his recent appointment.



C. B. Wildman

J. Cannon, whose appointment as general superintendent of transportation of the Missouri Pacific, the Memphis, Dallas & Gulf, the Natchez & Southern, and the Arkansas Central, with headquarters at St. Louis, Mo., was announced in the *Railway Age* of April 4 (page 923) was born at Cairo, Ill., on May 6, 1872. He entered railway service in 1886 as a laborer in the mechanical department of the Illinois Central. By May 1, 1892, he had been promoted several times and on that date was made chief clerk to the assistant superintendent of the Chicago division. He was soon promoted again and served successively as chief clerk to the superintendent of the Amboy and St. Louis divisions; chief clerk to the general superintendent of transportation; assistant trainmaster on the St Louis division; chief clerk to the general manager and trainmaster on the Springfield and Chicago divisions. In October, 1905, he entered the employ of the Missouri Pacific-Iron Mountain system as superintendent of the Southern Kansas division, with headquarters at Coffeyville, Kan., since which he has been consecutively to date, division superintendent at Little Rock, Ark., and De Soto, Mo.; superintendent of the Missouri division of the Eastern district at Poplar Bluff, Mo.; superintendent of the Eastern division at Sedalia, Mo.; general superintendent of the Eastern district; acting general superintendent of transportation with headquarters at St. Louis, Mo.;



J. Cannon

general superintendent of transportation and general superintendent of the Eastern district, which latter position he held prior to his recent promotion.

Fred C. Smith, whose appointment as assistant superintendent of the Salt Lake division of the Southern Pacific, lines south of Ashland, with headquarters at Ogden, Utah, was announced in the *Railway Age* of April 4 (page 923), received his honorable discharge from the army in the latter part of February. He entered military service in March, 1917, and served as a first lieutenant in the Engineers Corps, Russian Railway Service, returning to this country in July, 1918, when he was promoted to captain and assigned to an engineer unit in which capacity he served in France from September, 1918, until his return to this country in February, 1919.

Financial, Legal and Accounting

J. J. McEwen has been appointed federal auditor of the Gulf, Mobile & Northern and the Meridian & Memphis, with office at Mobile, Ala., vice H. M. Hood, who has resigned to accept a position with the Railroad Administration at Washington.

E. M. Devereux, acting federal treasurer of the Baltimore & Ohio, has been appointed federal treasurer of the Baltimore & Ohio, Eastern Lines; the Coal & Coke; the Morgantown & Kingwood; the Western Maryland; the Cumberland Valley, and the Cumberland & Pennsylvania, with headquarters at Baltimore, Md.

Traffic

R. H. Rolfe, passenger service agent of the Seaboard Air Line, with office at Jacksonville, Fla., has been appointed district passenger agent, with headquarters at Tampa, vice R. E. Camp, resigned.

A. Hilton, assistant traffic manager of the St. Louis-San Francisco, the Kansas City, Clinton & Springfield, the Paris & Great Northern Belt, the West Tulsa Belt and the Rock Island-Frisco Terminal, has been promoted to traffic manager of these roads and also of the St. Louis-San Francisco & Texas and the Fort Worth & Rio Grande, with headquarters at St. Louis, Mo. The office of assistant traffic manager has been abolished.

Engineering and Rolling Stock

C. A. Sasse has been appointed divisional car foreman on the Pennsylvania division of the Delaware & Hudson, with headquarters at Carbondale, Pa., vice F. S. Ganley, assigned to other duties. Mr. Sasse will report to the master car builder.

W. J. Ormsby, general foreman in the locomotive department of the Illinois Central, with headquarters at Chicago, has been promoted to master mechanic of the Wisconsin division of the same road, with headquarters at Freeport, Ill., to succeed E. Lawless, deceased.

A .T. Hawk, architect of the Chicago, Rock Island & Pacific, with headquarters at Chicago, has been appointed engineer of buildings, with the same headquarters, and his former position has been abolished.

D. C. Fenstermaker, assistant engineer in charge of construction on the Chicago, Milwaukee & St. Paul, has been promoted to district engineer, with headquarters at Chicago, in charge of the Iowa, the Des Moines, the Kansas City, the Sioux City and Dakota and the Dubuque divisions, succeeding W. E. Wood, assigned to other duties.

E. W. Hammond, division engineer of the Buffalo, Rochester & Pittsburgh, with office at Du Bois, Pa., has been promoted to acting engineer maintenance of way, with headquarters at Rochester, N. Y., vice G. C. Cleaver, granted leave of absence, and J. B. Oatman, roadmaster, at Du Bois, has been promoted to acting division engineer, with headquarters at Du Bois.

Corporate

Operating

I. T. Williams has been appointed general manager of the London & North Western Railway of England, succeeding Sir Guy Calthrop, deceased. Mr. Williams entered the service of this road in 1876, and in 1902 he was made district goods manager at Warrington. He was transferred to London in 1907 as traffic superintendent of the metropolitan area, and later went to Euston Station as assistant to the general manager. In 1914 he was appointed chief goods manager, and in 1917 he became acting general manager, which position he held until his recent appointment as general manager of the same company.

Charles Harry Fox, who has been appointed division engineer on the Canadian Pacific, with headquarters at Regina, Sask., was born at Winnipeg, Man., on April 2, 1885. He began his railway career in May, 1902, with the Canadian Pacific, serving as clerk, rodman and transit man in the maintenance department until 1906 and the following three years as transit man in the construction department of the same road. From 1904 to 1910 Mr. Fox attended McGill University, Toronto, Ont., and upon his graduation was appointed resident engineer on the Canadian Pacific, in which capacity he had charge of the construction of terminal docks, elevators and coal handling facilities at Fort William, Ont. The following year he was appointed assistant division engineer on the Manitoba division, in which capacity he served for three years when he was appointed resident engineer of maintenance, with headquarters at Winnipeg. During 1918 he was engaged in military service and upon his release from the army he was appointed division engineer as noted above.

Railway Officers in Military Service

Major George W. Berry, formerly general superintendent of the Illinois Central, with headquarters at Memphis, Tenn., has been made a Chevalier of the legion of honor by the French government. Major Berry has been in France since June, 1918, with the 31st Engineers (Railway), and is now in Paris consulting upon technical matters with the Peace Commission.

Obituary

Willard Van Valkenburgh, general baggage and mail agent of the Long Island Railroad, with office at Long Island City, N. Y., died on April 10, at his home in Brooklyn at the age of 53.

Thomas B. Purves, formerly for many years in the service of the Boston & Albany, died in Springfield, Mass., on April 13, at the age of 61. On May 1, 1904, he resigned as superintendent of motive power and rolling stock of that road. From January, 1907, for about three years, he was superintendent of motive power and the car department on the Denver & Rio Grande, with office at Denver, Colo. In 1909 he entered the service of the Massachusetts Railroad Commission on valuation work, and later served in the same capacity for the Interstate Commerce Commission.

"Erection of the Sciotoville Bridge" of the Chesapeake & Ohio Northern across the Ohio river was the subject of a paper presented before the Western Society of Engineers on Monday, April 14, by Clyde B. Pyle, manager of erection, McClintic-Marshall Company, Pittsburgh, Pa. Because this remarkable structure consists of 1,550-ft. trusses continuous over three supports, the erection involved some unusual problems requiring the institution of special methods which were explained in an interesting manner with the help of some fine photographs. A general article describing this bridge and its construction appeared in the *Railway Age Gazette* of September 14, 1917, page 453.

EDITORIAL

Railway Age

Open Cincinnati Office

On Monday, April 28, the Simmons-Boardman Publishing Company, publishers of the *Railway Age*, will open an office in the First National Bank Building, Cincinnati, Ohio. It will be in charge of R. H. Smith, a member of the business staff formerly connected with our Chicago office, who will look after the interests of the Simmons-Boardman publications, including the *Railway Age*, Railway Mechanical Engineer, Railway Maintenance Engineer, Railway Signal Engineer, Railway Electrical Engineer and the Locomotive and Car Builders' Dictionaries.

Contingent Fee Covenant Modified

Hereafter concerns selling supplies to the railways will be able to pay commissions, or, as they are technically called, "contingent fees," to bona fide agents employed under a general contract without invalidating their contracts with the railways. This is the result of an order recently made by Director General Hines. On June 18, 1918, the Department of Justice issued an order requiring that thereafter there should be inserted in every contract of purchase made by any government department a covenant stipulating that the concern from which the purchase was made would not pay a commission or fee to any agent as compensation for having made the sale to the government. This was not the exact language of the covenant, but was its substance and effect. The insertion of this covenant in all contracts between the railway equipment and supply companies and the railways, if permanently continued, would have forced many supply concerns radically to change business methods which had been used for years and would have driven not a few out of business. It had been a common practice for railway supply manufacturers to sell goods through agencies which were constituted regular representatives and whose compensation took the form entirely of commissions based upon the amount of goods they sold. The commission method of doing business would have had to be abandoned if the covenant drawn up by the Department of Justice had had to be inserted in all contracts. The result would have been that the equipment and supply companies would have had to make all sales through salaried agents. This would have increased their selling costs and either reduced their profits or rendered it necessary to charge the railways higher prices. The covenant was manifestly adapted to doing almost no good and much harm. It will continue to be inserted in contracts, but in appropriate cases there will be added a proviso to the effect that it "shall not invalidate a contract obtained through a bona fide commercial representative employed under a general contract covering designated territory and shall not prohibit or penalize the employment of the same agency methods and rates of compensation" which have heretofore been "customarily employed by the contractor in the regular course of his business in similar dealings with the railroad corporations." This seems to dispose of a matter which has caused much vexation of spirit and not a little expense to the railway supply companies. The negotiations which have led to this satisfactory outcome were conducted by the Railway Business Association which, as well as the director general of railroads, deserves credit for having secured a settlement on a common sense basis.

The Movies and Fuel Conservation

The effect upon the members of the New York Railroad Club of the moving pictures which have been used in the fuel conservation work on the Northern Pacific and which were shown by Fuel Supervisor M. A. Daly at the meeting of the club last week, was indeed remarkable. At first thought it is difficult to see how moving pictures can be used to show up the advantages and disadvantages of different methods of firing and the effects of wastefulness and carelessness in the operation of the locomotives and the handling of fuel. With the help of a skilful expert in the art of taking moving pictures, however, the Northern Pacific has developed a series of films that clearly show these effects and leave a deep and lasting impression on the mind which could hardly be produced in any other way. The moving pictures combined with the fuel instruction car which has been developed along lines which are unique and different from those used by any other road have, beyond question, been responsible for the splendid showing that the Northern Pacific has made in its fuel performance as compared with other roads operating under more or less similar conditions. The testimony of the fuel supervisors who took part in the discussion of Mr. Daly's address indicate a deep-seated belief in the fact that the average man takes a real pride in doing his work well; the difficulty in railroad service where the men are scattered and the problem of supervision is difficult, is to keep in sufficiently close touch with them to know that they understand exactly what is expected of them and just how their tasks should be performed. In no other field is the educational problem of greater importance than among the operating men on the road. Likewise the difficulty of reaching these men is equally great and exceptional methods must be taken if real results are to be obtained. The fuel instruction car on the Northern Pacific, with its simple and yet forceful lectures including practical experiments and demonstrations, taken in conjunction with the movies, should be studied by all those who are interested, not alone in fuel conservation but in educational work along other lines.

The Turning of the Tide

For months a dispute as to wages and length of working day has been dragging on between the workers in New York harbor and the owners of tugs and barges. Two arbitrations failed to settle the matters in controversy, but, as a result of the second of these arbitrations, the Railroad Administration granted the eight-hour day to employees on its tugs and barges and the men agreed to return to work. The independent boat owners, however, refused to grant the eight-hour day but effected a settlement with one of the unions involved. The inde-

pendents are largely owners of barges—coal, wheat, etc. It appeared that through the agreement with the rival union the independents were in a fair way to win in the strike which had been declared by the Marine Workers' Affiliation (the union with which the Railroad Administration made its settlement). The barges of the independent owners depended largely upon the tugs of the Railroad Administration to move them about the harbor but when the Marine Workers' Affiliation saw how things were going, they ordered crews of the Railroad Administration tugs to refuse to handle independent boat owners' barges. This was the cause of the trouble which was ended by the men agreeing to go back to work for the independent boat owners with a ten hour day. The wage question was left to future arbitration. This is, apparently, a defeat for the Marine Workers' Affiliation and is a successful outcome to the policy pursued by A. H. Smith, director of the Eastern region, in his handling of the dispute. It is true that the Railroad Administration granted the eight-hour day to its employees, whereas the success of the independent owners has demonstrated that a ten-hour day is not considered unreasonable by the men; but the encouraging feature about the strike is that it was handled, in regard to the administration's tugs in New York harbor, by the regional administration, not by the central administration in Washington, and that the regional administration stuck to its guns and won its point without making concessions. Needless to say, its case was perfectly clear-cut and the refusal of the Marine Workers' Affiliation to carry out the terms of an agreement so recently made left it without the power to greatly confuse the issue.

Maintaining Wages and Reducing Prices

SINCE THE SIGNING of the armistice it has been the policy of the government to try to maintain wages in industry while securing reductions of prices. In attempting to carry out this policy it has been given the support in public utterances of many labor leaders, public men and business men. It cannot be said that as yet the policy has been notably successful. There have been some slight reductions in wages and some larger reductions of prices. On the other hand, there have been some advances in prices. Generally speaking, both wages and prices have been maintained. One of the principal results has been that in most lines of industry business men, hoping for larger reductions in prices, have refrained from entering upon large new projects and that the business of the country has slumped. There is no better barometer of general business conditions than the amount of freight being moved by the railways. The volume of freight traffic has greatly declined.

There is naturally much skepticism in some quarters as to whether the policy of trying to maintain wages and at the same time reduce prices will be successful. If it is not successful it will in the long run do more harm than good. As to the maintenance of wages this is desirable, if it can be done. But wages are a very large part of the cost of production in every industry. There are only two ways in which wages generally can be maintained and prices reduced. The first is for business concerns to forego part of their profits. The second is to secure greater efficiency in production. As to the first, business men naturally will not make large reductions in their profits if they can avoid doing so. As to the second, increased efficiency means a greater output in proportion to the amount of materials used and the number of men employed, and unless the co-operation of labor can be secured it is extremely difficult to get improved results from either the material or the human elements in production.

As a matter of fact, no really large reduction of prices can be obtained merely through reduction of the profits of industry. Large reductions in prices, if they are to be obtained while wages are maintained must be secured by means of increased efficiency in production. Unfortunately, present-day labor generally seems to be almost as strongly indisposed to co-operate in securing increased efficiency of production as to accept reductions of its wages. This is one of the greatest obstacles to general reductions of prices. It is also the one obstacle regarding which the governmental authorities who are urging the maintenance of wages, the reduction of prices and the practice of "Buy it now," are maintaining the deepest silence. In Great Britain, where labor conditions are far more unsatisfactory than in the United States, and the trade unions are stronger, the leading statesmen, with Lloyd George at their head, are constantly emphasizing in their public utterances the need and duty of labor to co-operate with the employers in maintaining and increasing efficiency of production. Our public men at Washington are showing the same want of statesmanship and courage in dealing with this phase of our reconstruction problem that they are showing in dealing with most other phases of it.

Terms of the Victory Liberty Loan

ANNOUNCING THE DETAILS of the Victory Liberty Loan, Carter Glass, secretary of the treasury, stated that there will be no more popular subscription loans floated in the United States. War debts will continue to pile up as long as it is necessary to keep the army of occupation in the provinces along the Rhine, and until the troops already returned to this country are demobilized and the country takes up again the works of peace. But other means of financing will be found by the treasury department to meet these demands of the future. In outlining the purpose of the department in making this final appeal to the people for support, Mr. Glass said:

"In fixing the terms of the issue, the treasury has been guided largely by the desire to devise a security which will not only prove attractive to the people of the country in the first instance, but the terms of which will insure a good market for the notes after the campaign is over and identical prices for the two series, and should not affect seriously the market for the existing bonds of the Liberty Loans. This will be the last Liberty loan. Although as the remaining war bills are presented further borrowing must be done, I anticipate that the requirements of the government in excess of the amount of taxes and other income can, in view of the decreasing scale expenditure, be readily financed by the issue of treasury certificates from time to time as heretofore, which may ultimately be refunded by the issue of notes or bonds without the aid of another great popular campaign such as has characterized the Liberty Loans.

"I am sure that the people of America will subscribe to this Victory Loan in the same spirit of patriotism which they have shown in the past to the end that the notes may be distributed as widely as possible and that our great banking institutions may be left free to supply the credit necessary for the purpose of industry and commerce and the full employment of labor. Let the world see that the patriots of America out of their boundless resources, and with the same enthusiasm and devotion to country with which they prosecuted the war to a victorious conclusion, are determined to finish the job."

The *Railway Age* presents herewith details of the new Victory Loan, and terms of payment as outlined by the government. The amount of the loan was fixed at $4,500,000,000, instead of $6,000,000,000 as was anticipated in many

circles. The loan is in the form of two series of gold convertible notes, one bearing 4¾ per cent interest, exempt from state and local taxes, except estate and inheritance taxes, and normal income taxes; and the other bearing 3¾ per cent interest, exempt from all taxation except estate and inheritance taxes. The notes are for a term of four years, but may be taken up by the government at the end of three years by payment of the par value with accrued interest.

Either form of note is convertible into the other at the option of the holder. Interest is payable semi-annually on December 15 and June 15 after December 15, 1919. No oversubscription will be accepted, but all subscriptions up to $10.000 will be allotted in full.

The government's terms of payment are 10 per cent with the subscription prior to May 10, when the campaign closes; 10 per cent, July 15; 20 per cent, August 12; 20 per cent, Septemer 9; 20 per cent, October 7, and 20 per cent, November 11.

Although this is the last call of the government upon the people for á popular war loan, the raising of this money is just as important as were any of the Liberty Loans. The government needs the money for the payment of a myriad of war bills that accumulated during the last few months of the war, and to keep the finances of the country in such a condition that industry will not be crippled, and the chance at the world trade lost.

Progress in Water Treatment

THE HISTORY of the introduction and development of water treatment on American railroads not only is a fascinating story filled with human interest, but it also constitutes a lesson regarding the need of proper appreciation and practical application of scientific discoveries, that may be applied with equal propriety to many other phases of railway operation. Water softening on railroads received its first real impetus about 20 years ago, through the enthusiastic zeal of a few energetic engineers and chemists who understood the wonderful possibilities in the simple chemical transformation involving the use of two cheap reagents, lime and soda ash. Through their efforts the practical value of treating locomotive water supplies was demonstrated beyond question, and during 1904, 1905 and 1906 current technical literature was replete with expositions of the value of water softening, fully demonstrated by records of savings in boiler repairs, flue and sheet renewals, fuel economies and reductions in engine failures.

Then followed a lull in the advancement of this improvement of railway water supply. The subject was less frequently discussed and the occasional references brought to light from time to time were as often derogatory as otherwise. There was also talk of treating plants that had been taken out of service here and there.

This was the state of affairs when in 1913 the Water Service committee of the American Railway Engineering Association was instructed to "report on water treatment and the results of study being made of water softening from the operating standpoint." In the ensuing investigation, the committee discovered that a few roads which had undertaken water treatment some years before were not only thoroughly convinced of the advantages accruing from these installations, but were obtaining increased benefits from year to year as the more intimate details of the subject were better understood. However, the most profitable phase of this investigation was the study of those cases where the use of water softeners had been discontinued or was being considered with disfavor. This disclosed the fact that the failure of these plants to produce the desired results, arose in nearly all cases from one essential defect—inadequate supervision, not only in the operation and maintenance of the plants, but in making the installations in the first place.

The chemistry of water softening is simple. Nevertheless, the operation of a battery of plants treating a variety of waters, some of which change in composition from day to day, presents a problem of no mean proportions. It entails the exercise of both engineering and chemical knowledge, and like any other technical branches of railroading, it must be managed by one who knows his business and who is clothed with adequate authority to put his knowledge into effect. The particular importance of this in the case of water softeners arises from the fact that the successful treatment of water and the efficient use of the treated water in the locomotives requires co-operation on the part of all that have anything to do with the operation and maintenance of the plants and the operation of the locomotives. Consequently, the water treatment must be under the general supervision of a man who is able to inspire confidence in the system of water treatment he is handling, on the part of all those directly or indirectly concerned.

During the last four years water softening has received a renewed impetus, with the result that there have been repeated demonstrations of its economic value wherever the railroads have approached this subject with an adequate conception of the essentials for success. One of the best demonstrations of the results obtainable when it is prosecuted under a comprehensive plan with proper control will be found on another page of this issue where a report is given of the results secured on the Great Northern during the last seven or eight years. The special lesson of this report lies in the demonstrated value of close supervision of the minute details of plant operation. It also illustrates the advantage of water treatment covering a complete area, as compared to a "hit-or-miss" plan under which only the most objectionable waters are treated. The article will be found of interest alike to the student of water treatment and to the operating or mechanical officer who is concerned only with results

Senator Cummins on the Railroad Problem

THE VIEWS OF SENATOR CUMMINS of Iowa upon the railroad problem have become of great importance. He is now the ranking Republican member of the Senate Committee on Interstate Commerce and doubtless will be elected its chairman when Congress meets. Therefore, he will have a leading part in framing the important railway legislation which probably will be enacted this year. Senator Cummins recently delivered an address on the railroad problem before the General Assembly of Iowa, which we publish in this issue.

For some years the Iowa senator was a severe critic of the management of the railroads of the United States. He seemed inclined to favor government ownership. He is now, as his address shows, strongly opposed to government ownership—or, at least, to government management. He still believes that the system of management and government regulation existing before government control was adopted resulted in wastes and abuses; and he is in favor of returning to private operation under a different system.

The principal shortcomings of the old system of regulation were, first, the conflicts between state and federal regulation; second, the way in which it dealt with competition; third, the way in which it dealt with the return upon capital. Senator Cummins has come "slowly and reluctantly" to the conclusion "that in so far as the rates are concerned the national government must be the arbiter." He is in favor of competition between strong roads, but would have the railroads consolidated into not more than eighteen large

systems in order that the extremely unequal competition between the strong and weak roads which has rendered it impossible intelligently and fairly to regulate rates shall not be revived. Thus far most students of the subject who are in favor of private management will be able substantially to agree with him.

The most important feature of his plan, however, is that which relates to the regulation of the return to be earned by the railways. Regarding this part of it there will be sharp differences of opinion between those who favor and those who oppose government guarantees of net return. He would have a government corporation acquire all the railway properties or all the securities and substitute new obligations. After effecting the needed consolidations, he would turn the properties over to the ownership and operation of private companies. He would have the government guarantee a return of 4½ per cent upon the new securities, which would be based upon some kind of a valuation.

The execution of this plan would involve virtually a complete change in the ownership of all the railroads. The transaction would be the most enormous in history. The details to be worked out would be inconceivably intricate and numerous. Even if this part of the plan were practicable, it would seem that it would take years to carry it out. Meantime, the railroad situation would be wholly unsettled, and it is hard to see how any progress could be made in securing the improvement and expansion of railway facilities which is now needed.

Senator Cummins assumes, without conceding, that the value of the properties is $17,000,000,000. He says that a government guarantee of 4½ per cent, or $765,000,000 a year, on this would be "ample"—doubtless meaning it would be ample to keep the securities at par. He adds, "The people paid in 1917 a (railway) capital charge of a billion dollars. * * * The principle I have proposed, if embodied in the law, will save the people of the country from $250,000,000 to $500,000,000 annually." Senator Cummins' reasoning at this point is open to destructive criticism. It is wholly improbable that the value of the railways would be found to be as small as $17,000,000,000. Even if it were, and the government guaranteed 4½ per cent on it, the saving in capital charge would be nowhere near as large as he estimates. The year ended on June 30, 1916, is the last for which we have complete statistics of the Interstate Commerce Commission. By "capital charge" Senator Cummins must mean—in view of the figures he uses—the "operating income" which the railways have earned—in other words, the excess of earnings over operating expenses, taxes, etc. In 1916 the operating income was $1,043,000,000; but this was not really the "capital charge." The total net dividends and interest paid by the railways in that year amounted to only $834,600,000. This was but $69,600,000 more than the $765,000,000 a year which Senator Cummins estimates a guarantee of 4½ per cent would cost the government.

The difference between the operating income and the net interest and dividends paid was about $202,000,000. Out of this amount the companies appropriated $76,500,000 for investment in physical property. The rest was applied to sinking funds, used in extinguishing stock and bond discounts, carried to cash account, etc. Under any system, even government ownership, large investments would have to be made from earnings each year in unproductive improvements, sinking funds would have to be provided for, etc.

Furthermore it is not at all sure that, as Senator Cummins implies, a guarantee of 4½ per cent would be sufficient to enable railway securities to be sold at par. Government bonds which are subject to taxation are now selling on a 5 per cent basis. Besides, elsewhere in his address Senator Cummins indicates that while the government would guarantee 4½ per cent as a minimum this would not be the maximum which the more successful companies would be allowed to earn and pay. In this part of his address he favors "providing for a corporate ownership of the several systems into which the country could be divided, each corporation with a capitalization representing the actual value of the particular system and the establishment of rates which would produce not only the cost of maintenance and operation and the guaranteed return upon capital, but a reasonable sum in excess of the guarantee, the excess to be divided between the stockholders and the working men." But whatever excess over the government guarantee was allowed to be earned would make the "capital charge" more than 4½ per cent, thereby, of course, reducing the savings Senator Cummins estimates would be made.

There is another extremely important point to be considered. What effect would the guarantee of a minimum return to each company have upon the efficiency of operation? The operating expenses always have been and always will be several times as large as the capital charge under any system of ownership and management. Therefore, any system which will tend to stimulate efficiency of operation will be far more valuable as a means of keeping down the cost of transportation to the public than any system which will tend in equal or even greater degree to keep down the capital charge. Senator Cummins recognizes the need for affording an incentive to efficient management by suggesting that the companies be allowed to earn "a reasonable sum in excess of the guarantee." We fear, however, that if the government gave to each company a guarantee of at least 4½ per cent the tendency of the rate regulating authorities would be to so fix the rates that few, if any, companies would be able by efficient management to earn more that the guarantee, in which case the incentive to efficient management would be impaired if not destroyed.

Senator Cummins' address is a notable and statesmanlike document. The system he outlines would, on the whole, be an improvement from the standpoint of both many investors and the public over the system which prevailed before government operation was adopted. But he underestimates the time that would be consumed and the difficulties that would have to be overcome in carrying out his plan. He overestimates the saving in capital charges that it would make and underestimates the extent to which it would impair the incentive to efficient management. If private operation is to be made a success and adequate expansion of railway facilities is to be secured, a more definite assurance must be given to the railway companies that they will be afforded an opportunity to earn an adequate return; but a better method of affording this assurance than that proposed by Senator Cummins can be devised. Indeed, some better methods have been proposed.

Present Prices and Railway Rates

IT HAS BECOME PLAIN that neither under government nor private operation can the railways, while paying present wages and receiving present rates, earn enough net operating income to pay anything approaching a reasonable return. When, however, it is proposed to make a further advance in freight rates, the objection is likely to be made that the rates have been advanced greatly within recent years, and that the traffic could not stand a further advance.

The rates which commodities can bear, however, are determined mainly by the value of the commodities; and any comparison of the advances in the prices of staple commodities with the advance of the freight rates upon them within recent years, quickly establishes the fact that the increase in freight rates has been nowhere near as large in proportion as the increase in prices. The greatest advances in freight rates have been in eastern territory. First, there were the

advances made in the so-called "Five Per Cent Case" in 1914; second, the 15 per cent increase, part of which was granted in 1917 and part in 1918; and finally, the 25 per cent advance made throughout the country later in 1918. The effect of these various advances of the rates upon various commodities moving in large quantities in eastern territory are shown in the following table. The advances which occurred in the same years in the selling prices of the same commodities also are shown:

Advances in Freight Rates and Selling Prices of Nine Representative Commodities, 1914 Compared with 1919

	1914	1919	Per cent Increase
Wheat (Chicago to New York—994 miles):			
Freight rate N	$3.20	$4.90	53.1
Selling price N	36.47	79.33	117.6
*Lumber (W. Va. to New York—490 miles):			
Freight rate N	3.40	4.70	38.2
Selling price N	9.09	19.96	119.6
Steel Rails (Pittsburgh to New York—516 miles).			
Freight rate G	2.60	4.00	53.8
Selling price G	30.02	57.00	89.9
Fresh Beef (Chicago to New York—994 miles):			
Freight rate N	9.00	13.80	53.3
Selling price N	260.00	488.00	87.7
†Manf'd Iron (Pittsburgh to New York—516 miles):			
Freight rate N	3.20	5.40	68.8
Selling price N	22.60	58.40	158.4
Cotton (Middling) (St. Louis to New York—1,105 miles):			
Freight rate N	9.10	13.40	47.3
Selling price N	222.60	535.00	140.3
Fig Iron (Pittsburgh to New York—516 miles):			
Freight rate G	2.45	4.30	75.5
Selling price G	14.78	33.60	127.3
Bituminous Coal (Fuel) (W. Va. to New York—489 miles):			
Freight rate N	1.80	2.40	33.3
Selling price N	1.02	2.50	145.6
Stone (Ballast) (M'tsb'g to C-ville—172 miles):			
Freight rate N	1.00	1.40	40.0
‡Selling price N	.43	.89	107.2

Freight rate and selling price on ton basis.
N = Net ton. G = Gross ton.
*Lumber—Average of chestnut, hemlock, white oak and yellow pine.
†Manufactured Iron—Average of iron bars, steel bars, plates and shapes.
‡Prices paid at mine or quarry.

It will be noted that in the cases of all these commodities, the increases in prices have been much greater in proportion than the advances in rates. The advances in rates have varied from 33 to 69 per cent; the advances in prices, from 88 to 158 per cent. The rates now actually charged, therefore, in spite of the advances which have been made, are lower, and in most of these cases much lower, relatively to the value of the commodities than they were five years ago.

A more complete series of comparisons of the advances in rates in eastern territory with the advances in prices of commodities might not yield corresponding results; but that it would show that, on the whole, the increases in prices in that territory have been relatively greater than the advances in rates can not be seriously questioned.

But these comparisons are merely between the advances in rates and increases in prices which have occurred in eastern territory. Now, the increases in commodity prices have been approximately uniform throughout the country. On the other hand, while the advance in freight rates in eastern territory in the last five years probably have averaged 45 per cent, the advances in the southern and western territories have not averaged much over 25 per cent. Therefore, the disparity between the advances in rates and the increases in prices in other parts of the country has been much greater than it has been in eastern territory.

Since the freight rates which the commodities can bear are roughly in proportion to their market value it is clear that most commodities easily could bear much higher rates than are now being charged. As to the cost of the transportation service, it is now exceeding what is being paid for it, as the deficits of the Railroad Administration demonstrate. Therefore, whether measured by the cost of the service or the value of the service, freight rates, although much higher than a few years ago, are too low and should be advanced.

It is said that another advance in rates would cause further increases in commodity prices and, thereby, another increase in the cost of living. Perhaps that is true. But is it not fairer that those who actually receive the transportation service and benefit by it should pay the entire cost of it, than that the taxpayers, whose taxes have no relationship to the amount of transportation they use, or the benefits they derive from it, should be required to pay part of the cost of it, as they are now being required to do?

Pere Marquette

The Pere Marquette earned, under federal operation in 1918, the full rental which the government is to pay the company which owns the property. This was accomplished by holding down transportation expenses. The average train load in 1918 was 670 tons as against 582 tons in 1917. The property was operated in 1918 by F. H. Alfred as federal manager. Mr. Alfred had, prior to the reorganization, been one of the two receivers and, when the property was reorganized, had been elected president.

The government's rental amounts to $3,748,000, and after paying war taxes and interest on bonds there was a surplus of $1,894,000 or the equivalent of 5 per cent on the prior preference 5 per cent cumulative stock and 10.7 per cent on the $12,429,000 preferred stock on which dividends are cumulative at 5 per cent after January 1, 1919.

The earnings of the property under federal operation amounted to $28,955,000 in 1918 and after the payment of expenses and rentals there remained $3,851,000 or something over the rental due the company. The operating revenues were greater in 1918 than in 1917 by $5,447,000, due to an increase in the ton mileage of freight handled and to the increased freight rate received. Passenger business fell off but the increase in passenger rates permitted the Pere Marquette to just break even, as compared with the previous year, in its passenger earnings. The number of tons of revenue freight carried in 1918 was 14,242,000, or 7.3 per cent more than in 1917. The average haul was 5.5 per cent longer, being 196 miles in 1918, so that the ton mileage amounted to 2,796,000,000 in 1918, an increase of 13.3 per cent over 1917. The number of passengers carried, however, was 3,571,000 a decrease of 23.3 per cent. The average passenger journey was a little longer, but the decrease in passenger mileage was 20.5 per cent, the total in 1918 being 168,195,000. The passenger fare per passenger mile received by the company was 2.517 cents in 1918 as against 1.991 cents in 1917, an increase of 26.4 per cent.

Notwithstanding the increase of over 13 per cent in freight, the freight locomotive mileage was 1.6 per cent less in 1918 than in 1917. Helper mileage, however, increased from 160,000 in 1917 to 194,000 in 1918, but this was much more than offset by a decrease of 8 per cent in switching locomotive mileage, 6.6 per cent in road train switching miles and 9.3 per cent in passenger locomotive switching miles. The reduction of over 20 per cent in passenger business was accompanied by a reduction of 12 per cent in passenger locomotive mileage.

The increase in train load is all the more notable because the traffic was apparently less well balanced in 1918 than in 1917. Loaded freight car miles totalled 104,562,000 in 1918, a decrease of 3.7 per cent as compared with the previous year, while empty freight car mileage totalled 38,153,000 in 1918, an increase of 12.8 per cent. A large increase in the tonnage of bituminous coal carried may have been a help in getting a larger average train load. Of the total 14,242,000 tons of freight carried in 1918, 30.09 per cent was bituminous coal, comparing with a bituminous coal tonnage in 1917 which was but 25.85 per cent of the total 13,270,000 tons carried in that year. As a commentary on general business conditions in the territory served by the Pere Marquette, it is interesting to note that the tonnage of automobiles carried in 1918 was 139,000, which was 103,000 less than in 1917.

The tonnage of cement, brick and lime was 377,000 in 1918 or 189,000 tons less than in 1917, while the tonnage of sugar beets carried in 1918 was 291,000, an increase over the previous year of 113,000 tons.

Total operating expenses, under federal management, amounted to $23,316,000, an increase of $5,934,000, but of this increase only $2,308,000 was in transportation expenses, the total of these expenses in 1918 being $12,234,000. The increase in train load, the decrease in passenger mileage, and especially in switching mileage, indicate pretty clearly how transportation expenses were held down so remarkably well.

Maintenance of way cost $3,790,000, an increase over the previous year of $1,365,000, and maintenance of equipment cost (exclusive of depreciation) $5,608,000, an increase of $2,187,000. There was $536,000 charged for depreciation of equipment in 1918, an increase of $62,000 over the charges on this account in the previous year. The cost of repairs of equipment per unit of equipment, exclusive of depreciation, renewals and overhead, was as follows:

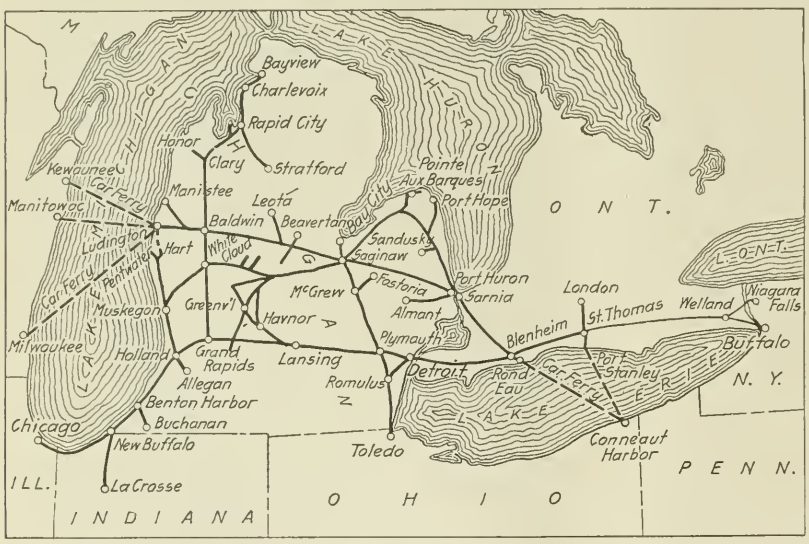
	1918	1917
Locomotives	$6,194	$3,354
Passenger train cars	997	588
Freight train cars	126	81

The following table shows the percentage of each class of operating expenses to total operating revenues:

	1918	1917
Maintenance of way and structures	13.09	10.32
Maintenance of equipment	21.22	16.57
Traffic	1.19	1.88
Transportation	42.25	42.22
General	2.60	2.74
*Total operating expenses	80.52	73.93

*Including miscellaneous.

During 1918, 586 40-ft. automobile cars of 40-ton capacity were bought and put in service; also 10 switching locomotives and 15 Santa Fe type locomotives. The average cost of the automobile cars was $1,808, and the average cost of the switching locomotives was $39,130 and of the Santa Fe type locomotives $56,146. There were 313 freight cars, five passenger cars and four locomotives retired during the year. The Railroad Administration credited the Pere Marquette with the ledger value of the equipment retired, but the Pere Marquette claims—to the layman it certainly seems justly—that since the federal control act requires property to be returned to the corporation in as good condition as when it was taken over, the federal administration ought to make good any shortage of equipment not replaced.



The Pere Marquette

There was $4,447,000 spent for additions and betterments; the greater part being for new equipment, the cost of which has already been mentioned.

The following table shows the principal figures for operation in 1918 as compared with 1917. This is not the income account of the corporation.

	1918	1917
Average mileage operated	2,239	2,248
Freight revenue	$22,200,348	$16,850,266
Passenger revenue	4,233,797	4,213,804
Total operating revenues	28,955,012	23,507,855
Maintenance of way and structures	3,790,387	2,425,689
Maintenance of equipment	6,143,894	3,894,690
Traffic expenses	344,773	442,858
Transportation expenses	12,233,619	9,925,781
General expenses	753,118	644,976
Total operating expenses	23,315,551	17,381,446
Taxes	697,488	566,945
*Surplus	3,851,484	3,634,952

*This is operating income less rentals, etc.

Corporation Income Account

	1918
Rental	$3,748,196
Gross income	3,779,738
Taxes	167,243
Interest	1,691,970
Surplus	1,894,125

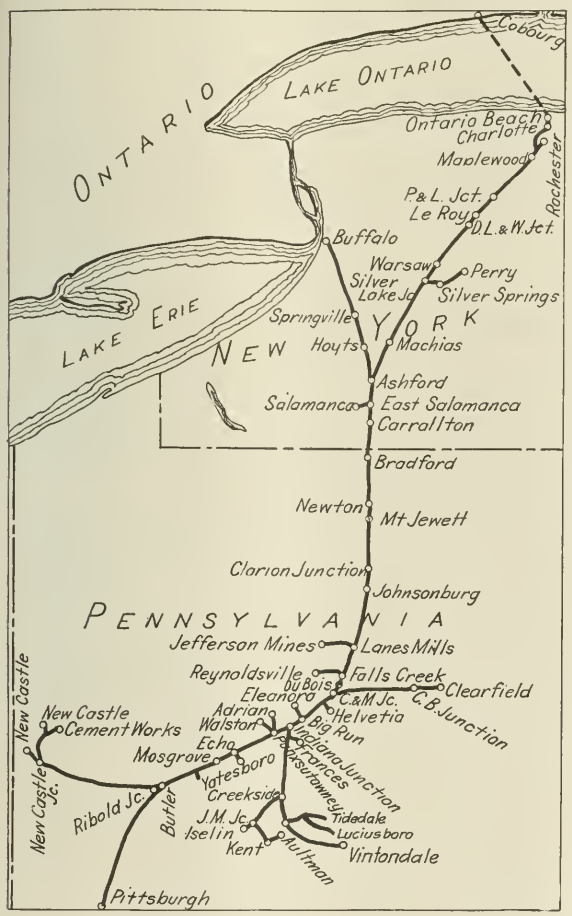
Buffalo, Rochester & Pittsburgh

The three years in the test period on which the rental of the Buffalo, Rochester & Pittsburgh in 1918 was based, were fairly prosperous ones and the standard return of $3,276,000, which the government agreed to pay the company for the use of its railroad property, is larger than the operating income from the operation of the property in 1917. The fact, however, that the company received in addition to its net operating income in 1917 $1,183,000 from equipment and joint facility rentals and paid out only $319,000 on this account, makes the gross income in the two years not greatly different. After the payment of interest, etc., there was a surplus available for dividends of $1,119,000 in 1918 and $1,068,000 in 1917. The company could, therefore, have paid six per cent dividends on both its preferred and common in the entire year 1918, as it did in the latter part of 1916, in 1917 and in the first part of 1918. It will be remembered, however, that the Buffalo, Rochester & Pittsburgh reduced its dividend rate to four per cent on the common in the latter half of 1918. So far, therefore, as the stockholder is concerned in regard to safety of dividends there is nothing to lament about.

It is rather startling, however to think of the Buffalo, Rochester & Pittsburgh as operating on over a 95 per cent ratio of expenses to revenues. This is, of course, a Railroad Administration matter and not a corporation problem, but it is of vital interest to railroad security holders and to railroad men in general, because of the bearing that it has on the conditions which will confront the owning corporations when they again begin to operate their properties. The Buffalo, Rochester & Pittsburgh has been a particularly well and economically operated property, and is in a geographical situation to profit by great industrial activity, such as prevailed in 1917 and 1918, but is also in a position to feel to the full the effects of labor shortage and higher wage schedules in other industries as well as on the rail-

roads, and to suffer from higher material costs. This latter fact possibly needs a word of explanation. A railroad running through the coal fields and into the Pittsburgh district is in times of industrial depression and low prices able to buy much more closely than a railroad in the west, for instance, but for this very reason when prices advance abnormally, as they have in the last two years, the spread or percentage of increase on a road like the Buffalo, Rochester & Pittsburgh is even greater than on roads not so intimately connected with the coal and industrial situation. Since the signing of the armistice coal production has dropped off to minimum but wage rates on all railroads have continued to go up and this has hit the Buffalo, Rochester & Pittsburgh doubly hard because it is a coal road.

When the Railroad Administration took over the actual



The Buffalo, Rochester & Pittsburgh

operation of the properties William T. Noonan, president of the Buffalo, Rochester & Pittsburgh, elected to remain with the corporation and T. F. Brennan, who had for a year been vice-president, and had for a number of years prior to that been general manager, was made federal manager. E. F. Robinson, who had been in charge of operation for a year prior to 1918 and chief engineer prior to that, became chief engineer under the Railroad Administration. With the exception of the executive, therefore, the same men were operating the property under the government as operated the property for the corporation.

Total operating revenues of the property (not the corporation in 1918) amounted to $18,480,000 in 1918 and to $14,975,000 in 1917. Nearly the entire increase in revenue was due to higher rates. The ton mileage of freight handled amounted to 2,844,000,000 in 1918, as against 2,697,000,000 in 1917, and passenger mileage to 51,380,000 in 1918, as against 57,112,000 in 1917. There were no important changes in the character of the traffic carried, the increase in ton-mileage being accounted for by an increase of three miles in average length of haul, this figure being 173.6 in 1918, and an increase in the tonnage of bituminous coal, coke and iron ore.

Total operating expenses in 1918 amounted to $17,577,000, an increase of $5,699,000, or 48 per cent. Maintenance expenses increased even more than transportation expenses, but the increase in transportation expenses amounted to $2,367,000, or 41 per cent. For years the Buffalo, Rochester & Pittsburgh has been able to offset the increasing unit costs of operation, with no increase in rates, through greater efficiency in operation, heavier train loading and the far-sighted but conservative adoption of heavier locomotives, with the attendant increase in weight of rail, strength of bridges, etc. In 1918 the largest stride in the history of the property was made in increased train loading. The average train load was 943 tons, comparing with 836 tons in 1917, 777 tons in 1916, 707 tons in 1915 and 694 tons in 1914. Never before in a single year had a hundred tons been added to the average train load. This showing is all the more remarkable in that traffic was not as well balanced in 1918 as in 1917. The Buffalo, Rochester & Pittsburgh is not a low grade road. On the contrary its profile shows a succession of fairly heavy grades against both north and southbound traffic, and to have attained an average train load of over 900 tons is a remarkable achievement.

The number of loaded cars per freight train was 23.24 in 1918 and 21.60 in 1917. The average number of empty cars per train was 18.01 in 1918 and 15.70 in 1917. The percentage of empty cars to total number of cars per train was 44 in 1918 and 43 in 1917. Steady progress had been made in years past in heavier loading of cars and this was maintained in 1918, and the remarkably high figure of 40.93 tons was reached for the average per loaded car last year, comparing with 38.69 tons per loaded car in 1917. When we take into consideration these evidences of good railroad operation, the increase in transportation expenses seems high, nor does an examination of the detailed figures for transportation expenses lead to the discovery of any peculiar circumstances, other than the general increase in the cost of labor and materials, which would explain the large increase in transportation expenses.

Maintenance of way expenses in 1918 amounted to $2,824,000, an increase of $1,369,000 over the previous year and the increase was due both to larger amounts spent for materials and larger amounts paid to labor. Thus, ties for renewals cost $266,000 in 1918, as against $154,000 in 1917, and labor for track laying and surfacing cost $873,000 in 1918, as against $455,000 in 1917. Repairs to shops and enginehouses amounted to $247,000 in 1918, as against $118,000 in 1917.

Maintenance of equipment in 1918 cost $5,966,000, an increase of $1,922,000. The increase in cost of repairs of locomotives alone accounted for more than half of this increase in total. Repairs of locomotives amounted to $2,545,000 in 1918, or $1,002,000 more than in 1917. The Administration charged a rate of 4½ per cent for depreciation of locomotives delivered in 1918 but continued the rate of 3 per cent on cars.

The Buffalo, Rochester & Pittsburgh equipment on January 1, 1918, was in as good or better shape than it had ever been in the history of the property. Great care and forethought have been spent on ordering the types of cars and locomotives best adapted to the particular requirements of the road. The company has been very liberal in times past in providing equipment, both because it was rightly con-

sidered economical to buy the best and because an ample supply of cars was a necessity in successfully meeting competition and providing for the future. So thorough were the repairs given to equipment in the Buffalo, Rochester & Pittsburgh shops that the cost of repairs per car per day on foreign lines due to owner's defects had been reduced to an average of five cents.

Under competitive conditions it had been possible to conserve for use on the Buffalo, Rochester & Pittsburgh itself, B. R. & P. equipment sufficient to handle by far the greater part of the traffic. In 1918, on the other hand, this equipment was scattered far and wide over the country and the traffic on the property itself was necessarily handled by a considerable proportion of foreign equipment. This was reflected in increased expenses not only of maintenance of equipment, but of maintenance of way and of conducting transportation. In mixing lighter and less well maintained cars with the company's own heavier coal and ore cars, not only was the lighter equipment damaged, but the danger of derailment and tearing up of track, etc., was increased. The equipment situation also necessitated considerably more switching work than would have been necessary had the company retained its own cars.

The following table shows the percentage of operating expenses to total operating revenues in 1918 and 1917:

	1918	1917
Maintenance of way	15.28	9.71
Maintenance of equipment	32.29	27.00
Traffic	1.02	1.28
Transportation	44.26	38.82
General	2.13	2.37
Total, including miscellaneous	95.12	79.32

During the year 1918 the property received 39 new freight locomotives and eight new passenger locomotives. These were orders placed by the corporation in 1917 and the cost was charged to the corporation's capital account. It is interesting to note that eight old locomotives were equipped with superheaters and 33 Duplex stokers were purchased. The Buffalo, Rochester & Pittsburgh has been exceptionally liberal in the provision of ample equipment. The purchase of heavier and heavier locomotives was in accordance with a well balanced plan of general improvement and the road now has in service 7 heavy Mallets (113,000 tractive power), 41 light Mallets (80,000 tractive power), 48 Mikados and 229 lighter freight and switching locomotives. The 39 freight locomotives received in 1918 included all seven of the heavy Mallets and 17 of the light Mallets mentioned above. The company placed its orders before the heavy rush of orders had driven prices up to their present level and got its heavy Mallets for $92,500 apiece and its light Mallets for $71,850.

The corporation spent $1,948,000 for additions and betterments to road and structures, the two largest expenditures being on the terminal facilities at Elk Run Junction, Pa., and at East Salamanca, N. Y. Both of these terminal improvements, which involved extensive changes in and additions to facilities, have now been completed.

The table shows the principal figures for operation of the property. This is not the corporation income account.

	1918	1917
Mileage operated	590	585
Coal freight revenue	$10,955,346	$8,499,013
Coke freight revenue	565,584	401,257
Merchandise freight revenue	4,917,019	4,219,568
Passenger revenue	1,335,097	1,313,594
Total operating revenues	18,479,659	14,975,000
Maintenance of way and structures	2,823,761	1,454,770
Maintenance of equipment	5,966,244	4,043,988
Traffic expenses	187,924	191,523
Transportation expenses	8,179,786	5,813,030
General expenses	393,795	354,834
Total operating expenses	17,577,208	11,878,566
Taxes	294,580*	566,000
Operating income	607,528	2,590,075

Corporation Income Account

	1918	1917
Gross income†	3,353,337	3,906,076
Net income	1,148,311	1,739,820
Appropriations	29,355	671,715
Income available for dividends	1,118,956	1,068,105
Dividends	885,000	990,000
Surplus	233,956	78,105

*Excluding war taxes, which are paid by the corporation.
† Rental in 1918.

Letters to the Editor

Clifford Thorne on English Freight Rates

Chicago

To the Editor:

My attention has been called to a letter by W. M. Acworth of London, England, referring to my testimony before the Senate committee on Interstate Commerce, Mr. Acworth's letter being published in your magazine, volume 66, No. 11, page 573.

I did not quote Mr. Acworth in regard to any comparison of rates. I simply used Mr. Acworth's work, referred to specifically in my testimony, in order to secure a typical or representative list of commodities and hauls in England. The rates were brought down to date by a London authority.

In addition to these specific comparisons of rates I made certain comparisons of revenues, using estimated hauls and average revenues per ton, all traffic. An examination of the transcript of the proceedings before the Senate committee will confirm the accuracy of my statement.

Clifford Thorne.

Not an Unqualified Recommendation

Chicago

To the Editor:

Your report of the discussion of my paper on "Creosoting Wood Signal Trunking to Extend its Life," presented before the recent meeting of the Railway Signal Association as appearing in the *Daily Railway Age* of March 18, page 644, due to the partial publication of my reply to Mr. Dryden places me in the position of recommending without qualification, treatment with zinc chloride. This is, first, incorrect, and second, far from the fact. May I, therefore, ask you to now publish a corrected reference to that discussion? The official transcript records my remarks as follows:

"Mr. Barth: I don't see where there would be any objection to using zinc as long as it doesn't interfere with the operation of your apparatus. That is a question I cannot answer. You can use zinc providing, of course, that the zinc treated timber is employed in dry situations. It is not suitable where there is an average rainfall or a lot of moisture which will cause leaching of the salt solution.

"Zinc chloride is soluble in water. If you are in a dry territory where there is less danger, as for instance, in the West where zinc treated ties have given excellent service, I should say that the zinc treatment there would apply also in the case of trunking. However, the advantage of creosote over zinc is that creosote is insoluble.

"As far as procuring creosote goes—you will understand that I have recommended in these surface treatments, of which I am primarily speaking, an oil, meeting the specifications of the United States Railroad Administration (R-828-A), which can be obtained in reasonable quantities at the present time."

Kurt C. Barth,
The Barrett Company.

Alonzo Sargent, the engineman at fault in the collision at Ivanhoe, Ind., on June 22, was tried in court in Indiana last week, and the trial resulted in the disagreement of the jury. Acting on the instructions of the court, the jurymen considered the question whether Sargent was or was not guilty of involuntary manslaughter.

Fuel Conservation on the Northern Pacific*



A Fuel Instruction Car and Moving Pictures Bring Big Results

By M. A. Daly
Fuel Supervisor, Northern Pacific

THE NORTHERN PACIFIC links together Wisconsin, Minnesota, North Dakota, Montana, Idaho, Washington, Oregon and Western Canada; yet, we don't feel that we are very far from the east. I suppose this is because every year we go to West Virginia and Pennsylvania to buy coal with which to supply a large percentage of our locomotives throughout the following year. Nevertheless, it is a long distance to haul coal. The average rail haul is about 200 miles from the eastern mines to the Lake Erie ports, where the coal is loaded into ships. It is a 900-mile boat haul from the Lake Erie ports to Duluth. At Duluth the coal is again loaded into cars and hauled by rail as far west as the Missouri river, a distance of 500 miles. By the time it reaches its destination the coal has become very expensive—and that is just the reason why our people have felt compelled to do everything they could to get the greatest possible amount of heat out of every ton of coal used.

The necessity developed a campaign of fuel economy, beginning about eight years ago, and we have kept right at it ever since. It has been largely an educational movement, designed to interest not only the men who handle coal, but the officers who supervise the operating performances.

Fuel Instruction Car

To introduce the work a passenger coach was fitted up as a traveling lecture room† Chemical and physical apparatus was installed to demonstrate the properties of coal and the chemistry of combustion. Stereopticon views and motion pictures were added from time to time, as needed.

In passing over the line, at suitable intervals, the instruction car was located at places convenient for the men at the various division points. Locomotive and power-plant engineers and firemen, interested roundhousemen, despatchers, yardmasters, superintendents, trainmasters, master mechanics, road foremen and other local officers presented themselves for the various lectures. The responsibilities of individuals were reviewed, proper methods of handling coal were emphasized and fascinating possibilities were pointed out.

With all who are directly or indirectly concerned with fuel the plan has been to realize a common understanding of its great value, develop an appreciation of the actual losses in known wasteful practices, and to anticipate the enormous savings to be accomplished by concerted efforts, systematically and persistently applied.

It was made clear from the start that fuel saving was a non-departmental matter, that instead of being the work of one department it was a matter of interest for all departments. And it was easily shown that there was enough available glory to be obtained so that all departments could take some of the credit.

Beginning with the preparation of coal at the mines attention is given to all phases of distribution, consumption and accounting. But, since approximately 95 per cent of all railroad fuel is consumed on locomotives, it naturally follows that special attention is given to its use on locomotives. Just as some engines through improper condition may burn more



*Abstract of an address before the New York Railroad Club, April 18, 1919.

†A description of the car and an outline of the lectures which are given was published in the *Railway Age Gazette* of May 1, 1914, page 976.

coal than others (of the same class), so, some enginemen through improper operation may burn more than other enginemen, and some firemen through improper handling may burn more than other firemen.

According to observations on various railroads, one fireman may burn as much as three tons per trip more than other firemen in the same service, using the same engine, on a similar train, over the same piece of track, under identical conditions. Now, men in general take a natural pride in doing good work. Once show a man that he can give better service with less labor and you have confronted him with a double argument which is seldom wholly lost. Once convince a fireman that when coal is properly placed in the firebox it will make more steam and less clinkers, that the required steam pressure will be more uniform and more certain, that the trip will require less shoveling and less shaking, and you have a fireman who is on his way to open-minded appreciation of instructions.

About all that is required for good firing is a little care and attention, with proper intention. Any instructed fireman can supply the necessary care and attention, and become a good fireman.

Talks in Instruction Car

Of the lectures in the instruction car, perhaps the things that most impressed our enginemen and firemen were the chemical experiments illustrating how combusition may take place. In one instance, a wide mouthed bottle was inverted over a lighted candle to prove that when the contained oxygen was consumed burning stopped. Hydrogen was prepared. With a proper supply of oxygen a lighted match could explode it. With no oxygen present, this highly inflammable gas would extinguish a lighted match. Thus, after a series of similar experiments, it was conclusively shown that to have burning, oxygen must touch the fuel. Accordingly it became clear to enginemen and firemen why it was necessary to have a draft bringing air through the grates into the firebox, and why air must constantly supply new oxygen to the pieces of coal throughout the burning firebed.

Considering then that since oxygen of the air is necessary for burning, and, since air cannot well pass through clinkers or banks in a firebed, it follows that clinkers and banks are not desirable things to have in a firebox. Following this line of thought it is but a step to consider that while gas is being driven from each piece of coal that lies in the firebox, this gas cannot be burned unless oxygen comes in contact with it. It then becomes obvious that the best firebox condition is possible only when air is coming through every square foot of grate surface.

In one of the demonstrations a pound of coal is put into a retort, heat is applied and the gases driven off. The coke remaining is weighed and computations made on a blackboard bringing out the fact that approximately one-half of the heat value of coal is in the gas. The gases themselves, having been collected in transparent jars, are then burned in various ways to illustrate proper and improper combustion. They can be burned with a clear, white flame, giving off intense heat, or may be burned with a dull, yellow, smoky flame, developing very little heat. One smoky flame and one white flame are placed under separate test tubes containing equal amounts of water. The white flame evaporated completely the water above it, using much less gas than the smoky flame. We had the smoky flame when the supply of oxygen was not sufficient to burn the flow of gas; that is, the smoky, imperfect, low-heat, extravagant combustion took place when the supply of gas was greater than could be burned by the available oxygen.

Here again was a direct comparison with the locomotive firebed. A fire that is fed at short intervals, with small quantities of coal, properly scattered over the surface of the firebed, will give a dazzling white fire to be compared with the dull red fire that comes when a large quantity of coal is thrown in at one time. To the enginemen and firemen this latter "slugging" method begins to take on a new aspect; the greater the quantity of coal thrown in at one time the greater the quantity of gas which may be rapidly driven off. And of course, when the quantity of gas exceeds the proportionate flow of oxygen through the grates, the excess gas cannot be burned and will pass off as smoke, through the stack—wasted. Then they correctly conclude that since 50 per cent of the heat value of the coal is in the gas, their aim must be to burn as much of the gas as possible, and thus they are intellectually persuaded to lean toward light and frequent firing, which is clearly the more economical method, and at the same time much the easier.

Firemen were encouraged to experiment for themselves, and it was not long before enginemen and firemen were boasting of the fact that they were making trips on one or more tons of coal less than formerly.

Competition is encouraged by comparing different crews on similar runs, between certain points. Road foremen use tally counters to ascertain the number of scoops, while a pocket scales will tell the weight of an average scoop, allowing the determination of the approximate number of pounds of coal used on the trip.

This all becomes very interesting when facing the fact that our Mikado locomotives often leave terminals with $125 worth of coal on their tenders, and each locomotive may take on an additional $50 or $60 worth of coal at some intermediate coal dock.

Our strong point with firemen has been that the more care exercised in placing the coal in a firebox the less coal will be required on the trip. This fact was taught not only verbally but by actual demonstration. So successfully has the plan worked out that we have men who actually fire our heaviest Mikados with one scoop to a fire. Now, single scoop firing is very particular work. Every fireman has not the patience to work it out, to master it. We do not advocate it, but we do point it out as an ideal to which firemen may aspire. Those who can approach it use less coal than formerly. Those who can master it use the least coal with the least labor. We do not ask our firemen to fire to a diagram.

The Movies

The value of self-criticism has not been overlooked as a means of aiding enginemen and firemen to raise the character of their service. By the use of motion pictures they have been enabled to see themselves as others see them. The result has been very gratifying.

(Mr. Daly then showed several hundred feet of motion picture films which demonstrated in a most forceful way the advantages and disadvantages of proper and improper firing and the losses due to wastefulness and carelessness. For instance, with the moving picture camera mounted on the tender, pictures were shown of firing by the single scoop method as compared to the ordinary methods. Not only did the pictures clearly show the movements of the fireman but at intervals the camera was elevated so that a view was obtained over the top of the cab showing the results at the stack. Pictures were also taken from the roadside showing the trains in motion and the effect of the proper and improper methods of firing as reflected in the amount of smoke from the stack.

Moving pictures were also shown of the wastefulness of overloading tender tanks, of carelessness in unloading and cleaning out coal cars, and of the losses due to popping. In order to maintain interest on the part of the men, particularly during the period of the war, pictures were interposed showing the great need for fuel conservation in order to re-

duce to a minimum the number of cars required. Such pictures, for instance, might show the results of the freight congestion at the eastern seaboard, or the great trains of troops and munitions which it was necessary to transport, etc.

Typical individual pictures selected from the films are shown in the photographs, but, of course, they give no adequate idea of the forceful way in which poor or indifferent methods of firing can be contrasted by means of the movies.

Results

Mr. Daly did not include in his paper any figures as to results secured on the Northern Pacific, but during the discussion he was questioned as to this and as to the size of the locomotives on the Northern Pacific. His reply showed that the average tractive power of the freight locomotives in service was high. He was also able to furnish the following figures as to fuel consumption which are taken from reports recently issued by the Fuel Conservation Section of the United States Railroad Administration:

FREIGHT SERVICE

	Pounds of coal per locomotive mile		Pounds of coal per 1,000 gross ton mile	
	December, 1918	January, '19	December, '18	January, '19
N. P.	241	237	162	175
G. N.	279	277	213	221
C. B. & Q.	304	294	223	221
C. & N. W.	275	285	226	242
U. P.	310	291	235	226
C. R. I. & P.	244	255	247	256
M. P.	217	240	176	200
Erie	307	299	206	210
Southern	282	312	281	320
A. T. & S. F.	262	265	209	216
C. M. & St. P.	273	251	212	219

—Editor.)

Discussion by George M. Basford

Let's get our heads out of the sand. Our nation must get out of the wasteful class. It must get over thinking that its resources are limitless. It must conserve many things, first of all coal. Coal comes in train loads. There are other train loads waiting to be moved and all hands on a railroad naturally feel that anything so easy to get is somewhat like dirt and therefore is cheap.

With wages up, probably to stay, and with coal costs doubled, the locomotive must be looked at in a new light. The present generation is to be held accountable for its stewardship. In a large sense it is to be tried on the charge of wasting coal.

Let us acknowledge and appreciate everything that the government and the railroads are doing to improve the firing of coal and the management of the coal itself. Great improvements are being made in this direction. However we must not overlook the fact that the best of coal and the best management of the fire may be nullified by the locomotive itself if the machine is not what it ought to be. This is being overlooked to-day in the case of thousands of old engines.

What is wanted is to put the locomotive in shape for its various parts to pull together to use the coal to best advantage. Boilers should not send wet steam to the cylinders. Fireboxes should not send unmixed and therefore unburned gases to the flues. Tender tanks should not send water to the boiler unheated by waste heat. There are a lot of other ways in which many old engines are working against themselves for lack of modern means for conserving their faculties and abilities. Even the best of firing of itself cannot insure the proper development of the heat of the coal or its use in producing power. The engine must have the means properly to make and use the power that is in the coal.

How about the 25,000 locomotives that as to power remain as they were built and are ten or more years old? Unless these engines are brought up to date they are antiquated, obsolete and an encumbrance as to power and as to the waste of fuel. Many of these engines were ten or more years old when they were built. This was because of bridge or other weight limitations. To-day they are in the class of the old Rodman cast iron cannon whereas we have Hindenburg Lines to deal with to-day.

Think for a moment of the taking of the Hindenburg Line. No small factor in the achievement was the confidence the men had in their equipment. They knew that this country had not sent them out without the best of everything to fight with. The inspiration of this confidence was necessary to success. Now think of the men who are handling these old engines we are talking about. What coal saving effort can you expect of men who know that the machine you give them wastes coal faster than they can save it?

In six years the coal consumption of locomotives has gone down from 3.6 lb. per draw bar horse power to 2.25 lb., the figures being taken at the most efficient power of the engine. No parallel improvement has ever been made in six years in any other branch of engineering development.

This has been done by intelligent use of improved designs and by the employment of labor and fuel saving and capacity increasing factors which everybody knows about. These figures show what may be done and what is in everybody's mind to aim at with new engines, but why overlook the 25,000 old ones?

The fortunate feature of these improvements lies in the fact that they may be applied to all old engines that are in shape to run at all and they give these old engines increased power making them, weight for weight, equal to the biggest, newest engines of the latest and best designs and in many instances they will be better adapted for the work they are doing than new engines would be.

I mean that one big thing to do right now is to modernize those old engines—25,000 of them, applying to them the factors that make the modern locomotive take its place among the efficient power plants of the world. The way to do it is to make a survey of the old equipment in complete detail, to decide upon a modernizing program and determine the number of engines to be rejuvenated per month and then follow the program in spite of "hell and high water."

One of the roads that did this found that the improvements paid for themselves in seven months. Every $100 of cost earned $171.60 in the first year. This was 171 per cent investment. If the engines had but one year of life ahead of them it would have paid most handsomely. Did it pay? Is this one of the big economies? Does it not put in the shade all other locomotive economies that you can think of?

The steam locomotive of America is too big a factor in the success, stability and happiness of the nation to allow so large a proportion of antiquated equipment to be running hauling tons and hauling people at the high cost that these conditions entail. These old engines ought to be modernized or they ought to be scrapped, and that quickly.

The survey of the power on any railroad will reveal the merits of this question. It is my opinion that this survey is one of the most important immediate problems before the railroads. The best thing about it is that it can be done now and that it will point out the best business policy of the roads—no matter who owns them.

A small engine need not be an uneconomical engine just because it is small. You need lots of small engines and always will need them. They should be put into the efficient class and their lives prolonged. By the way, this policy will overcome the extravagance of the past in the purchase of new power, much of which was necessary merely because there was so much unmodernized power on the road.

Some of you are thinking—"That's all right but where is the money?" Let me tell you where the money is. It is blowing up the stack of every unmodernized engine. The en-

tire first cost of modernizing is wasted in coal every seven to ten months on every one of these engines that is working. That's where the money is.

Did we back away from Germany because we didn't have the money for the war? We got the money!

You will find it easier to convince the hard headed businessmen, the shippers, that you ought to have freight rate increases after you have modernized these old engines. The shippers understand modernizing. That's why they succeed in business. That's why they have something to ship.

If you have had the inspiration of watching rival gun crews handling modern guns you will appreciate the fact that, to do the work of to-day, which is greater work than that of yesterday, the guns must be *right*. It is not sufficient that the handling only should be right. The results are up to the right guns handled *right*. The more worthy the gun the better it will be served and the more it will do. This is exactly true of the locomotive. Every scoop of coal well fired does the more work when the engine is modernized. Modernizing augments every other means of saving. Let's get our heads out of the sand.

Other Discussion

H. C. Woodbridge, fuel supervisor, Allegheny region, spoke particularly of the part transportation officers have in the conservation of fuel, mentioning a number of things not generally done now which they could do to reduce fuel consumption. When business is heavy it is now a common practice to start trains out from terminals whenever enough cars are available to make up a train, without regard to conditions at either the despatching or receiving terminals. He advocated the despatching of trains according to a predetermined plan, based on a careful study of the expected amount of business for any particular season, in which consideration has been given to conditions at terminals and important intermediate points on the division. In this way temporary congestion at terminal yards and engine terminals may be avoided and the power received only as fast as it can be handled. Such a plan has a marked influence on coal consumption through the elimination of delays.

The maximum allowable tonnage should be maintained, and tonnage should be reduced promptly to meet extraordinary conditions of weather, partial engine failures, etc. Tonnage trains should be given assistance out of the initial terminal to prevent delays in movement during the time in which the train is getting warmed up. Through loads should be segregated and pick-up work confined to certain trains rather than being handled hap-hazard by every train over the division. Trick despatchers and tower men should be made to see clearly the effect on fuel consumption of slowing or stopping tonnage trains. Recommendations from trainmen as to the revision of schedules should be carefully considered; engines should be assigned and not pooled; the road foremen's time should not be taken up in conducting efficiency tests, etc., but devoted to supervising the operation of the locomotives on the road; the use of unnecessary lighting should be discouraged, and men should be disciplined for pulling apart air hose and allowing locomotives to waste steam at the pops. A close check should be kept on slow orders to eliminate their use or continuance except within absolutely necessary limits. The most efficient engines should be used and the inefficient ones scrapped or stored.

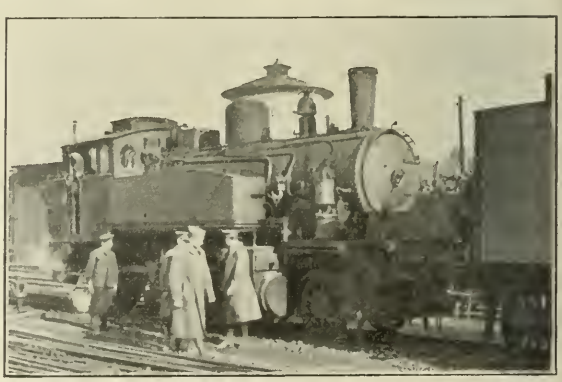
Robert Collett, fuel supervisor of the Eastern region, laid stress upon the fact that nothing saves so much coal as an all-around good job of railroad operation. Any practice or plan which tends to improve general operating conditions is bound to reduce the consumption of fuel. Mr. Collett said that his conception of the function of the Fuel Conservation Section lay more in passing on the good things already being done from one road to another, than in initiating absolutely new practices. In dealing with the use of coal on the locomotive he suggested that more stress be placed on telling the men about their good performances than in continually criticising them for their failures. The business of a railroad is to move trains and enginemen should not be criticised if they place more stress on keeping engines hot than upon the question of fuel economy, unless they have been thoroughly instructed in the best methods of firing and operating locomotives. As an evidence of the effect of operating conditions on fuel economy, he mentioned the fact that a 40 per cent difference in fuel used on the same passenger train on two succeeding days had been observed, where the difference in conditions lay in the necessity for stopping at block signals in one case, whereas a good run was made in the other.

Mr. Collett quoted from a comparative statement recently issued by the Fuel Conservation Section, which shows that the best results in reduction of fuel consumption on a gross ton-mile and passenger car mile basis have been obtained in the Central District of the Eastern region. Comparing the last six months of 1918 with the last six months of 1917, thus eliminating the effect of the extraordinary weather conditions prevailing during the early months of 1918, the average reduction in freight unit consumption for this district was 9.2 per cent and in passenger train-unit consumption 7.1 per cent. As shown by the available statistics, the total reduction in all regions was 5.5 per cent in freight service and 3.2 per cent in passenger service.

H. B. Brown, superintendent fuel department, Lehigh Valley, referred to the fact that, next to labor, fuel is the largest single item in railroad operating expenses and that the coal bill of the railroads was $150,000,000 greater in 1918 than in 1917, a fact which necessitates the redoubling of efforts to conserve coal from the standpoint of economy. He also referred to the necessity of fuel economy from the standpoint of the conservation of a natural resource which is not inexhaustible.

George L. Fowler called attention to the effect of proper firing methods on boiler repairs, stating that the opening and closing of the fire door produces a change in temperature of the firebox sheets reaching a maximum of 100 deg. F. in some parts of the firebox.

W. E. Symons referred to economies which could be effected in the 15 per cent of railroad fuel not burned in locomotives. By converting coal into producer gas for stationary power plant purposes, as high as $1.80 per ton may be realized from the sulphate ammonia, which is a by-product of the gas producer process.



Photograph by International Film Service Company, Inc., N. Y.

American Officers, Accompanied by German Railway Experts, Examining Locomotives to Be Turned Over to the Americans

A Statesman's View of the Railroad Problem*

Consolidations, Private Operation and Government Guarantees of Return Proposed

By Albert B. Cummins
United States Senator from Iowa

BARRING, POSSIBLY, the proposed League of Nations, the readjustment of the relation between the government and the railroads is by far the most important and most difficult of the many problems of reconstruction which the war has bequeathed to the United States. There can be no prosperity, no proper development, no enduring growth, unless our system of transportation, both internal and external, is adequate in its facilities and reasonable in the charge for the service rendered. The people of the country should turn their minds to the question in a serious, determined way. They must think of it fundamentally, and with intelligence adopt a policy which will not only be economically sound, but which will furnish sufficient transportation to meet the constantly increasing demands of business, and furnish it at the lowest possible cost consistent with fairness to the capital invested, and to the men whose brain and brawn conduct and operate railway properties. We ought to bear constantly in mind these two requisites as the basis of all our efforts toward regulation and control. I repeat them: First, adequacy of facilities; second, cost of maintenance and operation.

Dismissing for the moment the former, my greatest desire is to impress upon you and the country the fact, never to be forgotten for a single moment as we pass through this discussion, that the cost of transportation is composed of just two items: First, the charge for capital; and, second, the charge for maintenance and operation.

If we are to serve successfully the general welfare our labors must be directed toward reducing, if we can, the charge for capital, and toward securing the utmost efficiency and economy in maintaining and operating the railway properties compatible with fair compensation to those whose minds and hands are engaged in rendering the service we require.

Looks Upon Transportation as Government Function

In order that there may be no misunderstanding as to my attitude, I desire to say in the beginning that I look upon transportation by railway as a governmental function. I believe it is just as much the duty of the government to provide the people with adequate transportation at the lowest cost as it is to provide them with adequate highways, adequate water supply, adequate courts of justice, or adequate police protection. Whether the government can best perform this function through the government ownership and operation of railroads, or through the instrumentalities of private corporations under public control is entirely a matter of sound judgment and wise discretion. Whatever course is pursued the test must be the same. It is our manifest duty to adopt the plan which will give to the people of the country the transportation which they require at the lowest cost.

It is clearly recognized by every country in the world that government ownership and operation of railroads is a proper governmental activity, and if a particular government selects some other agency through which to accomplish its purposes it is solely because the commerce of the country can be better served through such agency. I interpolate this thought simply because there are some men who seem to believe that in government ownership and operation there is a dangerous approach toward socialism as it is generally understood. Nothing could be more erroneous than this view of the subject. I do not intend to enlarge upon this phase of the matter, and mention it only to quiet the fears which seem to disturb the composure of a great many good citizens.

I emphasize again the proposition already announced: The object which Congress must constantly bear in mind is the necessity for transportation, and the right of the people to have it upon reasonable terms. If they can secure better transportation and at lower rates through government ownership and operation that is the system which should be adopted. If, on the other hand, the object can be attained in a higher degree by employing private instrumentalities under public direction and control, it is obvious that we ought to pursue the latter course.

Magnitude of the Subject

With these preliminary observations I beg to turn your thought, first, to the magnitude of the subject with which we must deal; and, second, to some historical facts which may be of value in determining what we ought to do.

The railways of the United States constitute about one-twelfth of all the property of the country. We have 260,000 miles of railway lines—more than one-third, nearly one-half of all the railways of the world. These railways of ours carry a yearly traffic so much greater than that of any other country that there is really no basis for comparison. Indeed, the traffic of any two nations may be combined and still it does not approach the commerce of America borne upon American railways.

The average capitalization of our railways is $67,000 per mile, and while that may be greater than the cost of the properties, and I am quite convinced that it is, yet it is still true that it is considerably less than one-half the average capitalization of railways throughout the remainder of the world.

When we approach the radical readjustment of the system of control and regulation of such a property, appreciating its intimate relation with every other business activity, it is not difficult to understand the deep sense of responsibility which those who are engaged with the readjustment must feel; and the consciousness that the work must be done after the most complete inquiry, the most careful reflection, and the most intelligent comprehension of the subject in all its vast ramifications.

It is easy to demonstrate that these railways were not all built where they should have been built, and that the construction of hundreds of them was attended, not only with profound ignorance of the most fundamental principles of railroad building, but with a greed and graft which shocks the modern investigator; but which, happily, cannot be repeated in the future. Nevertheless, the railroads were built, communities have been developed which rely upon them, and it is idle to think even of dismantling any considerable number of them or of changing the channels of commerce which have now been established.

It is not my purpose to inquire into the iniquities of either the original construction of the railroads or into the dishonesty

*An address delivered on March 27 before the General Assembly of Iowa. Senator Cummins is the ranking Republican member of the Senate Committee on Interstate Commerce, and undoubtedly will be re-elected its chairman when Congress meets again.

which accompanied the capitalization of the railway corporations. Much of the wrong-doing can never be punished, and much of the injustice can never be repaired. Nearly a generation has passed since most of these things were done, and the railways are in the hands of a new and better body of men, who, in my opinion, have in the main for a decade or more been faithfully endeavoring to comply with the law in the management and operation of their railroads; and it is unfair to inflict upon them all the penalties which their predecessors justly incurred.

In my service as a member of the Interstate Commerce Committee of the Senate I have been in close contact with most of the railway presidents and managers of the country, and I take this opportunity to say that, while I cannot accept in all respects their opinions with regard to the readjustment which everybody admits is imperative, I believe them to be thoroughly honest in their discussion of the subject; and that they have a sincere desire to help, rather than to hinder, Congress in finding the best solution of the intricate and important problem. It is natural that they should be biased, but it is a pleasure to know that all of them recognize that they are engaged in a public service and that the public interest is, and must always be, the paramount consideration.

Passing over the earlier history of the railroads without further remark, I bring your attention to the three years immediately preceding the war. The years 1915-1916 and 1917 were the most profitable years ever experienced in the operation of railways. During these years the funded debt, and I use round numbers, amounted to eleven billions of dollars, and the capital stock, eliminating all duplication, to six billion five hundred millions of dollars. The property investment account, which was intended to show the actual cost of the railway property, but which in fact is inaccurate, as frequently declared by the Interstate Commerce Commission, aggregated something more than eighteen billions of dollars. This does not include all the assets of the corporations. The average net railway operating income for the three years was nine hundred and thirty millions of dollars.

Unequal Earning Capacity of Railways

The average return upon the so-called property investment for the Eastern District was 5.21 per cent. For the Southern District 5.36 per cent, and for the Western District 5.15 per cent. After paying all fixed charges, including interest upon the funded debt, and taxes, the railways earned upon their capital stock all the way from nothing to more than one hundred per cent.

Limiting my inquiry now to what are known as Class 1 roads, being the railways which have a gross income of more than a million dollars annually, and still using the average of the pre-war period and the property investment account for comparisons, a startling situation is disclosed.

In the Eastern District there are 67 railways: Three of them show a net operating income of more than 10 per cent upon the investment account. Two of them show more than 9 and less than 10. Three of them show more than 8 and less than 9. Four of them show more than 7 and less than 8. Five of them show more than 6 and less than 7. Twelve of them show more than 5 and less than 6. Fourteen of them show more than 4 and less than 5. Nine of them show more than 3 and less than 4. Seven of them show more than 2 and less than 3. Five of them show more than 1 and less than 2. Two of them show less than 1, and one of them was operated at a loss.

In the Southern District there are 32 railroads: I need not particularize so closely with respect to them, and it is sufficient to say that upon the property account four of them earned more than 7 per cent; fourteen of them earned less than 5 per cent, and seven of them earned less than 3 per cent.

In the Western District there are 63 railroads: Thirteen of them had a net operating income of more than 6 per cent. Twenty-five of them had a net operating income of less than 5 per cent; and twenty of them a net operating income of less than 2 per cent.

I am stating these facts for one purpose, and one purpose only. It is to fasten upon your minds the disparity in the earning capacity of the various railroads of the country. In my judgment, the railroads earned in the years to which I have referred, as a whole, more than they ought to have earned; but the varying conditions of the several properties present an insoluble problem under our former system of regulation and control.

It is, of course, well known that a very large proportion of the railroad revenues are earned under competitive rates, and no matter what the necessities of a particular railroad may be it must do business upon the rates that prevail among its competitors. I give you a concrete illustration in order to make this point perfectly clear.

You are all familiar with the Chicago & North Western and the Chicago Great Western railroads. They are wholly competitive. The average net operating income of the Chicago North Western for the period named was 6.13 per cent upon its property investment account, while the average net operating income of the Chicago Great Western for the same period was 1.77 per cent. The Chicago Great Western cannot survive upon rates which will enable the Chicago & Northwestern to pay its interest and 8 or 10 per cent upon its capital stock, and add every year to its surplus.

What is true of the Chicago Great Western is true in greater or less degree of the railroads which carry about 25 per cent of the traffic of the country. To increase rates so that the weak roads will become self-sustaining and able to finance themselves would give to the roads which do 75 per cent of the business a revenue which the commonest sense of justice forbids.

It was this situation which finally convinced every thoughtful man, even before the war turned the railroads over to the government, that there must be a radical change in the system gradually developed from 1887 to 1917. I beg that you will remember these conditions, for upon them is founded one principle which any readjustment must observe.

Two additional facts and I shall have finished the historical review. The funded debt of all the railroads was, at the beginning of the war, eleven billions of dollars, bearing an interest charge of four hundred and seventy-five millions of dollars, leaving substantially five hundred and fifty millions for either dividends, investment in property or surplus. In 1917 the revenue from operation was substantially four billions of dollars and the cost of maintenance and operation was substantially three billions.

Results of Government Operation

In order to complete the basis for the comparisons I shall institute I pass to a very brief statement with respect to the year of government operation. The President took possession of the railroads on the 29th day of December, 1917. In March, 1918, Congress passed an act which authorized the government to pay for the use of the property a sum somewhat in excess of nine hundred millions of dollars annually. The volume of traffic in 1918 was slightly less than in 1917, but in the first half of the year the rates, both passenger and freight, were increased so that the revenues amounted to a trifle more than four billions nine hundred millions of dollars. That is the aggregate sum which the people of the country paid in the year in freight and passenger charges for their railroad transportation—something like eight hundred millions of dollars in excess of the amount paid in 1917.

The cost of maintenance and operation, however, grew to substantially four billion two hundred millions of dollars, to

which we must add nine hundred millions for compensation and a further large sum yet to be announced for the expense of the Central Railroad Administration.

The outcome is that it cost the government more than five billions one hundred millions of dollars to furnish transportation for the year, leaving a deficit of more than two hundred millions of dollars to be paid from the treasury of the United States.

While the former Director General expressed before our committee the belief, and in this opinion he was joined by the present Director General, that the year 1919 would exhibit more satisfactory results, it is my judgment that the deficit of 1919 will not be less, and may be more, than the deficit of 1918. I do not intend to enter upon an analysis of this deplorable showing of government operation further than to say that the increase in revenues is substantially as great as the increase in wages and the advanced cost of supplies, and the shortage must be largely accounted for by the inefficiency incident to government operation and the tremendous increase in the number of railroad employees—an increase which has always been observed in all countries as they have passed from private to public operation.

Moreover, the government during the year either paid or became responsible for extensions, additions and betterments chargeable to capital account, and which the railroads must repay if they are able, about eight hundred millions of dollars. It is this condition which makes it impossible for the government to return the railroads to their owners until there is far-reaching legislation which will protect both the public and the railroads from the disasters which would inevitably follow an immediate return. Without the necessary credit to finance themselves, and in view of the enormous demands which the war has made, and is making upon the resources of the people, it is clear to thinking men that a return of the railroads to the corporations which formerly operated them without suitable legislation would lead fifty per cent of the railway mileage of the United States into the hands of receivers within six months.

It is the first and highest duty of Congress to deal with this situation in a fundamental way, and to establish a permanent policy for the future maintenance, regulation and control of our transportation systems. No half-way or timid measures will suffice. We must meet the question squarely and boldly. It is no time for shrinking, compromising spirits. I am sure that I speak for every member of the Senate when I invite the best thought of the General Assembly of Iowa to aid in the solution of this exceedingly serious and overwhelmingly important problem immediately confronting us.

You will understand, of course, that the facts which I have recited merely outline the information with which the history of railroads, their development and operation, is crowded, and I assume that you will supplement what I have said with your own comprehensive knowledge of the subject. These facts are sufficient, however, in my judgment, to point the way to the reorganization of our transportation system, and to sustain the principles which must be embodied in any successful readjustment of the relation between the government and the railways.

Some Fundamental Principles

Some time prior to the first of January of the present year, and in anticipation of the hearings which have been in progress before the Interstate Commerce Committee of the Senate for two months or more, I announced to the public a series of principles which, as it seemed to me, should be accepted in the enactment of any fundamental legislation. They are:

First. The return upon the capital invested in railways should be made certain through a government undertaking.

Second. The railways should be consolidated into comparatively few systems, and by few I mean not more than eighteen.

Third. The railways should be operated by private corporations organized under an Act of Congress.

Many complete plans of reorganization have been laid before the Senate Committee, brought forward by the most intelligent, thoughtful men of the country, some of whom are railway executives, some of whom represent security holders, some of whom are bankers, some of whom represent commercial and civic institutions, and some of whom are observers and students of economic life in all its varied phases.

It was intensely gratifying to me to discover as the hearing proceeded that all these plans, save one, adopted the substance of the principles which I had made public, although there are wide differences in the form of their application to the actual affairs of transportation.

Will you indulge me while I submit, with such brevity as I can command, the reasons which justify the principles to which I have called your attention?

The return upon the capital invested should be made certain by a government undertaking because:

First, it is highly desirable to remove for all time the demoralizing, corrupting struggle between the owners and representatives of railway property and the public, especially that part of the public directly interested in freight and passenger charges. For more than forty years this conflict has been going on in conventions, elections, legislatures, congresses and the courts. Sometimes the railways have won, sometimes the people have won, but the fight has been so intense that oftener than otherwise the justice of the matter has been ignored by both sides, and it is high time to bring the contest to an end.

Second, the honest investment in railway properties is entitled to protection, and the public is entitled to fair treatment. It is impossible to conceive of any revision of the law that will accomplish these two things without the elimination of the controversy relating to the return upon capital. The certainty of the return is also demanded because furnishing transportation is a public business, and abstractly considered there should be no speculative profit in the business.

Finally, and chiefly, the return should be made certain in order to reduce the charge for the capital invested in the railway properties. So long as the return is uncertain with respect to many railroads, every railroad will insist upon earning all it can.

Taken as a whole, the roads received in 1917 a net operating income of about a billion dollars, and they were contending earnestly for more. In 1918 Congress authorized the President to pay them as compensation during the government possession somewhat more than nine hundred millions of dollars per year, and this did not include many of the short line railways. If the government makes a certain return it can justly reduce the return to a rate of interest which a government obligation ought to bear.

Assuming, but not conceding, that the railways are worth in the aggregate seventeen billions of dollars, a return of four and a half per cent under a government guaranty would be ample. Under such a provision the annual charge for the properties as they now are would be seven hundred and sixty-five millions of dollars. The people paid in 1917 a capital charge of a billion dollars, and we are now paying under government operation a capital charge of more than nine hundred millions of dollars. The principle I have proposed, if embodied in the law, will save the people of the country from two hundred and fifty millions to five hundred millions of dollars annually, for it must be remembered that under the old system the capital charge was gradually increasing, and it is easy to believe that without reckoning any addition to the value of the property the capital charge would soon reach a billion two hundred millions of dollars.

Another vexatious element would be laid at rest. The unearned increment in public utility property is a constant menace. It ought to be understood, once for all, that a fair return upon the actual investment is all that capital can demand. I understand perfectly that many people will instinctively shrink from a guaranteed return, but their reluctance to adopt the principle will disappear upon reflection. There is no possibility of an additional burden; on the contrary, we shall save an immense sum of money every year and at the same time convert railway securities into a stable investment and contribute tremendously to the available credits of the country.

There are various methods in which the principle can be applied. It may take the form of a legislative assurance that the rates shall be sufficient to produce the sum required, but preferably it will be put in a positive guaranty. It may be worked out through the securities as they now exist, but the simpler plan would be for a government corporation to acquire all the properties or all the securities and issue or substitute new obligations.

It is to be understood that in any event there must be a valuation of railway properties, unless there can be an agreement between a government agency, such as the Interstate Commerce Commission, and the owners with respect to value. In my judgment, this principle extends the only hope of a reduction in rates, or of preventing still further increases.

Consolidation, Without Eliminating Competition

The second principle to which I have referred is that there must be a consolidation of the railroads into comparatively few systems. It is utterly impossible to maintain an efficient system of transportation with reasonable rates for service unless this be accomplished. In my statement of the earning capacity of the various roads it was made entirely clear that if the weaker roads are made self-sustaining so that they can continue to serve the communities through which they pass, the stronger roads will enjoy a revenue so excessively large that the people as a whole will be compelled to pay inordinately for their transportation. This is one proposition upon which all impartial students of the subject agree, no matter whether they come from railway life or from the general community. The weaker roads must be merged with the stronger ones into competitive systems which can endure upon substantially even terms. They must be merged, too, under a law that will require at proper times a common use of terminal facilities and a free interchange of equipment, and thus preserve the great advantages of unification, which is the one superiority in government operation.

I am not in favor of regional systems, for we must at all hazards perpetuate competition in service. The experts who have studiously examined the matter are of the opinion that all the railroads of the country could be consolidated into—say 18 systems, and that the competition in service in nearly every locality would be even more keen than when the government assumed control.

I cannot, within the time which I may properly consume, describe these systems, but I know that it is wholly practicable to do what I have suggested. When this is accomplished if any particular system earns enough as a whole to pay the capital charge and the cost of maintenance and operation the law will be satisfied, and all that will remain for the Interstate Commerce Commission to do will be to see that the rates as between communities and commodities are not discriminatory.

I would not have you think that it will be easy to bring about this situation. It will require very considerable time and a high order of intelligence, but it is largely administrative work, and in the hands of men who have devoted their lives to the subject it can be realized without danger to either the financial, commercial or industrial structure of the nation.

Here again more than one method can be used to embody the principle. It is possible to take railway corporations already in existence and work out the plan with them. My own conviction, however, is that the safer and better method is to put each of these consolidated systems in the hands of a Federal corporation. It is gradually becoming clear that in so far as rates are concerned the national government must be the arbiter. I have come to this conclusion slowly and reluctantly, but it is folly to resist the inevitable conclusion. State made rates which either discriminate against interstate rates, or which do not raise their full share of the required revenue, impair the control over interstate commerce which the Constitution has conferred upon Congress and destroy the efficiency of Federal action. I sincerely hope that there will be found some feasible plan for co-operation in this matter between Federal and state authorities, but in the last resort the Federal agency is supreme.

It seems to me, therefore, that all railway common carriers should be organized under an Act of Congress, although I freely admit that the national government can exercise its full power through state corporations, but with some embarrassment and loss of efficiency.

Government Operation Is Undesirable

The third principle which I have mentioned is that the railways should be operated by private corporations rather than by the government. I want you to observe that I emphasize the distinction between government ownership and government operation. I realize fully that when the government undertakes that the return upon the capital invested shall be certain, or in other words guarantees the return, whether by legislative assurance or explicit obligation, it is the equivalent of government ownership, and in so far as I am concerned, I am quite ready for the undertaking. The truth is that we have government ownership now in its most undesirable form. The Interstate Commerce Commission, under the present law, determines the revenues which the railways shall receive. It thereby determines the expenses which they may incur, and when the technical owner of property loses the right to say how much he shall have for its use, and the right to say how he shall conduct the business of which it is a part, and the right to fix the cost of its operation, he has parted with the essential characteristics of private property.

I favor the private operation of railways under the strictest control for one reason, and one only. The government cannot operate the railroads either economically or efficiently. It is not my purpose to examine the experience of other countries. It is sufficient to say that to my mind that experience is not reassuring. But no matter how that may be I know that the government cannot take seventeen billions of railway property rendering a service which reaches every nook and corner of the land, employing in the service two millions of men or more, and indirectly affecting the fortunes of many other millions, and manage it with either economy or efficiency.

It costs the government more to do any given thing in a country like ours, where every man is a sovereign, than it costs anybody else to do the same thing. The history of every enterprise of a business character conducted by the government proves all and a great deal more than the statement I have just made. I disparage no one, and impugn no man's integrity. What I have said is not only the truth, but it is as natural as life itself.

I admit that the result of government operation during the year 1918—a year of war—is not altogether a fair criterion by which to test the capacity of the government to manage the business of transportation, and it is not my

desire to discredit the officials who have been responsible for what has happened. They have, however, demonstrated that the influences which surround the operation of a great commercial and industrial enterprise are too strong to be resisted.

It is unnecessary for me to enter into the details of this subject and I am content simply to record my opinion in favor of private operation, an opinion based solely upon the ground that the people of the country will get better transportation and at less cost in that way than through government operation; and that, as I view it, is the chief concern of those to whom the service is to be rendered.

Must Afford Incentive to Efficiency

If then, private operation is the better plan, how is it to be accomplished, in view of the limited capital charge which I have already considered? I am fully aware that if private corporations are to operate the several systems which I have described there must be an incentive in the way of profit in order to secure the highest degree of fidelity and efficiency. There must be a reward for good management and honest work, and a penalty for bad management and dishonest work.

Happily, there are several methods through which this problem can be worked out. It can be done through a leasing system, with the rights of lessees carefully prescribed in suitable contracts, but a still better way may be found by providing for a corporate ownership of the several systems into which the country should be divided, each corporation with a capitalization representing the actual value of the particular system, and the establishment of rates which will produce not only the cost of maintenance and operation and the guaranteed return upon capital, but a reasonable sum in excess of the guaranty; the excess to be divided between the stockholders and the workingmen. I am a profound believer in profit-sharing, and when the rule is properly applied it will solve many of the problems which now disturb the industrial world. The additional compensation to capital for efficient management, together with the sum distributed among employes as a reward for faithful labor, will be far less than the increased cost of government operation.

These suggestions could be extended almost indefinitely, but I forbear, knowing that I have sketched but the outline of a mighty field. If, however, I have turned your thought to the real questions which must be answered, and have induced you to give them the study of which you are capable, and thus forward the immediate task in which we are commonly engaged, I have fulfilled my mission, and will be content with your judgment upon my public service in this regard.

One word more and I will have finished what to me has seemed a duty and which I hope you will not look upon as an intrusion upon your valuable time. I intend to discuss this subject throughout the country within the next two months and I felt that I should first lay my views before the law-making body of my own state.

The Supreme Court of the United States on April 21 agreed to expedite consideration of test cases which are expected to determine the question of the authority of the federal government to prescribe intrastate rates for freight, passengers and telegrams. The court fixed May 5 as the date for hearing arguments in three cases involving this question, one of which is the appeal by the Railroad Administration from a decree of the North Dakota supreme court enjoining the Northern Pacific and other railroads in the state from increasing freight and passenger rates within the state as ordered by the director general last year. The other two concern telephone and telegraph rates. It is hoped that final decisions may be reached before the court adjourns for the summer.

Return of Colonel McCrea

COLONEL JAMES A. M'CREA, formerly general manager of the Long Island Railroad, has returned from France and this week made a short address at a Victory Loan rally of Long Island employees at the Pennsylvania Station in New York. A part of the address is given below.

Colonel McCrea went over in the latter part of 1917, and served as general manager of the American railroads and deputy director general of transportation under Brig. Gen. W. W. Atterbury. He has received a distinguished service medal. General Pershing had recommended Colonel McCrea for promotion to brigadier general, but before the recommendation could be carried out the armistice was signed.

With Colonel McCrea at the meeting was Captain Charles E. McLaren, who was in charge of the Long Island Railroad's lighterage department prior to his enlistment early in 1917. Captain McLaren looked after the operation of ships at seven different ports in France, namely, La Rochelle, St. Nazaire, Nantes, LaPallies, Havre, Brest and Rochefort.

Colonel McCrea's Address

There had never been such a thing as a railroad transportation department in the United States Army. It had its inception when four or five men went to France in July, 1917. These men made a complete survey of the situation, which resulted in the preparation of what is known as "Requisition Number Six," being a list of materials and supplies that called for an expenditure of something like $400,000,000. And at the end of a year not a single item was found in that long list which wasn't needed and didn't have a distinctive part in the machinery of the transportation department.

We didn't build any separate railways in France, although many people here have been led to believe that we did. Our contribution was terminals, yards, and sidetracks, equal to a new line about 1,000 miles in length, with one important cutoff. With the exception of a few small branches, the French railroads are all double-tracked. There were plenty of French-built railroads, and we found them in pretty good physical condition, but there was a scarcity of men to operate them. The young men were doing their bit on the battlefields, but the men around middle age left in service did excellent work. The women of France also deserve great credit. They fired engines, did braking, and performed some of the hardest kind of manual labor in the shops.

By our arrangement with the French, we were to supply trainmen to move a tonnage equivalent to that which the American army would need. For every American serving in France we had to move an average of fifty pounds a day. This included coal, engineering materials, food, clothing and ammunition. We handled not only our own supplies, but also a great volume for the French as well. They reciprocated, moving American supplies over their lines to different sectors where our troops were fighting. There was magnificent co-operation on both sides.

The plans of the Allies required that by July, 1919, the United States should have three and a half million men in France, fully equipped and trained to do battle. For every hundred fighting men we had to have between 15 and 20 service-of-supply troops, to do other kinds of work. As many as 18,000 American troops landed at Brest in one day, and it was a gigantic problem to move these great hordes of men and their supplies, especially as we were continually handicapped with a comparatively small transportation force.

One of the fundamental reasons the American Expeditionary Forces did so remarkably well in France was their adaptability to almost any character of work, however

difficult. Of the transportation men few, if any, performed only the work which they came over to do.

There were many French railroad practices we did not fancy, I am frank to admit; but it would have been a tremendous mistake for us to go over there and insist upon introducing American methods. We had to adapt ourselves to conditions as we found them. We had trackage rights over all the French railways. On no two roads were the signal systems alike, and we had to prepare a book of rules whereby our men could run the trains. In this country the conductor is in charge of the train. In France the engineer has charge while the train is in motion, but when the train is not in motion a so-called "pilot" is the responsible head.

When the armistice was signed we were moving 40,000 tons of freight daily, and were planning to move a daily tonnage of 100,000. For about a week following the cessation of hostilities, everybody was celebrating the victory, but the transportation department's work could not be interrupted. Our job really had only just begun. Our hardest work was done between November 11 and the middle of January, when we had to get the Army of Occupation up to the Rhine. And even then we were not through. The Allied soldiers on the Rhine had to be fed, which meant that several trainloads of food had to be despatched every day and hospital trains had to be operated; and there was also the task of feeding the German population in the occupied territory.

Orders of Regional Directors

VICTORY LIBERTY LOAN.—The Northwestern regional director in a telegram, file 52113 to Northwestern railroads states that where payments on account of the fourth Liberty Loan have not been completed, it will be permissible to defer deducting from the payrolls on account of the Victory Liberty Loan until payments on the previous loan are completed; but the deductions on account of the Victory Loan must begin not later than the payrolls for September, 1919. The Eastern regional director has issued a similar notice.

Sale of Secondhand Rail to Industries.—Circular 199, canceling Circular 8 of the Southwestern regional director states that it will be satisfactory for relay rail to be sold for the construction and repair of industry tracks at $40 per gross ton.

Brakes on U. S. R. A. Hopper and Gondola Cars.—Order 194 of the Southwestern regional director requires inspectors to make a special inspection of all United States composite gondola standard and hopper cars, and that where these cars are found without sheave wheels on the brake shaft end of the hand brake rod to send these cars to shop, regardless of ownership, and have the brake arrangement changed to conform to the approved standard.

Campaign Against Venereal Diseases.—By circular 200 the Southwestern regional director permits state boards of health to post placards advertising the free government and state clinics for venereal diseases. These placards must not be placed in reading rooms or in cars.

Use of Headlight Generators.—Circular 203 of the Southwestern regional director reminds enginemen that by keeping water gages and shields clean or by slightly relocating the lamps of these water gages, it will not be necessary to run headlight generators during daylight as is now being done in many cases.

Records of Shipments of Distilled Spirits.—Supplement 1 to Order 88 of the Southwestern regional director states that records ordered kept by Order 88 of shipments of distilled spirits (no longer required) should be carefully retained and be made accessible to revenue officers at points where such officers have not already inspected them. The Eastern regional director, by Circular 600-70A687, issuing the same instructions.

Repairs of Short Line Cars.—Supplement 2 to Circular 49 of the Northwestern regional director similar to Circular 500-14-5A669 of the Eastern regional director. (*Railway Age*, April 18, page 984).

Revised Industry-Track Agreement.—Supplement 9 to Circular 33 of the Northwestern regional director contains two forms covering standard track agreements which have been revised in accordance with the terms contained in Supplement 1 to General Order 15. This form of agreement is subject to modification by the federal manager in special cases.

Reports of Air Brakes Cleaned.—The Eastern regional director by Order 1801-131A691, calls for regular monthly reports, beginning with April, showing the number of freight car air brakes overhauled, with a statement showing the ratio of number cleaned to the number of freight cars owned.

Rail and Lake Freight.—The Eastern regional director, by Circular No. 600-4-121A688, advises federal managers of the arrangement for delivering freight to boats at Buffalo. During this season the Cleveland & Buffalo Transit Company and the Great Lakes Transit Corporation will load vessels at the New York Central dock at Ohio street; the Detroit & Cleveland Navigation Company will load at the Delaware, Lackawanna & Western dock; and the Lehigh Valley Transportation Company at the Lehigh Valley dock. Attention is called to the fact that freight which is sent over the roads making these direct connections will avoid additional switching; but shippers must be allowed the right to route their freight as they please. Freight is not to be forwarded by lake unless so ordered by the shipper.

Passes for Brotherhood Chairman.—The Eastern regional director, by Circular 2100-13A689, advises federal managers that they may apply to the director of operation, Washington, for annual passes over connecting roads for general chairmen of committees of employees' organizations where such passes are necessary to enable a chairman to make a short cut from one part to another of his own territory.

Express Agents' Telegrams.—The regional director, Eastern Region, by circular No. 304-11A693, advises federal managers that the agreement with the American Railway Express Company permitting agents of the express company to send telegrams free on the railroad wires, is intended to allow this privilege only between points on the same railroad.

Passes for Representatives of Clerks.—The regional director, Eastern Region, by circular No. 2100-13A694, quotes an order from the director of the Division of Operation authorizing the issuance of free transportation to the general chairmen of the Brotherhood of Railway Clerks on the same basis as to general chairman of other brotherhoods, regardless of whether there is or is not a contract between the clerks and the railroad on which these chairmen are employed.

Passes to Brotherhood Conventions.—The regional director, Eastern Region, by circular 2100-37A695 promulgates the order of the director of the Division of Operation, dated April 15, authorizing free transportation for members to annual conventions of the conductors, the trainmen and the firemen, to be held within the next two months. Transportation is to be granted as in the past, and it is suggested that the federal managers, to save time, send their applications direct to Washington. This privilege includes also the delegates to the Ladies' Auxiliaries.



The New Retiro Station of the Central Argentine—the Largest in South America

The Railroad Development of the Argentine

The Largest Market for Railway Equipment in South America—Regulation, Labor, and Taxation Big Problems

In Two Parts.—Part II

SUPPLIES OF ALL KINDS have increased tremendously in price since the beginning of the war and have been hard to obtain at any price, but the increase in price and scarcity of fuel has contributed more directly than any other factor in increasing the cost and difficulty of operating the railways. Coal has risen in price from £1 10s. before the war to something like £10 in 1918; in 1916-17 the average price was about £5 or £6 a ton. In normal times the Central Argentine consumes annually about 400,000 tons; the Great Southern, 380,000; the Pacific, 280,000; the Western, 190,000; and other companies in proportion to their mileage and traffic. Not only has coal increased in price but the supply has been so limited that the railways have been forced to burn large quantities of wood.

It is estimated that the Great Southern, the Buenos Aires & Pacific, the Buenos Aires Western, and the Central Argentine together use approximately 3,000,000 tons of wood annually under the present abnormal conditions. In addition, the industrial enterprises burn 8,000,000 tons, and all this fuel must be brought down from a restricted area in the northern part of the republic. The carrying capacities of the lines serving this region are wholly inadequate, with the result that the Southern and some of the other systems having no wooded districts of their own to draw from have been unable to obtain sufficient wood at any price.

In 1915 the railways were authorized to raise their tariffs 10 per cent and in 1917 22 per cent. They announced a third increase of 10 per cent to take effect May, 1918, but were refused permission by the government to put this last into effect. According to the terms of the mitre law the government may not interfere in the rates which a company charges so long as its dividends do not reach 6.8 per cent on the recognized capital. The companies contend that since their dividends have not reached any such figure, and are unlikely to for a long time to come the government has overstepped the prescribed limits. They maintain further that this 10 per cent increase was promised them in compensation for the higher salaries granted their employees at the settlement of the strike in 1917 and the shorter working day which necessitated a larger working force. The government refused to allow the new rate on the grounds that the companies had failed to give the required four months' notice and that it would impose an unduly heavy burden on the producers of the nation, especially the wheat growers selling their crops to the allied governments at a contract price.

The various companies submitted detailed reports setting forth their reasons for asking this increase. All their expenses, especially wages, taxes, and cost of fuel, have been augmented during the last four years while their volume of traffic has not changed materially. The export freight has grown in volume but this has been counter-balanced by the falling off in import freight. The Southern claims in its report that the 22 per cent increase failed to add to the

gross receipts the 5,792,054 gold pesos estimated; that the proposed supplemental 10 per cent would only yield an additional 2,951,957 gold pesos; and that the working expenses were greater by 13,054,435 gold pesos. Hence, a rate 25 per cent higher instead of 10 per cent would be necessary to cover the deficit entirely.

Improvement in Financial Outlook

While not disposed to underrate the seriousness of the present unsettled labor conditions, the uncertainty as to the character of the proposed railway legislation, and the probability of the continued high cost of supplies, recently published reports of many of the Argentine railways indicate the hopeful feeling with which the shareholders are looking forward to the coming year. The 1917-18 net returns have in general been a trifle better than those of 1916-17, due to the 22 per cent rate increase allowed November, 1917, and this has been reflected in a slight rise in recent quotations of stock. The grain crop on which the railways are chiefly dependent for their export freight was large in 1917-18 and promises to be almost as good for the present year. The ending of the war means the gradual easing of the shipping situation which will result in larger volume of import freight traffic for the railways.

The following quotations of railway stocks which are listed on the London Stock Exchange represent the high and low prices for 1913 and the opening and closing prices for 1918. They show the very real depreciation in the selling price of these stocks since the war, but they show also that during the last year the movement has been appreciably upward. With a single exception, the closing price for 1918 is higher than the opening price.

Name of company	1913 High	1913 Low	1918 Opening	1918 Closing
Buenos Aires Great Southern, ord....	130	109	72½	72
Buenos Aires Western, ord.....	128	109	71	73¼
Central Argentine, ord.....	112	100	59	66
Buenos Aires & Pacific, ord.....	92	64	39	58½
Central Cordoba, ord.....	54	39	11½	17¼
Entre Rios, ord.....	78	54	22¾	41

The table in the next column gives the amount of gross revenue for the years 1916-17 and 1917-18, the percentage consumed in working expenses, and the dividends on ordinary stock, wherever it has been possible to obtain these details from published company reports.

Los Ferrocarriles del Estado usually show an annual deficit, but in 1915 and again in 1916 they showed a slight profit on the capital investment. No later reports are now available. A recent issue of the Review of the River Plate states that the minister of finance has been authorized to transfer the sum of 12,000,000 paper pesos to the administrator of state railways. One-half of this amount is to be utilized in canceling the outstanding liabilities of the administration and the remainder in the acquisition of materials urgently required for the state lines. It is understood that the transfer will be effected at the rate of 100,000 pesos a day.

Name of company	Gross receipts 1916-17	Gross receipts 1917-18	Per cent consumed in working expenses 1916-17	Per cent consumed in working expenses 1917-18	Dividends 1916-17 Per ct.	Dividends 1917-18 Per ct.
Central Argentine..	£5,246,626	£6,184,089	68.71	73.94	1	2
Great Southern.....	5,734,141	5,838,441	64.06	76.16	4	2
Pacific	4,421,368	5,269,979	65.98	65.80	None	None
Buenos Aires West'n.	2,504,939	2,858,039	66.88	75.68	3	2
Cordoba Central...	1,565,292	1,709,227	73.77	75.16	None	None
Entre Rios	636,526	847,797	64.38	62.32	None	None
Central of Buenos Aires	297,752	369,853	54.73	55.05	....	....
Argentine Northeast	389,100	460,000	.....	84.80	None	None
Rosario Puerto Belgrano	*2,317,330	*2,587,117	85.02	82.77	....	....

*Argentine paper pesos.

Extensive Improvement Policy Halted by War

Argentina's railway mileage has only increased from 21,000 miles at the beginning of the war to 22,000 in 1919,



Railroad Station at Goya

and some of the companies have allowed their concessions for extensions to lapse entirely. However, considerable sums have been spent in the improvement of roadbeds, the double tracking of main lines, erection of new and larger stations, the electrifying of suburban lines radiating from Buenos Aires, and the improvement of port facilities and workshops. Some of the companies have been severely criticised by their stockholders for the elaborate scale on which they have pursued this policy of improvement, and it is impossible to predict whether or not the railways will resume their prewar plans for expansion. In the case of the European companies it will depend on the price of money at home as well as on the form which the proposed railway legislation in Argentina will take and the solution of the present labor problem. Almost without exception the companies have increased their reserve funds during the last four years, although they have been forced to pay very small or no dividends at all, and they are anxious to retain and expand their Argentine holdings, provided they are insured sufficient protection by the government, as well as a chance to make a reasonable profit on their capital investment.

Electric Suburban System

The Central Argentine opened its new passenger station in Buenos Aires in 1915 and inaugurated its electric suburban line to Tigre in 1916. The passenger terminal, the Retiro, holds the distinction of being the largest in South America and is said to handle 1,900 passenger trains weekly. The branch to Tigre is a third-rail line, modern in every respect, and is operated by power from the Central's own plant. This company began an elaborate plan of expansion, which has been temporarily suspended during the war.

The Buenos Aires Western has a large passenger terminal in Buenos Aires, the Once, and has electrified a portion of its suburban system. From the point of view of economy



Cattle Wagon on the Transandine Railway

the freight tunnel recently completed by this company is interesting. It connects the docks with the company's station in the heart of the city, nearly 3 miles distant, and cost about 5,000,000 paper pesos. The original plan was to use only electric locomotives, and an order had been placed with a German firm to supply these, but this order was canceled, and at present steam locomotives are being used. About 100 cars pass through the tunnel daily. The company has also built a tunnel which affords direct connection between its own passenger terminal and a station of the Anglo subway and has plans for the construction of several branches and feeders.

The Great Southern, a third company which serves suburban Buenos Aires, has not electrified any portion of its line yet, but had made plans to do so prior to the war. It has a large passenger terminal in Buenos Aires, La Plaza Constitucion, and the largest freight station in South America, La Sola (also in Buenos Aires), which has capacity for storing 230,000 bags of grain and 2,000 tons of other freight. An extension is projected from Zepala, where connection will be afforded with a line to be built by the Chilean State Railways, thus forming a transcontinental line with easy grades. A second extension is planned to run south from Darwin to the port of San Antonio, where it will connect with the Patagonian State railways. Important irrigation works are being carried out in the Neuquin and Rio Negro valleys.

Plans for Further Expansion

The Buenos Aires & Pacific pursued a more aggressive plan of expansion during the last few years prior to the war than any other line in the Argentine. The land along its so-called Patagonas Extension is being irrigated, and every effort is being made to attract colonists. At present the fixed charges of this system are relatively high, and its financial condition not quite so assured as that of the other large companies, but in general its prospects are considered good. Should there be an influx of immigrants from Europe within the next few years, as seems likely, this road will benefit materially.

The Argentine Northeastern has a large projected mileage and serves a rapidly developing section. A considerable portion of its present mileage was opened just prior to the war. The Entre Rios states in its latest report that it does not intend to undertake any construction work for some time.

The Central Norte and the Transandine are the only two railways in the Republic whose construction has been complicated by engineering difficulties. The Central Norte reaches an altitude of 12,000 feet at Abra Tres Cruces, the Transandine over 10,000 feet at the Chilean border.

This latter line has never fully accomplished its mission of forming a quick and easy means of carrying freight from ocean to ocean owing to the forced suspension of traffic during the stormy winter months and to the excessively high freight rates. Conditions have been considerably improved on the Argentine portion of the railway during the last few years. There has been some discussion as to the advisability of joining the Chilean and Argentine portions under a single management, but nothing has been done so far. The Central Norte serves a portion of the Chaco, little developed as yet and comparatively uninviting.

Proposed Fusion with Government Lines—State Development Railways

There has been some discussion recently of the fusion of the Central Cordoba with the government lines of the north or the purchase of the Central Cordoba by the government in order to obtain a means of access for these roads into Buenos Aires. This would result in competition of government with privately owned railroads, and would be a decided departure from the past policy in regard to railway ownership.

The state development railways include two in the Chaco and the three Patagonian State lines. The Formosa-Embarcacion system will be about 437 miles long when finished,



The Train Shed of the New Retiro Station

The shed is 787 ft. in length and the steel arches have a span of 160 ft. with a maximum height of 84 ft. above platform level. (Note the third rail and the multiple unit equipment on the left.)

and will exploit the little-developed territories of Chaco and Formosa. The Diamante to Curuzu Cuati road, as planned, will extend from Diamante on the Parana River in the Province of Entre Rios westward to Crespo (21 miles), from which point the Entre Rios will be used to Hasenkamp. From here the line will extend northwest to Curuzu-Cuati in the Province of Corrientes, a point on the Argentine Northeastern. About 106 miles have been completed, and eventually this road will open a rich and extensive territory for development.

The plans for the Patagonian State railways call for about 1,243 miles of track, 580 of which are now open for traffic

either full or provisional. When finished, this system will consist of two lines, the San Antonio and the Comodora Rivadavia, across Patagonia from east to west, and a third extending from Puerto Deseado in the Territory of Santa Cruz northwest across the Comodora Rivadavia to the western terminus of the Port San Antonio Railway. The San Antonio line, which now reaches the foothills of the Andes, may later be extended across the Andes to connect with the Chilean State railways at Osorno. The Comodora Rivadavia will eventually reach Lake Buenos Aires on the Chilean boundary.

The Central of Chubut is the only privately owned road which operates wholly in Patagonia. This company plans to extend its present short line across the republic to the Andean foothills. It owns an iron pier at Port Madryn in addition to the railway.

The bulletin of the Pan American Union for August, 1918, reports that Juan B. Lalucat & Co., of Buenos Aires, have petitioned the national government for a concession authorizing the construction of about 180 miles of railway to extend from Malabrigo, a point on the French railway of Santa Fe, to Anatuya, a junction of the State railway system in the Province of Santiago del Estero. The road, as planned, runs northwest through a quebracho zone.

Argentina as a Market for Railroad Supplies

The Argentine market for railway supplies of all kinds is varied and extensive. The electric suburban systems operated by the Central Argentine and the Western necessitate an entirely separate equipment, and the large freight terminals and the extensive docks at Buenos Aires require their own special equipment.

The following table shows the quantity of rolling stock owned by each of the large companies in 1913, the last pre-war year:

Railroads	Locomotives	Passenger cars	Freight and other cars	Total
Central Argentine	620	651	21,233	22,504
Buenos Aires Great Southern	627	786	15,200	16,613
Buenos Aires & Pacific	742	409	12,651	13,802
Buenos Aires Western	327	348	9,747	10,422
Cordoba Central	267	323	6,960	7,550
Central Norte	387	206	6,537	7,130
Province of Santa Fe	160	147	5,604	5,911
Province of Buenos Aires General Railroad	104	98	2,566	2,768
Entre Rios	84	94	2,168	2,346
Argentine del Norte	66	100	1,829	1,995
Argentine Northeastern	68	74	1,136	1,278
Rosario Puerto Belgrano	44	28	1,094	1,166
Buenos Aires Central	38	25	1,016	1,079
La Plata & Meridiano Quinto	21	25	923	969
Buenos Aires Midland	34	33	869	936
Central Railway of Chubut	6	7	86	99
State Development Railways	...	...	...	...
Total	3,595	3,354	89,619	96,568

It will be noted from this table that the Central Argentine, the Southern, and the Buenos Aires & Pacific normally require the largest amounts of rolling stock. These three companies maintain extensive shops in the Argentine where they not only do repair work but manufacture a considerable amount of rolling stock. The Central Argentine has large factories at Rosario and Perez, where it has been building cars for several years. The shops of the Southern are situated at Talleres, where, among other railroad equipment, a special type of postal car is made. The Buenos Aires & Pacific has been building a distinctive ventilated fruit car for fast service between San Juan, Mendoza, and Buenos Aires.

The administrative offices of the large English companies are, without exception, situated in Buenos Aires, but the executive officers are English and prefer to make their purchases in England when possible. This fact explains the predominant place occupied by England among the countries sending railway equipment to the Argentine during the five-year period (1909-1913) immediately preceding the war.

Steady Decrease in Imports

The following table gives the total amount of railway supplies imported during this period by country of origin. Since the tariff valuation is a fixed amount for each article, increase or decrease in these figures represents a difference in the amount of imports and not price fluctuations.

Countries of origin	Locomotives Number	Passenger cars Number	Freight cars Number	Rails, steel Metric tons	Rails, used Metric tons	Other material Gold pesos
United Kingdom	612	372	10,957	426,124	161	26,924,577
United States	50	160	2,016	198,830	...	1,075,661
Germany	525	26	1,576	289,889	1,340	2,657,117
Belgium	69	27	7,230	80,246	...	2,685,042
France	15	6	588	40,685	38	754,469
All other countries	16	8	72	37,903	41	236,609
Total	1,287	599	22,439	1,073,677	1,580	34,333,475

No detailed statistics for 1916, 1917, or 1918 are now available, but the following table compiled from the official Argentine statistics for 1913-1917 demonstrates the continued decrease in total import during successive war years:

Year	Locomotives Number	Passenger cars Number	Freight cars Number	Rails, steel Metric tons	Rails, used Metric tons	Other material Gold pesos
1913	234	98	5,370	156,592	29	5,041,415
1914	189	69	68	84,936	13	4,116,622
1915	29	28	...	13,391	21	1,690,786
1916	30	6	24	1,535	25	1,261,908
1917	2	5	28	640	14	822,065
Total	484	206	5,490	257,094	102	12,932,796

Since imports, not only of rolling stock, but of miscellaneous supplies of all kinds including raw materials have been so greatly restricted for the past four years, the equipment of all the roads has become very materially depleted. The Patagonian State railways are reported to be especially hampered by lack of equipment. The Entre Rios, according to the latest company report, is in the market for one or more new train ferries. The annual purchases of the government railways are said to amount to about 5,000,000 paper pesos. All the companies report that in view of high prices, difficulty of obtaining supplies, and unsettled conditions in the Argentine, purchases have been reduced to the minimum.

War Cost of Railway Equipment

For the information of the Liquidation Commission, the office of the chief of engineers has prepared an estimate of the costs of railroad equipment shipped to the A. E. F. computed on the basis of 1914 prices. The government actually paid from two to two and a half times the pre-war costs.

Unit Cost of Standard Gage Railway Equipment Compared with Pre-War Cost

	Shipped to A. E. F.	Unit price Pre-war	Unit price Actual	Actual cost in per cent of pre-war cost
Locomotives—				
Consolidation	1,306	$17,500	$42,966	245
Gasoline	10	9,350	22,000	235
Saddle tank	30	4,500	9,700	216
Total	1,346	.....	.....	...
Cars—				
Tank	675	$1,367	$3,397	248
Gondola, l. s.	3,420	1,090	2,340	215
Flat	1,900	982	2,107	215
Box	7,299	1,290	2,755	214
Refrigerator	950	1,649	3,489	212
Gondola, h. s.	2,650	1,155	2,430	210
Dump	500	1,026	2,108	206
Ballast	406	1,454	2,987	205
Box, with cab	500	1,366	2,770	203
Total	18,303	.....	.....	...

Cost of Standard Gage Railway Equipment Compared with Pre-War Cost

	Pre-war cost	Actual cost	Actual cost in per cent of pre-war cost
Locomotives	$23,083,500	$56,524,870	245
Cars	22,346,745	48,822,100	214
Total	$45,430,245	$104,446,970	230

Securing the Maximum Efficiency in Train Loading*

High Ratio of Actual Tonnage Moved to Rating of Engines. Heavy Loading Promotes Fuel Economy

By T. H. Williams
Assistant General Manager, Southern Pacific

ONE OF THE FIRST FACTORS to be considered in the subject of train and engine loading is organization. Under the plan of organization effective on the Southern Pacific, the superintendent is practically the general manager of his division, and he is looked upon in this light by the executive officers. He is the responsible head and is the man who is looked to for results. The staff officers on a division of the Southern Pacific consist of the superintendent, one or two assistant superintendents (as the needs of the business justify), from one to three trainmasters, a chief despatcher, a master mechanic, a master car repairer, a road foreman of engines, a division engineer, a signal supervisor, a bridge and building supervisor, roadmasters, and a division storekeeper.

In the movement of the business as it relates to train and engine loading, the officers who are principally concerned as an aid to the superintendent are the chief despatcher and the master mechanic. The first is charged with the responsibility for the handling of the power, and the second with the responsibility for the power being in good repair. The assistant superintendent and trainmasters act as aids to the chief despatcher in assisting in loading the engines to a point somewhere near their efficiency and seeing that the trains move promptly over the division. The usual practice is to charge the chief despatcher with the responsibility of loading the train with such tonnage as will present a proper engine efficiency. The assistant superintendent and trainmaster should encourage every effort on the part of the chief despatcher by aiding him in the support of this work. Good progress is usually measured by the amount of interest that the staff officers take in this or in any other subject, and when the chief despatcher, who really carries this load, finds his superiors seeking every avenue in which to assist him, the results are always in favor of a division organization of this kind.

Importance of Yard Organization

The chief despatcher, in carrying out a program of train service, and in ordering the trains from each yard, has to rely upon the general yardmaster and his assistants. It is therefore necessary that the general yardmaster, the chief yard clerk and the entire yard clerical organization manifest some spirit of interest in the make-up of the trains with the tonnage as ordered by the chief despatcher, and the despatching of these trains from the initial terminals on time is necessary. A poor start of any train is frequently met with a very poor ending. Initial delays to tonnage trains in terminals will not exist in a well organized yard, and are a handicap to the chief despatcher's efforts.

Locomotives are rated to haul a given tonnage and this rating is arrived at by a series of tests, developing the number of tons that each engine can haul and maintain schedule time. The ratings of these engines vary, of course, as the business is moved over the various grades, but the ratings show the maximum capacity of the engine to haul a given tonnage over each freight district of a division, and the engine is given credit for a 100 per cent performance when hauling the tonnage for which it is rated.

* From a paper presented before the Pacific Railway Club on February 13, 1919.

To bring out graphically the saving that can be accomplished in train and engine mileage by reason of increasing train and engine loading, consider the actual figures as reflected in the statistics of the results accomplished on the Tucson division during the month of December, 1918, as compared to the same month of 1917. This division extends from Yuma, Arizona, to El Paso, Texas, with a main line mileage of 560 miles, and has a decided preponderance of eastward business. In the direction of the preponderance of business on the main line during the month of December, 1918, this division handled an average of 1,692 tons per locomotive against 1,463 tons during the same month of 1917, an increase of 229 tons per locomotive, or 15.7 per cent. By reason of this splendid increase in engine load the engine efficiency was increased from 86 per cent in December, 1917, to 94 per cent in December, 1918. During this same period, in the same direction the division handled 216,152,000 gross tons one mile as against 238,903,000 gross tons one mile during the same month of the previous year, a decrease of 22,751,000 gross tons, or 9.5 per cent. This amount of business was handled with 99,186 train miles as against 136,675 train miles in the same month of the previous year, a decrease of 37,489 train miles, or 27.4 per cent; and with 127,727 locomotive miles as against 163,258 locomotive miles, a decrease of 35,531 locomotive miles or 21.8 per cent. In other words, by reason of increasing the engine load 15.7 per cent, and the engine efficiency from 86 per cent to 94 per cent this division was able to handle a decrease of only 9.5 per cent in business with a decrease of 27.4 per cent in train miles and 21.8 per cent in locomotive miles.

Waste of Power Due to Light Train Loading

This year, taking the business as a whole in the direction of the volume of traffic, every train moving over this 560 miles of main line during that month hauled 94 per cent of its full tonnage rating. In other words we lost only 6 per cent efficiency on the engine of each train run. In the same month of the previous year each engine hauled 86 per cent of the rated tonnage, or in other words the division failed in the full utilization of its power by 14 per cent. Let us say for argument that a division of any railroad is only obtaining 75 per cent efficiency in its engine load in the direction of the preponderance of its business. Here is a wastage of 25 per cent in the utilization of the power, and, considering the fact that a heavy type freight engine costs in the neighborhood of $90,000, I leave to your own conclusion the waste of power on a machine that is utilized at 75 per cent of its efficiency.

It is not possible for a division that originates a large tonnage to compete in tons per engine and in engine efficiency, with a desert division that originates very little business. The large number of local freight trains run on each freight district of the division that originates considerable business, must be started each day with a train load that will permit them to pick up and set out cars at stations between terminals, and these trains when pooled with the through tonnage trains over this division, pull down the average train or engine load and detract just that much from engine efficiency. For example, our Coast di-

vision in the year 1918 loaded 167,000 cars, or 4,000,000 tons of commercial freight. It is not hard to realize the large number of local freight trains necessary to assemble a business of this volume. A desert division originating little business on account of the character of the country has the opportunity of moving its trains intact with little change in their make-up en route, and enjoys the opportunity of obtaining a splendid engine load and engine efficiency.

Heavy Engine Loading and Fuel Economy

Our monthly statistics show the amount of fuel oil saved or lost in freight service on a ton mileage basis as compared to the same period in the previous year, and while we always conduct a very intensive campaign of education among our enginemen on fuel conservation, the large part of any saving that is made can be directly charged to an increase in the average tons per locomotive. Contrary to the general impression that prevails that less fuel is consumed by running light trains at high speed, when fuel consumption is figured on a ton mile basis, which is the only fair way of showing this consumption, our statistics have proven conclusively that increasing the engine load is the biggest factor in railroad fuel conservation.

For example, consider the performance of the Tucson division in this respect for the month of December, 1918, as compared to the same month in 1917. Due largely to the increase of 229 tons in average tons per locomotive this division in December, 1918, consumed an average of only 13.38 gal. of oil per 1000 gross ton miles, as against 16.29 gal. per 1000 gross ton miles in December, 1917. This resulted in a saving of 1,024,554 gal. of oil on a ton mile basis as compared to the consumption during the same month of the previous year. At the current price of oil, this means a saving of $36,128 on this one division alone. Of course, we must attribute some of this saving to mechanical improvements, such as the superheater; also to the campaign of education among the enginemen and the co-operation which we have received from these employees, but as stated before, the major portion of this saving has been effected by the splendid increase that has been made in the average tons per locomotive.

Daily Records of Train Loading

Our company furnishes statistics as a guide to operation, and although these statistics are furnished with promptness, it is not necessary for the divisions to wait for the auditor's figures to keep abreast of their showing in train and engine loading. The divisions that are successfully handling a good engine load, are the ones that are tabulating in statement form from day to day the number of tons handled in the direction of the volume of business, taken from their train sheets, and the average tons per engine, showing how their performance today compares with their record on the same day of the previous year.

High speed freight trains means light loaded locomotives and detract from engine efficiency and increase the consumption of fuel. One of the discouraging features that operating officers are called upon to contend with is the burden placed upon them for fast freight train service. These demands are usually the result of an endeavor to meet some competitive feature of service, and while appreciating the necessity, from a competitive standpoint, for the establishment of such fast schedules, it must be understood that wherever conditions of this kind are met we throw away the opportunity of building up an engine load and engine efficiency that means increased net returns in the operation of the property. It is not my experience that the shipping public is unreasonable in its demands for service. A freight train schedule arranged with a view of giving to the shipper and receiver of freight a dependable service and at the same time framed by the railroad with a view of maintaining the efficiency of its power, is a condition that can be covered to the satisfaction of both the shipper and the railroad. In other words a condition of this kind is possible, and where it is in effect works out to the mutual advantage of both parties.

Division Secures 100 Per Cent Engine Efficiency

No better illustration of what can be accomplished in full train and engine loading could be given than the record obtained by the officers of our Los Angeles division during the second week of January. On the freight district from Indio, Cal., to Yuma, Arizona, a distance of 122 miles, this division hauled an average of 2321 tons per locomotive, as against 1845 tons per engine for the same week in 1918, an increase on each train run of 476 tons per locomotive, giving the division 100 per cent engine efficiency this year as against 86 per cent last year.

While this freight district is in desert territory and originates very little if any business and the conditions are ideal for obtaining splendid engine efficiency, these favorable conditions do not detract from the fact that this splendid increase in engine load was obtained only through the undivided attention and individual effort of the staff officers on that division. The division handled a large number of orange, perishable and high-class manifest trains, on which it is necessary that schedule time be closely observed, and it was only through system and method that the officers were able to load up their fast freight trains, together with drag freight trains, to the extent of finally obtaining 100 per cent efficiency on the tonnage hauled by each engine during this week. To illustrate further the efforts of the organization on this division, during this second week in January each engine run on the four freight districts of the division, in the direction of the volume of business, eastward, obtained 96 per cent efficiency in tons per engine, which was the best record made, or the highest percentage of efficiency of any division on the system.



From the Macon Telegraph

"Cheer Up," Says Robin Redbreast

Treating Water Reduces Boiler Troubles

Great Northern Has Found Installation on 1,100 Miles of Main Lines Yields Excellent Results

By C. Herschel Koyl

Engineer of Water Service, Great Northern, St. Paul Minn,

During the past six years the Great Northern has been developing a system of water treating adapted to its needs. Of this the following is a brief description, with some account of the waters, treating plants, methods of inspection, and results.

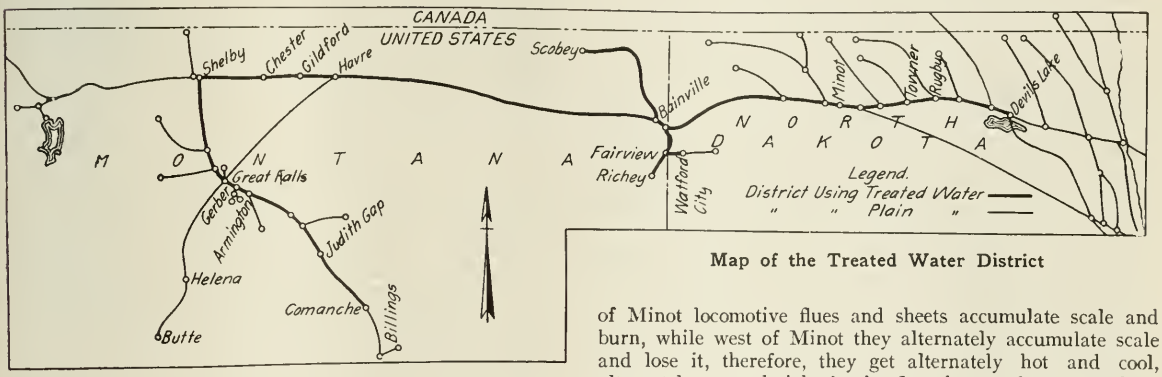
The Great Northern crosses a strip of country 600 to 700 miles wide, just east of the Rocky mountains, which receives less than the average rainfall and the waters of which contain more than the average dissolved mineral water, particularly of the sodium salts. The trouble used to come not alone from the amount of matter dissolved in the water, but from its variety, because any boiler will leak and foam if it receives alternately hard water and alkaline water. The principal work of the water treating plants has been to reduce all of these waters to a common standard of hardness and alkalinity, and for this essential we have installed a plant at every water station on the treated water district.

Work was begun in 1912 and now, in 1919, we have more than 1,100 miles of exceedingly bad railroad water converted into water satisfactory in all respects for its content of sodium sulphate. We have practically abolished scale, leaks due to water, and clogging of the injector and branch pipes. We have not altogether abolished foaming (due to the accumulation of soft sludge deposited in the boiler from the 3 grains per gallon of calcium carbonate unavoidably left in the water when treated cold), but we seldom hear about it. We have not abolished pitting and grooving (which are not produced by chemical action of the water), but we have had a set of tests running for some months from which we hope to be able shortly to add something to the present knowledge on this subject.

The Waters

Many interesting and important problems are presented on a road having so many kinds of water. In Minnesota, surface water of fair quality is plentiful in rivers and lakes, and when these are not convenient to the railroad it is generally possible to get usable water in wells of moderate depth. West of Minnesota to the Rocky mountains, railroad water *must* be taken from the surface or near it because deep waters are so laden with sodium salts as to be practically unusable.

The waters of the Great Plains of North Dakota and Montana are divided into two classes at a line running roughly north and south through Minot, S. D. East of this line the deep waters are charged mostly with sodium chloride (common salt); west of this line with sodium sulphate (Glauber's salt); and in each the charge is so heavy, several hundred grains per gallon, as to make them impossible as railroad waters. Of the surface and sub-surface waters, all contain calcium bicarbonate and nearly all magnesium bicarbonate; while east of the Minot line they contain also calcium and magnesium sulphate, but west of the Minot line sodium bicarbonate. At Minot these substances are so nearly balanced that in summer the Mouse river contains 3 grains per gallon of sodium carbonate and in winter 3 grains per gallon of magnesium sulphate. It is understood that this is a general classification, there being a few individual exceptions; but east



Map of the Treated Water District

of Minot locomotive flues and sheets accumulate scale and burn, while west of Minot they alternately accumulate scale and lose it, therefore, they get alternately hot and cool, alternately expand tight in the flue sheet and contract from it, and therefore leak.

In each state there is also some excellent water flowing south in gravel beds from isolated mountain peaks—the Turtle mountains on the Canadian border of North Dakota and the Sweetgrass hills on the Canadian border of Montana. In Dakota, just below the surface soil, is clay of great depth, but lying in east and west waves so that the troughs of the waves run north and south. In the course of years, these troughs have been nearly filled with gravel and sand from the weather worn peaks of the Turtle mountains, and all year long these gravel veins carry excellent water from the mountains south through Dakota. I do not know the total number of these troughs nor their length, but I am sure of four which are 60 miles long each, and there are numerous shorter ones. In Montana somewhat similar conditions exist about the Sweetgrass hills.

Then we have a most interesting set of waters in shallow lakes which we use as reservoirs. These lakes are crowded with weeds and small fish. The water is supplied by melting snow and rain. In summer, weeds and fish are growing and the quality of the water is fair; but toward

winter organic decay sets in, of which the product is marsh gas, and in hard water eventually hydrogen sulphide. Before ice forms, this gas escapes to the air; but later the escape is cut off and great concentration takes place in the water, with results to the boilers which are very serious. Sweetwater Lake, so named by the Indians when the lake probably had a current, is our most striking example; and before we treated the water engines sometimes could not make the main line from the roundhouse, although now we use it with conspicuous success.

Nearly all of the surface waters are growing yearly harder because of the more extended plowing of nearby lands. Still, in springtime, most of them are fairly soft, though they grow gradually worse with the season until in late winter several of the reservoirs and at least one of the streams exceed 100 grains per gallon in hardness.

For locomotive purposes all these waters must be put into the same chemical condition, which is done except as to the varying content of sodium sulphate or chloride. It is the aim to maintain all treated waters, clear and colorless, at 3 grains per gallon hardness and one extra grain alkalinity due to sodium hydrate. The treating plants are of the "continuous" type with 40-min. mixing tanks fed from the bottom, the plants varying in working capacity from 20,000 gal. per hour at the principal stations to 5,000 on the branches. Each has an engine with two pumps controlled by clutches, the pumps operating simultaneously, with the raw water pump delivering to a water wheel which furnishes power for all the mixing devices and the treated water pump working at the same rate and delivering to the track tank.

The plant design has varied in detail from year to year as we have gained experience of railroad wayside conditions, but it has always retained the essential feature of a 40-min. mixing tank fed from the bottom—this for the reason that raw water and chemical reagents do not mingle by diffusion in any practicable time and that experience shows the necessity of a minimum of 25 min. mechanical stirring if the reactions are to be completed in the mixing tank and the precipitate deposited in the settling tank instead of in the track tank. The mixing tank is fed from the bottom so as to provide therein a mass of old precipitate for the cohesion of the microscopic and slow settling particles which are nascent during the last reactions when combining molecules are few. We do not use filters in any form, and for wayside work have discarded automatic regulating devices and feed the chemical boxes every hour. Each plant is housed and in winter is kept warm by a hot water system distributed about the lower walls.

We put a pumper at each plant; a water inspector in charge of each engine district, usually of 9 or 10 stations, and a general inspector in charge of 5 or 6 district inspectors.

The Chemical Treatment

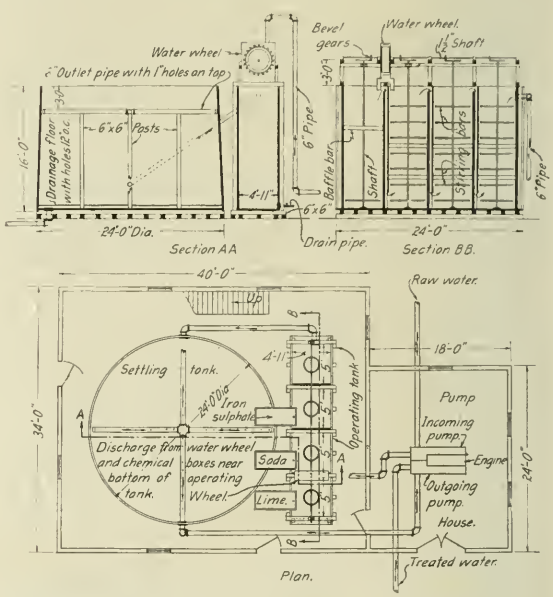
The character of the treatment varies from plant to plant with the character of the water, and may vary at any plant from day to day; but all cases are covered by the use in proper proportions of hydrated lime, soda ash (sodium monocarbonate) and sulphate of iron (ferrous sulphate).

Hydrated lime is used to extract the carbonic acid, which brings about (1) the precipitation of the scale-making limestone carbonates (down to 3 grains per gallon or less), (2) the conversion of sodium bicarbonate into sodium hydrate, and (3) the weighting of the particles of light suspended mud and organic slimes. Soda ash is used to replace completely the scale-making limestone sulphate by non-scaling medium sulphate. Ferrous sulphate is used (1) for the treatment of the last 3 grains of calcium carbonate so that it will not clog the injector or branch pipe, (2) for the conversion of caustic sodium hydrate into neutral sodium sulphate, and (3) for the further weighting and more rapid settling of particles of light suspended matter.

The treatment with lime was the gift to the world, in 1840, of Dr. Thomas Clark, professor of chemistry in Mareschal College, Aberdeen, Scotland; the treatment with soda ash was proposed by William Porter, an Englishman renowned for his advances in water softening, and the treatment with ferrous sulphate is my own device for preventing after-precipitation and particularly the clogging of the locomotive injector and branch pipe.

The Results

The first treating plant in 1911 was for demonstration purposes on the three stationary boilers of the roundhouse at Minot, N. D. These boilers had been fed from the hard and dirty water of the Mouse river; had been washed, one each day; had received the exclusive service of one boiler maker; had been dismantled, thoroughly cleaned and the flues retipped or renewed each summer, and, even so, had consumed $10,000 worth of coal per year and delivered about $5,000 worth of steam. The demonstration treating plant consisted of an old wooden water car, partitioned, fitted with



Plan and Sections of a Water Treating Plant

stirring apparatus, set in the roundhouse, connected at one end with the track tank and at the other end with the stationary feed water heater. The river water varied from a colored, muddy, comparatively soft water in spring to a comparatively clean water of 40 grains per gallon hardness in late winter. The treated water was kept throughout the year colorless, clear and at a hardness of 3 grains per gallon (calcium carbonate) and at a total alkalinity of 5 grains per gallon, the extra 2 grains being sodium hydrate.

The results in the boilers were immediate. In 10 days the shells and lower flues were clean, and when the loosened masses of scale above were broken so that they could fall through between the flues the whole boiler interiors became clean. Thereafter for a year the flues were black and the master mechanic reported for the year "no scale, no leak and not a tool touched to a boiler." During this year, too, there was no lack of steam for any purpose and

there was a hitherto unknown "snap" to the tools operated by compressed air. We burned as much coal as before, but we made twice as much steam.

Before the year was out instructions had been given for equipping with treating plants the 10 water stations for locomotives on the engine district between Devils Lake and Minot, and this was accomplished during the summer of 1912. During the winter of 1911, with untreated water, the Minot roundhouse handled an average of 600 engines per month and maintained a certain force for boiler repairs and washing; during the winter of 1912, the Minot roundhouse handled an average of 900 engines per month, of which 600 were from the untreated water sections and 300 from the treated water district between Devils Lake and Minot, and during this winter the crews for boiler repairs and washing were the same as during the winter of 1911. This looks as though the treated water boilers cost nothing for washing or repairs, but the fact was that the other boilers all took treated water at Minot before going to their hard water work and the effect of this one tankful of treated water every two days was quite marked in their repair and washing bills. The flue renewals at Minot roundhouse in 1911 with raw water were 491; in 1912, with heavier traffic and raw water most of the year, were 676, and in 1913, with circumstances as stated above, the total renewals were only 183.

While the old scale was coming out of the boilers there was considerable foaming, but this gradually disappeared, and with freedom from leaks boiler operation became something of an exact science. The effect on the locomotives was such that since then the addition of treating plants has been continuous, until now there are 77 in use, protecting 1,156 miles of traffic through the wheat fields and the cattle country. They are attached to every water station except one from Devils Lake, N. D., west to Shelby, Mont., a distance of 652 miles; they run in the same manner from Shelby southeast to Comanche, near Billings, Mont., a distance of 295 miles; they protect two important branches of 209 miles, and there are 3 other plants where the division equipment is not yet complete.

The general benefits accruing to the railroad are the usual saving in coal and in boiler repairs, and the saving of time on the road, and the greatest of these is the saving of time on the road. It is not merely that boilers do not leak and fail; it is that the service is dependable, and that every officer can reckon on speeding up his department accordingly.

The following note, under date of January 20, 1919, from the general master mechanic of the Central district concerning the work on the Billings line, represents fairly the conditions and results along the road. "The treating plants were put into operation between Great Falls and Billings during October, November and December, 1917, and we were able to have passenger power use treated water as early as October. In December, 1916, we had 6 complete failures on the Billings district on account of flues leaking. In December, 1917, we had one partial failure, and since that date we have not had an engine failure on account of flues leaking nor have we heard of flues leaking between Great Falls and Billings.

"We used to bombard crown sheets on this district once a month to remove scale that adhered around crown bolts and stays. The stationary boilers at Judith Gap had to be washed once a week and crown sheets scraped in order to keep scale off sheets. The boilers now go 30 days and there is no scale.

"Before treated water was used our helper engines at Armington could not stay in service over 5 days on account of flues leaking, and the Neihart engine which laid over at Armington had to come in once a week. But since Armington water has been treated the engines stay 30 days, at which time they are brought in for monthly inspection and washout.

"Gerber is the best illustration of what water treating has done. Our Sand Coulee engines use this water only, and a set of flues sometimes used to last six months, but never longer. Since Gerber water has been treated the scale has all come off from stays, crown bolts and flues; and with the aid of a little kerosene the flues and sheets in engine 1204 are as clean as the day she came out of the shop. This engine has now been in service on this one district 15 months as against a maximum life of 6 months with untreated water.

"I cannot say that treated water has reduced our boiler washing, because, on account of the concentration of sodium sulphate and the sludge in the mudring, we think it best not only to change water, but to wash every round trip, the same as before."

On the Montana division main line from Williston west to Cut Bank, a distance of 420 miles, treating plants were installed during the autumn of 1914. Improvement in locomotives and in service followed at once, and increase regularly was evident until in February, 1915, a comparison with the month of February, 1914, under practically the same weather conditions, gave the following results:

	1914	1915
Boiler repair and washing, hours per week...	2,000	1,000
Boiler failures on the road.....	10	0

Average Tons Per Train

	1914	1915	Increase Tons	Increase Per cent
Williston to Glasgow (West).	1,180	1,691	511	43½
Williston to Glasgow (East)..	1,602	2,152	550	34
Glasgow to Havre (West)....	1,192	1,769	577	47½
Glasgow to Havre (East)....	1,810	2,297	487	27
Havre to Cut Bank (West)..	936	1,241	305	33
Havre to Cut Bank (East)...	1,466	2,134	668	45½
Whole main line.....	1,364	1,881	517	38

In February, 1919, operating conditions in Montana were quite different and most of those engines were working on other divisions. One remains, however, to prove not only that the loading exceeded that of February, 1915, but that the time was less.

Our boiler washing on treated water districts averages about half what it used to be. The roundhouse cost of handling an engine is much reduced. If we succeed in doing away with pitting and grooving, boiler repairs will be almost nil.

No one need expect to get perfect boiler service the first year after installing a set of treating plants, because there are many things other than water which will make a locomotive boiler leak. In the old hard water days, if a boiler leaked, it was easiest to blame it on the water and let it go. But in our case we found that, with treated water, boilers would go through a North Dakota or Montana winter without a sign of leak, and then the first warm day in spring there would be an epidemic; and it took a long time to trace this to a tendency of inexperienced firemen to imagine that a sun which was hot on the back raised outside air to the temperature of the firebox.

It will be found, too, that in hilly districts there is a constant tendency on the down grade to permit thin spots in the firebox and consequent local flue chilling, and there are other causes of unequal heating and of resultant flue leaking well known to boiler men. In bad water districts so much has been blamed on the water that these other matters have not received as much attention as they deserved; but with the advent of treated water and the co-operation of everyone connected with the boiler service in making a careful report of every case of leaking, we are gradually running down these causes and endeavoring to eliminate them.

This is a cold country for a short time every winter and water-treating plants must be carefully housed and heated.

The cost of the housing and the heating apparatus is more than the cost of the plant proper, but it is a necessity, for in winter the water is worst and must be most carefully treated; in winter engines require more water than in summer because of the heating and other extra work they do, in winter there are more engines for the same traffic because the trains are shorter, in winter much water is wasted at coach hydrants and other places to keep the pipes and hose from freezing, in winter the men are all under strain and a frozen pipe line or a failure at a treating plant might disarrange traffic very badly.

Not only are our plants costly in construction because of the climate and the service we aim to give, but also our operating expenses are heavy because of the constant patrol and inspection maintained. Improperly treated water is little better than water not treated at all; and the amount of treatment depends not alone on the kind of raw water (which itself may change 20 grains per gallon over night), but on the rate of pumping, which may be affected 10 per cent or more by an obstructed suction, a flaw in the pump packing, some derangement of the pumping engine, a drop in the voltage of an electric current, or other causes; and under our rule "Get there before it happens, not after," the inspector's duty is not only the regular and frequent examination of the character of the treated water, but the examination, as regular and frequent, of all the appliances which affect the operation of, or the rate of water flow to, the plant. For this reason, our water inspectors are the trained and promoted pick of our pump repairers.

The sending of a weekly water sample to a chemist a couple of hundred miles away is good enough for record purposes; but how is the chemist to know why the treated water is not correct, or how is he to know that the pump will not be repaired by the time the pumper receives the data for the changed treatment? I have seen many abandoned water-treating plants on railroads and in other places, but never one which had been regularly inspected on the ground. The value of a properly run treating plant for locomotive service is so much greater than the cost of inspection, with interest and depreciation on its cost of construction, and the value of one improperly run is so small that I think there is no question of method. What is worth doing at all is worth doing well. I have never known a case of locomotive priming with properly treated water which I did not consider traceable to the accumulation of sludge from the last 3 grains per gallon of calcium carbonate which cannot be taken out while the water is cold, and I am confidently looking forward to the time when all boilers will have blow-offs in the front and back ends as well as in the throat sheet, *all operated from the cab*, or similarly operated blow-offs connected to properly perforated pipes inside the boiler bottom and the mud ring. Then 5 seconds' blowing would do more good than 60 seconds' blowing under present conditions, and there would be almost no necessity for boiler washing.

Railway Developments in Foreign Countries

New Corporation Organized in America to Finance Public and Private Enterprises in Foreign Countries

An important development in export trade is contained in the announcement Monday of the incorporation under the laws of Delaware of the Foreign Bond & Share Corporation. The purpose of the corporation, according to the statement issued by the Guaranty Trust Company of New York, is to finance public and private enterprises in Central and South America, the Far East, Europe, and other parts of the world. It will also sell to American investors either the debentures of the corporation, which will be covered by the deposit of the securities of these foreign companies, or the foreign securities themselves. It is the intention of this corporation to reach all investors in the United States.

The Foreign Bond & Share Corporation has an authorized capital stock consisting of 100,000 shares of common stock, of the par value of $100 each, and 3,000 shares, with no par value, known as "participating certificates," and a subscribed capital and surplus of $3,000,000.

It is understood, the statement says, that the state department is particularly interested in the development of trade in the manner proposed by the Foreign Bond & Share Corporation.

The organizers of this corporation include private banking firms and some of the strongest financial institutions throughout the United States. Among them are Brown Brothers & Co., J. & W. Seligman & Co., Guaranty Trust Company, Chase Securities Corporation, Central Union Trust Company, Columbia Trust Company, Hayden, Stone & Co.—all of New York; First National Corporation of Boston; Hibernia Bank and Trust Company, New Orleans; First Trust & Savings Company, Cleveland; Anglo & London Paris National Bank, San Francisco; Mercantile Trust Company, Mississippi Valley Trust Company, and interests associated with National Bank of Commerce—all of St. Louis; and the Central Trust Company of Chicago. Other institutions which have expressed their desire to take part in the enterprise will be announced later.

The directors of the corporation are:

John Henry Hammond and Thatcher M. Brown, Brown Brothers & Co.; Frederick Strauss and William P. Philips, J. & W. Seligman & Co.; Albert Breton and Harold Stanley, Guaranty Trust Company of New York; E. V. R. Thayer and R. I. Barr, Chase Securities Corporation; James N. Wallace, Central Union Trust Company of New York; Howard Bayne, Columbia Trust Company; Charles Hayden, Hayden, Stone & Company; John Sherwin, First Trust & Savings Company; R. S. Hecht, Hibernia Bank & Trust Company; Herbert Fleishhacker, Anglo & London Paris National Bank; Adolfo Stahl of New York and Guatemala; J. Hugh Powers, Mercantile Trust Company; Breckinridge Jones, Mississippi Valley Trust Company; J. G. Lonsdale, National Bank of Commerce; Joseph E. Otis, Central Trust Company of Illinois; and Ernest Gregory, First National Corporation of Boston, and Maurice Hely Hutchinson.

A number of the subscribers of the Foreign Bond & Share Corporation are now actively identified with the Asia Banking Corporation, Mercantile Bank of the Americas, the American Foreign Banking Corporation, Banco Mercantile Americano del Cuba, the China & Japan Trading Company, and other American financial institutions which have branches in many parts of the world. The statement brings out the necessity of investment abroad for foreign trade.

"Latin-American, Asiatic, and other countries undeveloped economically, will buy merchandise from the nation which places capital at their disposal, it says. This has been the

history of undeveloped countries. It is in large the secret of the success of the British, German, and French trade in such countries in the past.

"As regards the European countries, they now owe the United States such enormous sums that the mere problem of exchange necessitates the taking of foreign securities by the American public in payment for our exports of merchandise to Europe, if such exports are to continue in anything like their present volume.

"In the past London has been the great international market for the securities of every government of the earth and of the industries that were among the principal sources of national wealth. British investors always have been large buyers of such securities. The new-found financial position of the United States should result in a similar appreciation on the part of American investors of this factor, which is vital to the future of our foreign commerce.

"Rates of investment return in Latin-American, Asiatic, and other countries needing development are higher than in the United States. There is no reason why, under careful supervision, the American investor should not be given the benefit of such attractive rates of investment return, and at the same time have the protection of good security.

"England, France, and Germany in the past have done most of the financing necessary for the development of foreign countries, and have reaped the benefits; but, as they are no longer in a position to supply the amount of capital needed for this purpose, Americans must furnish the larger part of it from now on."

Chilean Railways to Buy Equipment

Felix Nieto Del Rio, of the staff of the Diario Ilustrado, Santiago, in an article written for The Sun (New York), is authority for the statement that Chile hopes to borrow $32,000,000, most of which will be spent during the next three years for railway equipment.

Industrial progress, together with agricultural development due to expanses of land recently irrigated, and the more extensive cultivation of the soil brought about by the increase of population and higher prices of the products, has threatened, he says, to make the Chilean railway system, of which the greater part belongs to the State, incapable of meeting the demand on it, and in this way is jeopardizing the coming prosperity if its deficiencies are not corrected in time.

The remainder of his article follows:

"The total number of ton kilometers transported through the South Central Lines of the Chilean State Railways was: Seventy-nine per cent greater in 1909 than in 1901, 87 per cent greater in 1910 than in 1902, 99 per cent greater in 1911 than in 1903, 105 per cent greater in 1912 than in 1904, and 106 per cent greater in 1913 than in 1905.

"A similar proportion in the increase of passenger traffic was found, the percentages above being replaced respectively by these figures 93 per cent, 92 per cent, 87 per cent, 107 per cent.

"The Chilean Government, due to the actual economic conditions of the country, expects that in the coming years the railway traffic will continue to increase in the same proportion, and has decided to place in the foreign markets the loan that it had been agreed upon to place in the year 1914, but which had been postponed on account of the war, increasing it to $32,000,000. With this resolution the government initiated the policy that determined the law authorizing the loan, that is: To provide the Chilean State railways with the sufficient and adequate equipment necessary to maintain a correct and efficient service, and in the future increase this equipment systematically following the requirements of the production and commerce of the country.

"These investments, required periodically by the increase of traffic, correspond really to an increase in capital. It is expected that these periodical loans, to be made after the $32,000,000 loan, will amount to an average of $3,000,000 yearly. The $32,000,000 will be invested systematically between 1919 and 1925 and the greater amount of this sum will be disposed of during 1920, 1921 and 1922.

"The materials to be bought comply in general with the specifications in use in this country, and as it is of interest to the manufacturers here I insert a rough outline of the different items: Electric lines, feeders and sub-stations, $2,500,000; electric locomotives, $2,100,000, which materials will be used in the electrification of the railway between Valparaiso and Santiago; rolling stock, $5,200,000; railroad shops, $3,100,000; couplers and air brakes, $1,640,000; electric signal system, $1,500,000; reconstruction and reenforcing of bridges, $1,200,000; sidings and double tracking, $2,820,000; coal storages, $800,000; ballast cars, $364,000; buildings, warehouses, machine shops and platforms, $3,600,000.

"Up to date about ten millions have been spent in purchasing equipment belonging to the different items above listed, nearly all of which has been bought in this country.

"It is natural to expect that the country where the loan is placed will get preference in the sale of materials when the offers are as advantageous as those from other sources. This makes the placing of the loan more interesting for American investors, as they will not only obtain the benefit of the interest, but also the benefits that indirectly come to them or their associates in the different branches of the industries when orders are placed."

Uruguay East Coast Railway

Latest advices are to the effect that the Senate of Uruguay has passed a bill without amendment authorizing the purchase by the state of the Uruguay East Coast Railway and the construction of a branch line from La Paloma to Rocha. The government was urged to proceed with the construction of the latter without delay, although it was estimated that it would cost $40,000 per kilometre at the present time.

Germans Ousted From Chinese Railroad Loans

The Chinese Cabinet, says an Associated Press despatch, has agreed to a request by the British, American and French governments that German capital be dissociated from the four-Power railway loan agreement concluded by the Chinese government in 1911, under which each financial group contracted for the construction of assigned sections of the Hankow-Szechuan line. In deference to the wishes of the allied powers the German interests will not be assigned to any other nationality but will be divided among the Americans, British and French.

Special Correspondence from China

PEKING, March 5.

During the closing days of December, the managing director of the Peking Suiyuan line negotiated a loan with Japanese capitalists in the amount of Yen 4,000,000 ($2,000,000), with the line as security. A further provision gives the same capitalists preference whenever foreign money is to be used for extensions to the line. The American firm of Siems-Carey under its opinion on the construction of 1,600 miles of line in China, has marked out a route branching from the further extremeity of this line, but which was given up temporarily under a protest from Russian firm of Siems-Carey under its option on the construction anese loan by two years, it is not anticipated that the American firm will raise any opposition. American firms never have successfully resisted pressure from other nations in China. But the loan is particularly interesting as an indi-

cation of the difficulties of the Chinese government as to funds. This line has been operated at a profit from the very first. It has no funded debt. The purpose of the loan has not been given out. So the inference is that the funds will be loaned to the government for administrative purposes. Up to the present the Chinese have been proud of the fact that the Peking Suiyuan line was "all Chinese,"—built by Chinese engineers and with Chinese money, operated entirely by Chinese forces. That they should now mortgage it to Japanese is very significant.

Exports of Locomotives in February

The exports of locomotives in February totaled 85 with a value of $2,584,269, as compared with 87 in January, valued at $3,076,543. The figures compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce show that nearly one-half the locomotives exported in February from the standpoint of value were shipped to France. The larger part of the remainder were divided among Italy, Cuba and Egypt.

The figures in detail follow:

Countries	Number	Dollars
France	33	1,126,380
Italy	21	962,650
Spain	2	25,800
England	1	1,250
Canada	1	15,000
Mexico	2	21,400
Trinidad and Tobago	1	9,800
Cuba	12	223,423
Chile	2	14,670
Peru	1	11,000
Japan	4	31,350
Philippine Islands	3	24,325
Egypt	2	117,221
Total	85	2,584,269

Exports of Car Wheels and Axles

The exports of car wheels and axles in February, totaling $541,630, were double those of January when exports of these commodities were made, valued at $278,393. The figures as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce, show that nearly one-half the February total was consigned to "Japanese China," and about one-fifth to Canada.

The figures in detail follow:

Countries	Dollars
Denmark	16,700
Italy	33,465
England	18,985
Canada	111,589
Panama	307
Mexico	12,979
Cuba	7,952
Dominican Republic	1,281
Argentina	33,309
Brazil	25,354
Peru	4,647
Venezuela	129
Japanese China	238,945
Straits Settlements	5,500
Japan	22,839
Australia	7,128
New Zealand	67
British South Africa	454
Total	541,630

Exports of Railway Track Material

Exports of railway track material in February showed a considerable increase over January, according to the figures compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce.

Exports of rails totaled 66,900 tons with a value of $6,023,982, as compared with 65,024 tons valued at $4,221,563 in January. Spikes exported in February reached a value of $258,073, as compared with $189,408 in January, while switches, frogs, etc., exported amounted to $905,264 as against $543,330 in January. Over half the total of all three were consigned to France. The figures in detail were as follows:

	Railroad spikes		Rails of steel		Switches, frogs, etc.
Countries	Pounds	Dollars	Tons	Dollars	Dollars
Belgium	.....	.....	422	24,260	8,094
France	2,252,960	165,222	49,400	4,847,312	467,701
Italy	.....	.....	3,476	298,135	88,402
Netherlands	.....	.....	383	18,307	695
Norway	1,567	532	.....	.....	.....
England	.....	.....	.....	.....	1,089
British Honduras	3,000	164	.....	.....	29
Canada	689,500	20,254	2,605	164,281	21,606
Costa Rica	.....	.....	.....	.....	135
Guatemala	2,000	124	.....	.....	.....
Honduras	17,200	1,060	.....	.....	717
Nicaragua	9,000	639	76	4,643	79
Panama	7,245	503	.....	.....	147
Mexico	41,885	2,023	76	5,867	9,845
Barbados	.....	.....	68	7,000	.....
Jamaica	8,000	424	59	3,095	.....
Trinidad	.....	.....	9	689	54
Other Br. West Indies	.....	.....	.....	.....	52
Cuba	681,126	38,704	2,952	184,189	70,938
French West Indies	800	51	.....	.....	400
Dominican Republic	2,000	115	77	4,227	18,233
Bolivia	.....	.....	.....	.....	9,000
Brazil	230,740	14,232	.....	.....	113,278
Chile	23,000	1,853	4	445	4,021
Colombia	28,000	1,966	233	14,710	.....
British Guiana	4,050	280	51	3,712	239
Peru	42,111	2,986	571	41,893	46,198
Uruguay	.....	.....	.....	.....	1,075
Venezuela	3,000	158	.....	.....	.....
China	.....	.....	1,447	79,051	65
Japanese China	.....	.....	223	14,329	.....
Straits Settlements	13,440	835	.....	.....	.....
Dutch East Indies	.....	.....	351	36,751	14,926
French East Indies	.....	.....	.....	.....	3,825
Japan	123,734	5,132	3,474	268,102	18,577
Siam	7,600	240	.....	.....	.....
Australia	470	37	.....	.....	.....
Philippine Islands	13,800	539	826	56,209	5,520
British South Africa	.....	.....	117	6,775	324
Total	4,206,228	258,073	66,900	6,023,982	905,264

Exports of Cars in February

The Division of Statistics of the Bureau of Foreign and Domestic Commerce has added to its detailed compilations of exports of railway material which it began for January a similar compilation for exports of freight and passenger cars. The exports for February were in detail as follows:

	Passenger		Freight and other	
Countries	Number	Dollars	Number	Dollars
France	219	40,708	50	112,600
Canada	...	.....	6	12,000
Mexico	...	.....	47	110,180
Cuba	6	90,060	379	513,041
Haiti	...	.....	55	27,105
Bolivia	...	.....	12	23,100
Chile	...	.....	1	1,225
Ecuador	...	.....	1	110
Dutch East Indies	...	.....	2	5,200
Russia in Asia	...	.....	30	152,567
Total	225	130,768	583	957,128

Americans Are Speeding Up Trans-Siberian Railway

Some improvement is noticeable in the operation of the Trans-Siberian Railway since the Inter-Allied Railway Mission began its work, representatives of the mission say, although the mission has done nothing beyond making a preliminary investigation, says a Canadian press despatch. The reason for the improvement is believed to be due to the fact that Allied officers have been visiting the various stations and jogging up the local officials.

The Trans-Baikal line is hampered seriously by the opera-

tions of General Semenoff, whose armored trains demand much needed rolling stock and whose levies on railway funds tend to disorganization.

Rumors of Bolshevik uprisings have caused the officials to use the greatest vigilance in operating the trains.

A Three-Minute Railway Strike in France on May 1

Press despatches from Paris report that the role to be played by the railroad men in the May 1 demonstration has been decided by the General Federation of Labor to consist in the main feature of a three-minute stoppage of trains at or about 10 o'clock in the morning. The stoppage is to be entered in the train logs as "The manifestation of May 1, by order of the Federation." The central office and workshop staffs will lay off for 24 hours, while the depot staffs will stop work for periods of from 15 minutes to three hours, according to the nature of their service.

The union's instructions explicitly state that the stoppages must not in any way endanger the public, special gangs being assigned to make any urgent repairs necessary to the tracks, etc., and the union expressly disclaims all responsibility for individual acts done outside of its instructions.

This decision followed a meeting on April 15 at which the delegates of the unions of the railroad workers, miners, dock workers, metal workers, sailors and general transport workers decided to unite in efforts to obtain recognition of the demands of the workers, especially an eight-hour day and increased wages.

Delegates recognized that the demands of individual unions had been satisfied in many cases, but decided that the members of the unions should not work on May Day, in order to show the power of the organized working classes and the spirit of solidarity. They adopted a resolution, giving the results of the negotiations in detail. The first part, dealing with the railroad union said that definite engagements had been made regarding the eight-hour day and the scale of wages, and that two commissions are in session arranging details.

London Business Interests Oppose British Transport Bill

Representatives of a number of business associations meeting in London recently brought out strong arguments against the proposed Ministry of Ways and Communications Bill and passed resolutions strongly opposing particularly the inclusion of the control over public docks and piers and any alteration in the existing control and management of the Port of London. It was declared that the work of the Port of London authority was complex and efficient and that it was better to let well enough alone.

The bill was perilously overweighted, the meeting declared, and there were other grave objections, the most striking of which was that arbitrary powers were conferred on the minister to override the statutory rights of the undertakings which he was to control. Another objection, greatly affecting London, was the inclusion of the docks in the general scheme. Before that was done some good argument for their inclusion should be brought forward.

The ground the minister took was that the docks were essential to the scheme because they were the great terminal points of the railways. That was not a correct expression so far as London was concerned, it was brought out, for 90 per cent of the produce imported into London docks did not pass on to the railway lines direct from the ship. Besides, vast quantities of goods came into London that never passed at all on to the railway lines, but were reshipped to the near continental or coastwise ports.

Foreign Railway Notes

On February 20, by ministerial order, the managing director of the Peking-Suiyuan railway was created director of aerial navigation. Subsequent reports state that ten Handley-Page machines have been purchased through the Peking Syndicate for use between Kalgan and Urga. These machines are said to be capable of carrying 20 passengers or three tons of freight, and will make the complete trip in ten hours. At present by caravan the trip requires 30 days and by automobile from three to five days. During winter,—six months of the year—the route is closed by snow. An unconfirmed report gives that a loan of $10,000,000 (Mex.) has been obtained from Japanese sources for the development of aerial navigation.

The Taokow Chinghua line is about to begin work upon a branch line of 37 miles from Chinghuachen to Menghsien. The latter point is on the Yellow river, which offers a means of distributing a considerable portion of the coal business arising some ten miles east of Chinghuachen. Due to the poor navigability of the river during a large portion of the year, it is not anticipated that any large tonnage will be diverted from the usual rail haul to the Peking-Hankow line. The funds are being supplied by the Peking Syndicate, owner of the mines in question.

The Peking-Suiyuan line is about to begin work upon a short branch line to an iron mine a little north of Kalgan. The principal stockholders in the mine are the managing director of the Peking-Suiyuan railway, the Minister of Communications, the former Minister to Japan, now head of the Japanese Exchange Bank of China, and other high officials in the present government. It is understood that ore will be shipped to the Hangyang Iron Works at Hangyang, about 1,000 miles to the south. The latter is under contract to sell its entire output to Japanese merchants.

On February 22, the Standing Committee of the Unification of Railway Accounts and Statistics finished its labors upon a standard set of forms with rules to govern to be used at all stations for accounting purposes. While ministerial sanction is necessary before the standardized system is in force, it is believed that this will be forthcoming. Six months' preparation will be required upon lines using the daily system of reports. All of the French lines come under this category. The committee will next attempt to standardize store accounts and construction accounts.

The through traffic administration has recently perfected plans for the interchange of rolling stock upon the basis of equivalent tonnage. That is, no obligation will rest with respect to the return of a particular car, but per diem charges will be calculated upon the difference in tonnage borrowed and tonnage lent. Settlements will be made through the Clearing House in the Ministry of Communications.

No subject has given rise to more heated discussion in Peking than the unofficial proposal to consolidate the foreign interests in Chinese railways. British and American policy is decidedly pro, Japanese influence is con, while French interests seem to have adopted a waiting attitude. Chinese opinion is distinctly divided. The Minister of Communications is opposed. Outside of his following, official and unofficial opinion is favorable.

Disastrous Collision in France

By a collision between a passenger train and a standing train at Crisse, near LeMans, France, on the 17th of April, 16 American and 17 French soldiers were killed and 45 persons were injured.

Doings of the United States Railroad Administration

Tie Producers Urge Restoration of Competitive Buying—Number of Employees and Pay on Class I Roads

WASHINGTON, D. C.

THE RAILROAD ADMINISTRATION has executed compensation contracts with the Port Camden Ferry Company, providing for an annual payment of $401,556, and the Baltimore, Chesapeake & Atlantic providing for an annual payment of $86,647.

Locomotives Returned to Home Roads

Practically all of the locomotives that have been used during the past year on railroads other than those of their owners, in accordance with the Railroad Administration's plan of pooling facilities, have now been returned to their home roads or are in repair shops on their way home. Instructions were issued about March 1 that when leased locomotives could be returned to their owning roads without inconvenience and without serious interruption to traffic it should be done as a large number of the roads at that time had locomotives of their own in storage. Nearly 800 locomotives at that time were being operated under lease by roads other than their owners. They have been repaired and put in good shape before return at the shops where the work could be most conveniently done. In many cases, particularly where locomotives were returned from eastern or southern roads to the western lines, it was necessary to use very roundabout routes because of insufficient clearance.

Tie Producers Ask Restoration of Competitive Buying

President John W. Fristoe and a committee representing the National Association of Tie Producers called on officers of the Division of Purchases at Washington last week to urge changes in the methods of the Railroad Administration in the purchase of cross ties for the purpose of restoring competitive buying by the railroads. The committee presented a statement regarding conditions affecting the production and purchase of ties, together with a series of specific suggestions, which were taken under advisement for a definite reply when the director of purchases, Henry B. Spencer, returns from a western trip, but no encouragement was held out to the tie producers to think that the present plan, by which each railroad acts as the agent for the other railroads in the purchase of ties, would be done away with. They were urged to produce as many ties as possible with the assurance that there would be a market for all that meet the specifications.

The statement presented by the committee expressed appreciation and endorsement of the principle of standard specifications for cross ties as a step toward permanent improvement, but objection was made to the plan of fixed prices and limitations of markets. The specific suggestions were that roads on which ties are produced should continue to purchase at present prices such ties as are offered up to November 1; that any railroad may immediately enter into contracts with individual tie producers at prices not to exceed those now in effect at point of shipment up to November 1, provided the quantities and kinds of ties contracted for are approved by the Railroad Administration; that all cross ties should be inspected by regional inspectors at the point of shipment and that the purchase of cross ties for delivery after November 1 should be made in accordance with the following plan:

1. The railroad should register their annual cross tie requirements with the Division of Purchases and all ties should be purchased in accordance with national standard specifications.

2. All ties should be inspected by regional inspectors in accordance with standard rules for application of the specifications.

3. Individual roads should enter into contracts for their tie requirements direct with responsible tie producers, filing copies of the contracts with the Railroad Administration.

4. All contracts should be awarded only after fair and open competition has developed the lowest price per tie obtainable from responsible tie producers.

The statement also included other detailed suggestions.

Number and Compensation of Employees

The January, 1919, pay roll of the Class I railroads under federal control was $230,800,589 for 1,848,774 employees, as compared with $153,039,988 for 1,703,748 employees in December, 1917, according to a statement compiled by the Operating Statistics Section, which shows the effect of the wage increases during 1918 as between the different classes of railway employees, together with the numbers, the days and hours worked, the compensation per day and per hour, and the percentage of change in the unit compensation for each of the 68 classes prescribed by the Interstate Commerce Commission. The average increase in unit compensation was 48 per cent, the range being from a 20 per cent reduction for general officers receiving $3,000 per annum and upwards, up to 98 per cent for structural iron workers and 99 per cent for "other yard employees."

The increase in the number of employees was 145,026 or 8.5 per cent and the average compensation per employee in January was about $125, as compared with about $90 in December, 1917. This would amount to an average of $1,500 per year, as compared with an average for the year 1917 of $1,004.

The increase in the number of employees was the greatest in the territory where the war traffic had been concentrated, notably in the Allegheny region, where the increase was 15.4 per cent. The number and percentage of increase in the total employees by regions and districts is as follows:

	January, 1919.	December, 1917.	Per cent Increase.
New England District	89,822	87,324	2.8
Central District	286,334	282,179	1.4
Ohio-Indiana District	50,634	49,373	2.5
Eastern Region	426,790	418,876	1.9
Allegheny Region	403,975	350,014	15.4
Pocahontas Region	58,028	51,390	12.9
Southern Region	257,314	229,320	12.2
Northwestern Region	240,110	217,307	10.5
Central Western Region	300,833	285,226	5.4
Southwestern Region	161,724	151,615	6.7

The number of days worked in January for those employees whose time is reported by days was 6,156,896, as compared with 5,819,461 in December, 1917, and the number of hours worked, for those reported on an hourly basis, was 391,444,564 as compared with 387,696,988. The 1,644,000 employees paid by the hour worked an average of 238 hours in January, 1919, whereas 1,507,000 in December, 1917, worked an average of 257 hours. The average daily compensation for those reported by the day increased from $3.52 to $4.83, and the average per hour from $.342 to $.514. The weighted average for the increase is 48 per cent.

The average daily compensation of general officers receiving over $3,000 per annum shows a decrease of 20 per cent,

EMPLOYEES AND THEIR COMPENSATION

MONTH OF JANUARY, 1919, COMPARED WITH MONTH OF DECEMBER, 1917—CLASS I ROADS UNDER FEDERAL CONTROL

	Class of employee	Number of employees Jan., 1919	Number of employees Dec., 1917	Days worked Jan., 1919	Days worked Dec., 1917	Hours worked Jan., 1919	Hours worked Dec., 1917
1	General officers, $3,000 p. a. and upwards	4,370	4,251	127,747	119,215	.....	.....
2	General officers, below $3,000 per annum	4,481	3,201	65,669	88,841	.....	.....
3	Division officers, $3,000 p. a. and upwards	3,712	1,717	111,278	42,182	.....	.....
4	Division officers, below $3,000 per annum	8,762	9,419	251,705	298,164	.....	.....
5	Clerks, $900 p. a. and upwards (except No. 37)	205,885	108,185	.....	.....	47,108,809	24,088,379
6	Clerks, below $900 per annum (except No. 37)	8,903	86,912	.....	.....	1,515,966	20,716,997
7	Messengers and attendants	9,822	8,810	281,871	242,015	.....	.....
8	Assistant engineers and draftsmen	10,694	10,810	289,067	288,585	.....	.....
9	M. W. & S. foremen (excluding Nos. 10 and 28)	7,769	7,786	237,528	226,174	.....	.....
10	Section foremen	39,702	39,443	1,178,324	1,138,383	.....	.....
11	General foremen—M. E. department	1,745	1,665	53,019	45,168	.....	.....
12	Gang and other foremen—M. E. department	21,399	18,429	648,421	532,500	.....	.....
13	Machinists	54,382	42,973	.....	.....	12,592,995	10,651,011
14	Boiler makers	16,960	13,469	.....	.....	4,078,782	3,411,669
15	Blacksmiths	9,925	8,369	.....	.....	2,074,276	1,878,208
16	Masons and bricklayers	1,350	1,330	.....	.....	269,289	297,177
17	Structural ironworkers	566	852	.....	.....	153,649	192,511
18	Carpenters	56,057	50,848	.....	.....	12,131,975	11,883,446
19	Painters and upholsterers	11,064	9,878	.....	.....	2,274,912	2,223,531
20	Electricians	12,061	9,894	352,501	287,368	.....	.....
21	Air-brake men	7,328	5,846	.....	.....	1,587,555	1,636,340
22	Car inspectors	24,902	20,763	.....	.....	6,336,603	6,811,054
23	Car repairers	81,799	66,443	.....	.....	18,236,118	15,948,946
24	Other skilled laborers	57,674	55,201	.....	.....	13,205,187	14,030,197
25	Mechanics' helpers and apprentices	110,870	92,018	.....	.....	24,801,164	23,097,913
26	Section men	249,015	212,663	.....	.....	59,495,365	53,320,778
27	Other unskilled laborers	122,881	104,050	.....	.....	29,444,243	27,026,316
28	Foremen of construction gangs and work trains	2,162	2,239	.....	.....	518,930	707,328
29	Other men in construction gangs and work trains	30,099	28,651	.....	.....	6,697,610	7,119,116
30	Traveling agents and solicitors	1,252	5,245	33,262	149,383	.....	.....
31	Employees in outside agencies	981	1,342	34,133	43,579	.....	.....
32	Other traffic employees	379	510	10,200	12,623	.....	.....
33	Train despatchers and directors	5,399	5,158	.....	.....	1,327,900	1,328,309
34	Telegraphers, telephoners and block operators	21,914	20,975	.....	.....	5,222,225	5,136,759
35	Telegraphers and telephoners operating interlockers	7,945	7,588	.....	.....	1,893,374	1,910,410
36	Levermen (non-telegraphers)	3,972	3,513	.....	.....	969,160	993,865
37	Telegrapher-clerks	11,412	11,178	.....	.....	2,820,176	3,052,479
38	Agent-telegraphers	18,782	19,149	.....	.....	5,158,275	5,848,196
39	Station agents (non-telegraphers)	14,035	14,411	441,531	452,606	.....	.....
40	Station masters and assistants	669	614	19,518	19,520	.....	.....
41	Station service employees (except Nos. 5, 6, 37, 38, 39, 40 and 66)	101,626	110,647	.....	.....	24,834,419	30,206,592
42	Yardmasters	4,031	3,835	126,571	124,312	.....	.....
43	Yardmasters' assistants (not yard clerks)	3,571	3,080	109,475	93,484	.....	.....
44	Yard engineers and motormen	19,800	20,355	.....	.....	4,867,441	5,593,160
45	Yard firemen and helpers	20,694	20,821	.....	.....	4,889,536	5,639,441
46	Yard conductors (or foremen)	19,870	20,362	.....	.....	4,800,808	5,472,878
47	Yard brakemen (switchmen or helpers)	51,417	50,874	.....	.....	11,749,143	13,139,861
48	Yard switch tenders	5,572	4,841	.....	.....	1,535,967	1,534,079
49	Other yard employees	4,610	3,663	.....	.....	1,252,221	1,180,765
50	Hostlers	9,908	8,493	.....	.....	2,972,926	2,859,587
51	Engine-house men	71,066	60,439	.....	.....	21,425,629	19,191,693
52	Road freight engineers and motormen	31,974	32,923	.....	.....	7,749,304	8,849,605
53	Road freight firemen and helpers	34,409	35,549	.....	.....	7,823,401	8,896,511
54	Road freight conductors	25,335	26,320	.....	.....	6,580,869	7,556,378
55	Road freight brakemen and flagmen	62,858	65,242	.....	.....	15,738,811	18,029,699
56	Road passenger engineers and motormen	11,810	12,826	.....	.....	2,724,306	2,877,377
57	Road passenger firemen and helpers	11,622	12,433	.....	.....	2,636,626	2,778,482
58	Road passenger conductors	10,026	10,507	.....	.....	2,337,848	2,460,948
59	Road passenger baggagemen	5,258	5,532	.....	.....	1,254,982	1,352,449
60	Road passenger brakemen and flagmen	13,881	14,362	.....	.....	3,200,223	3,356,350
61	Other road train employees	3,627	3,697	.....	.....	881,618	892,522
62	Crossing flagmen and gatemen	20,775	15,569	663,069	474,942	.....	.....
63	Drawbridge operators	1,479	1,267	52,121	41,803	.....	.....
64	Floating equipment employees	7,841	8,243	.....	.....	2,273,867	2,517,476
65	Express service employees	1	1	.....	.....	81	200
66	Policemen and watchmen	10,738	12,275	331,808	389,373	.....	.....
67	Other transportation employees	5,917	5,492	209,510	175,669	.....	.....
68	All other employees	18,009	18,202	528,568	533,572	.....	.....
69	Totals	1,848,774	1,763,748	6,156,896	5,819,461	391,444,564	387,696,988

	Class of employee	Compensation Amount Jan., 1919	Amount Dec., 1917	Per day Jan., 1919	Per day Dec., 1917	Per hour Jan., 1919	Per hour Dec., 1917	Per cent change in unit compensation
1	General officers, $3,000 p. a. and upwards	$2,051,254	$2,395,628	$16.07	$20.10	....	....	d 20
2	General officers, below $3,000 per annum	442,654	512,579	6.74	5.77	....	....	17
3	Division officers, $3,000 p. a. and upwards	1,217,927	460,500	10.94	10.92	....	....	a
4	Division officers, below $3,000 per annum	1,785,883	1,554,238	7.10	5.11	....	....	39
5	Clerks, $900 p. a. and upwards (except No. 37)	24,015,479	10,349,137	....	....	$0.510	$0.430	19
6	Clerks, below $900 per annum (except No. 37)	469,555	5,176,968	....	....	.310	.250	24
7	Messengers and attendants	713,101	389,948	2.53	1.61	....	....	57
8	Assistant engineers and draftsmen	1,480,475	1,132,279	5.12	3.92	....	....	31
9	M. W. & S. foremen (excluding Nos. 10 and 28)	1,763,985	832,296	5.32	3.68	....	....	45
10	Section foremen	4,668,256	3,084,905	3.96	2.71	....	....	46
11	General foremen—M. E. department	440,679	225,917	8.31	5.00	....	....	66
12	Gang and other foremen—M. E. department	4,388,800	2,253,167	6.77	4.23	....	....	60
13	Machinists	9,047,042	5,419,490	....	....	.719	.509	41
14	Boiler makers	2,509,803	1,719,544	....	....	.713	.504	42
15	Blacksmiths	1,466,427	928,293	....	....	.707	.494	43
16	Masons and bricklayers	168,920	107,576	....	....	.627	.362	73
17	Structural ironworkers	115,684	73,420	....	....	.753	.381	98
18	Carpenters	7,018,106	4,154,224	....	....	.579	.350	65
19	Painters and upholsterers	1,394,637	848,462	....	....	.613	.382	60
20	Electricians	1,895,101	926,027	5.38	3.22	....	....	67
21	Air-brake men	958,936	588,059	....	....	.604	.359	68
22	Car inspectors	3,783,853	2,201,447	....	....	.597	.323	85
23	Car repairers	10,365,776	5,831,462	....	....	.568	.366	55
24	Other skilled laborers	8,236,628	5,244,247	....	....	.624	.374	67
25	Mechanics' helpers and apprentices	11,670,454	6,825,060	....	....	.471	.296	59
26	Section men	22,116,352	11,372,899	....	....	.372	.213	75
27	Other unskilled laborers	12,165,831	6,635,365	....	....	.413	.246	68
28	Foremen of construction gangs and work trains	279,447	227,718	....	....	.539	.322	67
29	Other men in construction gangs and work trains	2,659,776	1,697,182	....	....	.397	.238	67
30	Traveling agents and solicitors	211,717	809,232	6.35	5.42	....	....	17
31	Employees in outside agencies	156,490	160,659	4.59	3.69	....	....	24
32	Other traffic employees	64,476	63,831	6.32	5.06	....	....	25
33	Train despatchers and directors	1,214,446	802,874	....	....	.915	.604	51

	Class of employee	Compensation: Amount Jan., 1919	Amount Dec., 1917	Per day Jan., 1919	Per day Dec., 1917	Per hour Jan., 1919	Per hour Dec., 1917	Per cent change in unit compensation
34	Telegraphers, telephoners and block operators	2,826,107	1,690,418	....	....	.541	.329	64
35	Telegraphers and telephoners operating interlockers	1,065,020	648,654	....	....	.563	.340	66
36	Levermen (not telegraphers)	480,964	260,794	....	....	.496	.262	89
37	Telegrapher clerks	1,497,267	896,806	....	....	.531	.294	81
38	Agent telegraphers	2,822,118	1,675,803	....	....	.547	.285	92
39	Station agents (non-telegraphers)	1,932,426	1,330,976	4.38	2.94	....	....	49
40	Station masters and assistants	101,404	66,970	5.20	3.43	....	....	52
41	Station service employees (except Nos. 5, 6, 37, 38, 39, 40 and 66)	10,126,340	7,164,361	....	....	.408	.237	72
42	Yard masters	970,050	605,839	7.67	4.87	....	....	57
43	Yardmasters' assistants (not yard clerks)	712,328	418,949	6.51	4.48	....	....	45
44	Yard engineers and motormen	3,350,637	3,025,069	....	....	.688	.541	27
45	Yard firemen and helpers	2,369,162	1,918,553	....	....	.485	.340	43
46	Yard conductors (or foremen)	3,054,313	2,640,518	....	....	.636	.483	32
47	Yard brakemen (switchmen or helpers)	7,056,575	5,690,199	....	....	.601	.433	39
48	Yard switch tenders	532,597	365,213	....	....	.347	.238	46
49	Other yard employees	466,631	222,327	....	....	.374	.188	99
50	Hostlers	1,504,564	941,060	....	....	.506	.329	54
51	Engine-house men	9,065,710	4,643,739	....	....	.423	.242	75
52	Road freight engineers and motormen	6,390,593	6,258,403	....	....	.825	.707	17
53	Road freight firemen and helpers	4,817,163	4,059,644	....	....	.616	.456	35
54	Road freight conductors	4,553,106	4,313,747	....	....	.692	.570	21
55	Road freight brakemen and flagmen	8,543,495	6,949,781	....	....	.543	.385	41
56	Road passenger engineers and motormen	2,686,215	2,584,447	....	....	.987	.898	10
57	Road passenger firemen and helpers	1,830,477	1,552,220	....	....	.694	.559	24
58	Road passenger conductors	1,947,835	1,818,760	....	....	.833	.739	13
59	Road passenger baggagemen	722,770	569,554	....	....	.576	.421	37
60	Road passenger brakemen and flagmen	1,855,681	1,421,430	....	....	.580	.424	37
61	Other road train employees	414,008	276,235	....	....	470	.309	52
62	Crossing flagmen and gatemen	1,759,982	751,899	2.65	1.58	....	....	68
63	Drawbridge operators	158,671	88,618	3.04	2.12	....	....	43
64	Floating equipment employees	1,046,407	763,084	....	....	.460	.303	52
65	Express service employees	11	50	....	....	.136	.250	d 46
66	Policemen and watchmen	1,143,516	962,869	3.45	2.47	....	....	40
67	Other transportation employees	708,035	427,405	3.38	2.43	....	....	39
68	All other employees	1,450,461	1,060,961	2.74	1.99	....	....	38
69	Totals	$230,800,589	$153,039,988	$4.83	$3.52	$0.514	$0.342	48

d—Decrease. a—Less than one-half of one per cent.

but the number of such officers shows an increase from 4,251 to 4,370, while the average for those paid less than $3,000 has increased 17 per cent, and their number has decreased from 3,201 to 2,481. This shows the effect of the cutting off the operating pay roll or reducing the pay of the higher salaried officers, while the lower paid officers have had their compensation increased. The total number of general officers has been reduced from 7,452, who were paid a total of $2,908,207, or an average of $390, in December, 1917, to 6,851, paid $2,493,908, or an average of $364, in January, 1919, a saving of 601 in number and of $414,299 in salaries.

The number of division officers paid $3,000 a year and over also shows an increase, from 1,717 to 3,712, while the number receiving less than $3,000 has been decreased from 9,419 to 8,762.

The number of employees for 1919 is as of January 16. The number for 1917 is as of a typical day of the week of December 16. The mileage covered for 1919 is 228,571 and for 1917, 228,914.

The largest increases in the number of employees are shown in the mechanical department. A considerable reduction is shown in the number of train employees, attributable to the decreased volume of traffic.

The details are given in the accompanying table.

Modification of Shipping Day Plan

Director General Hines announces that as a result of conferences with representatives of the National Industrial Traffic League and some of the state railroad commissioners regarding the movement of less than carload freight, decision has been reached as follows:

"Shippers shall not be deprived of the right to route less carload freight over any line at the legal rates applicable or of delivering it at point of origin to such carrier on any week day except holidays during the established hours of service. Preferred routes will be established on the basis of convenience of patrons, economy, despatch and proper destination of railroads not under federal control and less carload freight will be routed accordingly except when routed by shipper at shipping points.

"Where it can mutually be arranged between representatives of the shipping public and the carriers schedules will be arranged covering forwarding of less carload freight from such points in through cars or set out cars on specified days, it being understood that such cars be forwarded daily except Sunday and holidays, when tonnage is offered in sufficient amount.

"Peddler cars are to be operated on all week days but holidays except when a less frequent service meets the requirements. The foregoing shall not be construed as requiring the establishment of additional train service."

This is in accordance with the report of a committee at the conference, which was published in our issue of April 11.

Certificates of Indebtedness

Up to Thursday the Railroad Administration had issued and delivered certificates of indebtedness to equipment companies on account of amounts due for cars and locomotives to the amount of about $14,000,000 and about $2,000,000 certificates had been signed ready for delivery. The total indebtedness to equipment companies is now about $60,000,000, and certificates will be issued on application which can be used as collateral either at banks or, if necessary, for loans from the War Finance Corporation. They are issued in denominations convenient for payment to specialty and material companies for their bills against equipment companies. The Administration has also begun the issuance of certificates to railroad companies to meet their May 1 requirements, and will issue for that purpose about $70,000,000.

Steel Controversy Reopened

President Wilson has declined to take sides in the controversy between the Industrial Board of the Department of Commerce and the Railroad Administration regarding steel prices but has sent a cablegram to Secretary Redfield, the effect of which is to direct the reopening of negotiations in another effort to reach common ground. Secretary Redfield had asked the President whether the board should be disbanded or remain quiescent until his return. Chairman Peek of the board immediately wrote to Mr. Hines, who is in the west, suggesting a new conference, and the board began to prepare for further conferences with other industries.

Director General Hines announced that in order to make effective the policy already announced as to publicity in connection with railroad fuel contracts it has been decided to post on all bulletin boards or in a record book open to the public at the headquarters of the purchasing agent of each railroad under government operation the following facts: The name of the coal company or coal operator to whom a contract for railroad coal has been allotted by the railroad in question, the price of the coal contained in the contract, the tonnage involved in the contract, the duration of the contract. Through this method the information will be made available not only to coal miners and coal operators, but, the public generally.

A conference between Mr. Peek and R. S. Lovett and Henry Walters of the Railroad Administration advisory committee on purchases was to have been held on Monday but was postponed because of the illness of Judge Lovett. There have been other cablegrams from the President to Mr. Hines and to Secretary Redfield but they have not been given out. It is reported that the members of the Industrial Board have prepared letters of resignation but that they have been withheld pending new developments.

Disputes Between Employees Organizations

Director General Hines has announced in supplement 22, General Order 27, that he will not become involved in jurisdictional disputes between organizations of employees which in some instances have demanded removal of employees because of belief that classification of employees named in wage orders established rights to such demands and have claimed that wage orders have established jurisdiction for certain organizations over all employees of certain classes. No order or supplement has such intent, he says.

Contracts with 70 Roads

The Railroad Administration to April 17 had executed standard compensation contracts with 70 roads; 62 of these were Class 1 roads. There were 68 contracts with a total annual compensation of $529,000,000, and two contracts with a lump sum of $121,000.

Side Lights on the Russian Railroad Situation

RUSSIA'S WAY of operating railroads is described in an entertaining fashion by Major Benjamin O. Johnson of the American Railway Mission to Russia in a letter to his father, Olaf Johnson of Worcester, Mass. Writing under the date of October 3 about conditions on the Russian railways as he found them Major Johnson says:

"I can not tell you what I am doing at the present time, so will proceed to tell you something of the Russian way of running a railroad. All the State railways of Russia are divided into small lines of about 1,500 miles in length. Each of the small lines has a complete general and supervisory organization; is actually about four times our force in the States. Office forces work from 9 to 3 with some 10 or 15 minutes for tea about noon. The real officers and heads of departments show up about 10 and leave about 2.

"When it is considered that the Russian officer in any line of work is the inventor of thoughtful, systematic, effective and perfected procrastination, and also in the noble art of 'passing the buck,' it is really most surprising that they are only four times as heavily officered as we are in America.

"Along the lines of organization, every railroad officer must be a graduate engineer. The common ruck never has a look-in. You have read stories and seen plays of comic opera South American armies with 50 generals and 10 soldiers. The Russian way of running a railroad is along the same lines, and the comedy of the situation never appeals to the Russian railway officers. When it comes to morals for this office-holding class there is no such animal. Honesty, ditto, ditto. So much for the officers and their staffs.

"The rank and file of the Russian railway workmen are as fine a bunch of workmen as are found in the world. They are about 75 per cent. as efficient as our men, but are steady, good-natured and very good workmen. Bolshevism is simply the misdirected expression of a class of workmen against the officer class.

"There is no middle class in Russia. Either you are to the purple born or you are a roughneck.



With the Czecho-Slovaks in Siberia—Taking Water from a Wayside Brook

"Please don't understand that the Russian people average to Americans. They have many undesirable qualities, but they are honest. They don't know what they want. They don't know what liberty is, but they want it. They are coming out from their 'liberty jag' and are waking up. My sympathies are certainly with the Russian common people as against their so-called 'intelligentia' class.

"I can give you one very good illustration of the difference. Along Lake Baikal, on the Siberian Railroad, are 41 tunnels. The cut stone and masonry, the brick work and, in fact, all the workmanship is something splendid. The engineering is a joke.

"To start with, the locating engineers could have avoided half these tunnels on the present alignment and, by leaving the lake, could have avoided this tunnel district entirely. In other words, the engineers fell down, but the workman did his share satisfactorily. This runs through all the engineering work I have seen.

"The old Russian governing class still believes in the divinity of the class. I heard a very highly educated Russian, who had been converted to the republican theory, express himself that he believed absolutely in the democratic form of government. Franchise was to be universal, excepting that the workingmen must not be permitted to vote as they had no idea of their own best interests. He was just as serious about this as he could be, and could not be convinced that what he was talking about was not a democratic form of government at all. Yes, the Russian 'intelligentia' is impossible. In any event, every officer so conducts himself that you can never fasten anything on him.

"Physically speaking, the Russian railways are in very good shape. I venture the opinion today there is not one single American trans-continental line in the splendid physical condition of the trans-Siberian. Of course, the little organization they ever had is entirely gone, but the rank and file, through all the confusion, has gone ahead getting out ties, putting them in, raising joints and keeping the property up.

"During the big drive across Siberia we had considerable fighting at the divide between Lake Baikal and Pacific watersheds. To cross this summit is quite a bunch of 1.75 grade. When we got to the near side of the foot of the hill we were so close to the trail of the Magyars and Bolsheviki that they could not stop to blow up any bridges or fuss up any railroad until they could get a few miles ahead of us. So over this mountain we tore—the enemy ahead in some 75 trains and we behind in some 60. Our head end, which was our train, had to feel our way over. They took out some rails and then ran a bunch of equipment into the open gaps at the far foot of the hill. We were only two hours getting a hole through and away we went again.

"Do you know that the movement of these 135 trains was made over the hills without accident of any kind? Of course, we had double track to operate on and opposing business was extremely light. Practically all enginemen handling the Czech trains were from the Ural district and mind you, no air, nothing but water and hand brakes. That is the kind of a workman the Russian workman is.

"I remember well my own sensations at the summit. We had about 40 cars—no air—and I went over to the head end and asked the engineer if he had ever been over here before, and he told me he had never been east of Omsk before. Going down this hill, not knowing what the bunch ahead was doing on the water and hand brakes on every car—to put it mildly, I was quite nervous.

"In reading over the above I note that I omitted the most important part which is that the mountain movement in question was made in 48 hours. It was wonderful."



A Czecho-Slovak Armored Train at Chaljabinsk, on the Trans-Siberian

Chamber of Commerce Report on the Business Situation

A COMPREHENSIVE REPORT on the business situation issued by the Chamber of Commerce of the United States says: "The railroads are in serious condition. This seems chronic, and is due largely to the increase in salaries and wages, which is not offset by heavy increases in freight and passenger charges. To return the roads to their stockholders in their present condition would mean bankruptcy to the entire system. There must first be a thorough readjustment between expenses and revenues. Meanwhile the roads must naturally experience a decline in their volume of business at least for a time, because of withdrawal of Government transportation created by the war and the present smaller volume of domestic business." The report also comments on the effect on lumber business because the largest single consumers, the railroads, are slow in buying, and railroad buying of iron and steel products is light.

The American Association of Freight Agents will hold its annual meeting at Cleveland, Ohio, on June 17, 18, 19 and 20. E. L. Kemp, Union Stock Yards, Chicago, is president of the association, and R. O. Wells, Chicago, is secretary.

The Canadian Government and the Grand Trunk Pacific

THE EVENTS which immediately preceded the appointment on March 8 of the Honorable J. D. Reid, Minister of Railways, Dominion of Canada, as receiver for the Grand Trunk Pacific Railway Company, because of their unusualness and unexpectedness, constitute an interesting chapter in the development of Canada's railways and their relation to the Dominion government, and throw some light on the present railway situation in Canada. This action, according to governmental announcements, was taken mainly because of the peremptory notice given by A. W. Smithers, chairman of the board of directors of the Grand Trunk Railway Company, that on March 10, one week after the information was given, operations on the entire Grand Trunk Pacific Lines west of Winnipeg would be discontinued.

The financial condition of this road for the past few years has been very serious and the Grand Trunk Railway Company, which originally took $25,000,000 stock in the Grand Trunk Pacific, is now liable for about $97,000,000, and the government, owing to the payments of deficits and guarantee of bonds is liable for approximately half of the estimated cost of the road or $100,000,000. The actual correspondence and negotiations which led up to the acquisition of the Grand Trunk Pacific by the government grew out of the decision of the Dominion government not to ask Parliament to provide further funds for the Grand Trunk Pacific while negotiations with the Grand Trunk, the parent company, were in an alleged unsatisfactory condition.

Frank Scott, vice-president and treasurer of the Grand Trunk Pacific on February 25, wrote Sir Thomas White, finance minister, and acting prime minister, in part, as follows:

"I am in receipt of a cable from Mr. Smithers stating that in the anticipation of receiving the balance of the appropriation of $7,500,000, viz., $951,911, to apply for interest on Grand Trunk Pacific debenture stock due March 1, payment was duly advertised. In consequence, however, of the remittance being coupled with the condition that it is to be used only for operating obligations, the company will be unable to meet the interest due on March 1, and a serious situation will result."

To this letter Sir Thomas White replied as follows:

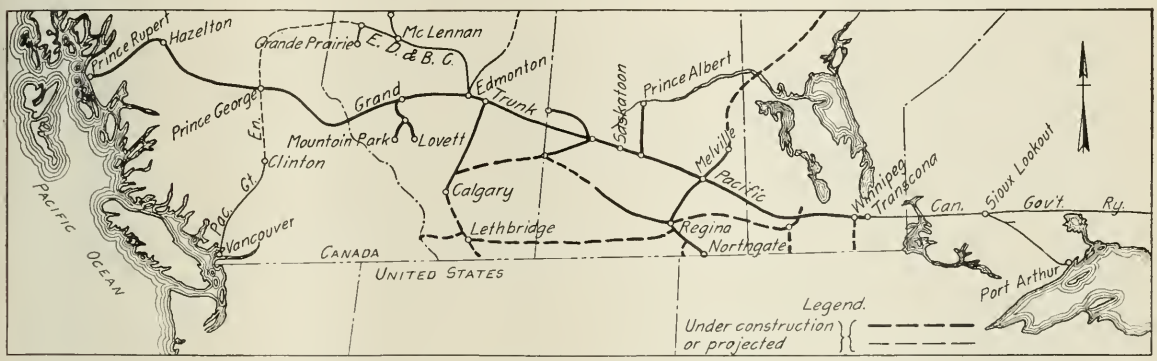
"With reference to the balance of the appropriation of the vote of $7,500,000 by parliament, $923,311 was paid to your company on your certificate No. 10, dated January 28, 1918, approved by the acting Deputy Minister of Railways. This certificate expressly states that this sum is 'on account of cash deficit in the operations of the company from April 1 to November 30, 1918, inclusive,' and 'is required to enable the company to meet its operating obligations.' The small balance of the vote amounting to about $28,000 will, I understand, be required for the same purpose. There seems no doubt that the deficit in operation should have priority over all other charges.

"I have already informed Mr. Kelley, president of the company, and yourself, that it is not the intention of the government to ask Parliament to provide a further vote for the Grand Trunk Pacific while our negotiations with the Grand Trunk remain in their present unsatisfactory condition. It will be for the Grand Trunk directors to determine the question of their responsibility in respect of the interest maturing tomorrow upon securities guaranteed by their company."

The interest on the Grand Trunk Pacific debenture stock was, however, paid when due.

Following this letter came the sudden announcement by Frank Scott in a letter to Sir Thomas White, dated March 4, that "in view of the fact that the increased rates applicable to the Grand Trunk Pacific have not been sufficient to meet the increased operating expenses, it will not be possible for that company to continue its operations when the present funds have been exhausted, which will be about March 10." The governmental answer to this notice was an order passed in council appointing the Honorable J. D. Reid, receiver for the company.

Negotiations between the Grand Trunk and the government have been carried on for some time with a view to the purchase of the Grand Trunk system by the government. The state of these negotiations is indicated in the following series of telegrams, the first from Mr. Smithers to Sir Thomas White, which reads in part as follows:



Occupation of the Western Canadian Provinces by the Grand Trunk Pacific

"I have received a cable containing an extract from your letter saying that it is not the intention of the government to ask Parliament to provide a further vote for the Grand Trunk Pacific while negotiations with the Grand Trunk remain in their present unsatisfactory condition. I beg to recall that when the ministers came over last summer, it was stated in Parliament that negotiations would be resumed in London. I accordingly saw the ministers with members of the board several times, and at last was told that the ministers could make no advance in their original offer without the consent of the full cabinet in Ottawa. In these circumstances progress in negotiations was impossible, but with a view to facilitating matters, just before the Prime Minister left for Canada, a committee of the board and myself saw him, with two of his colleagues, and made a fresh proposal, involving a very big reduction in our first offer. This offer was not accepted, but on November 5, the High Commissioner for Canada sent for me and said he had a message from the Prime Minister asking me if we wished to continue negotiations, and if so, he thought I should go to Canada. I told the High Commissioner that, looking to the fact that the government had given no sign of any intention of departing from their original offer, I thought it was useless going out unless I had some further explanation or assurance as to the

government's intentions. To this we have had no reply, and I really fail to see how the company can be held responsible for the unsatisfactory condition of our negotiations."

Sir Thomas White answered Mr. Smithers on March 8, as follows:

"The government considers that the unsatisfactory condition of negotiations is due to the Board of Directors of the Grand Trunk Railway Company entirely failing to appreciate its responsibilities to the Grand Trunk Pacific undertaking, and the bearing of its liabilities in respect thereto upon the question of the net earning power and value of the Grand Trunk Railway System. In November last the Prime Minister cabled to Sir George Perley to suggest to you that if your company desired further negotiations the government would be glad to see you in Canada as soon as convenient. He pointed out that it did not seem useful to continue discussion by correspondence. He also suggested that if you came you should be invested with ample powers to conclude an arrangement if one could be reached. Your attitude towards the reasonable suggestion contained in the Prime Minister's communication seemed clearly to indicate indifference towards the continuance of negotiations. Confirmatory of this is the peremptory notification on Thursday last to the government, without previous intimation or discussion, that the Grand Trunk Pacific would on March 10 discontinue operations entirely, regardless of consequences to Canada, through interruption of traffic over a system so extensive and important."

The official announcement of the receivership was made by Sir Thomas White on March 8, and the Minister of Railways commenced to act as receiver on March 10. W. P. Hinton, vice-president and general manager, and other company officials having signified their willingness to obey the order in council were retained in their respective positions and no changes of title have been announced. The Minister of Railways is acting as receiver in his individual capacity, as though appointed by the Exchequer Court, and not by the government. On March 10, Sir Thomas White outlined the case to the House of Commons and on March 20 moved that the House go into committee to consider a resolution that it was expedient to bring in a measure to ratify and confirm the order in council of March 7, appointing a receiver for this road. Following the introduction of this matter into the House of Commons there was considerable discussion as to the legality of applying the war measures act to this case, but the resolution was concurred in. A bill giving effect to the resolution was then introduced by Sir Thomas White, and read a first time.

The Canadian Government Railways, a public service corporation recently formed by the government, consisting of the old Canadian Northern, the National Trans-Continental and the Intercolonial line operated as one system, now comprises 11,540 miles of railway, and with the addition of 2,229 miles of the Grand Trunk Pacific the government will be operating 13,959 miles under one system. If the Grand Trunk system, including the old Grand Trunk and the Grand Trunk Pacific, eventually comes under government control there will be operated under one system a total of 17,511 miles exclusive of a number of smaller lines which would soon be forced by these conditions to come under the same direction. The effect of this possible amalgamation will be probably to place the government system in a position to compete effectively with the Canadian Pacific system, which now has a mileage of 12,823 miles, and is the one big successful private railway corporation in Canada.

A Disappointed Monopolist.—F. G. Pettibone, federal manager of the Santa Fe and Gulf Coast lines, arrived in Houston Friday morning. He said that he had come to discuss plans for obtaining exclusive control of the transportation business of Houston for his lines and asked if there was any method by which this monopoly could be obtained. It was suggested that W. D. Hines or possibly Albert Sidney Burleson was the man to approach on a monopolistic proposition.

Train Accidents in March[1]

The following is a list of the most notable train accidents that occurred on the railways of the United States in the month of March, 1919:

Collisions

Date	Road	Place	Kind of accident	Kind of train	Kil'd	Inj'd
11.	N. Y., N. H. & H.	Touisset, Mass.	bs	P. & F.	2	34
*6.	Pennsylvania	Heaton, Pa.	rc	F. & F.	5	2
13.	Pitts. & L. Erie	Newcastle	xc	F. & P.	0	4

Derailments

Date	Road	Place	Cause of derailment	Kind of train	Kil'd	Inj'd
4.	Atlantic C. L.	Cairo, Ga.	b. rail	F.	0	0
10.	Waynesburg & W.	Vankirk	unx	P.	0	8
14.	Seaboard A. L.	Kress, Va.	.....	P.	0	1
18.	Texas Mid.	Atlas	d. track	P.	0	0
21.	Del., L. & W.	Cresco	boiler	F.	3	0
27.	St. Louis S. W.	Pine Bluff	b. rail	P	0	0

The trains in collision at Touisset, Mass., on the first of March were passenger train No. E23, consisting of a single car, and a work car. The passenger car, an electric motor, was crushed for a length of 15 ft. One passenger was killed and 25 passengers and nine employees were injured. The motorman of the work car was killed. The line is worked by the manual block system, and it appears that the passenger train entered the block section under a permissive signal; also that the flagman of the work train failed to flag the passenger train properly.

The trains in collision at Heaton, Pa., on the sixth, about 5:30 a. m., were eastbound freights. The leading train, consisting of a locomotive and 85 cars, was at a standstill, the locomotive taking water; and the other train, consisting of a locomotive and 76 cars ran into it at good speed, making a bad wreck. A westbound freight was passing on the track to the left; and there were standing freight cars on side tracks both north and south of the two main tracks. Flames burst from the wreckage, and, fanned by a strong wind, spread among the cars on all tracks and also to a bridge above the tracks. Fire companies were called from Lamont, Edge Hill, Bryn Athyn, McKinley, Jenkintown, Abington, Glenside, Willow Grove and Hatboro; but water had to be run in hose for about three-quarters of a mile and the flames were not subdued for 17 hours. Five trainmen were killed and one was injured. The bodies of four of the dead were burnt up. The collision occurred on a straight line, in clear weather. This line, the Trenton cutoff, is operated by the manual block system. This collision occurred in a block section six miles long, and the rear of the standing train was 2885 ft. east of the entrance to the block section. The following train was running under a permissive signal and responsibility for the collision is charged against both the engineman of that train and the flagman of the standing train. The flagman had used neither torpedoes nor fusees. The engineman is reported as saying that he was blinded by the glare of the headlight of the westbound train. Estimated loss $200,000.

The trains involved in the collision on the Pittsburgh & Lake Erie at Newcastle, Pa., on the morning of the 13th, were eastbound passenger No. 506, and a switching engine of the Carnegie Steel Company's plant, which ran uncontrolled from a siding into the side of the passenger train. One combination passenger and baggage car was pushed off the track and into the Shenango River. Six trainmen were slightly injured. Most of the passengers were railroad employees going to their work; a few of these were slightly injured.

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[1]Abbreviations and marks used in Accident List:

rc, Rear collision——bc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc. ——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

The train involved in the accident near Cairo, Ga., on the morning of the 4th, was a westbound freight. It was derailed by a broken rail and 19 loaded cars fell through the trestle over Ochlocknee River. The trestle for a length of 400 ft. was destroyed. Trains were detoured for three days.

The train derailed on the Waynesburg & Washington, at Vankirk, Pa., on the 10th, was southbound passenger No. 542. Three cars were overturned; but the train was moving slowly and was quickly stopped. Eight persons were injured. The cause of the derailment was not determined.

The train derailed at Kress, Va., on the 14th, was a southbound passenger. The engine and five cars were derailed and four sleeping cars fell down a bank. One employee was injured.

The train derailed near Atlas, Tex., on the evening of the 18th, was southbound passenger No. 1. Three cars left the rails, but reports indicate that no person was seriously injured. The derailment was due to insecure track on a curve in a cut, resulting from heavy rains.

The train involved in the accident near Cresco, Pa., on the 21st, was a westbound freight, drawn by three locomotives, two ahead and one pushing, moving at low speed up grade. The boiler of the leading locomotive exploded and was wrecked, and the engineman, fireman and one brakeman were killed. The train consisted of 72 cars, and two cars near the rear end were thrown off the track, obstructing the eastbound track. The explosion was due to low water in the boiler of the engine.

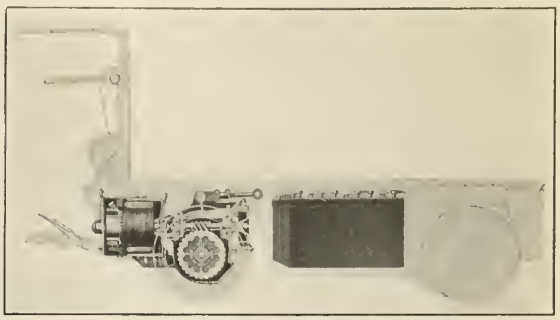
The train derailed at Pine Bluff, Ark., on the 27th, about 2 a. m., was southbound passenger No. 3. Two passenger cars were partly overturned, and five passengers were slightly injured. The derailment was due to a broken rail, 75-lb., found to be badly piped.

Canada. On the Canadian National Lines at Saskatoon, Sask., on the 24th of March a passenger train was derailed near an elevator, and the locomotive, knocking down a part of the wall of the building, caused the rupture of several grain bins; and the engine and first two cars were buried in an avalanche. The engineman, fireman and one other man were smothered to death.

Industrial Trucks With Standardized Parts

STANDARDIZATION OF PARTS whereby the essential details of various styles of industrial tractors and utility trucks are made interchangeable is a noteworthy feature of the equipment manufactured by the Baker R. & L. Company, Cleveland, Ohio. Some of the salient features of this system, under which 98 per cent of all vital parts are said to be identical, will be found of interest to those concerned with the installation and operation of industrial trucks for handling freight and baggage or supplies at shops and storehouses since the interchanging of parts from one machine to another greatly reduces the necessary supply of spare parts.

An adequate comprehension of the system necessitates a general knowledge of the make-up of these trucks of both the tractor and burden-carrying models. All of the standard trucks are of the four-wheel steering type, that is with all four wheels swiveled by the action of the steering lever, the arrangement being such that all wheels travel on arcs having a common center. Under this arrangement the load is applied from a structural steel platform through a spring pedestal to the top of the knuckle. The standardization idea is carried throughout this detail since the same steering knuckles, jaw parts, wheels and tires are used on the trailing and power axles of both the tractors and utility trucks. The tractors are either two-wheel or four-wheel drive but the trailing axle is substantially the same as the power axle with its differential and driving parts omitted. The application of power and transmission is the same in all types, except that a 48-volt motor is used for the tractor instead of the 24-volt type used for the general utility truck. However, the worm drive, as shown in one of the photographs, with a single reduction direct to the driving axle is standard throughout all of the types. By extending the motor shaft to the other pair of wheels and replacing the trailer shaft by another drive



Phantom View of a Utility Truck Showing Details of the Power Unit

shaft, the truck is readily transformed from two-wheel to four-wheel drive.

The working conditions and purchaser's requirements determine the battery equipment. With a view to having battery trays for tractors and trucks made up of identical units the standard truck battery compartments provide for two trays of 6 lead cells or two trays of 11 to 12 Edison cells. In the case of the high platform utility trucks the battery compartment is underneath the platform between the wheels, whereas in the tractor and the elevating and low platform



A Tractor of the Four-Wheel Drive, Four-Wheel Steer Type

trucks, the battery compartment is on top of the platform.

Standardization of parts is also applied to the auxiliary equipment. The controller, which is of the continuous short-drum type in a cast metal housing, is the same on all the models. This is also true of the automatic switch operated by a foot lever so that the current is on only when the operator has his foot on the lever. This standardization between models has been made possible by the simultaneous development of all the basic units. It contributes materially in shortening the time that the trucks stand in the repair shop.

General News Department

The War Department has announced that the 66th Company, Transportation Corps, had been assigned to early convoy for its return to this country.

The Waterloo, Cedar Falls & Northern reports a 100 per cent Victory loan subscription; 335 employees subscribed $34,200. This was the first railroad to report a 100 per cent subscription to the new loan.

The Chamber of Commerce of the United States, at its annual meeting, at St. Louis (Statler Hotel), next week, will discuss a great variety of subjects, as heretofore announced. Group four—transportation—will meet on Tuesday afternoon. George A. Post is chairman of this group. Director General Hines and United States Senator Albert B. Cummins will speak on Wednesday evening.

New York Public Service Commission Changed

The New York State Public Service Commission for the first district (New York City), consisting of five members, is to be changed, and, so far as the steam railroads are concerned, will hereafter consist of only one member. This results from a law which was passed by the 1919 legislature, just adjourned, and which, it is understood, is sure to receive the approval of the governor. Another law provides for a separate commissionership, of one member, to supervise the completion of the subway and elevated railroads now in course of construction in the city.

Conference of Technical Societies

A conference of representatives of the technical societies of America was held at Chicago on Wednesday, Thursday and Friday of this week. This conference was called by Engineering Council (a joint organization of the four national engineering societies with the American Society for Testing Materials) to consider the advisability of advocating the creation of a national department of public works. Among the subjects which were considered were (a) what Federal bureaus or activities which should be included in a department of public works—(b) whether an effort should be made to secure an additional Cabinet office, or to make over one of the present departments by the redistribution of activities—(c) whether the present efforts shall be to reorganize the engineering bureaus completely or merely to bring these bureaus under a single head so that such rearrangement of functions as may be found desirable may be made gradually. Among other subjects which were presented for consideration were the creation of a department of transportation and the definition of the attitude of the conference with respect to engineering work on highways, rivers and harbors and railroads.

American Bureau of Welding

At the meeting of this Bureau held on April 11, at the Engineering Societies building, 33 West 39th street, New York, the by-laws of the Bureau were adopted and the following officers were elected: Director, C. A. Adams; vice director, H. M. Hobart; vice-director, A. S. Kinsey; treasurer, W. E. Symons; secretary, H. C. Forbes. Regular meetings of the Bureau are to be held on the third Friday of each month.

The Bureau voted to establish a research committee for the purpose of carrying out the plan of co-operation in conducting investigations in welding, and appointed 52 members. This membership will be increased from time to time.

The American Bureau of Welding was organized for the purpose of providing a means for co-operative research and standardization in welding. The nucleus of the bureau consists of the board of directors of the American Welding Society, and that the bureau may fulfill its mission, the board invites engineering societies, associations and government departments, each to designate a representative for appointment as co-operating director; and appoints the representative so designated a director of the American Bureau of Welding with full powers.

"Prevent a Claim a Day"

R. H. Aishton, Northwestern regional director, in an effort to minimize freight loss and damage, has started a campaign to "prevent a claim a day." The claim prevention departments of carriers in the Northwestern region, under the supervision of the regional bureau for the prevention of freight loss and damage, have dealt personally with the employees who handle freight, inculcating a feeling of individual responsibility. In a statement outlining this campaign, issued by Mr. Aishton's office, it is said that the claim payments of the past year amount to about 3 per cent of the freight earnings, which is a large increase. This increase is due in a large measure to inexperienced help, to the increased price of commodities (with the smallness of the increase in transportation rates) and to the inferiority of containers.

Railroad Men Returning from France

Fifty officers and 1,316 men of the Sixteenth Engineers, one of the first of the railway constructing organizations to enter the war, arrived at New York city on April 22 on the transport "Panaman" and were sent to Camp Upton, whence they will be returned to Detroit, Mich., for demobilization. They are mostly Ohioans. The work of this regiment in France was the building of freight classification yards, putting up the great hospital as Nesves and building railroads. It was in March, 1918, when the British fighters were hard pressed, that these Americans threw down their picks and shovels and took up rifles to stem the mighty German drive.

The regiment was ordered on duty with the American Army on October 1, 1918, and began building light railways around Montfaucon. It was close to the front at the battle of the Meuse, at Verdun, Sedan and Stenay. Since the armistice these men have been laying light railways in the mining districts of Lorraine.

The 108th Company, Transportation Corps, commanded by Capt. F. R. Fitzpatrick, also came on the "Panaman." The company was originally the Nineteenth Engineers, made up chiefly of Pennsylvania Railroad men. They went across in May, 1917.

Companies C and D of the Eleventh Engineers also arrived in New York this week on the transport "Santa Teresa." The Eleventh left New York in July, 1917, and was the first American regiment to be received by the King of England. The regiment assisted in handling tanks in advance of the attack on Cambrai in November, 1917, and was in some severe fighting.

In March, 1918, while engaged in railroad yard construction, the regiment was hurriedly sent to the British front near Arras, and later near Bethune, where the men worked on intrenchments and were held in readiness to serve as combat troops in event of further German attacks. While here the regiment suffered further casualties and earned its second citation from the British.

In June the regiment was again sent back to railroad work, but in July, the first battalion was sent to serve with the first army of the American forces east of Paris, and Company E for a short time was in the Château Thierry salient. In September the entire regiment went with the First Army to the St. Mihiel front, where Lieutenant Charles T. Cusick was killed.

The rest of the Eleventh, with Colonel William Barclay Parsons, will probably reach New York this week.

REVENUES AND EXPENSES OF RAILWAYS

TWO MONTHS OF CALENDAR YEAR 1919

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of									
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicks	141	$295,632	$124,357	$448,180	$65,922	$114,238	$2,940	$212,011	$15,946	$413,834	92.33	$34,346	$20,622	$13,688	—$30,527
Alabama Great Southern	312	1,146,939	317,064	1,548,756	145,152	394,179	23,105	730,072	34,523	1,332,029	86.00	216,728	49,122	167,575	—47,404
Ann Arbor	301	527,642	98,834	653,757	138,945	115,303	5,874	294,569	24,610	579,402	88.62	74,355	26,200	48,053	89,137
Arizona Eastern	377	558,473	101,857	707,768	157,486	107,356	2,729	205,171	6,903	490,232	69.26	217,536	32,564	184,883	—88,854
Atchison, Top. & Santa Fe	8,635	17,754,605	6,696,937	25,597,223	3,537,376	5,940,101	238,389	9,863,616	535,742	20,077,691	78.43	5,519,532	1,099,663	4,416,809	—1,823
Atlanta & W. Point	93	230,831	169,338	439,653	53,527	84,064	3,905	172,185	13,154	332,184	75.55	107,469	17,000	90,435	10,047
Atlanta, Birmingham & Atl	639	546,871	139,496	739,954	231,653	280,159	12,296	456,605	25,447	1,006,389	136.00	—266,435	32,000	—298,853	—304,681
Atlantic City	177	248,946	214,509	511,459	79,431	80,993	594	322,087	1,521	484,802	94.78	26,657	24,000	2,657	91,689
Atlantic Coast Line	4,839	6,970,164	3,188,448	10,847,066	1,544,710	2,071,989	113,934	4,487,258	209,802	8,496,340	78.32	2,350,726	400,000	1,948,312	—466,186
Baltimore & Ohio	5,145	17,517,213	4,919,300	24,561,103	4,180,333	9,060,645	298,004	13,234,580	817,543	27,775,051	113.08	—3,213,948	741,110	—3,958,594	150,142
Baltimore & Ohio Chicago Term	91	.....	7	230,761	81,539	95,352	2,211	245,157	20,204	454,326	196.88	—223,565	63,752	—287,330	—54,826
Baltimore, Chic. & Atl	87	121,380	52,331	177,040	17,664	30,259	1,904	122,833	6,848	179,508	101.39	—2,469	6,320	—8,789	—65,556
Bangor & Aroostook	632	713,563	133,650	889,559	199,306	203,166	7,486	377,340	27,603	825,346	92.78	64,213	42,000	22,115	54,348
Beaumont, Sour Lake & Western	118	185,154	40,291	235,345	48,248	36,330	4,215	99,957	10,857	199,606	84.81	35,738	5,400	30,313	—61,907
Belt Ry. Co. of Chicago	31	.....	.....	475,683	67,403	91,799	742	352,914	17,182	530,040	111.42	—54,357	32,885	—87,241	39,785
Bessemer & Lake Erie	217	1,148,261	64,863	1,288,381	126,303	600,562	23,156	602,182	42,026	1,360,685	105.61	—72,302	39,000	—101,363	155,173
Birmingham Southern	27	83,790	.....	114,876	7,843	10,363	1,417	48,870	6,442	74,935	65.23	39,941	7,019	32,922	26,148
Boston & Maine	2,258	5,803,490	3,009,947	9,908,464	1,266,775	2,203,226	74,199	6,143,371	339,039	10,080,395	101.73	—171,932	344,772	—516,703	529,712
Buffalo & Susquehanna	296	334,975	14,166	357,098	84,968	157,550	3,630	129,736	15,135	391,018	109.49	—33,921	6,500	—40,421	103,608
Buffalo, Rochester & Pitt	589	2,157,289	234,269	2,467,876	338,774	929,794	28,822	1,220,085	65,188	2,586,642	104.81	—118,766	54,000	—173,066	14,566
Brooklyn, Eastern District	10	119,630	.....	134,215	43,558	59,416	94	100,494	8,348	211,909	157.88	—77,694	9,940	—87,634	—83,121
Canadian Pacific Lines in Maine	233	522,693	87,612	636,329	74,466	143,933	5,329	448,444	9,157	681,329	107.07	—45,001	22,000	—67,000	59,991
Carolina, Clinchfield & Ohio	282	829,885	57,247	908,066	161,327	227,839	8,485	294,040	27,251	718,615	79.13	189,451	32,600	156,839	—14,142
Central of Ga.	1,918	1,870,424	1,000,192	3,204,807	651,131	756,341	55,196	1,476,777	115,527	3,050,410	95.18	154,397	89,375	64,566	—790,270
Central of New Jersey	684	4,941,275	1,095,456	6,614,686	737,608	1,930,243	39,418	3,249,617	165,519	6,151,879	93.00	462,808	315,385	147,266	227,633
Central of New England	301	884,707	46,324	978,870	165,230	259,942	3,787	523,616	22,055	978,690	99.98	180	32,000	—31,823	—57,937
Central Vermont	411	579,835	155,029	798,802	85,078	229,184	11,806	575,957	35,611	938,109	117.43	—139,308	34,800	—174,123	28,816
Charleston & Western Carolina	342	356,708	115,288	495,015	88,620	104,313	7,928	234,090	11,903	446,855	90.27	48,160	17,000	31,160	—59,031
Chicago & Alton	1,050	2,740,574	924,073	3,856,410	565,501	1,053,076	43,281	1,742,114	92,160	3,518,189	91.22	338,221	111,000	227,120	432,896
Chicago & Eastern Ill.	1,131	2,781,522	769,737	3,819,754	617,441	1,427,457	38,548	1,837,216	97,740	4,024,097	105.34	—205,343	159,092	—365,179	74,740
Chicago & Erie	269	1,392,923	133,407	1,628,169	181,294	292,714	20,670	875,645	56,579	1,431,800	87.93	196,364	73,217	123,134	688,053
Chicago & N. W.	8,090	12,394,666	4,969,767	18,859,327	2,507,913	4,590,304	122,949	9,823,528	493,001	17,688,407	93.79	1,170,919	950,000	218,614	1,640,109
Chicago, Burlington & Quincy	9,372	16,033,503	4,788,198	22,126,427	2,677,815	4,543,960	164,869	9,268,905	630,221	17,444,064	78.83	4,682,363	952,364	3,719,717	1,295,794
Chicago Great Western	1,496	2,144,424	910,168	3,264,680	374,765	873,739	55,478	1,531,904	89,020	2,949,117	90.33	315,563	122,999	192,169	166,182
Chesapeake & Ohio	2,486	7,983,408	2,222,951	10,828,119	1,853,687	2,641,572	76,664	4,546,581	222,683	9,409,219	76.89	1,418,900	338,841	1,077,439	441,023
Chicago, Ind. & Lou	657	1,195,295	1,379,673	1,724,414	223,155	439,034	23,281	735,648	45,612	1,480,226	85.83	244,188	63,161	180,873	296,036
Chicago Junction	12	.....	.....	566,436	170,685	89,038	225	484,174	17,260	761,382	134.41	—194,947	4,312	—199,258	—47,689
Chicago, Milwaukee & St. Paul	10,273	14,969,143	4,199,403	20,870,745	2,303,563	6,348,316	155,303	10,674,503	570,150	20,144,611	96.52	726,134	1,063,461	—340,272	1,251,963
Chicago, Peoria & St. L	247	179,787	46,346	239,012	70,712	115,716	5,150	156,471	19,236	367,280	153.66	—128,268	14,766	—143,048	—72,611
Chicago, Rock Island & Gulf	474	528,089	160,381	725,657	136,380	156,267	11,676	345,547	22,525	674,189	92.90	51,468	26,310	25,021	—180,175
Chicago, Rock Island & Pac	7,731	10,328,870	4,311,069	15,506,298	2,737,139	4,128,455	181,907	7,522,066	387,531	15,032,994	96.94	473,304	696,718	—224,346	—554,866
Chicago, St. Paul, Minn. & Omaha	1,749	2,764,758	1,074,161	4,168,004	393,932	788,310	45,920	2,048,168	114,191	3,424,725	82.16	743,279	207,546	534,664	433,333
Chicago, Terre Haute & S. E.	374	584,161	42,900	639,331	113,289	312,634	6,991	252,732	17,604	707,585	110.67	—68,254	29,000	—97,255	—8,332
Cin. Indianapolis & Western	321	305,005	95,803	439,641	90,937	151,067	8,380	263,486	24,415	538,904	122.57	—99,263	20,486	—119,750	—173,418
Cin., New Orleans & Tex. Pacific	337	1,984,720	692,594	2,806,018	263,739	816,337	43,585	1,015,560	65,429	2,217,599	79.03	588,420	77,999	509,206	496,312
Cin. Northern	251	385,457	32,846	428,326	83,943	110,950	4,542	150,347	9,606	359,387	83.90	68,939	16,000	52,874	69,184
Cleveland, Cin., Chic. & St. L	2,395	7,171,767	2,384,409	10,318,841	1,489,210	2,413,123	141,328	4,381,723	197,315	8,696,597	84.28	1,621,808	370,000	1,249,061	866,960
Colorado & Southern	1,109	1,692,829	287,211	2,069,971	212,276	479,023	15,480	805,536	73,450	1,597,340	77.16	472,631	94,000	378,085	—160,244
Colorado & Wyoming	41	51,052	2,234	196,686	13,707	34,508	195	99,092	8,059	155,560	79.09	41,126	8,000	33,126	8,064
Cumberland Valley	163	688,693	121,527	855,456	171,587	195,421	13,210	418,866	21,336	821,551	96.03	33,904	19,043	14,782	—117,888
Delaware & Hudson Co	868	4,245,369	396,736	4,937,534	763,282	1,613,268	36,327	2,467,575	223,839	5,170,396	104.74	—232,862	120,000	—358,446	932,550
Delaware, Lackawanna & Western	955	8,279,170	1,781,441	11,054,505	944,760	2,370,110	80,106	4,903,070	222,088	8,620,773	77.98	2,433,732	561,057	1,872,128	613,827
Denver & Rio Grande	2,640	3,735,205	748,440	4,671,765	495,165	1,449,895	31,517	1,764,031	137,475	3,937,769	84.29	733,995	200,000	533,329	—222,551
Denver & Salt Lake	255	254,032	34,996	301,928	100,755	186,381	1,602	208,519	11,713	508,970	168.57	—207,042	18,000	—225,055	—42,915
Detroit & Mackinac	381	135,306	52,486	204,450	34,999	80,780	7,944	122,254	32,423	278,399	136.16	—73,949	14,504	—88,453	—46,053
Detroit & Toledo Shore Line	61	353,019	.....	365,831	25,555	29,562	772	106,692	4,280	166,273	45.45	199,557	14,500	185,057	97,086
Detroit, Toledo & Ironton	457	579,057	22,455	646,770	178,979	222,039	5,046	316,426	25,046	747,536	115.57	—100,767	17,432	—118,214	143,266
Duluth & Iron Range	292	155,670	45,197	225,967	89,345	178,736	851	247,807	26,657	543,384	240.47	—317,418	12,873	—330,409	—18,086
Duluth, Missabe & Northern	410	262,545	74,727	385,500	245,125	254,297	4,488	309,410	38,308	854,243	221.59	—468,743	19,915	—488,658	443,611
Duluth, South Shore & Atl	599	451,625	147,816	634,848	111,583	136,316	12,190	383,066	20,664	671,973	106.00	—337,125	38,000	—75,125	29,831
Duluth, Winnipeg & Pac	178	278,661	46,789	336,076	32,550	63,860	5,368	163,608	16,077	285,961	85.08	50,115	16,840	33,273	41,418
East St. Louis Connecting	3	.....	.....	192,119	23,257	74,784	679	128,768	6,293	233,783	121.68	—41,664	4,000	—45,663	7,118
El Paso & Southwestern Co	1,027	1,665,092	323,644	2,092,076	249,784	390,983	10,552	574,194	49,066	1,295,926	61.94	796,149	139,263	656,848	—350,588
Elgin, Joliet & Eastern	819	3,169,007	16	3,799,212	284,097	898,854	11,322	1,404,355	53,438	2,651,774	69.79	1,147,438	106,500	1,040,938	1,361,677
Erie	1,989	10,327,000	1,808,805	13,290,383	1,330,977	4,667,764	113,040	7,199,016	402,406	13,790,831	103.76	—500,448	434,247	—937,884	1,286,136
Florida East Coast	764	1,026,847	752,333	1,975,659	312,675	346,497	18,565	886,288	39,379	1,620,110	82.00	355,549	77,644	277,731	—350,890
Ft. Smith & Western	253	159,969	50,013	225,459	40,193	54,836	7,008	90,111	12,125	204,734	90.80	20,724	10,000	10,694	—3,552
Ft. Worth & Denver City	454	1,127,996	402,478	1,618,545	180,353	350,754	8,613	638,476	48,644	1,231,861	76.10	386,684	38,500	348,177	72,722
Ft. Worth & Rio Grande	235	97,780	85,159	196,414	49,983	49,796	—2,157	142,797	8,996	249,415	126.98	—53,002	6,553	—59,765	—75,338
Funda, Johnstown & Gloversville R. R.	88	45,557	120,793	173,883	18,758	17,957	871	73,656	9,556	120,798	69.47	53,085	9,800	43,285	—4,623
Galveston, Harrisburgh & San Ant	1,382	2,409,865	801,729	3,385,669	517,119	690,951	41,731	1,459,940	106,763	2,822,065	83.35	563,604	104,410	458,823	—677,352

REVENUES AND EXPENSES OF RAILWAYS

TWO MONTHS OF CALENDAR YEAR 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss)	Increase (or decrease) compared with last year
Galveston Wharf	13	.....	.....	$137,924	$23,699	$1,718	$49	$58,574	$2,097	$102,460	74.28	$35,464	$22,800	$12,664	$1,448
Georgia	328	$588,866	$344,932	1,008,741	112,267	163,653	11,962	470,770	34,727	793,738	78.68	215,003	12,500	202,1[illegible]	—46,625
Georgia & Florida R. R.	348	109,204	36,771	155,468	47,072	35,648	3,824	93,799	10,113	190,457	122.50	—34,988	8,400	—43,429	—55,267
Georgia, Southern Florida	402	464,199	248,034	775,424	125,076	179,621	10,393	332,551	18,555	664,931	85.75	110,493	27,300	83,193	33,927
Grand Rapids & Indiana	569	713,226	237,334	1,046,255	197,562	282,265	20,000	576,850	45,973	1,125,358	107.56	—79,103	50,743	—129,859	—[illegible],238
Grand Trunk Lines in New England	172	504,255	54,999	652,763	181,004	95,856	5,660	510,014	29,686	882,100	135.13	—229,337	23,000	—252,337	—8,[illegible]73
Grand Trunk Western	1,002	2,265,396	422,209	2,952,936	411,216	634,896	24,426	1,522,319	77,878	2,688,935	91.05	264,000	101,025	162,536	954,330
Great Northern	8,255	11,263,952	2,540,354	15,084,235	2,262,598	3,371,677	90,687	7,057,966	301,564	13,263,543	87.92	1,820,693	999,493	820,[illegible]69	1,69[illegible],95[illegible]
Gulf & Ship Island	307	231,852	77,451	343,965	107,762	74,037	6,330	152,871	17,111	358,817	104.31	—14,852	17,132	—37,999	—106,735
Gulf, Colorado & Santa Fe	1,927	1,998,674	728,534	2,858,530	530,440	423,794	21,393	1,220,383	87,140	2,280,548	79.78	577,982	142,335	434,261	—304,865
Gulf, Mobile & Northern	424	277,385	76,769	375,161	80,464	108,234	9,975	182,850	19,699	401,254	106.95	—26,092	20,465	—46,571	—110,978
Hocking Valley	350	724,375	170,939	950,820	224,254	587,326	11,569	481,138	42,732	1,345,773	141.53	—394,953	114,133	—513,250	—287,696
Houston, East & West Texas	190	273,789	77,254	366,038	63,760	48,293	1,623	163,497	8,355	285,528	78.00	80,510	12,317	68,113	36,275
Houston & Texas Central	856	894,985	334,951	1,294,470	256,783	246,920	16,573	579,173	37,071	1,135,227	87.69	159,244	68,048	90,389	—274,228
Illinois Central	4,782	11,510,877	3,812,402	16,429,173	2,980,589	4,550,982	129,096	7,297,635	461,553	15,463,142	94.12	966,031	831,503	132,877	—467,365
Indiana Harbor Belt	116	.....	.....	1,051,589	168,391	245,768	3,363	651,510	30,900	1,099,932	104.59	—48,343	20,208	—68,551	266,548
International & Great Northern	1,159	1,518,523	483,801	2,135,143	528,180	534,421	25,373	1,077,693	66,557	2,242,789	105.04	—107,646	60,000	—168,077	—579,366
Kanawha & Michigan	176	352,597	114,740	489,784	104,381	262,809	4,576	257,728	23,651	655,145	133.76	—165,351	35,770	—201,121	—204,500
Kansas City, Mexico & Orient	272	100,798	25,197	133,470	60,121	87,243	1,623	112,496	14,424	275,907	206.71	—142,437	12,531	—154,987	—106,302
Kansas City, Mexico & Orient of Tex	465	111,952	21,650	142,790	62,768	91,723	1,950	133,370	13,051	302,862	212.10	—160,072	9,985	—170,057	—153,873
Kansas City Southern	774	1,842,657	376,771	2,397,956	444,073	524,945	31,754	1,010,180	86,681	2,091,992	87.24	305,964	150,279	154,553	—491,857
Kansas City Terminal Co	24	.....	.....	204,746	21,506	56,490	.....	119,509	2,511	202,697	98.99	2,049	40,300	—38,256	—29,816
Lake Erie & Western	908	1,282,102	110,278	1,457,610	234,202	465,089	23,836	696,636	47,660	1,463,306	100.40	—5,896	50,000	—55,997	—5,106
Lehigh & Hudson River	96	372,917	7,838	393,768	39,843	103,734	3,226	190,170	11,585	348,558	88.51	45,210	10,500	34,710	32,898
Lehigh & New England	224	417,831	3,102	469,950	79,720	116,159	4,789	206,789	18,903	426,285	90.71	43,665	17,220	26,445	50,901
Lehigh Valley	1,436	7,485,046	772,997	9,164,126	1,042,559	2,797,799	63,728	4,784,074	210,510	8,929,353	97.43	234,773	293,450	—58,788	1,452,709
Long Island	398	790,514	1,796,875	2,902,203	521,161	564,896	20,456	1,813,501	90,634	3,039,914	104.74	—137,711	188,856	—326,895	228,077
Los Angeles & Salt Lake	1,168	1,844,566	640,562	2,605,901	392,906	551,371	29,596	879,288	57,674	1,976,222	75.83	629,679	127,816	501,501	239,550
Louisiana & Arkansas	302	258,380	74,289	345,822	82,341	70,560	7,606	158,843	13,294	332,643	96.18	13,180	22,295	—9,143	—73,419
Louisiana Ry. & Navigation Co	349	455,885	78,287	558,024	130,326	108,484	7,864	338,894	14,899	600,467	107.61	—42,443	28,000	—70,462	—132,752
Louisiana Western	207	377,884	214,121	608,706	72,367	115,409	9,025	192,667	22,634	416,090	68.35	192,616	19,726	172,851	—141,878
Louisville & Nashville	5,013	11,200,851	4,122,668	16,211,010	2,714,423	4,165,721	200,197	6,956,236	361,898	14,464,137	89.22	1,746,873	507,503	1,237,360	—775,821
Louisville, Henderson & St. Louis	199	334,514	111,178	454,456	101,759	58,928	14,978	180,811	15,436	371,912	81.66	86,544	8,000	78,299	9,037
Maine Central	1,216	1,899,781	633,863	2,688,123	388,367	687,112	19,453	1,717,198	78,654	2,891,172	107.55	—203,049	151,246	—354,305	163,594
Maryland, Delaware & Virginia Ry. Co.	82	107,804	45,631	157,028	14,515	24,456	995	119,280	3,836	163,083	103.85	—6,055	3,466	—9,521	—47,991
Michigan Central	1,861	7,807,156	2,529,608	11,130,385	1,608,128	2,273,112	123,750	4,523,351	204,471	8,873,557	79.72	2,256,828	320,000	1,935,800	1,898,712
Midland Valley	387	444,091	145,192	613,962	115,669	113,607	3,766	247,436	24,200	504,678	82.20	109,284	13,426	95,576	—556
Mineral Range	101	172,743	1,112	177,576	20,634	47,851	655	92,695	2,065	163,899	92.29	13,677	6,600	7,077	18,714
Minneapolis & St. Louis	1,646	1,299,825	414,248	1,791,568	377,362	512,444	23,712	1,101,889	60,225	2,071,859	115.64	—280,290	110,808	—391,622	—474,940
Minn. & International Ry. Co	194	108,380	45,679	162,211	25,988	28,654	1,105	101,774	7,325	164,847	101.62	—2,635	8,001	—10,645	—21,476
Minn., St. Paul & Sault Ste. Marie	4,243	4,573,950	1,082,026	5,965,999	734,996	1,414,423	43,529	2,696,805	136,236	5,045,121	84.56	920,878	375,387	545,477	757,596
Mississippi Central	164	92,331	45,871	142,607	38,326	59,519	2,647	64,513	10,738	175,744	123.23	—33,137	6,650	—39,[illegible]45	—77,[illegible]03
Missouri & North Arkansas	365	149,791	67,552	234,649	153,074	82,133	3,350	117,933	15,006	371,058	158.13	—136,410	12,483	—148,981	—143,995
Missouri, Kansas & Texas	1,714	3,533,519	1,231,506	4,998,218	1,103,147	1,449,128	45,888	1,959,004	155,750	4,728,336	94.60	269,881	180,710	88,993	—79,349
Missouri, Kansas & Texas of Texas	1,796	2,088,076	1,105,277	3,482,093	654,871	724,870	34,134	1,991,875	151,736	3,586,477	102.99	—104,384	99,242	—204,650	—269,568
Missouri, Okla. & Gulf	332	146,843	35,003	192,615	82,654	80,810	3,018	137,692	13,354	317,945	165.07	—125,330	17,007	—142,740	—102,729
Missouri Pacific	7,108	9,758,927	3,151,105	13,865,364	2,967,564	3,396,791	152,534	6,454,236	396,828	13,426,573	96.83	438,791	540,893	—106,386	—1,840,015
Mobile & Ohio	794	1,849,264	370,172	2,353,261	390,372	821,597	50,255	1,123,911	78,329	2,470,357	104.98	—117,096	102,325	—219,465	—185,605
Monongahela	108	493,782	39,352	546,164	124,689	64,949	1,470	197,742	13,061	401,909	73.58	144,254	10,000	134,235	96,686
Monongahela Connecting	5	.....	.....	388,455	66,941	140,611	1,030	230,491	13,904	452,977	116.60	—64,523	4,471	—68,994	—50,868
Montour R. R.	54	130,353	3,328	145,590	44,006	110,466	2,917	52,362	12,511	223,622	153.50	—78,031	4,600	—82,632	—43,530
Morgan's La. & Texas R. R.	400	836,633	324,963	1,227,325	164,739	277,099	16,304	563,953	37,899	1,063,969	86.68	163,356	61,191	101,533	—289,798
Nash., Chatt. & St. L.	1,247	1,785,207	859,931	2,883,360	628,673	802,446	65,662	1,466,380	91,322	3,080,019	106.82	—196,659	100,000	—297,041	—616,672
Nevada Northern	168	275,203	25,763	310,622	34,574	49,124	1,929	88,084	8,988	182,994	58.91	127,628	36,646	90,981	—99,114
Northern Alabama	112	194,682	24,939	226,805	52,375	10,262	2,415	157,474	3,550	226,076	99.67	729	6,800	—6,071	—43,206
Newburgh, South Shore R. R.	7	.....	.....	257,389	31,933	55,658	.....	131,409	7,028	226,027	87.81	31,363	14,519	16,843	68,541
New Orleans & N. E.	203	644,699	202,497	957,053	129,396	276,749	14,132	502,813	28,224	959,510	100.25	—2,457	56,714	—59,199	—200,192
New Orleans & Great Northern	284	249,195	74,097	343,549	72,259	73,270	3,721	143,166	13,703	306,877	89.32	36,672	23,130	13,409	—48,244
New Orleans, Texas & Mexico	191	160,677	55,029	242,917	58,652	70,191	3,274	108,904	12,005	257,277	105.91	—14,360	20,000	—34,395	—131,121
New York Central	6,075	29,466,043	11,179,930	45,335,185	6,262,729	9,733,182	427,510	20,813,547	1,198,344	39,128,827	86.31	6,206,358	2,026,867	4,177,947	4,677,452
New York, Chicago & St. L.	572	3,636,312	318,723	4,078,902	499,242	784,946	53,158	1,643,549	108,707	3,094,831	75.87	984,071	110,000	874,067	1,215,556
New York, New Haven & Hart.	1,965	6,539,080	6,231,299	14,291,542	1,946,933	3,630,448	71,277	8,097,922	551,006	14,643,530	102.46	—351,988	536,000	—893,130	—1,195,471
New York, Ont., Western	567	971,164	204,252	1,409,030	210,816	479,397	14,517	765,789	50,733	1,521,252	107.96	—112,223	49,400	—161,587	—182,106
New York, Phila. & Norfolk	121	865,465	232,643	1,192,476	107,622	250,344	17,790	551,454	22,891	984,619	82.56	207,858	34,040	173,817	241,958

REVENUES AND EXPENSES OF RAILWAYS

TWO MONTHS OF CALENDAR YEAR 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
New York, Susq. & Western	135	$428,767	$99,864	$604,443	$54,112	$94,541	$3,295	$401,461	$14,742	$568,151	93.99	$36,293	$29,188	$7,061	$63,802
Norfolk & Western	2,087	9,657,371	1,662,917	11,932,334	1,616,434	3,503,054	70,154	4,558,846	184,905	9,972,378	83.57	1,959,956	520,000	1,439,782	330,547
Norfolk Southern	907	624,146	246,722	940,709	198,884	236,752	14,671	498,475	41,660	991,191	105.36	—50,482	40,000	—90,508	—171,345
Northern Pacific	6,566	11,130,575	2,773,273	14,779,066	1,908,174	2,624,083	133,282	5,871,395	369,939	11,110,782	75.17	3,668,283	1,033,385	2,634,009	941,512
Northwestern Pacific	507	422,728	255,917	746,477	209,407	123,493	9,345	404,951	24,987	775,947	103.94	—29,470	44,139	—73,791	—183,569
Oregon Short Line	2,347	4,141,332	927,427	5,431,303	1,038,449	930,308	26,656	1,794,992	170,788	4,066,504	74.87	1,364,979	355,927	1,008,555	—173,377
Oregon-Wash. R. R. & Nav. Co.	2,069	2,639,046	911,939	3,912,765	797,636	652,439	51,873	1,664,902	186,474	3,418,983	87.38	493,781	229,063	264,269	61,341
Panhandle & Santa Fe	772	589,062	146,259	769,511	222,811	283,671	8,283	476,670	32,583	1,018,618	132.37	—249,107	32,427	—281,714	—472,739
Pennsylvania Co.	1,754	9,929,925	2,855,746	14,248,645	2,182,630	4,494,829	135,162	7,501,765	365,881	14,781,782	103.74	—533,137	575,947	—1,109,459	—1,581,348
Pennsylvania Railroad	5,360	36,311,144	14,105,543	56,526,140	7,216,103	16,160,229	475,792	28,365,372	1,485,992	54,714,620	96.79	1,811,521	1,713,120	96,455	6,067,806
Peoria & Pekin Union	19	70,166	8,473	196,490	32,027	54,801	1,237	151,440	10,340	249,905	126.89	—253,415	19,000	—72,415	—29,407
Pere Marquette	2,232	3,653,509	722,689	4,710,374	705,451	963,557	46,984	2,222,500	133,753	4,080,481	86.62	629,893	43,306	586,357	939,271
Phila., Bethlehem & New England	71	.....	.....	183,050	24,059	23,643	417	97,545	2,550	148,214	80.96	34,836	4,183	30,653	—8,063
Phila. & Reading	1,127	8,199,861	1,623,505	10,646,006	1,099,462	3,110,507	61,766	6,365,491	268,272	10,941,302	102.77	—295,297	286,456	—581,753	—313,224
Pitts. & Lake Erie	224	4,267,653	389,256	5,167,882	890,608	1,312,365	24,888	1,691,889	82,800	4,005,709	77.51	1,162,173	151,000	1,011,172	676,760
Pitts. & Shawmut	103	180,463	9,542	191,828	57,283	75,774	3,291	76,357	5,878	218,583	113.95	—26,755	1,943	—28,698	—39,672
Pitts. & W. Va.	63	176,535	19,224	220,567	112,510	79,438	2,013	98,547	10,324	317,775	144.07	—97,208	25,161	—122,370	—91,151
Pitts., Cinc., Chicago & St. L.	2,387	9,154,757	3,299,895	14,019,795	1,728,990	4,367,601	158,096	6,940,051	321,507	13,648,061	97.34	371,734	465,348	—94,269	—1,161,349
Port Reading	21	272,958	.....	470,028	55,200	61,679	20	232,767	1,507	351,172	74.71	118,856	18,000	100,856	203,606
Richmond, Fred. & Pot.	78	675,747	634,641	1,388,873	91,677	152,993	8,756	433,275	25,943	725,100	52.21	663,773	28,426	635,338	389,986
Rutland	415	339,967	180,549	625,849	135,432	196,446	315,663	342,368	21,484	711,395	113.66	—85,545	36,638	—122,209	66,470
St. Joseph & Grand Island	258	354,323	71,434	447,424	116,281	40,008	3,671	284,784	21,988	470,453	105.15	—23,028	17,622	—40,650	—94,303
St. Louis, Brownsville & Mexico	548	522,541	201,148	769,335	133,526	131,715	11,222	245,870	32,789	555,122	72.15	214,214	20,000	194,084	—17,685
St. Louis, Merchants Bridge, Terminal	9	.....	1,516	462,252	97,362	111,765	1,592	365,362	10,958	587,039	126.99	—124,787	16,000	—140,787	126,659
St. Louisan-San Francisco	4,761	7,780,235	3,206,319	11,600,991	2,151,856	2,643,884	83,126	4,831,083	355,789	10,014,988	87.49	1,586,004	446,515	1,133,020	405,940
St. Louis, San Fran. & Texas	134	141,344	36,536	193,591	47,899	37,887	93	139,982	9,670	235,438	121.61	—41,846	2,498	—44,355	—122,888
St. Louis Southwestern	939	1,594,103	305,550	1,970,775	466,929	460,504	36,574	642,120	77,922	1,700,419	86.28	270,356	74,280	195,204	—429,380
St. Louis, Southwestern of Texas	814	698,339	222,872	971,697	320,449	368,211	10,534	452,864	49,207	1,200,190	123.51	228,493	42,000	—270,540	—431,801
St. Louis Transfer Co.	6	.....	.....	194,331	18,412	38,361	462	92,641	4,280	154,157	79.32	40,174	200	39,974	21,997
San Ant. & Aransas Pass	732	503,653	161,237	705,497	191,889	202,239	12,806	364,022	40,830	810,674	114.91	—105,176	30,000	—135,240	—213,307
Seaboard Air Line	3,563	4,317,224	1,811,786	6,708,909	1,048,477	1,493,805	121,405	3,258,318	208,432	6,180,564	92.12	528,345	270,000	257,572	—435,798
South Buffalo Ry. Co.	11	92,851	.....	304,212	24,843	40,183	561	134,570	3,191	203,348	66.84	100,864	5,100	95,764	116,480
Southern R. R.	6,982	12,427,523	5,666,844	19,634,133	3,093,689	5,064,656	230,158	8,649,824	512,450	17,681,780	90.06	1,952,353	642,003	1,296,582	—1,666,584
Southern In. Mississippi	278	170,211	104,153	296,520	73,416	38,235	4,045	152,308	8,228	276,232	93.15	20,289	18,000	2,289	—31,769
Southern Pacific	7,049	16,379,664	5,984,576	23,991,803	4,430,458	4,669,127	205,501	9,606,291	585,810	19,915,744	83.01	4,076,059	1,228,011	2,842,411	—912,208
Spokane International Ry. Co.	156	107,699	27,238	138,412	20,518	14,196	2,979	52,212	9,047	98,641	71.27	39,772	8,024	31,747	—5,456
Spokane, Portland & Seattle	554	765,670	213,841	1,073,468	259,435	189,192	11,590	406,740	38,875	909,351	84.71	164,117	118,400	45,626	—464,637
Staten Island Rapid Transit Co.	23	152,878	118,920	328,807	39,448	41,727	2,020	175,069	17,381	275,645	83.83	53,162	26,000	27,145	117,486
Tennessee Central	293	298,275	86,965	416,307	154,338	147,396	7,118	187,657	13,298	509,807	122.45	—93,500	10,270	—103,868	—93,160
Terminal R. R. Ass'n of St. Louis	36	.....	7,141	584,582	162,659	149,621	1,821	290,546	13,029	624,746	106.87	—40,164	56,499	—96,664	—114,033
Texarkana & Ft. Smith	81	159,799	31,577	209,084	38,947	45,705	943	72,583	7,061	165,025	78.92	44,059	12,917	31,129	—17,872
Texas & New Orleans	469	733,750	308,974	1,110,675	249,890	395,706	10,602	452,981	30,007	1,167,186	105.08	—56,511	42,172	—101,048	—386,681
Texas & Pacific	1,946	3,598,501	1,293,130	5,098,498	894,297	1,185,523	52,186	2,718,034	141,492	5,031,699	98.68	66,799	169,942	—103,251	—824,775
Toledo & Ohio Central	435	949,526	122,916	1,127,057	253,270	449,630	12,163	543,743	31,996	1,295,002	114.90	—167,944	62,530	—230,506	17,964
Toledo, Peoria & Western	247	167,103	93,256	273,849	50,667	76,022	4,404	126,489	10,898	266,296	97.24	7,554	17,000	—9,446	20,664
Toledo, St. Louis & Western	454	994,518	50,068	1,087,578	180,445	263,565	11,999	461,728	22,531	940,265	86.45	147,313	52,000	95,210	129,119
Trinity & Brazos Valley	368	169,648	34,879	214,353	79,696	87,084	3,324	114,933	16,370	301,406	140.61	—87,053	11,429	—98,544	—39,391
Ulster & Delaware	128	63,778	26,852	127,379	23,744	39,995	2,212	96,254	9,213	172,580	135.48	—45,202	9,200	—54,402	—23,951
Union Pacific	3,614	12,173,908	2,888,883	16,209,730	2,086,119	3,031,490	89,141	4,996,094	449,969	11,015,015	67.95	5,194,715	239,977	4,953,877	2,441,375
Union R. R. of Penna.	35	.....	.....	1,115,590	104,612	311,797	514	598,452	14,891	1,029,211	92.26	86,379	12,856	73,523	507,663
Utah Ry.	98	197,906	701	200,805	27,282	50,714	598	41,642	3,929	124,165	61.83	76,639	8,119	68,520	—38,346
Quincy, Omaha & Kansas City	255	110,084	47,386	163,350	46,368	21,140	531	96,134	2,101	166,083	101.67	—2,733	6,006	—8,775	18,662
Vicks., Shreve. & Pacific	171	344,945	151,323	535,757	102,342	119,345	4,269	218,645	16,588	465,006	86.79	70,751	18,833	51,901	—62,731
Virginian	518	1,305,788	101,220	1,551,019	338,898	516,324	10,892	741,665	31,266	1,624,401	104.73	—73,381	73,200	—146,581	—393,681
Wabash	2,519	5,194,665	1,329,462	7,062,811	931,999	1,480,317	102,972	4,044,499	217,846	6,814,402	96.48	248,409	210,316	37,784	625,574
Washington Southern	35	298,339	408,524	778,951	59,929	75,663	6,153	235,645	12,941	395,704	50.79	383,246	13,517	369,725	223,289
West Jersey & Seashore	361	541,700	746,861	1,413,680	406,135	325,066	14,544	902,697	42,665	1,698,905	120.17	—285,225	80,125	—365,544	23,637
Western Maryland	707	1,886,169	150,506	2,214,745	498,866	748,866	40,730	1,067,007	84,706	2,458,862	111.02	—244,116	86,400	—330,516	—112,514
Western Pacific	1,011	1,380,972	153,919	1,598,434	444,699	337,220	22,303	590,509	41,509	1,464,353	91.61	134,081	85,794	48,262	—343,440
Western Ry. of Alabama	133	256,373	142,010	425,247	53,313	91,779	5,678	182,027	13,626	352,842	82.97	72,405	15,000	57,403	—23,277
Wheeling & Lake Erie	511	1,167,489	89,122	1,387,680	324,387	486,022	12,906	741,132	51,405	1,619,697	116.71	—232,017	111,100	—343,117	—246,921
Wichita Falls & N. W.	329	204,085	63,456	282,602	96,138	45,820	2,462	138,298	12,381	293,099	103.71	—12,497	18,326	—30,877	2,802
Yazoo & Mississippi Valley	1,382	2,631,835	877,737	3,649,782	611,320	792,433	26,846	1,478,032	102,771	2,943,010	80.63	704,773	136,504	568,048	—80,026

Increase in Rates in Germany

The new Minister of Prussian Railroads foresees the necessity of raising all freight rates 60 per cent (exception made in the case of potatoes and wheat, if necessary). He proposes besides an increase of passenger rates with the following percentages: 4th class, 20 per cent; 3rd class, 25 per cent; 2nd class, 35 per cent; 1st class, 100 per cent. If the financial results of exploitation improve, the increase will be reduced or even abolished. The new Minister of Railroads is an adversary of the four class system of passengers, and wishes to reduce it to two classes. However, he considers this reform actually impossible. He has been authorized to negotiate with the federated German governments on the question of unification of rates, but not to bind the Prussian government in this question.—*Vorwaerts.*

Chicago to New York in Six Hours, 50 Minutes

Captain E. F. White, an aviator of the United States army, flying in a Dellaviland biplane, made the trip from Chicago to New York on Saturday, April 19, without a stop, in six hours, 50 minutes, beating all previous speed records for that distance. The airplane has a twelve-cylinder Liberty motor, and its gasoline tank holds 194 gallons. Captain White had with him a mechanic. He left Ashburn field, Chicago, at 9:50 a. m., and landed at Hazelhurst field, Mineola, N. Y., at 5:40 p. m. (4:40 p. m. Central time). Mineola is 20 miles east of the New York post office, and the distance through from Chicago is calculated at 727 miles, making the rate of speed 106.38 miles an hour. Captain White reported that the temperature, at the great altitude at which he flew, was not uncomfortably cold.

On Monday, April 21, Captain White flew from New York to Washington in one hour, 50 minutes, starting at 11:30 a. m., and arriving at 1:20 p. m.

The best regular passenger train time between New York and Chicago is 20 hours, and the best time which has ever been made between these cities by a special train is 16 hours, 30 minutes. Between New York and Washington the best regular schedule is five hours, and the best time on record is four hours, 18 minutes.

Loans by War Finance Corporation to Railroads

The War Finance Corporation has announced the following list of loans made by it to railroads up to April 10:

Baltimore & Ohio	$4,450,000
Baltimore & Ohio	1,000,000
Buffalo, Rochester & Pittsburgh	1,000,000
Central of Georgia	900,000
Chesapeake & Ohio	25,000
Chesapeake & Ohio	275,000
Chesapeake & Ohio	2,070,000
Chicago, Mil. & St. Paul	11,560,000
Chicago, Rock Island & Pacific	9,700,000
Chicago, Rock Island & Pacific	730,000
Illinois Central	1,500,000
Illinois Central	10,500,000
New York Central	13,500,000
New York Central	3,000,000
New York Central	4,000,000
Southern	5,264,480
Southern	735,520
Southern	792,770
Southern	562,500
Baltimore & Ohio	4,600,000
Baltimore & Ohio	2,000,000
Buffalo, Rochester & Pittsburgh	208,800
Central of Georgia	1,121,000
Chesapeake & Ohio	250,000
Chesapeake & Ohio	800,000
Chicago, Burlington & Quincy	3,977,600
Chicago, Ind. & Louisville	1,400,000
Chicago, Mil. & St. Paul	1,600,000
Chicago, Rock Island & Pacific	2,800,000
Cleveland, C., C. & St. L.	340,000
Cumberland & Manchester	175,000
Erie	12,768,420
Lake Erie & Western	62,400
Lehigh Valley	2,400,000
Michigan Central	992,000
Missouri Pacific	1,120,000
New York Central	2,000,000
Wheeling & Lake Erie	618,000
Boston & Maine	728,000
Erie	2,500,000
Western Maryland	931,000
Walker D. Hines, Director General of Railroads	50,000,000
Total	$164,897,490

Traffic News

The New York State Barge Canal is to be opened on May 1. The United States Railroad Administration has announced that no action will be taken by the government toward regulating the rates for transportation except on the boats owned or controlled by the government.

C. D. Boyd, formerly general coal and coke agent of the Louisville & Nashville, has become traffic manager for the coal operators of eastern and southeastern Kentucky and Tennessee, members of the Southern Appalachian Coal Operators' Association, Harlan County Coal Operators' Association and Hazard Coal Operators' Exchange.

The Refractories Traffic Association of the St. Louis district was recently organized at St. Louis, Mo., by traffic agents of fire brick and clay products companies located in this district. The object of the association is to keep in touch with all matters pertaining to freight rates on the various commodities manufactured by the companies. Meetings will be held monthly.

The Railroad Commission of Texas has issued an address to the commercial and shipping interests of that state, calling for information concerning experience with the sailing-day plan, adopted at freight stations in that state, with a view to presenting a protest to the United States Railroad Administration. The Texas Commission believes the plan is inconvenient to the shipping public.

Freight rates by lake, this season, as approved by the United States Shipping Board, are published as follows: Grain, from Lake Superior and Lake Michigan ports to Lake Erie, in April, 3½ cents a bustel; in May, 3 cents a bushel. Ore, to Lake Erie, 80 cents a ton. Coal, from Lake Erie ports, 42.5 cents a ton. Grain rates to Goderich, to Port Huron and to Collingwood, will be one-half cent a bushel less than to Lake Erie.

The Houston (Tex.) Traffic Club has adopted resolutions opposing government ownership or operation of railroads and outlining desirable legislation to accompany the return of the roads to private ownership. The Atchison (Kan.) Chamber of Commerce has taken similar action including also the telegraph and telephone lines. The resolutions ask that Congress take immediate steps to return the railroads to private ownership and to vest jurisdiction over the issuance of securities in the same national governmental agency by which freight and passenger rates are controlled.

The Fruit Growers' Express, Chicago, has been cited by the Federal Trade Commission on charges of making contracts with railroads to create a monopoly in the interstate transportation of fresh fruits and vegetables. The commission "has reason to believe that a complete monopoly already has been established over the Atlantic Coast Line, Seaboard Air Line, Florida East Coast, New York, Philadelphia & Norfolk, and other lines." The contracts complained of stipulate that the railroad shall use the car line's equipment exclusively in the movement of fruits and vegetables under refrigeration. Answer is called for by June 1.

Export freight on hand at North Atlantic ports for the week ended April 16 totaled 32,994 carloads, exclusive of bulk grain and coal, compared with 33,619 for the same day of the preceding week. For the same period there were 8,161 carloads of export food on hand at these ports, exclusive of bulk grain, which was a decrease of 2,219 cars, compared to the week previous. For the week ended April 16 there were 19,240,216 bushels of grain in elevators at North Atlantic ports; received during the week 6,099,116 bushels; cleared 7,288,986 bushels. At South Atlantic and Gulf ports there were 11,329 carloads of export freight on hand for the week mentioned, compared with 11,855 for the week previous; grain in elevators, 3,924,898 bushels.

Commission and Court News

Court News

Federal Control of Railroads—Constitutionality of 1918 Statute

In an action in the New York Supreme Court, Erie County, against the Pennsylvania for the death of a brakeman, which happened while the railroad was being operated by the federal authorities, the chief question involved was the constitutionality of the Act of Congress of March 21, 1918, in so far as it authorized the maintenance of actions and the recovery of judgments against carriers for damages sustained by employees and others while the railroad is being operated by and under the direction of the federal authorities. The court holds that the act is unconstitutional in so far as it authorizes the recovery of judgments against carriers for the negligence or default of the government or its agents and the enforcement of such judgments against such property of the carriers as is not taken under federal control. It considers that this amounts to depriving the corporation of its property without due process of law. The court says that it may almost take judicial notice of the fact that railroad companies, or many of them, do own and possess other property than that employed in the transportation of property and freight, which latter alone was taken under government control. Many of the companies have large holdings of the stock and bonds of subsidiary companies. Many, if not all, in addition, owned considerable sums of money on hand and in bank as the result of their operations. The federal government took into its possession and control none of this class of property and all such property can be reached by judgment creditors in appropriate proceedings to satisfy valid judgments against the corporation.

The court cited in support of its opinion in the present case the recent decision of the federal district court for the Eastern District of South Carolina in U. S. Railroad Administration v. Burch, 254 Fed. 140 (November 30, 1918), where the United States Director of Railroads sought to enjoin a sale under execution, under a judgment obtained against the Atlantic Coast Line of certain lots owned by the company, and claimed not to have been taken over by the government. The court there held that the acts of Congress of August 29, 1916, did not authorize the Director General of Railroads to take possession of lands belonging to a railroad company which are not used in the business as a carrier, and that a sale of such lands under execution will be enjoined by the court.

The federal government, in the control and operation of the railroad properties taken over, is in no sense the agent or representative of the railroad companies to which the systems belong. By the 12th section of the act of 1918 the moneys and other property derived from the operation of the railroads during federal control are declared to be the property of the United States."

In view of the importance of the questions and the far-reaching effect of such a holding, the court considered they should be passed on by courts of review; and as the appellate courts have expressed the opinion that constitutional questions should be reserved by trial courts for their determination, it was held that the exceptions taken on the trial be ordered heard in the first instance at the Appellate Division of the Supreme Court, with a stay of entry of judgment on the verdict pending the hearing and disposition of the case in that court. Schumacher v. Pennsylvania Railroad Company. Decided March 26, 1919.

Condition of the Roumanian Railroads.—The condition of the Roumanian railroads, which before the war were prosperous, becomes more and more one of the chief difficulties in the return to economic life. There is only one train a day between the different parts of the country, instead of three to seven, which circulated in normal times. The wagons are partly useless.

Equipment and Supplies

Locomotives

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., wishes to purchase one, 40 to 50-ton, consolidation or 10-wheel locomotive, with a short rigid wheel-base, 36 to 44 in. wheel centers, and 180 to 200 lb. steam pressure; one 65-ton, 2-6-2 type locomotive, and one 4-4-0 type locomotive with 14 by 22 in. cylinders. This company also wants a second-hand, standard gage, four driver saddle tank locomotive, with 10 or 11 by 16 in. cylinders.

Locomotive Deliveries

The following new locomotives were shipped to railroads under federal control during the week ended April 12:

Works	Road	Number	Type
American	C. M. & St. P.	15	USRA Mikado
	Cent. of Ga.	1	Mallet
	Erie R. R.	3	USRA Pacific
	C. & N. W.	3	USRA 6-w. Sw.
		22	
Baldwin	Norf. & W.	1	Mallet
	C. B. & Q.	1	Mikado
	Phil. & R.	1	Consol.
	Penn. R. R.	1	Mikado
	C. B. & Q.	4	USRA Mikado
	C. C. & O.	1	Mikado
	Gt. North.	2	8-w. Sw.
	A. T. & S. F.	1	Mikado
	C. C. & O.	1	Mallet
		13	
	Total	35	

Passenger Cars

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, is in the market for one gasoline motor car with baggage compartment, seating 25 to 30 people.

Car Deliveries Week Ended April 5

Road	Number	Type	Manufacturer	Total accepted for given roads
Sou. Pac.	45	50 Ton S. S. Box	Am. Car & Fdy. Co.	100
C. C. & O.	48	50 Ton S. S. Box	Bettendorf Co.	276
Sou. Pac.	142	50 Ton S. S. Box	Haskell & Barker	331
Sou. Pac.	200	50 Ton S. S. Box	Pullman Car Co.	200
N. & W.	70	50 Ton S. S. Box	Pullman Car Co.	800
P. McK. & Y.	107	70 Ton L. S. Gond.	Pressed St. Car	130
Total	612			

Car Deliveries Week Ended April 12

New standard cars were accepted during the week ended April 12, as follows:

Road	Number	Type	Manufacturer	Total accepted for given roads
C. C. & O.	24	50-ton S. S. Box	Bettendorf Co.	300
Sou. Pac.	146	50-ton S. S. Box	Haskell & Barker	477
Sou. Pac.	200	50-ton S. S. Box	Pullman Car Co.	400
P. McK. & Y.	77	70-ton L. S. Box	Pressed St. Car Co.	207
Total	447			

Freight Cars

W. W. Hedgeman, St. Paul, Minn., is in the market for one flat car.

The Commonwealth Edison Company, Chicago, is inquiring for one 66-ton concentrated-load well-car.

The Government of the Netherlands, Colonial Department, is inquiring for one motor inspection car for export.

The New Howard Colliery Company, Huntington, W. Va., has ordered 59 cars from the American Car & Foundry Company.

Supply Trade News

J. S. Cullinan has recently been elected president of the Galena-Signal Oil Company, New York.

J. H. Deppeler of the Metal & Thermit Corporation, Jersey City, N. J., has been elected a director of the American Welding Society.

Briggs & Turvias, Inc., iron and steel, Chicago, have opened a New York office at 1805 Equitable Trust building, to be under the direction of the president of the company, Carl R. Briggs.

The United States Switch Company, Eau Claire, Wis., has let contracts for the erection of additions to its iron and steel foundry and machine shops and work is now under way on the new buildings.

The Illinois Manufacturers' Association, Chicago, is planning to open a New York office as a result of recommendations of its foreign trade committee. The committee states that particular attention will be paid to buyers from the Philippines and the Orient.

Charles Gilman, eastern manager at New York for the Massey Concrete Products Corporation, Chicago, has been elected vice-president, effective May 1. Mr. Gilman's headquarters will be in New York, and he will be in charge of sales in the eastern territory.

Geo. W. Hoover, formerly in charge of the procurement of railway material in the Construction Division of the army, has been appointed manager of the St. Louis office of the Buda Company, Chicago. The Buda Company opened a St. Louis office on April 1 at 2025 Railway Exchange building.

T. J. Hudson, of the Chicago Pneumatic Tool Company, has been appointed acting manager of the pneumatic tool sales division, effective April 15, succeeding F. H. Waldron, who returns to Minneapolis, Minn., as district manager of sales for the Minneapolis territory.

B. L. Swearingen, formerly assistant general freight agent on the Missouri Pacific, and for the past year supervisor of oil traffic for the Railroad Administration with headquarters at Kansas City, Mo., has been appointed traffic manager of the Sinclair Refining Company, Chicago, to succeed G. F. Rung, who has been assigned to other duties.

The Indian Refining Company, Lawrenceville, Ill., will commence work immediately on the construction of a car repair shop at Lawrenceville. The new shop will be of structural iron and brick construction, one story high and 85 ft. by 327 ft. The work will be done by the company's own forces. The approximate cost is $75,000.

The American Railway Signals Company, Terre Haute, Ind., has been organized with a capitalization of $200,000 by Harry W. Beggs, Thomas G. Beggs, John T. Beasley, John F. O'Brien and John H. Beasley. The new company will manufacture railroad signal devices and holds a license contract with the Julian-Beggs Signal Company giving it the sole right to manufacture, sell and install the Julian-Beggs Signal Company devices.

The Hess-Bright Manufacturing Company, the S K F Ball Bearing Company, the Atlas Ball Company and the Hubbard Machine Company have announced a combination effective May 1, under the name of S K F Industries, Inc., to sell the products of the above companies through one central organization. The new company will offer a comprehensive line of ball bearings, including the Hess-Bright deep-groove type, S K F self-aligning radial and thrust bearings and ball bearing pillow-blocks and shafting hangers. S K F Industries, Inc., is simply a holding, sales and engineering organization under the direction of B. G. Prytz, president; W. L. Batt, vice-president; J. P. Walsh, comptroller, and S. B. Taylor, sales manager. The principal office will be at 165 Broadway, New York, with branches at Boston, Philadelphia, Atlanta, Buffalo, Cleveland, Detroit, Cincinnati, Chicago and San Francisco.

Advisory and Purchasing Engineers

Earl Wheeler, O. A. Mechlin and Frank Rhea announce their association in the firm of Wheeler, Mechlin & Rhea, as advisory and purchasing engineers with office at 90 West street, New York. Its purpose will be to conduct an advisory and purchasing engineering business, organized to furnish service to foreign and domestic clients purchasing machinery and engineering materials in the United States, to be used to construct, maintain and operate properties.



Earl Wheeler

By the term "machinery and engineering materials" is meant those classes of materials, equipment, apparatus and supplies which demand engineering specifications or plans as a fundamental basis of purchase, including general construction materials and plant; steam railway materials, equipment and supplies; electric railway materials, equipment and supplies; electric light and power apparatus and supplies; shop and factory equipment; harbor, wharf, dredging and freight handling equipment; highway, street, sanitation and water supply plant and materials; mining and smelting plant equipment, etc.



Frank Rhea

The firm in addition to acting as advisory and purchasing engineers will arrange coordinated production programs for shipments from one or several manufacturing plants, will follow production schedules at the factories by a follow up system of correspondence and personal visits, and supervise inspection, packing and shipments by rail and water. It will also follow through export bills of lading and coordinate shipments from different sources at ship's side and will combine inspection certificates of quality, quantity and packing with bills of lading and secure all possible discounts by applying the client's established credits.

The entire compensation of the firm will be derived from the clients served, in direct fees for advisory engineering and commissions on purchases made. No compensation will be received in the form of selling commissions, as the firm will conduct negotiations as the authorized agent of its client.

Earl Wheeler is a member of the American Institute of Electrical Engineers. He has served as director of the department of electrical and mechanical engineering, engineer school; Corps of Engineers, United States Army; as treasurer and general manager of the Electric Speedometer Company, Washington, D. C.; and as local manager of the General Electric Company at Washington, D. C. He had the rank of lieutenant colonel of engineers, United States Army, and

acted as chief of the machinery and engineering materials division, office of the Director of Purchase, General Staff, which was formerly the General Engineer Depot, the purchasing engineers for the Corps of Engineers during the participation of the United States in the world war.

O. A. Mechlin is an associate member of the American Society of Civil Engineers. He is a member of the firm of Mechlin & Starr, architectural engineers, Washington, D. C. He served as lieutenant-commander, Civil Engineer Corps, United States navy, and was the officer in charge of construction of the additions to the Naval Academy; the Navy and Munitions building, Washington, D. C. (the largest concrete-steel office building in the world); and was public works officer, Navy Yard, Philadelphia, Pa., in charge of construction of shops, buildings, wharves, power plant, dry-dock and ship building ways.

Frank Rhea is a member of the American Society of Civil Engineers, the American Railway Engineering Association, and the Railway Signal Association. He was at one time assistant supervisor and supervisor of track on the Norfolk & Western, and later served on the Pennsylvania as chief signal inspector, assistant engineer and division engineer, respectively. He was also at one time an apprentice with the Union Switch & Signal Company, superintendent of construction of the Clamond Telephone Company and commercial engineer in the railway engineering department of the General Electric Company. He later served as district engineer of the Eastern District, Division of Valuation, Interstate Commerce Commission; and as a commercial engineer of the Bureau of Foreign and Domestic Commerce made a study of the markets for railway materials in New Zealand, Australia, the Philippine Islands, China and Japan.

John T. Dickerson, general manager of the **Strauss Bascule Bridge Company,** Chicago, died April 14 at his home, Oak Park, Ill., at 40 years of age. Mr. Dickerson was a graduate civil engineer of Rose Polytechnic Institute of Terre Haute, Ind., class of 1902. He had been identified with the company for seven years. Prior to 1912 he was assistant engineer and general sales engineer with the Scherzer Rolling Lift Bridge Company of Chicago for a period of 5 or 6 years, and before that he was employed in the bridge departments of the Chicago, Burlington & Quincy and the Chicago, Rock Island & Pacific, and the American Bridge Company of St. Louis, Mo.

Carl H. Peterson, western representative of the Baldwin Locomotive Works, Philadelphia, Pa., and the Standard Steel Works Company, Philadelphia, with headquarters at Chicago, has resigned, effective May 1, to become president of the Iron Mountain Company, Chicago, and vice-president of the Jackson-Park Machine Company, Chicago. He was born in Chicago on November 9, 1872, and began his business career as an engineer and draftsman with Swift & Company, Chicago, in 1889. From this time until May, 1919, he has been consecutively engineer for the Railway Lighting & Manufacturing Company, Chicago; engineer and salesman for the Safety Car Heating & Lighting Company, Chicago; engineer and salesman for the Pressed Steel Car Company; assistant to the western representative of the Baldwin Locomotive Works and the Standard Steel Works; southwestern representative of the same firms, with headquarters at St. Louis, Mo., and western representative for the same firms, which position he has held prior to his recent election. Mr. Peterson will be succeeded by **Arthur S. Globe,** southwestern representative of the Baldwin Locomotive Works and the Standard Steel Works Company, with headquarters at St. Louis, who will have the title of manager of the Chicago office, the title of representative having been abolished. **Paul G. Cheatham,** assistant to the western representative, with headquarters at Chicago, will succeed Mr. Globe as manager of the St Louis office

American Steel Foundries

The stockholders of the American Steel Foundries Company, Chicago, at a special meeting held in New York on April 22, voted unanimously in favor of the plan submitted by the board of directors to create a preferred stock issue of $25,000,000 and to split the present capital of 178,140 shares or $17,814,000 into 515,520 shares of par value of $33⅓ per share. These latter shares will be exchanged, three for one, for the present stock.

This plan was formulated some time ago by the board of directors to provide capital for the acquisition of additional properties. President R. P. Lamont, in outlining the plan at the meeting, explained that only a part of the new preferred stock would be issued at this time and only in exchange for property that would earn the preferred dividend, leaving the balance of earnings for the common. The rise in the present shares on the New York Stock Exchange within the last few days from around 82 to 96 on April 22, is indicative that the preferred issue will not stand in the way of dividends on what will now be the common stock

Trade Publications

Slotting Machines.—Latest information on three types of Newton slotting machines in a variety of sizes is given by the Newton Machine Tool Works, Inc., Philadelphia, Pa., in catalogue 49-A, which also contains photographs and brief information on upright generating planers, cold saw cutting off machines, locomotive link grinding machines, horizontal milling machines, vertical milling machines, rotary planers, keyseat milling machines and duplex locomotive rod boring machines.

Shop Production.—"The Missing Link" is the title of a 16-page booklet issued by the Gisholt Machine Company, Madison, Wis., explaining the principle of the Periodograph and the advantages to be secured from its installation. This machine was developed to make it possible to secure an accurate record of the time actually spent in producing and the loss of time lost by workmen waiting for materials, broken machines, lack of power, and other causes of delay. The booklet shows several cards which are used for registering the tme lost, with the reasons, and a chart showing the record of a machine for an entire year.

Steam Pumps.—Several bulletins have been issued by the A. S. Cameron Steam Pump Works, New York, describing their pumps, which are bound together in a heavy manila folder. Included among these are bulletin 7204, which explains the general characteristics and operation of Cameron steam piston and plunger pumps; bulletin 7152, showing the construction of a single suction volute centrifugal pump, with tables of capacities, speeds and horsepowers; bulletin No. 7251, covering two-stage motor driven and three-stage turbine driven centrifugal pumps and giving complete information regarding their operation, specifications and detail parts; and bulletin 7150, describing and illustrating the general design of a double suction volute centrifugal pump, including the results of tests made with this pump and useful information regarding the friction and pressure of water.

History of Rail Manufacture.—Robert W. Hunt, president of Robert W. Hunt & Co., Chicago, has prepared a booklet on the occasion of his recent eightieth birthday outlining in detail the early development of Bessemer rail manufacture. The book contains a paper entitled "The History of the Bessemer Manufacture in America," which was presented by him at the American Institute of Mining Engineers at its centennial meeting held in Philadelphia on June 23, 1876, and one entitled "The Evolution of American Rolling Mills," which he presented as a presidential address before the American Society of Mechanical Engineers on November 16, 1891. These papers contain much information not commonly known regarding the early development of Bessemer rail manufacture.

Locomotive Coaling Plants.—A comprehensive book on locomotive coaling facilities, Rands gravity sand plants and cinder handling equipment for railroads, describing a large number of representative installations, has been published by the Roberts & Schaefer Company, Chicago. The catalogue contains 68 pages, 9 in. by 11½ in., is well illustrated and includes erection drawings of several of the plants. It also describes and illustrates some of the special features of Roberts & Schaefer equipment, including the Schraeder automatic measuring feeder and a patented elevating bucket. Some interesting data is also given showing in detail the cost of handling coal, taken from carefully compiled records of a large railway system which employs 10 different methods of handling coal, comparing the cost of operating plants designed by the Roberts & Schaefer Company with the others.

Railway Construction

DE QUEEN & EASTERN.—This company is connecting a terminus of its road at the Arkansas-Oklahoma state line, about nine miles west of De Queen, Ark., with a line extended from the terminus of the Texas, Oklahoma & Eastern at Broken Bow, Okla. Beginning at a point on the St. Louis-San Francisco at Valliant, Okla., and extending east through Bismark and Broken Bow, in Okla., and De Queen, Lockesburg and Dierks, in Ark., a link of 76 miles will be built. There remains six miles of grading to be done and 15 miles of steel to lay. Many trestles and one 100-ft. steel span are to be built. The company's forces will carry out the trestle work and at a later date will contract for the steel span.

ANNUAL REPORT

Buffalo, Rochester & Pittsburgh—Thirty-fourth Annual Report

The Directors of the Buffalo, Rochester and Pittsburgh Railway Company submit to the Stockholders the following report for the year ending December 31, 1918.

As stated last year, the U. S. R. R. Administration formally assumed possession, control, operation and use of your property at 12 o'clock noon on December 28, 1917. The actual operation and accounting, however, became effective at midnight of December 31, 1917.

Under authority of a proclamation of the President, dated March 29, 1918, authorizing the Director General of Railroads to agree with the carriers respecting all the terms and conditions of the Federal Control Act, and in accordance with authority given by you at a meeting held July 10, 1918, a contract between the Director General of Railroads and your Company, dated October 25, 1918, was executed on December 19, 1918.

The annual compensation thereby guaranteed to your Company is $3,276,410.42, payable quarterly in equal installments on the last days of March, June, September and December of each year, and was based entirely on the average annual operating income of your Company during the test period named in the Federal Control Act, being the three years ending June 30, 1917. A claim for additional compensation presented by your Company did not receive favorable consideration.

In assuming control of the property January 1, 1918, the Director General took over the following assets:

Cash	$1,422,153.48
Agents and conductors balances	304,244.60
Material and supplies	2,932,330.71
Total	$4,658,728.79

According to the agreement, out of the amounts received from the Company in cash collected or realized upon by him from current operating assets, he has paid the current operating liabilities of the Company and other claims arising prior to January 1, 1918, and is to account for the balance in the quarterly settlements. At the end of Federal control he is to return materials and supplies equal in quantity, quality and relative usefulness to that of the material and supplies which he received, or account for the same at prices prevailing at that time.

As definite settlements under this contract have not yet begun, the U. S. R. R. Administration advanced from time to time the necessary funds for immediate needs, as follows:

On account of annual compensation	$860,000.00
Loans on notes	1,440,000.00
Total	$2,300,000.00

For your information, and also to maintain the continuity of the statistics, full details of the operation under Federal control so far as available, are given in an appendix to this report.

ROAD

(Operated by U. S. R. R. Administration)

	1918	1917	Inc.
Owned	368.31	367.07	1.24
Leased	90.31	89.91	.40
Trackage rights	131.11	127.67	3.44
Total length of road operated	589.73	584.65	5.08
Second track	212.61	210.61	2.00
Sidings	457.48	412.57	44.91
Total miles of tracks, all steel rails	1,259.82	1,207.83	51.99

The increase of road operated is due to an adjustment of 1.64 miles in line owned and leased, caused by remeasurement, and additional trackage rights of 1.24 miles over Pennsylvania Railroad in Pennsylvania, and 2.20 miles over New York Central Railroad at Clearfield, Pa.

The tracks were increased by 2.00 miles of second track, from remeasurement, and 44.91 miles of sidings, including 25.83 miles on lines used under trackage rights.

INCOME.

	1918.	1917.	Increase or Decrease.
OPERATING INCOME:			
Revenues	.....	$14,975,000.30	—$14,975,000.30
Expenses	$52,281.17	11,878,565.89	—11,826,284.72
Net revenue .....(Def)	$52,281.17	$3,096,434.41	—$3,148,715.58
Tax accruals	150,000.00	506,000.00	—356,000.00
Uncollectible revenues	.....	359.09	—359.09
	$150,000.00	$506,359.09	—$356,359.09
Total operating income (Def)	$202,281.17	$2,590,075.32	—$2,792,356.49
NON-OPERATING INCOME:			
Guaranteed rental	$3,276,410.42	.....	$3,276,410.42
Equipment and joint facility rental	.....	$1,183,038.03	—$1,183,038.03
Other items	279,207.88	132,963.20	146,244.68
	$3,555,618.30	$1,316,001.23	$2,239,617.07
Gross income	$3,353,337.13	$3,906,076.55	—$552,739.42
DEDUCTIONS:			
Equipment and joint facility rental	.....	$319,061.15	—$319,061.15
Rentals of leased lines, interest, etc.	$2,205,025.94	1,847,194.91	$357,831.03
	$2,205,025.94	$2,166,256.06	$38,769.88
Net income	$1,148,311.19	$1,739,820.49	—$591,509.30
APPROPRIATIONS:			
Pension and Fire Insurance Funds	$28,754 45	$27,360.98	$1,393.47
Special appropriations	600.29	644,354.25	—643,753.96
Total appropriations	$29,354.74	$671,715.23	—$642,360.49
Surplus available for dividends	$1,118,956.45	$1,068,105.26	$50,851.19
Return on capital stock	6.78%	6.47%	.31%

Under the agreement with the Director General only the taxes commonly called war taxes (estimated this year at $150,000.00) are to be paid by your Company.

The increase of other items in non-operating income came principally from interest on balances due and adjustment in accounts with the Federal Administration.

A special appropriation of $29,354.74 was made from Net Income, of which $600.29 was applied to the purchase of new rolling stock, under provisions of the Sinking Fund of Equipment Agreement Series B, and the balance for the Pension and Insurance Funds.

DIVIDENDS.

		1918		1917	
Dividends in cash were paid on:					
Preferred Stock	$6,000,000	6%	$360,000	6%	$360,000
Common Stock	10,500,000	5%	525,000	6%	630,000
Total	$16,500,000		$885,000		$990,000

Since the close of the fiscal year, your Board of Directors has declared semi-annual dividends of three dollars per share on the preferred stock and two dollars per share on the common stock, payable February 15, 1919.

CAPITAL STOCK.

There has been no change during the year in this account. The total outstanding Capital Stock of the Company amounts to $16,500,000, and consists of $6,000,000 preferred stock and of $10,500,000 common stock.

FUNDED DEBT.

In accordance with the provisions of the Consolidated Mortgage of 1907, $1,500,000 4½% bonds were received from the Trustee to apply on payments made for improvements and betterments, and the securities placed in the Treasury of the Company.

The Trustee also delivered to the Company $147,000 Consolidated Mortgage 4½% bonds, representing 50% of a part of Equipment Bonds Series E and F retired during the year. The balance of the bonds due will be obtained next year.

These bonds, added to those in the Treasury of the Company, make a total of $2,970,000 held in reserve.

Under the terms of the Sinking Funds for the redemption of Equipment Bonds, $724,000 bonds were retired, as follows: $25,000 Series A; $50,000 Series B; $50,000 Series C; $117,000 Series D; $116,000 Series E; $185,000 Series F; and $181,000 Series G.

Also the fourth annual installment of $125,000 Series H bonds, and the first and second semi-annual installments of Series J bonds, amounting to $160,000, were retired, as provided for in the agreements.

To provide for additional rolling stock, an issue of $1,200,000 six per cent. Gold Bonds was authorized, to be secured by new equipment costing $1,573,606. These bonds were issued under an agreement, known as "Equipment Agreement Series K" dated August 1, 1918, and were sold during the year to the W. S. R. R. Administration. The Agreement provides that both principal and interest are payable without deduction for any tax, or taxes (except any Federal Income Tax) under any present or future law. The bonds mature in semi-annual installments of $40,000, beginning February 1, 1919, and ending August 1, 1933.

The net result is an increase of $326,000 in the bonded debt of the Company, held by the public on December 31, 1918.

LOANS.

Pending a more favorable market for the sale of the Company's Consolidated Mortgage Gold Bonds, held in its Treasury, at a fair price, it was found advisable to issue its notes bearing interest at 6% to the amount of $2,440,000.00 to obtain the necessary funds for corporate purposes.

Further loans of $250,000.00 were made at 4¼% and 4½% to meet the purchase of a similar amount of the Fourth Liberty Loan Bonds, subscribed for by your Company.

Including the loans made in 1917, the short term indebtedness now amounts to $3,699,600.00,

COST OF ROAD.

Capital account has been charged during the year with $1,947.756.34 for investment in road, as follows:

Second track, Marion Center, Pa., to Home, Pa.	$27,052.96
Passing Siding, etc., West Shore Junction, N. Y.	11,081.40
Passing Siding, etc., Warsaw, N. Y.	21,554.98
Passing Siding, etc., Beavers, N. Y.	52,607.72
Passing Siding, etc., Falls Creek, Pa.	31,493.06
Passing Siding, etc., Whistletown, Pa.	29,100.63
Passing Siding, etc., Juneau, Pa.	27,123.99
Interlocking plant, Riverside Jct., N. Y.	7,870.93
Interlocking plant, Brockwayville, Pa.	15,526.54
Interlocking plant, Falls Creek, Pa.	5,274.71
Interlocking plant, C. & M. Junction, Pa.	15,487.43
Terminal facilities, Buffalo Creek, N. Y.	31,441.10
Terminal facilities, East Salamanca, N. Y.	375,909.21
Terminal facilities, Clarion Junction, Pa.	26,781.29
Terminal facilities, Du Bois, Pa.	32,251.74
Terminal facilities, Elk Run Jct., and Cloe, Pa.	734,003.16
Remodeling freight station, Rochester, N. Y.	5,530.56
Remodeling freight station, Ganson St., Buffalo, N. Y.	14.794.00
New station, West Falls, N. Y.	8,289.57
Tie tamping machines and equipment	25,315.81
Shop and power plant machines	158,108.21
Improvement bridge, Johnsonburg, Pa.	19,803.98
Increased weight of rail, etc.	144,947.36
Stone and slag ballast	33,507.80
Additional yard extensions, sidings, etc.	92,898.26
Total	$1,947,756.34

The program of new work authorized in 1917, including the extensive improvements and changes in the terminal facilities and buildings at East Salamanca, N. Y., and Elk Run Junction and Cloe, Pa., is virtually completed.

The only important work still in progress, to be completed in 1919, is the following:

Land for industrial tracks, Buffalo, N. Y.

Interlocking plants at Riverside Junction, N. Y., and Falls Creek, Pa.

Yard tracks at Falls Creek, Pa.

No further new projects involving large expenditures are required or contemplated at this time.

COST OF EQUIPMENT.

Expenditures were made for additions to equipment as follows:

Thirty-nine new freight locomotives	$2,427,777.40
Eight new passenger locomotives	351,006.85
Forty-four steel underframe gondola cars, built at company's shop	47,442.10
Fifteen new caboose cars	42,646.55
Eight locomotive superheaters	14,246.31
Twenty-five incandescent headlights	3,869.14
Thirty-three duplex locomotive stokers	75,279.27
Sundry other additions, including two flanger cars, three tractor plows, re-classification or transfer of ten freight cars to work equipment	33,295.32
	$2,995,562.94

There was credited for equipment sold, transferred or destroyed, the following book values, of which the accrued depreciation to January 1, 1918, was charged to Accrued Depreciation Account, and the balance to the U. S. R. R. Administration:

Two freight locomotives	$23,198.24	
Two passenger locomotives	16,792.74	
Two passenger train cars	5,494.75	
One hundred thirty-seven freight train cars	89,151.94	
Five work equipment cars	1,443.59	
Eight miscellaneous equipment cars	5,289.70	141,370.96
Making a net increase of		$2,854,191.98

The total tractive power of engines aggregates 16,025,362 pounds, an increase of 3,251,952 pounds during the past year.

The average tractive power of each engine increased 4,252 pounds, being 43,312 pounds as against 39,060 pounds on December 31, 1917.

The total carrying capacity of cars in freight service now amounts to 777,657 net tons, an increase of 40,330.

The average carrying capacity or efficiency of each freight car increased .57 ton, being 43.94 tons as against 43.37 tons.

Of the cars in passenger service 47.31 per cent are of all steel construction; and in the freight service 93.63 per cent of the cars are all steel or are equipped with steel underframes.

All rolling stock under contract was delivered during the year and is included in this report.

The approximate cost of $2,253,600.00 for 800 fifty-five ton steel coal cars, allocated to your Company by the U. S. R. R. Administration and accepted from the builders by their inspectors, was not entered upon the books, pending a final determination of the whole question of the railroad equipment problem.

FIRE INSURANCE FUND.

The assets of this fund were increased $12,295.11 and now amount to $373,461.65 in interest bearing securities and cash.

PENSION FUND.

The assets of this fund, created July 1, 1903, were increased $11,611.28, and now amount to $243,998.69 in interest bearing securities and cash.

There were 68 pensioners upon the roll on December 31, 1918, a net increase of 4 during the year.

GENERAL REMARKS.

The Ontario Car Ferry Company, Limited, paid a dividend of 2½% for the six months ending December 31, 1917. The sum of $6,250.00 received on the $250,000 of this Company's stock was credited to non-operating income account.

The Interstate Commerce Commission began the valuation of your lines on July 1, 1917. About 95% of the field work, 75% of the office work and 45% of the profiles are completed. The amount expended to date on this account has reached $95,166.76.

The officers and employees of your Company subscribed to the Liberty Loans of the Government as follows:

1st Liberty Loan	3,390	individuals	$275,650.00
2nd " "	1,738	"	128,250.00
3rd " "	5,544	"	355,250.00
4th " "	7,567	"	924,850.00
Total	18,239	"	$1,684,000.00

of which only $144,442.34 remains to be paid for in the coming year.

During the war, two of the Directors and 850 employees joined the Nation's military and naval forces, of whom seven received commissions.

The acknowledgments of the Board are renewed to its officers and employees for their faithful and efficient service.

By order of the Board.

WILLIAM T. NOONAN,
President.

Rochester, N. Y., March 6, 1919.

PROFIT AND LOSS ACCOUNT.

December 31, 1918.

CREDIT.

Balance Surplus December 31, 1917			$4,395,242.15
Credit Balance, transferred from Income Account (page 22)			1,118,956.45
MISCELLANEOUS CREDITS—			
Adjustment on equipment bonds retired this year, to equalize discount at time of sale		$34,564.46	
Unclaimed wages, etc.		3,693.93	
Discount on funded debt retired		5,172.65	
Profit from securities bought and sold—			
Pension Fund	$879.00		
Insurance Fund	1,240.00		
		2,119.00	
Sundry items		65.18	
			45,615.22
Total			$5,559,813.82

DEBIT.

Dividend appropriation of surplus:			
Preferred stock—			
(No. 49) 3% on $6,000,000, payable February 15, 1918	$180,000.00		
(No. 50) 3% on $6,000,000, payable August 15, 1918	180,000.00		
Common stock—			
(No. 36) 3% on $10,500,000, payable February 15, 1918	315,000.00		
(No. 37) 3% on $10,500,000, payable August 15, 1918	210,000.00		
		$885,000.00	
Surplus applied to sinking and other reserve funds—			
Equipment bonds retired—Series A to G inclusive		577,348.68	
Miscellaneous appropriation of surplus—			
Series H and J		225,000.00	
Debt discount extinguished through surplus		944.99	
Miscellaneous debits—			
Premium on funded debt retired	$3,625.99		
Sundry items	1,551.79	5,177.78	1,693,471.45
By BALANCE SURPLUS December 31, 1918 (page 16)			$3,866,342.37

Railway Officers

Railroad Administration

Central

G. W. Tomlinson, director of the Division of Inland Waterways, has been given leave of absence to become resident director at London for the American Shipbuilding Company.

E. Marvin Underwood, general solicitor of the Seaboard Air Line and formerly assistant attorney general of the United States, has been appointed general solicitor of the United States Railroad Administration, and R. V. Fletcher, general attorney of the Illinois Central, has been appointed assistant general counsel of the Railroad Administration, in charge of traffic matters, succeeding R. Walton Moore, resigned.

Operating

W. Stephenson, assistant superintendent on the St. Louis Southwestern with headquarters at Pine Bluff, Ark., has been promoted to superintendent, with headquarters at the same place, succeeding J. E. Callahan, promoted.

J. G. Fitzhugh, superintendent of safety and fire prevention of the Gulf, Colorado & Santa Fe and associated lines, with headquarters at Galveston, Texas, has had his authority extended over the Beaumont, Sour Lake & Western, the Houston Belt & Terminal, the Iberia St. Mary's & Eastern, the New Iberia and Northern, the New Orleans, Texas & Mexico, the Orange & Northwestern and the St. Louis, Brownsville & Mexico.

John P. Darling, who has been appointed superintendent of the Bangor & Aroostook, with headquarters at Houlton, Maine, as has already been announced in these columns, was born on January 25, 1866, at Port Jefferson, N. Y. He began railway work in May, 1883, with the New York, West Shore & Buffalo, now the West Shore, and served in different capacities until the summer of 1885, when he was appointed night operator at Utica, N. Y. In 1888 he served as copier to despatcher and later became trick despatcher. He subsequently served on the same road and the New York Central lines consecutively as despatcher, chief despatcher, examiner and trainmaster, until 1907, when he resigned from railway work on account of ill health. In October, 1909, he entered the service of the Bangor & Aroostook as examiner. The following year he was appointed yardmaster, and later in the same year became trainmaster, which position he held until his recent appointment as superintendent of the same road as above noted.

Financial, Legal and Accounting

Charles Elsey, acting federal treasurer of the Western Pacific, the Tidewater Southern and the Deep Creek, has been promoted to federal treasurer of these roads, with headquarters at San Francisco, Cal.

W. F. Ingram, acting federal treasurer of the Southern Pacific, with headquarters at San Francisco, Cal., has been promoted to federal treasurer of this road and the Arizona Eastern with the same headquarters.

J. Kennedy has been appointed auditor of disbursements of the Southern Pacific and the Arizona Eastern, with headquarters at San Francisco, Cal., vice F. L. McCaffery resigned to accept service with Southern Pacific Company.

James F. Wright, assistant general solicitor of the Seaboard Air Line, with office at Norfolk, Va., has been appointed general solicitor, vice E. Marvin Underwood, resigned to become general solicitor for the United States Railroad Administration.

C. H. Hueston, acting federal treasurer and paymaster of the Des Moines Union, the Iowa Transfer, the Des Moines Western and the Des Moines Terminal has been appointed federal treasurer for these roads, with headquarters at Des Moines, Iowa.

Engineering and Rolling Stock

Philip Petri, until recently district engineer on the Baltimore & Ohio, Eastern Lines, with office at Pittsburgh, Pa., has been appointed division engineer, with headquarters at Cumberland, Md., vice W. T. Hughes, transferred.

Purchasing

R. L. Irwin, purchasing agent of the Gulf, Colorado & Santa Fe and associated lines, with headquarters at Dallas, Texas, has had his authority extended over the Beaumont, Sour Lake & Western, the Houston Belt & Terminal, the Iberia, St. Mary's & Eastern, the New Iberia and Northern, the New Orleans, Texas & Mexico, the Orange & Northwestern and the St. Louis, Brownsville & Mexico.

Corporate

Traffic

M. O. Bicknell, assistant to the president of the Sacramento Northern, has been promoted to traffic manager, with headquarters at San Francisco, Cal., to succeed J. R. Wilson, who has resigned.

Executive, Financial, Legal and Accounting

Colonel Frederick W. Green, having retired from army service, has been reinstated to the office of assistant to the president of the St. Louis Southwestern Railway Company, with office at St. Louis, Mo.

Railway Officers in Military Service

Major Edward W. Mason, 31st Engineers (Railway), American Expeditionary Force, who has been stationed at St. Nazaire, France, since May, 1918, has been promoted to Lieutenant-Colonel and appointed general superintendent of the 14th Grand Division, which extends from Gievres to St. Nazaire and La Rochelle, with headquarters at Nantes, France. Mr. Mason was formerly general superintendent of the Western Pacific, with headquarters at San Francisco, Cal. He entered the service of that road in 1909 and served continuously with the Western Pacific until his entry into the service of the United States Army.

Obituary

Harry De Laney, formerly superintendent of motive power of the Chicago, Indianapolis & Louisville, at New Albany, Ind., and later for about six years, previous to 1912, eastern representative at New York for Brown & Company, Inc., manufacturers of iron and steel products, at Pittsburgh, Pa., died at his home in New York on March 30. Mr. De Laney retired from active work in 1912.

David M. Perine, special agent on the personal staff of the general superintendent of the New Jersey division of the Pennsylvania Railroad, with headquarters at New York, died on April 22, at Baltimore, Md., while on a business trip in that city. He was born on February 13, 1869, at Baltimore, Md., and entered the service of the Pennsylvania System in May, 1888, as an apprentice at the Mt. Vernon shops of the Northern Central. He subsequently served consecutively as assistant road foreman of engines, assistant master mechanic, assistant engineer of motive power, and master mechanic until April, 1906, when he was promoted to superintendent of motive power of the Northern Central and the Philadelphia & Erie. The following year he was transferred to Pittsburgh on the Western Pennsylvania division, and in January, 1912, was again transferred to the New Jersey division and the West Jersey & Seashore, remaining in that position until his promotion in June, 1917, as special agent on the personal staff of the general superintendent of the New Jersey division as above noted.

EDITORIAL

Railway Age

Playing the Game

H. C. Woodbridge, supervisor of fuel conservation in the Allegheny region, directed attention at the New York Railroad Club meeting week before last to the importance of the statistics which are being developed by the Fuel Conservation Section of the United States Railroad Administration. While there are, of course, many reasons why the performance of one railroad cannot be directly compared with that of another road, yet in a general way such comparisons may prove of the greatest value in inspiring the managements of the different roads to look into the reasons for the differences and to try to improve their records. The matter of fuel conservation is of such vital importance that no stone should be left unturned in encouraging those who actually handle it to use it to the best possible advantage. This, however, involves the most careful and far reaching educational methods, which in conjunction with accurate performance records will encourage the men to emulate each other and will transform the work of the firemen and engineers into the spirit of playing a game. It is this spirit that is so necessary in getting the best results from men engaged in any kind of occupation or business. It kills the spirit of drudgery and adds a zest to a man's work that is reflected in an improvement in his physical and mental condition and development. The records that are being developed by the Fuel Conservation Section, which will undoubtedly improve in accuracy as the standard statistics developed under the direction of Professor W. J. Cunningham become better understood and appreciated, will encourage rivalry among the managements of the different roads. These same statistics which are being compiled for divisions and for individual performance will accomplish the same purpose among the various parts of each organization and among the individuals.

Telephone Strike Under Government Operation

The rapidity with which the various stock arguments formerly advanced in favor of government management of railways and other public utilities are being refuted by the results of actual government operation is as amusing as it is instructive. One of the principal of these arguments was that the government would be a model employer, and that therefore under its management labor would be fairly dealt with and there would be no strikes. The Bell telephone system is now being operated, under government control, by the post office department. Recently the lines of the Bell system throughout New England were almost completely tied up by a strike of the operators and some other employees. The strikers attributed their break with the management to an unreasonable attitude assumed by Postmaster General Burleson regarding the method of settling their wage demands. Irrespective of the merits of the controversy, however, the fact that the strike took place under government operation is highly significant. We cannot now recall a single important claim which ever has been advanced in favor of government management which has not been refuted by actual experience in the operation by the government of the railroads and the telegraph and telephone systems; and some of the worst evils which appear sure to develop under long continued government management have not yet had time to come to full fruitage. For example, the twin evils of politics and bureaucracy, although they already have made themselves felt, are still in their infancy, and the properties in the main are still operated, not by political appointees, or by the mediocre products of the civil service system, but by men trained under private management. In view of the great disparity which exists between the claims made in the past by advocates of government operation and the results that have already been produced, one wonders how wide the disparity would become after politics and bureaucracy had done their perfect work, and men of ability had been weeded out.

Summing Up the Railroad Problem

There were three short talks before the National Institute of Social Science in New York last Friday which, although they occupied less than an hour and a half in all, summed up the present railroad situation as clearly as it could be covered in weeks of discussion. Theodore E. Burton, formerly United States senator from Ohio, sketched in outline the three phases through which, in his opinion, the railroads of the United States have passed; these were, encouragement of railroad building by gifts of land, etc., protection of the shipper which eventually amounted to persecution of the railroads, and exploitation of the employees. With this as a background, William Church Osborn showed in a lucid and entirely convincing address how, although the government had taken over control and operation of the physical properties of the railroads, it had not attempted to control the employees on these physical properties. As Mr. Osborn put it, control of the railroads without control of the organization to run them, means that the government has taken over less than 50 per cent of what constitutes the steam railroad transportation system of the country. It is a situation which nearly every railroad man realizes but it is one which is seldom fearlessly and frankly faced in the discussion of railroad matters in Congress or before congressional investigating committees. The solution that Mr. Osborn suggested, by implication at least, appeared to be a recognition that railroad labor as well as railroad capital was invested with a public interest to a degree which required it to be regulated. Employment in railroad work would then be an acceptance of conditions different from those in private industry and the right to strike—to quit work without warning—would be abrogated by acceptance of the position. George A. Post, chairman of the Railroad Committee of the Chamber of Commerce of the United States got down to the "brass tacks" of the situation when he summed up the discussion with the irrefutable fact that, discuss as much as you would the theoretical problems involved in the future of American railroads, what we have to do now is to "dig down into our jeans" as shippers and consumers of goods that are shipped by rail and pay the higher freight rate that is absolutely necessary to the continued solvency of the railroads.

What Punitive Overtime in Train Service Would Mean

THE QUESTION of "punitive" overtime for employees in railway train service has been referred to the consideration of Board of Adjustment No. 1 of the Railroad Administration without attracting much attention. If the public knew just what this action means it would attract more attention. The granting of punitive overtime would involve another increase in wages of many millions of dollars a year which the public would have to pay and would not necessarily mean at the same time any change in the hours of work of the men affected.

Almost all railway employees have now been given the eight-hour basic day and changes are under way as a result of which practically all of them except those in train service soon will actually be working only eight hours a day. Work in train service, however, is peculiar, and the wages paid for it are on a peculiar basis. The number of hours a railway engineer, fireman, conductor or brakeman works in a day depends upon how far and how fast his train runs. If he is called for duty and works eight hours or less (five hours or less for passenger enginemen), or runs 100 miles or less (150 miles for passenger trainmen), he receives a day's pay. If he works eight hours or more, or runs 100 miles or more, he receives overtime at the regular hourly or mileage rate for the time in excess of eight hours or the miles in excess of 100 miles. To many people this arrangement does not seem reasonable. Admitting the soundness of the proposition that eight hours should constitute a day's work, the question naturally arises as to why a man who runs 150 miles in eight hours should be paid a half day's overtime for the extra 50 miles. The result of considering 100 miles a day's work is that thousands of men who run more than 100 miles in eight hours or less receive more than a day's pay for working eight hours or less.

Suppose, now, that the demand of the train employees for so-called "overtime" on a time and a half basis is granted. This would mean, first, that an employee in train service who worked ten hours in a day would receive time and a half for the extra two hours. That sounds reasonable enough. But as 100 miles is also considered a day's work, that is not all that is involved. If an employee should run 125 miles in eight hours he would be paid time and a half for the extra 25 miles. Why should a man be paid so-called "overtime," not merely at the regular rate, but at the rate of time and a half, when as a matter of fact his entire day's work is accomplished in eight hours, or even less than eight hours? The answer of the employee is that in train service 100 miles is a day's work. That is true. But ought it to be a day's work when it can be and actually is, run in less and even much less than eight hours? And if the theory that it is a day's work is still to be recognized, on what grounds can the proposition be defended that when more than 100 miles is run in eight hours or less the excess mileage should be paid for, not merely on a pro rata basis, but on the basis of 50 per cent more per mile than is paid for the first 100 miles.

Stated in terms of money, it was estimated on the occasion of the controversy which resulted in the passage of the Adamson law that the granting of time and a half for overtime would cost the railways about $40,000,000 a year. The wages of the train service employees are now at least 50 per cent higher than they were then. Therefore, to grant their demands now would cost the railways about $60,000,000 a year. This is upon the assumption that the terminals between which trains are run remain as they are now. Every study of the subject which has ever been made has indicated that it would cost more to change the terminals and shorten the runs than to leave them as they are.

It is clear that the train service employees should be required to make some very large and important concessions before the large additional burden which would result from granting them time and a half for overtime should be imposed upon the public.

New Light on Present Railway Wages

THE EFFECTS OF THE CHANGES in salaries and wages and working conditions on the railways which have been made under government control are strikingly reflected by the statistics regarding the payroll for January, 1919, which were published in the *Railway Age* for April 25, page 1060. The last month of private control was December, 1917. In that month the railways handled practically the same traffic as in January, 1919. In January, 1919, however, they had 145,026 more employees than in December, 1917. This increase in employees was largely due to reduction in the average hours worked per employee per day. While the increase in the number of employees was 8½ per cent, the increase in the number of days worked by those reported on a daily basis was less than 6 per cent, and the increase in the hours worked by those reported on an hourly basis was less than 4 per cent.

It is clear, however, that the amount of traffic handled per employee, and in proportion to the average number of hours or days worked per employee, was smaller than in December, 1917, in spite of the vast advances in wages which have been made, and of the fact that December, 1917, was a month of extremely severe weather, while January, 1919, was a month of extremely mild weather. With the average wage per employee going up and the average amount of traffic handled per employee going down, it is easy to understand why the changes in wages and working conditions are having such unfavorable effects upon net earnings.

The table showing the increases and decreases made in salaries and wages per day or hour calls attention forcefully to the difference between the way in which the officers of the railways and the employees have been treated under government operation. The average salary of general officers receiving $3,000 or more per year has been reduced 20 per cent. The average salary of division officers receiving $3,000 or more per year has remained unchanged. The average salary of general officers receiving less than $3,000 has been increased 17 per cent, and the average salary of division officers receiving less than $3,000 has been increased 39 per cent. The average increase made to all officers and employees up to the end of January had been 48 per cent. Since then further advances have been made to employees in train service, etc., which will increase the average to considerably more than 50 per cent. In other words, the general and division officers receiving more than $3,000 a year have seen their salaries standing still or being reduced, while they have seen the wages of railway labor advanced by more than half. If railway officers have not been altogether happy and enthusiastic about a regime which has had these relative effects upon their compensation and that of other persons in railroad service, it need occasion no surprise.

There is a marked difference between the changes which have taken place in the number of men employed in train service and the number employed in the shops. Owing to the reductions in passenger service, and to reductions in the number of freight trains due to increases in the average freight train load and to reductions in the freight traffic handled, there have been reductions in the number of almost all the classes of men employed in the train service. On the other hand, the statistics for January show a sharp increase in the number of men employed in the shops. In December,

1917, the number of machinists, blacksmiths, boilermakers, air brake men, painters and upholsterers, car inspectors, car repairers, machinists' helpers and apprentices, and gang and other maintenance of equipment foremen, was 278,188; while in January, 1919, it was 338,629, an increase of 60,500, or almost 22 per cent. Reductions in average hours worked per employee will account for some of this increase in the number of employees, but the total hours these employees were paid for on an hourly basis was much greater in January, 1919, than in December, 1917. The advances made in their hourly wages ranged from 41 to 85 per cent; and this, coupled with the large increase in the number of hours they were paid for, accounts for a large part of the increase in railway expenses. The Railroad Administration has adopted some radical measures in the shops, including the abolition of piece work. Most of these have been adopted contrary to the opinions of most leading railway men as to what ought to be done. How much have the new policies which have been favored by labor union leaders and adopted by the Railroad Administration, had to do with the manifest decrease in the efficiency of shop labor? The shop crafts are now before the Board of Railroad Wages and Working Conditions asking for another large advance in wages. They might pertinently be asked to work efficiently for the high wages they already are receiving before seeking for another advance.

Computations based upon the January pay roll indicate that in that month the wages being paid by the railways were running at a rate substantially in excess of $900,000,000 a year more than they were when government control was adopted. Since then other advances amounting to about $65,000,000 a year have been made. Roughly speaking, therefore, it must be concluded that, assuming that the same number of employees would be kept on the pay rolls as in January, 1919, and that they would continue to work the same number of hours or days per month as then, the advances in wages made under government control would amount to very close to $1,000,000,000 a year. This fact is highly interesting and significant in view of what was said by the Railroad Wage Commission about a year ago in its report. That commission was created to consider the claims of all classes of employees. In its report it said that if all the advances in wages asked for were made they would cost about $1,000,000,000 a year. It recommended advances amounting to about $300,000,000 a year. Since then, however, sufficient advances have been made actually to raise the total granted to a sum equal to all that the railway employees originally asked for. The mere fact that in sum total the railway employees have been given all that they asked for would be enough to raise a question in the minds of thinking and fair-minded people as to whether in many cases the advances which have been made have not been very excessive.

The representatives of the railway employees have certainly done very well for their followers. As to those who have represented the public, and especially Mr. McAdoo, to whom the present wage scales are chiefly attributable, it may at least be said for them that they have succeeded in restraining themselves from giving the employees more than the employees asked for!

Counting the increases ordered by the director general during the past year as $900,000,000, the total increase in three years has been $1,250,000,000, as the railroad companies allowed increases amounting to $350,000,000 in 1916 and 1917. This makes a total increase since 1916 of about $600 per employee per year, or about 60 per cent; and since 1914, when the war began, the average increase has been about 80 per cent. For the trainmen the total increase in three years has been estimated at $295,000,000 a year, including $70,000,000 as a result of the Adamson law, $160,000,000 from General Order No. 27 and $65,000,000 from the recent supplemental orders. This would make the average increase per man $725 a year. The rise in railroad wages in recent years is shown in the following figures of average annual earnings per employee those for 1918 and 1919 being estimated:

	All employees	Train men	Employees not in train service
1910	$673	$993	$599
1914	810	1,253	711
1917	1,004	1,470	900
1918	1,330	1,870	1,200
1919	1,500	2,020	1,325

For want of a better unit, these calculations are necessarily expressed in terms of the somewhat enfeebled, but still, in a manner of speaking, almighty dollar, which will buy just as much fine gold as it formerly did and somewhat more of railroad securities, but less of almost everything else. The monetary unit in which wages are paid, however, is the same as that used to pay freight and passenger rates, which have not yet been advanced proportionately with wages.

Shall Engineering Be a Profession or a Trade?

THE APPEARANCE of representatives of Engineering Council and of the American Association of Engineers before the Board of Railway Wages and Working Conditions at Washington on March 31 and April 1 and 2, to appeal for higher wages for technical engineers in railway service, marks a new departure in the activities of engineering associations and one of much significance. Engineering work (civil, mechanical or electrical) requires a high degree of technical knowledge, in addition to practical experience; it requires the use of the brain rather than of the hand; it involves, in the main, the giving of directions, rather than the carrying of them out; in other words, it has the characteristics which differentiate a profession from a trade.

Because of their common professional interest, engineers have organized themselves into various technical societies. The national and local engineering societies have amply justified their organization by their valuable contributions to the knowledge of the profession of their members. In their concentration on technical activities they have given little attention to the promotion of their interests financially through these organizations, leaving this to the individual initiative and efforts of their members.

Meantime, workmen in the trades in railway service and elsewhere have combined for financial rather than technical or educational benefits, and through the power of their organizations have forced large concessions in wages and working conditions from their employers. This has reacted to the financial detriment of the engineers, particularly in railway service. It has led to a feeling among many members of the technical societies that these societies must give more attention to the promotion of the business interests of their members. It has also resulted in agitation for the formation of organizations of engineers fashioned after those of the trades whose principal object would be to promote the financial rather than the technical interests of their members.

The hearing at Washington brought into the foreground these two schools of engineering thought. Engineering Council is a joint organization of the four national engineering societies (civil, mechanical, electrical and mining) with the American Society for Testing Materials, formed to represent the engineering profession in matters of common interest. In general, the membership of its constituent societies includes the older and more experienced men of the profession. By its appearance at Washington it reflected the belief of the older and well established societies that the interests of the engineering profession, as represented in railway employ, made advisable the presentation of a united plea

for increased compensation for engineers. Its spokesmen pointed out the failure to recognize engineers adequately in the past and urged attention to the merits of their request.

The American Association of Engineers approached the problem from the other angle. It is intended solely as a business organization for engineers, and its membership is principally among the younger men in the field. It is patterned in many ways after the trades unions. It advocated collective bargaining, the standardization of positions, working conditions, and salaries, etc., and presented a standard wage scale for railway engineers to the Board.

There is no disagreement between these two schools of thought on the point that technical engineers in railway service are underpaid. This is evidenced by the appearance of representatives of both organizations to plead their cause. Where they differ is as to the methods which should be pursued to correct this situation. Shall they be those of a professional or a trades union organization?

Those advocating the latter course point to the lack of progress which the older national engineering societies have made in promoting the financial interests of their members, and argue from this that because these associations have not given attention to the business interests of their members in the past, they must necessarily continue this policy. But is this true? The policy of any organization is in the control of its members and it can be made to express their desires. The time may have come for these organizations to take up these new activities. That they recognize this fact is indicated by the participation of Engineering Council in the hearings at Washington. True, the beginning is small, but it is a beginning. There is nothing inconsistent or unprofessional in these technical societies taking such action along certain lines. The legal and medical associations have not considered it unprofessional to do so, and surely the engineering societies can do as much.

Those advocating the professional point of view believe that it will be unfortunate if engineers in railway service and elsewhere permit the present inequality between the compensation of professional engineers and workingmen to lead them to take any steps which will change the standards of the former to those of a trade union. They maintain that no group of men can adopt the principles of standardization of positions and wages and collective bargaining without at the same time suffering other results—most important of all, the stifling of individual ability and initiative, which is the foundation of professional ambition and advancement. When the position becomes the measure of compensation to the exclusion of the kind of work done by the individual occupying the position, the work degenerates from that of a profession to a trade. Where the position of a man, whether he be rodman or chief engineer, carries a fixed salary without reference to his ability and efficiency, the incentive to the highest achievement is lost. This has been the case in the trades. The members of Engineering Council believe that engineers are underpaid today, but they also believe this can be and is being overcome by other than trade union tactics. Other professions have been able to do it, and the engineers can.

Perhaps it may become necessary ultimately for brain workers of all classes to organize themselves into unions and use trade union methods to get a compensation reasonable compared with that of hand workers. But iron-clad standardization of wages and working conditions in the trades tends to destroy individual skill and energy and to hinder industrial efficiency; and standardization of wages and working conditions in the professions could not fail to have a similar tendency.

Present conditions call for sober thinking on the part of all engineers in railway service or elsewhere. Shall engineering in the future be a profession or a trade? The attitude of railway men will largely decide.

Administration Draft Gear Tests

THE PUBLIC DEMONSTRATIONS of the method of recording the action of draft gears under impact, which were carried out at the draft gear testing plant of the T. H. Symington Company at Rochester, N. Y., on April 10 and 11, opened up some very interesting possibilities in the graphic comparison of various types of gears. But aside from the graphic recording method shown, a description of which appears elsewhere in this issue, the outstanding features of the demonstrations are the evidence which they furnished as to the thoroughness with which the Inspection and Test Section of the Railroad Administration is studying the draft gear problem and the perfect fairness and good faith of the Section in the conduct of its investigations. Constructive criticism was invited with the utmost frankness and all suggestions offered were gladly received.

The testing of draft gears under conditions closely approaching those encountered in service is not entirely new. The method of graphically recording the action of the gears during the complete cycle of draft gear movement from the instant of first contact of the buffing faces to the instant of final separation, however, is unique. In some respects the apparatus is crude, but there appears to be no reason why the errors in the record may not be kept within limits which for practical comparisons are insignificant.

The study of the characteristics of new draft gears, however, is but one phase of the whole draft gear problem. The ultimate and decisive test is not in the possession of the characteristics of the ideal draft gear, but in the maintenance of characteristics nearest approaching the ideal throughout a reasonable period of service. To obtain reliable data on this phase of the subject requires a large amount of investigation and the essential element in such investigations is time. This phase of the subject is now being investigated by the draft gear committee of the Master Car Builders' Association, which is also co-operating with the Inspection and Test Section of the Railroad Administration. The prospects that ultimate results of the highest constructive value may be obtained through the joint efforts of these two agencies are bright.

New Books

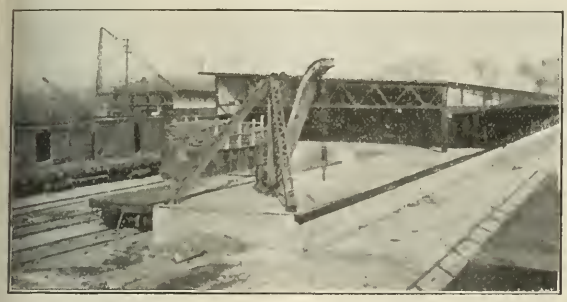
Training for the Electric Railway Business. By C. B. Fairchild, Jr., executive assistant, Philadelphia Rapid Transit Company. Written under the supervision of T. E. Mitten, chairman, executive committee, Philadelphia Rapid Transit Company. 155 pages, 9 illustrations, 5 in. x 7½ in. Published by the J. B. Lippincott Company, Phila delphia, Pa. Price $1.50.

The function of this book is to present the demands and requirements of the electric railway business to the young man who is about to choose an industry. It outlines the organization of the business, names the officers required and explains the duties of each officer. The book is divided into five parts, as follows: Organization, the executive and transportation functions, the engineering functions, the administrative functions and miscellaneous functions. Each of these five phases of the business is laid out briefly and in order so that a single reading of the book will furnish a very complete and well defined picture of the subject. For example, in the section dealing with the executive and transportation functions, appear such subjects as the executive, the manager's duty, the morning mail, the day's work, transportation, public service and timetables, and the motormen and conductors. The book is written primarily for the young man looking forward, but as it outlines the entire field briefly, it furnishes the railway officer an opportunity to get a comprehensive view of his own work.

Novel Features in New D. & R. G. Freight Terminal

The Facilities at Salt Lake City Include Two Houses, Transfer Platforms and a Team Yard

BASCULE BRIDGES between trucking platforms and foot warmers for checkers are special features of new freight house facilities now being completed by the Denver & Rio Grande at Salt Lake City. Aside from these, the terminal represents an effective design based upon a simple layout and modern construction ideas. The development consists of separate houses for handling in and outbound business, together with appurtenant platforms, tracks



Inbound House and 20-Ton Derrick; Outbound House in the Background

and a small team yard. The freight houses and platforms are located at the southwest corner of the intersection of Second South and Fifth West streets, and replaces an old installation which had become entirely inadequate to take care of rapidly growing needs.

In general, the new layout consists of parallel inbound and outbound houses with two 16-ft. transfer platforms between, all connected at the north end by a trucking platform 18 ft. wide. Another thoroughfare between houses and platforms is afforded by three pairs of hand-operated bascule bridges 14 ft. in width, located near the mid-length of the layout. They are protected by a continuous roof between houses built at a height to clear the bridges when in the upright position.

There are three tracks serving each house, with two additional tracks between the island platforms. These eight tracks have a capacity of 100 cars, set for loading. In addition, two spur tracks at the south end of the outbound house and four at the south end of the inbound house are used for end door loads. Four team tracks with a combined capacity of 45 cars are provided, and two additional tracks are contemplated. The tracks to be built are to be bridged by a 30-ton capacity transfer derrick located near Second South street.

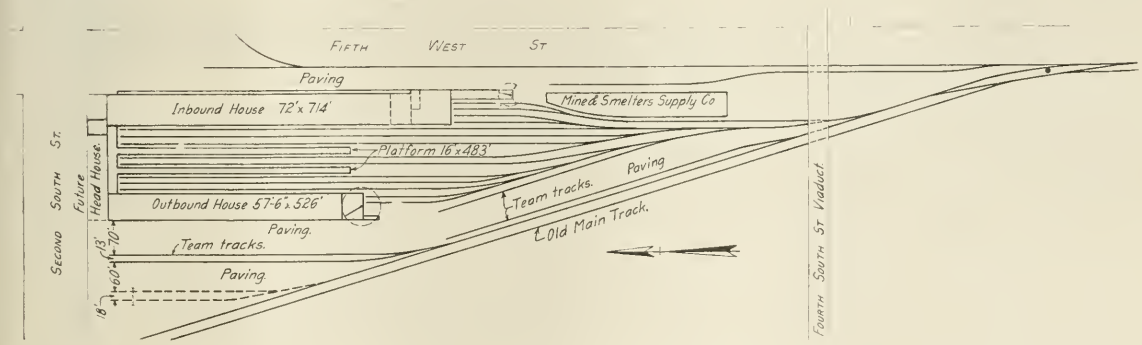
It was originally planned to construct a head house facing Second South street and adjoining the north ends of both freight houses, but war-time economies compelled the temporary abandonment of this part of the program, and offices, lavatories, etc., were fitted up for the agent and clerical force in the north end of the inbound house. All driv--ways are to be paved with 3½ in. of asphalt topping laid



Outbound House from the Team Side

on a 7-in. concrete base. The pavement on Fifth West street has been completed.

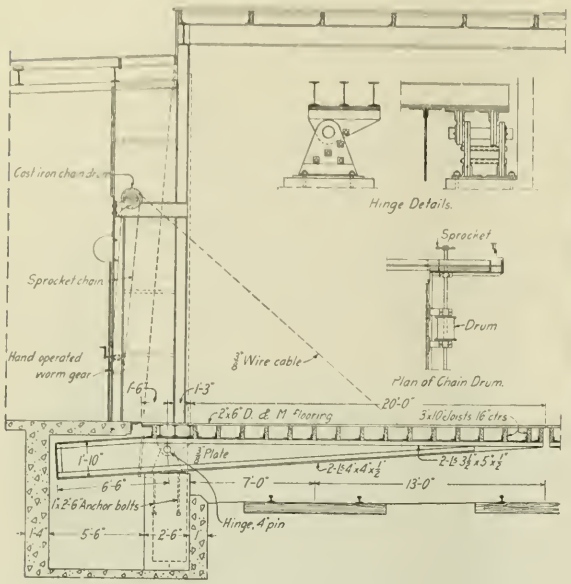
The outbound house is 57 ft. 6 in. wide by 526 ft. long. Of this length 399 ft. is inclosed, 84 ft. is covered platform, and 43 ft. is open platform. The latter is provided with a 5-ton electrically-operated, full-circle, swing steel derrick with 40-ft. boom. The inbound house is 714 ft. long, including 84 ft. of covered automobile platform at the south end. The inclosed portion is 66 ft. wide, exclusive of a 6-ft. loading platform on the team side. An open platform 19 ft. wide by 127 ft. long adjoins the covered platform and is provided with a 20-ton, stiff-leg derrick with a 23-ft.



Layout of the Freight Houses and Tracks

boom. A concrete ramp affords easy access to the automobile platform from Fifth West street.

The houses are one story of concrete and steel construction, the details of which are common to both. The floors consist of 1½ in. of J-M asphalt mastic on a 5-in. concrete base which in turn is supported by a thoroughly-tamped sand and gravel fill between retaining walls. Cement top-



Details of the Bascule Bridges Connecting Trucking Platforms

ping, in place of the mastic, was used on the automobile and open platforms. Steel columns, spaced 21-ft. center to center on both track and team sides support the roof trusses, giving a clear span of 54 ft. 8 in. in the outbound and 64 ft. 8 in. in the inbound house. Above the doors there are reinforced concrete lintels on both track and team sheathing rests on 4-in. by 6-in. rafters spaced 4 ft., on centers, and spiked to lugs on the 10-in. 23½-lb. roof purlins. Steel canopies, 18 ft. wide, covered with corrugated iron, are suspended from brackets attached to the columns on the team side of both houses.

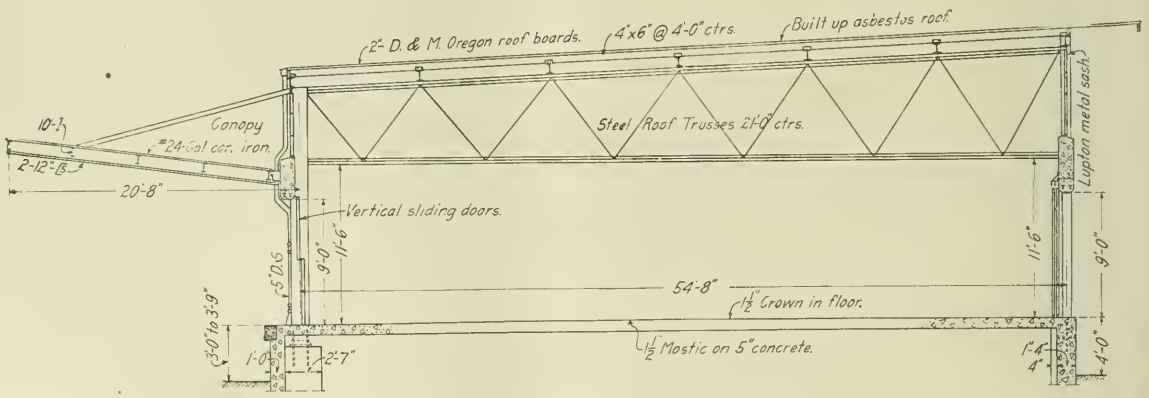
Two styles of doors are used. On the team side, Kinnear vertical sliding sectional steel doors, providing a clear opening of 9 ft. by 20 ft. were installed. On the track side horizontal sliding, tin-clad fire doors, each 9 ft. by 11 ft. were provided. The latter operate on double lines of continuous trolley tracks bracketed to the concrete lintels. The vertical sliding doors are counter-balanced by weights suspended inside the columns of the steel frame. Well diffused light is



Interior of the Outbound House

obtained through ribbed glass set in metal sash above the concrete lintels.

A noteworthy feature of the design is the provision for the comfort of the checkers in cold weather in the shape of a heating system for foot warmers. A line of 3-ft. 6-in. horseshoe-shaped concrete conduits extends under the floors of each house. Heat is supplied in these conduits by steam pipes, and as the automatic dial scales are located directly over the conduits with a vent and floor register at each one, the checkers are afforded a warm place to stand. These "foot warmers" meet a long felt want and contribute to the efficiency of the checkers, while eliminating the obstruction to a general view of the interior introduced by the usual checker's house. The steam pipes have a gravity return to



Cross Section of the Outbound Freight House

sides for the full length of both houses at a clear height of 9 ft. above the floor, which are supported by brackets riveted to the columns.

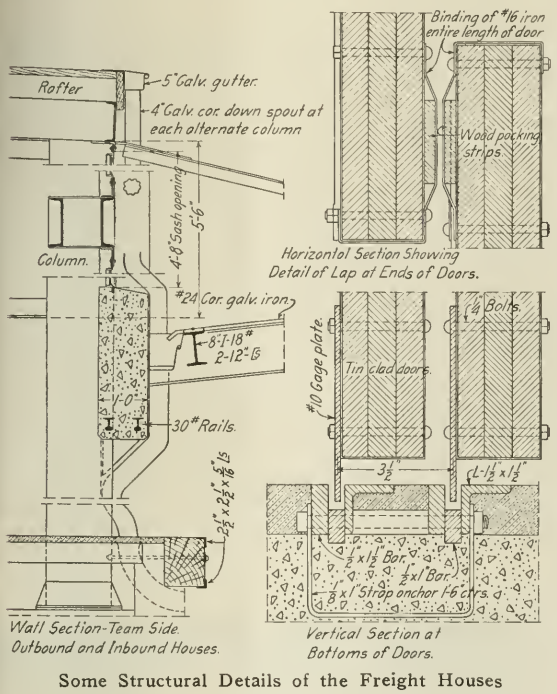
The roofs are of two-inch tongue and grooved lumber, covered with "J-M" three-ply builtup asbestos roofing. They have an overhang of five feet on the track side. The boiler located in the basement under the north end of the inbound house.

Separate rooms for oils and hides, invoice, bonded, and perishable freight are provided in the inbound house. Ample weighing facilities are afforded by 30 Fairbanks automatic dial scales, of two to five-ton capacity, 17 of

which are placed in the outbound house and 13 in the inbound house, together with one 5-ton wagon scale on the covered platform of each house.

The platform heights are variable on the team sides, ranging from 3 ft. 3 in. to 4 ft. at the inbound house and 3 ft. to 3 ft. 9 in. at the outbound house. For guards 10-in. by 12-in. timbers with exposed corners protected by angle irons are set in the concrete wall, the top being flush with the floor. The transfer platforms are each 483 ft. long by 16 ft. wide, with a butterfly-type roof supported by timber posts set in channel-iron pedestals which are spaced 21 ft. center to center, and bedded in concrete. The floors and roofs of the platforms are of the same composition as those of the houses.

The character of the bascule bridges, mentioned above, is indicated in the drawing. They are operated by worm gears attached to auxiliary columns set back of the door line of the



Some Structural Details of the Freight Houses

houses, and near the edges of the platforms. Steel wire cables ⅜ in. in diameter are fastened to the outer ends of the bridges and wind up over the drums on a shaft connected to the hand gear by an endless chain.

Electric light is supplied by 100-watt lamps, one to each 21-ft. panel; two rows being used in the outbound house, three in the inbound house and a single row on each transfer platform. Detachable cords 35 ft. to 50 ft. in length with two and three 60-watt lamps on each provide light in the cars. Double service plugs for these cords are set in alternate posts of the platforms. When not in use, the cords are stored in cabinets fastened to the posts.

The Lynch Construction Company of Salt Lake City was awarded the general contracts for the foundations and superstructure, while the structural steel was fabricated and erected by the Omaha Structural Steel Works. In order to insure continuous operation, traffic being particularly heavy at the time construction was begun, it was necessary to build the plant in units; the outbound house being completed and put in operation before the old sheds could be wrecked and the site cleared for the erection of the inbound house. The contract was let and work started in August, 1917, on the outbound house and one transfer platform, which were completed and occupied the following May, after which the old sheds were torn down and work was begun on the inbound house. All plans and specifications were drawn in the office of J. G. Gwyn, chief engineer of the Denver & Rio Grande, Denver, Colo.

The Railroad Administration's New Advertising Campaign

Now that the war is over and the necessity for restricting travel has passed, the Railroad Administration is spending approximately a million dollars in advertising campaigns. This attempt on the part of the Railroad Administration to restore the travelers' interest is developing into three campaigns. In fact, three distinct campaigns are being carried out at the present time, one to restore tourist travel to pre-war standards and the other two to again start the westward migration of homebuilders.

The first definite steps taken in this general campaign were toward the establishment of a Homeseekers' bureau last January as part of the Agricultural Section of the Railroad Administration. This bureau was placed under the jurisdiction of J. F. Jarrell, with the two-fold purpose of more closely co-ordinating the agricultural development work of the railroads under federal control with allied departments of the government and prosecuting the work with increased vigor. Its establishment was in a way due to the agitation for furnishing information to returned soldiers and war workers concerning available land in all parts of the country on which they might begin life anew. The advertising done under this bureau is not extensive, but this does not necessarily impair the efficiency of the service rendered by the bureau. At the present time classified ads are being placed in a number of farm daily and weekly papers throughout the United States, the inquiries received as result of these ads being sent to the railroads interested. The supervisor of agriculture of the roads to which the inquiries are sent gathers all available data, and after the prospective settler is furnished with this information in the form of pamphlets and booklets, he is placed in touch with reliable land men, whose duty it is to see that he is sold productive land. The new farmer is introduced to his future neighbors by the county agents, and is also put in touch with the state agricultural college, which will help solve his seed, crop and stock problems. In general it is the duty of these county agents to see that the man "starts right," and that he is an asset to the community.

Closely allied with the work being done by the Homeseekers' Bureau is the campaign instituted at a meeting of the agricultural supervisors of the Railroad Administration at Memphis, Tenn., early in April. At this meeting, which was presided over by J. L. Edwards, manager of the Agricultural Section of the Railroad Administration, a program was adopted which included four general propositions, as follows:

"1. To collect the latest information about opportunities for farming, stockraising, dairying, fruitgrowing, etc., in the several states having undeveloped resources, and furnish it free to those who wish to engage in such pursuits, special attention to be given to discharged soldiers, sailors and war workers.

"2. To co-operate with county farm agents and other government and state authorities in looking after the interests of newcomers through the dissemination of information regarding methods of soil preparation, seeding, cultivation,

etc., in order that they may be successful in the localities in which they have settled.

"3. To improve marketing conditions by the widest circulation of information about where and when farm products will be ready for sale and where, and when there will be need of such products, thus enabling the farmer to send his stuff to markets which are not glutted, and to obtain for it a price that will mean a profit on his investment, rather than a loss.

"4. To conduct a campaign in co-operation with government and state authorities with the view of increasing the livestock output, not only because it is a profitable feature of the farming business, but also for the purpose of building up the soil."

It can clearly be seen from the propositions stated in this program that the work will, to a large extent, augment the work of the Homeseekers' Bureau. This bureau in the first three months of its existence awakened the interests of 12,000 prospective settlers, of whom 15 per cent were discharged soldiers, sailors and war workers. In many cases they may be led to the new fields, and it is the work of the agricultural supervisor under this plan to carry the service rendered these new farmers still further. The work being done by the agricultural section, aside from the campaigns carried on by the Homeseekers' Bureau, is partially illustrated in a statement made by C. L. Seagraves, supervisor of agriculture of the Atchison, Topeka & Santa Fe, and also chairman of the committee which is handling this matter for the north, west and east. The substance of the statement is contained in the following:

"One of the principal duties of the agricultural men at the present time is to see that the prospective settler has enough money to make the necessary payments on land, live stock, buildings, seed, etc. In this way it is almost impossible for him to fail if he takes advantage of the federal land banks and applies the information issued by the railroads and state agricultural colleges.

"Many of our states at the present time have unlimited undeveloped resources, and it is the duty of the agricultural departments to place these opportunities before industrial workers, discharged soldiers and sailors, and those desiring to change location.

"A great deal of attention at the present time is given to the improving of market conditions through the widest circulation of information in the way of market bulletins being issued by a number of railroads, containing information as to where and when products will be ready for sale, and where there will be a need for such products, thus enabling farmers now located along the line to send their products to markets which are not glutted, and receive a fair price for same, which means a profit on his labor and investment instead of a loss.

"Live stock, potatoes, and other products, are receiving a great deal of attention and the railroad agricultural departments are working hand in hand with the county agents and agricultural supervisors, so as to enable the farmer to grow more and better crops.

"Every railroad wants every farmer on its line to be an asset to the community in which he lives, and unless the farmer is able to conduct his business along profitable lines he will be a liability.

"The Agricultural Section of the Railroad Administration at the present time is issuing booklets on opportunities in the various States of the Union. These booklets are profusely illustrated and contain good concrete information as to temperature, rainfall, soil conditions, crops, stock, marketing, school advantages for the children, etc."

The third phase of the general advertising campaign carried on by the Railroad Administration concerns itself with a return practically to the pre-war practice of the railroads in advertising the national parks and monuments of the west. This is the real "See America First" publicity campaign, with which it is hoped to stimulate passenger travel enough to justify the expenditure of the thousands of dollars which the Railroad Administration is planning. The only difference between the pre-war advertisements and those being used by the Railroad Administration is that in the latter advertisements there is no specific mention of routes or of the advantages of one point of interest over another. The fundamental principle behind all of the advertising is to induce the American public to travel, and the route which the traveling public selects to reach the advertised regions is immaterial.

This campaign has already been instituted in newspapers and magazines, and it is being furthered by the preparation and distribution of illustrated pamphlets and booklets describing the attractions of various sections of the country and especially the beauties of the national parks such as Yosemite Valley, Yellowstone Park, Glacier Park and the Grand Canyon.

The Railroad Administration has authorized the publication of low round trip summer tourist fares to practically all western resorts to which it has been customary to sell tickets in the past. In the majority of cases the sale date of these tourist fares will be from May 30 to September 30, inclusive, with the possible exception that 15-day tickets will be sold in the meantime. These reductions may be illustrated by those authorized for the Southern Pacific and Western Pacific. These roads have been notified that there will be two general classes of fares. For tickets limited to three months from date of the sale, the carriers will make a reduction of 20 per cent from double the one-way fare; and for the 15-day tickets sold on Friday and Saturday the reduction will be one-third. These reductions in general have been offered the public on practically every line over which the summer tourist travel has gone in the past and the passenger traffic officials of these roads have been making preparations for a heavier tourist traffic than ever before. To all appearances these reductions are practically the same as those made when the roads were under private control, but the fares are really proportionately higher, owing to the fact that the one-way fares on which the rates are based are very much higher than in the past.



Photo from Central News Photo Service

Food and Clothing for the Aerial Freight Service to Belgium

The National Foreign Trade Convention at Chicago

Meeting Attended by 1,800; Outline of the Ideas Presented; Abstracts of Some of the Papers

THE SIXTH NATIONAL Foreign Trade Convention which met at the Congress Hotel, Chicago, April 24, 25 and 26, had as its theme "Foreign Trade Essential to American Industry," but the spirit evidenced by the 1,800 delegates showed that they needed no conversion to that idea; they were already converted and came prepared to consider the practical problems of carrying on and increasing the country's present great trade overseas. The convention took the form of four general sessions and eight group sessions as well as the banquet Friday evening. Alba B. Johnson, president of the Baldwin Locomotive Works, was elected president of the convention and presided at the general sessions. Some 50 papers were presented during the three-day meeting, not including the addresses at the banquet by Edward N. Hurley, chairman of the United States Shipping Board on The Future of Our Foreign Trade; by Frank O. Lowden, governor of Illinois on The Meaning of Foreign Trade to the Middle West, and by James A. Farrell, president of the United States Steel Corporation and president of the National Foreign Trade Council, who spoke on American Maritime Policy.

The scope of the convention is perhaps best shown by an outline of the topics taken up at the various sessions. The first general session on Thursday considered America's Need of Foreign Trade, papers being presented by Edward Prizer, president of the Vacuum Oil Company, on Export of Industrial Products; by Fred I. Kent, vice-president of the Bankers Trust Company, on America's Financial Equipment for Foreign Trade; by Tracy Lay of the Department of State, on Present Aspects of France, and by William Pigott, president of the Seattle Car & Foundry Company, on The Element of Cost in American Exports.

The second general session on Thursday considered a number of topics, papers being presented by Charles J. Brand, chief of the bureau of markets of the Department of Agriculture, on The Vital Concern of Agriculture in Foreign Trade; by John M. Parker, president of the Mississippi Valley Association, on The Mississippi Valley and Foreign Trade; by William S. Culbertson, of the United States Tariff Commission, on The Bargaining Tariff, and by J. W. Hook, president of the Allied Machinery Company, on The Stabilizing Effect on American Industry of a Definite Foreign Trade Policy.

Thursday evening was devoted to four group sessions, dealing respectively with Commercial Education for Foreign Trade; Foreign Trade Merchandising; Financing Foreign Trade, and Advertising for Foreign Trade.

The topic for the third general session on Friday morning was the American Merchant Marine. Homer L. Ferguson, president of the Newport News Shipbuilding and Drydock Company, presented an able paper on American Shipbuilding which discussed the status of shipbuilding during the war and treated to no small extent the fabricated ship as compared to the established methods of shipbuilding. Other papers presented were by W. S. Tower of the division of planning and statistics of the United States Shipping Board, on The World's Merchant Fleets Today; by Frederick J. Koster, president of the San Francisco Chamber of Commerce, on The Future of the American Marine on the Pacific; by Ernest E. Baldwin of the New York bar on the Relation of Law to the Development of Our Merchant Marine, and by James E. Smith, president of the Mississippi Valley Waterways Association on The Relation of Inland Waterways to Foreign Trade.

Four group sessions on Friday afternoon dealt respectively with Foreign Credits and Credit Information; Direct Selling and Representation; Export Combination—the Webb Law in Operation, and Ocean Service.

At the closing session on Saturday, a paper was presented by Captain H. R. Moody, of the Quartermaster Corps on Packing for Export.

The tone of the convention expressed about as much as any other one thing the desire of those present to get back to a pre-war basis of unrestricted trade in private hands and with private initiative, every reference to that feature being greeted with loud applause and often with cheers. As one of the speakers put it, "the less the government interferes directly with export trade the better, confining itself to those functions which are clearly governmental, leaving to the exporter the handling of the business." Several references were made to the government control of the railroads, telegraph and cable lines, shipping, etc., and in every case the spirit in favor of their return to private control and private initiative was plainly shown.

On the other hand, it was felt that the government was not doing all that it should to help the exporter or the investor in the way of standing up for American rights in other lands. It was agreed that the consular service was efficient, but several appeals were made for additions and improvements to that service both for the purpose of a more adequate representation of American standing in foreign cities, and for the gathering of more information of a useful and practical character.

Great emphasis was placed on the necessity for investment of American capital abroad, it being pointed out on the one hand that trade would be expected where American capital was invested, and on the other that the country, if it desired to continue its export trade, would have to accept payments in securities because it could not secure goods for a long time to balance its exports to Europe.

Several of the speakers, touching upon the same point, showed the necessity for the limitation of imports by some of the countries of Europe and explained that with the exchange situation so adversely against them, they absolutely had to hold down their imports to a minimum until things are once more nearer normal. An appeal was made that American exporters should not complain at such restrictions, for the European countries were meeting an exceedingly difficult problem and themselves knew best how to work it out and what commodities they could for the time being best get along without.

The agreement of the delegates to the sentiments mentioned was apparent, and the desire to play fair and square with the European importer was much in evidence.

It is impossible to abstract any of the papers at length, but with a view to showing in more detail some of the important points that were brought out, a few are briefly abstracted as follows:

The Webb Pomerene bill was referred to by a number of speakers, among them Mr. Hurley, and was considered of sufficient importance to have a group session devoted to it, at which John Walsh, formerly general counsel of the Fed-

eral Trade Commission and other speakers considered its provisions in great detail.

America's Financial Equipment for Foreign Trade

By Fred I. Kent
Vice-President, Bankers Trust Co.

The most extraordinary condition will face the United States in relation to its foreign trade upon the signing of the peace agreement. Before considering the financial equipment of the country which has been built up to meet our foreign trade problems it will first be necessary to analyze this condition.

The United States will stand as the one great country of the world with power to produce, manufacture and deliver to other nations all of the commodities vital to man's needs during times of peace, and covering as well those things required for his convenience and desired for his pleasure. On the other hand, the power to purchase our goods by those countries which are our natural customers has been seriously depleted. All of the belligerent nations of Europe have great financial problems facing them, which cannot be solved honorably and successfully unless their imports are confined largely to essentials until such time as their exports of commodities and service exceed in value their imports and other current foreign obligations.

The world trade situation which will face the United States upon the conclusion of peace is about as follows:

We will be called upon by our allies to supply them with the minimum amount of goods with which they can get along, whose maximum will undoubtedly be determined more by the amount of credit which this country can furnish to them through investments and otherwise than by the demands of such countries, for they can undoubtedly use effectively more of our raw material and manufactures than they can purchase without our help. Our allies will owe us interest, which they can only pay in foreign exchange that they can accumulate on balance, except as the United States reinvests such payments in the countries which make them.

The neutral countries of Europe should import from us more than they export to us.

Our trade with South America, while against this country, should not be so in such proportion as has been true in the past.

The same condition will probably prevail in our commerce with the Far East.

Under the federal reserve system and with the authority of our member banks to accept time bills drawn upon them, together with the foreign relationships which have been established by American banks and bankers doing a foreign exchange business, we have abundant capital and facilities to finance our foreign trade as it exists today. We will, however, require a very large development of our discount market for acceptances in order to make the banking facilities which we already have fully effective. . . .

Admitting for the moment that our financial institutions and facilities are sufficient to take care of our foreign trade, in so far as it covers the actual operations necessary to finance such trade, another element has been introduced as a result of the war, which remains to be taken care of if we are to maintain and increase our export trade. The United States is to receive $500,000,000 annually in interest from those countries to which it has made loans. Its own foreign interest payments have been reduced through the purchase of foreign held American securities to such an extent that it is reasonable to expect an annual net balance in favor of the United States, based upon normal foreign trade conditions, of $1,000,000,000. Unless this sum is absorbed in some manner through additional imports, increased services purchased abroad or foreign investment, our natural export trade cannot be maintained nor increased. The amount is so large that our financial institutions cannot and should not absorb the whole amount, or even such portion of the total as will probably be left after deducting possible increased imports. It is going to be necesary, therefore, if we would hold and increase our export trade, to import such high class foreign investments that the public will see fit to purchase them. To do this to the extent required, it may be necessary to organize companies in this country whose business it shall be to investigate and purchase foreign securities in all parts of the world, where they can be surrounded by proper safeguards, and to issue against such securities for sale to the public their debentures based upon them. A few such companies, with sufficient capital to act as proper margin, controlled by men carrying the confidence of the public both as to ability and integrity of purpose, could extend a great service to the United States. Such organizations would be in position to make such thorough investigation of foreign securities before their purchase that debentures issued against them should be the safest sort of investment, and one that the public at large should be most willing to absorb. It would undoubtedly require less education as to foreign investments on the part of the people to develop a market for such paper than would be true in the case of foreign securities purchased for direct distribution.

It is also going to be necessary, however, for our great foreign exchange banking institutions which have the facilities for investigating and purchasing foreign securities to build up a market in the United States which will absorb them.

Still another form of foreign investment will be most valuable and undoubtedly necessary if we would maintain our exports, and that is the purchase of interests in foreign industrial partnerships and corporations. Such investments carrying with them as they should a proper representation in the foreign companies, would help stimulate our exports, and under conditions of great security as to payment. They should also be of great benefit to the foreign countries in which they were made, as they would help to develop their resources.

When such undertakings are made by American export manufacturers in foreign organizations which absorb their own products, it will in a sense represent a direct investment of our exports, thus taking them entirely off the exchange market, with the exception of the income to be derived from them. This would help the continuation of our export trade while that of the other nations is being built up to the point where they can give us imports in exchange for our exports in such manner as to represent a great world exchange beneficial to all concerned.

Due to the high prices prevailing, neutral countries have largely stopped the importation of all classes of goods except those absolutely needed at the moment, and it can be expected that such a condition will continue until prices are readjusted or, which would seem more doubtful, stability of present prices is apparently assured for a period.

No financial equipment for trade or any other purpose can be successful unless based upon integrity. Such integrity, if existent, can only be maintained while the mass of the people is honest at heart or is controlled by those who are themselves honest. That it was safe to deal with Russian banking institutions before the establishment of Bolshevism is of no help to that nation now that its people have allowed such banks to be looted by those temporarily in power. If it was wrong for the former owners of property in Russia to hold it, there is even less excuse for those who have stolen it

to have the use of it. While the world is being flooded with theories which are intended to cover up this situation, the cold fact remains that Russia is being ruled by murder and loot, and entirely without principle, and that stolen money is being used throughout the world to purchase those whose souls are for sale to carry on their false propaganda.

We have before us the spectacle of a so-called agent of the Russian looters, who is supposed to have back of him some millions of the ill-gotten wealth of the Bolshevists for the purchase of American goods from our manufacturers and exporters. It is inconceivable that any American manufacturer of integrity can be induced to sell his products for stolen property. Those who would sell their goods under such circumstances are in the same position as the man who would willingly and knowingly sell to a thief in exchange for money that he knew the thief had just stolen from his neighbor, and who is nothing more or less than a fence for stolen property. There is no more excuse nor right in dealing with wholesale crooks than with retail thieves, and if our country is going to stand for the principles which it professes, we will accept no market for our goods where payment is to be made from stolen wealth.

The Government and Foreign Credits

By E. E. Pratt

Vice-President, Overseas Products Corporation

Mr. Pratt, in his paper presented before the group session on Foreign Credits, outlined a number of ways in which the various departments of the government could expand the assistance they are now giving the exporter. In conclusion, however, he asked for a stronger foreign trade policy on the part of the government and said:

The foreign policy of the United States has in recent years seen some extraordinary contrasts. In the case of Mexico, although American property and American lives were sacrificed in the mêlée of revolutions and counter revolutions, we have refused to interfere. We took the position that we could not possibly interfere in the internal affairs of that republic. The same point of view seems to characterize our attitude toward Russia, and will probably characterize our position in the near future toward Germany and Austria-Hungary. On the other hand we have interfered in the internal affairs of the Dominican Republic and the Republic of Haiti, where American lives and American property were endangered. We have not only interfered, but we have set up governments that are practically colonial administrations. We are superintending the finances of those countries. We are even policing them. Just exactly why we should interfere in the affairs of the Dominican Republic and Haiti, and just exactly why we should take over and supervise these governments, and why we should omit to do so in the case of other disturbed areas even on the American continent, is a question which our unannounced foreign policy does not comprehend.

Stop for a moment to examine the map of the world, and no one can fail to be impressed by the very large areas that are today in a disturbed and unstable condition. No one can fail to be impressed with the spread of such infectious disturbances. He is a brave exporter who today is willing to send his merchandise into Central Europe, unless he has first received payment. The same is true of all of Russia and Siberia. The same is true of Mexico. We hear constant rumors about revolutions and disturbances in other parts of the world, as for example in Italy and Argentina. This is the most important aspect of the credit situation which we must take into consideration at the present time. It is a situation in which our government can be of the greatest assistance in selecting and in determining our credit risks. We must look to the government of the United States for a consistent policy with reference to the protection of American interests abroad.

But even more important, we must look to the government of the United States for a consistent foreign policy with reference to the establishment of stable government and the preservation of the existing economic system throughout the world. It is a question of very great importance whether the government of the United States at the present moment stands for stable government, or whether our government is at the moment an essentially disturbing element which tends rather to prevent the resumption of normal conditions.

Shall American Business Enterprise Be Restricted?

By Edward N. Hurley

Chairman of the United States Shipping Board

Ships are the controlling factor in the development of foreign trade. Before the war only 9.7 per cent of our total exports was carried in American bottoms. It is our hope, if our program is completed, to have sufficient ships to move 50 per cent of our total commerce in American bottoms.

We want to put the best American initiative behind the operation of the fleet; we want to get rid of red tape and the possibility of stagnation when moving these ships to the ports where they will carry American trade.

We can't build up our foreign markets in a slip-shod manner. We must specialize in trying to meet the different needs of different markets, and we must purchase raw materials and manufactured products from foreign countries as well as sell to them. We must take some chances in developing trade routes which are at present unprofitable, and a little of the pioneer spirit of the old days will not be out of place even in these modern times.

There is a feeling on the part of many business men that their competitors, at home as well as abroad, are not playing the game fairly. This is largely imaginary. Usually when you meet your competitor face to face you find that he is a pretty likable and human fellow. The same is true of our foreign competitors.

We hear a great deal these days about what is going to happen to American business when Great Britain and the other nations, supposed to have certain advantages over us, get into full swing. We have heard such doleful predictions many times long before the war.

After three months studying the situation in Europe I have not observed any outstanding advantage which they have over us, either from a production point of view, or a labor point of view, or from the character of products manufactured. This is true not merely of manufacturing, but with reference even to shipbuilding. Here we find some cloistered critics asserting we will never be able to compete with British shipping. Over in England you will hear English critics telling their government that Great Britain will never be able to compete with us.

We should not complain about Great Britain, France and Italy placing temporary restrictions on a number of commodities which they import. They are the best judges concerning what particular products they can do without during the present trying economic periods which they are going through.

We have many ships returning in ballast from France, Italy and Great Britain, and materials produced in those countries and needed here should be purchased now when tonnage is available. If our business men would take such

steps now, it would also be helpful in balancing our trade.

We needn't worry much about flank movements from our foreign competitors. They will compete fairly. They understand now, better than ever before, the evil of unfair competition. Germany's commercial system reached the point where it became top heavy. It was hard to distinguish between Germany's commercial enterprises and Germany's government, and it is my belief that combinations between governments and business are almost as dangerous as combinations between church and state.

If there were no obstacles to be overcome, half of the exhilaration of contest and competition would be gone. Neither foreign nor domestic trade will ever be handed to us on a silver platter. Gossip, rumors or criticisms as to whether we can do this, or whether we can do that, in competition with other nations, takes up a great deal of time, and serves no useful purpose. Let us try it out and see. As a nation, we have never been lacking in perseverance, energy, enterprise and skill. We have developed enormous purchasing power at home and compete keenly, yet fairly, with each other. There is no reason why we cannot do the same in the markets of the world.

Business should *not* get into the habit of relying upon the government to solve difficulties which can be overcome by ordinary business skill and honest methods.

American Maritime Policy

By James A. Farrell

President, U. S. Steel Corporation, Chairman, National Foreign Trade Council

The temporary appearance as a military necessity of the government of the United States as a shipbuilder and shipowner on a colossal scale does not render it any less a fact that the future of the American merchant marine must depend on the attractions which it offers to the employment of private capital and the application of private enterprise. The steamship business is one requiring special and exceptional aptitudes. The men engaged in it have to match their wits against the keenest in the world; have to be prompt in decision, resourceful, expedient and expert in the calculation of probabilities. These are qualities which are not usually forthcoming when a government assumes the functions of private enterprise. As a commercial proposition, government owned ships in foreign trade could only result in disorganization of existing trade routes in which government ships might engage, while bringing about a complete paralysis of individual effort to obtain for private American ships a larger share of American sea-borne commerce. Thus, in the event of government ownership and operation of merchant vessels becoming a settled policy, the problem of the future of American shipping would solve itself by the extinction of private endeavor.

The Foreign Trade Council has already placed on record its conviction that American shipyards after the war will be able to produce tonnage at rates and under conditions that will compare favorably with those obtaining in foreign countries. There will be no return, for some time at least in any country, of so called pre-war prices of materials and labor. Shipbuilding materials and equipment are on a lower level in the United States, since the signing of the armistice, than in any other producing country; ship plates and structural material having declined $12.00 per ton here with a corresponding reduction in collateral forms of iron and steel products.

Foreign ships in the past have worked their round of trade with profit because when they reached the regions of great production of bulky cargoes they found few or no rivals. This will no longer be the case, because the foreign ship which goes in ballast from a coal station or South American port to the east coast of North America, must reckon with the competition of the tonnage of the United States. On the other hand, there is no escaping the fact that we start in the race with higher costs of operation. . . .

If in other respects we are able to meet the competition of the world on equal terms, especially with types of ships built or to be built, comparable with those of our competitors, experienced in long voyage trades, the relatively high wages of American officers, engineers and seamen sufficient in numbers to operate economically with safety will not prove to be a serious handicap. Of course it is essential that laws requiring the employment of an excessive number of seamen or engineers, be repealed by the establishment of a definite policy.

One of the earliest requirements of the shipping situation is likely to be a general international agreement about the employment of the agencies of ocean transportation in the least wasteful and the most effective way.

The freedom of the seas, as a working formula of peaceful intercourse, should find a larger conception. It should stand for open ports and as free an interchange of commodities as the fiscal necessities of the nations will allow. To ourselves, with a merchant marine commensurate with the resources of our country, the lesson will come with new force, that to sell we must also buy.

American Manufacturers' Export Association

In connection with the Foreign Trade Convention the American Manufacturers' Export Association held a luncheon on Friday at which Alba B. Johnson, president of the Baldwin Locomotive Works, presented a new idea as to the possible relation of the banks to foreign trade.

"The banking problem, the financing of our foreign trade, is one of the most important matters that now confronts us," said Mr. Johnson. "Goods cannot be sold unless satisfactory arrangements are made for payments. I feel that our bankers are confined in their dealings by the limitations of our banking methods, and that it is not realized that methods are in use elsewhere that are much more elastic.

"With reference to the plan I have in mind, you know that when you go to an insurance man and explain how you are going to ship goods he gives you a rate and assumes the entire risk, for that is his business. When you go to a banker he will extend you credit, provided you take the risk and do all the guaranteeing. Granted that the buyer is an individual whose responsibility can be ascertained, and that the man to whom you are talking knows the credit of this individual, isn't it reasonable to expect him to do the guaranteeing?

"What would you think of an insurance man who would say, 'Yes, I will insure you, provided you will underwrite the risk yourself.'? When a bank is asked for the credit rating of an individual it gives its opinion. The seller takes the bank's word regarding this credit and assumes the risk. Is it folly for the seller to say to the banker, 'will you for a consideration guarantee this information?' Is it unreasonable for you to ask the bank to back up its opinion?"

The Kansas City, Clinton & Springfield and the St. Louis-San Francisco have been indicted by a Polk County (Mo.) grand jury under the state law requiring railroads to operate a passenger train each way each day. The railroad companies take the stand that the statute cannot apply as long as the roads are in the hands of the government.

The Industrial Board of the Department of Commerce*

Work of Board Is Reviewed Particularly in Relation to the Controversy with the Director General

By George N. Peek, Chairman

THE RECORD OF THE CREATION, purpose, organization and procedure of the Industrial Board is perfectly clear. The project was initiated in several preliminary conferences between W. M. Ritter and Secretaries Glass, Lane, Burleson and Wilson. At a special meeting with members of the Cabinet on February 3, the plan upon which the board finally operated was thoroughly discussed and explained and it was agreed by the director general of railroads that an essential element of success was the co-operation of the Railroad Administration, which was then and there promised by Mr. Hines. The legality of the course proposed was discussed and approved by Mr. Hines. The plan was submitted by cable to the President and by him approved. The board was, to use the language of Secretary Glass in cabling the President: "To endeavor in voluntary co-operation with business interests, to arrive at a level of prices upon which business activities would be more actively resumed and the Railroad Administration and other spending agencies in the government would be justified in buying liberally."

Departmental purchasing was an incident to and not a condition of the plan and yet a factor upon which the success of the plan must depend.

The procedure was to conduct an investigation of the costs of producing and marketing basic materials, textiles and important food products. It was to announce the results in the form of prices which it considered fair and reasonable and which would continue present wage rates and agreements and prevent reductions of wages. This was all the board ever intended or attempted to do.

Since the Armistice the plan of the Industrial Board was the first concrete, forceful and effective step taken by the government toward an immediate and general reduction in prices of commodities and the cost of living. That plan had passed so far into execution as to render its effect certain. Greatly reduced steel prices had been determined on a study of costs and the theory of the board was proved by the fact that their mere announcement made them effective, and that the books of steel producers show beyond question that the tide of buying had begun and that the very results promised by the board were rapidly materializing.

The disagreement between the board and the Railroad Administration was the incident that stopped the operation of the board, but the ostensible issues of that controversy are relatively so insignificant that they can never be advanced as the real consideration for the overturning of a policy so vital.

The director general contended that the price on steel rails was too high by $2 per ton. Throughout the discussion, the figures representing costs of production were constantly available to the Railroad Administration's representative, and the basis upon which conclusions have been reached has been repeatedly represented to the advisors of the director general and to Mr. Hines himself. Never have those figures been contested; never has additional or contradictory data been presented; never has the argument of the Railroad Administration been addressed to those figures nor to the conclusions drawn from them by the board. Repeatedly, all of these gentlemen have been urged to bring forward any facts which would assist the board in reaching a conclusion on prices lower than those approved. The answer of the Railroad Administration has ever been, that the price at which the Railroad Administration will buy is within its own discretion and that in its opinion the prices approved by the board are too high.

In the opinion of the board, the prices arrived at were the lowest which the members believed they could recommend and which would, at the same time, permit the producers to maintain the existing scale of wages and preserve the existence of the average independent producer, without increasing prices to the public.

It is believed, therefore, that we must look further for the motive which prompted the director general of railroads to decline to accept the prices recommended. In a statement on April 5 he states: "I have therefore been unwilling to comply with the suggestion which has come from the National Coal Association, that the Railroad Administration withdraw requests for bids and instead undertake to buy its coal at uniform prices for the various districts fixed by some governmental agency."

On April 4, the director general placed himself on record in a long letter, which may be briefly summarized as follows:

(a) That the Industrial Board has no power to impose prices upon the Railroad Administration against its judgment.

(b) That if the Railroad Administration felt that the prices approved by the Industrial Board were such as would in themselves carry the suggestion that no lower prices were likely, it would accept them as a justification for buying liberally.

(c) That such approved prices are not the lowest that may be expected, but that lower levels of prices will be reached if the activities of the Industrial Board are curtailed.

(d) He suggests that the action of the board has resulted in an immunity to the iron and steel industries from the anti-trust laws.

(e) He objects to the form of approval by the board of the iron and steel prices.

(f) He expresses dissatisfaction of the fitness of the members of the board to sanction trade agreements as to prices, carrying the implication that governmental agencies must buy at those prices.

I concur with him fully that the board has no power to impose a price upon the Railroad Administration, against its judgment. I concur also that only the lowest fair prices immediately to be expected should be accepted by the Railroad Administration, or indeed, approved by the Industrial Board; but I can not agree that it is either fair or wise for the government to expect or attempt to force prices lower than the steel prices approved by the Industrial Board. These prices were approved only after a most exhaustive study of costs of production based upon figures in intimate detail furnished by other governmental agencies, and verified by experts in the service of the board. Upon these studies were determined the lowest prices that could be exacted without certainly producing one of the following highly undesirable effects: (a) Creating a market in which only the most powerful highly organized, and lowest cost producers of steel could survive. (b) Reducing the wages of labor throughout the iron, steel

*Abstract of an address at the convention of the U. S. Chamber of Commerce, St. Louis, Mo., on April 29, 1919.

and subsidiary industries. (c) Increasing the prices to the public.

The director general feels, if I understand him, that had the board refrained from an attempt to consider prices from the aspects of labor and other costs, and had acted purely as a mediator to bring sellers and government buyers together, a lower price would have resulted. In this I think the director general is correct, and especially with regard to steel rails, because the Railroad Administration, by reason of its large percentage of consumption in this important commodity, could have practically controlled the market and the price. But such a beating down of prices would entail the very results which the Industrial Board was endeavoring to avoid. No one ever preceded the director general of railroads in supposing that governmental buying or action in aid of governmental buying, as a mediator or otherwise, was any part of the duty of the board. There is not the slightest need for such mediation and the creation of a new governmental agency for such a purpose would be extremely difficult to justify.

I think that in establishing the Industrial Board, a governmental policy was decided, viz: to avoid the chaos and possible panic incident to the fall of an abnormal market by an immediate determination of the lowest prices that can reasonably be expected; that low prices are not now to be secured by reductions in labor wages; that readjustment is to be made with the least possible disturbance to our social situation. I think that the studies and the course of conduct of the board were the only possible means to this end. If I am correct in this then I think that, while the board has no power to impose a price on the Railroad Administration or any other governmental purchasing agency, still it is the duty of the Railroad Administration and other governmental purchasing agencies to support the governmental policy, and, in the instant case, either to establish that a lower price could be had without producing the undesirable results I have recited, or to accept the price decided upon.

My conclusion is that it is not so much in the matter of price that he does not agree with me, as it is in the policy I have stated. Indeed, his apprehension concerning the course of the board in approving prices based on cost studies, rather than in calling sellers and government buyers together and permitting the best possible bargains by barter confirms me in this. The latter alternative overlooks entirely the circumstances that prices so forced to a lower level would, as is abundantly proved by the studies of the board, result in lowered labor wages, or the diversion of business to a few powerful producers, or increased prices to the public. My conclusion is that if the policy of scientific adjustment of prices is wrong, it ought to be abandoned; if it is right, then all departments of the government ought to support it.

The prices approved by the board were not agreed prices. Any producer is free to sell at either higher or lower prices. The action of the government itself in consulting an industry in an effort to obtain a price reduction (as distinguished from an increase) in the public interest can scarcely be denounced as a combination in restraint of trade. It is not a combination at all and even if it were, the result achieved is certainly a fit field for the application of the rule of reason. Whether the board was violating the Sherman law was the responsibility of the board and not of the Railroad Administration and had nothing to do with the question of fairness of the price announced by the board.

As to the form of price approval to which he objects, I have difficulty in following the objection, but the board has repeatedly indicated its willingness to agree to any change of announcement that will meet the wishes of the attorney general.

Successful accomplishment of readjustment problems can be attained only by thorough and complete co-operation on the part of every agency of the government, or industry, and of labor, to reduce values to a stable level by first eliminating voluntarily on the part of industry everything in the way of profits not essential to the maintenance of the average operator, on a reasonable living basis, and thereby enlist the normal purchasing power of the government departments and of the public in making purchases, to the end that normal production may be had and unemployment of labor reduced to a minimum.

As the war called for the co-operation of all, so the adjustment to new peace conditions calls for the same unusual co-operation. To effect co-operation it is essential that there shall be concessions of the special and individual interests. Government departments and industry are called upon to make the first concessions.

The government permitted and required the abnormal conditions essential to the making of war. It must co-operate to restore. The government departments must temporarily yield something of their former customs and practices and the new departments of railroads and shipping, with their large power of purchase, must bend to the task even though pressed for sufficient revenue. At this time the railroads can only do better by immediately doing more to help industrial conditions and they, in turn, must be helped if that shall later be found essential to their well being.

The board recognizes that the purchasing value of the dollar has decreased approximately 40 per cent and that until this purchasing value of the dollar can be increased, compensation to labor should not be reduced; and that compensation to industry—with a normal volume of business—must somewhat exceed the compensation of periods during which the purchasing value of the dollar was not depreciated.

The more efficient or more servicable producers in any industry will receive more compensation and will support the government to a greater degree by the payment of greater taxes and still retain a fair reward for greater efficiency. Those less efficient than the average will pay little or no taxes and may have to sustain losses for a period or discontinue entirely. There is no other fair basis. If the most efficient reduce their prices to the utmost the others will be reduced to a point where they can not exist, and the entire purpose will be defeated and nothing stable will result.

The board believes that any impression upon the part of any one as to what constitutes a fair price or reduction of price at this time which is not based on an investigation of costs under existing conditions, with proper consideration for all, is not valid; that the lowest price obtainable under stress at this time from the most efficient is not a fair measure of what is right and is not in the interest of the nation. It believes further that no department of the government is entitled to a better price than the general public, except to the extent to which costs may be reduced by the quantity of purchase or the conditions of delivery, and at this time, in the national interest even this advantage might be waived.

With reference to the question sometimes asked as to whether or not the board is engaged in price-fixing, it may be said that inasmuch as it does no more than to announce what prices are fair and reasonable under all circumstances, and as low as may be expected for some time to come, it can not be regarded as fixing prices in any sense. Either this board or some other properly constituted body will have to promptly consider these matters, or in my opinion, the consequences to the country will be very grave.

A fire at the Atlantic Coast Line freight station in Bennettsville, S. C., on April 21, destroyed the freight house and contents, 8 freight cars, and about 700 bales of cotton; estimated loss $150,000.

Expenses of the U. S. Railroad Administration

Statement for Senate Committee on Interstate Commerce Gives Figures Not Hitherto Public

THE total expenses of the United States Railroad Administration for the year 1918 were $3,647,143, according to a statement filed with the Senate Committee on Interstate Commerce by Director General Hines, and the total payroll for its organization for the month of December was $280,600 for the central administration and $252,500 for the regional administration, or at a yearly rate of $6,390,000. This was for 1,193 officers and employees of the central administration at Washington and 227 officers and employees outside of Washington (including 106 central administration traveling representatives, supervisors and inspectors) and 1,079 officers and employees of the regional administration. This and a large amount of other interesting information not heretofore made public was furnished by Mr. Hines in reply to a series of questions addressed to him by the committee and has been made available by the publication of the concluding instalments of the record of the hearings held before the committee in January and February. The annual office rentals as of December 31 were $74,993 for the central organization and $24,872 for the regional organization. The office expenses exclusive of office rents, traveling expenses, expense for posters, and subscriptions to publications for the year, amounted to $366,953.50 for the central organization and $94,168.43 for the regional organization; traveling expenses were $167,704.99 and $40,134.40, and the expense of posters, and subscriptions to publications was $9,402.36 and $396.99. This was given in reply to a question as to the salaries, office and traveling expenses, and expenses for publications, posters, advertising and publicity.

The Railroad Administration Payroll.

A complete list as of January 1, 1919, of all officers and employees of the central Railroad Administration, under the director general, and of the regional administration, under regional directors, other than those on the regular payrolls of the various railroad companies under federal control, together with their salaries, wages or compensation was furnished the committee. It includes only one "dollar-a-year-man," Theodore H. Price, actuary. The list shows the following:

DIRECTOR GENERAL—GENERAL OFFICE

No.	Occupation	Annual salary
1	Assistant to director general	$10,000
1	Assistant to assistant to director general	3,000
1	Private secretary to director general	6,000
1	Office manager	5,000
1	Assistant private secretary to director general	3,000
2	Secretaries	2,500
1	Superintendent of telegraph	3,000
20	Telegraphers	$1,500 to 2,000
6	Telephone operators,	$1,080 to 1,200
67	Clerks	$600 to 2,700
2	Stenographer-clerks,	$1,800 to 2,000
13	Stenographers	$900 to 1,500
2	Chauffeurs	$960 to 1,000
26	Laborers	$300 to 840
20	Messengers	$600 to 1,200
11	Charwomen	$180 to 360

ASSISTANT DIRECTOR GENERAL

1	Assistant director general	$25,000
1	Assistant to assistant director general	12,000
1	Assistant to assistant director general	9,000
1	Office assistant	5,000
1	Secretary	4,000
1	Secretary	3,000
1	Accountant	5,000
1	Accountant	3,000
3	Clerks	$1,200 to 2,000
1	Secretary	2,100
5	Assistant secretaries	1,800
4	Stenographers,	$1,400 to 1,500
3	Messengers	$600 to 720

FINANCE AND PURCHASES

1	Assistant to director	$9,000
1	Assistant to director	4,000
1	Manager, fire loss and protection	8,400
1	Manager, marine insurance	7,500
1	Manager, forest product section	5,000
1	Treasurer	10,000
1	Cashier	3,600
1	Accountant	3,600
7	Inspectors	$2,700 to 4,000
1	Lumberman	2,700
30	Clerks	$1,000 to 3,000
1	Secretary	2,100
1	Secretary	2,000
3	Assistant secretaries	1,800
1	Assistant secretary	1,680
33	Stenographers.	$1,000 to 1,500
2	Laborers	840
7	Messengers	$480 to 840

CAPITAL EXPENDITURES

1	Director	$25,000
1	Assistant to director	10,600
1	Assistant to director	8,400
1	Accountant	3,900
2	Accountants	3,000
1	Accountant	2,700
1	Secretary and assistant	4,000
1	Chief clerk	4,000
2	Assistant engineers	4,200
1	Assistant engineer	3,900
2	Assistant engineers	3,600
18	Clerks	$1,200 to 1,920
4	Secretaries	1,800
6	Stenographers.	$1,200 to 1,500
2	Messengers	840

DIVISION OF OPERATION (PROPER)

1	Director	$25,000
1	Assistant director	15,000
1	Assistant director	14,000
1	Assistant director	12,000
2	Assistant directors	10,000
1	Assistant to director	7,500
1	Manager, fuel conservation	9,000
1	Manager, operating statistics	7,500
1	Manager, telegraph	7,500
1	Assistant manager, operating statistics	4,800
1	Assistant manager, fuel conservation	7,200
1	Assistant manager, safety	4,500
1	Assistant to manager, fuel conservation	6,000
2	General supervisors, equipment	7,500
1	General supervisor, car repairs	6,000
7	Supervisors, equipment	4,800
6	Assistant supervisors, equipment	3,900
7	Supervisors, safety	3,000
12	Supervisors, car repairs	4,200
1	Supervisor, troop movement	3,600
1	Supervisor, troop routing	6,000
1	Supervisor, coding	3,000
1	Assistant engineer	4,800
1	Inspector of transportation	7,500
6	Supervisors, fuel conservation	4,800
1	inspector of transportation	5,000
2	Assistant supervisors, fuel conservation	3,900
1	Assistant supervisor, fuel conservation	3,600
1	Inspector	2,400
1	Inspector	1,800
1	Statistician	4,200
2	Statisticians	3,000
1	Secretary and assistant	3,900
1	Secretary and assistant	3,000
1	Chief clerk	4,500
1	Office engineer	4,200
1	Chief clerk	3,600
1	Assistant chief clerk	3,600
124	Clerks	$720 to 3,600
1	Assistant secretary	2,400
1	Secretary	2,100
2	Secretaries	1,800
67	Stenographers	$960 to 1,500
2	Laborers	840
6	Messengers	$480 to 600

DIVISION OF OPERATION (CAR SERVICE)

1	Manager	$10,000
5	Assistant managers	9,000
1	Assistant manager	7,500
1	Assistant manager	6,500
1	District manager	5,400
1	District manager	4,800
1	Assistant to manager	3,600
1	Assistant	3,000
1	Special assistant	6,000
1	Chief inspector	3,300
1	Special inspector	3,000
13	Inspectors	2,400
10	Inspectors	1,800
2	Special representatives	4,000
1	Secretary	3,300
1	Secretary	3,000
9	Office assistants	$3,000 to 3,600
91	Clerks	$720 to 3,000
2	Secretaries	1,800
2	Secretaries	1,620
66	Stenographers	$900 to 1,500
8	Messengers	$480 to 900

DIVISION OF TRAFFIC

1	Director	$25,000
1	Assistant director	15,000
1	Assistant director	12,500
1	Assistant director	7,200
1	Manager, Food Administration	20,000
1	Manager, War Industries Board	18,500
1	Manager, inland traffic, War Department	18,000
1	Manager, Fuel Administration	13,200
1	Manager, express and mail	12,000
1	Manager, Navy Department	8,000
1	Manager, Shipping Board	7,200
2	Managers, fuel oil	6,000
1	Manager, inland traffic, United States military railroads	4,200
1	Manager, War Trade Board	3,000
1	Assistant	7,500
1	Assistant	7,200
4	Assistants	6,000
3	Assistants	4,800
1	Assistant	4,200
1	Assistant	4,000
1	Assistant	3,600
2	Assistants	3,000
1	Assistant, War Department	6,000
1	Assistant, War Department	3,300
1	Assistant, Navy Department	3,600
1	Assistant, Navy Department	3,000
3	Assistants, Fuel Administration	4,800
1	Assistant, Fuel Administration	4,200
1	Assistant, Food Administration	5,000
1	Assistant, Food Administration	3,600
1	Assistant, Food Administration	2,400
1	Assistant, War Industries Board	5,000
1	Assistant, War Industries Board	3,000
1	General agent	4,800
1	General agent	4,500
1	General agent	4,000
2	General agents	3,600
2	General agents	3,300
1	General agent	2,700
4	General agents	2,100
1	Secretary	3,000
1	Secretary	2,820
1	Chief clerk	3,600
1	Chief clerk	3,300
45	Clerks	$840 to 3,600
1	Secretary	2,400
1	Secretary	2,100
8	Secretaries	1,800
21	Stenographers.	$1,200 to 1,500
1	Laborer	840
7	Messengers	$480 to 780

Public Service and Accounting

1	Manager, accounting	$9,000	11	Accountants	2,700
1	Manager, Short Line section	8,500	1	Accountant	2,500
1	Auditor	7,500	8	Accountants	2,400
1	Special rate expert, Short Line section	7,200	12	Accountants	2,100
2	Traffic assistants	6,000	7	Accountants	2,000
1	Accountant	6,500	1	Accountant	1,800
3	Accountants	6,000	1	Accountant	1,500
4	Accountants	4,200	1	Chief clerk	3,900
1	Accountant	3,900	73	Clerks	$840 to 2,700
1	Accountant	3,600	1	Secretary	1,680
1	Accountants	3,300	1	Stenographer and clerk	1,620
1	Accountant	3,300	18	Stenographers	$1,200 to 1,500
11	Accountants	3,000	1	Laborer	840
1	Accountant	2,880	6	Messengers	$480 to 720

Division of Labor

1	Director	$25,000	1	Secretary	2,500
	Assistants	4,000	1	Chief clerk	2,700
1	Assistant	5,000	4	Field agents	2,700
2	Assistant	4,000	3	Reporters	2,100
1	Manager, women's section	5,000	3	Assistant reporters	1,800
7	Members of boards	7,500	8	Clerks	$1,080 to 1,800
4	Representatives	6,000	2	Secretaries	2,100
3	Secretaries of railway board of adjustment	3,000	17	Stenographers	$1,200 to 1,500
			1	Underclerk	900
			2	Messengers	$720 to 840

Division of Law

1	General counsel	$25,000	1	Attorney	5,000
3	Assistant general counsel	10,000	4	Attorneys	3,000
			1	Attorney	2,200
1	Assistant to general counsel	7,500	1	Inspector	4,000
			1	Inspector	3,600
1	Assistant to general counsel	6,000	2	Inspectors	3,500
			4	Inspectors	3,000
4	Assistants	4,000	2	Chief clerks	3,000
1	Manager, claims and property protection	7,500	1	Chief clerk	2,500
			11	Clerks	$900 to 2,000
1	Chief, secret service and police	7,500	2	Secretaries	1,800
			19	Stenographers	$1,200 to 1,500
2	Attorneys	7,500	3	Messengers	600
2	Attorneys	6,000	3	Inspectors	2,100

Actuary to Railroad Administration

1	Actuary	$1	1	Correspondent	2,400
1	Assistant actuary	6,000	8	Clerks	$1,100 to 2,400
1	Correspondent	4,800	16	Stenographers	$1,200 to 1,500
1	Correspondent	4,000	1	Messenger	800
1	Correspondent	3,000			

Division of Inland Waterways

1	Director	$25,000	1	Clerk	2,100
1	Traffic manager	4,000	4	Stenographers	$1,020 to 1,500
1	Secretary	3,000	3	Laborers	$720 to 840
2	Inspectors	3,600			

Board of Railroad Wages and Working Conditions

6	Members of board	$10,000	1	Chief clerk	3,000
1	Secretary of board	6,000	19	Clerks	$720 to 2,700
2	Wage schedule experts	5,000	5	Secretaries to members	1,800
2	Examiners	6,000	9	Stenographers	$1,200 to 1,500

Eastern Region

1	Regional director	$50,000	2	Transportation inspectors	2,400
1	Assistant regional director	35,000	1	Telegraph and telephone engineer	4,200
1	District director	35,000	2	Engineers	4,800
1	District director	30,000	1	Engineer	2,700
1	Chairman budget committee	25,000	1	Engineer	2,520
1	Traffic assistant	20,000	1	Supervisor of transportation	2,700
1	Mechanical assistant	20,000	2	Members sub-committee—Forest products	4,200
1	Resident traffic assistant	15,000			
1	Marine director	15,000	1	Freight representative	3,600
1	Assistant mail and express	10,000	1	Freight representative	3,000
1	Terminal manager	8,400	1	Inspector	2,700
1	Terminal manager	8,000	1	Inspector	2,100
1	Terminal manager	7,200	1	Statistician	5,000
1	Terminal manager	5,400	1	Accountant	3,000
1	Terminal manager	5,000	1	Accountant	1,950
1	Staff assistant to traffic assistant	7,200	1	Accountant	1,800
			1	Chartermaster	2,700
1	Assistant to traffic assistant	4,200	1	Tug despatcher	2,700
			1	Tug despatcher	2,400
1	Supervisor of stores	6,000	5	Tug despatchers	2,100
1	Transportation assistant	6,000	5	Tug despatchers	1,800
			1	Secretary	3,600
1	Operating assistant	4,800	2	Secretaries	3,000
1	Operating assistant	4,200	1	Secretary	2,700
1	Special agent	8,000	1	Secretary	2,610
1	Executive assistant	6,500	1	Secretary	2,400
1	Executive assistant	4,200	1	Chief clerk	4,800
1	Office assistant	6,000	1	Chief clerk	4,000
1	Office assistant	5,000	1	Chief clerk	3,600
1	Office assistant	3,600	2	Chief clerks	3,300
1	Secretary	6,000	3	Chief clerks	3,000
1	Special assistant	5,000	1	Chief clerk	2,700
2	Assistants	4,200	1	Chief clerk	2,400
1	Assistant	3,600	111	Clerks	$840 to 3,000
1	Transportation inspector	4,000	78	Stenographers	$720 to 2,250
			16	Telegraph and telephone operators	$840 to 1,800
3	Transportation inspectors	3,600	1	Laborer	1,100
			15	Messengers	$480 to 780
5	Transportation inspectors	3,000			

Allegheny Region

1	Regional director	$50,000	1	Transportation assistant	10,000
1	Assistant regional director	20,000	1	Engineering assistant	10,000
1	Traffic assistant	20,000	1	Assistant to traffic assistant	5,400
1	Operating assistant	20,000	3	Terminal managers	10,000
1	Mechanical assistant	10,000			

Allegheny Region

1	Assistant terminal manager	5,400	1	Freight service representative	3,300
1	Assistant to terminal manager	3,600	1	Passenger service representative	3,000
1	Supervisor operating division	4,800	1	Perishable traffic agent	3,600
2	Supervisors operating division	3,600	1	Office manager	4,500
1	Supervisor freight service	4,200	1	Statistician	5,000
1	Freight supervisor	4,200	1	Statistician	2,607
1	Supervisor car repairs	4,200	1	Secretaries	3,000
1	Supervisor locomotive repairs	4,200	1	Secretary	1,920
1	Supervisor train movement	3,000	1	Secretary	2,100
1	Engineer	4,200	2	Secretaries	1,800
1	Chief of wage information	4,200	2	Chief clerks	3,600
1	Inspector of yards	4,500	1	Chief clerk	3,480
1	Inspector of piers	3,900	2	Chief clerks	3,000
			1	Chief clerk	2,400
			1	Chief clerk	1,800
			51	Clerks	$1,050 to 2,700
			23	Stenographers	$1,050 to 2,220
			5	Messengers	$660 to 780

Pocahontas Region

1	Regional director	$40,000	2	Secretaries	2,280
1	Traffic assistant	17,500	1	Chief clerk	3,100
1	Transportation assistant	10,800	1	Chief clerk	3,300
			1	Chief clerk	3,000
1	Chairman regional purchasing committee	10,000	11	Clerks	$1,326 to 2,700
1	Member regional purchasing committee	7,800	3	Stenographers	$1,020 to 1,380

Southern Region

1	Regional director	$40,000	1	Assistant to regional purchasing committee	3,600
1	Traffic assistant	15,000	1	Inspector instructor	3,000
1	Operating assistant	10,000	3	Inspector instructors	2,100
1	Staff officer, mechanical	7,500	1	Secretary	2,700
1	Staff officer, engineering	6,000	1	Secretary	2,100
1	Staff officer, traffic	6,000	1	Secretary	1,950
1	Assistant to traffic assistant	3,600	1	Secretary	1,800
			5	Secretaries	1,620
2	Terminal managers	6,000	1	Chief clerk	4,500
3	Terminal managers	5,000	2	Chief clerks	3,600
1	Terminal manager	2,500	1	Chief clerk	3,000
1	Assistant to terminal manager	3,600	1	Chief clerk	2,400
			2	Chief clerks	2,100
1	Staff officer, accounting	5,100	42	Clerks	$720 to 3,600
1	Accountant	3,600	25	Stenographers	$960 to 2,100
1	Accountant	2,400	6	Telegraph and telephone operators	$1,080 to 1,734
1	Engineer	4,200	4	Chiefs	$1,098 to 1,319
1	Terminal trainmaster	3,900	3	Porters	$1,098 to 1,269
1	Traveling representative	4,200	4	Messengers	$600 to 720
1	Traveling representative	3,000			

Northwestern Region

1	Regional director	$50,000	1	Inspector	3,000
1	Assistant regional director	20,000	1	Correspondent	2,700
1	District director	25,000	1	Accountant	3,600
1	Traffic assistant	20,000	1	Accountant	3,300
1	Traffic assistant	8,000	1	Supervisor of car service	4,500
1	Traffic supervisor	5,000	1	Assistant supervisor of car service	2,700
1	Operating assistant	6,000			
1	Engineering assistant	6,000	1	Supervisor of transportation	4,500
1	District manager	10,000			
1	Car service assistant	6,000	1	Assistant supervisor of transportation	3,600
1	Terminal manager	10,000			
1	Terminal manager	9,000	1	Supervisor of transportation	4,200
1	Terminal manager	7,000			
1	Terminal manager	5,400	1	Supervisor	3,000
1	Acting terminal manager	4,800	1	Freight house supervisor	2,700
1	Assistant to terminal manager	3,600	1	Office assistant	4,800
			1	Office manager	3,600
1	Assistant to traffic assistant	3,600	3	Chief clerks	3,000
			5	Chief clerks	2,700
1	Engineer	4,300	1	Chief clerk	2,139
1	Engineer	3,600	2	Chief clerks	2,100
2	Engineers	3,600	1	Secretary	2,700
2	Engineers	3,000	1	Secretary	2,400
1	Assistant to district director	4,200	1	Secretary	2,100
			217	Clerks	$540 to 2,700
1	Joint export agent	4,200	3	Stenographers	$1,020 to 2,100
1	Car agent	2,700	6	Telegraphers	1,591.20
1	Field man	3,600	1	Cook	1,320
3	Inspectors	2,400	1	Porter	1,200
2	Inspectors	2,100			

Central Western Region

1	Regional director	$50,000	1	Inspector of transportation	3,600
1	Assistant regional director	20,000	1	Traffic inspector	3,300
1	District director	35,000	1	Inspector, telegraph and telephone	2,400
1	Traffic assistant	20,000	1	Chief tie inspector	2,400
1	Engineering assistant	12,000	1	Chief treatment inspector	2,400
1	Transportation assistant	8,400	5	Treatment inspectors	1,800
1	Mechanical assistant	4,000	1	Accountant	3,600
1	Terminal manager	3,900	1	Accountant	2,400
1	Labor representative	5,000	1	Office manager	4,000
1	Routing assistant	7,500	1	Chief clerk	3,300
1	Assistant to district director	5,000	1	Chief clerk	3,000
1	Transportation efficiency	3,300	2	Chief clerks	2,700
			1	Chief clerk	2,100
1	Assistant to traffic assistant	4,200	1	Chief clerk	2,000
			1	Chief clerk	1,980
3	Engineers	3,000	1	Secretary	2,640
1	Supervisor of loss and damage	3,900	3	Secretaries	2,400
			2	Secretaries	1,800

CENTRAL WESTERN REGION

2	Secretaries	1,620	1	Chief	1,380
35	Clerks	$720 to 2,220	1	Porter	1,320
29	Stenographers.	$1,020 to 1,620	1	Cook	1,269

SOUTHWESTERN REGION

1	Regional director	$50,000	1	Telegraph and telephone engineer	3,600
1	Assistant regional director	15,000	1	Special investigator	(1)
1	District director	30,000	1	Office manager	4,200
1	Traffic assistant	20,000	2	Chief clerks	3,600
1	Engineering assistant	12,000	3	Chief clerks	3,000
1	Supervisor transportation	4,800	1	Chief clerk	2,400
1	Supervisor car service	4,200	1	Chief clerk	2,100
1	Supervisor oil traffic	4,500	1	Secretary	2,100
1	Supervisor coal traffic	4,800	31	Clerks	$720 to 3,000
1	Manager, tie and bridge	3,600	29	Stenographers	$900 to 2,400
2	Inspectors, tie and bridge	2,400	2	Messengers	$126 to 600
2	Assistant inspectors, tie and bridge	1,800	1	Chef	1,100
			3	Porters	$1,020 to 1,100

[1] $7.50 per day.

Recapitulation

CENTRAL ADMINISTRATION

	Employees
Office director gneral	175
Office of director general	175
Division of finance and purchases	24
Division of capital expenditures	94
Division of operation (proper)	44
Division of operation (car service)	281
Division of traffic	260
Division of public service and accounting	143
Division of labor	167
Division of law	63
Office of actuary to Railroad Administration	71
Division of inland waterways	31
Board of railroad wages and working conditions	13
Total central administration	45
	1,411

REGIONAL ADMINISTRATION

	Employees
Eastern region	320
Allegheny region	126
Pocahontas region	24
Southern region	126
Northwestern region	286
Central Western region	112
Southwestern region	91
Total, regional administration	1,085
Grand total	2,496

Railroad Payroll Charges by Months

The total payroll for 1918, including charges to operating expenses and all other accounts for the Class I roads under federal control, was $2,593,085,502, an increase over that for 1917 of $874,339,367 or 50.9 per cent. The percentages of increase by regions were as follows: Eastern, 49.1; Allegheny, 57.1; Pocahontas, 60.5; Southern, 59.8; Northwestern, 44.9; Central Western, 44.9; Southwestern, 50.2. A statement showing the payroll and the increases by months, including back pay, is as follows:

	1918	1917	Amount	Per cent
Miles of road operated	231,052	230,911	141	0.1
Total pay roll charges:			Increase	
January	$165,770,977	$128,139,997	$37,630,980	29.4
February	157,638,852	121,035,187	36,603,665	30.2
March	169,763,097	133,413,505	36,349,592	27.2
April	166,887,325	137,401,108	29,486,217	21.5
May	172,163,116	144,574,915	27,588,201	19.1
June	258,632,637	145,191,893	113,440,744	78.1
July	228,787,992	145,443,525	83,344,467	57.3
August	252,596,016	152,537,924	100,058,092	65.6
September	261,948,245	146,985,956	114,962,289	78.2
October	264,030,246	154,811,533	109,218,713	70.6
November	247,991,874	153,090,395	94,901,479	62.1
December	246,875,125	156,120,197	90,754,928	58.1
Total	2,593,085,502	1,718,746,135	874,339,367	50.9

This statement includes payroll charges for other purposes, e. g., for construction, as well as for operating expenses. The statement does not reflect the amount of increase in payrolls due to increases in the rates of pay, but has to include without segregation, all influences (e. g., number of employees, amount of overtime, state of experience of employees, etc.), making for a difference in total payroll in 1918 as compared with 1917.

Beginning with the month of April, figures for 1917 contain back pay retroactive to January 1, under the Adamson Act. From June to November, inclusive, figures for 1918 contain retroactive wage payments due to General Order No. 27 and its supplements.

Although changes were made during December, 1918, in the grouping of roads by regions, the December figures on this statement are made up on the basis of the same grouping as was in effect November 30.

Wage Increases Charged to Operating Expenses

The table below is an estimate of the increase in payroll charges to operating expenses for the year, due to advance in wage rates over those in effect December 31, 1917, as authorized by General Order No. 27, supplements thereto, and collateral increases made necessary thereby, (not including supplements 12 and 13 promulgated in December):

Supplement No. 4 was that giving a supplemental increase to the shop employees. Supplement 7 was for clerical forces and others, and Supplement 8 was for maintenance of way employees.

Increase in Number of Employes

Another statement filed with the committee gives the number of employees for the Class I roads under federal control by classes in October, 1917, December, 1917, October, 1918, and January, 1919. In October, 1917, the total was 1,733,115; in December, 1917, it had fallen to 1,703,684; in October, 1918, it had increased to 1,855,911, an increase of 122,796, or 7 per cent in a year, and in January, 1919, it had been reduced to 1,843,530, an increase of 139,846 or 8.3 per cent as compared with December, 1917. The figures regarding increases in wages and number of employees do not agree with those in a later statement compiled by the operating statistics section and published in these columns last week, based on revised reports which showed the number of employees on January, 1919, as 1,848,774.

The information is also compiled by regions and by railroads.

In reply to a question by the committee as to whether any discretion is lodged with the regional directors and federal managers to employ men at current rates of pay in their respective territories, or whether all rates of pay are fixed by the director general, the following statement was made:

The rates of pay, generally speaking, are fixed in general orders by the director general.

As to personnel and salaries in the organization of regional directors, regional directors have authority to fix salaries up to but not including $3,000 per annum and to select persons to fill these positions. All salaries of $3,000 per annum or over are reported by the regional directors to the central administration at Washington.

WAGE INCREASES CHARGED TO OPERATING EXPENSES

Operating expense account	Estimated payroll charges, excluding increases	Estimated increases charged to 1918 operating expenses: General Order No. 27 and Supplement 4	Supplements 7 and 8	Collateral increases	Total estimated increase	Per cent total increases over rates of Dec., 1917
Maintenance of way and structures	$321,791,000	$53,634,000	$30,072,000	$12,584,000	$96,290,000	29.9
Maintenance of equipment	433,594,000	192,125,000	5,485,000	4,288,000	201,898,000	46.6
Traffic expenses	24,508,000	2,870,000	619,000	131,000	3,620,000	14.8
Transportation:						
Superintendence and train despatching	53,874,000	7,806,000	1,701,000	1,514,000	11,021,000	20.5
Station forces, including telegraph and signal operation	232,455,000	41,301,000	12,968,000	2,979,000	57,248,000	24.6
Yardmasters and clerks	29,929,000	5,125,000	2,021,000	1,342,000	8,488,000	28.4
Yard conductors, brakemen, and switchtenders	99,704,000	26,852,000	377,000	198,000	30,427,000	30.5
Yard engiemen and motormen	56,055,000	15,651,000	34,000	43,000	15,728,000	28.1
Train engiemen and motormen	164,004,000	36,724,000	85,000	154,000	36,963,000	22.5
Trainmen	173,404,000	50,417,000	98,000	94,000	50,609,000	29.2
Enginehousemen, yard and road	75,162,000	20,675,000	5,113,000	1,199,000	26,987,000	35.9
All other transportation accounts	87,893,000	22,010,000	5,141,000	1,712,000	28,863,000	32.8
Total transportation	$972,480,000	$229,561,000	$27,538,000	$9,235,000	$266,334,000	27.4
General expenses	$70,480,000	$10,464,000	$4,691,000	$855,000	$15,410,000	21.9
Total all operating expenses	$1,822,793,000	$488,654,000	$67,805,000	$27,093,000	$583,552,000	32.0

As to positions where the salary is $5,000 per annum or over, the persons selected and the salaries are submitted by the regional directors to the central administration at Washington. Federal managers have authority to pass upon promotions and appointments to what are known as official positions, and to fix salaries of employees where the salary is less than $3,000 per annum, except where the employee falls within one of the classes covered by general wage orders.

With respect to salaries of $3,000 per annum or over, paid employees under the jurisdiction of the several federal managers, the federal managers submit their recommendations to the regional directors, who have authority to pass finally upon such matters in respect of positions carrying salaries up to but not including $5,000 per annum, except where the employee falls within one of the classes covered by general wage orders.

As to positions where the salary is $5,000 per annum or over, in the organization of the federal managers, the persons selected and salaries paid are submitted by the regional director, with his recommendations, to the central administration, where they are finally acted upon.

As to maintenance of way employees and clerks, maximum and minimum rates of pay are fixed in general orders of the director general, but where inequalities are found to exist the regional directors have authority to make changes within such maximum and minimum, in order to abolish the inequalities.

With respect to telegraphers, exclusive agents, and other classes of employees covered by Supplement 13 to General Order No. 27, regional directors also have authority to make adjustments where glaring inequalities are found to result from the application of this order.

Rails and Ties

The following information was furnished to the committee regarding the rails and ties bought and inserted in 1918; as compared with 1917 and 1916:

Rails and Ties Used Calendar Years 1916, 1917 *and* 1918.

1.	Number of ties bought and supplied calendar year—	
	1916	96,665,800
	1917	93,177,208
	1918	82,871,551
2.	Number of crossties actually laid in all tracks calendar year—	
	1916	90,140,016
	1917	81,154,529
	1918	78,958,224
3.	Number of tons new rail laid and track-miles calendar year—	
	1916 tons	1,450,952
	1916 track miles	9,831
	1917 tons	1,233,031
	1917 track miles	8,233
	1918 tons	1,097,277
	1918 track miles	7,431
4.	Number of tons new rail on hand Dec. 31—	
	1918	369,223
	1917	460,865
5.	Number of track miles new rail on hand by weights per yard:	

Weight per yard *Pounds*	On hand Dec. 31, 1918 *Track miles*	Weight per yard *Pounds*	On hand Dec. 31, 1918 *Track Miles*	Weight per yard *Pounds*	On hand Dec. 31, 1918 *Track Miles*
141	....	101	.....	75	35.98
136	10.70	100	535.27	74	4.00
135	4.10	96	3.95	72	27.00
130	96.26	93	.....	70	11.98
125	.12	91	.....	67½ (Russian)	7.03
120	.60	90	1,218.91	Total	2,544.41
110	5.30	85	342.71		
107	18.86	80	160.89		
105	60.75	76	.....		

Car and Locomotive Repairs

Statements showing comparisons regarding car and locomotive repairs in 1918 and 1917 are given in the following table:

Repairs to Locomotives and Cars Combined, 12 Months, January to December, 1917-1918

	1918	1917
Average number of serviceable freight locomotives	30,824	30,378
Average number freight locomotives in or awaiting shop	4,624	4,286
Per cent freight locomotives in or awaiting shop	15.0	14.8
Average number freight cars in service	2,430,786	2,363,309
Average number freight cars in or awaiting shop	138,989	133,252
Per cent of freight cars in or awaiting shop	5.7	5.6
Total number of locomotives receiving repairs requiring more than 24 hours	235,522	193,924

Comparison of Freight Cars Repaired by Railroads Under Federal Control, 1917 and 1918

	Light	Heavy	Total
(1) Number of freight cars repaired by 133 Class I railroads and 22 Class II railroads, showing separation between light and heavy repairs:			
1917	29,207,081	1,941,380	31,148,461
1918	27,650,214	2,005,926	29,656,140
Increase, 1918 over 1917	.....	64,546	.....
Decrease, 1918 over 1917	1,556,867	.....	1,492,321
(2) Number of freight cars repaired by 6 Class I railroads that were unable to give complete separation between light and heavy repairs:			
1917			1,112,966
1918			1,154,085
Increase, 1918 over 1917			41,119
(3) Total number of freight cars repaired by 161 railroads, representing ownership of 2,357,208 cars:			
1917			32,261,427
1918			30,810,225
Total decrease, 1918 over 1917			1,451,202

(*a*) Referring to item (1), showing decrease of 1,556,867 light repairs, 1918 over 1917, with an increase of 64,546 heavy repairs: The reduction in light repairs is due to reporting light running repairs, requiring less than one 1-man hour to repair, in 1917, which were not permitted reported in 1918.

(*b*) Item (2) shows substantial increase, 1918 over 1917.

(*c*) Item (3). Explanation for total decrease, 1918 over 1917, is given in paragraph (*a*).

A statement giving the subdivision of the accounts entering into the transportation expenses for the calendar year 1918 as compared with 1917 is as follows:

	1918	1917	Increase	Per Cent.
Transportation Expenses:				
Supervision	$78,272,839	$55,639,797	$22,633,042	40.7
Station service	311,524,168	224,084,008	87,440,160	39.0
Yard service	370,383,523	265,390,430	104,993,093	39.5
Train service	1,029,558,191	790,515,022	239,043,169	30.2
Miscellaneous transportation	93,225,618	73,880,451	19,345,167	26.2
Casualties	106,562,854	78,948,522	27,614,332	35.0
Joint facilities	22,221,745	15,905,582	6,316,163	39.7
	$2,011,748,938	$1,504,363,812	$507,385,126	33.7

While revenues increased 21.4 per cent, expenses increased 40.3 per cent. The subdivision of the other expense accounts is not given. Maintenance of way and structures increased 46.8 per cent; maintenance of equipment, 60.5 per cent; traffic expenses decreased 25.3 per cent, and general expenses increased 15.7 per cent.

The following officers were elected by the Denver (Colo.) Commercial Traffic Club at its annual election on April 16: President, Robert C. Quest, of the F. C. Ayers Mercantile Company; vice-president, T. A. Dinkel, of the Longmont Farmers' Milling & Elevator Company and secretary-treasurer, C. E. Page, of the Hendrie & Bolthoff Company.



Photograph by Press Illustrating Service, Inc., N. Y.

General View from the 89th Division Headquarters in Germany



Draft Gear Test Plant of the T. H. Symington Company

Freight Car Draft Gear Test Demonstrations

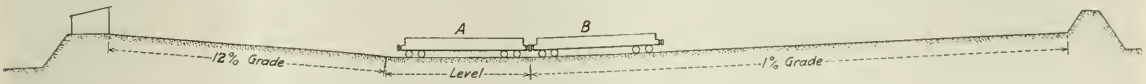
Showing Methods to Be Followed by the Inspection and Test Section in Official Investigations

On April 10 and 11 a series of public demonstrations were conducted by the Inspection and Test Section of the Division of Operation, United States Railroad Administration, at the draft gear testing plant of the T. H. Symington Company, Rochester, N. Y. The manufacturers of draft gears, the draft gear committee of the Mechanical Section of the American Railroad Association, the mechanical committee of the Railroad Administration and a number of railroad officers were present. The purpose of the demonstration was to disclose in advance of a series of official draft gear tests to be conducted at this plant, the methods of testing which will be followed, and particularly to demonstrate the operation of the devices which have been developed to graphically record the action of the draft gear between two cars, one moving and the other standing at the instant of impact.

For a period of several months the Inspection and Test Section has been engaged in testing draft gears under the direction of B. W. Kadel, assistant engineer, the program including tests both with the static machine and under the drop, and the work to be done on the Symington plant covers the next series of tests in the draft gear programs, in all of which the draft gear committee of the Master Car Builders' Association is co-operating.

The test plant of the T. H. Symington Company was built to facilitate the testing of draft gears under as nearly as possible actual service conditions. It consists of a test track, one end of which is laid out on a 12 per cent grade for accelerating purposes, followed by a section of level track at the other end of which is a one per cent ascending grade. Two 50-ton steel frame gondola cars with wood floors and siding are used in the tests. The facilities for handling the cars consist of a motor driven drum hoist housed at the top of the 12 per cent grade, the cable from which is attached to a special puller car to which the test car is attached in such a way that the coupling may be tripped at any predetermined point on the grade; a motor driven capstan winch beside the track is used to spot the cars on the level track.

Both of the 50-ton gondola cars are loaded so that each has a gross weight of 143,000 lb. The adjoining ends are arranged so that they may be equipped with any draft gear of standard dimensions, or with solid buffers. The moving car, designated as the *A* car, is drawn up the inclined track and released at stations predetermined to produce whatever velocity of impact is desired. The stationary car, designated as the *B* car, is placed at a fixed point on the track so that the performance of the cars during the period of impact is comparable for all tests. This position is chosen so that the *B* car stands fully on the one per cent decelerating grade when struck by the *A* car, while the latter moves upon level track during the period of impact and for a distance of approximately six feet before the instant at which the buffing faces of the two drawheads come in contact. The cars are equipped with flat face buffing stems instead of standard couplers, in order to produce a normal impact on the buffing coupler mechanism without coupling the cars.



Profile of the Test Track

The method of recording and comparing the action of various draft gears under impact between the two cars is a development recently worked out, and the apparatus built, jointly by the Inspection and Test Section and the engineers of the T. H. Symington Company.

The outstanding feature of the new recording apparatus is that a direct and continuous record is made of the movement of both cars during a period beginning before the instant of impact and continuing after the final separation

of the two cars. The records of the car movements are made by pencils traveling in a line parallel to the track and marking upon revolving drums, one for each car, both of which are mounted on a common shaft also parallel to the track. The drum shaft is worm driven by a 32-volt shunt-wound, direct-current motor, which receives its power from a storage battery. The paper speed of the drum is approximately 31 in. per second. The pencil holders for the two drums are mounted on guides parallel to the axis of the drums and are moved by bars which project out from the sides of the cars. Provision is made for horizontal movement of these bars at right angles to the longitudinal center line of the car. Guides attached to the instrument base engage a lever suitably attached to each bar to withdraw it from contact with the pencil holder before it can be moved beyond either end of the cylinder.

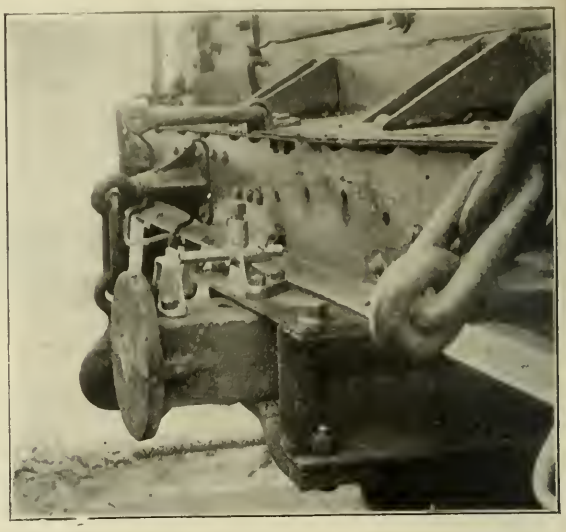
The line drawn upon the first or *A* drum shows the exact velocity of the *A* car at the moment of impact, denotes the exact point of impact, shows by the type of curve drawn the rate of retardation of this car and finally gives the velocity of the car after the two cars have parted. The line drawn upon the *B* drum shows the rate of acceleration of the *B* car and shows the final velocity of this car as the two cars part. Curves made in the same test upon the *A* and *B* drums are reproduced in Figs 1 and 2, respectively.

When a test is to be made the two cars are spotted with the buffing faces in contact and all slack is eliminated from the draft gears and attachments. With the drums standing the pencil carriages are given a slight movement along the guides to draw common reference lines, 3-3, Fig. 1, and 4-4, Fig. 2, by means of which the two cards later may be synchronized as to time. The pencils are then set on both drums in the positions which they will occupy against the bars projecting out from the sides of the cars at the instant the buffing faces between the two cars come in contact. With the pencils thus located the drums are rotated to draw the common datum line, 1-1, Fig. 1, and 2-2, Fig. 2, upon these drums. Line 2-2 on the *B* drum indicates the standing position of the B car; line 1-1 on the A drum indicates the position of the *A* car at the first instant of contact with the *B* car. By means of these datum lines the cards can be matched as to their positions along the track.

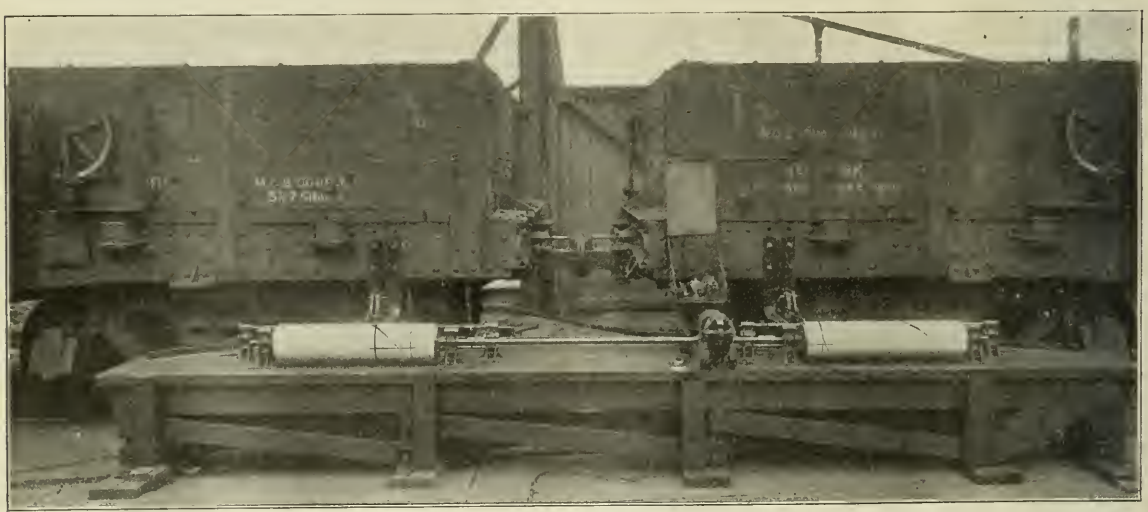
The test is then run by hauling the *A* car up the 12 per cent grade, releasing it at the point required to produce the desired velocity of impact, the pencil on the *A* drum being moved back from its impact position so that a record of the velocity of the car as it approaches the point of impact may be obtained.

From the curves a study can be made of the car movements throughout the cycle of draft gear movement and the velocity of the *A* car at the moment of impact can be accurately determined, as well as the velocities of both cars beyond the point of separation. Thus on the card for the *A* car, Fig. 1, the angularity of the line below the datum line denotes the exact velocity of the striking car, and the weight being known, its energy as a moving body can be accurately determined.

Referring again to Fig. 1, at point 5 it is known that the *A* car first met the *B* car, that the draft gears started to close and consequently that its velocity began to decrease. Assuming that the draft gear action is entirely smooth and that



The Flat Face Buffer and the Draft Gear Travel Gage



Instrument for Recording the Movements of the A and B Cars on Time-Distance Coordinates

the bombardments of static testing are not present in this service, it is possible to determine from the shape of the curved line denoting the decrease in velocity of this car, the approximate forces which must have been at work to produce the retardation shown between any two points on the time axis. From the final angularity of the approximately straight line beyond the point of separation of the two cars can be determined the velocity of the *A* car after the draft gears have parted and the number of foot pounds of energy still stored in this car. On cards made from certain draft gears the *A* car comes to rest as denoted in Fig. 1 before it has traveled beyond the limit of the pencil movement on the *A* drum.

Referring to Fig. 2, from the curve drawn by the *B* car can be determined the rate of acceleration of this car and its final velocity when the cars part. Knowing this velocity and the weight of the car it is possible to calculate the energy transferred from the *A* car to the *B* car. From Figs. 1 and 2 it is thus possible to determine the actual energy absorption which has taken place during the draft gear cycle.

The common datum and reference lines drawn on the two cards prior to the test makes it possible exactly to super-

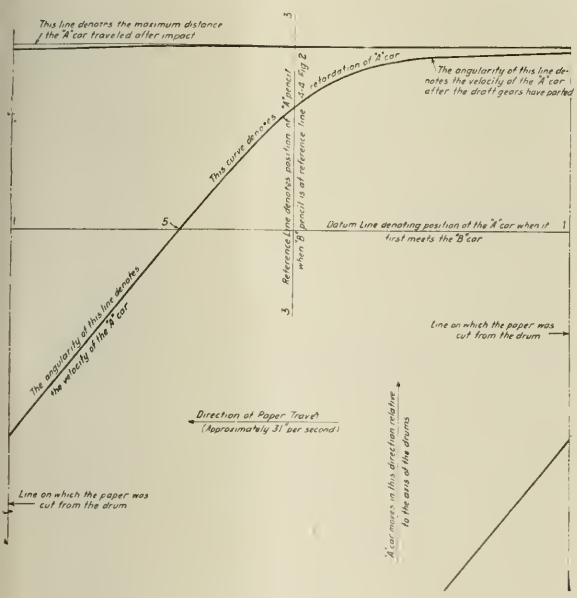


Fig. 1—The Card Made by the A Car

impose one curve upon the other, thus producing a graphic record of the relationship of the cars to each other throughout the significant range of movement. This has been done in Fig. 3.

From the superimposed cards it is possible to determine point 5 at which the draft gears begin to close, the point at which they closed to the maximum amount, point 6 at which they finally part, the distance the cars move along the track during any period of time within the range of the diagram, the time required for any phase of the gear movement cycle, and the amount of draft gear travel at any instant, this being indicated by the vertical distance between the two curves at that instant.

In addition to the instrument with which these diagrams are obtained, the *B* car is also equipped with a small constant-speed motor driven recording drum, the pencil movement of which records the movement of the buffer stem on that car with relation to the car body, by means of an equalized piano wire connection to the top and bottom of the front follower. The card from this drum reflects the smoothness of action of the draft gear in closure and release on a time-closure basis and provides a measure of the maximum closure of the draft gear on the *B* car. In addition to the record thus obtained, which compensates for any tendency of the follower to tilt in a vertical plane, the buffers of both cars are fitted with the closure gage shown in one of the illustrations, from which the maximum

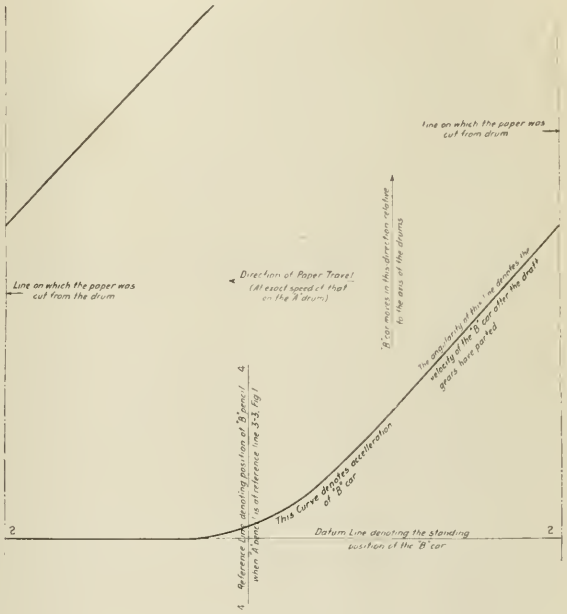


Fig. 2—The Card Made by the B Car

gear movement may be measured. These gages are a part of the regular equipment of the test cars as they have previously been used.

To the side of each car are also attached two pendulum shift gages or seismographs. The pendulums of these instruments are arranged to swing freely in but one direction from the perpendicular, the two instruments on the same car

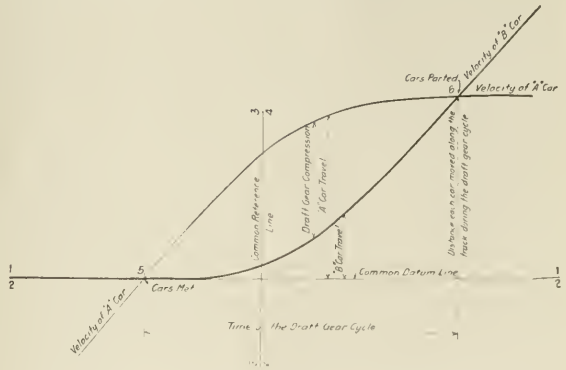


Fig. 3—Cards for the A and B Cars Superimposed

being arranged so that the pendulums swing in the opposite directions. The swing of the pendulums under the action of inertia carries with it a small marker mounted on a graduated segment, a friction spring in the marker causing it to remain in the position to which it is moved by the swing of the pendulum. These instruments are a part of the regular test equipment of the cars and the records obtained from them

provide a means of comparison of the load shifting tendencies of the impact with various draft gears.

The demonstrations were entirely unofficial in character, no records or detail comparisons of commercial gears being taken. The curves here reproduced were obtained with M. C. B. spring draft gears in both cars.

Orders of Regional Directors

DERAILMENTS AND GASOLINE FIRES. The regional director, Eastern Region, by circular 602-31A701, calls to the attention of trainmasters and trainmen a recent bulletin issued by the Bureau of Explosives (Bulletin 176), setting forth the dangers incident to the presence of gasoline tank cars in freight trains, when cars are derailed, and pointing out the precautions which should be observed in such cases.

Agitation of Piece-Work Question.—The Southern regional director by Circular 1521-29-6, dated April 22, instructs federal managers not to allow the question of hour-rates versus piece work to be reopened. In this circular, he says:

"Referring to my telegram of January 2, regarding preference of shopmen throughout the country to be paid on hourly basis: Acting under the permission of the director general, of December 31, 1918, employees on many railroads have indicated their preference with respect to working upon an hourly instead of a piece work basis. Director Tyler, Division of Operation, Washington, writes me he is advised that at some shops, after a decision has been reached in this way, certain local officers or foremen are continuing to agitate the matter, urging upon the men that another vote be taken, with the result that in some cases two or three votes have already been taken upon the subject.

"This is taken as indicating a purpose on the part of these local officers to circumvent the wishes of the director general, so clearly expressed in his telegram of December 31. The effect is to keep the shop organizations at such points continually agitated with most certain detrimental effect upon the efficiency and morale of the organization.

"Will you please direct that, on railroads under your jurisdiction, where employees have once decided this matter by vote, it will be considered as definitely settled during the period of federal control."

Sanitary Maintenance of Cars, Shops, Etc.—The regional director, Eastern region, by circular 500-97A705 advises federal managers that a committee is at work standardizing the rules for practice in the maintenance of sanitary conditions in cars, shops, offices, etc. The committee wants copies of all such regulations now in effect.

Payment of War Taxes.—The regional director, Eastern region, by circular 2002-16A707, advises federal managers of instructions from the director of the division of finance, Washington, to the effect that payment by the railroads to the Treasury Department of taxes collected on transportation should not be made in any one month for more than a single month, where such double payment can be avoided. The usual practice has been to make payment ninety days after the close of the month in which the money is collected. The commissioner of internal revenue now desires to have payment made within thirty days; but this time will be extended, on request, where it is impracticable to file the statement within thirty days.

Refrigerator Car Distribution.—The Northwestern regional director in Freight Car Distribution Notice 11 refers to complaints of the misuse of refrigerator cars belonging to packers and directs that instructions be adhered to.

Express Agents' Telegrams.—Circular 205, canceling Circular 158, of the Southwestern regional director similar to Circular 304-11A693 of the Eastern regional director. (*Railway Age*, April 25, page 1046).

Shipping Day Plan.—Circular 79 of the Northwestern regional director authorizes agents to accept less than carload freight on any week day except holidays and regardless of any instructions heretofore issued as to routing.

Passes for Brotherhood Chairman.—Supplement 27 to Circular 29 of the Central Western regional director, similar to Circular 2100-13A689 of the Eastern regional director. (*Railway Age*, April 25, page 1046).

Prohibition of Smoking in Mail Storage Cars.—Supplement 15 to Circular 120 of the Central Western regional director, similar to Order 174 of the Southwestern regional director. (*Railway Age*, March 21, page 758.)

Violations of Inspection and Safety Appliance Laws.—The Central Western regional director in a letter dated April 19, states that, from the large number of reports which are being made by Interstate Commerce Commission Inspectors to the assistant director of the Division of Operation covering violations of federal inspection and safety appliance laws, it is evident that either the railroad inspectors are not adequately educated or they are careless. A systematic method of handling this matter is advised. Division master mechanics should keep a check upon whether or not the work reported by engineers is being done, and see that reports of violations of rules are followed by suitable discipline. Records should be kept of the violations at each terminal and of the employees responsible in each case.

Preparation of Box Cars for Grain.—The Central Western regional director in a letter dated April 17 calls for immediate attention to the preparation of box cars for grain, and the providing of well-adapted temporary grain doors where needed.

Loss of Coal in Transit.—The Central Western regional director in a letter dated April 14, reports complaints of loss of coal from open cars while in transit occasioned by train and yard employees throwing it off for the use of switchmen, crossing watchmen and others. Coal losses from this source must be reduced to a minimum.

Furnishing Secondhand Rail to Industries and Dealers.—Supplement 8 to Circular 33 of the Northwestern regional director states that hereafter it will not be necessary to secure authority of the regional director's office for the sale of secondhand rail to industries and dealers.

Statistics for Census.—The regional director, Eastern Region, by circular 1801-118A703, informs federal managers that all inquiries presented by the Census Bureau must be answered, the census law requiring all persons to answer inquiries propounded by the Bureau.

Agreements with Brotherhoods Concerning Safety Measures.—The Eastern regional director, by circular 1201-16A708, advises federal managers of the agreement made with the brotherhoods when they promised to refrain from presenting bills to state legislatures. Switch lights are to be maintained on all derail switches in tracks where trains are moved at night. Pusher engines must not push cabooses, except where the caboose has no platform or has steel center sills running through the length of the caboose and platform. Long back-up movements must not be made; if such movements are necessary as a regular thing, provision must be made for turning the engine, or to put pilots and headlights on rear ends.

Contracts Must Terminate with Federal Control.—The Eastern regional director, by circular 304A709 calls attention to the order of April 11, stipulating that all contracts for materials and supplies must be made to terminate at the end of federal control, if they do not by their terms terminate sooner.

Better Packing and Marking.—The regional director,

Eastern region, by circular 600-159A710, advises federal managers of investigations which have been made to improve the efficiency of receiving clerks at freight houses. F. W. Smith, member of the Official Classification Committee, has visited and instructed the men at 257 freight stations. He had intelligent attention from the 6,897 employees to whom he talked, but many of them were found very poorly informed as to the rules for receiving freight. Intensive loading of way cars has resulted in some damage to freight. At some freight stations, receipts have been given, during the closing hour of the day, by men who have not seen the packages for which they signed. Railroads are found supplying shippers with tags (for merchandise) which would not meet their own tariff requirements, being made of a poor quality of wood pulp. Waybill clerks working on the piece work basis are found to leave off part of the classification description, and this may result in making the rate too low.

Cartmen's Custom House Bonds.—The regional director, Eastern Region, by circular 600-68A699, informs federal managers that the director general, acting on behalf of all federal railroads, has executed, for the benefit of the Treasury Department, a blanket bond, such as is required by the custom house authorities, covering the liability of these railroads as carters and lighterers. Individual railroads, which perform cartage or lighterage service, and which have executed bonds to the government, need not renew such bonds.

Development and Death of the "Sailing Day" Plan

Shippers' Fight Against the New Method of Handling l. c. l. Freight Is Successful

THE "SAILING DAY" plan is dead. Despite masses of figures, statistical reports and thousands of actual service cases marshalled in its support the plan for forwarding package freight less frequently than once a day, instituted just before the taking over of the railroads by the Government and supported by the Railroad Administration died on April 8, after having been viciously assailed for many weeks by shippers and their organizations in various parts of the country. A distinct innovation in operating methods, it lived but a short time before becoming merely an incident in the most turbulent period of railroad history. Its demise may be said to be due indirectly to the termination of the war; or, more directly, the reluctance of shippers to accept any service other than the very best. The complaints of the shippers were voiced unmistakably in resolutions passed by the National Industrial Traffic League at its spring meeting held in New Orleans, La., on March 11 and 12. These resolutions declare that the plan is a restriction upon commerce, that the carriers fail in their legal obligations of receiving and forwarding freight with all reasonable despatch; that this failure is a hardship on receivers of freight, lays a heavy burden of extra expense on the shipping public and causes undue discrimination between markets.

The discussion on these resolutions brought out the fact that the shippers believe there has been a lack of uniformity in the application of the plan. The most definite objections were based on the refusal of carriers to accept freight on other than the sailing days. In some of the larger cities shippers were permitted to deliver freight to the freight houses daily. But, whatever the detail reasons, the points raised in this discussion really explain the main reasons for the downfall of the sailing-day plan.

It was at Philadelphia, Pa., on September 4, 1917, that the sailing-day plan was inaugurated. Its apparent advantages, the condition of traffic at that time and the willingness of shippers to accept anything that promised better service made the first few months of the new system a success; and about March 1, 1918, the plan was extended to all of the Pennsylvania Railroad lines east of Pittsburgh and Erie, with the result that before long the records showed that 654 cars were being saved in this territory daily, and that 25 distributing freight trains were found unnecessary and were discontinued. By this time the new plan had reached a stage where it was possible to make definite claims concerning its superiority and shippers were told that by supporting it they would economize car space, would enjoy more regular service, reduce the time in transit, lessen the number of loss and damage claims because of the elimination of rehandling at transfer stations and lessen the amount of freight going astray. Immediately following the extension of these economies over the Pennsylvania system the Car Service Section of the Railroad Administration threw its support behind the plan and it was quickly extended to all portions of the country.

But it was not long before clouds began to appear, and even before the Car Service Section gave its approval to the plan trouble was encountered at Philadelphia, at New York, in Massachusetts and in Rhode Island with the schedules first prepared. The plan, however, was not actually assailed until after the termination of hostilities on November 11, when the necessity for stringent economies in cars and service being ended, the shipper felt that he could express the objections, theretofore voluntarily repressed because of his desire not to do anything which might embarrass our government in its efforts to win the war. The first criticisms came from the smaller jobbing points. Smaller Iowa points first raised the cry which later was taken up by Missouri, Kansas, Nebraska and other central western states, terminating finally in the resolution passed by the National Industrial Traffic League representing the traffic interests of the entire country. The direct result of this resolution was the formation of a committee composed of National Industrial Traffic League members to lay the shippers' objections before the Railroad Administration and request the amendment or discontinuance of the plan. This was done at a meeting arranged by Max Thelen, director of the Division of Public Service which brought together traffic and operating men of the Railroad Administration, representatives of the shippers and state commissioners. The Railroad Administration at once acquiesced in the principles laid down by the objectors, a rather unexpected outcome in view of the steady backing that the plan had received from the Railroad Administration. The regional directors soon were ordered to accept less than carload freight on any week day except holidays, and regardless of any instructions previously issued as to routing. In other words, this order was the obituary of the sailing-day plan and the old sailing-day orders were made virtually inoperative. The action thus taken was epitomized in the formal announcement of the director general given in the *Railway Age* of April 11, page 942, which also virtually abolished the scheme for consolidating freight for a given destination over one of two or more competing lines.

Preferred routes were to be maintained only as they were accepted by patrons as "convenient." The proposal was for a "modification" of the plan; but with shippers' wishes so completely in the ascendant that the modification really meant abolition.

And so the sailing day, advocated as a war measure by the Railroad Administration, passed out of existence, a victim of the ill will of shippers and shipping organizations. It was natural that the first objections should come from the smaller jobbing centers. They complained of failure to receive and forward freight with reasonable despatch. Ordinarily this was as true of the larger cities as of the smaller. Legally, carriers must accept freight whenever it is offered during business hours and must transport it with all reasonable despatch. Obviously, the skipping of days to save cars often violated this legal obligation. The second point was that the sailing-day plan laid a heavy burden of extra expense on the shipping public. At the larger terminals where the tonnage is heavy this was not true, for the shipper was enabled by the fact of his heavy tonnage to deliver his freight to the roads on any day. But the jobber in the smaller town with only two or three sailing days in a week was compelled to store his freight on his own premises until the railroad was ready to receive it. But the small town jobber played his trump card in this third point; he said that the operation of this plan caused undue discrimination between markets. For example, competing shippers are located in Kansas City, Mo., and Atchison, Kan. Their products are substantially the same, their selling forces equal and their advertising equal; in short, they are typical rival companies. Yet when the sailing-day plan entered it gave an advantage to the jobber situated in the larger city, for he could ship freight on practically every day, whereas the shipper located in the smaller city was restricted in his shipping to the same point to two or three days of the week. The purchasers of the commodities produced by these companies, being in the main dealers in the smaller towns who as a rule do not place their orders for further stocks until the goods are actually needed, required the shipping of their orders with the least possible delay. The salesman of the Kansas City company could say definitely that the goods would be shipped immediately; the Atchison salesman usually would not dare to promise shipment in less than two or three days.

The discussion which followed the presentation of the resolutions before the National Industrial Traffic League brought out the interesting fact that the sailing-day plan had not been uniformly applied in the various sections of the country. For instance, in the east and northeast the objections to the plan were much less vigorous than those registered by shippers in the middle west, due probably to the careful manner in which schedules were arranged by the Eastern roads in order to avoid discrimination between markets. But on one objection shippers from all parts of the country seemed to agree, that against the carriers' refusal to accept freight, on other than the sailing days; although at some of the larger cities shippers were permitted to deliver freight to the freight houses daily.

These are the arguments presented by the shippers; the other side, the railroad men's side, has been backed by the compilation of important car savings effected, better service rendered and large expense saved. Certainly it is true that the sailing-day plan conserves cars. Undoubtedly the operation of the plan in the congestion so generally prevalent last year gave the shippers more regular and dependable service than would otherwise have been possible; but the question arises whether the shipper really wants a regular and dependable service or prefers an apparently better service with its faults and weaknesses concealed. In defense of the objections which arose in the central west against the sailing-day plan railroad officers claim that many of these objections were made before the schedules had been properly arranged and revised to meet conditions of which their authors did not know when the schedules were prepared. In other words, railroad men believe that the shippers kicked against the sailing-day plan before it had been given a fair trial, and before the relations between the larger terminals and the smaller jobbing points could be satisfactorily adjusted to the individual needs of shippers. In many situations the sailing-day plan is the only really effective means of handling less than carload freight with true and mutual economy.

The Facts in the Zone Rate Postage Controversy

In a public and official statement given to the press on April 26, attacking the publishers, Postmaster General Burleson named Charles Johnson Post, director of the Publishers' Advisory Board, as the chief representative of "selfish publishers" and challenged him "to disclose all moneys raised by him to repeal this legislation (the Postal Zone Law) or in what manner it was spent."

Mr. Post immediately accepted the challenge to make public all the books and funds of his organization and to put himself under examination, under oath, as to the expenditure thereof.

The telegrams of Mr. Post and Mr. Burleson are given herewith:

Post Replies to Burleson's Challenge

On April 26 Mr. Post wired the postmaster general as follows:

"I accept your challenge issued in your official statement published in today's papers, to publicly present all figures of moneys raised by the Publishers' Advisory Board, its expenditures and all details in connection with myself and this organization, before any representatives named by you and at any time or place at their convenience. I shall place myself entirely at their disposition as to examination under oath in connection with all these expenditures.

"In return I challenge you to similarly produce and make public your record of the moneys received by you and the profits made by you in connection with convict-labor on properties owned by you, a convict-labor system which competes with free American labor and in which whippings, brutality and ferocious punishments were the methods of extracting adequate labor from its victims.

Burleson's Reply, Evading Acceptance

On the same date the postmaster general replied to Mr. Post thus:

"Answering your wire, the full facts in connection with the lease to the state of Texas of the plantation in which I was interested, upon which the state used its convict labor, and the terms of the contract in connection therewith have been placed before the Congress more than once and have long been a matter of public record.

"It would be quite interesting for you to publish now and later have laid before Congress the facts in the same detail about moneys raised and spent to secure the repeal of the zone postage rate law. Of course you know, as the New York World did when it published this falsehood, that I did not use convict labor on my plantation, but that the plantation was leased and cultivated by the state of Texas and the

convicts used thereon were at all times under the state's exclusive control and management."

Post's Second Telegram to Burleson

Mr. Post replied to the above telegram on April 28 as follows:

"In reply to my prompt acceptance of your challenge you apparently seek to avoid any of the consequences of your challenge, for you clearly evade the issue in your simple, abstract and mild reference to it when you say: 'it would be interesting for you to publish now and later have laid before Congress the facts in detail about moneys raised and spent to secure the repeal of the zone postage rate law.'

"I met your previous challenge promptly and unequivocally; I accepted your challenge to produce publicly all records of moneys subscribed to this Publishers' Advisory Board and to submit myself, under oath, to examination as to all expenditures thereof before any body of representatives to be named by you as I stated to you in my telegram. I call upon you as a matter of good faith to the public to whom you appealed to come through on your own challenge—which I have absolutely and unqualifiedly accepted—or to stand repentantly self-confessed as a quitter along that line of sinister and disreputable suggestion.

"I, in return, challenged you to similarly produce to the public your record of moneys and profits received by you in connection with the abominable convict-labor system with its floggings to extract more work. In reply you admit that you have received moneys in connection with that convict-labor system, and in your own defense you merely plead that you, personally, were not directly in contact with the operation itself, but that your plantation was 'leased and cultivated by the state of Texas.'

"The public will thoroughly appreciate the unique qualities of such defense. It is as though a landlord were caught owning a house used for immoral purposes and immediately pleaded his own probity on the ground that he merely leased the premises, receiving the profits therefrom, but took no personal part in the orgies. Your defense—which is, I believe, what lawyers call a 'plea of confession and avoidance'—may well be left to the scrutiny of the American public.

"In your published official statement you continually endeavor to hide behind Woodrow Wilson's back and to make it appear that it is the enemies of the Administration who attack and martyrize you. Let me say in passing that behind Woodrow Wilson's back is pre-eminently the symbolic place for you; for it is you and your chief support in Congress that have been the Trojan horse of the Administration, hacking and ham-stringing the very principles and party you profess to serve.

"It is not the enemies of the Administration who effectively denounce you—it is your own record of postal incapacity and postal demoralization; it is your autocracy and Prussianized methods; your unswerving, imperialistic contempt and lack of understanding of what the ideals and hopes and rights of America today represent that make you out of harmony with the public and the functions you are supposed to serve. Among those is your contemptuous overturn of the sound postal principles established by President Lincoln that the postal service is an educational and social function of vast benefit to our entire nation and that equal postage to all Americans everywhere within our nation is a basic postal principle. Your public utterances proclaim that all this means nothing to you. A revenge upon publishers—as you think it is—justifies in your eyes the revival of a discarded and condemned postal system of zones with increasing and unfair postal charges against the homes of this nation merely by reason of their accidental remoteness from any city in which a newspaper or periodical is published."

Joint Engineering Meeting in Chicago

Representatives of approximately 75 engineering associations of the United States, representing an aggregate membership of 100,000 engineers, met in Chicago on April 23 to 25, inclusive, to consider the proposal to advocate the creation of a Department of Public Works. The meeting was called by Engineering Council and was presided over by M. O. Leighton, chairman of the National Service Committee of Engineering Council.

Among the question considered were (1) the federal bureaus or activities which should be included in such a department; (2) the advisability of endeavoring to secure an additional cabinet office or to make over one of the present departments by the redistribution of activities, and (3) the advisability of directing present efforts toward the complete reorganization of engineering bureaus or merely to bring these bureaus under a single head so that such a rearrangement may be made later as experience may show to be desirable.

After extended discussion extending for the greater part of three days, the consensus of opinion was incorporated in resolutions advocating, (1) the establishment of a National Department of Public Works by grouping those government bureaus, services, commissions and other activities whose functions are predominately of an engineering or architectural character in what is now the Department of the Interior and designating that department "The Department of Public Works"; (2) the transfer of any bureau, service or commission from any other department to the Department of Public Works should be accomplished without a change in personnel, compensation and general plan of organization, leaving the co-ordination of the several activities, and the establishment of additional bureaus to be effected as their need may become apparent from time to time; (3) in transferring river and harbor work and other work non-military in character but now in charge of the engineering corps of the United States Army, to a Department of Public Works, the relation of the army engineers to such work should not be changed so that there should be no relinquishment of non-military duty by the army engineers now on such duty, until such transfer of these engineers to military duty may be made without detriment to the public interest.

The conference decided that among the various activities which logically belong in a Department of Public Works were a Bureau of Public Roads; the United States Reclamation Service; the Alaskan Engineering Commission; the Construction Division of the United States Army; a Bureau of River, Harbor and Canal Work, including such functions as are now exercised by the Mississippi River Commission and the California Debris Commission; a Bureau of Architecture; a Bureau of Surveys, including the Coast and Geodetic Survey; a Bureau of Mines; the Geological Survey; the Forest Service (at least until it is divorced from the supervision of water powers and road building), and the Bureau of Standards.

It was believed that it would be unwise to determine at this time the extent to which the proposed Department of Public Works should control the engineering activities of the General Land Office, the National Park Service, the bureaus of Lighthouses and Indian affairs, and the Public Health Service, and of various commissions, such as those on buildings and grounds, and suggested that such questions be deferred for later consideration, preferably after the department had been organized. Three permanent committees were formed—(1) an executive committe, (2) a committee to draft the bill providing for the creation of a Department of Public Works, and (3) a committee to conduct the campaign for the passage of this bill. M. O. Leighton was made chairman of all three of these committees.

The session on Thursday morning was devoted to the dis-

cussion of the creation of a Department of Transportation. Several speakers advocated such a department to take over the duties assigned to the Interstate Commerce Commission before the government took over the railroads, these same speakers advocating the handling of railway engineering and construction work through the proposed Department of Public Works. However, the conference passed no resolutions in this matter relative to the proposed Department of Transportation.

Engineering Council and Other Societies

The concluding session of the conference on Friday afternoon was devoted to the consideration of the relation which Engineering Council should bear to national, state and local societies on matters concerning the council. In opening this discussion, J. Parke Channing, chairman of Engineering Council, outlined its development as a joint organization of the four national societies of civil, mechanical, electrical and mining engineers with which the American Society for Testing Materials has since become affiliated. Engineering Council handles problems of common interest to engineers and, only three years old, has made marked progress in developing its activities in spite of the handicaps of limited finances and war-time conditions. Among the accomplishments outlined by Mr. Channing are the creation of an employment bureau for engineers, the establishment of a National Service Committee at Washington and the creation of a war committee of technical societies in co-operation with the Naval Consulting Board. Committees of Engineering Council are also studying the problems of Americanization, the classification of compensation of engineers, curricula of engineering schools, the international affiliation of engineers, the licensing or registration of engineers, the patent situation and public affairs.

During the discussion need was expressed for more aggressive action on the part of the council to promote the business interests of the profession. The meeting adjourned without the adoption of any resolutions or the expression of opinion.

Harmony and Safety*

By T. J. O'Kelly
Brakeman, Atchison, Topeka and Santa Fe

When I went to railroading I was only a boy. I wrote to my relatives in Missouri and told them of my new job. My brother and sister wrote and begged me to quit as it was so dangerous. I did not heed the advice. In less than a year my brother had his eye shot out by a blast and my brother-in-law had let his team run away and his ankle was broken, which made him a cripple for life. I wrote and told them they ought to quit farming as it was too dangerous. My observation is that a man's work is safe or dangerous just to the extent he makes it so. * * *

A man working on the railroad has more to make him optimistic and happy than in any other occupation on earth. There is more to remind a railroad man of the good than in any other occupation. Every telegraph pole should remind him of the cross on which the Great Teacher was crucified because He taught the Truth. What is more sublime than to look along a freight train as she rounds a sharp curve going down a grade and think of that entire train being under the control of one man, the engineer, and *that* only by action of his mind, and all he uses to control it is the very air we are breathing. Think of the possibilities when we know all the truth about the wonderful earth and her resources.

The engineman who is happy at his work is the most successful. * * * So with conductors. With some conductors you can be sure that when the caller comes trouble begins. If the caller is five minutes ahead of time he gets bawled out, and if he is five minutes late he gets a cussing. The conductor gets on the caboose with a grouch, knows he is going to have a bad trip even before the train is made up. He catches the caboose and begins to complain to the rear brakeman about the head man, and when he gets to the head end he tells the head man the hind man is no good and everything is against him. He carries three kinds of trouble all the time: That which he had last trip, that which he is going to have this trip, and that which is coming after a while. But the man who is happy in his work is the man who will win.

Harmony among men and officers will make preventable accidents unknown. No train is safe when a brakeman doesn't like the conductor, or vice versa. I have actually known an instance where a brakeman let a conductor pass a meeting point because they were not on good terms. I am sure that most all these unfriendly feelings are the result of misunderstanding. Pardon me for quoting another passage from the old Book. The Great Teacher said: "The truth shall make you free." He also said if our brother had aught against us go first to him and talk it over. We can usually adjust all differences in the first conference, and if we have gone in the spirit of real brotherhood we shall have saved a friend. If it should happen that difference arises that cannot be settled at the time, suppose you say to him, "Now, let us not get mad, but when we get in we will go and ask Mr. Christie (superintendent) about it." I know that Mr. Christie will take both your hands and cement the friendship closer than ever.

A few seconds before nine o'clock each morning, if we are near a telegraph office, we hear the signal for time. If now in this room we were to compare watches we could easily tell who are carrying standard watches. The great master clock in Washington, D. C., is calling for the wire to send time. Everything is hushed, it reminds me of when I was small and father would call all the family together for morning prayers. As that clock beats off the seconds we stand with attentive ears to hear the time signal given. We then announce our differences—but they are not great if we have compared regularly. * * *

*Extract from a paper read at the Arizona division safety committee meeting at Needles, Cal., on February 10.



Photograph by International Film Service Company, Inc., N. Y.

Railroad Bridge, Near Ufa, Russia, Blown Up by the Bolsheviks. This Has Cut the Town Off from the Outside World

What Does It Cost to Stop a Tonnage Train?

A Study of the Value of Interlocking to Keep Traffic Moving at Grade Crossings, Draw Bridges, Etc.

By C. C. Anthony
Santa Rosa, Cal., Formerly Assistant Signal Engineer Pennsylvania Railroad

THE ECONOMY of signaling and interlocking is much more generally recognized now than it was 30 years ago; although the actual returns in dollars and cents are often so hidden among other varying operating factors that it is hard to prove or exhibit them so that they will make much impression. Even at the present day it is likely that many railroad officers view with gentle suspicion the estimates that have been prepared to show the operating economies effected by the installation of signals or interlocking, because of the favorable showing made, and besides there may be little hope that the predicted benefits can be detected after the work is done. Nevertheless, in many cases the benefits are real, however difficult it may be to show beyond question their money value.

The particular case considered here is that of the saving that may be effected by the use of interlocking where such an installation will assist in preventing the stopping of trains. Railroad grade crossings are prominent examples because, in the absence of interlocking, the stopping of trains before crossing is generally required by law. The same condition may exist at other points, such as drawbridges and junctions, depending upon the practice of each road or the laws and commission rulings in the various states. On several occasions in the past attention has been called to this phase of the benefit of interlocking, and some study has been given to the cost of stopping trains, on which the actual financial saving is mainly based.

As long ago as 1887 Wellington devoted a chapter to this subject in his book entitled The Economic Theory of Railway Location (Chapter XXV, edition of 1887). In his discussion Mr. Wellington is moved to strong language, which was undoubtedly justified at the time, and is, perhaps, to no small extent even now. After mentioning the practical absence of grade-crossings in England, he says:

"In America there are a great many grade-crossings, even on important lines; but the clumsy and costly precaution of a full stop of every train at every crossing is still the rule, although it can hardly be that such an absurd relic of barbarism will linger much longer, now that there is a considerable and increasing number of grade-crossings operated without a stop by the aid of interlocking apparatus, and always with perfect safety and success.

"In part, the slow progress in this matter is easily explained. The great loss and delay from grade-crossing stops goes on quietly and silently, sapping the life-blood of the company, as do the consequences of bad location, without interfering much with the routine of operation, and at points removed from the managing officers' immediate observation, whereas the difficulties at yards obtrude themselves on attention, and many of the most crowded yards have passed the limit of their capacity without some such mechanical aid. Nevertheless, from an economical point of view, abolishing the stops at grade-crossings is by far the most important, especially when, as is so frequently the case, they reduce the number of cars hauled below what it otherwise would be."

He rejects "the wild estimates which give the cost of a stop at anywhere from a dollar up," and, without going into details, takes from 30 to 60 cents as fair for the cost of a stop, apart from all effect on length of trains. At 40 cents per stop, which he thinks not excessive for average trains on lines doing considerable through business, the cost per year of each train per day stopping at a crossing, becomes $146. For an average of ten trains per day each way on each of two crossing roads, the total annual loss to both roads is then $5,840. If these figures were reasonably near the truth, it is hardly necessary to go into the details of the cost of a small interlocking plant required at the crossing of two such roads, including the cost of operation, maintenance and depreciation, to be convinced that interlocking would be a profitable investment. Even at present rates and prices, which would greatly increase the interlocking costs, and at the same time increase the cost of stops materially, a good showing would undoubtedly be made.

To what extent the length of trains is affected at the present time by the stops required at non-interlocked crossings, the writer is unable to say. Mr. Wellington, however, asserts that there were many such cases at that time, and points out that the loss due to cutting down the length of train on account of the stops at a crossing, may be much more than that due to the direct cost of the stops themselves. It is evidently assumed that the train-load would be based on no stop at the particular crossing, if interlocking were provided, and that the trains occasionally stopped when the crossing was blocked by trains on the other road, would "double the hill" or be helped away by a yard engine.

In 1905 J. A. Peabody, signal engineer of the Chicago & Northwestern, prepared a paper on the cost of stopping trains, compared with the cost of maintenance, operation and inspection of interlocking plants, which was published in the proceedings of the Railway Signal Association, Vol. I, page 281. Mr. Peabody obtained from two railroad officers estimates of the costs of stopping trains (stopping, starting and accelerating to the speed from which the stops are made). These estimates varied from 35 cents for a six-car passenger train at 45 miles an hour to $1 for an 80-car freight train of 2,000 tons at 35 miles an hour.

Mr. Peabody takes 45 cents as a conservative average cost for all trains and presents calculations of the savings to be effected in nine assumed cases (entrance to a yard, crossings and drawbridges) by eliminating stops through the installation of interlocking. It is assumed that additional men will have to be employed to operate the plants except at the drawbridges, for which calculations are made both with and without additional men. In each case the results for various numbers of trains are given. The annual saving, due to the cost of stopping trains, is equal to the annual charges against the interlockings (interest, depreciation, maintenance and operation) for from 16 to 19 trains per day, except at the drawbridges where no additional men are assumed, in which cases the balance exists for 7 and 8 trains. Except for one example net savings appear when the number of trains is 20 where additional men are assumed, and in the case of drawbridges requiring no additional men, when the number of trains is 10. At the crossings, of course, the number of trains is the total both ways on both roads. In one case, where 25 is the smallest number of trains for which there is any sav-

ing, the cost of the interlocking, and consequently the costs of interest, depreciation and maintenance, are assumed to be increased by the inclusion of two switches and a crossover located so near a crossing that they would have to be interlocked. In cases of this kind, however, although only from one point of view, the interlocking of adjacent switches is purely incidental and an unavoidable burden upon the protection of the crossing, it may still fairly be claimed that the resulting increased cost is more or less fully offset by a gain in safety at least.

In all of these examples, where additional men for operation are assumed, the cost of this item is $1,320 per year. This amount is now much too small, of course; it should apparently be about three times as much under present conditions. On the other hand, it would seem that the entire pay of the levermen would rarely have to be charged up, for presumably in most cases where the traffic would warrant consideration of interlocking, signalmen are already employed, although the stopping of trains cannot be eliminated because approved interlocking has not been provided. Consequently the only thing usually to be considered is any increase of pay that may be necessary if interlocking is installed. No doubt the other items also have increased greatly since the estimates under consideration were made. But as against any increase in the total annual charges due to the interlockings, there must be charged an undoubted increase in the cost of stopping trains, especially in comparison with the average cost assumed, 45 cents, which seems to have been almost needlessly conservative in 1905. In view of the fact that freight trains are slightly more numerous than passenger, it seems that the average cost assumed should be a little greater than that estimated for the latter. At the same time there must have been a considerable increase in the actual costs, due to increases in prices, rates, and weights of trains. In practice, of course, after the costs of stopping average passenger and freight trains are separately calculated or estimated, it would be better to total them for the number of trains of each kind at a given point under consideration, than to use an average for all trains.

The annual charges against a proposed interlocking can be closely estimated, at least on the basis of conditions prevailing at the time. What changes the future may bring forth is, of course, a matter of speculation; although it should be rather immaterial in the long run, since variations due to changes in the general level of prices are likely to be nearly offset by similar variations in the cost of stopping trains. But this latter cost is not so easily determined. And yet it is the principal item in any estimates of benefits to be derived from the installation of interlocking in the cases here considered; in fact, it is about the only one on which attempts have been made to figure savings in dollars and cents, in these cases. For the most part the costs used have been based on pure estimates, or even on guesses—which, in some of the answers to Mr. Peabody's inquiries, ranged from five cents to five dollars. Whether the cost of stopping trains can ever be calculated with reasonable accuracy, even as closely as might be permitted by the use of statistical average amounts or costs for certain items, such as fuel and repairs per car and engine-mile, etc., is questionable. Very likely the best that can be done is to use careful and conservative estimates.

Calculating Cost of Stopping Trains

In this connection it is interesting to refer to an ingenious method of calculating the "approximate cost of stopping a train," presented by "R. E. W." in the *Railway Age* of March 22, 1918, page 708. In this method the energy stored in the train, and dissipated in stopping, is calculated—taking a train of given weight moving at the speed from which the stop is assumed to be made. The amount is divided by the work required to move the train a mile at the original speed. The quotient, "equivalent miles run," "will represent the distance the train would have traveled due to its stored-up energy." The assumption is that "this quotient multiplied by the cost of coal, repairs and wages per train-mile, will give the total cost of the stop."

As worked out by this method the cost of stopping an eight-car passenger train weighing 623 tons, from a speed of 30 miles an hour, is 61.4 cents; and for a 50-car freight train weighing 3,943 tons, at the same speed, is 175.3 cents. In these examples wages of the train crews are not included, as they seem not to be a factor unless overtime is involved. So, too, certain neglibly small items are omitted. This method is attractive in that it is definite—free from estimates, and makes use of available, experimental and statistical data. If, for a given situation, an average passenger train, an average freight, and average speeds are taken, then for each kind of train the stored energy is obtained from the speed and weight of the train; the work required to move the train at the original speed is calculated from accepted values of train-resistance; and the cost of running the "equivalent miles" is determined from the average cost of fuel and repairs per car and engine-mile, as given in the road's reports. This cost, being for an average train and based on average costs per mile, should be fairly accurate. But is it the cost of the stop?

Apparently the principal items in the cost of stopping (and starting and accelerating) a train are: Extra wear and tear due to stopping and starting (wear of brake shoes, tires and wheel treads, and various other parts), represented by some addition to the average cost of car and engine repairs. Cost of extra fuel chargeable to the air compressor when replacing the air used in braking. In one set of estimates cited by Mr. Peabody this item was based upon tests, and amounted to about ten per cent of the total coal estimated. Cost of fuel used in starting and accelerating the train less the cost of fuel required to move the train, at its original speed, between the point where reduction of speed for the stop begins and the point where the original speed is regained.

Unfortunately it is not clear that the cost obtained by the method briefly described above has any necessary relation to the total of the items just enumerated. It might prove to be about equal if the amounts of these items could be found with reasonable accuracy. But it does not seem evident, on the face of things, that it would. As stated before, then, it may be necessary to depend upon careful and conservative estimates; although test runs with and without stops, over the distance covered by the stop and acceleration, should supply fairly accurate data of the extra fuel used for the air compressor and the acceleration together. One such test is reported by Mr. Peabody, and very likely others have been made.

Cost of Stops Affected by the Delay of Other Trains

Impossible as it may be to determine the cost of stops with certainty, and difficult as it may be to see in the operating results the saving effected by eliminating certain stops, nevertheless this saving is real money. In addition to such direct financial saving there is the elimination of damage in starting heavy freight trains, and the general improvement in train movement due to cutting out the stopping of all trains at a certain point. The cost of the damage to trains may be included in the cost of the stops, but, even if it is, the indirect and sometimes quite far-reaching effects in the way of accumulating delay, both to the damaged and to other trains, may mean a considerable loss in the course of a year. So, too, with the general improvement in train movement. It is not merely a matter of saving so many minutes per train, lost in the stops. The few minutes lost by a freight train in stop-

ping at a crossing may mean a bad combination in meets and passes on all the rest of the run, resulting in many times the original delay before the terminal is reached; and other trains may suffer at the same time. If it is not always, or often, possible to show the money loss from such derangements of the movement, the elimination of one cause of them means, as everyone knows, real benefit thrown in for good measure above more definite money savings.

Although there is no quick and easy way of showing beyond dispute just what saving will result from eliminating stops of trains by installing interlocking in a given case, the result can, with proper conservatism, be estimated convincingly. As interlocking costs and the cost of stopping trains have both risen, though probably not in just the same proportion, it is safe to say that the relation, as estimated years ago, is not now very far wrong, or at any rate is not too favorable to interlocking for general purposes.

A Financier on the Railroad Problem*

By Charles E. Mitchell
President, National City Company, New York

THE TIME HAS COME to solve the problem of the future for the railroads, and the longer the delay the more difficult the solution. The administration has suggested that government operation continue for a further period of five years, in order that it may be more thoroughly tested. This suggestion has met with marked opposition and apparently it has been dropped by its original advocates. While it is in the power of the administration to turn the railroads back at any time and immediate return has been threatened, assurances have been recently given that the railroads will not be returned in a way to bring disaster, which surely means that they cannot be abruptly returned. To fix a date, even that date provided in the law, namely twenty-one months after the declaration of the ratifications of the treaty of peace, as the date when the roads shall be returned, would seem the height of folly. The railroads should be, and probably will be, returned when a sane and sound plan for their return has been devised.

Suggestions for the return and subsequent method of operation and regulation have been many. Plans have been submitted by the railway executives, by the Associate of Railway Security Owners, by the Interstate Commerce Commission and the director general himself. Railroad presidents and bankers have expressed their views and the railroad brotherhoods have produced for consideration a most socialistic suggestion. Many of the views expressed in these plans are admirable, though for the most part, they involve the laying of the railroad structure upon the operating table and performing upon it major surgical operations that will result in making it little resemble that transportation system which has served so well our public in the past. They propose such physical and financial readjustments of the railroad situation as, in my opinion, would leave the patient weak and disfigured and unable to bear the burdens which American commerce must throw upon him without interruption.

Most of the plans provide for guaranteed minimum profits to the roads and a maximum profit return. I am personally opposed to the minimum guaranty suggestion, for I believe it to be a definite step toward government ownership, especially if private management fails to earn the income guaranteed. I believe it will take from private initiative a fear of failure, which is, in itself, a spur to achievement. I do believe, however, in a fair division of profits above a specified maximum, but I cannot believe in fixing a point in profits above which all excess goes to others than the railroads. Rate making in itself must be largely determined by the expense of operation, not of one road but of all roads involved in the specific rate made. If operating on such a rate, the poorly located or poorly managed road is to be given a chance to live, the well located and highly efficiently operated road will find such rate extravagantly profitable. Such excessive profits should, I believe, be divided with the government and others as in the judgment of our Congress seems proper, but the spur to achievement in operation that results in high profits should never be taken away by placing a fixed maximum return on any road. In many of the plans suggested, an attempt is made to arrive at a method—a precise formula, as it were—for the establishment of equitable rates, and some definitely suggest a regional combination of roads. I cannot believe that this is the time to attempt to figure out theoretically a rate formula or what combinations of roads should in the ultimate be made. Given a properly constituted Interstate Commerce Commission of truly representative men with authority for the development of rates, as a result of a study, experimentation and adaptation, combined with legally delegated responsibility to see that such rates be commensurate with operating expenses, a federal commission having jurisdiction over intrastate as well as interstate commerce so far as the laws permit, but in any event working with greater harmony than heretofore with various states, through, perhaps, regional advisory boards, composed of State representatives, of shippers and of labor—then I feel that we have gone as far as we can along the lines of rate fixing.

Perhaps the thought that I would contribute to the discussion leading to the solution of the railroad problem may be of interest. It is based upon the conclusion that government ownership and operation is not practical; that private ownership and operation, freed from government regulation, has been shown by history to have its dangers and is not feasible; and that the situation must be worked out under private ownership and operation under fair and equitable regulation, the solution to be found with as little disturbance as possible of structures already existent.

Three things appear to me essential to be done before consideration is given to the return of railroad property to private operation: first, the reconstruction of the Interstate Commerce Commission, with rate-fixing authority and responsibility definitely established; second, an immediate rate increase sufficient to take up the burden of the wage increase granted during government operation; and third, the passage of such legislation as will provide for a division of profits above what shall be determined to be a reasonable return to invested capital. With these things accomplished, we should be ready for private operation. That complete severance from government responsibility for railroad credit should be immediate and for every road at the same hour, seems to me, however, a preposterous suggestion. The corner to be turned must not be a sharp one. The return must be gradual, both in method and point of time. I feel that the government should continue its guaranty of standard rental return as now established for such a period, probably two to three years, as will enable private managements to get back a firm hold upon their affairs. Under such continuance of guaranteed return, let the government turn back the properties with reasonable working assets to the private owners, leaving for gradual settlement and adjustment the counter claims inevitably to be made as between the government and the private owners for later but as early an adjustment as may be possible. Let private management reinstate itself, with the requirement upon each road to pay over to the government any excess over the government guaranteed rental return and with the right to call upon the government during the guaranty period for any deficit between its net operating revenue and such guaranteed rental. But let there be pro-

*From an address delivered before the Canadian Club, Montreal, Canada, on April 21, 1919.

vision that at any time during this two to three-year period of continued government guaranty, any railroad company may, if it so elect, release the government from its guaranty and receive thereafter the full net return resulting from its operations, subject to a division of excessive earnings as heretofore suggested. I am of the belief that, under this plan, the owners of the majority of our large railroad companies would release the government from its guaranty within the first year, and that the roads continuing to work under the guaranty to the end of the period, which would naturally be the weakest of the companies, would be comparatively few. The financial condition of such remaining companies will doubtless be such that drastic reorganizations will be necessary at such time as the government guaranty ceases, and I would consider it more than likely that at such time the government would deem it wise to give its permission, present laws to the contrary notwithstanding, for absorption and consolidation of such roads in the stronger systems. Thus, would the roads return to private management under the same incentive to the development of efficient competitive service that has made the railroad system of the United States the model of the world. I recognize that this plan of adjustment involves many complexities which will demand co-operative effort and well considered legislation to solve, but I do feel that the plan subjects the problem to comparatively simple and effective treatment.

The railroad problem is only one of our great problems of the adjustment period through which we are now passing, but it is entwined with practically every other problem of the day—the problem of labor, of inflation, merchant marine, and even the problem of our export trade—for, as you know, the railroad item enters into the cost of goods delivered at seaboard for export to a greater extent than in any other country, with the possible exception of your own. It would be interesting indeed, were there time, to trace the windings of the knot which entwines other adjustment problems with this great railroad problem. The minds of American business men, however, are distinctly upon these many problems, and in that thought alone we may be optimistic that they will be solved aright.

Conditions in our country are, on the whole, exceptionally good. A uniformity of conditions and a uniformity of thinking, throughout the length and the breadth of the land, exists as I have never before seen it. Wages are everywhere high, and there is no marked degree of unemployment anywhere. Bolshevism is being trampled down wherever it shows its head. Merchants are doing a large and profitable business. Our Victory Loan campaign gives promise of being a huge success. By and large, the fundamental conditions in the United States are sound. We have, to be sure, many questions for which we have yet to find the answer, and not the least of these is as to where we are to find a market for our goods. The development from a debtor to a creditor nation has brought its difficulties, as well as its responsibilities, and among those difficulties is the sharp advance in dollar exchange, which impedes the opening of foreign markets for our exports. The maze of the railroad situation would seem to preclude the possibility of the railroads becoming active purchasers in volume immediately, and as I have suggested before, the rate of railroad buying is usually a barometer of the prosperity of the times. On the other hand, agricultural conditions are so abnormally good with us that we hope the farming communities will enter our markets as exceptionally heavy buyers. Winter wheat was reported, on April 1, as in practically 100 per cent perfect condition, comparing with 78.6 per cent a year ago and a ten-year average of 82.3 per cent. The ground condition is everywhere good, and a bumper year is expected. All things considered, the favorable conditions would appear to at least offset the unfavorable conditions with which we are confronted, and, while I will not predict a year of tremendous commercial activity, as compared with the years of the war, nevertheless, I feel that a year of at least moderate prosperity is assured.

One thing is certain—the immense wealth of the United States today and its unprecedentedly strong position as a creditor nation not only makes favorable the conditions for, but enforces the seeking of, foreign investments. In that way only, in my opinion, can inequalities of exchange such as exist between Canada and the United States today, be overcome, and I am satisfied that our people are only awaiting the opportunity to invest their capital on this side of the border. We hope to be of assistance to you in your development and of assistance to our own nation in the development of its commerce by bringing American dollars to your land for investment and thus adjusting the rate of exchange, to the end that there may be a free and easy movement across that imaginary line which separates commercially and politically your people and mine, who, after all, are one in blood, in method of thought and in purpose.



Photograph by International Film Service Company, Inc., N. Y.

Railroad Yards at Coblenz, Where Many German Locomotives Have Been Surrendered to the American Engineers

Doings of the United States Railroad Administration

Offer of Industrial Board to Bring Together Administration and Steel Producers Is Accepted

ANOTHER EFFORT TO SETTLE the controversy over steel prices is to be made by calling the steel producers to Washington for a conference with the representatives of the Railroad Administration. Director General Hines telegraphed from Denver on April 28 accepting an offer made by the Industrial Board which had tendered its services to bring together the representatives of the Railroad Administration and the steel producers. It was stated that the board would "render all the mutual aid possible to bring about a satisfactory understanding between the Railroad Administration and the producers of steel, on the broad basis of the maintenance of the existing wage scale and the preservation of the average independent producer." The position taken by Mr. Hines throughout the controversy thus far would indicate that the success of the new conference depends upon whether the steel companies are willing to offer prices sufficiently lower than the scale approved by the board on April 21 to attract the Railroad Administration into the market, and that otherwise it will continue its policy of purchasing as little as possible.

It is understood that this represents the last effort to instil the breath of life into the price-stabilizing scheme. Following the failure of earlier conferences President Wilson cabled instructions that further efforts be made to harmonize the situation and on April 24 Robert S. Lovett, Henry Walters and George G. Yeomans of the Railroad Administration held a further conference with the Industrial Board without result. The railroad representatives reported to Mr. Hines and the Industrial Board to Secretary Redfield of the Department of Commerce, after which Chairman Peek wrote to Mr. Hines making the offer above referred to and saying in part:

"The previous recommendation of steel prices was made only after careful study of costs prepared by the Federal Trade Commission and the figures of the producers which were checked by experts in the service of the board.

"The prices arrived at were the lowest which the members of the board believed they could recommend and which would at the same time, permit the producers to maintain the existing scale of wages and preserve the average independent producer.

"The President has referred to our board 'as a court of mediation between buyer and seller.' We therefore, must decline to take a partisan attitude and in the absence of new information or data to urge the steel manufacturers to make a reduction in the offered prices, merely because the Railroad Administration requests it.

"If, however, you have any facts, figures or information showing that, on any ground whatsoever, the price recommended was too high, we shall be glad to approach the representatives of steel producers again and attempt to secure a modification of their offer in accordance therewith."

Secretary Redfield also telegraphed Mr. Hines as follows:

"Mr. Tumulty has informed me of the President's cablegram to you, requesting co-operation with myself and associates respecting prices. I regret that meeting of your advisers with Industrial Board Thursday, April 24, failed to advance matters, because they candidly stated they had no new facts and reserved their views respecting proper prices. I shall be more than glad, however, to take any possible further steps that will bring us into accord and relieve existing business tension. Am ready therefore to reconsider candidly all facts you or your representatives may care to present and to give same sympathetic attention.

WASHINGTON, D. C.

"You are cordially requested to ask your representatives to confer anew with the Industrial Board, with the spirit on both sides of gentlemen engaged in a common service, seeking a mutual end, speaking without reserve and with entire absence of bargaining and without thought of maintaining previously expressed opinions, save so far only as facts may when fully developed justify. I assure you in advance that the Industrial Board will act in this spirit.

"Kindly advise if possible by telegraph whether you are prepared to act as above suggested. This is asked because you will appreciate that in the absence of action looking to definite results it will be necessary that the members of the Industrial Board resume their personal affairs."

Mr. Hines did not accept the idea of further conferences with the board but accepted the board's offer of mediation. In his statement he called attention to the fact that on April 24 Judge Robert S. Lovett and Henry Walters as representatives of the Railroad Administration had met with the Industrial Board "for the purpose of reaching common ground in a practical sense regardless of former conceptions on either side and had been prepared to offer compromise suggestions looking to an agreement as to prices but that the board declined at the meeting to act except according to its original conceptions which in the opinion of the director general were erroneous and that this attitude of the board practically closed the door to further discussion at that meeting."

The director general in view of the renewed suggestion for conference indicated a willingness to accept the offer made by the Industrial Board in a telegram sent by Chairman Peek on April 26 to bring together representatives of the Railroad Administration and the steel producers.

The resignations of members of the Industrial Board have been in the hands of Secretary Redfield since April 1, but he declined to make them effective until further efforts had been made.

Cost of Train and Locomotive Service

The total cost of locomotive service per locomotive mile in February, 1919, was 120.7 cents as compared with 106.3 cents in February, 1918, an increase of 13.5 per cent, and the total cost of train service per train mile was 169.3 cents as compared with 155 cents, an increase of 9.2 per cent, according to a monthly report compiled by the Operating Statistics Section. The report shows in detail by roads and by regions the freight locomotive and freight train costs for the various items, all of which show an increase as compared with February, 1918, except the items of train men and enginemen. The total cost of train service per 1,000 gross ton miles was 126.5 cents in February, 1919. This is made up of 43.1 cents for locomotive repairs and enginehouse expense, 40.3 cents for locomotive fuel, 3.4 cents for other locomotive supplies, 34.8 cents for enginemen and train men and 4.8 cents for train supplies and expenses. No comparisons are made with last year on the gross ton mile basis. Per locomotive mile the cost of locomotive repairs was 40.2 cents in February, 1919, as compared with 31.5 in February, 1918; engine house repairs were 10.4 as compared with 7.4; train enginemen 18.8 as compared with 20.3; locomotive fuel 47.3 against 43.9, and other locomotive supplies 4 against 3.2 cents. The cost per train mile for locomotive repairs and engine house expenses was 57.7 against 45.2, locomotive fuel 54 against 51.1, other locomotive supplies 4.6 against 3.7, train

engiemen 21.5 against 23.6, trainmen 25.1 against 26.6, train supplies and expenses 6.5 against 4.8. The highest cost for total train service per 1,000 gross ton miles is shown in the New England district, 197.7 cents. The lowest is in the Pocahontas region, 93.9 cents.

Allocation of Equipment

The Railroad Administration is making renewed efforts to get rid of some of the standard freight cars being built on its orders placed last year, which have been allocated to the various railroads, but which many of them have refused to accept. While something over one-third of the equipment has been built, the number of cars accepted by the railroads is between 10,000 and 15,000 less than those built and the balance are being held in storage without stencilling. During the week ended April 19 only 122 of the cars were accepted, although the number built has frequently been 800 or 900 a week. Swagar Shirley, director of the Division of Finance, held a conference at New York on Wednesday with members of the Association of Railway Executives to discuss the subject, but the only announcement after the meeting was that the executives would appoint a special committee to confer with Railroad Administration officials at Washington. One of the reasons for the failure of the railroad companies to accept the equipment is their inability to finance it. It is hoped that a practical plan for financing the equipment may be worked out. The equipment has been paid for by the Railroad Administration as it has been delivered, except that recently it has been necessary to make the payments in certificates of indebtedness and the cost is to be charged against the corporations to which the cars are allocated.

Record Breaking Car Surplus Being Reduced

All previous records as to the number of surplus freight cars in the country have recently been exceeded. On March 1 the total of idle freight cars of all kinds was considerably over 450,000, although it has since been decreased by an improvement in the volume of traffic, particularly in the grain movement to the elevators to meet the drafts made by exports, and by the opening of the lake coal and ore movement, and the surplus of freight cars of all kinds at the present time is somewhat over 300,000. On April 1 it was about 390,000. The largest surplus of freight cars previously recorded was in April, 1908, when the total was over 413,000, and the present surplus is probably greater than it has been at any time since 1908. In 1909 the net surplus was 332,513, and in 1915 it again reached about 330,000. The present surplus began in April, 1918, and it rose gradually until the peak was reached in March of this year. The greater part of the surplus on March 1 consisted of open-top coal cars, because the coal traffic has been at a low ebb since last fall. At the present time it is estimated that there is a surplus of 170,000 to 200,000 open-top cars and it is understood that approximately 125,000 of the total surplus represents box cars stored in western and southwestern regions in preparedness for the heavy loading of grain. On the other hand, there are some occasional shortages of box cars east of the Mississippi and north of the Ohio and since the opening of navigation the surplus of open cars is being absorbed by the lake movement.

The Railroad Administration inherited a shortage which had begun in the fall of 1916 and continued throughout 1917. On January 1, 1918, there was a net shortage of 90,000 and on March 1, 1918, a net shortage of 138,000, but on May 1 this had been changed to a net surplus of 12,000. There was a comfortable surplus for the rest of 1918, which jumped from 91,000 on November 1 to 157,000 on December 1 after the signing of the armistice, and which increased rapidly until March this year.

The regularly published statistics of car surpluses and shortages compiled by the American Railway Association since 1907 (with an interruption from October, 1914, to February 1, 1915), were discontinued by the Railroad Administration last April and the figures have not since been published, but a special study has recently been made by the Railroad Administration of the figures since January, 1918, which shows the following for the period up to February 1, 1919:

	Shortage		Surplus		Net
	Open top	All cars	Open top	All cars	surplus
January 1, 1918	.....	110,332	.....	20,337	*89,995
February 1, 1918	.....	122,341	.....	24,297	*98,044
March 1, 1918	.....	159,992	.....	21,890	*138,102
April 1, 1918	13,079	82,555	7,770	54,428	*28,127
May 1, 1918	14,160	45,886	14,988	57,921	12,035
June 1, 1918	4,861	15,058	11,044	86,282	71,224
July 1, 1918	8,248	20,757	11,256	83,563	62,806
August 1, 1918	15,311	35,905	8,267	92,339	56,434
September 1, 1918	10,137	28,870	11,447	64,792	35,922
October 1, 1918	4,380	21,248	14,866	66,988	45,740
November 1, 1918	3,112	13,788	32,565	105,479	91,691
December 1, 1918	2,025	10,350	82,130	167,177	156,827
January 1, 1919	96	833	96,744	270,177	269,344
February 1, 1919	52	1,036	134,910	355,488	354,452

*Net shortage.

Since January 1, 1907, when the records of car surpluses and shortages were first kept there have been net shortages only in 1907, for a short period in 1909, in 1912, for a short period at the end of 1913 and in 1916, 1917 and the early part of 1918. Throughout the greater part of the time there have been net surpluses.

Weekly Traffic Report

According to a report of traffic conditions for the week ended April 23, the movement of freight throughout the country shows considerable improvement over the week previous. This is especially true with respect to shipments of grain and grain products from the Southwestern and Southern regions. Tidewater coal dumpings increased 37,933 tons in the Pocahontas region over the previous week.

In the Southwestern region the loading of miscellaneous commodities showed considerable increase, forest products increasing approximately 15 per cent over the week previous. A heavy movement of fat cattle from southwestern Texas continues.

A summary follows:

Eastern Region:—The increased movement of freight traffic did not materialize as was expected, but reports from the interior indicate that the general tone of the shipping public is optimistic and improvement is looked for. There is some decrease of furnaces in blast in Central territory as compared with last week's report. General reports indicate decrease in unemployed labor. Passenger reports are very satisfactory, the movement from out of town for the parade of the 26th Division at Boston, April 25, taxing facilities of Boston roads to their utmost.

Allegheny Region:—Freight operating conditions are about normal. Adjudication of labor difficulties in New York Harbor has resulted in a freer movement of traffic. Grain movement continues heavy and special efforts are being made to provide elevators in the Chicago district with sufficient cars to meet loading requirements. The movement of ore via the Lake was resumed April 18. Considerable decrease in the number of open top cars stored, and box car requirements were heavy, but supply ample. Regular passenger travel is normal, but tourist and excursion travel to the seashore resorts is showing heavy increases over corresponding period of 1918. The outlook is for an abnormally large seashore business during the coming season.

Pocahontas Region:—Tidewater coal dumped shows some increase over previous week, but last week's showing of cars loaded in region and received from connections was a disappointment. The present outlook is that April will show im-

provement over March. Total loads, other than coal and coke, decreased 119 cars. Compared with same period last year Tidewater coal dumped decreased 123,668 tons. General passenger travel is about normal as compared with past few weeks, earnings continuing to show increases over same period last year.

Southern Region:—Growers' organizations are being formed at various points for systematic handling of a bumper sweet potato crop; the indications are that an increased movement amounting to several hundred carloads will result. The general freight movement showed some decrease for the past week as compared to the previous week. The movement of crude oil from the eastern Kentucky districts continues to increase, 343 cars having been handled during the past week. Some improvement in the movement of grain and grain products has been noted and the demand continues good, a shortage of soft wheat, however, being claimed by some millers.

Central Western Region:—For the week ending April 22, as compared to same week last year, there was a decrease of approximately 12 per cent in number of cars of freight loaded, the greatest decrease being in coal loading. Live stock loading also decreased considerably, while grain loading shows some increase. The movement of grain products is increasing and the demand for equipment is heavy. On account of the relatively mild winter, reports indicate that the wool clip will be much better in quality this year than in previous recent years. Passenger travel continues heavier than for corresponding period last year.

Southwestern Region:—Loading of grain and grain products, live stock and miscellaneous commodities showed considerable increase, forest products increasing approximately 15 per cent over previous week. Lumber dealers, while complaining that building trade is not reviving, anticipate an early resumption of service. Heavy movement of fat cattle from southwestern Texas continues. . . .

2,104 Persons in Washington Employed in Railroad Operation and Regulation

The supervision of railroad operation and the regulation of the railroads together require the services of over two thousand people in Washington, according to a census just made by a commission which is engaged on a proposed reclassification of governmental salaries. The commission's report embodies an elaborate classification of the people employed in Washington in the various branches of government service, including 1,280 in the organization of the director general of railroads and 824 in that of the Interstate Commerce Commission, or 2,104 out of a total of 101,586 for all the governmental departments. These figures do not include the President and members of Congress and they take no account of either the labor leaders, the state commissioners or the shippers' representatives, many of whom are constantly on hand to offer assistance in one way or another in the processes both of operation and of regulation, nor do they include the large number of railway officers who are frequently called here for conferences, committee meetings, etc.

Attachments Left Subject to Law

The director general of railroads has issued an order effective May 15, rescinding General Order No. 43 made during the war, which provided that money in the possession of carriers under federal control shall not be subject to attachment, garnishment, or like process. This action does not make wages or other money subject to attachment or garnishment if they are not made subject to garnishment or attachment by the laws of the state as modified or affected by the federal control act. It leaves the matter to be governed by the act of Congress and the state statutes where applicable, so that wages and other money in the possession of carriers under federal control will not be subject to garnishment or attachment unless the state law provides for it and the final construction by the courts of the federal control act of Congress permits it. The supreme court of Tennessee recently held that by reason of the federal control act, money in possession of the Railroad Administration is not subject to attachment or garnishment, and that this was the law regardless of General Order No. 43.

In view of this and other decisions, the director general concluded that it was wise to leave the matter to be determined by the law, rather than by any action of his.

Net Operating Income in March Decreased 82 Per Cent

The Railroad Administration again earned a deficit as compared with the standard return, according to preliminary reports of railroad earnings and expenses for the month of March. The net operating income amounted to $10,522,620 for 178 Class I roads, operating 224,000 miles, a decrease of $50,000,000 or 82.7 per cent as compared with March, 1918. The standard return for the Class I roads for March is about $68,000,000 and for three months it is about $170,000,000, so the net operating income for the three months' period is about $128,000,000 short of the standard return. Gross earnings reports for April are also showing very little improvement. For March the operating revenues of the 178 roads amounted to $357,699,961, an increase of 2.8 per cent. Operating expenses were $339,044,348, an increase of 22 per cent. Taxes, $14,536,629, decreased 1.1 per cent. The railroads in the eastern district had a deficit of $1,283,939, a decrease of 107.8 per cent as compared with the net operating income of last year. The southern roads had a net operating income of $4,485,303, a decrease of 72 per cent. The western roads had a net operating income of $7,321,256, a decrease of 74 per cent.

Excursion Rates

The Railroad Administration is making a bid for passenger traffic in these days of reduced freight business by conducting special excursions similar to those formerly made by the railroads. A special Sunday rate of $2.45 for the round trip between Washington and Philadelphia has been announced and also a similar round trip rate of $3.00 between Washington and New York. The war tax is, of course, to be added to these rates. It has also been announced that a special rate of 2 cents a mile with a minimum rate of $2.00 will be made for the round trip for the first convention of World War Veterans to be held at St. Louis May 8.

Lake Line Established

In an endeavor to restore as nearly as possible pre-war conditions, Director General Hines has issued instructions that a lake line be established from Buffalo to Chicago and Milwaukee. The proposed line will operate in connection with all trunk lines to and from Buffalo and the western trunk lines beyond Chicago and Milwaukee in addition to serving the Chicago and Milwaukee territories. To expedite the movement of freight and save excessive terminal work, one dock at Buffalo has been designated as point of interchange for all eastern roads. It is known as the Tifft Farm terminal of the Lehigh Valley. Practically the same scale of differential rates under all rail, as were in effect in 1917, has been authorized.

Railway Developments in Foreign Countries

The Market for Railroad and Telegraph Supplies in Trinidad; Other Notes of Interest.

THE POLISH DIET is considering bills for the construction of new railways, and it is hoped that construction can begin shortly in order to provide work for some of those whose lack of employment has made them the prey of agitators.

The railroad bridge over the Tornea Elf river in Finland is completed, according to report, and by the present is probably in use, thus establishing the long awaited through railroad communication between Scandinavia, Finland and Russia.

The National Exposition of Venezuela will open between the middle and the end of May. Manufacturers of motors, trucks, agricultural machinery, tools, implements, rolling stock, and farm railways will be permitted to exhibit their goods. It is expected that competition among the various countries interested in this market will be strong, as the farmers of Venezuela are unusually prosperous and in a buying mood.

Italian Railwaymen's Claims

The executive committee of the Railwaymen's Union, including delegates from every important railroad center, recently met in Rome and passed a resolution urging the government to grant all demands made concerning the new scale of wages and an eight-hour working day.

British Locomotives in France

In reply to a question in the House of Commons recently, Captain Guest, joint parliamentary secretary to the treasury, said that there were 423 locomotives owned by British railways still retained in France; 36 have been returned, and the remainder are being returned as they can be released, and as speedily as trans-channel facilities permit. There are in addition 786 locomotives in France which are the property of the war department.

Lubricating Oil Desired by Bulgarian State Railroads

Chargé d'Affaires Charles F. Wilson has transmitted to Commerce Reports from Sofia, Bulgaria, a list of lubricating oils required by the Bulgarian State Railroads. The quantities are as follows (1 kilo equals 2.2 pounds): Engine oil, 1,300,000 kilos; cylinder oil, 500,000 kilos; superheated cylinder oil, 200,000 kilos; axle oil, 600,000 kilos; gas oil, 200,000 kilos; colza, 50,000 kilos; linseed oil, 30,000 kilos; kerosene, 40,000 cases; and benzine, 1,200 cases.

Dutch East Indies

The continuing prosperity of the islands comprising the territory known as the Dutch East Indies is shown clearly by the extensive plans which the government is making for the extension of the already excellent railroad facilities of the islands. No fewer than seven new systems and extensions are planned, and work on eight lines will begin almost immediately. Sales were made recently in the United States of quantities of railway steel material. It is pertinent in this connection to note the discovery of extensive iron fields on the island of Celebes. The quantity of ore in the surface field on one deposit is estimated at at least 5,000,000 tons, with 155,000,000 tons of clay ore, which can be easily and cheaply mined. Plans for developing the fields, in which the government will have certain rights, are being outlined.

British Officers of Railways of Argentina to Visit That Country

It is understood that a party of railway officials from England is about to visit the Argentine. Among the number are Sir Henry Bell, chairman of the Buenos Ayres Western, and a director of the Great Southern; Albert E. Bowen, chairman of the Great Southern, and a director of the Western; and Sir Harry Livesey, of a well-known firm of consulting engineers. Some of the directors have been accustomed to visit their Argentine railways annually, but this is the first visit since the outbreak of the war.

Electrification on the Paris, Lyons & Mediterranean

The Paris, Lyons & Mediterranean Railway Company is proposing, subject to government sanction, to electrify the line between Clermont Ferrand and Nimes, via Alais. The distance is about 130 miles. The necessary power will be obtained by the construction, in the Department of the Lozere, of a barrage or dam near Florac, closing up a small valley, so as to form a fresh-water lake of six miles in circumference. The lake will contain 45,000,000 cubic metres and the water will fall a distance of 500 ft. The cost of constructing the lake and power station is estimated at about $40,000,000.

France and the Channel Tunnel

The Channel Tunnel Investigators' Committee, which was constituted by a ministerial decree dated September 3, 1918, and has already held several sittings, reassembled in Paris recently under the presidency of M. Claveille, minister of public works and transports, to consider definitely the conditions for the construction of the tunnel when an agreement has been come to between the British and French governments. It should be understood that while the British government recently announced that it was considering the project, it has as yet announced no definite decision as to whether the plan would be carried out or not.

Electrification of Swedish Railways

The Swedish State Railway Administration has published a statement to the effect that after investigations regarding the electrification of the entire Swedish railway system, it has come to the conclusion that the plan can be carried out in 30 years at a cost of 192,000,000 kr. The advantages of electrification are that the whole of the power needed can be obtained from eight Swedish electric power stations, the traffic capacity will be considerably increased, and a great saving in staff costs will be effected. Sweden's enormous water power will, in the first place, be made available for this purpose.

New Railway Laws in Venezuela

New railway laws have recently come into force in Venezuela, which materially affect future construction in that country. Hereafter, the government will no longer guarantee the interest on capital invested in the construction of railways, and all contractors are to be required to make a cash deposit proportionate to the length of the line and the width of the gage in accordance with the following scale: 0.610 metre, or 2 ft. gage, 600 bolivares per kilometre; 0.915 metre, or 3 ft. gage, 900 bolivares per kilometre; 1.08 metre-gage,

1,000 bolivares per kilometre; and 1.435 metre, 4 ft. 8½ in. gage, 1,400 bolivares per kilometre. (One bolivar equals 19.3 cents.) These deposits may be reduced by presidential decree by as much as 15 per cent. A reduction in rates is to be dependent upon the tonnage hauled beyond a certain amount.

Standard Specifications in Spanish

Industrial Standards No. 29, giving in Spanish the standard specifications for cast-iron locomotive cylinders, as adopted by the American Society for Testing Materials, is the latest of the series of industrial standards to be issued by the Bureau of Foreign and Domestic Commerce. These booklets are designed primarily for distribution in Latin-American countries to assist in introducing American construction and engineering materials. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at five cents each.

Concrete Cars in the Netherlands

The construction of concrete rolling stock for railroads is under way in Holland. Only the wheels, axles, buffers and couplings are made of steel. The weight of cars of the new type is said to be no greater than that of steel cars, the construction is simpler and cheaper, and the upkeep light. This announcement, which is well authenticated, is of special interest in view of the establishment of large steel mills in Holland, and the proposed extensions of the railroads of the Dutch East Indies, a large part of whose material has been bought in the United States in the past, and for which additional orders have been expected.

New Railway in Colombia

The Department of Bolivar, Colombia, according to Trade Commissioner P. L. Bell, has under consideration the building of a new railroad to connect Cartagena with the line now being constructed north from Medellin in the Department of Antióquia. A light, narrow gage road is to be built, the preference being for an electric line, using Diesel electric locomotives of light weight. The chamber of commerce has secured $20,000 to defray expenses of the preliminary location and survey of the new line, and there is every evidence that the department will push the work as fast as possible. Although no definite specifications of requirements are available, they are being prepared now. [The name of the official to whom inquiries should be addressed may be obtained from the Bureau of Foreign and Domestic Commerce or its district and co-operative offices by reference to file No. 40197.]

Mexico Has Lost 10,000 Freight Cars

According to Felipe Pescador, director general of the National Railways of Mexico, revolutionists and bandits have destroyed 10,000 freight cars and many passenger cars during the last eight years. There are now available approximately 16,000 freight cars for handling the traffic of the different divisions of the system which are in operation. The shops of the company are making repairs to damaged cars as rapidly as possible, there being at this time 3,000 of such cars in the yards awaiting shop. Mr. Pescador says that the plan of leasing American cars or permitting them to be employed in handling international traffic is not practicable at this time for the reason the National Railways is so short of locomotives that it is impossible to handle any more cars than are now available in Mexico. If engines could be obtained from the United States it would be a good idea to obtain the use of foreign cars, he thinks. The supply of locomotives for the National Railways is being gradually increased by repairing those that were damaged by internal troubles. At this time there are 380 locomotives in the shops undergoing repairs. The company also has ordered 20 locomotives from the United States.

Mexico Now Producing Rails

The iron and steel plants of the Monterey Iron & Steel Company will be running full blast in all of its departments within a few weeks, it is announced. It is now giving employment to about 1,200 men, and the number will be increased to about 2,500 when full operation is resumed. The orders for steel rails are not confined to the National Railways of Mexico, but embrace a number from mining companies and private industrial interests, it is stated. The demand for structural steel is constantly increasing. This comes from the larger cities of the country. The company is now obtaining its iron ore supply from its own ore beds, situated only about 60 miles from Monterey. Formerly its ore supply came chiefly from Iron Mountain, situated at Durango. The Monterey Iron & Steel Company is composed of Italians and the plant represents an initial investment of $10,000,000 gold.

Rumania's Need for Railway Equipment

Rumania, with a population of 7,500,000 before the war, was the richest of the Balkan countries, says a publication of the Guaranty Trust Company, New York. Enlarged by the inclusion of great areas formerly attached to Austria, and probably Russia, but inhabited, nevertheless by Rumanians, she will be, potentially, one of the powerful nations of Europe. There is little doubt, in the minds of most observers, that with direct water communication with the United States, via the Bosporus to the port of Constanza, she will be a larger buyer in the United States, always provided that favorable terms can be arranged. So far, it is said, the Canadian Government has advanced $25,000,000 for purchases in the Dominion, chiefly of agricultural products. Of 2,000 locomotives in Rumania before the war, the Germans took all but 15. Six hundred must be purchased shortly, and for this purchase approximately $30,000,000 will be needed. Mechanical equipment of all sorts, clothing, and other supplies are necessary, and purchases probably will be made when the terms can be arranged.

Priority Traffic in France

Under the terms of a decree published in February, which handed back the control of the French railways to their peace-time administrative control, special provision is made for certain forms of priority traffic, says a recent issue of the Railway Gazette (London). These include the conveyance of demobilized men and soldiers on leave; the evacuation of material; the handling of the food traffic, often for long distances, to meet the requirements not only of French and Allied troops, but also of the civilian population of reconquered and occupied territories; and the import traffic in such essential commodities as coal. It appears that this priority traffic is being conducted under conditions of great difficulty. In a statement to the Minister of Public Works, the president of the Committee of the Ceinture system has pointed out that the operating problems in the army zone are considerable, due to the enforced concentration of the traffic on a limited mileage as the result of destruction by the enemy. For instance, a single section of the Eastern Railway, via Toul and Nancy, is being called on to handle traffic for Alsace, the Rhine Provinces, part of the Ardennes and Belgium; while three lines on the Northern Railway are being simultaneously burdened with the task of assuring the food supplies and the demobilization of the British forces, the Pas-de-Calais coal field traffic, and communications with Belgium and the devastated regions of northern France. The operating difficulties of these two railways, the president

points out, recoil on the other French systems, and so far the employment of locomotives and rolling stock handed over by Germany under the terms of the armistice has not materially relieved matters, owing to the condition in which much of this stock has reached France.

Railway Construction in Ecuador

The construction of a railway in Ecuador, from the capital (Quito) to Esmeraldas, has long been under consideration; many different contractors have been involved, while almost as many different groups of capitalists have been invited to participate, says the Railway Gazette (London). The project has its advocates and its detractors. The latter seem to predominate. But the government is determined to proceed with the building of the line, which has now found contractors who will see the thing through, perhaps. Plans have been prepared which show that the section to Ibarra will have a length of 167 km., and a 3.5 per cent grade. The construction work is estimated to cost between 8,000,000 and 8,500,000 sucres (about $4,000,000), but the total will probably come out at about one-half as much again. The Ibarra Railway, it is resolved, shall be built in two sections. What is known as the Ibarra section—upon which work was commenced in August, 1917—has less than one-third of its length graded, but, on the other hand, it has completed 6 open and 87 covered culverts.

The Chimbacalle section has 24 kms. graded. The Sibambe to Cuenca Railway is divided into three sections, namely, Sibambe, Cuenca and Chunchi-to-Tambo sections. The Curaray Railway is now practically completed as far as Pelileo, and between 30 and 40 km. of the line are in operation.

Trinidad Market for Railway and Telegraph Supplies

There is considerable agitation in Trinidad at present, says Consul Henry D. Baker, Trinidad, British West Indies, for better railway service, especially in regard to reliable time schedules and more up-to-date equipment. Cars still have old-fashioned hand brakes, although it is recognized that American air brakes must be substituted in the future. Owing to the high prices of materials and the difficulties in arranging prompt delivery of goods, the roads have been running with decreasing efficiency during the war.

Equipment, consisting of four large and three small locomotives, ironwork for 100 freight cars, and about $80,000 worth of bridge material, recently ordered by the government railway from England is the first to be purchased in five years. An order consisting of 500 tons of 60-pound rails, English standard, 33 feet in length for relaying track has also been placed in the United States. The latter country would have been a more convenient market for the rolling stock mentioned above, but American manufacturers, on comparatively small orders of this sort, are unwilling to alter their patterns to conform to local specifications. For instance, locomotives here use brass tubes in their boilers and have copper fire boxes instead of steel. The government railway considers uniformity an important factor, as it desires to avoid carrying too great a variety of spare parts in stock, and it is found more convenient to follow British standard specifications.

Proposed Improvements

The railway is arranging for all its locomotives to be equipped with oil burners, and the Legislative Council of Trinidad has just made an appropriation of $8,640 to purchase two tank cars to carry oil on the government line. Besides having to provide for transportation of its own oil, the road has made contracts with several estates which it can not fulfill without additional cars. These two cars would be the Government's share of an order of ten cars to be imported from the United States by a large oil-producing company on the island.

The railway is planning to improve the lighting facilities at its workshops and yards and will want two electric-light generators of either 110 or 220 volts, together with an oil engine for each generator of 50-kilowatt capacity. These will probably be purchased in the United States. All passenger trains on this line are illuminated by an American light system, the batteries being located in the brake van or baggage cars. This method of lighting is also to be installed shortly in all the stations of the railway, as it has been found to be more satisfactory and less expensive than the gas-lighting systems used heretofore.

Mileage to be Increased—Revenue

The Trinidad government railway has altogether 115½ miles of railway open for traffic. It also has three steamers, two of them used for traffic between Port of Spain and the small islands in the Gulf of Paria, and the other for traffic from San Fernando to Brighton, at the asphalt lake, and to the small towns on the Cedros Peninsula, at the extreme southwestern end of Trinidad, the railway not being extended along the coast south of San Fernando.

There is a public demand for an extension of the government railway to the east and north coasts of the islands. One branch line, which extends from Port of Spain to Sangre Grande, lacks about eight miles of reaching the east coast, and another branch, to Rio Claro, comes within 15 miles of the important cocoanut regions at Mayaro, also on the east coast. There the road will probably be extended, while another extension is planned to go to Salybia and Toco Bays, on the northeastern coast. This would make it possible to have a daily steamer communication between Port of Spain and the island of Tobago, reached now only by a coastal steamer making the trip once a week. While there have been no appropriations for such extensions, yet the Governor of Trinidad in his address opening the Legislative Council several weeks ago, said:

> During the past year a committee appointed at your instance has been considering the questions of the improvements and extension of the communications of the colony and the development of its resources. The committee is making good progress in the task assigned to it, and I hope that before the session closes it will be able to lay before you a preliminary report containing recommendations regarding road and railway extensions and the improvement of the Tobago services.

The last report of the government railway, covering the year 1917, shows that the total revenue earned was $756,652, of which $717,289 was contributed by the railway proper and the balance by the railway steamers. The expenditures for the same period were $644,294. The total number of passengers carried in 1917 was 1,701,665 and the freight amounted to 277,370 tons. The chief articles shipped over the line included sugar cane, sugar, molasses, rum, petroleum products, fruits (chiefly oranges and bananas for local use), cedar and other native timbers for export.

Private Lines for Sugar Estates

In addition to the Trinidad government railway the leading sugar estates of Trinidad also maintain private lines for the conveyance of sugar cane to their factories. The Usine Ste. Madeleine Sugar Co. has about 40 miles of railway through its sugar-cane farms; Waterloo Estate, 20 miles; Caroni Estate, about 15 miles; and the La Fortunee and Hermitage Estates, about 18 miles. Each one requires a certain amount of new rails every year for replacements and extensions, the average being about one-half mile each. The rails used are chiefly those rejected by American railway companies as defective, but as the sugar estates use their lines only for about three months a year, and very little traffic is carried over them, the defects do not matter. The rails weigh as much as 55 pounds a yard and the tracks are standard gage, 4 feet 8½ inches.

The locomotives used on these sugar-cane railways are

four-wheeled and have a 5-foot wheel base, with a maximum weight of 20 tons. They are equipped to use mineral-oil fuel and have no bogies or trailers. The distances are short, but there are often very sharp curves. The sugar-cane trucks or wagons are of 6 to 10 tons capacity, net weight of canes, and have side doors. The canes are loaded into the cars by means of derricks. The sleepers or ties are of local balata wood.

Means of Communication to Be Increased

The telegraph department of the government railway has opened 138 miles of telegraph wire exclusive of duplicate wires, and also 116 miles of telephone wire. The total number of messages, public and railway, passing over the wires in 1917 was 114,120.

It is expected that orders will be placed in the United States very shortly for 30 miles of telegraph wire (No. 8 standard wire gage), and also for 35 miles of telephone cables, 10 miles of which will be two-wire cables, and 25 miles, four-wire cables. This will be used for the railway line between Port of Spain and San Fernando, and for communication beyond that to La Brea at the asphalt lake. About 25 new telephone instruments will also be ordered in the United States. The telegraph wire will all be used for replacements.

Comparison of Fuel Cost in 1917 and 1918

The fuel conservation section, division of operation, United States Railroad Administration, recently issued a statement showing the increase or decrease in the cost of locomotive fuel on the basis of the pounds used per thousand gross freight ton miles, and per passenger train car mile for the last five months of 1918 compared with the same period in 1917. The period referred to was taken as being reasonably comparable, from the standpoint of uniform weather conditions, absence of any general congested condition or other serious disturbing factor. The following summary of results based on the cost of coal, exclusive of the haul on users rails, is taken from this statement:

	Freight Train Service				Passenger Train Service		
	Roads for which complete information is available						
Region	Per cent of total mileage of all roads	Total savings	Per cent savings	Estimated total savings for all roads	Total savings	Per cent savings	Estimated total saving for all roads, passenger and freight service
Eastern—							
New England dist.	36	$106,169	4.5	$312,200	L $278,783	L 6.1	$33,447
Central dist.	37	1,328,364	11.2	2,297,000	564,338	8.6	2,861,338
Ohio - Indiana dist.	65	349,079	14.0	472,500	63,061	7.1	535,561
Total Eastern	54	1,783,612	10.0	3,061,700	348,646	2.9	3,430,346
Allegheny	66	1,260,053	9.3	1,856,000	101,227	1.4	1,957,227
Pocahontas*.	15	.....	...	.....	38,528	4.6	38,528
Southern	70	145,817	1.5	208,000	98,951	1.7	306,951
Northwestern	57	755,816	7.4	1,357,600	171,460	2.6	1,529,060
Central Western	98	1,574,578	6.8	1,597,000	437,130	5.6	2,034,130
South Western	97	343,734	3.5	352,000	33,866	0.8	385,866
Grand total all regions	97	$5,863,610	7.0	$8,452,300	$1,229,808	2.8	$9,682,108

L—Indicates loss.
*Pocahontas region freight train service total omitted, since information on which to base estimate is inadequate.

In determining the estimated total saving in freight train service for all roads in each region, it has been assumed that the average per cent saving for the whole region is the same as the average per cent saving for the roads in that region for which complete information is available. The grand total saving for all regions has been taken as the sum of the regional totals.

The loss shown in passenger train service for the New England District of the Eastern Region is due to the extraordinary increase in cost of coal used in 1918 compared with 1917. The pounds of coal per passenger train car mile were 6.8 per cent less in 1918, than in 1917. This statement does not include fuel used in mixed or special train service.

Beware of Detours!

George Bradshaw, supervisor of safety of the Pere Marquette and associated lines, expands the idea of "safety first" to take in moral and economic questions, as well as matters of bodily safety, and in his latest bulletin (No. 13) addresses the wives of railroad men, reminding them of the importance of providing healthful meals and comfortable and quiet sleeping rooms; of always seeking domestic harmony and of keeping out of debt. On this last point (addressing the husbands as well as the wives) he says:

Pay cash or go without.—This is a good rule for every house. In many cases it is best to go without and save the cash. Ordinarily, there is only one justification for going into debt voluntarily, and that is to buy a home at a reasonable price and on reasonable terms.

The installment craze is a facing-point switch, where many a family train has been derailed. The installment method of buying is a detour from the better and safer road called



Copyright, 1919, by George Bradshaw.

Bad Company for a 31 Train Order

"Cash Drive." The firms doing business on the detour road have their tempting window displays and seductive advertisements to make you believe that the detour is not a detour, but the regular highway. Don't you believe it. That road is a detour. It may be the better road for you at certain times; but remember, it's a detour. Careful and experienced tourists are shy of it. There ought to be more happiness pushing a wheelbarrow than riding in a motor car with a mortgage. Can you save? Are you able to console yourself with the philosophy of going without when you want something you can't afford? Can you go without halting right by the show window with its luring diamonds, furs or other things your neighbors have and you want, and head straight for the savings bank in the next block? Can you do that every pay day till the bank cashier in his cage comes to have more attraction for you than the finest show window in the city? If you can, you have stood the acid test.

Major General Sir Henry Worth Thornton, K. B. E., general manager of the Great Eastern Railway of England, and inspector general of transportation in the British army in France, arrived in New York last week on the steamship "Aquitania." General Thornton is on a visit to his mother at Newtown, Pa.

Proposed Solution of Railroad Problem

By Clinton D. Winant

Formerly Examiner for the Interstate Commerce Commission

THE GOVERNMENT has decided to regulate your business, Mr. Business Man, and this is the method hit upon. We will assume that you are engaged in the manufacture and sale of a great number of different commodities. A commission is appointed with power to determine reasonable rates for all commodities handled by you. This is interpreted to mean that each article sold by you shall yield only a certain fixed profit (say, for example, 6 per cent on the cost of producing the article). In cases coming before it, the commission is not concerned in the general question whether your investment shows a fair return as a whole. It limits its view to the particular case in hand. If the particular price asserted appears to yield a larger return than would be sanctioned on the investment as a whole, the price on that particular article will in all probability be cut. And you, Mr. Business Man, in continuing to talk about a fair return on "your investment as a whole" are simply out of order. You must learn to conduct your business on a basis that will keep the profits on every article the same.

Outside the hearing room Mr. Business Man might well say, "That each commodity sold or service rendered should by itself show a fixed profit is not important and often not possible of realization. In every business the vital thing is that the capital invested be rewarded. The success of any business depends upon the totality of revenue received and not upon the profits derived from any particular article."

But the system of railroad regulation now in vogue continually places upon the stand one single service (i. e., one single transportation unit purveyed by the carrier). If, compared with various other services, the charge appears to be somewhat high the chances are it will be cut. From the nature of the case the general condition of the carrier is lost sight of. After several hundred of such onslaughts what occurs? Under such a system but one result can occur. The road goes into the hands of a receiver.

Now what is the remedy for all this? It is obviously to permit the carrier whenever the *quantum* of a rate is challenged to come into court and say, "Here is my whole schedule of rates. While one single rate may appear high as compared with other rates over my line even under existing rates a fair return on the invested capital is not being earned. We are perfectly willing to alter the present schedule of rates as you see fit. All we seek is a fair return on our capital. But with our present return we do not think it fair for the regulating body to pick out one single rate which it may think high and order it reduced without indicating to us any way whereby the ensuing loss can be made good."

Under the procedure suggested all pending complaints against one carrier which affect merely the *quantum* of its rates could be disposed of by one investigation of the rates as a whole. This would save the enormous duplication of work which now occurs when these cases are considered separately.

The only bulwark which will protect the railroad investor is a law which will secure for him a fair return on his investment. How can this be realized? It is believed by providing that *"the power to reduce a rate or rates or deny an increase when the carrier shows it is not earning a fair return shall not be exercised without first indicating how a fair return can be obtained by some means other than that proposed by the carrier."*

It would still appear to be the law that an investor in public securities is entitled to a fair return on all moneys invested in the public interest. The question is similar to the one which is at the heart of governmental regulation of the issue of securities. If a proposed expenditure will be in the public interest, the railroad should be permitted to raise the needed money. Perhaps some governmental certificate to that effect will some day act as a sort of stimulus to the moribund credit of the railroads.

The amount of capital invested in American railroads upon which a fair return may be asked will not be known exactly until the so-called "physical valuation" of the roads is completed. Until such time what may be taken as a fair rate of interest on the invested capital?

Pending the completion of the "physical valuation" the compensation to the carriers provided for in the Federal Control act might well be used as affording a fair return on the capital invested. Of course, an increase in rates sufficient to provide for additional capital necessary for improvements should be allowed when the commission is of opinion that the proposed improvement is in the public interest.

It has been suggested that "the determination of what rate shall be paid should be taken" from the Interstate Commerce Commission while entrusting to it the accounting end of the railroad problem, the maintenance of parity between shippers and places and control over the issuance of securities. With this view, the writer cannot agree.

If it is true that "the commission has failed utterly in this commercial problem of fixing the necessary rate to enable the railroads to prosper and to obtain the needed capital to grow" it is simply because it was not given adequate power. It was given not too much responsibility but too little. It should be made responsible not only that the shipper obtains a reasonable rate but equally responsible that the investor obtains a reasonable return. This reasonable return should be made definite by law so that its power to control rates is affected thereby. Set a standard for the commission, for example, the average annual railway operating income for the three years ending June 30, 1917, as a fair return on each road's investment. If the returns of the roads fall below this standard the curtailment of the carrier's revenue by the condemnation of any rates assailed should not be allowed without the granting of a proper increase in other rates. The commission would then be in a position to deal with the situation effectively. It could order the reduction of one rate while at the same time finding the rates of the carrier generally too low.

The great percentage of cases brought before the commission present upon analysis merely questions of discrimination or undue preference. It would seem that much confusion would be avoided if cases involving the *quantum* of rates were placed upon a separate docket.

Summary of Remedial Legislation

1. A repeal of the federal control act.

2. When a carrier shows that it is not earning a fair return, no rate should be reduced or increase denied by the commission without first indicating to the carrier how a fair return can be obtained by some other method than that proposed by the carrier.

3. Enactment of the standard set up in the federal control act for compensation to the carrier as the standard of a "fair return" pending the completion of the physical valuation.

4. A complete divorce on the commission's docket of cases involving the *quantum* of a rate as distinguished from cases involving undue preference (*i. e.*, a relationship of rates).

5. The commission should be given power over the issuance of securities of interstate carriers.

6. The commission should have power over all rates of interstate carriers irrespective of whether traffic is interstate or intra-state.

7. The anti-trust laws and anti-pooling provisions of the Act to Regulate Commerce should be repealed in so far as they affect carriers by railroad.

General News Department

The Committee on Automatic Train Control of the United States Railroad Administration left Chicago on April 28 for a trip of inspection of automatic train stops at Spokane, Wash., San Francisco, Cal., and Oroville, Cal.

The Associated General Contractors of America are preparing to establish a clearing house for workmen, an employment bureau for the service of members of the association. The work will be handled through the office of the secretary at 111 West Washington street, Chicago.

The Strike of 1894 figures in a suit now on trial in Chicago. After 25 years, the suit of the Yazoo & Mississippi Valley, now operated by the Illinois Central, against the city of Chicago for $20,000 damages has been brought to trial before Judge S. T. Page in the United States Circuit court. The suit is for loss by the destruction of freight cars at the time of that noted strike when federal troops were called to guard property. Many of the witnesses called at the opening of the court were reported dead.

J. R. Holman, formerly (to September, 1915) chief engineer of the Oregon-Washington Railroad & Navigation Company, now colonel in command of the Eighteenth (railway) Engineers, at Bordeaux, France, has been awarded a Distinguished Service Medal. The order of General Pershing, dated March 27, commends Colonel Holman in connection with his supervision of construction in the vicinity of Bordeaux, for the display of "unusual judgment and great executive ability"; and in addition, "he rendered valuable services and advice to the other departments of Base Section No. 2."

The American Short Line Railroad Association announces that an important meeting of all short line railroads in the United States will be called to be held at Washington, D. C., about June 1, or as soon as President Wilson announces the date for the extra session of Congress. The special object to be considered is the legislation necessary to increase and protect transportation facilities, especially the short line railroads. It is planned to hold a three-day meeting about 10 days after Congress meets, and to have each session addressed by a prominent speaker interested in transportation problems. The proposers expect to have a very large attendance.

The Chicago section of the American Institute of Electrical Engineers and the electrical engineering section of the Western Society of Engineers held a joint meeting in Chicago on April 28. An interesting paper on "Wireless Telephony and Telegraphy in the War" was presented by A. A. Oswald of the Western Electric Company, New York. Mr. Oswald, during the war, was research engineer on the development of wireless telephony and telegraphy. He treated in a general way the apparatus which has been developed and its various uses in connection with military and naval warfare for land, air and water service. A number of slides were shown to illustrate the various types of apparatus in use and the diagrammatical charts of the sending and receiving stations in the fighting zones.

Railway Projects in South Dakota

Reports from South Dakota show that organizations are being formed to advocate the building of railway extensions. In the southern part of the state west of the present terminal of the Chicago & North Western at Winner, S. Dak., there is a large section of the state which has been rapidly developing during the past four years and which is asking for better railroad facilities. A similar move is being made in Meade county, where the effort is to have either the Chicago, Milwaukee & St. Paul extend southwest from its present terminus at Faith or the Chicago & North Western to extend from its present terminus at Newell east into that territory. Improvements on the Chicago, Milwaukee & St. Paul in this territory continue to be made and heavier rails have been laid between Aberdeen, S. Dak., and Mobridge. A cut off to save several miles has also been built near Mobridge.

Certificates of Indebtedness

The Railroad Administration up to May 1 had issued its certificates of indebtedness to railroads on account of compensation to meet the April and May requirements, to the amount of about $76,000,000. It had issued certificates of indebtedness to the equipment companies for cars and locomotives to the amount of about $17,000,000. The exact total of certificates issued for these two purposes was $94,267,733.

American Railroad Association Moves Chicago Headquarters

The American Railroad Association has moved its Chicago offices from the Transportation building, 608 South Dearborn street, to the Manhattan building, 431 South Dearborn street, where the entire fourteenth floor has been secured for its offices and those of the railway associations which have been merged or affiliated with it. The office of the secretary of the Master Mechanics' and Master Car Builders' associations has been moved to the same building, and also that of the secretary of the American Railway Engineering Association, heretofore in the Karpen building.

Large Safety-First Meeting at Cleveland

Officers and employees of the New York Central Lines, to the number of more than 400, attended an enthusiastic safety meeting at the Statler hotel, Cleveland, Ohio, on Friday, April 25, and enjoyed an elaborate program prepared by General Safety Agent M. A. Dow. Among the guests present were A. F. Duffy, manager of the safety section of the United States Railroad Administration, and other representatives of the government, and W. G. Lee, president of the Brotherhood of Railroad Trainmen. Addresses were given by Mr. Dow, Mr. Lee, and others. W. R. Rasmussen, representing the National Safety Council, said that that organization intended to open headquarters in Ohio or Indiana. Mr. Rasmussen said that he found the New York Central highly praised for its safety work in all parts of the country and in all industries. Mr. Duffy gave credit to the New York Central for the plan and standards which have been adopted by the Railroad Administration in the establishment of safety committees all over the country.

Waterways Convention

The second annual convention of the Mississippi Valley Waterways Association was held at St. Louis, Mo., on April 18, at which resolutions were passed urging the Railroad Administration to extend the same service and operation of boats on tributaries of the Mississippi as exist on trunk lines and the extension of joint rail and river rates by the government. Other resolutions were passed urging that the jurisdiction of the Interstate Commerce Commission be extended to waterway problems, that Congress appropriate $100,000,000 for the completion of improvements on the Mississippi river and its tributaries and the establishment of a fleet of four towboats and 24 barges for hauling freight on the upper Mississippi.

The projects already approved by Congress, but for which it has not as yet provided funds, include the completion of a 6 ft. channel on the Mississippi river from Minneapolis to St. Louis, a 9 ft. channel from St. Louis to New Orleans, a 6 ft. channel

from Kansas City, Mo., to St. Louis in the Missouri river and a 9 ft. channel in the Illinois river from Utica, Ill., to St. Louis; completion of the remaining three locks on the Ohio river, making that stream navigable from Pittsburgh, Pa., to Cairo, Ill., and the admission of the Tennessee river into membership in the eighth district of the association. James E. Smith, of St. Louis, was re-elected president of the association.

A Transportation Corps in Northern Russia

According to the March 8 issue of "Rails and Sails," the publication of the Transportation corps with the American Expeditionary Force in France, 720 men of the Transportation corps have left France for Russia. This force is divided into two companies of 360 men each and has been designated as the North Russian Transportation Corps Expeditionary Force. These men are going to Russia by order of President Wilson in response to a request by the British for railroad troops to operate on the line of communication from the Murman Coast south to the Bolshevik front. In commenting on the organization of the new expeditionary force the "Rails and Sails" says that when the call was issued for volunteers five or six times as many men offered their services as were needed. The two companies sailed for England the latter part of March, and from there they sail to Russia. Major E. E. MacMorland, Coast Artillery corps, who has been on duty in the office of the Director of Military Affairs, has been placed in command of the expedition.

Proposed State Purchase of the Denver & Salt Lake

Various reports of the contents of the Steele bill passed by the Colorado House of Representatives and Senate and providing for the acquisition and operation of the Denver & Salt Lake and the boring of the James Peak tunnel have been made. Yet few of the reports contain the true provisions included in this act. The first section of the bill calls for the appointment of a state railroad commission consisting of five members to be appointed by the governor with the consent of the Senate. The powers and duties of the commission so formed are specifically described in the bill. Provision is made for the condemnation of railroads operating wholly within the state, to empower this commission to institute proceedings in eminent domain and for the condemnation of the Denver & Salt Lake, to the end that the state may acquire and operate this road. The commission is also instructed to ascertain the approximate cost of purchase and such condemnation, to ascertain the approximate cost of construction and equipment for operation by electricity of the James Peak tunnel upon the line of the Denver & Salt Lake, to ascertain the approximate cost of extension, including equipment, of the Denver & Salt Lake from the present terminus at Craig, Colo., by the most feasible route to the western boundary line of the state and from its present line near McCoy, Colo., to a junction with the Denver & Rio Grande at Dotsero, Colo. When the approximate amount has been ascertained, there will be submitted to the voters of the state a constitutional amendment providing for the issuance of 30-year 4½ per cent bonds of the state sufficient in amount to pay for the condemnation, the construction of the James Peak tunnel and the extensions mentioned. Similar powers are given to the railroad commission to take action in regard to any railroad whose lines are entirely within the state of Colorado.

New York Central Rally

In New York City on Tuesday afternoon, April 29, the New York Central held a grand rally which was a combination of a welcome home to seven hundred employees of the road who have been in the military or naval service, and have returned to the railroad, and a gathering for stimulating subscriptions to the Victory Loan. Of the thousands of employees of the railroad who served their country in the great war, over 1,000 have returned; but this gathering included only those in and near New York City. The announcement of this meeting says, by the way, that many of these returned soldiers are being employed in better positions than they had when they went away. This rally was held out of doors, on Park avenue, north of the Grand Central Terminal. This avenue, about 150 ft. wide, is built on the roof of the Grand Central Terminal yard, and its broad open spaces have been beautified with elaborate decorations, including columns, flags and heroic figures. There is an immense pyramid, covered with 12,000 German helmets, and the street is temporarily named "Victory Way."

Many thousands of the employees, men and women, from the general offices and other departments, attended the rally, and two hundred young women from the offices mingled with the crowd selling Victory notes. From the windows of the ten-story army hospital immediately east of the "Victory Way" hundreds of wounded soldiers looked down on the scene.

The chairman of the meeting was Marcus A. Dow, chief of the New York Central Safety Department, and among the speakers, besides officers of the road, were William G. Sharp, former ambassador to France, and Colonel William Barclay Parsons, commander of the Eleventh Engineers, just returned from Europe.

Telegraph and Telephone Systems to Be Returned

Postmaster General Burleson has ordered the return of the marine cable systems, the operation of which was assumed by the government on November 2, to their owners as of midnight, May 2, and has announced that the telegraph and telephone lines will be returned to the various companies as soon as legislation can be secured from Congress safeguarding the interests of their owners. This announcement was made after the postmaster general had been subjected to a great deal of criticism for his handling of the telegraph and telephone lines. In a public statement he said that at the time the government took over the control of the wires extraordinary and abnormal conditions existed, resulting in a constantly increasing and very high operating cost which has necessarily continued, and with the early coming of the armistice the accentuated cost of operation, diminishing revenues and the uncertainty in the period of government control, presented such a situation that those in charge for the government were able to accomplish but little by way of unification or to go forward with their policies of economy and consequently were soon brought face to face with a very serious problem. The only answer, he said, was an increase of rates, which was necessary and in no sense tends to refute the soundness of the contention that through government ownership savings would be effected that would result in a reduction of rates. The postmaster general reiterates his belief that a complete unification of the various wire systems should be brought about through government ownership and operation as a part of the postal establishment and declares that the present control affords no more a test of the virtues of government ownership than could be had through a temporary receivership in a court proceeding. The postmaster general has not changed his mind, he says, but as it is apparent that government ownership does not meet with the approbation of the new Congress there is but one course to pursue, which is to return the properties to their owners after urging proper legislation. It was announced that the President had approved of the proposed step.

Victory Loan Subscriptions

The Railroad Administration had received up to Wednesday the following reports regarding the progress of the Victory Loan among railroad employees:

The Northwestern region reported for the first eight days, out of a total of 251,783 employees, 128,936 or 51.21 per cent subscribed $12,244,650. As compared with the first eight days of the fourth liberty loan, this is a decrease of 53,894 subscribers and $6,537,300.

The Southern region reported for the first six days, out of a total of 243,500 employees, 41,771 or 18.75 per cent had subscribed $4,519,000, a decrease of $2,800,250 as compared with the fourth liberty loan.

The Lawrenceville Branch Railroad had subscribed 100 per cent to the Victory Loan on April 23, and the Cincinnati, Burnside & Cumberland River had subscribed 100 per cent on April 25.

The Southwestern region reported that up to and including

April 28, out of a total of 167,969 employees, 68,767 or 40.1 per cent had subscribed $6,751,700.

The Pocahontas region reported up to and including April 28, out of a total of 51,389 employees, 11,148 or 21.69 per cent had subscribed $1,076,000.

The Central Western region reported for the first eight days, out of a total of 304,960 employees, 159,904 or 52 per cent had subscribed $14,872,050, a decrease of $3,498,290 as compared with the fourth loan.

The Allegheny region reported up to and including April 28, out of a total of 382,545 employees, 135,337 or 35.37 per cent had subscribed $10,797,100.

The Eastern region reported up to and including April 28, out of a total of 334,995 employees, 151,320 or 43 per cent had subscribed $14,474,750.

L. S. Taylor, federal manager of the Pullman Car Lines, reported that up to and including April 29, out of a total of 21,065 employees, 10,489 or 50 per cent had subscribed a total of $848,100. H. S. Noble, federal manager of the New York-New Jersey Canal Sections, reported that the New York Canal Section had subscribed $3,000, and that out of a total of 34 employees, 22 of them had subscribed. E. R. Richardson, of the Coastwise Steamship Lines in New York, reported that the employees of those lines had subscribed a total of $83,600.

This makes a total of $65,669,950 subscribed to the Victory Loan by employees of the Railroad Administration.

Railway Regiments Return

The 13th Railway Engineers, recruited mainly from Chicago railroad men, arrived in New York on April 28, after service of a year and a half on French military railways. The history of the American Expeditionary Forces shows that this was the first American engineering regiment in France and the first American regiment of any kind to come under actual shell fire. Among the enviable records established by it in handling the strategic railways immediately behind the lines was the moving of 103 trainloads of men, ammunition, ordnance and supplies to the front lines during the Argonne drive within a period of 24 hours. Except for the men who died or were wounded in France and thirteen men who volunteered for service with the North Russian Transportation Corps Expeditionary Force and who are now on their way to Russia, the 13th Engineers returned complete. The regiment was in command of Colonel C. N. Whiting, formerly superintendent of the Chicago, Milwaukee & St. Paul at Butte, Mont. Colonel Whiting succeeded Colonel N. L. Howard, of Chicago, the son of E. A. Howard, vice-president of the Chicago, Burlington & Quincy and formerly division superintendent of the Chicago, Burlington & Quincy at Hannibal, Mo.

The 13th Engineers sailed for France on July 21, 1917, and spent 21 months and five days in service in the "zone of advance." The regiment was taken to France by Colonel William C. Lanfit, a regular army officer, who was succeeded soon after the regiment's arrival overseas by Colonel Kootz, who in turn was succeeded by Colonel Howard, who remained with the organization until after the signing of the armistice. All of the men, supplies, ammunition and ordnance supplied to the American troops in the St. Mihiel and Argonne drives were transported by the 13th Engineers, who in addition to their work in the Argonne drive built special spur tracks for the American naval guns which were used in that engagement.

Committees have been appointed from the Illinois Central, the Chicago & North Western, the Atchison, Topeka & Santa Fe, the Chicago, Rock Island & Pacific, the Chicago Great Western and the Chicago, Milwaukee & St. Paul—the six roads from which the 13th Engineers were recruited—to make plans for a great reception of the regiment at Chicago. These plans are in charge of W. L. Park, federal manager of the Chicago Great Western.

Plans are being made in St. Louis, Mo., for the reception of the 12th Regiment of Railway Engineers, recruited mainly in St. Louis and adjacent territory, which arrived in New York on April 26. The war department has given permission to the regiment to stop over in St. Louis on its way to Camp Funston, Kan., for demobilization. Colonel F. G. Jonah, chief engineer of the Katy-Frisco lines, will meet the organization in New York and accompany it to St. Louis, as the representative of the St. Louis Railway Club. The entertainment and reception in St. Louis will be sponsored by the Engineers' Club of St. Louis, the Ladies Auxiliary of the 12th Regiment and the St. Louis Railway Club.

Soldiers of the 117th, and the 18th engineer regiments also arrived in New York on Monday of this week. The 117th regiment was recruited mostly in North and South Carolina. These men built bridges between Luneville and Sedan. Many of the officers and men have decorations. This regiment saw severe service and lost 237 men killed. The 13th regiment lost only 13 men.

Exhibits at June Conventions

Secretary J. D. Conway, of the Railway Supply Manufacturers' Association, Oliver building, Pittsburgh, Pa., has advised us that by utilizing various odd spaces as well as the front porches on the Million Dollar Pier at Atlantic City, a total of 92,755 square feet of exhibit space has been obtained for the conventions of the Master Car Builders' and the Master Mechanics' Associations next June. This is 5,395 square feet in excess of the space assigned in 1913, that being the banner year for exhibits.

Through an error, two names were left off of the exhibit list which was published in the *Railway Age* of April 18: The Vapor Car Heating Company, Inc., Chicago, and Harry Vissering & Company, Inc., Chicago. Three changes should be made in the list as published. Gray & Davis, Inc., should be changed to Unit Railway Car Company, Boston; the Goodyear Tire & Rubber Company has withdrawn as an exhibitor, and the Southern Foundry & Machine Company should be shown as Southwark Foundry & Machine Company, Philadelphia.

The following names should also be added to the list of exhibitors:

Beatty Machine & Mfg. Co., Hammond, Ind.
Brewster, William, Company, New York.
Crucible Steel Co. of America, Pittsburgh, Pa.
Electric Controller & Mfg. Co., Cleveland, O.
Electro Dynamic Co., Bayonne, N. J.
Graver, William, Tank Works, Chicago.
Hanna, The, Locomotive Stoker Co., Cincinnati, O.
Kerite, The, Insulated Wire & Cable Co., New York.
Keyoke Railway Equipment Co., Chicago.
Liberty Mfg. Co., Pittsburgh, Pa.
Pratt & Whitney Co., New York.
Railway Devices Co., St. Louis, Mo.
Rogers' Journal Packing Co., Chicago.
Standard Railway Equipment Co., New Kensington, Pa.
Swind Machinery Co., Philadelphia, Pa.
Wilson Welder & Metals Co., Inc., New York.

June Signal Meeting

The next meeting of the Signal Division of the American Railroad Association (formerly the Railway Signal Association) will be held at "The Breakers," Atlantic City, N. J., on Thursday and Friday, June 26 and 27. The Journal of Proceedings, containing the reports of committees which will be dealt with at this meeting, is to be issued about June 7. Members are asked to make their reservations at the hotel at an early date. The rates at the hotel range from $3.00 a day, European plan, for a room without private bath, occupied by one person, to rooms with private bath, occupied by two persons, at $7 to $14; and, on the American plan, from $6 or $7 a day for room without private bath, occupied by one person, to $20 for a room with private bath occupied by two persons.

H. S. Balliet, secretary of the signal division, announces the removal of his headquarters, on May 15, from Bethlehem, Pa., to 75 Church street, New York City.

St. Louis Railway Club

On Tuesday evening of this week the St. Louis Railway Club listened to a paper by Carl R. Gray, former director of the division of operation of the United States Railroad Administration, on the operation of the railroads by the government under war conditions, in which he dwelt particularly on his experiences in the early days of federal control. The paper was discussed by B. F. Bush, regional director, and others.

Air Brake Association Convention

The 20th annual convention of the Air Brake Association will be held at the Hotel Sherman, Chicago, on May 6. The Railroad Administration has requested regional directors to send as many as possible of their air brake men to this meeting and the attendance is expected to be greater than at any previous convention.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—F. M. Nellis, 165 Broadway, New York City. Next convention, May 6-8, 1919, Chicago.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—E. H. Thayer, St. Louis-San Francisco R. R., St. Louis, Mo.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, Chicago. Next meeting, June 17-20, Cleveland, Ohio.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—J. E. Quick, Port Huron, Mich.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Union Station, St. Louis, Mo.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—F. C. J. Dell, 50 E. 42nd St., New York.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—Otto E. Schlinck, 485 W. 5th St., Peru, Ind. Next convention, June 2-5, Marquette Hotel, St. Louis, Mo.

AMERICAN RAILROAD ASSOCIATION.—J. E. Fairbanks, 75 Church St., New York.—

- Operating Section (including former activities of Association of Railway Telegraph Superintendents and Railway Storekeepers' Association).
- Engineering Section (including former activities of Railway Signal Association).
- Mechanical Section (including former activities of Master Car Builders' and Master Mechanics' Association).
- Traffic Section (including former activities of Freight Claim Association).
- Transportation Section (including former activities of Association of Transportation and Car Accounting Officers).

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Wells St. Ave. Austin Station, Chicago. Next convention, October 21-23, 1919, Cleveland, O.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 910 Michigan Ave., Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION (see American Railroad Association, Mechanical Section).—Acting Secretary, V. R. Hawthorne, 735 Transportation Bldg., Chicago. Next annual convention, June 23-25, 1919, Atlantic City, N. J.

AMERICAN RAILWAY PERISHABLE FREIGHT ASSOCIATION.—E. F. McPike, 135 E. 11th Place, Chicago. Regular meetings, 2d Wednesday in March and September.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 6202 Greenwood Ave., Chicago. Next convention, August 27-29, Hotel Sherman, Chicago.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Next meeting, June, 1919, Atlantic City, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Charles W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York. Next annual convention, June 17-20, Hotel Radisson, Minneapolis, Minn.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, 708 Union Trust Bldg., Washington, D. C.

AMERICAN TRAIN DESPATCHERS' ASSOCIATION.—D. L. Darling, Northern Pacific Ry., Spokane, Wash. Next convention, June 17-20, Hotel La Salle, Chicago.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Semi-annual meeting with Master Car Builders' Association.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—Willis H. Failing, C. R. R. of N. J., Jersey City, N. J.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Next meeting, October, 1919, Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS (see American Railroad Association, Operating Section).—W. L. Connelly, N. Y. C. R. R., Gibson, Ind.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS (see American Railroad Association, Transportation Section.)—G. P. Conard, 75 Church St., New York.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—M. J. Trees, Chicago, Bridge & Iron Company, Chicago. Next annual convention, October 21-23, 1919, Cleveland, O.

CANADIAN RAILWAY CLUB.—James Powell, 46 Aberdeen Ave., St. Lambert (near Montreal), Que. Next meeting, 2d Tuesday in May, 1919, Windsor Hotel, Montreal, Que.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November, and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. R. McMunn, New York Central, New York.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MAN'S ASSOCIATION.—D. B. Wright, Lehon Company, 45th and Oakley Sts., Chicago.

EASTERN RAILROAD ASSOCIATION.—D. G. Stuart, Washington, D. C. Next annual meeting, May 8, 1919, Railroad Club, New York.

FREIGHT CLAIM ASSOCIATION (see American Railroad Association, Traffic Section).—Lewis Pilcher, R. F. & P., Richmond, Va.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 856, Insurance Exchange Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, B. & O., Lima, Ohio. Next convention, August 19-21, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago. Next meeting, May 19-22, 1919, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha Ave., Winona, Minn. Next convention September 2-5, 1919, Hotel Sherman, Chicago.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION.—F. W. Hager, 1323 Hurley Ave., Ft. Worth, Tex. Next annual convention, October 21-23, 1919, St. Louis, Mo.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Next meeting, May 26-29, 1919, Hotel Sherman, Chicago.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next meeting, September, 1919, Chicago.

MASTER CAR BUILDERS' ASSOCIATION (see American Railroad Association, Mechanical Section).—Acting Secretary, V. R. Hawthorne, 746 Transportation Bldg., Chicago. Next annual meeting, June 18-21, Atlantic City, N. J.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES' COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York. Next annual convention, October 14, 1919, Indianapolis, Ind.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—George A. J. Hochgrebe, 623 Brisbane Bldg., Buffalo, N. Y. Regular meetings, 3d Tuesday in each month, Tenjost Hall, Buffalo, N. Y.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Bldg., Washington, D. C. Next annual meeting, June 11, 1919, Hotel Commodore, New York.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month except June, July and August, Colonial Annex Hotel, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—D. C. Welty, Missouri Pacific R. R., St. Louis, Mo.

RAILWAY ELECTRIC SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—D. L. Eubank, Galena Signal Oil Company, Richmond, Va. Next annual meeting, September, 1919, Hotel Sherman, Chicago.

RAILWAY FIRE PROTECTION ASSOCIATION.—G. L. Ball, St. Louis-San Francisco Ry., St. Louis, Mo.

RAILWAY REAL ESTATE ASSOCIATION.—James P. Nelson, President, C. & O., Richmond, Va.

RAILWAY SIGNAL ASSOCIATION (American Railroad Association, Engineering Section, Signal Division, H. S. Balliet, Bethlehem, Pa.; after May 15, 75 Church St., New York. Stated meeting, on Monday, before 3d Tuesday in March, Chicago.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, N. Y. C. R. R., Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Next annual meeting, June 18-25, 1919, Atlantic City, N. J.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Next annual convention, September 16-18, 1919, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, West Nyack, Rockland County, New York.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, Western Ry., of Ala., Atlanta, Ga.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Next annual convention, September 16-18, 1919, Auditorium Hotel, Chicago.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., Cleveland, O. Next annual meeting, September, 1919, Hotel Sherman, Chicago.

WESTERN ASSOCIATION OF SHORT LINE RAILROADS.—Clarence M. Oddie, Mills Bldg., San Francisco.

WESTERN RAILWAY CLUB.—A. F. Steubing, 750 Transportation Bldg., Chicago. Regular meetings 3d Monday in month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—Edgar S. Nethercut, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except July and August.

Traffic News

Grain loading on railroads under federal control up to April 19 this year has amounted to 330,800 car loads as compared with 342,964 in the corresponding period of last year.

F. M. Renshaw, assistant manager of the traffic department of the Cincinnati (Ohio) Chamber of Commerce, has been promoted to acting manager of the traffic department, to succeed Guy M. Freer, who recently resigned to take a position with the Central Coal Association.

A milling and grain division has been organized in the Traffic Club of Minneapolis to co-operate in the adjustment of traffic problems and to protect grain and milling interests. The officers of the division are: President, Otto Mortenson, Cargill Elevator Company; vice-president, E. C. Best, Washburn-Crosby Company; secretary-treasurer, J. H. Mashek, of the F. R. Milling Company.

The Farmers' Educational and Co-operative Union, at a recent convention held in Denver, Colo., passed resolutions asking Congress to grant a storage fee of two cents a bushel to farmers who store their own wheat and calling for the placing of an embargo on Oriental vegetable oil. Contrary to reports, no resolutions were passed at this convention concerning the solution of the present railroad problem.

The directors of the Texas Industrial Traffic League have announced their opposition to the efforts being made by New Orleans interests to obtain government ownership and private operation of all boats of the United States. They further declared themselves heartily in favor of the plan advocated by Chairman Hurley of the Shipping Board providing for private ownership and operation of the boats subject to the jurisdiction of the United States Shipping Board.

Producers of crude oil in Texas have formed the Texas Petroleum Refiners' Association for the purpose of obtaining favorable freight rates for the Texas industry. E. P. Byars, traffic manager of the Fort Worth (Tex.) Freight Bureau, is to be counsel of the new organization. A. J. Scrivner, assistant traffic manager of the Fort Worth Freight Bureau, will assist Mr. Byars as secretary-traffic manager of the new organization. M. A. Bundy, Wichita Falls, Tex., has been elected president and J. K. Gilgour, also of Wichita Falls, has been elected vice-president of the association.

In Arkansas the widespread use of automobiles has reduced the passenger traffic on some branch railroads by about fifty per cent. This statement was made by B. F. Bush, regional director, in a plea before the Texas State Railroad Commission against the proposed order to reinstate certain passenger trains on some of the railroads. He said that the automobile traffic has cut into the railroad passenger earnings severely. The traffic on the main lines as well as on branches has been seriously affected. While the figures for Texas have not yet been compiled, it is estimated that the showing will be fully as great as in Arkansas, so far as reduction of passenger traffic on branch lines is concerned. With the building of good highways and the restoration of business to normal the number of automobiles and the extent of their use for long distance travel will increase.

The New Orleans (La.) Joint Traffic Bureau, an organization of which the constituent bodies are the local Board of Trade, the Cotton Exchange, the Association of Commerce, the Board of Commissioners and the Public Belt Railway, has started a "campaign" against the recent action of the Chicago Passenger Traffic Committee, which eliminates optional routing by way of New Orleans on passenger traffic from Chicago, St. Louis, and Memphis, to points in California. The Bureau says that the route by way of New Orleans has been used extensively in the past, that the stop-over privilege has been of benefit to New Orleans, and that under the action proposed a trip by way of that city would cost $18 more from Chicago and $10 more when from Memphis. The Bureau further maintains that since the Railroad Administration did not see fit to eliminate this routing even during the war, there is no necessity to make the change now. Protests have been sent to Max Thelen, director of the Division of Public Service.

Business Men's Association vs. Chamber of Commerce

The Shore Chamber of Commerce, Atlantic City, N. J., as reported in a Philadelphia paper, has "sounded the knell" of $1 excursions from Philadelphia to Atlantic City the coming summer by declining to join in a movement started by the Fourth Ward Business Men's Association to get a reduction of the rate from $1.25 and war tax. The Chamber of Commerce has issued a statement saying: "Considering the marked increase in the expense of operating railroads, we do not see on what grounds the increase of twenty-five cents was criticized. It was only by exerting influence from every angle that we were able to have it reduced last summer from the $1.79 rate then prevailing. It would be beneficial to Atlantic City if the further reduction were possible, but we do not think the time is ripe to even ask for it."



Photograph by Press Illustrating Service, Inc., N. Y.

Moving an American Made Car in Yards at Vladivostok, Siberia. Man Power is Cheap with Korean Laborers

Commission and Court News

Interstate Commerce Commission

The Commission has appointed a board of referees, in accordance with the provisions of the federal control law, to determine the just compensation of the Boston, Cape Cod & New York Canal Company, for the use of its canal under government control. The board will consist of J. B. Eastman, commissioner; J. J. Hickey, chief of the bureau of inquiry, and A. G. Hagarty, examiner attorney.

The Commission has received a petition from Director General Hines, asking that the "Michigan percentage cases" be reopened, as there are now pending against the director general complaints filed by various Indiana and Ohio cities attacking their percentage bases, resulting from the commission's decision in this case. It was held by the commission that rates between eastern trunk line territory and certain Michigan communities were so constructed as to give undue preference to cities in Ohio and Indiana, and to Detroit. Rates then put into effect have lately been declared to be discriminatory as against North Bend, Elkhart, Mishawaka, Goshen and Napanee, Ind. The only way to remove the discrimination resulting from the obedience of the carriers to the commission's order, Director General Hines states, is to change the bases now in effect, on which the rate structure in Michigan is built. He further avers that the South Bend case, the first to come up, is of greatest importance to the government in relation to its management of the railroads, in that a decision adverse to the government would be disastrous to the revenues and to the historical percentage structure of rates between eastern trunk line and Central Freight Association territory.

In Natchez Chamber of Commerce v. Aransas Harbor Terminal Railway Company et al., the commission finds that: Class rates between Natchez, Miss., and Texas points are unreasonable and unduly prejudicial to the extent that they exceed rates between Shreveport, La., and Texas points. Class rates between Natchez and Houston-Galveston group are found unduly prejudicial in so far as they exceed rates between Shreveport and Texas points in common-point territory. Carload rates on cattle, horses, and mules from Texas points to Natchez are found unduly prejudicial to the extent that they exceed, for distances of 750 miles or less, the rates from Texas points to Shreveport, and, for distances greater than 750 miles, the rates from the same points to Shreveport by more than 6 cents per 100 lb. Carload rates on salt from Grand Saline, Tex., to Natchez, Miss., are found unduly prejudicial to the extent that they exceed rates from Grand Saline to Vicksburg and New Orleans. Carload rate of 23 cents on cement plaster from Acme and Plasterco, Tex., to Natchez found to be unduly prejudicial to the extent that it exceeds rates from the same points to New Orleans and Vicksburg, and unreasonable to the extent that it exceeded 18 cents per 100 lb. prior to June 25, 1918, and subsequent to that date to the extent that it exceeded and exceeds 20 cents per 100 lb. Portions of fourth-section applications of defendants are denied.

Commission Prescribes Tap Line Divisions

By an order entered on July 29, 1914, the commission fixed the maxima of allowances or divisions out of the rates of interstate shipments of lumber and forest products that may be received by the tap lines involved in its investigation. The general rate advance ordered by the director general last June increased the rates on lumber and forest products 25 per cent, no increase to be more than 5 cents per 100 lb. The commission has now ordered that after June 1 the divisions which may be paid to tap lines shall not exceed the following amounts: for switching a distance of 1 mile or less from the junction, $2.50 per car; over 1 mile and up to 3 miles from the junction, $3.50 per car; on shipments from points over 3 miles and not more than 6 miles from the junction, 2 cents per 100 lb.; over 6 miles and not more than 10 miles from the junction, 2½ cents per 100 lb.; over 10 miles and not more than 20 miles from the junction, 3 cents per 100 lb.; over 20 miles and not more than 30 miles from the junction, 3½ cents per 100 lb.; over 30 miles and not more than 40 miles from the junction, 4 cents per 100 lb.; over 40 miles from the junction, 4½ cents per 100 lb. These divisions are to be the net amounts that may be paid out of the trunk line rates from the junction, and when the rates from points on the tap lines are made by the addition of an arbitrary, the amount of such arbitrary shall accrue to the tap line.

Valuation Order No. 3

The commission has issued a second revision of valuation order No. 3, containing the regulations and instructions to govern the recording and reporting of all extensions and improvements or other changes in physical property of common carriers, for the purpose of keeping its valuation records up to date in accordance with Section 19-a of the act to regulate commerce. The order is effective as of January 1, 1919.

Report in Bill of Lading Case—New Forms Prescribed

The Interstate Commerce Commission has issued a report in the so-called bill of lading case, written by Commissioner Woolley. It deals comprehensively and generally with the entire subject and consists of three sections, one dealing with the general merchandise domestic bill, another with the export bill, and a third with the live stock bill; but the section on the live stock bill is reserved for disposition in a supplemental report. The report does not deal with the question of negotiability, that having been taken care of by the so-called Pomerene act. It discusses the fundamentals and history of the common law of the carrier's liability and exemptions tracing the development of the law in this country down to the time when Congress enacted legislation imposing certain specific duties upon carriers and making unlawful some of the exemptions and limitations of liability theretofore existing.

The commission holds that it has authority to enforce the provisions of the statutory law in respect to the issuance of bills of lading. It rules on the lawfulness and reasonableness of many of the time-honored terms and conditions, and interprets the Cummins amendment.

The long-standing provision that the measure of the carrier's liability shall be computed on the basis of the value of the property at time and place of shipment is in contravention of the Cummins amendment and is required to be stricken from the domestic bill, but the similar provision is retained in the export bill, the Cummins amendment being held not applicable to traffic destined to non-adjacent foreign countries.

The use of the new form is made compulsory in interstate and foreign commerce from August 8, next. The present order is dated April 14, and the case (No. 4844) originated on December 7, 1918; but the discussion covers various matters which have been before the Commission for seven years past.

State Commissions

The New York State Public Service Commission, First District, holds that a railroad has no right to inconvenience its patrons by cutting off a service which it has contracted to give merely because that service no longer happens to be profitable. This is in an opinion by Commissioner F. J. H. Kracke, disallowing an application of the Long Island Railroad for permission to discontinue passenger service on its Bushwick branch. The railroad line referred to is single-track, and is largely used for freight service. The company desires to use the branch altogether for freight, and is willing to provide transfers to an adjacent street railway. This plan, however, was not acceptable to the Bushwick Branch passengers, who protested against the proposed discontinuance of service. It is held that merely because the passenger service was unprofitable and the company desired to use the

tracks for a more profitable form of traffic was not a good reason for depriving the passengers of service to which they were accustomed.

Louisiana Commission Demands Service

The condition of the roadway, equipment and service of the Louisiana Railway & Navigation Company has resulted in the issuance of three orders by the Railroad Commission of Louisiana demanding a betterment of the existing conditions. The first of these orders requires the company thoroughly to repair its entire roadbed including cross ties, rails, bridges, switches, frogs and trestles and to provide a sufficient number of locomotives and other equipment to afford adequate freight and passenger service. The representatives of the carrier did not question the charges made but pleaded the weak financial condition of the company and inability to secure necessary materials. William Edenborn, president of the company, declared that during 1917 and 1918 the road was unable to obtain sufficient ties. Also the unprecedented labor shortage and the excessiv rainfall contributed to the road's troubles. Mr. Edenborn said that repair work was being done on the roadbed as rapidly as possible and that conditions would soon again be normal. A second order requires the payment to the state of Louisiana of a fine of $300 for violation of the commission's rule which requires that coaches be in a clean and sanitary condition. A third order imposes a fine of $300 for violation of the rule relative to heating coaches.

Court News

Liability for Loss Under Cummins Amendment

The district court for the district of Minnesota holds that, under the Cummins Amendment, declaring that carriers shall be liable for the full actual loss caused by them notwithstanding any limitation of liability, a common carrier, where wheat was lost in transit, is liable for its value at the point of destination, notwithstanding the shipment was made under a uniform bill of lading, which was part of the public tariff filed with the Interstate Commerce Commission, and which provided that the loss should be computed on the value of the property at the time and place of shipment. Conceding, as has been suggested by the commission, that this conclusion will result in difficulties and confusion in existing rules and regulations and tariffs, and possibly hardship and injustice to the carriers, and possibly in some discrimination amongst shippers, the court said the remedy is to be found in facing the law squarely and revising and reconstructing those rules and regulations to meet it.—McCaull-Dinsmore Co. v. C. M. & St. P., 252 Fed. 664. Decided August 23, 1918.

United States Supreme Court

Federal Employers' Liability and Locomotive Inspection Acts

A fireman on the New Orleans & N. E. was injured by being thrown down between the engine and the tender. The accident was caused by the uncoupling of engine and tender; and this was apparently due to the breaking of the king pin and the coupling chains. He brought suit in a state court of Mississippi, under the Federal Employers' Liability Act and the Boiler Inspection Act of 1911, and recovered judgment, which was affirmed by the Supreme Court of the state (115 Miss. 285). The railroad took the case to the United States Supreme Court, contending that the state Supreme Court erred in sustaining the action of the trial court, which charged the jury that the so-called "Prima Facie Act" of Mississippi applied, and that it relieved the plaintiff of the burden of proof to establish negligence. The plaintiff then conceded that that statute cannot be constitutionally applied to suits under the Federal Employers' Liability Act, since the United States Supreme Court has so decided in N. O. & N. E. v. Harris, 247 U. S. 367, and that the judgment must be reversed if the railroad's rights were prejudiced by this error. But he contended that the railroad was not prejudiced, because negligence on its part was not essential to recovery. He insisted that the Boiler Inspection Act, as amended, imposes upon the railroad the absolute duty to have the locomotive and tender and all parts and appurtenances thereof in proper condition and safe to operate; that the mere breaking of the king pin and coupling chains showed conclusively that they were defective; that the evidence showed conclusively that this breakage was the proximate cause of the injury; and that the plaintiff was therefore entitled, under the Federal act to have the jury peremptorily instructed to render a verdict in his favor. This contention was apparently not considered by the State Supreme Court. The United States Supreme Court holds that the evidence did not establish as a matter of law that the king pin or the chains were defective. At most it presented a question for the jury. The court could not therefore say that the railroad was not prejudiced by the error of the trial court in instructing the jury that the "Prima Facie Act" was applicable, and it reversed the judgment.—New Orleans v. Scarlet. Decided April 21, 1919. A similar decision was made the same day in the case of Yazoo & Mississippi Valley v. Mullins.

Cost of Industry Tracks

An order of the Minnesota Railroad and Warehouse Commission, requiring the Chicago & N. W. to alter and extend a side track leading from its main line to an adjacent brick making plant, made under a local statute, practically assigned two-thirds of the cost to the railroad and one-third to the owner of the plant. The railroad objected to bearing any part of the cost and the plant owner was not willing to bear all. The state Supreme Court sustained the order as reasonable. (135 Minn., 323.) The Untied States Supreme Court affirms the judgment, holding that the enforced discharge of the duty to provide the facility did not amount to a taking of property without compensation merely because it was attended with some expense, since the expenditure was for property which will belong to the company and be employed in its business. The court said in part: "Of course, the expense is an important element to be considered in determining whether the requirement is within the bounds of reasonable regulation or is essentially arbitrary, but it is not the only one. The nature and volume of the business to be affected, the revenue to be derived from it, the character of the facility required, the need for it and the advantage to be realized by shippers and the public are also to be considered. Tested by these criteria we think the order in question is not arbitrary, but reasonable." The yearly freight charge on the traffic of the existing side track to the plant had exceeded $10,000, which the output over the new track would double. The estimated cost of the work was about $2,300.—Chicago & N. W. v. Ochs. Decided April 14, 1919. A similar ruling was made the same day in the case of Lake Erie & Western v. State Public Utilities Commission of Illinois, regarding a side track in Illinois.



Photograph by Underwood & Underwood, N. Y.

Airplane Forced to Descend Because of Dead Engine, Crashes Into Locomotive Near Seaside, Toronto

Equipment and Supplies

Locomotive Deliveries for Week Ended April 19

The following locomotives were shipped to roads under federal control during the week ended April 19:

Works	Road	Number	Type
American	C. M. & St. P.	12	USRA Mikado
	N. Y., N. H. & H.	6	USRA L. Mount
	Maine Central	2	USRA 6W. Sw.
	Penn. R. W.	6	USRA St. F.
	A. C. L.	3	USRA 6W. Sw
		29	
Baldwin	Ill. Cent.	1	Mikado
	N. T. & S. F.	3	Mikado
	C. B. & Q.	6	USRA Mikado
	C. R. & Q.	1	Mikado
	L. V.	1	Pacific
	A. T. & S. F.	1	Mountain
	T. & P.	2	Pacific
		15	
Total		44	

Cars Accepted Week Ended April 19

The following new standard cars were accepted during the week ended April 19:

Road	Number	Type	Manufacturer	Total accepted for given roads
Sou. Pac.	23	50 Ton S. S. Box	Haskell & Barker	500
P. McK. & Y.	99	70 Ton L. S. Gon.	Pressed St. Car	306
Total	122			

Freight Cars

The Biddle Purchasing Company, Pittsburgh, Pa., is inquiring for one small lever hand car.

The Wendnagle Company, Chicago, is inquiring for one 80,000-lb. capacity 40 or 42-ft. flat car.

The Aiken Gasoline Company, Tulsa, Okla., has ordered 10 40-ton, 8,000-gal. tank cars from the American Car & Foundry Company.

The Liberty Steel Products Company, Inc., has recently placed orders for 200 flat cars and 200 tank cars to be shipped to France for private operators. These cars are to be made in accordance with the French State Railway and Paris & Orleans standards.

Car wheels and axles for Norway. Commerce reports in its issue of April 16 contains the following trade opportunity: 29,125—An officer of the department of public works in a city of Norway desires to purchase car wheels and axles complete, to be used in the construction of railway cars. Quotations should be given f. o. b. New York. Terms, payment against documents. Further information may be obtained from the Bureau of Foreign and Domestic Commerce or from any of its district and co-operative offices.

Signaling

The Lehigh Valley has ordered from the General Railway Signal Company a 24-lever interlocking for Weatherly, Pa.

The New York Central has ordered from the General Railway Signal Company a mechanical interlocking, twelve levers, for Military Road, Buffalo, N. Y.

Canadian Pacific.—This company plans this year to install automatic signals between Gault, Ont., and Woodstock, 30 miles; also to renew interlocking plants at Walkerton, Ont., and Saskatoon, Sask. A new copper telegraph wire is to be put up from Halifax, N. S., to Winnipeg, Man., and from Toronto, Ont., to Windsor.

Supply Trade News

The **Southern Railway Car Company** has been organized at Wichita Falls, Texas, with **James A. Jones** as president, to make tank cars, railway cars, and street cars; also to operate repair shops.

The Booth-Hall Company, designers and builders of electric furnaces, has removed its executive and sales offices from 2307-15 Archer avenue, Chicago, to the Hearst building, 326 West Madison street.

John Walsh, counsel for the Federal Trade Commission since its organization, and its chief counsel for the past year and a half, has resigned and has opened an office in the Southern building, Washington, D. C., for the general practice of law.

Henry M. Sperry, publicity representative at New York of the **Union Switch & Signal Company,** the **General Railway Signal Company,** the **Federal Signal Company** and the **Hall Switch & Signal Company,** has removed his office from 120 Broadway to 347 Madison avenue.

Frank J. Tone has been elected president of the Carborundum Company, Niagara Falls, N. Y., in place of **F. W. Haskell,** deceased, and **George R. Rayner,** secretary, has been elected vice-president in place of **R. B. Mellon** of Pittsburgh. **F. H. Manley** retains the office of treasurer.

C. D. Barrett, who has just returned from France after 18 months' service as an officer in the Transportation Corps of the American Expeditionary Force, has been appointed district engineer of the **Locomotive Stoker Company,** with headquarters at New York. He was born in Fort Wayne, Indiana, and after graduation from Purdue University in 1901, he entered the service of the Pennsylvania Railroad as a special apprentice at Altoona. He remained with the Pennsylvania in the positions of motive power inspector, foreman, assistant master mechanic, assistant engineer of motive power and master mechanic until the summer of 1917. He then received a commission as major in the United States Army and went to France in command of the First Battalion of the Nineteenth Engineers. In France Major Barrett organized the St. Nazaire locomotive erecting shop, where all the locomotives used by the A. E. F. were erected. He remained in charge of this shop until July, 1918, when he was appointed assistant general superintendent of motive power in the Transportation Department.



C. D. Barrett

Frank J. Lepreau has been appointed sales manager of the railway signal division of the **Macbeth-Evans Glass Company,** Pittsburgh, Pa. Mr. Lepreau resigned on April 1 as vice-president and general sales manager of the primary battery division of Thomas A. Edison, Inc.

T. W. Holt, superintendent of shops of the Pressed Steel Car Company, Pittsburgh, Pa., who had entire charge of the munition work undertaken by that company, has resigned to accept the position of assistant general manager of the **Curtain Supply Company,** Chicago, succeeding the late **R. S. Reynolds.**

G. E. Scott, who for the past year and a half has been in the service of the American Red Cross as assistant general manager at Washington, D. C., and from September, 1918, as general manager, has received his honorable discharge and resumed his duties as first vice-president of the **American Steel Foundries,** Chicago.

J. E. Mason has been appointed manager of field sales of the **Blaw-Knox Company,** Pittsburgh, Pa., with offices at Pittsburgh. In this capacity, Mr. Mason will supervise the operation of a sales agency plan throughout the country. Mr. Mason is a graduate of Purdue University and for the past four years has been in the employ of the McGraw-Hill Publishing Company, Inc., New York.

The Bailey Meter Company removed its main office and works from Boston, Mass., to Cleveland, Ohio, on May 1. The Boston office, with H. D. Fisher as manager, is retained to handle sales and engineering service work in the New England district. For the present the New York and Philadelphia districts will be covered from Boston and all other districts will be covered from Cleveland.

James Viles, chairman of the board of directors of the **Buda Company,** Chicago, died Sunday evening, April 27, at the St. Lukes Hospital, Chicago. He was born in Boston, Mass., on March 10, 1855, and received his education in the public schools of Cambridge, Mass., and a private school at Waltham, Mass. He began his business career in 1878 with the firm of Underwood & Company, packers, which was succeeded by the firm of Viles & Robbins, of which Mr. Viles was senior partner. Later he became president of the Omaha Packing Company, Omaha, Neb., from which position he retired in 1902 to engage in the railway supply business with the Buda Company. In 1907 he was elected president of the Buda Company, in which capacity he served until the early part of 1919, at which time he was elected chairman of the board of directors.



J. Viles

The Chicago Pneumatic Tool Company announces the election of **Allan E. Goodhue** as managing director of its English subsidiary, the **Consolidated Pneumatic Tool Company, Ltd.,** whose offices are at 170 Piccadilly, London, and whose plant is in Fraserburg, Scotland. Mr. Goodhue will also have charge of European sales for the Chicago Pneumatic Tool Company. He was for a number of years connected with the sales department of the Midvale Steel Company and Midvale Steel & Ordnance Company in Philadelphia, Chicago and Boston, leaving that company in March, 1918, to enter the service of the government. From that time until January 1, 1919, when he became connected with the Chicago Pneumatic Tool Company, he was assistant manager of the Steel and Raw Material Section, Production Division, of the Emergency Fleet Corporation. Mr. Goodhue will sail for England May 13 on the Mauretania.

Lewis A. Nichols, consulting engineer and president of the **Chicago Steel Tape Company,** Chicago, died on March 5, at his home in Chicago. He was born on August 26, 1851, in Florence, Italy, of American parents and came to this country in July, 1857, settling in Danvers, Mass. He was graduated from the Massachusetts Agricultural College at Amherst in 1871. Later during the same years he was engaged in laying out an addition to the city of Fall River, Mass., after which he was employed as leveler in a locating party on the Massachusetts Central. In the spring of 1872 he was given charge of the locating party finishing the construction of a division of that railroad in the fall of 1873. In 1875 he was elected to the position of city engineer of Chelsea, Mass., from which position he resigned in 1877 to engage in railroad surveys and construction work in many parts of this country and Mexico. He gave up the active practice of his profession in 1908, except as a consulting engineer, and since then has devoted most of his time to the interests of the Chicago Steel Tape Company.

Colorado Brake Shoe and Foundry Company

The Colorado Brake Shoe & Foundry Company, Denver, Colo., was organized on January 1, 1919, by **James C. Dolan,** representative of a number of railway and mine equipment and supply firms at Denver, Colo. Mr. Dolan, in addition to assuming the presidency of the new company will retain his connection with the companies with whom he has been engaged for the past six years. Previous to this he was in the employ of the purchasing department of the Denver & Rio Grande for nine years.



J. C. Dolan

F. T. Dickinson, general manager of the new company was formerly superintendent of the Railway Material Company's plant at Toledo, Ohio, and later the plants at Phoenixville, Pa., and Stevens Point, Wis. Mr. Dickinson has been associated with the foundry business for the past 35 years, having received his early training in the general foundry business in Chicago. He first became interested in the manufacture of reinforced brake shoes while working for the Union Iron & Steel Company of Chicago in 1905. Soon after Mr. Dickinson was employed by the American Brake Shoe & Foundry Company and here he was given opportunity to develop ideas on permanent iron molds for making brake shoes. After remaining with the American Brake Shoe & Foundry Company for two years he resigned to establish the Illinois Malleable Company, of Chicago, in the brake shoe business. In 1909 Mr. Dickinson resigned from this company to accept the superintendency of the Railway Material Company's plant at Toledo and later, while still in the employ of this company, started and operated its new plant at Phoenixville, and later at Stevens Point, retaining the latter position until his appointment as general manager of the Colorado Brake Shoe & Foundry Company. Mr. Dickinson is the inventor of numerous brake shoes and foundry devices pertaining to the manufacture of steel brake shoes.



F. T. Dickinson

The company has acquired a modern brake shoe foundry with a floor space of 150 ft. by 250 ft. and equipped with modern machinery. This foundry has a capacity of 50 tons a day, and its entire output is being devoted to reinforced brake shoes.

Trade Publications

TRACK MATERIAL.—The Illinois Steel Company, Chicago, has issued an attractive book of 48 pages of specifications, photographs and dimensions of track spikes, ordinary and open hearth oil-quenched track bolts and screw spikes. This book contains much data of use to those engaged in the ordering, handling and using of track materials.

TIE PLATES.—The Illinois Steel Company, Chicago, has issued an 80-page booklet showing the dimensions and designs of the standard sizes of tie plates rolled by that company. In addition to showing over 50 designs of tie plates, the book contains information concerning the widths of rail bases of various sections of rails and presents the information required with orders for tie plates.

MOTOR DRIVE.—A universal motor drive for any kind of double spindle shaper has recently been developed by the Oliver Machinery Company, Grand Rapids, Mich., and this company has now printed a bulletin fully describing and illustrating the device and showing its advantages. It also includes a drawing showing the floor plan of the motor drive operating in connection with the Oliver No. 483 high speed double spindle shaper.

THE UNIT CAR.—A steam propelled car, designed for railroad interurban and branch line service, known as the Unit car, is described in an attractive booklet containing 16 pages, issued by the manufacturer, the Unit Railway Car Company of Boston, Mass. As the name indicates, its power plant, passenger and baggage space is combined in one car and it has been operated successfully and demonstrated its adaptability for satisfactorily handling short line traffic. The text is illustrated with photographs of the car and drawings showing the side elevation, floor plan and front end.

TEXACO LUBRICANTS.—The series of advertisements of the Texas Company, New York, entitled "How Texas Jones Convinced the Railways," which has appeared in the *Railway Age*, has been reprinted in a booklet of 39 pages, 9 in. by 12 in., issued by the Texas Company. Thirty pages contain each a record in dialogue form, with illustrations, of imaginary meetings of a railroad purchasing board, showing the evidence brought by "Texas Jones" and others to convince the railways of the value of using Texaco lubricants. In addition, the book contains a new and valuable feature in the form of a list covering four pages, of railroad products made by the Texas Company.

WELDING RODS AND WIRE.—A small booklet of 60 pages has been published by the Page Steel & Wire Company, New York, which contains a large amount of useful information on welding and welding materials and describes the method of manufacturing Armco iron rods and wire for oxy-acetylene and electric welding, illustrated with microphotographs showing the structure of the material used. The booklet contains a large number of other illustrations and data in tabular form, including a table showing the diameter of rods to be used on various thicknesses of metals to be welded, temperature and metric conversion tables and data regarding the properties of elements and metal compositions, etc.

MECHANISM OF COMBUSTION.—The American Arch Company is issuing a series of bulletins dealing with the subject of combustion and the transfer of heat, of which the bulletin on The Mechanism of Combustion is the second. This bulletin, written by J. T. Anthony, vice-president of the company, presents in a very clear manner the various processes that take place in the combustion of coal. It explains the molecular construction of fuel and shows just what transformations occur in its combustion and why they occur. The illustrations serve as a great aid to the reader in visualizing the chemical processes of combustion. The pamphlet also shows where and how the heat is generated from fuel by the process of combustion. It discusses first the structure of atoms and molecules and explains the hydrocarbon molecules which are found in fuel. It explains the behavior of these atoms and molceules in the coal in both the quiescent and the active (when the coal is burning) state, and fully explains why and how the heat is obtained.

Railway Construction

BLACK MOUNTAIN RAILROAD.—The line building from Hulen, Ky., to the head of Packetts Creek, 8 miles has been completed. The tracklaying was carried out by company forces. M. E. S. Posey, chief engineer, Path Fork, Ky.

CANADIAN PACIFIC.—This company has asked the Dominion government for permission to build various branch lines in the western provinces of Canada, as follows: From Duchess, on the Bassano easterly branch in Alberta, in a general northerly direction; from Archive, on the Moose Jaw southwesterly branch, in a southwesterly and westerly direction to Wymark, on the Swift Current southeasterly branch in Saskatchewan; from a point on the Moose Jaw northwesterly branch at or near either Fortune or Rosetown, Saskatchewan, in a general southerly direction for 50 miles, then easterly for 30 miles in Saskatchewan; from a point on the Weyburn-Stirling branch in Saskatchewan in a southerly direction across two townships and thence in a westerly direction; from Lanigan, on the Pheasant Hills branch, in a northeasterly direction to a point between Carroll and Saskatchewan river and then to a point near Cumberland House, Saskatchewan; from Leader, on the Swift Current northwesterly branch, in a southwesterly direction 50 miles, and then easterly to a point on Big Stick lake in Saskatchewan; from a point on the Manitou lake branch to a point on the Whitford lake branch in Alberta.

GREAT NORTHERN.—This road will rebuild the bridge over the Whitefish river west of Whitefish, Mont., replacing the 341 ft. of timber trestle and 150 ft. Howe truss span with a new steel span. The material for this work is now on the ground. This road has also let a contract for the filling of the Beaver Bay trestle and the work will be completed this season.

ILLINOIS CENTRAL.—This road has received bids for the construction of a new passenger station, freight house and heating plant at Centralia, Ill. The passenger station will be 325 ft. by 36 ft., of which 85 ft. by 36 ft. will be two stories. The construction will be of reinforced concrete and brick with slate roofing. The freight house will be of concrete and brick construction with maple floors and a slate roof. The building will be 218 ft. by 40 ft., of which 110 by 40 ft. will be two stories. The heating plant will be 30 ft. by 34 ft., of brick and stone reinforced concrete construction with slab and composition roof. In conjunction with the new buildings considerable amount of new trackage, paving, sewerage, water lines and platforms will be constructed. The approximate cost of the entire construction will be $250,000.

The Illinois Central has awarded a contract to the Railway Water & Coal Handling Company, Chicago, for the construction of a concrete dam across the Tradewater river at Dawson Springs, Ky., to supply water for a pumping station. The dam will be of concrete construction, 14 ft. high by 125 ft. long and 10 ft. thick, and will cost approximately $6,000. Work has already been started on the project. This road has also awarded a contract to the same company for the construction of a pumping station 27 ft. by 27 ft. in area, one story in height, of brick with concrete foundation and slate roof. The machinery will consist of two 25 h.p. fuel-oil engines having belt connections with two 500 r.p.m. centrifugal pumps, discharging through 3,000 ft. of 10 in. cast iron main pipe into a 100,000 gallon tank. The approximate cost will be $35,000.

SOUTHERN RAILWAY.—This road has given a contract to M. M. Elkins, Macon, Ga., for building a bridge at Gaffney, S. C. The bridge and retaining wall approach will be of reinforced concrete construction. The structure will consist of three spans, one of which will be 35 ft. long and the other two 26 ft. long. The cost of the work will be about $30,000.

The Southern Railway is building, with its own forces, transfer sheds at the Atlanta (Ga.) transfer yard. The structures are to be one story high; one of the buildings will be 16 ft. wide and 760 ft. long, and another will be 30 ft. wide and 760 ft. long.

Railway Officers

Railroad Administration

Central

G. B. Clifton has resigned as office manager of the Railroad Administration to become secretary and treasurer of the United Artists' Corporation, with office at New York. Mr. Clifton was office manager of the Railroads' War Board in Washington in 1917, and prior to that was special representative of Vice-President **A. W. Thompson**, of the Baltimore & Ohio.

Federal and General Managers

The jurisdiction of **G. L. Peck**, federal manager of the Pennsylvania Railroad, Western Lines, and associated lines, has been extended over the Columbus Union Depot.

H. E. Whittenberger, general manager of the Grand Trunk, Western Lines, has been appointed federal manager of the same lines, with headquarters at Detroit, Mich., these lines having been released from the jurisdiction of **F. H. Alfred**, federal manager at Detroit, Mich.

E. F. Blomeyer, general manager of the Ann Arbor and the Manistique & Lake Superior, has been appointed federal manager of the Ann Arbor Railroad, with headquarters at Toledo, Ohio, which road has been released from the jurisdiction of **F. H. Alfred**, federal manager at Detroit, Mich.

B. C. Stevenson, general manager of the Toledo, St. Louis & Western, has been appointed federal manager of the same road and the Detroit & Toledo Shore Line, with headquarters at Toledo, Ohio. These roads have been released from the jurisdiction of **J. E. Taussig**, federal manager at St. Louis, Mo., and **F. H. Alfred**, federal manager at Detroit, Mich., respectively.

Operating

R. D. Miller, trainmaster on the Chicago, Milwaukee & St. Paul, with office at Ottumwa, Iowa, has been appointed trainmaster of the Milwaukee terminals, with headquarters at Milwaukee, Wis., vice **N. A. Meyer**, promoted.

Lieutenant-Colonel Dwight S. Brigham, of Newton Centre, Mass., who went to France in July, 1917, with the 14th Engineers (Railway), has returned and been discharged from the United States service. He has resumed his duties as trainmaster on the Boston & Albany, with headquarters at Beacon Park, Boston, Mass.

Lewis Randolph Taylor, whose appointment as superintendent of the Virginian Railway, with headquarters at Princeton, W. Va., has already been announced in these columns, was born on September 22, 1871, at Charlottesville, Va. He began railway work on September 1, 1888, with the Richmond & Danville, now a part of the Southern Railroad, as a rodman, and was employed on surveys and construction work on that road, the Chesapeake & Ohio, the Chicago & Eastern Illinois, and the Ohio Southern for the next five years. From May, 1895, to May, 1897, he served in the maintenance of way department of the Baltimore & Ohio, Philadelphia and Baltimore divisions, and then to September, 1901, was assistant engineer, United States Engineering department, in charge of field work, coast defense and harbor improvement, Baltimore harbor. From September, 1901, to June, 1903, he was in the general contracting business in Baltimore, and then was engaged in making the reconnoissance for the Deepwater and Tidewater railways, which later became the Virginian Railway, until February, 1904. He then served consecutively as division engineer, principal assistant engineer and superintendent of construction on the Tidewater Railway, and from April, 1909, to March, 1918, as superintendent of the Third and Deepwater divisions of the Virginian Railway. Since March, 1918, he has been engaged in mining enterprises.

Robert Cornelius Reid, whose appointment as superintendent of the New Orleans & Northeastern and the New Orleans Terminal, with headquarters at Hattiesburg, Miss., has already been announced in these columns, was born on November 22, 1872, at Huntsville, Texas. He was educated in private and high schools and began railway work in 1890, with the Central of Georgia. He subsequently served as city ticket agent at Columbus, Ga.; then as agent at Sylacauga, Ala., on the same road and in 1893 entered the service of the Plant System as a rate clerk. In 1894, he was appointed train despatcher on the Southern Railway, at Columbus, Miss.; later in the same year he was appointed bill clerk at Anniston, Ala., and in 1895 served as operator at Atlanta, Ga., on the same road. From 1896 to 1899, he was an operator on the Central of Georgia and the following year was appointed despatcher on the Alabama Great Southern, becoming chief despatcher in 1906. In 1908 he was appointed chief despatcher on the Cincinnati, New Orleans & Texas Pacific, and two years later was appointed trainmaster of the Alabama Great Southern. In 1917 he became trainmaster on the New Orleans & Northeastern, which position he held until his recent appointment as superintendent of that road and the New Orleans Terminal, as above noted.

Financial, Legal and Accounting

W. J. Stevenson has been appointed general solicitor of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, vice **H. T. Ballard**, resigned.

Traffic

R. W. Farrell has been appointed general baggage and mail agent of the Long Island Raliroad, with headquarters at Long Island City, vice **W. Van Valkenburgh**, deceased.

C. H. Ryan, Jr., division freight agent on the Louisville & Nashville, with headquarters at Nashville, Tenn., has been transferred to Memphis, succeeding **R. S. Willock**, division freight agent of the Memphis line. Mr. Willock succeeds Mr. Ryan at Nashville.

A. Hilton, whose promotion to traffic manager of the St. Louis-San Francisco, the Fort Worth & Rio Grande, the St. Louis-San Francisco & Texas, the Kansas City, Clinton & Springfield, the Paris & Great Northern Belt, the West Tulsa Belt and the Rock Island-Frisco Terminal, with headquarters at St. Louis, Mo., was announced in the *Railway Age* of April 18, was born at Hamilton, Ont. He entered railway service in 1878 as a clerk on the Great Western of Canada, now a part of the Grand Trunk. From 1880 to December, 1884, he was a clerk in the passenger department of the Chicago & Alton, and subsequently, until 1889, he was city passenger and ticket agent on the same road at Kansas City, Mo. In 1887 he acted as Pacific Coast agent at San Francisco, Cal., and from 1889 to March 1, 1901, was general agent in the passenger department of the same road at Kansas City. On March 1, 1901, he was appointed assistant general passenger agent of the Kansas City, Fort Scott & Memphis, and the following August he was made general passenger agent of the St. Louis-San Francisco. In October, 1913, he was appointed passenger traffic manager of the same road. In 1918 he was promoted to assistant traffic manager of the St. Louis-San Francisco and the Missouri, Kansas & Texas, which position he held until March 1, 1919, the date of the regrouping of the Southwestern region lines. Incident to the regrouping



A. Hilton

he was appointed assistant traffic manager of the St. Louis-San Francisco, the Kansas City, Clinton & Springfield, the Paris & Great Northern, the West Tulsa Belt and the Rock Island Frisco Terminal, which position he held prior to his recent promotion.

Engineering and Rolling Stock

I. O. Walker, division engineer of the Atlanta division of the Nashville, Chattanooga & St. Louis, with office at Atlanta, Ga., has retired after 33 years continuous service, 28 of which were spent with the Nashville, Chattanooga & St. Louis and leased Lines.

R. B. Robinson, engineer maintenance of way of the Oregon Short Line, with headquarters at Pocatello, Idaho, has been appointed engineer maintenance of way of the Union Pacific, with headquarters at Omaha, Neb., to succeed **W. R. Armstrong**, whose promotion to assistant chief engineer appears elsewhere in these columns.

H. L. Worman, master mechanic on the St. Louis-San Francisco, with office at Memphis, Tenn., has been appointed assistant superintendent of motive power, with headquarters at Springfield, Mo., and **G. R. Wilcox**, assistant master mechanic at Monett, Mo., has been appointed master mechanic of the Southern division, with headquarters at Memphis, vice Mr. Worman.

W. R. Armstrong, engineer maintenance of way of the Union Pacific and the St. Joseph & Grand Island, with headquarters at Omaha, Neb., has been promoted to assistant chief engineer of these roads, the Oregon Short Line and the Los Angeles & Salt Lake, with headquarters at Salt Lake City, Utah, to succeed Carl Stradley, deceased. Mr. Armstrong has had 25 years of railroad experience, both as an engineer in charge of construction and maintenance of way and as an operating official. Prior to his entering the employ of the Oregon Short Line in 1905, he was connected with various lines in the Middle West. During his first year with the Oregon Short Line he was employed on special engineering work, and in the following year was placed in charge of the construction of the Yellowstone Park branch and also in charge of the extension from Huntington, Ore., through the Snake river canyon, to Homestead. In 1908, Mr. Armstrong was made superintendent of the Montana division which position he held until 1913, when he was promoted to general manager and chief engineer of the Salt Lake & Utah, then under construction. On August 1, 1916, he was appointed engineer maintenance of way of the Union Pacific, which position he held until his recent promotion.



W. R. Armstrong

R. D. Moore, signal supervisor of the Los Angeles division of the Southern Pacific, Pacific System, with headquarters at San Francisco, Cal., has been promoted to assistant signal engineer, with the same headquarters, succeeding **L. V. Parle**, deceased. **C. A. Veale**, signal supervisor of the Tucson division, with headquarters at Tucson, Ariz., has been transferred to succeed Mr. Moore. **H. M. Stone**, principal assistant signal supervisor, with headquarters at Los Angeles, Cal., has been promoted to signal supervisor succeeding Mr. Veale. **P. A. Bliss**, who recently received his discharge from the United States Army, has been appointed signal supervisor of the Stockton division, with headquarters at Stockton, Cal.

H. H. Maxfield, formerly superintendent of motive power of the New Jersey division of the Pennsylvania Railroad, with headquarters at New York, who was granted a furlough to enter military service, as an officer in the 9th Engineers, National Army, in July, 1917, has returned to the service of the Pennsylvania as acting works manager, with office at Altoona, Pa., in charge of the Altoona shops, comprising the Altoona machine shops, the Altoona car shops, the Juniata shops and the South Altoona foundries. This is a new position recently created on the Pennsylvania Railroad, Eastern Lines. Mr. Maxwell reports to the general superintendent of the Eastern Pennsylvania division and the superintendent of motive power of that division has been relieved of the jurisdiction over the above named plants. While in France Mr. Maxfield was superintendent of motive power of the Transportation Corps, American Expeditionary Force.

Corporate

Railway Officers in Military Service

Major C. E. Lester of Meadville, Pa., has been appointed general superintendent of the 19th Grand Division, Transportation Corps, of the American Expeditionary Force. He entered the National Guard, 13th Pennsylvania Infantry, in August, 1916, and was commissioned first lieutenant, infantry, in October of the same year. In August, 1917, he was transferred to the engineers. He was appointed captain, engineers, in the National Army in April, 1918, and commanding officer of the 50th Engineers, with which he went abroad in July, 1918. Upon his arrival in France he was appointed general foreman at the Nevers locomotive shops, operated entirely by United States soldiers. He subsequently served as assistant superintendent of the same shops and then as acting general superintendent of the 19th Grand Division until his appointment as general superintendent of the same division. Major Lester was formerly general foreman boiler maker on the Erie at Meadville, Pa., from April, 1906, to January, 1911, and was assistant master mechanic on the Baltimore & Ohio at Pittsburgh, Pa., until March, 1912, when he returned to the Erie as foreman boiler maker at Jersey City. From July, 1912, to July, 1914, he was assistant foreman in the tank shop of the American Locomotive Company at Dunkirk, and then was inspector with the Lima Locomotive Works at Lima, O., and from February, 1915, to August, 1916, was boiler maker foreman on the Lehigh Valley at Sayre, Pa.

Obituary

W. P. Boger, general freight agent of the Florida East Coast Railroad, with headquarters at Jacksonville, Fla., died in the East Coast Hospital, at St. Augustine, Fla., on April 27.

William N. Noon, formerly superintendent of bridges and buildings of the Duluth South Shore & Atlantic, who retired in 1912, died on April 27, at his home in Miami, Fla. It is believed that Mr. Noon's death was due to a fall which he sustained while walking on a highway bridge soon after his retirement.

Frank May Souther, assistant treasurer of the National Railways of Mexico, with office at New York, died at his home in New York on April 26, after a short illness. Mr. Souther served on the Mexican Central Railway Cmopany, Limited, for about 20 years (part of this time, from 1907 to 1909, as treasurer), previous to the merger of that road and the National Railway Company of Mexico, to form the National Railways of Mexico, and since that time he was assistant treasurer of the new company.

Charles H. Jacobi, assistant engineer with the Division of Capital Expenditures, United States Railroad Administration, died of pneumonia in Salt Lake City, Utah, on April 20, while on an inspection trip en route to the Pacific coast. Mr. Jacobi was born in Brooklyn, N. Y., on March 14, 1883, and was employed for a number of years as assistant engineer with the Lehigh Valley, and more recently as construction engineer with the Westinghouse, Church, Kerr Company, New York. He entered the service of the Railroad Administration on July 22, 1918.

EDITORIAL
Railway Age

Japan's Rights in Shantung

The *Railway Age* does not care at this time, at least, to enter into a discussion of the political aspects of the recent decision of the Paris peace conference whereby the former German rights in the Chinese province of Shantung are to be transferred to Japan. It does believe, however, that the decision is of far-reaching importance from many points of view. By the agreement made, to quote from the Associated Press despatch, "Japan voluntarily engages to hand back Shantung province in full sovereignty to China, retaining only the economic privileges granted Germany, and the right to establish a settlement at Tsingtao, south of Kiaochau." That the economic privileges mentioned are great is generally understood. That they will help Japan in its efforts to secure access to one of the greatest coal fields in the world is not so generally known. The *Railway Age,* therefore, feels itself somewhat fortunate in being able to present to its readers the article on another page by Frank Rhea, which clearly outlines the salient facts in the situation, from the railroad and transportation standpoint. In his article, Mr. Rhea has purposely omitted all reference to the controversial and speaks only from the point of view of an engineer who has visited the country in question and has studied it first hand.

A Sometime Forgotten Item

The standard contract between the government and the railways lays the burden of paying expenses accrued prior to the assumption of government control upon the railroad corporation. In like manner, when the roads are turned back to their owners, the accrued but unpaid expenses of the properties under the Railroad Administration will have to be paid for by the government. These accrued expenses cannot be taken into the accounts until they are known. Practice among different roads has varied and the amount of liability for accrued expenses that have not gotten into the accounts is greater proportionally on some roads than on others. This amount cannot be reflected in the balance sheet. For instance, no liability is shown in the balance sheet for a claim for loss and damage until the amount of such claim has been determined. There is a total of such unaudited accounts much larger than most people realize. For instance, the income deductions account of the Chicago, Milwaukee & St. Paul, *Railway Age,* April 18, 1919, page 1026, shows that the expenses prior to January 1, 1918, credited in account with the Railroad Administration amounted to $5,583,965. Ordinarily, of course, these expenses are simply carried into the next year's accounts and since each year bears corresponding expenses for the previous year, the accounts fairly correctly represent a 12 months' expenditure, but when the accounts are cut off, as they were as of January 1, 1918, there slowly come in items which the corporations have had to pay out of their own funds and it must be remembered that the government took over the cash as well as other working assets. These bills have had to be paid, therefore, either through borrowed money or from rental received from the government or from other corporate sources of income. There is, however, the reverse side to this situation. When the roads are turned back to their owners there will be a corresponding total of items coming in to the government to be paid by the government, which would not be reflected in the balance sheet if one were to be drawn up today for the United States Railroad Administration. This is a factor which should not be forgotten in making an estimate of what funds are required for working capital, payment of rental, etc., by the Administration. Indeterminate as it is, it must be reckoned in some way in the cost of government operation and allowed for in Congress appropriations.

"Cost Plus" in Railway Construction

The "cost-plus" form of contract was in many ways a desirable instrument for the award of railway construction work under the uncertainties of war times. Inability to predict basic costs even a short time in advance made the unit price or lump sum contract undesirable, since the bidders had to make their tenders high enough to cover the maximum unfavorable conditions and the highest possible cost of materials and labor. Now, during the period of readjustment, conditions are subject to nearly as much uncertainty as during the war. Owing to the apparent failure of the price stabilizing plans and the fact that the prices of certain classes of labor are still subject to the laws of supply and demand, no one can predict with any accuracy what work will cost two months hence. Therefore, the form of agreement which will protect the contractor against rising costs, yet will allow the owner to take advantage of any reductions in the prices of materials and labor, would seem highly desirable from many aspects. The one basic objection to this arrangement lies in the lack of incentive for efficiency under the cost-plus contract. One contractor doing work on a unit price basis is now paying as low as 30 cents for common labor, thus obtaining a neat margin over a bid made last fall under much less favorable circumstances. The question arises whether he would have taken the trouble to secure labor at this low rate if it had not been to his pecuniary advantage to do so. However, even this objection would not seem to justify the use of the unit price or lump sum forms of contract under present conditions for any except the small jobs to be undertaken immediately and completed within a few weeks' time. Work of this kind does not involve the uncertainties inherent in the larger projects of railway construction.

Savings Due to Interlocking Plants

A STUDY OF THE ECONOMIES effected by the installation of interlocking plants made in 1905 showed that 45 cents was a conservative figure for average cost of stopping a train. It was also found that when from 16 to 19 trains a day had to stop at a crossing the annual saving offset the annual charges (interest, depreciation, maintenance and operation) against interlockings of a certain size. At drawbridges, where it was assumed no additional men were needed, the same thing was true, with a daily traffic of 7 or 8 trains. If more trains were operated, interlocking at such points would more than offset the charges against it. The cost of materials has steadily climbed since this investigation was conducted,and while this would increase the cost of a plant, the cost of stopping trains has also undoubtedly increased in an equal or greater proportion, so that the above ratio should hold good at present.

When railroad traffic is heavy the officers have little or no

opportunity to plan or put into effect certain economies, but during periods when less active business prevails, an opportunity exists to carry on such studies. Where savings can be made those of an intangible nature are usually the last to be considered, even though they would in the aggregate amount to large sums yearly. An interlocking plant usually reduces the cost of operation, but the saving is to a large extent of an intangible nature. Not only do plants eliminate the cost of stopping trains, but their installation may permit of the hauling of heavier tonnage because of the elimination of stops. Other items to be considered are the prevention of damage in starting heavy trains, the increased safety of operation, the reduction of time on the road and the general improvement in train movement.

As an example, the studies made in 1905 by J. A. Peabody, signal engineer, Chicago & North Western, show a net saving of $2,300 a year effected by the installation of an interlocking plant at a point where two single-track roads cross, with a total of 30 trains a day on both roads. The time required to pay for the installation from these net savings, neglecting all other factors, is three years. Twenty like places interlocked on a system meant a saving of $46,000 per year at that time. A proportionate saving would result at the present time, as was brought out in an article by C. C. Anthony, published in the *Railway Age* last week. Railroad officers may well afford to have similar studies made at the present time covering points on their systems not now interlocked, such as grade crossings, drawbridges, entrances to yards, crossover locations, etc., looking to the construction of plants as soon as conditions warrant.

Can Electrification Meet All Future Requirements?

The railroad men who are responsible for keeping the railroads operating on a sound basis are of a necessity hard-headed. They have had the advantages of electrification presented to them in such glowing colors for so long by enthusiastic promoters of electrification that they are not prone to recognize its merits when presented to them fairly. They know that general electrification would conserve a vast amount of the nation's coal, that electric locomotives are capable of high sustained drawbar pull at comparatively high speeds, that electrification increases track capacity and has numerous other advantages. They also know that the first cost of electrification is very large, that it requires more or less complicated overhead systems, that it means a necessary departure from established methods of operation and that existing conditions in a territory under consideration for electrification are the deciding factor for or against its adoption.

It is difficult to frame a convincing argument showing that electric operation improves service and reduces the cost per ton-mile of hauling freight. It can be done, however, and railroad men know that the amount of electric operation is bound to increase. For this reason they are interested in the specific problems involved. For example: Is there to be a continuous increase in the weight and length of trains as there has been in the past? What is to limit the capacity that can be hauled? Is it the length of the train, or the weight, or the power requirements or some other factor? What is the economic speed for passenger and for freight work? What requirements will be made of electric locomotives which are not inherent in their operation? Is it necessary to provide for moving fleets of freight trains or can they be scattered through the day to give a load factor on the line which can be handled without prohibitive expense? These are questions which vitally affect the economy of electrification. The inherent characteristics of steam and electric locomotives will largely determine which shall be used to meet future problems, and for this reason the abstract in this issue of the paper presented by W. R. Potter and S. T. Dodd at a recent meeting of the Western Railway Club is of timely interest.

Government Guarantees to Railroads

Upon most of the important questions regarding the legislation under which the railways should be returned to private operation there is now substantial agreement among those who have given long and earnest study to the railroad problem, and who are in favor of a return to private operation. But the most important question involved is that of what means shall be adopted to restore and maintain the credit of the railway companies so that they shall become able adequately to develop their facilities; and upon this really vital question there is serious disagreement.

The difference of opinion is chiefly over whether the companies shall be given guarantees of net operating income by the government. Government guarantees are advocated by persons who have widely different reasons for doing so. They are advocated by Senator Cummins, who will be chairman of the Senate Committee on Interstate Commerce, on the ground that they would reduce the capital charge and thereby effect a saving in the cost of transportation. In an editorial in our issue for April 25, page 1031, we presented our reasons for believing that the effect of government guarantees to individual companies would be to increase rather than reduce the total cost of transportation.

Government guarantees are also being advocated by some of the leading financiers of the country, including Paul M. Warburg. Director General Hines also favors them. Most of the financiers who advocate them do so because they fear that in the absence of guarantees the regulating authorities can never be prevailed upon to make the net return earned by the railways large and sure enough to attract adequate capital.

Those who take this position have the strong argument of experience on their side. The system of regulation which prevailed during the 11 years before government control was adopted was a failure chiefly because the federal and state regulating authorities would not let the railways earn enough net return. The State authorities were the greatest offenders, but the Interstate Commerce Commission was far from guiltless. Most of those who favor guaranteeing the railway companies minimum returns also propose that those which earn more than the guarantee shall be allowed to retain part of the excess as an incentive to efficiency, the rest to go partly to the government and partly to labor.

The plan of giving guarantees to individual companies, whether upon the basis of valuation or any other basis, is opposed by most of the shippers of the country. It is opposed by many leading financiers, including Otto H. Kahn. It is also opposed by a majority of the railway executives, and especially by those who represent relatively prosperous roads. One very strong argument against it was presented by Samuel Rea, president of the Pennsylvania Railroad Company, in his address before the Chamber of Commerce of the United States last week, which is published elsewhere in this issue. The principal point made against government guarantees is that they would impair the incentive to efficient management. Another point is that if some of the railways failed to earn their guarantees and the government had to make them good from the public treasury, there would result controversy and agitation which probably would lead to government ownership.

The *Railway Age* has never had any doubt as to the general policy which would most effectively further the welfare of both the railways and the public, if it could be adopted. The

best policy would be, to let the railways make all consolidations and agreements which will not prevent competition in service and emulation in operating efficiency, and earn as a whole, a net return sufficient to attract adequate capital without guaranteeing a minimum to any individual road. Perhaps legislation and a system of administration can be secured under which this will be done. The principal shortcomings of the old policy of regulation were due to the following causes: First, the Interstate Commerce Act required the Interstate Commerce Commission to fix "reasonable" rates, but did not specifically make it the commission's duty to fix rates which would enable the railways to earn a return adequate to develop their facilities. Second, the commission as now constituted was created and its members were appointed at a time when the public believed that the sole function of regulation was to punish and control the railways and not to help them. Third, regulation by the Federal Government was constantly interfered with by that of the States. In consequence of these things, most of the members of the Interstate Commerce Commission during the last 13 years have regarded the railway companies with chronic suspicion and hostility, and even when the commission has shown a disposition to give the roads adequate rates its work has been interfered with by the State commissions and denounced in Congress. Bills have been introduced to abolish it, the real purpose of which was to prevent it from granting needed advances in rates.

It may be that regulation would be given a very different tone and tendency if the Interstate Commerce Commission were by express legislative enactment required, first, to prevent any interference by the States with Federal regulation of interstate commerce, and, second, to make rates not only reasonable in their relations to each other, but adequate to enable the railway companies to develop their facilities sufficiently. But whether this would be enough to solve the problem of regulation is very doubtful. Some members of the commission have within recent months publicly contended that it did let the railways earn an adequate return. Not much can be hoped from men who cannot see facts that are as plain as a pikestaff.

Many persons have criticised the plan of regulation put forward by the Association of Railway Executives because it proposes to transfer most of the administrative functions of the Interstate Commerce Commission to a Secretary of Transportation. But the railway executives do not ask for any government guarantees, and their proposal that a large part of the authority and duties of the commission shall be transferred to a Secretary of Transportation, is merely their way of saying that in the absence of guarantees they would fear to leave their case entirely in the hands of the commission. And they are amply justified in this position. It is clear that if private operation is to be made a success at all, either the railway companies must be given government guarantees, or the Interstate Commerce Commission must be so reconstituted as to render certain that the policy followed by it in regulating rates in future will be widely different from that followed in the past; or a large part of the administrative functions of the commission must be transferred to some other official or body. In the absence of guarantees, rate cases must in future be decided more promptly; intelligent cognizance must be taken not merely of existing conditions, but of prevailing tendencies; and the rates allowed must be adapted not to restrict the railways to the so-called "fair return upon the fair value of their properties," but to provide them with revenues ample to enable them to give good service and to expand their facilities. It may be, as those who oppose specific guarantees contend, that the guarantee policy would soon land us in government ownership. But it is even more certain that if guarantees are not given and the policy of regulation of rates formerly followed is restored we shall soon be forced into government ownership.

Delaware & Hudson

ONLY WHEN THE GOVERNMENT began to have to cast about for ways and means of raising the money to operate the railroads did any considerable number of people discuss the railroad problem, not as an effort to find ways of suppressing a predatory power, but as a question of how the transportation system of the country can be continued in its development and be best operated. When men like Samuel Rea, Daniel Willard, Frank Trumbull and Julius Kruttschnitt went to Washington and confessed frankly that they did not know where the money was to come from for the continued development of the roads, the great majority of the public was skeptical and somewhat amused. Had these gentlemen tried fully to express the acuteness of the fear with which they viewed the situation, it would have but laid them open to the ridicule of the Clifford Thorne's and the Hearst papers.

The railroad men and some of the bankers knew how affairs were actually shaping themselves. L. F. Loree, president of the Delaware & Hudson, and a close friend and associate of the late E. H. Harriman, made the remark, at the time of Mr. Harriman's death, that he, Harriman, saw as clearly as any pessimist of them all what the course of events was leading to, but that he differed from his associates in that he had such entire confidence in his own ability to meet the situation that he viewed it without apprehension. Whatever particular form the solution of the present railroad problem may take, the first essential in devising the solution is a thorough understanding of the problem itself. Thoughtful students of public affairs more and more often have been been asking where the money is to come from to continue the development of American railroads.

The Interstate Commerce Commission tried in a theoretical bookkeepingish way to draw a hard and fast line between operating expenses and capital expenditures. The stronger railroad companies, with far-sighted and wise managements, at first protested the definition of expenses, and then frankly took the attitude that the commission could define expenses as it pleased; they, however, would continue to put into the property great sums of money over and above what the commission defined as maintenance and to issue securities against only a part of such so-called capital expenditures. Had earnings been sufficient to permit of such a course, the railroad managements which adopted it would have had a good prospect of success.

The factors involved in the development of an American railroad are different than the factors involved in the continued operation of railroads in Great Britain or in continental Europe. The Interstate Commerce Commission's theory of accounting might have been applicable to the Prussian State Railways. It was probably influenced by German practice, and nothing could demonstrate more clearly the fact that the commission had not the faintest comprehension of the fundamentals of the industry which it so confidently set out to regulate. That it was lack of comprehension and nothing politically immoral that swayed the commission goes without saying. There has never at any time been the slightest question of the integrity of the commission.

The development of an American railroad makes a tremendously interesting study. Concealed or revealed, dependent on the reader, in the masses of statistics reported to the commission and to stockholders, there is a wealth of incidents worthy of as much interest as the history of a country or the life of a great statesman. Seldom, if ever, has such a story been written in a language intelligible to the average reader. L. F. Loree, in his annual report to the stockholders of the Delaware & Hudson, has undertaken to do this very thing. The road is being operated by the government, and Mr. Loree, therefore, dismisses quite briefly the

year's operations and devotes himself instead to a discussion of the development of the property from 1907, when the new management took hold of it, to the time it was turned over to the government. This story of the Delaware & Hudson, rightly and fully comprehended, gives the essentials of the railroad problem. Could it have been read and understood by each interstate commerce commissioner, there would have been no need for long drawn-out rate cases. The Delaware & Hudson report is not easy reading, notwithstanding the fact that statistics are avoided and figures are used very sparingly. It is both tersely and intensively written; facts are stated often without comment; conclusions are arrived at by the writer only after they have become inevitable to the reader.

In Poor's Manual for 1872-73, in the description of the Delaware & Hudson Canal Company, which controlled the Delaware & Hudson canal and the Delaware & Hudson railroad, the following occurs: "The company derive their income mainly from the mining, transportation and sale of anthracite coal, conveyed to market over their own works. The incidental traffic is very limited, and brings no net profits into the treasury. For several years the company's stock has received dividends, February and August, each of 5 per cent." As a matter of fact, although the Delaware & Hudson, as Mr. Loree points out, is one of the oldest railroad companies in the United States, and "was the first to operate a steam locomotive on the American continent," it was formerly an adjunct to coal operations rather than a machine depending entirely on its earning power as a common carrier to reimburse its owners and creditors.

Prior to 1907, however, a considerable expansion of purely transportation facilities had taken place and the former management had gotten the company into a rather difficult situation, partly through the purchase of unprofitable electric lines and partly through lack of sufficient forethought and courage in the development of the railroad property and the financing thereof. When, therefore, the new management took hold in 1907 it had to deal with nearly all of the important elements of the problem which has faced American railroad men. The management has been eminently successful and turned over to the use of the government a thoroughly modern and up-to-date American railroad property. The success of the Delaware & Hudson has, we believe, been in part due to the strength which the coal department of the company lent to its credit and, in remaining part, to the skilful use of this credit by the management in the development of the machine as a transportation machine. Again and again, in Mr. Loree's story, we come across the evidences of the studied development of a plan as a whole, of which the purchase of Mallet locomotives, the building of the Oneonta yard, grade reduction, etc., are only parts, each carried out in co-ordination with other parts of the general plan. It is the extraordinary sureness and nicety of fit of the parts that has contributed so much to the success of the Delaware & Hudson.

The rental which the company should get under the standard contract is $7,415,000, and after taking into its income account other corporate income and after the payment of war taxes, rentals and interest, the company had $4,715,000 available for dividends, or an amount equal to 11.09 per cent on its stock. The Delaware & Hudson is paying dividends at the rate of 9 per cent annually.

Ordinarily, the annual report of the company includes details of operating expenses and statistics of operation, but this year these details are omitted, although the figures will later become available through reports to the Interstate Commerce Commission. It seemed best, therefore, to leave an analysis of the operation of the property, by the federal manager in the employ of the government, until next week, or such time as the detailed figures are available, and to confine these comments to the historical sketch of the development of the property from 1907 to 1918, which is contained in the report to stockholders, and the greater part of which is reprinted elsewhere in this issue of the *Railway Age*. It is a document which is worthy of the most careful study by all those who are now engaged in discussing the future of the railroads. Different phases of history have, from time to time, brought out some supremely comprehensive and searching narrative and analysis of the events, and occasionally a phase of history, an economic development, or the career of a statesman, calls forth a classic in the shape of a history, an essay or a biography. This report of Mr. Loree's, confined as it is to the history of one railroad company, the Delaware & Hudson, is, nevertheless, such a classic dealing with the history of American railroads in the last decade.

The Railroads—A Bankrupt Industry

THE DEFICIT INCURRED by the Railroad Administration not only continues to grow, but grows faster than even the most pessimistic have feared. It was $58,000,000 in March. This made the total deficit for the first three months of the year approximately $130,000,000, or almost one and a half million dollars a day. The government's guarantees of standard return to the companies, in these three months, based upon the net operating income which the companies had formerly earned in those months, were $170,000,000. The net operating income actually made was only $40,000,000, or but 23 per cent of the guarantees.

These startling figures ought to raise in the minds, not only of everybody directly concerned with railway operation, but also in the minds of public men and the public, the question of what is the matter with the railways?

The *Railway Age* has said repeatedly within recent weeks that if the wages now being paid are to be continued passenger and freight rates must be substantially advanced or the railways will be unable to earn the guaranteed standard return under Government operation or to earn sufficient net operating income under private operation to save the railway companies from general bankruptcy. Director General Hines, on his recent trip to the Pacific coast, made a number of addresses and public statements. He appears to have attributed the current bad showing of earnings and expenses chiefly to the heavy decline of traffic. He indicated that in his opinion the results will improve when industrial and transportation conditions become normal. He implied that until then no advance in rates will be made, and apparently left the impression that probably little or no advance in rates may be necessary.

Let us consider the director general's attitude in the light of the facts. It is true there has been a decline of traffic; and some refer to the business which has been handled thus far this year as abnormally small. It is smaller than that of 1918 or 1917; but conditions in 1917 and 1918 were not normal, and the traffic handled in those years showed a vast increase largely due to war conditions. Let us go back to the first three months of 1916. In that year the railways had the largest increase of traffic that ever occurred in any single year. They made the largest operating income ever made in one year. Every one remembers this. Doubtless, consequently, most people assume that because of the recent decline in traffic the business which has been moved thus far this year has been much less than in the remarkable year 1916. It is somewhat disconcerting, therefore, to find that in the first three months of 1919 the freight traffic of the railways was 85,000,000,000 ton-miles, while in the first three months of 1916 it was only 80,000,000,000 ton-miles, an increase in 1919 over 1916 of over 6 per cent. Furthermore, the traffic handled in the first three months of this year

was only 10 per cent less than that moved in the corresponding three months of 1917 and 1918. The railways moved less freight in February and March of this year than in the same months of 1917 and 1918, but they moved more in January than in either of those years.

Bearing in mind that the freight traffic moved in the first three months of the year was 6 per cent greater than in the same three months of 1916, let us compare the earnings made and the expenses incurred. The total earnings in these three months in 1916 were $811,000,000, while in 1919 they were $1,120,500,000, an increase of 38 per cent. The operating expenses in 1916 were $560,000,000, while in 1919 they were $1,037,000,000, an increase of 85 per cent. In the first three months of 1916 the ratio of operating expenses to total earnings was 69 per cent. In 1919, with passenger rates 50 per cent higher, and freight rates close to 35 per cent higher, the ratio of operating expenses to total earnings was 93 per cent. In the first three months of 1916 the railways, after paying their expenses and taxes, had left $214,000,000 of operating income. In the first three months of 1919 they had operating income (which is slightly larger than *net* operating income) amounting to only $44,000,000, a decline as compared with 1916 of 79½ per cent.

It is easy enough for anybody who carefully examines the foregoing figures to see what is the main trouble with the railroads. It is not the decline of traffic, but the increase of expenses. The increase of expenses seems especially startling when it is considered that the weather conditions for this period were abnormally favorable to economical operation.

Mr. Hines seems to look forward confidently to a revival of business which will stop the decline in traffic. Doubtless that will come. But that it will come soon enough or be large enough to prevent the loss of traffic during the year from being relatively as large throughout 1919 as it was during the first three months—that is 10 per cent—there seems no good reason for believing. If the loss of traffic throughout the year should be relatively as large as it was during the first three months, and railroad expenses should continue to be relatively as large, the railroad deficit for the year would be not far from three-fourths of a billion dollars.

Mr. Hines is also counting upon a substantial reduction of expenses. But the progress which had been made up to the end of March does not inspire hope. In January, when there was an increase of 10 per cent in the freight moved, the increase in operating expenses, compared with the same month of 1918 was 32 per cent. In February, when the decline in freight traffic was 13 per cent. the increase in expenses was 24 per cent. In March, when the decline of freight traffic was 23 per cent, the increase in expenses was 22 per cent. Whether the business moved increased or decreased, the large increase in expenses went on.

We can draw only one inference from these three months' statistics, or, for that matter, from the statistics regarding the six months of operation following the signing of the armistice. This is, that no increase of traffic, or increase in efficiency of operation, or increase in both, which there is the slightest possibility will occur, would leave the railways anything but a hopelessly bankrupt industry, if existing wages and existing rates were retained.

The fact cannot be too strongly emphasized that, from the standpoint of its earnings and expenses, the railroad system of the United States is today absolutely bankrupt. It is earning only 23 per cent as much net operating income as in the three years ended with June 30, 1917, in spite of the fact that its gross earnings are running about 50 per cent more than they averaged in those years. The rates must be advanced, and substantially advanced, if the railroads are ever to be converted from a bankrupt into a prosperous industry, and this whether government operation is continued or private operation is restored.

Letters to the Editor

The Lessons of the Past for Guidance in the Duties of the Present

St. Johns, Que.

To the Editor:

The educational value of your paper for young trainmasters and division superintendents is a fact often remarked in railroad circles and, of course, does not need to be proved by any specific declaration in your columns. Like the Washington monument on the banks of the Potomac, or the Statue of Liberty in New York harbor, it is as patent, to those who look, as is the monumental building in which you frame up your useful lessons for ambitious readers. But even those massive monuments are to most of us rather dim, because ordinarily we are too distant to take in all of their details; and the teachings of the Railway Age in like manner often suffer from our inability to focus attention on specific points. You will be pleased therefore, to hear of a definite item in this field of knowledge and of railroad science. In publishing your lucid and searching accounts of the shocking collision near Nashville, Tenn., last summer, you contributed toward the prevention of a similar catastrophe on another road. Two passenger trains were running in opposite directions toward each other and one of them was prevented from proceeding beyond the meeting point (through the forgetfulness of all hands) only by the presence of the trainmaster on the train, who called the negligent men to their senses.

Train No. 3 was proceeding westward, from a point which we will call Boston, toward "Chicago," which was the end of double track. Thence, on the single track line, the distance was 9 miles to Washington and thence 15 miles to Waterloo. About half a mile before reaching Chicago, the trainmaster observed that they were meeting train No. 2; No. 2 being superior to No. 3 by direction, and both first class passenger trains. He observed also that No. 2 displayed green signals, yet did not sound the whistle to call the signals to the attention of the men on No. 3. No. 3 had a car to set off at Chicago; so the trainmaster had some little conversation there with the engineman and fireman.

After the engine had backed on to the train and the conductor had shouted "All aboard" and it was plain that no thought had been given to the second section of No. 2, the trainmaster said to the engineman "Where are you going?" The engineman replied "Why, what's the matter?"

"What have you got on No. 2?" said the trainmaster. The engineman then replied that No. 2 had gone. On being told that it carried green signals he declared otherwise; and he said to his fireman, "Did No. 2 have signals?" The fireman replied that it did. Then the trainmaster, telling the engineman to remain at a standstill, went back and asked the conductor what he had on second No. 2. The conductor replied that he had nothing; and he did not know that No. 2 was carrying signals.

The point of this story is that the trainmaster, in relating the particulars to my informant, said that he had been reading about the Nashville collision; and he had the facts of that disaster in his mind. The engineman of first No. 2 failed to sound the whistle. The fireman of train No. 3 failed to speak to the engineman when he saw the green flags. The conductor of No. 3 failed to make any inquiry at the end of double track (there is no train register at this point). Thus four men "fell down"; and who knows whether the trainmaster would not also have fallen down if he had not been a regular reader of the Railway Age? K. & Q. C.

Chamber of Commerce Discusses Railroad Situation

Suggestions for Permanent Solution of the Problem a Feature of St. Louis Convention

With one of the six general sessions and a group meeting devoted exclusively to the railroad problem and its solution, discussion of the present transportation situation developed into one of the features of the seventh annual meeting of the Chamber of Commerce of the United States which was held at St. Louis, Mo., April 28 to May 1 inclusive. The feature of this convention of most interest to railway men was the general session, held on the evening of April 30, at which Walker D. Hines, director general of railroads, Senator Albert B. Cummins of Iowa and Samuel Rea, president of the Pennsylvania spoke in the order named. The preceding day a group meeting, presided over by George A. Post, chairman of the railroad committee of the Chamber of Commerce of the United States, was devoted to the subject of railroad transportation. At the same time the railroad problem and the relation of the present situation to the general state of business, entered into the discussion in several other group meetings, especially in one devoted to wholesale domestic distribution at which Luther M. Walter, counsel for the National Association of Owners of Railroad Securities delivered an address on "The Desirability of the Return of Railroads to Private Ownership" and M. J. Sanders, federal manager of the Mississippi-Warrior Waterways at New Orleans, La., spoke on "The Importance of Co-ordination of Rail and Inland Waterway Transportation."

An outstanding feature of the general session devoted to the discussion of the railroad problem, at which Director General Walker D. Hines, Senator Albert B. Cummins and Samuel Rea spoke, was the similarity of the solutions presented by Mr. Hines and Senator Cummins. The solution offered by the former was in substance the same as that outlined before the National Lumber Manufacturer's Association in convention at Chicago, an abstract of which was published in the *Railway Age* of April 18, with the exception that in this case Mr. Hines immediately delved into the solution of the present problem and went into detail as to the disadvantages of the present and past systems and the advantages of the solution he proposed. Senator Cummins in turn presented his solution, outlining practically step by step the same principles advocated by the director general. Senator Cummins' solution of this problem is essentially the same as that outlined in his address delivered on March 27, before the general assembly of Iowa which was reproduced in the *Railway Age* of April 25, page 1041.

Address by Honorable W. D. Hines

Director General Hines said in part:

I want to tell you that my own judgment, based on a very careful study of this subject since the federal control began, is that the best interests of the country will be promoted, not through permanent government control of the railroads but through the return of the railroads to private management. It is also highly desirable to have a permanent solution at the earliest possible time, so that this return may take place without unreasonable delay, but so that it will not be necessary to take place until a permanent solution shall have been adopted. I think at times the disposition to want a very early return to private management has obscured the appreciation of the necessity for thoroughgoing legislative reform before that return takes place.

Viewing railroad regulation from the standpoint of the private management and the public standpoint, I have undertaken to make a diagnosis of the trouble which seemed to manifest itself in the sort of regulation which we have had in the past. I think there is general agreement that the regulation was not satisfactory. It seemed to me as the years went by the regulation was increasingly unsatisfactory from the public standpoint, and that from time to time there was increasing unrest with the conclusions which were reached by the regulating bodies.

Undoubtedly the regulation was unsatisfactory from the standpoint of the capital invested in the railroads because the difficulty in attracting capital into the railroad business had become increasingly apparent. The condition had arisen for several years where it was almost impossible to sell railroad stocks, and the new money needed by the railroad had to be raised almost wholly by the creation of additional debt, so that the proportion of debt to total capitalization was rapidly increasing and the credit of the railroads was correspondingly diminished. Now based on my observation of this matter, first from the private management standpoint; secondly, from the public standpoint, I want to put before you my conception of the fundamental difficulties of the old form of regulations, because I think a clear appreciation of these difficulties will be the first step in arriving at a satisfactory remedy.

I would put first among the difficulties of the old form of regulations the fact that there was an entire absence of standards by which the regulation could be governed. There was a general concurrence of views that the railroads ought to have a fair return on the fair value of their property and no more, but nobody knew what the fair return ought to be; nobody knew what the fair value of the property ought to be, so it was unending debate all the time. We had a condition which in my opinion made successful regulation under the old conditions utterly impossible, and that is what I wish to mention as the second point in my catalog of fundamental difficulties with the old form of regulations. That second point is the wide disparity between the weak roads and the strong roads.

We had about 180 railroad companies in this country with revenue of a million dollars or more every year, and we had several hundred companies with operating revenues of less than a million dollars per year. That great number of companies presented every possible variation from a degree of exceptional prosperity to the degree of exceptional adversity, and yet every one of these railroads represented a necessary instrument of public service. Broadly speaking, the rates had to be the same for the weak roads as the strong; to a very large extent the scale of wages had to be the same regardless of the strength of the particular railroad because the cost of the supplies was practically the same for the weak and the strong. So we had a condition that whatever might be done through fixing the rates or through establishing a wage scale, the result was that some railroads would prosper while other railroads could not prosper at all, so that however any question of broad railroad importance was disposed the result led to discontent on the part of the public and to discontent on the part of the owners of the railroads.

There was another feature of regulation in the past which militated against a successful result: there was no point of contact in any effective sense between the government and the railroads. The government was permitting the railroads to exercise important public franchises, and the government was insisting very properly on the most thorough and far-

reaching regulation of what the railroads did, both as to the rates they charged and the service they rendered, and yet there was never any adequate provision for participtation by the government in what the railroads did, and the regulating body that represented the government was absolutely separate in its method of procedure and in the conduct of its business from the private management which represented the owners of the capital invested in the railroads. The railroad business, therefore, was conducted by two factors, each of vital importance, and yet those two factors were entirely aloof from each other. Each operated without adequate understanding of the point of view of the other; neither was in position to explain in a timely way its ideas to the other. That absence of any connecting link, the inability to have a common understanding of the necessity of the situation, was another reason why the regulation did not tranquilize the situation, but generally any definite step that was taken was simply the starting point for new agitation and new discontent.

Another point which was of very great importance was the persistent suspicion which was entertained by a very substantial part of the public and which was almost unanimously entertained by labor, that the railroads, or some of them, were heavily over-capitalized. Any argument that was made on behalf of the owners of the railroads against the institution of any given level of rates, or in opposition to any proposed increase in the level of expenses was disregarded by a considerable part of the public and by labor almost altogether because of this persistent belief that the railroads were over-capitalized.

Then again, and connected with that thought of over-capitalization, the public very generally believed that since the railroad business was a public business and could be conducted only by the exercise of important public franchises and since in its nature it was practically a monopoly, no matter how much competition in service there might be, it was of great importance that the public and labor should not be exploited for the benefit of the private capital. Plausible cause might be made for increase of the rates, and yet there was the fear that if the increased rates produced more than was absolutely necessary, or if conditions became more prosperous, so that there would be additional profit, that profit would inure wholly to the benefit of the private capital. There was no way in which the public could participate in it, and this fear of the public being exploited for the benefit of private capital was always tending to prevent a confidential and liberal treatment of the railroad question.

I would list those five propositions as the five fundamental evils of the railroad situation: first, the absence of standards; second, the wide disparity between the weak and the strong roads; third, the absence of any point of contact between the regulating body and the private management; fourth, the suspicion as to over-capitalization; and fifth, the fear that the public would be exploited for the benefit of the private capital.

Those difficulties I have mentioned were obvious before the war. They are very much more serious, and much more obvious now. The railroad situation in the future is going to be far more difficult than it was in the past. The disparity between the weak and the strong roads is going to be more pronounced; there are going to be fewer roads which can survive on the basis of their individual earnings. So whatever may have been the necessity for a radical and effective solution of these difficulties in the past, that necessity is multiplied many times by the new conditions which will confront the railroads of this country, and which have been the outgrowth of this war.

Simply as an illustration further to emphasize the point I have made, and to serve as a basis for discussion, I want to put before you my personal view as to a solution, and in all that I say I want to emphasize that I am speaking for myself alone.

This would be the solution which I personally believe ought to be adopted. I think there ought to be a compulsory consolidation of the railroads of this country into a few large competitive systems. I believe the American public wants competition in service, and I think that can be accomplished through the creation of a few large systems, say anywhere from 12 to 20. I believe in each of the three great sections of the country—the West, the East and the South—a few large railroad companies can be constituted each of which will be a strong system, and the several companies in each of these regions will give effective competition in service at practically every important point which now enjoys competition.

Each of these railroad systems can be made to combine the strong roads and the weak in such a way as to present a fair average in the general situation. In that way we will get entirely away from the insuperable difficulty in the past of trying to apply a single standard to railroads so different in their earning capacity that it was impossible for the same standard to work for all.

Since these railroad companies, reconstituted in this way, would have an official capitalization, that official capitalization would put an end for all times to come to this prevailing and persistent suspicion as to overcapitalization.

Having those railroad companies constituted in that way, with an official capitalization, I think the government ought to be business-like enough to save its own money and the money of the public by guaranteeing a moderate return on that capitalization, instead of by adopting a plan of giving an assurance which amounts to a sort of a moral guarantee, but yet is so uncertain as not to accomplish the result intended, either in attracting the new capital necessary, or in assuring an adequate public service. The government is morally bound, and as a practical matter it is bound, to keep the railroads in condition to render the public service, and if it cannot accomplish that in one way, it will have to accomplish it in another.

If you stopped there, you would wipe out the private initiative, which I think is of the utmost importance in order to get satisfactory public service, and in order to get a maximum of efficiency and economy, I would preserve that private initiative by giving private management a fair participation in the profits that might be earned in excess of this moderate guaranteed return. In that way the railroad management would get enough to stimulate private initiative just as effectively as it would be stimulated under any other system and at the same time the fact that there was a division of the profits, and perhaps, a rapidly ascending proportion of profits going to the government, or to the government and labor, would prevent the public and prevent labor from this suspicion and fear that it has always had that it would be seriously and detrimentally exploited for the benefit of private capital.

I believe that would result in removing the disposition toward illiberal treatment because I think that disposition has grown largely out of the fear, first of overcapitalization, and second, that there would be an unfortunate exploitation of the public for private benefit, if the rates were increased in a liberal manner, and I think this participation in the profits, along with the official classification, would guarantee that moderate return, and would get rid of all those difficulties.

I would go further than that. I would have the government represented on the boards of directors and I would have some of the government directors made members of the government regulating body, and in that way we would establish the necessary point of contact so that the private management in conducting this public business would do so with the advice and counsel of the representatives of the public, and so

that the regulating body, when it undertook to deal with this subject, would do so in the light of the knowledge acquired by members of its own body who were in daily contact with the management of the business.

Senator Cummins' Plans

Senator Cummins, after stating the supposition that President Wilson will retain the possession and continue in the operation of the railroads until Congress has had a fair opportunity to enact a permanent policy for their regulation and control and that Congress will proceed with the task and bring it to a conclusion within the next 12 months, concurred in the belief of the Director General that there must be a series of consolidations which will merge the weak roads with the strong ones to the end that the resulting systems may do business upon substantially even terms. Under this plan Senator Cummins would have the railways consolidated into 18 or 20 systems under the initiative and direction of the government.

However, these systems would not be regional systems; on the contrary, they would preserve competition in every part of the country and in practically every community. The second principle of the solution presented by Senator Cummins is that the government guarantee in some form a return upon the capital invested in railroads. In backing up these two principles of his plan, Senator Cummins cited the disparity in the net operating income of railroads operating in practically the same districts and the amount of return on the railway bonds of the country. The third phase involved in his solution advocated the operation of the railroads by private corporations rather than by the government. All three of these principles are the same as underly Director General Hines' proposed solution outlined above and the making of this solution a reality was indicated in the closing statements of Senator Cummins when he said that he planned to introduce a measure embodying these principles for the solution of the railroad problem in the early days of the coming Congress.

The address of Samuel Rea, president of the Pennsylvania Railroad Company, is published elsewhere in this issue.

Railroad Section Meeting

At the group meeting devoted to railroad transportation presided over by George A. Post, chairman of the railroad committee of the Chamber of Commerce of the United States there were presented the recommendations of that committee which were promulgated after four conferences with executives, financiers, legislators and labor leaders of the country. These recommendations will be presented to the various Chambers of Commerce throughout the United States for a referendum vote. These recommendations as presented were as follows:

1. Adherence to the policy of corporate ownership and operation of the railroads, under a comprehensive system of government regulation.

2. The return of the railroads to their owners as soon as remedial legislation can be enacted, and that no extension of the period of government operation should be made until Congress shall have found it impossible to enact the required legislation within the period possible under the Railroad Control Act.

3. That while adhering to the principle of railroad competition in service, the railroads be allowed, in the public interest, when so declared, and as approved by public authority, to consolidate to such extent and in such manner as may be necessary to enable the existing railroads to unite in a limited number of strong competing systems, so located that each of the principal traffic centers of the country shall, if possible, be served by more than one system.

4. That railroad companies engaging in interstate commerce shall be required to change from state to federal corporations, with suitable provisions in the Act of Congress providing therefor, that the several states shall retain the power of taxation and police regulation of the properties of said railroads.

5. That the Interstate Commerce Commission be authorized to pass upon the public necessity for expenditures of capital (in excess of a stipulated amount) by carriers engaged in interstate commerce, and to determine the amount and to regulate the other conditions of the issuance of securities to obtain the funds required to cover authorized capital expenditures. That a railroad applying to the Interstate Commerce Commission for authority to make capital expenditures, or to issue securities, shall be required to file with the proper authorities of the states in which the railroad is located copies of the original petition; and that the Federal Commission be required to notify the said authorities of the hearings upon the petition in order that they may advise the Federal Commission as to actions they favor.

6. That the Interstate Commerce Commission be given authority by statute to regulate intra-state rates, when those rates affect interstate commerce.

7. The enactment of a statutory rule providing that railroad rates and fares fixed by the Interstate Commerce Commission shall be such as will yield the railroad companies, in each of such traffic sections as shall be designated by the Commission, aggregate revenues which will provide (after provision has been made for renewals and depreciation) a net return upon a fair value (determined by public authority) of the property devoted to the public use. This net return should be sufficient in amount to enable the carriers to furnish the public with adequate facilities and efficient and economical services.

8. The enactment of a statutory rule of profit-sharing, whereby the railroad systems, having a net corporate income in excess of an equitable minimum return upon a fair value (determined by public authority) of their property devoted to the public service, shall be required to turn over a stipulated share of their excess profits to a fund to be employed, as Congress may direct, to strengthen the credit of the railroads as a whole and to enable them to serve the public with greater efficiency.

9. That a Federal Transportation Board be created, whose general duty it shall be to promote the development of a national system of rail, water and highway transportation, and thus to make possible the articulation and economical use of all the facilities, including tracks, terminals and transfer facilities, of steam and electric roads, waterways, and hard-surface highways.

Not only were these recommendations presented to those interested in railroad transportation present at the group meeting but the committee's reason for arriving at each conclusion was also presented. George A. Post, the chairman of the committee, in addressing the group, said in part:

The query for discussion in this section today is: What Shall Be Done With the Railroads? There are several things of importance to be considered in giving the answer, but it appears that *two things* ought to be done, which take precedence in any general statement, viz.: return the railroads to their owners just as soon as the necessary remedial legislation can be enacted by Congress, as preliminary thereto, and in doing so provide them with adequate revenue without which performance our country's commerce and industry must languish.

Before taking up for consideration the financial policy that must be adopted before the railroads may safely be returned to their owners, it may be of interest at this point to make a survey of some other phases of the plan for necessary remedial legislation which will demand the attention of Congress, and which will be useful to it as indicative of public opinion as it seems to have already taken form.

Federal regulation of all issues of securities of corporations engaged in Interstate Commerce is now believed, with practical unanimity, to be necessary for the protection of the public, and legislation to accomplish this is desired.

The joint use of terminals and pooling of equipment in facilitating the movement of freight and passengers is now accepted as a public policy which needs only appropriate legislation to effectuate. This viewpoint has obtained, growing out of methods devised under federal control, and is a

feature of federal administration which cannot be too highly commended, it yet needs to be greatly expanded in the public interest.

There seems to be a marked trend of public opinion in the direction of providing for the consolidation of railroads into a limited number of strong competing systems, such consolidation to be permitted, advised, or even required by federal authority, when it is deemed in the public interest to do so.

That the state commission shall no longer attempt, in the interest of their particular state, to interfere with rates affecting interstate commerce is a view which I believe to be the opinion of a very large majority of the people of the United States. There is yet a desire to retain all the powers that they have heretofore exercised, and through able advocates they entreat the public to trust them with the further exercise of this power. They protest vigorously that they ought not be deprived of the power of rate regulation, but it would seem to be the public opinion now that the Interstate Commerce Commission must have or should have absolute sway in the matter of interstate rates. But if there shall be a disagreement, the rule of the Interstate Commerce Commission must be absolute.

The development of a national system of transportation is now conceded to be a crying necessity, necessitating the articulation and economical use of all facilities, including tracks, terminals and transfer facilities of steam and electric railways, water ways and hard surface highways, and was strenuously advocated by Director General McAdoo before his retirement, and by his successor, Mr. Hines.

There are already over four hundred million dollars worth of demand obligations of the railroads now outstanding, which are likely to be increased before the end of the federal control, which the railroads owe to the government as a consequence of the taking over of the railroads by the government as a war emergency. In common fairness to the railroads, and in order that they may not be rendered impotent when they are returned to their owners, the business judgment of the country would surely favor legislative action whereby such indebtedness by the railroads to the government would be funded by the issue to the government of the obligation of the debtor company maturing within a period of years, with interest, say, at five per cent per annum, and secured in such manner as may be required by the Secretary of the Treasury.

Most significant of all is the general recognition, both in and out of Congress, that the national prosperity requires a new element of policy in regulation of rates which shall aim to assure adequacy of railway service and development of facilities. Particularly has discussion concentrated upon the problem of giving sufficient revenue to meet the necessities of the people served by one road where the increase in rates would have to be needlessly imposed upon the people served by a more prosperous competitor taking the same rates. It is now declared by railway managers and financiers of the first rank that this part of the problem would be largely solved through combinations, if sanctioned. Thus a strong road would be permitted to take over a weak road and spread its income and credit over both. This does not mean the elimination of competition within geographical areas. One of the most unmistakable of recent tendencies in opinion is away from the proposal of regional monopoly toward retention of competition.

It is conceded that even after the process of consolidation has reduced the system to a score or so, there might still remain some strong and some weak roads, and a further adjustment now evidently accepted is that in some way the process of adjusting inequality of conditions should include the use of a part of the surplus income to form a contingent fund for diffusion wherever most needed. Underlying such efforts as these in the direction of equalization is, of course, the assumption that revenue will be made sufficient for reasonable adequate service, facilities and development. Neglect of Congress to declare a policy designed to furnish revenue sufficient for operation and credit would, it is generally recognized, result in an experiment foreordained to failure, which would mean failure of private ownership or private operation.

Resolutions

No resolutions were adopted on the railroad problem. This topic will be the subject of a national referendum among member organizations.

Among the resolutions passed by the convention and dealing indirectly with the railroad situation are:

Request of the President that he call Congress into immediate extra session upon his return to solve the problems of the readjustment period. The right of individualistic effort in business is declared in this connection, together with opposition to any governmental entrance to industry and commerce.

The extension of the foreign trade of the country is necessary to supply a market for greater production and banking and insurance interests are urged to accompany the manufacturer into the new field.

Immediate resumption of all construction, particularly by federal, state and municipal governments in public works is urged.

Immediate return of the telegraph and telephone lines to private operation is demanded, together with legislation that will permit their merger, if desired.

The immediate consummation of all congressional waterways projects, already approved, is urged, the construction of terminals by cities upon waterways advocated and the co-ordination of waterways with railways suggested as the subject of a special committee's effort to obtain needed legislation.

Mr. Plumb Opens the Campaign

"THE ARRIVAL IN WASHINGTON of Mr. Glenn E. Plumb, author of the Plumb plan for the government ownership and operatives' management of railroads, marks the opening of a nation-wide campaign for the solution of the railroad problem along new and wholly original lines," according to a notice sent to the press on May 3 signed "The Plumb Plan, by R. P. Risley, Manager," containing an interview with Mr. Plumb, who is attorney for the four railroad brotherhoods and the ten railroad employees' organizations affiliated with the American Federation of Labor. The plan was outlined by Mr. Plumb in his recent testimony before the Senate Committee on Interstate Commerce. The press notice says it is to be incorporated in the form of necessary bills for legislative action which will be introduced at the approaching special session of Congress, and that copies of the plan will be sent on request and personal interviews will be arranged by special appointment.

"I am here to stay until the solution of the existing railroad problem is found in the enactment of legislation as endorsed by organized labor and civic and public bodies throughout the nation, with such reasonable modifications in non-essentials as may be deemed expedient in the preparation and framing of the proposed bills," Mr. Plumb is quoted as saying in reply to inquiries on his arrival from Chicago.

"The coming session of Congress will, in my opinion, be only a preliminary skirmish—there is such division of sentiment among the parties in interest that I do not anticipate any railroad legislation of a definite character at the special session.

"The time will be necessarily short, and the session crowded with urgent measures bearing especially upon appropriations. The big issues will, however, be clearly defined, and next winter the fight will be on in earnest, accentu-

ated by the importance of a national campaign in the summer."

"You expect, then, that the railroad problem will develop into a Presidential campaign issue?" Mr. Plumb was asked by his press agent.

"Inevitably," he replied. "I do not see how that can be avoided. The railroads have always been in politics, and it requires politics to take them out. It is a political problem pure and simple, demanding a political solution. Personally, I think the whole question should be put up squarely to the people. In this I agree with Major-General Thornton, inspector general of England's railways, who in a recent interview at Philadelphia, is quoted as saying:

"Put it up to the people direct. Whether the government or private interests run the roads, the people have to pay, so let them decide. Why not vote on this?"

Steps are now being taken to obtain the sentiment of every candidate for a political office in this country having to deal with the problem, so that he must declare himself on this issue, the press notice states.

"The plan of government ownership which we advocate is so entirely different from any other proposition of the kind before the public that the usual arguments are answered before they are advanced against it," Mr. Plumb continued. "The question of government ownership can be debated, as it is being debated all over this country almost daily, with affirmative or negative decisions rendered, and still the essential features of our plan would not be touched upon. There is a very general misapprehension in the public mind respecting the difference between government ownership and government administration, to say nothing of the essential factor of the operatives' and the public participation in management which we introduce. It is beginning to be realized that war-control applied to over-capitalized corporations operated for private profit bears no more relationship to rational railroad functioning than does the moon to the proverbial green cheese.

"One of the numerous vital defects inherent in each of the half-a-dozen plans submitted by the railroad interests at the recent Senate hearing is the inevitable demand for a rate-increase or its equally inevitable alternative demand for a government subsidy. If these demands are not fully met, any deficiency must be made up by a wage reduction. These plans, furthermore, provide only for transferring the persistent drain upon the investing public, which must advance, as estimated by the late J. J. Hill, a billion of new funds needed for capital charges yearly, from the investing public to the taxpayers of the nation. They do not furnish the supply to meet the drain. They do not stabilize rates. They solve nothing. Our plan, on the other hand, meets every condition essential to sane financing and proper operation of our entire railroad system, trunk lines, 'weak sisters,' and short lines all included."

Orders of Regional Directors

DEMURRAGE DUE FROM U. S.—The regional director, Eastern region, by circular 600-2-5-3A713, reminds federal managers that demurrage bills accruing on government freight must be collected strictly in accordance with the tariffs. A large amount of bills against the War Department remain uncollected, due in large measure to the difficulty in arranging for payment of the bills at points where the military officer responsible for the charge has to certify to the accuracy of the amount. Evidently the bills will have to be submitted in a special communication to the War Department.

Interest on New Work During Construction.—The Eastern regional director, by circular 2700A714, prescribes regulations for calculating interest during construction on additions and betterments to railroad property where payment is to be made out of federal funds. The rate is 6 per cent, and it applies on work done since December 31, 1917. On a job costing $1,000 or less, or which is completed in one month, no interest is to be charged. A circular is to be issued containing further details.

Employees' Passes for Conventions.—A. H. Smith, regional director, Eastern region, by circular 2100-37A716 advises federal managers that employees regularly elected as delegates to conventions of their brotherhoods are to be granted free transportation both ways; and ordinarily these passes will be issued at Washington. Trip passes for side trips should be requested and secured through the usual channels.

Quarantine Against Barberry Plants.—The regional director, Eastern region, by circular 600-163A717 gives notice of a quarantine, issued by the Agricultural Department, against the shipment of barberry and certain other plants into the states of Nebraska, Iowa, Illinois, Indiana, Ohio, North Dakota, South Dakota, Minnesota, Montana, Wisconsin, Michigan, Wyoming and Colorado, because of the capacity of these plants for harboring the black stem rust, dangerous to wheat.

Terminal Managers.—C. H. Markham, regional director, Allegheny Region, announces that the offices of the terminal managers at Philadelphia and at Baltimore, were discontinued on April 30.

Cartage and Lighterage Surety Bond.—Order 198 of the Southwestern regional director similar to Circular 600-68A699 of the Eastern regional director (*Railway Age*, May 2, page 1101).

Oiling Track Joints.—Circular 206 of the Southwestern regional director states that a recent canvass in the Southwestern region discloses the fact that most of the larger roads apply crude petroleum or other cheap grades of oil to rail splices and bolts not only when first put in service, but also to those already in place. These are first, however, cleaned of rust and dirt. In view of the savings effected by this practice the regional director suggests that it be made uniform on all railroads. The oil should be applied at least twice a year.

Repair of Short Line Cars.—Order 197 canceling order 192 of the Southwestern regional director similar to Circular 500-14-5A699 of the Eastern regional director (*Railway Age*, April 18, page 984).

Posters for Employment of Returned Soldiers.—Supplement 4 to Circular 39 of the Northwestern regional director authorizes the placing in railroad stations of posters dealing with employment of returned soldiers and sailors. This arrangement may be made effective upon application of the local agents of the United States Employment Service or the Bureau for Returning Soldiers and Sailors. The Southwestern regional director in Supplement 4 to Circular 112 issues similar instructions.

Industrial Sidings.—Circular 208 of the Southwestern regional director suggests that, in order to expedite consideration of industrial sidings and in order to encourage new business these projects be handled by wire. Messages should give full information concerning the amount of money involved, how long it will take to lay the track and how soon the industry, will furnish the expected revenue.

U. S. Employment Offices.—The regional director, Eastern region, by circular 1500-80A719, asks federal managers to see that every useful advantage is taken of the United States Employment service. Complaint has been made that the railroads do not make full use of this service. Federal managers must, of course, exercise their own judgment in the selection of men, but they are requested to make use of the government employment offices so far as it is possible without harm to their own programs.



Repair Shop Train in Working Order

Repair Shop Train Used on Narrow Gage in Flanders

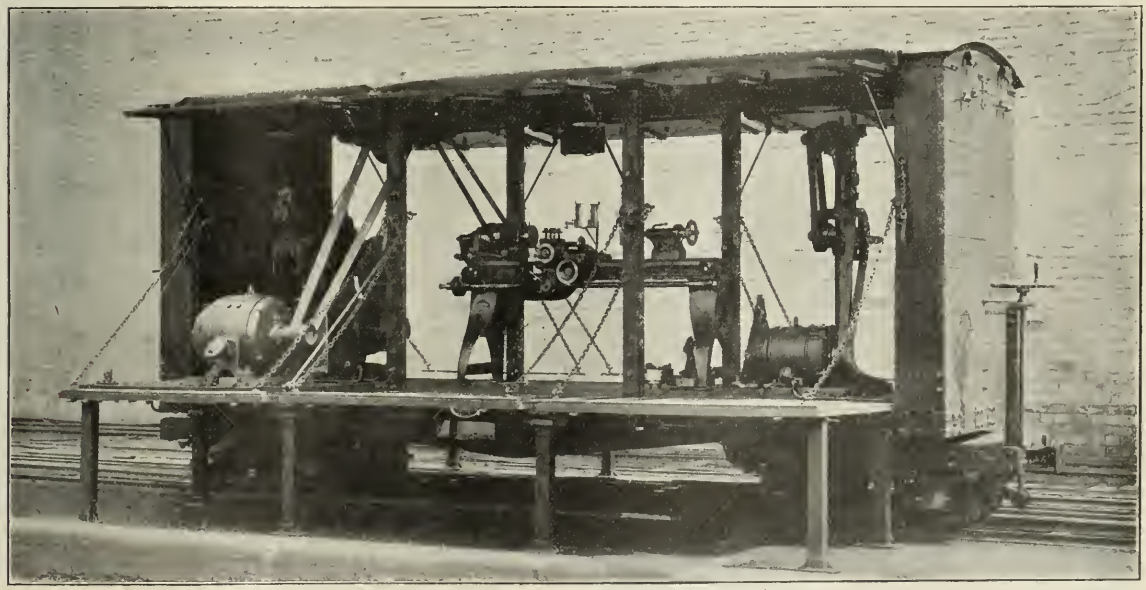
Portable Machine Shop Equipped With Electric Motor Driven Tools and Gasoline Generator Sets

By F. C. Coleman

ONE OF THE UNUSUAL FEATURES of transportation in the war zone was the system of a narrow gage military railway. The 16 cm. (1 ft. 11⅝ in.) gage roads operated by the British in Flanders had some interesting equipment, of which none was more novel than the mobile workshop repair trains constructed by the Gloucester Railway Car & Wagon Company, Gloucester, England. Six of these trains, each consisting of six cars, were built to the requirements of the Director General of Light Railways and Roads branch of the War Office and the Railway Material branch of the Ministry of Munitions for use on the lines serving the standard gage railway system. The train comprises a generating car, two machine shop cars, a tool car, a supply car and an officers' car. The over-all dimensions of each unit are the same, being as follows: length over body 17 ft. 8½ in., width over body 5 ft. 4¾ in. and height from top of rail to top of body 9 ft. 1 in.

The generating cars are fitted with two direct connected gasoline driven electric generator sets each with 15 to 20 hp. engines and 10 kw. generators. These sets weigh approximately three tons each. The gasoline is carried in tanks at each end of the car and water tanks are placed below the under frame, while the muffler is located on the roof. In the center of the car there is an air compressor driven by a 10 hp. motor and connected to an air reservoir slung from the roof. The total weight of this car is approximately 8½ tons.

The machine shop car is furnished with a duplex wheel



Machine Shop Car Showing Motor Mounted on Hinged Side Panel

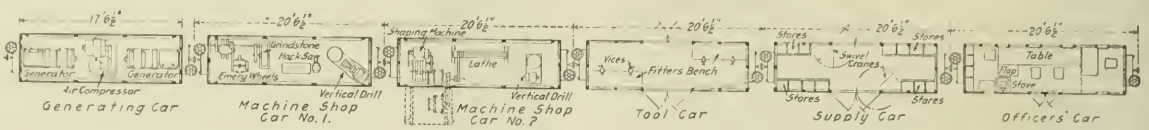
emery grinder, a 30-in. grindstone, a rapid hack saw, and a vertical drilling machine. The first two machines are connected to overhead shafting which is driven by a 3 hp. motor, while the other two are driven direct, each having a 2 hp. pipe ventilated motor. Electric lights are placed over each machine. The electrical connection between the cars is made by means of insulated cables which are plugged into special fittings on the end of the car. The total weight of this car is 5 tons. The second machine shop car con-

tains one 8 in. shaper driven by a 1½ hp. variable speed motor and a 6 in. lathe with a 21 in. chuck driven through a countershaft attached to the roof by a 2 hp. motor on the bottom portion of the falling side. There is also a small drilling machine in this car fitted with a chuck and driven by a 2 hp. motor. The weight of this vehicle is about 5¼ tons.

The tool car has two fitters' benches with four vises and is equipped with shelves for holding tools, etc. The supply car is provided with two swivel jib cranes, one on either side. Three rows of shelves are provided for storing material and there are also large bins below the shelves. The cranes swing out beyond the side of the car and the shelves are so arranged that they clear the crane when swung in and not in use. The floor space in this car may be used for portable articles such as forges, jacks, drills, etc. The weights of the tool van and store car are about 3¾ and 4⅛ tons, respectively.

The officers' car is divided by means of a partition into two offices. The smaller of these, for the accommodation of the deputy assistant director of light railways, is 4 ft. 6 in. by 4 ft. 11 in. and is heated by an electric radiator. The general office measures 12 ft. 8 in. by 4 ft. 11 in. and has a small coal stove for heating. The car is well equipped with electric fixtures, both stationary and portable.

From the illustrations it will be noted that the machine shop cars are provided with hinged side doors, the top half forming a canopy and the bottom half when lowered making a platform on which the men have room to work. The platform is supported by chains and wood posts reaching to the ground. During stormy weather use is made of tarpaulins, these being fastened to the canopy and thus completely screening the men from the weather. The underframes of the cars are constructed of wood strongly braced by angle trussing. The trucks are similarly wooden framed with the drawbars built in so that the pull is transmitted through the trucks instead of through the body of the cars, as is the usual practice on broad gage roads.



Plan of Shop Train for British Military Railways



Homeward Bound. Transferring Wounded Yankees from a Hospital Train to an Ambulance Bound for the Docks at St. Nazaire

Railway Storekeepers' Association Reorganized; Now Section 6, A. R. A.

THE EXECUTIVE COMMITTEE of the American Railroad Association has created an additional section, to be known as Section VI, to consider and report upon all questions affecting the purchasing, selling, storing and distribution of materials and supplies, and kindred subjects; and the section will include the former activities of the Railway Storekeepers' Association. In this section the representatives of the railroads will be officers of the purchasing and stores department.

J. E. Fairbanks, general secretary of the association, in circular No. 1949, has issued a tentative code of rules of order for the section, as approved by the executive committee. These rules, in principle and very largely in detail, are like those which have been adopted for the other sections of the association. (*Railway Age*, January 17, 1919, page 194; March 7, 1919, page 535.) The membership is divided into three classes, representative, affiliated and life. The life membership is for railroad officers and others "whose work and interest have been beneficial to the section." The present honorary members of the Railway Storekeepers' Association are to be continued as life members of the section.

The section is to be managed by a general committee of 16 elected members, and, in addition, during the period of Federal control, of three representatives of the United States Railroad Administration, to be designated by the director of the Division of Purchases. The elected members must be divided equally between the purchasing departments and the stores departments; and during the period of Federal control there must be two from each Federal region, and two from Canadian railroads. The regular meeting of the section is to be held in May of each year, and at that meeting officers are to be elected. The time and place will be designated by the general committee three months in advance.

The first general committee, which has been appointed by the executive committee, will organize the section and will serve until a regular election is held. This committee consists of the following:

H. S. Burr (Chairman), Superintendent of Stores, Erie Railroad.
E. J. Roth, Manager, Stores Section, Division of Purchases, United States Railroad Administration.
S. Porcher, Assistant Director, Division of Purchases, U. S. R. A.
G. G. Yeomans, Assistant Director, Division of Purchases, U. S. R. A.
A. W. Munster, Purchasing Agent, Boston & Maine.
W. G. Phelps, Purchasing Agent, Pennsylvania Lines West of Pittsburgh.
E. W. Thornley, Supervisor of Stores, Allegheny Region, U. S. R. A.
B. T. Jellison, Purchasing Agent, Chesapeake & Ohio.
J. P. Murphy, General Storekeeper, New York Central (West).
H. C. Pearce, General Purchasing Agent, Seaboard Air Line.
H. H. Laughton, Staff Officer, Materials & Supplies, Southern.
G. E. Scott, Purchasing Agent, Missouri, Kansas & Texas.
W. A. Hopkins, Supervisor of Stores, Southwestern Region, U. S. R. A.
F. D. Reed, Purchasing Agent, Chicago, Rock Island & Pacific.
H. E. Ray, General Storekeeper, Atchison, Topeka & Santa Fe.
F. A. Bushnell, Purchasing Agent, Great Northern.
J. E. Mahaney, Supervisor of Stores, Northwestern Region, U. S. R. A.
E. N. Bender, General Purchasing Agent, Canadian Pacific.
E. J. McVeigh, General Storekeeper, Grand Trunk.

The car shops of the Atchison, Topeka & Santa Fe, in Chicago, formerly known as the Empire Car Shops, were destroyed by fire on April 21. The fire was caused by crossed electric wires in the blacksmith shop. A planing mill, blacksmith shop and machine shop, including machinery, were totally destroyed; estimated loss $65,000.

Rate-Making Powers of the Director General

Right of the Federal Government to Prescribe State Rates Argued by the Supreme Court

THE RATE-MAKING POWERS of the state authorities were compared with the "bleaching bones of the Hindenburg line" by John Barton Payne, general counsel for the Railroad Administration, in the argument before the United States Supreme Court on Monday in the test case appealed from the Supreme Court of North Dakota involving the question of the power of the director general of railroads acting for the President to prescribe rates for services wholly within a state. The case arose on a writ of error to review a judgment of the North Dakota supreme court directing the issuance of a peremptory writ of mandamus commanding the Northern Pacific Railway Company and Walker D. Hines, as director general of railroads, to desist from collecting for service wholly within the state any rates, fares or charges other than those on file in the office of the State Board of Railroad Commissioners. The rates involved are those put in effect by General Order No. 28 issued by Director General McAdoo on May 25, 1918, which were not filed with the North Dakota railroad commission except for purposes of information, and the laws of that state regulating the procedure to be followed by the common carriers in increasing rates, fares and charges were not absorbed. Arguments for the Railroad Administration were made by Judge Payne and Charles Donnelly, assistant general counsel, and for the state by Frank E. Packard and W. V. Tanner. A brief was also filed on behalf of the National Association of Railway and Utilities Commissioners as *amicus curiae*.

The brief of the Railroad Administration states that the court erred in holding that section 10 of the federal control act of March 21, 1918, does not confer on the President authority to initiate intrastate rates superseding pre-existing rates prescribed by state authority; also in holding that under section 15 of that act pre-existing intrastate rates remain in effect as lawful police regulations; also in holding that the term "police regulations" as used in section 10 embraces regulation of railroad rates and fares, and that the court erred in entering judgment in favor of the plaintiff. The argument of the Railroad Administration is summed up in the following points:

1. Congress was empowered by the Constitution to vest in the President or in the Interstate Commerce Commission control over intrastate rates and fares.

2. By the acts of August 29, 1916, and March 21, 1918, the President was given control over all traffic, state and interstate, and was empowered to initiate rates, fares and charges by filing them with the Interstate Commerce Commission.

3. Section 15 of the act of March 21, 1918, does not limit or qualify the power given by Section 10 to initiate rates.

4. Section 15, as construed by the court below, is repugnant not only to the specific provisions of Section 10, but as well to the whole spirit of the federal control act. It must be construed so as to harmonize with those provisions and with that spirit.

5. Any state regulation limiting the President's right to initiate rates and fares would affect the transportation of troops, war materials and government supplies.

6. Any doubt as to the meaning of the law will be resolved in favor of the Executive's practical construction of it.

Some extracts from the brief are as follows:

So complete was the control given to the President "in time of war" over systems of transportation by the act of August 29, 1916, that he was authorized to utilize them for the transportation of troops, war material, etc., *"to the exclusion,* as far as may be necessary, of all other traffic thereon." Possessing authority *to exclude* all other traffic, state or interstate, he could, of course, say what should be charged for moving it.

Again, section 10 of the act of March 21, 1918, gives the President express authority during federal control to initiate rates and fares by filing them with the Interstate Commerce Commission; and that commission upon complaint is empowered to enter upon a hearing concerning the justness and reasonableness of "said rates and fares." This authority covers *all* rates and fares. It is not limited to interstate rates or fares, nor can any reason be suggested why it should be so limited. Every consideration which could prompt the President to increase interstate rates must, of course, prompt him to increase those applying wholly within a state; indeed, discrimination must inevitably result if there were an increase of the one class without a corresponding increase of the other. Congress by section 10 did indisputably give him power to increase interstate rates and deprived the Interstate Commerce Commission of the power to suspend them; the state does not and cannot deny this. Yet its argument is that though the law was, as expressly declared in its last section, "emergency legislation" enacted by Congress in time of war, under its war powers, and designed to vest in the commander in chief authority commensurate with his duties and responsibilities, it yet left him a helpless petitioner before 48 separate and independent state tribunals for the permission necessary to make his action effective and lawful.

Moreover, the power thus given to the President by section 10 to initiate "rates, fares, charges, classifications, regulations and practices" must be considered in the light of the purpose for which he was to initiate them, and the manner in which the properties were to be operated, as shown by that section. It was recognized that to pay increased expenses, taxes and compensation to the companies he would probably be obliged to increase rates; and it was provided that if complaint should be made to the Interstate Commerce Commission regarding them consideration must be given to his certificate that he had in fact been obliged to do so. The properties, it was said, were to be operated "as a unit," and "under a *unified* and co-ordinated *national* control." How could they be so operated if subject to the regulation of the various states as to a considerable part of their traffic? And how was the President to proceed to get the needed additional revenue? Was he to make a segregation between interstate expenses and returns, and intrastate expenses and returns, along the lines pursued in the various rate cases with which the court is familiar? Such segregations, while theoretically possible, are essentially impracticable, and as this court must have come to realize are of little value when made. But if we accept the theory that it was the duty of the President to deal with each state as to the rates within the state, and to deal with the Interstate Commerce Commission only as to the interstate rates, such a view must proceed upon the idea that there is a practical basis for segregation. If this is true, it must follow that the President ought to have made a separate study of all the intrastate operations so as to decide how the increased burden should be divided. If the President had undertaken

to do this it would probably have been 1924 or 1925 before he could have reached a conclusion.

Surely it is not credible that Congress in providing a method to meet a *war emergency*, intended any such result.

It is said, however, that the very language of section 10 shows that it was never intended to apply to intrastate rates, because it authorizes the commission on complaint to make only "such findings and orders as are authorized by the federal act to regulate commerce," and to enforce them as provided in that act.

This argument utterly misconceives the scope and purpose of the language in question. That language authorizes the Commission to make "*such*" findings and orders as the act to regulate commerce authorizes. Now, what orders and findings does that act authorize? It authorizes findings as to whether rates under attack are unjust or unreasonable; as to whether they are unduly discriminatory or unduly preferential; as to what will be proper rates to substitute therefor; as to whether practices of the carriers are proper; as to whether a claimant has suffered damage and is entitled to reparation; and it authorizes orders giving effect to its findings and in certain cases—as where the order requires the payment of money—proceedings in court to enforce them. Congress might have enumerated specifically each of the findings and orders described in the act to regulate commerce which it was empowering the commission to make; but it wished to avoid circumlocution. It was enacting emergency legislation dealing with temporary conditions. The machinery already provided by the interstate commerce act was adequate to any case involving a complaint as to rates, and therefore it authorized the commission, in dealing with any case involving rates, whether state or interstate, to make findings and orders *such as* (i. e., *of the character of*) those authorized by that act.

Far from telling against the construction for which we contend, the language here in question tells distinctly in its favor. Had section 10 been concerned alone with interstate rates and fares, there would have been no point in giving to the commission authority, when such rates were attacked, to make such findings and orders as the interstate commerce act authorized. *The commission had that authority already.* The very purpose of the language was to give it like authority in cases of a character which it had not previously been authorized to consider.

The state contends that in preserving unimpaired its "lawful police regulations" Congress restricted to interstate commerce the authority given by section 10 to initiate rates; or, stated differently, that this language in section 15 proves that section 10 was not intended to have the broad effect now claimed for it. The argument is that laws relating to the regulation of rates and fares are "police regulations," and that these are not preserved unimpaired if the President is given authority to disregard them.

Taking the term "police power" in its broad sense, it is undoubtedly true that laws regulating rates and fares may properly be referred to that power; but in its broad sense almost every legislative enactment might be referred to it.

It is not in this broad sense that the term is commonly used. In its ordinary sense it is taken "to extend to the protection of the lives, health and property of the citizen and to the preservation of good order and the public morals."

Moreover, it is to be observed that it is not the "police power" of the states that section 15 preserves unimpaired, but only their "lawful police regulations."

It is said, however, that the history of section 15 in its passage through both houses proves that Congress intended by that section to preserve unimpaired the state's power of rate regulation. This argument rests upon the fact that the bills dealing with this subject which passed the Senate and House, while generally alike, had numerous points of difference in detail, and were therefore referred to a conference committee. The House bill, as thus referred, provided, that "nothing in this act shall be construed to amend, repeal, impair, or affect the existing laws or powers of the states in relation to taxation, or the lawful police regulations of the several states, except wherein those regulations may affect the transportation of troops, war materials or government supplies, *the regulation of rates, the expenditures of revenues, the addition to or improvement of properties*, or the issue of stocks and bonds." The conference committee struck out the italicized words, and the remainder was reported with slight changes as the present section 15, and adopted with the rest of the bill. No explanation whatsoever was made by the conferees of their purpose in eliminating these phrases. The hearings before committees, and the observations of members in the course of the progress of the bill show that it was the purpose and aim of those who advocated the adoption of the provisions of section 10 to vest in the President primary control of *all* rates, state and interstate.

Again, if all state police regulations in the broad sense were to be observed, it is not alone in the matter of rate regulations that the President has been at fault. How about state laws forbidding consolidation of parallel and competing lines? These certainly are police regulations in the broad sense. He has disregarded them. Was he bound to observe them? He thought he was not, for he was told by the act that "a *unified* and co-ordinated *national* control" was provided for. Unification and co-ordination and nationalization of the railroads were the primary objects sought to be obtained; and can anything be more absurd than to suppose that Congress meant to undo its own work, and by its use of the term "police regulations" in section 15 to defeat the very purpose for which the law was enacted?

That it is opposed to the specific provisions of section 10 is apparent at once. That section tells the President that by filing them with the Interstate Commerce Commission he may initiate rates which the commission shall be powerless to suspend pending final determination; and this, as we have seen, within the principles of statutory construction which this court has laid down, means *all* rates, state as well as interstate. Section 15, on the other hand, as construed by the court below, directly negatives this and tells him that as to traffic moving locally within each of the 48 states, he may not initiate rates in this way, but must observe existing state regulations. But the language of section 10 is specific; it deals directly with the subject in hand, namely, rates, and tells the President how he may initiate them. The language of section 15, out of which the court below spells a prohibition against this, is general. It is not an express statement that he may not initiate those intrastate rates, which section 10 says he may. It is a mere general statement that those exceedingly vague things called "lawful police regulations" are to remain unimpaired.

Even if a state law regulating rates is a "lawful police regulation" within the meaning of section 15, the President, by the very terms of that section, was relieved from the necessity of observing it if its observance would affect the transportation of troops, war materials or government supplies. Is it certain that such a law would *not* have that effect; or, to put it on the lowest ground, is it *so* certain as to justify a court at this day, when the crisis is past, in undoing what the President then did? He was in charge of the transportation systems of the country. He had to operate them; and the consideration of the first importance was, of course, to utilize them in the movement of troops and war material. He could not in such an exigency allow their operation to cease through the disaffection or strikes of employees. This court knows judicially that on the very day when the director general issued Order No. 28, increasing railroad rates, he issued as well Order No. 27, increasing by several hundred millions of dollars annually the wages of railroad employees. The money to meet this added

charge must come from some source; it was proper that it should come from the shippers and passengers for whom, for the most part, it was incurred; and it was proper, indeed it was necessary, that in distributing the burden interstate shippers and passengers should not be discriminated against. Confronted with this situation the President might well have said: "These state laws which require me, at such a time, to observe all the formalities of a procedure adapted to times of peace, in order to get that financial assistance which to be effective must be obtained promptly, are a real hindrance to the effective prosecution of the war, and their observance would affect the movement of troops and war materials." And if in the exercise of his executive discretion he took this view, is it the function of a court now to say that he was wrong?

It is to be remembered that the action complained of was not that of a railroad corporation. They were increased by the President of the United States, in time of war, at a critical period in the history of the nation and of the world, and in the exercise of what *he believed* to be authority duly vested in him by Congress. No one questions or would dream of questioning his good faith; no one would think of suggesting that in what he did he or those through whom he acted had any ulterior or unworthy ends to serve. He acted with absolute impartiality. He imposed upon the commerce of North Dakota no burden not placed equally upon the commerce of every other part of the nation. His authority to do this was not then challenged. North Dakota, like every other state in the nation, acquiesced in and recognized it; and from the intrastate rates thus established and assented to many millions of dollars, as the answer shows have been collected and disbursed by the United States Government. We have, then, the disinterested, practical construction placed upon a law by those whose duty it was to administer it, and acquiesced in by the very parties who now challenge it. Unless that construction was clearly erroneous the courts will sustain it. Authorities in support of this proposition might be multiplied indefinitely.

Counsel for the state denied the contention of the Northern Pacific that because it no longer has possession and control of its property this suit as to it should be dismissed. They contended that the Northern Pacific is a necessary and proper party defendant, and that it is apparent that Congress intended to preserve the right to sue. The state also argued that the federal control act did not abrogate the laws of the state respecting the establishment and regulation of rates, and that it is the duty of the court to adopt the statutory construction that will reconcile the two statutes—the Interstate Commerce Commission act and the federal control law. Mr. Tanner argued that the states have no arbitrary powers which would interfere with the President's exercise of his control over the railroads, saying that the decision of the Interstate Commerce Commission in the 15 per cent rate advance case was immediately followed by the states. The contention was that while the President might initiate rates, the law contemplated that the Interstate Commerce Commission should review the interstate rates, and that the state commissions should review the state rates, and that their laws regulating the procedure to be followed were not inconsistent with the federal control act.

The state brief said in part:

The fact that the railroads are instrumentalities of interstate commerce does not preclude the exercise by the state of powers establishing regulations governing their internal commerce, and the fact that they are temporarily agents of the national government to execute national policies in war time does not exempt them from state regulation. The national power exercised for the enactment of national measures in war time emergencies is paramount, but the question here is not merely one of the existence of inherent power, either in the national government or in the states, but the purpose manifested by Congress to exert its powers to the exclusion of that of the states.

In matters growing out of the war emergency, for which Congress deemed it necessary to prescribe regulations, there can be no question that the national powers are paramount and exclusive—whether these matters involve interstate commerce or the employment of other agencies for the execution of constitutional functions; but in so far as these instrumentalities are employed only in the purely local concerns of the state, regulatory power is reserved to the state authority.

We have shown that the mere fact that a railroad may be an agency of the Federal Government for military or other purposes, does not necessarily exempt such railroad from state authority.

It will hardly be contended that the act of August 29, 1916, operates to abrogate, repeal or suspend the provisions of law, federal and state, relating to the publication and establishment of rates, except as such laws may be affected by the utilization of the railroads "to the exclusion as far as may be necessary of all other traffic thereon, for the transfer or transportation of troops, war material and equipment, or for such other purposes connected with the emergency as may be needful or desirable."

Is the power here vested in the President to "initiate" rates inconsistent with the laws of the state relating to the filing and establishment of rates? Surely it is not. The use of the word 'initiate" in defining the power of a public agency is new, but manifestly it is used in the sense of proposing a rate rather than in the sense of *fixing* or *establishing* the rate. The explanation of the use of this word is probably found in the fact that under the act of August 9, 1917 the carriers were required to first obtain the approval of the Interstate Commerce Commission before filing any increased rate or charge, and to the desire to remove this restriction during the period of federal control. Prior to this statute the carriers themselves, under federal laws and under the laws in force in most of the states, have always had the power to *initiate* rates. This power, however, has never been regarded as inconsistent with the *fixing* and *establishment* of rates by regulative commissions nor with the obligation to comply with provisions of law respecting the filing and publication of the rates so initiated.

Nor is an inconsistency created by the provision for the filing of the rates initiated by the President with the Interstate Commerce Commission. Prior to federal control rates initiated by the carriers were required to be filed with the state commissions and the interstate Commerce Commission, and, as pointed out, since the initiation of the rate is not the fixing of that rate, there is no inconsistency in permitting a rate to be initiated by filing it with the Interstate Commerce Commission and the concurrent requirement of compliance with state laws upon the subject. We believe this is the more apparent when regard is had to the provision forbidding the Interstate Commerce Commission from suspending rates initiated by the President pending final determination. In this provision Congress recognized the existence in the commission of a power to suspend rates initiated by the President and evidently felt it necessary to deprive the commission of that power during the period of federal control, showing that Congress did not regard the power to initiate rates by filing the same with the Interstate Commerce Commission as inconsistent with the power of the commission to review, regulate and fix the rates so initiated.

The provisions of section 10 of the federal control act modify to some extent the powers of the Interstate Commerce Commission in respect to the rules established for its guidance in the determination of questions affecting rates. It must proceed with due consideration to the fact that the railroads are being operated "under a unified and co-ordinated national control and not in competition."

The absence of an express provision in section 10 saving

in power of the states to act through the state commissions in cases involving intrastate rates is explained by the provision of section 15 saving the "police power" of the states. Having preserved to the state their right to make police regulations (with certain exceptions), it was wholly unnecessary to expressly save the jurisdiction of the state authorities as was done in the case of the Interstate Commerce Commission.

Certainly those provisions of the federal control act with relation to the exercise by the Interstate Commerce Commission of the powers *now possessed* by that body, although modified by the existence of federal control, cannot be held to be inconsistent to the point of conflict with the existence of state laws regulating the publication and fixing of "reasonable rates for its exclusively internal traffic."

It will undoubtedly be argued that the government, as the temporary proprietor of the property, has the right to *initiate and establish* rates. No one disputes the power of the government to initiate rates. Indeed, the law specifically provides the method of procedure with respect to interstate rates. The question is as to the power in the matter of purely intrastate rates. The government claims that the war emergency justified the exercise of the supreme power of the federal government. Assume that it did. This is no reason why the law should not have said so.

It was argued by counsel for the Railroad Administration in the state court that it would be "absurd and contrary to the general welfare" to permit the government to establish interstate rates for general commodities between points in different states and deny the right to fix the rates on the same commodities between points wholly within a state. Many will agree that the accident of state lines should have no controlling effect, but this condition is no more absurd in time of war than in time of peace, and it is just the condition that obtains in time of peace under the respective jurisdictions of the Interstate Commerce Commission and the authorized state commissions.

The matter of the charges for carrying passengers and freight between the various stations situated along the lines of the Northern Pacific in the state of North Dakota has no direct effect upon the transportation of troops, war materials, or government supplies. As stated before, it must be presumed that the established rates are reasonable. Such rates, governing as they do the transportation of property between individuals, have no more effect upon the conduct of the war than does any other purely local police regulation.

The President has not been vested with authority to set aside state laws, whenever he thinks it necessary to do so, for purposes connected with the war or for purposes connected only with the ordinary administration of railroad affairs. The act subordinates state laws to such orders as the President is validly authorized to make by the act of March 21, 1918, and the act of August 29, 1916. Any order not so authorized would be of no effect.

Under the act of March 21, 1918, the President is authorized to make only such orders as are necessary or proper to carry out the objects of federal control, *i. e.*, the use of the railroads for war and other purposes connected therewith.

No one would contend, for instance, that the President may make orders with respect to the method of recording documents affecting the title to the property of the carriers, the matter of establishing liens against their property, the liability of the carriers for damages in cases of personal injury or loss or destruction of property.

Clearly the state laws upon these subjects are not inconsistent with the act of Congress and cannot be abrogated or superseded by an order of the President. The laws governing the carriers in these matters have no relation to the conduct of the war. Similarly, if the obligation of the carriers to transport property at reasonable rates established by state law is not inconsistent with the provisions of the acts of Congress, it is not within the power of the President to interfere with the force and effect of these laws.

We believe that when the federal control act is viewed in the light of the changes made in its text during the time it was under consideration by Congress, prior to its final passage, there can be but one opinion upon the question of the purpose of that body, that the states should retain their power to regulate rates applicable to their strictly domestic commerce.

When a proposed act as introduced in the legislature establishes one rule (*i. e.*, broadly empowers the President to fix rates) and during its progress through that body is changed so that, giving the words used their ordinary definite meaning, the act means something else (*i. e.*, intrastate rates to be fixed by local authorities), that fact is of the greatest importance in determining the intention of the legislature. The act should be examined in the light of the change; and we submit that when this is done, the conclusion is unavoidable that Congress intended, as it said, that nothing in the act should be construed "to repeal, impair or affect * * * the lawful police regulations of the several states * * * "

The Economic Aspects of the Control of North China

By Frank Rhea

THE CONTROL of the future supplies of iron and fuel in the Far East is not only of great importance to the industrial development of that entire region, but it is bound to have a profound influence on the whole industrial world on account of the great volume of these resources in China with her unlimited supply of willing and capable labor.

There are undoubtedly large deposits of very good iron ores in China. The proved deposits of iron at the present time are largely in the provinces of Hupei and Anhui, all within reasonably short distances of that most unusual water route, the Yangtse river, the only great river of the world in the temperate zone navigable for 1,000 miles from its mouth running from west to east. All other great rivers, except the Amazon, run from north or south, as for example the Mississippi.

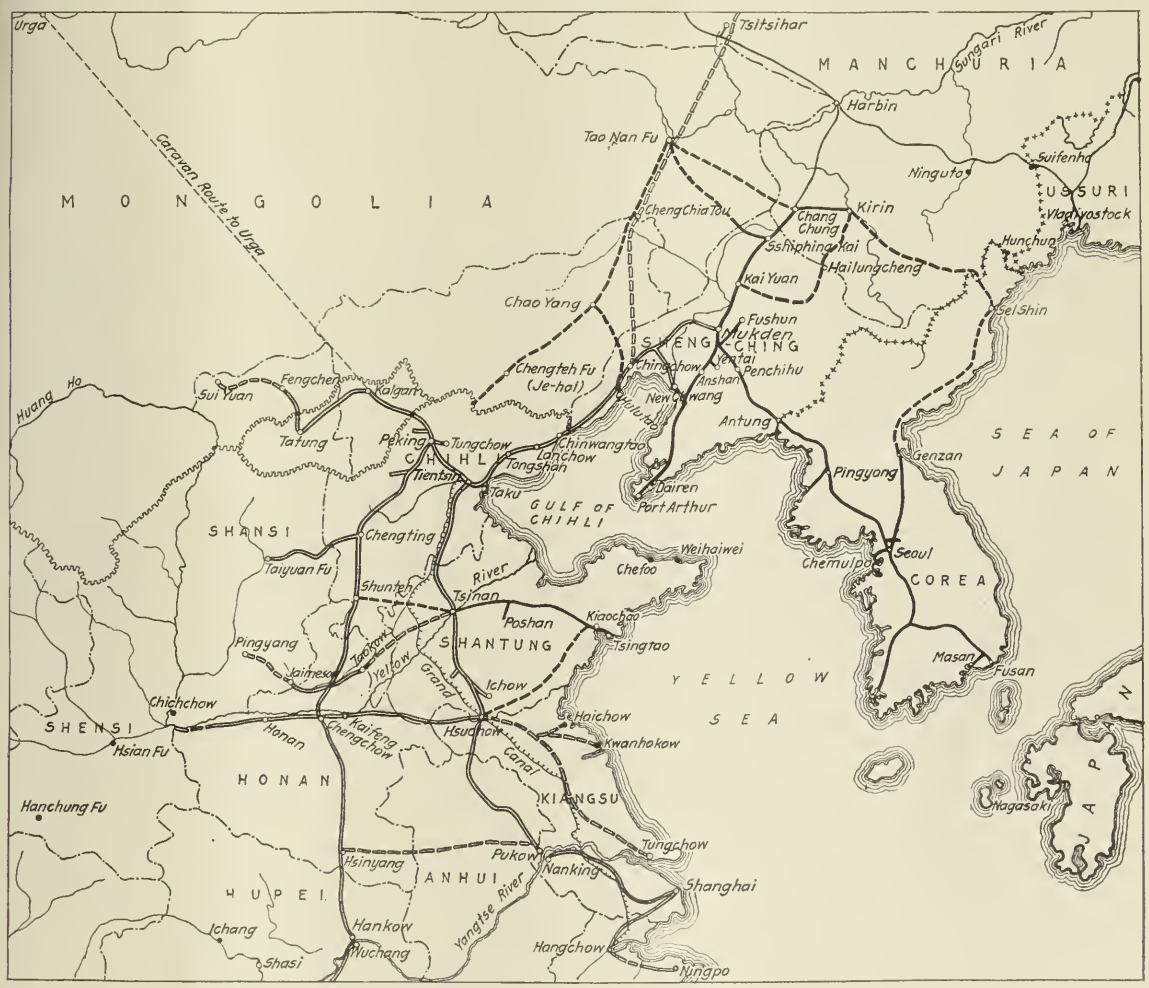
There are no doubt many great deposits of fuel in China, but few of these have been scientifically proved to date. It can be stated, however, and supported by good authority, that probably the greatest coal field in the world outside the United States is the general field in northern China, the central part of which lies in central and southwestern Shantung, all of northern Honan, all of southeastern Shansi and southern, western and northern Chihli. The known part of this field starts in northeastern Chihli at the Kaiping Basin, between Lanchow and Tongshan, and keeps inside the Great Wall and the Hunangho or Yellow river until Chichchow is reached, where it extends south of the Yellow river into southwestern Shantung—the limits of the field extending south of Honan and Kaifeng.

The Kaiping Basin, controlled and operated by the Kailan Mining Administration (Sino-British*) with the exception of the Fushan deposits in South Manchuria controlled and operated by the South Manchurian Railway (Japanese), is the only large deposit of coal in China which has been thoroughly and scientifically proved and comprehensively developed. The outlet of the Kaiping Basin operations to the sea is by the Pekin-Mukden Railway (Sino-British) through the port of Chinwantao with a rail haul of less than 100 miles. The port of Chinwantao has been developed and is largely controlled by the Pekin-Mukden Railway.

*Chinese and British.

The Pekin-Hankow Railway (Sino-Franco-Belgian) for some two-thirds of its length either passes through or runs in close proximity to this great field, and there are now considerable developments on the northern end of this line. The Pekin-Suiyuan Railway, usually known as the Pekin-Kalgan (Chinese), by branches near Pekin, reaches deposits of this field, and there are a number of native workings on this line outside the Great Wall. The meter gage Cheng-Tai or Shansi Railway (Sino-Franco-Belgian) running from Chengting on the Pekin-Hankow to Taiyuanfu passes through one of the richest parts of this field. This is the only line not of 4 ft. 8½ in. gage in this part of China. Tientsin-Pukow Line (Sino-British) reaches important deposits in southwestern Shantung which would also be tapped by the proposed line (Japanese) from Kiaochao to Hsuchow.

The South Manchuria Railway (Japanese) taps the small but very good iron and coal fields at Penchihu in southeastern Manchuria, the important and completely developed and equipped Fushun coal mines and the indifferent Yentai coal deposits. Fuel from these three fields will be used at the new Anshan iron furnaces for smelting the indifferent ore found near the latter place. The rail haul from the Fushun mines to the ice free port of Dairen is less than 300 miles. What the coal and iron deposits are on the



The Railways of Northern China

The railways under the control of the Chinese Ministry of Communications are shown by open lines; the concessioned or Japanese railways by bold, full lines

The Taokow-Chinghua Railway (Sino-British) from Jaimeson to Taokow and the Pienolo Lines (Sino-Franco-Belgian) between Honan and Hsuchow both pass through extensive and excellent deposits of this great field. The Shantung Railway (now Japanese, formerly German) taps the indifferent iron and coal deposits near Poshan in northern Shantung, but the proposed extension of this line from Tsinanfu to Shunteh, where connections would be made with the Pekin-Hankow would give the Shantung Railway access to all this part of these great coal deposits and an outlet to the sea by way of the port of Tsingtao (Japanese). The proposed railways (Japanese) in the region from Jehol to Chao Yang to Tao-nan-fu is not known, or, if known by anyone, the information was not obtainable by the writer.

The coast of China north of the Yangtse river, including that of south Manchuria, is singularly devoid of good harbors, particularly ones that can be kept open in the winter. The really good harbors are the well-known and excellently equipped ports of Dairen and Tsingtao, both at present under Japanese administration, and the port of Ching-wangtao, practically controlled by the Pekin-Mukden Railway (Sino-British). Hulutao claimed in connection with Japanese rail-

way concessions is probably capable of being developed into a reasonably good port, which can be kept open during the long winters of this region. Port Arthur, located in the leased territory of Kwantung (Japanese), while valuable as a naval base, is of little value as a commercial port. Newchang in the mouth of the silt-carrying Liao River is unsatisfactory at the best, and is tightly closed during the long winters in this locality. Tientsin (Taku) is unsatisfactory, particularly for vessels of any size, and is also closed during the winter season. Chefoo is little more than open roadstead with poor land communications, and Weihaiwei has almost impossible land communications. Haichow and Kwanhokow are both undeveloped and neither is probably capable of satisfactory development. This very clearly indicates the strategic value of the control of the four practicable seaports of North China.

The railways controlled by the Chinese Ministry of Communications are shown by the open lines on the map. The concessioned railways are shown by the full lines. At present all these concessioned lines are under Japanese control and operation, except the Chinese Eastern. The lines in Corea are operated as part of the South Manchuria Railways. The black broken lines indicate the concessions claimed by the Japanese to build and operate additional railways in Shantung, Chihli, southern Manchuria and Inner Mongolia, and one of the special claims in this connection is the right to develop and operate the port of Hulutao, already mentioned. The open broken line indicates the general route of the so-called Kuhn-Loeb concession negotiated by the late Major Willard Straight for a line from Chinchow on the Pekin-Mukden Railway not far from Hulutao to Angin on the Amur river, crossing the Chinese Eastern Railway near Tsitsihar.

As already stated, the map and this brief description have been prepared to give the viewpoint of an engineer concerning the vast industrial and economic stakes which are at issue in the control of the transportation facilities of north China. These transportation facilities will completely dominate and control one of the world's greatest coal fields, combined with the great iron resources of China and also what was particularly impressive to the writer in several months' travel in this part of China, they will control the world's present greatest supply of willing, robust and capable labor.

American Rails for Birmingham, Eng.

THE STEEL MANUFACTURERS of the United States are carrying their competition in foreign trade to the home of the British supply manufacturer, one mill having recently taken an order for 1,200 tons of rails for the tramways in Birmingham, England. The placing of the order excited no small amount of criticism on the part of British interests, with the result that the purchasers issued a statement as follows:

"The recent announcement that the Birmingham Corporation Tramways Committee had accepted a tender for steel rails from an American firm has given rise to considerable discussion. It now appears that the facts are as follows: During the war the tramway tracks had become so defective that it was necessary to reconstruct several routes at the earliest possible moment. The committee, accordingly, invited tenders for the supply of 1,200 tons of rails. Three replies were received. One, from an American firm, offered full delivery, April-May shipment, and quoted the lowest price of the three. A second, from an English firm, could only offer delivery of about 50 tons a week, commencing in three or four weeks. The firm stated, moreover, that they could not agree to a penalty clause, in view of labor conditions and of their difficulty in obtaining raw materials. The third offer was also from an English firm, who quoted a still higher price, and could not deliver under 20 weeks.

"Had the committee accepted either of the English tenders the work could not have been completed this summer. It could not be done during the winter months, and it would, therefore, have been delayed for a year. Such a responsibility the committee, having regard to public safety, were not prepared to take. They were, therefore, obliged to accept the American tender."

The Modification of the Shipping Day Plan

OFFICIALS OF THE CAR SERVICE SECTION deny strenuously the statement made in the *Railway Age* last week, which has been made by some shippers and even some railroad men, that the "shipping day" plan (formerly called the "sailing day" plan) has been killed by the modifications that have been made in it to meet the objections of shippers and because the war emergency has passed. It is asserted, on the contrary, that the plan, originally adopted as a war emergency measure, has now received official sanction and that the shippers, through the National Industrial Traffic League committee, have pledged themselves to support its principle and to co-operate toward making it a success as a permanent measure now that concessions have been made to overcome the points of criticism that made the plan unpopular in some quarters. It is admitted that without the co-operation of shippers the complete object, which is principally to concentrate l.c.l shipments in through cars over direct routes, thereby obtaining the advantages of full loading and avoiding the delays, losses and expense incident to transfer, cannot be obtained, but they believe that when the shippers are approached in the right way and their interests are properly protected the necessary measure of co-operation will be forthcoming. They point not only to the assurances of large numbers of shippers who have come to appreciate the advantages to themselves, but also to the successful results which have actually been obtained in the Eastern region, where, although it would seem that the difficulties were greater than in other parts of the country, the plan has been most successfully worked out.

The modifications in the plan as agreed to by representatives of the Railroad Administration and the shippers on April 8, with the concurrence of a committee of state commissioners that had, however, no power to bind the commissions generally, were published in the *Railway Age* of April 11, page 942, and a later announcement by Director General Hines was published in the issue of April 25, page 1062.

The opinions of those who feel that the plan has not been emasculated are based on the fact that it was agreed that the shipper shall not be deprived of the right to route his l.c.l. freight over any line, or of delivering it to the carrier on any day except holidays and that the schedules of specified shipping days should be published only after mutual arrangement between representatives of the shipping public and the carriers. It was agreed that peddler cars should be operated daily, except where more limited service is agreed upon, and Mr. Hines' announcement stated that peddler cars are to be operated daily on week days except holidays "except where a less frequent service meets the requirements" and that "the foregoing shall not be construed as requiring the establishment of additional train service."

It is admitted that if the shippers should withhold their co-operation by refusing to assent to a less frequent service or to route their shipments via the scheduled through car routes, little could be accomplished, but confidence is felt that by eliminating from the shipping day plan some of the more or less arbitrary applications of it that were sometimes made during the war, the manifest opportunities for im-

proved service in the handling of l.c.l. merchandise by concentrating it in through cars will operate to commend the plan. It is also felt that many of the evils charged against the plan arise not so much from the operation of the "staggered service" or "skip-stop" features of the plan itself as from the deficiencies of the l.c.l. service during war time and during the period of labor shortage. Much animosity was also aroused by the occasional arbitrary disregard of the shipper's legal right to send his freight to the freight house on any day, but where tact and care in meeting the shippers' requirements have been used in working out the schedules the reports indicate that the plan has been remarkably successful. For example in the Eastern region 33,000 tons of l.c.l. freight per week have been forwarded direct to destination which formerly would have had to be transferred from one to three times en route. There are something like 1,000 l.c.l. transfer points in the country, all of which present opportunities for freight to be delayed, go astray or be damaged in handling, and before the shipping day plan was adopted many of these points had become badly congested. At Waverly transfer on the Pennsylvania near New York at one time 250 cars were held up for handling, whereas since the adoption of the plan the business at this point has been handled currently. At West Albany, N. Y., the number of shipments transferred has been reduced from 1,500 to 250 a day. The New York, New Haven & Hartford has been able to operate practically all of its local freight trains on a basis of service at each station every other day, with a weekly saving of about 15,000 train miles.

By way of illustration, the shipping day plan is compared with the skip-stop service plan adopted for the street car system in Washington and other cities in order to improve the running time during a period of congestion. While occasionally a would-be passenger is seen frantically gesticulating at a car that does not stop and "cussing" the motorman or the company because he feels his rights were infringed when he was asked to go to the corners where the yellow signs are, the man who is already on the car appreciates the fact that he will get down-town sooner than if the car stopped at every crossing.

What Railroad Plan Should the Country Adopt?

Private Operation and Constructive Regulation Without Guarantees of Fixed Net Return Favored

By Samuel Rea
President of the Pennsylvania Railroad Company

What is the so-called "railroad problem"? We must be assured as to this before attempting to prescribe the remedy. It is now admitted by the vast majority of our thinking people that government ownership and operation of the railroads are undesirable, and that individual enterprise has given, and will give, the public the best and cheapest service. It is also admitted that it is in the public interest that the capital required for enlargement of transportation facilities should be voluntarily furnished by private investors under the attraction of a satisfactory rate of return and degree of safety.

It is admitted that there must be responsible and reasonable governmental regulation over rate structures, over capital issues, and over wages.

It is admitted that railroads, subject to public regulation as to charges and service, are not naturally subject to the state and federal "anti-trust" laws, and that in order to get full use out of facilities and avoid waste in service, they should be encouraged to consolidate and co-operate up to a certain point, and beyond that point they should be encouraged to compete in service.

Regarding the final objects to be attained there is no obscurity whatever. All that the regulating authority has to do is to see that hurtful discriminations in rates or service do not exist, and that the rates yield an adequate but not an excessive return to the railroads, so that they can obtain from the investor the new capital required for expansion and improvements.

Several years ago these railroads were assigned to the strictest public regulation, controlling revenues and the chief expenses, standards of equipment, wages, working conditions, and investigation of accidents, and subject to numerous bureaus. But have we been freed from controversy or complaints; has more new mileage been constructed or has the cost of transportation been decreased and is their financial condition sound? The public can answer these questions. All the economies and the benefits of better equipment, heavier train loads, larger yards, stations, shops, etc., have been absorbed, and the return upon the property investment has, with few exceptions, been kept close to, and often below, the starvation line. The proportion of stock which the public would buy has been a minimum. The railroads have maintained and improved operating efficiency, but have been forced to restrict broad developments such as new mileage and electrification, and to finance the greater part of the railroads by the burden of additional debt, instead of through stock issues. In 1900 the total capital stock outstanding exceeded the funded debt by $200,000,000, but in 1916 the situation was reversed and the total funded railroad debt exceeded the capital stock by about $2,200,000,000. Even a conservative property like the Pennsylvania Railroad has found it impossible to sell stock for the last six years.

Railroads Not Allowed a Fair Return

The railroads were not in that period allowed a fair return, such as a business enterprise requires to live and expand. Banking rates of 6 per cent are legal, and public utilities are allowed rates to produce returns of 7 and 8 per cent, and higher, on their property investment, depending upon conditions and service. Railroad rates were regulated by charter and general laws, and later by competition, efficiency, and growth of the business, and ultimately by strict government regulation. Therefore, I feel that any return which a railroad can make under reasonable rates fixed by governmental action cannot be regarded as unfair, and should not be a matter of criticism when based upon an honest investment, and as a result of years of conservative financing, and able management.

We must consider the averages for a few years rather than for a single year. In the so-called Five Per Cent. Rate case,

which was decided in 1914, the Interstate Commerce Commission found that in the period from 1900 to 1913 the ratio of net operating income to the property investment in road and equipment, of the thirty-five railroad systems in the so-called Eastern district of the country had fluctuated between 5.19 per cent and 6.31 per cent, the yearly average having been 5.64 per cent. In the year preceding the Commission's decision, viz., 1913, this ratio had been 5.36 per cent. Having regard to these figures the commission held that in its opinion "the net operating income of these railroads in Official Classification Territory taken as a whole is smaller than is demanded in the interest of both the general public and the railroads." Experience demonstrated the soundness of that decision; yet in only five single years from 1900 to 1916 was a higher percentage earned by the railroads of the country. Taking three year periods, since 1900, only in that period ending with 1908 was an average return of 5.36 per cent exceeded in the 17-year period by the railroads of the country as a whole. But to avoid controversy as to the integrity of property investment let us take the Pennsylvania System whose property investment has never been questioned and is understated. In only one calendar year from 1910 to 1917 was the property investment return equal to 6 per cent. The return on property investment was 6.1 per cent in 1916, but in 1914 it fell as low as 3.92 per cent. All this proves conclusively to my mind that such returns were not sufficient for an expanding business. Is it any wonder that some railroads went into receivers' hands, or resorted to unsound financing? Appeals to the various state and federal regulators were long and costly, and even when the federal regulators were disposed to be reasonable, the states, or a state, deferred action.

The unsatisfactory plight of the railroad industry in America is due to the fact that while there was a general consensus that a policy of public regulation should prevail, we have had no definite national railroad policy, and no single authority responsible for the results of public regulation. The numerous regulating authorities have been governed largely by the great fear that the companies—or some of them—might make too much money from the rates. The seeds of distrust and timidity were sown in the minds of the investors by the continued hostile attitude of legislators and regulators to all railroads, and there was no foundation on which to expand. Consequently, speaking broadly, the rate of return allowed under regulation has been unattractive to the investor, and the industry has failed to regularly secure the new capital needed for its proper development. Briefly, I diagnose our real problem as weak railroad credit, which is directly attributable to the lack of responsible, constructive, regulation.

Finally, when confronted by war, the railroads were, as a war emergency measure, taken under federal control, with legislative restrictions removed. It was imagined that the word "unification" would cure all, that with a guaranteed rental the companies' financial strength would not be further weakened during federal control, and that the government could institute vast economies, and earn large profits. To this freedom from restrictions must be added the patriotic assistance of the public who were willing to endure any transportation inconveniences, and the services of experienced railroad men who devoted themselves to carry out the government policies, so as to assist in winning the war.

Government Operation Is Excessively Expensive

But a railroad problem still exists, notwithstanding the efforts of the Railroad Administration to prevent it. The result of federal control did not surprise experienced men in this country or abroad, but the cost was nothing compared to what it would have been under government ownership. I cannot express the situation better than it was expressed by Senator Cummins recently before the Iowa state legislature:

> "It costs the government more to do any given thing in a country like ours, where every man is a sovereign, than it costs anybody else to do the same thing. The history of every enterprise of a business character conducted by the government proves all and a great deal more than the statement I have just made. I disparage no one, and impugn no man's integrity. What I have said is not only the truth, but it is as natural as life itself."

These results do not peculiarly apply to our own country; they have been the experience of the world, wherever government ownership, government operation or government guarantee has been instituted, and when a policy is laid down for them to follow, subject to political exigencies.

Necessities of the Situation

How shall we approach the present situation to again make the railroad system the instrument of our future national progress? We must decide upon a national policy. Either government ownership, or responsible national regulation must be adopted. I believe it should be the latter. The essentials of the situation are adequate revenue to enable the companies not only to live, but to attract new capital for expansion, accompanied by constructive and responsible national legislation and regulation, committed to experienced men, assured of a long term of office to prevent the dread of reappointment, and paid sufficient compensation, and brought into state and local transportation necessities through regional commissions.

We have one system of National regulation from which we can take some comfort, i. e., the national banking system regulated through the Federal Reserve Board and the Regional Reserve Banks. That system permits and encourages prosperous banks, and we have confidence and pride in them. They stood the test of solvency in war time, and are the mainstay of the nation in its industries. Like the strong railroads a large part of their profits were made from rates that were reasonable, which profits, that might legally and morally have been paid as dividends, were invested in the expansion of business to serve the country. Yet banks have not been free from failures and bankruptcies in the past. In times of stress and depression our credit and currency system was often over-inflated and not helpful to industry, but we did not attempt to cure this solely by denunciation. Instead, we made the banks subject to one central reserve board to carry out a national policy through the federal reserve regional banks. The banks participate in the selection of the regulators comprising the boards of each federal reserve regional bank, but each individual bank, under the legal rate established, can earn as much as its individual management is able to earn. We recognize that their banking regulators must be men chosen from various walks of business life, beginning with the farm and ending with the bank itself. The banks are not forced to continuously take a small margin of profit, and therefore when confronted by weak conditions are not forced to bankruptcy. Compare bank dividends and profits with the railroads, and also compare the legislative treatment and regulation accorded to them with that accorded the railroads. Can it be possible that a dollar invested in bank stock, or placed on deposit, is a greater national trust than one invested in railroad securities?

The more that the business men and the public observe the success of banking regulation will they appreciate the principles for the rehabilitation of railroad credit recommended by the railroad executives. They will see the necessity for the railroads to have a separation of regulatory judicial questions from executive and administrative questions. They will see the effectivness of a responsible national regulatory policy by putting the responsibility for executive questions and actions where it properly belongs. In the case of the railroads, it should be lodged either in a cabinet officer,

or in a board headed by a cabinet officer, or by an officer like a permanent assistant secretary of war, as in the case of railroad control during our Civil War. Congress could safeguard the situation against such an official suggesting, appointing, removing, or compensating any railroad officer or employee. They will see the necessity of rates reasonable and adequate to sustain railroad credit, and the wisdom of national regulation of securities and wages. They will also see the necessity of co-operation and consolidation between the railroads, and the freedom from those restrictive laws and inadequate profits that have separated and weakened them in the past. During federal control the government recognized most of these features were essential to carry out an active transportation business, but will our legislators and regulators have the faith and courage to put through some such reasonable program, and deal as constructively with the railroads as with the banks, and will the state governments co-operate?

Does the fear of allowing the railroads adequate rates still exist?

I would point out that in many of our strongest companies, and notably in the case of The Pennsylvania Railroad System, which consists of weak lines as well as strong lines, part of the surplus was continuously put back into betterments and improvements, and in aiding traffic-feeding lines, as a conservative measure of finance. The surplus of the Pennsylvania System did not arise from extortionate rates, but very largely from paying dividends to stockholders below the prevailing return in other companies for a series of years, and also from profits on long time investments, and through premiums on some of its capital stock issues. To be conservative and lay a foundation for continued growth, the stockholders were willing to relinquish a portion of the profits over a term of years, and in this way the Pennsylvania System in seventy-two years invested in its railroad property for public use about $430,000,000 in excess of its capital issues held by the public. This undercapitalization explains why the parent company has been able to continue its 6 per cent dividends despite such low returns on the property investment. The increased cost of living has always been recognized for the employees and for the producer of materials of which the railroads are large consumers, but the railroad stockholder has often been neglected, and his conservatism has been used as a basis to keep rates down, instead of allowing them to be reasonable.

Rate Reductions Under Private Management

I would further point out that, under no system of government ownership, guarantee or control, have there been reductions in rates equal to those made by our company and others under private management and initiative and prior to the enforcement of punitive laws and regulations. In 1864 the average revenue per ton mile on the Pennsylvania Railroad was about 2.5 cents. Due to the traffic development and continued efficiency, the average revenue per ton mile was reduced from 2.5 cents in 1864 to 1.3 cents in 1874, and in 1884 it had been reduced to 8 mills per ton mile. By 1894, as a result of commercial depression and competition, it had been reduced to 5.85 mills per ton mile, and later, through ruinous competition between all the railroads, fell to a very unreasonable and unremunerative basis. Yet, notwithstanding greatly increasing labor and material costs, taxes and other expenses, the average ton mile revenue received in 1894 was not again permanently reached until 20 years later, in 1914. Compared with similar charges abroad we begin to see the moderate revenues for which our railroad service was rendered.

While the trend of public opinion is now unmistakably opposed to government ownership as a solution of the railroad problem, there is much discussion of the possibilities of a government guarantee of railroad income, and if the income is guaranteed in substance, the principal of bonds must be paid at maturity, if not previously scaled down through government valuation. The railroad investor—so badly frightened by punitive laws and regulations and small profits—is willing to listen to any reasonable plan, whereby he can have a guarantee, hoping that he will have no more serious fluctuations in the price of his securities, and will be assured of a fixed income. He is not given the value to be placed on his individual investment on which the guarantee is to be based, nor the income to be guaranteed. He knows nothing of the division that is to be made between the various classes of securities of his railroad, nor the standing that is to be given to the various liens on his railroad property, and consequently does not know what is to be the final value of his securities, or whether he will finally get any return thereon at all. That knowledge, if it had to be conveyed beforehand, would be a serious eye-opener to the railroad investor. He should know it beforehand or he is taking a step in the dark.

Effects of a Government Guarantee

A governmental guarantee would plunge the country into a wholesale financial reorganization of the railroads extending over a period of years, and would ultimately mean government ownership. But to temporarily palliate the situation, the guarantee is to be coupled with private operation. What is to be the capitalization of these private operating corporations? Are they to be mere shells with no large financial stake in the properties they operate and administer? Is there any business man present who would recommend the government to guarantee returns on property having a value of about eighteen billion of dollars and turn it over to six, or even eighteen, private operating companies without demanding the power to thereafter define its financial and operating policy? Can any stock or bondholder imagine that our government will guarantee railroad stocks and bonds, and charge nothing for that guarantee? Should capital improvements thereafter be made according to the business necessities or on the political judgment of each administration? Would political favoritism as to new improvements, branches and extensions, and orders for supplies be inevitable in the government guarantee plan? Should we then employ officers and men who have political influence? Should we impose this guarantee plan on the country in the midst of the great struggle she must meet to reconstruct her industries and put national affairs and taxation on a peace basis? What period do you think it would take to work out the financial reconstruction of all the railroad systems of the country, and all their leaseholds, guarantees and other obligations, and what is to occur meanwhile?

These questions open up some of the problems of a guarantee. Why, even the Railroad Administration's federal control contracts, that deal only with the parent companies, and are based on the earnings for the three years ending June 30, 1917, remain in large part still unexecuted, and many vital questions and settlements thereunder are still untouched, although it is the ardent wish of the Administration to dispose of them.

Now, selfishly, the investor might take a 4½ per cent guarantee for his railroad security, and let the country take over his problem, but he must look further and realize that as a citizen and taxpayer he would be called upon to pay, in taxes and in the greater transportation costs upon production, his share of the extra cost of the government guarantee and administration, so that the net result to him of the guarantee plan would not better his condition.

What is the advantage of the guarantee plan to the private citizen who is not a railroad security holder? Those who support it admit that private ownership and initiative under equitable regulation produce the most efficient and economical operating results.

On top of that annual guarantee on about eighteen billions of dollars of existing railroad property, from six hundred million to one billion dollars more would be required annually for additions and betterments to the roadbed and equipment.

Now the chief advantage emphasized for the guarantee plan is that the government could raise new capital cheaper than private corporations, and that by various schemes of regional unification the weak roads could be tied to the strong, further economies effected, and some element of competition left. Now, we know that reasonable competition as to service and attracting traffic is the best method of keeping up the standards and accommodating the public and enforcing economies, but there must be some appealing force to assure such reasonable competition, and the guarantee plan on its face does not seem to possess that force. I agree that the government could probably raise new capital much cheaper for a time than the majority of the railroads, but the savings obtained in that way would be easily obliterated by extravagance and lack of concentrated and continued responsibility under the government guarantee plan with our form of government.

Under the federal control contracts the government allows 5 per cent on deferred rental payments, and 6 per cent on new capital expenditures. This, in substance, shows that the government financing can become just as costly as that of the conservative corporations. We have also seen the strongest nations selling bonds at rates as high as those allowed by private corporations. Even so able a man as Paul Warburg, in suggesting a very attractive guarantee plan, has this to say upon the subject as the result of his long experience, both in private and government finance:

> "It has been argued that through the use of the Government's credit, railroads would procure the necessary funds at a lower rate of interest. As against that, we must remember that the excessive use of the government's credit tends to increase the rate at which a government borrows. With us it would not only affect the rate of the government bonds to be issued in refinancing the outstanding railroad securities, estimated at $17,000,000,000, but it would add to the rate to be paid by our government when some of our liberty bonds in due course mature and come up for renewal. Moreover, the incessant use of government bonds, in order to finance the annual requirements for future railroad developments and improvements, would have a disastrous effect upon the price and standing of our government securities. Granting, however, that some economy could be secured by substituting the government borrowing power for that of the railroads, it would be insignificant when compared with the increase in cost of operation and waste and inefficiency that inevitably would follow government operation."

Shall we, in order to save some small difference between the rate which the railroads would pay and the rate the government would pay on new capital, incur the risks of a guarantee plan? Shall we try to effect a saving in that part of the railroad dollar used to pay interest and dividends that represents less than 20 per cent of the whole dollar and at the outset admit that expenses of operating and other expenses (already requiring 80 per cent of that railroad dollar) when subject to government dictation, would increase rapidly?

Guarantee Plan Means Government Ownership

Let us try to depict the situation in any year when the income earned was less than the guarantee. How would the deficit be made up? Congress would have to appropriate the money out of the public treasury and raise the funds by public taxation. If the deficiency ran through several years Congress would be obliged to make repeated appropriations from the public funds to the railroad companies. Instead of getting the railroads out of politics we would probably be making them the major issue in national politics. It is difficult now for the government Railroad Administration to get from Congress the funds needed to meet the government obligations to the roads when the government is in complete charge of operation and is collecting and disbursing the revenues. What would be the situation with eighteen railroad companies in full charge of the operations and the revenues, and the government called upon to make good their operating deficit? Bitter partisan attacks would be made on the corporate management for their failure to earn their minimum standard income, and demands in Congress for investigation of alleged extravagance and inefficient management and waste of the peoples' money given to the railroad bondholders and stockholders.

To my mind the guarantee of railroad income by the government would inevitably lead to government ownership—first of the weak lines, and later of all the lines. It might be argued that the government, instead of paying funds out of the treasury to the less prosperous companies, would advance the rates. But this again, it seems to me, would lead to the same sort of bitter political debate and attacks on the corporate management. It would probably be alleged that these weaker roads, knowing that their income would be provided by the government in any event, were purposely failing to do their best.

American industry has made its wonderful progress because the industries, and the men conducting them, have been rewarded for efficiency and penalized for inefficiency. It is the fear of failure as well as the hope of reward or commendation that incites men to do their best. A government guarantee on private capital invested in transportation would to a large extent remove the fear of failure, but would it be in the public welfare, or be helpful to our industries, which pay freight rates? If the government could keep rates at a level that would provide sufficient revenues for all roads to earn their guaranteed income and operating expenses, why can we not equally assume that the government will allow such adequate rates under a system of government regulation, stimulated to economy and efficiency by private ownership and initiative, and without the blight of a government guarantee?

The guarantee is not a solution of this great economic question, but a patch upon it.

Rehabilitation of Railroad Revenues Should Begin at Once

Don't let us get frightened about the task of rehabilitating railroad credit or imagine that it is an impossible task. It is entirely possible if we approach it with the proper methods and with equitable legislation. We had a Civil War—its cost was heavy. Compared with the aggregate wealth and position of our country, each citizen had more national debt per capita than we now face. We met the cost and it was our pride to steadily reduce our national debt. Following the war period the railroads and the country expanded, and laid the foundation for the greatest progress the world ever saw. It had some pains and sacrifices, and we cannot escape similar experiences. It is the price of liberty and progress. We had weak railroads after the Civil War, but we had a fair chance to conduct the railroad business and other industries. The Pennsylvania Railroad had ton mile revenues of about 2½ cents, so that it could pay its taxes, expanded its property, and lease or acquire weak roads even in the war period. It did this, and gradually reduced the rates as its business justified, and its solvency was assured. If the roads are allowed reasonable rates to properly support the railroad investment and service, and these rates are accompanied by constructive regulation, the credit of weak roads will, like that of so many weak roads in the past, be built up gradually by the growth of the country without taxing the public treasury or breaking down the few fairly strong roads. They will also be helped by ability to co-operate in the use of service and facilities with the strong roads, and adapt their capital and operating outlays to their necessities.

The root of our difficulty lies in weak railroad credit, and Congress must by legislation place the welfare of the public,

which is so intimately intertwined with the transportation systems, beyond the powers of any state or federal commission to disrupt the entire transportation system and investment. The way to do this is by a statutory rule that will insure adequate rates, and responsible regulation. Without such action there can be no railroad financial rehabilitation.

I suggest that the first step in the program of having the roads produce an adequate return upon the investment should be taken by the government itself which now has control of the railroads. There is no justification in throwing the railroad deficiencies on the backs of the taxpayers through a congressional appropriation, and if the government itself, in the control of the properties, has not sufficient courage to deal with the rate situation as it has dealt with wages and material costs, then from what source can we expect the requisite courage to deal with this great business and financial question? While wages and material costs are high, that adjustment of the rate structure to existing conditions should be the first constructive step in railroad financial rehabilitation, and constitutes a necessary preparation for the return of the railroads to their owners after appropriate legislation. The railroads of most countries face huge rate increases compared with the ante-war period, and our necessary increases being smaller than theirs will not place our industries at any disadvantage compared with those of other war-burdened countries.

Conclusion

I conclude that the immediate remedy for the railroad situation is

1. Adequate revenues on which the railroad credit may be strengthened and the new capital attracted;

2. Concentrated, responsible national regulation, separated as between its executive and administrative functions, and its judicial functions, and founded on equitable legislation, that will require our regulators to insure strong transportation systems, and not weak railroads;

3. All railroads under public regulation to be authorized to lease, acquire or consolidate with any other railroad corporations, and reasonable co-operation permitted in facilities, equipment, and train service;

4. Regulation of security issues;

5. Regulation of wages, with the employee, the employer and the consumer represented;

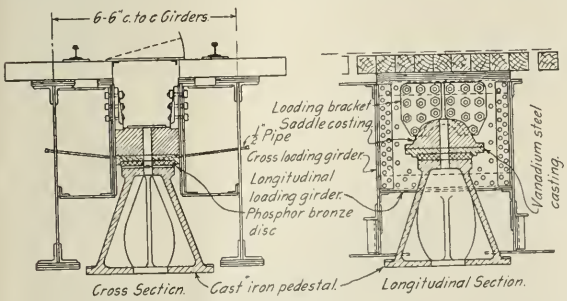
6. Funding of the capital debts incurred during government control.

7. Rehabilitation of revenues of the existing railroads, should begin immediately while they are under government control.

New York Central Turntable Has Unique Features

A Recent Design Has New Type of Disc Bearing Center and Heavy Wrought Steel End Trucks

A CENTER BEARING of the flat-disc type with a new form of rocker saddle and forged steel end trucks of heavy design are novel features embodied in a 100-ft. turntable recently developed by the New York Central Western Lines. Some of these features are an elaboration of ideas developed on a 90-ft. turntable which has had extended use at a number of engine terminals on this road. The table is exceptionally heavy, being adequate for a New York Central 0-8-8-0 Mallet locomotive weighing 480,000 lb., balanced over the table, or a Coopers E-70 loading for the



Arrangement for Applying the Loading to the Center

single spans. The circular wall is provided with a large inspection pit (6 ft. square by 6 ft. 9 in. high) and a jacking base is introduced on the circle wall footing directly in front of the inspection pit and also circumferentially opposite so that the table may be jacked up for a more thorough inspection or for the replacement of the end trucks.

Of particular interest are the reasons given for adopting the disc type of center. Briefly, continuous service and low maintenance cost are more important than ease of turning and therefore low operating cost. It has been the experience on this road that under present heavy loadings the roller centers used have been too highly stressed, causing rapid grinding and wear of both rollers and treads with the result that replacement has come too soon. It has also been found that the roller centers used have required more frequent and careful inspection and maintenance than they have received from the roundhouse forces, with the result that their operation was not satisfactory. While the roller centers unquestionably turn easier than the disc centers when new, it was found that poorly-maintained roller centers did not turn as easily. Tests made by this road on a number of its turntables several years ago and which are recorded in the Proceedings of the American Railway Engineering Association for 1916, page 141, confirmed this position. Briefly, with electric power costing 4 cents per kw. hr. and the roller center in first-class shape the cost for turning an engine weighing about 486,000 lb. is one-quarter of a cent, while if the center is in poor condition the cost might run as high as 0.6 cents. For the flat disc center 24 in. in diameter the cost is about 0.57 cents. On this basis the cost of turning 100 engines in 24 hr. would be $0.57, while the cost per month would be a little more than $17. In other words the cost of operating the turntable, even with a center affording increased resistance, is small compared with the cost of operating the engine terminal.

In connection with the turntable, special attention has been given to the requirements of the tractor. It was felt that it is a serious mistake to provide a tractor of too limited capacity, for with it out of service 15 to 20 men may be required to turn the table. It is believed that with proper attention to this subject there is no more occasion for tractor failures on turntables than for failures of the motive power on movable bridges. The tractor required for these 100-ft. tables is specified to provide a tangential pull of 1,725 lb.,

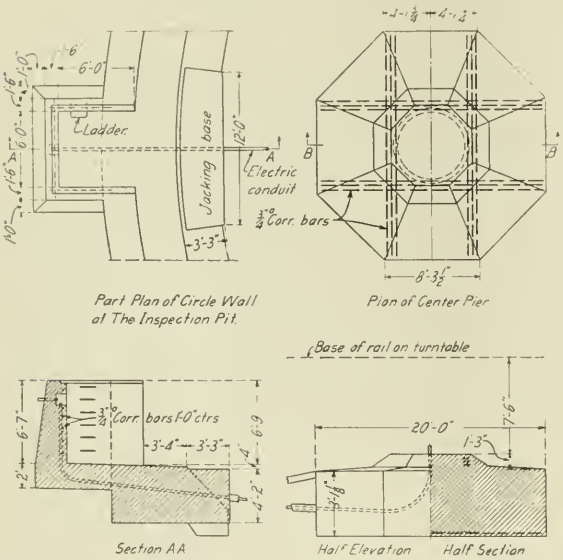
this being the initial friction estimated for a total load on the center of 842,000 lb.

The New Center

The disc of the center is flat and has only one rubbing surface. A vanadium steel bearing casting is attached to the under side of the turntable saddle and this bearing casting turns on a flat phosphor-bronze disc two feet in diameter which is attached to the center pedestal. The vanadium steel bearing is attached to the saddle casting by bolts while the disc is secured against turning on the pedestal by means of keys.

Special attention was given the manner of lubricating the contact between the vanadium steel and phosphor-bronze surfaces. Graphite grease is used for this purpose, being introduced into grooves cut in the surface of the vanadium steel through half-inch pipes leading from grease cups located outside the girders. Grease has been used because it was felt that for slow motions and heavy pressures a thick lubricant would be better than oil, since it has less tendency to be squeezed out of bearings.

The table is supported on the center through the use of a pin bearing. As seen in the drawing, the loading arrangement consists of two transverse loading girders connecting the two main girders, with two shorter longitudinal girders interposed between the two transverse loading girders. These two interior loading girders transmit the load of the turntable to the center through the aid of two brackets resting on trunnions forming a part of the saddle casting. As a consequence of this arrangement, the turntable may rock with

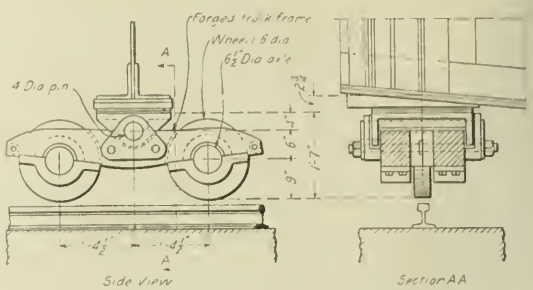


Details of the Masonry

the passage of a locomotive over it without introducing any eccentric loading on the center.

The forged steel end carriage is another interesting detail, an important feature being the articulating arrangement whereby an even distribution of the load on the two wheels is obtained. The truck frame is of forged steel made in two parts so that it may be bolted around the wheels. The middle of the frame carries a four-inch pin which takes the load from the girder in direct bearing through a cast steel shoe bolted to a bevel plate on the bottom of the girder. The shoe has a groove of 4 in. in diameter bored in its under side to fit over the pin, thus affording an effective rocker joint with a bearing 1 ft. 7 in. long. The wheels are of cast steel 1 ft. 6 in. in diameter and 4 in. thick with forged axles 6½ in. in diameter.

The table was designed for unit stresses not to exceed 12,000 lb. per. sq. in. in tension or compression with other stresses in proportion. For designing the end trucks and connecting parts the maximum end reaction was increased by two axle loads of 70,000 lb. each. When the table is



The New End Truck

moving the end trucks were considered as carrying an unbalanced load of 80,000 lb. on one end of the table. Provision was also made in the design for an end thrust of 20 per cent of the total live load on the table.

The total weight of the turntable is 171,927 lb., of which 145,720 is structural steel in the girders and cross frames, etc., and 26,207 lb. in the special castings, forgings, bolts, etc. The design of this table was developed under the direction of B. R. Leffler, engineer of bridges, New York Central Lines West of Buffalo, at Cleveland, Ohio.

The Black Tom disaster in New York harbor, on July 30, 1916, is the subject of a lawsuit which is being tried in Jersey City, N. J., this week, wherein 200 witnesses have been called. The case is the suit of the Bethlehem Steel Company against the Lehigh Valley Railroad to recover $2,900,000 for munitions destroyed in the explosion and fire. The suit is in the Supreme Court of New Jersey, in which court, a jury, in a similar suit a few weeks ago, awarded damages of $413,390 to B. H. Howell Son & Co., sugar refiners, for sugar lost in the fire. The defense of the railroad company was that the fire started on property not owned by it.



U. S. Official Photo, from U. & U., N. Y.

One of the 14-inch Naval Guns at Bassons, Gironde, France, Prior to Its Being Taken to the Shop to Be Dismounted for Its Return to the United States

Hearing at Washington in Railway Mail Pay Case

Revenues Steadily Decreased Under Space System—New Basis and Higher Rates Proposed

THE HEARING before Attorney-Examiner George N. Brown of the Interstate Commerce Commission in the railway mail pay case, which has been in progress at Washington since the first week in April, was concluded this week. The commission is to render a decision fixing reasonable rates for the transportation of mail by railway and prescribing the method or methods, by weight, or space, or both, for calculating the compensation of the railways for carrying the mail and the service connected therewith. If the decision of the commission shall be adverse to the space system now in effect, or if the rates established by it shall be greater or less than those now in effect, the postmaster general is required by law to readjust the compensation of the carriers from the date on which the present rates became effective, November 1, 1916.

Both the railways and the post office department have submitted voluminous testimony, and both have submitted plans representing their ideas as to the proper methods of compensation for the transportation of the mails, that of the department providing for a continuation of the present space system, with some modifications, and that of the carriers providing for a combination of the space and weight systems and greatly increased rates.

The case has its origin in the law passed by Congress at the instance of the post office department on July 28, 1916, which provided tentative rates for mail transportation, based on 21 cents per 60-foot car mile, subject to review by the commission, and authorized the postmaster general, pending the decision of the commission, to pay the carriers on the basis of the new rates by space, on such routes or systems as he should select for a test. Meanwhile the former method of paying on the weight basis was to remain in effect. The post office department, however, selected practically all of the routes for such "test" and put the space system in effect on November 1, 1916. Although for a short time the compensation of the railways under the new basis was increased at the rate of about $2,000,000 a year, the department began reducing the amount of car space used in such a way as to reduce the annual railway mail pay from a maximum of $62,750,551 in 1917, to $53,502,591 in 1918, although the volume of mail was greatly increased. Although a few mail trains were taken off during the war, the railways saved very little in operated mileage, and it is not denied that the reduction in mail pay was the direct result of the reduction in the authorizations of space under the new system.

One of the ways by which space has been saved has been to reduce the amount of mail handling on the cars and to send it as storage mail, to be sorted at the terminal upon arrival, thereby gaining the advantage of the heavier loading in the storage car.

The post office department has always claimed that the method of paying for mail transportation on the basis of authorized space afforded a more equitable plan for measuring the service performed, while the railways opposed it both as to the railroads as a whole and as a means of distributing the compensation among the different railroads. They now contend that the roads which carry the greatest density of mail traffic have been penalized both in the rates and by the consolidation of a greater volume into the space used, with a consequent reduction in pay greater than the saving in expenses, while the roads of lighter traffic have been penalized because the car space necessarily run is not fully used and paid for by the department.

For the purpose of presenting the case to the commission the month of April, 1917, was selected as a test period, and on all the roads the service was measured both on the weight and the space basis. The basic statistics thus determined have been agreed upon by the carriers and the post office department; but different conclusions have been reached from them because the post office takes the position that it should not be charged with any space but that authorized, except in mixed cars, while the railroads take the position that all of the cars necessarily run in order to furnish the authorized space should be paid for by the mail service. For example, a 60-foot car is run from Chicago to Omaha. From Chicago to Creston, Ia., a unit of 60 feet of space is required and authorized, but from Creston to Omaha only a 30-foot unit is authorized, because some of the mail has been put off at Creston. The car is run through to Omaha and the railroads claim it is done necessarily and should be paid for, but the department claims that the movement of the empty 30 feet of space is "for the convenience of the railroad" or is incidental to the passenger, baggage or express traffic. Approximately 31 per cent of the car space which the railroads find it necessary to operate is not covered by authorizations; and the post office not only has not paid for it, but at the hearing objected to its inclusion in the cost studies, except as to mixed cars.

The railroads also contend that the space system lends itself to other one-sided interpretations of the law, such as holding the authorizations down to an unreasonable minimum and making frequent emergency authorizations; authorizing small units of space for mail to be divided among several routes at a junction point and thereby requiring the railroad to haul a car for each route; failure to pay adequately for empty return trips, etc. The law provides for authorizations of space in units of 3 feet, 7 feet, 15 feet, 30 feet or 60 feet, but in making emergency authorizations the department has adopted the practice of authorizing multiples or combinations of such units in such a way as to save a few feet, as by authorizing two 3-foot units instead of one 7-foot unit, or two 7-foot units instead of 15 feet, although the railroad may have to furnish the larger amount of space.

The roads also claim that the space system is theoretically unsound and does not compensate fairly for the service rendered. They say that under the present system mail is carried in storage or baggage cars on passenger trains for less than freight rates, and less than the railroad's proportion of express rates.

Mail Rates Less Than Freight

Traffic men appearing as witnesses at the hearing produced elaborate detailed exhibits to show that to a great extent the railroads are being paid less for hauling storage mail in passenger trains than for merchandise freight in freight trains. It was testified that on the petition of the postmaster general the Interstate Commerce Commission had authorized a rating of first class for carload freight shipments of stamps and postal cards, but that since the establishment of the space basis the department has withdrawn such articles from the freight and is now sending them by mail in storage cars for less money.

For the purpose of comparing the revenue on parcel post traffic, a crate the size of a 3-foot unit of car space was taken to the plant of Sears, Roebuck & Co., Chicago, and filled with packages ready to mail. The crate held 874

pounds, or 146 packages averaging 6 pounds each. Assuming shipment for 17 large cities to various destinations approximately 50, 100, 225, 450 and 650 miles distant, and from Chicago to the 30 largest cities in the United States, it was shown in one of the exhibits that the average revenue when carried as closed pouch mail was $7.79, and when carried in storage space $5.11, but that if carried, under rates in effect in January, 1919, as one shipment of 874 lbs., the revenue would have been $10.30 if carried as express, or $9.12 if carried as freight.

The case for the railroads was prepared by the Railway Mail Pay Committee, Ralph Peters, New York, chairman, and was presented under the direction of its legal committee, F. H. Wood, of the Southern Pacific, chairman. Mr. Wood conducted the examination for the carriers with the assistance of other members of the legal committee, which includes Clyde Brown (N. Y. C.), New York; Kenneth F. Burgess (C. B. & Q.); H. W. Bikle (Pennsylvania); W. A. Cole (B. & M.); C. B. Northrup (Southern), and A. P. Russell (N. Y., N. H. & H.). The case for the post office department was directed by Joseph Stewart, special assistant to the Postmaster General.

The carriers' presentation was opened by testimony of traffic witnesses, D. M. Goodwyn (L. & N.), for the Southern carriers; P. C. Sprague (P. C. C. & St. L.), for the Eastern roads, and L. C. Mahoney (C. B. & Q.), for the Western lines, who presented voluminous statistics showing that present railway mail pay per gross ton-mile is far below first-class freight rates, as of April, 1917, when the freight rates were much less than at present.

Probably the most comprehensive statistics of passenger train operating costs and revenues ever put together are included in a series of exhibits presented in this case by L. E. Wettling, statistician for the railroad committee. Operating revenues and expenses for passenger train service were computed for 140 Class I roads on two different bases, for the separation of expenses common to both freight and passenger service, the basis used by the post office department and the basis of road locomotive ton-miles. On the first basis passenger train operating expenses were shown to be 26.58 per cent of the total operating expenses and on the second basis 27.79 per cent.

After reducing the service to equivalent 60-foot car miles the operating revenues and expenses per 60-foot car were shown on the two bases as follows (cents per mile):

	Basis No. 1	Basis No. 2
Total passenger train revenue	25.9	25.9
Total passenger train expenses	19.7	20.7
Passenger revenues	27.5	27.5
Passenger expenses	20.3	21.3
Express revenues	22.1	22.1
Express expenses	17.6	18.5
Mail revenues	17.8	17.8
Mail expenses	17.8	18.8

Calculation of Reasonable Revenue

For all roads in the United States the average passenger train revenue per passenger train car mile in 1917 was 29.29 cents. From this it was calculated that the mail revenue per annum necessary to make the mail earnings per used car mile equal to the average for the calendar year 1917 would be $97,796,749, or 38.4 cents per authorized car mile. This was based on 252,195,309 car miles authorized as of March 27, 1917, plus .91 per cent of this amount for emergency authorization, a total of 254,490,286 car miles authorized; plus 31.2 per cent of the authorization to cover empty space, a total of 333,891,255 car miles. It was also figured that to pay expenses, taxes and a 7 per cent return on the investment devoted to the railway mail service in 1917, based on service and costs in April, 1917, would require an annual revenue of $93,981,267, or 36.9 cents per authorized car mile, on the basis of post office letter of instructions No. 504; and $98,895,819, or 38.9 cents, on the locomotive ton-mile basis. The mail investment, based on 9.1382 per cent of the passenger train investment, according to the first basis of apportionment was $443,629,626, and on the second basis it was $463,824,955. For the calendar year 1918, based on the service in April, 1917, and on the costs in November, 1918, the mail revenue necessary to pay expenses, taxes and a 7 per cent return on the investment would have been $121,675,988, or 47.8 cents per authorized car mile on the first basis and $128,304,700, or 50.4 cents per car mile on the second. The average revenue, based on the authorization of March 27, 1917, was 7.32 cents per ton-mile and 23.69 per 60-foot car mile; and based on the authorization of June 30, 1918, it was 5.91 cents per ton-mile and 23.68 cents per car mile.

One of Mr. Wettling's exhibits showed that the compensation for initial and terminal service for 174 roads in April, 1918, was 18.55 per cent less than in November, 1916, for regular service, while for emergency service it had increased 55.84 per cent; and the total pay for both line haul and initial and terminal service had decreased 14.64 per cent. Another exhibit showed the distribution of passenger, express and mail revenues for April, 1917, for all roads in the case as follows: Passengers, $55,401,359; excess baggage, $551,039; sleeping cars, $142,078; parlor and chair cars, $80,490; other passenger train revenues, $589,561; milk, $1,209,824; express, $8,315,260, and mail, $4,467,027. Of this last amount $4,397,040 was computed on the space basis and $69,986 on the weight basis.

Mr. Wettling also presented exhibits showing the excess service performed by the carriers in carrying the mails over that authorized.

A special exhibit for the New England group of railroads showed the revenues and expenses per 60-foot car mile on the two bases of separating expenses as follows (cents):

	Basis No. 1	Basis No. 2
Total passenger train revenues	39	39
Total passenger train expenses	26.6	27.5
Passenger revenues	42	42
Passenger expenses	27	27.9
Express revenue	31.1	31.1
Express expenses	24.8	25.7
Mail revenue	20.8	20.8
Mail expenses	25.4	26.2

On both bases each of the New England roads was shown to be losing money on the railway mail service.

Traffic Increases; Mail Pay Reduced

An exhibit presented by W. A. Worthington, vice-president of the Southern Pacific Company, illustrates graphically the disparity in growth between railway mail pay and that in other sources of railway revenue since 1900, when the Wolcott-Loud commission reached the conclusion that railway mail pay was not then excessive, and also the effect of the space basis in actually reducing the compensation for mails, notwithstanding the fact that while the space basis has been in force the volume of mail has been the greatest on record, as stated in the annual reports of the Postmaster General. Under the old weight basis there was an automatic decrease in the ton-mileage rate as density of traffic increased, yet the mail pay was also subjected to several reductions after 1907.

From 1900 to 1917 the railway mail pay increased from $37,315,725 to $62,750,551, but in the calendar year 1918 it had fallen to $53,502,591. Express revenue, however, was over four times as great in 1918 as in 1900, passenger and freight revenue were each over three times as great in 1918 as in 1900, and operating expenses in 1918 were over four times as great as in 1900. The operating ratio had increased from 64.65 to 81.25 and railway taxes were nearly five times as great.

In another exhibit Mr. Worthington showed that while the volume of mail as measured by total postal revenues had more than trebled, increasing from $102,354,579 in 1900 to $344,475,962 in the year ending June 30, 1918 (excluding $44,500,000 due to increased postage rates) the payments to

railroads had increased only from $37,315,724 to $56,418,781, and the total postal expenses, excluding payments to railroads, had increased from $70,424,543 to $260,788,020. The percentage of postal revenues paid the railroads was only 56.46 in 1900, but this had been steadily decreased to 16.38 in 1918. Meanwhile the percentage of postal revenues absorbed by expenses other than payments to railroads had increased from 68.8 to 75.7.

Mr. Worthington also showed that while freight revenues per train mile had increased from $1.65 in 1890 to $4.60 in 1917, and passenger revenues per train mile had increased from $1.08 to $1.70, the operating expenses and taxes per train mile had increased from $1 to $2.48.

For the Class I roads mail revenue in 1918 under the space basis was 13 per cent *less* than in 1916 under the weight system, while express revenue was 40 per cent greater, passenger revenue 46 per cent greater, and freight revenue 35 per cent greater. While operating expenses had increased 70 per cent, the operating ratio had increased 24 per cent, and the net operating revenue had decreased 27 per cent.

Another exhibit illustrates the monthly fluctuations during 1916, 1917 and 1918, in revenues from express and mail, the former being directly responsive to increases in traffic, while the latter was not only not responsive but actually declined as traffic increased, because no additional pay was allowed to the carriers as the load in the car became greater.

As of March 27, 1917, the total mail pay on the space basis (excluding closed pouch service) was $56,943,826, of which $43,705,001 was for R. P. O. service and $13,238,825 for mail storage car service, which represents over one-half of the mail ton-mileage. A total of 366,318,887 ton-miles of mail was handled in R. P. O. service and 411,317,318 in storage car service. The average tonnage per 60-foot car was 2 and per storage car 6.69, an average of 3.18 tons per car. The average pay on the space basis was 23.89 cents per 60-foot car and 11.93 cents per ton-mile for R. P. O. service and 21.54 cents per 60-foot car and 3.22 cents per ton-mile for storage car service. The average was 23.30 cents per car and 7.32 cents per ton-mile.

Greatest Reduction on Heavy Traffic Routes

The annual railway mail pay on the basis of a weighing in April, 1917, would have been at the rate of $69,546,909. The annual pay on the basis of the actual space pay as of April, 1917, was $60,498,840, a decrease of 13 per cent. On some of the principal roads, carrying the bulk of the traffic, the percentage of decrease was much greater. For the Union Pacific the reduction on account of the introduction of the space system was $1,192,277 per annum, or 40.2 per cent. For the Southern Pacific the reduction was 34.4 per cent. While the average space pay per ton-mile was 7.32 cents, it was as low as 3.82 in the Union Pacific, and it was 10.33 on the St. Louis-San Francisco.

An exhibit covering 17 of heavy traffic routes showed the average pay per ton-mile to be 4.09 cents, 9.03 cents for R. P. O. service and 2.8 cents for storage and closed pouch service. While these routes carry nearly one-half of the total mail traffic they received only 27 per cent of the total pay.

It was also brought out in connection with the exhibits that the increase in the ton-mileage of mail of 202.91 per cent since 1900, when the Wolcott-Loud commission held that the mail pay was not excessive, would have made the annual mail revenue for 1917 $98,640,000 if the rate per ton-mile had fallen 5 per cent, the same as the fall in the average freight rate per ton-mile; that it would have been $110,000,000 if the rate per ton-mile had risen 6 per cent with the average passenger rate; that it would have been $141,440,000 if the mail pay rate had increased in the same ratio as express revenue, or $126,960,000 if it had increased in proportion to the passenger revenue; or $103,840,000 if there had been no reduction in revenue per ton-mile after the commission had made its report showing the rates not to be excessive.

Mr. Worthington presented a statement, made up from the records of the Post Office Department, showing that in the fiscal year ended June 30, 1918, the periodicals shipped by the Post Office Department on freight trains amounted to 50,971,929 ton-miles. The average haul was 883 miles; average railway pay per ton-mile, 1.518 cents; average load per car, 17 tons, and average railway pay per 40-ft. car per mile 25.88 cents. This would be equal to 38.70 cents per 60-ft. car.

The Carriers' Plan

Mr. Worthington also presented the carriers' plan for computing railway mail pay, under which about 40 per cent of the total compensation would be on the space basis and the remainder on the weight basis, and which it is estimated would produce an annual revenue of $95,034,182. This plan has been approved by the Railway Mail Pay Committee, the Railroad Administration, and the American Short Line Railroad Association. The plan is based on the fact that railway mail transportation in part represents the furnishing of traveling post offices which cannot be adequately paid for on the basis of the weight of the mails, and in part the hauling of mail in storage cars, for which the carriers declare that the space basis is neither fair to the railroads as a whole nor to the individual roads, because it gives no consideration to the loading of cars. Therefore the space basis is proposed for that portion of R. P. O. and apartment cars that is made up of distributing facilities and in which the weight carried is practically negligible, and the weight basis is proposed for storage mail and that carried in R. P. O. or apartment cars outside of the space devoted to distributing facilities. Under the old plan about 10 per cent of the mail pay was computed on the space basis.

The proposed space rates for the distributing facilities are based upon passenger train revenues per car mile and are, therefore, flexible, in that they may be changed from time to time as passenger train car mile revenues materially increase or decrease, should the Interstate Commerce Commission determine a change to be necessary.

A rate of 5½ cents per ton-mile was proposed as a proper rate for weight, to apply to about 97 per cent of the total ton-mileage. But, on the ground that such a flat rate, while applicable to storage mail, was insufficient when applied to light tonnage in apartment cars, closed pouch service, etc., and would not compensate for differences in the length of haul, the carriers proposed an initial rate of 45 cents per ton-mile for the first 100 miles or less on a line of road. This would increase the rate per ton-mile on the routes of light traffic density, and for the short line roads and would compensate for shorter hauls. For closed pouch service, which is used especially on the short lines and involves a great deal of labor for handling and much unused space, an additional service rate of 3 cents per train mile was suggested. The percentage of increase proposed over the former weight basis, because of the increased cost of operation, is 36.6 per cent.

The proposed rate of 5½ cents per ton-mile as applied to storage mail, with an average load of 6.7 tons and a tare of 50 tons per car, produces a revenue of 36.8 cents per car mile or 6.5 mills per gross ton-mile for loaded movement and 5.7 mills after allowing 15 per cent empty haul. The post office department in the year ending June 30, 1918, paid for the transportation of periodicals shipped by freight 7 mills per gross ton-mile, or 25.88 cents per 40-foot car-mile.

Following Mr. Worthington's testimony a number of mail traffic managers testified as to the practical administration of the space basis by the post office department; and representatives of the New England roads presented a request for

special compensation due to higher operating costs. B. M. Robinson, president of the American Short Line Railroad Association, testified on behalf of the short lines.

The carriers' plea in detail is as follows:

The rates proposed herein are submitted as basic rates predicated on conditions prior to January 1, 1918, and should be increased 30 per cent to absorb subsequent increase in cost of operation.

The transportation of the mail to be paid for on the following basis:

Rates for Weight Carried

The rates for all routes of all classes shall be as follows:

Forty-five cents per ton-mile for the first hundred ton-miles or less per mile of railroad per annum on each mail route, and 5½ cents for each additional ton-mile for each route

Service Rate for Closed Pouch Service

On short line railroads or branch trains of other railroads, and on other trains of other railroads not above designated, where there are no postal clerks on the train and the mails are carried in the baggage car handled exclusively by the baggageman, with record thereof at local stations, and the handling does not partake of the character of compact loading, as with storage mail for stowing in the baggage cars, an additional service rate of 3 cents per train mile shall be paid.

Method for Weighing

All weights to be taken for a period of 35 consecutive days, beginning with the second Tuesday in September of each year, or at such other representative period as may be prescribed, and a daily average for that period to be ascertained by the following method: readjustment of pay upon the rates prescribed to be made by the Postmaster General retroactively from July 1, of each year.

All weights to be taken at railroad stations by railroad employees where practicable; where their duties render it impracticable and the work of weighing shall require additional force, they shall be employed and paid by the railroad company after agreement has been reached between the Post Office Department and the railroad company as to the number of such employees necessary for that purpose.

The railroads to furnish trucks and scales at their expense.

The Post Office Department during the weighing shall have access to and supervision of the actual weighing under such regulations as may be prescribed by the Postmaster General.

The Postmaster General shall prescribe and furnish the forms upon which the weights shall be reported, and he shall make the necessary tabulations and computations and announce the average weights upon which payment shall be made.

The railroad companies may be furnished with duplicate reports by their employees, and shall be furnished with tabulated statements of the weights as computed by the Post Office Department.

Rates for Distributing Facilities

The linear feet of distributing facilities in postal cars and apartment cars, as now constructed under Post Office Department standards, shall be paid for at the following rates:

35-37 ft. distributing facilities, 17.8c. per car mile, provided in 60-ft. car.
30 ft. distributing facilities, 15.3c. per car mile, provided in 60-ft. car.
25 ft. distributing facilities, 12.8c. per car mile, provided in 60-ft. car.
17 ft. distributing facilities, 10.7c. per car mile, provided in 30-ft. apartment car.
14 ft. distributing facilities, 8.8c. per car mile, provided in 25-ft. apartment car.
11 ft. distributing facilities, 6.9c. per car mile, provided in 20-ft. apartment car.
8 ft. distributing facilities, 5.6c. per car mile, provided in 15-ft. apartment car.

For existing 70 ft. R. P. O. cars (40 ft. to 42 ft. distributing facilities) the rate of pay will be 20.3 cents per car mile. Space for distributing facilities, according to the rate scale prescribed, shall be paid for over the necessary operating run of car computed on a round trip basis, according to the maximum needed by the Post Office Department for distribution on such car run.

The foregoing rates are for railroad transportation service only, and do not include messenger or cartage service to and from post offices or to and from other railroad stations.

A differential of 33 1-3 per cent should be added for the New England lines, including Long Island, on account of higher operating cost.

Post Office Department Estimates

The Post Office Department introduced exhibits estimating the expenses of the principal roads for April, 1917, and after allowing a net income of 2.72 cents per car mile, as representing the rate which it said the railroads derive from express, arrived at a figure of $54,415,778 as a fair estimate of the total railway mail pay for a year, or 21.57 cents per 60-foot car mile. Applying 21.5 cents (and proportionate rates for various units of space) to the authorizations of March 27, 1917, produced a total annual revenue of $53,088,250.

The plan proposed by the Post Office Department for the continuance of the space basis contains certain modifications as compared with the present system, some of which were made during the course of the hearing as concessions to meet objections made by the railroads. The first witness for the department said that the space plan as at present operated was satisfactory, and he had only two changes to suggest, one to apply the system of using combinations or multiples of the space units to the regular authorizations as well as to emergency authorizations, and another to make separate contracts for side and terminal service. In the course of the rebuttal testimony the "improved" plan was submitted, eliminating the proposal for using multiple units. The proposed plan provides as follows:

Post Office Department's Plan

The space basis, as provided in the Act of July 28, 1916, shall be continued, subject to the following modifications:

Regular Authorizations

1. All regular authorizations for cars may be changed or discontinued at divisional points in accordance with the needs of the service; and for this purpose a divisional point is defined as one where the railroad company performs switching service in connection with passenger train service; but a change in an apartment car authorization may not be made at such point when the operating conditions of the train in question will not permit it.

Emergency Authorizations

2. All units of space needed to supplement regular authorizations of space shall be units of 3, 7, 15 or 30 feet, without duplication or grouping, and such units shall be discontinued, increased or decreased at any point where a fluctuation in the volume of mail carried permits of a change from one unit to another.

3. Whenever a regularly authorized unit of storage or closed pouch space, combined with an emergency unit, necessitates the use of more than 30 feet of linear space in a baggage or storage car furnished exclusively for the use of the mail, a 60-foot car will be requested of the railroad company and paid for on the basis of the round trip, provided it is not used by the carrier in the opposite direction.

4. Whenever a regular authorization is exceeded on 60 per cent or more of the trips during a period of 30 consecutive days, the next higher unit shall be authorized. This rule will not be applied in the month of December.

Undersize Cars

5. Where a railway post office car or any apartment car is deficient in length, but otherwise standard, it will be paid

for pro rata. In computing the pay for such cars the major portion of a foot will be regarded as a full foot. One-half of a foot or less will be disregarded.

DEFICIENCY IN STORAGE SPACE

6. Where a railway post office car or apartment car is of standard length, but deficient in storage space, it will be paid for pro rata in the same manner as cars deficient in length.

OVERSIZE CARS

7. Whenever an oversize car is furnished, storage units may be authorized therein on the basis of actual measurement.

SIDE, TERMINAL AND TRANSFER CARS

8. Where the railroad companies are required by the Post Office Department to perform side, terminal or transfer service, they shall be compensated separately from the line rate for such service (other than that performed in or directly contiguous to railway terminals and depots, unless otherwise provided for), in the amount paid therefor to contractors and for the value of the actual time of their employees while engaged in the carriage of the mails, including reasonable cost of vehicular service that may be necessary.

9. Where railroad companies contract for such service such contracts shall be let to the lowest responsible bidder upon advertisement.

10. Readjustment for such service shall be made annually and the companies shall furnish to the Postmaster General statements in detail showing the cost of the service rendered on such forms and in such manner as the Interstate Commerce Commission may prescribe.

MERGER OF RATES

11. The initial and terminal allowances shall be merged with the line rate.

The Progress of Electric Locomotive Design*

Knowledge of Design Essential to Intelligent Consideration of Electric Operation Possibilities

By W. B. Potter and S. T. Dodd
Railway and Traction Engineering Department, General Electric Company

A COMPARISON OF AMERICAN electric locomotive development with European, and particularly Continental, shows a characteristic difference in the method of transmitting the power of the motor to the driving wheels. In America the success attained with the many heavy high-speed motor cars, and the utilization of these cars in many cases for hauling trains, naturally led to the building of similar equipment for locomotive purposes only. This type of locomotive is the most economical design, but as the tractive effort is transmitted through the truck center pin, this type is commonly limited to a weight of about 60 tons. For heavier locomotives of this type, weighing from 60 to 100 tons, the two trucks are usually connected and the tractive effort transmitted directly through the trucks instead of through the locomotive frame.

The Continental designers, having had little experience with heavy motor car equipment, were skeptical of gearing and the practice of mounting motors directly on the axle. Their efforts have been mainly directed toward substituting the electric motor for the steam locomotive cylinder, retaining all of the side rods and adding a few more. There is a difference, however, between driving side rods from a steam piston and from a motor-driven crank, which does not seem to have been fully appreciated. In a steam engine the maximum stresses end-pin pressures, so far as the driving power is concerned, may be predetermined from the piston area and steam pressure. In an electric locomotive, however, having a motor-driven crank and side rods, the maximum stresses are influenced by variations in the wheel centers and the wear of bearings. The mechanical design must be strong enough to withstand the driving torque at a 45 deg. angle from the center, and at as much less angle as may result from the variations. As an extreme illustration, with one side stripped and the other on dead center, the stresses would be in excess of any practicable design.

The Continental locomotives show many variations of the side rod drive, both with the jack cranks direct driven by the motor through parallel rods or by means of gearing. Comparing only the most important trunk line electrifications in Europe and America, we find that out of nine European railroads operating 210 locomotives, there are represented 28 different types, while out of 14 American railroads operating 364 locomotives only 21 types are represented. The cause for this difference is to be found in the historical development which we have sketched above and in the fact that the American development has largely been determined by commercial reasons.

The design of American locomotives for slow-speed freight and passenger service has been influenced largely by the heavy motor car with motors geared directly to the driving axle. A gearless motor which could develop as tractive effort a proportion of the weight on the axle comparable to the geared motor would furnish a still simpler design. Recent developments along this line indicate the possibility of such a gearless slow-speed locomotive at a comparable price.

The design of electric locomotives for high-speed passenger service at 60 to 80 miles per hour is a more complicated problem. A substantial saving through the elimination of turn-tables and incident delays being obtained by designing the locomotive double ended and capable of running equally well in both directions, this desirable requirement involves features of design differing from that of a steam locomotive built for operation in one direction only. A feature in the design of a double-ended locomotive is to control the lateral oscillation and to minimize its effect on the track. This characteristic is more in evidence on tangent track where the flanges of the guiding wheels are free to move within the clearance, than on curves where the flanges of these wheels bear firmly against the outer rail. This characteristic also appears, though in a different form, in the single-ended steam locomotive, as the front and rear ends are not both subjected to the reactionary influence of two guiding trucks. In any event, the wheels at the front and rear ends of the locomotive must be relied upon to withstand the effect of these lateral oscillations.

In a double-ended locomotive, with guiding trucks at

*Abstract of a paper presented before the Western Railway Club April 21.

each end, any lateral oscillation will deliver a thrust at the truck center plate both at the front and rear ends. The roll of the locomotive body has little tendency to transfer weight to the outside guiding wheels and, therefore, has but little effect in holding down the outer rail. The lateral movement of the locomotive, however, does increase the weight transferred to the outside guiding wheels in proportion to the height the center plate is raised above the rail head. The problem presented is to design a double-end locomotive with leading and trailing trucks, which shall have sufficient guiding force for the front end and with such characteristics as to minimize the cause and effect of lateral oscillations.

To minimize the cause of lateral oscillations the front and rear trucks should be restrained so far as possible from any individual movement, other than that essential to proper guiding of the locomotive. Experience has demonstrated that a two-axle truck with an articulated connection accomplishes this desired result much more effectually than either a two-axle bogie or pony truck. To minimize the effect of lateral oscillations the characteristics should be such that the truck will allow a time element during delivery of the thrust against the rail head and such that any lateral thrust at the center pin will produce a large vertical component at the outer guiding wheels. Raising the bearing point or center plate of guiding trucks to 60 in. or 70 in. above the rail head has shown by tests that these characteristics can be obtained in that manner. What we wish to do is to direct attention to the fact that a successful double-ended high-speed locomotive can only be obtained by a proper study of the front and rear trucks.

For high speed passenger service with speeds of the order of 60 to 80 m.p.h. if a locomotive is equipped with geared motors the gear reduction approaches a small ration, if the armature is to be kept within practical rotative speeds. This presents all the disadvantages of increased weight due to gears with their cost of maintenance without the compensating advantage of the increase in tractive effort usually gained by gear reduction. Consequently, it appears to us that for such speeds and for such service the gearless motor with the armature mounted directly on the axle presents the best solution. The bipolar gearless motors on the New York Central Railroad, which have been in service for twelve years, have shown very low maintenance costs.

Collection of Current

The trolley pole and wheel which has so well served the electric railway is not well adapted for the heavy service we have been considering, nor is it a convenient device for movement in both directions. The pantograph collector, which requires no attention on reverse movement, has long been used, but it is only within the past few years that its capacity as a collecting device has been fully demonstrated. Rolling and sliding contracts have both been tried, with results distinctly in favo rof the sliding. The wear of the working conductor or trolley wire is due far more to the destruction by arcs at the point of contact than from the mechanical friction, hence it is most important that the wire be so supported as to eliminate any rigid spots which are the usual cause of this arcing. The wire should be lifted slightly and really supported by the collector rather than that the collector should run underneath a wire held in rigid relation to its support. Lubrication of the collecting surface not only reduces the wear but seems to slightly improve the contact, presumably because of less tendency to chatter than with bare metal. The amount of current that can be successfully collected seems limited only by the current capacity of the working conductor. Tests have shown no arcing at the contact with 3,000 amp. at 30 m. p. h., and 2,000 amp. has been collected with equal success at over 60 m. p. h. A copper conductor with copper wearing strips on the collector has been found to give the best results. Measurements taken on the St. Paul railroad indicate the working conductor will have a life of over 100 years before it will have to be replaced because of wear.

Regeneration

Regeneration as used in this connection implies the use of electric braking and the utilization of the energy in the train as electric power, which is fed back into the distributing system. The train on a down grade drives the motors as generators, which is comparable to the action of falling water in a hydro-electric power station. Regeneration is of special advantage in the long grades encountered in mountain districts. Grades of 20 to 50 miles in continuous length are found on almost all the railway lines crossing the continental divide. It eliminates the surging in the train and the variations of speed which are encountered in holding the train by air brakes. In addition to this, the wear of brake shoes is eliminated and the delays which are often due to overheated brake shoes on long grades are also avoided. The electric braking takes place entirely at the front end of the train, taking up all slack and permits the air reservoirs to remain fully charged in reserve for emergency.

The amount of power returned to the trolley by regeneration varies with the amount of the grade and the type of train. On specific tests it has been shown that a train on a 2 per cent grade has regenerated 42 per cent of the power required to pull the same train up the grade. On a 1.66 per cent grade 23 per cent has been regenerated. The records for a particular month over the entire Rocky Mountain division of the C., M. & St. P. for both freight and passenger trains show that the regeneration was equivalent to 11.3 per cent of total power used.

Conclusion

On locomotives for freight and slow speed passenger service it seems probable that the use of geared motors mounted directly on the axle will be continued. On locomotives for high speed passenger work the motors will presumably have some type of gearing or preferably be of gearless design. The characteristics of the guiding trucks in their design and method of attachment are important for high speed running.

We find that incidental difficulties in connection with operation of heavy service electrically are being solved. The collection of any reasonable amount of current from an overhead conductor offers no difficulty; while regeneration solves in a practical manner the problem of braking on long grades and returning the available power to the power system instead of wasting it in brake shoes.



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Arriving at Brest

Doings of the United States Railroad Administration

Three Months' Deficit $192,000,000; May Ask for Larger Appropriation; Rate Advance Deferred

WASHINGTON, D. C.

THE RAILROAD ADMINISTRATION is likely to ask Congress for an appropriation of $1,000,000,000 instead of the $750,000,000 which was lost in the filibuster of last session. The President has called Congress to meet in extra session on May 19 and its first work after organization will be to take up the necessary appropriation bills which failed of passage. While the Railroad Administration has not announced any change in its figure, it will be necessary to present its request anew and it is now engaged in a reconsideration of the various items that represent its needs for money and that will be shown in the new statement to Congress. As an additional deficit of $192,000,000 has accumulated in the three months since the figures on which its first request was based were made up, and as the April reports are liable to increase this by another $50,000,000 or so, while the revised returns for 1918 show the deficit for that year to have been $226,000,000 instead of $196,000,000 as estimated then, it is believed that a billion dollars is a conservative estimate, although the capital expenditures program has been curtailed by the lack of funds.

While there has been much discussion of the need for an advance in rates and most railroad men are inclined to the belief that such a step will be necessary, Mr. Hines has thus far deferred a decision on the matter until better information as to the probable results for the year as a whole is available. There is still hope that tonnage may be considerably increased later in the year and it might be a more propitious time to take up the rate question more definitely after an appropriation based on present and past conditions has been granted.

The passage of the appropriation bill will make it unnecessary to issue any more certificates of indebtedness after those applied for to take care of the present requirements have been issued unless the appropriation should be delayed.

The Railroad Administration has no other legislation to propose except the appropriation bill, but Congress is expected to take up at an early date the question of a permanent solution of the railroad problem and undoubtedly a large number of bills dealing with the subject will be introduced at the opening session.

Mr. Hines Explains Financial Situation

The aggregate deficit of the Railroad Administration for the first three months of 1919, after allowing for the rental due the railroad companies, the expenses of the Railroad Administration, the operation of inland waterways and some incidental items, was $192,000,000, according to a statement authorized by Director General Hines. This figure is reached, he explained, by comparison with three-twelfths of the standard return for a year, although the average net operating income during the three-year test period for January, February and March was less than that amount. Mr. Hines' statement did not give the figures for March, which show a net operating income for the Class I roads and the switching and terminal companies of $10,924,000, or 82.5 per cent less than for March, 1918. The three-year average for March was $68,251,000. For three months the net operating income was $39,813,000, as compared with an average for the corresponding months of the test period of $172,798,000, while three-twelfths of the standard return for a year for the roads under federal control would be about $232,000,000.

Mr. Hines also stated that practically complete returns for 1918 now show the deficit for the year to have been $226,000,000 so that the total deficit up to April 1, since the government took over the roads is $418,000,000.

The fact that his statement was somewhat less conservative than some previous financial statements of the Railroad Administration gave an impression that he might be preparing the public mind for an advance in rates, but he said it is now impossible to make any confident statement as to the results for the year as a whole and that his own judgment is that conditions are too abnormal to serve as a basis for any general change in the level of rates and that it is preferable to defer action on that subject until further information is available. The statement follows:

"I believe it is highly important to keep the public as fully informed as practicable as to the financial results of the Railroad Administration. Practically complete accounting for the calendar year 1918 has just been accomplished and tentative results for the months of January, February and March, 1919, have become available. I take advantage of the first opportunity after an extensive trip in the West to put a summary of these results before the public.

"The results for the calendar year 1918 show that at December 31, 1918, the deficit incurred by the Railroad Administration for that year after deducting the rental due the railroad companies amounted to $226,000,000. This included the expenses of the central and regional administrations, and also included the operations of the inland waterways under control of the Railroad Administration as well as the incidental and miscellaneous items which must be taken into account in a complete statement. There remained comparatively small amounts of back pay for the calendar year 1918 which were not charged into the accounts for that year but which have largely been charged into the three months ending with March, 1919.

"For the months of January, February and March, 1919, the aggregate deficit incurred, after deducting the rental due the railroad companies, was approximately $192,000,000. This figure includes not only the Class I railroads, but all other railroads under Federal control, the expenses of the central and regional administrations, the operation of inland waterways under control of the Railroad Administration as well as some incidental and miscellaneous items. In arriving at this figure there has been charged against each of these months one-twelfth of the annual rental for the railroads. Generally speaking, these three months have always earned much less than three-twelfths of the return for the year so that a substantially less charge of rental into these months would not be inappropriate. Still it seems preferable to charge a full one-twelfth of the rental into each of these months rather than to run the risk of an impression arising that there is any disposition to under-state the actual results. To a large extent the unfavorable results for January, February and March are due to the fact that business has fallen off and that expenses could not be correspondingly readjusted so that the loss largely arises in connection with the period of readjustment through which the country is going. Industrial enterprises generally have suffered embarrassment on account of the fact that business has been curtailed so much more rapidly than expenses could be curtailed. The railroad business is probably in its nature less elastic than any other business and shows more unfavorably the embarrassments of readjustment.

"Since the first of the year I have conferred repeatedly

with the regional directors and I have also conferred with nearly all the federal managers in the United States on the subject of costs. The entire railroad organization has been and is working most earnestly to readjust these costs to meet the present conditions, but the nature of the railroad business whether under private or public control is such that to a very large extent it is impossible to offset loss in business by a corresponding reduction in costs. On the other hand when there shall be a substantial increase in business the revenues therefrom will be largely reflected in the net because the costs will not be correspondingly increased. It is believed that this improvement will be considerably emphasized by reason of the fact that maintenance work has been carried forward during the favorable weather of January, February and March, on a liberal basis despite unfavorable business and this should be reflected in a saving in maintenance costs later in the year.

"While passenger business for the three months was only slightly less than last year, the loss in freight business was much more pronounced, as is shown by the following table:

Total Net Ton Miles in Thousands
(Revenue and Non-Revenue)

	1919	1918	1917
January	30,383,169	27,619,867	32,652,616
February	25,681,943	29,678,260	28,386,351
March	28,952,925	37,706,100	31,674,619

"The figures for 1919 are strictly comparable with those for 1918, but the 1917 figures do not include all the large roads in federal operation. In order to put all three reports on a conveniently comparable basis, the net ton miles per mile of road per day are given in the following table:

Net Ton Miles Per Mile of Road Per Day
(Revenue and Non-Revenue)

	1919	1918	1917
January	4,275	3,878	4,770
February	4,002	4,591	4,511
March	4,059	5,273	5,192

"It is impossible on the basis of these three months to predict the results for the year as a whole, although it is believed the results will be very much less unfavorable if as seems to be generally anticipated there shall be an important resumption of business later in the year, especially if the great crops now in prospect shall be realized.

"On the trip in the West which I have just completed I have found the most pronounced optimism on the part of business and agricultural interests generally which gives a reasonable basis for hoping for an enlarged business that will be relatively profitable to the railroads since handling it should not correspondingly increase their costs. But while it is proper to mention these factors, it must be admitted that in the midst of the present period of post-war readjustment it is impossible to make any confident statement as to the results of railroad operations for the remainder of this calendar year.

"The present unfavorable results naturally lead to agitation of the question whether there ought to be an increase in rates. My own judgment is that the present conditions are too abnormal to serve as a basis for any general change in the level of rates and that it is preferable to defer action on that subject until there shall have been a fuller opportunity to get a more reliable, and possibly a more normal, measure of the conditions, meanwhile resorting to every practicable economy, studying the situation with the greatest care, and keeping the public fully informed as to developments.

"There has not been included in the months of January, February and March the sum of approximately $6,000,000 per month for back pay on account of wage orders recently issued to put into effect recommendations of the Board of Railroad Wages and Working Conditions which were made upon proceedings pending before it during the war, such wage orders being necessary as heretofore explained to complete the war cycle of wages to which the government was necessarily committed during the war. These amounts of back pay will appear in the next few months and of course will result in diminishing operating income for those months.

"One other item needs to be mentioned. Under the contract made between the government and the American Railway Express Company in the summer of 1918 the government undertook to assume any operating deficit which the express company might incur during government control. Such operating deficit for the first year will not be ascertainable or technically chargeable against the Railroad Administration until the end of 12 months from the effective date of the contract, i. e., July 1, 1918. The amount of this deficit, however, should be borne in mind. For the six months ending December 31, 1918, such deficit was approximately $9,500,000 and for the months of January and February, 1919 (including allowance for back pay to be hereafter paid on account of those months) it is roughly estimated that such deficit will be approximately $5,040,000, making the operating deficit now in sight for the first eight months of the year which will end June 30, 1919, approximately $14,540,000. It can reasonably be assumed that this additional expenditure will have to be incurred by the Railroad Administration on account of the eight months in question, although it will not appear in the accounts until after June 30 next. No estimate can yet be made for the month of March.

"It is not anticipated that the conditions for April will be more favorable than the conditions for January, February and March. In many parts of the country the effects of business readjustment were more pronounced in April than in the earlier part of the year.

"It is my policy to give the public the facts and, where the inference to be drawn is doubtful, to resolve the doubt in such way as to avoid the risk of making a statement more favorable than the ultimate facts will justify."

As compared with the three-year average for March, the March deficit was $57,327,000. In January the deficit was $37,830,000 and in February it was $37,828,000. Freight traffic declined very sharply in March, the net ton mileage being 23.2 per cent less than in March, 1918. The operating revenues were $376,345,000, an increase of 2.9 per cent, while expenses were $346,770,000, an increase of 22.2 per cent. Net operating revenues were $29,574,000, a decrease of 63.9 per cent. The Eastern roads had a deficit of $1,283,000, the Southern roads earned $4,489,000 net operating income, and the Western roads $7,719,000. For the first quarter of 1919 the operating revenues were $1,125,078,000, an increase of 37 per cent over the test period average, and operating expenses were $1,031,756, an increase of 81 per cent, while the net operating income $39,814,000 was 77 per cent less than the three year average.

Cash Transactions of the Central Administration

Director General Hines also authorized the following statement in connection with cash receipts and disbursements by the United States Railroad Administration treasurer at Washington, for the month of April:

The cash receipts from all sources, including payments of loans by the railroad companies, amounts transferred from railroad treasuries, collections from express companies, and payments on account of additions and betterments, aggregated $35,643,175.

The cash disbursements, including loans to railroad companies, payments to railroad companies on account of compensation, advances to federal treasurers, and payments to waterways and canals, amounted to $48,857,027.

Of the foregoing receipts, $20,276,500 represented amounts transferred from railroad treasuries to the central administration treasury, while $46,955,500 of the disbursements covered advances to federal managers. The net amount which it was necessary for the central administration to advance to federal treasurers for current requirements was, therefore, $26,679,000.

The total amount loaned the railroad companies by the director general for the 16 months of federal control ended April 30, 1919, was $232,349,459 and of this amount $61,399,250 has been repaid. All of the balance, practically speaking, can be deducted in settlement of the compensation, so that these items, while termed loans, can be regarded substantially as payments on account of compensation. The total disbursements on account of compensation and loans substantially of that character, aggregated for the 16 month period $494,913,615.

The total payments for standardized equipment during the 16 month period amounted to $163,950,402.

The above relates to the cash receipts and disbursements of the central administration, and does not include the receipts and disbursements of the federal treasurers, in connection with the operation of the properties under federal control, as these figures are not yet available.

The director general issued to April 30, 1919, certificates of indebtedness aggregating $148,883,234, of which $131,257,800 were on account of compensation to enable the various carrier corporations to meet their cash requirements, such as interest, dividends, and other corporate charges, up to and including May 1, 1919; and $17,625,434 were on account of amounts due the car and locomotive builders for equipment. These items are not included in the cash disbursements given above.

Demurrage Rates to Be Cut

The Division of Traffic of the Railroad Administration has advised the National Coal Association that the present demurrage rates will be changed at the earliest practicable date, and announcement of changes on the following basis is expected:

The rate will be $2 per day for the first four chargeable days after the usual two days' free time; for all chargeable days thereafter the charge will be $5 per day. The average agreement may apply on inbound loads separately and on outbound loads separately, but no credits will be allowed to be transposed from one operation to the other.

It is understood that the proposed recodification of the national car demurrage rules, in so far as it includes various changes, will be deferred until some future date, and that the rules now in effect will continue to be operative except as outlined above. The rules now in effect, and which are to be superseded by the new rates, provide that after the expiration of free time, the charges per car per day shall be $3 for each of the first four days; $6 for each of the next three days, and $10 for each succeeding day.

Mechanical Officers Instructed to Report on June Conventions

Frank McManamy, assistant director of the Division of Operation, has addressed the following to the regional directors, asking that mechanical officers be instructed to make written reports regarding their observations at the June conventions:

"The convention of Section 3, Mechanical, American Railway Association, which is composed of the Master Car Builders' Association and American Railway Master Mechanics' Association, will be held at Atlantic City, June 18 to 25.

"It is desired that the representative members from the different railroads attend, as far as possible, and that other mechanical department officials who are members be permitted to attend, for at least a portion of the time, where they can be spared from their regular duties without adversely affecting the service. It is anticipated that there will be on exhibition the most complete collection of mechanical appliances that has ever been exhibited at one of these conventions, and a study of it will be of substantial value to the mechanical department officers who are in attendance.

"In order to obtain the greatest possible amount of benefit from this convention, it is desired that each member present below the rank of superintendent of motive power shall, on his return from the convention, make a written report to the superintendent of motive power, relative to the new devices which he inspected at the convention, or ideas which he obtained from the discussions which can be applied with profit to the work under his direction.

"The superintendent of motive power will make a digest of the various subjects presented in this way, so that those which can be profitably adopted may be given consideration, sending a copy of it to the assistant director, Division of Operation, in charge of the mechanical department, for the use of the Committee on Standards for locomotives and cars.

"Will you please issue the necessary instructions?"

Freight Traffic Movement for March

The volume of freight traffic in March decreased 23.2 per cent, measured in net ton mileage, as compared with March, 1918, according to the monthly report of freight traffic movement and car performance compiled by the Operating Statistics Section. Net ton miles of revenue and non-revenue freight were 28,952,925, as compared with 37,706,100 in March last year. In the Ohio-Indiana district the decrease was 39.4 per cent, while in the Southern region it was only 8.6 per cent, but all regions show a decrease. Net ton miles per mile of road per day were 4,059 as compared with 5,273. Train miles decreased 22.4 per cent and total car miles decreased 18.6 per cent, while the percentage of loaded to total car miles was 68.1 per cent, as compared with 71.4 per cent. Tons per train fell off 1.2 per cent, from 666 to 658, and tons per loaded car from 27.9 to 27.6, a decrease of 1.1 per cent. The average number of freight cars on line daily was 2,432,469, of which 2,295,617 were reported as serviceable. The percentage of unserviceable cars was 5.6 per cent as compared with 5.1 per cent in March, 1918. The average mileage per car per day was only 20.4 as compared with 24.9 in March, 1918, a decrease of 18.1 per cent, and the net ton miles per car day were 384 as compared with 496.

Executives' Committee to Confer on Car Allocation

Following a conference last week with Swagar Sherley, director of the Division of Finance of the Railroad Administration, the Association of Railway Executives has appointed a special committee to confer further with the Railroad Administration on the question of the allocation to the various railroad companies of the standard freight cars ordered by the Railroad Administration. According to a recent report about 92,000 of the cars had been allocated and 45,000 had been built, but only 27,000 had been accepted by the railroads, 18,000 being in storage without stencilling. Efforts will be made to work out a plan to assist the companies in financing the equipment. No date for the conference has been set. The committee consists of the following: Thomas DeWitt Cuyler, chairman; Alfred P. Thom, counsel; Howard Elliott, president, Northern Pacific; Julius Kruttschnitt, president, Southern Pacific; W. H. Finley, president, Chicago & North Western; E. E. Loomis, president, Lehigh Valley; Charles Hayden, president, Chicago, Rock Island & Pacific; Mark W. Potter, president, Carolina, Clinchfield & Ohio, and E. P. Ripley, president of the Atchison, Topeka & Santa Fe.

Conference of Steel Prices

Representatives of the purchasing department of the Railroad Administration were to hold a conference with a committee of iron and steel producers at New York on Thursday to discuss the much-controverted question of iron and steel prices. The conference was arranged by the Industrial Board of the Department of Commerce, which, having failed to obtain the endorsement of the Railroad Administration for the scale announced on March 21, offered its services as a

mediator. The board itself was not to take part in the conference. It was understood that the Railroad Administration was prepared to offer the steel interests a compromise price.

Interest to Be Paid on Claims

Accounting Circular No. 41-A says that P. S. & A. Circular No. 41, issued October 29, 1918, seems to be unfair as to claims presented previous to November 1, 1918, and is accordingly amended by striking out paragraph 2 of the original circular and inserting in lieu thereof the following:

"2. In case of claims presented prior to November 1, 1918, interest shall be paid from the date of presentation. If settlement has been made during federal control upon a different basis, the claim shall be readjusted upon the interest basis here prescribed. In the making of payment fractions of the month shall be disregarded as is provided in paragraph 1."

Small Under or Over Charges May Be Ignored

Accounting Circular No. 87 states that in the course of collecting freight charges from shippers or consignees and adjusting disputed items to a correct basis many small errors occur which in the aggregate are not substantial, but the correction of which are both costly and annoying to the railroad and some of its patrons. In order that these petty differences may quickly be disposed of, carriers federally operated may enter into agreements with shippers or receivers of freight to ignore undercharges or overcharges of 10 cents or less on each shipment detected after freight bills therefor have been rendered. If patrons require the settlement of all undercharges or overcharges of 10 cents or less, all such differences must be settled with them. Care should be exercised to see that differences of this character are not intentionally created so as to result in an advantage to any interested person or concern. It is expected that the obvious benefits of the plan will commend it to all concerned, and that no difficulty will be experienced in making it effective.

Contracts Executed

The Railroad Administration has executed compensation contracts as follows: Chicago Great Western, $2,953,449.94; Brooklyn Eastern District Terminal, $306,259.63; New Orleans, Great Northern, $575,951.79; and the Leavenworth Terminal Railway & Bridge Company, $43,583; also co-operative short line contracts with the following: Cumberland & Manchester; Alabama Central; Bartlett Western; Glenmore & Western; Kosciusko & Southeastern; Nevada Copper Belt, and Pittsburgh & Susquehanna.

Kanawha & Michigan Uses Electric Tractors and Trailers

THE NEW FREIGHT HOUSE of the Kanawha & Michigan at Charleston, W. Va., has been equipped with electric tractors and trailers for economy in the handling of package freight, both inbound and outbound, as well as to accomplish a general speeding up of freight house operations. The photograph illustrates the character of the equipment which was supplied by the Lakewood Engineering Company, Cleveland, Ohio.

The tractors are of the four-wheel-steer, four-wheel-drive type, operated by a 48-volt, 45-ampere motor (continuous rating), supplied with current by storage batteries. The motor is mounted on a longitudinal shaft with a worm drive on both axles. Among the distinctive features of the equipment is the short turning radius of 5 ft. 1 in., measured to the outside edge of the platform at the forward corner, which is of great advantage in handling the tractors and trains in close quarter. Another feature is the double-end control. The control equipment is mounted in a centrally located stand flanked at either end of the car by battery boxes, each fitted with a driver's seat. Thus the driver has the controller, steering wheel and safety pedal in convenient position before him no matter which seat he occupies. This feature is of special value in handling the tractors in narrow passageways.



Tractors and Trailers Used in the Freight House at Charleston, W. Va.

In connection with the steering and drive arrangement it is of interest to note that the power is transmitted from the axles to the wheels without the use of universal joints. Instead the transmission is accomplished by a train of bevel gears, using the vertical shaft which also serves to swing the wheel in steering. Power is applied to this shaft from a bevel gear on the axle and is transmitted from the shaft to the wheel by means of a second bevel gear of large radius mounted on the inner face of the wheel.

The trailers used at Charleston are of the caster type with main wheels 16 in. by 4 in. and caster wheels 8 in. by 4 in. and a weight of 720 lb. The carrying capacity is 5,000 lb. This type is particularly adapted to installations where it is desirable to do a certain amount of hand trucking. Another Lakewood type, the four-wheel-steer trailer tracks more accurately and has the further advantage that it may be hauled in either direction. Still other types of Lakewood trailers include a balanced type having a pair of 18-in. center wheels with two casters at each end, and a "fifth wheel" type for use on rough ground in cases where considerable hand hauling is done.

Railway Developments in Foreign Countries

Proposed Extensions in Peru; Suggestions for Trading With Greece; South African News

THE GOVERNOR of the state of Sao Paulo, Brazil, has temporarily authorized an automobile passenger and freight service along the route of the branch of the Campinheiro Railway from Joaquim Egydio to Dr. Laciada, in place of the present steam railway service.

Exports of railway material through the port of New York in March, according to figures compiled by the National City Bank of that city, included car wheels to the value of $197,573; steam locomotives valued at $779,099; steel rails amounting to $1,289,394, and steam railway cars valued at $427,378.

Discussion of Chinese Railway Unification Ceases

[Special Correspondence from Peking]

Public discussion of the proposed "unification" of the foreign interests in Chinese railways has ceased as suddenly as it began. In the meantime, the Japanese-controlled Chinese press contains almost daily articles dealing in innuendo against American motives in Korea, Siberia, and in world politics. The most pointed action has been the publishing of the Siems-Carey railway agreements simultaneously with a few of the more innocent Japanese secret agreements. The idea evidently has been to convey the impression that these American agreements were also "secret" when as a matter of fact they were given to the press two years ago.

Standard Specifications in Spanish

A number of additional publications in the Industrial Standards Series of the Bureau of Foreign and Domestic Commerce are now available. These contain standard specifications of the American Society for Testing Materials in English and Spanish, and include No. 14, carbon steel car and tender axles; No. 29, cast-iron locomotive cylinders; No. 45, iron and steel chain; No. 30, extra-high-carbon steel splice bars; No. 47, cast-iron car wheels; No. 35, structural steel for cars; No. 48, malleable iron castings. Copies may be obtained from the Superintendent of Documents, Washington, D. C., at 5 cents each.

Ambitious Japanese Electrification Project

Application has been made to the Japanese government, says an item in the Electric Railway Journal, for permission to construct a high-speed electric railway between Tokyo and Osaka, a distance of 287 miles. It is estimated that an expenditure of about $100,000,000 will be necessary for the purpose. The proposed line is about 69 miles shorter than the existing steam railroad. Doubt is expressed in Japan as to the willingness of the government to permit the construction of an electric line competing with its own steam line, but the promoters are counting on the changed commercial, financial and transportation conditions brought about by the war to cause the government to consider the project favorably.

Proposed Railway Extensions in Peru

A committee of civil engineers has been appointed to recommend to the Peruvian government the most feasible and desirable of the different surveys made for the construction of the Jatunhuasi Railway.

The Lima to Lurin railway, the construction of which was commenced under the administration of President Billinghurst, was completed and opened to traffic during the latter part of 1918. The road is 46 kilometers long.

The Peruvian Congress has authorized the executive power to build a branch railway from kilometer 76 on the Chimbote to Recuay line to Cajabamba.

Information has reached the State Department at Washington that the Peruvian Government has undertaken the construction of a railway line which will make possible transportation between the Pacific and Atlantic coasts across the widest part of South America. With the completion of the railroad goods can be shipped from Callao, on the Pacific, to ports on the Amazon River and transferred then to steamers bound for ports on the Atlantic. The new road starts at a point on the Cerro de Pasco Railroad, which runs from Lima to the Cerro de Pasco copper mines, which are owned by an American company. This firm was said to be interested in the construction of the new line, which will tap extensive virgin forests of valuable timber.

[Other references to new railway construction in Peru have appeared in this column in the issues of February 7, 1919, page 373; February 14, page 418; March 28, page 866 and April 18, page 1012. A map will be found in a more extensive article in the issue of March 7, 1919, page 533.]

American Railway Supply Prospects in Greece

Consul General Alexander W. Webber, at Athens, in a letter to the *Railway Age* makes the suggestion that American railway companies should appoint representatives in Athens to submit bids on government contracts; and submits a list of business men who might be willing to consider agency proposals.

With the exception of a few small suburban railways, he says, all railways in Greece are operated by the government ministry of transports.

"There are two facts which it is thought advisable to point out, in this connection, to American manufacturers of railway equipment," he continues. "The first is that the British and French Armies at Salonica, which are being returned home from the Macedonian front, are disposing of large quantities of material of all kinds at very favorable terms. It is possible that the Greek Government will avail itself of the opportunity to purchase railroad material. And secondly, it is understood here that the Canadian Government has offered to the Greek Government railway material and equipment, in great quantities, at very low prices.

"Present conditions, however, are not normal, and there is every reason to believe that American railway equipment manufacturers can advantageously meet ordinary European competition.

"While the firms named on the list below are of good local repute, no responsibility can be assumed for them by this office. They can doubtless furnish references, while detailed information relative to their financial strength and credit standing could no doubt be obtained, through any New York bank, from the National Bank of Greece, Bank of Athens, Commercial Bank, or any other financial institution of this city."

The commercial representatives whose names are given are J. M. Schapira, 21 Colocotroni street, Athens; George Rozis & Co., 50 Hippocrates street, Athens; Nicolaidis, Papazoglou, Politis & Co., Philonos street, Piraeus; Stephen C. Stephanson, 11 Lycourgou street, Athens; E. A. Hill, 55 Eolou street, Athens; Rousso & Danon, Piraeus; A. Denaxas

& Co., Stadium street, Athens; Christos Stassinopulos, 35 Miaouli avenue, Piraeus; Bernard Melissinos, Sophocles street, Athens; P. Vryonis, 1 Plouton street, Athens.

The South African Railway Budget

[Special Correspondence from Johannesburg]

The exhaustive statement of the Minister of Railways and Harbors on the railway estimates throws further light on the circumstances which have necessitated the recent increases of rates. For the current year (1918-19) the department was faced with the prospect of a deficit of £1,169,000. Rates were consequently increased as from May 11 and thereafter revenue showed a remarkable expansion until the influenza epidemic. The original estimate of general revenue was £276,034 per week. During the seven weeks preceding the epidemic the weekly earnings averaged £301,385. By the end of September, half way through the financial year, the total traffic receipts were £397,915 in excess of the estimates. There was, however, a big decline as soon as the effects of the epidemic made themselves felt. For the week ended October 26 the receipts dropped to £186,933, the lowest figure since Union, with the exception of the strike period and the week ended September 26, 1914, just after the outbreak of the war. It is calculated that the epidemic occasioned a loss in railway revenues of something like £550,000. It was not until December that signs of recovery became apparent, but for that and the following months the earlier record was re-established and exceeded the total ending February 8, being £342,000. Meanwhile the second increase in rates had taken effect from the New Year and as the combined result of the traffic improvement and the higher charges there is now every reason to hope that the ordinary railway revenue for the year will be approximately £650,000 in excess of the original estimate. To this position passengers, parcels, and general goods traffic have all contributed, the first named, so far from having shown any falling off owing to the increased fares, having attained proportions with which the department has been hard pressed to cope, while passenger traffic for the year constitutes a record since Union. There has also been a record tonnage of goods and minerals other than coal. Coal traffic, on the other hand, has decreased owing to the diversion of shipping and decline in military requirements, though the falling off in respect of bunkering has been set off by a heavy expansion in export and the internal coal traffic has generally increased. A noteworthy feature of the period under review has been that the heavy decline in the traffic in imports, brought about by war conditions and the restrictions on ocean transport, has been counter balanced by a contemporaneous increase in the revenue from internal sources. In this respect the railways have reflected the growing industrial activity within the Union which is a healthy sign of the times. From the standpoint of railway revenue the replacement of traffic in imported overseas goods by that in South African products is the exchange of a lucrative for a less productive class of business, but from the point of view of general development it implies that South Africa has been more favorably situated than most countries during the war. The gross revenue from railways is now expected to exceed the estimates by £805,055.

Expenditure

Turning to expenditure, the epidemic cost the department £77,000 in sick pay alone, while overtime and other sources of special outlay due to the same cause are estimated to have involved a further loss of £100,000. Apart from this exceptional visitation, however, there have been substantial causes of increased outlay, notably the war bonus, improvement in the pay of various sections of the staff and the increased cost of materials of all descriptions owing to the war. Under these circumstances the gross railway expenditure for 1918-19 is expected to exceed the estimates by £627,128 and the harbor expenditure by £67,525. The actual results of the year's working, however, are now expected to be considerably better than the original estimates implied and the net result has been a reduction of the estimated deficit on the current year, from £1,169,396 to £1,062,000. This deficit is being treated as estimated expenditure for the coming year.

Drawbacks of the Past Few Years

Glancing back over the conditions of the past few years, the Minister recalls a remarkable sequence of serious drawbacks, comprising the general strike of 1913, the railway strike and other industrial troubles in January, 1914; the outbreak of war; the rebellion in 1915; the prolonged drought of 1916; the destructive floods and washaways of 1917, and the devastating epidemic of last year. Throughout the whole of this period the general overseas position, and the state of affairs in regard to shipping, created constant difficulties. The cost of all requirements has been subject to constant expansion. The pay of men on active service absorbing nearly £1,250,000 per annum. The war bonus for railwaymen in the current year amounts to over £1,300,000. The rate of interest on capital has advanced. Despite all this, the Minister points out, and the improvements made in the pay and conditions of the staff, the expenditure has been met out of revenue, and the normal working of the railways has been maintained comparatively unimpaired. In this connection he pays a high tribute to the devotion of the Staff, and makes acknowledgment of the way in which unavoidable inconveniences have been borne by the public.

Financial Year 1919-20

For the financial year 1919-20 the estimated expenditures on railways and harbors is: Railways, £19,410,983; harbors, £913,087. Total, £20,324,070. There is an increase on railways as compared with the previous year, of £2,884,521 and on harbors of £79,498, a total of £2,964,019. The biggest contributory item towards this increase is the deficit of £1,062,000 from the current year.

The Estimate of Revenue

The estimate of revenue for 1919-20 leaves an anticipated deficit at the end of that period of £877,500. The question of how to deal with this position, the Minister states, has been the subject of the most careful consideration.

Funds can only be provided in two ways—by reducing expenditure or raising more revenue, and the only way of raising more revenue is by the increase of rates. It is not considered likely that the estimate of revenue will be exceeded under existing conditions. It is frankly recognized that the drastic expedient of withholding or reducing contributions to the renewals fund cannot be repeated, the fund stands at about £5,832,000, but the great bulk of this has already been ear-marked, and the Minister makes significant revelations as to the far-reaching extent of present requirements for getting the railways into proper working condition. Under these circumstances there is no alternative but to carry the deficit forward and await developments. If it seems likely that the deficit will be substantially covered, no action will be taken. If, on the other hand, there is no immediate prospect of wiping it out, it will be necessary to reconsider the whole position from the standpoint, presumably, of determining whether there will not have to be some further raising of rates.

J. E. Johanson, a member of the St. Louis (Mo.) Western District Freight Traffic Committee, has been appointed chairman of that committee to succeed C. E. Perkins who has resigned. G. E. Rambach has been appointed a member of the committee in place of Mr. Johanson.

Air Brake Association Holds Annual Convention

Record Attendance; Air Consumption of Auxiliaries and Holding Trains on Grades Among Topics Discussed

THE LARGEST DELEGATION of air brake men in the history of the organization gathered at the Hotel Sherman, Chicago, on Tuesday for the opening meeting of the twenty-sixth annual convention of the Air Brake Association. The first session was devoted to addresses by Frank McManamy, assistant director division of operation, United States Railroad Administration; W. J. Bierd, Federal manager, Chicago & Alton; W. J. Patterson, bureau of safety, Interstate Commerce Commission, and F. J. Barry, president of the association.

Address of President

President Barry in his address spoke of the past work of the association and mentioned its recognition by the Railroad Administration as showing the general recognition of the progress that had been achieved through the leadership of the organization. He urged that the association should continue its efforts to improve air brake service and to extend its sphere of activity, particularly by more active co-operation with the local air brake clubs, which offer an excellent opportunity for keeping in close touch with the problems arising in the maintenance and operation of air brakes. In closing he paid a glowing tribute to the genius of Walter V. Turner whose work was largely responsible for many of the most important recent advances in the art.

Address of Frank McManamy

Mr. McManamy emphasized the necessity for promoting safety, efficiency and economy in the operation of the railroads under present conditions and pointed out how the Air Brake Association can help to secure these aims. He spoke of the need for a realization of the fact that the air brake is not merely a safety device, but is essential for proper operation with the heavy motive power and long trains now in use. He mentioned also the part that could be taken in reducing damage claims by the proper maintenance of the air brake.

Mr. McManamy stated that in his opinion the neglect of brake equipment was too common on roads with low grades and that steps should be taken to remedy the condition. He recommended increasing the forces employed on air brake work and installing proper facilities at repair points where the equipment is overhauled. As the first essential for proper operation he suggested that more attention should be given to stopping leakage in the air brake system and especially in brake cylinders and retainer valves. He spoke also of the co-ordination of the mechanical associations under the American Railroad Association and the benefit that the Air Brake Association could derive by having its recommendation referred to the Mechanical Section and issued as mandatory instructions.

Address of W. J. Patterson

Mr. Patterson outlined the work of the Division of Safety as it affects air brake matters and spoke of the importance of improving general air brake conditions throughout the country. He advocated the universal use of the incoming brake test as a means of securing better conditions. He also referred to the fact that hand brakes are used to control freight trains when descending heavy grades and said that it was the intention of the Division of Safety to require such practices to be discontinued.

Air Consumption of Locomotive Auxiliary Devices*

The committee submitted a report of progress, giving a resumé of the work which had been done. The purpose of the committee's investigation was, (1) to investigate the rate of air consumption of auxiliary devices as found in service on locomotives; (2) to investigate the relation of air consumption by auxiliary devices to compressor operation; (3) to determine if the amount of air used is sufficient to warrant a separation of auxiliary devices from the air brake system, with a separate compressor to furnish air for them; (4) to determine if it is satisfactory to have the auxiliary devices take their air supply from the air brake system, but necessary on this account to install an additional compressor; (5) to investigate the cost of compressed air for operating the auxiliary devices used, and (6) to make recommendations with respect to the maintenance of auxiliary devices.

TESTS MADE AND RESULTS

While the data given here do not cover the subject completely, they will at least serve to give a conception as to what the use of air operated auxiliary devices on locomotives may mean in the ordinary practice of busy railroads. It is to be expected that this report will be regarded as a report of progress, and it is hoped that the work of the committee will be continued for the ensuing year.

The investigation covered in this report naturally divides itself into two parts, *viz.*, standing and running tests. The standing tests were made on locomotives in roundhouses, and consisted in measuring the amount of air used by the auxiliary devices operated while the locomotives were standing. The running tests were made on freight engines working over the road in service, and consisted of the continuous measurement of air used by the auxiliary devices in operation while the engine was running. The standing tests involved a total of 48 engines, and the running tests were made with six engines. A total of 489 individual tests were made, the results of which have been classified and arranged for the purposes of this report.

The locomotives used during these tests were not selected, nor were any locomotives inspected before the tests were made. It was desired to test the equipment just as it might happen to be available so that the data would be representative of average operating conditions. Furthermore, the standing tests were made at three division points and involved the equipment on four different divisions. The running tests were conducted on two road divisions.

Standing Tests—The standing tests involved measuring the amount of air used by the various auxiliary devices with the locomotive at rest. The form of apparatus for making this measurement is shown in Fig. 1. It consisted of two tanks connected as shown, the larger being designated as the measuring reservoir and the smaller as the pressure

*The meaning of the term "air operated auxiliary devices on locomotives," as used in this report, can be defined as referring to all air operated devices on locomotives which are not a part of the air brake system, such as air operated fire doors, bell ringers, reverse gears, sanders, etc.

reservoir. The measurement of the air used by each auxiliary device was accomplished in the following manner:

The auxiliary device to be tested was disconnected from the main reservoir on the locomotive and reconnected to the measuring apparatus at globe valve No. 3. A connection was likewise made from the main reservoir on the locomotive

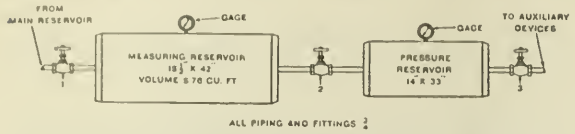


Fig. 1—Measuring Apparatus Used in Standing Tests of Air Operated Auxiliaries

to the measuring reservoir at globe valve No. 1. The air was measured by opening valve No. 3 and manipulating globe valves Nos. 1 and 2. The operator of valve No. 2 regulated that valve so that a constant pressure of 70 lb. was maintained in the pressure reservoir as the supply of air pressure to the auxiliary device under test. The operator of the main reservoir valve No. 1 opened this valve so as to charge the measuring reservoir up to the main reservoir pressure of the locomotive, usually 40 to 50 lb. higher than the constant pressure in the pressure reservoir. This operator

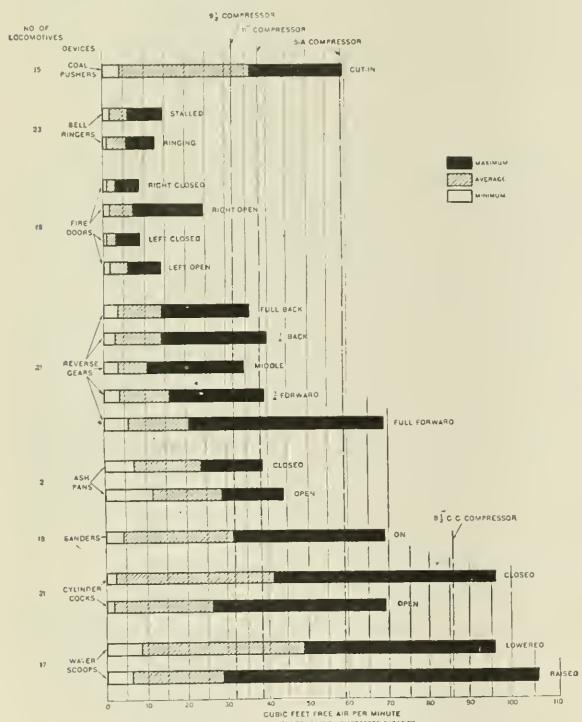


Fig. 2—Results of Standing Tests of Auxiliary Devices on All Locomotives

then closed valve No. 1 and noted the time required for the pressure in the measuring reservoir to drop any given amount during the time it was supplying air continuously to maintain the constant pressure in the pressure reservoir.

The air consumption was calculated as follows:

$$\frac{20 \text{ (drop in measuring reservoir)}}{14.7 \text{ (atmospheric pressure)}} = 1.36 \text{ drop in measuring reservoir expressed in atmospheres.}$$

$$1.36 \text{ atmospheres} \times 5.76 \text{ (volume of measuring reservoir)} = 7.83 \text{ cu. ft. of free air supplied during the test.}$$

$$\text{Then } \frac{7.83 \times 60 \text{ (No. of sec. in one min.)}}{78 \text{ (time of test in sec.)}} = 6.03 \text{ cu. ft. per minute.}$$

The standing tests made on all auxiliary devices have been classified and arranged according to the type of locomotive upon which they were found, and the results are shown in graphic form in Fig. 2. Each figure on the chart shows the minimum, average and maximum rates of air consumption of all the auxiliary devices of the several types tested. The results for passenger locomotives are based on the standard passenger train reservoir pressure of 130 lb., although the actual tests were made at a constant pressure of 70 lb. In every case the data were converted from the 70 lb. basis to give the equivalent rate of air consumption at 130 lb. in the following manner:

$$\frac{\text{Rate of leakage, cu. ft. per min.}}{\text{Absolute test pressure (84.7 lb.)}} \times \text{Absolute press. on locomotive (144.7 lb.)}$$

equals rate of leakage on engine when main reservoir pressure is 130 lb. instead of 70 lb.; that is, the leakage is taken as proportional to the absolute pressures. The data for freight engines are based on 100 lb. main reservoir pressure, standard for freight service.

It will be noted that all charts have the capacity of air compressors indicated on them for convenient comparison with the rates of air consumption given. These values for compressor capacity are based on the rate of air delivery established by the Interstate Commerce Commission's compressor condemning tests, as shown in Table I.

Table I.—Compressor Capacities Based on I. C. C. Condemning Tests

Type of compressor	Delivery rate, cu. ft. free air per minute, 60 lb. pressure
9½-in.	32
11 -in.	37.5
5-A	59
8½-in. C.C.	86

Running Tests—Running tests were made with the object of determining the rate and total amount of air used by the auxiliary devices while the locomotive was working in regu-

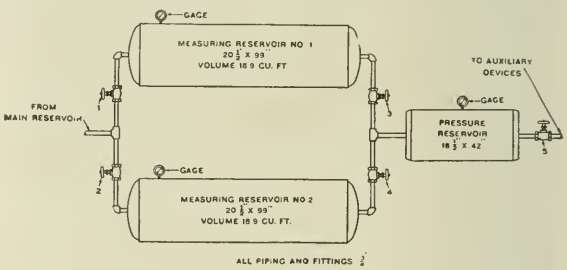


Fig. 3—Measuring Apparatus Used in Running Tests

lar service. An apparatus was devised for measuring continuously the rate and amount of air used, and is shown diagramatically in Fig. 3. This apparatus is similar to that described above and shown in Fig. 1; the only difference being that two measuring reservoirs are used, with the object of permitting the measurement of air to go on continuously.

This apparatus was manipulated so that while the air was being measured by the dropping pressure in one reservoir, the other reservoir was allowed to charge from the main reservoir in order to be ready to start measuring the supply of air to the pressure reservoir as soon as the air pressure in the first measuring reservoir was exhausted.

The measuring apparatus was installed in a caboose which was run at the head end of the train next to the engine. The

piping was so arranged that with either end of the caboose toward the engine, connections could be made to the main reservoir and the auxiliary devices on the locomotive under test.

The length of running tests covered in this report varied from 3½ to 8 hours, or the time required to make a fast freight movement over a division of 131 miles. The running tests made were six in number and can be divided into two classes, *viz.:* (a) Running tests in which the rate of air consumption was measured for the reverse gear only, and (b) running tests in which the rate of air consumption was measured for all auxiliary devices.

Three tests of each kind were made, and each test was made during a full trip of an engine in regular service on

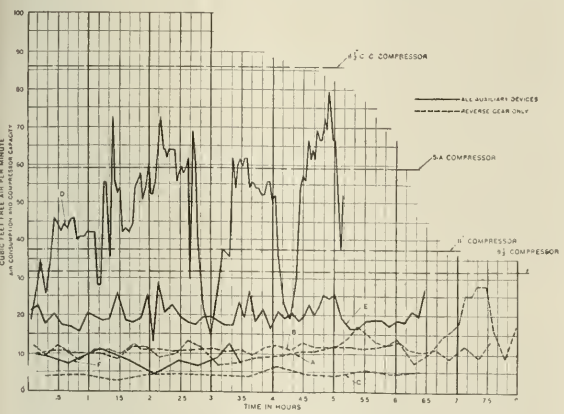


Fig. 4—Results of Freight Service Running Tests

fast freight. The running tests are, of course, of a great deal more importance than the standing tests, in that they show the rate of air consumption as it varies during the working time of the locomotive, and it is the judgment of the committee that more tests of this kind should be made.

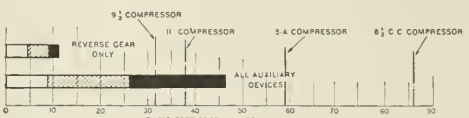
The tests herewith presented do not provide sufficient data for basing definite conclusions, but they do show how the leakage of auxiliary devices will vary with running conditions on the road, and that cases do exist in which the air consumption is unreasonably high, if not actually dangerous, in the sense that it increases the possibility of an engine failure as the result of overworking the air compressor.

The running test, data are shown plotted in graphic form in Fig. 4. Each of the six tests is represented by a line which shows how the rate of air consumption varied throughout the trip. The three solid lines represent tests made on all auxiliary devices, and the three dotted lines represent the tests made in which the air consumption was measured for the reverse gear only. Additional lines are shown on the charts to indicate the capacity of different air compressors in order that comparisons between the compressor air capacity and the rate of air consumption can readily be made. All of the engines used in the six tests plotted on this chart were of the same class, and were equipped with two No. 5-A air compressors and the following air operated auxiliary devices: reverse gear, double fire doors, bell ringer, sander, water scoop, and cylinder cocks.

The tabulation below shows the total amount of free air used and the average rate of using during each of the six running tests shown in Fig. 4.

Locomotive designations	Auxiliary devices	Total cu. ft. free air used during trip	Cu. ft. free air used per min.
A	Rev. gear only	5,665.2	11.84
B	Rev. gear only	4,939.8	10.55
C	Rev. gear only	1,809.62	4.50
D	All devices	14,750	46.93
E	All devices	7,761.2	23.13
F	All devices	1,738.4	8.17

Cost Data—Fig. 5 has been made up from the running test data to show the relative cost of maintaining auxiliary devices at the minimum, maximum, and average conditions of leakage found during these tests. The first two figures of this chart show the minimum and average rates of air consumption for the three tests in which the reverse gear only was measured and the three tests in which all auxiliary devices were measured. These values were obtained from the test data by dividing the total amount of air used during the trip by the total time of the trip in minutes. The actual values used are shown in the last column of the preceding tabulation. The remaining figures in Fig. 5 give the relative minimum, maximum, and average cost for compressed air when using various types of air compressors. There are two figures for each type of compressor, one for the tests made with reverse gears only, and the other for the tests made with all auxiliary devices. These figures show the relative cost of supplying the compressed air required under the various conditions, based on the following assumptions: (1) That the average working time for locomotives is 6 hrs. per day, or 2190 hrs. per year; (2) That the rate of evaporation is 7 lb. of water per pound of coal; (3) That the price of coal on the tender is $2.00 per ton, or $1.00 per 1,000 lb.; (4) That the rate of steam consumption in pounds of steam used per 100 cu. ft. of free air compressed, is in accordance with



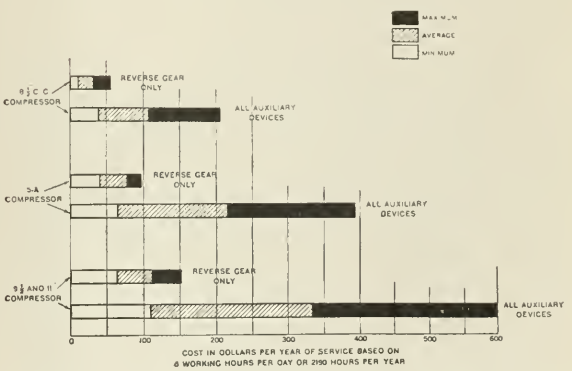


Fig. 5—Cost Data Based on Running Tests of Various Types of Air Compressors

the values given in Table II. These values have been determined from a series of steam consumption tests made on each of the types of air compressors indicated.

TABLE II—STEAM CONSUMPTION OF LOCOMOTIVE AIR COMPRESSORS

Type of compressor	Lb. of steam, at 200 lb. pressure, per 100 cu. ft. free air compressed: To 100 lb. main res. pressure	To 130 lb. main res. pressure
9½ in. and 11-in.	68	76.25
5A	44.7	51
8½-in. C. C.	24	35

The cost comparison figures are based upon the above assumptions only, no consideration being given to such factors as the cost of handling coal on engines, cost of water, depreciation of boiler plant and compressor plant, etc. These considerations have been omitted because the committee does not have sufficient data to accurately determine them. It is obvious that these factors would increase the costs shown, and

the chart figures can therefore be regarded as the minimum conservative values.

A detailed account of the results of the tests of individual appliances was given in the report. The theoretical or computed air consumption did not account for even the minimum consumption that was found during the standing test, proving that the greatest part of the air used was wasted through leakage due to improper maintenance of the devices. The committee believes that it would be worth while to continue the test with a view to establishing more complete data upon which performance standard and condemning tests could be made.

Conclusions

(1) Auxiliary devices under average conditions were found to use too much air.

(2) Conditions frequently exist where compressor capacity may be exceeded by the demands of the auxiliary devices.

(3) Some of the data justify the conclusion that auxiliary devices should be operated separately from the air brake system. On the other hand, some of the data show that with proper maintenance this conclusion might not be warranted.

(4) Under some of the conditions shown by these data, it would not be satisfactory to connect the auxiliary devices to the air brake system and increase the compressor capacity accordingly, unless the air brake main reservoir is protected from the consequences of excessive air requirement by the auxiliary devices.

(5) Cost basis data show that better maintenance would be profitable.

(6) Standards of performance, including maximum permissible leakage, should be established upon which to condemn devices unfit for service.

(7) Means should be devised for checking and testing the performance of auxiliary devices.

Recommendations

The committee recommended that its work be continued and this report be regarded only as a report of progress; that the data be made more complete by investigations on individual railroads, conducted as outlined in the report, such investigations to be reported to the chairman of this committee; that steps be taken to secure better maintenance of auxiliary devices; that further experiments be made with the object of devising satisfactory means for testing, and satisfactory standards of performance which can be applied to show whether the device is fit for service; and that consideration be given to the plan of operating the auxiliary devices at a pressure lower than that carried in the air brake system main reservoir. This plan would effect a large saving in air used, but would require a separate air supply reservoir with means provided for controlling the reduced pressure.

The report was signed by C. H. Weaver (N. Y. C.), chairman; C. B. Miles (Big Four), W. W. White (M. C.), and R. E. Miller (W. A. B. Co.).

Discussion

Great interest was shown in the results of the test and numerous opinions were advanced as to the cause of excessive leakage in auxiliaries and the method that should be used to overcome it. The practice of operating power reverse gears by steam when handling locomotives around the roundhouse was condemned by several speakers, who stated that steam destroyed the packing in the cylinders and caused excessive leakage. Some roads are now equipping metal disk power reverse systems with metal packing rings. T. F. Lyons (N. Y. C.) brought out the fact that leakage in the auxiliary devices might interfere with the proper operation of the brake even though it did not result in a large waste of air. The loss due to leaks in water scoop cylinders did not cause excessive air consumption because the cylinder is operated at infrequent intervals. However, in approaching water tanks the scoop is usually dropped at the same time as the brakes are released and excessive leakage in the water-scoop cylinder might seriously interfere with the recharging of the auxiliary reservoir.

Air Leakage Due to Defective Hose Couplings

A paper on Air Leakage and Money Wasted Through Failure to Keep Hose Couplings in Standard Gage, submitted by the Manhattan Air Brake Club, was presented at the Wednesday session of the convention. The paper emphasized the fuel waste due to brake pipe leakage and stated that examination of 1,600 freight cars showed that 35 per cent of the leakage existed in the hose couplings. Further investigation developed that it was difficult to find couplings in service that would pass the M. C. B. standard coupling gage test. Employees often use makeshifts to secure tight joints and at least one road has adopted a special gasket to eliminate hose coupling leakage. Some special types of gaskets submitted to railroads for approval when tested have required from 1,000 to 1,300 lb. to pull the hose apart. Such excessive strains fracture the hose and cause the brake pipe to shift, resulting in leakage. The paper recommended that the universal practice of gaging air brake hose couplings be included when periodic attention to air brake equipment is being given freight cars in shops or on repair tracks.

M. C. B. Air Brake Defect Card

By Jas. Elder

General Air Brake Inspector, Chicago, Milwaukee & St. Paul

The United States Railroad Administration, Fuel Conservation Division, in Circular No. 13, of August 31, 1918, issued by Eugene McAuliffe, manager, presents 15 specific recommendations made by an Air Brake Association committee. Recommendation No. 9 is as follows: "A rule should be put into effect that trainmen must apply an M. C. B. standard air brake defect card in cases where defects develop en route or for brakes cut out by them; defect to be checked off on back of card."

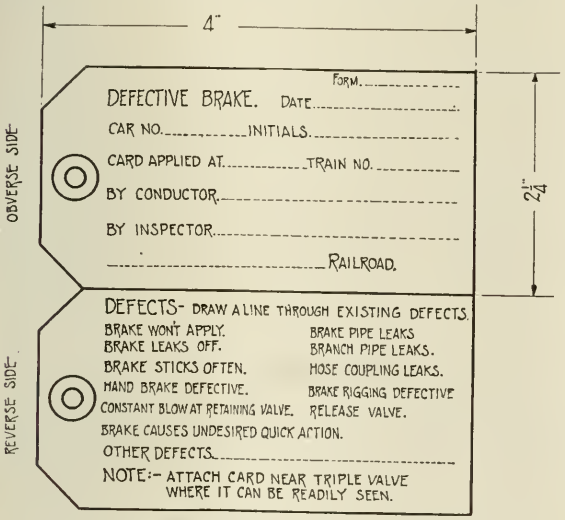
The M. C. B. card shows careful thought, but the changed conditions since its last revisions demand certain alterations to meet present requirements. Some believe the brake defect card has outlived its usefulness, basing this on (a) the great difficulty in getting it applied where needed; (b) on incoming brake tests rendering it less necessary; (c) and some object because of the appearance occasional trains would present if all cars with defective brakes were carded. Assuredly the brake defect card should either be used to better advantage or discontinued.

If a defect card is yet needed and is practicable after having simplified the card, it will be very desirable to have mandatory instructions as to responsibility for its application. As this car is a detail of repairing, for which car men are responsible, *car men should be primarily responsible for its application;* that is, before a departing train is released from the blue signals, the inspectors should have either repaired or carded every defective brake. With this insured, it would be fair to insist that the departing train crew should card every defective brake delivered at the next terminal. However, as the incoming test should invariably be made, and as this would disclose to inspectors all defects except with cut-out brakes, it is submitted that if train men are required merely to card properly every brake brought in cut-out, all needs will be met, and the work of getting cards used by them will be lessened in a rational manner.

If one road cards all defective brakes not repaired and a connecting line does not, the former will be subjected to an unfair comparison; hence, that if real value is to be obtained from the defect card, its full and similar use must be obligatory on all roads in interchange traffic. If the defect card

is to be continued the following additional means for bettering the results obtained should be adopted. The card and its use should be simplified, and then action looking toward its obligatory and uniform use by all railways in interchange service should be taken. The stub should be omitted. If it were possible to get the stubs filled out and forwarded, they would merely burden the mails and the offices. The reasons warranting omission of the stub also justify dropping from the card all matter pertaining to its use after the defect has been repaired. The size proposed is 4 in. by 2¼ in.

With all-air trains, a defect which prevents placing a certain car between other air brake cars, puts it back of the caboose. This advertises the defect on arrival at the next terminal, and as it must not go farther until repaired, there is now no use for the second card, as there was when the present M. C. B. card was designed. Where an existing defect does not require air pressure to locate it, such as one



Suggested Revision of M. C. B. Air Brake Defect Card

with either the hand brake or the foundation brake, it is plainly undesirable to elaborate the card by specifying the various points where such defects commonly develop. The revised card submitted is here illustrated.

Discussion

Practically all who discussed the paper agreed that the defect card gave valuable information, but that considerable difficulty was found in getting train men to use them. There was a marked difference of opinion regarding the advisability of eliminating the stubs. The association adopted a motion recommending the adoption of the air brake defect card revised as suggested in the paper, the use of this card to be confined to train men and inspectors in departure yards.

Holding Standing Freight Trains and Cars on Grades

By R. J. Watters
Assistant Air Brake Inspector, Northern Pacific

While many, if not most roads with steep grades have recognized the possible great dangers incident to holding standing trains and cars on grades, and have generally issued rules or instructions to guard against such dangers, yet the fact that even on such roads there is a strong tendency, on the part of some officials as well as of the men in the train service, to gravitate toward easier and more dangerous practices, and the further fact that many accidents from lack of the right practices occur on roads with grades too light to include them under the term mountain or steep grade roads, amply justify the Air Brake Association's careful consideration of this subject.

As before implied, probably the greater danger is due to laxness in the daily enforcement of rules and instructions on this subject. Observance of these requires more forethought and co-operation on the part of engine and trainmen to reduce the time and labor for compliance; and even then the latter will be greater than by the easier but more dangerous ways. Familiarity with steep grades, and the many deviations from safe practices that can occur so generally without an accident following, tend constantly toward habits which, unless checked regularly, will eventually result in disaster. One of the most common and dangerous of these is failure to release and recharge the train brakes promptly after stopping on a grade, which should invariably be done whether or not the engine in control is to be cut off.

A general superintendent of a large road with several long and steep grades, expressed this matter well by the statement that it was necessary about every six months to instruct each superintendent having a steep grade, to report how well safety precautions against runaways were being observed, but not to do so until he had the trainmaster and the traveling engineer make a special investigation and report. He said that without this, a serious accident invariably occurred in time, and that its investigation disclosed chronic laxness as the cause.

The following definite instructions and recommendations are submitted on the subject of this paper:

As soon as a train is stopped on a grade, brakes should be released and recharged at once. If the engine from which brakes are being operated remains attached, and keeps the train charged, as it then should, it may be held with the independent brakes; that is, by keeping the independent or the straight air brake valve in application position. An exception is where the engineer is to leave the engine. In this case enough hand brakes to alone hold the train should be applied. This should be proved by having all automatic and independent brakes off and, if the compressor may be kept running, then the independent brake should be reapplied and its brake valve handle left in application position.

If the engine from which the train brakes are being operated is to be cut off, enough hand brakes to alone hold the train, should be applied, but the trainmen should not commence to apply them until the automatic brakes are released. Where retaining valves are in use, none need be turned down, but no hand brakes should be applied until one minute after train brake release is begun.

Hand brakes used to hold cars or a train on a grade should be applied at the down-grade or lower end, thereby assuring against any car starting if uncoupled. All slack should be in, against the applied hand brakes, as well as all automatic brakes off (see previous exception about retaining valves) before cutting off an engine.

If, with the engine in control of the train cut off, another engine is to be detached, as a helper or pusher, its engineer should first cut in, release and recharge the train brakes, then release the independent brake so as to be certain the train will stand after the engine is cut off. While remaining with the train the independent brake should be kept applied on each of any such other engines.

With a descending train, the final reduction to bunch the slack, as the stop is being completed, should be followed, during the wait of one minute after release is begun before commencing to apply hand brakes (at the head end), by reversing and pushing the slack in as much more as possible, then holding the train with the independent brake while the hand brakes are being applied.

With an ascending train, that the slack is in before cutting off should be insured by allowing it to drop back gradually, with train brakes off, until the train will stand with no aid from the engine in control. It should be held by hand brakes applied at the rear, aided by the independent brake of each other engine in the train.

If a break in two, or burst hose occurs on a grade immediately apply more than enough hand brakes to alone hold the train until its brakes are again recharged. If it is a descending train, and a coupling is damaged that will take some time to repair, and if the portion of the train with the engine (ahead) can be backed so as to couple the detached hose, it should be done and the train kept recharged during any necessary wait while obtaining a repair part, as a knuckle or pin, or if a delay must ensue before putting the damaged car elsewhere, as where this occurs where the car may be switched out or to the rear end.

It should be noted that the air brakes are off before applying hand brakes on cars set out on a grade, and on level track as well, sufficient to hold them. It is not necessary to bleed the air from auxiliary reservoirs of cars so set out as long as the air brakes are off when the hand brakes are applied. In addition to the foregoing any rules regarding blocking cars should be complied with. Hand brakes applied when the car air brakes are set, may result in broken chains when the air brakes leak off, especially dangerous with one or two cars. Even where this exceptional failure does not occur, they will often be so difficult to release as to necessitate the delay and waste of air required to apply the air brakes to aid in releasing them.

Instructions on Freight Car Brake Maintenance

A paper giving detailed instructions for the maintenance of freight brake equipment was presented by Mark Purcell (Northern Pacific). The need for clear and definite instructions in printed form was shown by the tests of cars shortly after cleaning, which demonstrated that 21.3 per cent of the brakes cleaned were ineffective within one month. Two years of special inspection and instruction work reduced the percentage to 8.8 which still left a big opportunity for improvement. The need for detailed instruction is particularly urgent at the present time because of the large number of inexperienced men in the air brake department.

To avoid unnecessary switching and loss of car service, work should be done well when the cars are sent to the repair track and every opportunity taken to ascertain the condition of the brakes when on the repair track, house track and transfer track. The installation of air lines at such points was advocated as a means of reducing the cost of brake maintenance, increasing car efficiency and expediting train movement.

This completes the report of the proceedings up to the time of going to press. The remainder will appear in next week's issue.

Exhibitors at the Air Brake Convention

An organization of manufacturers of air brake and accessories, for supervising the exhibits in connection with conventions of air brake associations, was formed at a meeting held in the Hotel Sherman, Chicago, May 7. At this meeting a constitution and by-laws were adopted and the name, Air Brake Appliance Association, chosen. The following officers were elected: Chairman, J. J. Cizek, The Leslie Company; secretary-treasurer, F. W. Venton, Crane Company. Members of the executive committee for three years: J. F. Gettrust, Ashton Valve Company; J. C. Younglove, H. W. Johns-Manville Company; J. D. Wright, Westinghouse Air Brake Company. Members of the committee for two years: F. W. Venton, Crane Company; J. H. Dennis, New York & New Jersey Lubricant Company; L. H. Snyder, Joseph Dixon Crucible Company. Members of the executive committee for one year: J. J. Cizek, The Leslie Company; M. S. Brewster, U. S. Metallic Packing Company; D. S. Prosser, U. S. Rubber Company.

The companies exhibiting devices at the Air Brake Association convention this year, together with a list of their representatives, are given below:

Anchor Packing Company, Chicago.—Packing. Represented by John Landreth.

Ashton Valve Company, Boston, Mass.—Gages, gage testers and safety valves, portable boiler test pump, inspectors' testing and proving outfit. Represented by J. W. Motherwell and J. F. Gettrust.

Barco Manufacturing Company, Chicago, Ill.—Metallic engine-tender air, steam and water connections, air reservoir joint connections, metallic car steam heat connections, smoke box blower fitting. Represented by F. N. Bard and C. L. Mellor.

Broschart Threadless Pipe Coupling Company, Trenton, Mo. Emergency train-line repair coupling.

Chicago Railway Equipment Company, Chicago, Ill.—Brake beam supports. Represented by E. G. Busse and E. A. LeBeau.

Detroit Lubricator Company, Detroit, Mich.—Lubricators and flange oiler. Represented by A. G. Machesney.

Dixon Crucible Company, Joseph, Jersey City, N. J.—Graphite and graphite products for railroad service. Represented by L. H. Snyder and F. R. Brandon.

Edna Brass Manufacturig Company, Cincinnati, Ohio.—Lubricators, injectors and boiler checks. Represented by E. O. Corey and H. A. Glenn.

Garlock Packing Company, Palmyra, N. Y.—Air brake gaskets, air pump throttle, cab cock and reverse gear packing and spiral packing. Represented by W. G. Cook.

Gould Coupler Company, New York City.—Gould universal automatic brake slack adjuster. Represented by William H. Sauvage, W. F. Richards, George R. Berger and William Garstang.

Johns-Manville Company, H. W., New York.—Air pump, throttle and brake cylinder packing, expander rings and slack adjuster. Represented by J. E. Meek, C. E. Murphy, Fred Horne, G. Christenson, L. S. Wilbur, J. C. Younglove, D. L. Jennings, P. C. Jacobs, E. H. Willard and P. R. Austin.

Leslie Company, The, Lyndhurst, N. J.—Steam heat regulators and removable injector coupling nuts. Represented by S. I. Leslie and J. J. Cizek.

Nathan Manufacturing Company, New York.—Injectors, lubricators, boiler check, gage cocks, non-lifting coal sprinkler. Represented by Otto Best, W. E. Brumble, J. G. Arn and Richard Welch.

New York & New Jersey Lubricant Company, New York.—Non-fluid-oil brake cylinder lubricant and N. F. O. triple valve lubricant. Represented by J. H. Bennis and F. J. Barnes.

New York Belting & Packing Company, New York.—Air brake and air signal hose, air tool hose, car heating and tender hose, gaskets, air coupling, packing rings, rubber gaskets, air pump packing, rubber belting, etc. Represented by L. F. Purtill.

Ohio Injector Company, Chicago, Ill.—U. S. Standard injector, Chicago non-lifting injector, Ohio injector, Chicago lubricator, Chicago flange oiler, Chicago automatic drifting valve, Ohio water glass protector, Ohio boiler checks and Ohio feed hose strainer. Represented by A. C. Beckwith.

Simmons-Boardman Publishing Company, New York—*Railway Age* and Railway Mechanical Engineer. Represented by A. F. Stuebling and J. M. Rutherford.

Traction Lubricating Company, Chicago, Ill.—Air brake lubricant. Represented by D. W. Kimball.

U. S. Metallic Packing Company, Philadelphia, Pa.—King type air pump packing. Represented by M. B. Brewster and H. E. Hyslop.

United States Rubber Company, New York.—Mechanical Goods Division. Air brake hose, pneumatic tool hose, gaskets and packings. Represented by C. S. Prosser.

Westinghouse Air Brake Company, Pittsburgh, Pa.—M. C. B. hose coupling gages and hose coupling gasket gages, individual car testing device, air brake cleaning and testing tools and devices, triple valve test rack, brake pipe vent valve, automatic brake valve with collapsible equalizing piston, M. C. B. standard hose coupling packing ring gage, shipping caps for triple valves, auxiliary devices governor. Represented by J. B. Wright, F. H. Parke, A. L. Berghane, G. B. Pierce, F. M. Nellis, E. H. Dewson, H. H. Burns, F. B. Johnson, J. S. Y. Fralich, E. Weaver, B. F. Key, G. A. Stenson, A. G. Houston, R. E. Miller, W. M. Sleeth, C. J. Olmstead, L. M. Carlton, L. Wilcox, C. H. Larimer, E. W. Davis, F. W. Nagle, T. L. Burton, A. B. Brown, C. E. Rowley, H. L. Cusic, G. W. Wildon, C. C. Farmer, F. B. Farmer, H. A. Wahlert, C. D. Foltz, V. Villette, J. D. Siegrist.

The director general had received up to May 3 the following reports regarding the progress of the Victory Loan among employees of federal operated railroads:

Region	Employees on roll	Employees subscribing	Amount of subscriptions	Per cent of employees subscribing
Northwestern	251,599	164,270	$16,160,150	65.29
Southern	235,263	69,587	6,307,000	26.14
Southwestern	177,321	84,786	8,435,800	47.8
Pocahontas	51,334	15,986	1,499,150	31.14
Central Western	305,057	180,800	16,708,900	59.3
Allegheny	382,434	184,999	14,878,100	48.37
Eastern	420,473	213,822	19,702,050	50
Pullman Lines	21,061	13,385	1,070,500	64
N. Y. N. J. Canal	34	28	3,850	82
Coastwise S. S.	.....	1,604	107,400	..
Total			$85,872,900	

General News Department

William Howard Taft, speaking before the Hamilton Club, at Chicago, on Wednesday last, called on the Republican party to make a party issue of the return of the railroads to private ownership.

The Michigan East & West Railroad, which is now operated under a court injunction restraining its owners from dismantling the road, evidently will have to go before the Michigan State Railroad Commission to get leave to expire. The road was sold under foreclosure. Officers of the state, understanding it to have been sold as a "going concern" exercised their authority to prevent the buyer from taking up the rails. The line of road is 72 miles long from Manistee, eastward to Marion.

Governor Lowden, of Illinois, this week sent a message to the Legislature asking for the appointment of a joint committee to investigate charges that representatives of the Pullman Company had approached members of the state board of equalization on matters relating to assessments of the Pullman Company's property. M. H. Malone, president of the board of equalization had declared that members had been threatened with the loss of their positions if the Pullman Company's assessment should be increased. Resolutions in accordance with the governor's wish were passed by both Senate and House. Governor Lowden, formerly a director of the Pullman Company, resigned his directorship when elected governor.

Western Railway Club

The annual meeting of this club will be held on May 19 at the Hotel Sherman, Chicago. The usual dinner preceding the meeting will be served in the Italian Room at 6:30. The meeting will be held in the Louis XVI Room at eight and there will be an address by R. A. White on international problems.

Accounting Officers' Association

The Railway Accounting Officers' Association will hold its 31st annual meeting at the Commodore Hotel, New York City, on Wednesday, June 11. C. A. Prouty, director of the division of accounting, United States Railroad Administration, is expected to be present. Members should make their hotel reservations as far in advance as possible; $2.50 to $4 for single room with bath, and $4 to $6 per day for double rooms with bath.

American Society for Testing Materials Convention

The American Society for Testing Materials will hold its twenty-second annual meeting at the Hotel Traymore, Atlantic City, N. J., on June 24, 25, 26 and 27. Among the features of special interest to railway men as outlined in the tentative program are a session on preservative coatings, lubricants and containers on Tuesday afternoon; a session on steel and wrought iron on Wednesday forenoon; one on Wednesday evening on corrosion and magnetic analysis, and one on concrete and gypsum, including the report of the committee on reinforced concrete, on Friday afternoon. The convention will close with a joint session on cement and concrete with the American Concrete Institute on Friday evening.

Pacific Railway Club

At the annual meeting of the Pacific Railway Club, held at San Francisco, Cal., on March 13, the following officers were elected: president, C. E. Norton, chief despatcher of the Southern Pacific; first vice-president, Dennistoun Wood, assistant mechanical engineer, Southern Pacific; second vice-president, George H. Harris, general superintendent, San Francisco-Oakland Terminal Company, and treasurer, G. H. Baker, Atchison, Topeka & Santa Fe.

O. S. Corbin, engineman on the Southern Pacific, addressed the meeting on the subject of "The Prevention of Accidents at Highway Grade Crossings," treating the matter from the standpoint of the engineman. Eugene H. Baker and Mr. Dembow also spoke on the same subject. Following a discussion on this subject the meeting was addressed by Chaplain John T. Kendall of the 44th Infantry.

Reception for the Thirteenth Engineers

Arrangements have been completed for the reception at Chicago next week of the 13th (Railway) Engineers. This regiment was recruited in Chicago immediately after declaration of war from the Chicago Great Western, the Chicago, Milwaukee & St. Paul, the Chicago & North Western, the Chicago, Rock Island & Pacific, the Illinois Central and the Atchison, Topeka & Santa Fe. The regiment is expected to arrive in Chicago on Monday morning, May 11. Breakfast will be served the men at the Coliseum. At 11 o'clock they will parade through the loop district and then will have luncheon at one of the large hotels. At four o'clock in the afternoon the regiment is scheduled to leave for Camp Grant, Rockford, Ill., for demobilization. In the reviewing party will be the federal managers of the six roads having companies in the regiment and Major General Leonard Wood. Arrangements have been completed for giving railroad employees, so far as possible, a holiday in order to welcome the soldiers.

Railroad Employees' Subscriptions for Victory Bonds

The director general has received up to May 7 the following reports regarding the progress of the Victory Loan among the men and women employed by the United States Railroad Administration:

Region	Employees on roll	Employees subscribing	Amount subscriptions	Per cent of employees subscribing
Northwestern	248,588	180,013	$17,664,900	72.41
Southern	264,796	89,804	8,337,000	33.91
Southwestern	177,326	96,464	9,775,900	54.4
Pocahontas	51,334	20,489	1,910,000	39.91
Central Western	307,699	192,676	18,899,250	64.2
Allegheny	382,780	214,894	17,431,500	56.14
Eastern	427,909	251,535	23,096,650	58.
Mississippi-Warrior (water lines)	.....	.....	9,600	...
Pullman Lines	21,061	16,355	1,308,450	78.
N. Y. Canals	34	33	4,850	98.
Coastwise S. S.	....	1,918	126,850	...
Central Adm'n.	1,242	1,242	500,050	100.
Total	.....	.....	$99,065,000	....

Luncheon to Thornton and McCrea

Ralph Peters, president of the Long Island Railroad, New York city, on Wednesday of this week gave an informal luncheon in honor of Major General Sir Henry W. Thornton and Colonel J. A. McCrea, both lately returned from France. The list of guests included the following: William A. Nash, chairman of the board of directors of the Corn Exchange Bank; Walter E. Frew, president of the Corn Exchange Bank; George A. Gaston, of Gaston, Williams & Wigmore; Lewis L. Clarke, president of the American Exchange National Bank; Austin B. Fletcher; Colonel George T. Slade; John Markle; Colonel A. L. Whiting, 13th Engineers; Thomas DeWitt Cuyler, chairman of the board of directors of the Pennsylvania Railroad; Samuel Rea president Henry Tatnall vice-president and A. J. County vice-president, Pennsylvania Railroad; F. D. Underwood, president, Erie Railroad; W. H. Truesdale, president, Delaware, Lackawanna & Western; L. F. Loree, president, Delaware & Hudson Company; Howard Elliott, president, Northern Pacific; W. G. Besler, president, Central of New Jersey; H. F. Gunison, publisher of the Brooklyn Daily Eagle; W. A. Goodman, Jr.; A. R. Parsons, of Douglas L. Elliman & Co. and Lieut. Ralph Peters, Jr.

May Day in Denver

Approximately 6,000 railroad shop employees held a mass meeting in Denver, Colorado, on May 1, and adopted resolutions protesting against the efforts of "certain moneyed interests to force private ownership" and favoring a nationwide strike in the event of their success. Resolutions were also passed disapproving of the imprisonment of Eugene V. Debs and extending cordial greetings to "our Russian fellow workers and wishing them Godspeed in their successful venture and epoch making revolution." Other resolutions adopted called for the immediate withdrawal of American troops from Russia, censured the "undemocratic methods being used by our national officers in connection with the new wage schedule," and protested against unemployment among railroad men.

The meeting was attended by employees of the shops of the Denver & Rio Grande, the Colorado & Southern, the Union Pacific, the Chicago, Burlington & Quincy and the Denver & Salt Lake. All of the shops of these roads were closed for the afternoon. A committee in each shop asked the foreman for a half holiday for the May day celebration and the holiday was granted in each case. The shop workers contended that the government had failed to make a satisfactory agreement with them, and declared that, in violation of its pledge to keep all railway shop hands working, 60 per cent of the employees in one shop had been laid off. Inquiries were made if the present Victory loan is to be used to wage war on Russia. The resolutions as adopted were ordered printed and distributed broadcast over the country.

Record of the Engineer Corps

A resume of the work of the Engineer Corps of the American Expeditionary Forces has been issued by the office of the chief engineer of the A. E. F. and is included in Engineering Recruiting Circular No. 2 used by army recruiting officers in their campaign for volunteers. The circular states that there were 174,000 engineer troops in the service. Part of the work done by the railway engineering units in this force consisted of the construction of 947 miles of standard gage track and a six mile cut-off at Nevers requiring a bridge across the Loire river, 2,190 ft. long. This latter project had been described in the *Railway Age*.

Among the accomplishments of this force are listed many records in the construction and operation of military railroads. The light railways of the American Expeditionary Forces handled to February 1, 860,652 tons of freight, of which 166,202 tons was ammunition. In one week the ammunition moved amounted to 10,600 tons, and in five nights 23,135 soldiers were carried on these railways. The daily net tonnage handled in October, 1918, was 8,100 tons. In one week 10,700 tons of rations were handled. At the time of the signing of the armistice 2,240 kilometers (1,392 miles) of light railway were in operation, of which 1,740 kilometers had been taken from the Germans, the balance being newly constructed or rebuilt. On November 11, 165 locomotives and 1,695 cars were available for use. In five hours 135 men laid 14,200 ft. of light railway track. Among the shops erected were 10 buildings at Abainville, with a total floor area of 70,000 sq. ft. Over 2,300 cars have been erected and 140 locomotives have been repaired in these shops.

In a letter to Major General William C. Langfitt, chief engineer, General John J. Pershing, expressing his appreciation of the work of the engineer department, said:

"The various units attached to combat troops distinguished themselves at all times in the assistance which they rendered. The Division of Construction and Forestry, with limited resources at its disposal and under conditions of extreme severity, more than met the many demands made upon it. The Department of Light Railways and Roads furnished the indispensable link between the railheads and the front lines for the transportation of troops and supplies, and for the evacuation of sick and wounded. Its record in the construction and operation of light railways and roads has seldom been equalled. The many other services of the Engineer Department, connected with the acquisition and distribution of engineer supplies, particularly those needed for combat operations, were so conducted that our forces never lacked for any essential.

"The Engineer Department has made a proud record for itself, and it gives me pleasure to express to you my sincere thanks and admiration, and that of your comrades of the American Expeditionary Forces, for its splendid achievements."

Fuel Association Convention

Following is the program for the annual convention of the International Railway Fuel Association, which will be held at the Hotel Sherman, Chicago, May 19-22:

MONDAY, MAY 19

Address by the president, L. R. Pyle, supervisor of fuel conservation, Central Western region, Railroad Administration.
Report of Committee on Pulverized Fuel, chairman, W. J. Bohan, assistant mechanical superintendent, Northern Pacific.
Teamwork of Engineers and Firemen, by M. A. Daly, fuel supervisor, Northern Pacific.
Locomotive Fuel Losses at Terminals, by J. M. Nicholson, fuel supervisor, Atchison, Topeka & Santa Fe.

TUESDAY, MAY 20

Responsibility of a General Operating Officer and What He Can Do to Promote Fuel Economy, by F. H. Hammill, general superintendent, Union Pacific.
Storage of Coal by Railroads During 1918, by Professor H. H. Stoek, professor railway engineering, University of Illinois.
Fuel Losses Due to Distorted Valve Gears, by J. W. Hardy, supervisor, Fuel Conservation Section, Railroad Administration.
Dirt in Coal, by L. J. Joffray, general fuel inspector, Illinois Central.
Tests of Locomotives on Russian Railways, by I. B. Lebedeff, assistant chief of locomotive department, Russian Mission of Ways of Communication.
Burning Oil on Locomotives, by William L. Hack, district road foreman of engines, Southern Pacific.
Equated Tonnage, by R. N. Begien, general manager, Baltimore & Ohio Western Lines.

WEDNESDAY, MAY 21

Address by Frank McManamy, assistant director, mechanical department, Division of Operation, Railroad Administration.
Certain Essentials, by Eugene McAuliffe, manager, Fuel Conservation Section, U. S. Railroad Administration.
Fuel Department Organization, by T. Duff Smith, fuel agent, Grand Trunk.
Co-operative Research and the Railway Fuel Problem, by Captain O. S. Beyer, Jr.
Internal Combustion vs. Steam Engines for Small Stationary Plants, by C. A. Lichty, secretary-treasurer, American Railway Bridge & Building Association.

THURSDAY, MAY 22

Report of Standing Committee on Front Ends, Grates and Ashpans, chairman, H. B. MacFarland, engineer of tests, Atchison, Topeka & Santa Fe.
Results of Tests Showing Losses Due to Front End Air Leaks, by E. P. Roesch, supervisor, Fuel Conservation Section, Northwestern region, Railroad Administration.
Reports of standing and special committees.
Election of officers.

New York Railroad Club

The meeting of the New York Railroad Club on Friday evening, May 16, will be different from anything that has heretofore been attempted by that club. There is a considerable number of foreign railroad officers in this country, a number of them associated with purchasing commissions. Several of these gentlemen will make brief addresses explaining something of railroad conditions in their own countries.

Association of Railway Chief Surgeons

This association held its annual meeting at the Hotel Commodore, New York city, on Monday and Tuesday of this week. Dr. C. W. Hopkins (C. & N. W.) was elected president for the ensuing year; Dr. Duncan Evans (N. C. & St. L.), vice-president; Dr. L. J. Mitchell, 29 East Madison street, Chicago, treasurer.

B. R. T. Convention

The Brotherhood of Railroad Trainmen will hold its triennial convention at Columbus, Ohio, beginning on May 14. The convention is expected to last at least a month and it is planned to give consideration to the reconstruction work among members who have returned from active service with the army or navy. Director General Walker D. Hines will address the convention but the date of his appearance has not been announced.

Traffic News

An attractive booklet, setting forth the advantages of the state of North Carolina to the homeseeker, has been issued by the Agricultural Section of the United States Railway Administration. It contains full information about production of all kinds, transportation, markets, roads and climate. The statistical information was furnished by the commissioner of agriculture for North Carolina.

For soldiers and sailors attending the first convention of World's War Veterans, which will be held at St. Louis, Mo., on May 8, the Railroad Administration has announced a general fare of two cents a mile, with a minimum charge of $2 for the round trip. For the Grand Army of the Republic a fare and one-third for the round trip has been made from stations on the Texas & Pacific and the Southern Pacific to Houston, Tex., for the encampment and meetings of allied societies held at Houston, on May 8, 9 and 10.

Export Traffic

The weekly report for the week ended April 30, shows at North Atlantic ports a total of 31,567 carloads of export freight on hand, compared with 32,566 cars the preceding week (exclusive of bulk grain and coal). On the same date there were 7,469 cars of export food on hand, compared with 8,206 cars for the week previous. There were 18,893,111 bushels of grain in elevators at North Atlantic ports, 7,952,878 being received during the week while 8,356,278 bushels were cleared. At South Atlantic and Gulf ports there were 2,922,144 bushels of grain on hand for the period mentioned.

Transcontinental Rates on Oriental Goods

Director General Hines has announced reductions in freight rates from Pacific coast ports to all eastern territory on a large number of commodities which are imported from the Orient. Some of the commodities and the proposed rates thereon are shown below. The effective dates of these new rates cannot yet be announced, but they will be published at the earliest practicable date on three days' notice. Most of the rates are reductions of from 10 to 25 per cent.

New Import Rates

	C. L. Per 100 lb.	L. C. L. Per 100 lb.
Eggs, dried, etc.	$2.00	....
Bagging burlap, etc.	.75	....
Beans, cocoa	.85	....
Chinaware, crockery, etc.	1.50	$2.00
Hemp, jute, sisal, etc.	.75	....
Hides, green	1.10	....
Matting and rugs	1.50	2.00
Rattan, cut to length	1.20	....
Rubber, crude	1.00	2.25
Tallow (inedible)	.85	....
Tea and tea dust	1.50	2.50
Tin, bar, block, etc.	.75	....
Toys	2.00	3.00
Bulbs, plants, etc.	1.50	2.00
Cotton piece goods	....	2.00
Dry goods, N. O. S.	....	3.12½
Fibre, ramie	1.25	....
Fans, palm leaf or paper	....	2.50
Fans, N. O. S.	....	3.25
Oranges	1.44	....
Paper or fibre articles	....	2.50
Rugs, hemp or cloth	1.50	2.00
Spices, etc.	1.25	2.00
Wool in grease	....	1.25
Silk waste	....	2.50

The Trans-Canada Express

The Canadian Pacific is to run a regular train through from Montreal to Vancouver in 93 hours, 30 minutes. The new train is to begin running on June 1 and is to be called the Trans-Canada, and it will be in addition to the two regular through trains now in service. The announcement in Montreal papers calls attention to the fact that the best time across the continent in the United States is 98 hours, 50 minutes; but no mention is made of the fact that the distance by the American roads is considerably greater. From Montreal to Vancouver the distance is 2,886 miles, making the rate of speed of the new train about 31 miles an hour; whereas from New York to San Francisco by way of the New York Central, the Chicago & North Western, the Union Pacific and the Southern Pacific, the distance is 3,225 miles, or 339 miles more than the length of the Canadian Pacific route; and the time from New York to San Francisco, 98 hours, 50 minutes, makes the rate of speed 32.63 miles an hour.

Advance in Passenger Fares in Michigan

By a law which has been passed by the legislature of Michigan and which goes into effect on August 14, next, all railroads and interurban roads in that state having gross annual earnings of less than $8,000 a mile, may increase their passenger fares to the basis of 2½ cents a mile. Roads earning $8,000 or more must continue to carry passengers at 2 cents a mile.

Vicissitudes of the Express Business

According to the New York Sun all parties holding claims against the Adams Express Company for goods lost prior to July 1, 1918, will be paid 60 cents on the dollar without question. Announcement to that effect has been made by C. W. Stockton, counsel for the company. The offer is for claims in cases in which the company received the goods and there is no record of delivery. It is estimated that the company faces an accumulation of $100,000 such claims. Most of them resulted from the freight and express congestion when freight service broke down.

"There was perhaps no public utility that was affected more by the war than the express companies," said Mr. Stockton. "They operated on a very close margin before the costs of virtually every factor in the service rose and it is a matter of record that no increases in rates were granted before the merger of the companies in July, 1918. The Adams Express Company lost about $10,000,000 between July 1, 1917, and July 1, 1918, a deficit equal to the capital stock. If it had not been for a reserve stowed away in its sock the company would have been bankrupt. The employees of the company were young men who were hefty and virile. They had to move heavy freight. When the war came virtually all of them were lost to the company through enlistment or the draft. Commercial companies, able to pay higher wages than the express companies, grabbed the others. The Government took away our railway express cars for its movement of troops and military stores. When the freight service broke down we were deluged with business. This had to be handled in box cars, which were neither heated nor lighted. It was necessary to load and unload frequently and this caused more labor and greater losses from breakage. The clerical costs soared and help, being inexperienced, billed goods by the wrong routes, failed to keep records carefully and caused an avalanche of claims to pile up against us. Owing to resultant disorganization we have been unable to investigate claims promptly and there are perhaps outstanding $100,000 on goods shipped prior to July 1, 1918. Shippers have flocked to our offices desiring settlement, and we have explained some of the difficulties involved. The claims are being investigated by local agents of the American Railway Express and, as it is inexpedient to have the tons of records sent here, there is, consequently, much delay.

"In a number of cases shippers are insistent on immediate settlement, for, as they state, some of the claims are of ten months' standing. Therefore we have decided to offer 60 per cent on all claims where we know we have received the goods and have not a record of delivery, or haven't yet finished the investigation to establish delivery. It is a gambler's chance, but a considerable number of firms holding claims have agreed upon the settlement at this figure. On our behalf, it should be stated that not all the claims made are valid and the percentage of valid claims will be just about 60 per cent of the number presented. If the persons holding claims want to wait until the investigations are complete and we have opportunity to check up our records, they will be paid in full. They can get 100 per cent if they will bide their time, and we think that the Adams Express Company, despite losses during war, will be able to meet all of its valid debts. This statement is based upon a study of the balance sheet and the assets of the company."

Commission and Court News

Interstate Commerce Commission

The Commission has denied the petition of Director General Hines that the Michigan percentage rate case be reopened

The commission has awarded a hearing at Washington on May 15 on the petition of the Arkansas & Louisiana for the appointment of a board of referees to determine its compensation under the federal control act.

Classification of Lumber

The commission has announced a decision after an investigation on its own motion that:

The commission is empowered, under sections 1, 3, and 15 of the act, to prescribe a classification of lumber and lumber products. Classification should rest in the first instance upon those factors which are definite and readily ascertainable, such as value, risk, and car loading. The range of values of common lumber to such an extent embraces the values of the other article under consideration as to make impracticable and unjust a differentiation in rates based on value. This element should be considered only in fixing the basic lumber rate and its relationship to rates on commodities not so intimately related to lumber as those here under consideration. The car loading of lumber and lumber products constitutes to a considerable extent the determinative factor in their classification. A percentage relationship between lumber and articles which should take related rates will effect a fairer distribution of transportation costs than the observance of flat differentials. The present record affords no basis for prescribing different rates for different minima. Rates on lumber products should not exceed commodity rates contemporaneously maintained on lumber by more than is indicated in the lumber list suggested herein. Poles and piling from the north Pacific coast and the "inland empire" should take rates no higher than are contemporaneously applied on fir lumber.

Personnel of Commissions

W. D. Humphrey, member of the Oklahoma Corporation Commission, has resigned. In his letter Mr. Humphrey tells the governor that his resignation was due to his desire to fight the agitation for government ownership and control of public utilities without the handicap of a state office.

The Public Service Commissioner of the State of New York, for the First District (New York City), under the new law, (which reduces the number of commissioners from five to one) is Lewis Nixon, who is promoted from the position of state superintendent of public works. Mr. Nixon will temporarily also fill the office of the other commissioner who, under the law, is to supervise the construction of subway and elevated railroads in New York City. This office has been declined by Col. William Barclay Parsons. Mr. Nixon was president of the East River Bridge Commission at the time of the construction of the Manhattan bridge (1901), and has been commissioner of public works for the Borough of Richmond. He was graduated from the United States Naval Academy at Annapolis in 1882 and is known as a naval contractor, and a shipbuilder. The old Public Service commission as it goes out of office, consists of only three members, Messrs. Travis H. Whitney, F. J. H. Kracke and Charles S. Hervey.

The Miami Valley Paper Manufacturers' Association, with a membership of 20 paper companies, has adopted resolutions opposing government ownership, operation or management of the railroads, and favoring the prompt enactment by Congress of remedial legislation as advocated by Director General Walker D. Hines.

Equipment and Supplies

Locomotives

The Dayton & Tennessee River Railway expects to purchase shortly a standard gage oil burning locomotive. This is a new line. Jake Benkovitz may be addressed at Dayton, Tenn.

Locomotive Deliveries Week Ended April 26

Locomotives were shipped to railroads under federal control during the week ended April 26, as follows:

Works	Road	Number	Type
American	C. M. & St. P.	2	USRA Mikado
	Penn. L. W.	12	USRA St. F.
	N. & W.	9	USRA Mallet
	N. Y., N. H. & H.	4	USRA Lt. Mount.
	A. C. L.	2	USRA 6W. Sw.
	Sou. Ry.	1	USRA Lt. Mount.
	C. B. & Q.	4	USRA 6W. Sw.
		34	
Baldwin	A. T. & S. F.	3	Mountain.
	C. C. & O.	1	Mallet.
	Penn. R. R.	1	Milkado.
	C. B. & Q.	1	Mikado.
	G. N.	2	8W. Sw.
	E. L. & E.	4	8W. Sw.
	C. R. & O.	1	USRA. Mikado.
		13	
Total		47	

Freight Cars

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., is in the market for 6 second-hand, standard gage, 36 or 40 ft. long, box cars.

Passenger Cars

Cars Built in Railroad Shops in March

The Railroad Administration has compiled the following statement of new cars constructed in railroad shops during the month of March:

Class of cars	Steel	Steel underframe	Steel center sills	Wood	Total
Passenger—					
Sleeping	..	..	..	..	..
Parlor	..	..	..	..	..
Dining	..	..	..	..	..
Passenger coach	..	..	..	..	..
Passenger and mail	..	..	..	..	..
Mail	..	..	..	..	..
Baggage and mail	..	..	..	..	..
Baggage	..	1	..	..	1
Express	..	..	..	..	..
Express and refrigerator	..	..	..	..	..
Horse express	..	..	..	..	..
Milk	..	..	..	..	..
Total passenger equipment	..	1	..	..	1
Freight—					
Stock	..	..	37	48	85
Hopper	..	..	3	112	115
Gondola	..	..	..	7	7
Flat	..	4	..	2	6
Coke rack	..	5	..	2	7
Work car	..	5	..	37	42
Miscellaneous freight cars	..	..	..	..	..
Caboose	4	25	6	2	37
Box	55	5	85	35	180
Refrigerator	..	..	..	4	4
Total freight equipment	59	44	131	249	483
Total passenger and freight	59	45	131	249	484

The Philadelphia & Reading has resumed the shipment of coal by water from Port Richmond, Philadelphia, to New England points. This traffic was discontinued last year when German submarines became active off the Jersey coast, and since then the company's barges have been loaded at Port Reading. In the New England service the Reading uses twelve tugs and 73 barges.

Supply Trade News

The **Joseph Dixon Crucible Company**, of Jersey City, N. J., has moved its Philadelphia, Pa., sales office from 1020 Arch street to the Finance building, South Penn Square.

F. J. Foley, recently appointed general sales agent of the **Railway Steel-Spring Company**, New York, as has already been announced in these columns, was born in Chillicothe, Ohio, on May 14, 1879. He entered the service of the Baltimore & Ohio at Newark, Ohio, as a messenger in 1892, and then until 1897, was telegraph operator and despatcher on various roads in the West. He entered the manufacturing department of the Pullman Company at Pullman, Ill., in 1897, where he remained until 1900, when he became connected with the Steel Tired Wheel Company, which company was subsequently absorbed by the Railway Steel-Spring Company in 1902. Mr. Foley has been successively manager of all of its various spring plants, and while he has occupied the position of general superintendent of the company since 1912, during much of this time he was closely associated with the sales department.



F. J. Foley

The R. W. Young Manufacturing Company, Chicago, has moved its offices from 14 East Jackson boulevard to Room 620, Railway Exchange building, Chicago.

E. R. Lewis, chief engineer of the Duluth, South Shore & Atlantic, with headquarters at Duluth, Minn., has resigned from that position to become associated with the editorial department of the Simmons-Boardman Publishing Company as an editor of the **Maintenance of Way Cyclopedia**. Mr. Lewis was born on November 20, 1869, at Raritan, N. J., and graduated from the University of Iowa in 1890. He began railway work in 1885 with the Missouri Pacific with which road he was consecutively axman and rodman on construction, levelman, clerk in the timber department, levelman on bridge location and from 1891 to 1892 division engineer. He was reclamation engineer in Wyoming from 1893 to 1895, and was then for two years division engineer on the United States Government Levees on the Mississippi River improvement work. From 1897 to 1901 and again from 1903 to 1905, he was with the state government railways in South Africa, first as locating engineer in Cape Colony, and during the last year as district engineer of maintenance at Maeking and Port Elizabeth.



E. R. Lewis

During 1901 and 1902, he was engineer in charge of construction on the White River division of the Missouri-Pacific, at Batesville, Ark., and division engineer on location and construction of the Fort Smith & Western in Oklahoma. He was made assistant engineer of the Keweenaw Central in 1905 and from August, 1906, to June, 1912, he was division engineer of the Michigan Central at Bay City, Mich. In July, 1912, he was appointed assistant to the general manager of the Duluth, South Shore & Atlantic, with headquarters at Duluth, Minn., and when this road was taken over by the government, he was made chief engineer, which position he held until his association with the Simmons-Boardman Publishing Company.

As briefly noted in last week's issue, **Frank J. Tone** has been elected president and **George R. Rayner** has been elected vice president of the **Carborundum Company**, Niagara Falls, N. Y. Mr. Tone, who now becomes executive head of this Niagara Falls company and its five foreign plants, was formerly works manager, having been in charge of manufacturing operations since the establishment of the works at Niagara Falls in 1895. He was previously engaged in electric railway work in Pittsburgh. He is well known for his work in the electric furnace field on artificial abrasives, refractories and silicon alloys, and is past president of the American Electrochemical Society. Mr. Tone graduated from Cornell University in 1891. **George R. Rayner**, the new vice-president of the Carborundum Company, was born in Springfield, Mass. He served for a period of time as a member of the sales force of the Hampden Wheel Company, and in June, 1898, he was appointed manager of the Chicago branch of the Carborundum Company. In August of the same year he was transferred to Niagara Falls, and was appointed secretary and general sales manager of the company. Mr. Rayner is a past president of the American Foundry & Supply Association and is a member of the board of directors of the Chamber of Commerce, at Niagara Falls.



F. J. Tone



G. R. Rayner

The Van Dorn Electric Tool Company, Cleveland, Ohio, has opened a Chicago office at 527 South Dearborn street, in charge of **William Cottrell**, sales manager.

L. V. Estes, Incorporated, industrial engineers and accountants, Chicago, has removed its offices from the McCormick building to the Century building, 202 South State street.

The **Van Dorn & Dutton Company**, Cleveland, Ohio, has opened branch offices at New York and Chicago. **Harry F. Keegan** will manage the Chicago branch, with office at 1241

First National Bank building, and his brother, **John Keegan**, will manage the New York branch, with office at Room 317, 30 Church street.

H. M. Davison, for the past 14 years connected with the sales organization of the Hayward Company, has left that company to become sales manager of the **Ohio Locomotive Crane Company**, Bucyrus, Ohio.

Frank E. Wade, president of the **Fairmont Gas Engine & Railway Motor Car Company**, Fairmont, Minn., and mayor of that city, died after a short illness at his home in Fairmont on March 3. He was born at Whitehall, Wis., March 6, 1862, and received his education in the Curtis Business College, at St. Paul, Mill. He received considerable engineering training under C. F. Loweth, now chief engineer of the Chicago, Milwaukee & St. Paul, and in 1881 entered the employment of the G. W. Sherwood Co., at St. Paul, as superintendent in charge of bridge construction. With this firm he was connected with the building of bridges along the Mississippi river. Later, he entered the employ of Fairbanks, Morse & Co., Chicago, as general salesman. From 1902 to 1906 he was interested in mining properties in the Black Hills district of North Dakota, returning to Fairmont in 1906, where he became interested in the Fairmont Gas Engine & Railway Motor Car Company several years later. Mr. Wade was also interested in many banking projects in the Northwest, and in Florida and Mexico lands.



F. E. Wade

The Standard Car Wheel Company, Cleveland, Ohio, has increased its preferred capital stock by $100,000 for the purpose of capitalizing the 1917-1918 enlargements to its plant, at Cleveland. No construction is contemplated at this time.

Donald M. Ryerson, who for the past two years has been in the United States Navy, has received his discharge from the service and has returned to his duties as vice-president in charge of purchases and sales of the **Joseph T. Ryerson & Son Company**, Chicago.

J. N. Ebling, recently returned from France, after having spent 13 months with the American Expeditionary Forces, has resumed his position as president of the **Railway Specialties Corporation**, New York. **D. A. Munro**, formerly secretary, is no longer connected with the corporation.

Edwin R. Webster, until recently assistant engineer on the Iowa, Dubuque, Des Moines and Dakota divisions of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has taken up private practice in general, civil, sanitary and structural engineering, with offices in the Webster building, Chicago.

The Chicago Pneumatic Tool Company, Chicago, has sold its Giant truck department, consisting of the Chicago Heights plant, stock of trucks finished and in process of construction, and the agencies and branches with their stock. The truck business will be continued by the purchasers, probably under the title of the **Giant Truck Corporation.**

Marcel E. Cartier, sales engineer of the **Joseph T. Ryerson & Son Company**, Chicago, with headquarters at Paris, France, has returned to France after a few weeks' visit in this country. He will be joined in Paris by **John H. Romann**, sales engineer of the same firm. Messrs. Cartier and Romann will have charge of the company's business in France, Belgium, Holland, Switzerland, Italy, Spain and Portugal.

The manufacturing facilities of the **U. S. Light & Heat Corporation**, Niagara Falls, N. Y., are to be increased by the addition of several buildings. The plant space now covers about nine acres and consists of 22 buildings. Recently, two structures of brick and concrete were added. Contracts have been let and construction is already under way on the new buildings which will be of reinforced concrete and brick.

Stone Franklin Company

The Stone Franklin Company has been organized to market the Stone Franklin car lighting system in the United States and Canada. This system was introduced into this country by the Franklin Railway Supply Company. The new company has elected the following officers: Joel S. Coffin, chairman of the board of directors; Ralph G. Coburn, president; C. E. Walker, vice-president; H. D. Rohman, chief engineer, and W. Truelove, secretary, with offices at 18 East Forty-first street, New York.

Ralph G. Coburn, president of the new company, has been identified with the Franklin Railway Supply Company. He was born at Boston in 1882, and graduated from Harvard in 1904. From 1904 to 1909 he was in the service of the American Glue Company, having charge of its western factories with his headquarters at Des Moines, Ia., and Chicago. On May 1, 1909, he opened the Chicago office of the Franklin Railway Supply Company as resident sales manager. On June 1, 1911, he was made assistant to the vice-president, in charge of eastern-southern territory, with headquarters at New York. In December, 1913, he was appointed eastern sales manager of the Franklin Railway Supply Company, which position he held until his appointment with the Stone Franklin Company.



R. G. Coburn

Charles C. Walker, vice-president of the new company, has had a broad experience in industrial manufacturing, sales and railroad work both in this country and abroad. He is a graduate of the engineering course of the University College, of Bristol, England. He served as an apprentice with the Bristol Railway Carriage Company and as junior assistant on the staff of the Newcastle Electric Supply Company. He later went to South America on the mechanical constructional staff of the Buenos Ayres & Pacific Railroad. While in South America he joined J. Stone & Co., Ltd., as technical adviser and sales manager with office in Buenos Ayres. In the latter part of 1912 he went to England to take charge of foreign sales in the main office at London. When war was declared he joined the British army and saw active service at the front for nearly three years. Receiving the order of the British Empire in February, 1917, he was returned to England to take charge of



C. E. Walker

the manufacture of anti-submarine devices, which is the work he leaves to take up the position of vice-presiednt of the Stone Franklin Company.

Harry D. Rohman, chief engineer of the Stone Franklin Company, New York, is a graduate of the technical schools of Zurich, Switzerland. Upon graduation he entered the works of the Oerlikon Electrical Construction Company, and in 1903 qualified as an electrical engineer, with experience in high and low tension and a. c. and d. c. work, especially electrical traction. Later he entered the service of J. Stone & Co., London, and in 1910 was appointed chief of the testing and experimental departments. In 1914 he was appointed chief assistant electrical engineer, and held that position until October 1, 1915, when he entered the service of the Franklin Railway Supply Company as chief electrical engineer, which position he held at the time of his recent appointment. Mr. Rohman speaks several languages and has had an extensive experience in all European countries, as well as in South Africa and the Belgian Congo. He has a broad experience in car lighting engineering, obtained by many years of active work in that field.



H. D. Rohman

Sale of Surplus Property by the Government

The general policies of the War Department in the disposal of surplus property, were enunciated by C. W. Hare, Director of Sales, to a committee representing the trade and technical papers of the country, at a recent meeting in Washington.

Mr. Hare stated that the War Department would dispose of its surplus materials by first consulting with the various branches of the government to ascertain what, if any, could be utilized in regular government work. After the government requirements have been satisfied, the producers of each particular commodity will be called into conference to advise with the Director of Sales as to the best method of getting the remaining amount of the commodity back into the usual channels of trade.

If, as has been the case in the disposal of copper, sulphur, lead, wool and lumber surplus stocks, the industry is able to contract with the government to dispose of its surplus within a reasonable length of time, paying the government the current market prices, it would be the policy of the government to make such an arrangement.

Should both of the methods mentioned fail, the surplus property will be offered to the general public through auction sales, or by sealed bids, or in any other manner which will enable the government to obtain the best prices.

A Sales Promotion Section has been established under the supervision of T. R. Elcock, Jr., to collect all information pertaining to the disposition of surplus property and to see that appropriate information reaches interested industries through the proper trade and technical papers.

Trade Publications

Explosives.—E. I. du Pont de Nemours & Co., Wilmington, Del., manufacturers of explosives, have issued an interesting and instructive eight-page booklet on the use of explosives in blasting concrete. It describes in detail new and economical methods of removing old walls, breaking up engine beds and excavating concrete foundations. One page is devoted to short descriptions of the actual application of explosives to work of this character and the illustrations show in a graphic way the contrast between the old and new methods.

Financial and Construction

Railway Financial News

Ann Arbor.—President Newman Erb announced recently that arrangements have been completed with the War Finance Corporation under which two alternative proposals are made to the holders of the company's $622,000 notes maturing May 1. The offers are made through F. J. Lisman & Co., as follows:

(a) Cash payment of 20 per cent of the face amount of notes with an extension of the balance for a further period of two years at 6 per cent plus a payment of 2½ per cent in cash on such extended portion.

(b) Extension of the full face amount of the notes for a further period of two years at 6 per cent interest, with a payment of 2½ per cent in cash on said notes.

In addition to their present collateral the notes are to be further secured by the deposit of $500,000 face value of the company's improvement and extension 5 per cent bonds. Noteholders wishing to avail themselves of either offer are asked to deposit their notes with the Empire Trust Company.

Delaware & Hudson.—See editorial elsewhere in this issue.

Missouri, Kansas & Texas.—James Speyer has been elected a director to succeed Horace E. Andrews, deceased, and Samuel E. Kilner, of New York, has been elected a member of the board to represent the English interests in the company.

New York Central.—The United States Supreme Court on Monday declined to review the decision of a lower court which had failed to sustain the petition of Clarence H. Venner, a stockholder, attacking the consolidation of the New York Central & Hudson River Railroad with the Lake Shore & Michigan Southern and nine other subsidiary railroads.

New York, New Haven & Hartford.—The list of stockholders of this road on April 16 shows that many of the large corporations, as well as individual stockholders of a year ago, have disposed of a large part of their holdings. Among the most important changes are the American Express Company, which this year held only 625 shares of stock, as compared with 20,324 in 1918, and the Adams Express Company, which reduced its block of 24,730 shares in 1918 to 14,730 in 1919.

Western Pacific.—Director General Hines has authorized this company to declare and pay a dividend of 1 per cent on its preferred stock. This is the dividend which would ordinarily have been paid on April 1.

Railway Construction

Sioux City Stock Yards Company.—Two new terminal yards costing approximately $150,000 will be built at Sioux City, Iowa, this spring to facilitate the delivery of livestock. The terminals will have a combined capacity of 600 cars.

Southern Railroad.—This road is carrying out improvements to the bridge near Spencer, N. C., over the Yadkin river, at mile post 330.8, to consist of four single track deck riveted steel spans about 160 ft. long for Cooper's E-60 loading. Repairs will be made to some of the present masonry; estimated cost for the entire work is about $170,000. The American Bridge Company has the contract for fabricating and erecting the superstructure.

Erie Railroad, the Baltimore & Ohio Lines and the Pennsylvania Lines West.—These roads have entered into an agreement with the city of Akron, Ohio, for the elimination of certain grade crossings in that city. The first step provided for in the agreement is the construction of a temporary structure over the East Miller avenue crossing to cost about $135,000. The whole of this work will cost about $4,000,000, to be divided on the basis of 65 per cent to the railroads and 35 per cent to the city.

ANNUAL REPORT

The Delaware and Hudson Company.

New York, N. Y., April 1, 1919.

To the Stockholders of
The Delaware and Hudson Company:

The following presents the income account of your Company for the year 1918, arranged in accordance with the rules promulgated by the Interstate Commerce Commission, with comparative results for the year 1917:

		Comparison with 1917.	
	1918.	Increase.	Decrease.
Compensation accrued under Federal Control (on basis of Standard Return) for possession, use and control of railway property of the Company and its leased and operated lines	$7,415,148.72	$1,805,761.95	.....
Other Corporate Income:			
Miscellaneous rent income	$137,197.51	.....	$649.88
Income from lease of road	102,822.97	.....	7,682.35
Miscellaneous non-operating physical property	22,501.10	6,529.18	.....
Dividend income	938,163.10	.....	54,243.17
Income from funded securities	225,232.83	59,272.77	.....
Income from unfunded securities and accounts	447,099.95	207,217.83	.....
Income from sinking and other reserve funds	162,168.13	53,005.80	.....
Miscellaneous Income	1,152,446.28	.....	1,560,079.49
Total Other Corporate Income	$3,187,631.87	.....	$1,296,629.31
Gross Income	$10,602,780.59	$509,132.64	.....
Deductions from Gross Income:			
Railway operating expenses	$95,770.45	$95,770.45	.....
War taxes	127,027.52	112,899.30	.....
Miscellaneous tax accruals	17,636.27	1,518.12	.....
Rent for leased roads	1,946,986.08	.....	$9,075.63
Miscellaneous rents	.....	.....	2,658.71
Interest on funded debt	2,938,318.26	12,959.92	.....
Interest on unfunded debt	142,728.01	.....	26,371.16
Miscellaneous income charges	619,521.57	602,077.47	.....
Total Deductions from Gross Income	$5,887,988.16	$787,119.76	.....
Net Income—The D. & H. Co. carried to general profit and loss	$4,714,792.43	.....	$277,987.12
Percentage to capital stock	11.09	.....	.66

FINANCIAL.

The capital stock of The Delaware and Hudson Company on December 31, 1918, was $42,503,000, there having been no change during the year.

The total funded debt on December 31, 1918, was $66,010,000, a reduction of $452,000 having been effected during the year by the purchase and cancellation of that amount of First Lien Equipment bonds through the sinking fund established in connection with their issue.

The sum of $395,040, being one per cent of the par value of the First and Refunding Mortgage Gold Bonds outstanding on June 1, 1918, was paid during the year to the trustee under the First and Refunding Mortgage, making the total paid to December 31, 1918, $2,846,150. This amount has been expended in additions and betterments to the mortgaged property in accordance with the trust agreement.

There was accumulated in the Coal Department Sinking Fund during the year, in accordance with the ordinance passed on May 9, 1899, and amended on May 10, 1910, $384,195.56, which has been applied to reimburse the treasury for coal lands and unmined coal in Pennsylvania.

The usual payment of $650,000, required under the terms of the First Lien Equipment Trust indenture, was made, making the total paid to date $7,150,000. This has been increased by accumulations of interest on balances and investments. During the year 1918, $1,288,703.65 was expended for new equipment, which was made subject to the indenture, leaving in the hands of the Trustee, securities and cash to the amount of $2,387,393.83.

During the year there was received from the United States, in partial payment of compensation for the taking over of the company's property in December, 1917, and its subsequent occupation and use by the United States, the sum of $4,190,000, and the company borrowed from the Railroad Administration, without security, $2,100,000; making a total of $6,290,000. The Interstate Commerce Commission has certified to the President, under the Act of March 21, 1918, that the average income of this company for the three years that ended with June 30, 1917, was $7,409,600.12. If the latter sum is all to which your company is entitled, which is by no means admitted, it has received $1,119,600.12, or 15.11 per cent less than it should have received to December 31, 1918.

The changes in Current Assets and Current Liabilities are largely due to the Government taking possession and control of the Company's railway property as a going concern, the Government collecting the major portion of the current assets and paying the major portion of the current liabilities.

COAL MINING DEPARTMENT.

The anthracite produced by The Hudson Coal Company during 1918, including the product of washeries, aggregated 9,059,228 long tons, an increase of 415,505 tons, or 4.81 per cent over 1917. The year's output was 11.82 per cent of the total output of Pennsylvania mines and washeries, which was 76,649,918 long tons. The number of breaker-hours required for the preparation of this coal was 55,191.

Throughout 1918, the United States Fuel Administration continued to urge the maximum possible production and those in charge of your operations made every practicable effort to meet their wishes. Underground development was carried on during the year and the properties were fully maintained.

The wages agreements effected during 1917 and explained fully in the report for last year made full provision, according to their terms, for the whole period to March 31, 1920. Nevertheless, during 1918, a further increase was urged upon the operators and after conferences in which the Fuel Administration, as representative of the Federal government, and the employees, participated, a supplementary agreement providing for very heavy increases in wages rates and effective from November 1, 1918, to the end of the war or until March 31, 1920, if peace is not declared prior to that date, was effected. In consideration of the effect of these increases in wages upon the cost of production, the Fuel Administration authorized an increase of $1.05 per ton in the price of pea coal and all larger sizes.

A statement, in regard to prices, issued by the Fuel Administration during February, 1919, when about to relinquish most of its functions, states plainly its conclusion that the prices of anthracite are still too low. The following is quoted:

"By his executive order of August 23, 1917, the President adopted as maximum prices for anthracite coal, the schedule of prices which had been acquiesced in by the industry while under investigation by the Federal Trade Commission under the so-called 'Calder' resolution of the Senate. This involved one price for the railroad-controlled coal companies and a price 75 cents higher for the individuals. With the exception of a reduction of 60 cents a ton in the prices for pea coal made October 1, 1917, and two adjustments to cover increases in miners' wages, the Fuel Administration allowed the prices fixed by the President to stand pending examination of costs such as were made in the case of bituminous coal.

"For the purpose of arriving at a fair increase in price to cover the increase in wages, recommended by the War Labor Board last October, an examination was made to determine the costs of the various anthracite-producing companies. The result of this examination showed that the general increases in the price of materials and labor had raised the cost of mining anthracite to such an extent that many of the companies were not receiving a fair return and that some producers of necessary coal were actually sustaining a loss on the sale of coal at the government prices, in spite of two increases allowed on account of advances to labor.

"At the time this situation was discovered every indication pointed to an early peace and it was deemed unwise to increase the maximum prices so near the time when, on account of the end of the war, price restrictions would, in the natural course of events, be lifted entirely.

"The above statement is made at this time, when price restrictions are about to be lifted, out of fairness to those companies who have patriotically kept up their production to war needs, even at a cost which resulted in many instances in a loss, not only by the individuals, but also by some of the railroad companies, so that the impression shall not exist that the government prices of anthracite coal in existence at the time of the lifting of restrictions were prices which the Fuel Administration had fixed on the basis of cost to the operators.

"Had the Fuel Administration's active control over maximum prices on anthracite coal been continued, the cost examination above referred to shows that it would have been necessary, on the basis of the present wage scale, to raise these maximum prices possibly as much as 50 cents a ton above those last fixed by the government in order to prevent financial embarrassment and perhaps the closing of companies producing a substantial per cent of the necessary anthracite output.

"Such a curtailment of production would eventually result in the demand exceeding the supply to such an extent as to increase the prices much higher than they would be if that supply were continued."

The increase in prices suggested by the Fuel Administration, relates solely to domestic sizes. The reduction in prices of other fuels which compete with anthracite steam sizes have necessitated some reduction in the latter. Therefore, an increase of fifty cents per ton in the price of domestic sizes will secure to The Delaware and Hudson Company and The Hudson Coal Company an increase of only 23.55 cents per ton of all sizes produced and marketed.

RAILROAD DEPARTMENT.

Late in December, 1917, the President of the United States conceived it to be his duty to take possession of substantially all railways engaged in interstate transportation, together with affiliated boat lines. Your railway property, and that of your system corporations in the United States, with the boats operated on Lake Champlain and Lake George, were included in this exercise of power and passed out of your control at noon on December 28, 1917. Since that date these properties have been operated, in accordance with the President's proclamation of December 26, 1917, and the Act of Congress of March 21, 1918, for the account of the United States, which have assumed responsibility for all expenses of operation, including maintenance, and all taxes, except war taxes, and have become liable to your company for whatever just compensation may be provided for in any contract negotiated in pursuance of the Act or otherwise determined in accordance with the statutes and the Constitution.

Under this condition the income account of your company for 1918 was not affected by the operating revenues, operating expenses or the ordinary exactions of the taxing authorities. Your interest in the operating results obtained by the Railroad Administration is, therefore, indirect and restricted to their implications as to operations after the anticipated restoration of the properties to your direct control.

Data supplied by the Railroad Administration indicate that the operating revenues of The Delaware and Hudson Company's Railway for 1918 amounted to $34,789,864, an increase of $4,800,465, or 16.01 per cent over 1917. Freight receipts increased $4,757,563, or 18.77 per cent and passenger receipts *decreased* $232,007 or 7.64 per cent.

Freight movement increased from 3,954,096,760 ton miles, in 1917, to 4,062,078,074 ton miles, in 1918; a gain of 107,981,314 ton miles or 2.73 per cent, while the average receipts per ton per mile increased from 6.41 mills to 7.41 mills, a gain of 15.60 per cent.

The increased freight movement was principally in anthracite, food products and munitions of war. The Railroad Administration assumed a control over routing of traffic never exercised by railways under corporate management, generally refusing to permit shippers to select routes or to choose the delivering lines and not only diverted to your railway, in order to relieve actual or threatened congestion at New York harbor, and elsewhere, considerable traffic that would otherwise have moved differently but, also, diverted from your lines numerous shipments which they would normally have carried.

Several changes, of which the following are considered the most important, contributed to the increase in the average receipts per ton per mile:

(1) Advances in freight rates applicable to anthracite moving to Canadian destinations, cement, stone, sand and similar commodities, asked for in 1917, were sanctioned by the Interstate Commerce Commission and permitted to go into effect on April 1, 1918.

(2) On June 25, 1918, the Railroad Administration began to enforce an increase of twenty-five per cent applicable to all classified freight with increases roughly corresponding to that percentage on all other articles. Coal rates, for both anthracite and bituminous coal, were advanced on a scale commencing with fifteen cents per ton as to rates formerly under forty-nine cents per ton and ending with fifty cents per ton as to all rates formerly $3.00 per ton or higher. Rates applicable to coke took a scale of advances running from fifteen cents to seventy-five cents per ton, the minimum increase applying where the former rate was forty-nine cents or less and the maximum where it was $3.00 or more. Rates on ores, except ex-lake ores, were increased thirty cents per ton; cement and stone rates, two cents per hundred pounds; lumber rates, twenty-five per cent but not over five cents per hundred pounds; grain rates, twenty-five per cent but not over six cents per hundred pounds; cotton rates, fifteen cents per hundred pounds. All commodity rates not specifically indicated were increased twenty-five per cent. The minimum charge for any less than carload shipment was raised to fifty cents; the previous minima had been twenty-five, thirty and forty cents for different kinds of shipments. The minimum charge for a car-load shipment was increased to $15.00, superseding many much lower minima. Before these increases were made, an estimate, based on 1917 traffic, indicated that they would add about $5,900,000 to annual gross receipts.

(3) The Railroad Administration adopted and has applied since May 1, 1918, a basis for the apportionment of interline revenues, differing from the former system resting upon contractual relations between connecting carriers. While primarily adopted to reduce the labor of accounting, this change is understood to have increased the revenue attributed to your railway under Federal operation. Other changes in interline relations, such as the discontinuance of adjusting overcharges and undercharges in settlements, are considered to have had similar results.

From data furnished by the United States Railroad Administration, it would appear that the movement of passengers over your lines *decreased* 13.45 per cent, the passenger mileage being 112,180,679 compared with 129,620,729 in 1917, and the average receipts per passenger mile increased 6.75 per cent from 2.342 cents in 1917 to 2.500 cents in 1918. Passenger train mileage was, however, reduced 22.57 per cent from 2,660,310 in 1917 to 2,059,990 in 1918, and passenger car miles 24.59 per cent from 13,080,801 to 9,864,219. Passenger receipts per passenger train mile increased 19.30 per cent from $1.14 to $1.36, and receipts per passenger car mile increased 22.49 per cent from 23.21 cents to 28.43 cents.

The decrease in passenger travel indicated by the foregoing is probably attributable to direct efforts to discourage unnecessary passenger movement, as well as to increased charges and withdrawal of facilities furnished under corporate management. One aspect of the reduction of facilities is indicated by the decrease in revenue from parlor and chair car service from $10,340 in 1917 to $3,954 in 1918.

The increase in the average rate per passenger mile resulted from the increase of the basic mileage rate to three cents, effective on June 10, 1918, modified, however, by the allowance of a special rate of one cent per mile to soldiers and sailors on furlough.

There was a considerable increase in miscellaneous transportation revenue, due to augmented switching charges, and incidental revenues were increased by a gain of 109.98 per cent in the demurrage charges collected, which amounted to $345,925 as compared with $164,744 in 1917. Prior to February 10, 1918, the original rate for demurrage of $1.00 per day, regardless of the length of detention, had been superseded by a rate of $2.00 per day for the first five days, with a rate of $5.00 per day thereafter. On the date named the rates were increased to $3.00 per day for the first four days, $6.00 per day for the next three days, and $10.00 per day thereafter. These increased charges had a beneficial effect in expediting the movement of cars when a shortage of equipment appeared imminent, and tend strongly toward the elimination of a misuse of facilities that is at all times wasteful.

Operating expenses amounted to $31,353,784, as compared with $23,449,953 in 1917, an increase of $7,903,831, or 33.71 per cent. Subtracting the increase in revenues of $4,800,465 leaves a *decrease* in operating income, before the deduction for taxes, of $3,103,366. Expenditures for maintenance of way and structures increased $1,215,554; for maintenance of equipment, $2,873,831; for transportation, $3,809,887.

The following figures, which should be understood as approximate only, indicate, as closely as computations now practicable permit, the relation of the various changes in operating conditions to the total increase of $7,903,831 in expenses:

Increase due to	Amount	Per cent of total increase	Per cent of total operating expenses
Higher wage rates	$4,345,025	54.97	13.86
Increased number of employees	1,700,000	21.51	5.42
Higher prices of materials	1,043,183	13.20	3.33
Increased quantities of materials and miscellaneous	815,623	10.32	2.60
Total	$7,903,831	100.00	25.21

Considerably more than one-half the increase in expenses, and almost one-seventh of the total operating cost of the year, is attributable, therefore, to higher rates of wages than were in force in 1917. The new scale of wages, with changes in hours and working conditions, which has had this result, was put in force by General Order No. 27 issued by the Railroad Administration. This order established eight hours as the basic day for all classes of labor and in many instances provided bonuses for time in excess of eight hours or in excess of the number of hours which had theretofore constituted a day. The following table shows some of the typical and controlling rates in comparison with those in force in 1917:

Employees	Rate per Hour, in Cents 1917	1918
Machinists	40	68
Boilermakers	45	68
Blacksmiths	43	68
Tinsmiths	43.25	68
Pipe fitters	43	68
Car repairers	27.25	58
Carpenters, locomotive and coach	30 to 34	68
Car inspectors	29.75	58
Laborers	23	35
Section foremen	77.50*	102.49*
Sectionmen	22.5 to 23.5	40
Carpenters, bridge and building	30	53
Signal repairers	34	68
Station laborers	23	35.5
Engineers:‡		
Freight	63	73
Passenger	74	87
Mixed	62.5	73
Yard	54	67
Firemen:‡		
Freight	41.5	56
Passenger	45	63
Mixed	40.5	52.6
Yard	34	47.2
Conductors:‡		
Freight	52.6	63
Passenger	68.7	83.5
Mixed	58	77
Yard	48.7	63.6
Brakemen:‡		
Freight	35	49
Passenger†	41	59
Mixed	39	55
Yard	45	60

* Dollars per month. † Includes other trainmen.
‡ Averages for all classes of engines and service.

Increases of $25.00 per month over the pay received on January 1, 1918, with a minimum of $87.50 per month, were also granted to all employees who were receiving on January 1, 1918, prior to the application of General Order No. 27, a basic rate of $62.50 per month and devoting major portions of their time to clerical work of any character, including not only clerks, but also train announcers, gatemen, checkers, baggage and parcel-room employees, callers for train and engine crews, etc. Substantially all the increases noted were made retroactive to January 1, 1918, thus requiring heavy payments to adjust the wages actually paid during the early months to the new standards.

Apparently the operating expenses thus stated are still subject to increases on account of further wage increases which are under discussion, and that are likely to be made retroactive at least to September 1, 1918. These projects include an increase of approximately 15 per cent in favor of engine and train crews with, in addition, provision for payment at one and one-half times the standard rates, instead of proportionately, for all time in excess of eight hours, and an increase in favor of telegraphers.

INDUSTRIAL DEPARTMENT.

Fifty-nine new industries were located on the tracks of your Company during 1918, as compared with one hundred in 1917. Twenty-six extensions to old industries and seventeen industrial side tracks were constructed; the corresponding numbers for 1917 were forty-nine and thirty-eight, respectively. During the year the Federal management cancelled all memberships maintained by your railway in commercial organizations, eliminated substantially all advertising of the Industrial Department and practically suspended its normal activities. The work permitted related almost exclusively to agricultural development, in which some progress is reported.

ADDITIONS AND BETTERMENTS.

One of the early decisions of the Railroad Administration was to provide for a reconsideration, by an agency of its own, of every program for additions and betterments that had been approved and adopted by the owners of the properties which had been taken under Federal control. As applied to your railway, this reconsideration resulted in determination to continue most of the work in progress at the end of 1917, with the exception, however, of the new third track between Schenevus and Richmondville Summit, which was under construction as a principal feature of the general grade revision between Oneonta and Mohawk Yard. The omission of this portion of the plan for adapting this part of your railway to the movement of trains of heavier tonnage would so seriously reduce the benefits obtained by heavy capital expenditures at other points, in addition to rendering useless the considerable outlay upon the particular project, that it was deemed necessary to request a rehearing, which was accorded. Upon this rehearing the former action was reversed. But before this occurred the contractors had been paid and the work stopped. The completion of the work during 1918 was, therefore, held to be impracticable, and nothing was done toward its resumption. To the end of 1917 the total expenditure on this third track was $414,555.74, and the amount paid in the settlement with the contractors when the work was suspended was $125,770.09, so that it now represents a capital investment of $540,325.83, all of which remains idle and unproductive. The suspension of this improvement has also involved losses in the necessary adjustments with contractors and the natural deterioration resulting from the exposure to erosion of unfinished grading. This interruption of the development program led to the postponement of the grade reduction between Cobleskill and Barnerville, which was authorized in 1917, but could not be placed in operation until the completion of this section of the third track. The Railroad Administration also determined not to continue during 1918

the erection of new stations or the elimination of grade crossings in accordance with the ordinary program for the general development of your property.

From Nineveh to Windsor, a distance of nine and one-half miles on the Nineveh Branch, a new second track was completed and placed in operation during June. During the year $305,031.63 was expended on this work, of which $297,373.20 was charged to cost of property and $7,658.43 to operating expenses. A new second track between Lanesboro and State Line, a distance of 2.3 miles, was undertaken and the grading completed, at a cost of $93,122.26, of which $86,522.21 was for new capital and $6,600.05 for operating expenses. Bridge-work and track laying should be completed early in 1919.

The new third track between Oneonta and Cooperstown Junction, six miles, and the revision of grades between Schenevus and Cooperstown Junction, nine miles, referred to in last year's report, were finished during 1918. The cost, $540,325.83, included $511,775.28, chargeable to cost of property and $28,550.55 chargeable to operating expenses.

The enlargement and rearrangement of the Carbondale Yard, in progress for several years, was substantially advanced and placed in operation during the year. Changes yet to be made at the southern end, near Dundaff Street, will be undertaken when the grade crossing at that point can be eliminated. An enlarged yard office is now under construction. This yard now has a capacity of 3,139 cars, an increase of substantially 50 per cent over the former capacity of 2,100 cars. The expenditure during the year was $89,481.38 of which $66,317.97 was a capital expense and $23,163.41 a charge to operating expenses.

At Whitehall, three sidings with capacity for eighty cars each, were completed during October, providing storage space that was greatly needed. The expense was $41,925.22, of which $39,929.45 was charged to cost of property and $1,995.77 to operating expenses.

At Rouses Point additional yard tracks are under construction. The grading was practically completed during October and they should be in service early in 1919. The expenditure was $24,405.95.

At Fort Edward additional land was purchased, the engine house enlarged, a new ash pit and coaling platform constructed, and a rearrangement of tracks is in progress. The expenditure of $18,856.69 was distributed in the sum of $17,970.19 to cost of property and $886.50 to operating expenses.

At the Colonie shops, the installation of two new 400 horse-power boilers, mentioned in 1917, was completed at a total cost of $22,956.18, of which $22,922.93 represents new capital and $33.25 operating expenses.

The addition to the general office building at Albany was completed during 1918 and occupation began in May. The whole building, modern in construction and equipment, and suitable for your corporate purposes, now supplies office space of 189,079 square feet. The addition to its cost during 1918 was $50,516.19.

Other improvements to your property include new water tanks for locomotives, with capacity for 100,000 gallons each, at Central Bridge and Rouses Point; a restaurant and women's rest-room at Colonie shops; a "Wye" track for turning locomotives at Delanson; a new freight station at Mechanicville, begun before 1918; in addition to the freight station at Glens Falls; reconstruction of heating systems in round houses at Wilkes-Barre, Green Ridge, Carbondale, Oneonta, Mohawk, Whitehall and Rouses Point and in other buildings at Green Ridge, Carbondale and Oneonta, this reconstruction to be completed early in 1919.

Heavy repairs to 3,434 freight train cars, including the application of Economy draft arms, 5 x 7 couplers and heavy friction springs, referred to in the report for 1917, were continued during 1918 and are approximately two-thirds completed. The equipment of two hundred steel underframe flat cars with temporary sides and removable drop-ends was completed. All freight train cars must be equipped with safety appliances approved by the Interstate Commerce Commission not later than September 1, 1919; of 18,794 cars, 18,534, or 98.62 per cent, have received this equipment. A statute requiring the equipment of locomotives with electric headlights by July 1, 1920, was the occasion of the equipment in that manner of 123 locomotives. By the same date all cabooses operated in New York must have eight wheels and steel under-frames; 84 out of 212 such cars have received this equipment and 72 are to be provided for during 1919. The conversion of 135 wooden underframe gondolas into company service cars is in progress and about 38 per cent completed. Application of "Z" bar reinforced ends to 500 box cars is in progress and about one-third completed, and raising of the sides and ends of 500 low-side gondolas is proceeding and about 82 per cent completed.

FEDERAL VALUATION.

The valuation of your railway property in accordance with the statute of 1913, by the Interstate Commerce Commission, progressed during the year somewhat more slowly than in 1917. The depletion of the office force of the Commission owing to military necessities is assigned as the reason for reduced effort. Most of the field work, except the building and equipment inventory and the appraisal of lands has been completed. The completion of all inventories before the end of 1919 and a final report from the Commission during the ensuing twelve months are considered possible—perhaps probable. The cost of this work, to the end of 1918, amounted to $362,342.15, of which $302,934.56 was charged to corporate operating expenses to December 31, 1918, and $59,407.59 to the operating expenses of the Railroad Administration during 1918.

LITIGATION.

In the suit of Katherine S. Weld and others, for an accounting of royalties under the lease of coal lands made to the company in 1859 by Henry B. Rockwell, the decision of the referee, on which judgment was entered on September 24, 1918, awarded the sum of $429,153.60 to the plaintiffs. Appeal was taken but, pending the appeal, a proposal for settlement was received and negotiations are in progress which may lead to a settlement.

The proceeding instituted by The Rensselaer and Saratoga Railroad Company, referred to in the report for 1917, against the United States Collector of Internal Revenue and your company for the purpose of requiring the deduction from the dividend payments which your company is required to make to the stockholders of the former corporation, as a part of the rental for its property, the amounts due to the United States as income tax thereon, was dismissed by the United States District Court. Appeal to the Circuit Court of Appeals was taken and has been argued and is now awaiting decision.

The action begun in August, 1916, by the Mechanicville and Fort Edward Railroad Company, a subsidiary of your company, against the Fitchburg Railroad Company and its lessee, the Boston and Maine Railroad Company, to determine the title to the railway and right of way extending northward from Mechanicville, in Saratoga County, and decided adversely to your company by the trial court, is now awaiting argument on the appeal to the Appellate Division.

In the suit of The Ticonderoga Railroad Company against your company for an accounting under the contract for the operation of the former, the referee determined the amount of the fund to be accounted for as of December 3, 1914, to be $186,221.31. An appeal from this award has been taken by your company and there is a cross-appeal on the part of the plaintiff. Determination of these appeals by the Appellate Division is anticipated during the year 1919.

GENERAL REMARKS.

The temporary relinquishment of possession of your railway property to the Federal Government suggests a review of the eleven years' period of development which began in 1907. Within a brief period which ended with the year 1906 or early in 1907, there had been acquired in your interest additional coal lands in Schuylkill County of large extent, your present Canadian railway holdings, as well as additional railway properties in New York, and your interests in street and interurban electric railways, greatly expanding your several interests. This expansion had not been currently financed, and adequate provision therefor, as well as for future development, was the first problem which confronted your present management. It was met by the issue of the First Lien Equipment Bonds of 1922, bearing date as of July 1, 1907, and the First and Refunding Mortgage Gold Bonds of 1943, issued as of July, 1908. These provisions made it practicable to consider the improvement and better adaptation of your railway to the economic potentialities of the communities and industries which it serves.

While your company was the first to operate a steam locomotive on the American continent, and in 1917 was probably the oldest American corporation operating a railway under its original charter, its common carrier functions were, until a few years ago, secondary to its function as a producer of fuel. Its railway system was inaugurated and expanded as an agency for the marketing of its anthracite, and the common carrier duties which it undertook were merely incidental to this principal purpose. As recently as February 19, 1906, the Supreme Court of the United States, deciding the matter of *Interstate Commerce Commission* v. *Chesapeake & Ohio Railway* (200 *U. S.* 361), determined that a corporation which was at once a common carrier and an extensive owner of coal lands could not be charged with unjust discrimination in respect to any transportation undertaken for its own account as a producer, and although the commodities clause of the Hepburn law was made by its terms to take effect on May 1, 1908, it was at first held to be unconstitutional (164 *Fed.* 215) and did not become actually effective until after the decision of the Supreme Court in *United States* v. *Delaware and Hudson Company* (213 *U. S.* 366), which was rendered on May 3, 1909. This decision sanctioned the relations then existing between your railroad and coal departments although for the first time it was held, in that case, that your company is a "railroad company" within the intendments of such a statute (213 *U. S.* 417-8). From the date of the last mentioned decision it became desirable to develop the common carrier functions of your railway upon lines wholly independent of your interest as a coal-producing enterprise.

Modernization of motive power began in 1907 with the adoption of a new and heavier type of freight locomotive, known as the E-5 locomotive, which is of the consolidation type with a weight on the drivers of 227,000 pounds. Ninety of these locomotives are now in service. In 1910, six Mallet articulated locomotives were purchased and fifteen are now owned and in use. The following locomotives have been bought since 1906:

YEAR	NUMBER	TYPE
1907	18	E-5
1908	30	E-5
1910	6	Mallet
1911	4	Mallet
1911	6	Ten-wheel
1911	1	Oil-burning consolidation
1912	12	E-5
1912	3	Mallet
1913	15	E-5
1914	15	E-5
1914	10	Pacific
1915	1	E-6
1917	2	Mallet
1918	20	E-6 (Ordered in 1917)

The E-6 locomotive, shown above, purchased in 1915, was for experimental purposes, and it was in consequence of this experimentation that twenty more of the same character were ordered in 1917 and received during 1918. Commencing in 1911, specifications for new locomotives required that they should be equipped with superheaters. In 1914 the equipment with superheaters of the locomotives purchased prior to the adoption of this policy was begun and prosecuted as rapidly as the engines could be spared from service or as they were shopped for general overhauling. The following authorizations for equipment with superheaters were made and largely completed before the end of the year 1917:

YEAR	NUMBER	TYPE
1914	10	E-5 Locomotives
1915	38	E-5 Locomotives
1915	6	H Locomotives
1915	4	E-3-A Locomotives
1915	4	D-3 Locomotives
1916	12	E-3-A Locomotives
1917	30	E-3 and E-3-A Locomotives

By the end of 1917 this work had resulted in greatly increasing the efficiency of the power equipment, enabling the movement of equal tonnage at materially lower operating cost. The increase in tractive power of locomotives between 1907 and 1917 affords a measure of the augmented efficiency which had been obtained.

YEAR	AVERAGE TRACTIVE POWER OF ALL LOCOMOTIVES IN POUNDS
1907	28,876
1917	38,616
Increase, per cent	33.73

At the beginning of 1907, the number of freight cars in service was 13,785; on December 1, 1917, the number was 18,302, an increase of 32.79 per cent. The mere numbers fail, however, to state the actual increase in car capacity. The increase in the number of cars has been by the addition of larger cars and has been accompanied by the retirement of many cars which were below average capacity and their replacement by cars of greater than average capacity. The average capacity of all freight cars in 1909 was 35.77 net tons, while the average of the year 1917 was 37.69 tons, an increase of 5.37 per cent. In order further to increase the efficiency of freight equipment, a program of substitution of steel underframes for wooden underframes was inaugurated in 1909 with an authorization covering 500 cars. This was followed in 1910 by an authorization of 400 cars; in 1911, 400 were authorized; in 1912, 800, and in 1917, 1,000. On December 1, 1917, there were, as already stated, 18,302 freight cars, of which 8,543, or 46.7 per cent, had steel underframes and 9,888, or 54.0 per cent, had each a capacity of 85,000 pounds or greater.

The principal increase in passenger equipment after 1906 was by the purchase, in 1916, of twenty-four steel passenger cars and three steel mail and baggage cars. In addition a number of baggage and mail cars were equipped with steel underframes. The steel passenger cars added in 1916 are provided with smoking compartments and their use frequently enables a single car of this type to perform services for which two cars of the former type were necessary.

Additional main tracks constructed during the period under review include the following:

Delanson to Schenectady.—A second track, over a new line, was constructed between these points during 1907 and 1908. The location was determined with relation to southbound grades and it is operated as a southbound track, thus materially reducing the grade against southbound traffic between these points and greatly increasing the capacity of the railroad over this distance.

Watervliet to Waterford Junction.—A second track between these points was authorized in 1907 and the work was prosecuted during 1907 and 1908 and finally completed early in 1910. Owing to the heavy passenger traffic between Albany and Saratoga, traffic between these points had formerly been greatly congested and this improvement greatly facilitated operation.

Green Ridge to Carbondale.—Third and fourth tracks between these points were authorized during 1907 and completed in 1909. The frequent passenger service between Scranton and Carbondale and the large volume of coal traffic originating at breakers in this territory had rendered operation with the double-track line extremely difficult. The two added tracks have largely eliminated delays, and enable the railroad to handle increased tonnage between these points.

Binghamton.—A second track, one mile long, was constructed on Bevier Street, in this City during 1911. This permits freight trains to advance out of the Binghamton yard without blocking the main track or interfering with yard operations and has materially augmented efficiency at this point.

Schoharie Junction to Delanson.—As part of a plan of grade revision between these points, a third track became necessary in order to permit slow-moving freight trains to advance without interference with faster moving passenger trains travelling in the same direction. This track was put into service on December 1, 1916, and has materially benefited operation.

Oneonta to Schenevus.—Construction of a third track between these points was authorized in 1917 and a portion between Oneonta and Cooperstown Junction was put in operation during October, 1917. This additional track was also provided for as a part of the general plan for reduction of grades between Oneonta and Richmondville Summit. The ruling grade between the two points last named is now 0.8 per cent; when the plan is complete the maximum grade will be 0.5 per cent. This work was not entirely completed at the end of 1917, but the additional track now enables heavy freight trains from the Oneonta yard to advance a considerable distance without interference with passenger trains and has greatly improved yard operations.

Schenevus to Richmondville Summit.—A third track with a maximum grade of 0.5 per cent between these points is a part of the general plan for grade revision and was partly constructed during 1917.

Nineveh Branch.—A second track on this branch was authorized late in 1917 and construction has continued during 1918. No benefit to operations resulted from this work prior to January 1, 1918. All the heavy coal trains moving out of the Anthracite Region are operated over this branch and the single track heretofore existing was the cause of serious congestion in the past. The second track was necessary in order to increase the capacity of this portion of the road and thus to remove difficulties which tended to restrict the capacity of the whole system.

The Wilkes-Barre Connecting Railroad Company was organized in 1912, by the joint action of your company and the Pennsylvania Railroad Company for the purpose of establishing a connection between the lines of the respective companies, near Wilkes-Barre. Right of way was acquired and construction commenced during 1913, and the line was opened for operation, although not entirely completed, on March 29, 1915. This line is used to handle traffic which was formerly moved, under trackage rights, over a line owned by the Lehigh Valley Railroad Company and in addition to saving in expenditure, has greatly expedited the movement of trains. The question of grade crossings, which promised to be a very troublesome one, has also been avoided by this construction. Prior to Federal control it was operated by your company under an agreement with the other parties in interest. The cost of the one half interest secured by your company has been $1,131,838.65.

From 1906 to 1917, improvements in yard facilities were made at many points upon the system. The yard at Oneonta was remodeled and enlarged during 1906. At Glenville, N. Y., a new yard was constructed in 1907. The yard at Binghamton was enlarged in 1908. During 1909 new yards were constructed at Bluff Point, N. Y., and Jermyn, Pennsylvania, the latter for use as an interchange yard with the New York, Ontario and Western Railway. The yards at Plattsburg and Rouses Point were enlarged during 1912 and that at Mechanicville was remodeled and enlarged in 1913.

A principal improvement of this character, in progress throughout the years from 1913 to 1917, inclusive, was the reconstruction and enlargement of the yard at Carbondale. This yard is one of the most important facilities in the operation of the Company's railroad as it is located at the concentration point of all northward bound anthracite passing over the lines, and the center of distribution for empty cars returning to the collieries for reloading with coal. Carbondale is located at substantially the extreme north end of the Lackawanna Coal Basin, only one anthracite mining operation, that at Forest City, Pennsylvania, being further north. All but one of the mines of The Delaware and Hudson Company's system are within the region between Plymouth and Carbondale, in the Susquehanna and Lackawanna Valleys, and are well distributed over the intervening distance of about thirty-eight miles. Empty cars, destined to the anthracite mines, are taken out of the Carbondale yard by road engines which deliver them at the breakers and, picking up the cars which have been loaded, return to the yard. In the yard, these loaded cars are sorted and arranged in trains with regard to convenience in delivery at destination and junction points. In addition there is handled in this yard, a considerable tonnage of general freight, other than anthracite, principally consisting of traffic moving in car loads, which is interchanged with the Pennsylvania Railroad at Wilkes-Barre. This yard is also used for handling business of the Erie Railroad from and to anthracite mines in the same region. That company owns the railroad extending northward from Carbondale, which is used by The Delaware and Hudson Company as far as Jefferson Junction, under a long term agreement, and in consideration of the payment of trackage charges. The Erie Railroad has no direct connection with these mines over its own rails and has, therefore, arranged to use The Delaware and Hudson Company's railroad between Carbondale and Avoca, handling thereover a considerable tonnage which passes through Carbondale yard and is there sorted and arranged in trains substantially as this Company's own traffic is handled. This yard was established in 1872 and successively enlarged during 1888, 1893, 1895 and 1899. The growth of the work there accomplished is indicated by the following which shows the average tonnage, during each period, moving northward out of this yard on which this Company has paid trackage charges to the Erie Railroad for use of the Jefferson Branch.

Period.	Average Tons Moved Per Year
Years 1874 to 1879	289,750
Years 1880 to 1889	1,076,164
Years 1890 to 1899	1,975,219
Years 1900 to 1909	4,713,499
Years 1910 to 1917	8,621,985

Previous to 1910 the expansion of this yard had been by the addition of new tracks wherever the topography permitted and there had been, apparently, no well considered plan of development. It was not properly co-ordinated with the balance of the system, its capacity was insufficient and it was not economical in operation. The tracks were too short to hold entire trains. The Erie Railroad had also constructed a yard, of limited capacity, on land leased from this Company and this yard was of inadequate capacity and unsatisfactory design. In these circumstances a study of the situation, locally and as related to the entire operation of the Company's railroad, was undertaken in 1910 and a comprehensive plan, contemplating progressive development over a considerable period and with the minimum interference with regular operations was ultimately formulated and adopted.

The initial step was the reconstruction of the engine terminal in co-ordination with the general plan for the development of the whole railroad. The old roundhouse, turntable and coal and ash-handling facilities were too small for the motive power contemplated by this development, particularly for the Mallet locomotives intended for use as pushers on the heavy grade immediately north of Carbondale. These Mallet locomotives are ninety-two feet long, while those for which provision had formerly been made were about seventy-three feet long, and the weight of this new power exceeded that of the old by about fifty per cent. This part of the work was authorized in 1910 and completed during 1911. At the time of this authorization, the officers were empowered to purchase the land necessary to the enlargement of the yard and purchases were begun, but the whole area necessary was not immediately obtained owing to difficulties in dealing with certain of the owners and those incident to the elimination of certain grade crossings. A further step in the program, the construction of storage tracks for locomotives, car repair tracks and the rearrangement of water-tanks and water supply lines was completed in 1914. The earliest authorization covering reconstruction of the actual yard itself was granted during October, 1914, and covered the construction of two main tracks beyond the western limits of the yard as it then existed and of certain new tracks within the existing yard. To obtain space for the new tracks it was necessary to level a large section of the hill lying west of the yard and to remove the old yard of the Erie Railroad. The latter was provided for by permitting the Erie to use the new yard upon paying part of the cost of its operation and maintenance. This work was prosecuted throughout the whole of the calendar year 1915. The new tracks were not available for use during that year and the work interfered somewhat with the operation of the old facilities as the material taken from the hill had to be moved southward through the southern end of the yard and about one and one-half miles on the main tracks to "Duffy's Field," where it was planned to erect a new plant for the storage of anthracite. The new coal storage plant at "Duffy's Field" was a part of the general plan of reconstruction. In 1899, a storage plant for coal had been provided on a location just north of the yard as it then existed and east of the Lackawanna River. To straighten the channel of the river in order to permit the lengthening of the yard tracks it was necessary to utilize this space and therefore to remove and reconstruct the storage plant upon another location. Authority to do this was issued in May, 1915, and the work completed during December, 1916. Every effort was made to accomplish this removal with the minimum interference with the use of the plant but a heavy reduction in its capacity during a portion of the time was unavoidable. As an incident of this yard improvement it was necessary to eliminate a grade-crossing by constructing a highway bridge over "Simpson's Road." The final plan of the yard required two additional main tracks across this road for which the consent of the local authorities was required. The highway was occupied by a street railway track and the traffic on both the street railway and on the highway was heavy so that the continuance of the grade-crossing, with additional railway tracks, was considered, by the authorities, exceedingly dangerous. An overhead bridge, to carry the street railway and the highway, was constructed under an agreement by which its cost, together with that of the necessary approaches, was unequally divided by the Scranton Railway Company, and The Delaware and Hudson Company. The portion borne by this Company was properly a part of the cost of the yard improvement. The work was completed and the overhead structure placed in use on December 7, 1917.

The completion of the yard improvements was provided for by an authorization issued during October, 1916, and the final work progressed throughout the whole of the year 1917. The new main tracks were placed in operation in October, 1917, and some of the new yard tracks became available during the preceding summer. Actual benefit did not accrue from these heavy outlays until the new main tracks could be utilized and full use of the improved yard could not be attained during the brief remainder of the calendar year. During December, 1917, however, the new facilities began greatly to facilitate the operation of the property as a whole. The cost of these improvements to the Carbondale yard exceeded $1,500,000.00. Before the work began in 1910, the yard had an approximate length of 5,000 feet and an aggregate capacity of 2,100 cars. The new yard turned over to the Railroad Administration on January 1, 1918, has an extreme length of 7,200 feet and capacity for 3,139 cars, an increase in car capacity of 49.48 per cent. This, however, by no means measures the gain accruing from this expenditure. Not only has nominal capacity been greatly increased, but an uneconomical yard, difficult and costly to operate, has been replaced by one thoroughly modern and efficient in design and arrangement. The relation of the old yard to the railway system was such that its inadequacy was reflected over the entire system; that of the enlarged and improved yard is such that its operation increases the capacity and efficiency of the entire railroad.

The development of the railroad required new locomotive shops. Previous to 1911 heavy repairs to locomotives were distributed between shops at Carbondale, Oneonta and Green Island. With the large increase in the number of locomotives and in the size and weight of the power units these shops became inadequate. It was considered necessary to locate shops of much greater capacity at a single point as near as possible to the center of locomotive distribution. Such shops were erected at Colonie, a short distance north of Albany, during 1911 and 1912. The design of these shops was new and presents many novel features in shop economy. A bay for the transfer of engines by cranes takes the place of the old style transfer-table and is located in the centre of the shop. It has bays on both sides for erecting pits, behind which are bays for machine tools, the light tools being placed in galleries. When first made available for use these shops were considered to be the most advanced and complete of their kind in the country. In order to provide for their erection, the Company acquired 111.87 acres of additional land, of which about 104 acres are occupied by building and track development and the balance available for expansion. The buildings are so located that they may be doubled in size by end extension. The total cost has been $2,592,856.63. The new shops have effected a considerable saving in expense by (1) concentrating this kind of labor under proper and unified supervision and (2) by reducing the time required for repairs and more promptly returning locomotives to service. In connection with this development, the company provided a yard for use in connection with passenger service of the Albany district, including facilities for the repair of passenger and freight cars.

Proper handling of the larger and heavier locomotives, particularly at the ends of runs, has made necessary the replacement of many of the

older enginehouses by structures of greater size, many of the old turntables were too short and of insufficient strength, while ash-pit and coaling facilities, adequate under former conditions, became obsolete. At Oneonta a new roundhouse with fifty-two stalls was built in 1906, together with a 75 foot turntable and a new coaling trestle. In 1912, new ash-pits were built as those in existence were too short and caused serious delay. In 1916 this roundhouse was further enlarged and in 1917 a plant for the storage of locomotive fuel was erected in order to avoid delays in times of coal shortage. Binghamton was provided with a new 10-stall round house, 90 foot turntable, modern ash-pit and mechanical locomotive fuel station in 1910. At Carbondale a new 41-stall roundhouse, a 90-foot turntable, ash pits and coaling station were provided in 1911. A 30-stall roundhouse, 90 foot turntable, ash-pits and locomotive coaling trestle were built at the Colonie shops in 1911. In 1913, a new 5-stall roundhouse with a 160-foot turntable, ash-pits and mechanical locomotive fueling plant were erected at Mechanicville. All these structures are of the most modern design and capacity sufficient for the longest locomotives.

Motive power of greater capacity of course increased the normal length of trains and passing sidings which sufficed with lighter power were rendered inadequate. Additional sidings of sufficient length for the heaviest trains became necessary in the co-ordination of a railroad of developed capacity. New sidings were constructed at Schenevus, Sidney, Wells Bridge, Bainbridge and Cobleskill in 1909; at Castleton and Cambridge in 1910; at Fort Edward, Summit (two), Fort Ann (two) and Ballston (two) in 1911; at Montcalm Landing, Crown Point, Waldhams and Canada Junction in 1912; at Cobleskill and West Richmondville in 1915. Old sidings were extended, during the same years and the year 1916, at East Worcester, Rupert, West Pawlet, Tunnel, Schenevus and East End.

The earliest effort, on a comprehensive scale, to obtain more favorable grades, was the reduction of the grades against north-bound traffic between Nineveh and Oneonta. This was accomplished in 1911 with the result that the former maximum of 0.76 per cent was replaced by a maximum of 0.3 per cent. With this reduction it became possible to move full trains from Carbondale to Oneonta without, in any way, breaking the load and for one locomotive to haul from the summit north of Carbondale to the end of the division any train which can be taken to the summit by a single locomotive reinforced by a Mallet pusher. Work was next undertaken upon the line between Oneonta and Delanson, the ultimate object in view being the attainment of a maximum of 0.5. It was practicable, however, to adjust the program in such a way as to obtain, as a preliminary step, a maximum of 0.8. The adverse grades formerly encountered ran as high as 1.16 per cent. This work was in progress during 1916, the work of that year including the sections between Worcester and Richmondville Summit, Cobleskill and Barnerville and Schoharie Junction and Delanson. These portions of the improvement became available for service on December 1, 1916, and have resulted in considerable economies since that date. The completion of this work so as to obtain the 0.5 per cent maximum, in accordance with a plan developed after a great deal of study, was authorized in 1917. It will require revisions of grades on the sections between Oneonta and Schenevus and Cobleskill and Barnerville and the construction of a new line on an entirely new location from Schenevus. During 1917, part of the work between Oneonta and Schenevus was accomplished and the new line from Schenevus to Richmondville Summit was placed under construction but not completed. With the completion of this phase of the work, the tonnage capacity of locomotives on the Susquehanna Division will be materially augmented, thus considerably reducing operating expenses. With the maximum of 0.5 attained it will be possible to haul trains of the maximum tonnage from Oneonta to Schenectady with the use of a pusher locomotive between Schoharie Junction and Esperance only.

The grade revisions referred to are all upon the Susquehanna Division which extends from Binghamton to Albany and Mechanicville. This is the area of greatest traffic density for the railroad as it is traversed not only by the greater portion of the anthracite shipments originating at the mines adjacent to its tracks and the bituminous coal and general merchandise traffic interchanged with the Pennsylvania Railroad and Central Railroad of New Jersey at Wilkes-Barre, but also by heavy general merchandise and bituminous coal traffic interchanged with the Erie and Lackawanna railroads at Binghamton, and with the Lehigh Valley at Owego. This combined tonnage is moved to Oneonta on through trains either from Binghamton or from the Pennsylvania Division via Nineveh. At Oneonta the traffic is sorted and moved northward, through Delanson, to Albany or Mechanicville or through Saratoga into Canada. Local business, while considerable, constitutes a relatively small proportion of the total tonnage and under normal conditions the northbound business greatly exceeds that moving southward. Consequently there is a heavy southward movement of empty cars, the preponderating portion of the anthracite cars going back to the coal region without loads. Except under extraordinary conditions the greater part of the power moving toward the south is not loaded to capacity. The line between Oneonta and Delanson was built as a single-track road in 1865 and, in conformity with the custom and necessities of that period, was located with regard to economy in capital expenditures rather than to the economies in operation which might have been gained with a greater first cost and more attention to securing a low-grade line. Later this was made a double track line but without relocation or reduction of grades. Oneonta lies in the valley of the Susquehanna River and to reach Delanson it is necessary to cross two water sheds, first, that separating the Susquehanna and Schoharie Valleys, next that dividing the latter from the valley of the Hudson River. Exhaustive studies of the topography and possibilities of this region were necessary before actual work was undertaken.

On June 30, 1913, an agreement was made with the City of Albany in pursuance of which the company's terminal facilities in that city for both passengers and freight have been greatly enlarged and improved and a new office building and freight terminal obtained. This contract was the result of long consideration and represented the desire of the municipality to improve the appearance of the water-front and the lower portion of State Street, as well as the wish of the company to obtain enlarged facilities. Prior to these changes the operation of the property was hampered by grade crossings, inadequate trackage, badly located freight terminals and insufficient office room under its own ownership. Not only have these defects been remedied by the improvements, but provision has also been made for further expansion to meet additional requirements of the future.

It is necessary to understand that all the foregoing improvements were related from the beginning and that the full benefit of none could have been obtained until all were completed. The problem was to increase freight-train efficiency. This involved, primarily, better grades, locomotives of greater tractive power and larger cars. Larger locomotives required better road bed and stronger bridges as well as larger roundhouses, turntables and ash-pits. Longer trains, made possible by better grades and more powerful engines, required larger and more capacious terminal and assorting yards, longer passing tracks and more second and third tracks. New and additional power and cars required new shops. All these changes and improvements had to be balanced and co-ordinated so that the completed property would function efficiently as an entity. It was a real process of construction and development resulting in the creation of a property, turned over to Federal control at the end of December, 1917, which was of much greater capacity and entirely different from that which was operated during the period of development.

FEDERAL CONTROL.

To the end of May, 1918, the railway properties under Federal control were operated through their managing boards and the officers selected by these boards or directly by the owners. At the beginning of June, however, the Director General, without assigning any definite reasons therefor, relieved the corporate managers and officers of these responsibilities and appointed "Federal Managers," who were required to separate themselves wholly from relations with the owning and formerly operating corporations. Your former Vice-President and General Manager, Mr. E. P. Gutelius, was designated as the Federal Manager of your railway and its affiliated railway and boat lines in the United States, and immediately ceased to be an officer of your corporation and its subsidiary corporations. Coincident with this change, a complete separation of the railway and corporate managements was required involving a rigid classification of the personnel and in some instances the distribution of duties formerly performed by single officers. No comment upon the wisdom of these requirements is made or intended. It must be noted, however, that it adds another to the problems of readjustment, the solution of which must accompany or precede the restoration of the properties to their owners.

The act of March 21, 1918, under which the railways are now operated, permits Federal control for no longer than one year and nine months after the "proclamation by the President of the exchange of ratifications of the treaty of peace." Notwithstanding certain efforts to prolong the period, and an apparent desire on the part of a numerically slight section of the public to utilize the emergency action, in violation of solemn pledges at the time it was taken, as a means to permanent ownership by the Government, it is plain that the great majority of the public desires as prompt return as possible to normal methods and conditions. This is especially true of those who, as travellers and shippers, have most frequent occasion to require railway services. The discussion of the legislative changes which should accompany the return of the properties to their owners, is now in progress, many and varied programs have been suggested, and within a short time the consideration of measures is likely to become detailed and definite. Intelligent discussion of these problems ought to proceed from initial recognition that the solitary basis of necessity for the radical action of December, 1917, was the destructive character of the regulative measures and methods that had accumulated, rather than developed, up to that time. It was the financial weakness of the carrier corporations caused thereby that in the face of a great national emergency impelled toward the proclamation of December 26, 1917. On the side of financial resources the regulative measures had left no margin of safety. Independent and conflicting authorities, none of them with definite or recognized responsibility for obtaining an equation between required expenses and permitted income, had regulated expenses (chiefly but not by any means wholly those reflecting rates of wages), upward, while rates of fare and freight were regulated in the opposite direction or held nominally stationary while the medium of payment was rapidly declining in purchasing power. Prior to the war these conditions had induced sporadic disasters, in other cases they had merely threatened; but with the enormous inflation of the war period and with the sudden pressure upon the reduced supply of labor and resultant high wages, the situation became unworkable and impossible. The only relief lay in the direction of a prompt adjustment of rate schedules to the new conditions and between such an adjustment and the corporate managers the machinery of regulation seemed to interpose as an insurmountable obstacle. By means of Federal possession, the President conceived that an adequate adjustment of rates could be obtained without excessive delay and that, pending such adjustment, the inevitable losses of operation could be, in the main, shifted to the public treasury. If the former could have been accomplished without Federal possession, the latter would have been unnecessary.

The problem is the elimination of the conditions of which this weakness in face of emergency was the inevitable result. The mere form of the regulative system determined upon is of minor consequence. The essentials are that it should be complete and systematized, prompt and sympathetic. If rates of wages are to be controlled by public authority, in consideration of the obligation of employees as well as owners not to interrupt the public services rendered by the facilities they operate, it is necessary that there should be co-ordination between the regulation of wages and the regulation of rates. Otherwise, the carriers are not unlikely to be required to pay wages in amounts in excess of any income available for that purpose, in effect out of capital, with the early result of impairment of service and the ultimate consequence, if uncorrected, of its discontinuance. There have, in recent years, been many instances in which one public or *quasi*-public authority has coupled with a direction to increase wages the declaration that to meet the added expenses there must be compensatory changes in rates, only to have the proposed compensation refused by a second authority actually constituted by the same public—that is deriving its powers from the same source.

Railways and all public service enterprises are now required to operate for moderate returns to their owners and these returns secured by but narrow margins of safety. Such has been the public attitude in the more recent past, where it has not appeared to be even less favorable, and there is no evidence of a change of temper in this respect. If this attitude is not to be fatal to private management the rectification of conditions that would destroy the margin between solvency and insolvency must be immediate, the remedy must always be applied before the margin has been absorbed. This implies a degree of rapidity in the processes of regulation which the past has shown them not to possess. Railways and other public service enterprises have been compelled to wait for justice until action which, if promptly taken, would have sufficed, has become wholly insufficient. The correction of this defect is among the plainest necessities of the situation. Moreover, regulation to be consistent with the public interest must be applied in the light of sympathetic realization of the problems and needs of the industry. The scales of justice must be held in balance without partiality to the purchasers of transportation and with adequate comprehension that, in the long run, the interests of those who desire transportation services and those who are equipped to render such services are identical. Economic efficiency reposes in ability and intention to create and dispose of some commodity or service on terms which afford a just profit to both parties to each transaction, the seller and the buyer. If either the railways or the purchasers of railway services fall below this standard the condition must speedily be corrected or the whole industrial fabric will be unfavorably affected.

By order of the Board of Managers,

L. F. LOREE,
President.

[Adv.]

Railway Officers

Railroad Administration

Regional

Horace Epes, of the Washington office of the Associated Press, has been appointed special assistant to **B. L. Winchell,** regional director of the Southern region, with office at Atlanta, Ga.

Federal and General Managers

K. B. Conger, general manager of the Hudson & Manhattan, has been appointed federal manager, with headquarters at New York.

W. H. Edmondson has been appointed assistant to the federal manager of the Grand Trunk, Western Lines, with headquarters at Detroit, Mich.

J. P. Main, assistant to the federal manager of the Ann Arbor and the Detroit & Toledo Shore Line, with headquarters at Detroit, Mich., has been appointed assistant to the federal manager of the latter line and the Toledo, St. Louis & Western, with headquarters at Toledo, Ohio.

Alfred M. Darlow, whose appointment as federal manager of the Buffalo & Susquehanna, with headquarters at Wellsville, N. Y., has already been announced in these columns, was born on November 29, 1884, at St. Louis, Mo. He began railway work in June, 1902, as a rodman on the Vandalia Railroad, and later went to college. He graduated from Cornell University with the degree of M. E. in 1906, and the same year entered the service of the Chicago & Eastern Illinois as a special apprentice at the Danville (Ill.) shops. In 1909 he was made roundhouse foreman and served at Dolton and at Danville, on the same road. He was appointed mechanical engineer of the Buffalo & Susquehanna, at Galeton, Pa., in 1911, and later assumed also the duties of general storekeeper. From 1912 to 1916 he was superintendent of motive power at Galeton in charge of stores and mechanical departments, and then, to 1918, served as assistant to president and superintendent of motive power in charge of operation. On June 13, 1918, he was appointed general manager under the United States Railroad Administration, which position he held until his promotion, on April 7, as federal manager of the same road, as above noted.



A. M. Darlow

Operating

T. H. Hervey has been appointed superintendent of car service of the Ann Arbor Railroad, with headquarters at Toledo, Ohio.

F. Schaefer, district freight agent of the San Francisco & Portland Steamship lines, with headquarters at San Francisco, Cal., has been promoted to manager, with the same headquarters, succeeding **G. L. Blair,** general manager, deceased.

H. M. Williams, recently discharged from the army, has been appointed terminal superintendent for the New York, Chicago & St. Louis, with headquarters at Chicago. **Ogden Pierce,** acting terminal superintendent, has been appointed terminal trainmaster, with the same headquarters. **E. S. Kirby,** acting terminal trainmaster, has been assigned to other duties.

R. B. White, superintendent of the Philadelphia division of the Baltimore & Ohio, with office at Philadelphia, Pa., has been appointed superintendent of the Baltimore division, with headquarters at Baltimore Md. On May 1 the Philadelphia and Baltimore divisions, exclusive of the Baltimore Terminal division, were consolidated and are now known as the Baltimore division.

William C. Bevington, whose appointment as superintendent of the Joplin division of the Missouri Pacific, with headquarters at Nevada, Mo., was announced in the *Railway Age* of April 18, was born in New Lenox, Ill., in 1868, and received his education in the high school of that city. He entered railway service in 1885 with the Chicago & North Western as operator, since which he was consecutively, until 1897, despatcher, chief despatcher and terminal trainmaster. The following two years he was in the employ of the Union Pacific, and from 1899 until 1905 he served on the Chicago, Rock Island & Pacific as despatcher, chief despatcher and trainmaster on the Kansas and Colorado divisions. From the latter date to 1907, he was in the employ of the Chicago, Burlington & Quincy as assistant chief despatcher and chief despatcher, resigning from that road to enter the employ of the Missouri Pacific as chief despatcher, which position he held until 1911, when he was promoted to trainmaster of the Joplin division, with headquarters at Nevada, Mo., in which capacity he served until his recent appointment.



W. C. Bevington

Financial, Legal and Accounting

The following appointments have been announced by **E. F. Blomeyer,** federal manager of the Ann Arbor Railroad, effective May 1: **Joseph Goldbaum,** auditor, has been appointed federal auditor, and Alexander L. Smith, general attorney, has been appointed general solicitor; both with offices at Toledo, Ohio.

B. C. Stevenson, who was appointed federal manager of the Toledo, St. Louis & Western and the Detroit & Toledo Shore Line, as announced in the *Railway Age* of May 2, has made the following appointments: **W. A. Eversman** becomes solicitor, with headquarters at Toledo; **L. T. Williams** becomes assistant general solicitor, with headquarters at Toledo; **R. Larmer,** assistant auditor of the Toledo, St. Louis & Western, with headquarters at Toledo, becomes federal auditor, with the same headquarters; **G. S. Ross,** assistant federal treasurer of the Toledo, St. Louis & Western, with headquarters at Toledo, becomes federal treasurer, with the same headquarters.

The following appointments have been made on the Grand Trunk, Western Lines, following the appointment of **H. E. Wittenberger** as federal manager: **W. K. Williams,** general attorney of the Grand Trunk, Western Lines, with headquarters at Detroit, Mich., has been made general solicitor, with the same headquarters; **N. C. Foss,** purchasing agent of the Ann Arbor, with headquarters at Toledo, Ohio, has been made purchasing agent of the Grand Trunk, with headquarters at Detroit; **William A. Geer** has been appointed general attorney, with headquarters at Detroit; **E. J. Cooper** has been made general claim agent, with headquarters at Detroit;

L. R. **Flanders** becomes freight claim agent, with headquarters at Detroit; J. O. **Talbott**, federal auditor of the Grand Trunk, Western Lines, and the Pere Marquette, with headquarters at Detroit, has been appointed federal auditor of the Grand Trunk, with the same headquarters; J. L. **Cramer**, federal treasurer of the Grand Trunk, Western Lines, and the Pere Marquette, with headquarters at Detroit, has been appointed to be federal treasurer of the Grand Trunk, with the same headquarters.

Traffic

H. S. Bradley has been appointed traffic manager of the Ann Arbor Railroad, with office at Toledo, Ohio.

F. S. Ross has been appointed general freight agent of the Detroit & Toledo Shore Line, with headquarters at Detroit, Mich.

C. E. Rose, assistant general passenger agent of the Toledo, St. Louis & Western, with headquarters at Toledo, Ohio, has been promoted to general passenger agent with the same headquarters.

G. J. Vizard, heretofore assistant general freight agent of the Erie, with headquarters at Chicago, has been appointed manager of the traffic bureau of the Little Rock (Ark.) Board of Commerce.

The jurisdiction of R. R. **Mitchell**, general freight agent; S. G. **Warner**, general passenger agent; H. A. **Weaver** and J. R. **Mills**, assistant general freight agents, and F. D. **Downie**, general baggage agent has been withdrawn from the Midland Valley, the Kansas City, Mexico & Orient and the Missouri & North Arkansas. Eugene **Mock** of the St. Louis (Mo.) District Freight Traffic Committee has been appointed general freight and passenger agent of the Midland Valley with headquarters at Muskogee, Okla. E. H. **Shaufler**, general freight agent of the Kansas City, Mexico & Orient has been promoted to general freight and passenger agent with headquarters at Wichita, Kan. C. E. **Veatch** has been appointed general freight and passenger agent of the Missouri & North Arkansas with headquarters at Harrison, Ark. **Percy Talbot**, acting division freight and passenger agent of the Midland Valley at Muskogee, has been promoted to division freight and passenger agent with headquarters at Tulsa, Okla. J. R. **Holcomb** has been appointed division freight and passenger agent of the Kansas City, Mexico & Orient with headquarters at San Angelo, Tex.

Engineering and Rolling Stock

F. R. **Ramsey**, engineer maintenance of way of the Toledo, St. Louis & Western, with headquarters at Frankfort, Ind., has been promoted to chief engineer, with the same headquarters.

C. E. **Allen**, general master mechanic of the Northern Pacific, at Livingston, Mont., has been appointed general master mechanic of the lines east of Mandan, N. D., with headquarters at St. Paul, Minn., vice T. J. **Cutler**, transferred.

A. M. **Traugott**, division engineer of the Virginian Railroad, with office at Princeton, W. Va., has been appointed acting chief engineer, with office at Norfolk, Va., vice F. L. **Nicholson**, who is resuming full service with the Norfolk Southern Railroad.

R. B. **Robinson**, whose appointment as engineer maintenance of way of the Union Pacific, with headquarters at Omaha, Neb., was announced in the *Railway Age* of May 2, began railway work with the Union Pacific, with which road he served in various minor engineering positions for six years. For the past 15 years he has been in the employment of the Oregon Short Line in various engineering positions leading up to that of engineer maintenance of way in which capacity he served until his recent promotion.

J. **O'Connor**, special roadmaster of the Minneapolis, St. Paul & Sault Ste. Marie with headquarters at Minneapolis, Minn., has been appointed general roadmaster of this road, the Duluth, South Shore & Atlantic and the Mineral Range with the same headquarters. The position of special roadmaster has been abolished. J. B. **Kelly**, roadmaster on the Minneapolis, St. Paul & Sault Ste. Marie with headquarters at Minneapolis, Minn., has been promoted to assistant general roadmaster with the same headquarters. H. P. **Stafford**, general roadmaster of the Duluth, South Shore & Atlantic with headquarters at Marquette, Mich., has been promoted to assistant general roadmaster of this road and the Mineral Range with same headquarters.

J. W. **Oplinger**, superintendent of motive power of the second and third divisions of the Atlantic Coast Line, with headquarters at Waycross, Ga., resigned, effective, May 1. He entered the service of the Central of New Jersey on March 1, 1874, as a machinist apprentice and after completing his apprenticeship in 1878, served as a machinist until 1880 on the same road. He then went to the Lehigh Valley as a machinist at Wilkes-Barre, Pa., and four years later left that road to go to the Atchison, Topeka & Santa Fe, in New Mexico, remaining in the service of that road until 1887. He then returned to the Central of New Jersey as gang foreman, and later was erecting foreman on that road. In 1894 he served as general foreman on the New York, Susquehanna & Western, and in 1900 was appointed master mechanic on the Atlantic Coast Line. Four years later he was promoted to superintendent of motive power of the second and third divisions, with office at Savannah, Ga., and since 1910 at Waycross, Ga., from which position he now resigns to retire to his farm in Pennsylvania.

Purchasing

C. Z. **Hughes** has been appointed purchasing agent of the Ann Arbor Railroad, with office at Toledo, Ohio.

Dwight C. **Curtis**, inspector of stores on the Chicago, Burlington & Quincy, with headquarters at Chicago, has been promoted to supervisor of stores of the Northwestern region, with the same headquarters, succeeding J. E. **Mahaney**, resigned to accept service elsewhere.

Corporate

Executive, Financial, Legal and Accounting

J. F. **Aitchison**, acting auditor of disbursements on the Grand Trunk and the Grand Trunk Pacific, has been appointed auditor of disbursements, with headquarters at Montreal, Que., and the title of acting auditor of disbursements has been abolished.

Operating

W. C. **Ramsay**, auditor of the Dayton, Toledo & Chicago Railway Company, has been appointed assistant general manager, with headquarters at Dayton, Ohio.

W. E. **Brown**, general manager of the Dayton, Toledo & Chicago Railway Company, with headquarters at Dayton, Ohio, has been appointed general manager also of the Oklahoma, New Mexico & Pacific Railway Company, with headquarters at Ardmore, Okla.

Traffic

W. G. **Roche** has been appointed general agent of the freight department of the Canadian Pacific Ocean Services, Limited, with office at Chicago, and J. R. **Clancy** has been appointed general agent of the freight department for Ontario, with office at Toronto, Ont.

H. L. **Blackstone**, general agent of the Sacramento Northern, with headquarters at San Francisco, Cal., has been promoted to assistant general freight agent, with headquarters at Sacramento, Cal. He was born in Shullsburg, Wis., in 1875, and entered railway service in 1899 with the Chicago, Milwaukee & St. Paul. In the same year he entered the employ of the Great Northern as traveling freight agent, at Butte, Mont. He remained in this position until 1904, when he was appointed agent, with headquarters at Fernie, B. C. From 1909 to 1914 he was in the employ of the Western Pacific as traveling freight agent at San Francisco, Cal., remaining with that road for five years and then entering the employ of the Sacramento Northern as general agent at San Francisco, in which capacity he served until his recent promotion.

EDITORIAL

Railway Age

The Automobile, General Manager and Freight Conductor

The salaries of many railway general officers have been reduced under government operation. The average compensation of those receiving more than $3,000 a year is 20 per cent less than it was when the government took the railways over. On the other hand, the wages of train service employees recently have been advanced again, and now average about 40 per cent more than a year ago. An incident illustrating the effects upon the mode of living of the officers and the employees which the reduced salaries and increased wages are producing has come to our attention. The general manager of a certain railroad who has had his salary reduced advertised a Packard automobile for sale. He received in reply a letter from one of the freight conductors on his railroad seeking to buy the car. The general manager has sent us the original letter for our edification. Now that general managers, in order to reduce their expenses, have to sell their high priced automobiles, and their freight conductors offer to buy them, we think the time has about come for railway officers to organize themselves into a trade union. We note that in Europe the bourgeoisie have begun to organize to protect themselves from exploitation by the proletariat. If government operation were continued, and railway officers did not form themselves into a union, it would apparently be but a matter of time until all the officers would be looking with envy upon the automobiles owned by the employees.

Railroad Y. M. C. A. Extension Program

The Railroad Y. M. C. A., after a long period of careful preparation, is about to inaugurate a continental extension program that has a number of unique features and promises to very greatly enlarge and extend the efforts of that organization. The 300 Associations in this country and Canada are carrying forward this movement as a unit; the railroad men, themselves, have done a large part of the planning and will do the greater part of the work, the secretaries or employed officers being utilized largely in an advisory capacity. During the coming week, May 18-24, efforts will be concentrated on increasing the membership. Every Association will be divided into two parts, each of which will strive to make a better record than its opponent in renewing memberships and securing new members. In the same way, different parts of a railroad system will be pitted against each other. Different railway systems will also engage in friendly rivalry. This idea has been extended even to having different regions of the Railroad Administration challenge each other. During the next few months, the new members will be assimilated, and in the fall there will be a series of programs of service which will be participated in simultaneously by all of the associations. For instance, one week will be devoted to making plans and putting into effect educational programs for the year. In a similar way, a week will be devoted to religious work, another to thrift, and others to patriotism and sociability, and health and happiness. The Railroad Y. M. C. A. has been a most important factor in improving the conditions under which the enginemen and trainmen and others have had to work, thus adding to the safety and efficiency of operation. It has, however, largely limited its efforts to serving the road men and has not been as active as it might be in trying to reach all of the railroad men with a service program. The movement which it is entering would seem to be a long step in that direction, and it is to be hoped that it will receive the most cordial co-operation from all railroad men who are interested in the welfare of their fellows.

Making the Railroads Pay for the Waterways

ONE INFLUENCE that has served to make railroad transportation, or at least the privilege of owning railway securities, more expensive than it should be is the zeal with which the United States War Department has protected the potential waterways of the country for a waterway traffic which may come some time in the distant future. Much of this zealous solicitude has worked a burden on the railroads which have been forced to spend vast sums for drawbridges that have never opened to pass a ton of freight, or in high bridges whose expensive channel spans are rarely smutted by the smoke of a passing steamer. Notwithstanding the decadence of inland waterway traffic the demand for larger and more expensive structures keeps ever apace with the advancement of the art in bridge engineering. Where 400-ft. clear spans were considered adequate 40 years ago, 600-ft. spans are now being demanded.

One especially unreasonable exaction of the government in its solicitude for a waterway traffic that is not, but some time may be, was the order for the raising of the Pennsylvania Lines bridge over the Allegheny river at Pittsburgh. In March, 1917, this four-track (two-level) structure was ordered raised 12.5 ft. and the road was given just one year in which to complete the work. Since the demand for this difficult and expensive project came just at our entrance into the world war it is to be inferred that this was a war measure. However, it is of interest to note that the Pennsylvania Lines bridge is the fifth bridge over the Allegheny river above its confluence with the Monongahela, there being four city bridges connecting the Pittsburgh side of the river with the Allegheny side within this distance under which any river traffic coming up from the Ohio river must pass before encountering the railroad bridge. The city bridges were also ordered raised, but the interesting detail of the whole story is that while the railroad was required to raise its bridge within a year's time, the city was allowed 2½ years in which to complete the work on its structures.

The change in the Pennsylvania Lines bridge cost $800,000, while necessary alterations to approaches made the total expenditure considerably over a million dollars. The work has now been completed for over a year, yet not even a beginning has been made in the raising of the city bridges. So while the river traffic is still subject to the headroom restrictions the Pennsylvania Lines are paying the interest on a million dollars additional investment. Whether measures such as this will ever be effective in developing the inland waterway traffic which will be so potent in solving all of our economic and social ills, we cannot say, but meantime the public will be paying the excess cost of railway transportation due to requirements such as this.

Industrial Board's Exit Does Not Restore Normal Conditions

Director General Hines' refusal to pay the steel prices fixed by the Industrial Board has had one good effect. It has caused the board to go out of existence. The board's chairman, George N. Peek, had demonstrated his unfitness for his position. Throughout the negotiations he assumed an attitude well calculated to destroy the confidence and arouse the ire of officials of the Railroad Administration. Besides, it was very doubtful from the board's inception whether it was desirable for the government to continue to try to fix prices, since the war was ended. If it had performed its functions in an intelligent and reasonable way it might have aided in the transition of prices from a war to a peace basis. But government boards, experience has shown, seldom perform their functions intelligently and reasonably. The passing of the Industrial Board is welcome as the removal of one more governmental obstruction to the return of the country to normal industrial conditions and business methods.

The director general of railroads has recently tried, by direct negotiations with the steel companies, to get better prices than those fixed by the Industrial Board. These negotiations have failed, and it is announced that the Railroad Administration will advertise for competitive bids on 200,000 tons of rails. It does not seem highly probable that substantially better prices will be obtained in this way than already have been offered, although the outcome may be different from what now appears likely. The retirement of the Industrial Board from the scene has not restored normal conditions of doing business, in either the iron and steel field, or any other field, in which the railways are large purchasers. There was mighty little competition in prices among manufacturers of steel rails for years before government operation of railways was adopted; and the very fact that the government is now operating the railways affords those who sell materials and supplies to the railways a strong incentive to refrain from very active competition in prices for their business.

Government control gives the Railroad Administration a virtual monopoly of purchases for the railroads, and the Railroad Administration, when W. G. McAdoo was director general and John Skelton Williams was director of purchases, assumed an attitude and adopted a policy regarding purchases which indicated a purpose to use the monopoly power of the Railroad Administration almost regardless of the consequences to concerns from which they bought goods. It centralized control of purchases in such a way as to make it practically impossible for any concern to make a different price to one railway from what it made to all others. Its spokesmen talked about the pooling of patents and the foregoing of royalties. Mr. Williams' treatment of representatives of the supply concerns was not considerate or sometimes even civil, and in many cases goods were bought mainly on the basis of price and almost regardless of quality. The Railroad Administration did not finally drive as hard bargains as apparently it originally intended to, but the former director of purchases succeeded in making almost every class of concerns from which it made purchases feel that it was an unreasonable and disagreeable customer to deal with. This feeling still prevails, in spite of modifications of policy which have been made since Mr. McAdoo retired as director general and Mr. Williams as director of purchases, and as long as it exists concerns that sell materials and supplies to the Railroad Administration will be on their guard, and will not be disposed to risk engaging in very active competition.

The continued existence of the Industrial Board would have been an obstruction to the return of business to normal conditions and methods. But the same thing may be said of the continued existence of the Railroad Administration, and especially of its highly centralized purchasing organization. A monopoly of railroad purchases is an abnormal thing in itself, and the highly centralized purchasing organization adds to the abnormality of the situation. Before normal conditions of competition in price among the sellers of railroad equipment and supplies can be, or indeed probably ought to be, restored normal conditions of competition among the buyers of railroad equipment and supplies should be restored.

The Railroad Administration has made large purchases since it has been in existence, although not as large as were ordinarily made by the railway companies in equal periods. These, we believe, have not included any purchases of rails. All the rail laid under government operation was ordered by the companies under private operation. In other words, the Railroad Administration has not heretofore had to bargain for rails. There had been almost no bargaining regarding rail prices for some years under private operation, the steel companies having fixed the prices, and, in effect, told the railway companies they must pay these prices, or go to some other country for their rail. It will be highly interesting to see how the Railroad Administration, with its position of a practical monopoly of purchases, finally comes out in dealing with the steel companies. One thing is certain. This is, that the railroads need large quantities of rail, and that the welfare of the country demands that the mills be set to work making it.

There are reasonable men among both those who represent the Railroad Administration and those who represent the steel companies; and it is inconceivable that with reasonable men on both sides, the present deadlock regarding prices, which is doing so much harm to the interests directly affected and to the public, will be allowed to last much longer. But, in view of the policy of the steel companies when the railways were privately operated, and when there was competition among the buyers of rail, it does not seem probable that there will develop very active competition between the steel companies for railroad business while the railways are in the hands of the government, and while in consequence there is no competition among the buyers.

Government Control of Railroad Labor

William Church Osborn in a recent address which we publish elsewhere in this issue, undertook to show that the government has not taken entire control of the railroad industry, but of only one-half of it. Railway labor, he said, gets 50 per cent. of railway earnings, but the government has not taken control of the employees.

The case is at present even worse, in a way, than Mr. Osborn said. In December, 1917, the last month of private operation, the railway employees received as wages 61 cents out of every dollar of operating expenses and 45.4 cents out of every dollar which the railways earned. In January, 1919, under government operation, railway employees received as wages 64 cents out of every dollar of operating expenses and 58 cents out of every dollar which the railways earn. While, however, the total earnings in December, 1917, represented all that the public paid for transportation, the total earnings in January, 1919, failed by about $40,000,000 to represent all that the public must pay, this being approximately the amount of the deficit which was incurred and which must be defrayed by the taxpayers. The railway employees received as wages about 52 cents out of each dollar that was collected by the government for railway purposes in the form of both rates and taxes.

How far the government has fallen short of taking control of railway labor is indicated by certain significant facts. As we recently pointed out, the railway employees last year asked for changes in wages and working conditions which

it was estimated would cost one billion dollars a year, and they have now been given changes in their wages and working conditions which are costing at the rate of about one billion dollars a year. The government has permitted and even encouraged all classes of employees to organize. We do not criticise this, but merely call attention to the fact. When the question of whether piece work in the shops should be abolished came up the government submitted the determination of it to a vote of the employees concerned; and because they voted for its abolition piece work was abolished, regardless of the views of a large majority of the officers of the roads. To say that the government has not taken control of the employees is stating the case very mildly, indeed.

During recent months many persons have been energetically applying themselves to a study of the question of what shall be done with the railroads. Public sentiment favors their return to private operation. Upon the policy adopted by the government regarding the settlement of controversies arising between the railway companies and their employees will very largely depend the success of private operation if it is resumed. Under government operation labor troubles have been prevented mainly by the simple expedient of giving labor practically everything it has asked for, and then passing the burden along to the public in the form of increased rates and taxes. Private companies cannot advance rates easily, nor can they have recourse to the taxpayers. If the government should return the railways to private operation without providing means of settling labor disputes fairly and without resort to strikes and without providing means for enabling the companies promptly to recoup themselves for increases in their payrolls, past and future, the results would be disastrous both to the companies and the public. Nevertheless, there is a marked tendency on the part of commercial bodies and public men that are studying the railroad problems to side-step this vitally important labor question.

The railway labor organizations are not side-stepping it. Under the plan which is being advocated on their behalf by Glenn E. Plumb, the government would buy the railroads with the taxpayers' money, and then turn them over to be operated by a board of directors, three of whose members would be appointed by the President of the United States, three by the railway officials and three by the railway employees. All wages and salaries would be fixed by a board composed equally of officers and employees. Under this plan an "officer" would be merely an employee of high rank. Therefore, the railway employees would solve the railway problem, including the labor part of it, by having the public furnish the money to buy the roads and pay the interest on the purchase price, and then turn them over to be operated by and chiefly for the benefit of the employees. This would solve the labor part of the problem—at least from the employees' standpoint. How could there be any dissatisfaction on the part of labor if labor was allowed to run the roads and fix its own working conditions and pay? The experience of the last year, when labor has demanded and got an increase of one billion dollars a year at the expense of the public may cause the public to suspect that this method of solving the problem might prove rather expensive for it. But Mr. Plumb can prove the contrary. He is the greatest magician in effecting paper railroad economies that has yet appeared—greater than William Randolph Hearst, Clifford Thorne, S. W. Brookhart or William G. McAdoo. None of the miracles these gentlemen have predicted would be worked by government operation has been wrought; but Mr. Plumb is undaunted by their experience and shows with airy facility how under his plan of "operatives' management" there could be effected a saving of a billion dollars a year. The old rule still holds good—the less a man knows about the railroad business the more oriental are his dreams as to what could be done with it.

In view of the fact that labor has been so influential under government operation and has profited so enormously by it, it is not surprising to find labor asking the public to now buy the railroads and turn them over to the complete and avowed management of the employees. Recent experience affords some apparent justification for the belief of many employees that they can get anything they ask for and insist upon having. It is this very attitude on their part which makes it so necessary that the labor problem on the railways shall be squarely faced and fairly but firmly dealt with. The government will never under private operation cease strictly to regulate the conduct of the companies which own the roads and the officers who manage them. Unless it asserts a corresponding authority over the relations between the employees, on the one side, and the companies and the public on the other, no policy of regulation which it may adopt will more than very temporarily serve its purpose.

New Books

Government Ownership of Public Utilities in the United States. By Leon Cammen, M. A. Distributors: McDevitt-Wilson, 30 Church Street, New York, N. Y.; Price $1.50.

By public utilities, Mr. Cammen, apparently, refers to the railroads, telephone and telegraph lines. He confines himself to a study of the effect that government ownership would have on American institutions other than the railroads themselves. This is not primarily a discussion of whether government ownership would lead to more efficient and satisfactory movement of freight and passengers, but rather a discussion of the effect that it would have on the public, the political parties, the control of industries, the legal relations between the federal government and the states, and on labor. An argument that is sometimes used in favor of government ownership of railroads is that they are so powerful to make or break industries and they affect so vitally the interests of all classes of citizens that they cannot safely be entrusted to the management of private individuals. Mr. Cammen undertakes to show that, whereas under public regulation the private citizen, the owner of a small factory, or the aggrieved traveler, can meet the railroad company in the courts on an equal footing—in a loss and damage claim in advantage generally is all with the claimant against the railroad—if the government owned and managed the roads a suit against the government would be almost prohibitively expensive and nearly hopeless. Most people who have disinterestedly watched the experiment in government operation which has been going on in the past year and a half will be inclined to thoroughly agree with Mr. Cammen.

Railroad labor would at the start, at least, Mr. Cammen believes, get higher wages from the government than it could get from private corporations, but, even if railroad labor, itself, benefited to some extent from uneconomically high wages, all other labor in the country would be taxed to pay this uneconomically high wage to the railroad men. Mr. Cammen figures that labor, including agricultural labor, constitutes 80 per cent of the population. If taxes are raised either through increased costs of transportation passed along to the consumer or directly, in order to meet a deficit in the government operation of railroads, the 4 or 5 per cent of the population which is represented by railroad labor and its dependents would profit to some extent but the other 75 per cent, which is labor other than railroad labor, would have to foot the bill. Mr. Cammen's book is logical, well written and his arguments are non-technical and clear. Treating the subject from a purely American point of view as he does and from an angle somewhat different than that from which it is generally discussed, he has made a distinct conribution to the literature on this subject.

Letters to the Editor

Deferred Railroad Maintenance — An Increasing Public Debt

Houston, Texas.

To the Editor:

Volumes have been written by those associated with the United States Railroad Administration, and lengthy reports have been rendered, to illustrate reductions in expenses and various savings accomplished during the federal management of railroads, resulting from centralizing control, unifying terminal facilities, direct routing of car-load freight and other similar activities.

But of the work left undone, of the non-performance of duties resting upon them—duties to the public and to the owners of the railroads alike, the spokesmen for the Railroad Administration say nothing. Not a word from them, or their assistants, or from the assistants to the assistants. These unaccomplished obligations exist on every railroad, and deferring their performance does not eliminate the government's liability to eventually meet them, either by the physical performance of this deferred work at a later date and increased cost or by the payment of its value to the owners of the railroads.

One of the most important subjects resulting from the control and operation of the railroads of the United States, through the agency of the director general, is that of maintenance, in its practical application, so that the railroads may be returned to their owners unimpaired, and without deterioration, upon the termination of federal control. Under the provisions of Section 5, (Upkeep), of the standard contract covering the operation of the railroads by the director general, certain sums shall be expended for the maintenance, repair, renewal, retirement and depreciation of the properties of the railroads, in order that such properties may be returned to the owners in substantially as good repair and in substantially as complete equipment as it was on January 1, 1918, the date when federal control became operative.

The expenditures to be made during federal control are to be predicated upon the annual average of similar expenditures made by the railroads during the test period—that is, the three years ending June 30, 1917; making due allowances for any differences in the costs of labor and material, which have actually advanced to an abnormal degree. Briefly stated, the duties of maintenance are to expend an equal amount of labor and an equal quantity of material, during any year of federal control, as was expended during the annual average of the test period. A mere comparison of the money expended would lead to the belief that this had been done; the final total of operating expenses chargeable to maintenance of way and structures for the year ending December 31, 1918, will probably be as much as 50 per cent in excess of the average for the test period. But this does not reflect excess maintenance or even equal maintenance during federal control; as a matter of fact, there has been allowed to accumulate an alarming amount of deferred maintenance. This represents work which should have been performed in the interest of public safety and to eliminate deterioration of the most vital factor of the nation's existence—the national arteries of commerce and communication.

Under the stimulus of a desire to gratify the employees, increases in salaries, entirely out of proportion with the increases in living costs, were granted. To have met the increased living expenses, in awarding increased wages, would have been reasonable and expected. But, as an example, the average retail prices of foods increased 43 per cent during 1918 as compared with the test period, while the wages of section men increased 82 per cent, or very nearly twice as much, and while the cost of food in 1919 has not materially changed, the wages of section men are more than double what they were during the test period. Equally exorbitant increases were granted in other departments; and while the nation, as a whole, was denying itself, in a patriotic effort to bear the burdens of the great war, the average railroad employee was enjoying a better existence than he had ever dared to imagine; an enjoyment of life at the public's expense and increasing the public's burden.

While the government's expenditures for labor during 1918 were far in excess of what had been spent during previous years, the results attained were equally far below the normal. A very severe labor shortage existed, and many railroads were maintained with less than 60 per cent of their normal maintenance forces. This shortage became so acute at one time that it developed the necessity, in many instances, of employing women and boys on the track, the result being an inferior amount and quality of service at a greatly increased cost.

Material values also increased, for varying causes, the advance for steel rails approximating 100 per cent, track fastenings 75 per cent, track ties 80 per cent, bridge lumber 45 per cent and building material over 60 per cent. Coupled with these advances in cost, there was a grave shortage in all of the principal classes of materials. A large portion of the steel output was required for war purposes, lumber was needed for shipbuilding, and the railroads were left with but a small portion of their requirements. In the case of track ties, the Railroad Administration could have secured sufficient for their needs, but, while they increased the prices paid for ties, they instituted an entirely new set of specifications which, coupled with slow payments, seriously reduced the tie supply.

The wearing away of the rails in the track continued during 1918 just as it had in previous years—there was no reduction made in this wear. At the same time only a small percentage of their requirements was furnished. In the case of ties, the rotting, breaking and wearing out of track timber was not decreased in the least during 1918, although the roads under federal control were given less than 75 per cent of these requirements during 1918. The condition with respect to other classes of material was the same. And while the Railroad Administration paid more for material during 1918 than had been spent by the railroad companies during any previous year, they have not maintained the property of the railroads; they have not offset the annual wear and tear with its equivalent in new life.

The result of this failure to perform the duty of maintenance—this failure on the part of those charged with the maintenance of the railroads for the government and as agents of the public—is found in the physical condition of these railroads today. It is represented by the deferred maintenance of the property, the value of which, translated into dollars, has not been saved to the public, but must inevitably be faced and overcome by the expenditure of the required amount of labor and material.

And the longer this work is deferred, the more it will cost when finally undertaken. It is estimated that the present cost of doing the maintenance work, deferred during 1918, will vary from $100 to over $300 per mile and will average in excess of $160 per mile, or over $36,720,000. This is but another item on the debit side of Uncle Sam's books, and while not seeming so very large to us who have learned to think of costs in billions of dollars, it is a tidy sum, owed to the railroads by the Railroad Administration, and which the public must liquidate.

F. S. Schwinn,
Corporate Engineer, International & Great Northern.

Plan of Price Stabilization Abandoned

The Railroad Administration Has Asked for Competitive Bids for Rails and Other Steel Products

WASHINGTON, D. C.

THE GOVERNMENT'S PLAN of "stabilizing" prices through the efforts of the Industrial Board of the Department of Commerce has finally collapsed and the resignations of the members of the board which had been submitted on April 22, were accepted by Secretary Redfield on May 9, thus leaving prices subject to the law of supply and demand.

After having failed to reach any agreement with the steel interests on lower prices than those announced by the board, the Railroad Administration has asked for competitive bids on 200,000 tons of rails and presently a demonstration will be afforded as to whether it can purchase at lower prices than those approved by the board. The requests for bids went out Saturday. They ask prices on both open hearth and Bessemer steel, 80 to 135 lb. sections, f. o. b. cars at mills, to be submitted this week, Saturday, May 17, to the Division of Purchases, delivery to be completed by July 1. The quantity named is a smaller tonnage than would have been asked for if a satisfactory price had been proposed and probably is to be regarded as a test of the market*. Henry B. Spencer, director of the Division of Purchases, and T. C. Powell, director of the Division of Capital Expenditures, represented the Railroad Administration at the conference with the steel people at New York on May 8, and suggested a price of $41.37 for rail, but the steel interests insisted that further reductions cannot be made without decreases in costs of production which would necessitate a lowering of wage rates. After the meeting Director General Hines, who was also in New York, issued a statement explaining his position, in part as follows:

Mr. Hines' Statement

"Messrs. Spencer and Powell offered specific criticisms of the steel prices heretofore proposed and suggested maximum prices which the Railroad Administration would feel justified in paying. It was made clear that the Railroad Administration did not wish to obtain preferential prices as compared with the general public. The conferences on this subject are at an end and the Railroad Administration will, in accordance with its settled purpose, proceed as rapidly as it needs steel materials of any kind to ask for competitive bids and purchase accordingly.

"By way of comment on the prices proposed in March, as well as in support of the prices suggested by the Railroad Administration, the following views were expressed by Messrs. Spencer and Powell.

"The reduction since the war in a single element of cost is so great as to make the prices proposed practically as profitable as were the higher prices that prevailed during the war upon the basis of which the steel interests made enormous profits. This is the price of scrap materials, which is not a controlled commodity, but the price of which fluctuates according to supply and demand, and which, of course, can be and is used very largely in the making of steel products. The fall in the price of scrap material (from $30 per ton to about $15 per ton) has been so great that the resulting decrease in the cost of steel products is practically as great as the total proposed reduction in the prices. Therefore, the prices proposed for steel products represent no concessions whatever from wartime profits.

"That the steel interests have made profits so large as to make substantial concessions practicable under existing conditions without affecting the wages is strikingly illustrated by a consideration of the profits for the calendar year 1918.

"The United States Steel Corporation for the year 1918 reports the net earnings from all rolled tonnage, before deducting income tax, excess profits tax, etc., a profit of about .....$33 per ton

"The Midvale Steel Company for the same period shows a profit of approximately.....$35 per ton

"This statistical information for other steel producing companies is not yet published, but their financial statements indicate results which were correspondingly favorable.

"The arguments which have been presented in the effort to support the prices proposed by the steel interests and the Industrial Board have rested upon costs incurred during the war period. Even those costs show exceedingly handsome profits to the low cost producers. But it is obvious that these, without reduction in wages, will, on account of the termination of the war, be subject to very important reductions.

"The war costs appear in many instances to involve a heavy increase in the royalty for ore, or the assumed value of the ore in the ground. This increase did not represent an actual increase in cost so far as the producers of the ore were concerned, but simply represented a heavy additional profit. Yet this increased profit in ore appears to be included in the war costs upon which the figures have been based. The cost of coke has fallen substantially from $3 to $4 per ton, representing a saving of from $3 to $5 per ton of iron.

"The steel interests and the Industrial Board have proposed a price of $38.50 for steel billets and yet they have proposed prices for finished steel products which are wholly out of line with the price for steel billets. The differentials which the steel interests and the Industrial Board propose for the finished products as compared with steel billets are so great as to make the prices for the finished products altogether unattractive and altogether unjustifiable.

"If the average differentials for finished products as compared with steel billets during the 16 years preceding 1917, be increased by 50 per cent (to insure against any adverse effect upon the wages paid to labor), the resulting differentials and prices for the finished products would be as follows as compared with the prices actually proposed (per ton of 2,240 lb.):

	After adding 50 per cent to differential	Suggested new price based on 50 per cent increase in differential plus billet price of $38.50	Price fixed March 21, 1919, by Peek committee
Bars	$10.32	$48.82	$52.64
Bessemer steel rails	2.87	41.37	45.00
Galvanized sheets, No. 28	81.48	119.98	127.68
Beams	13.04	51.54	54.88
Wire rods	9.81	48.31	52.00
Tank plates	13.28	51.78	59.36
Black sheets, No. 28	40.67	79.17	87.44
Tin plate	83.84	122.34	156.80
Nails	23.69	62.19	72.80

"Messrs. Spencer and Powell pointed out that the cost of open-hearth rail was no greater than the cost of Bessemer rail since the cost and price of both sorts of billets were the same and, therefore, that the price of open-hearth rail should

* The Navy Department on May 13 opened bids from 11 steel companies on 14,000 tons of plates and shapes and found that the basic prices were all alike and corresponded to the prices announced by the Peek Committee. The Navy had rejected bids on this material submitted on April 4 because they were not on a competitive basis.

be no higher than the price of $41.37 above indicated for Bessemer rail, and that if the steel interests wished to encourage the purchase of Bessemer rail they should do so by making the price of Bessemer a differential under the price so arrived at for open hearth rail rather than through increasing the price of open-hearth rail by $2, the amount of the old differential.

"The actual differentials during the year ending June 30, 1917, which represent as nearly as possible the conditions immediately prevailing prior to the great assumption of war activity by this government, are even less than the differentials for the 10-year period. The best estimates as to the actual operating costs of converting steel billets into finished products, even under war conditions, indicate that the differentials on the basis of 150 per cent of the 10-year period average shown above, will fully cover that additional cost and a substantial profit.

"Messrs. Spencer and Powell indicated a willingness on the part of the Railroad Administration to purchase for the time being at the suggested new prices based on 50 per cent increase in differential plus the billet price of $38.50 announced in March.

"The steel interests were unwilling to make any reduction in their price, and, in order to repel the argument that the prices for all other products were out of line with the billet prices, manifested a disposition now to claim that their own billet price of $38.50 was lower than it ought to have been.

"Another fact which the Railroad Administration regards as a significant indication of the unreliability of using war costs as a basis for current prices is that one important element in the war costs was the cost of the water carriage of ore, and this was especially burdensome with respect to some of the high cost producers. This condition has radically changed since the termination of hostilities has released so much shipping. As an illustration, the Bethlehem Steel Company has filed a claim against the Shipping Board for the use by the latter, during the war, of the former's ships which were desired by the steel company to carry ore from Cuba to the plant near Baltimore. The steel company claims that the actual cost of transporting ore was $1.96 per ton during 1918, while the Shipping Board's rate which the Bethlehem Steel Company paid during 1918 was $9.50 per ton. Hence, by the Bethlehem Steel Company's ability to get back its ships, there appears to be a saving of approximately $7.50 a ton for delivery of ore, which represents at least $15 per ton on pig iron, since it requires two tons of ore or more to make a ton of pig iron.

"The steel interests urged that their costs in March were unusually heavy notwithstanding the cessation of hostilities, but the representatives of the Railroad Administration claimed that these abnormally high costs at the present moment were due to temporary conditions of readjustment and ought not to be taken as a basis for prices designed to stimulate a general buying movement. It should be remembered in this connection that the Industrial Board justified its approval of the steel interests' costs for the month of October involving the elements which, as above pointed out, have so radically changed.

"After the most prolonged discussion, the representatives of the Railroad Administration still remained entirely satisfied that the reduced prices indicated by them could, and ought to be, adopted without affecting the wages paid labor in the steel industry.

"The uncertainty and hesitation which have been injected into this situation would never have arisen if at the outset Chairman Peek had been willing to accept as final the position which the Railroad Administration stated before the Industrial Board made its public announcement and which it has at all times felt forced to maintain.

But Chairman Peek has been so bent on justifying his own mistaken conception of his functions that he has been trying for weeks to get them accepted; and yet he has never succeeded in getting the support of the President or the cabinet, or the attorney general.

"In closing the discussions it is important that the totally erroneous impressions created by him, particularly in a recent speech before the United States Chamber of Commerce at St. Louis, be removed. The plan on which the board was supposed to operate was thoroughly discussed at a special meeting of the cabinet on February 3, and Mr. Peek stated in his speech that that meeting approved the plan of having the board determine prices and make them effective by the authorization of a governmental announcement. In this he is in error. The meeting distinctly declined to approve any plan for announcing prices at which the general public would buy, and the only plan which was approved, was a plan to bring about by voluntary action, a reduced level of prices at which the Railroad Administration would be justified in buying freely, and therefore the plan actually approved specifically contemplated that the board would act as a mediator between the producers and the Railroad Administration. The meeting of the members of the cabinet on February 3 was called and presided over by Secretary Glass of the Treasury Department and as indicating Mr. Peek's erroneous conception of the plan approved at that meeting, Secretary Glass telegraphed to the director general after reading Mr. Peek's address in St. Louis, sharply contradicting Mr. Peek's assumption that the President and the cabinet ever sanctioned the policy of price fixing engaged in by the Industrial Board.

"Mr. Glass stated that Mr. Peek had conveyed the impression that the Industrial Board pursued the exact course suggested by Mr. Glass' first cable to the President, whereas, quite the contrary was true; and the Industrial Board, under Mr. Peek's leadership, utterly perverted the suggested policy of those who initiated the movement for resumption of business activities, and brought the scheme into direct conflict with the federal statutes against unlawful agreements. Mr. Glass called attention to the fact that this was the very thing against which the President at the outset gave warning and precisely the thing that the members of the cabinet who had part in the initial conference refuse to countenance. Mr. Glass concluded by stating that although Mr. Peek had made it appear that his advocacy of unsatisfactory prices had the sanction of the President and cabinet and has been opposed solely by the Railroad Administration, the very reverse is true."

Judge Gary's Comment

Elbert H. Gary, chairman of the United States Steel Corporation, in commenting on Mr. Hines' statement, said:

"The statement of the director general, if it had been made after full acquaintance with the facts and figures and had been accurate in all respects, would not, in my opinion, have any bearing upon the exact present situation.

"On the present basis, cost of production, as shown on the books of the manufacturers, verified by the Federal Trade Commission, would not permit any further reductions in the present selling prices, without lowering the wage rate. Our subsidiary companies are strictly maintaining the scale of prices approved by the Industrial Board, and it seems to me that will be the attitude of other manufacturers, for the reason, if for no other, that the cost of production will not allow any further reductions in selling prices. They have voluntarily made two substantial reductions since the armistice was signed.

"I regret that opinions between the Railroad Administration and the iron and steel industry should have differed. The business relationship has always been pleasant, and we should like to see it continued without interruption."

Prior to the New York conference Secretary Redfield of the Department of Commerce had made public a letter to Mr. Hines stating that he had asked the Industrial Board to convey to the steel representatives the desire of the board, in which he joined, that nothing should be allowed to prevent an agreement and that if it was in their power to make reductions that would be acceptable to the Railroad Administration without disturbing labor or increasing prices to the public, the board would welcome such a conclusion, as it would relieve the tension on the business of the country. He also expressed the hope that Mr. Hines would do all in his power to bring about a definite agreement with the steel industry.

The acceptance of the resignations of the board members closed the chapter of the efforts of the Department of Commerce to assist in the readjustment of prices from a war to a peace basis. The coal, cement, and lumber interests had expressed a readiness to make price concessions through the medium of the board, but negotiations were postponed until it could be learned whether the Railroad Administration would buy at the prices announced. Since it has declined to do so in the case of steel the whole plan has been abandoned.

Chairman Peek of the board on May 10 issued a statement releasing all industries that had submitted themselves to the board, on the latter's invitation, from any obligation to the board. In this statement he said:

"In conducting its investigations the board found that very much higher costs of production, resulting from conditions brought about by the war, precluded the possibility of immediately making as large reductions as were thought possible without disturbing labor rates. Labor rates have increased from 85 per cent to as high as 140 per cent in the steel industry, and labor costs in even greater ratio, and as labor either directly or indirectly constitutes approximately 85 per cent of the total cost in many industries, it will be seen that as compared with pre-war levels, prices must necessarily be very much higher than formerly, unless a general liquidation of all values were effected, which is considered impracticable at this time or so long as the high cost of the necessaries of life prevails."

Plan Called Illegal

After the resignations of the board members had been accepted there was made public an opinion submitted by Attorney General Palmer in a letter to Secretary Redfield dated April 1, that the proposed plan of the board, "viewed in any aspect" was "unauthorized by law." This is now expected to serve as a warning against the submission of uniform bids by the steel producers. The plan was called illegal by the attorney general on the ground that it constituted price-fixing in violation of the anti-trust law.

The attorney general said in part:

"Of all forms of restraint of trade price-fixing agreements have been the most common. No rule of law is better established than that such agreements are illegal and void. * * * To bring a price fixing agreement within the condemnation of the law it is not necessary that it be in writing or that it be an express agreement. * * * Nor is it necessary, to make such an agreement unlawful, that the parties should be under compulsion by penalty or otherwise to observe it. Finally, it is no defense that such an agreement was induced by good intentions and may have some good effect.

"The foregoing considerations lead irresistibly to the conclusion that the proposed plan, viewed simply as an arrangement between private producers, would be in violation of the anti-trust laws. The Industrial Board, not being a creature of statute, has not been clothed by Congress with any powers which would remove contracts made by it from the operation of the Sherman act. It follows, therefore, that the legal defect of the proposed plan is not altered by the fact that it would be carried out through the Industrial Board.

"Lastly," said the attorney general, "in no less than 30 statutory provisions Congress has announced its purpose that the purchase of government supplies shall be governed by the competitive system.

"I am of opinion, therefore, that the proposed plan of the industrial board of the Department of Commerce, viewed in any aspect, is unauthorized by law."

In accepting the resignations of the board members Secretary Redfield, the only cabinet officer who has supported the board, said:

"That board was conceived in the spirit of unselfish public service and has so acted from the beginning. There has been no change in its viewpoint, policy or attitude from the beginning. No statement nor inference to the contrary has a basis of fact. It has had the widespread support of industry and commerce throughout the country. It has sought merely to serve and has been ready to consider all figures, to respect all facts and to reconsider any statement or conclusion in the light of further knowledge. Its mind has been open and its purpose was directed not to winning a controversy but solely and simply to serving the country. I believe it has developed standards of public co-operation which will be of permanent value."

Chairman Peek's Statement

Mr. Peek issued a statement criticising the administration for failure to support the stabilization plan after it had been approved and declaring it inconceivable that the Railroad Administration's objection was sufficient to justify the abandonment of the policy.

Mr. Peek said in part: "The plan to make an immediate reduction in the cost of living, to remove the cloud of buying uncertainty and to anticipate by several months the return to normal business conditions has been abandoned. The plan was very simple—'In voluntary co-operation with business interests to arrive at a level of prices upon which business activities would be more actively resumed, and the Railroad Administration and other spending agencies of the government would be justified in buying liberally.' In so doing it planned to study costs of production, to add reasonable profits, and to announce the resulting price as a fair basis for buying.

"Weary of the details of the controversy between the Railroad Administration and the board, the public will yet demand an explanation of the wrecking, apparently on the obstinacy of a single official, of a plan of such apparent national value.

"Throughout the baffling controversy the board has found itself checked by forces in opposition which it could neither understand, reason with, nor overcome, but which grew in strength until they rendered further progress impossible and forced abandonment of the plan. It is inconceivable that the unsubstantial objection to the price of rails alone was sufficient to justify the abandonment of a policy of such importance. Nor has the director general been alone in thwarting the purpose of the board. The secretary of the treasury has taken a stand in direct contradiction with his message to the President urging the creation of the board. The attorney general has rendered an opinion that the plan of the board contravenes the Sherman act, but the facts assumed as the basis of that opinion are so inconsistent with

the actual course of conduct of the board as to render the opinion inapplicable.

"In all this opposition the board has sought in vain for a substantial reason. It has urged the Railroad Administration, first to aid it by one single fact, or argument, to arrive at a lower price for steel, and second to name a price which the Railroad Administration would consider fair. The first suggestion has been met with a stubborn and haughty silence, the second with a suggestion of absolutism: 'We will name you the price only on condition that you agree in advance to urge it on the steel producers'—and this in the face of the unimpeached cost studies of the board. Acceptance of such a suggestion would shame the manhood of the board.

"The only answer has been that the steel price announced by the board is 'too high.' If 'too high' means that the Railroad Administration can force lower prices, by smashing industry, smashing labor, smashing the public interest and throwing production into the hands of the most powerful and lowest cost producers, the board agrees that the price is 'too high.' But it was precisely these results the board was set up to prevent and the case stands proved that lower prices without these results are impossible. Still the Railroad Administration persists and announces specifically that its only view of a low price is one that shall, by inherent attractiveness, induce buying not by the Railroad Administration alone but *also by the old railroad corporations* who are so ably represented in the administration by the director general himself and by Messrs. Lovett and Walters, who have headed the opposition to the board.

"That the administration would commit itself against the public interest merely to support the ancient and discredited railroad slogan, 'the public be damned,' is unthinkable. Yet after all it is the administration, not the director general alone, who had power to thwart the board. Thus, there is no question that the board was set up to do exactly what it has done, and was set up with the full knowledge and assent of the administration and was given godspeed upon its way by Mr. Glass.

"The irrelevant opinion of the attorney general is dragged in. Persistently the activities of the board are referred to as 'price fixing' and 'agreement on prices with the steel producers.' Price fixing has never been attempted by the board. In co-operation with industry it has studied costs, added reasonable profits and promulgated the result. No one was under the slightest obligation to demand or to accede to these prices. Nor was any agreement by the steel producers to sell at these prices ever sought. Distortion of this course of conduct to make it appear a 'combination in restraint of trade' is little short of absurd and is only a further confusion of the issue.

"Members of the Industrial Board are experienced business men untrained in the devious ways of partisan politics. They came to their present task without hope of reward or advancement, believing that the war-time adjournment of politics in national affairs of economic importance had been extended to cover the period of reconstruction. Acclimated to the wholesome air of that adjournment by service on the War Industries Board, they have become stifled by the impregnated atmosphere that has come with the armistice, and are leaving gainers only by the conclusion that the inspiration of the war was not sufficient to induce the administration to give over the business of politics for the business of government.

"They have been unable to penetrate the inky cloud in which the political squid has concealed its escape from support of the board in a position which for some unstated reason was politically undesirable. I can only admit the public to my own perplexity among the following conjectures:

"In the beginning, did the present opponents of the board fail to foresee the far-reaching results to be achieved and was the growing importance and power of the board's policy too powerful a political engine to leave outside the administration's arsenal and in the hands of a non-partisan board? Does the administration plan for 1920 a platform of state-socialism which it now finds inconsistent with the results achieved by the board? Or, after all, am I giving too much credit for an acumen that does not exist and is what the board has encountered merely the machinations of the old railroad guard as represented by Messrs. Lovett and Walters and imposed on a too-complacent director general, or on a director general too jealous of his own prerogatives to see beyond the confines of his little czardom?

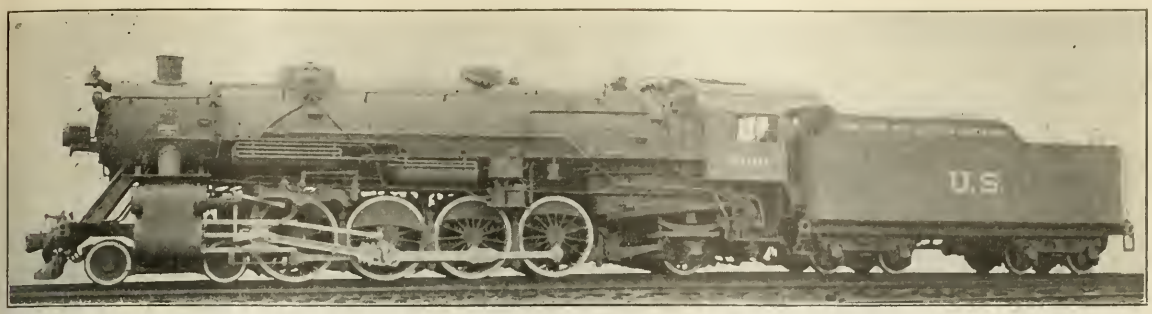
"The board cannot answer. It can only depart more in sorrow than in anger, and in great disappointment, from a lost opportunity to serve the country by a simple and sensible plan to reduce the cost of living and to return prosperity. In doing so it leaves a single message. The plan of the board was good. It is capable of accomplishing what it promised. The administration owes it to the nation to put that plan into immediate execution at the hands of some agency in which it can feel political confidence and sympathy."

Statement by Secretary Glass

Secretary Glass also issued a statement saying that the attempt made to fix minimum prices for the public seemed to him wholly indefensible and contrary to fundamental principles of economics, of public policy and of the law. "Surely the healthy restoration of industrial life and activity is not to be found in the perpetuation and exaggeration, months after the cessation of hostilities, of the artificial conditions which in war-time were tolerated as necessary evils," he said. "The original plan, which in its general features had my approval, was to endeavor to bring about a meeting of the minds, between the producers and those governmental agencies which had large purchases to make, upon bed-rock prices which would carry conviction that new enterprises might be undertaken with safety and the hope of profit. The Industrial Board, having failed to bring about such a meeting of the minds with governmental buying agencies, attempted to fix minimum prices for the general public, and thus did precisely that which it had been warned not to do. This action was promptly repudiated by me and the board was fully advised of the reasons and urged to mend its ways. Its subsequent efforts to force these minimum prices upon the railroad administration and its failure to recede from the action taken in attempting to fix minimum prices for the general public for a year, confirmed me in the view that the board was hopelessly committed to an unsound and dangerous policy.

There is scarcely one accurate assertion or sane deduction in all of Mr. Peek's intemperate screed; and to me it is now perfectly clear why there has been a sad ending of the movement which had its initial meetings in the Treasury, and which had for its purpose the revival of industrial activity through agencies and by methods that were not contrary to the statutes nor obnoxious to the elementary principles of economics."

The Chicago & North Western, before the Wisconsin Tax Commission, argues for the reduction of its preliminary assessment of $135,000,000 by $20,000,000. Unless this is done, declares T. A. Polleys, the road's tax commissioner, the state authorities will be exacting from the federal government approximately $300,000 of taxes not justly due to the state. A similar claim was submitted on behalf of the Chicago, St. Paul, Minneapolis & Omaha.



The U. S. R A. Standard Light Mountain Type Locomotive

The Administration Standard Light Mountain Type

The Last of the Government Designs to be Constructed; Weight 327,000 lbs., Tractive Effort 53,900 lbs.

THE FIRST of the Railroad Administration standard light Mountain type locomotives has recently been turned out at the Richmond works of the American Locomotive Company and assigned for service on the New York, New Haven & Hartford. This is the last of the standard designs prepared by the Railroad Administration from which locomotives have been built and locomotives of each of the twelve standards are, therefore, now in service.

These locomotives were designed on the basis of rail loads of 55,000 lb. on each driving axle. The actual weight in working order is 327,000 lb., of which 224,500 lb. is on the drivers. The engines produce a tractive effort of 53,900 lb., with a factor of adhesion of 4.2. In the table is presented a comparison of some of the more important dimensions and ratios of the standard light Mountain type with other moderate size locomotives of this type designed to meet conditions which would not permit of the use of maximum axle loads. With the exception of the Canadian Pacific locomotive few Mountain type locomotives designed for passenger service have been built with piston strokes greater than 28 in. It will be seen that the light Mountain type has cylinders of 30 in. stroke, which is also the case with the standard heavy Mountain type locomotive. Except for its greater tractive effort, partly due to the increased cylinder stroke and partly to the greater boiler pressure, the standard light Mountain type compares closely with the Chicago, Rock Island & Pacific Mountain type built in 1913. The heating surfaces compare closely, although the standard locomotive has a considerably larger grate than the earlier built locomotive.

COMPARISON OF THE PRINCIPAL DIMENSIONS OF LIGHT MOUNTAIN TYPE LOCOMOTIVES

Road	U.S.R.A.	Cent. of Ga.	C.R.I. & P.	Can. Pac.
Year built	1919	1919	1913	1915
Tractive effort, lb.	53,900	47,800	50,000	42,900
Total weight, lb.	327,000	316,000	333,000	286,000
Weight on drivers, lb.	224,500	209,500	224,000	192,000
Diameter of drivers, in.	69	69	69	70
Cylinders, dia. and stroke, in.	27 x 30	27 x 28	28 x 28	23.5 x 32
Boiler pressure, lb.	200	190	185	200
Heating surface, total, sq. ft	4,121	3,649	4,117	3,667
Superheating surface, sq. ft.	966	961	944	760
Grate area, sq. ft.	70.3	66.8	62.7	59.6
Tractive effort × dia. drivers ÷ equivalent heating surface	667.7	648.0	623.5	625.0
Equivalent heating surface ÷ grate area	79.2	76.2	88.2	80.7
Firebox heating surface ÷ equivalent heating surface	6.2	5.8	3.4	5.5

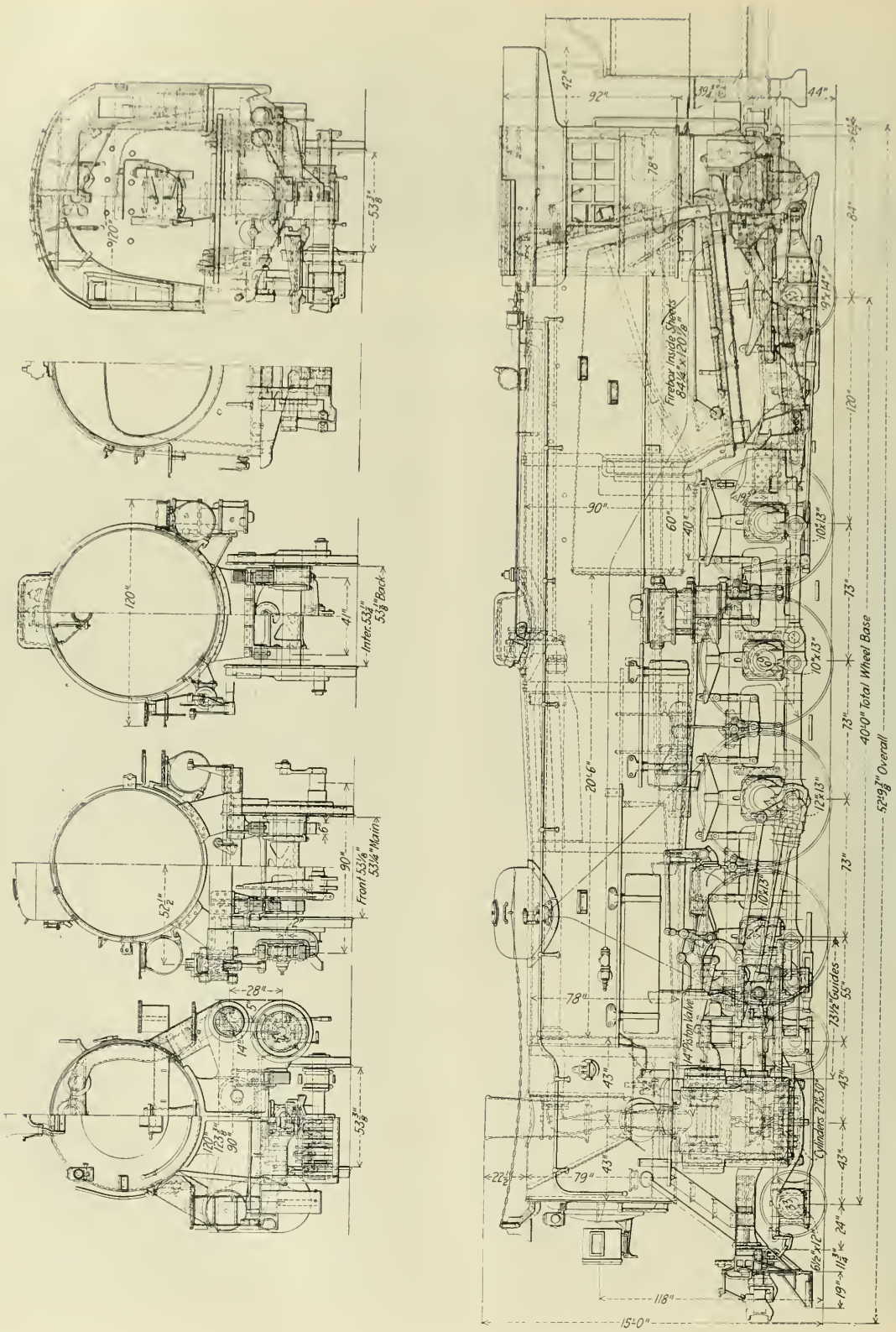
In design the light Mountain type locomotive is essentially the same as the other standard types, following closely the lines of the heavy Mountain and the two Pacific types.

The boiler is of the conical wagon top type, with the dome set on the third course. The firebox includes a combustion chamber extending forward 60 in. from the throat sheet, leaving for the tubes a length of 20 ft. 6 in. There are 216, 2¼-in. tubes and 40, 5½-in. flues for the elements of the type *A* superheater. The same number of tubes and flues are also used in the boiler of the heavy Pacific type locomotive, the length of which, however, is 19 ft., with a 38-in. combustion chamber. The size of firebox at the mudring is the same for both boilers. The boiler of the light Mountain type is fitted with a Shoemaker power operated firedoor.

The frames are similar in design to those of other single unit standard types. The width is six inches and the top rail has a maximum depth of 7⅞ in. over the pedestals, with a minimum of six inches between the pedestals. The lower rail has maximum and minimum depths of 4¾ in. and 4¼ in., respectively. The cylinders are carried on a single front rail of slab section, cast integral with the main frame. This rail tapers under the cylinder fit from a depth of 10⅝ in. at the rear to a depth of 9⅝ in. at the front, the width being 6 in. under the cylinders and to a point 30 in. back from the front end of the casting. Unit steel cradle castings are spliced to the rear of the main frames, the joint being of the same type used on all of the other designs which are fitted with trailer frames.

The cylinders, pistons and valves are similar in details to those on practically all of the other locomotives, the valves being of the piston type and 14 in. in diameter. The front and back cylinder heads are interchangeable between this locomotive and others having cylinders 27 in. in diameter, including the heavy Mikado, the light Santa Fe and the heavy Pacific types. The cylinder and valve chamber bushings, valve bull rings and packing rings, piston bull ring and packing rings and crosshead shoes are all of Hunt-Spiller gun iron.

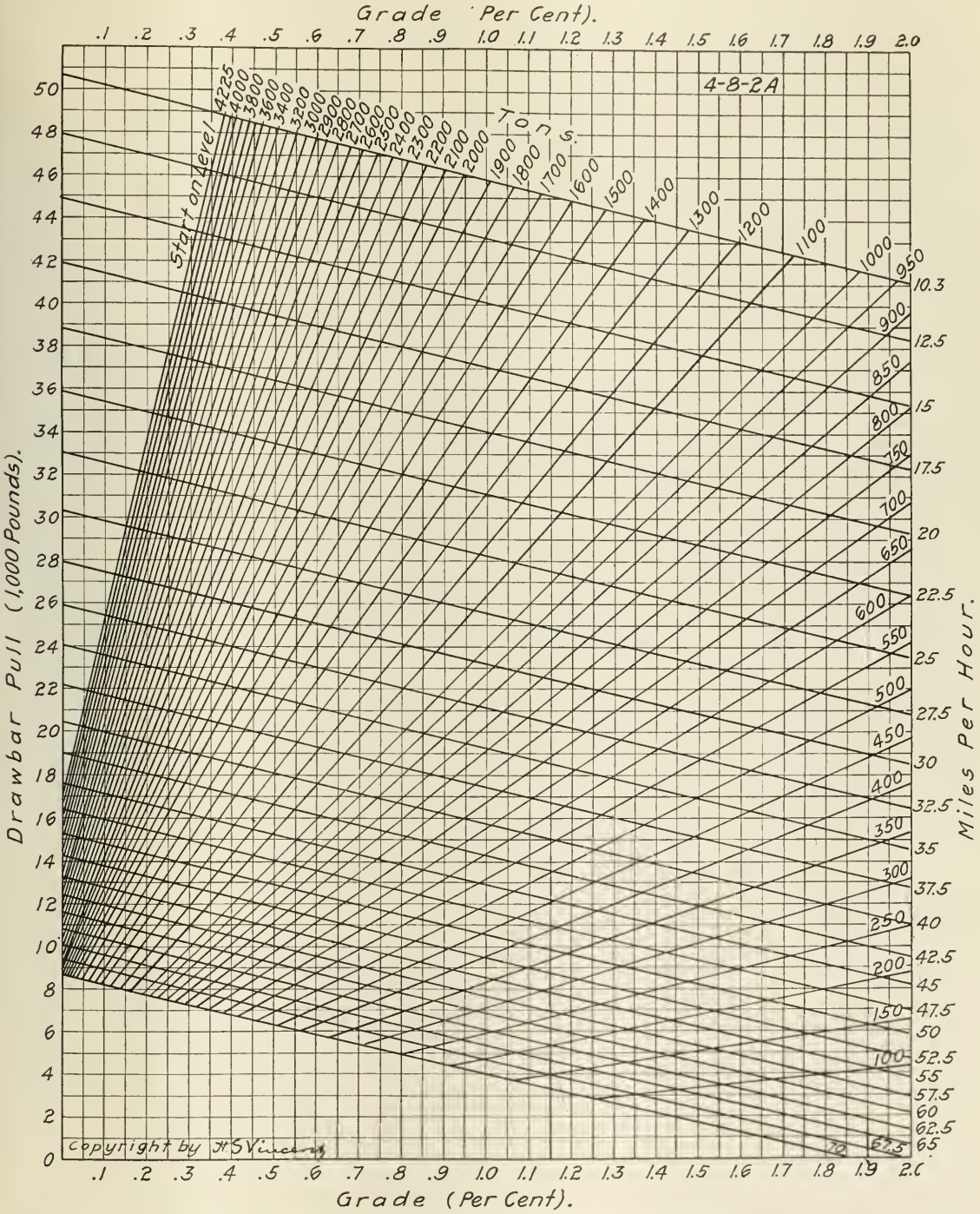
The main and side rods differ in no essential from those on any of the other locomotives. The side rods are of slab section, this being the rule the only exceptions to which are in the case of the two Pacific type locomotives, which have I-section side rods. There is a considerable degree of interchangeability in the side and main rod bearings between the various classes of standard locomotives. The back end main rod brasses of the light Mountain type interchange with those of the heavy Mikado, light Santa Fe and heavy Pacific types, while the front end main rod brasses interchange with both Mikado type locomotives, the eight-wheel switcher, the light Santa Fe and both Pacific types. Similar, although



Elevation and Sections of the Standard Light 4-8-2 Type Locomotive

not exactly the same interchangeability applies to the side rod bearings.

Driving boxes and axles are also of interchangeable design to a very considerable degree. The journal sizes on the front, intermediate and back pairs of drivers of the light Mountain type are 10 in. in diameter by 13 in. in length. With the exception of the main journals, those of the light Pacific, both Mikado types and both Santa Fe types have the same size and both axles and driving boxes interchange. The main journals of the light and heavy Mountain, heavy



Tonnage Rating Chart for the Standard Light Mountain Type Locomotive

Mikado, heavy Pacific and light Santa Fe types are interchangeable.

The tenders have Commonwealth unit frame castings and are carried on Commonwealth equalized four-wheel trucks. The tank has a capacity of 10,000 gallons, carries 16 tons of coal and is fitted with the Locomotive Stoker Company's coal pusher. The tanks are built up of ¼-in. and 5/16 in. plate with 2½-in. by 2½in. by ⅜-in. angles at the corners, for the attachment of the splash plates and for the crossties. Two T-irons of 4-in. by 3-in. by ⅜-in. section are used as horizontal stiffeners on each side of the water space and to these the ends of the crossties are attached. The cistern opening has a length of 96 in. across the tank and a width of 18 in.

The clearance diagram and wheel loading diagrams which are included were prepared by F. P. Pfahler, chief mechanical engineer of the Division of Operation, of the Railroad Administration. Actual weights are shown on the wheel loading diagram. The tonnage rating diagram was prepared and is copyrighted by H. S. Vincent. The curves of hauling capacity are constructed for a car resistance of four pounds per ton. The chart may be used for any other car resistance or for any combination of resistances by converting them into terms of grade.

1 lb. car resistance = .05 per cent grade
1 deg. curve uncompensated = .04 per cent grade

For example, find the tonnage which can be hauled in passenger service on 0.5 per cent grade combined with a five degree uncompensated curve at 40 m. p. h. The resistance of passenger coaches at 40 m. p. h. is 6.65 lb. per ton.* The equivalent grade is then:

$$0.5 + (5 \times .04) + (2.65 \times .05) = 0.8325 \text{ per cent.}$$

At the intersection of the ordinate for 0.8325 per cent grade with the drawbar pull curve for 40 m. p. h., we find 800 tons as the capacity of the locomotive.

A list of the specialties on all of the standard locomotives was published in the January 3, 1919 issue of the *Railway Age*, page 91. The principal dimensions and data for the light Mountain type locomotive are as follows:

General Data

Gage	4 ft. 8½ in.
Service	Passenger
Fuel	Bit. coal
Tractive effort	53,900 lb.
Weight in working order	327,000 lb.
Weight on drivers	224,500 lb.
Weight on leading truck	49,500 lb.
Weight on trailing truck	53,000 lb.
Weight of engine and tender in working order	519,000 lb.
Wheel base, driving	18 ft. 3 in.
Wheel base, total	40 ft. 0 in.
Wheel base, engine and tender	75 ft. 8½ in.

Ratios

Weight on drivers ÷ tractive effort	4.2
Total weight ÷ tractive effort	6.1
Tractive effort × diam. drivers ÷ equivalent heating surface*	667.7
Equivalent heating surface* ÷ grate area	79.2
Firebox heating surface ÷ equivalent heating surface,* per cent	6.2
Weight on drivers ÷ equivalent heating surface*	40.3
Total weight ÷ equivalent heating surface*	58.7

*See the *Railway Age* for October 4, 1918, page 631, for a table of passenger cars resistances for use with these charts.

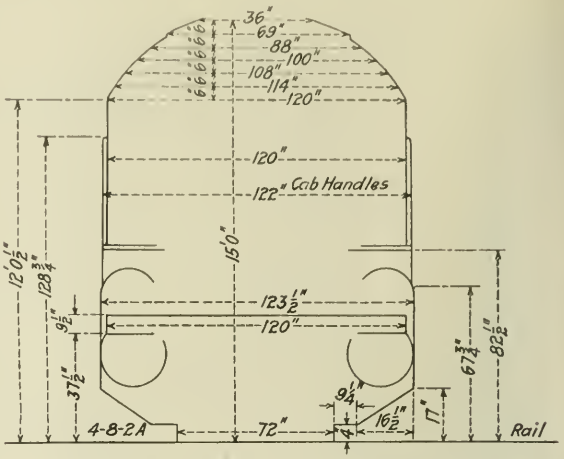
Volume both cylinders	19.9 cu. ft.
Equivalent heating surface* ÷ vol. cylinders	279.9
Grate area ÷ vol. cylinders	3.5

Cylinders

Kind	Simple
Diameter and stroke	27 in. by 30 in.

Valves

Kind	Piston
Diameter	14 in.
Greatest travel	7 in.

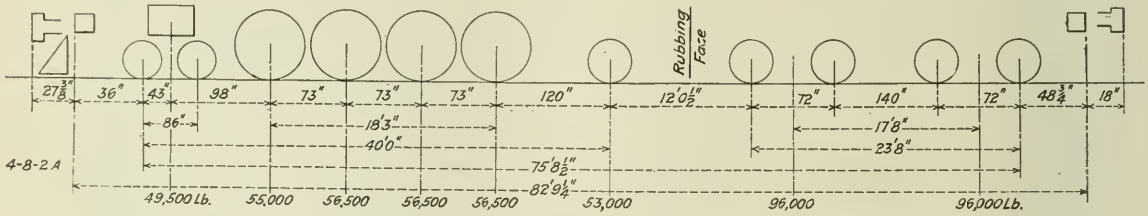


Clearance Diagram for the Light 4-8-2 Type

Steam	1¼ in.
Exhaust clearance	1⅛ in.
Lead	¼ in.

Wheels

Driving, diameter over tires	69 in.
Driving journals, main, diameter and length	12 in. by 13 in.
Driving journals, others, diameter and length	10 in. by 13 in.
Engine truck wheels, diameter	33 in.
Engine truck, journals	6½ in. by 12 in.
Trailing truck wheels, diameter	43 in.
Trailing truck, journals	9 in. by 14 in.



The Distribution of Wheel Loads for the Standard Light Mountain Type

Boiler

Style	Con. wag. top
Working pressure	200 lb. per sq. in.
Outside diameter of first ring	78 in.
Firebox, length and width	120⅛ in. by 84¼ in.
Firebox plates, thickness	Tube and throat, ½ in.; others, ⅜ in.
Firebox, water space	Front, 6 in.; others, 5 in.
Tubes, number and outside diameter	216—2¼ in.
Flues, number and outside diameter	40—5½ in.
Tubes and flues, length	20 ft. 6 in.
Heating surface, tubes	2,597 sq. ft.
Heating surface, flues	1,176 sq. ft.
Heating surface, firebox, including arch tubes	348 sq. ft.
Heating surface, total	4,121 sq. ft.
Superheater heating surface	966 sq. ft.
Equivalent heating surface*	5,570 sq. ft.
Grate area	703 sq. ft.

Tender

Tank	Water bottom
Frame	Cast steel
Weight	192,000 lb.
Wheels, diameter	33 in.
Journals, diameter and length	6 in. by 11 in.
Water capacity	10,000 gal.
Coal capacity	16 tons

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

Some Phases of Government Control*

Shall Railroad Labor Be Considered to Be Affected with a Public Interest as Is Railroad Capital

By Wm. Church Osborn

IT IS GENERALLY BELIEVED that the government took control of the transportation organization of the United States on January 1, 1918. Such is not the case. The control bill gave the government real control of only a part of the organization. It is true that the government assumed control of the physical property and the money of the railroads; the right to change rates, etc., at its pleasure. The government freed itself completely from the restrictions of the Sherman act and the Hepburn bill as to pooling, consolidations, etc., including the regulations of the Interstate Commerce Commission, all of which had for years been the accepted policy of the country in managing the transportation interests, but the government did not assume control of railroad labor.

A transportation system is a living organism. It gets its life from the men who run it and it works well or ill according as the men constituting the organization conduct themselves. It is a mistake to think of a railroad as the right of way, the rail, the engines, the cars, the terminals and the financial management with the bonds, stocks and balances in bank. As a fact, these things are less than half of a railroad. The other half is the working organization of men—from the president to the gate tender, from the traffic manager to the advertising agent—which runs the road. The flight of the Twentieth Century from New York to Chicago is made possible because each one of some thousand men performs his appointed duties at the stated minute. The people of the country will get good or bad transportation; will pay more or less for it, in direct ratio as the two million or more of ordinary railroad employees perform their duties well or ill.

The total operating revenues of the railroads for 1918 were $4,800,000,000; of this $2,400,000,000 was paid to labor, the rest went in materials, taxes and the rental. The dominating fact of government operation is therefore, that although the government took actual control of about 50 per cent. cost value of the transportation organization of the country it remained in the position of a private employer with reference to the remaining 50 per cent. of the transportation business, i. e., the human organization of the system. Mr. Kruttschnitt, president of the Southern Pacific lines, is reported to have said that if he had to choose between the return of a railroad without an organization, or of an organization without a railroad, he would take the organization. The control bill granted to the government no special powers of arbitration of differences with the railroad employees. It made no prohibition upon leaving the government railroad service without notice and without cause; it granted no coercive authority such as enlistment or the fixing of a penalty for failure in duties. It left the "right to strike" in full effect. It is therefore a misstatement to say that we have had government control of the railroads since January 1, 1918.

The cost of materials and supplies, the maintenance of the organization and the necessary payments for capital and taxes absorb to-day about 50 per cent. of the gross annual revenues. The remaining 50 per cent. is paid directly to labor. We have, therefore, about 50 per cent. of the railroad business under regulation and control and about 50 per cent. free. The question is whether an organization half regulated and half unregulated can endure.

The problem before the American people in settling our transportation question is no longer to check the rapacity of capital, or to control the autocratic tendencies of the operating officials, or to fix the nature of the facilities to be given to the public. Capital no longer regards a railroad investment as a profit maker and will be thankful if its existing investments shall return a moderate income. The once haughty managers of railroads now know their masters and agree to requests of national and state commissions on all sorts of details, from placing unnecessary brakemen on a train, down to the character of drinking cups permitted in the cars. They are ready to install steel equipment, terminals, block signals and any other desirable railroad facilities, provided they can obtain the money to pay for them. The great body of financial sentiment approves government supervision of the issues of railroad securities and is prepared fully to endorse the government making of rates, provided they will make a return upon the existing investment. The people may therefore feel that as to 50 per cent. of their transportation no serious obstacle stands in the way of a full control; as to the remaining 50 per cent. of transportation the situation is different. From the passage of the Adamson law, raising wages by Congress, under threat of a nation-wide strike, in the month of January, 1917, down to the settlement of the harbor strike in New York City in 1919 by the acceptance of the strikers' terms by the railroad administration, there has not been an instance where the demand for increased pay and reduced hours by the railroad employees has not been granted.

Since the passage of the Adamson law, viz., the period from January 1, 1917, to date, the pay of railroad men has been increased by successive stages so that the actual increase in pay in the year 1918 over the year 1916 would amount to over $900,000,000 and the estimated increase in 1919 over 1916 would be approximately $1,000,000,000. In order to understand these figures they may be contrasted with various other railroad items; for instance, the increase in freight and passenger rates in 1918 produced the sum of approximately $800,000,000. It is estimated that these excess rates, 25 per cent. on freight and 50 per cent. on passenger, will produce in the fiscal year from July 1, 1918, to June 30, 1919, the sum of $1,000,000,000. In other words, practically all of the increase in rates has been absorbed by the increased labor charges on the roads. Contrast again the payments to labor with the payments on account of capital and we find that the increase alone in labor is equal to the entire annual rental of the properties. That rental is fixed under the Control Bill at approximately $920,000,000 a year.

There is no mystery about who pays the railroad freight rates. They are paid first by the farmers, the manufacturers and the dealers, but they are passed on to the consumers and make part of the cost of living. The people pay the freight. The people pay excess labor charges just as they pay excess capital charges. A general railroad strike is therefore a strike to make the people pay more or grant easier conditions. A railroad strike stops industry and the food supply. Hence we are all afraid of it.

One great result of government operation has been to

*An address read before the National Institute of Social Sciences, April 25, 1919.

make it clear to the public that they have not to deal with an ordinary conflict between capital and labor. Capital is not at present involved or interested in the subject. It is probable that the readjustment will give capital little or no voice in rates or management. The question before the country is a larger one, viz., whether the 50 per cent. of railroad earnings going to labor shall be subject to regulation and control as is the remaining 50 per cent., or whether it shall be left to the laws of supply and demand and subject to the "right to strike." The government management has shown itself to be helpless in the face of an organized demand by a large number of voters and that tendency of government, being equally apparent both in England and France, may be taken to be a general characteristic and we must consider any plans for the future management of transportation with that feature in mind.

It is the general statement in Washington by senators and others in interest, that the roads may be turned back to private management but under far greater control than has existed heretofore. The labor question is an inconvenient question, certain to stir up trouble and arouse anger, but if the people are to have satisfactory transportation conditions, they must face the problem of the control of railroad labor as well as that of the control of railroad capital and operation. This is not a question for capital. As I have pointed out, capital for railroad enterprise has ceased to be speculative and profit making and is merely interest bearing. New capital can be had at market rates by making it secure. The subject of future capital requirements, however, is not germane to this paper.

There is a common assumption that the roads will be turned back to private owners without action upon the labor problem. As the roads are operated at a heavy loss under the existing conditions that proposal would mean placing upon private management the burden of exacting efficient service from labor and reducing payrolls to a point at least of transportation solvency. The result will be unco-ordinated efforts of a great number of different railroad managers, some strong, some weak, some vindictive, some easy, each considering his business as a separate problem and solving it as a special railroad problem without reference to the general labor requirements and conditions of the country. Doubtless, such a readjustment would be accompanied by costly and exasperating strikes. The public would be inflamed against the railroad management and much injustice and suffering would result to the men and to their families.

A more ideal way, and one more consonant with the views of an idealistic administration, would be to require the Interstate Commerce Commission to inquire into and regulate the surroundings and proper compensation of railroad labor, both wages and hours, as compared with the general labor conditions in the country. Upon that commission should sit men familiar with the conditions of railroad labor and also men familiar with the interests of the shippers using the railroads, such as members of chambers of commerce and the agricultural industry of the country. If possible, some members should be found who really represented the consuming public upon whose broad shoulders ultimately rests the burden of supporting the transportation of the country. Indeed, the balance of power on the commission should rest with those who have no interest except to second the general welfare, who can carry a just proportion between the special interest of the railroad employees and the general interest of the farmers, the laboring classes and the salaried people throughout the country. If the public desires to control its transportation interests, and has determined through the commission what is a fair return for railroad labor in its different classes, and has made provision for a just revision of the scale from time to time as may be required by general conditions in the country and in the industry, the public must, to be consistent if for no other reason, face the question of how the award of the commission shall be enforced.

Shall railroad labor be considered to be "affected with a public interest" as is railroad capital? Shall entry into the service be made subject to certain fixed conditions with regard to leaving the service, such as thirty days' notice, the refusal of re-engagement in case service is terminated without adequate cause? Shall compulsory arbitration be adopted? Shall it be a misdemeanor to leave the service in a strike against an award adopted fairly and after due consideration? How can the railroad service be made attractive by way of old age pensions, better facilities for living, etc.? Such are the problems which the American people face in settling their transportation question. If we attempt to turn over the management of the 50 per cent. of the problem to private control, we must face difficulties of a character far more serious since the changes brought about by the war, than those which existed previously. The owners of the railroads do not wish to take them back under existing conditions. There are many who think that the proposal to leave the readjustment of these matters to private control would bring about a general bankruptcy of the transportation systems of the country. As a matter of fact, the government control is bankrupt to-day. In spite of the fact that it has raised railroad rates a billion dollars, its management is a half billion dollars behind its obligations. Government operation will require a billion appropriation by July. About a quarter of the war tax levy for this year besides another billion in transportation tax are thus due to government operation. Were it not for the taxing power, the government administration would have to seek refuge in a receivership. This condition is largely caused by the increased cost and the growing inefficiency of labor under government control, and makes plain the necessity of attacking with moderation and fairness but determinedly the problem of securing effective regulation of railroad labor in the United States.

The problem is not one of labor and capital. It is one of the relation of one branch of labor to the other labor, industries and interests of the country, for railroad rates touch everyone in the United States. There is no work in which men take such an intense and loyal interest as the railroad men take in their jobs. There is no class from whom loyal service is so essential to the public interest, because of their direct touch with the public both in passenger and freight transportation. There is no class of labor for which the strike is so tempting and so potent a weapon. A transportation strike is a blow at the food supply of the country and paralyzes all industry by withholding material and shipments. It would be an indictment of our courage and our collective intelligence to leave this desperate remedy of a transportation strike as a temptation to the railroad workers and as a menace to the general public.

The discussions in Congress and in the press have avoided the subject of railroad labor. There is a general readiness to let some one else bell the cat.

Railroad operatives are a very fine body of men. Their work takes them away from home and involves some risk. They are well entitled to good pay and good hours. But in the interest of the public they must submit to steady discipline and be held to it. The same interest requires that its food and material supply be not interrupted, and that its freight charges be not unduly raised.

Surely some method can be found, fair alike to the railroad employees and to the general public, which will solve the question indicated in the foregoing pages, upon the grounds of absolute justice and equitable treatment relatively to other industries and interests in the country.

Some Modern Tendencies in Roundhouse Design*

Economic Studies of Engine Terminals Demonstrate the Advantages of Permanent Construction

By Exum M. Haas
Railroad Specialist, The Austin Company, Cleveland, Ohio

An engine terminal is a clearing house for motive power, hence anything done to obviate delays tends to increase the traffic-carrying capacity of the road without increasing the fixed charges. The tremendous increases in traffic, operating charges, and hauling capacity of locomotives and their cost have proportionately increased the demand for full utilization of a locomotive's earning power. Mere minutes saved on each locomotive handled, when multiplied by the total number of locomotives of a given road, and reduced to money, will finance unbelievable improvements.

I refer to this phase of the engine terminal problem to indicate that a road can afford to pay for the most efficient facilities. As a matter of fact, a 100-engine terminal can be built at present day prices, and fully equipped, for $660,000. This would result in annual fixed charges of about $69,300, at 10½ per cent for interest and depreciation, or at about $2 per engine per day. For a terminal of this size, a 20 to 25-stall roundhouse would be required. Assuming 24 stalls, the house would cost about $220,000, or about one-third of the terminal cost. This amount would provide a roundhouse, equipped with all the modern labor-saving facilities, and it could be so constructed as to reduce depreciation to a minimum. For instance, a reinforced concrete structure would carry a rate of about 2½ per cent for depreciation, whereas a brick wall, wooden frame and roof structure would carry at least a rate of 5 per cent.

While the weight of locomotives has increased about 100 per cent, the cost has doubled. This also emphasizes the need for better facilities for the protection of the motive power. A locomotive is not a fire risk in itself, but when it is placed in a wooden roof roundhouse it certainly becomes one.

Some roundhouses are quite important running repair shops; hence anything incorporated in the design that will reduce the time to clear a locomotive should be adopted. Of course, there is an economical limit to the amount that can be spent, but that need not worry most of us, because there is so much room for improvement at most terminals that we would find it difficult to reach the limit of cost. For instance, engine terminal costs varied in 1918, so far as my knowledge goes, from $25,000 to $50,000 per stall of house capacity. The roundhouse proper has varied in cost from $6,000 per stall, with lighting, heating and plumbing, to $22,000 per stall. Both of these figures are high for the types of construction used, because of the abnormal labor and material market conditions prevailing in 1918, but the cost relation would hold even in normal times. On the other hand, from what I know of the labor-saving facilities provided in the higher-priced terminal and the permanence of its construction, I believe the mechanical department will have no difficulty in justifying the greater investment.

The Question of Labor

Another of the broader questions affecting roundhouse design at present is labor. This concerns the quantity and class of help available, and the working conditions and wages. Under prevailing industrial conditions intelligent labor has obtained employment at higher wages and with more satisfactory working conditions than are commonly found in and about a roundhouse. The roundhouse design must meet this form of competition or the quality of labor will fall below its present standard, and roundhouse labor is none too intelligent now.

Conditions in the average roundhouse built 20 years ago were not conductive to efficiency or economy. Poor day and night illumination and a lack of proper handling and machine tool equipment not only reduced the capacity of the house for clearing locomotives, but resulted in serious delays. On the other hand, the shortage of desirable help and the correspondingly higher prices that must be paid to obtain good men, make it important that all the facilities necessary and consistent with economy be provided to increase the production per man. The increased use of bridge and jib cranes in roundhouses is evidence of an appreciation of this fact. The substitution of the electric hoist for the truck and driver drop pits is another example. Improved daylighting in the working areas, and better heating and ventilation are also examples of the tendency to improve roundhouse conditions. Paved floors and walks, attention to good drainage, all add to engine terminal efficiency, and do not materially increase the fixed charges.

Modern Types of Construction

Modern roundhouses divide themselves into three classes—the brick wall, wood frame and roof; reinforced concrete frame and roof, and a combination of steel frame and reinforced concrete structure. In one or two instances, concrete frames with wooden roofs have been built to reduce first cost, and in others reinforced concrete unit construction was adopted. The brick wall, wooden frame and roof construction has been most generally used because of its cheapness.

A roundhouse located at an unimportant terminal, housing engines that are comparatively small, is usually of simple design. The present tendency, however, is to increase the height to improve daylighting and ventilation. Houses of this type should be built of slow burning construction throughout—nothing less than 2-in. sheathing, and preferably 3-in. on 6 in. by 12 in. rafters—and all S-4-S and heavily coated with a fire-resisting paint.

On many roads the frequent post spacing has been found objectionable. This was the case with the New York Central Lines, and a 64-ft. truss has been substituted in the working area for the columns and beams. These trusses were formerly of heavy timber construction, but are now built up of bolted planks. The reason for this change was to cheapen the construction without reducing the quality of the lumber. This house has a one-bay portal way, with a lean-to at the back of the house. The lean-to in the rear not only provides a working aisle, but also permits the locomotives to be shifted over the driver and truck drop pits. There is some difference of opinion regarding the lean-to, but it is undoubtedly a cheaper construction than if the trusses had been carried the full width of the house.

In but comparatively few instances have the reinforced concrete houses, which are now being quite generally used, followed the same section as the wooden frame roundhouses.

*Abstracted from a paper presented before the Western Society of Engineers, Chicago, May 12, 1919.

Generally speaking, however, they have been of the monitor-type construction, varying principally in the number and spacing of the columns. For instance, Philadelphia & Reading has built a house of three-bay construction, two low bays on each side of a monitor section. The interior columns are all structural steel encased in concrete. The reason for adopting this type of column was to permit the installation of a jib crane. The roof is a combination floor tile, T-beam construction to form an insulating medium against temperature changes and condensation. All sashes are of steel with pivoted ventilating sections. As an aid in ventilation, five permanent slot openings were provided at the ceiling line between each set of columns in both sides of the monitor and through the back wall. In addition, of course, there is the smoke jack and the opening around it.

I believe the first instance where a bridge crane was installed in a roundhouse was that in one built by the Baldwin Locomotive Company at Philadelphia. This was built for repairing locomotives, and is equipped with two cranes, the larger of which is of 50 tons capacity. Among the first of the bridge crane types of houses built by a railroad was that of the Pennsylvania Railroad at Altoona, Pa. It was constructed in 1902 and consists of 52 stalls, handling an average of between 250 and 350 locomotives daily. The head room in the crane section is about 30 ft. and the crane capacity is 12½ tons. It is interesting to note that an analysis of roundhouse crane requirements on the Pennsylvania Railroad made recently developed the fact that the maximum load that a crane would be required to handle was about 8½ tons. This meant that a 10-ton crane would be adequate for all purposes.

Another house along similar lines, and one which has been described quite frequently in technical journals, and railroad engineers' hand-books is that of the Western Maryland at Hagerstown, Md. This house is a steel frame construction, encased in concrete. Woven wire mesh was wrapped about the steel, and the concrete put in place by the Gunite system. The roof slab is 3-in. concrete with Hyrib reinforcing. It is of double monitor construction, permitting daylight to enter at three points in addition to the back wall. In connection with steel frame houses, I would call your attention to the fact that built-up columns, girders of heavy section, are being used as the frame in the new houses recently built by the Pittsburgh & Lake Erie. This company believes that proper attention to painting will give unusually long life to these steel frames.

The type of house recommended where repairs are light has a reinforced concrete frame with a column spacing that results in economical concrete beam construction. The roof slab is flat on the under side, and is formed with 8 in. by 24 in. floor tile, and 4 in. concrete T-beams. This provides an insulated roof and one which is just as cheap to construct as the plain slab. The location of the monitor windows is such that it will throw daylight into the working area. In addition, the sash area in the lean-to at the back of the house is large. Provision has been made for omitting one set of columns in the drop pit section. This is done to provide a clear floor area between the pits for removing wheels from the drop pits to the back of the house. Permanent openings 4 in. by 18 in. in section at the front and rear of the monitor and just below the roof slab will take off the gases which collect at those points.

So far as we can learn, the life of steel sash in a roundhouse is somewhat longer than of wooden sash in the same location, and it is just about as cheap. If it is kept well painted, steel sash has the additional advantage of not swelling under excessive moisture, and the ventilators are just as readily operated in the winter months as in the summer.

In houses where heavy repairs are made a crane of approximately 50 ft. span should be provided which, with a slight shifting of the locomotive, will reach any of the heavy repair parts which have to be handled. The height of the crane rail should be 26 ft. 6 in. above the floor line, which is sufficient to permit of the crane removing the cab without striking other parts of the locomotive. This height also greatly facilitates all crane movements. In a house with a craneway the objection may be raised to the fact that smoke and gases flow freely from the locomotive and fill the entire monitor section. In other words, the crane installation does permit the installation of the usual smoke jack. It has been found in houses of this section that the high monitor and the installation of a large ventilator or jack in the roof over each stall does not result in an objectionable accumulation of gases and smoke. In the winter time, and even in the summer, the fan in the hot blast heating system can be kept running to force out the gases.

I also want to call attention to the growing tendency to substitute the electric hoist for the truck and driver drop pit. In addition to reducing liability of accidents it removes wheels more quickly and cheaply. While this hoist is sometimes installed in the roundhouse, its proper location is in the back shop. In any case, the back shop should be connected with the roundhouse by a passageway, lined up with the turn-table, so that the dead locomotive can be pushed through the house into the back shop. With the electric hoist in the shop section, the removal of wheels is under proper supervision, and the handling of repair parts to and from the various machine tools is for but a short distance. Placing the hoist in the back shop also releases a stall for regular roundhouse service. Serious objection to the drop pit has developed in recent years, owing to the extremely heavy locomotives and to the declining quality of roundhouse help. While accidents due to jacking up the locomotives for the removal of wheels do not occur frequently, there is always the liability, and it has greatly increased with the failure to obtain intelligent labor.

Other Details

With the curved roof in a roundhouse the valley construction does not collect drifting snow like it does in a rectangular building. The wind has a sweep at the house from practically every direction, and those who have had long experience in roundhouse maintenance advise that they have never seen a great accumulation of snow on the roof. By pitching the monitor section to the rear of the house, as well as the lean-to to the back, practically all of the roof drainage is carried to a point where it does not interfere with the operation of the house.

Two types of roundhouse doors are quite generally used—a two-leaf steel-frame, wooden swinging door, and a rolling wood slat door. The former is the most popular because repairs are more readily made. The question is frequently raised whether or not it is desirable to provide sash in the door or in a transom over the door. Sash in the door permits lowering the roof level, but to some it is objectionable because the rough usage results in frequently broken glass. Daylight at the front of the house is not so essential, and all that is really needed may be had through small transom sash. On the other hand, it has been found that most of the blows which would break the glass in the door would break a wooden panel, and the glass is more readily replaced than the wood. For that reason, the glass area in the doors is made quite liberal in the houses built by a number of roads.

Another tendency in roundhouse design and construction which has come into more general use in the past few years is the substitution of the hot blast heating system for the pipe coils or other forms of direct radiation. A hot blast heating system installation costs very little more than a direct system, and it has the additional advantage of providing forced ventilation in the house, which is often very neces-

sary. At first the selection of too low fan and radiation capacity resulted in the indirect system being unsatisfactory. This has been corrected, and the fan may be speeded up in extremely cold weather to raise the temperature for thawing out frozen locomotives quickly.

Thirteenth Engineers Returns to Chicago

THE GREATEST RECEPTION given to any organization of returning soldiers at Chicago was given to the 13th Railway Engineers on May 12. Its welcome to its home town was unequaled in point of enthusiasm and spectacular expression in the after-war history of the city. Approximately 100,000 people banked Michigan boulevard on both sides and maintained a bedlam of noise as the regiment paraded in platoon formation. Employees of the six railroads centering in Chicago, from which the 13th Engineers was mainly recruited, were organized in groups along Michigan boulevard to welcome the men. Major General William M. Black, chief of the United States Engineer Corps; Colonel R. D. Black, general staff, one of the organizers of the 13th Engineers; S. M. Felton, president of the Chicago Great Western and father of the 13th Engineers; W. L. Park, federal manager of the Chicago Great Western and chairman of the reception committee; the federal managers of the six roads from which the regiment was recruited and other prominent railroad men in Chicago occupied the reviewing stand on Victory Way. Major General Leonard Wood, who was to have reviewed the troops, was caught in the crowd at one of the street intersections and was unable to pass.

A majority of the regiment arrived in Chicago on Sunday night and after being permitted to go to their homes assembled at dawn and marched to the Coliseum where thousands of relatives and friends welcomed them home. At 11:30 the men were again assembled and as they turned into Michigan boulevard for their parade, engineers on the Illinois Central and other railroads in Chicago opened their whistles until the parade had passed from Victory Way on Michigan boulevard into the loop district. The din created completely silenced the famous band of the 13th Engineers. Flower wreaths were hung over the shoulders of Colonel C. L. Whiting, in command of the regiment, battalion commanders and company officers, and a company of girls scattered roses on the pavement in advance of the men. Immediately after the parade the men were taken to one of the large hotels where they were dined and entertained.



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Officers in Command of the Regiment

Major General Wood in addressing the men after this banquet made an appeal for the formation of a strong national policy of preparedness and urged the men to establish conditions to prevent another war.

Mr. Park, after welcoming the men on behalf of the middle west railroads, read a letter from Governor Lowden of Illinois, whose illness prevented him from attending and



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Thirteenth Engineers Passing Victory Way on Michigan Boulevard

added that every man in the 15th Engineers has his position on his old railroad waiting for him. A cordial welcome was also extended to the men by Major General Black and S. M. Felton and praise for the work the men had done in France was voiced by Colonel Whiting. Colonel Black, who was transferred from the regiment soon after their arrival in France, was then called upon by the men for a speech and told of his pride in having once been a member of the regiment.

The men entrained at three o'clock for Camp Grant where they will be demobilized.

The history of the regiment incorporated in the main report written by Captain L. E. Warner, regimental historian, to the Engineer Staff, American Expeditionary Forces, has been printed by the reception committee and is to be distributed to the men. A silk embroidered replica of the



Photograph copyright by the International Film Service, Inc.

On State Street

official regimental insignia with each man's name embroidered thereon is also to be sent to the men as soon as it can be prepared.

Permanent organizations to preserve the 15th Engineers have already been started, one for the officers of the regiment and the other for the enlisted men.

Orders of Regional Directors

STOREHOUSE DEVICES AND PRACTICES.—Supplement 2 to Circular 85 of the Central Western Regional Purchasing Committee outlines a list of special appliances, devices and profitable practices reported by various regions to the Stores Section of the Division of Purchases.

Weekly Report of Delayed Loads.—Order 199 of the Southwestern regional director orders a weekly report showing all loaded cars on hand on each Wednesday, which cars have been on hand 15 days or more. This report will show point of origin, contents, consignee, etc., and the reason for the delay.

Free Transportation for Witnesses.—Supplement 50 to Circular 20 of the Northwestern regional director authorizes interstate passes for witnesses appearing on behalf of the director general in any case against the railroads under federal control in which the director general is interested.

Per Diem Settlement.—Supplement 3 to Circular 78 of the Northwestern regional director states that previous circulars providing for the assignment of non-federal controlled roads to roads under federal control for the purpose of settling car hire accounts does not apply to the following classes: (a) roads found to be plant facilities, (b) roads receiving allowances on a plant facility basis under Section 15 of the Act to Regulate Commerce, (c) roads which do not participate in joint through rates either directly or through absorption of regularly published and filed switching charges and which do not receive any allowances, and 2, roads found to be industrial common carriers. Instructions are provided for handling the per diem settlement with roads which fall under these classes.

Distribution of Light Capacity Box Cars.—Supplement 1 to Freight Car Distribution Notice 10 of the Northwestern regional director states that box cars of less than 30 tons capacity may be utilized as follows: (a) cars belonging to other regions may be loaded to or in the direction of the home road and accepted in interchange provided the load takes the car directly to the home road or to a road in the same region; (b) cars belonging to railroads in the Northwestern region may be loaded and accepted in interchange provided the load takes the car directly to a point on the home road and (c) cars belonging to roads not under federal control may be loaded and accepted in interchange when consigned to any point on or in the direction of the home road.

Interstate Commerce Commission—Defense in Handling of Formal Complaints.—Circular 209 of the Southwestern regional director states that henceforth the responsibility for the defense of rate cases before the Interstate Commerce Commission, also the compliance or otherwise with the orders of the commission, is placed with the traffic assistants of the several regions, and outlines a plan for defense of these formal complaints.

Interest on New Work During Construction.—Circular 207 of the Southwestern regional director gives directions similar to those in Eastern Region Circular 2700A714, noticed in the issue of the *Railway Age* for May 9, 1919, page 1138.

Improper Billing of "Order" Shipments.—Order 200 cancelling Order 125 of the Southwestern regional director calls attention to improper billing of shippers' order shipments. Grain, lumber and other commodities are being sent to the principal markets without sufficient information as to the person who is to be notified.

Japan Desires American Co-operation in the Far East

An Interview With Baron Goto, One of Japan's Leading Statesmen and Formerly Head of Its Railways

"IF BY SECURING PRIVILEGES and succeeding to the German rights over the railroads in the Shantung province of China, Japan could be called aggressive, there is no nation which could not have been called aggressive toward China. The development of China's natural resources for the mutual benefit of China and Japan cannot properly be called aggressive in any way." This is the translation of a statement in Japanese by Baron Goto, one of Japan's leading statesmen, to a representative of the *Railway Age,* who called on him at his hotel in Washington on Tuesday last. In speaking to the representative of the *Railway Age* through an able interpreter, Akio Kasama, of the Japanese foreign office, the Baron sought to emphasize two things—one, the idea that Japan is trying to carry out a plan of assisting China to make the most of her tremendous resources of coal and iron and in the way that will prove of most benefit to China and Japan, and second that Japan is trying to work out this problem with the co-operation of the only other nation that is at present on a firm foundation in the Far East, the United States.

Baron Shimtei Goto is one of Japan's leaders in every sense of the term. He has been a member of the Japanese cabinet on a number of occasions and as president of the Japanese Imperial Railways was the man who perhaps did the most to bring that railway system to the point where it is now classed as one of the best operated in the world. The Baron is now on his second visit to this country —the first visit having taken place about 18 years ago. He is traveling at present in a private capacity, principally to investigate America's mobilization for war and its demobilization after the war. He has been especially impressed by America's industrial mobilization and is of the opinion that this was perhaps the most important factor in attaining the final victory in the war.

President of the Japanese Railways

The Baron was, about 18 years ago, civil governor of Formosa, and as such built the railways of that island. He was later president of the South Manchurian system and in his year of office there rehabilitated those lines. One of the large parts of this work was to change to standard gage the 5-ft. gage railways which were taken over after the Russo-Japanese war as well as the light railway feeders which now form an important part of the South Manchurian Railways. It is of special interest to Americans that in rehabilitating the lines he introduced American standards almost throughout to such an extent that Americans traveling over the Chinese Eastern and changing to the South Manchurian lines at Changchun, almost get the impression that they have come upon a section of United States.

Baron Goto then returned to Japan and soon entered the Japanese cabinet as minister of commerce and was also chosen president of the Japanese railways—a position which he held for nearly 10 years. Still retaining his position as head of the railways, he was later made minister of home affairs and then was given the important portfolio of minister of foreign affairs. He resigned from the cabinet about a year ago, but continued in an advisory capacity as a member of the supreme council of foreign affairs—a temporary body made necessary by the war. That the Baron will again return to the cabinet on his return to Japan there seems no question. It is in fact not unlikely that he will eventually attain the premiership, itself.

Japan, the Baron said, is endeavoring to co-operate in its work in China with the United States—Japan and the United States being the only two countries that are at present in a strong position in that part of the world, now that Russia has collapsed and China is in a state of revolution. This co-operation has already been manifested in a number of ways not the least important of which is the agreement made between Japan and the United States concerning the Chinese Eastern Railway or that part of the Trans-Siberian which crosses Manchuria to Vladivostok. This agreement was brought about largely through the efforts of Baron Goto who conferred on the subject with Mr. Morris, the American ambassador to Japan. Baron Goto emphasized the importance of this agreement as helping to preserve the peace of the Orient and as being one step to show the world how eager Japan and the United States are to stick to their mission of co-operation in the Orient.

The Development of China

The Baron in the interview devoted no small amount of attention to the work Japan is now carrying out in developing China. He pointed out that the northern part of China had tremendous resources in iron and coal, and did not try to conceal his opinion that Japan was in the best position of any country to bring them into use for China and the rest of the world. He emphasized again and again, however, Japan's keen desire for American co-operation in China and the Far East. It has been noted above that he had strong opinions that Japan could not properly be called aggressive in its dealings with China, and he pointed out a number of things that would tend to show the opposite. For one thing, he said, Japan was about to give up its privilege of extra-territoriality in China whereby foreigners have the right to be tried in their own courts and under their own laws. Japan is the first nation to take this step, and it will also essay to bring about a codification of Chinese laws and regulations, so that by means of China's having a more efficient legal system, extra-territoriality will not be necessary.

The world has always been impressed by the manner in which the United States returned the Boxer indemnity in the form of a fund to encourage the education of China's youths. Japan, said Baron Goto, is now considering taking the same step and hopes to work out the same plan in the near future. Japan in assisting to develop China has invested in the railways of the latter country some $25,000,000 during the last three or four years. This money, the Baron emphasized, however, has not been loaned in a general way, but covers particular railway projects. These have been mentioned in detail in the *Railway Age* from time to time, and it is only necessary to point out that the lines in question are extensions of present systems meant primarily to reach the iron and coal resources of northern China.

Japan already has a large mileage of railways in Manchuria and by the war came into possession of the Shantung Railway, formerly owned by the Germans. These lines are absolutely controlled by the Japanese. The new lines, for which the loans have been made, the Baron emphasized, are quite different. They are to be operated not by the Japanese, but to be under the control of the Chinese Ministry of Communications, which will operate them with the assistance of Japanese advisers and supervisors. One most important factor is that there is no requirement that supplies must be bought in Japan. Many of the British, French and Belgian

concessions have a requirement that equipment must be bought from the country from which the loans are obtained —a provision that proved of great hardship during the war when cars and locomotives could not be bought in Europe. The lack of this provision will no doubt prove of great value to the United States, for China and Japan alike have shown a great favor for American railway supplies.

America has supplied great numbers of cars and locomotives for the railways under the control of the Chinese Ministry of Communications. Not only have American car and locomotive manufacturers supplied equipment in quantity for the South Manchurian Railways, but that system, as noted above, is largely built and equipped to American standards.

The *Railway Age* representative did not question Baron Goto in any degree concerning the railways of Japan because Mr. Kasama has already covered that factor in an interview in the *Railway Age* last year (February 22, 1918, page 409). He did ask, however, concerning the status of the project to convert Japan's roads to standard gage, an idea which was worked out and fathered by Baron Goto. The project is now being held in abeyance. Large sections of Japan's lines have their right of way and bridges made to 4 ft. 8½ in. gage standards largely through the efforts of Baron Goto and there seems to be no doubt that the change from 3 ft. 6 in. to standard will be carried out eventually. This will give Japan the same gage as its other lines in Manchuria and Chosen, which were converted to standard gage a number of years ago.

In closing his interview the Baron expressed his appreciation of America's railroads and their equipment and added that Japan in railway matters came to us as a pupil. The Japanese railways are well operated, he admitted, but they still needed a great deal to bring them up to American railroad standards physically.

Rail Production in 1918

THE PRODUCTION OF RAILS in the United States for 1918 was 2,533,675 gross tons or a reduction of 410,486 tons as compared to 1917, and 1,444,212 tons less than the record production of 1906. These statistics are given in a special bulletin issued by the American Iron and Steel Institute, New York, from which the following table giving the production of rails by processes for the years 1902 to 1918, inclusive, was taken:

PRODUCTION OF RAILS BY PROCESSES, IN GROSS TONS.

Years	Open hearth	Bessemer	Rerolled*	Electric	Iron	Total
1902	6,029	2,935,392	.....	.....	6,512	2,947,933
1903	45,054	2,946,756	.....	.....	667	2,992,477
1904	145,883	2,137,957	.....	.....	871	2,284,711
1905	183,264	3,192,347	.....	.....	318	3,375,929
1906	186,413	3,791,459	.....	.....	15	3,977,887
1907	252,704	3,380,025	.....	.....	925	3,633,654
1908	571,791	1,349,153	.....	.....	71	1,921,015
1909	1,256,674	1,767,171	.....	†	.....	3,023,845
1910	1,751,359	1,854,442	.....	†	230	3,636,031
1911	1,676,923	1,053,420	91,751	462	234	2,822,790
1912	2,105,144	1,099,926	119,390	3,455	.....	3,327,915
1913	2,527,710	817,591	155,043	2,436	.....	3,502,780
1914	1,525,851	323,897	95,169	178	.....	1,945,095
1915	1,775,168	326,952	102,083	.....	.....	2,204,203
1916	2,269,600	440,092	144,826	.....	.....	2,854,518
1917	2,292,197	533,325	118,639	.....	.....	2,944,161
1918	1,938,226	494,193	101,256	.....	.....	2,533,675

* Rerolled from old steel rails. Included with Bessemer and open-hearth steel rails from 1902 to 1910 inclusive.

† Small tonnages rolled in 1909 and 1910 but included with Bessemer and open-hearth rails for these years.

These production figures include rails rolled for export, which tonnage was unusually high last year, owing to the quantities shipped to our forces and those of our allies overseas. Another evidence of the abnormal conditions during the last year is to be seen in the further increase in the relative production of Bessemer rails, the proportion being 19.5 per cent in 1918 as compared to 18.11 per cent in 1917, 15.42 in 1916 and 14.82 in 1915.

In spite of the unusual relation of the demand to the supply of rails last year, it is to be noticed that the tonnage of rails rerolled has decreased progressively in the last three years. This tonnage aggregated only 101,256 tons in 1918 as compared to 118,639 tons in 1917, and 144,826 tons in 1916. The production of renewed and rerolled rails in 1911 to 1918, inclusive, is given in detail in the following table:

PRODUCTION OF RENEWED AND REROLLED RAILS, 1911-1918

Years	Rerolled from new seconds, new defective rails, etc.: Open-hearth	Bessemer	Total	Rolled from old rails	Total rerolled
1911	2,631	19,379	22,010	91,751	113,761
1912	13,140	29,446	42,586	119,390	161,976
1913	13,052	30,741	43,793	155,043	198,836
1914	13,538	13,234	26,772	95,169	121,941
1915	6,477	2,652	9,129	102,083	111,212
1916	1,711	2,149	3,860	144,826	148,686
1917	1,825	7,182	9,007	118,639	127,646
1918	13,296	19,462	32,758	101,256	134,014

Another indication of the deficiency of rail production and purchasing during the past year is given by the table below showing the production of rails by weights per yard in the years 1902 to 1918, inclusive. This goes to show that the production of rails in sections weighing 100 lb. or over has decreased far more than most of the other classes of weights, indicating that the limited tonnage of steel available for rails made it necessary to dispense with the heavier sections in considerable measure.

PRODUCTION OF RAILS BY WEIGHT PER YARD, 1902-1918

Years	Under 45 pounds	45 and less than 85	85 and less than 100	100 pounds and over	Total. Gross tons
1902	261,887	2,040,884	645,162		2,947,933
1903	221,262	1,603,088	1,168,127		2,992,477
1904	291,883	1,320,677	672,151		2,284,711
1905	228,252	1,601,624	1,546,053		3,375,929
1906	284,612	1,749,650	1,943,625		3,977,887
1907	295,838	1,569,985	1,767,831		3,633,654
1908	183,869	687,632	1,049,514		1,921,015
1909	255,726	1,024,856	1,743,263		3,023,845
1910	260,709	1,275,339	2,099,983		3,636,031
1911	218,758	1,067,696	1,536,336		2,822,790
1912	248,672	1,118,592	1,960,651		3,327,915
1913	*270,405	†967,313	2,265,062		3,502,780
1914	*238,423	†309,865	868,104	528,703	1,945,095
1915	*254,101	†518,291	742,816	688,995	2,204,203
1916	*295,535	†566,791	1,225,341	766,851	2,854,518
1917	*308,258	†882,673	989,704	763,526	2,944,161
1918	*387,907	†665,165	888,141	592,462	2,533,675

* Includes rails under 50 pounds.

† Includes 50 pounds and less than 85 pounds.



U. S. Official Photo. From U. & U., N. Y.

Loading American Wounded in France for Carriage to Debarkation Points

Railway Mounted Artillery in the War*

Use of Mobile Guns Had Reached High Stage of Development When Armistice Was Signed

As soon as war was declared against Germany the American Ordnance Department, in its search for an immediate equipment of strong artillery, surveyed the ordnance supplies of the country and discovered some 464 heavy guns which might be spared from the seacoast defenses, obtained from the Navy, or commandeered at private ordnance plants where they were being manufactured for foreign governments. There were six guns of this last-named class—powerful 12-in. weapons which had been produced for the Chilean government. It was seen that if all, or if a large part, of these guns could be made available for service in France, America would quickly provide for herself a heavy artillery equipment of formidable proportions.

The Ordnance Department conceived that the only way to make these guns available for use abroad would be to mount them on railway cars. These guns were not vital in the defense of our coast under the conditions of the war with Germany, but it was evident that they would make a valuable type of long-range artillery when placed on satisfactory railway mounts.

The guns thus available for mounting on railway cars ranged in size from the 7-in. guns of the Navy to the single enormous 16-in. howitzer which had been built experimentally by the American Ordnance Department prior to 1917. In addition there was the 16-in. howitzer, 20 calibers in length, which had been built by the Ordnance Department before 1917. The expression 14-in. guns, 50 calibers, means that the gun has a barrel diameter of 14 in. and that the gun body is 50 times the caliber of 14 in., or 700 inches (58 ft. 4 in.) long.

Origin of Railway Artillery

Mounting heavy artillery on railway cars, however, was not an idea born of the recent war. The idea was probably originally American. The Union forces at the siege of Richmond in 1863 mounted a 13-in. cast-iron mortar on a reinforced flat car, this being the first authenticated record of the use of heavy railway artillery.

In 1913 the commanding officer of the defenses of the Potomac, which comprise Forts Washington and Hunt, was called upon to report on the condition of these defenses. In reply, he advised that no further expenditure be made on any one of the fixed defenses, but recommended that a "strategic railroad" be built along the backbone of the peninsula from Point Lookout to Washington, with spurs leading to predetermined positions both on Chesapeake bay and the Potomac river, so placed as to command approaches to Washington and Baltimore.

Further, he recommended that 4 major-caliber guns, 16 medium-caliber guns, and 24 mine-defense guns be mounted on railroad platforms, with ammunition, range finding, and repair cars making up complete units, so that this armament could be quickly transported at any time to the place where most needed. He suggested that this scheme be made applicable to any portion of the coast line of the United States. His argument was based upon the fact that guns in fixed positions, of whatever caliber or place, violate the cardinal military principle of mobility.

The nations engaged in the war now ending developed to a high stage the use of heavy artillery mounted on railway cars, bringing about a combination of the necessary rigidity with great mobility considering the weight of this material.

Railway artillery came to be as varied in its design as field artillery. Each type of railway mount had certain tactical uses, and it was not considered desirable to use the different types interchangeably. The three types of cannon used on railway mounts were mortars, howitzers and guns. It was not practicable to use the same type of railway mounts for the different kinds of cannon. Moreover, these mounts differed radically from the mounts for such weapons at the seacoast defenses.

The three general types of railway mounts adopted were those which gave the gun all-around fire (360-degree traverse), those which provided limited traverse for the gun, and those which allowed no lateral movement for the gun on the carriage but were used on curved track, or epis, to give the weapons traverse aim.

The smaller weapons, such as the 7-in. and the 8-in. guns and the 12-in. mortars, were placed on mounts affording 360-degree traverse. The limited traverse mounts were used for the moderately long-range guns and howitzers. The fixed type of mount was used for long-range guns only, and included the sliding railway mounts, such as the American 12-in. and 14-in. sliding mounts and the French Schneider á glissement mounts.

The work of providing railway artillery—that is, taking the big, fixed-position guns already in existence within the United States and similar guns being produced and designing and manufacturing suitable mounts for them on railway cars—grew into such an important undertaking that it enlisted the exclusive attention of a large section within the Ordnance Department. This organization eventually found itself engaged in 10 major construction projects, which, in time, had the war continued, would have delivered more than 300 of these monster weapons to the field in France and, to a lesser extent, to the railway coast defenses of the United States.

As it was, so much of the construction—the machining of parts, and so on—was complete at the date of the armistice, that it was decided to go ahead just the same with all of the projects except three, these involving the mounting of 16 guns of 14-in. size, 50 calibers long, the production of 25 long-range, 8-in. guns, 50 calibers, and their mounting on railway cars, and the mounting of 18 coast defense, 10-in. guns, 34 calibers long, on the French Batignolles type of railway mount.

The barbette carriage revolves about a central pintle, or axis, and turns the gun around with it. When it was decided to put coast defense guns on railway cars, the guns were taken from their emplacements, barbette carriages manufactured for them, and the whole mounted upon special cars. The barbette mount revolves on a support of rollers traveling upon a circular base ring. In the railway mount the base ring is attached to the dropped central portion of the railway car. The barbette railway mount is provided with struts and plates by which the car is braced against the ground.

The Schneider railway mount is named after the French ordnance concern Schneider et Cie, which designed it. In this mount the gun and its carriage are fastened rigidly parallel to the long axis of the railway car. Thus the gun itself, independently of any movement of the car, can be

*From an advance proof of a report on "American Munitions," by Benedict Crowell, Assistant Secretary of War.

Note: Previous articles briefly describing and illustrating some of the railway mounted artillery have been published in the *Railway Age* of November 29, 1918, page 967, and December 20, 1918, page 1113.

pointed only up and down in a vertical plane, having no traverse or swing from left to right and vice versa. In order to give the weapon traverse for its aim, special railway curved tracks, called epis, are prepared at the position where it is to be fired. The car is then run along the curve until its traverse aim is correct, and the vertical aim is achieved by the movement of the gun itself. In the Schneider mount there is no recoil mechanism, but the recoil is absorbed by the retrograde movement of the car itself along the rails after the gun is fired. This movement, of course, puts the gun out of aim, and the entire unit must then be pushed by hand power back to the proper point.

In the Batignolles type, gun and cradle are mounted on a so-called top carriage that permits of small changes in horizontal pointing right and left. Thus with the railway artillery of the Batignolles type also track curves, or epis, are necessary for the accurate aiming. The Batignolles mount partially cushions the recoil by the movement of the gun itself in the cradle. But, in addition, a special track is provided at the firing point, and the entire gun car is run on this track and bolted to it with spades driven into the ground to resist what recoil is not taken up in the cradle. The unit is thus stationary in action, and the gun can be more readily returned to aim than can a gun on a Schneider mount.

The conditions under which the war with Germany was fought virtually precluded any chance of a naval attack on our shores which would engage our fixed coast defenses. The British grand fleet, with the assistance of fleets of the other allies and America, had the German battle fleet securely bottled. On the other hand, there was the prowling submarine able at all times to go to sea and even to cross the ocean, and some of the latest of these submarines were armed with long-range medium-caliber guns. It was not beyond possibility that some sort of an attack would be made on our shores by submarines of this character, yet it was safe to believe that these craft would keep wel lout of range of the guns at our stationary coast defenses.

To protect our coast from such attack the Ordnance Department conceived the plan of mounting heavy guns on railway cars. They might then be moved quickly to places on the seacoast needing defense. For this purpose the Navy turned 12 of its 7-in. rifles over to the Ordnance Department for mounting. Meanwhile our ordnance officers had designed certain standard railway artillery cars, known as models 1918, 1918 Mark I, and 1918 Mark II, for 7-in. and 8-in. guns and 12-in. mortars, respectively. These cars all had the same general features.

The model 1918 car was selected for the converted 7-in. Navy rifle. The rifle was mounted on a pedestal set on the gun car in such a manner as to give all-around fire, or 360-degree traverse. The pedestal mount permitted the gun to be depressed at an angle suitable for firing from high places along the coast down upon the low-lying submarines.

Manufacture

Contracts for the various parts for these cars and the pedestal gun mounts were let to concerns engaged in heavy steel manufacture, but the assembling was done by the American Car & Foundry Company at Berwick, Pa. Twelve of the 7-in. rifles were so mounted. As this equipment was intended exclusively for use in this country, the gun cars were equipped with the American type of car couplings.

For the 8-in. guns taken from seacoast fortifications the Ordnance Department designed a barbette mount giving complete, 360-degree, traverse, thus providing for fire in any direction. There were 96 such guns available for railway mounts. Orders for 47 gun cars with carriages for mounting the weapons were placed with three concerns—the Morgan Engineering Company of Alliance, Ohio, the Harrisburg Manufacturing & Boiler Company of Harrisburg, Pa., and the American Car & Foundry Company of Berwick. Two of the three contractors found it necessary to provide additional facilities and machine-tool equipment at their plants in order to handle this job.

The first railway mount for the 8-in. gun was completed and sent to the Aberdeen proving ground for test in May, 1918. In early June the test had shown that the weapon was efficient and entirely satisfactory. Before the end of the year 1918 a total of 24 complete units, with ammunition cars for standard-gage track, shell cars for narrow-gage track, transportation cars, tools, spare parts, and all the other necessary appurtenances of a unit of this character, had been completed. Three complete 8-in. units were shipped overseas before the armistice was signed.

When the armistice came the Harrisburg company had delivered 9 of these mounts and the Morgan Engineering Company an equal number, making 18 in all. The former concern had reached an output of 5 mounts per month and the latter 10 per month.

An interesting feature of this mount is that it can be used either on standard-gage or on narrow-gage railroad track. The narrow-gage adopted was that in standard use in the fighting zones in France, the distance between the rails being 60 centimeters, or the approximate equivalent of 24 inches. Each gun car was provided with interchangeable trucks to fit either gage. The artillery train necessary for the maneuvering of the weapon was also similarly equipped to travel on either sort of track.

As a rule, the longer the barrel of a cannon, the greater its range. The 8-in. seacoast guns thus mounted were 35 calibers in length; that is, 35 times 8 in., or 23 ft. 4 in. The requirements of our forces in the field in France called for guns of this same size but of longer range. Consequently an 8-in. gun of 50 calibers—that is, 10 ft. longer than the seacoast 8-in. gun—was designed, and 25 of them were ordered. This project came as a later development in the war, the guns being intended for use abroad in 1920. The railway mounts for the weapons had not been placed in production when the armistice came. Because of the incomplete status of this project in the autumn of 1918, the whole undertaking was abandoned.

There were at the seacoast defenses and in the stores of the Army a large number of 10-in. guns of 34 calibers. Of these 129 were available for mounting on railway cars. It was proposed to mount these weapons on two types of French railway mounts—the Schneider and the Batignolles.

The project to mount 36 of these weapons on Schneider mounts was taken up as a joint operation of the United States and French governments, the heavy forging and rough machining to be done in this country and the finishing and assembling in the French shops. The American contractors were three. The Harrisburg Manufacturing & Boiler Company undertook to furnish the major portion of the fabricated materials for the carriages and cars. The Pullman Company contracted to produce the necessary trucks for the gun cars, while the American Car & Foundry Company engaged to build the ammunition cars.

Eight sets of fabricated parts to be assembled in France had been produced before the armistice was signed. General Pershing had requested the delivery in France of the 36 sets of parts by March 2, 1919. After the armistice was signed there was a natural let-down in speed in nearly all ordnance factories, but even without the spur of military necessity the contracting concerns were able by April 7, 1919, to deliver 22 of the 36 sets ordered. Had the war continued through the winter there is little question but that all 36 sets of parts would have been in France on the date specified.

The 10-in. seacoast gun, Batignolles mount project, was placed exclusively in the hands of the Marion Steam Shovel

Company of Marion, Ohio. It had been proposed also to mount 12-in. seacoast guns on this same type of equipment, and this work, too, went to the Marion concern. There were to be produced 18 of the 10-in. units and 12 of the larger ones.

The Marion Steam Shovel Company had had a large experience in producing heavy construction and road-building equipment. The concern encountered numerous difficulties at the start in translating the French drawings and in substituting the American standard materials for those specified by the French. These difficulties, combined with struggles to obtain raw materials and the equipment for the increased facilities which had to be provided at the factory, so delayed production that no mount for either the 10-in. or 12-in. guns had been delivered at the time of the armistice. The first mount of these classes—one with a 12-in. gun—reached the Aberdeen proving ground about April 1, 1919. The 10-in. project, calling for 18 mounts, was cancelled soon after November 11, 1918. The work on the dozen mounts for 12-in. guns, however, had progressed so far that the Ordnance Department ordered the completion of the entire equipment.

As has been stated, the government found in this country six 12-in. guns being made for the Republic of Chile. Their length of 50 calibers gave them a specially long range. It was decided to place the Chilean guns on a sliding mount. In a mount of this type the retrograde movement of the car along the track as and after the gun is fired takes up and absorbs the energy of fire.

Types

The first sliding railway mount used on the Allied side in the great war was of French design. But our manufacturers had so much trouble with French designs that when the project came up of mounting the Chilean guns in this fashion it was decided that it would be quicker to design our own mount. Consequently the French design was taken in hand by our ordnance engineers and re-designed to conform to American practice, with the inclusion in the design of all original ideas developed by the Ordnance Department in its creative work during the war period up to that time. The manufacturers who looked at the French design of the sliding railway mount estimated that it would take from 12 to 18 months before the unit could be duplicated in this country and first deliveries made. They looked at the American design and estimated that they could build it in 3 months.

It was decided to build three mounts of this character and thus have a reserve of one gun for each mount to reserve as replacement when the original guns were worn out. Contracts were placed in the early summer of 1918, and all three mounts were delivered before the armistice was signed, the first mount being completed within 85 days after the order was placed. For these mounts the American Bridge Company furnished the main girders or side pieces, the Baldwin Locomotive Company built the railway trucks and the Morgan Engineering Company manufactured the many other parts and assembled the complete units. The speed in manufacture was made possible by the fact that the plant engineers of the three companies helped the ordnance officers in designing the details. With such intimate co-operation, the concerns were able to begin the manufacture of component parts while the drawings were being made.

All three weapons with their entire equipment, including supplies, spare parts, ammunition cars, and the whole trains that make up such units, were ready for shipment to France in November, 1918. Each mount as it stands today is 105 ft. long and weighs 600,000 pounds. The load of the gun and the peak load put on the carriage when the gun is fired are so great that it requires four trucks of 8 wheels each, 32 car wheels in all, to distribute the load safely over ordinary standard-gage track.

In years past the Ordnance Department had procured a large number of 12-in. mortars for use at seacoast defenses. These great weapons are 10 calibers in length, or 10 ft. in linear measurement, the diameter of the barrel being just an even foot. Of the number stationed at the coastal forts and in reserve it was decided that 150 could be safely withdrawn and prepared for use against Germany. When General Pershing was informed of the proposal, he asked that 40 of these weapons mounted on railway cars should be delivered to the American Expeditionary Forces for use in the planned campaign of 1919. In order that there might be an adequate supply of them, the Ordnance Department let contracts for the mounting of 91 of these mortars on railway equipment, a project which would give the United States a formidable armament and still provide a reserve of 59 mortars to replace the service mortars on the carriages after repeated firing had worn them out.

This job proved to be one of the largest in the whole artillery program. The entire contract was let to the Morgan Engineering Company of Alliance, Ohio. In order to handle the contract a special ordnance plant, costing $1,700,000 for the building alone, had to be constructed at the company's works at Alliance. The work was so highly specialized that machine tools designed for the particular purpose had to be produced. The government itself bought these tools at a cost of $1,800,000. Although work on this plant was not started until December 10, 1917, and although thereafter followed weeks and weeks of the severest winter weather known in recent years, with all the delays in the deliveries of materials which such weather conditions bring about, the plant was entirely complete on June 1, 1918, not only, but the work of producing the mounts had started in it long before that, some machines getting to work as early as April.

The gun car used for mounting the mortar carriage was of the same design as that for the 7-in. and 8-in. guns, except that each truck had six wheels. The carriage built upon this car was of the barbette type, and it allowed the gun to be pointed upward to an angle as high as 65 degrees and provided complete traverse, so that the mortar could be fired in any direction from the car. A hydropneumatic system for absorbing the recoil of the mortar after firing was adopted. This recuperator in itself was a difficult problem for the manufacturer to solve, being the first hydropneumatic recuperator of the size ever built in this country.

In spite of the weight and elaborate character of this unit it was put into production in an astonishingly short space of time. The pilot mount came through on August 22, 1918, less than nine months after the spade was first struck in the ground to begin the erection of the ordnance plant. By the end of August the pilot mortar had successfully passed its firing tests at Aberdeen, functioning properly at angles of elevation from 22 degrees to 65 degrees and in any direction from the mount. While this unit was put through hurriedly for these tests, the preparation for the rest of the deliveries was made on a grand scale, looking toward quantity production later on. When the armistice was signed, every casting, forging and structural part for every one of the 91 railway mounts was on hand and completed at the works of the Morgan Engineering Company, and thereafter the process was merely one of assembling, although in a unit of such size the assembling job alone was one of great magnitude. Even at the reduced rate of production incident to the relaxation of tension after the armistice was signed, the company delivered 45 complete units to the government up to April 7, 1919, or five more than General Pershing said he would require during the whole campaign of 1919. Careful estimates show that if the war had con-

tinued the company would have delivered the mounts at the rate of 15 per month beginning on December 15, 1918, a rate which would have completed the entire project for 91 mounts by the middle of June, 1919.

As in the case of the 8-in. railway guns, the 12-in. mortars were provided with interchangeable wheel trucks allowing the unit to travel and work either on standard gage track or on the 60-centimeter, narrow-gage track of the war zone in France.

The War Department did not have any 14-in. guns which could be spared from the seacoast defenses for use abroad. The Ordnance Department, therefore, inaugurated the project for the construction of 60 guns of 14-in. caliber. For the construction of such guns complete new plants were required, as all available facilities were already taken over for other projects considered more important. This contract was to have been turned out by the Neville Island ordnance plant. The Navy Department in May, 1918, expressed willingness to turn over to the Army certain 14-in. guns, 50 calibers, then under construction and of which it was estimated that 30 would be completed by March, 1919.

It was decided to place some of these 14-in. guns on American sliding railway mounts, and 16 such mounts were ordered from the Baldwin Locomotive Works, deliveries to begin February 1, 1919. The 16 units were to be delivered prior to April, 1919, but due to the signing of the armistice work was suspended on the contracts, since the mounts were designed for use in France. The contract was cancelled in March, 1919.

The Navy itself placed five of these guns on railway mounts of another design to be operated in France by naval forces on shore. Eleven such mounts were built by the Baldwin Locomotive Works under the supervision of the Navy Ordnance Bureau, and six of them were afterwards turned over to the Army.

Without discussing here the 12-in. howitzers, 20 ft. long, which the Ordnance Department ordered produced and mounted on a railway truck, a development for use abroad in 1920, we come, finally to the largest weapon of all in the railway artillery program, the 16-in. howitzer, the barrel of this mighty weapon being 26 ft. 6 in. long. The American 16-in. howitzer had been forged out and finished prior to the date of America's entrance into the war. It was proposed to place this weapon on a railway mount and make it available for use on the western front.

The Ordnance Department completed the design for the mount on February 10, 1918. In order to turn out the unit in the shortest possible time, the project was placed with three manufacturers, each of whom was to produce different parts. The American Bridge Company received the order to build the structural parts, the Baldwin Locomotive Works contracted for the trucks, while the Morgan Engineering Company undertook to assemble the unit and also to build the top carriage and other mechanical parts. The contractors did a speedy job in producing the mount for this howitzer.

In nearly all railway artillery of this size it is necessary to provide bracing when the gun is set up in position for firing. The 16-in. howitzer mount was unique in that the weapon could be fired from the trucks without any track preparation whatsoever. An exhaustive test at the Aberdeen proving grounds demonstrated that this piece of artillery ranked with the highest types of ordnance in use by any country in the world.

In the meantime orders had been placed for 61 additional howitzers. The American Expeditionary Forces asked that 12 of these enormous weapons be sent overseas as soon as they could be produced, a job which naturally would have extended over a period of months, if not years. Since none of the additional howitzers had been produced when the armistice was signed, the project of building mounts for them never got under way. The pilot howitzer and mount were not shipped abroad.

Operation

In the design of railway equipment for high-angle weapons such as howitzers, two loads must be considered by the builders in order to provide a gun car of sufficient strength to hold its freight. One of these loads, the lighter one, consists merely of the ordinary weight of the gun and its carriage upon the car wheels. The other load, the so-called firing load, consists of the weight of the unit plus the additional weight of the downthrust of the howitzer when it recoils. In the case of the 16-in. howitzer the firing load is approximately 748,231 pounds. The weight of 748,231 pounds must be distributed along the tracks by the numerous sets of wheels at the instant the gun is fired.

The mount for the howitzer is so constructed that this load is partly taken up by the slide of the gun car along the track. In addition, the howitzer is equipped with a hydraulic recoil cylinder. Thus the unit has a double recoil system. The car trucks in the tests comfortably transmitted, through a series of equalizer springs, this enormous load upon an ordinary rock-ballast track, without any distortion to the track or roadbed or impairment to the working parts of the unit. After each discharge the whole huge mount moves backward along the track for a distance of 20 or 30 feet.

Each railway artillery project called for the manufacture of a great equipment of ammunition cars, fire-control cars, spare-parts cars, supply cars, and the like, a complete unit being a heavy train in itself. Such armament-train cars, together with numerous other accessories and necessary equipment, were designed by the Ordnance Department and produced for each mount. In all, 530 ammunition cars were produced up to April, 1919. Most of them were

RAILWAY ARTILLERY PROJECT

Type	Total ordered	Number produced November 11, 1918	Number produced to April 7, 1919	Number required by A.E.F. for campaign during 1919	Guns available	Remarks
7-inch Navy gun, railway mount.	12	12	12	0	12	Produced for antisubmarine work along America's seacoast.
8-inch 35-caliber seacoast gun, railway mount.	47	18	33	36	96	
10-inch, 34-caliber seacoast gun on French type railway mount.	36	[1]8	[1]22	36	111	Fabricated material and trucks, complete, produced within country, mount to be assembled in France.
Do.	18	0	..	0	18	Project canceled on signing of the armistice, Batignolles.
12-inch, 35-caliber seacoast gun on French type railway mount.	12	0	1	12	49	French Batignolles type.
12-inch, 50-caliber gun on American sliding railway mount.	3	3	3	4	6	Guns obtained from Chilean Government manufactured in this country.
14-inch, 50-caliber naval gun on railway mount.	11	11	11	11	21	
12-inch, 10-caliber seacoast mortar on railway mount.	91	1	45	40	150	
16-inch howitzer, 20-caliber, on railway mount.	1	1	1	0	1	61 guns under construction.
14-inch, 50-caliber guns on American sliding railway mount.	16	0	..	..	..	Project canceled March 11, 1919. Guns under construction.
12-inch, 20-caliber howitzer on railway mount.	1	0	..	..	..	If war had continued, 60 mounts contemplated.

[1]Sets fabricated parts.

shipped abroad, but 118 were retained for use in this country.

Since the overseas cars were to be used with French railway equipment, it was necessary to fit them out with French standard screw couplers, air brakes and other appliances for connecting up with French railway cars.

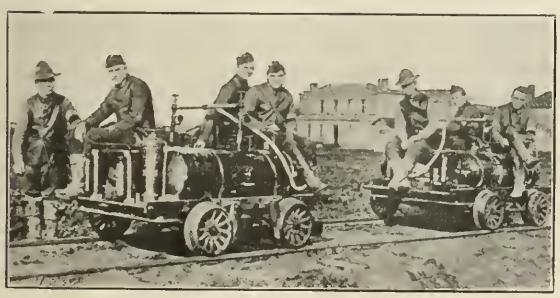
The matter of traction power for these gun and armament trains near the front set a problem for the Ordnance Department to solve. It was out of the question to use steam engines near the enemy's lines, since the steam and smoke would betray the location of artillery trains at great distances. The Ordnance Department adopted a gas-electric locomotive of 400 horsepower to be used to pull railway artillery trains at the front, and was on the point of letting a contract to the General Electric Company for the manufacture of 50 of them when the armistice was signed, making further equipment unnecessary.

The Neville Island ordnance plant, on an island in the Ohio River near Pittsburgh, would have produced weapons of the character of those used with railway mounts and would have turned them out in large numbers had the armistice not come to put an end to this enormous arsenal project. The plant was being erected for the government by the United States Steel Corporation without profit to itself. The estimated cost of this plant when finished was $150,000,000. Designed to supply the needs of the Army for artillery of the heaviest types, the Neville Island plant was being constructed on such a scale that it would surpass in size and capacity any of the famous gun works of Europe, including the Krupps.

It was being equipped to handle huge ordnance undertakings, such as the monthly completion of 15 great 14-in. guns and the production of 40,000 projectiles monthly for 14-in. and 16-in. guns. The plans of the government contemplated the production of 14-in. guns to the number of 165 in all and their shipment to France in time to be in the field before May 1, 1920. An initial order for 90 of these weapons had been placed at the arsenal while it was being erected.

Besides 14-in. guns the plant was being equipped to turn out 16-in. and even 18-in. weapons. The immense size of the machinery necessary for such production can be understood when it is noted that an 18-in. gun weighs 510,000 pounds and a 14-in. gun 180,000 pounds. It requires from 12 to 18 months to produce guns of this size, yet Neville Island was being developed on a scale to build hundreds of them simultaneously. The entire plant was to cover 573 acres and was to employ 20,000 workmen when in full operation.

At the signing of the armistice work was suspended at Neville Island, and four months later the whole project was abandoned.



U. S. Official Photo. From U. & U., N. Y.

Fire Fighters with Speeders at St. Sulpice, Gironde, France

Objections to Proposed Rules for Competitive Bids Under Clayton Law

A SPECIAL COMMITTEE appointed by the American Railway Association in 1916 has filed with the Interstate Commerce Commission a series of objections and suggestions for changes in the proposed regulations issued by the commission on April 10 to govern the method of securing competitive bids as required by Section 10 of the Clayton anti-trust law in connection with dealings in securities or purchases or contracts between companies having an interlocking interest.

The attention of the commission is called to the fact that on June 20, 1916, a hearing was had before the commission in respect to the matter of rules proposed at that time, at which the carriers, after making their objections to the rules tentatively proposed by the commission, requested the commission to appoint a committee to act on its behalf in conference with a committee representing the carriers for the purpose of reporting rules and regulations recommended for adoption.

The commission appointed such a committee and the American Railway Association also appointed a committee, including Julius Kruttschnitt, W. W. Atterbury, W. G. Belser and Alfred P. Thom, W. A. Worthington representing Mr. Kruttschnitt and S. Porcher representing Mr. Atterbury. The two committees held conferences but no final report was announced because Congress suspended the operation of the law. The railroad committee now urges that as the matter is being taken up anew, a similar conference between representatives of the carriers and such representatives of the commission as it may appoint, may be permitted.

The statement filed for the committee by Mr. Thom as its counsel says the question is how far it is safe in the public interest to put the carriers in "the straight jacket of unyielding rules" in respect to their purchases, and while the policy of the law must, of course, be carried out, much will depend upon the character of the regulations which are adopted because it is of the utmost importance that while protecting the interests of the public these regulations be made sufficiently elastic to adapt themselves properly to the economic conditions which surround purchases and to the needs of the carriers. It is, therefore, urged upon the commission that the matter of the formulation of these rules be taken up now where it was left off when the law was suspended and that conferences shall be resumed. In the event that the commission does not see its way clear to do this without further consideration the committee asks for an opportunity of presenting orally to the commission its views on the subject. A copy of the suggestions made by the carriers to the conference committee is attached and the commission is asked to give careful consideration to the suggestions then made. The tentative regulations proposed by the commission, to which any objections were to be filed by May 15, were published in the *Railway Age* of April 18, page 1009.

Pending a determination of the request above made, the committee makes a preliminary return to the order of the commission of April 7, in part as follows:

It is most important that doubts which will arise as to the meaning of the law and as to its scope and application, shall be cleared up by conference rulings and we, therefore, respectfully urge that the commission make such conference rulings and adopt the rules set forth in Exhibit A hereto attached.

1. Section 10 of the Clayton act should not be construed to apply to dealings between a corporation and its subsidiaries. The reasons for this were given in detail by carriers' counsel in proceedings before the commission on June 20, 1916. It is manifest that a ruling of this kind is neces-

sary to preserve the integrity of the carriers' organizations and that such a ruling is in the public interest.

2. Section 10 should not apply to dealings in respect to which there can be no competition, such as patented articles, purchases of water, gas, electricity, maintenance of company standards, etc.

3. The commission should make some definition of the expression "substantial interest," as, if that is left to individual judgment, there can be no uniform interpretation of this expression and no way of knowing when, in this respect, the act becomes applicable.

4. The commission should define the expression "most favorable bid" in such a way that carriers may be permitted to exercise an honest business discretion as to what bid in all the circumstances of the case is most favorable to its interest.

In the rules now proposed by the commission two tests alone are permitted in respect to what constitutes the most favorable bid:

(1) That the bid must be the lowest price for material purchased and the highest price for securities sold.

(2) The ability and reliability of the bidder financially and otherwise.

We submit that this is too narrow a definition. The definition as now proposed does not give sufficient latitude in respect to the reliance any particular carrier may have on dealers in regard to the special materials they furnish, the character of the article which is to be delivered, or with respect to the bearing that this particular transaction may have on other transactions with the same party, nor to the broader and perfectly honest business considerations which frequently affect the judgment of men in business as to what is the most favorable transaction. It likewise takes no note of the necessity which a carrier is frequently under to apportion its purchases among several for the purpose of keeping labor employed along its lines and available quickly for pressing needs in the manufacture or production of articles. As submitted in the brief, an honest business discretion seems to be the only proper criterion of what should be applied in determining what is the most favorable bid.

For example, it is most important for a railroad at times to keep certain coal mines on its road open for fuel purposes. This is also in the public interest. It is also frequently necessary for them to keep certain tie concerns on its road in operation. This applies also in the matter of equipment where it is necessary to have the manufacture of equipment continued at separated points, and where it is necessary to make an apportionment in order to get early deliveries. Many of these very desirable things would be prevented if the rule is restricted within the narrow limits as now proposed.

It will be observed that the latitude respecting delivery contained in the proposed rules doubtless is confined to deliveries contemplated when the advertisement is made, whereas conditions may change, and an honest business discretion would require the railroad to accept some bid, not quite the lowest, because it afterwards transpired that very much more favorable deliveries can be obtained.

5. The act should be construed so as to cover only dealings and transactions which take place subsequent to the effective date of Section 10; that is to say, it should not apply to dealings previous to 1919, although delivery under such dealings may be made during 1919.

6. In ascertaining whether or not dealings amount in the aggregate to more than $50,000 in any one year, the measure should be the time when the dealings are had and not the time of performance or of deliveries. Some conference ruling of this kind is manifestly needed to avoid difference in understanding.

7. It should be made clear that the expression "dealings in securities" does not apply to the borrowing of money for a period of not exceeding one year nor to the renewal thereof for like periods, nor to the pledge, as security for money borrowed, of securities. This is very important.

8. It would also be well to make clear that the act begins to operate only with the transaction which brings the sum above $50,000.

Remarks as to Regulations Presented by Commission for Consideration May 15

The proposed rules represent a considerable improvement over those originally suggested and with the foregoing conference rulings would represent a better working plan. The new regulations are, however, objectionable in certain respects, notably in the following:

Referring to page 3, line 4, of the regulations, publication is required in at least two newspapers, one at operating headquarters and the other in certain cities. It may be in some cases that the operating headquarters will also be at one of the cities especially designated. In such case there should be necessity for publication in only one newspaper instead of two.

The provision in paragraph 3 of the regulations affording to each bidder an opportunity of examining each bid and of furnishing each bidder with a tabulation of the proposals, is a very objectionable feature and should be entirely eliminated from the regulations. This feature will tend to deter some potential competitors from bidding at all and almost certainly would cause responsible bidders to refrain from naming the lowest price which they are willing to accept, as they do not wish their competitors to know exactly what they are doing in the matter of prices. The proposal invites collective bidding, furnishes notice to the lowest or most favorable bidder that no revision of his formal bid is necessary to secure the business, and entirely prevents successful negotiation after bids are opened for a still lower price, which is very frequently obtainable. It is felt that the public interest would be safeguarded without public opening of bids so long as the Interstate Commerce Commission may require the furnishing of desired information and always has access to the carriers' records.

We also call special attention to the rule suggested by us as Item No. 6 of the memorandum. Large sums of money are annually saved to each carrier by the power to negotiate with the lowest bidder for a still lower bid. If a new advertisement is necessary in order to do this, an additional charge of unknown proportions, but great in amount, will be added to the carriers' expense and execution of work will be needlessly delayed. It does not seem to us that any harm can come to the public from making the rule read as we have suggested. On the contrary, immense advantage will come to the carriers and will thus be reflected in its beneficial influence on the public.

A method for conducting emergency purchases should be provided, otherwise considerable hardship may be imposed upon the carriers.

To allow time for thorough understanding it would be desirable if the commission's rules would become effective not earlier than July 1, 1919.

Other objections will appear by comparison of the regulations now proposed by the commission with those contained in Exhibit A.

The carriers present the above views in writing, as requested in the order of April 7, but would be glad of an opportunity to supplement them with oral testimony if the commission so desires or to co-operate, as above suggested, in revising the regulations with a special committee if the commission will grant our request to have the matter so handled.

The Railroad Administration has filed a statement with

the commission as a disclaimer, taking the position that the law does not apply to transactions of the railroads operated by the government. The short line railroads have filed no statement with the commission but intend to ask Congress to repeal the law.

National Parks and Monuments Advertising Appears

RAILROAD LITERATURE, such as the traveling public was accustomed to see before the elimination of advertising as a war measure by the Railroad Administration, has again made its appearance in the ticket offices, travel bureaus and tourist agencies. Magazines and newspapers which formerly reaped a neat revenue from advertisements inserted by railroad companies concerning points of interest reached by their lines are again carrying "See America First" displays. All this is part of the Railroad Administration's advertising campaigns, the purpose of which is to stimulate travel. Much of this advertising is substantially the same as that familiar to tourists in pre-war days, with the exception that there is no mention made of the carriers reaching these places nor is anything said of preferred routes.

This campaign, in so far as the western district is concerned—and it is this district to which a large percentage of the annual summer tourist traffic goes,—is well under way and 10 of 18 books, each dealing with some national park, national monument or resort region in the west, have been prepared and are now being distributed. These books, ranging in size from 16 to 80 pages, and dealing with a particular region, have been written more as an advertisement of the particular region than as an advertisement of the carrier which reaches that place. With vivid descriptions and profuse illustrations the beauties are enumerated of Arizona and the New Mexico Rockies, California, Colorado and the Utah Rockies, Crater Lake National Park, Oregon; Glacier National Park, Montana; Grand Canyon National Park, Arizona; Hawaii National Park, Hawaiian Islands; Hot Springs National Park, Arkansas; Mesa Verde National Park, Colorado; Mt. Rainier National Park, Washington; the Pacific Northwest and Alaska; the Petrified Forest National Monument, Arizona; Rocky Mountain National Park, Colorado; Sequoia and General Grant National Parks, California; Yellowstone National Park, Wyoming; Yosemite National Park, California; the Zion National Monument, Utah, and the Northern Lakes of the Central West.

An innovation in the composing of books of this type is the inclusion of an introduction written by a well-known writer whose familiarity with the section advertised is nationally known. Enumerating the writers who are interested in this work sounds much like an American literary Hall of Fame—Mary Roberts Rinehart wrote the introduction for the book on Glacier National Park; Emerson Hough for Yellowstone National Park; Winston Churchill for Crater Lake National Park; Gilbert H. Grosvenor, editor of the National Geographic Magazine, for Mt. Rainier National Park; Enos A. Mills for Rocky Mountain National Park; Jack Lait for the Zion National Monument; Opie Read for Hot Springs National Park; Edwin Markham for California; Edwin L. Sabin for Colorado and Utah; Doctor J. Walter Fewkes, chief of the Bureau of American Ethnology, Smithsonian Institute, for Mesa Verde National Park; Charles F. Lummis for Grand Canyon National Park and the Petrified Forest National Monument; Harriet Monroe for Yosemite National Park; E. A. Newman for Hawaii National Park; Hamlin Garland for the Pacific Northwest and Alaska; Zane Grey for Arizona and New Mexico, and Albert Britt, editor of the Outing Magazine, for the Northern Lakes.

As stated before, ten of these books already have been compiled and are now being distributed. The work of preparing this advertising matter has been done by the Western Passenger Traffic Committee and under the direct supervision of W. H. Simpson, chairman of the advertising committee appointed to handle this work for the Western district. The actual work of compiling statistics and facts, selecting photos, etc., concerning the different parks and regions, was assigned to subcommittees composed of representatives of different railroads serving the particular places to be advertised. Distribution of the books has been placed in the hands of the Travel Bureau—Western Lines, Chicago, of which Howard H. Hays is manager. This bureau has made arrangements to have the books on western points shipped to passenger traffic officers for distribution to important ticket offices other than consolidated ticket offices; to passenger traffic officers, who in turn will furnish supplies to union station ticket offices and to offices interested; to consolidated ticket offices, and to tourist agencies and travel bureaus. While the work of distribution of the first copies of these books was only begun during the past week, they have already received extensive circulation.

The magazine and newspaper advertising already mentioned is still in the embryonic state, but it is planned to have this matter before the public before the annual tourist season to western resorts opens, which is usually about June 1. This work likewise has been placed in the hands of the Western Passenger Traffic Committee, and under the supervision of Mr. Simpson.

To further the "See America First" campaign, the Bureau of Service, National Parks and Monuments, has obtained a stock of lantern slides and motion picture films, featuring the national parks and monuments already mentioned. These slides and films are to be loaned for exhibition purposes without cost excepting, of course, the express charges in both directions. The lantern slides, which are accompanied by adequate lecture notes, include as subjects the following National Parks: Glacier, Grand Canyon, Mesa Verde, Mt. Rainier, Rocky Mountain, Yellowstone, Yosemite, Sequoia, and General Grant. Among the motion picture films obtained and available at this bureau are reels featuring the Crater National Park, Glacier National Park, Grand Canyon National Park, Mesa Verde National Park, Mt. Rainier National Park, Rocky Mountain National Park, Yellowstone National Park and the Yosemite National Park. Added to this collection are several reels of films featuring Alaska, the Columbia River Scenic Highway, the Dawn of Electrical Era in Railroading, Central Wyoming, Idaho, Portland Rose Festival, Royal Gorge and the California Scenes.

Although the tourist travel in the west during the summer is greatly in excess of that in the east the committee handling this advertising matter for the eastern district has issued similar books concerning the Adirondack mountains and Thousand Islands, the Blue Ridge and Allegheny mountains, the Catskill mountains and Sullivan County, New York; Long Island, New York; New England lakes and mountains, New England shores north and east of Boston, New England shores south of Boston, New Jersey seashore, Niagara Falls and the Highland of Ontario, Saratoga Springs, Lake George and Lake Champlain, summer resorts in the south, the Pocomos, Delaware Water Gap, Mauch Chunk and Chautauqua Lake. This work is being done by the Eastern Passenger Traffic Committee, under the supervision of its advertising committee, of which Mr. P. V. D. Lockwood is chairman. The newspaper and magazine advertising campaign is similar to that of the western lines.

The Southern Passenger Traffic Committee has issued one booklet for summer resorts of the south. Its advertising will be confined to newspapers.

Present plans of the committees both in the east, west and south, provide for the continuing of this form of advertising throughout the summer and the succeeding winter.

Closing Sessions of the Air Brake Association

A REPORT of the greater part of the twenty-sixth annual convention of the Air Brake Association was given in last week's *Railway Age*, page 1165. Other papers which were presented include the following:

How Can Enginemen and Trainmen Assist in Air Brake Maintenance?

By H. A. Glick
Air Brake Inspector, Bangor and Aroostook

While locomotive engineers are not primarily responsible for air brake design and maintenance, they can, nevertheless, aid materially by making careful and specific reports about air brake conditions on their locomotives requiring attention. Many of the defects that may arise in the course of a trip, especially leakage in the numerous pipe connections that contain air pressure, due to vibration or improperly connected pipe joints, can be discovered better by the engineer while the locomotive is under steam and air pressure and in his charge. His co-operation in reporting intelligently and reliably all air brake troubles is essential to good air brake maintenance.

Whenever trouble arises with any air brake part on an engine, the man that delivers the engine should properly book on the work report the actual defect that exists, but should not book non-essential or imaginary defects; for by so doing he causes a great deal of unnecessary work on the part of the roundhouse force. The time so used is simply wasted and might be used to good advantage performing essential work on this and other engines. Before taking an engine out the engineman should know that all air brake parts perform their functions, and not take it for granted that they do; that is, he should make the necessray tests to convince himself that they are in good condition.

The trainman can assist and he should be duty bound to do so, by following the general air brake instructions now existing on all railroads, by taking greater interest in them, and consequently, in his own welfare. If he does not follow the general instructions, he should be made to do so by proper measures from his superiors, and also by the urging of his fellow workmen. He should be made to recognize the right and wrong of his part in air brake maintenance. There are times when the brake is cut out for no reason. No brake should be cut out of service unless a defect exists; then whoever cuts the brake out should specify the trouble on a proper air brake defect card and tie the card to the cross-over pipe on the car, so that when this car reaches an inspection point it can be repaired.

Trainmen should do everything possible to stop brake pipe leakage, as this leakage causes hardship on the air compressor, takes away from the engineer the ability to properly control the amount of the application, contributes to brakes sticking and prevents the maintenance of sufficient brake pipe pressure. The practice when separating cars of closing but one angle cock, allowing the brakes on cars back of the separation to apply in emergency, should be discontinued. When separating cars, both angle cocks should always be closed and hose should always be separated by hand. When opening angle cocks on the charged portion of train, they should be opened slowly to prevent brakes from applying in emergency. When switching cars they should not be allowed to strike any harder than three miles per hour. Coupling cars at a greater speed creates shocks, which in turn are absorbed by the unions in brake pipe connections, causing brake pipe leakage. The cordial co-operation of enginemen and trainmen in the matter of air brake maintenance is very necessary in order to get the best results.

Discussion

The necessity for co-operation between the trainmen and enginemen and the air brake repair men in order to promote proper maintenance, was emphasized by several speakers. One road reported good results by requiring trainmen to pass an examination on the proper handling of brakes.

The Air Brake Supervisor's Responsibilities to the Store Department

By W. H. Clegg
Air Brake Supervisor, Canadian National

The air brake supervisor's interest in this question starts with his discovery that some standard practice or regulation relative to air brake maintenance is not being adhered to, or that a locomotive or car is being held out of service awaiting the arrival of certain repair parts by reason of lack of knowledge or failure of the local officers to anticipate the requirements, and this in spite of the fact that less important stations are overstocked with the very parts that are needed to release the locomotive or car in question, or permit of adherence to standard practice covering repairs. Thus it appears that the supervisor in order to help himself must of necessity assist the stores department. The following should form the basis of the air brake supervisor's assistance to the storekeeper: (1) Providing suitable places for the care and preservation of repair parts in stock. (2) Advising as to the various repair parts and quantities required to be carried in stock at general stores. (3) Approving of sub-requisitions placed with general stores. (4) Periodical inspection of divisional stores and assistance to divisional storekeepers. (5) Preventing the accumulation of a surplus stock of repair parts that are seldom used. (6) Advising the general storekeeper where a surplus of repair parts are found so that same may be transferred to other terminals or returned to general stores.

The recommended assistance as outlined above requires but a very small portion of the supervisor's time and those who become interested in this matter can effect a very material saving to the railroad company without neglecting their other numerous duties and the often unsolicited efforts will eventually be fully appreciated.

Address of F. W. Brazier

At the Wednesday session F. W. Brazier, superintendent of rolling stock, New York Central Lines East, gave an inspiring address in which he counseled the younger members to devote their energies whole-heartedly to their work. He condemned the lax enforcement of the rules governing the maintenance of brake equipment to which he attributed in large measure the present unsatisfactory conditions. As an indication of the efforts the New York Central has made to maintain cars in good condition he cited the fact that as many as 800 men had been employed on air brake work alone and in 1917 the expenditure for freight car repairs had been over twice as much as for locomotive repairs.

Fuel Supervisors Addressed the Convention

At the Thursday session L. R. Pyle and F. P. Roesch, fuel supervisors of the Central Western and Northwestern

Regional Districts, respectively, delivered addresses in which they pointed out the way in which the air brake men could assist the Fuel Conservation Section. Mr. Pyle stated there has been a marked improvement in air brake conditions during the past few months, especially as regards brake pipe leakage. He urged the association to continue its support of the Fuel Conservation Section particularly by giving publicity to the magnitude of the waste of fuel caused by train line leaks. Mr. Roesch spoke of the necessity for reducing the cost of operation on the railroads now that normal conditions are being restored. As it appeared impossible to reduce wages or cut the cost of material more efficient service was the only means of effecting economies that was left. He urged all the employees to justify the large increases in wages by greater efficiency in their work.

Other Business

On Thursday morning a report was presented on damage to car brake equipment by thawing plants. The practice of thawing loads of coal and ore in buildings heated to a high temperature destroys the packing leathers, gaskets and air holes. The removal of the triple valves, hose and brake cylinder piston, before thawing, was recommended. No objection was raised to thawing by inserting steam pipes into the lading.

A paper was also submitted by the Northwest Air Brake Club advocating a braking ratio of 40 per cent. and an inside release valve for caboose cars; the Central Air Brake Club also presented a report advocating large radiating surface between the compressor and the main reservoir.

The secretary reported a membership of 1,050 with a registration at the convention of 650.

The following officers were elected: President, T. F. Lyons, New York Central; first vice-president, L. P. Streeter, Illinois Central; second vice-president, Mark Purcell, Northern Pacific; third vice-president, G. H. Wood, Atchison, Topeka & Santa Fe; secretary, F. M. Nellis, Westinghouse Air Brake Company; and treasurer, Otto Best, Nathan Manufacturing Company. Newly elected members to the Executive Committee are C. M. Kidd, Norfolk & Western; R. C. Burns, Pennsylvania; H. A. Clark, Soo Line; and H. A. Sandhas, Central of New Jersey.

Doings of the United States Railroad Administration

Nearly 19,000 Standard Cars Stored Because They Have Not Been Accepted by the Railroad Companies

WASHINGTON, D. C.

DIRECTOR GENERAL HINES and members of his staff left Washington Tuesday night for an inspection trip over the railroads in the Southwest. Mr. Hines expected to be at Memphis and Little Rock on May 15, at Dallas and Fort Worth on May 16, at Houston and Austin on May 17, at St. Louis on May 19, at Cincinnati and Columbus on May 20 and to return to Washington on May 21. He is to speak at St. Louis at the convention of the Order of Railway Conductors, at Cincinnati at the convention of the Brotherhood of Railway Clerks and at Columbus at the convention of the Brotherhood of Railroad Trainmen.

Nearly 19,000 Standard Cars Stored

The Railroad Administration has given out the following statement showing the number of U. S. R. A. standard freight cars stored as of April 30, 1919, because they have not been accepted by the railroad companies:

Type of cars	Number of cars
40 ton double sheath box cars	3,702
50 ton single sheath box cars	1,169
50 ton composite gondolas	6,043
55 ton steel hopper	8,057
70 ton low side gondolas	1
Total	18,972

Earnings, Expenses and Traffic for March and Three Months

The Operating Statistics Section has published complete figures covering the financial results of operation for the month of March for the large railroads in federal operation. 231,466 miles of road are included out of a total of 240,944 miles actually federally operated; comprising 96 per cent of the mileage and 98 per cent of the revenues.

Month of March	1919	1918	Increase or Decrease Amount	Increase or Decrease Per cent
Operating revenues	$371,520,077	$361,054,326	$10,465,751	2.9
Operating expenses	342,152,207	279,047,313	63,104,894	22.6
Net operating revenues	29,367,870	22,007,013	d 52,639,143	....
Taxes, rents, etc.	15,272,048	18,287,109	d 3,015,061	....
Net Federal income	14,095,822	63,719,904	d 49,624,082	....
Operating ratio	92.2	77.3	14.9	....

d represents decreases.

One-twelfth of the annual rental due the companies covered by the report amounts to $74,047,939, so that the net loss to the government for the month was $59,952,117.

It is stated that inasmuch as present rates are about 25 per cent higher than they were last year, the increase in operating revenues of only 2.9 per cent means that total traffic has fallen off approximately 18 per cent. The falling off in freight traffic alone has exceeded this figure. This has been partially counterbalanced by a small increase in passenger travel due to the demobilization of troops, but the passenger returns are not yet complete enough to give out any figures for March. The freight business shows a slight increase over last month, but this is not as large as is usual at this time of year under normal industrial conditions.

Comparison with 1918 is difficult because the increased rates were not in effect in March, 1918, and the increased wages for March, 1918, were not charged into operating expenses until subsequent months.

The expenses for March, 1918, do not include the increases in wages allowed by the director general in May, 1918, and subsequently in that year and retroactive to January 1, 1918. It is estimated that about $40,000,000 of such back pay was applicable to March, 1918. The expenses for March, 1919, include about $5,300,000 back pay applicable to prior months but do not include the increases recently granted to the enginemen and trainmen and the dining car employees which it is estimated will amount to about $6,000,000 per month.

It is stated that the freight train performance of March, 1919, does not compare favorably with last year, because of the severe loss in the volume of traffic, which made it difficult to maintain the trainload and carload to the higher averages which were possible while the abnormal conditions due to the war created a large volume of additional traffic, much of which was of a nature which tended to increase both the carload and the trainload. The heavy loss this year in coal traffic adversely affected both the average trainload and the average carload. In view of the heavy loss in traffic the

slight decreases in the trainload and carload are said to indicate close attention to this important feature of operation.

The summary of passenger train performance for March, 1919, shows a decrease of 1.4 per cent in passenger train miles compared with March, 1918, with an increase of 0.2 per cent in passenger train car miles. The average cars per train were 6.2 this year against 6.1 last year.

The figures for the three months' period ending March 31, 1919, are as follows:

INCOME ACCOUNT

3 Months Ending March 31	1919	1918	Increase or Decrease Amount	Per cent
Miles of road operated	231,442	.....	.....	....
Operating revenues	$1,109,614,342	$928,403,776	$181,210,466	19.5
Operating expenses	1,015,977,653	802,210,045	213,767,608	26.6
Net operating revenue	93,636,589	126,193,731	d 32,557,142	....
Taxes, rents, et	47,658,837	50,512,243	d 2,853,406	....
Net federal income	45,977,752	75,681,488	d 29,703,736	....
3 1/2 of annual rental	222,143,817	222,143,817	.....	....
Operating loss	176,166,065	146,462,329	29,703,736	....
Operating ratio	91.5	86.5	5.0	....

FREIGHT TRAFFIC MOVEMENT

3 Months Ending March 31	1919	1918	Increase or Decrease Amount	Per cent
Net ton miles	85,035,399,000	95,032,526,000	d 9,997,127,000	d 10.5
Freight train miles	133,328,000	153,287,000	d 19,959,000	d 13.0
Train load (net tons)	638	620	18	2.9
Car load (net tons)	28.1	28.5	d 0.4	d 1.4
Loaded car miles	3,026,149,000	3,336,347,000	d 310,198,000	d 9.3
Total car miles	4,500,992,000	4,707,875,000	d 206,883,000	d 4.4
Per cent of loaded to total car miles	67.2	70.9	d 3.7	d 5.2

Uniform Rules and Working Conditions for Telegraphers, Etc.

In Supplement No. 21 to General Order No. 27, Director General Hines has prescribed, effective May 1, rules and working conditions to apply to employees herein named in the service of railroads in federal operation where agreements are not in existence, namely, telegraphers, telephone operators (except switchboard operators), agents (except those specified in Article IV of Supplement No. 13 to General Order No. 27), agent-telegraphers, agent-telephoners, towermen, levermen, tower and train directors, block operators and staffmen. The supplement provides in part:

Employees shall be paid on the hourly basis in accordance with the terms of Supplement No. 13 to General Order No. 27.

The entering of employees in the positions occupied in the service, or changing their classification or work, shall not operate to establish a less favorable rate of pay or condition of employment, than is herein provided.

Where existing payroll classification does not conform to the preamble hereof, employees performing service in the classes specified therein shall be classified in accordance therewith.

When new positions are created, compensation will be fixed in conformity with that of existing positions of similar work and responsibility in the same seniority district.

Eight consecutive hours, exclusive of the meal hour, shall constitute a day's work, except that where two or more shifts are worked, eight consecutive hours, with no allowance for meals, shall constitute a day's work.

Overtime shall be computed at the rate of time and one-half time; even hours shall be paid for at the end of each pay period; fractions thereof will be carried forward.

When notified or called to work outside of established hours, employees will be paid a minimum allowance of two hours at overtime rate.

Employees will not be required to suspend work during regular hours, or to absorb overtime.

When the carrying of United States mail and parcel post by the employees herein specified become unduly burdensome, or interferes with the proper operation of trains, they will be relieved from such work.

An employee disciplined, or who considers himself unjustly treated, shall have a fair and impartial hearing, provided written request is presented to his immediate superior within five days of the date of the advice of discipline, and the hearing shall be granted within ten days thereafter. A decision will be rendered within ten days after completion of the hearing.

If an appeal is taken, it must be filed with the next higher official and a copy furnished the official whose decision is appealed within ten days after date of decision. The hearing and decision on the appeal shall be governed by the time limits of the preceding section.

At the hearing, or on the appeal, the employees may be assisted by a committee of employees, or by one or more duly accredited representatives.

If the final decision decrees that charges against the employee were not sustained, the record shall be cleared of the charge; if suspended or dismissed, the employee will be returned to former position and paid for all time lost.

Committees of employees shall be granted leave of absence and free transportation for the adjustment of differences between the railroad and the employees.

Employees will be in line of promotion, and where ability and qualifications are sufficient, seniority will prevail.

When vacancies occur or new positions are created, they will be advertised to all employees on that division between the first and the tenth of each month (or more frequently if mutually agreed upon), and accepted within ten days thereafter. The position must be permanently filled within 30 days after advertisement.

An employee applying for and being assigned to an advertised position will not be eligible to the position vacated by him until same shall have been declined by all employees on that division, or is advertised a second time.

Unless otherwise mutually agreed upon, office seniority will prevail for telegraphers or telephone operators in dispatching, relay and division offices. When vacancies occur in these offices they will be filled by advancing the regular force, and the last trick left vacant will be advertised to all employees on that division.

Regular relief employees will be allowed $2.00 per calendar day for expenses while away from their headquarters. This article does not apply to extra men.

Typewriters will be furnished at offices where the railroads require their use.

Controversies arising under the application of this schedule of wages and working conditions shall be referred to Railway Board of Adjustment No. 3, in accordance with the provisions of General Order No. 53.

Pullman Annual Passes for General Chairman of Shop Crafts

Approval has been given to issuance of Pullman annual passes to general chairmen of shop crafts, to be made good on railroad or railroads over which such general chairmen have jurisdiction, and also on such foreign lines as they may hold railroad transportation over, which has been furnished to them for the purpose of enabling them to make short cuts between points on the lines over which they have jurisdiction.

Application for these passes should be made by the federal managers to the director, Division of Operation, at Washington.

War Department Desires Information as to Railroad Men With Foreign Experience

As a part of the information which the War Department requires in its records, the chief of transportation, rail transportation branch, United States War Department, Washington, has asked for the following information:

(1) Names and addresses of all employees connected with railroads under federal control who have at any time been employed in an *operating* capacity as engineers, conductors, or higher rating or grades on railroads in any foreign country.

(2) In addition to the names and addresses, information as to the capacity in which employed while on duty with a foreign railroad company, and name of such railroad and its location.

(3) Information as to the qualifications of the persons named for special occupations.

The regional directors are asking the various roads for this information for the War Department, including the employees who served abroad in the war from which we are just emerging.

Search of Baggage of Interstate Passengers by State Prohibition Officers

John Barton Payne, general counsel of the Railroad Administration has issued a circular saying:

"The Railroad Administration has been greatly embarrassed by the efforts of state prohibition officers to enforce prohibition laws, the prohibition commissioners insisting upon the right to search the baggage of interstate passengers while such passengers were passing through prohibition states. The Supreme Court has now decided this can not be done; that interstate passengers are entitled to pass through a prohibition state with liquor in their possession. I have called the attention of the prohibition officers to the opinion of the Supreme Court, and asked them to instruct their officers to comply with the law as now settled."

Railroad Administration Departments Moving to New Building

Most of the departments and sections of the Railroad Administration that have been located during the past year in the Southern Railway building in Washington are moving into the new Hurley-Wright building, across the street from the Interstate Commerce Commission building at Eighteenth street and Pennsylvania avenue. The offices of the divisions of accounting, capital expenditures and public service are already located there and the offices of the Division of Purchases, the engineering and maintenance department, the Operating Statistics Section, and the Safety Section, are also to move from the Southern Railway building.

Passenger Traffic

Passenger traffic during the month of February showed an increase of 8.1 per cent over that of February, 1918, according to the report of the Operating Statistics Section. The number of passengers carried one mile was 3,139,935,739. In the Pocahontas region the increase was 30.3 per cent and in the Eastern region it was 14.2 per cent. None of the regions showed a decrease. For the two months ended February 28 the number of passengers carried one mile was 6,598,643,073, an increase of 9.8 per cent.

Rates for Yard Foremen Acting as Yardmasters

Supplement No. 22 to General Order No. 27 provides that, effective January 1, 1919, where there is no existing agreement or practice more favorable to the employees, the wages for yard foremen who also act as yardmasters (designated in some schedules as "foot board" yardmasters) will be not less than 40 cents per day in excess of the yard foremen's rates. The same rules for the basic day and overtime shall apply to such employees as applies to other yardmen.

The Effect of Cinder Fill on Locomotive Water Supply

By William M. Barr

Consulting Chemist, Union Pacific System, Omaha, Nebr.

WATER PERCOLATING through cinders dissolves large quantities of scale-forming material and increases the corrosive properties of the water. Steel pipe laid in cinder fill is soon destroyed, and even cast-iron pipe under the same conditions is short-lived.

Distilled water which had been poured over cold fresh cinders and allowed to stand for 48 hrs. contained 123 grains of dissolved solids per gallon, 42 grains of this being calcium sulphate. Large quantities of other calcium compounds were present, and a natural water coming in contact with such material would have both the temporary and permanent hardness greatly increased.

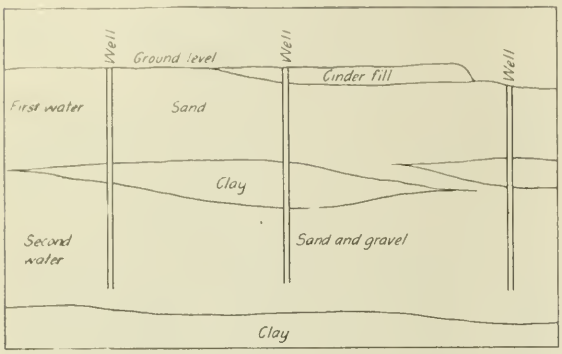


Samples of Scale Produced by Water That Had Seeped Through the Cinder Fill

Several cases have been reported where water percolating through cinder fill has increased the hardness of surface water supplies. Such water has been made unfit for boiler purposes because of the very hard scale that it would deposit on the flues. The writer has observed a case where water at a depth of 65 to 75 ft. has been changed by cinders at the surface, and it is interesting to note that this is the second water sheet and not the normal surface supply. The second water in this region is cut off from the first or surface water by impervious clay sheets which in places are several feet thick. Drilling a large number of test holes developed the fact that these clay sheets are lenticular, and drilling

showed but four or five inches of clay in places. As this sheet appeared to be constantly thinning in one direction, it is probable that it runs out entirely, thus letting the top water down to mix with the second water, which occurs at a depth of 60 to 75 ft. The underground flow in this region is from northwest to southeast.

Analyses Nos. 1, 2, 3, 4 and 5 represent the normal water of the region as it occurs below the first clay sheets. Nos. 1 and 2 are about 4,000 ft. north of the wells that show the effect of cinder fill. No. 3 is two miles west, and No. 4 is approximately 3,500 ft. east, while No. 5 is about 4,000 ft. west. There has been a considerable quantity of cinders spread in the region of No. 5, and the effect is shown in the analysis of No. 6 which is from the same well. Sample



Sketch Showing Probable Form of the Clay Sheets that Permits the Second Water to Be Contaminated by the Seepage from the Cinder Fill

No. 5 was taken in 1894 and No. 6 was taken in 1916, indicating the increase in incrusting solids which has developed.

In the region most affected, there has been from 10 to 20 ft. of cinders filled into the low ground. Analysis No. 7 is a mixture of water from twelve wells in this region, and 8, 9, 10 and 11 are from four of these wells selected at random. All show heavy increases in calcium sulphate and magnesium sulphate, as well as some increase in calcium carbonate. All of the wells are approximately the same depth if due allowance is made for the surface contour.

Water from these 12 wells was used in locomotives for many years until the consumption at times reached 1,000,000 gals. per day. The use of this water resulted in heavy hard scale on flues and fireboxes, with constant leaks in the flue sheets and much pitting. The water shown in Analysis No. 1 was then developed and pumped into the tank through 4,000 ft. of 10-in. pipe line. The result is that scale is light, leaks have stopped, and there is practically no corrosion resulting from the new water.

The photograph shows scale removed from switch engines operating at this station, before and after the change was made in water supply.

This illustrates the importance that should be attached to local ground conditions when developing new water supplies, even when the water comes from a considerable depth.

Analyses of Normal and Cinder Impregnated Waters

	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11
Silica	1.59	1.44	1.35	1.89	1.61	1.52	1.44	1.67	1.59	1.72	1.32
Oxides of iron and aluminum	.12	.27	.35	.23	...	.12	.29	5.95	1.29	.20	.56
Calcium carbonate	5.60	4.29	5.17	4.90	4.51	4.61	7.43	8.74	5.30	6.24	3.98
Magnesium carbonate	...	1.07	1.88	1.04	1.29	4.51	5.30	.54	7.42	.52	.37
Calcium sulphate	...	...	.38	...	.12	2.77	5.54	5.37	4.74	5.04	6.25
Magnesium sulphate	...	...	...	...	...	1.20	3.34	3.49	2.07	2.59	3.42
Alkali carbonates	...	.46	...	1.53	2.90	...	...	...	...	...	...
Alkali sulphates	3.61	.32	.50	.99	.62	...	...	4.87	...	1.52	1.26
Alkali chlorides	1.53	.15	.15	.05	.78	.50	.75	.75	.60	.65	.50
Alkali nitrates	...	.03	.01	.02	...	.03	.06	.15	.15	.15	.08
Total solids	12.45	8.03	9.79	10.65	10.93	15.26	24.15	31.53	23.16	18.63	17.74

Analyses shown in grains per U. S. gallon.

Tonnage Rating Charts for Standard Pacific Type Locomotives

In the *Railway Age* of October 4, 1918, was begun the publication of a series of charts prepared by H. S. Vincent, from which the tonnage rating of the United States Railroad Administration standard locomotives can be determined for any condition of grade, curvature or frictional resistance.

In this issue are given charts for the light and heavy standard Pacific type locomotives, description of which appeared in the *Railway Age* of April 11, page 951.

The tonnage rating charts are so designed that the maximum hauling capacity of the locomotives in tons of 2,000 lb. can be read directly from them for any combination of speed and grade within the given limits.

Table I—Frictional Resistance of Freight Cars

Speeds 5 to 30 M.P.H.

Weight in tons		Resistance, lb. per ton	
Loaded	Empty	Loaded	Empty
15	6.0	6.40	10.30
20	7.8	5.91	9.60
25	9.5	5.44	9.05
30	11.1	5.07	8.45
35	12.6	4.74	8.05
40	14.0	4.40	7.65
45	15.3	4.18	7.26
50	16.5	3.90	6.85
55	17.6	3.65	6.50
60	18.6	3.43	6.26
65	19.5	3.24	6.00
70	20.3	3.07	5.82
75	21.0	2.90	5.63

The drawbar pull, which varies with the resistance, is shown on the charts by the inclined parallel lines, and is read on the left margin. On straight, level track this equals the tractive effort of the locomotive less the frictional resistance of engine and tender. The tonnage curves are based on a frictional car resistance of four pounds per ton, which is a good average for the usual mixed freight trains with varying weight of cars and loading, with the rolling stock and roadbed well maintained.

The tonnage can be read from the charts for any other car resistance factor or for any combination of resistances, simply by converting them into terms of grade on the following basis:

One pound car resistance = .05 per cent grade.
One degree curve uncompensated = .04 per cent grade.

While the frictional car resistance of four pounds per ton applies only to freight service, to avoid confusion the charts for passenger and express service locomotives have

also been based on a resistance of four pounds per ton, and in every case adjustment must be made for the increased resistance of passenger and express cars.

Table II—Frictional Resistance of Freight Cars
From Bulletin No. 43—University of Illinois—Edward C. Schmidt

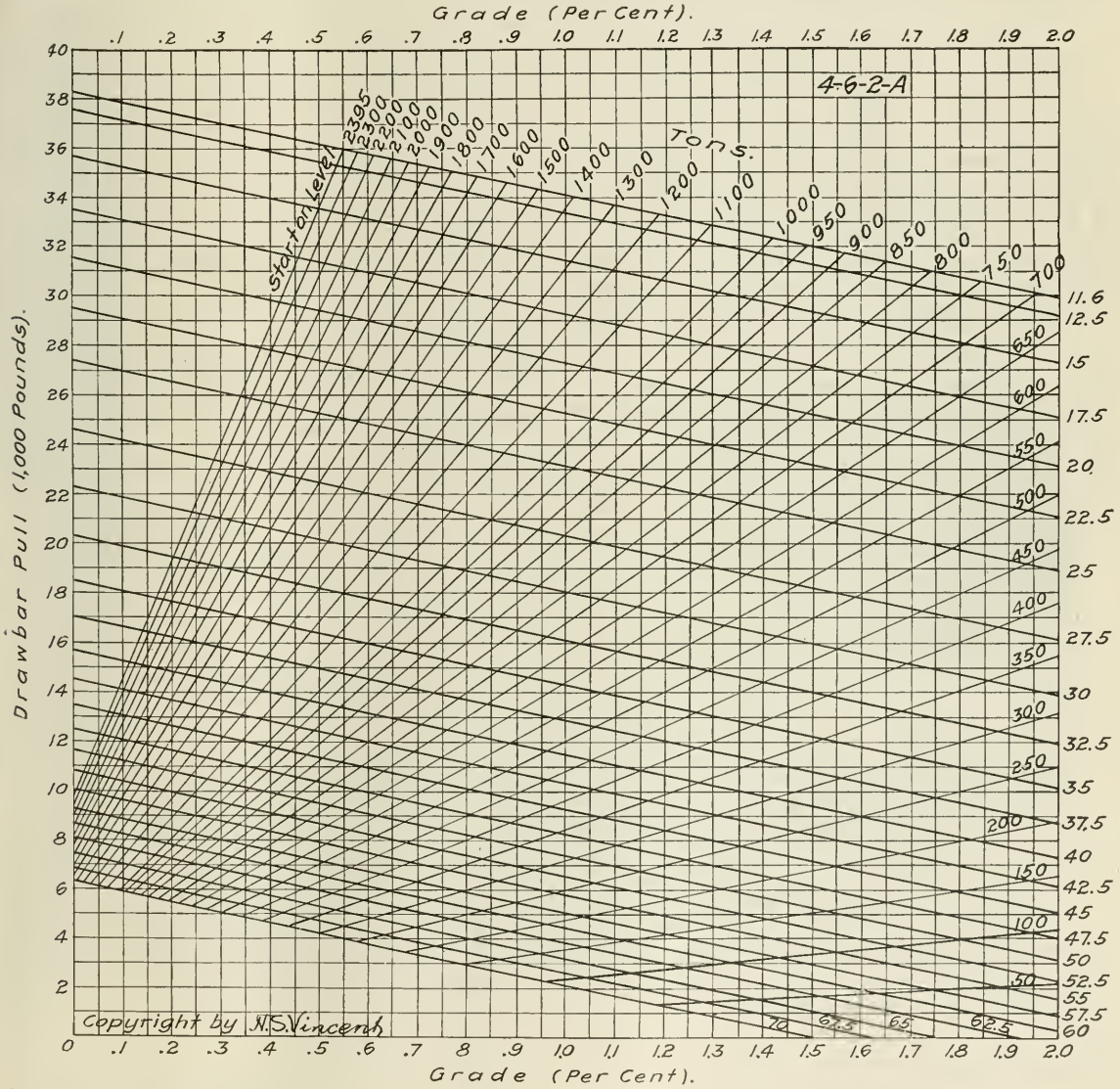
Speed, miles per hour	Train resistance, lb. per ton. Column headings indicate average weights per car												
	15	20	25	30	35	40	45	50	55	60	65	70	75
6....	7.7	6.9	6.1	5.5	4.9	4.4	4.1	3.8	3.5	3.3	3.2	3.1	3.0
8....	8.0	7.1	6.3	5.6	5.0	4.6	4.2	3.9	3.6	3.4	3.3	3.2	3.1
10....	8.2	7.3	6.5	5.8	5.2	4.7	4.3	4.0	3.7	3.5	3.3	3.2	3.2
12....	8.4	7.5	6.7	6.0	5.4	4.8	4.4	4.0	3.8	3.6	3.4	3.3	3.3
14....	8.7	7.8	6.9	6.2	5.5	5.0	4.5	4.2	3.9	3.7	3.5	3.4	3.4
16....	9.0	8.0	7.1	6.4	5.7	5.1	4.7	4.3	4.0	3.8	3.6	3.5	3.5
18....	9.3	8.3	7.4	6.6	5.9	5.3	4.8	4.5	4.1	3.9	3.7	3.7	3.6
20....	9.6	8.5	7.6	6.8	6.1	5.5	5.0	4.6	4.3	4.0	3.9	3.8	3.7
22....	9.9	8.8	7.9	7.0	6.3	5.7	5.2	4.8	4.4	4.2	4.0	3.9	3.8
24....	10.2	9.1	8.1	7.3	6.6	5.9	5.4	4.9	4.6	4.3	4.2	4.1	4.0
26....	10.5	9.4	8.4	7.5	6.8	6.1	5.6	5.1	4.8	4.5	4.3	4.2	4.1
28....	10.9	9.7	8.7	7.8	7.0	6.3	5.8	5.3	4.9	4.7	4.5	4.4	4.3
30....	11.3	10.0	9.0	8.0	7.3	6.6	6.0	5.5	5.1	4.9	4.7	4.5	4.5
32....	11.6	10.4	9.3	8.3	7.5	6.8	6.2	5.8	5.3	5.0	4.9	4.7	4.6
34....	12.0	10.7	9.6	8.6	7.8	7.1	6.5	6.0	5.5	5.3	5.1	4.9	4.8
36....	12.5	11.1	9.9	8.9	8.0	7.4	6.7	6.2	5.8	5.5	5.3	5.1	5.0
38....	12.9	11.4	10.2	9.2	8.3	7.6	7.0	6.5	6.0	5.7	5.5	5.3	5.2
40....	13.4	11.8	10.6	9.5	8.6	7.9	7.3	6.8	6.3	6.0	5.7	5.6	5.5

For example: Find the tonnage which can be hauled in passenger service by the standard light Pacific type locomotive on a 0.5 per cent grade combined with a four degree uncompensated curve at 40 m. p. h.

From Table III it is found that the resistance of passen-

Table III—Frictional Resistance of Passenger Cars

Speed, m.p.h.	Resistance, lb. per ton	Speed, m.p.h.	Resistance, lb. per ton
5	5.89	42.5	6.90
7.5	5.60	45	7.20
10	5.51	47.5	7.35
12.5	5.42	50	7.85
15	5.42	52.5	8.30
17.5	5.42	55	8.65
20	5.46	57.5	9.03
22.5	5.48	60	9.45
25	5.60	62.5	9.95
27.5	5.70	65	10.42
30	5.85	67.5	10.95
32.5	5.95	70	11.45
35	6.20	72.5	12.00
37.5	6.40	75	12.60
40	6.65	77.5	13.20
....	....	80	13.85



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Tonnage Rating Diagram for the United States Railroad Administration Standard Light Pacific Type Locomotive

ger coaches at 40 m. p. h. is 0.05 lb. per ton. The equivalent grade therefore is:

0.5 + (4 × .04) + (6.65 — 4) × .05 = 0.7925 per cent.

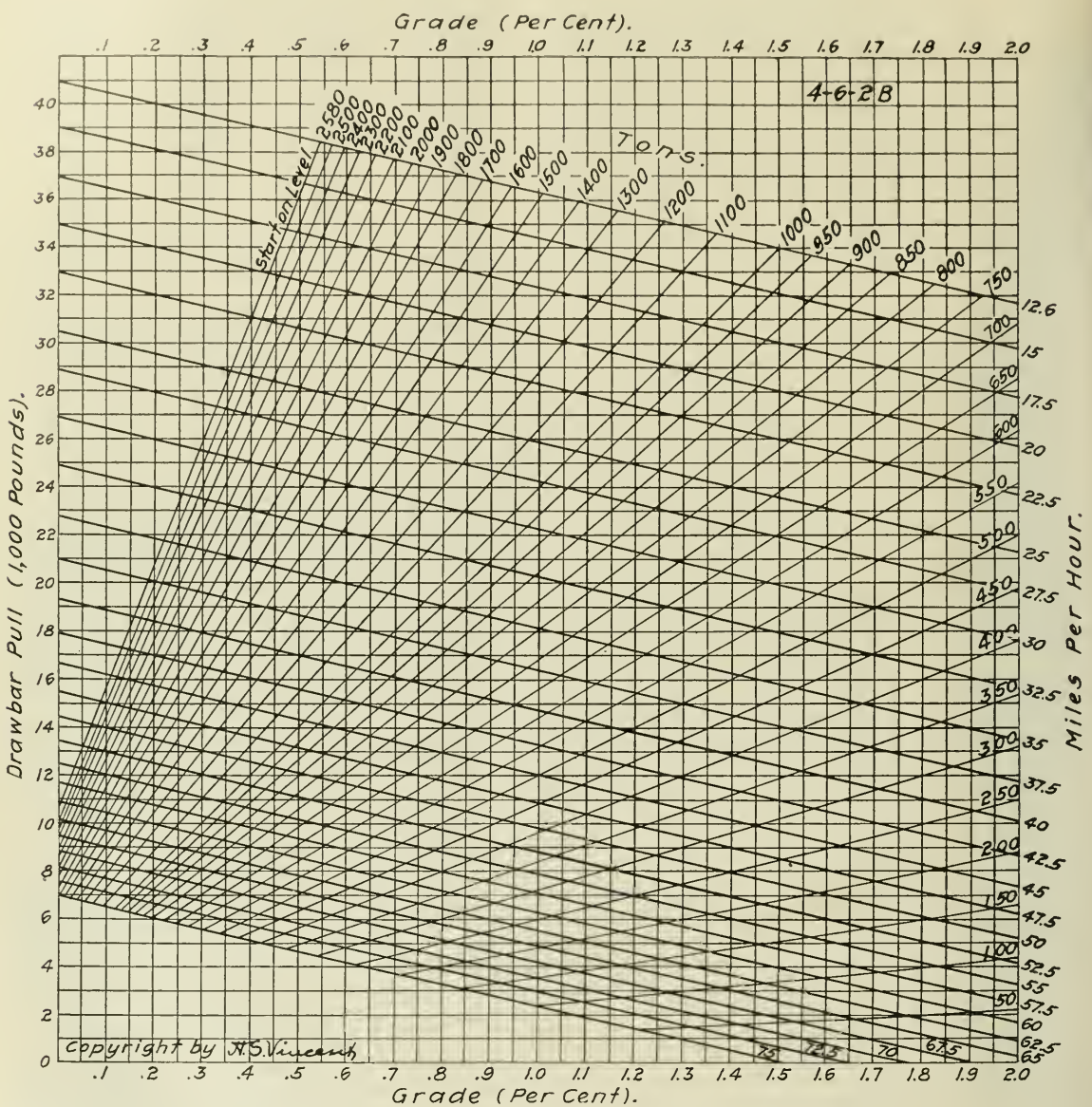
From the chart for the light Pacific type locomotive, at the intersection of the ordinate for 0.7925 per cent grade with the drawbar pull curve for 40 m. p. h., we find a rating of 625 tons.

Similarly for the standard heavy Pacific type locomotive operating on 0.3 per cent grade combined with a four degree uncompensated curve at a speed of 45 m. p. h., Table III shows for this speed a resistance of 7.20 lb. per ton, and the equivalent grade is:

0.3 + (4 × .04) + (7.20 — 4) × .05 = 0.62 per cent grade.

Referring to the chart for the heavy Pacific type locomotive, at the intersection of the ordinate for 0.62 per cent grade with the drawbar pull curve for 45 m. p. h., it will be found that the capacity of the locomotive is 845 tons.

No allowance has been made for weather or temperature conditions or for drop in boiler pressure. In rating the locomotive a deduction should be made from the maximum capacity as given in the charts to suit local conditions.



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Tonnage Rating Diagram for the Standard Heavy Pacific Type Locomotive

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The American Electric Railway Association will hold its thirty-sixth annual convention at Young's Million Dollar Pier, Atlantic City, N. J., on October 6, 7, 8, 9 and 10. The chairman of the convention committee is L. S. Storrs, president of the Connecticut Company, New Haven, Conn.

Railway Developments in Foreign Countries

$20,000,000 for Trans-Siberian; Electrification in France; Earnings of Chinese Railways

ITALIAN RAILWAY EMPLOYEES, according to a Havas press despatch, have been granted by ministerial decree an eight hour day with one day off in seven.

A French commission sent to this country to investigate electrification of steam railroads has recently visited the Norfolk & Western to inspect that railroad's electrified line. The commission comprises thirteen railway officials and electrical experts, headed by Professor Mauduit, of the University of Nancy, and Major d'Anglards, representing the Ministry of Transports. Special study will be made of a number of lines.

A Tunnel Under Gibraltar

A committee of financiers, with headquarters in Barcelona, Spain, has been formed recently to carry out the necessary soundings and other preliminary work in connection with a tunnel under the Straits of Gibraltar. It is proposed that the tunnel should start at a point just west of Tarifa, in Spain, and end to the east of Tangiers, in Africa.

The Electrification of French Railways

M. Cels, under-secretary for public works and transports, stated recently that he will introduce in the French Chamber a bill for the utilization of water power in France by absorbing all private undertakings into one combination. The greater part of the power thus obtained will be allotted for the electrification of the main railway systems of France. The electrification of the Midi has already been begun, the water power of the Pyrenees being brought into use. For the Paris-Lyons-Mediterranean Railway the power will be found in the Alps. The bill has also in view the improvement of lighting, tramway traction, and a system of pumping for feeding agricultural irrigation and local industries.

Trans-Australian Needs Equipment

It is announced in Australia that owing to the increasing volume of traffic on the recently completed Trans-Australian Railway (which links up Western Australia with the Eastern States of the Commonwealth), the rolling stock is insufficient for further requirements. Additional sleeping cars will be acquired and possibly other equipment. Presumably the cars in question will be built in Australia, although parts may be purchased elsewhere, possibly in the United States.

$20,000,000 for Trans-Siberian

The United States and Allied governments have decided to lend to the interallied commission administering the Trans-Siberian Railroad $20,000,000 for operating the line, according to a statement issued by the State Department at Washington, Monday.

It has not been determined what proportion of the loan each of the governments will assume, but it is believed that the United States, Japan and Great Britain each will furnish $5,000,000, and that France and Italy each will be invited to supply $2,500,000.

By making the loan direct to the interallied commission, the governments evade the question of recognition of the Omsk government. It was deemed inadvisable, in the absence of recognition, to make the loan to the Omsk government, and the arrangement agreed upon does not raise the question of recognition in any sense.

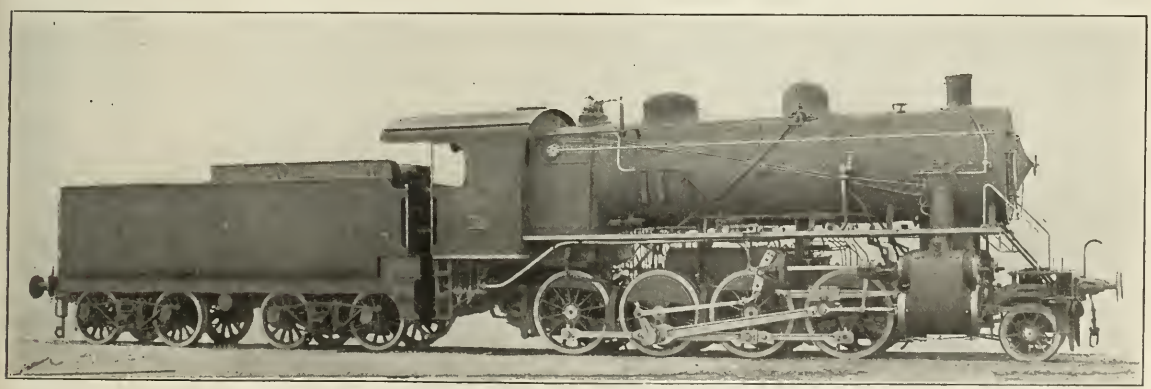
The absence of guarantee excluded participation by private bankers in the loan. It is stated that the loan will not be made as an investment, but to assure the continued operations of the trans-Siberian line. It is thought that the refunding of the loan will be requested later.

Paris-Constantinople Railway Service

The announcement of the resumption of the Paris-Constantinople service by the International Sleeping Car Company, which appeared in a recent issue of the *Railway Age,* is supplemented by some additional facts from a recent issue of the Near East, which says:

The reestablishment of the Orient Express between Paris and Bucharest is a foretaste of the facilities for reaching all parts of the Near East that will be provided in due course of time by the International Sleeping Car Company. H. M. Snow, agent general for the company, discussing this latest development, said that at present the trains are running twice weekly and that direct connections with Warsaw and Prague have been made.

The route, he pointed out, is from Paris to Basle, Zurich, Vienna, Budapest and Bucharest. A section is detached at Linz for Prague, and another



Consolidation Locomotive for the Italian State Railways

The American Locomotive Company has this week received orders for 150 more of these locomotives, making a total of 400 ordered of that company by Italy since the first order in 1916. The locomotives are superheated and have 21½ in. by 27½ in. cylinders; 53⅛ in. driving wheels; a total weight in working order of 146,000 lb.; a weight on drivers of 128,000 lb., and a maximum tractive effort of 33,400 lb.

section at Vienna for Warsaw. The time required for the journey from Paris to Vienna is now 38 hours, as against 35 when the route crossed the corner of Germany. Of course the speed is necessarily very limited as the railways have suffered severely as the result of more than four years of war. No doubt when normal conditions obtain, this new service will be at least as good as formerly, and the route will have the advantage of avoiding German territory. The trip from Vienna to Bucharest takes another 11 hours, making the time for the whole journey 49 hours. With regard to passenger facilities, the service at present exists primarily for officials, and no one can travel by the train without special permission from the French Ministry of War.

After peace is signed, Mr. Snow continued, the Orient Express may be running all right to Constantinople, but at present the only method of reaching there is by way of Constantza. We can get now only as far as Fetesti, and there the river must be crossed in boats. When the Orient Express service is resumed to Constantinople it will be established on the old route via Belgrade and Sofia.

As regards the connections with Greece, a section will be detached at Nish and will run via Uskub to Salonika, Lariswa and Athens. Then there are numerous connections in Bulgaria and elsewhere that will presently be restored.

This covers the immediate developments contemplated by the company as regards the Near East, but Mr. Snow pointed out that only time and settled conditions were required for much wider schemes. The time is certainly not far distant, he said, when Constantinople will no longer be the terminus of the Orient Express. Steamers will be used to take the trains across the Bosphorus, and a service will be established to Aleppo and from there to Bagdad. At Aleppo a section will be detached for the Syria and Palestine service, and eventually the trains on this route will be able to go as far as Egypt.

Exports of Steel Rails and Other Railway Track Material

(Prepared by the Division of Statistics, Bureau of Foreign and Domestic Commerce.)

Another chapter in the story of American steel and the part it will play in reconstruction and in the extension of lines of communication throughout the world is written in the export statistics of rails, railroad spikes, and other iron and steel railway track materials, such as switches, frogs, fishplates, splice bars, etc., shipped to foreign countries since the armistice was declared. The quantity and value of these products exported during the four months ended with March, the average monthly price thereof in December of each year, and the shipments during the calendar years 1911 to 1918 are given below:

Calendar year	Steel rails: Tons	Steel rails: Value	Steel rails: Price per ton in December	Railroad spikes *a*: Pounds	Railroad spikes *a*: Value	Other railway track material (value) *a*
1911	420,874	$12,229,045	$29.11	.....	.....	.....
1912	446,473	13,053,774	29.62	.....	.....	.....
1913	460,553	13,979,549	31.23	25,375,827	$483,283	$3,088,866
1914	174,686	5,103,918	27.05	15,489,687	258,808	1,775,391
1915	391,379	12,095,170	32.65	29,693,252	591,752	4,857,047
1916	540,828	20,417,582	38.43	53,428,813	1,489,091	6,540,187
1917	512,669	24,013,090	52.65	47,467,317	2,009,808	8,194,270
1918	453,944	26,440,780	60.80	22,330,104	1,229,083	5,546,960
December, 1918	44,982	2,735,544	60.80	1,708,554	116,787	541,522
January, 1919	65,024	4,221,563	64.90	3,509,054	189,408	543,330
February, 1919	66,900	4,611,982	68.94	4,206,228	258,073	905,264
March, 1919	48,955	3,051,611	62.30	4,185,816	193,987	515,535

a Not separately stated prior to July 30, 1912.

Countries of Shipment

An analysis of the advance figures for March shows a distribution of American steel rails extending to 23 countries, about 18,000 tons, or over one-third the total exportation, going to France. Cuba, Japan and Canada were also large purchasers during recent months.

Early in the history of the steel industry there arose the foreign demand for American steel rails, developing from an average annual exportation of less than 300 tons in the period 1867-1870 to an average of 474,705 tons during the four calendar years of the war period 1915-1918, although the exports did not reach six figures until near the end of the century. From 1900 the volume increased, with slight fluctuations, from year to year, until the record-breaking shipments of 540,828 tons, valued at $20,417,582, occurred in the calendar year 1916. The total shipments of steel rails for the four-year war period were 1,898,820 tons, invoiced at $82,976,622, as compared with 1,502,580 tons, worth $44,366,286, exported during the pre-war period of four calendar years, 1911-1914, representing an increase of 26 per cent in tonnage and 86 per cent in value of the total shipments during the war period over the exports for the previous four years.

Like other great staple commodities, the value of steel has soared to unprecedented heights during the war and since the armistice, the average monthly export price of steel rails during the war culminated in the record figure of $62.20 per ton in November, 1918, $68.94 per ton being reached in February, while the advance figures for March would indicate a price of $62.30 per ton on foreign shipments.

In addition to $82,976,622 worth of steel rails shipped during the four-year war period, railroad spikes valued at $5,319,734 and other track material valued at $25,138,473 were exported; or a total of $113,434,829 for all iron and steel railway track materials.

While a greater quantity of these products was shipped to France than to any other country during the war, it is noted that with this single exception Cuba has recently become the leading market for steel rails exported from the United States. From comparatively modest purchases prior to the war, Cuban imports of this commodity during the last three calendar years reached a total tonnage of 187,798, valued at $8,146,383; as compared with 159,335 tons, invoiced at $9,812,418, shipped to Japan; 155,932 tons, worth $6,565,708, to Canada, and less amounts to other countries during the same period.

Railway Notes From China

[From Our Special Correspondent in Peking]

A short time ago, the allied ministers made a representation to the Chinese government demanding that the interference with the Peking-Mukden railway by Chinese soldiers be abated, and that all such forces stationed along the railway between Peking and Shanhaikuan be removed. This action was taken under the authority of the Boxer protocol which provides that the Peking-Mukden railway shall be open from Peking to the sea, and that the allied nations may establish garrisons at several points to enforce the provision. While allied garrisons have been maintained at several points ever since 1900, during the past five years, no objection has been made to Chinese garrisons also. As a result, the line was broken for several days during the attempted Imperial restoration during 1917. The recent abuse of freight equipment by Chinese soldiery, and the constant threat which these troops represent to the authority of the central government of China, has resulted in consideration of ways and means to put the Boxer protocol back into force. This consideration was brought to a decision by recent rough handling given some of the foreign staff of the Peking-Mukden line by Chinese soldiers at Tientsin.

The Chinese Ministry of Communications has given out the following condensed operating and income statement covering the year 1917:

	1917	Comparison with 1916: Increase	Comparison with 1916: Decrease
Operating revenues	$63,873,704	$1,111,983	.....
Operating expenses	30,040,565	1,198,287	.....
Net operating revenues	33,833,139	.....	$86,303
Income debits	13,303,911	.....	663,975
Income credits	1,101,028	325,769	.....
Net income debits	12,202,943	.....	989,744
Surplus for the year	21,630,196	903,440	.....

These operating expenses contain charges to the amount of $1,837,819 to cover depreciation on rolling stock. Data from the Canton-Samshui line is not contained in the above, for the reason that this line was in the hands of the rebellious southern authorities. Its surplus is annually in excess of $400,000. It should be remembered in this connection that two important lines were seriously interfered with by floods. Through trains could not be run on the Peking-Hankow from July 27 to October 29, and the north end of the Tientsin-Pukow together with considerable equipment was similarly cut off from August 8 to November 26. Several other lines had lesser interference from the same cause.

Income charges above stated contain slightly over $10,-

400,000 interest and $2,100,000 loss on depreciated currency. In gaging the above results it must be remembered that favorable rates of exchange reduce interest charges to about 3½ per cent upon the nominal debt outstanding, while revenues contain a large quantity of depreciated bank notes which are included at par. Expenses, on the other hand, are paid almost entirely in silver. The result is that after a nominally prosperous year the more important lines found themselves hard up for ready cash.

Nominal net operating revenue represents a return upon cost of road and equipment of 8.2 per cent. The Peking-Mukden and the Peking-Hankow, the two oldest lines, had returns of 17.1 and 11.8, respectively, stated on this basis. The operating ratio was 47. The two lines just mentioned had operating ratios of 38 and 37, respectively. This compares very favorably with American experience, as well as with other countries. Note the following for the year 1913: Austria, 76 per cent; France, 63 per cent; Germany 70 per cent; India, 52 per cent; Japan, 48 per cent; United States of America, 69 per cent.

Three full years are now available for comparison under the uniform classification of accounts. The final surplus for each of these three years is as follows:

	Surplus	Increase over 1915
1915	$9,671,535	.....
1916	20,726,755	$11,055,220
1917	21,630,196	11,958,661

The surplus remaining after all charges for the year had been paid in 1915 was equivalent to 9 per cent upon the investment made by the government in these lines. In 1916 it jumped to 17.7 per cent, and in 1917 amounted to 18.8 per cent.

Announcement is also made of the approximate return of traffic for the year 1918. Total revenues are stated at $75,539,739. These include revenues from a section of the Canton-Hankow line, which was put into restricted operation during the year. These amount to $323,042, so that the lines reporting in 1917 had a revenue of $75,216,697 in 1918. This is an increase of $11,300,000 in round numbers. While operating expenses will naturally show considerable increase also, it is not believed that such increase will be more than one-fourth of the increase in revenue. The Peking-Mukden, which has closed its books for 1918, reports an increase in revenue of $3,857,000 with an increase of only $374,000 in expenses, bringing about a reduction of operating ratio to 33 per cent.

Japanese interests are pressing surveys and preliminary work for an extension of the Ssupingkai-Chenchiatun railway westward to Ha-ma-til-ya. This extension will carry Japanese construction westward of the American Aigun-Chinchow route. The considerations which motivate this activity are almost entirely political, for there is no population to speak of, no industries nor mines to be served by the extension. But if the Aigun line should be built first, the American concessionaires would be in a position to demand all minor westward lines as branches, and thus definitely confine Japanese activity to the eastern portion of Manchuria. Japanese activities in Mongolia are such that it is very apparent that such a limitation to her field of influence is furthest from her thoughts. In order to preserve her connection with this hinterland and if possible establish a plausible claim to a broad zone between Siberia and the Eighteen Provinces of China, Japan must drive her rail lines westward. Once in the field she will also be in a better position to support her objection to the construction of the Aigun Chinchow line by the Americans, and if successful will be entirely free to oppose the unification movement and to work her will on north China.

Preparations are being made to double track a short section of the Peking Hankow line, just south of Peking.

Some Comments on the Lisman Plan

THE SUGGESTION by F. J. Lisman that railroads of the country be combined end to end so as to form light strong competitive systems was published in the *Railway Age* in the issues of March 28 and April 4.

The Globe (New York) on April 29 published an interview by Brice Bliven with Walker D. Hines, director general of railroads, which contained the following:

I had the privilege the other day of hearing Mr. Hines explain his idea as to what should be done with the railroads.

Here in a nutshell is the Hines plan:

Return the railroads to private ownership, but limit the profits to a certain percentage—probably 6 per cent—and give the government part of all earnings above that amount.

Create out of the 170 railroads which the government took over not more than ten or twelve big new railroad systems. Make each system a combination of some strong and some weak roads.

Get a new basis for valuation of the lines, based partly on their actual physical worth and partly on their proven earning power. Give the stock and bondholders new stock or bonds in accordance with the resulting capitalization of the railroads. Let the government guarantee to the stockholders a moderate rate of interest on their investment. Have the government represented on every board of dirctors, and let these government directors form part of the rate-making body, whatever it may be (not the present Interstate Commerce Commission, probably).

Many of the plans Mr. Hines has for disposal of the railroads are taken from the general scheme drawn up by F. J. Lisman of F. J. Lisman & Co. I don't know Mr. Lisman from Adam, but I think it is only fair to say that as a demonstration of sheer power to think I have rarely seen anything more interesting than his plan, which he calls "A Possible Solution of the Railroad Problem." Since Mr. Hines is showing more and more inclination to go over to this plan in its entirety, it is worth while to describe some of its features. * * * * *

An Executive Point of View

The following is an abstract of some letters exchanged between Mr. Lisman and an executive officer of one of the large eastern trunk lines:

Dear Mr. Lisman:—

I had the pleasure last night of reading over carefully your plan for the rehabilitation of the railroads. It is extremely interesting and of real constructive value and will be useful to the commission which I hope the new Congress will appoint, as soon as it is organized, to study the railroad situation and recommend a plan.

I don't agree entirely with some of your conclusions; especially that it would be wise to consolidate all the railroads of the country into a few big systems, because it will result, which appears to be part of your plan, in the strong systems being loaded with the weak sisters and every corporation that would naturally be able to earn a good dividend would be consolidated with a lot of bankrupt properties, so that the whole railroad system of the country would be reduced to the dead level of being barely able to live, unless the rates were made pretty high.

My experience in corporations is that no corporation as big as the ones you provide for can be managed to the best advantage, because the work and responsibility placed on each officer would be so great that it would largely have to be done by assistants and clerks and would lose the personal touch. * * * * * The weakest point in the United States Railroad Administration is that the officers are trying to do more than they can do properly, with the result that the roads are being run on "General Orders" with no pos-

sibility of their being adjusted to fit each particular case. The result is the most ridiculous overpayment in some cases and insufficient payment in others, and also the inability to recognize superior efficiency by promotions and increasing wages or of getting rid of inefficient help by demotions or discharge.

Whatever plan is adopted, it seems to me, must provide for allowing the initiative on the part of the corporations to remain and for some regards for careful operation. If the government guarantee a dividend those roads that could not ordinarily earn such a dividend will sit down quietly and live on it, with no hope of making anything extra. To get the best results the rewards offered for economical and efficient operation and the use of the best possible brains and judgment should be large enough to enable the corporation to pay good salaries and secure the most competent men. It seems to me that in your plan the amount of excess earnings to be divided to labor in bonuses is too large and the amount to go to the corporations too small to insure the best results.

EXECUTIVE OFFICER.

DEAR MR. EXECUTIVE:—

Your particular criticism can be put under two heads

1. The proposed systems are too large for proper supervision.

2. The incentive to do good work is taken away by putting all companies more or less on a dead level.

I admit there is much force to the criticism that the systems are too large. I should have perferred to have kept the proposed systems down so they would not exceed 20,000 miles, but under my plan I somehow had to take care of the roads in the Southwest as there are practically no strong roads in that region, outside of the Southern Pacific and the Atchison, Topeka & Santa Fe. It was, therefore, necessary to link a number of lines with very weak credit to strong lines in the Northwest and Northeast. Besides, there are a number of systems with a substantial capitalization in other sections of the country, which are weak and their burden therefore had to be pro rated among several strong lines. The systems are so very large, however, that they really have to be divided into regional districts, both for the purpose of more effcient operation and in order to enable the Interstate Commerce Commission to keep a record of the earnings, or rather of the result of rates, as same may prevail from time to time.

It seems to me such sub-division after all, should be no more difficult than the present sub-division, under which the Santa Fe System keeps separate accounts for its Gulf, Colorado & Santa Fe and its Pacific Coast Lines. The Southern Pacific keeps a separate account for many companies; in fact for many more than would become necessary hereafter.

The Pennsylvania System up to now, has kept up its separate organization for the lines east and west of Pittsburgh, and I believe that it is the intention to keep up this separate organization in spite of the fact that the Pennsylvania Company, which operates the lines west of Pittsburgh, is to be or has been liquidated.

As to the incentive being taken away, it is quite true that if the companies are practically going to be limited to 6 per cent dividends the incentive for great improvements or great efficiency is not quite as great as it has been heretofore. In order to overcome this, I have worked out the following:

1. The directors personally are to receive additional compensation for increased dividends.

2. A substantial proportion of increased net results are to go to labor.

3. The Board of Directors is in no way restrained from paying good salaries to efficient men.

Let us assume some such plan as mine were to be put into effect. We would then have, say, eight national railway systems, with probably an average of five sub-divisions or districts. The Northern, Central and the Union Railways would compete with each other; they would each have their Atlantic, Central, Western, Pacific and other divisions. The results of the operation of these divisions would continue to be published and compared with each other, the same as now. The officials in charge of these divisions, as well as their sub-divisions, would still each be keen to show good results in the expectation of recognition of their work by increased salary or promotion.

The gist of the proposition is that the Government cannot have full control; the public cannot have competition and close regulation, and at the same time get the fullest benefits of the previous system of private management and personal incentive. It should be possible though to arrive at some compromise by which the best features of private management can be combined with the desires of the public.

F. J. LISMAN.

Movement of Troops for New York Parade

FOR THE PARADE of the 77th Division of the army, which took place in New York City on Tuesday, May 6, the soldiers had to be moved from and to the camp 20 miles east of New York, by the Long Island Railroad, and the total train movement over the company's lines between New York and Camp Upton for the week of May 4-10, was one of the heaviest on record—and exceedingly heavy records have been common on this road ever since this country first entered the war.

A total of 19,288 men were carried westward—Camp Mills to Long Island City—on Monday, the 5th, in 28 trains of 11 cars each. The first of these trains left the camp at 7 a. m. and the last one at 1:50 p. m. The running time (20 miles) is about 40 minutes. The trains carried from 500 to 800 men each, but on one there were 952—16 officers and 936 men.

The troops were taken from Long Island City across the East River to Manhattan in the railroad company's ferryboats, each boat carrying two or three trainloads.

This part of the Long Island road is traversed by large numbers of regular trains, about three-fourths of the distance between Long Island City and Camp Mills being a three-track or four-track line. For the rest of the distance the line is two-track.

In the movement from the city (eastward) on Wednesday, the 7th, 21 trains were run to Camp Upton, 60 miles from Long Island City, and 8 to Camp Mills; the number of coaches used was 324, as compared with 308 on Monday. The movement was spread over a longer time, the first train starting at 7:57 a. m., and the last one 7:10 p. m. The trains from and to Camp Mills were electrically propelled while those from and to Camp Upton were hauled by steam locomotives.

The total troop movements to and from Camp Upton and Camp Mills, for the whole week, seven days, amounted to 172 trains carrying 100,238 men, equal to an average daily movement of 25 trains and 14,320 men. The number of trains moved each day, including both eastbound and westbound, was: Sunday, 22; Monday, 37; Tuesday, 27; Wednesday, 37; Thursday, 11; Friday, 26; Saturday, 12.

All of these special trains had to be made up at the yard in Jamaica, situated about half-way between the western terminus and Camp Mills, so that the actual train mileage (empty and loaded) incident to the movement of troops was about double that indicated in the second and fifth paragraphs, above.

General News Department

The Association of Railway Executives, T. DeWitt Cuyler, chairman, meets in New York city today, Friday.

The Brotherhood of Railroad Trainmen began its triennial convention at Columbus, Ohio, on May 14. The service flag unfurled contains 840 gold stars. Director General Walker D. Hines is announced to address the convention on Tuesday, May 20.

The State of Texas has secured a temporary injunction prohibiting the Galveston, Harrisburg & San Antonio from further removing and abandoning its track between Blodgett, Texas, and West Junction, a distance of 6 miles. The attorney general also asked for a mandamus to require the restoration of tracks already taken up and to pay a $5,000 fine.

The Order of Railway Conductors is holding its triennial convention at St. Louis, Mo., and, according to St. Louis papers, the convention brings 6,000 visitors to the city. Tomorrow (Saturday) the conductors and their families will go by special train to French Lick Springs, West Baden, Ind., 230 miles from St. Louis, where they will be the guests, over Sunday, of Thomas Taggart.

Col. Frederic A. Delano, formerly president of the Wabash and later of the Chicago, Indianapolis & Louisville, who resigned as member of the Federal Reserve Board to go into the army, has been made a Chevalier of the Legion of Honor, in recognition of his services as deputy director general of transportation for the A. E. F. He entered the service as a major and was promoted to lieutenant colonel and later to colonel.

Regular airplane mail service is announced to begin this week between Cleveland and Chicago, a distance of about 350 miles. Airplanes are to start from each city at 9:30 a. m., and will be scheduled to arrive at destination at 2 p. m. The post office department plans to transfer mails to and from railroad mail cars at Cleveland, so as to give the benefit of the quick time to letters from Chicago to New York, Boston and other eastern cities, and vice versa.

The Canadian Pacific Railway has applied to the Canadian Government for authority to operate airplanes between such points as may be found desirable. An officer of the road is quoted as saying that no immediate action is contemplated, the company simply means to be prepared for future developments. In speaking of the prospective importance of aerial transportation he called attention to the fact that there is a regular daily airplane service between London and Paris, by a Handley-Page machine which can carry 17 passengers. He said that the estimates of the British Government for the coming year include for air service no less than three hundred million dollars, of which ten million will be set aside for experimental research and civic aviation.

Cleveland, Ohio, by action of its city government, has ordered clocks to be changed from Eastern to Central Standard Time. Using Eastern or 75th Meridian time, as has been done in the winter, Cleveland keeps its clocks about 27 minutes faster than local time; and now, with the daylight saving law in operation, these timepieces are 87 minutes too fast; and this evidently causes the people to rise in the morning earlier than is agreeable to them. The railroads, being required to regulate their time according to the law, as prescribed by Congress through the Interstate Commerce Commission, continue to use Eastern time, with the exception of the Cleveland, Cincinnati, Chicago & St. Louis, which uses Central time. The interurban electric roads have changed from Eastern to Central Standard.

The St. Louis & Hannibal Railroad Company has made application for permission to cease operation and junk its entire property. The petition prepared to this end declares that the road was started toward bankruptcy by the inconsistent orders of the government railway management. (This road is not operated by the government.) From January 1, 1918, to March 31, 1919, the operation of the road resulted in a net loss of $26,620. The petition declares the company is facing certain bankruptcy and asks that it be permitted to cease operation, take up the track and sell the equipment. The original cost of property is given as $1,118,894. It was sold at a trustee sale in 1917 for $620,000. This is a single track railroad, 86 miles in length, extending from Hannibal, Mo., south by east, to Gilmore, where it connects with the Wabash, which makes a connection to St. Louis, 42 miles east.

The Victory Loan Subscriptions of the railway supply industry in Chicago amounted to $5,500,000. The railway supply trade went "over the top" in splendid fashion, oversubscribing its quota by a round million. This record was made by Committee Number 26, Railway Supplies. C. K. Knickerbocker, of the Griffin Wheel Company, was chairman, with T. W. Aishton, of the National Malleable Castings Company; Robert F. Carr, of the Dearborn Chemical Company; L. B. Sherman, of the *Railway Age;* Herbert W. Wolf, of the American Car & Foundry Company; Thomas Finnigan, American Brake Shoe & Foundry Company; R. H. Ripley, American Steel Foundries Company; H. L. Monroe, General Electric Company; James M. Hopkins, the Camel Company, and Frederick T. Vaux, of Adams & Westlake. C. S. Boggs, of Halsey, Stuart & Company, was captain.

The airplane mail service between New York and Washington has now been in operation one year, and the event was celebrated in Washington on Thursday, May 15. The airline distance between New York and Washington is calculated at 218 miles, and the trips have been made with a high percentage of punctuality, one trip each way each day except Sunday. One of the fliers, making 191 flights, made only seven forced landings and failed to complete his trip only five times. Another, making 138 flights, completed 129 of them without landing. There were 10 or more fliers in all, and others made equally good records. The aggregate mileage flown was 128,037 miles; aggregate weight of mail 193,021 lb. The same six airplanes that began the service are still in operation, with the same engines. It is stated that there has been but one serious injury to a machine, and but one serious accident to a pilot.

According to a statement issued by Otto Praeger, second assistant Postmaster General, the sale of airplane mail stamps has amounted to $159,700. He says that there was a saving in railroad mail transportation of $2,264, and that the airplane operating expenses amounted to $142,861.

Change in M. C. B. Rules

The American Railroad Association, Mechanical Section, has issued Circular 37, reestablishing delivering lines' responsibility and the use of defect cards between railroads under federal control, all circulars and interpretations to the contrary being abrogated. In view of accounting division Circular 86, articles 1, 2, 3 and 4 of the 1918 code of the Master Car Builders' rules for freight cars and modifications A to C inclusive of the 1918 code for passenger cars have been withdrawn and new rules have been formulated to govern the inspection and intrechange of cars between roads under federal control.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MARCH, 1919

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp with last year
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	141	$152,623	$51,412	$215,778	$42,465	$58,645	$2,404	$91,866	$8,940	$205,257	95.12	$10,521	$11,216	— $	— $
Alabama Great Southern	512	571,347	191,277	810,894	117,803	251,285	12,534	326,084	16,405	737,152	90.91	73,741	24,561		
Ann Arbor	301	242,324	55,371	316,167	65,701	49,772	2,290	155,873	11,804	285,443	90.28	30,724	16,701		
Arizona Eastern	377	241,042	46,466	304,444	84,385	46,585	1,426	103,376	3,059	241,734	79.40	62,710	16,282		
Atchison, Topeka & Santa Fe	8,635	8,612,749	3,277,494	12,494,210	1,991,515	3,189,537	144,125	5,118,204	254,531	10,661,619	85.83	1,832,591	553,339		
Atlanta & West Point	93	105,588	107,382	239,350	26,285	40,091	2,725	75,568	5,833	151,708	63.38	87,642	8,500		
Atlanta, Birmingham & Atlantic	639	329,464	72,857	428,661	125,372	126,049	6,876	239,901	11,418	509,705	118.90	—81,045	16,000		
Atlantic City	177	122,125	128,160	263,830	43,212	37,381	1,815	165,361	854	248,708	94.27	15,122	12,000		
Atlantic Coast Line	4,839	3,585,574	1,878,891	5,801,391	791,633	1,255,556	64,952	2,767,289	113,726	5,036,242	86.81	765,149	210,000		
Baltimore & Ohio	5,145	8,838,210	2,463,386	12,336,137	2,206,307	4,484,158	147,659	6,044,768	385,050	13,363,526	108.33	—1,027,389	346,355		
Baltimore & Ohio Chicago Terminal	91	.....	—4	120,486	19,411	43,923	1,056	117,313	7,613	193,991	161.00	—73,505	26,542		
Baltimore, Chesapeake & Atlantic	87	63,500	29,465	97,218	16,020	18,582	961	62,841	3,799	102,204	105.12	—4,986	3,160		
Bangor & Aroostook	632	366,473	77,014	460,175	86,893	115,139	4,634	181,654	12,773	404,949	87.99	55,227	21,000		
Beaumont, Sour Lake & Western	118	45,425	21,984	71,723	22,009	19,955	1,298	52,341	4,554	100,157	139.64	—28,435	2,700		
Belt Ry. Co. of Chicago	31	.....	.....	229,014	—8,570	57,127	79	175,240	6,914	230,788	100.77	—1,774	13,969		
Bessemer & Lake Erie	217	609,450	35,486	662,122	99,449	316,066	10,737	274,969	19,354	708,029	106.93	—45,907	14,500		
Bingham & Garfield	36	75,735	2,523	81,592	32,375	40,110	1,219	28,615	3,854	106,609	130.66	—25,017	6,232		
Birmingham Southern	29	39,650	.....	54,219	3,369	9,441	717	22,956	3,925	39,778	73.36	14,440	2,616		
Boston & Maine	2,258	2,782,437	1,588,859	4,927,007	664,962	1,152,769	42,966	2,917,210	171,411	4,975,607	100.98	—48,599	173,318		
Buffalo & Susquehanna	296	147,931	7,855	159,402	35,334	92,601	1,850	61,377	6,990	198,152	124.30	—38,750	3,250		
Buffalo, Rochester & Pitts.	589	933,523	122,175	1,090,230	197,483	290,096	14,684	555,154	34,300	1,093,527	100.30	—3,297	27,000		
Canadian Pacific Lines in Maine	233	215,904	97,172	326,875	20,856	89,234	2,495	215,061	3,537	331,184	101.31	—4,308	11,000		
Carolina, Clinchfield & Ohio	282	403,555	32,336	441,948	82,506	111,319	3,613	135,946	13,592	346,963	78.50	94,985	16,300		
Central of Georgia	1,918	1,060,403	499,856	1,738,688	371,763	402,865	48,749	769,355	56,539	1,646,609	94.70	92,078	64,042		
Central of New Jersey	684	2,202,370	607,190	3,077,687	461,167	867,303	19,193	1,654,066	81,225	3,101,079	100.76	—23,392	157,074		
Central of New England	301	385,672	28,850	433,888	120,993	107,432	2,963	264,272	14,819	511,483	117.88	—77,595	16,000		
Central Vermont	411	277,325	80,694	397,772	53,271	117,096	5,979	268,166	17,577	462,790	116.35	—65,018	17,460		
Charleston & Western Carolina	342	200,821	57,616	268,434	54,068	39,390	6,412	127,079	4,569	231,519	86.24	36,915	8,500		
Chesapeake & Ohio	2,506	3,840,338	1,253,688	5,271,819	902,940	1,189,027	36,500	2,212,178	119,295	4,491,415	85.19	780,405	172,000		
Chicago & Alton	1,050	1,310,773	476,560	1,899,167	322,224	513,303	27,802	895,779	48,884	1,817,696	95.71	81,471	60,266		
Chicago & Eastern Illinois	1,131	1,278,331	398,126	1,806,857	326,640	820,186	24,065	851,095	47,690	2,076,696	114.93	—269,839	79,500		
Chicago & Erie	269	656,248	82,434	807,993	65,577	136,212	11,182	485,223	27,996	730,875	90.45	77,118	27,678		
Chicago & North Western	8,090	6,657,446	2,565,566	10,034,661	1,165,833	2,200,121	88,133	5,151,775	244,282	8,928,367	88.97	1,106,294	475,000		
Chicago, Burlington & Quincy	9,372	7,885,183	2,553,813	11,279,417	1,672,211	2,531,872	95,932	4,764,839	318,194	9,492,052	84.15	1,787,364	314,000		
Chicago Great Western	1,496	1,011,644	452,263	1,579,748	218,805	310,605	28,259	792,235	43,419	1,405,071	88.94	174,678	54,975		
Chesapeake & Ohio	2,506	3,840,338	1,253,689	5,271,819	902,940	1,189,026	36,500	2,212,178	119,295	4,491 415	75.19	780,405	172,000		
Chicago, Indianapolis & Louisville	657	556,612	219,648	851,988	91,450	223,316	13,103	366,547	26,166	730,437	85.73	121,552	32,501		
Chicago Junction	12	.....	.....	257,250	89,288	66,198	85	227,906	6,912	390,388	151.75	—133,138	2,401		
Chicago, Milwaukee & St. Paul	10,273	7,655,699	2,373,701	10,970,124	916,756	3,805,500	92,986	5,437,785	341,368	10,622,117	96.82	348 006	481,881		
Chicago, Peoria & St. Louis	247	88,183	26,178	121,843	43,584	69,147	2,406	82,339	9,754	207,228	170.00	—85,385	7,400		
Chicago, Rock Island & Gulf	474	271,544	70,868	360,522	63,489	67,609	7,653	172,688	11,350	323,287	89.67	37,246	13,155		
Chicago, Rock Island & Pacific	7,723	5,347,952	2,260,122	8,103,326	1,396,900	2,043,177	97,880	3,566,138	201,627	7,329,308	90.44	774,018	348,264		
Chicago, St. Paul, Minn. & Omaha	1,749	1,360,771	600,297	2,096,472	176,491	446,137	14,366	1,109,459	59,957	1,822,090	86.91	274,382	104,241		
Chicago, Terre Haute & S. E.	374	300,549	22,620	330,775	51,003	142,291	4,339	119,729	6,975	325,782	98.49	4,993	14,500		
Cincinnati, Indianapolis & Western	657	1,556,612	219,648	851,989	91,451	223,317	13,103	366,547	26,167	730,436	85.73	121,552	32,501		
Cincinnati, New Orleans & Texas Pacific	337	978,331	285,139	1,330,639	139,239	517,354	22,351	474,209	31,379	1,196,924	89.95	133,715	39,000		
Cincinnati Northern	251	201,266	18,604	224,861	40,684	49,187	2,622	77,155	4,070	173,718	77.25	51,143	8,500		
Cleveland, Cincinnati, Chic. & St. Louis	2,395	3,536,650	1,192,953	5,126,885	666,087	1,070,443	82,619	2,173,181	102,453	4,132,123	80.59	994,763	185,000		
Colorado & Southern	1,100	829,458	165,031	1,053,027	145,283	258,873	9,973	400,178	36,679	856,095	81.29	196,933	47,000		
Colorado & Wyoming	41	24,905	1,238	93,939	9,526	18,983	75	47,642	3,682	79,909	85.06	14,031	4,000		
Cumberland Valley	163	323,767	67,596	432,194	66,923	94,116	5,904	179,763	14,196	361,540	83.65	70,654	9,164		
Delaware & Hudson Co.	868	2,332,170	246,353	2,698,013	347,676	807,574	18,672	1,131,133	102,627	2,451,158	90.85	246,855	60,000		
Delaware, Lackawanna & Western	955	3,764,159	898,849	5,275,652	522,678	1,151,068	24,404	2,487,308	114,915	4,356,839	82.59	918 813	340,956		
Denver & Rio Grande	2,643	1,674,535	424,325	2,232,121	274,794	750,847	22,220	892,627	69,118	2,045,303	91.63	186,816	100,000		
Denver & Salt Lake	255	138,568	24,025	169,196	48,315	96,084	921	131,254	4,112	280,686	165.89	111,490	9,000		
Detroit & Mackinac	381	103,551	28,542	139,267	18,770	36,935	7,978	64,283	19,874	147,840	106.16	—8,573	2,378		
Detroit, Toledo & Ironton	457	240,118	13,154	268,146	72,372	112,521	3,345	139,102	12,270	339,610	126.65	—71,465	8,500		
Detroit & Toledo Shore Line	61	212,059	.....	215,282	12,863	15,114	347	55,543	3,056	86,923	40.38	128 360	21,996		
Duluth & Iron Range	292	111,594	25,973	151,206	55,331	87,445	600	118,081	13,313	274,769	181.71	—123,563	7,630		
Duluth, Missabe & Northern	410	146,560	44,030	212,618	63,181	117,365	2,166	138,722	7,896	330,602	155.49	—117,984	10,012		
Wichita Falls & N. W.	328	100,456	34,778	141,882	44,575	24,475	760	74,660	7,633	152,102	107.20	—10,219	9,256		
Philadelphia, Bethlehem & N. E.	71	.....	.....	64,284	5,834	9,816	333	43,926	1,701	61,611	95.84	2,672	1,100		
Cincinnati, Lebanon & Northern	76	49,172	5,729	68,678	13,763	18,187	1,163	55,313	803	89,228	129.92	—20,550	4 441		
Duluth, South Shore & Atlantic	599	219,473	83,699	322,106	54,927	62,957	6,193	184,118	8 842	321,531	99.82	576	19 000		
Duluth, Winnipeg & Pacific	178	162,635	28,198	203,598	18,298	30,673	1,748	90,133	8,706	158,279	77.74	45,319	10,506		
East St. Louis Connecting	3	.....	.....	76,914	10,647	37,759	261	54,037	2,984	105,688	137.41	—28,774	5,111		
El Paso & Southwestern Co.	1,027	808,009	180,339	1,036,795	130,515	207 200	9,918	293,428	24,831	672,594	64.87	364,201	48,364		
Elgin, Joliet & Eastern	828	1,575,690	2	1,838,780	166,643	429.138	7,337	699,366	24,437	1,326,878	72.16	511,902	53,250		
Erie	1,989	4,753,383	1,017,652	6,439,134	890,162	2.158.223	62,046	3,768,954	208,447	7,127,749	110.69	688,616	267,475		
Florida East Coast	764	468,073	428,865	990,132	147,271	179,387	7,374	502,662	17,902	865,340	87.39	124,792	38,784		
Ft. Smith & Western	253	89,827	23,586	122,243	23,919	29,204	3,758	45,722	6,408	109,239	89.36	13,004	5.000		

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MARCH, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Ft. Worth & Denver City	454	$573,354	$217,338	$819,964	$98,934	$161,477	$7,539	$334,542	$30,040	$635,016	77.44	$189,948	$19,250	$165,645	—$34,150
Ft. Worth & Rio Grande	235	70,130	47,899	126,163	35,022	38,055	2,687	75,198	14,703	165,664	131.30	—39,502	2,983	—42,485	—49,056
Fonda, Johnstown & Gloversville R. R.	88	20,729	63,321	87,494	9,397	8,895	920	40,695	4,601	64,216	73.39	23,278	4,900	18,378	—12,795
Galveston, Harrisburg & San Antonio	1,382	1,038,773	460,237	1,581,654	253,873	269,971	14,727	612,636	50,031	1,315,983	83.20	265,672	52,205	212,828	—110 017
Galveston Wharf	13	.....	.....	57,001	19,085	888	938	19,939	2,192	48,643	85.33	8,358	11,400	—3,041	—29,179
Georgia	328	370,627	147,984	556,565	61,069	86,633	5,591	241,041	16,078	410,569	73.76	145,996	5,590	140,041	10,111
Georgia, Southern Florida	402	236,131	101,782	370,452	66,483	81,992	5,599	184,186	9,705	349,790	94.42	20,662	13,550	7,037	—37,545
Grand Rapids & Indiana	569	388,026	142,239	584,198	93,083	120,008	10,496	325,776	22,436	572,774	98.04	11,424	25,951	—14,536	—91.025
Grand Trunk Western	1,001	1,328,989	253,323	1,703,671	169,945	308,886	13,374	828,111	45,036	1,364,004	80.06	339,668	49,390	289,021	329,141
Great Northern	8,252	5,308,201	1,421,562	7,411,951	1,322,174	1,720,275	65,350	3,511,086	161,817	6,860,781	92.56	551,170	251,946	298,867	—223,103
Gulf & Ship Island	307	138,355	42,363	195,247	59,051	45,837	4,199	76,694	8,221	194,359	99.54	887	11,355	—10,487	—65,616
Gulf, Colorado & Santa Fe	1,937	942,623	381,903	1,404,707	326,816	279,409	10,558	629.197	47,316	1,291,076	91.91	113,632	71,167	42,084	—412,962
Gulf, Mobile & Northern	424	144,765	41,583	198,481	39,369	61,162	5,046	99,511	9,857	214,951	108.30	—16,470	10,546	—27,049	—63,942
Hocking Valley	350	379,904	86,120	500,190	89,210	226,484	5,516	234,281	19,840	575,253	115.00	—75,062	57,067	—132,129	—230,758
Houston, East & West Texas	190	131,392	43,956	183,664	34,597	24,928	749	81,652	4,159	146,085	79.53	37,579	6,158	31,369	2,008
Houston & Texas Central	856	434,973	184,842	656,096	145,375	150,394	5,961	321,725	20,270	643,678	98.11	12,418	34,023	—21,830	—187,928
Illinois Central	4,782	5,830,579	1,922,329	8,327,859	1,558,063	2,295,010	78,425	3,445,966	229,066	7,628,323	91.60	699,536	403,500	292,316	—1,926,432
Indiana Harbor Belt	116	.....	.....	468,192	85,938	119,860	1,667	312,811	16,808	537,084	114.71	—68.892	9,954	—78.846	—140,463
International & Great Northern	1,159	722,327	235,821	1,033,188	299,506	361,784	12,438	595,860	43,162	1,317,571	127.52	—284,384	30,000	—314,386	—576,751
Kanawha & Michigan	176	193,624	51,542	255,326	39,459	104,675	2,473	106,167	12,039	264,812	103.71	—9,487	17,885	—27,372	—90 581
Kansas City, Mexico & Orient	272	75,340	13,685	92.948	42,849	40,170	2,084	53,839	6,857	145,798	156.85	—52,850	6,250	—59,100	—27,634
Kansas City, Mexico & Orient of Texas	465	78,361	11,349	94,933	34,574	40,785	1,712	52,965	8,007	138,043	145.41	—43,110	5,000	—48,112	—40.118
Kansas City Southern	774	852,890	175,654	1,112,776	209,858	322,580	19,687	469,586	43,419	1,066,643	95.32	52,134	61,250	—9,744	—383,393
Kansas City Terminal Co	27	.....	.....	104,555	14,501	26,111	.....	47,767	1,213	90,972	87.01	13,583	20,150	—6.567	—6,914
Lake Erie & Western	902	683,935	63,146	775,356	123,332	257,296	10,649	321,944	23,088	736,156	94.94	39,199	27,000	12,060	—186,288
Lehigh & Hudson River	96	172,052	3,916	184,451	22,927	59,233	1,573	87,505	5,239	176,477	95.67	7,974	4,500	3,471	—38,253
Lehigh Valley	1,435	3,384,318	416,380	4,279,673	643,506	1,328,475	42.356	2,095,047	95,158	4,219,734	98.59	59,940	146,725	—86,815	—681,467
Long Island	398	386,484	1,116,733	1,672,794	272,486	272,931	9,464	934,974	47,780	1,553,365	92.86	119,429	85,804	32,998	—169,544
Los Angeles & Salt Lake	1,168	1,005,693	341,764	1,431,075	271,750	301,482	17,745	467,002	30,623	1,117,458	78.08	313,617	67,235	246,278	16,547
Louisiana & Arkansas	302	128,075	33,560	170,038	46,825	45,657	2,676	87,564	5,680	188,403	110.80	—18,365	11,755	—30,120	—74,611
Louisiana Western	207	162,101	124,735	301,711	38,243	54,874	2,875	80,851	10,597	189,538	62.82	112,173	9,070	103,080	—33,604
Louisville & Nashville	5,013	6,272,994	2,105,483	8,794,552	1,393,715	2,105,419	109,638	3,555,209	189,210	7,384,049	83.96	1,410,502	246,773	1,162,974	—952,080
Louisville, Henderson & St. Louis	199	159,581	58,732	227,728	46,918	29,596	7,010	90,080	6,924	180,527	79.27	47,201	4,000	43,189	—26,599
Maine Central	1,216	874,457	366,184	1,338,677	202,956	332,431	11,304	879,681	37,524	1,464,352	109.38	—125,674	75,623	—201,303	—178,674
Maryland, Delaware & Virginia Ry. Co.	82	58,644	26,237	87,312	10,182	17,826	355	61,882	2,357	92,603	106.05	—5,290	1,733	—7,023	16,840
Michigan Central	1,861	3,818,645	1,346,295	5,633,810	894,697	1,208,786	72.873	2,275,426	104,537	4,624,884	82.09	1,008,925	160,000	848,716	—809,878
Mineral Range	101	71,269	380	73,721	7,959	18,420	313	43,447	907	71,074	96.40	2,647	3,300	—653	178
Minneapolis & St. Louis	1,646	731,897	229,037	1,011,633	177,588	259,279	6,763	515,905	29,217	984,586	97.32	27,047	46,763	—20,084	—134,199
Minn. & International Ry. Co	194	72,728	25,589	102,954	20,030	17,555	533	52,716	3,635	94,470	91.75	8,484	5,133	3,351	—26,320
Minn., St. Paul & Sault Ste. Marie	4,243	2,253,220	592,228	3,033,582	401,955	766,384	23,696	1,345,733	71,812	2,826,022	93.15	207,561	187,693	19,463	—333,398
Missouri & North Arkansas	365	86,685	34,970	128,620	64,687	44,987	1,157	56,397	8,285	175,364	136.34	—46,744	7,178	—54,194	—62,350
Missouri, Kansas & Texas	1,714	1,743,632	658,782	2,539,440	603,776	828,528	15,342	852,999	78,044	2,384,168	93.88	155,272	90,355	64,850	—474,730
Missouri, Kansas & Texas of Texas	1,796	1,080,940	628,840	1,830,847	448,076	334,230	14,271	956,148	65,082	1,835,499	100.25	—3,652	47,828	—52,325	—155,341
Missouri, Oklahoma & Gulf	332	82,185	17,399	104,929	55,235	48,234	1,708	57,470	6,501	169,266	161.31	—64,337	8,500	—72,851	—66,747
Missouri Pacific	7,108	4,701,371	1,570,301	6,737,364	1,459,390	1,756,726	61,683	3,049,528	199,184	6,555,190	97.29	182,174	258,287	—78,474	—1,906,256
Mobile & Ohio	997	934,656	170,468	1,168,163	203,114	478,163	15,606	596,120	35,214	1,327,999	113.68	—159,836	55.174	—215,421	—271,559
Monongahela Connecting	6	.....	.....	173,328	23,412	62,209	511	82,536	7,160	175,828	101.44	—2,500	2,539	—5,039	—47,262
Monongahela R. R.	108	232,389	21,716	258,313	60,661	41,416	1,193	75,540	6,550	185,360	71.75	72,953	5,000	67,953	16,354
Montour R. R.	54	59,028	1,864	64,696	20,162	28,386	1,052	23,088	6,155	78,911	121.97	—14,215	2,286	—16,501	7,611
Morgan's Louisiana & Texas R. R.	400	329,087	195,569	554,819	89,767	132,597	7,094	248,375	20,249	500,266	90.16	54,553	31,034	23,381	—253,949
Nashville, Chattanooga & St. Louis	1,247	1,001,216	436,298	1,533,492	354,582	453,020	32,413	707,449	43,024	1,600,611	104.37	—67,119	50,000	—117,172	—547,505
Nevada Northern	168	96,256	9,240	114,084	14,976	18,923	830	39,019	4,431	78,298	68.63	35,787	18,323	17,464	—75,245
Northern Alabama	112	82,242	13,826	98,383	24,618	6,254	1,362	67,861	1,892	101,988	103.66	—3,605	3,400	—7,005	41,406
Newburgh & South Shore R. R.	7	.....	.....	144,756	17,577	25,633	.....	59,416	3,563	106,189	73.36	38,567	8,198	30,368	32,052
New Orleans & N. E.	498	340,237	126,947	521,379	57,845	126,829	8,036	283,225	14,787	501,039	96.10	20,340	28,357	—8,048	—188,668
New Orleans Great Northern	284	134,066	42,554	183,608	42,319	40,996	3,176	84,096	8,939	180,063	98.06	3,545	9,100	—5,721	—53,968
Mississippi Central	164	60,216	27,631	91,713	17,441	31,663	1,448	33,039	5,490	89,081	97.13	2,632	3,325	—693	—29,189
Grand Trunk Lines in New England	172	285,229	36,227	371,448	102,362	44,768	3,099	202,669	11,603	393,919	106.04	—22,471	11,500	—33,971	—33,025
New Orleans, Texas & Mexico	191	118,699	34,063	164,267	36,735	42,738	2,793	38,489	5,501	128,140	78.00	36,127	10,000	26,127	—83,842
New York Central	6,075	14,025,568	6,722,044	23,430,720	3,023,034	5,511,401	155,901	11,298,167	635,921	20,997,452	89.61	2,433,268	1,017,123	1,414,360	—2,570,718
New York, Chicago & St. Louis	572	1,874,009	119.182	2,035,861	258,667	360,733	23,343	785,270	52,810	1,483,582	72.87	552,279	55.000	496,919	145,881
New York, New Haven & Hartford	1,965	3,327,628	3,411,471	7,652,328	918,119	1,696,858	45,068	4,183,056	277,418	7,297,317	95.36	355,012	268.000	86,376	—1,067,259
New York, Ontario & Western	569	361,506	92,162	577,585	96,029	197,551	10,006	327,688	24,987	656,261	113.62	—28,676	24,700	—103,376	—199,382
New York, Philadelphia & Norfolk	121	451,575	128,204	622,176	52,753	114,553	7,385	306,495	11,038	509,544	81.89	112,632	17,035	95,597	42.263
New York, Susquchanna & Western	135	167,824	57,782	270,607	43,515	54,924	1,668	193,965	8,819	303,134	112.02	—32,527	37,111	—69,639	—103,804
Norfolk & Western	2,088	4,833,378	787,917	5,844,392	772,006	1,623,566	33,695	2,153,693	108,321	4,710,856	80.60	1,133,536	260,000	873,401	—320,500
Norfolk Southern	907	392,860	135,907	566,258	125,524	106,332	7,208	262,971	18,058	520,311	91.88	45,947	19,882	26,008	—83,300
Northern Pacific	6,564	5,368,590	1,484,313	7,423,001	1,131,792	1,506,915	58,799	3,006,185	190,193	1,932,419	79.92	1,490,582	520,026	968,513	—1,246.335
Northwestern Pacific	507	187,233	153,678	382,433	119,894	72,032	5,231	198,099	11,615	408,230	106.74	—25,797	22,019	—47,871	—135,806
Oregon Short Line	2,347	2,082,845	556,302	2,822,116	610,711	539,239	20,692	892,188	79,357	2,196,545	77.83	625,571	177,964	447,461	—428.913

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MARCH, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.)	Maintenance of—Way and structures.	Maintenance of—Equipment.	Traffic.	Transportation.	General.	Total.				
Oregon-Washington R. R. & Nav. Co.	2,060	$1,541,116	$593,224	$2,344,946	$506,806	$377,258	$29,411	$997,326	$94,267	$2,048,286	87.34	$296,660	$113,614	$18[illegible]
Panhandle & Santa Fe	772	272,531	73,875	372,125	122,935	137,595	3,124	205,245	14,717	482,493	129.65	—110,368	15,924	—126,446
Pennsylvania Co.	1,754	4,887,342	1,589,526	7,180,289	1,004,081	1,997,278	61,395	3,490,512	186,452	6,769,312	94.27	410,978	289,573	930,615
Pennsylvania Railroad	5,360	17,430,540	7,779,810	27,514,360	3,958,012	7,235,655	220,972	15,034,164	719,857	25,721,373	93.48	1,792,988	861,228	930,615
Peoria & Pekin Union	19	29,542	5,504	96,510	18,309	33,869	885	76,202	5,764	135,029	139.91	—38,519	9,500	—48,019
Pere Marquette	2,232	1,989,579	405,591	2,581,811	337,219	550,381	21,640	1,101,401	72,890	2,085,459	80.77	496,352	104,447	391,794
Philadelphia & Reading	1,127	3,421,559	817,753	4,539,028	559,805	1,755,895	40,554	3,015,782	127,668	5,512,851	121.45	—973,822	143,228	—1,116,997
Pittsburgh & Lake Erie	224	2,058,770	197,736	2,413,921	564,074	705,578	21,174	981,945	43,133	2,317,158	95.99	96,763	75,500	21,263
Pittsburgh & Shawmut	103	61,075	4,607	66,789	37,735	35,817	1,310	29,293	3,244	107,398	160.80	—40,610	971	—41,581
Pittsburgh & West Virginia	63	79,254	10,046	100,369	52,113	32,836	1,194	51,188	5,313	150,964	150.40	—50,595	11,261	—61,856
Pittsburgh, Cincinnati, Chic. & St. Louis	2,383	4,512,833	1,535,590	6,920,967	853,302	2,068,832	80,803	3,458,171	175,297	6,700,982	96.82	219,986	233,118	—13,271
Pittsburgh, Shawmut & Northern	204	64,102	6,725	73,979	18,922	34,973	927	34,335	5,360	94,522	127.76	—20,543	1,844	—22,405
Port Reading	21	84,528	.....	119,347	—6,821	4,576	18	81,821	1,418	81,010	67.87	38,337	9,000	29,337
Richmond, Fred. & Pot.	77	363,896	241,581	662,499	76,062	88,517	4,038	221,517	13,790	413,649	62.43	248,850	11,809	237,040
Rutland	415	199,903	105,056	359,490	64,156	93,347	9,273	167,566	10,948	345,293	96.05	14,198	19,059	4,866
St. Joseph & Grand Island	258	138,024	39,611	189,921	40,393	41,979	1,661	147,492	12,664	246,014	129.53	—56,093	8,810	64,967
St. Louis, Brownsville & Mexico	548	256,339	129,211	402,471	62,581	73,701	3,894	120,193	15,317	275,686	68.49	126,784	10,000	116,782
St. Louis Merchants Bridge Terminal	9	.....	820	193,439	63,514	64,686	719	162,392	7,286	298,597	154.36	—105,158	8,000	—113,158
St. Louis-San Francisco	4,761	3,932,296	1,675,460	5,913,473	1,030,337	1,329,999	58,492	2,399,468	160,383	4,970,686	84.06	942,787	215,936	724,545
St. Louis, San Francisco & Texas	134	94,523	4,827	105,808	20,890	24,006	2,924	62,676	4,072	114,569	108.28	—8,760	1,629	—10,421
St. Louis Southwestern	93	836,019	159,604	1,038,896	281,607	279,029	16,514	368,860	38,068	996,935	95.96	41,961	37,140	4,774
St. Louis Southwestern of Texas	814	315,560	103,972	455,879	141,128	196,633	6,810	240,939	22,786	604,444	132.58	—148,566	21,000	—169,634
San Antonio & Aransas Pass	732	176,907	81,648	779,419	100,033	109,419	5,716	161,334	15,954	391,483	140.11	—112,063	15,000	—127,071
Seaboard Air Line	3,563	2,150,261	1,186,085	3,698,777	536,726	823,535	59,464	1,731,737	100,208	3,281,099	88.70	417,678	135,000	281,824
South Buffalo Ry. Co.	11	36,948	.....	77,477	13,032	17,013	279	53,285	1,680	85,288	110.09	—7,811	2,551	—10,361
Southern R. R.	6,982	5,782,641	2,947,971	9,469,761	1,600,662	2,498,476	132,653	4,403,705	284,271	8,964,911	94.66	504,850	322,231	174,512
Southern in Mississippi	278	70,467	45,840	123,307	43,082	26,197	2,234	68,743	4,639	144,892	117.51	—21,585	9,000	—30,587
Southern Pacific	7,049	8,189,384	3,324,755	12,470,349	2,555,222	3,087,379	120,413	5,045,571	287,551	11,338,870	90.93	1,131,479	605,881	525,087
Spokane International Ry. Co.	156	50,270	14,794	67,390	13,715	7,437	1,770	28,269	4,203	55,394	82.19	11,996	4,013	7,983
Spokane, Portland & Seattle	554	432,247	129,545	596,296	120,939	90,806	5,747	262,036	19,964	438,538	73.54	157,758	59,200	98,523
Staten Island Rapid Transit Co.	23	60,591	69,401	143,356	26,645	26,923	846	93,767	9,149	157,330	109.75	—13,974	9,000	—22,980
Tennessee Central	293	174,314	43,210	229,174	99,414	42,010	2,307	114,599	6,154	264,883	115.58	—35,709	5,135	40,844
Terminal R. R. Assn. of St. Louis	36	.....	3,108	296,028	72,490	81,501	723	140,443	6,533	305,042	103.04	—9,014	28,250	—37,264
Texarkana & Ft. Smith	81	80,204	17,220	106,395	22,669	18,007	1,698	54,710	2,904	95,968	90.19	10,427	6,459	3,968
Texas & New Orleans	469	431,814	169,724	637,250	124,855	193,686	4,824	251,076	13,946	602,648	94.57	34,602	21,086	13,374
Texas & Pacific	1,946	1,734,935	716,316	2,593,599	529,205	548,084	27,391	1,344,122	75,742	2,544,220	86.13	49,379	84,971	—36,173
Toledo & Ohio Central	435	494,310	71,624	588,349	101,864	175,342	6,890	263,044	14,788	564,083	95.87	24,266	32,975	—8,709
Toledo, Peoria & Western	247	59,849	50,910	111,751	25,011	38,266	2,115	61,922	6,760	134,072	119.97	—22,321	8,500	—30,821
Toledo, St. Louis & Western	454	494,184	29,822	550,144	89,961	130,244	3,982	239,605	13,062	476,853	86.67	73,292	26,000	47,292
Trinity & Brazos Valley	368	71,939	18,366	95,411	42,603	43,942	1,566	63,991	5,943	158,043	165.64	—62,631	5,715	68,353
Ulster & Delaware	128	35,845	12,736	63,761	11,614	15,458	1,483	53,674	4,773	87,513	137.25	—23,751	4,600	—28,405
Union Pacific	3,614	6,189,112	1,648,255	8,402,369	1,459,964	1,583,099	41,546	2,709,116	228,459	6,196,791	73.75	2,205,578	261,551	1,942,743
Union R. R. of Pennsylvania	35	.....	.....	654,189	54,643	121,744	280	333,693	7,296	517,655	79.12	136,533	6,428	130,105
Utah Ry.	98	88,401	781	90,016	7,210	26,493	187	17,784	2,127	53,799	59.74	36,317	4,091	32,126
Quincy, Omaha & Kansas City	255	50,632	26,184	82,248	21,635	11,234	254	32,640	1,973	67,724	82.34	14,523	3,003	11,520
Vicksburg, Shreveport & Pacific	171	165,485	70,394	252,674	52,050	50,421	3,085	91,052	7,369	206,187	81.60	46,487	9,417	36,985
Virginian	518	562,462	52,102	690,849	148,962	206,963	4,495	317,252	14,893	690,025	99.88	823	38,000	37,180
Wabash	2,519	2,629,512	697,381	3,505,276	582,507	728,321	44,439	1,978,403	103,863	3,457,770	98.64	47,507	108,887	—61,588
Washington Southern	35	134,575	203,074	382,525	42,502	34,891	2,732	120,628	6,630	211,749	55.35	170,776	6,318	164,451
West Jersey & Seashore	361	261,900	456,480	774,300	166,832	154,146	6,906	460,542	21,595	815,386	105.31	—41,086	40,063	—81,371
Western Maryland	707	864,828	79,987	1,038,406	194,031	388,269	16,649	484,407	39,299	1,133,306	109.14	—94,900	43,200	—138,100
Western Pacific	1,011	619,459	115,593	762,681	251,460	200,048	10,963	515,232	22,064	814,516	106.79	—51,835	48,232	—100,090
Western Ry of Alabama	133	111,921	92,817	224,208	27,556	50,380	2,674	76,913	5,080	166,295	74.16	57,913	7,500	50,413
Wheeling & Lake Erie	511	578,091	50,682	696,772	165,642	202,674	6,422	354,460	24,962	756,757	108.60	—59,984	53,500	—113,484
Yazoo & Mississippi Valley	1,381	1,367,730	440,067	1,888,063	331,729	441,886	14,870	762,202	49,581	1,504,980	79.71	383,084	68,066	314,864
Perkiomen R. R.	42	69,012	6,104	78,872	4,640	3,592	17	41,974	254	50,496	64.02	28,376	1,800	26,576
St. Louis Transfer Co.	6	.....	.....	55 239	13,450	17,063	178	46,930	2,111	79,731	144.34	—24,493	100	—24,593
Southern Pacific Steamship Line	...	780,527	41,420	862,795	14,547	181,093	12,239	617,422	25,742	851,044	98.64	11,751	13,719	—1,968
THREE MONTHS OF CALENDAR YEAR 1919														
Alabama & Vicksburg	141	448,255	175,769	663,958	108,387	172,883	5,343	303,878	24,886	619,092	93.24	44,867	31,839	12,989
Alabama Great Southern	312	1,718,286	508,341	2,359,650	262,955	645,464	35,639	1,056,156	50,928	2,069,181	87.69	290,469	73,683	216,735
Ann Arbor	301	769,966	154,205	969,924	204,646	165,075	8,164	150,442	36,414	864,845	89.16	105,079	42,900	62,013
Arizona Eastern	377	799,515	148,323	1,012,212	241,871	153,942	4,154	308,547	9,962	731,967	72.31	280,246	48,846	231,338
Atchison, Top. & Santa Fe	8,635	26,367,355	9,974,431	38,091,433	5,528,891	9,129,639	382,514	14,981,820	790,273	30,739,310	80.69	7,352,123	1,653,002	5,694,162
Atlanta & W. Point	93	336,419	276,720	679,003	79,812	124,155	8,630	247,753	18,987	483,893	71.26	195,111	25,500	169,576
Atlanta, Birmingham & Atl.	639	876,335	212,353	1,168,615	357,026	406,208	19,172	696,506	36,866	1,516,094	129.73	—347,480	48,000	396,292
Atlantic City	177	371,071	342,669	775,290	122,644	118,375	2,410	487,448	2,375	733,510	94.61	41 779	36,000	5,779
Atlantic Coast Line	4,839	10,555,739	5,067,339	16,648,457	2,336,343	3,327,546	178,886	7,254,547	323,528	13,532,582	81.28	3,115,875	610,000	2,501,697
Baltimore & Ohio	5,145	26,355,423	7,382,687	36,897,641	6,386,641	13,544,803	445,663	19,279,348	5,202,592	41,138,577	111 49	—4,241,337	1,087,465	—5,328,028

Strike of Express Company Employees

A strike of wagon drivers and other employees of the American Railway Express Company, in and around New York city, which was settled on Monday of this week, had blockaded the merchandise traffic of the company badly for nearly a week. The men struck for recognition of their newly formed union, and for a further increase in pay, the increase recently granted by the Railroad Administration being declared unsatisfactory; and double-time for Sunday and holiday work, time and one-half for all overtime, and ten holidays a year, were also asked for. Most of the strikers have joined the International Brotherhood of Teamsters; and members of that brotherhood, representatives of the company, and W. S. Carter, representing the Railroad Administration, are to settle the grievances of the men, a large meeting of the strikers having voted unanimously to agree to this. About 10,000 men left their work. Notwithstanding the extent and the completeness of this strike, the delays to traffic which resulted seem to have been much less troublesome than usually is the case in such a condition; the apparent explanation of which is that enormous quantities of merchandise in packages weighing 70 lb. or less were sent by parcel post, while large quantities of other merchandise, which usually go by express, were sent by freight.

Explosion in C. P. R. Tunnel

The five-mile tunnel on the Canadian Pacific near Connaught, B. C., which was being lined by Carter-Halls-Aldinger Company, contractor of Winnipeg, Man., was filled with poisonous gas caused by the explosion of thirty drums of gasoline and kerosene used for the operation of a concrete mixer. A watchman was suffocated in a telephone booth where he had stopped to escape the gas. A slight fire occurred, following the explosion, and the extent of damage was approximately $6,000.

Reorganization of the U. S. Chamber of Commerce

At the recent meeting of the Chamber of Commerce of the United States the delegates approved a recommendation by the board of directors that structural changes be made in the organization of the Chamber to permit an expansion of its activities. The proposed plan contemplates establishment within the chamber of departments designed to deal with the following: Industrial production; domestic distribution; foreign commerce; transportation and communication; finance; insurance; civic development.

Railroad Employees' Subscriptions to Victory Loan

The director general had received to May 13 the following reports regarding the progress of the Victory Loan among the officers and employees of the United States Railroad Administration:

Region—	Employees on roll	Employees Subscribing	Amount Subscribed	Employees Subscribing
Northwestern	248,086	197,493	$19,601,650	79.61
Southern	264,363	117,327	11,385,000	44.38
Southwestern	175,375	104,377	10,614,000	59.5
Pocahontas	50,365	34,406	3,325,450	68.31
Central Western	299,332	244,200	24,456,450	81.
Allegheny	382,484	265,999	21,939,250	69.54
Eastern	419,549	303,372	28,463,500	72.
Pullman lines	21,061	19,917	1,616,350	95.
Coastwise S. S.	.....	2,226	164,550	.....
N. Y.-N. J. canals	139	120	12,300	86.
Miss.-Warrior Rivs.	.....	.....	9,600	.....
R. R. Administration (Ship. Board fund)	.....	.....	863,000	.....
Central Administration	1,242	1,242	580,000	100.
Total	.....	.....	$123,031,100	.....

Derailment and Blockade at Sabula, Pa.

By the derailment of a freight train on the Pennsylvania Railroad in a tunnel at Sabula, Pa., on April 30, thirteen freight cars and a large quantity of freight were destroyed, the tunnel for a length of 145 ft. caved in, and the road was blocked so that probably two months will be required for its restoration.

In the train derailed there were 34 loaded and 10 empty cars. A car was derailed in the tunnel, apparently because of the falling of a brake beam, and the train was stopped; fire soon broke out, and nine cars with their contents were entirely destroyed. Most of the rest of the train was considerably damaged. The cause of the fire is not known, but presumably it was started by the ignition of two cars of gasoline which were derailed. The flames were unsubdued for 42 hours and the estimated total damage is $125,000. Sabula is five miles east of Dubois, on the line from Red Bank, Pa., to Driftwood; and all trains are running temporarily over the Buffalo & Susquehanna between Dubois and Driftwood, 45 miles.

Chicago Union Station

Federal government, railroad and city officers of Chicago recently held a conference at which the pushing of the Chicago Union passenger station project was discussed. As a result of this conference it was announced that work on the new station will be rushed and it is expected that more than 3,000 men will be employed on the work within 30 days. The purpose of this conference was to develop cooperation between the city and the railroads and a number of contracts will probably be let in the near future for work on the station and its approaches.

The foundations for the headhouse of the station are at present approximately 50 per cent completed. The Butler Brothers building, which the Union Station Company will have to build in order to get room for tracks, is well under way, the foundation being in and work is now being done on the superstructure for which the John Griffith & Son Company, Chicago, hold the contract. Work is now being done on the substructure of the Harrison street viaduct by the W. J. Newman Company, Chicago, and is approximately 40 per cent completed. The Taylor street viaduct is also approximately 50 per cent completed, the Underground Construction Company having the contract for the substructure and the Strobel Steel Construction Company, Chicago, holding the contract for the superstructure. This part of the work will be finished at an early date. Bids for the twelfth street viaduct are now in the hands of the Chicago Union Station Company and the contracts for this part of the work will be let in the near future. The steel for the Polk street viaduct has been completed and will be on the ground within 30 days. Rails and ties for the tracks from Van Buren to Twelfth street have been bought and it is planned to contract the grading and track work on this approach within ten days. The steel for the raising of the Harrison street bridge has also been delivered and on this the work will be started soon.

Golden Spike Celebration

The fiftieth anniversary of the driving of the golden spike which marked the completion of the first American transcontinental railroad was celebrated at Ogden, Utah, on May 10. Veteran railroad men who were connected with the construction of the Union Pacific or the Central Pacific were in Ogden as guests of the city. There was a great parade, in which was a replica of engine No. 60, the "Jupiter," which was used in the building of the Central Pacific, and George Lashus, of Ogden, who was engineman of the original engine, was at the throttle of the replica, which was mounted on an automobile truck. There were small sized models of the two engines which met at Promontory on May 10, 1869, and which appear in the well-known picture of the driving of the golden spike.

The building of the "Pacific Railroad" was begun at Omaha, Neb., by the Union Pacific and at Sacramento, Cal., by the Central Pacific, in 1863. The race between the two roads to lay the largest mileage of track ended on May 10, 1869, at Promontory, Utah, 50 miles west of Ogden, at which time trains from the Union Pacific and Central (now Southern) Pacific met. Governor Leland Stanford of California, representing the Central Pacific, completed the physical connection of the two roads by driving a golden spike, and T. C. Durant, president of the Union Pacific, took part in the ceremonies. In the last year of the construction work, the two railroads were employing approximately 25,000 men and using 6,000 teams. Many of the men engaged in this work were present at the celebration, and included in these were three

Chinese, each over 90 years old, who began railroad work in California about 1849. These three men, Ging Cui, Wong Fok and Lee Cho, were in the gang that laid the last rail of the Central Pacific up to the point where the golden spike was driven. They came from Susanville, Cal., where they were in the service up to three years ago in gang No. 28.

Reception to Fourteenth Engineers

The Fourteenth Engineers, made up of employees of the principal New England railroads, were guests at a banquet in Boston on Thursday of last week (May 8), which is said to have been the most successful affair of the kind that has been held in any part of New England. The Fourteenth Engineers arrived in Boston on April 27, thirty officers and 1,486 men. Companies A and B were made up of men from the Boston & Maine, C from the Maine Central, D from the Boston & Albany, and companies E and F from the New York, New Haven & Hartford. Prior to the day of the general reception, each road had had an entertainment for companies connected with that road, and the general reception on the 8th filled a whole day, a picnic being held at Riverside, 11 miles from Boston, in the daytime. The banquet in the evening was at Symphony Hall. While the banquet was in progress there was what might be called an overflow meeting, across the street, for the families of the soldiers, a luncheon being served. After the banquet there was a dance.

Robert H. Newcomb, secretary to the federal manager of the Boston & Maine, was chairman of the executive committee which provided these entertainments. This committee represented, not only the railroads and their employees, but also the "Association of Friends of the Fourteenth Engineers."

American Short Line Railroad Association

The American Short Line Railroad Association has issued the call for a meeting at the New Willard Hotel, Washington, on June 3, 4 and 5, which will be attended by five or six hundred representatives of the short line railroads, and also a large number of trunk line executives as guests. The special object to be considered is the legislation necessary to increase and protect transportation facilities. The meeting will be divided into six sessions, each of which will be addressed by a prominent speaker, including Walker D. Hines, director general of railroads, Senators Cummins and Underwood, Representative Esch and possibly Commissioner Hall of the Interstate Commerce Commission.

All short line railroad companies are authorized and requested to send one or more of their officers as delegates, and all such delegates will be urged to participate in the proceedings. The call for the meeting states the object as follows:

"The conditions surrounding the railroads generally, and especially the short lines, are not only serious, but appalling, and Congress must act, and act wisely, to prevent wholesale bankruptcy. While operating the main line railroads, the government has imposed many hardships upon, and in many instances has done great injustice to, the short lines, and it is now a serious question whether it is possible for the Railroad Administration to do adequate justice to such lines. The only real hope is to look to Congress; hence, it is vitally important that all short lines participate in the convention. The legislation to be enacted must be based upon broad, true and equitable principles. It must be fair to the public as well as to the railroads, and to the railroads as well as to the public. It must be such as to enable the main line railroads to become prosperous, otherwise the short lines cannot be, and it must safeguard the rights of the latter class so that they may not be unjustly treated by any interest or community in the future.

"The problem is not sectional, hence, it is most important that the short lines in all sections of the country participate in the plans that are adopted.

"We have invited about 150 of the presidents of the main line companies to attend the convention as our guests, and there is every reason to believe that more than 100 of the leading officials of that class will be present. We think it wise to have these officials present for two reasons: First, the convention must consider the railroad problem as a whole. Second, the short lines must deal with the main lines when they are returned by the government, hence, it will be most desirable to know these officials and take them into consideration."

W. T. Tyler, director of operation of the Railroad Administration, has authorized the issue of necessary transportation for delegates and their families.

Railway Revenues and Expenses for March and Three Months of 1919

The Interstate Commerce Commission's monthly statement of railway revenues and expenses, covering the operations of 183 Class I roads and 17 switching and terminal roads is as follows:

Item	March				Three months ending March 31			
	Amount		Per mile of road operated		Amount		Per mile of road operated	
	1919	1918	1919	1918	1919	1918	1919	1918
1. Average number miles operated	232,815.90	233,310.78	....	....	232,785.76	233,295.88	....	....
REVENUES								
2. Freight	$255,679,065	$259,850,752	$1,098	$1,114	$775,246,187	$646,954,731	$3,330	$2,773
3. Passenger	89,187,627	73,118,329	383	313	255,037,340	201,822,667	1,096	865
4. Mail	4,289,713	4,526,594	19	20	12,798,974	13,481,854	55	58
5. Express	8,158,522	9,574,221	35	41	22,298,936	27,404,486	96	118
6. All other transportation	9,200,325	9,621,329	40	41	27,292,866	25,233,396	117	108
7. Incidental	10,040,344	9,380,223	43	40	31,443,037	25,688,823	135	110
8. Joint facility—Cr.	530,390	431,520	2	2	1,649,777	1,239,992	7	5
9. Joint facility—Dr.	189,477	133,006	1	1	489,646	383,630	2	2
10. Railway operating revenues	376,896,509	366,369,962	1,619	1,570	1,125,277,471	941,442,319	4,834	4,035
EXPENSES								
11. Maintenance of way and structures	59,478,891	43,944,494	256	188	171,787,354	123,728,307	738	530
12. Maintenance of equipment	96,472,547	74,136,684	414	318	285,846,486	207,966,421	1,228	891
13. Traffic	3,693,177	4,533,735	16	19	10,742,931	14,022,473	46	60
14. Transportation	174,338,928	150,544,896	749	645	523,873,397	438,487,543	2,250	1,880
15. Miscellaneous operations	3,743,499	2,940,327	16	13	10,715,171	8,616,652	46	37
16. General	10,299,159	8,584,720	44	37	30,690,985	25,519,908	132	109
17. Transportation for investment—Cr.	653,111	473,734	3	2	1,546,436	1,367,415	6	5
18. Railway operating expenses	347,373,090	284,211,122	1,492	1,218	1,032,109,888	816,973,889	4,434	3,502
19. Net revenue from railway operations	29,523,419	82,158,840	127	352	93,167,583	124,468,430	400	533
20. Railway tax accruals (excluding "War Taxes")	14,968,947	15,131,657	65	65	45,231,880	44,400,246	194	190
21. Uncollectible railway revenues	64,531	79,166	....	....	180,678	168,195	1	1
22. Railway operating income	14,489,941	66,948,017	62	287	47,755,025	79,899,989	205	342
23. Equipment rents	(D)2,198,263	(D)3,126,754	(D)9	(D)13	(D)4,416,558	(D)6,219,640	(D)19	(D)27
24. Joint facility rents (Dr. Bal.)	1,449,070	1,064,457	6	5	3,677,689	3,319,989	16	14
25. Net of items 22, 23 and 24	10,842,608	62,756,806	47	269	39,660,778	70,360,360	170	301
26. Ratio of operating expenses to operating revenues, per cent	92.17	77.57	....	....	91.72	86.78	....	....

Atlantic City Mechanical Convention

The American Railroad Association has issued the calendar for the first annual convention of Section III—Mechanical, which is to be held at Atlantic City, N. J., June 18 to 25. The order of business is as follows:

Wednesday, June 18, 9:30 *A. M. to* 1:30 *P. M.*

Prayer; address of welcome by the mayor of Atlantic City; address by the chairman.

Action on Minutes of Annual Meeting of 1918 (M. C. B.); Report of Secretary and Treasurer (M. C. B.).

Appointment of Committees on Subjects, Resolutions, Correspondence, Obituaries, etc.; Unfinished business; New business.

Report of General Committee, including announcement of nominations for members of Nominating Committee; Discussion of Reports on Nominations; Standards and Recommended Practice (M. C. B.); Train Brake and Signal Equipment; Brake Shoe and Brake Beam Equipment.

Wednesday, 3 *P. M.*

Revision of the Rules of Interchange, including consideration of the following reports of committees: (1) Arbitration; (2) Revision of Prices for Labor and Material; (3) Depreciation for Freight Cars; (4) Revision of Passenger Car Rules of Interchange.

Thursday, 9:30 *A. M. to* 1:30 *P. M.*

Discussion of Reports on Car Wheels; Standard Blocking for Cradles of Car Dumping Machines; Specifications and Tests for Materials (M. C. B.); Welding Truck Side Frames, Bolsters and Arch Bars; Couplers; Draft Gear.

Question proposed by members.

Friday, 9:30 *to* 1:30

Discussion of Reports on Safety Appliances; Loading Rules; Car Construction; Car Trucks; Train Lighting and Equipment; Tank Cars.

Questions proposed by members.

Saturday, 9:30 *to noon*

Consideration of Rules of Order, Election of Officers, General Committee and Nominating Committee, Presentation of badges to retiring officers, etc.

Monday, June 23, 9:30 *to* 1:30

Address of Vice-Chairman; Action on minutes of 1918 Annual Meeting (M. M.); Reports of Secretary and Treasurer (M. M.).

Discussion of Reports on Standards and Recommended Practice (M. M.); Mechanical Stokers.

Paper on "Standardization," by Frank McManamy.

Questions proposed by members.

Tuesday, 9:30 *to* 1:30

Discussion of Reports on Fuel Economy and Smoke Prevention; Specifications and Tests for Materials (M. M.); Design and Maintenance of Locomotive Boilers; Locomotive Headlights; Superheater Locomotives.

Paper on Carbonization in Valve Chambers and Cylinders of Superheated Steam Locomotives, by F. P. Roesch.

Amalgamation of other Mechanical Associations with Section III, A. R. A.

Questions proposed by members.

Wednesday, 9:30 *to* 1:30

Discussion of Reports on Design, Maintenance and Operation of Electric Rolling Stock.

Paper on The Use of Bronze for Valve Snap Rings and Piston Surfaces, and for Bull Rings in Large Cylinders, by C. E. Fuller.

Discussion of Reports on Train Resistance and Tonnage Rating; on Subjects; on Resolutions, Correspondence, etc.

Unfinished business: questions proposed by members and closing exercises.

American Association of Engineers

The annual convention of the American Association of Engineers was held at Chicago on May 12 and 13. The officers of the association elected at the convention are as follows: President, F. H. Newell; first vice-president, W. W. DeBerard; second vice-president, T. A. Evans. Among those elected as members of the board of directors are W. W. K. Sparrow, corporate chief engineer of the Chicago, Milwaukee & St. Paul; A. A. Mathews, chief engineer of the St. Louis-Southwestern System, and E. F. Collins, valuation engineer of the St. Louis-San Francisco.

Traffic News

The El Paso (Tex.) Chamber of Commerce now has a traffic bureau, under the direction of A. E. Tadlock.

The Dallas (Tex.) Embargo Bureau has been discontinued and embargo advices affecting any line of the Southwestern region should hereafter be addressed to the regional director.

The Traffic Club of Chicago gave a farewell luncheon to William Gourlay, general agent at Chicago for the American Railway Express Company and vice-president of the Traffic Club of Chicago, on May 6. Mr. Gourlay leaves shortly for London, England, where he will act as manager of the American Express Company.

Frank M. Williams, of Albany, N. Y., New York state engineer, under whose supervision the New York State barge canal was completed, addressed the Toledo (Ohio) Commercial Club at a meeting at Toledo, May 8, for the purpose of creating interest in the proposed barge canal from Toledo to Cincinnati with a branch to Lake Michigan.

The director general reports 9,147 cars of export freight, exclusive of bulk grain and coal, as received at North Atlantic ports for the week ended May 7, while 9,393 cars had been delivered. On May 7 there were 17,720,670 bu. of grain in elevators at North Atlantic ports; received during the week 7,307,905 bu.; 8,241,393 bu. cleared. At South Atlantic and Gulf ports there were 10,216 carloads of export freight on hand on May 7, as compared with 10,582 cars for the week previous.

The Southern Traffic League at a recent meeting at Augusta, Ga., elected the following officers: W. E. Gardner, president, Jacksonville, Fla.; J. T. Slatter, vice-president, Columbia, S. C.; Howard H. Stafford, vice-president, Augusta, Ga.; C. W. Hayward, secretary-treasurer, Meridian, Miss. Recommendations were adopted for the appointment of shippers to places on freight traffic committees as follows: Southern Regional Committee, M. M. Caskie, Montgomery, Ala.; New Orleans Eastern Committee, C. W. Hayward, Meridian, Miss.; Birmingham district, R. G. Cobb, Mobile; Atlanta, Geo. W. Forrester, Atlanta; Louisville, A. F. Vandergrift, Louisville, and E. DeL. Wood, Chattanooga; Richmond district, W. D. Nelson, Jacksonville, Fla. Resolutions were adopted urging municipalities, boards of trade and chambers of commerce to propose traffic committees for their respective cities and recommending the employment of traffic managers and the maintenance of traffic bureaus. Resolutions were adopted stating that the Southern Traffic League is opposed to the sailing day plan as proposed for general application and that the league is opposed to the four o'clock closing hour for freight receiving stations. Resolutions were also adopted opposing rate increases as shown in General Order 28 and calling for a committee to investigate the Southern Weighing and Inspection Bureau and report to the league as to the advisability of filing a formal complaint with the Interstate Commerce Commission asking for an investigation of the bureau.

Opportunities for Home-Seekers

The United States Railroad Administration, through its Agricultural Section, has issued a booklet giving in detail the opportunities offered to home-seekers in Wisconsin and upper Michigan. The material was collected by the agricultural representatives of the railroads under federal control in these two states, in co-operation with the officers of the states. The booklet contains information about production, markets, transportation facilities, climate, schools, churches, roads and living conditions. Opportunities for homeseekers are found especially in the "cut-over lands" of upper Wisconsin and the upper peninsula of Michigan, and the booklet gives detailed information about how the homeseeker can make a success in the locality described.

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission on the petition of the Midland Valley, has appointed Commissioner H. C. Hall, Attorney Examiner A. G. Hagerty and W. H. Carleton, assistant chief examiner of accounts, as a board of referees for the purpose of determining the company's just compensation under the federal control act.

Court News

Employers' Liability Act

The Circuit Court of Appeals, Fourth Circuit, holds that a railroad employee, who cleaned and iced intrastate and interstate cars, and who was proceeding to get the ice when injured, was not engaged in interstate commerce authorizing suit under the act.—Southern vs. Pitchford, 253 Fed. 736.

Tank Cars

The obligation to carry goods safely often requires that special kinds of cars be supplied for the transportation of goods which the carrier has accepted. But where articles of an extraordinary character are offered, a carrier is not bound to accept them or to provide facilities of a different kind from those usually furnished for transportation. For this reason a carrier may be excused from acceptance of explosives or of goods that are improperly packed. There are other limitations of the carrier's duty to accept goods, growing out of the usual course of business and the limitations of convenience; so carriers are not bound to accept as baggage articles that by reason of bulk or value transcend their customary limitations. The ordinary freight cars of the railroads, because of their dimensions, impose restrictions of length, width, and height to commodities that may be carried, and they are wholly unsuitable for the transportation of articles such as acids, oils and gases, which are not packed in containers. In the case of U. S. vs. Pennsylvania, 242 U. S. 208, 37 Sup. Ct. 95, the Supreme Court of the United States recognizes the fact that a tank car is not only a car but a package for the goods. If the producer of oil may demand of the carrier a specially constructed car suitable as a container of the article produced by him, there is no reason why the producers of the various forms of gases, liquids, and solids may not also require peculiar cars suitable for such unpacked products. In the private car case (50 I. C. C. 652, July 31, 1918) the Interstate Commerce Commission found that there are 59 varieties of liquids that are regularly transported in tank cars; also that very few railroads in the United States furnish tank cars for the use of shippers (see also U. S. vs. Penn. 242 U. S. 208) and that railroad tariffs usually provide that the carriers assume no obligation to furnish tank cars. There is an economic waste in the use of tank cars, because usually they are returned empty. Under the rules of interchange, a railroad may own a large supply of such cars, and yet have none available on its own lines. The rule is a reasonable one that if the shipper wishes to compel the carrier to accept his goods he must properly prepare and pack his product to suit the cars that the carrier assumes to supply, and which are ordinarily furnished by carriers for such products, and that it is not the usual practice of railroads to furnish tank cars for shippers. Applying these principles, the Circuit Court of Appeals, Eighth Circuit, holds that a railroad company is not required to furnish tank cars to carry the oils of a refinery; and where the tariffs of a railroad which owned no tank cars did not purport that tank cars would be furnished, and the railroad had leased tank cars, some of which it allowed a refinery to use, it might withdraw the use of the cars from the refinery when they were needed to carry water to supply its engines, etc.—Rock Island vs. Lawton Refining Co., 253 Fed. 705.

Equipment and Supplies

Tests of Locomotive Specialties

The Inspection and Test Section of the Railroad Administration is considering the question of tests of locomotive specialties, such as bell ringers, fire-doors, electric headlights, and would be glad to receive full information from the various manufacturers desiring to participate in the tests. Communications should be addressed to C. B. Young, manager, Room 709, 1800 Pennsylvania avenue, Washington, D. C.

Regional Director Inquiring Into Possibilities of Locomotive Orders

R. H. Aishton, regional director of the Northwestern region, in a telegram to Northwestern roads states that locomotive builders are urging the placing of orders for locomotives in order that they may keep their shops in operation, and also keep down the overhead cost of the locomotives that have been or will be built. The telegram asks for information as to the number and type of additional U. S. standard locomotives that will be required on lines in this region and whether or not approved by the railroad corporation. If the corporations are not willing to buy the United States standard type they are asked to give the number and the type or types that they will be willing to purchase of their own standard.

Locomotives

The Italian State Railways have ordered 150 superheated consolidation locomotives from the American Locomotive Company. These locomotives will have 21¼ in. by 27½ in. cylinders and a total weight in working order of 149,600 lb. These engines will be duplicates of an order of 150 locomotives ordered last year and bring the total number of engines ordered since the first orders placed by Italy in this country in 1916, to 400.

Freight Cars

The Gregg Company, Hackensack, N. J., is inquiring for one storage battery truck.

The Pennsylvania Coal Company, New York, has placed an order for 100 mine cars.

The United States Iron & Steel Company, New York, is inquiring for 6 small motor cars.

The H. Koppers Company, Pittsburgh, Pa., is inquiring for one 50-ton, coke quenching car and one 5-ton lorry car.

Oscar C. Sintas, Havana, Cuba, has ordered 60 cane, and 10 40-ton, 6,500-gal. tank cars, from the American Car & Foundry Company.

The Buenos Aires Railway, has ordered 12, 10,000-gal. tank cars and mountings from the American Car & Foundry Company.

The Liberty Coal Mining Company, Osceola Mills, Pa., has ordered one wooden mine car from the American Car & Foundry Company.

The Republic Trading Company, New York, is inquiring for 10 36-in. gage cane cars and a number of 36-in. gage dump cars for export to Nicaragua.

Viele, Blackwell & Buck, New York, are inquiring for 40, 20-ton capacity ore cars, 4 flat cars, 3 dump cars, and 200 cars of 22 different types, for export to China.

The Railways of the Union of South Africa are asking bids on 650 goods wagons and will probably want more. They are seeking American bidders as well as others.

Supply Trade News

Geo. L. Fowler, consulting mechanical engineer, has moved his office from 83 Fulton street to 120 Liberty street, New York.

Captain J. A. McIntosh, who has been in the service overseas with the Tank Corps, has returned to his former position in the engineering department of the Ohio Brass Company, Mansfield, Ohio.

Charles Gilman, whose election as vice-president of the **Massey Concrete Products Corporation,** with headquarters in New York, was announced in the *Railway Age* of April 25, was born in 1882 at Cambridge, Mass., and received his education at Harvard University, graduating in 1904. His first construction experience was obtained in connection with building of the Harvard stadium in 1903. The following two years he was engaged in work on the New York subways. In 1911, Mr. Gilman became identified with the concrete products business as assistant to the vice-president of the American Concrete Pile & Pipe Company, and when this organization was taken over by the C. F. Massey Company in 1912 he was appointed Eastern engineer. The following year he was advanced to Eastern manager, which position he held until his recent election as vice-president in which capacity he will have charge of sales in the Eastern territory of the corporation, comprising the New York, Pittsburgh, Southern and Canadian districts.



C. Gilman

A. P. Van Schaick, district sales manager of the Lackawanna Steel Company, at Chicago, has resigned to become special representative, with headquarters in Chicago, of the **American Chain Company, Inc.,** Bridgeport, Conn., effective May 15. Mr. Van Schaick began his business career in 1903, at which time he left Williams College, Williamstown, Mass., to enter the railroad sales department of the Pittsburgh Plate Glass Company, with headquarters in Chicago. From 1906 to 1910 he was in the employ of the Universal Railway Supply Company, with headquarters in the same city, resigning from that position during the latter year to become district sales manager of the Lackawanna Steel Company at Chicago. Mr. Van Schaick has been active in the work of railway supply organizations and especially of the National Railway Appliance Association. He was elected a member of the executive committee of this association in 1910, vice-president in 1911, and president the following year. He is still a member of the executive committee.



A. P. Van Schaick

The Baldwin Locomotive Works has recently established a separate department for handling foreign sales in charge of **F. de St. Phalle,** recently elected vice-president and with **Reeves K. Johnson** as manager of foreign sales.

The American Steam Conveyor Corporation, Chicago, has appointed **N. B. Stewart** district representative in charge of its St. Louis territory. Offices have been opened at 708 Merchants-LaClede building, St. Louis, Mo.

Mudge & Co., Chicago, have awarded contracts for the erection of a one-story factory 190 ft. by 194 ft., at West 16th street, Chicago. The superstructure of the new building will be of steel and brick. It will cost approximately $75,000.

Captain Charles S. Pillsbury, who was assistant sales manager of the **Chicago Bridge & Iron Works,** Chicago, prior to his entrance into military service, has been promoted to major and decorated with the French Legion of Honor. Major Pillsbury is in the construction division of the U. S. Army overseas.

Judge S. E. DeHaven, LaGrange, Ky., has resigned as county judge of the fiscal court of Oldham county to become traveling salesman in Kentucky of the **Canton Culvert & Silo Company,** Canton, Ohio, and **L. W. Hurley,** of Lansing, Mich., has joined the sales force of the same company as Michigan culvert salesman.

Frank H. Clark, formerly general superintendent of motive power of the Baltimore & Ohio, has opened offices at 15 Park Row, New York, and will undertake engineering investigations, report upon railway conditions and operations and prepare or co-operate in the preparation of plans and specifications for railway equipment and materials. He will also act in an advisory capacity to export firms and to foreign railway or other concerns purchasing equipment or material from manufacturers in the United States, and make such inspections as may be desired. Mr. Clark was associated for four years with David L. Barnes, consulting engineer, of Chicago, after which he entered the service of the Chicago, Burlington & Quincy, where he held successively the positions of chief draftsman, mechanical engineer, superintendent of motive power and general superintendent of motive power. He resigned his position with that company on December 30, 1910, to enter the service of the Baltimore & Ohio as general superintendent of motive power and held that position for eight years. He is a member of the American Society of Mechanical Engineers, the Franklin Institute and other technical societies. He is also a member of the American Railway Master Mechanics' Association and of the Master Car Builders' Association. He served as president of the M. M. Association for the early part of the term 1918-1919, and of the M. C. B. Association for the term 1910-1911.



F. H. Clark

J. Stanley McCormack, formerly sales manager of the **Bell Locomotive Works, Inc.,** New York City, will return to resume his old position as soon as he receives his discharge from the Naval Aviation Corps. Mr. McCormack enlisted at the outbreak of the war, received his commission, training as a naval aviator, and was detailed to special experimental aviation development. His discharge is expected within the next two weeks.

Frank H. De Brun has been appointed mechanical engineer in charge of design and improvement for **Mudge & Co.**, Chicago, effective May 15. Mr. De Brun was born in Switzerland in 1883 and received his education in the Higher Polytechnic University of Geneva. After graduation from that institution he served three years as an apprentice in mechanical and electrical laboratories in Switzerland and the following two years as a mechanical draftsman for the Coventry Motor Works, Ltd., at Coventry, England. The next seven years he was in the employ of the Royal Automobile Club of London, England, as superintendent in charge of garage and repairs, resigning from that position to come to the United States as manager of the Universal Auto Training School in New York City, where he remained for two years. In the fall of 1917 Mr. De Brun became associated with the Detroit Institute of Technology, where he had charge of the automotive engineering laboratories works, electrical equipment and battery works and special courses in the maintenance and repair of tractors.



F. H. De Brun

E. Roy Gordon has been appointed service engineer of **Mudge & Co.**, in which capacity he will have charge of investigating service given by the products manufactured by that firm and the successful handling, care and operation. He was born on January 17, 1893, at Galveston, Tex., and after graduation from the public schools entered Purdue University, Lafayette, Ind., where he remained for three years, at the end of which time he entered the service of the Pennsylvania at Fort Wayne, Ind., as a special apprentice in the shops of that road. The following year he returned to Purdue University, graduating from that institution as a mechanical engineer in June, 1915. In the fall of the same year he entered the employ of the Atchison, Topeka & Santa Fe in the test department where he remained until December, 1917, at which date he was commissioned a second lieutenant in the ordnance department of the United States army and sent to France. On February 13, 1919, he received his honorable release from the service and returned to the testing department of the Atchison, Topeka & Santa Fe, which position he held prior to his appointment as service engineer of Mudge & Co. on May 1.



E. R. Gordon

Paul H. Schatzmann, foreign representative of the **Joseph T. Ryerson & Son Company,** sailed for Rio de Janeiro, Brazil, April 10, to take charge of the company's interests in Brazil, Argentina and Peru temporarily. In August Mr. Schatzmann will sail for Europe, thence to India, China and Japan. **A. L. G. Gentles** will establish headquarters in London to take care of the interests of this firm in Great Britain and Scandinavia and will leave the United States in May.

The incorporation of the firm of **Oscar F. Ostby & Co.** is announced with Oscar F. Ostby as president with offices, as hitherto, at 1044 Grand Central Terminal, New York. The new company will continue to handle the lines of railway supplies hitherto handled by Mr. Ostby, and in addition Mr. Ostby has been appointed exclusive railway distributor for Davidson high speed steel and tools, manufactured by the Davidson Tool Manufacturing Corporation, New York.

The Clark Equipment Company, manufacturers of "Celfor" drills and precision tools, has just completed a modern hospital at its plant in Buchanan, Mich. The hospital is intended primarily for the use of employees, but is also open to citizens of the community at cost. It contains private rooms and wards, modern operating and x-ray rooms, sterilizers and laboratory equipment. The operation of the hospital is directed by the Clark Hospital Association, a volunteer organization of employees and residents.

John Stevenson, Jr., Sharon, Pa., has acquired a controlling interest in the capital stock of the **Standard Car Construction Company** at Masury, Pa. Mr. Stevenson has purchased the holdings of Bioren & Co., bankers and brokers of Philadelphia, and the holdings of other Philadelphia stockholders. The Standard Car Construction Company is capitalized at $1,400,000, and the original plant was built three years ago. Since then it has been substantially enlarged. When working at capacity it employs 700 men and has a daily production of 20 tank cars.

Surplus Military Railway Equipment in the United States

The War Department has given out the following statement of the amount and value of property on hand or on order available for sale. The figures are as of May 1.

The locomotive and raised pier cranes will be turned over to the Railroad Administration, by arrangement with the director general of railroads, for sale to the railroads.

	Number	Average unit cost	Total cost
Standard gage locomotives	197*	$38,275	$7,540,175
Standard gage cars—			
Box	75	$2,650	$198,750
Gondolas, high side	8,600	2,237	19,235,475
Gondolas, low side	2,850	2,159	6,153,750
Flat	479	1,959	938,361
Tank	400	2,738	1,095,200
Total	12,404†	$2,227	$27,621,536
Locomotive cranes—			
10-ton	38	$12,400	$471,200
15-ton	101	18,992	1,918,226
20-ton	13	19,699	256,092
25-ton	15	26,475	397,122
30-ton	6	25,700	154,200
35-ton	4	34,132	136,528
50-ton	18	32,865	591,570
Total	195‡	$20,128	$3,924,938
Raised pier cranes—			
10-ton 2.4 meter gage	15	$16,884	$253,260
10-ton standard gage	10	21,700	217,000
15-ton 2.4 meter gage	9	20,300	182,700
Total	34†	$19,205	$652,960
Track pile drivers	18	$33,500	$603,000
Grand total			$40,342,609

*All on hand.
†None delivered.
‡Forty-six not yet delivered.

Under the arrangement with the Railroad Administration the director general will use every effort to dispose of the property to the several railroads at market prices at the time and place at which disposition is made. The incidental expenses incident to the care of the material are to be taken from the proceeds of the sale.

This arrangement also covers the transfer of all 80-pound A. R. A. type B. rail which has been declared surplus by the War Department and about 1,366 tank cars purchased by the Ordnance Department, 100 twelve-yard and 1,320 twenty-yard side dump cars, all of which are fitted to comply with Master Car Builders' and Interstate Commerce Com-

mission standards. In the event of termination of federal control of the railroads before this material is entirely disposed of, the material remaining at the time is to revert to the War Department's possession but in all cases where the material has been sold by the Railroad Administration on the deferred payment plan the War Department will protect such arrangements after the federal control of the railroads ceases.

This entire transfer covers approximately $18,000,000 worth of material. The distribution of the property to the railroads will be handled by the director of the Division of Purchases.

The sales of surplus supplies by the department of military railways, as reported to the director of sales up to April 25, amounted to $71,104,130, of which $68,993,837 represented rolling stock. The prices received represented the actual original cost.

The Blaw-Knox Company has taken over the manufacture and field operation of the Uni-Form system of reinforced concrete floor and roof construction, and the Uni-Form system is now incorporated in the Steel Forms department of the Blaw-Knox Company and will be known as "Blaw-forms." **Nils F. Ambursen,** chief engineer of the Ambursen Hydraulic Construction Company, and the developer of the Ambursen dam, assumes the duties of chief engineer of the Building Form department of the Blaw-Knox Company, and **W. L. Church,** formerly of Westinghouse, Church, Kerr Company, and Lockwood, Greene & Co., engineers, is retained as consulting engineer on the operation of the Uni-Form system.

The Detroit Seamless Tubes Company has begun the construction of a new plant, in Detroit, Mich., which it is estimated will cost $3,000,000, on a tract of 66 acres. The plant will be equipped with the latest types of modern labor saving devices and machines. The first section, costing $1,000,000, will be completed by January 1, 1920, at which time the company will move from its present place of business at West Jefferson avenue and Nineteenth street, Detroit. A subdivision will be created in the vicinity of the building and 150 houses erected for workmen of the company. The entire construction and financing of these homes will be done by the company to assist its employees in their housing problems.

The following changes in the organization of the **Western Electric Company,** New York, will become effective on June 1; **J. M. Skinkle,** formerly in the engineering department, has been appointed assistant manager of the government department with headquarters at New York; **J. A. Pizzini,** sales manager at New York, has been appointed assistant manager at the same place; **W. J. Drury,** until recently manager of the Cleveland branch, has been appointed sales manager at New York, to succeed Mr. Pizzini; **A. M. Collins,** formerly sales manager at the Detroit office, succeeds Mr. Drury as manager of the Cleveland branch, and **A. R. Maynard,** until recently connected with the sales department in Chicago, has been appointed sales manager at Detroit, succeeding Mr. Collins.

The Safety Car Heating & Lighting Co. Elects New Officers

At the annual election by the board of directors of the Safety Car Heating and Lighting Company, **W. L. Conwell** was made president of the company; **J. A. Dixon, Randolph Parmly** and **James P. Soper,** vice-presidents; **C. W. Walton,** secretary and treasurer; **Wm. Stewart,** assistant secretary and assistant treasurer. Mr. Conwell came with the company January 1, 1916, as assistant to the president. Upon the death of R. M. Dixon, former president of this company, October 16, 1918, Mr. Conwell was made acting president.

At the annual stockholders' meeting, held on May 8, F. F. Fitzpatrick, president of the Railway Steel Spring Company, was elected to the board of directors. The board of directors is now made up of the following: Chellis A. Austin, president, Mercantile Trust Co.; Robert Barbour, president, Barbour Flax Spinning Co.; E. M. Bulkley, Spencer Trask & Company; Henry R. Carse, president, Submarine Boat Corporation; W. L. Conwell; J. A. Dixon; F. F. Fitzpatrick, president, Railway Steel Spring Company; E. LeB. Gardner, president, New Jersey General Security Co.; A. B. Hepburn, chairman, advisory board, Chase Natl. Bank; R. Parmly; G. D. Pope, capitalist; Alex. C. Soper, capitalist; Henry H. Wehrhane, Hallgarten & Company, and Jas. P. Soper, president, Soper Lumber Co.

Vauclain Succeeds Johnson as Head of Baldwin Locomotive Works

Alba B. Johnson, president of the Baldwin Locomotive Works, has resigned from that position and has been succeeded by **Samuel M. Vauclain,** hitherto senior vice-president.



A. B. Johnson

Mr. Johnson, who had been contemplating the step for a considerable time, presented his resignation at a special meeting of the board of directors in Philadelphia, May 9. He will retain his extensive interests in the company and will remain a director. In connection with the resignation and the election of Mr. Vauclain as president, there were rumors of friction between different interests in the company, but the existence of such friction has been emphatically denied by Mr. Johnson and Mr. Vauclain alike.

Following the meeting of the board of directors, Mr. Johnson issued a statement in which he explained that he had desired to withdraw from the presidency of the company in order to devote his time to his extensive personal and public interests and in which he expressed his wishes for the success of Mr. Vauclain. The statement said:



S. M. Vauclain

"For a long time I have contemplated a withdrawal from active business to be free to devote myself to matters of personal and public interest. For a time it seemed desirable to postpone this until the business and resources of the Baldwin Locomotive Works could be more firmly established. When the war broke out in Europe, and especially when our country engaged in war it became a patriotic duty to continue until assured that the war was over.

"Peace has now come and the financial strength of the works has been placed upon an assured basis. I feel that the time has now arrived when my responsibility to the stockholders can be laid aside without prejudice to any interest which has been confided to me.

"My connection with these works has extended now over the whole of the lifetime which I can remember. My father entered the employ of Mathias W. Baldwin & Co. in the spring of 1863, and continued in it for 29 years until 1892. My own service began May 14, 1877, forty-two years ago, and the entire energies of my active business life have been de-

voted to upbuilding the properties and reputation of the works.

"The extent to which this has been accomplished is a source of pride and gratification. It has not been the work of any one man. Our honored predecessors laid the strong foundation on which we have builded, and the structure that has been raised upon those foundations is the work of many. I hope that what has already been accomplished may be only the beginning of their growth and prosperity in the future.

"To Mr. S. M. Vauclain, with whom I have been associated so long, and who succeeds me as president, I wish all possible success and I hope that he will enjoy the same measure of co-operation and loyalty that has been given me through all these years."

Mr. Vauclain declined to issue any statement, but said in answer to a question that there would be no change in the policy of the company.

Mr. Johnson has been connected with the Baldwin Locomotive Works since 1877 and its president since 1911. He was born at Pittsburgh, Pa., February 8, 1858, and upon his graduation from the Central High School of Philadelphia entered the employ of Burnham, Parry, Williams & Co., as the present Baldwin Locomotive Works was then known, as a junior clerk in May, 1877. On the advice of John H. Converse he studied stenography and then for about 20 months was in the employ of William Sellers of the Edge Moor Iron Works, Wilmington, Del. Upon returning to the Baldwin Works he became secretary to Mr. Converse and served in that capacity for 33 years, gradually working up in the company and taking over Mr. Converse's work. In 1896 he was made a partner in the firm of Burnham, Williams & Co., as the firm had then become known, and was in charge, first of sales and later, on the withdrawal of George Burnham, Jr., of sales and finances. Upon the incorporation of the company under the name of the Baldwin Locomotive Works on July 1, 1909, he was elected vice-president and treasurer and succeeded to the position of president on July 1, 1911.

In the period in which Mr. Johnson was president the company had what may truly be called a phenomenal growth, its gross sales having increased from a total of $29,000,000 in 1912, the first full year after he became the head of the company, to over $98,000,000 in the year ended December, 1918. The total undivided profits over the same period increased from $4,470,000 in 1912 to $5,752,000 in 1918, while in 1917 a total was reached of $8,306,000, excluding the return from the Standard Steel Works Company and the Southwark Foundry & Machine Company.

Mr. Johnson has extensive personal and public interests, and is one of the country's leaders in export trade. He is president of the Railway Business Association; a member of the National Foreign Trade Council, having acted as president of all the National Foreign Trade Conventions with the exception of the one in Cincinnati last year; president of the Pennsylvania State Chamber of Commerce; vice-president of the Philadelphia Chamber of Commerce. In addition to these he was formerly president of the American Manufacturers' Export Association and is now acting president of the Jefferson Medical College and Hospital and a leading member in a number of other organizations.

Samuel M. Vauclain, the new president of the Baldwin Locomotive Works, has been connected with the company or its predecessors since 1883, and its senior vice-president since 1911. He entered the employ of the plant in 1883 as a foreman. In November, 1885, he was promoted to superintendent of equipment, and in 1886 was advanced to general superintendent. He became a member of the firm of Burnham, Williams & Co., in 1896 and in 1911 was elected a vice-president of the Baldwin Locomotive Works. It is through his work as manager of operations in the Baldwin Works that Mr. Vauclain is generally recognized as one of the leaders in shop management in the country.

Mr. Vauclain's greatest work, however, was during the war, not only in connection with the work of the Baldwin Locomotive Works in supplying locomotives for the allied armies overseas, but also in connection with the great shell making plant of the Eddystone Munitions Company at Eddystone, Pa. Mr. Vauclain was on a number of occasions called into consultation with various of the allied governments and so well was his work regarded that he was made a chevalier of the Legion of Honor by the French Government. In connection with our own part in the war, he served with the Council of National Defense, first in an advisory capacity and later as chairman of the committee on ordnance and as chairman of the committee on cars. After the War Industries Board was organized he became chairman of that body's special committee on plants and munitions and was also the head of the committee of car and locomotive builders.

General Miller Heads New Oil Company

General Charles Miller, of Franklin, Pa., is to assume the chairmanship of the board of directors of the **Home Oil Refining Company of Texas**, on June 1. General Miller occupies a unique position in the history of American railroads. He was the first man to recognize the great importance of scientific study of oil and lubrication problems in transportation, and he taught the railroads the best ways and means to efficient economical use of lubricating oils. Prior to 1869 the railroads began using what was known as pure West Virginia oil (a mineral oil from 28 to 29 gravity with a cold test of 10 below zero and a fire test of 175). This oil displaced all the fatty oils and tallow previously in use. In July, 1869, General Miller formed a partnership with three associates and began to manufacture an oil in all appearances like pure West Virginia oil and meeting the same tests. The product was, however, superior because of the addition of certain materials. The company made a specialty of supplying railways with cylinder, engine and freight car oils. General Miller studied the subject of railway lubrication in all its aspects. His company was the first to formulate a plan of furnishing railway oils under contracts guaranteeing the cost per thousand miles on locomotives and freight cars. It was the first to organize a department of lubrication experts, whose services were given to the railroads, teaching all ranks of employees how to use oil economically.



General Charles Miller

In 1878 the Galena Signal Oil Company was shipping 12,000 barrels per year, supplying about 15 per cent of the railroad mileage in the country. In 1918 its product was said to be standard upon approximately 98 per cent of the entire railway mileage of the United States and Canada, with a large export trade to France and South America. With the advent of electric railways the company developed special oils to meet their requirements, making contracts on the same basis which had proved so satisfactory to the steam railroads. Not only did the company furnish lubricants to the railways but also signal oil, long time burner oil, headlight oil and other illuminating oils.

General Miller severed his connection with the Galena Signal Oil Company some months ago because of differences of opinion as to policy. The Home Oil Refining Company which he is to head as chairman of the board has large oil contracts covering a production of 7,500 barrels per day in the Ranger and Burkburnett (Texas) fields. It also holds leases on approximately 200,000 acres of oil lands exceptionally well located and now in process of development. The company owns a refinery at Yale, Oklahoma, now operating at 2,500 barrels daily capacity. It is constructing a large refinery at Fort Worth which will be in operation in a few weeks. Nearly 600 men are now engaged in the construction work on the site of 165 acres located on the St. Louis-San Francisco Railway in the outskirts of Fort Worth. Recently the Home Oil Refining Company purchased a convenient site of 50 acres at Franklin, Pa., for the erection of a large plant to be devoted to the production of railroad oil.

In assuming the chairmanship of the Home Oil Refining Company of Texas, General Miller heads an organization which covers the entire field of oil production, manufacture and sales. The present list of officers and directors of the Home Oil Refining Company, is as follows: President, **W. M. Babcock,** formerly Mid-Continent manager of the Humble Oil & Refining Company; operating vice-president and general manager, **M. A. Isaacs,** Tulsa, Oklahoma; assistant operating vice-president and general manager, **John B. Given,** formerly associated with General Miller in the Galena Signal Oil Company; vice-president, **Sam Davidson,** Fort Worth; vice-president, **William Churchill,** formerly sales manager of Corning Glass Works; treasurer, **Benjamin J. Tillar,** Fort Worth; secretary **Harry M. Bronner,** New York. The board of directors headed by General Charles Miller, as chairman, consists of the officers of the company and nine other members of whom the following have already been appointed: W. C. Stripling, Fort Worth; Sam Levy, Fort Worth; G. H. Golvin, Fort Worth; Paul D. Langdon, New York.

Westinghouse Company Establishes Memorial Scholarships

As a war memorial to the more than 8,000 employees of the Westinghouse Electric & Manufacturing Company who have entered the service of the government in the war, the company has decided to establish a number of technical scholarships. The details of the plan by which this will be done have been given out by President E. M. Herr as follows:

Four War Memorial Scholarships will be established each year under the following general conditions:

(a) Candidates will be limited to sons of employees of the Westinghouse Electric & Mfg. Company and its subsidiaries, who shall have been employees in good standing for a period of five years.

(b) Two of such annual scholarships may be open to the younger employees of the company or its subsidiaries who have been in their service for a period of at least two years and who do not exceed the age of 23.

(c) The selection is to be determined by competitive examination, to be conducted annually by the company's educational department under the direction of the committee hereinafter provided. The examination is to take into account not only the applicant's academic training and preparedness, but due consideration will be given to personal qualifications, general character and aptitude.

(d) Scholarships will entitle the successful candidate to pursue a four year's course in any technical school or college that he may select with the approval of the committee. The scholar may pursue a course in any branch of engineering that he may select.

(e) Scholarships will be granted for one year only but will be continued for the full four years provided the scholar pursues a course in any branch of engineering that he may select.

(e) Scholarships will be granted for one year only but will be continued for the full four years, provided the scholar maintains the academic and other standards required by the college or institution in which he elects to pursue his course of study.

(f) Each scholarship carries with it an annual payment of $500, to be made in two installments and the number of new scholarships will be four each year.

(g) The company will establish a memorial scholarship committee consisting of three vice-presidents of the company, to whom shall be referred the names and records of the candidates, and who will select therefrom the four successful persons who, in its judgment, have most satisfactory met the tests applied. The said committee will also be charged with the duty of establishing the detailed rules and regulations and such other matters of administration as have to do with this particular matter.

It is the intention of the company to continue these memorial scholarships from year to year but the company reserves the right to recognize changing conditions and to modify the plan or discontinue it entirely if, in its judgment, it seems wise and expedient to do so.

Trade Publications

Crossing Frog Costs.—The International Steel Tie Company, Cleveland, Ohio, has issued a folder describing the crossing foundations manufactured by that company, and giving a list of the railroads which have used these foundations and an exposition on the economies accruing from the use of this construction.

Cableways.—The Lidgerwood Manufacturing Company, New York, has issued a 10-page booklet describing its various types of cableways and transfers for storing and reclaiming coal, handling ashes and similar materials. These include the stationary cableway, the traveling cableway, the radial cableway and Lidgerwood transfer. All of these types are illustrated by means of diagrams showing clearly the character of work performed by each type. Three pages of the booklet are devoted to particular installations.

Financial and Construction

Railway Financial News

Boston & Maine.—James L. Doherty of Springfield, Mass., and the other trustees named in the government's dissolution suit against the New York, New Haven & Hartford have petitioned the Federal District Court to extend until July 1, 1921, the time to sell the stock of the Boston & Maine. There are 251,480 shares of the preferred stock of the company and 250,254 shares of the common stock that must be sold. In their petition the trustees assert that since the date of their appointment the financial condition of the Boston & Maine has been such that it has been impossible to dispose of these large quantities of stock without a great and unreasonable sacrifice.

Canadian Northern.—William A. Read & Co. are offering an issue of $7,500,000 6 per cent equipment trust certificates at prices yielding from 5½ to 6 per cent. The certificates are issued against new railway equipment costing $10,724,705, the company making an initial payment of $3,224,705, or 30 per cent of the cash contract cost.

Delaware & Hudson.—President L. F. Loree told stockholders at their annual meeting on Tuesday that maintenance of way has been inadequate both as to quality and quantity in the year just passed. He said in part: "The President, in taking over your property, gave assurance that your property would 'be maintained during the period of federal control in as good repair and as complete equipment as when it was taken over by the government.' In the matter of locomotive power you need feel no present apprehension. Your shop equipment is ample and it has been used to keep in repair not only your own locomotives, but as well some owned by connecting lines. The situation in regard to your freight cars is not so reassuring. Where, as formerly, the great majority were on your own rails, and the balance were returned thereto at frequent intervals, now nearly 90 per cent are on foreign lines. No clear idea can be had of their condition. During the past year 131 freight cars were dismantled by the Railroad Administration for various causes, and none of these vacancies has as yet been filled. In the matter of maintenance of way there has been a serious falling off in the application of material."

Norfolk & Western.—Bernhard, Scholle & Co., the Bankers Trust Company of New York and the Union Trust Company of Pittsburgh are offering for subscription, at the market, $2,500,000 Norfolk & Western convertible ten-year 6 per cent bonds dated September 1, 1919, and maturing September 1, 1929. They are a part of a total authorized and outstanding issue of $17,945,000 represented by subscription receipts exchangeable on September 1, 1919, for definitive bonds and are convertible at par into common stock of the company at the option of the holder at any time between September 1, 1919, and September 1, 1929.

Railway Construction

Chicago & Northwestern.—Work has been authorized and will be started at an early date upon the construction of a new passenger station at Clinton, Ia. The new structure will be of brick, one story high, 28 x 287 ft., with a tile roof and a concrete substructure. A small power house, 47 x 57 ft., one story high, of brick construction will be built in conjunction with the new station and the total cost with necessary improvements will be approximately $250,000. The contracts for the work have not been let.

Chicago & North Western is completing an addition to its division shops at Kaukauna, Wis., to be used exclusively for the production and compression of acetylene gas for welding and cutting tools used at its various shops in central and northern Wisconsin, heretofore supplied from Chicago. These new plants and equipment represent an investment of about $5,000.

Railway Officers

Railroad Administration

Regional

The office of **E. J. Henry** supervisor of rail-and-lake traffic, with jurisdiction over the Lehigh Valley Transportation Line and the interchange of business of other lake lines with railroads of the United States Railroad Administration, has been transferred from Buffalo, N. Y., to Chicago, Ill. (La Salle Street Station).

Federal and General Managers

N. L. Howard, until recently colonel in command of the Thirteenth Engineers (Railway) regiment and formerly division superintendent on the Chicago, Burlington & Quincy, with headquarters at Hannibal, Mo., has been appointed assistant to the federal manager of this road, with headquarters at Chicago.

Operating

John F. Clark, trainmaster on the Northern Pacific, with headquarters at Missoula, Mont., has resigned.

The headquarters of **F. W. Kelsey**, superintendent of the Chattanooga division of the Nashville, Chattanooga & St. Louis, have been moved from Nashville, Tenn., to Chattanooga.

R. E. Hoard, trainmaster on the Champlain division of the Delaware & Hudson, at Plattsburg, N. Y., has been transferred to the Saratoga division, with headquarters at Albany, vice **L. A. Crounse**, assigned to other duties, and **J. J. Rounds**, assistant trainmaster on the Saratoga division, with headquarters at Albany, succeeds Mr. Hoard.

Financial, Legal and Accounting

H. A. St. John, auditor of the Lake Superior & Ishpeming and the Munising, Marquette & Southeastern, with headquarters at Marquette, Mich., has been promoted to acting federal auditor, with the same headquarters. **G. F. St. John**, cashier of the same lines, with headquarters at Marquette, has been promoted to acting federal treasurer, with the same headquarters.

Traffic

B. C. Prince, assistant to traffic manager of the Seaboard Air Line, at Norfolk, Va., has been appointed assistant traffic manager, and the position of assistant to traffic manager has been abolished.

L. B. Burford, assistant to general traffic manager on the Erie, at Chicago, has been appointed assistant general freight agent on the Erie Railroad Lines—Buffalo, Salamanca, N. Y., and east thereof, with office at New York, N. Y.

G. C. Manning, assistant general freight agent of the Erie, with headquarters at Youngstown, Ohio, has been transferred to Chicago. He succeeds **G. J. Vizard**, who has resigned to engage in other business; **D. L. Wells**, division freight agent at Meadville, Pa., succeeds Mr. Manning, and **E. W. Vail** succeeds Mr. Wells.

Engineering and Rolling Stock

S. A. Chamberlain has been appointed superintendent of motive power of the Lake Superior & Ishpeming and the Munising, Marquette & Southeastern, with headquarters at Marquette, Mich.

J. D'Esposito, assistant chief engineer of the Chicago Union Station Company, Chicago, has been promoted to chief engineer, effective May 1, succeeding **Thomas Rodd**, who has been appointed consulting engineer.

R. L. Schmid has been appointed assistant division engineer of the Nashville, Chattanooga & St. Louis, with office at Nashville, Tenn., vice **J. L. Fergus**, who has been appointed assistant engineer. The headquarters of **D. E. Counts**, supervisor of bridges and buildings, have been moved from Atlanta to Chattanooga.

T. J. Cutler, general master mechanic on the Northern Pacific, with headquarters at St. Paul, Minn., has been transferred to Livingston, Mont., with jurisdiction over the lines from Mandan, N. D., to Paradise, Mont., succeeding **C. E. Allen**, whose appointment as general master mechanic of the lines east of Mandan, N. D., was noted in the *Railway Age* of May 9.

J. J. Corcoran, assistant engineer on the New York Central, with headquarters at Albany, N. Y., has been promoted to chief signal inspector East of Buffalo, N. Y., with the same headquarters. Mr. Corcoran will act as a general field assistant to the engineer maintenance of signals and give special attention to the maintenance of relays, signal mechanisms and storage batteries. A graduate of the Worcester Polytechnic Institute, Mass., Mr. Corcoran entered the service of the New York Central as signal helper at Buffalo in June, 1911, since which time he has been, consecutively, assistant maintainer, maintainer, maintenance inspector and construction inspector, draftsman, chief draftsman and assistant engineer.

Corporate

Executive, Financial, Legal and Accounting

Charles C. Rose has been elected corporate treasurer of the Spokane, Portland & Seattle, the Oregon Trunk, the Oregon Electric, and the United Railways Company, with headquarters at Portland, Ore., vice **Paul McKay**, resigned to accept service with the United States Railroad Administration.

Operating

A. L. Smith has been appointed superintendent of the Toronto (Can.) Union station, succeeding **J. J. Beck**, deceased.

Traffic

John Bickel, commercial agent of the Duluth, South Shore & Atlantic, with headquarters at Chicago, has resigned to enter the employ of the Canadian National as traveling agent, with headquarters at Chicago.

H. L. Blackstone, general agent of the Sacramento Northern, at San Francisco, Cal., has been promoted to assistant general freight agent in charge of solicitation, with headquarters at Sacramento, Cal., and the office of general agent at San Francisco has been abolished.

M. A. Thomson, division freight agent of the Canadian National Railways at Ottawa, Ont., having resigned, **George Collins**, special representative of the freight traffic department, will also, until further advised, assume the duties of acting division freight agent, with office at Ottawa, Ont.

Obituary

Thomas W. Barrett, terminal trainmaster on the Pittsburgh district of the Baltimore & Ohio, with headquarters at Glenwood, Pa., was killed in a derailment on May 9.

P. C. Eldredge, formerly general superintendent of the Chicago, Milwaukee & St. Paul, died at his home in Oconomowoc, Wis., on May 8, at the age of 63 years. Mr. Eldredge was born in Sharon Springs, N. Y., in 1856 and entered railway service on October 1, 1879, as an operator on the Chicago, Milwaukee & St. Paul, with which road he served 39 years as chief despatcher, trainmaster, division superintendent, assistant general superintendent and general superintendent, which position he held until August 1, 1918, at which time he resigned to accept a position with the Carnation Milk Products Company, Chicago.

EDITORIAL

Railway Age

Table of Contents will be found on Page 5 of the Advertising Section

Opening of Our London Office

THE SIMMONS-BOARDMAN Publishing Company, publisher of the *Railway Age*, has opened a new office at No. 85 Fleet Street, London, England. It has been placed in charge of Robert E. Thayer, who becomes European editor of all the publications of this company, including the *Railway Age*, the *Railway Mechanical Engineer*, the *Railway Maintenance Engineer*, the *Railway Electrical Engineer* and the *Railway Signal Engineer*.

Mr. Thayer, until his recent transfer to London, was located in our New York office and was mechanical department editor of the *Railway Age* and managing editor of the *Railway Mechanical Engineer*. The imperative necessity that the publications of this company should be represented in Europe by a member of our own editorial staff was created largely by the war. As a result of the war the people of the United States, including the officers of railways and of railway equipment and supply concerns, have become keenly interested in foreign economic and industrial affairs. The railway developments in foreign countries will in future be especially interesting to our American readers. While the people of this country are engaged in solving their railroad problem they will be interested in what the people of other countries are doing with their railroad problems. The war almost stopped the development and caused the deterioration of railways throughout the world and especially in Europe, and this has opened up a large foreign market for American railway equipment and supplies. It is believed that the *Railway Age* and other publications of this company can render an important and valuable service to the railway and the railway supply industries of the United States by furnishing to them full, up-to-date and correct information regarding the conditions of and developments on railways in other countries.

Mr. Thayer has a technical education, a railroad training and a ripe journalistic experience. We have located him in London because it is the best point in Europe from which to gather information regarding foreign railways. But London will be merely his headquarters, and he will travel extensively in Europe in quest of the kind of material which will be of interest and value to our readers and patrons.

Mr. Thayer was graduated from the Massachusetts Institute of Technology in June, 1907. For some time he was employed by the American Locomotive Company as special apprentice and in the calculating department at Schenectady. He then entered the service of the Boston & Maine in the test department and was later instructor in mechanical engineering at the Massachusetts Institute of Technology. He became connected with the *Railway Age* editorial staff in January, 1911.

Getting the Most Out of the Conventions

Frank McManamy, the assistant director of the Division of Operation, is to be congratulated upon the letter which he has sent to the regional directors and which was noted in our issue of May 9, page 1161, suggesting that they urge the roads to send as many representatives as possible to the June mechanical department conventions, and also suggesting that each member below the rank of superintendent of motive power should render to his superior a written report of those things which specially attracted his attention at the convention and appeared to him to be of value to his particular road. The railroads have not been getting as much from the various conventions as they should, simply because they have not been prepared to take advantage of them in a scientific way. There is no question but what the larger number of officers who have gone to the conventions have earnestly tried to make the best use of their time. There is an added incentive, however, in going to the meetings with a definite object in view and of having to prepare a report in writing on new practices that may have been described or suggested at the meetings or of noteworthy devices in the exhibit. Then, too, there is the added importance of informal discussions with men holding similar positions coming from all over this country. It is now up to the mechanical department officers to do their part in earnestly trying to make the best possible use of their time in Atlantic City and of demonstrating to their superior officers that the investment in time and money is well merited. The Railway Supply Manufacturers' Association is planing on co-operating in this movement by arranging for a supply of note books specially adapted to the convenience of railroad officers in making notes.

Stagnation in Improvement Work

Railway officers and railway supply men alike are vitally interested in the attitude which Congress will take toward the railway problems that are presented to it for solution. The first and most pressing problem is that of passing the deficiency appropriations to enable the Railroad Administration to meet its obligations already contracted and to proceed with the expenditures necessary for the proper maintenance, improvement and operation of the roads. At no time in the history of American railways has the development of our transportation facilities to meet increasing demands been so nearly at a complete standstill as within recent weeks. Less than forty million dollars worth of improvement work chargeable to additions and betterments was authorized during the first four months of this year, or only a fraction of the appropriations normally made at this season. After deducting almost one third of this amount for supplementary appropriations for work done last year and which exceeded the authorizations and an equal amount for work done last year without authority, it appears that less than fifteen million dollars worth of improvement work has been authorized for completion this year and this is confined very largely to the construction of industry tracks tending to develop new traffic and other small improvements. The roads were also permitted to proceed with approximately four hundred million

dollars worth of work authorized last year and carried over. This work is being finished at the rate of about 10 per cent per month or at a rate much greater than that at which new work is being undertaken. Therefore, unless additional work were authorized it would be a matter of only a short time until the development of our railway facilities would almost entirely stop. The history of our country has shown that the demand for transportation is always increasing except during short intervals of time, therefore the dam which has been created artificially must be broken and in the very near future. When broken, the stream of improvement work should be greater than normal in order that the facilities may catch up with the demands made upon them.

Financing the Standard Equipment Purchase

Sometime ago the Railroad Administration suggested that the standard equipment, which was ordered under war conditions and is being allocated to the different roads in accordance with the judgment of the Administration, be paid for through the issuance of one joint block of equipment trust certificates. The railway executives have approved of this suggestion, and at the meeting of the standing committee of the Association of Railway Executives on Friday morning last, and later at the afternoon meeting of the association itself, this proposal was discussed at some length. Details of the plan have not as yet been worked out. The purchases of equipment by the Administration amount to about $400,000,000. Some of the railroads have refused to accept that which the Administration has assigned to them. Others are in a financial position which would hardly permit of their issuing equipment trust certificates at a reasonable interest rate. Whether or not the equipment is required, it has been ordered and in part delivered and must be paid for.

The Railroad Administration has its hands more than full providing working capital for the railroads it is operating, and paying the rental due the corporations. Equipment trust certificates of railroad companies with sound credit are selling at comparatively high prices. These notes, running generally for ten years, and occasionally for 15 years, have a broad market. Whether this market is broad enough to absorb $400,000,000 new certificates so soon after the sale of the government's short term notes, it is impossible to say. If the notes are issued under what is called the Philadelphia plan, title to the equipment will be vested in a trust company and the notes will be in the form of certificates of participation in a leasehold. If they are secured simply by a pledge of the equipment with a provision for the payment of interest and a part of the principal each year from the rental received for the use of the equipment, the security will be only fair even if 10 or 15 per cent of the cost of the equipment is paid in cash and the notes outstanding represent only 90 or 85 per cent of the cost. The equipment was purchased at abnormally high prices and there might be serious difficulty in persuading the roads to rent that which has been arbitrarily assigned to them.

On the other hand, if the notes are secured by the equipment and, in addition, are guaranteed jointly by the railroad companies, they will have the best of security and ought to sell at a high price compared with other short term notes in proportion to the rate of interest paid upon them. It would seem much better to have the railroad companies guarantee the notes than to have the government do so. A government guarantee might be an entering wedge for trouble after the roads are returned to their owners. The railroads will have to meet the interest charges in any case. No road will be putting a severe strain on its credit by participating in a joint guarantee of these notes.

Four Things That Are Needed

Congress met in special session this week. It is expected to begin considering at once the legislation to be passed before the railways are returned to private operation. President Wilson has announced in his message that the railways will be returned to their owners at the end of the present year. There are at least four important things which must be done if the railways are to be returned to their owners under conditions which will enable private operation to succeed.

First, a larger part of the traffic must be got back to normal channels. Wholesale diversion of traffic was necessary while the railways were being operated primarily as an instrumentality for helping to carry on the war. Necessarily this diversion was done regardless of the effects upon individual lines. When traffic once has been turned into new channels it will not return to the old without special efforts being made to restore it to them. Of course, if there are to be wholesale changes in the ownership of the railways and they are to be grouped into entirely new systems before they are returned to private operation, it would serve no purpose to try at present to restore their traffic to the old channels. But probably there will be no wholesale changes in ownership before the return to private operation. If it becomes evident that there are not going to be, the Railroad Administration ought, in co-operation with the railroad corporations, to use its power to cause traffic to move as formerly. Otherwise some railway companies will profit enormously and some will be hurt greatly for a long time as a result of the diversions of traffic which have occurred.

Second, every effort should be made by officers of the Railroad Administration, and especially by the officers of individual lines, to increase the efficiency and economy of operation. The statistics of operation demonstrate beyond question that the railways are not being as efficiently and economically operated as they could be. There is a good deal of "passing the buck" between the managers of the individual lines and the officers of the Railroad Administration at Washington as to the reasons for this. One thing is certain, however, and this is, that if efficiency is to be restored it must be done mainly by the managers of the individual lines. It cannot be done by a few men located in Washington, however able they may be. The managers of the individual lines can do it only by each manager exercising his own initiative and using the methods and making the changes which he sees the local conditions on his own line demand. The managers of many lines say that whenever they begin to try to do this they get into trouble with some bureau or division in Washington. The officers of the Railroad Administration in Washington say the managers of the individual lines have all the authority they need. It is clear that the managers of the individual lines should exercise all the authority they possess in order to increase efficiency and that the central administration should interfere with them as little as possible. The present disparity between railway income and outgo is enormous. It is doubtful if an advance in rates sufficient completely to remedy it can be secured. A great increase in the efficiency and economy of operation is needed.

Third, rates should be advanced. While the efficiency of operation can and ought to be increased, no conceivable increase of efficiency and of traffic will be sufficient to make net earnings adequate. It is the duty of the Railroad Administration to ascertain how large the advance in rates should be and to make it before the railways are returned to private operation.

Fourth, constructive legislation should be passed by Congress, and its main purpose should be to assure to the railway companies the opportunity to earn a net return sufficient to enable them adequately to develop their facilities. Any

egislation which may be enacted will be practically value-ess unless it contains provisions specifically directed to this ›urpose and skilfully adapted to accomplishing it. The ›reatest danger in the present situation is not that the rail-vays will not be returned to private operation, but that they vill be returned to private operation under conditions and aws which will make successful private management impos-ible. If, in spite of the experience of the last ten years, nd especially the last two years, Congress is not ready now o adopt legislation which will enable the railways to be suc-essfully operated and developed under private ownership, he conclusion will have to be accepted that government wnership sooner or later is inevitable, and that it will be ›etter to accept it sooner rather than later.

Cost of Reproduction in 1920

THE DIVISION OF VALUATION expects to complete its in-ventory of the railroads some time late in 1920, and ıdging by the preliminary reports on a few of the smaller ›ads which the division has made public, its final report to ıe Interstate Commerce Commission will consist essentially f figures regarding the cost of reproduction new, less de-reciation, for each of the properties. The results presented ıus far have been based on unit prices purported to be epresentative of conditions on June 30, 1914, and obtained ı the main from an average of unit costs of work done dur-ıg the five years 1910 to 1914, inclusive. Presumably these 914 prices were selected because they afforded the latest ıformation available at the inception of this momentous ndertaking, and it has been contended that these same prices ıould, in fairness, be applied to all properties alike, re-ardless of the time that the inventories are completed.

Just what significance is to be placed in 1920 on a cost f reproduction based on unit prices applicable in 1914, has ›t been made clear. Although the valuation act does not › state, it is to be presumed that the data accumulated by ıe Division of Valuation are to be used for the placing of physical valuation on the railroads, and if a valuation so etermined is to serve any useful purpose it must be based ı evidence admissible at the time that the valuation is to e used. In other words, any estimate cost of reproducing property new on a given date must be obtained by applying › the inventory quantities unit prices that are typical at that ıte. Unit prices selected in 1914, except as they represented ıe latest information available at the time the valuation ork was started, will have no more real relation to the ›st of reproduction in 1920 than the prices of 1904, or 1894, any earlier year that might be arbitrarily selected.

Had there been no radical change in price levels in the ears subsequent to 1914 this question would be of no par-cular importance, but actually there has been a most pro-›und change. Four years of the European war have pro-ıced such an inflation of currency and other changes that e wages of labor and prices of many commodities probably verage close to 100 per cent higher than in 1914, and onomists hold out scant hope for any appreciable reduc-›ns from the present levels. In the words of Professor ving Fisher of Yale University, "To talk reverently of 913-14 prices is to speak a dead language today."

Notwithstanding these considerations, there are current ferences to a value of the railway properties of the United ates in the neighborhood of seventeen billion dollars—a gure obviously based on past costs—whereas the use of resent unit costs of labor and materials probably would roduce a valuation fully 50 per cent higher than those of 914. This must of necessity be the case if cost of reproduc-›n, the only real fruit of the valuation division's labors, to be a prime factor in placing a valuation on the carriers. This experience in the evaluation of the railroad properties ıs been a most illuminating object lesson regarding the use of cost of reproduction as the principal factor in valuation. In five years' time, on the basis of cost of reproduction, the railroads have increased enormously in physical value—at least $5,000,000,000 and probably much more—while their net earnings have woefully decreased. With continuing high prices the physical valuation would be maintained on the high basis due to high cost of reproduction, while with varying unit costs it would fluctuate up or down, and in a manner entirely independent of earning capacity. Of what use can such a valuation be in the establishment of rates? A valuation based on present unit costs certainly would not amount to less than $22,000,000,000, while the book cost of road and equipment of the carriers is only about $18,000,000,000, and their net capitalization only about $17,000,000,000.

If the public still insists on basing rates on valuation and on basing valuation mainly on the cost of reproduction of the properties, the railway owners will hardly object, since the result would be to make the rates and net earnings far higher than any railway manager ever had the temerity to suggest. Spokesmen of the railways are modestly suggesting that the book cost of road and equipment be used as the basis for regulating future rates and earnings. The public would better accept this basis than go on with its valuation; for if the valuation is not used all the money spent in making it will be wasted; while if, as apparently is intended, the valuation is based chiefly on cost of reproduction, and if, as apparently must be done, up-to-date unit costs must be used, the valuation will be so enormous that its use as a basis for regulating rates and earnings would cost the public more than any other basis that could be used.

Lehigh Valley

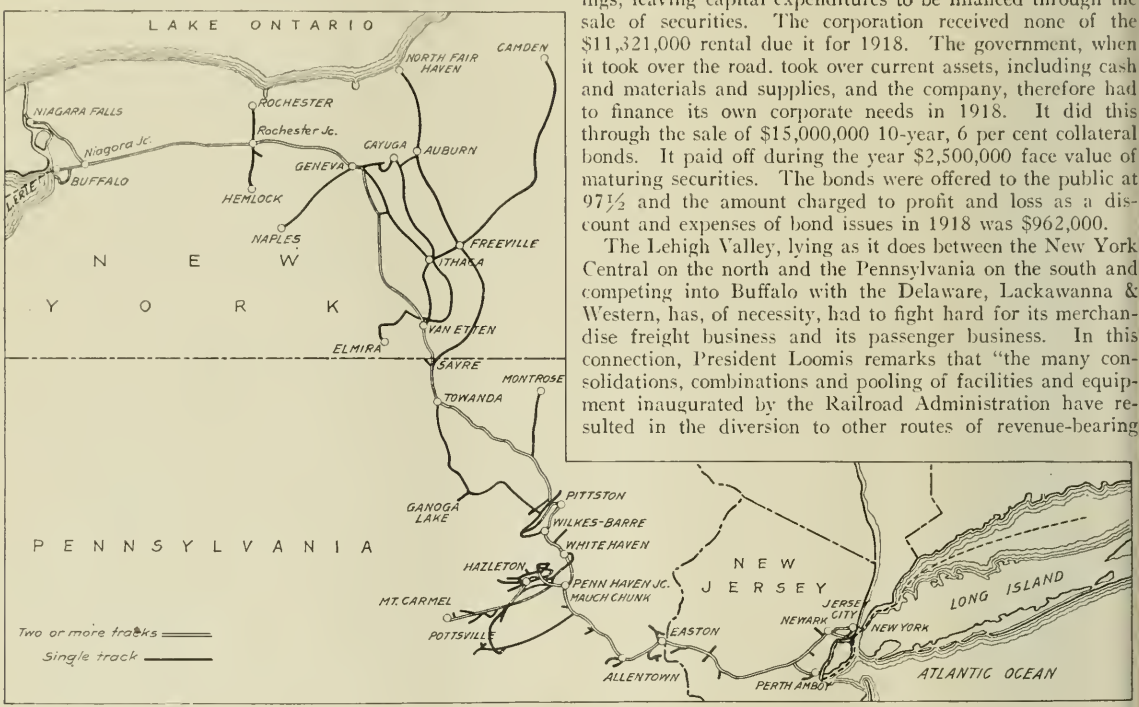
THE RESULTS of federal operation of the Lehigh Valley in 1918 were remarkably good. Total operating revenues amounted to $65,587,000, an increase of $12,228,000 over the previous year. Operating expenses amounted to $57,346,-000, an increase of $15,520,000. This left, after the payment of rentals, etc., net income of $6,821,000, a decrease of $2,867,000, as compared with 1917. The government guarantee to the owning corporation is $11,321,000. To say that the results of operation were good when the government fell behind earning the rental which it had to pay by $4,500,000, seems rather a contradiction, but the totals of operating expenses and net revenue do not tell the whole story.

The total tonnage of all freight carried one mile amounted to 7,138,000,000 in 1918, an increase of 474,000,000 ton miles, or 7.11 per cent over the previous year. Nearly the entire increase was due to a greater tonnage of merchandise freight carried. The ton mileage of merchandise freight amounted to 4,033,000,000 in 1918, an increase of 12.65 per cent over the previous year. The revenue passengers carried totaled 7,630,000 in 1918, an increase of 6.91 per cent over the previous year, and since the average passenger journey was nearly 4 per cent longer, the passengers carried one mile totaled 270,000,000 in 1918, an increase of 10.85 per cent.

Transportation expenses, the out-of-pocket cost of moving the business, amounted to $30,010,000, an increase of $6,667,000, or between 28 and 29 per cent. Taking into consideration the increase in wages, this is not a particularly large increase in transportation expenses, even had the volume of business remained the same in the two years.

With an increase, however, of more than 7 per cent in the ton mileage of freight, revenue freight train miles totaled but 7,583,000 in 1918, a decrease of 10.25 per cent. The average train load, including company freight, was 920 tons in 1918, an increase of 143 tons, or more than 18 per cent over 1917. Traffic was not as well balanced in 1918 as in 1917, the percentage of loaded car mileage to total car mileage being 66.92 in 1918 and 68.65 in 1917. There was a large

gain in average car loading, the average number of tons of all freight per loaded car being 32.97 in 1918, comparing with 29.10 in 1917, a gain of 13.30 per cent. There was an increase in tonnage of anthracite and bituminous coal carried, the total tonnage of bituminous in 1918 being 4,726,000 tons and in 1917 3,785,000 tons and the total for anthracite being 15,523,000 in 1918 and 14,917,000 in 1917. The percentage of the total tonnage furnished by the different classes of commodities remained about the same; there was a slightly smaller proportion of anthracite, but this was balanced by a larger proportion of bituminous coal. As noted above, the ton mileage of merchandise freight increased very much more than the ton mileage of coal; the Lehigh Valley therefore evidently got a shorter haul on its coal in 1918 than in 1917, due probably to the effect of the zone system order, and got a much longer haul on the average on its merchandise freight. Under the zone order, the markets of the various coal mines



The Lehigh Valley

were restricted to territory situated within a comparatively short haul of the mine.

In 1917, 52 freight locomotives were bought and 23 ten-wheel freight locomotives and 10 Pacific type locomotives were rebuilt. A part, therefore, of the remarkably good showing made in heavier train load may be credited to the new and heavier locomotives.

The federal administration spent $7,818,000 for maintenance of way in 1918, comparing with $5,353,000 spent in 1917; and the administration spent $17,004,000 for maintenance of equipment in 1918, as against $10,000,000 spent in 1917. This increase in maintenance of equipment costs looks exceedingly large.

The administration assigned 1,000 box cars, 1,300 coal cars, 500 low-side gondola cars, and 500 drop-bottom gondolas to the Lehigh, but the company has refused to accept this equipment, the cost of which is $9,648,000. As President E. E. Loomis points out in his annual report to stockholders, 98 per cent of the freight cars of the Lehigh Valley are steel or steel underframe. President Loomis says that the company has a larger equipment for its gross business and per mile of road, with one exception (as to per mile of road) than any other railroad in the eastern territory. It is a fact that the Lehigh Valley was one of the few coal roads in the eastern territory which was able to supply during the entire year 1917 a full quota of cars to its mine operators. This, of itself, is strong evidence of the amplitude of its car supply, and, with the falling off in output of both bituminous coal and anthracite that has taken place in 1918 and threatens to extend far into 1919, it is not strange that the Lehigh Valley stockholders hesitate to take on a capital charge of nearly $10,000,000 for equipment which the government thought it was going to need.

The Lehigh Valley is in strongly competitive territory. It has been a particularly conservatively managed road for many years, although its 10 per cent dividends absorbed in the years prior to 1918 nearly the entire amount of surplus earnings, leaving capital expenditures to be financed through the sale of securities. The corporation received none of the $11,321,000 rental due it for 1918. The government, when it took over the road, took over current assets, including cash and materials and supplies, and the company, therefore had to finance its own corporate needs in 1918. It did this through the sale of $15,000,000 10-year, 6 per cent collateral bonds. It paid off during the year $2,500,000 face value of maturing securities. The bonds were offered to the public at 97½ and the amount charged to profit and loss as a discount and expenses of bond issues in 1918 was $962,000.

The Lehigh Valley, lying as it does between the New York Central on the north and the Pennsylvania on the south and competing into Buffalo with the Delaware, Lackawanna & Western, has, of necessity, had to fight hard for its merchandise freight business and its passenger business. In this connection, President Loomis remarks that "the many consolidations, combinations and pooling of facilities and equipment inaugurated by the Railroad Administration have resulted in the diversion to other routes of revenue-bearing traffic which your company had enjoyed."

The following table shows the principal figures for operation of the property under federal management. This is not the income account of the corporation.

	1918	1917
Mileage operated	1,441	1,443
Anthracite freight revenue	$21,225,341	$18,201,495
Bituminous coal freight revenue	2,892,992	2,200,731
Merchandise freight revenue	29,155,590	22,705,556
Passenger revenue	6,234,935	4,894,990
Total operating revenues	65,586,769	53,358,446
Maintenance of way and structures	7,818,030	5,353,466
Maintenance of equipment	17,004,251	9,999,610
Traffic expenses	654,982	1,013,395
Transportation expenses	30,009,870	23,343,165
Total operating expenses	57,346,025	41,826,166
Taxes	1,874,237	1,953,954
Operating income	6,364,382	9,575,996
Net income	6,821,130	9,688,471

Corporate Income Account	1918
Rental from government	$11,321,233*
Other corporate income	3,026,425
Gross income	14,347,658
Interest and rentals	7,754,824
Net income	6,592,834
Dividends	6,060,800
Surplus	532,034

*No part of this rental had, up to the close of 1918, been received from the government.

End of Year Set for Return of Railroads

President Says They Will Be Handed Back to Owners and Congress Prepares for Permanent Legislation

WASHINGTON, D. C.

THE FLAT STATEMENT made by President Wilson in his message to Congress on Tuesday that "the railroads will be handed back to their owners at the end of the calendar year," creates at least one factor of certainty in the complicated railroad situation that has been lacking since December 26, 1917. The President spoke specifically and with authority because he is authorized by the federal control law to relinquish the roads "at any time he shall deem such action needful or desirable," although Congress could take away that power if it felt that more time should be allowed to work out its legislative solution.

While December 31 has been the date most commonly assumed for the termination of federal operation of the railroads, there have been some fears that the time of the transfer back to corporate control might be made dependent upon the degree of success attained by Congress in its efforts to enact legislation for the future regulation of the roads, and that the period of debate might thus be prolonged to extend into next year.

The President's statement, therefore, serves notice upon Congress, unless circumstances should be allowed to change his mind, or unless Congress should change the present law, that there is a time limit upon its endeavors if it is to act in season to accomplish the desired result of placing the country's transportation system on a secure foundation. It should also serve to induce some conservation of breath and words on the part of those who are inclined to wax rhetorical in demanding the return of private management without offering practical suggestions as to the conditions under which the companies are to be allowed to operate. The practical question is no longer "Shall the roads be returned?" or "When will they be turned back?" but, "How shall the transfer be effected with the least disturbance to the economic welfare of the country?"

The telegraph and telephone lines "will, of course, be returned to their owners as soon as the transfer can be made without administrative confusion," the President said; adding that if he were in immediate contact with the administrative questions which must govern the transfer he could name the date for their return also. Meanwhile he only suggested that in the case of the wire systems, "as in the case of the railways," it is "clearly desirable in the public interest that some legislation should be considered which may tend to make of these indispensable instrumentalities of our modern life a uniform and co-ordinated system which will afford those who use them as complete and certain means of communication with all parts of the country as has so long been afforded by the postal system of the government, and at rates as uniform and intelligible."

The President gave no further details of his ideas regarding the railroad situation, saying he hesitated to venture any opinion with regard to domestic legislation while out of daily touch with the problems, but in his latest previous statement on the subject, in his message to Congress in December, he said that the one conclusion he was ready to state with confidence was that "it would be a disservice alike to the country and to the owners of the railroads to return to the old conditions unmodified," because "those are conditions of restraint without development. There is nothing affirmative or helpful about them." As a general agreement with this sentiment has been expressed both within Congress and elsewhere, attention is now directed to the form of the modifications to be made in the old conditions, as the result of the efforts of those of both conservative and radical views which will be brought to bear on the subject.

The President's statement may also be regarded as placing a definite period to the idea of an experiment with government operation, which, while ostensibly not a part of the purpose for which the railroads were taken over, was undoubtedly an active element in the cerebrations of some of the men placed in charge of the transportation system last year. As a practical matter the experiment was ended when Congress tabled Mr. McAdoo's proposal for a five-year extension of government operation, which was then said to have been approved by the President. Mr. Hines, upon succeeding Mr. McAdoo in the office of director general, took up and supported for a time the ideas of his former chief as to the desirability of a further test of government operation, but he has not manifested any tendency to cry about spilt milk since it was made apparent that the public was not receptive toward the five-year plan. He has rather turned his attention to the complicated problems immediately before him and to formulating suggestions for a permanent reorganization of the railroads under private management. The transfer of the activities of the Railroad Administration from experimentation to the work of restoration and readjustment has been very perceptible and there has been more "railroading at home."

Announcement of a definite date for the return of the railroads brought great joy to many, if not most, of the railroad officers in the Railroad Administration organization, who have long been anxious for the opportunity to return to their homes and to their old jobs. While some may feel the loss of their present authority or may regret the passage of the opportunities for carrying out their ideas which operation of the roads as a single system afforded, most of them give an impression that they share in the feelings of the soldier who was more than willing to make any sacrifice for his country, but who wanted his discharge mighty quick after the armistice was signed.

Some of the members of the organization who are not railroad men may feel differently about the matter, because many of them are holding bigger jobs and receiving better pay than they ever have before. This is not true of most of the railroad men, and even when exercising a higher degree of authority, some of them have felt a certain circumscription while serving as parts of the huge governmental machine which they did not feel in their former positions.

The Republican leaders showed no disposition to quarrel with the President's announcement that he would return the roads. Senator Cummins expressed confidence that a bill could be passed before the end of the year but he predicted that if the bill is not passed by that time the roads would not be returned without legislation.

Chambers of commerce, boards of trade, and state legislatures and commissions are also expected to rejoice in the prospect of a return of the roads, but there is reason to believe that some of them are inspired by a desire to get the roads out into the open, from behind the protection of the federal control law, where they can get at them once more.

The Sixty-sixth Congress assembled in extra session on Monday, May 19, and after the preliminaries of organization prepared to take up as speedily as possible the appropriation bills which failed at the last session, including the appropriation for an additional revolving fund for the Railroad Administration to meet its deficit and to enable it to

assist the railroads in financing capital expenditures. Instead of the $750,000,000 asked at the last session, the amount now required is estimated at over a billion dollars. While permanent railroad legislation is expected to take a prominent part in the activities of the session, the railroad question will first come up in connection with the appropriation bill.

Chairman Good of the House appropriations committee, promptly called a meeting to consider the general deficiency bill, in which the railroad appropriation was included at the last session and it is understood there will be a separate bill covering the railroad requirements, but Director General Hines has not yet submitted his estimate. Appropriations for the Interstate Commerce Commission and for the Alaska railroad are also to be passed upon.

The interstate commerce committees of both the House and the Senate are planning to take up the subject of permanent railroad legislation as early as possible, but no dates for hearings have yet been announced. Representative Sims reintroduced his former bill to extend the period of federal control until 1924.

A conference of the Republican members of the House adopted a legislative program which promised early consideration of the return of the telephone, telegraph and cable lines to their owners, and also of "railway legislation and development of transportation facilities."

Senator A. B. Cummins of Iowa, who was also elected president pro tempore of the Senate, has been selected as chairman of the committee on interstate commerce, and J. J. Esch of Wisconsin was made chairman of the House committee on interstate and foreign commerce. The other Republican members of the House committee are: E. L. Hamilton, Michigan; Samuel E. Winslow, Massachusetts; James S. Parker, New York; Burton E. Sweet, Iowa; Walter R. Stiness, Rhode Island; John G. Cooper, Ohio; Henry W. Watson, Pennsylvania; F. F. Ellsworth, Minnesota; E. E. Denison, Illinois; Everett Sanders, Indiana; Schuyler Merritt, Connecticut, and J. S. Webster, Washington. Mr. Esch has prepared a comprehensive railroad bill, amplifying the provisions of a bill he introduced at the last session, which represents in general the ideas of the Interstate Commerce Commission. He expects to introduce it probably by next week.

One of the first measures introduced was a resolution providing for a return of the wire systems to their owners and definite action on that subject is likely to precede the more complicated question of the disposition of the railroads.

A number of bills dealing with the railroad question have already been introduced but in most cases they represent the reintroduction of bills presented at the last session. Senator King introduced a bill, S. 31, to repeal the federal valuation act. S. 67, introduced by Senator Thomas, provides for the creation of federal railroad companies and is intended to establish more effective supervision of railroads. Senator Gronna introduced a bill, S. 113, providing for reduced rates for the transportation of laborers when traveling under the direction and control of the Department of Labor. Senator Poindexter re-introduced as S. 360 his proposed amendment to Section 4 of the commerce act to provide a rigid long and short haul clause; also a bill, S. 361, to provide for the regulation of security issues. Several bills were introduced to repeal the Daylight Saving law.

Senator Gronna of South Dakota filed resolutions adopted by the South Dakota legislature petitioning for additional passenger service in the state and also urging Congress to enact legislation necessary to authorize the continuance of government control for five years. Senator Myers of Montana presented a petition from the Montana legislature urging the prompt return of the railroads and also urging an inquiry as to the possibility of additional railroad construction in Carter County.

Transportation Must Be Put on Sound Basis

Thomas DeWitt Cuyler, chairman of the Association of Railway Executives, in commenting upon the President's statement to Congress that the railroads would be returned to owners at the end of this year, said:

"It is to be assumed, of course, that the President believes that Congress will be able to frame in the next seven months the legislation that it will be necessary to enact before the government returns the roads to their owners. The members of the Senate and House who have this legislation in charge are apparently hopeful that, with the unmistakable general agreement over the country as to the basic principles of necessary railroad legislation, a non-partisan bill, embodying these principles, can be placed in the President's hands for his signature within the next few months.

"To return the railroads to their owners under the old system of regulation—a system that had failed—would invite disaster. As Senator Cummins has so well expressed it, this is the psychological time to correct the evils in our pre-war system of railroad control.

"The problem of putting our transportation system on a sound basis for the future is not nearly so complex as it seemed two or three years ago. The public demands, first, adequate, efficient, safe transportation, economically produced —second, new railroad facilities and improvements to meet the needs of a growing country, without wasteful or unnecessary construction; third, fair wages and working conditions for employees, with insurance against a paralysis of the railroads by strikes.

"In order that these public needs may be met by the railroads when they are returned to private management, certain things are indispensable: First, a continuous investment of new capital for additions and betterments, from $750,000,000 to a billion dollars a year; second, rates for carrying freight and passengers that will pay for the labor and material consumed in operation, and that will provide a fair return on the value of the property devoted to the public use—that is, an income on the capital that will attract the necessary new capital; third, responsible regulation by the national government that will protect the interests alike of the owners, the workers and the general public.

"The legislation to make these things possible, and to insure the future growth of our transportation facilities, does not have to be very complicated. On most of the principles involved there is a general understanding and agreement over the country, and the honest differences of opinion are mainly as to details. But this certainly is the time to lay a sure foundation for the future, and to perform the same public service for our transportation system as was performed seven years ago by Congress for the banking system.



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Repatriated Armenians

Railway Stockholders: December 31, 1917

Total of 647,689 Understates Number of Individuals Who Have Interest in Financial Ownership

The Bureau of Railway Economics has issued Bulletin No. 140, giving statistics regarding railway stockholders as of December 31, 1917. In Bulletin No. 94 the bureau gave a compilation of the number of holdings of railway stockholders on June 30, 1915. A similar compilation was prepared by the bureau as of December 31, 1916, but publication was held up by the war. The present bulletin not only incorporates the unpublished data for 1916, but brings the record down to December 31, 1917.

This bulletin is based on reports to the commission of operating and non-operating companies of all classes, except switching and terminal companies. The statistics are virtually complete for each class, although it has been necessary to omit a few of the smaller roads that filed incomplete returns or no returns at all. Such omissions are so unimportant as to be virtually negligible for practical and comparative purposes.

Railway stockholders numbered 647,689 on December 31, 1917, as compared with 612,880 on December 31, 1916, and 626,122 on June 30, 1915. This covers the steam railways of the United States, operating in 1917 259,485 miles of line. The average holdings per stockholder, par value, amounted to $13,966 in 1917, as compared with $14,321 in 1916 and $13,796 in 1915.

The foregoing statements apply to all roads. For roads of Class I and Class II, operating 250,804 miles (96.6 per cent of the total), it is possible to exclude to a considerable extent capital stock held by or for other railway companies. Making this exclusion, the approximate amount of railway stock in the hands of the general public on December 31, 1917, was $6,377,551,082. The number of holders of this net stock was 636,208, and the average amount of their holdings $10,024. The corresponding returns for 1916 were $6,202,673,485 of net capital stock, 600,671 stockholders, and average holdings of $10,326; for 1915, $6,004,496,162 of net capital stock 607,630 stockholders, and average holdings of $9,882.

Table I shows the number of roads, operated mileage, and total number of stockholders on December 31, 1917, grouped by class and district.

TABLE I

Number of Stockholders

Railways of the United States, December 31, 1917

Class and District	Number of roads	Miles of line operated	Number of stockholders
All classes:			
United States	1,272	259,485	647,689
Eastern District	534	64,829	340,586
Southern District	275	50,378	58,301
Western District	463	144,278	248,802
Class I (operat. and non-operat.):			
United States	572	232,798	627,930
Eastern District	333	59,089	332,624
Southern District	78	42,852	53,226
Western District	161	130,857	242,080
Class II (operat. and non-operat.):			
United States	272	18,006	8,947
Eastern District	88	4,067	3,470
Southern District	62	4,650	2,659
Western District	122	9,289	2,818
Class III (operat. and non-operat.):			
United States	428	8,681	10,812
Eastern District	113	1,673	4,492
Southern District	135	2,876	2,416
Western District	180	4,132	3,904

It should be borne in mind that the number of stockholders shown in Table I is the number of distinct holdings of stock, and does not necessarily represent the number of separate individual owners. On the one hand, the aggregate contains duplications arising from the fact that a person may own stock in two or more railway companies; on the other hand, and of much greater significance, blocks of stock are often held in trust for multiple beneficiaries, or are held as investments by banks, insurance companies, and educational, benevolent, or other institutions in which many individuals have an interest, although not directly.

The Interstate Commerce Commission recently issued a statement giving the number of stockholders as 627,930, but this covered only 572 Class I roads and their non-operating subsidiaries. The commission also gave an analysis of the 20 largest holders in each road, aggregating 8,301 names, holding 50,873,322 shares, without regard to whether they were $50 or $100 shares, from which it drew the conclusion that stock ownership is largely concentrated in a few holdings. This point is further analyzed in the bureau's bulletin to show that while this is a fact the large holdings represent the interest of many individuals. On this point the bulletin says:

"To say that there were 647,689 railway stockholders in 1917 is therefore very much to understate the total number of individuals who had a direct or indirect interest in the financial status of the railways, and in the equities represented by railway ownership. This fact is strikingly brought out in a statement recently issued by the Interstate Commerce Commission, showing that 8,301 out of the 627,930 stockholders of railways of Class I held about one-half the outstanding stock of those railways. At first sight this appears to indicate great concentration of railway stock in the hands of a relatively small number of holders, but further analysis shows that more than five-sixths of the total number of shares held by the 8,301 large stockholders were in the hands of railway and other corporations, voting trustees, and estates, the remaining shares being individual holdings. These individual holdings comprised 8.2 per cent of the total number of shares outstanding. It may safely be assumed that the great bulk, if not the whole, of the stock held by corporations, trustees, and estates represented the kind of holdings described above, namely, blocks held in trust or for corporate investment, in which many individuals had an indirect interest. In the light of this analysis, the seeming concentration of railway stock in the hands of a few individual holders is largely contradicted by the actual fact that only 8 per cent of the total outstanding stock is concentrated in large individual holdings, while the remaining 92 per cent is distributed among hundreds of thousands of small holdings, or is held in trust for, or for the benefit of, many millions of individuals."

There were 847 operating roads, with 560,621 stockholders, and 425 non-operating companies, with 87,068 stockholders. The number of stockholders per company averaged 509.

Holdings Per Stockholder

Table II shows the par value of gross capital stock outstanding on December 31, 1917, the total number of stockholders, and the average amount of stock per stockholder.

The capital stock of the Eastern railways represented $3,559,686,211, or 39.4 per cent of the total; of the Southern railways $1,203,202,068, or 13.3 per cent; of the Western railways $4,282,543,530, or 47.3 per cent.

As in earlier years, the average holdings for railway companies of Class II were considerably larger throughout than those for Class I. This was due to the relatively small number of stockholders per company, a considerable number of companies of this class being controlled by other corporations and their stock being held in large blocks. The same thing

is true of companies of Class III, but the comparatively low capitalization per company results in a small average holding per stockholder. In the case of many controlled railway companies, the number of stockholders on their books is the sum of the number of directors (holding one qualifying share of stock each) and the controlling corporation.

TABLE II

AVERAGE HOLDINGS PER STOCKHOLDER
Railways of the United States, December 31, 1917

Class and District	Capital stock outstanding, par value	Number of stockholders	Average amount of stock per stockholder
All classes:			
United States	$9,045,431,809	647,689	$13,966
Eastern District	3,559,686,211	340,586	10,452
Southern District	1,203,202,068	58,301	20,638
Western District	4,282,543,530	248,802	17,213
Class I (operat. and non-operat.):			
United States	8,663,190,028	627,930	13,701
Eastern District	3,433,734,454	332,624	10,323
Southern District	1,089,848,118	53,226	20,476
Western District	4,079,607,456	242,080	16,852
Class II (operat. and non operat.):			
United States	335,471,297	8,947	37,495
Eastern District	107,702,407	3,470	31,038
Southern District	80,707,610	2,659	30,353
Western District	147,061,280	2,818	52,186
Class III (operat. and non-operat.):			
United States	106,770,484	10,812	9,875
Eastern District	18,249,350	4,492	4,063
Southern District	32,646,340	2,416	13,513
Western District	55,874,794	3,904	14,312

To obviate the duplications resulting from intercorporate holdings, Table III eliminates them as far as practicable.

Since 1915 the Interstate Commerce Commission has required roads of Classes I and II to report the names and holdings of their 20 largest stockholders. Generally speaking, wherever one railway company has a controlling interest in another railway company through stock ownership, its name will appear in the list of the twenty largest stockholders of the controlled company. By eliminating such holders and their holdings, so far as they may be railway companies or trustees holding for railway companies, it is possible roughly to approximate the amount of stock held by the public, and the number of stockholders owning such stock. The result is only an approximation, as it necessarily can take no account of small holdings by railway companies, but a large part of the duplication due to intercorporate railway holdings can certainly be eliminated by the method outlined. Table III gives the results of such an elimination.

Railways of Classes I and II operated 250,804 miles of line on December 31, 1917, or 96.6 per cent of the total operated mileage on that date. Table III shows, first, the outstanding stock and total number of stockholders of railway companies of Classes I and II; second, the number of cases of stock held by or for other railway companies, reported as among the 20 largest holdings of each company's stock, and the amount of stock so held; deduction of railway holdings and number of stockholders from the total produces as a result, third, the stock in the hands of the public and the number of stockholders corresponding to such stock.

Deducting from the aggregate amount of stock and number of stockholders, respectively, the $2,561,110,243 held by or for other railway companies, and the 669 railway companies by or for whom held, the approximate net amount of stock in the hands of the public becomes $6,377,551,082, while the number of holders of net stock was 636,208. This reduces the average holding per stockholder to $10,024. The corresponding average in the East was $7,584, in the South $16,543, and in the West $11,886.

TABLE III

RAILWAY STOCK IN THE HANDS OF THE PUBLIC, DECEMBER 31, 1917
(Roads of Classes I and II, with annual operating revenues above $100,000)

Item	United States	Eastern District	Southern District	Western District
Number of roads	844	421	140	283
Miles operated..	250,804	63,156	47,502	140,146
Number of stockholders	636,877	336,094	55,885	244,898
Total stock outstanding	$8,938,661,325	$3,541,436,861	$1,170,555,728	$4,226,668,736
Average holding per stockholder	14,035	10,537	20,946	17,259
Held by or for railways:				
Number of railway holders.	669	391	108	170
Amount of stock held	$2,561,110,243	$995,382,218	$247,830,807	$1,317,897,218
In hands of public:*				
Number of stockholders	636,208	335,703	55,777	244,728
Amount of stock held	$6,377,551,082	$2,546,054,643	$922,724,921	$2,908,771,518
Average holding per stockholder	10,024	7,584	16,543	11,886

*Approximate.

Table IV compares the statistics of Tables I and II, all classes of roads for the United States combined, with corresponding statistics for December 31, 1916, and June 30, 1915. The statistics for 1915 are from Bureau of Railway Economics Bulletin 94, while those for 1916 are from hitherto unpublished tabulations.

Average holdings per stockholder were $13,966 in 1917, compared with $14,321 in 1916 and $13,796 in 1915. The average for 1917 was lower than in 1916 by $355, or 2.5 per cent, but greater than in 1915 by $170, or 1.2 per cent.

TABLE IV

COMPARATIVE STATISTICS: 1915, 1916, AND 1917
United States—all classes

Item	December, 31, 1917	December, 31, 1916	June 30, 1915	Increase or decrease, 1917 compared with 1916: Amount	1916: Per cent	Increase or decrease, 1917 compared with 1915: Amount	1915: Per cent
Miles operated	259,485	259,509	257,211	.....	..	.....	..
Capital stock	$9,045,431,809	$8,777,052,011	$8,638,286,892	$268,379,798	3.1	$407,144,917	4.7
Number of stockholders	647,689	612,880	626,122	34,809	5.7	21,567	3.4
Average holdings per stockholder	$13,966	$14,321	$13,796	d 355	d 2.5	$170	1.2

Capital stock in the hands of the public approximated $6,377,551,082 in 1917, which was greater by $174,877,597, or 2.8 per cent, than in 1916, and $373,054,920, or 6.2 per cent, greater than in 1915. The number of stockholders was 636,208, which was greater by 35,537, or 5.9 per cent, than in 1916, and 28,578, or 4.7 per cent, greater than in 1915.

The average amount of net stock per stockholder was $10,024 in 1917, compared with $10,326 in 1916 and $9,882 in 1915. This was a decrease of $302, or 2.9 per cent, as compared with 1916, and an increase of $142, or 1.4 per cent, as compared with 1915.

TABLE V

COMPARATIVE HOLDINGS IN THE HANDS OF THE PUBLIC, 1915, 1916, AND 1917 (APPROXIMATE)
United States—Classes I and II

Item	December, 31, 1917	December, 31, 1916	June 30, 1915	Increase or decrease, 1917 compared with 1916: Amount	1916: Per cent	Increase or decrease, 1917 compared with 1915: Amount	1915: Per cent
Miles operated	250,804	250,215	248,395	.....	..	.....	..
Capital stock (net)	$6,377,551,082	$6,202,673,485	$6,004,496,162	$174,877,597	2.8	$373,054,920	6.2
Number of stockholders	636,208	600,671	607,630	35,537	5.9	28,578	4.7
Average holdings per stockholder	$10,024	$10,326	$9,882	d $302	d 2.9	$142	1.4

The Heating and Ventilation of Engine Houses

A Detailed Exposition of Approved Methods of Application to Either New or Old Structures

By T. W. Reynolds

THE HEATING and ventilating of engine houses by means of air propelled by a steam driven fan, through adjustable louvres and heaters, and discharge ducts to the engine pits of the various stalls, is common practice. The ducts may be of concrete run under ground or of sheet metal carried overhead. The underground ducts are the more desirable and are the type generally provided in new structures, but in installing the system in old houses the cost of the underground duct is prohibitive.

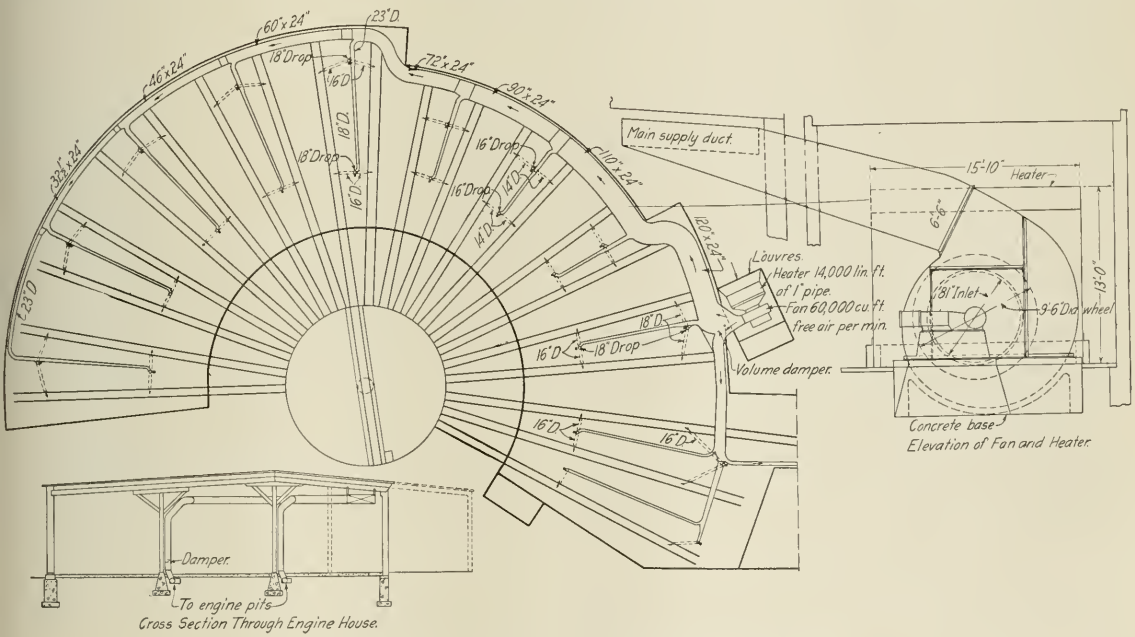
This article discusses the use of underground concrete air ducts as applied to a new 30-stall engine house, having concrete floors and engine pits, brick walls and timber frame and roof, but the use of ducts of sheet metal is also referred to. The cubical content of the house under discussion is 1,700,000 cu. ft.; the glass area is 10,000 sq. ft.; the exposed area of brick wall is 15,720 sq. ft.; and of wooden wall, 9,520 sq. ft.; the concrete floor area is 73,930 sq. ft.; the roof area is 57,730 sq. ft.; and the area of the yellow pine doors is 5,300 sq. ft.

The installation is to maintain an even temperature of 65 deg. F., when the temperature of the external air is —10 deg. F., and when fresh air only is supplied to the fans; and to have a capacity to change the entire contents of the house once every 12 min. The installation is also to keep the house free from fog and steam at all times. The temperature of 65 deg. is to be obtained after the doors have been closed five minutes, all temperatures being measured five feet above the floor.

For these average or typical conditions the following sizes and capacities of apparatus will be required; there being two similar sets of equal capacities, one of which is described.

Heaters: 16,500 lin. ft. of 1-in. wrought iron pipe in coils of the mitre type, arranged in two groups of five sections each, and having a free area through the coils of 80 sq. ft. The length of the shortest coil is 4 ft., longest 19 ft., height of heater 9 ft. 2 in., weight 49,500 lb., size of manifold connection 8 in., main return connection 3½ in.

Fans: three quarter housed bottom horizontal discharge, of the steel plate type, having a capacity of 80,000 cu. ft. of air per min. at ¾-oz. pressure per sq. in. 140 r. p. m. for the above capacity and 2,250 ft. per min. for the velocity of air at the fan outlet; size of the latter 78 in. by 66 in. with a fan inlet diameter of 94 in. The weight of the fan is 7,500 lb., diameter of the fan wheel 132 in., width of blade at inlet 63 in., and periphery, 54 in.



Layout of a Heating System with Overhead Sheet Metal Ducts

Engines: direct-connected 12 in. by 16 in. simple horizontal side crank of 45 i. h. p., having a throttle valve of 3½ in. size and exhaust outlet of 4½ in., set on a cast iron base 26 in. high, weight 6,650 lb., engine to operate with 80 lb. steam pressure.

Condensation return pumps: horizontal duplex, piston type, brass fitted, size 6 in. by 4 in. by 6 in. automatic hot water return pump with cast iron receiver in combination, designed to operate with a steam pressure of 80 lb. per sq. in. and a back pressure of 3 lb. or less.

The required boiler horse-power for both sets of engines, pumps and coils as above described is 390.

An arrangement of engine or motor direct connected to the

fan is preferable, flexibility and exact alinement being procured by means of a flexible coupling connecting the shafts of the engine or motor with that of the fan. Proper alinement is most important and may be obtained where care is used with simple flange couplings. Space conditions (where length is considered) make the direct connection the more desirable. Such an arrangement eliminates the loss due to slippage of belts and the cost of maintaining them, and is safer because of their elimination. The cost, however, is greater, since it is necesary to select larger engines or motors to obtain the same power at a less speed.

Belt drive is necessary where alternating current motors are used, since the available minimum speed is in excess of fan requirements. The fan and engine pulleys are placed on not less than 8-ft. centers. Where impossible to arrange for this distance a drive by means of the so-called silent chain may be used. The use of a motor requires a base of the sliding type adjusted from time to time by screws to conform with the stretching of the belt.

The most economical prime mover is the steam engine since it is possible to use the exhaust steam from the steam using machinery, such as the engines and pumps. By cross connection with like apparatus in the boiler and engine plants, the exhaust from all such units is made available at either the feed water heater or heater coils.

Arrangement of Blast Heaters

Blast heaters are indirect and may be of the all cast iron type, such as the Vento, or they may be constructed of pipes set in rows and staggered with ends screwed into cast iron sectional bases. Some manufacturers divide these bases by means of partitions into two compartments, one for steam, the other for air. Fewer difficulties are encountered with the mitre type of coil in the way of air binding. In these, the pipes run horizontal from the top of the coil and, fitted with 90 deg. ells, connect to the return base at the bottom of the coil. Pipe coils may be operated under atmospheric pressure and, where steam pressures in excess of 15 lb. must be used, they are particularly desirable. The horizontal pipes of the coils should have a slope of not less than ¼ in. in 10 ft. to drain them.

The steam pressure being less than that in the boilers, some mechanical means is required for returning the condensate to the boilers, a return pump being used for this purpose and the exhaust utilized in the heating system after passing through an oil separator.

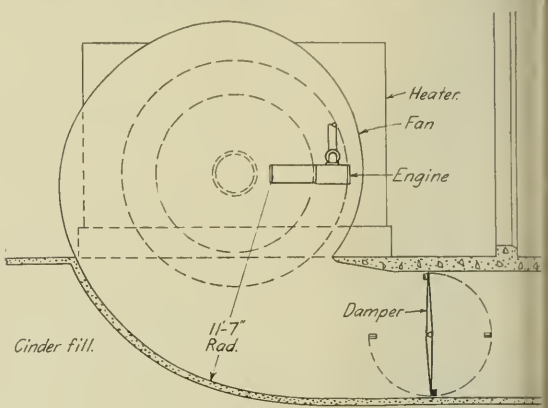
Design of Air Ducts

The heating requirements for an engine house are roughly and quickly determined by multiplying the total number of stalls by the average amount in square feet of radiation usually required per stall. Other requirements are a final temperature of 140 deg. for the air with a velocity of 600 ft. per min. at outlets, each pit having four outlets. Due to practical conditions of building construction, the widths of ducts are practically standard, the height being variable, as required, to obtain the necessary cross section.

Referring to the plan, a duct 6½ ft. square is extended from each fan and connected into one having an area of 67 sq. ft. just inside the engine house. It is obvious that economy and a better distribution are furthered by the extension of this duct through the center of the house to its front wall, and then dividing and branching each way. Furthermore, it is often impossible to run these by any other method. Each of the two main branches is 7 ft. wide and about 34 sq. ft. in cross section, the branches and outlets to pits being 2 ft. 4 in. wide and 4.66 sq. ft. in area. Ducts are of concrete or of brick, smooth-finished on the inside. Those of smaller size may be of glazed sewer pipe installed in the usual manner.

Ventilation Augmented By Smoke Jacks

Ventilation is aided by the exhaust through smoke jack from the stacks on locomotives. Some types of smoke jack are made with horizontal and vertical adjustments s as to enshroud the locomotive stacks more com pletely, thereby carrying off all of the smoke and gase and avoiding the necessity for exact spotting of loco motives. There have been a few recent and successfu installations in which the discharge from locomotive stack is collected by means of ducts run above the roo This is in addition to the ventilation system and necessi tates an exhauster which forces the smoke into a stack Metal parts are avoided because of the sulphuric acid re sulting from soot and water in combination, and a specia type of non-corrosive fan is required. Should the fan a



Horizontal Bottom—Discharge Fan Used with Undergroun Concrete Ducts

any time be inoperative, the smoke jacks are arranged wit bypasses, so that they may be discharged directly into th atmosphere. In general, these installations are provide where local laws make their use compulsory.

Course of the Ventilating Air

In the system of ventilation under description the air discharged into the engine pits and assists in ridding th running gear of the locomotive from snow and ice quickl The steam passes rapidly upward beyond the breathing zor and out of the smoke jacks, while the working level maintained free of all objectionable smoke and gases.

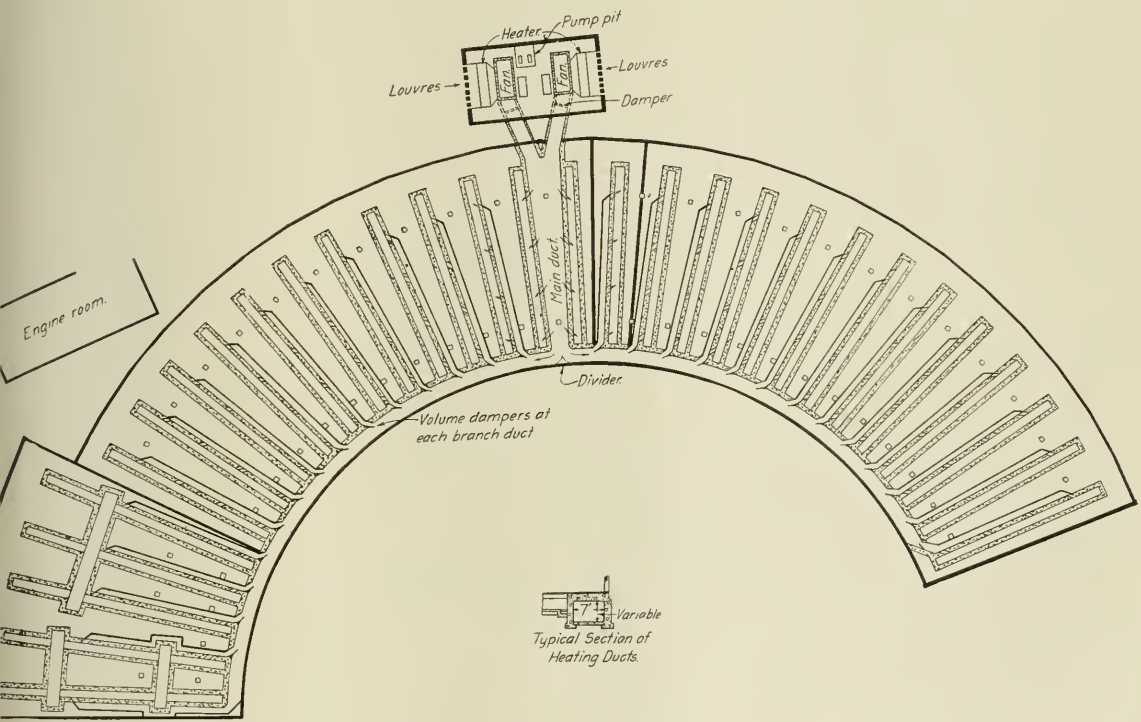
The distribution of air to the various branch ducts effected by means of volume deflectors. These consist e sentially of a door made of a steel plate braced by angl and securely hinged to the duct, adjustments being mac along a ⅜-in. by 1¼-in. strap iron punched on 1½ i centers. When the pressure of air into each branch du under normal working conditions is approximately the san the deflectors are permanently fastened into positio Operating and locking devices are also installed in the du leading from each fan, and conveniently near the same, a adjustable damper. The damper is bottom heavy and com to rest on angle stops. A stationary deflector or divider also installed at the point where the main underground du divides near the middle of the engine house. This deflecto is constructed of No. 12 steel, bent to an easy radius an braced.

The heating and ventilation apparatus is divided into tw equal sets which is an advantage in many ways and allow for a greater economy of operation. While the exhau steam should be utilized in the heating system during th winter months, any excess may be used for heating th water of the locomotive boiler washout and reclaiming sy

m or for boiler feed water. An outboard exhaust pipe must e provided to carry off the exhaust steam in warm weather hen it cannot be used in the heating system or otherwise. o regulate the back pressure carried on the engines a back-ressure valve is connected to this pipe, and from this point line is extended through the roof with spiral riveted pipe, rminating in an exhaust head. This valve also holds the eam within the heating system when it cannot be used, ıtomatically opening for the pressure set and releasing the haust steam through the exhaust head until the excess ressure has been discharged.

The Use of Sheet Metal Ducts

While concrete ducts are better, though requiring a greater penditure in first cost, they are prohibitive through greatly creased costs, if applied to a house existing prior to its stallation. Concrete ducts require but little or practically



Layout of a Heating System with Underground Concrete Ducts

maintenance, whereas with ducts of sheet metal renewals ust be made from within one to two years from date of stallation. The smoke and gases are the more conspicuous the older type of houses, and the presence of moisture from e many locomotive safety valves combines with these to rm sulphuric acid acting as would an accelerated test upon e light sheet metal.

The conditions are the worst for corrision, alternate etting and drying. Melting snow and ice on locomotives, ong with the escape of steam greatly assist in this corro-on. This is more rapid at some points than at others, as, accordance with the overhead building construction, the ıcts may of necessity be run in locations near the safety lves and smoke stacks of the locomotives. The only ad-ntage of sheet metal ducts is in their low first cost, the se of construction and their adaptability to turns and ınsformations. The use of any kind of sheet metal ducts should only be permitted where applied to an existing house.

As a practical illustration of an installation of sheet metal ducts, take the case of an old roundhouse originally built with 11 stalls to which in course of time an addition of 10 stalls was made, making 21 stalls in all. These were made of greater length to accommodate the increasing length of locomotives. Six of the original stalls were similarly length-ened and when it was decided to install a heating system a fan house was erected at the rear for housing the one set of indirect heating apparatus.

The sheet metal ducts were installed overhead. The trunk duct is rectangular in shape because of limited head-room, being run close along the rear wall so as to avoid coming in contact with stacks when locomotives are run too far forward.

Supports for the trunk duct are of two ½-in. rods secured to one 1½ in. by 1½ in. by 3/16 in. angles passing under-neath the duct. Round ducts are supported by means of ⅜ in. bent rods. The branches are taken off and run along the roof trusses, most of the branches having two down pipes. These are carried down at building uprights and are divided beneath the floor so as to serve the engine pits, each pit having two outlets.

Starting from the fan the main duct is divided into two branches, one 120 in. by 24 in., the other 56 in. by 24 in. the first having a ratio of five to one for length and depth, so that the friction losses are of course somewhat increased. Branch ducts are sized according to the cubiture and the length of stall. They vary from 19 in. to 23 in. in diameter with down pipes, mainly of 18 in. diameter. The latter are divided into two 16 in. pipes and extended with rectangular shapes transforming to the 12 in. by 24 in. outlets in the pits. Down pipes in the machine shop terminate with open ends seven feet above the floor and are each fitted with

damper, quadrant and locking device; as are all others throughout the engine house.

Gages for the ducts are as follows:

Gages	Sizes, in. diam., for round shapes
26	3 to 12
24	13 to 24
22	25 to 34
20	35 to 50
18	51 up
	For rectangular shapes, referring to width of greatest dimensions
26	3 to 18
24	19 to 24
22	25 to 36
20	37 to 72
18	73 up

It is necessary to protect the down pipes from mechanical injury. Failure to do so will soon result in bent and damaged ducts. A sheet metal shield of heavy gage is fitted snugly around each down pipe for a distance of five feet above the floor and secured by ¼ in. bolts at the front and at the rear by 4 in. lag screws to the posts, bolts and screws being on 10-in. centers. The space between the pipe and the shield is grouted for 3 in. above the floor line and sloped so as to drain to the post. Shields are painted two coats inside and outside before erection.

The screens which are fitted to openings at the duct outlets in engine pits are made up of an angle iron frame with corner plates which encloses a screen of 2 in. mesh No. 11 B. W. G. galvanized poultry wire. Of late these screens have been constructed of locomotive wire mesh, since the ordinary wire quickly deteriorates and in a short time totally disappears.

Standard Time Zones Modified

THE Interstate Commerce Commission has issued a supplemental report modifying its original order prescribing the boundaries of standard time zones, as reported in the *Railway Age* of November 22, 1918, page 917, and September 13, 1918, page 525. Changes are made in the boundaries between eastern and central time, in Ohio, to meet complaints from various towns, and similar changes between the 90th and 105th meridians to meet the wishes of certain towns in Montana, all to take effect June 1, at 2 A. M.

The Hocking Valley, the Toledo & Ohio Central, the Kanawha & Michigan and the Pennsylvania, have various joint track arrangements, covering in all many miles, which make it essential that the Hocking Valley south of Columbus, the Toledo & Ohio Central between Columbus and Corning, the Pennsylvania between Bremen and New Lexington, and the Kanawha & Michigan between Corning and Charlestown, be operated under the same standard time. To do this, and to best accommodate commerce, the order now puts the four roads first named in the central time zone. The Kanawha & Michigan will, under this order, use central time to Gauley Bridge, W. Va., but will be required in eastern territory to use eastern time on its public time-tables and announcements.

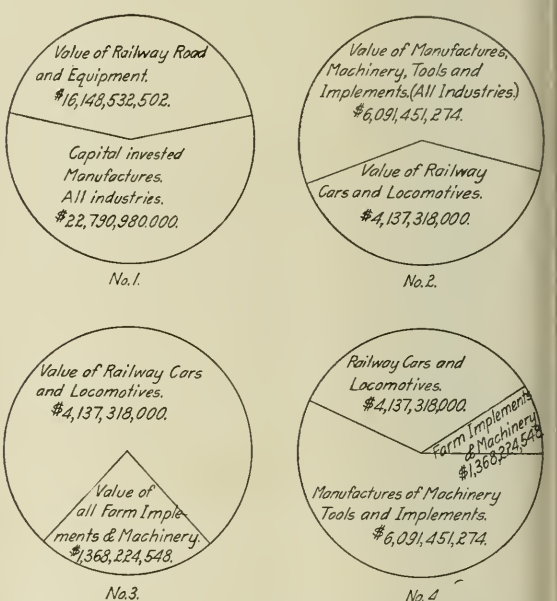
When the daylight saving law went into effect, in March, numerous towns in Ohio left their clocks unchanged, thereby virtually taking themselves out of the eastern zone and placing themselves within the central zone. These towns, located on the boundary line are allowed to consider themselves within the central zone; they are Bellevue, Monroeville, Plymouth, Shelby, Mansfield, Butler, Mount Vernon, Chicago Junction, Utica and Galion. Requests from places further east are denied.

The city of Toledo, as represented by the Toledo Commerce Club, requested to be changed from the central to the eastern zone; but the commission finds that the citizens are unable to agree among themselves, and the petition is denied. The New York Central and the Wheeling & Lake Erie, using eastern time at Toledo, are permitted to continue so, but public time-tables must show arrivals and departures with reference to central time. At Albany, Ga., the use of central time has already been authorized.

In Helena, Butte, Deer Lodge, Missoula, and other places in western Montana, the citizens have never observed Pacific time, as prescribed by the commission, and the whole state of Montana will now be allowed to use Mountain time. The Great Northern, however, will be allowed to use Pacific time as far east as Troy, Mont., and the Northern Pacific as far east as Paradise, Mont. Corresponding changes will be made on the Milwaukee road.

Value of Railway Plant Compared with That of Other Industry

THE ACCOMPANYING ILLUSTRATIONS were prepared by E. B. Leigh, president of the Chicago Railway Equipment Company, for the purpose of showing clearly the value represented by the railway plant of the United States as compared with that represented by the investment in manufacturing industries generally; also the value of railway locomotives and cars only as compared with the value of the machinery, tools and implements used in all



Comparative Value of Railway Plant and Equipment

manufacturing industries; and also the value of locomotives and cars as compared with that of all agricultural machinery, tools and implements. Mr. Leigh's specific purpose was to emphasize the large purchases which are or ought to be made by the railways as compared with other industries.

The statistics on which the illustrations are based were taken from the United States Census report for the year 1914, the latest official compilation which gives comparable data. They were first used in graphic form by Mr. Leigh in an address, entitled "Railway Buying and Industrial Readjustment," which was delivered at the recent business conference held under the joint auspices of the Beloit (Wis.) Chamber of Commerce and Beloit College. The essential features of Mr. Leigh's address were published under the same general heading in the *Railway Age* of April 4.

Fuel Association Holds Eleventh Annual Convention

Tackles Fuel Conservation Problem in a Big Way From Both Operating and Mechanical Standpoints

With an attendance rivaling that at the memorable convention of last year, the International Railway Fuel Association opened its eleventh annual meeting on Monday at the Hotel Sherman, Chicago.

Address of President L. R. Pyle

Mr. Pyle in his opening address made a plea for economy in fuel during the period of reconstruction. He spoke in part as follows: Those who have not had a practical working knowledge of the conditions under which the railroads labored during the past year have no conception of the task which has confronted all connected with the movement of transportation. The railroads have been the backbone of our war preparation and without them we would have failed miserably.

If the railroads have been the backbone of our country under war conditions they will also be the backbone of our country during the reconstruction period. Such being the fact, it behooves every man connected with the American railroads seriously to consider just what part he is to perform during this period. We are going to be called upon to do things which at first glance appear almost impossible of accomplishment, not because what we will be asked to do is impractical, but because of the difficulty of getting others to put these things into practice. If we are the men for the job during the reconstruction period we must of necessity get results. This is going to be the measure of our ability as railroad men. Regardless of who operates the railroads during the coming year this fact is clear and unequivocal. It is going to be necessary to produce better transportation facilities, both freight and passenger, at a lower cost than ever before. Wages are at the highest point ever known. All supplies entering into the operation and construction of a railroad are higher than ever before. To offset this increase in the cost of operation, we must of necessity eliminate waste wherever it appears. You, individually, are responsible to the Railroad Administration and to your individual corporations to deliver to the best of your ability a service which will result in decreased operating costs.

There is a wide field for discussion as to how economy can be realized on the locomotive, in the roundhouse or stationary plant, by the transportation man in more efficient methods of train handling, by the mechanical man through better maintenance of locomotives and cars, by the maintenance-of-way man through better track conditions and fewer slow orders, or by the car and air brake man in maintaining the air brake system and so taking care of lubrication on railroads that we can eliminate to a great degree hot boxes, or by the yardmaster in making up trains efficiently.

The results obtained through effecting economies in fuel are far reaching and if by better locomotive maintenance we save fuel, we also assist in speeding up the movement of transportation which in turn effects other economies. We should bear in mind that practically everything done to save coal has a beneficial effect on all other angles of railroad operation. Even now operating officials do not fully realize the tremendous opportunity for a material reduction in the cost of transportation by specializing on the second largest item of expense on a railroad, namely that of fuel.

For years this association has agitated fuel conservation and although some roads have and are eliminating fuel waste through systematic efforts, we have as yet barely scratched the surface. To get the real reduction in cost that is possible and absolutely necessary for the well-being of the railroads, a more practical interest has to be shown by general operating officials and a more sincere co-operation must exist between the heads of the different departments. This does not mean that there is no interest shown by general officials or that there is no co-operation between the heads of the different departments, but there is still a disposition to continue the campaign of fuel conservation in a haphazard manner and under such conditions the maximum economy can never be attained and waste will go on continuously.

One of the fundamental principles of fuel conservation is co-operation. The manifold duties of operating a railroad are so closely associated and so delicately interwoven that even the slightest error in one department often disturbs the entire organization. A chain is no stronger than its weakest link and a federal manager can have ever so good a fuel organization but if a superintendent fails to co-operate fully there is a break in the chain and the railroad suffers. It is not so much individual effort that is needed as a practical give-and-take co-operation from the chief operating official to the smallest individual on a road.

Hale Holden, regional director of the Central Western Region, was to have delivered an address at the opening session but was unable to attend. W. B. Storey, federal manager of the Atchison, Topeka & Santa Fe, addressed the convention instead. Mr. Storey spoke in part as follows:—

Address of W. B. Storey

We who are handling the railroads are vitally interested in saving fuel. Today we must save fuel in order to get back to normal conditions. On the Atchison, Topeka & Santa Fe the fuel bill for engines alone was one third of the total transportation expenses and one seventh of the total operating expenses during 1918.

There are many difficult phases to the fuel conservation problem. If we could make fuel economy the prime consideration, the matter would be greatly simplified, but service to the public must receive the first attention. Another serious phase is the labor condition. We must handle labor differently from what we did in the past. We must get the men to do what we want by suasion. We must get them interested in these problems, keep them before the men as matters that concern them and the railroads with which they are connected. The man who succeeds is the man who runs the railroads in spite of unfavorable conditions.

Report on Pulverized Fuel

The progress report which the committee has to offer will on account of the unusual conditions which have existed consist of a summary of some results, comments and suggestions. These are offered solely with the idea that they may bring out pertinent frank discussion and constructive criticism on a very interesting engineering subject. All deeply appreciate the earnest work that has been done thus far to progress the art of burning pulverized coal by both manufacturers and those interested in effecting steam economy. There are many things about pulverized coal that we are satisfied with. There are some things that we are

not satisfied with. It is of the utmost importance that accurate analysis of this subject be made in order that progress may proceed along correct lines

As railroad interest in pulverized coal at this time lies principally in its value as a steam producer, the subject will be considered from that angle only. To date five different American railroads—the Atchison, Topeka & Santa Fe, Chicago & North Western, Delaware & Hudson, Missouri, Kansas & Texas, and New York Central—have successfully operated during test periods individual locomotives equipped for and burning pulverized coal. These tests were all made under regular service conditions, and have demonstrated that locomotives burning pulverized coal will meet the train handling conditions imposed by the different classes of service. None of the locomotives tested is in service at this time, it being necessary in most instances on account of war activity and the demand for power to remove the pulverized fuel equipment and discontinue the experiments.

Requests by your committee for information on results obtained from the tests made on locomotives were complied with. The following points from replies received are of interest:

(a) "A carefully conducted test between two engines of the same class, one burning pulverized coal and the other hand fired, showed that a saving of 23 per cent in fuel burned could be made by burning pulverized coal. The main difficulties encountered were the slagging over of the flue sheet and burning out of the brick arch. The slagging was largely overcome by an air jet to blow off the slag accumulations. A number of burner arrangements were tried, but it was found impossible to overcome the rapid burning out of the brick arch. The cost of replacing the arch brick largely overcame the saving in fuel. The delay to locomotive, replacing arch brick, was also a decided drawback.

"A comparison of total costs of hand firing versus pulverized coal firing on the locomotives tested, which include cost of pulverizing, cost of handling, cost of arch maintenance, interest and depreciation, showed the hand firing to be most economical. In fairness to the pulverized coal it was thought possible to design a firebox that would eliminate such troubles as burning out of the brick arch and show an advantage in favor of the pulverized coal."

(b) "Burning pulverized fuel was very satisfactory, had all the steam that was wanted with splendid control all the time, burning 60 per cent anthracite and 40 per cent bituminous, the bituminous being necessary to increase the volatile. The question of economy is quite another thing and unless a poor or by-product coal can be purchased at a price that will absorb carrying charges, operation, etc., of a pulverizing plant and not exceed the price of a satisfactory lump coal, it should be given careful thought. There is no saving in the quantity of fuel used when pulverized, in fact the difference is in favor of the lump coal. Pulverizing costs between 45 cents and 50 cents per ton.

(c) "The burning of pulverized coal in a locomotive was quite an easy proposition, and with us was very satisfactory. The only difficulties were with the drying, pulverizing and handling of the coal, and also the danger in connection with it. In case of a large number of engines being equipped to burn pulverized coal, were the plant to be blown up, burned or otherwise made inoperative, the locomotives would be tied up until the plant was in service again."

(d) One foreign railroad, the "Central Railway of Brazil," has made marked progress in burning pulverized coal. (See *Railway Age,* Oct. 26, 1917, page 767.)

Something like 200 pulverized fuel installations on stationary plants are in operation throughout the country, comprising central power and lighting stations, street railway power stations, power stations of various manufacturing industries, railroads, mining companies, smelters, sugar refineries, office buildings, hotels, schools, laundries, etc. These plants are reported as successfully burning all grades and classifications of anthracite, bituminous, sub-bituminous and lignite coals in the pulverized form.

The following is a quotation from the reply to inquiries sent to different parts of the country by your committee asking for results obtained from stationary plants, received from a southwestern railroad. "Our stationary boiler plant

FUEL

Kind	Wyoming Lignite
State	Powdered

ANALYSIS OF COAL

	As fired	As received
Moisture	2.83%	19.2%
Volatile	42.77%	34.3%
Fixed Carbon	49.90%	42.5%
Ash	4.50%	4.0%
B. T. U. per lb.	11,849	

11.	Total amount of coal fired	13,821 lbs.
12.	Dry coal fired	13,430 lbs.
13.	Combustible fired	12,808 lbs.
14.	Total coal fired per hour	2,032 lbs.
15.	Dry coal fired per hour	1,975 lbs.
16.	Combustible fired per hour	1,884 lbs.

QUALITY OF STEAM

Percentage of moisture in steam	3.3%
Quality of steam	96.7%
Degrees of superheat	0.

WATER

Total water fed to boiler	99,679 lbs.
Total water actually evaporated	96,390 lbs.
Total water evaporated from and at 212 deg. F.	115,547 lbs.
Water fed to boiler per hour	14,659 lbs.
Water actually evaporated per hour	14,175 lbs.
Equivalent water evaporated per hour from and at 212 deg. F.	16,992 lbs.
Lbs. of water fed to boiler per lb. of coal fired	7.21
Lbs. of water evaporated per lb. of coal fired	6.97
Lbs. of water evaporated per lb. of dry coal	7.18
Lbs. of water evaporated from and at 212 deg. per lb. of coal	8.36
Lbs. of water evaporated from and at 212 deg. per lb. of dry combustible	9.02
Lbs. of water evaporated from and at 212 deg. per lb. of dry coal	8.60

Average heat in coal 11,849 B. t. u. per lb. of coal as fired—
Heat produced per hour ..... 24,077,168 B.t.u.

Heat required to evaporate a lb. of steam as discharged from the boilers = 0.967 (1195.1 — 32.0) + 0.033 (338.7 — 32) = 1124.7 + 10.1 = 1134.8.

Total heat given to the boilers per hour = 14,659 × 1134.8 = 16,635,000 B.t.u.

$$\text{Efficiency of boiler} = \frac{16,635,000}{24,077,000} = 69.1.$$

$$\text{Horsepower developed} \frac{16,635,000}{33,479} = 497.$$

$$\text{Per cent of horsepower rating developed} = \frac{497}{330} = 151\%.$$

that uses pulverized fuel has during the past year been compelled to use a considerable amount of oil, this on account of breakdowns and other troubles, and also the mixing of oil and powdered coal. The manufacturers have for some time, in fact most all winter, been changing, overhauling and remodeling their equipment, and on two boilers we have had very little service on this account.

"I am not going to give you any figures as to the cost of using pulverized coal at our plant here for the reason that our pulverizing and drying plant has not sufficient capacity to properly take care of the demands upon it, and this requires more labor than would otherwise be necessary, hence the cost is greater and would not be a fair comparison. We have, however, kept the plant going on pulverized coal most of the time, but it has been a forced proposition."

From the above summary the following conclusions may be deduced: The development of the art of burning pulverized coal during the past two years has shown marked progress in that the experimental work done and tests made, although still incomplete, have demonstrated the apparent soundness of the principle of burning coal in a finely divided form in suspension, and that the complete commercial success depends upon the further careful working out of such details as correct determinations of proper fineness of the

rious grades of coals and economical and efficient meth-ls and apparatus for preparing, storing and transporting e pulverized coal to the stationary plant or locomotive rnace.

It has not been clearly established that coal ground to e extreme fineness and dried to the extent recommended most of the supporters of pulverized coal best meets the nditions of the practical user operating under widely di-rsified conditions. The tendency of explosion and spon-neous combustion, which is always present in coal of this aracter, should be eliminated entirely if possible to do so. he tendency of reabsorption of moisture in containers and nsmission piping in stationary plants and at coaling sta-ons of railroads will always be a problem in climates hav-g extreme variations of temperature and humidity. Ex-riments should be made to determine if thoroughly air ied coal ground to the fineness of say coarse granulated gar and burned in suspension in specially designed fur-ces will not produce greater over all economies.

Further, in so far as the use of this kind of fuel on loco-otives is concerned, it seems advisable to give more care-l consideration to the individuality of the flexible steam comotive as it exists today. It is not without the realm possibility that a pulverizing and stoking device might arranged that would prepare any grade of coal on the nder and deliver it to the firebox in the pulverized form, us eliminating all of the expense incident to preparing d transporting pulverized coal from a central plant, which ings create a great deal of doubt about the success of lverized fuel at the present time. The same thing would so apply to a stationary plant in a modified form.

Much ill-advised engineering work and experimenting has en done and some snap conclusions have been rendered thout careful analysis of the problem and without doing very essential laboratory work necessary to establish ndamental facts. Some hurriedly prepared and conducted ts with incomplete and inadequate facilities and equip-nt have been made, particularly on locomotives on busy lroads during periods of heavy traffic movement. Such ts are more or less void of results, not only from lack of paration and facilities, but also because employees cannot e them proper attention. For these reasons also adverse inions and doubt about pulverized fuel prevail in the nds of many.

It does not seem that we are using the laboratories of our at universities to a sufficient extent. Many of these uni-sities have very thoroughly equipped laboratories, and uld and gladly would thoroughly thrash out all of the hnical questions and lay the foundation for reasonably erative devices before making field applications.

It is particularly noticeable in the reports of pulverized l tests received by the committee that practically all dealt h fuel economy only and with a deluge of figures and at balances" conclusively proved fuel economy to every-ly's satisfaction. Not enough has been said about "cash ances." In this respect conclusive evidence is lacking out pulverized coal, at least in so far as your committee s been able to develop after careful inquiry. This has n disappointing. We hope for some reliable statistics in near future that will dispel all doubt that now exists on s important matter.

There is little or no question about the ultimate practica-ty, efficiency and economy of burning coal in a finely ided form, both in stationary plants and locomotives. develop this fact to a practical conclusion requires thor-h co-operation of both manufacturer and user and it is gested that in view of the immense supply of bituminous, uite and other grades of coals of various characteristics uliarly adapted to the pulverized method of burning, t as soon as business conditions again adjust themselves, the railroads, with the assistance of manufacturers and universities, make the necessary conclusive and exhaustive tests and develop the fixed principles of methods and apparatus necessary to successfully meet the very urgent demands for vastly more economical burning of coal. This is not a question of self-interest of either manufacturer or particular industry. It is one of national interest and urgency.

The report was signed by W. J. Bohan (N. P.), chairman; H. T. Bentley (C. & N. W.), H. B. Brown (L. V.), R. R. Hibben (M., K. & T.), D. R. MacBain (N. Y. C.), J. H. Manning (D. & H.), H. C. Oviatt (N. Y., N. H. & H.), John Purcell (A. T. & S. F.) and L. R. Pyle (U. S. R. A.)

Discussion

J. E. Muhlfeld (Pulverized Fuel Equipment Corporation) submitted a written discussion in which he took issue with some of the statements in the committee's report. He stated that the practicability of burning powdered coal had been established, and asserted that it was necessary to develop it in order to increase the efficiency and the capacity of the locomotive, to decrease the cost of fuel, to permit of using coal of poor quality and to eliminate smoke and soot.

A. G. Kinyon (Fuller Engineering Company) submitted records of numerous pulverized coal installations and reports of tests showing the high efficiency of boilers fired in this manner. Several speakers called attention to the fact that troubles similar to those experienced with pulverized fuel had been encountered in the period of development of practically all the accessories used on locomotives

M. C. M. Hatch (Pulverized Fuel Equipment Corporation) expressed the opinion that the crux of the matter lay in the design of the locomotive furnace. Large furnace volume is needed for burning pulverized fuel and no locomotive has yet been built with the proper design of furnace for this fuel. Stationary installations, where proper care is taken in designing the furnace, are uniformally successful.

The association decided that an effort be made to secure co-operation from Purdue University, the University of Illinois and the Bureau of Mines with a view to solving the problem of burning pulverized coal.

Teamwork of Enginemen and Firemen

By M. A. Daly

General Fuel Supervisor, Northern Pacific Railroad

Engine crews dispose of nearly all of the coal used on the railroads of the United States. Approximately 95 per cent of all railroad coal passes through their hands. Nearly 130,000,000 tons of coal will this year be mined, hauled and placed on the tenders of locomotives. Into the locomotive fireboxes about $434,000,000 worth of coal will be shoveled.

Some of the coal mined for the locomotives will not be delivered to the tenders, some of the coal delivered to the tenders will not be thrown into the fireboxes, and some thrown into the fireboxes will not be burned. Coal will be lost from cars en route from mines to coal docks, coal will be lost off the side rails, decks and end sills of the tenders, and unburned coal will be lost through the grates and through the smokestacks. A large percentage of those losses are avoidable. Just how much, however, may always be an unknown quantity. Nevertheless, many railroads are now recognizing that such losses are enormous, and that partial prevention is easily possible.

The value of a ton of coal may be carelessly considered in railroad operation, but the cost of each ton will inevitably take its deliberate bite out of the current operating revenues. Each morning in the United States 65,000 locomotives stand ready for service. At the close of each day $1,190,000

worth of locomotive coal has been turned to ashes. Every ton of the coal contains a definite amount of potential drawbar pull. How much of it is actually utilized in pulling cars will depend largely on the condition of the locomotive, the manner in which it is operated, and the skill with which the coal is placed on the firebed.

When a locomotive is properly maintained, properly operated and properly fired, it will not only require the least possible amount of fuel, but it will also deliver the highest possible character of service. All three of these points are of direct concern to road foremen and traveling engineers. In fact, these points embody the chief part of the work of those officers, for most railroad executives now hold that the principal duties of road foremen and traveling engineers are to develop economy in the use of fuel. Economical fuel operation is a mark of good railroading. It may be possible, perhaps, to have economical fuel operation without good railroading, but no more is it considered to be good railroading unless there be economical fuel operation.

The locomotive is not a one-man machine. Its operation requires two men. One is occupied in converting water into steam, while the other is manipulating valves which permit the steam to do the work desired. The two men work at the same time. It may almost be said that the steam is being used at the same time that it is being made. There being a limit to the steam storing capacity of the locomotive, when the engineman stops using steam the fireman stops making it. At least such should be the firemen's aim. The fireman should have advance information of the approximate time of closing the throttle, so that he may control the fire accordingly. The engineer should know that the fireman has this information and that he is guided by it.

Similar information should be common knowledge before starting trains. In this case coal should be placed on the fire a short interval before the locomotive is worked heavily. The successful engineer closely supervises the firing of the locomotive, especially at this time of the trip. The fire must be properly prepared and built up to anticipate the conditions to be met.

This business of fire preparation and fire control, like preventing the waste of coal that works out and drops off end sills of tenders, is the work of the fireman, but it is the engineer's responsibility to see that he does it. When you have an engineer who sympathetically and intelligently supervises the firing of a locomotive, you soon have a fireman who becomes more careful in his work. This, of course, is teamwork. Perfect teamwork is easy to recognize, but difficult to develop. First of all it requires the proper state of mind in the engineer. The engineer must be made to feel his authority and responsibility in directing the work of the fireman. This assumes the full support of his immediate superiors, especially road foremen and master mechanics, and in addition, the full support of their superiors.

It is common knowledge that locomotives make trips on which several tons of coal more are consumed than on other locomotives of the same class, on similar runs, in the same service, over the same piece of track, by other crews. The difference in consumption is in the condition of the locomotive or in the work of the engineer or fireman. Habitually close supervision of the fireman makes it much easier for an engineman to suspect that an engine is getting a little "off" on steaming qualities, when he may proceed to locate the trouble and have it remedied.

There is nothing new about these considerations. Teamwork is universally desired. To realize it is the thing for accomplishment. We all acknowledge the existence of irregularities in practice. These should be removed. This paper was written to ask you to give your opinions and convictions as to how these irregularities may best be removed, after we go back to our respective railroads.

Locomotive Fuel Losses at Terminals

By J. M. Nicholson
Fuel Supervisor, Atchison, Topeka & Santa Fe Railroad

The fuel consumed by locomotives while in terminals is an incident of operation which requires a variable amount of fuel and has been given too little consideration for the quantity involved. The engineer and fireman, who are with the locomotive while from 75 to 90 per cent of the fuel is burned, have been charged with being very wasteful. The remaining 10 to 25 per cent is burned at the terminal in getting the locomotive ready for service and taking it to the enginehouse, much of which is the result of wasteful methods and practices.

Locomotives must be moved from yards to cinder pits, have the fires knocked, and be put in the house in order that necessary repairs can be made. They must be fired up and tests of locomotive auxiliary appliances properly made, after which they must be moved from the roundhouse to the train. These essential activities of operation require the use of fuel, but the fuel used in addition to that required for these purposes must be considered as waste.

When a locomotive is brought to a terminal the fire should be burned down to such a point that it will not be necessary to rebuild the fire in order to get the water level in the boiler to the proper height before knocking the fire. The dampers on oil burning locomotives and also coal burning locomotives, so equipped, should be closed as soon as the work at the cinder pit is completed and the blower shut off to reduce circulation of air through the boiler.

The roundhouse capacity should be such that no delay will be caused in getting the locomotive into the house. When a locomotive reaches the house a competent inspector should enter the firebox and see that the flues are clean and free from leaks. The arches must be clean and in repair. The grates must be thoroughly cleaned, and grates having broken fingers or excessive openings repaired or removed. The ash pans must be thoroughly cleaned and special attention given to see that the air opening under the mud ring is cleaned. The front end should be inspected to see that it is self-cleaning and free from air leaks.

As soon as the boiler and grate work is completed the grates should be bedded down with from three to four inches of coal evenly distributed over the entire grate area. The coal which falls through while bedding down the grates should be reclaimed. Tests show the coal reclaimed will vary from 80 to 200 lb. per locomotive, depending on the size of coal used and the amount of surface moisture on the coal. The coal can be reclaimed by collecting it in a bag fastened to the ash pan slide and removing the bag as soon as the grates are bedded down, or at larger terminals a pit on the outgoing track can be used for dumping this coal and conveying it into the car. A terminal handling fifty locomotives per day will conserve from fifty to one hundred tons per month by reclaiming this coal.

In case the boiler is to be washed, the heat in the boiler is entirely wasted unless the roundhouse is equipped with a hot water boiler washout system. A plant of sufficient capacity, if properly maintained and operated, will reduce the time consumed in the operations of washing boiler from 25 to 50 per cent and reduce the amount of fuel used in firing up from 25 to 30 per cent. The saving of from two to three hours' time in getting the locomotive back in service is an important factor under present operating conditions, as is also the saving of from 600 to 700 lb. of coal per locomotive.

In many cases where boilers are not due to be washed out engines are allowed to stand in the roundhouse twelve to fifteen hours before the time set for the locomotive to leave the roundhouse. During this time the heat in the boiler has been passed out through the stack unless a stack cover

is used or the dampers closed to prevent circulation of air through the boiler. This heat waste can be found in practically every roundhouse, and results in several tons of coal per locomotive being wasted each month. The time required to furnish a locomotive is greatly influenced by the pressure maintained in the roundhouse blower steam line. Insufficient pressure results in the use of more coal in firing up a locomotive and decreases operating efficiency. The use of old ties, old car material, shavings, etc., will reduce the amount of coal consumed and should be used where practicable.

The chief despatcher should furnish the roundhouse foreman with a list of trains that he expects to run and the roundhouse foreman should furnish the despatcher with a list of locomotives he expects to have ready. The exchange of these lists three times in twenty-four hours is advisable, after which the locomotives should be ordered for a scheduled leaving time, giving the roundhouse the necessary time to fire up the locomotive and call the engine crew. This will avoid holding locomotives under steam in cases where trains are set back or cannot be run according to the lineup. In cases where locomotives are fired up as soon as the work is completed and allowed to stand under steam for seven hours, the fuel wasted is equal to the amount of fuel that is necessary to furnish the locomotive for service. This is not an uncommon occurrence where despatching schedules are not in effect and given close supervision.

The wages paid for one hour's terminal delay on a freight train is a loss equivalent to the cost of one ton of coal, also eight locomotive hours under steam in addition to the time actually necessary to get the locomotive ready for service is a loss equal to the value of a ton of coal. Every locomotive on a division is burning some fuel at the terminals that is unnecessary, and many locomotives are burning before each trip fuel of greater value than the loss of wages paid for one hour's terminal delay. If this loss were given as close supervision as is given the wages paid for terminal delay, the cost of transportation would be reduced. Superintendents should know personally that locomotives are not being held under steam unnecessarily on their division and that co-operation in despatching locomotives does exist.

The fuel that is consumed as a result of lack of facilities for handling is a costly proposition, and adequate roundhouse and shop facilities should be provided. Repairs to turntables, roundhouses, coal chutes and tracks at the terminal should be made before cold weather sets in, as it may result in congested single track movement at coal chutes and cinder pits or tie up the entire roundhouse, all of which waste fuel. Proper care of a fire in the roundhouse contributes to economic locomotive performance on the road and also reduces the amount of fuel used at the terminal. The locomotive appliances should be tested out before leaving the roundhouse for the train to see that they are in the best possible condition to do their work, which means a saving of fuel on the road that, in most cases, cannot be accomplished after leaving the terminal. The train line leakage should be determined and the leaks repaired at the terminal. Train line air leaks cost a railroad company much more than it costs to repair them.

Locomotives should be maintained to prevent serious steam, air and water leaks. Throttles leaking, pops leaking and air pumps running in the house are to be avoided. All of the operations at a roundhouse contribute to fuel economy, and men should be impressed that neglect on their part often results in a waste of fuel greater than their day's wages before the locomotive reaches the next terminal where proper repairs can be made.

The amount of coal required for the period of firing up a locomotive and getting it ready for service under careful handling should be determined. The actual consumption against the required consumption is the fuel efficiency of the despatchers and the roundhouse organization. This efficiency is not a maximum, even on the best managed and best equipped roads. The magnitude of the amount of fuel involved in these losses should provide a strong incentive to renewed effort in fuel conservation as these conditions of fuel waste are decreasing operating efficiency and increasing the cost of transportation.

Discussion

Considerable discussion was brought out relative to the maintaining, banking and knocking or dumping the fires in locomotives brought into terminals, and also the use of covers or dampers on locomotives for fuel saving purposes. F. P. Roesch, fuel supervisor of the Northwestern region, stated that tests which were made on roads in the Northwestern region showed a saving in fuel by maintaining the fire in the locomotives brought into terminals when they remained for a period of eight hours. For locomotives remaining in for a period of 16 hours, a saving was accomplished by banking the fires. For those locomotives remaining in for a period of 24 hours or more, the fires should be dumped or knocked. He said further that good results had been obtained on some roads by using stack covers, but these should be provided with holes to permit some circulation.

S. Bisbee, fuel supervisor on the Boston & Albany, stated that his experience showed that the locomotives had to be turned over so rapidly for further use that they were not able to dump the fire and that he did not believe in dumping fires unless the locomotive remained in for a period greater than 30 or 36 hours. He also rather questioned the advisability of stopping the stack with a cover or damper with a fire in the locomotive. He further stated that firemen should estimate the amount of fire required in the locomotive for the maximum amount of work the locomotive may be expected to do when brought into a terminal. Another speaker stated that it was the practice of one road to prepare a weekly statement to show an estimate of how much coal would have been burned had the fires not been dumped or banked. Recent estimates showed that approximately 2,000,000 lb. per week would have been burned.

J. J. McNeill, supervisor locomotive operation on the Erie, stated that fires should be banked when locomotives are in the terminal less than 20 hours and dumped when they are to remain in for a longer period and also that considerable saving in fuel could be had by proper banking. He further stated that in making tests the results should be reported not only to the officers but also to the men who help to make the tests. In this way a system of co-operation of considerable benefit is brought about.

What Can a General Operating Officer Do to Promote Fuel Economy?

By F. H. Hammill

General Superintendent, Northern District, Union Pacific Railroad

This country in the last century has made wonderful progress along all lines, and no phase of this development has been of greater magnitude or of more importance than that of transportation. When we stop to think that within practically a lifetime there have grown up lines of transportation extending over 260,000 miles, spreading through nearly every county in every state in the Union; when we stop to analyze the tonnage that must be handled over these lines, and that the figures indicate that the increase in tonnage handled in one month of the year 1917, over that of the corresponding month of the previous year, was greater than the total gross tonnage handled by the railroads of England, France, Germany and Switzerland, it brings out somewhat the

magnitude of the transportation problem in this country.

At our last annual meeting one of the prominent mechanical men of the country, while addressing this society, stated that we "were to be congratulated for the privilege of living in this age and at this particular time. There never was a time when history was being made so rapidly, when men were doing so much, nor when so much was required of them." When we stop to fully analyze this statement, how truly it applies to the transportation problem! The founders of our government, when encouraging the enterprise of linking the ends of this country together, little appreciated the great value, especially in times such as we have just passed through, of adequate transportation facilities, manned by well trained, experienced officers and men. Until this critical time arrived, the coal producer hardly appreciated the value toward increased production and the financial success of his property, of a well equipped and well managed transportation department. This same thing was true of the manufacturer, the wholesaler, the retailer and the producer of every known commodity.

The past few months have been very profitable in bringing home to those requiring transportation its value in the development of their business. Likewise, the same recent months' experience should, and I feel has, brought closely to the mind of those directly in charge of transportation their responsibility for transportation, and their duty toward the public in giving the benefit of their years of experience toward developing the maximum transportation facilities.

It is an unquestionable fact that during the past few years men in charge of transportation properties in this country have been confronted with many difficulties and sometimes most discouraging problems. They knew from their years of experience and their ability to anticipate just what would be required in the way of added facilities, effort and financial requirements. On the other hand, they were confronted by difficult problems, which prevented them from conducting their plans as their experience and knowledge best dictated. We, therefore, confidently feel that the past few months have been of great benefit, not only in the development of a realization of the importance of reliable transportation facilities but also in bringing out what each individual connected with transportation owed to the public and to his country in developing the best, most reliable and yet cheapest transportation facilities that could be produced, in order that business might expand and our country continue to prosper.

The future, as we see it, is going to present even greater problems to the management of our railroads. Expenses in the way of labor charges are pretty well fixed and will permit of little reduction for economy. Prices of material will continue on a much higher level than in previous years. On the other hand, the public has learned the value of and the need for the best of transportation, and is going to be insistent on its requirements being met. The problem must resolve itself, therefore, into the development of every avenue of legitimate economy through more detailed study of every item of expense of railroad operation.

Records clearly show that next in importance to labor expense is that of fuel. When we recall that in the year 1917 there was produced in the United States approximately 621,000,000 tons of bituminous and anthracite coal, of which about 175,000,000 tons, or 28 per cent, was consumed by railroads, this statement cannot but bring home very forcibly the duty of the general transportation officer in promoting fuel economy.

A properly organized fuel department, having the lively interest and co-operation of the operating department, can, through careful study of all the details, be productive of very noticeable financial returns. It is our judgment that the question of fuel conservation presents one of the most important and necessary avenues for needed economy. It should and properly does bring forcibly to the minds of general operating officers what they can and must do to study this problem in order that we may avail ourselves of this needed economy.

Discussion

The discussion of this paper dealt largely with the question of establishing co-operation between the various departments and the men in the ranks by means of educational and co-operative meetings. A. D'Heur, manager fuel oil department, Southern Pacific, stated that staff meetings are being held on that road every 30 or 60 days which are attended by the enginemen who have the best fuel records according to the performance sheets. He stated that the tendency has been to create better co-operation and a greater interest among the men in their work. He presented the following figures to show fuel savings during the past few months on one division: January, $9,321.00; February, $12,950.00; March, $17,485.00.

Certain Essentials

By Eugene McAuliffe

Manager, Division of Operation, Fuel Conservation Section
United States Railroad Administration

I wish today to say a few words on certain compelling features, which if attended to will accomplish more in one year towards effecting fuel and operating economies than has been accomplished in the past five years. Briefly, the outstanding essentials of the railway fuel problem, as I see such, are:

Clean Coal. Buy clean coal, get clean coal. There is not a coal contract in existence that does not suppose the delivery of the cleanest coal that the particular mine from which the purchase is made is capable of producing. Do not ask from the coal producer the impossible, but insist on the possible. Tests have proved that with coal containing 12.5 per cent of ash taken as 100 per cent, the relative efficiency falls as the ash increases until coal with 40 per cent of ash marks a total lack of efficiency. At the mine face or on the mine tipple, is the place to clean coal. The excess and removable non-combustible matter can be separated cheaper there than in the locomotive fire box. Let the producer do the cleaning, such is a proper part of the cost of production. I have found on a majority of roads an insufficient and frequently untrained inspection force. The roads which most need an inspection force are most lacking in this respect. Ninety-nine per cent of the coal operators, all that are worth considering, will appreciate the help that an intelligent inspection force can give them. Good inspection supposes many things, including contract, quality, weights, clean equipment and proper class of equipment.

Distorted Valve Motion. The next cheapest thing we can do is to organize the work of establishing and maintaining a proper distribution of the steam made from the coal purchased. I commend to your attention the paper written by J. W. Hardy, on fuel losses due to defective valve motion, then read the circular just issued and immediately proceed to carry out the simple recommendations therein contained.

Air Leaks in Locomotive Front Ends. On August 1, 1918, the Fuel Conservation Section issued Circular No. 8 calling the attention of motive power men to the fuel losses that result from air leaks in locomotive front ends, particularly, those that surround the steam pipes where they leave the front end. The recommendations contained in this circular were followed in some instances; in others, ignored. A locomotive suffering from front end leaks invariably fails unless her guardians have compromised with her cost of keep and earning power by choking the nozzle.

Distorted Draft Apparatus. A limited survey of the interior of locomotive front ends can be easily made by looking down into the stack when the engine is cool, using a common flash light. This casual inspection, if made, will astonish many of you. Here again we lack organization and method. Distorted draft apparatus invariably indicates shiftlessness.

Stopped Up Flues, Grates and Ash Pans. Another essential has been covered briefly by the recent Fuel Conservation Section circular dealing with stopped up flues and choked superheater unit tubes, choked air openings in grates, and restricted air inlets in ash pans. An insufficient air opening in the ash pan represents a defect in design; the rest represents defects in execution. These conditions again result in the application of the well known remedy, choking the exhaust nozzle, with the result that the engine struggles part, or all the way over the division, at the expense of the fuel bill, delaying the reduced tonnage handled, with corresponding delays to opposing trains which are sidetracked at meeting points to wait for the crippled engine.

The Superheater. Another essential I wish to speak of relates to the proper maintenance and handling of what is the most substantial fuel saver ever put on the American locomotive, i. e., the superheater. The purpose of the superheater is to conserve fuel and water, and to increase the general efficiency of the locomotive. In some instances, this result is obtained to the extent of 100 per cent, the measure of efficiency shading off in other cases until the apparatus is frequently not able to absorb the load of improper locomotive maintenance put on its shoulders. Certain engineers carry water levels so high as to transform the superheater into an evaporator, getting the train over the road at the expense of much fuel and a few additional tanks of water. We have found superheater units not only improperly installed, but poorly maintained, and often they are not tested with sufficient frequency to locate the steam leaks that occur in the front end when the engine is working. The Fuel Conservation Section recently issued a circular on superheater losses; they deserve your best attention.

Back Pressure Losses. A condenser cannot be used on a locomotive and the limitations that surround the locomotive necessitate a restricted exhaust in order that a sufficient rate of combustion can be maintained with a relatively small boiler, generating many hundreds of horse power. Under the conditions that commonly obtain, of all the fuel that is used in the locomotive, only about six per cent is available for use in moving freight or passengers. Excess back pressure losses, therefore, apply against the 6 per cent saved for tractive purposes. Under the circumstances, why cripple the locomotive by choking the exhaust to offset lack of proper adjustment of draft apparatus, the closing of air leaks in front ends, the cleaning of tubes, super-heater flues, etc.?

The Old Type of Locomotive. Many of us began with the Eight wheel type of locomotive with low steam pressure and small firebox and grate area. These little engines had no fuel saving devices but they played their part in the greatest peaceful drama the world ever saw, the building of the Western Empire. Too many light locomotives have been scrapped in the past, instead they should have been modernized and kept in service suited to their capacity. In many instances locomotives too heavy for the job are employed to the detriment of train mile costs and the permanent way. The fuel saving attachments developed in recent years, with the exception of the compound air pump, only earn when the locomotive is moving, and it is very probable that improvements of the above character, if applied to the existing light locomotives now lacking them, would pay an equal or greater return than is being received from their application to the more modern locomotives. We frequently overlook the fact that the heavier types of locomotives, of which these devices are considered an essential part, makes a lower average mileage than the lighter, and consequently more mobile type of locomotive.

In conclusion, I wish to suggest the absolute importance of bringing every locomotive now in service, or that will be required for the service, up to the maximum standard of efficiency. I have been told that the work of applying superheaters and brick arches under order, and in some cases, in stock, has been held up on certain roads because of insufficient funds to apply them. This is unfortunate, and I trust the condition will be quickly remedied.

Dirt in Coal

By L. J. Joffray
General Fuel Inspector, Illinois Central Railroad

The ash content in coal varies widely in different localities and frequently there is considerable variation in the same locality under different conditions of mining and preparation. The normal amount of ash may be considered as that found in the face sample of the seam proper; the excess ash is that which is added to the coal from the roof or bottom in the process of mining and which is not eliminated before the coal leaves the mine.

Lump coal made over an inch and a quarter (1¼ inch) screen usually shows the normal per cent of ash, while the inch and a quarter (1¼ inch) screenings in most cases shows one and one-half times the percentage of ash contained in the lump.

The ash content in screenings can be reduced nearly to that of the screened lump by the use of a jig gravity washer, with an ample water supply and a convenient place to deposit the refuse. However, the washing of screenings has been considered too expensive while the price of all coal was low, but since prices have gone 60 per cent and more higher, and will probably remain so, it may be well, and at the same time profitable, to eliminate the excess ash by washing in the vicinity of the mines, thereby saving the use of cars for and the long haul on inert material to points where coal is finally consumed, the cost of which would be about six mills per ton mile.

The following table showing ash and B. t. u. content of coal from a bituminous mine in the central west district illustrates how the ash content of screenings can be reduced by washing:

Coal from one mine in Central West—	Ash	B.t.u.
Dry or unwashed screenings	22.61%	8.895
Washed screenings	14.05%	10.085
Lump	12.39%	10.499

The excess ash in mine run and prepared sizes, made over an inch and a quarter screen can easily be removed by hand by the miner at the working face when loading into mine cars, or by having men or boys working on picking tables or belts while the coal is passing to the railroad car.

The performance of this work can be looked after by a regularly assigned fuel inspector. We are using a system of close inspection with suggestions to the mine superintendents on the ground while the coal is being loaded. As a result of this effort, the impurities removable by hand picking and based on actual carload tests have been reduced from an average of 2.733 per cent in the year 1911 to an average of 1.535 per cent in the year 1917, or a net reduction of 1.198 per cent which applied to a consumption of 4,000,000 tons of coal used annually represents 47,920 tons less ash, requiring the use of 958 fifty-ton cars to move it. The transportation cost of moving this excess ash an average distance of 266 miles, based on an "out of pocket" cost of five mills per net ton mile, equals $63,733.60 per annum. This, however, is but the lesser saving.

Taking the established estimate of increase in efficiency of 1½ per cent for each reduction of 1 per cent in ash, the saving from this source, i.e., increased evaporative efficiency, with coal at a delivered price of $3.68 per ton equals $204,518.40, or a total saving of $328,252 per annum. What the measure of the economies following from reduced engine failures and reduction in enginehouse expense amount to are difficult of computation.

Elements of Ash

The effective combustion of coal depends largely on the nature and per cent of impurities it contains, especially so if the ash has a tendency to clinker, which is dependent on the percentage of silica, iron and lime in its composition. Tables I and II give analyses of coal and ash used in ten burning tests from ten different mines in Illinois and Indiana.

TABLE NO. I

ANALYSES OF COALS

Test number	Moisture, per cent	Volatile matter, per cent	Fixed carbon, per cent	Ash, per cent	Sulphur, per cent	B. t. u.	Clinker?
1	3.37	31.31	55.19	9.63	.64	12,325	No
2	6.02	30.00	53.50	10.30	1.30	12,136	No
3	4.61	31.35	54.05	10.00	1.19	12,368	No
4	2.92	33.10	51.25	12.73	2.96	12,389	Yes
5	4.99	39.22	43.99	11.80	4.43	11,768	Slightly
6	3.41	37.12	45.62	13.85	4.02	11,842	Yes
7	5.13	37.70	44.31	12.80	4.52	11,693	Yes
8	2.86	36.04	43.14	17.96	4.58	11,124	Yes
9	8.49	34.87	48.16	8.48	1.47	12,251	No
10	4.68	38.59	44.24	12.49	4.50	11,921	Yes

TABLE NO. II

ANALYSES OF ASH

Test number	Sulphur (S) per cent	Silica Oxide (SiO_2) per cent	Iron Oxide (Fe_2O_4) per cent	Aluminum Oxide (Al_2O_3) per cent	Calcium Oxide (Lime) (CaO) per cent	Magnesium Oxide (MgO) per cent	Color of ash
1	.64	59.0	3.1	31.0	5.6	1.3	White
2	1.30	55.2	8.3	26.6	7.3	1.3	White
3	1.19	56.1	8.1	27.2	5.4	.9	Light gray
4	2.96	45.4	25.3	16.9	11.6	.8	Reddish gray
5	4.43	49.1	32.2	13.5	4.5	1.4	Reddish gray
6	4.02	35.1	22.4	10.2	30.8	1.5	Reddish gray
7	4.52	43.3	24.1	9.0	19.9	1.2	Reddish gray
8	4.58	44.8	20.3	18.6	16.4	1.5	Reddish gray
9	1.47	45.8	20.2	28.3	5.4	0.0	White
10	4.50	27.1	52.3	14.1	4.4	1.2	Dark gray
Fusing tem. deg. F.	239	3227	2840	3416	3452	3882	.....

Table I gives the usual proximate analyses of the coals. Table II gives analyses of the ash. By referring to the column showing the clinkering and non-clinkering coals and then making a review of the ash table, we observe that the coals with non-clinkering ash are low in both sulphur and lime. In burning they did not clinker in a dazzling white fire of an approximate temperature of 2,900 degrees F., while the ash in the clinkering coals fused at a firebox temperature of approximately 2,200 degrees F., which indicates clearly that when the sulphur and lime content exist in high proportion to the silica, iron and aluminum oxides, it is the direct cause of the ash fusing at the lower temperature.

The bottom line of Table II shows the fusing point of the sulphur and the different oxides. From this it will be seen that by taking each element separately the fusing point is at a higher temperature than is usually obtained in the furnace of a boiler. However, by combining these elements in proper proportion with the sulphur, fusion at a much lower temperature will take place.

The conditions of these ten experiments as to draught, etc., was identical in each case. However, I have since observed that either one of the coals containing the clinkering ash will give better results both as to combustion and reduction of slag in the ash by increasing the draught, which increases the flow of air through the fire bed and has a tendency to keep the temperature of the fire below the fusing point of the ash. Hence it is always good policy to assign the clinkering coals to a lower class of service, as switch engine, local freight, and other light runs.

Address of Frank McManamy

Under the law the position of the Railroad Administration is in many ways analogous to that of a tenant, the landlord being represented by the corporate interests. The landlord whose rental is fixed (in this case by Act of Congress) naturally hesitates to make extensive and expensive improvements which do not have the effect of increasing his revenue regardless of the saving they may effect for the tenant; for that reason more than for any other it is necessary for us to do our very best to make our savings with the equipment, with the facilities and with the organization we now have.

It is comparatively easy to make a substantial saving in the cost of locomotive fuel by wholesale application of recognized fuel saving devices as for example, the brick arch and the superheater, and the Railroad Administration is in favor of such improvements and has worked out a very definite program along that line. Unfortunately, however, the application of these devices involves charges to capital which must be borne by the railroad corporations and probably for the reasons stated, the acceptance of these charges by the corporation is not always easily obtained; therefore, the progress being made in this direction is not entirely satisfactory. But even if we are denied the privilege of installing those improvements which we know will effect fuel economy there is no reason why we should not maintain in as thoroughly good condition as we know how these devices with which locomotives are equipped, nor is there any reason why we should not make every effort to save fuel by eliminating all waste of steam and water.

Broadly speaking conservation of fuel from the Railroad Administration standpoint requires careful supervision by the Fuel Conservation Section and close co-operation on the part of practically every department in the Railroad Administration, and in this the International Railway Fuel Association can be especially helpful. Fuel economy like practically all other economies is not as a rule accomplished by saving one huge sum, but the huge sum which it is possible to save is made up of the accumulated results of many small and what may sometimes appear as insignificant items. We gain nothing from conventions unless we make use of the knowledge obtained. It is comparatively easy to attend a convention of this kind, participate in the discussion and bring out some of the most valuable points in connection with conservation of fuel during a three or four days' session, but it requires real courage and perseverance as well as enthusiasm to go back home and for the remaining 360 days of the year consistently and persistently practice what we preach here.

Conservation of fuel is one of the important matters before the Railroad Administration during the period of government control and will be no less important when that period has passed. It is the desire of the administration to have the sympathetic co-operation of the International Railway Fuel Association and all of its members as individuals in effecting what will make for the conservation of fuel. It is the desire of the administration to co-operate with the members of the International Railway Fuel Association in everything that relates to the purchase, inspection, weighing, distribution, handling and accounting for fuel, as well as in its economical use to bring about the greatest possible saving.

The Railroad Administration will aid in every possible way by urging the proper maintenance of locomotives, the application of fuel saving devices and otherwise modernizing them and will be helpful in every other way that a central organization can be helpful under the present method of operation, but if we are to be successful we must have team work in getting the very best we can out of what we have got.

[The report of the proceedings of the convention will be continued in next week's issue.]

New York Railroad Club Has Foreign Night

Papers Presented by Heads of Russian and Japanese Railway Commissions and on the Lines in Bolivia

The New York Railroad Club at its monthly meeting on May 16, introduced a new idea in railroad club activities by having a program of speakers on railway conditions in other lands. Papers were presented on railway conditions in Russia by A. I. Lipetz, chief of the Russian Ministry of Ways and Communications in this country; on the railways of Bolivia by Philip W. Henry, vice-president of the American International Corporation, who was at one time president of a company which constructed many miles of railway in that country; on Japan by K. Yamaguchi, an officer of the Japanese Imperial Government Railways and at present the resident representative of that system in New York, and by Fred Lavis, consulting engineer of the American International Corporation who presented stereopticon views illustrating railways in Spain, Mexico, Argentina, and Colombia, in all of which countries Mr. Lavis has been engaged in railway construction work. A large attendance at the meeting evidenced the interest which railway and railway supply men are showing in export trade.

Abstracts of the papers follow:

The General Railway Situation in Russia

By A. I. Lipetz

Chief, Russian Ministry of Ways and Communications in the United States

The Russian Railway system, before the war, comprised 43,810 miles of line, or only a little more than one-sixth of the mileage of the railways in the United States. It is noteworthy, however, that it had the second largest mileage of any country in the world. Of the 43,810 miles in Russia, 36,540 was in European Russia and 7,270 miles in Asiatic Russia. The latter mileage included four principle roads—the Trans-Siberian, the Amur Railroad, the Tashkent and the Middle Asiatic Railroad. In addition, there were a few roads of lesser importance, such as the Orsk, Troitzk, Altai, Kooloondine, Kolchooghin, Atchinsk-Minoosinsk and Southern Siberian. These roads are each from 120 to 450 miles in length and some of them are under construction. In using the expression "of lesser importance," I mean to say that they are not trunk lines as are the first four mentioned. Still they are of great value as feeding lines and for connecting the trunk lines with rich territories in Siberia.

The greater part of the mileage—36,540 miles, as above noted—is in European Russia, excluding Finland, but including Russia proper, part of Poland (so-called Russian Poland), Lithuania, Ukrainia, Crimea and Caucasus. About two-thirds of the entire Russian system belong to the government and one-third to private companies, but even the privately managed roads have been under government control, in so far as the technical operation and the tariff regulations are concerned, and, to a certain extent in regard to administration and financial operations.

During the six years just preceding the war (1908-1914), the Russian railroads were very much improved. From a system which was a burden to the government treasury, it was turned into a system making a considerable profit. Many new lines, governmental and private, were constructed during that time and very considerable improvements were made in the rolling stock, in the methods of operation, and in the regulation of traffic. Since 1912, all new railroads have been constructed in accordance with a plan which had been very carefully worked out in advance and which took into consideration the proper development of the country and of its rich territories and also such problems as the colonization of uninhabited regions in Russia. In 1916, during the war and a few months before the revolution, a new plan was adopted, including provision for railroads which were to be built in the five-year period (1917-1922), and in a succeeding five-year period from 1922-1927, and also railroads for strategical purposes. An appropriation of three billion roubles (one and a half billion dollars) was made by the Duma for the railroad construction during the first five-year period.

Equipment

The Russian railroads had 22,700 locomotives which were of good design and workmanship, as heavy as the bridges and the roadbed would permit, and equipped with the more modern improvements which have been generally adopted. For instance, in 1910, 570 locomotives or 2.5 per cent of the total number of locomotives were equipped with superheaters, while in the United States only 360 locomotives or 0.6 per cent were thus equipped. In 1893, we started to build standard types of locomotives and in 1914 there were 7,376 locomotives or 32.5 per cent of the total number, which were of practically one type, the so-called "normal" slow freight engine. Of standard fast freight engines, there were 1,300 or 5.7 per cent of all the locomotives in service. Then there were 600 slow heavy freight locomotives. In 1915, we designed and had built in this country 1,075 Decapods, the standard fast heavy freight engine.

Practically all freight cars were of a standard type—the so-called "normal" freight car—which has proved quite satisfactory for local conditions on Russian Railroads, for over three decades. The dead weight of this car is only 42 per cent of its capacity. This, I believe, is the lowest ratio of any freight car ever built in such great numbers.

All of these cars are pooled over the entire system. Every railroad possesses a certain number of cars but this does not mean that specific cars are in its actual control, but rather that that number of cars is assigned to it. The idea is that each railroad is entitled to the use of 100 per cent of the cars owned by it; if, therefore, one railroad delivers a certain number of cars to another road, the receiving road is obligated to deliver to the first road at the same point and on the same date, from midnight to midnight, an equal number of cars. If it delivers less, a penalty of $1.50 for each 24 hours is charged against the delivering road by the receiving road and the difference must be offset by the delivery of extra cars on the following day. If the road fails to do so, day after day, the question is referred to the operation department of the Central Railroad Administration and relief is extended by commandeering cars from another railroad or by increasing the number of cars owned by the railroad which is short and supplying the new cars from the builders. The periodical inspection and repairs take place wherever the cars happen to be at the particular time and the cost is charged to the railroad which owns the cars at a certain schedule of rates. This system, which has been in general use in Russia for more than 30 years, is aimed to reduce the waste of car transportation and reloading and to simplify car accounting. A member of the American Railway Commis-

sion to Russia states that "having served on the Committee of Regulation between Railroads for 10 years, I have no hesitancy in saying that the Russian pooling arrangement is far advanced over the American method of handling freight cars."

Results of the War

War conditions have changed the Russian railroads very considerably. The traffic has changed entirely. Before the war, grain was carried from central European Russia and the Southeastern granary to the Baltic and Black Sea ports; coal moved from the Baltic ports and Southern Russia to Central Russia; manufactured goods from Western, Northern and Southern Russia to Central Russia, Siberia and Middle Asiatic Russia; Siberia had very little traffic as compared with European Russia. With the beginning of the war, the traffic to and from the Baltic and Black Sea ports ceased to exist; coal had to be carried from southern Russia all over the country; huge quantities of ammunitions and foodstuffs had to be moved from all portions of the country to the extreme West—the battle lines; and Trans-Siberian railroads from Vladivostok and railroads running from the northern ports—Archangel and Murmansk (constructed during the latter part of the war) became very active because of the immense new import business. The number of locomotive miles and car miles increased by 22 per cent as compared with the pre-war times. The number of locomotives had increased only 1.5 per cent and the number of cars 3 per cent more than before the war, but the number of cars and locomotives in good order in 1916 was from 3 to 8 per cent less because of the shortage of material and skilled help in the works and shops—conditions which were also experienced in this country during the war. As we all know, a continued orderly traffic is possible when the requirements of movements of goods, the necessary rolling stock for the required movement, the facilities for the manufacturing of material and spare parts for the upkeep of the railroads, and the movements of goods for industry balance each other. Within reasonable limits, there may be fluctuations when one or the other of the above-mentioned factors can be overstrained for a certain period of time; when this strain is extended beyond a reasonable limit, transportation is subjected to a disturbance and later to a disorganization. This happened just before the revolution in March, 1917, and during the revolution, and whatever was saved was later destroyed by the general disorganization and demoralization of the whole economic life of Russia under the Bolshevik regime.

Present Conditions in Bolshevik Russia

For further consideration of the Russian railroad situation, it is advisable to consider the country as divided into two parts—one under the Bolshevik control and the other, including Siberia and parts of Russia, under the control of the anti-Bolsheviks. We have no recent information about the railroad situation in European Russia but such information as we had received indicates that the situation is indeed desperate. The railroads are disorganized to the limit, the trains run only occasionally when a roundhouse can supply a locomotive and there is sufficient coal. On some roads trains are not moving at all, and on others all ordinary train movement is suspended in order to give precedence to trains with food supplies for the cities. The total number of locomotives now in operation is below 4,000, out of a total of 21,000 in European Russia; in other words, 82 per cent of the locomotives are in bad order. Locomotives cannot be overhauled because of the lack of material and spare parts. They cannot be replaced by new locomotives as the locomotive works are practically at a stand-still.

Passenger cars are so badly worn out that very few of them are suitable for carrying passengers; indeed, such passenger traffic as is handled is largely in freight cars, or in so-called "teplooshkas." The latter is practically a standard freight car equipped with a stove and having double walls to retain the heat. These cars are always overcrowded and traveling in Russia for long distances is accompanied by great inconvenience and distress. The last information that reached us was to the effect that the Bolshevik regime managed to introduce some order on the Nicholas Railroad between Petrograd and Moscow and on a few other roads and that there is now on some roads a regular service of one or two good passenger trains daily; this, however, is an exception which proves the general rule. There are no financial or similar problems on the railroads. The wages are as high as the workmen's committees are pleased to make them and the expenses, no matter how large they are, are covered by paper money from the state banks. The result of this is that Russia, which exported yearly about 8,000,000 tons of grain or 12 per cent of its total production, now faces general starvation in large cities because of the disorganization of the transportation system.

Better Conditions in Siberia

The situation in Siberia is very different. The railroads in that section have been considerably disorganized by the Bolshevik but about a year ago the loyal Russian forces drove out the Bolshevik from the territory served by the Trans-Siberian railroad and the reorganization of the transportation system started at once. Fortunately, the Russian Deputy Minister of Ways of Communication, L. A. Oustrugov, happened to be in Siberia at that time and a new Ministry of Ways and Communications was organized at Omsk. As soon as communication was established through Siberia the Russian Mission of Ways and Communication in America started to ship material from Seattle and New York to Vladivostok. This included rails, locomotives, cars, various kinds of machinery, and large quantities of spare parts for locomotives and cars. From November, 1918, to the present time, we have sent to Russia nine complete ship loads and partial shipments on other ships. All together we have shipped 43,600 tons and we have about 20,000 tons waiting for future shipments.

The news we receive from Siberia indicates a general improvement in the situation. New railroads have been built or are under construction as, for instance, the Semipalatinsk-Sergiopol and the Petropavlovsk-Kokchetava or the South Siberian Railroad from Orsk to Semipalatinsk, the construction of which was stopped during the revolution but has now been resumed. A new department at least for Russia, is a colonization department, which is developing plans for the colonization of Siberia. Trains are running on regular schedules; the once famous weekly Siberian express, made up of eight passenger cars and dining car, is running again from Chelabinsk (Ural Mountains) to Vladivostok, covering a distance of about 4,800 miles in nine days. Service is not as good as it was before the revolution, but it is better than it was in 1918. The Omsk Ministry of Ways of Communication is now considering the addition of another weekly express train from Omsk to Vladivostok. The other passenger trains and freight movement are now fairly regular—about 4 or 5 trains daily in each direction according to the latest advice in March, 1919. In other words, about 150 cars leave daily from Vladivostok for the interior of Siberia. This is even more than the traffic before the war and 50 per cent of the traffic during 1915-16. It is true that this schedule is not ample for the traffic demands as, of the 150 cars, only 10 can carry private shipments; the remainder of the cars are loaded with goods for the account of the war department, railways, zemstvos, cities and municipalities; these have preference over private shipments. Such were the conditions in March.

The winter was a very cold one in Siberia and the railroads suffered greatly from this and from the lack of coal which could not be delivered. When the weather became milder in March, the Omsk Railway Administration renewed its activities in re-establishing full service and also in rebuilding the railroad bridges which had been destroyed by the retreating Bolshevik and were recaptured by the Omsk government on its drive toward Perm and the northern part of European Russia. The organization of the Trans-Siberian railroad is as follows: There is in Omsk a Ministry of Ways of Communications with Mr. Oustrougoo, whose name I have already mentioned as Minister. He is also chairman of the Inter-Allied Committee for the Supervision of the Trans-Siberian Railways in the zone in which the allied military forces are operating. Under the control of the Inter-Allied Committee is a technical board with John F. Stevens as president. A Russian manager or director with other Russian officials remains at the head of each railway under the authority of the existing Russian law. In matters of a technical operation, the president may issue instruction to the Russian and other officials on the railroads and may assign, if necessary, corps of railway experts to the offices and the more important stations. The experts are chosen from the Russian Railway Service Corps, which is composed of American railroad men, sent to Russia in 1917. At that time there were 220 men under Colonel George Emerson, but the number has since been reduced to 150.

The Loan of $20,000,000

The activities of the Interallied Committee began formally last February. Up to that time John F. Stevens, with Colonel Emerson and the men of the Russian Railway Service Corps, did practically the same work as is now being done by the committee. They were making use of the material we have shipped and of what they could get in Russia. Now a loan of $20,000,000 is under consideration, to be extended by the Allies for purchasing material necessary for the upkeep of the Siberian Railways. As the railways are in good condition—many new locomotives and cars and spare parts for this new equipment are being shipped—the loan will help very materially to improve the situation by supplying the railroads with spare parts for existing equipment and with material for running trains. The situation will be relieved, I hope, during this summer, and this will help to accelerate the regeneration of Russia by way of Siberia; this was predicted by many Russians over a year ago.

The Railways of Bolivia

By Philip W. Henry
Vice-President, American International Corporation

The first railway connection of Bolivia with the outside world was through what is known as the Antofagasta (Chile) & Bolivia Railway, one of the best paying railways in South America, owned and operated by British capital, controlling practically the entire railway system of Bolivia, and terminating at Antofagasta, now one of the principal ports of Chile, but, prior to the war of 1879 between Peru and Bolivia against Chile, a port of Bolivia. One interesting thing about this railway is that its main line, extending from Antofagasta to Oruro, Bolivia, 573 miles, was constructed of 30 in. gage, and is still operated at that gage, although between Uyuni and Oruro, 195 miles, a third rail was placed several years ago in accordance with an agreement with the Bolivian government to adopt on that section the same gage (one metre) as the lines of the Bolivia Railway, which it had recently acquired.

Notwithstanding this narrow gage, the railway company has a very comfortable dining and sleeping car service. In fact, from personal experience, I can testify that, for comfort in traveling, the through train between La Paz and Antofagasta, 718 miles, is equal to that of first class trains in the United States, although the running time is very slow, the schedule being 43½ hours up and 39½ hours down, with a through train running only once a week. This, however, is not uncommon in South America, for the through service three years ago when I made the trip between Buenos Aires and Santiago, Chile, was only once a week. Many trains are scheduled for two or three trips a week.

Rising 13,050 Feet in 223 Miles with Only 2 Per Cent Maximum Grades

From a physical point of view the most astonishing thing about this railway is, that starting at sea-level and passing over a summit of 13,050 ft., 223 miles from Antofagasta, the grade is so regular that the maximum is only 2 per cent, and this pertains only to the first 18 miles out from Antofagasta, where the ascent in that distance is 1,800 ft. Beyond that to the summit there is almost a continuous grade of little more than one per cent. Another surprising thing is the fact that from Antofagasta to La Paz, 718 miles (with the exception of the last six miles) the grading was remarkably light, with few bridges over 100 ft. span, one of these being a high, but short viaduct, over the Loa river, 148 miles out from Antofagasta. I doubt if there is any railway in the United States of this length with so little grading and so few bridges, with no tunnels whatever.

Going into La Paz itself for a distance of six miles, with a drop of nearly 1,000 ft., there is some very heavy work, but on the other 712 miles the work is extraordinarily light. Another interesting feature is that for the first 200 miles it passes through territory which practically has no rain, and therefore the drainage problem is reduced to a minimum. As there is good ballast along the line, with practically no culverts or bridges, the maintenance of way gives little concern. Seventy miles from Antofagasta, at an elevation of 5,000 ft., the railway enters the nitrate district and continues for the next 30 miles. Of this material it carries a million tons a year (pre-war conditions) to Antofagasta, a haul averaging 87 miles, all down grade, for which it obtains $1.82 per ton or somewhat over 2 cents per ton per mile. This, of course, is very profitable traffic, and one reason why the Antofagasta is one of the best paying railways in South America. The average earnings of the entire system, before the war, were around $11,500 gross per mile with an operating ratio of from 50 to 55 per cent.

Next to nitrate in tonnage comes coal carried from the seaboard to the interior, and then come ores of silver, copper, tin, bismuth, tungsten, antimony, with such general merchandise, supplies and machinery as are needed for the railways, nitrate plants, mines and for personal consumption.

Although the freight rates over this railway (2 cents per ton per mile) and over all the railways of South America, are considerably higher than in the United States, passenger fares are no higher, and as there are second class cars, people can travel for less than in this country.

As Antofagasta and the country through which the railway runs for 200 miles is practically without water, the railway was forced to develop not only a supply for itself, but also for the industries and towns along its line, as well as for Antofagasta, a city of 70,000 population. The railway is therefore bringing water 193 miles to Antofagasta from an elevation of 10,700 ft. This water being somewhat brackish, it was necessary to go still further, 229 miles, to an elevation of 14,500 ft., in order to find suitable drinking water to supply the towns and industries along its line. Incidentally, the furnishing of water is quite profitable to the railway.

The construction of this railway, like so many of those

of the United States, was a matter of development. It was first projected to reach the nitrate fields, which it did in 1874, when 72 miles were constructed. From the nitrate fields, it was extended 378 miles from Antofagasta to Uyuni, Bolivia, in order to reach the very rich silver mines at Pulacayo near that city. The final extension came in 1892 when it reached Oruro, 573 miles from Antofagasta, the center of the principal tin district of Bolivia. Its further extension to La Paz was through its acquisition in 1909 of the Bolivia Railway, an American corporation, formed in 1907 to build a system of railways for the Bolivian government; and this brings me to the construction of this system, which reflects so great credit upon the Bolivian government which, in its settlement of a boundary dispute, received $10,000,000 from the Brazilian government. With this sum as a nucleus, the Bolivian government, under the presidency of General Ismael Montes (now the delegate of Bolivia at the Peace Conference, and one of the great statesmen of South America) decided to develop a system of railways which would bring La Paz, its capital, in touch with the outlying departments and afford means of transporting the minerals which so abound in that country.

Comprehensive Development

It must be understood that in many undeveloped countries it is impossible to interest private capital in the construction of railways without some kind of a government guarantee or subsidy. The conditions in those countries are usually quite different from those in the United States where the population is apt to follow the railway without much urging, and the resources along the line are quickly developed by private capital. In countries like Bolivia where the population (2,500,000, of which the great majority are Indians, in a territory more than twice the size of Texas) is scattered, with little attraction for immigration, the building up of the country is of very slow growth, so that the economic features of railway construction give way to those of political importance. For political reasons it is necessary to have transportation between different parts of the country, and particularly so is this true of Bolivia, where the white population is sparse and where there is no one city of great size. With the knitting of the country through railway construction, the national feeling is intensified and the dangers of revolutions diminished.

The Bolivian government, having decided on a program of railway construction, entered into negotiations in 1906, through its minister in Washington, with certain American bankers, by which the latter agreed to put up $15,000,000 for which they would receive first mortgage bonds of the railway, interest guaranteed for 20 years by the Bolivian government, which in turn agreed to put up its $10,000,000 cash for which it would receive income bonds. As a result of this agreement, all of this money, and in fact more, totalling $35,000,000, has been spent, with the result that today the three important commercial cities of Bolivia, Oruro, 25,000 population; Cochabamba, 30,000; and Potosi, 30,000, are connected with the capital, La Paz, 90,000 population, and with the outside world; and upon 60 miles of new construction, La Paz will be united with Buenos Aires, the capital of Argentina, 2,300 miles distant, forming the longest link south of the Rio Grande, in the much talked of Pan American Railway. For this latter piece of construction, the Bolivian government now has a representative in New York, trying to raise the necessary money, as all the funds under the former agreement have been expended.

From American to British Control

I might state, however, that all these funds were not expended by the American bankers. Soon after this construction program was under way, it occurred to the Antofagasta Railway, which up to that time had dominated the railway transportation of Bolivia, that the Americans might make serious competition if allowed to complete this new system of railway. It therefore entered into negotiations with the American bankers, who, with consent of the Bolivian government, sold out to the Antofagasta interests. This was after the first line from Viacha to Oruro, 125 miles, had been built. While to Americans in general and to myself in particular—for I was president of the company formed to construct this system of railways—it was a disappointment to see American capital retire from the Bolivian field, it was really better that the work should be done by such a strong organization as the Antofagasta Railway, which could afford to operate these lines of low earning capacity until such time as they were able to pay their own way. It was also able to advance funds beyond the original agreement, which another company depending entirely upon its Bolivia business could not afford to do. Even now, the Bolivia Railway is earning less than half of the interest charges on its first mortgage bonds, but the government has promptly paid the balance. During the past two years gross earnings have nearly doubled owing to the war demand for tin, copper, tungsten, silver and other metals in which Bolivia so abounds While under post-war conditions earnings may fall, it is not likely that they will reach the low figures before the war, as additional mines have been developed due to high prices, and Bolivia, with its greater buying power, will need more goods from the outside world.

As a result of the contract of 1906 made with the American bankers, assigned later to the Antofagasta Railway, the following lines have been constructed:

	Miles
Viacha to Oruro, opened in 1909	126
Rio Mulato to Potosi, opened in 1913	108
Oruro to Cochabamba, opened in 1917	127
Uyuni to Atocha, opened in 1913	55
Total	416

In addition, the Antofagasta is operating its own lines in Bolivia from

	Miles
Ollague to Uyuni, opened in 1889	107
Uyuni to Oruro, opened in 1892	195
Viacha to La Paz, opened in 1918	20
Total	322
Total miles controlled by Antofagasta Railway	738

Outside of the Antofagasta interests, there are three other railways in Bolivia:

1st.—The Guaqui & La Paz, 59 miles, operated by the Peruvian Corporation, connecting the capital with Lake Titicaca (elevation 12,500 ft., the highest body of water in the world on which steamers are regularly operated), whence a line of steamers connects with the Southern Railway of Peru with an outlet on the Pacific at Mollendo;

2nd—The Arica-La Paz Railway, finished in 1913, owned and operated by the Chilean government, 278 miles in length (of which 149 are in Bolivia), connecting the capital with Arica, Chile, and affording the shortest route to the Pacific;

3rd—The line, 25 miles long, running southeast from Oruro, serving a tin district and built and operated by private Bolivian capital.

As a total, therefore, Bolivia has within its border 971 miles of railway linking up such important points as Ollague, Uyuni, Oruro, Potosi and Cochabamba with the capital and affording an outlet to the Pacific at three different points, Mollendo, Arica and Antofagasta. The completion of a contract now under way between Tupiza and the Argentine border for 60 miles, and a new construction contract for a like amount between Atocha and Tupiza will give Bolivia an outlet to the Atlantic at Santa Fe, Rosario and Buenos Aires, and will afford an interchange between the mineral products of Bolivia and the agricultural products of Argentina.

Not all of these lines are like the main line of the Antofagasta Railway in finding so few natural difficulties to overcome. That to Arica has 10 per cent of its length in track railway of 6 per cent grade. That to Cochabamba descending from the plateau to the watershed of the Atlantic has experienced great difficulties with washouts brought about by storms, infrequent but approaching in intensity to cloudbursts.

Practically all of these railways in Bolivia are at an elevation of 12,000 ft. and over, lying in the great plateau between the eastern and western ranges of the Andes. The line to Potosi crosses the divide at an elevation of 15,814 ft., said in Bolivia to be the highest point reached by any railway in the world, but really exceeded by the line to Cerro de Pasco, Peru, where the elevation is 15,865 ft., 51 ft. greater.

The Conduct of Railway Enterprises in Foreign Countries

Having thus discussed specifically the railway situation in Bolivia, it may be in order to say something about the conduct of railway and other enterprises in foreign countries. In this I have been fortunate, for 25 years ago, while general manager of a large paving company, I was called upon to send an organization to lay the first asphalt pavements in Buenos Aires. From that experience I have deduced certain principles about carrying on work in foreign countries, from which I have profited ever since.

In order to carry out this contract in Buenos Aires, we sent a complete organization made up of a superintendent to take charge of the work, a competent accountant to take charge of the office, with various foremen to look after the grading, concrete, laying and mixing of the asphalt, as well as laborers skilled in the art.

It soon developed that many of those men were unadaptable, became dissatisfied, so that in time most of them returned home. Meanwhile the superintendent had been breaking in local men, so that within three or four years, the only Americans remaining on the job were the superintendent and chief accountant, all the other positions being filled acceptably by men found locally. Not only did this result in a less expensive, and just as efficient an organization, but it created a friendly sentiment with those with whom we were doing business. Naturally in all countries, there is a prejudice against foreigners and it is advisable to use local talent as far as possible. At the outset it may be necessary to have an organization of Americans, but later on it will be found, that with a few Americans at the top, the balance of the organization can be made up locally.

The same experience met me in Haiti some years later in operating a railway of which I was president, when we found that a native locomotive driver gave just as good service as a much more expensive white man from the States. An American master mechanic, however, was found indispensable, and in fact where initiative and executive ability are required, an American may be necessary. In recent railway and canal surveys in China, with which I have been connected, the only Americans have been the chief engineer and chiefs of parties, all the others, including instrumentmen, being Chinese.

Another point should be emphasized, and that is to consider not only the technical qualifications of the men sent to the foreign field, but more particularly their temperamental qualities. Very often the strong energetic type of American, who does so well in this country, does not fit in so well with the people of other countries. It is especially dangerous to send a man, no matter how great his technical ability may be, who regards the inhabitants of the country to which he is sent as "dagoes," as I have heard more than one American say. Unless the American really feels in his heart that he can do business with these men as equals, it would be better for him to stay at home. While we may admit that the point of view of those of other countries may be different from our own, and while they may lack certain qualities of business energy and judgment in which we take pride, they are more than likely to excel us in other qualities which, outside of business, may be more worth while than our own.

Another important point is to spend a great deal of time and thought in picking out the man who temperamentally and technically will fill the position, then, after outlining your general policy, give him full authority to handle local problems. If you are not willing to trust his judgment in such matters, better not send him—or, better still—confine your energies at home and let some one else tackle the foreign field. My experience has taught me that on local problems the judgment of a mediocre man on the ground is worth more than that of the most talented man in New York, who is more than likely to form a judgment based on conditions which exist only in his mind, while the judgment of the man on the spot is based on conditions which actually exist.

American Leaders in South American Railway Development

Reverting to the prominent part played in the past by Americans in foreign development, one is surprised to see in Valparaiso, Chile, a monument in the business section to an American, William Wheelwright; and in going to Argentina we find another monument to the same man. Upon inquiry, we find that this American was a native of Newburyport, Mass., born in 1798, shipwrecked on the Argentina coast when 28 years of age and prominent later in the development of Argentina and Chile. He was the founder of the Pacific Steam Navigation Company, recently acquired by the Royal Mail Steam Packet Company, and built the first important railway line in Argentina extending from Rosario to Cordoba, 246 miles, commenced in 1863, completed in 1870. Earlier than that, in 1849 he built a railway in Chile from Caldera to the coal mines at Copiapo, the oldest, with one exception (in British Guiana), in South America.

Another American, famous in the railway building of South America, was Henry Meigs, born at Catskill, N. Y., in 1811, who began his South American career by finishing in 1863 the line between Valparaiso and Santiago started by Wheelwright a few years earlier. Then he undertook in 1870 the construction of the Oroya (now Central of Peru) Railway, which reaches the highest point in the world, 15,865 ft., only 106 miles from the seaport of Callao. Under the stress of carrying on this great work, Meigs died in 1877, four years after Wheelwright, leaving the completion of the line to William Thorndike, another American.

These men worked with European capital—a condition not possible at the present time. The future activity of Americans in the foreign field of construction and development will therefore depend upon American capital, which in turn will depend upon the attitude of the American investor.

The Necessity for American Investments

It is not the province of bankers to make permanent investments. Their function is to furnish the initial money and take at first hand securities which may be issued in payment of any construction which is done. Unless the bankers in turn can sell these securities to the private investor, they will soon come to an end of their available resources, and the work of construction will soon come to an abrupt end. The investor must therefore be educated to believe that there are foreign securities of just as true value as those of our own country, especially when brought out by bankers of good standing. Not only will these foreign securities afford a profitable field for investment, but the con-

struction and operation of these properties will afford a favorable market for our manufactured products. The railways owned by British capital in South America have been great absorbers of their manufactured goods. In fact, such railways seldom, if ever, even ask for American bids. In this connection, it is interesting to note that a company, of which I have knowledge, under American ownership bought all its materials and equipment in the United States; under British ownership it bought them in England. Also the American engineers and operating men who were employed at the start were soon displaced by English. This is not said in criticism, but only to emphasize the fact that business follows investment—whatever may be its position with respect to the flag.

The Railways of Japan

K. Yamaguchi
Resident Representative, Japanese Government Railways

Japan is far apart from here geographically, separated by the Pacific Ocean, but industrially and economically the United States and Japan are very closely related, and it seems to me as though there were no ocean dividing us.

In 1872 the line between Tokio and Yokohama, the mileage of which was about 17 miles, was constructed, managed and operated by our government. In the years following, many other lines were constructed throughout the country, some operated by the government while others were run by private companies, their total mileage being in 1906 approximately 5,000 miles.

In the course of time we began to feel the difficulties naturally arising from the two forms of management, there being lack of unification and various complications. After close investigation the government finally took over the main lines of the country through the passage of a bill by Parliament in 1906. By this new law the government purchased 17 lines which had previously been owned by private companies, running through the main parts of the country, leaving a few branch lines to private companies. At present the total mileage of government lines is about 6,082 miles and about 1,200 miles are under construction, the mileage owned by private companies being 1,916 miles.

Besides those there are in Formosa, Manchuria, and Korea, 2,383 miles of line, but these are controlled by their own governor general and are not included in the details which follow.

We have on the railways of Japan itself 2,917 locomotives, of which 700 are superheated, and 62 are Mallet articulated locomotives, the heaviest being 95 tons. Passenger cars are classified as first, second, and third class, and we have also sleeping, dining and observation cars. The total number of passenger cars is about 7,058; nearly half have bogie trucks, the other half being four-wheeled cars. All new cars, however, are to be of the bogie type.

As to freight cars we can boast 47,570, the capacity of 15-ton cars being our standard. They are nearly all four-wheeled, but there are some coal cars having a capacity of 24 tons of all-steel construction and with bogie trucks.

The Japanese islands being mountainous, it is somewhat difficult to construct railroads, and we have been obliged to build many tunnels and bridges. It is therefore impossible to make straight roads. The sharpest curve on the main lines is 15 chains (nearly 10,000 ft. radius), and the steepest gradient is 1 in 40 or 2.5 per cent. The gage of our railroads is 3 ft. 6 in., and the rails are 60 lb. usually, but we also have 75 lb. rails on heavy traffic or mountainous lines, and these rails are to be put in general use.

We use the chain and screw couplings, except on Hokkaido Island. That island being 60 miles from the main island the automatic center couplers were originated there and have continued to be used after the American practice. We have found these automatic center couples much safer and more economical and I am glad to inform you that we are going to place them in operation on all lines instead of our former chain and screw couplers.

Owing to Japan's industrial development our railroads were pressed by extraordinary increasing traffic and to meet these demands we have been forced to increase the supply of cars and locomotives and make vast improvements in our roads and terminals.

Last year we purchased 150 locomotives, 2,500 freight cars and 200 passenger cars, all of which were built in our own country. Unfortunately, it was not possible for us to secure all the necessary materials for construction and improvement of roads, terminals and repairs of equipment, so we recently made purchases in this country amounting to about $10,000,000.

We are always endeavoring to improve our management and operation in general in order to keep transportation facilities adequate to the development of the country. To gain this object our government railways despatch every year several officials and engineers to this country and Europe for the purpose of investigating and studying railroad systems and management.

Important Revision of M. C. B. Rules

THE PROMULGATION of circular No. 37 by the Mechanical Section of the American Railroad Association was briefly noted in the *Railway Age* of May 16. The text of this circular is as follows: "This circular re-establishes delivering line responsibility and the practice of defect carding as between roads under U. S. Federal Control, and all circulars and interpretations to the contrary are hereby abrogated.

"In view of United States Railroad Administration Accounting Division Circular No. 86, issued April 15, 1919, effective the date of that circular, Articles 1, 2, 3 and 4 of the 1918 Code of M. C. B. rules for freight cars and modifications A to C, inclusive, of the 1918 Code of Rules for Passenger Cars are hereby abrogated and the following will apply to railroads under U. S. Federal Control:

"To the end that interchange inspection work may not be duplicated under U. S. Federal operation of railroads, so that more repair work and less unnecessary inspection will result, it is ordered—

"(1.) That joint arrangements shall be made to prevent such duplication in inspection by arranging all inspection forces at interchange points with a lead or chief joint inspector as conditions require, to supervise the forces and see that inspection and repairs are properly made to car equipment.

"(2.) M. C. B. Rule 2 is modified as follows: (a) Loaded cars offered in interchange (except those having defective safety appliances) must be accepted by the receiving line which may either run, repair or transfer lading from car; (b) the repairs to car or transfer of lading is to be done by the railroad having facilities nearest available. If facilities are equally available by both railroads, the car will be moved to facilities located in the direction car is moving.

"(3.) If car is shopped for repairs due to: (a) old defects that existed before car was loaded; (b) lading requiring transfer or readjustment, account of not being in accordance with M. C. B. loading rules; (c) overload requiring transfer of lading; (d) not being within clearance dimensions over route it is to pass; (e) not meeting A. R. A. third rail clearance. In each case above mentioned, the facilities

nearest to car will be used in making repairs to car or transfer of lading.

"(4.) Should the location of facilities require a receiving line to make transfer or readjustment of lading, the cost of such transfer or readjustment of lading will be billed against the delivering line as per Rule 2 of the 1918 Code. The chief joint or lead inspector will make report and forward to the head of the mechanical department of both railroads, showing all cars transferred or shopped for old defects, whose duty it will be to impose discipline for willful and inexcusable violation of the M. C. B. rules of interchange and loading rules, the same as instructed in Director General's Order No. 8 for the violation of the safety appliance law.

"(5.) Cars, whether loaded or empty, having safety appliance defects will have such defects repaired immediately upon discovery and will not be offered in interchange. If necessary to move car to shops for repairs of safety appliance defects, it must be moved to shops of the company upon whose line it became defective.

"(6.) Empty cars offered in interchange, if in safe and serviceable condition, must be accepted.

"(7.) Bad order cars which previously had been delivered in bad order under load must be repaired by the road making transfer, if they have facilities and material; if not, the nearest repair point on any line, having material and facilities, should make the repairs.

"(8.) Owners must receive their own cars when offered home for repairs at any point on their line.

"Rule No. 92 is amended to read as follows: 'In rendering bills cars shall be treated as belonging to companies or individuals whose name or initials they bear, except that bills for repairs to leased cars or cars of other ownership shall be rendered direct if so directed in the billing instructions in the Official Railway Equipment Register.' "

The Menace of a Concentrated Buying Power*

The Secretary of Commerce Discusses the Effects of Railway Purchases on Industry

By William C. Redfield

I SOMETIMES THINK of buying power as a force which *can* be used constructively, *is* commonly used with regard confined wholly to the immediate transaction, and which *may* be used destructively. Would not a great industry do well to use its purchasing power to develop new sources of supply, either looking to the increase of production of the articles it needs or to the development of satisfactory substitutes, or to making the certainty and security of its supply sure beyond doubt? Is it not possible to so extend the science of buying that it shall become a promotive force?

Out of the helpful experience the nation has had during the war and the readjustment period with government operation of our great systems of intercommunication, whether on sea, land or by wire, a fact has clearly emerged which has peculiar interest for this assembly and which points a finger of warning for the whole country. I do not recall that this special phase of government control of communication of all kinds was seriously discussed prior to the war, yet to my mind it is of basic importance. It has by itself settled my own judgment adversely to government operation, in a country as large as this, of the great enterprises involved in our railways, our merchant marine, and our telegraph and telephone systems. I have called our experience helpful because through the work of the able and conscientious men who have handled all these activities more has been learned of the essential factors of the problems than was possible by pure theorizing. Nor is there in the background of my thought the smallest element of controversy. I wish to express my full confidence in the honor, uprightness, and conscientiousness of gentlemen with whom I have recently differed. They acted as they believed was right and wise and are so to be esteemed and regarded. That water has run under the mill. Nothing in what follows has reference to recent discussions or is to be interpreted save in the most cordial spirit of good will. I firmly believe that throughout the gentlemen from whom I differed acted with an eye single to the public good and without undue bias of any kind, political or otherwise.

The factor of which I speak is the necessary combination when under government direction of so large a part—a controlling part—of the purchasing power of the country into a few hands or, regarding the government as a unit, into one compact control. The various transportation elements named include as I have said a controlling purchasing power over our industries and through them over our labor and our producers of raw material. It would lie in their power to injure or even destroy not one but many industries simply by either refusing to buy or by delaying buying at a critical period or by insisting upon impossible prices, or impracticable terms. Most business men will, I think, agree that it might make relatively little difference to industry who administered the laws or even what the nature of those laws might be if power over the life and death of industry lay in the hands of a few men because of their ability to purchase or to refuse to purchase its output.

This power, which is not so much by purpose as by its very nature autocratic would be peculiarly difficult to reach and control by law because it is impracticable to regulate by statute when or how buying must be done. Procedure can indeed be fixed. Publicity can be provided and competition secured in form. The danger suggested, however, comes not from paying excessive prices but from the reverse, from forcing by the pressure of enormous buying power prices, terms, and conditions of such a character as substantially to put our industrial fabric into the hands of masters of almost imperial power. Let there be given any one of you ability substantially to control one-third or more of the coal purchases of the United States through your predominant power in buying fuel and that industry becomes plastic in your hands. Let there be placed in the hands of another of you the power to purchase from one-third to one-half or possibly more of the products of the steel industries or of certain portions thereof and that industry becomes your servant, to do substantially as you will. The same is true of other great industries like copper, the shipyards and the builders of machinery. It will, I am sure, become clear to your thought after reflecting upon the incidental creation through government operation of a unified buying power that there would be established an enormous force so mighty as to work its will with industry and labor and to make them its creatures. It is not assumed that there would be intent to do harm. The reverse is undoubtedly true. It may indeed be taken as certain that as in the past and present

*From an address before the Purchasing Agents' Association of New York, Hotel Pennsylvania, New York, May 20, 1919.

so in the future conscientious and careful men would do the work. Ruin, however, can well be wrought by want of thought, by absence of social vision, by incomplete knowledge, by partisanship—involving either a party or directed to a service or a person, by the sense of irresponsibility arising from possible brief tenure of office or by the loss of balance arising from the intoxication of power. Years are not required to cripple an industry. It can be done in months or even weeks. There seem to be involved, also, the principle of democracy in commerce as against autocracy, with all that both imply, and the deeper one's thought goes into the matter the more one questions whether there would not be created an empire within the state which, however free in form the state might be, would of necessity control it from inside.

Consider the position of an industry that strove to be independent under such conditions. The circumstances are not frequent in which trade conditions are such as to constitute for a long period what is known as a seller's market. More frequently it is the case that the seller is more or less of a suppliant and the buyer has a great deal to say. We may not assume, on the contrary, that conditions always favor a buyer's market but there is commonly an intermediate state between the latter condition and that in which everything favors the seller; there is a middle ground in which the seller is far from being free from need and in which the buyer has a potent force. If a single purchaser uses one-half or nearly one-half the entire output of an industry and that purchaser refrains from buying for reasons that are satisfactory to him, where is your individual producer to find his market? Clearly the fraction of distributed purchasing power that remains must be divided over the entire industry, and so far as competitive conditions may prevail this means that quantity production on any continuous basis is impossible and that the high-cost producer, that is to say usually the smaller producer, must go to the wall. It is interesting to think what your position as buyers would be under such conditions.

Few would on reflection venture to favor the creation in this country of a condition in which such absolute power could be exerted over industry and therefore over the employees of industry as would be the fact if the government held in its hands the power to buy for the railroads, the merchant marine, the telegraph and the telephone systems and possibly other factors of our industrial life. Here would be in outward form what one might think a socialistic condition which would in its normal operations tend to become an imperialistic one. Here would be created a power within the state which might at any time exercise, even almost unconsciously exercise, a controlling power over it. The very existence of such a power would seem to involve the necessity of state-controlled industry in order that industry might be adequately defended against the state itself.

It throws light upon the possibilities that are suggested to read facts submitted by Mr. E. B. Leigh in his address before the National Industrial Conference Board in February last, in which he urges that railroad purchases measure general business prosperity.* His pamphlet is accompanied by a chart covering a period of 18 years which clearly indicates the relation of railway purchases to general business conditions and reaches the conclusion that:

"Our iron and steel industries have been developed to meet the railways' enormous requirements, and hence the railways have constituted the one industry whose purchases are upon such a scale as necessarily to affect the great barometer of iron and steel."

He proceeds to point out that buying is contagious and when initial buying takes place upon a large scale it stimulates greater buying. The current, as he suggests, proceeds out from the railways to car building plants, thence on to iron and steel plants and to the large number of railway supply industries. By these it is again directed to other industries which in turn influence a highly increased number of contributory interests, until the entire industrial machinery and the labor employed in connection with it have been set at work.

The possibility of favorable buying action thus existing in our railways becomes concentrated in the hands of a few when these great buying factors are unified under government control and this power becomes again enlarged if to it are added the ther great operating systems which are today or have recently been under government management. It is evident that this power, mighty for usefulness, may be exerted either directly or merely by reason of its inaction as a destructive as well as a constructive force. In short, there here exists almost unnoticed heretofore a power before which the greatest trust is helpless, a controlling, restraining force in trade, beside which the greatest combinations are petty. It would be, or has been, country-wide, reaching into every city and by its infinite ramifications stretching out into substantially every industry and branch of commerce.

Furthermore, it is the fact that purchasing power even in free-acting corporate hands has operated not of course deliberately but none the less directly to cause serious injury to industry and so as to constitute within its sphere one of the fundamental bases of wasteful business practice. Continuity of operation in industry is essential to effectiveness and low cost. From the human standpoint it is more important still. It is essential to continued employment and to regular earning power on the part of labor.

An interesting illustration of the effect of large purchasing power on an industry appears in the chart which I am permitted to show you herewith. It is furnished by a large industrial concern and covers a period of 13 continuous years, from 1906 to 1918, inclusive, by calendar years. It shows the normal capacity of the plant in tons, the orders received in tons, the production in tons, and the number of men employed, and indicates the increase in cost arising from the fluctuation in orders placed by the railroads of the country, chiefly while under private control. The sharp fluctuations shown by the irregular exercise of purchasing power will be evident at a glance. Let us summarize a few of them. The increase of cost varies always upward with the decrease of orders. It rises in one case 25 per cent, in another 37.5 per cent, in another 86.9 per cent, in another 89 per cent. The force employed varies from 990 to 325, from 1,360 to 445, from 1,570 to 440, and rises as high as 2,110. The item of orders received shows most extraordinary peaks. It would not be quite correct to describe the line as showing curves; it is high summits and low valleys.

A brief study of this chart indicates the indirect but practical control of an important industry over a period of years by railroad buying under private auspices. It is not argued that that control is intentional. It may be freely admitted that it may have been meant to be helpful. It can hardly be denied that it is a fact. It would seem obvious that it would have been wise management on the part of the buyers to have so distributed their purchases as to provide a more reasonable continuity of operation with a corresponding decrease in the cost of the goods and more continuous employment for labor. This may have meant using reserve funds and accumulating reserves of materials. The difficulties involved in both are, of course, real, but the study of the results from the methods actually used makes it evident that the course followed was productive of waste, a waste hurtful to labor, injurious to industry and to the buyer alike. I am advised that the particular chart is typical of other industries as well as of the one to which it directly relates. There is a clear mutuality of interest between these buyers, these sellers, and the employees of both as well as the public which seems ignored and to develop which no provision is made.

It bears, however, more directly upon my theme to point out that if under private auspices the operations of separate

*Abstracted in the *Railway Age* of April 4, 1919, page 879.

ailroad corporations did under private control exercise over he industries of the country so forceful a power as is shown n Mr. Leigh's pamphlet and by the chart now submitted to ou, it follows as of course that if this power be exercised s a unit instead of separately and if to it be added other imilar extensive powers, then a force is created the power f which over the industries of the country is so obvious s to need little explanation.

We ought not to leave the subject without presenting some onsiderations on the other side. For years prior to the war ur industries with or without full knowledge exploited the ailroads for their own benefit. We were favored with the heapest freight rates in the world and even after advances vere made that were strongly resisted our rates remained uch as would have filled any competing European manu- acturer with envy. A single illustration lies before me.)ne manufacturing concern which produces on both sides of ie Atlantic paid a rate from Hull to London, 198 miles, of 6 cents per 100 lb. and in this country paid on similar oods a rate, from Buffalo to New York, 450 miles, of 16 ents. The same goods were, therefore, transported more ian double the distance at the same price in this country. t has been perfectly well known to students of the subject or years past that American freight rates were the lowest n the world and yet our industries have resisted, not to say esented, any attempt at even moderate percentages of dvance.

The trouble has been that the vision of the industries in this respect has been inward, not outward. They have, in this as in other matters, mistaken cheapness for economy and have not regarded sufficiently the real mutuality of interest between the transportation systems and themselves. They were keen, as respects their own goods, to obtain prices sufficient to carry overhead expenses, to amortize equipment according to due standards of depreciation, to provide working capital for necessary improvements, but they failed to recognize that the railroads were entitled to the same consideration of these matters as they themselves exacted in their own figures. It was thought wisdom to be suspicious of the railways and to disregard the candid and outspoken pleas of experienced railroad officers for sufficient income to maintain their borrowing power. For this suspicion a fearful price has been paid, for when the pressure came and the railroads were unable to meet it the whole country suffered.

It is the merest common sense to say that the shipper does himself wrong when he brings such pressure on the railways as forces it to operate at rates below those which will enable it to maintain its plant and its credit as the shipper is himself obliged to do. There is needed here a social sense, a business vision which shall go a great deal further than the personal purse or profits of the industry making the goods, as respects single or grouped transactions, and which shall take into account the permanent interests alike of the railways and the industries using them.

Final Valuation of the Winston-Salem Southbound

Single Sum as the Value of Property to Be Stated Later; Exceptions to Tentative Valuation Considered

The Interstate Commerce Commission has issued its final valuation of the property of the Winston-Salem Southbound Railway, after considering the rotests of the carrier to the tentative valuation made by the ommission's bureau of valuation, giving findings as to nderlying facts upon which the commission will ultimately tate a single sum as the value of the common carrier prop- rty of the company for purposes under the act to regulate ommerce. The carrier and other parties may, if so ad- ised, apply to be heard upon the undetermined question as o what sum shall be stated. Otherwise, in due course, the ommission will state its conclusion and complete the final aluation.

The valuation is as of June 30, 1915. The invest- ient in road and equipment after making certain adjust- ients is stated as $5,598,999.65. The original cost to date f the property other than lands is stated as $5,197,452. The cost of reproduction new as $5,428,444 and the cost f reproduction less depreciation as $5,033,875. The riginal cost of the lands is stated as $401,547 and the pres- nt value at $565,256.

On many points the decision follows the decision in the Texas Midland case, and an appendix to the report in that ase is referred to for a statement as to the methods of aluation employed and as to the reasons for the differences etween the cost values mentioned in the first and third aragraphs of the valuation amendment. The railroad oper- tes 89.99 miles of road wholly within the state of North Carolina, single track with the exception of 3.02 miles. Its onstruction was financed by the Atlantic Coast Line and the Norfolk & Western, which on June 30, 1915, each owned ne-half of all outstanding stock of the carrier other than irectors' shares. An abstract of the report is as follows:

Original Cost to Date

The tentative valuation finds the original cost to date of the common-carrier property of the carrier, as of June 30, 1915, as follows:

Road, excluding lands	$4,637,819
Equipment	293,881
General expenditures	222,296
	$5,153,996

It is found in the tentative report that the original cost of carrier and non-carrier lands can not be stated separately, but the original cost of all lands is stated as $401,546. The accounting report appended to the tentative valuation apportions the cost of lands upon a basis necessarily somewhat arbitrary, as follows: Carrier lands, $372,189; and non carrier lands, $29,357. The total original cost to date of the road and equipment, including carrier lands, is set out as $5,526,186.

It is claimed by the carrier in its protest that the amount of original cost to date stated is less than should be shown by reason of the failure to include certain items of actual expenditure.

The amounts claimed for preliminary surveys and for the services of officers of the proprietor companies are not stated nor is the protest supported by evidence explanatory of such matters. It is shown in the accounting report that the carrier presented a claim that the survey in question was made in 1892, some 13 years before the carrier was chartered. It does not appear that the use of this survey saved any expenditure by the carrier; and it is conceded that the expenditure was made, not by the Southbound company, but by its proprietor companies. Many years have intervened since these claimed costs were incurred; they have never

become an account stated, although the proprietor companies have made settlements with the carrier involving reimbursement for millions of dollars advanced by them on its behalf. Nor, as far as this record shows, have either of the proprietor companies ever presented a claim against the carrier for any part of the sums stated. We see no reason to set aside the contemporaneous interpretation placed upon the transaction by the parties.

The carrier protests an adjustment of $441.92 in respect to equipment retired, set forth in the accounting report. The adjustment made increased the amount of original cost claimed by the carrier, was not controverted upon the hearing, and is to be taken as correct.

The original cost figures contained in the tentative report do not include the cost of materials and supplies on hand, but the cost is stated separately as $5,180.56. That amount represents the sum shown upon the carrier's records upon valuation date; but on that date the carrier in fact had on hand materials and supplies of a cost of $43,067, of which $37,886.44 had not been taken into the carrier's books of accounts. The carrier protests the tentative valuation in this regard; and upon the facts found as above stated, appropriate changes will be made in the tentative valuation.

The carrier and the bureau have agreed that the general balance sheet of the carrier shall be carried over into the final valuation; and this will be done. As the general balance sheet reflects what appears upon the books of the carrier, the amount of materials and supplies on hand will be shown therein as carried on the carrier's records, kept in obedience to the requirements of statute and the orders of this commission.

It is protested that the tentative valuation excludes any allowance for working capital, and that $70,000 should be included for this purpose. Apparently the protest differentiates between working capital and material and supplies, which are often confounded or considered together in appraisals of public service properties.

The carrier's testimony is to the effect that it is necessary and desirable that the carrier should have on hand a sum of money as working capital, which it is claimed should be at least $70,000.

The accounting report, which is a part of the tentative valuation, shows that on valuation date the carrier had on hand $58,468.25. The character and amount of the carrier's other current assets also appears in the general balance sheet, which we will carry from the accounting report into the final valuation.

The tentative valuation, as herein amended, reports fully and sufficiently the facts with respect to the working capital of the carrier.

As modified the original cost to date will appear thus, fractions of a dollar being disregarded:

Carrier property (other than materials and supplies):	
Road, including lands	$5,053,465
Equipment	293,881
General expenditures	222,296
Total carrier property	$5,569,642
Noncarrier property, land	29,357
Total, carrier and noncarrier	$5,598,999
Material and supplies:	
Carried on company's records	$5,181
Not on carrier's records	37,886
Total material and supplies	$43,067

Cost of Reproduction

Quantities and Unit Prices.—The carrier took numerous exceptions to the tentative valuation with respect to the matters contained in the estimate as to cost of reproduction now from which for the purposes of this statement lands are presently excluded and will be dealt with separately. While the case was upon hearing the respondent carrier and the bureau of valuation carefully reviewed these questions of fact in conferences which culminated in agreement upon the major differences, and a joint recommendation to the commission that the matters so agreed upon be adopted in the final valuation. The agreement upon the part of the carrier was predicated upon the acceptance by the commission of the recommendation made; and the offer was coupled with a statement which would have been evident in any event that the adoption of particular unit prices for the respondent should not bind other carriers not parties to the record or require the commission to use such prices in any future appraisal of other railroad properties.

We are, of course, not bound by the admission or stipulation of the bureau, as the duty of ascertaining the facts with accuracy in this proceeding rests upon us; but we give proper weight to these recommendations of our bureau and the carrier, and as they seem fair we shall adopt them. The tentative valuation will be changed in accordance with the stipulation.

The written joint recommendation contemplates that as to Account 26, telegraph and telephone lines, the unit prices ultimately established for the Western Union Telegraph Company should be applied. However, the carrier conceded that the final valuation of its property should not be delayed and agreed to accept the conclusions reached by our bureau of valuation after conference.

Certain items in the estimate of the cost of reproduction new, excepted to by the carrier, were not covered by the joint recommendation, but are reserved for our consideration. These include the issues respecting railroad crossings, signals and interlockers, interest during construction, appreciation, depreciation and certain specific contingencies. The claims of the carrier as to development cost and working capital were likewise specially reserved for submission to the commission; the former will be discussed subsequently herein, and the latter has previously been disposed of under the heading, "Original cost to date."

Unit prices were determined by the bureau of valuation as of June 30, 1914, although the inventory was taken as of June 30, 1915. The present value of lands appears as of June 30, 1915. The carrier protests the use of quantities as of 1915, in connection with unit prices as in 1914.

The prices employed by the bureau of valuation are not the exact prices which were necessarily in effect upon the precise date, June 30, 1914, but were fixed with relation to that date in such a way as to produce normal prices for periods ranging from 5 to 10 years prior thereto. The use of such unit prices upon items entering into the cost of reproduction of road and equipment (other than land) will permit consideration of the carriers upon a uniform basis as to time, so that as the normal trend of prices of material and labor may go upward or downward correction factors can readily be applied from time to time, as by law required, to the end that all appraisals may be kept to date upon a comparable basis.

We can not shut our eyes to the fact that the effect of the breaking out of the European war was to demoralize the markets for labor and material, so that prices current on that precise date, June 30, 1915, or over a period of time which would reflect the effect of a war which has largely monopolized the labor and material market to the exclusion of private industry, can not in any sense be said to represent normal or fair values.

With respect to lands, however, as to which the cost-of-reproduction theory is not applied, the values of which do not fluctuate wildly with war, and as to which present value is the criterion, a different situation is presented, and we have employed values as of the date of valuation.

Railroad Crossings.—It is protested by the carrier that the tentative valuation omits certain items of property owned or used by the carrier. These are detailed as (1) property owned or used, constructed at the carrier's expense, such as

overhead crossings with other railroads, 50 per cent of the grade crossings with another carrier, and a certain spur and coal trestle, and (2) property owned or used, but not constructed at carrier's expense, of which the tracks and facilities of other carriers at certain points, equipment of other carriers, private car lines, etc., are specified.

As the Southbound company was the junior carrier, the expense of these crossings was wholly borne by it. In the tentative valuation all costs borne by the Southbound company have been included in the statement of original cost to date.

It has been the practice of the bureau of valuation to apportion the estimated costs of reproduction in accordance with any agreement as to ownership of property of this character which the interested carriers may make. Failing such agreement, the cost of reproduction estimates of the junior carrier omit, in the case of under-crossings, anything for the assumed reproduction of structures used entirely for the passage of the trains of the senior companies; but the cost of reproduction estimates of every junior carrier includes the estimated cost of reproducing the property exclusively used by it. One-half of the estimated cost of reproducing property commonly used by both carriers, such as crossing frogs, is carried into the tentative valuation of the Southbound company. Such practice has been followed in the tentative report in this case.

The carrier contends that if it be assumed for purposes of determining the cost of reproduction that other railroads exist as of valuation date, then as a matter of theory it must be assumed that the identical structures which the Southbound company as the junior carrier was obliged to construct would likewise have to be constructed in reproduction.

The method followed in the tentative valuation does in fact contemplate the assumed existence of the railroads as crossed, and gives full credit in the cost of reproduction estimates for whatever is shown to be owned by a carrier, or occupied and used by it, while showing, as a historical fact for whatever it may be worth, the expenditures in fact made by the carrier in original construction. The method commends itself as involving the minimum of conjecture, and as the only plan which in all its aspects is feasible and certain in practical application.

In *Texas Midland Railroad, supra,* we have considered the treatment of property used but not owned, and of industrial tracks constructed in part only by the carrier. Claims of the second class specified are disposed of in the present case in conformity with the principles we there announced.

Certain changes have been made by us in the quantities and prices under Account 15, crossings and signs, and Account 16, station and office buildings, to carry out the joint recommendation of the carrier and the bureau that the claims of the carrier should be checked by the bureau and the results accepted by the commission.

Contingencies.—The carrier concedes that as its line is new a blanket allowance for contingencies such as is often claimed is not necessary; but it contends that several items of cost which were incurred in construction were not included in the estimate of cost of reproduction new. All these items are included in the report as to original cost to date. The general nature of the contingencies for which claims are made may thus be stated:

(1) Amounts paid the contractor for a release of contracts when, after construction had begun, the manner of doing the work was changed; (2) disputed items of yardage not calculated in certain cases; (3) yardage of earth rehandled because an apparently suitable borrow pit, partially utilized, was found to be unsuitable; (4) change in alignment found desirable after work had been started on the location originally fixed; (5) grading commenced, but not completed, for connection with another carrier, upon land owned by the carrier, the project being indefinitely deferred; (6) a trestle which was started for drainage purposes and which the carrier was afterwards permitted to fill. The protest also excepts to the omission to take into consideration as a necessary item in the reproduction program property which in fact was acquired in original construction but was abandoned by reason of proper and reasonable changes of plans due to changed conditions during construction. It is not contended by the carrier that all such items, so far as they relate to the construction of the carrier's property, are not taken into account in the statement of original cost to date.

Obviously it can not be assumed that in theoretical reproduction of the property these contingencies would occur, and no sum should be included in the estimate of cost of reproduction new in the valuation, because of such past occurrences. See *Texas Midland Railroad, supra.*

Appreciation.—It is protested that the tentative valuation fails to include appreciation as an item necessary to be considered in any rational method for the reproduction of the carrier's property, and that the minimum amount which should be included therefor in estimating the cost of reproduction would be not less than $32,400. No specific evidence was introduced in support of this claim. However, the carrier was permitted to make of record herein the general evidence which was before us in *Texas Midland Railroad, supra,* and certain other proceedings as to appreciation of roadbed.

The character of appreciation in roadbed claimed by the carrier, as shown in the record, is the equivalent of an overcoming of depreciation in roadbed items. We have reported the various items of roadbed substantially without depreciation, although, by the processes for which the carrier claims an allowance, the original or ideal form of the roadbed has been considerably altered. In not depreciating roadbed we have, in fact, taken into consideration the effects of these processes of operation, the lapse of time, and the elements, which the carrier terms appreciation. Again, what the carrier claims as appreciation can not be produced merely by the expenditure of money, and therefore can not be reproduced new. We have already pointed out that the valuation amendment contemplates the ascertainment of the cost of reproduction new, and not the cost of reproduction in the present condition.

For these reasons, and for the reasons already stated in *Texas Midland Railroad, supra,* no separate sum can, in this case, be stated as representing the value of appreciation.

Interest During Construction.—The carrier protests that the engineering program for reproduction, adopted as the basis for the tentative valuation, is too short. The length of the construction program assumed bears directly upon the amount which is to be included in the reproduction estimates for interest during construction. The following sums show in contrast the amounts reported in the tentative valuation under Account 76, interest during construction, and the claim of the carrier:

Tentative valuation:	
Original cost to date (interest on expenditures for lands included)	$163,358
Cost of reproduction new (lands excluded)	277,475
Cost of reproduction less depreciation (lands excluded)	259,103
Carrier's protest:	
Minimum claim (lands included)	413,170

This railroad has a main line about 88 miles in length, with a branch approximately 2 miles long. The carrier claims two years and three months as the construction period from the letting of contract to the beginning of regular operation. Construction was in fact completed in about two years. It appears from the record that except for reconnoissance and preliminary surveys, for which nine months was estimated as necessary, the road could be constructed, from the letting of contracts to the putting into operation,

within two years. Certain minor construction would be carried on after regular operation was commenced, such as the laying of permanent ballast, and the erection of some minor buildings and laying down of industrial tracks. But railroads are regarded as completed for operation, for all practical purposes, in advance of such construction, and we so treat this carrier.

The interest shown in the reproduction estimates in the tentative report was reckoned at 6 per cent for one-half of the construction period assumed by the engineers of the commission, upon road Accounts 1 to 48, inclusive (except 2, 39, 40, 41 and 42), and upon general expenditures Accounts 71 to 75, inclusive, and 77. Interest was computed on the equipment accounts at the same rate for a period of three months. The present record raises no question as to the rate at which interest has been computed.

Subsequent to the service of the tentative valuation, in view of the desirability of a railroad under construction having on hand a certain amount of money upon which to draw for its expenditures during such process, the bureau of valuation recommended that interest during construction should be computed upon the road accounts enumerated and general expenditures at the full rate for half the construction period plus three months. Equipment being usually purchased only when the road is practically completed interest was estimated in the tentative valuation for three months, and the recommendation of the bureau did not change this amount.

The construction circumstances surrounding the carrier's railroad are not in any respect abnormal, and, as modified by the acceptance of the recommendation of the bureau, the estimate for interest contained in the reproduction estimates in the tentative valuation is ample.

No interest has been included in the reproduction estimates contained in the tentative report on account of the cost of land. The non-allowance of interest on the present value of land in the reproduction estimate conforms to the holding of the Supreme Court in the *Minnesota Rate Cases,* 230 U. S., 352, 455.

The disposition we have indicated as to the disputed items of interest conforms to our finding in *Texas Midland Railroad, supra,* and what was there said by way of discussion need not be repeated.

The protest questions the adequacy of the sum reported for interest in the statement of original cost to date in the tentative valuation, with respect to the omission of sums said to have been advanced by proprietor companies on account of road and equipment accounts, and certain expenses in connection with the acquisition of land and rights of way and in settlement of damages to abutting property. As is otherwise shown herein, the record does not support the claim as to the principal items mentioned and therefore does not warrant us in estimating interest thereon. The carrier's records, kept presumably in conformity with law and the requirements of this commission, contain nothing with respect to interest during construction on such items, and the carrier and the proprietor companies, while adjusting claims on account of advances amounting to millions of dollars, did not treat these particular matters as constituting a debt from the carrier to its proprietor companies. The protest in this regard is not sustained.

Development Cost.—It is contended by the carrier that in correctly estimating the cost of constructing, completing and equipping a going railroad there must be added to the cost of construction and assembling an amount to cover the cost of developing the business. Computations were presented which purported to show that after the road was opened to traffic in 1911 until the date of valuation, June 30, 1915, the results of operation had been a deficit of more than $410,000, which deficit did not include all the interest actually paid. Computations were also presented on behalf of the carrier made along the following line: For each of the years prior to the year of valuation, as of June 30, the total cost of the road to date was taken less the cost of new work done during the year, which gave the amount invested and in service during the whole of that year; the deficit from operations during the year was added to this sum, and on the total so obtained interest at 6 per cent was computed as representing the cost to the investors for each year. This item of interest, added to operating expenses, taxes and other expenses for the year, diminished by operating revenues and other income, gave a remainder which the carrier terms the real deficit for the year. The sums of the deficits for the year are computed for the years 1911 to 1915, inclusive, representing the total development cost claimed by the carrier, amounting to $853,591. It is insisted that this figure must be added to the cost of reproduction, in order that the result will reflect the true cost of reproducing the property in the condition existing on valuation date.

The valuation amendment requires us to ascertain the cost of reproduction new, and not the cost of reproduction in any other condition. We should not overlook that by the method pursued by the bureau of valuation in ascertaining quantities, such costs during the early years of the enterprise as resulted in permanent increases to the property, are all discovered and taken into account. Additions to embankment, the widening of cuts, enlargement of ditches, etc., are examples.

It appears from the offer of testimony by the carrier as to development costs that all the data requisite to the computation thereof appear in the accounting report appended to the tentative valuation. In ascertaining the original cost to date of the property of the common carrier we have investigated and reported upon the history and organization of the carrier corporation, upon its net and gross earnings, and upon the expenditure of all moneys and the purposes for which the same were expended.

Our final valuation herein shows original cost to date, as well as the cost of reproduction new and the cost of reproduction less depreciation. It therefore embodies all of the underlying matters of fact, from which the carrier asks us to report a development cost.

Whether, in fixing a value for purposes under the act to regulate commerce, we should increase the cost of reproduction by the amount of deficit which the carrier may have incurred during the early years of the enterprise, will be a proper consideration when we come to state a single sum as value of the common-carrier property for such purposes. That question we leave intact. As stated, in the final valuation herein made we have the basic facts. The record herein shows no other values or elements of value.

Cost of Reproduction Less Depreciation

In the tentative valuation the cost of reproduction less depreciation was estimated by application of the same principles which were applied in *Texas Midland Railroad, supra.* Vigorous attack is made in the protest, in evidence, and in argument upon the soundness of those principles. We examined this question in *Texas Midland Railroad, supra,* and there sustained the soundness of the general theory employed in the estimate of cost of reproduction less depreciation. In the attempt to demonstrate the underlying unsoundness of the general theory of depreciation applied by our bureau of valuation, the carrier cited a number of instances in which it was claimed the methods employed gave incorrect results. We have examined these specific claims, and while they tend to show estimates somewhat different from those made by our bureau, the differences are not extreme, when adjusted to a common basis.

Certain changes in the tentative valuation will be made under this head, required by changes in the reported cost of reproduction new.

Lands

The protest excepts to a treatment of the lands of the carrier different from that given to other physical properties. The gist of the objection is that as to properties other than land the tentative valuation shows the original cost, and the costs of reproduction new and less depreciation, while as to land, what is termed a "present value" is reported, but no figures appear which represent the cost of reproduction.

It also is objected that the figures of present value were determined without reference to and without including the costs, damages and expenses that would be incurred in their acquisition. Numerous errors in methods and principles are alleged to have occurred in the determination of the present value. Among these errors the following are enumerated: (1) That the reported present value has been limited to the estimated unit of value for general purposes, not including railway purposes, of adjoining and adjacent lands, without taking into account the true value or actual cost of acquiring the same; (2) certain essential elements were not considered in the determination, e. g., the actual incidental costs of acquisition; rights which the carrier had to acquire, not measured by the value of a similar area of contiguous lands for general purposes; damages paid to original landowners by reason of the decrease of the rights of such owners and the increase of property rights of the carrier, such as severance and proximity damages, adaptability and availability of the lands acquired for then present needs; cost of buildings and other improvements; cost of removal and relocation of highways and other structures; and taxes accrued and assumed. It is protested that the recent experiences of the carriers generally in the acquisition of carrier lands, showing the amounts which carriers must pay in acquisition in comparison with the value of similar lands for general purposes, were not given consideration.

These protests raise the same question which was stated and decided in *Texas Midland Railroad, supra,* viz.: Shall the commission ascertain and report the present cost of condemnation and damages or of purchase of the carrier's lands? For the reasons stated in our report in that case, the tentative valuation herein, which bases the present value of lands upon the normal fair value of similar lands in the vicinity, ascertained in the manner employed and stated in the *Texas Midland Case,* must be approved in principle.

To abbreviate the record, it was stipulated that in the event the present cost of acquisition or reproduction cost of lands is to be ascertained and reported, certain multiples or percentages of present value as agreed upon should be applied. The disposition made of the principal question makes it unnecessary to give force to this stipulation.

In the carrier's protest exception is taken to the computations of the area of certain tracts of land, and to the classification of certain parcels as non-carrier instead of carrier. By agreement upon the hearing these matters were re-examined by the bureau of valuation, and as the carrier and bureau are now in substantial accord thereon the recommendations made by the bureau and accepted by the carrier will be incorporated in the final report. The protests of the carrier as to such matters will be treated as withdrawn.

As to the present value of lands, agreement has likewise been reached by the carrier and the bureau of valuation, and the carrier's protest is waived. The sums recommended are approved and will be included in the final report. The carrier's agreement as to these amounts does not, of course, waive its claim as to the ascertainment of the reproduction cost or present cost of acquisition of its lands.

There remain for our consideration the questions raised by the carrier's protest as to the omission from the tentative valuation of areas in streets, at grade crossings of public highways, at railroad crossings, and lands upon which industrial sidings are located. The same questions of principle were presented by the protest of the carrier in *Texas Midland Railroad, supra,* and have been carefully considered by us in that case. For the reasons there assigned, the protest herein is not sustained as to the land areas the omission of which is protested by this carrier, and the principles applied in the tentative valuation are approved, except as to streets and highways, as to which the tentative valuation has been corrected in accordance with the rule in the case cited.

The formal order includes the following:

Investment in Road and Equipment.—The investment in road and equipment as stated in the books of the carrier on June 30, 1915, was $5,598,557.73. By certain adjustments detailed in Appendix 2, this amount was altered to $5,569,642.45, for road and equipment, including land, and $29,357.20 representing miscellaneous physical property, viz., non-carrier land, a total of $5,598,999.65.

Original Cost to Date, Cost of Reproduction New, and Cost of Reproduction Less Depreciation.—The original cost of property other than land owned or used by the carrier for its purposes as a common carrier, is shown in the subjoined statement, which also shows the cost of reproduction new and cost of reproduction less depreciation.

The amounts of original cost to date may not in every instance represent the exact cost of property units now in place, as some renewals have doubtless been made.

	Original cost to date	Cost of reproduction	
		New	Less depreciation
Road, excluding lands	$4,681,275	$4,703,308	$4,397,031
Equipment	293,881	292,165	232,626
General expenditures	222,296	432,971	404,218
Total	$5,197,452	$5,428,444	$5,033,875

Reference will be made later herein as to the classification of such property in conformity with the classification of expenditures for road and equipment prescribed by us.

Cost of Lands, Rights of Way and Terminals at the Time of Their Dedication to Public Use, and Present Value of the same.—There can be no statement made showing the cost of the carrier and non-carrier lands of the Southbound company separately, without employing apportionments of costs which were incurred partly for one such class of property and partly for the other.

The following statement shows the original cost and present value of all lands, apportioning the original cost of lands as between carrier lands and non-carrier lands upon the relative area as constituting the best basis available:

	Acres	Original cost	Present value
Carrier lands:			
Urban	145,283	.....	$347,394.02
Rural	1,280,269	.....	163,260.74
Total, carrier lands	*1,425,552	$372,190	$510,654.76
Noncarrier lands:			
Urban	2,380	.....	$34,531.50
Rural	326,152	.....	20,069.94
Total, noncarrier lands	328,532	29,357	†$54,601.44
Grand total	1,754,084	$401,547	$565,256.20

* Included in the carrier lands are 273,223 acres acquired through aids, gifts, grants of right of way and donations, having a present value of $63,398.27.

† The present value of noncarrier lands includes the value of any structures located on the lands.

Present Cost of Condemnation or Purchase of Lands.—Following the views previously expressed, no attempt is made to state what would be the present cost of acquiring either by purchase or by condemnation the lands of the carrier devoted to public use.

Physical Property Held for Purposes Other Than Those of a Common Carrier.—The amount, original cost, and present value of lands held for purposes other than those of a common carrier have been stated.

Materials and Supplies.—As shown in the general balance sheet, the value of the materials and supplies on hand is

shown by the carrier's records to have been, upon valuation date, $5,180.56. The materials and supplies on hand, as shown by inventory, were of the value and cost of $43,067, and the difference between the amount shown in the balance sheet and the carrier's records, $37,886.44, was due to sums which had not yet been taken into account.

Aids, Gifts, Grants and Donations.—Certain carrier lands were acquired by the Southbound company through aids, gifts, grants of right of way, or donation. Such lands mounted in the aggregate to 273,223 acres, of a present value of $63,398.27.

Other Values and Elements of Value.—No other values or elements of value were found to exist.

Appendices.—Appended hereto as Appendix 1 are the summary sheets and explanatory text showing the classification of the cost of reproduction new and cost of reproduction less depreciation above stated, in conformity with the classification of expenditures for road, exclusive of lands, and equipment prescribed by us. Appendix 2 hereto states the details as to the corporate and financial history, original cost to date, investment, capitalization, gross and net earnings, expenditures of money and purposes for which expended, of the carrier.

The engineering, land and accounting reports give the details respecting these figures and are on file in the bureau of valuation of the commission, open to public inspection, and subject to the direction of Congress, and such reports are referred to for greater particularity as to the matters herein stated.

This order will be supplemented by such further findings and order with respect to the value of the carrier property as may be deemed appropriate.

Portland Cement Production in 1918

COMPLETE STATISTICS of the output of hydraulic cement in 1918 compiled under the direction of Ernest F. Burchard, of the United States Geological Survey, Department of the Interior, indicate a marked decrease from the output in 1917 and show that the production of Portland and other cements in 1918 was the lowest since 1909. The shipments of Portland cement in 1918 amounted to 70,915,508 bbl., valued at $113,153,513, compared with 90,703,474 bbl., valued at $122,775,088, in 1917, a decrease in quantity of 21.8 per cent and in value of 7.8 per cent. The production in 1918 was 71,081,663 bbl., compared with 92,814,202 bbl. in 1917, a decrease of 23.4 per cent. The stocks at the mills increased from 10,353,838 bbl. in 1917 to 10,453,950 bbl. in 1918, or 1 per cent.

The average factory price per barrel for the whole country was $1.596 in 1918, compared with $1.354 in 1917, an increase of 24.2 cents, or 17.9 per cent. The prices in these two war years are the highest that have been realized for Portland cement since 1898 and 1899, when they were respectively $1.62 and $1.43 a barrel. The lowest average price, $0.813, was recorded in 1909 and 1912. The exports of hydraulic cement from the United States in 1918 were 2,252,446 bbl., valued at $5,912,166, or $2.62 per barrel, compared with 2,586,215 bbl., valued at $5,328,536, or $2.06 per barrel, in 1917. This represents a decrease in quantity of 12.9 per cent and an increase in value of 11 per cent.

Embargo Bureau of the N. W. Region

A PLAN has been instituted and put into operation in the Northwestern region for the distribution of embargo information which is an advance over methods previously used and is proving satisfactory to roads in this region. It will be recalled that the Car Service Section recently issued revised regulations in Circular CS-57 for the handling of embargoes, to become effective April 1. Briefly, they placed the issuance of embargoes under the direction of the regional directors, thus abolishing the zone embargo committees which formerly handled their distribution. The circular further stated that when embargoes have been approved by the regional director they should be transmitted by the regional director's office to all Federal controlled roads in the region, to the Car Service Section and to other regional embargo offices interested. The federal controlled roads in turn were instructed to notify their agents and the non-federal controlled roads which were assigned to them. In addition, the reason for each embargo must be stated, the embargo must be given an identifying number and a complete file of outstanding embargoes must be maintained at all freight loading stations for the guidance of the shipping public. These regulations made necessary the installation of a complete new system of handling embargoes, and in the Northwestern region the task of developing a workable plan was assumed by L. M. Betts, supervisor of car service.

The plan adopted for use in the Northwestern region has accomplished the dissemination of up-to-date embargo information in simple, compact form.

This was brought about by the compilation and publication of a monthly pamphlet containing in skeleton statement form all embargoes in effect on all railroads of the United States, Canada and Mexico that would be likely to affect business originating on railroads in the Northwestern region. The information is shown by roads arranged alphabetically in regional groups. Convenient reference is provided by an index both of the railroads involved and also of all local stations affected by the embargoes. Arranged in successive columns, the pamphlet shows information concerning the destination, consignee, commodity and gateway affected, together with a full statement of the exceptions that may apply. A sample entry is shown at the bottom of this page.

This pamphlet quite naturally would not answer the requirements of the Car Service Section as to the completeness of the embargo file at freight loading stations. To obviate this there was conceived, along with the method of issuing the bulletin of embargoes monthly, the plan of issuing a series of daily supplements. These supplements are mailed each night with a complete summary of all additions, cancellations and modifications received during the day, and sufficient copies are provided each road so they can be distributed immediately and directly to all local agents without the delay and expense of reproduction. They are so arranged that additions and corrections can be clipped and inserted in their proper places in the current month's issue of the embargo bulletin, and thus with very little labor the record can be maintained up-to-date at all times. One of the most satisfactory features of the system is that, regardless of the attention paid by the local agent to the daily

PENNSYLVANIA RAILROAD, LINES EAST

N. W. R. embargo number	Originating R. R. embargo number	Destination	Consignee	Commodity	Exceptions	Gateways	Reason for embargo
228-1-20	67-15	Brooklyn, N. Y. (Atlantic Terminal, Baltic Terminal, Fulton Terminal)	All	All freight	None	All	Accumulation

A SPECIMEN FORM OF EMBARGO

supplements, there is placed in his hands on the first of each month a complete and up-to-date revision of all embargoes then in effect.

Telegraph transmission of important embargo changes is continued, but by reason of the prompt distribution to the local agents of the daily supplements it is possible to reduce the use of the wires to a great extent.

While the expense involved in printing and distributing the monthly bulletins and supplements is a considerable item, it has been more than offset by the savings made by roads in the Northwestern region in the reproduction and distribution of embargo information formerly received by them from the zone offices, and by the saving secured through discontinuing the zone embargo offices.

Progress is being made by the Car Service Section on a plan to consolidate embargoes applying via various roads to a common point. In lieu of half a dozen or more separate embargoes, identical in their provisions, from as many different roads, one embargo only, applying via all lines, is being issued. This plan is entirely practicable under the present system of handling embargoes by the regional directors, but could not have been installed under the former plan where each road issued and transmitted its embargoes without central supervision. It is expected that as the new system of regional direction develops it will greatly simplify the embargo situation, and thus reduce the annoyances and difficulties that have made embargoes one of the nightmares of the long-suffering railroad agent.

Doings of the United States Railroad Administration

Many Roads Badly in Need of Rail. When Is a Railroad Under Federal Control Question Before I. C. C.

Washington, D. C.

Bids were received by the Railroad Administration up to May 17 on 200,000 tons of rail, but announcement was withheld until Mr. Hines' return from his trip to the Southwest as to whether the prices quoted are more favorable than those of $45 per ton for Bessemer and $47 for open hearth announced by the Industrial Board of the Department of Commerce in March. The fact that no announcement was made has given an impression that the bids are not regarded as satisfactory, because the Railroad Administration needs the rail. While the records show that an average of approximately 1,500,000 tons of rail were used for renewals during the 10 years before federal control, and approximately 1,350,000 tons during the three-year test period, only about 1,100,000 tons were used in 1918 and the Railroad Administration has not placed any orders for rail since it took over the roads nearly a year and a half ago. While some of the orders were redistributed so as to make delivery to railroads whose companies had not placed orders, that practice was discontinued after January 1 this year and the steel companies have declined to deliver rails ordered by one company to other railroads. To take the rail after it has been delivered for use on another line is impracticable in most cases because of the difference in rail standards. Where different roads agree as to the rail section there are usually differences in the drillings. As a result, while the steel companies have been delivering rail this year at the rate of 35,000 to 40,000 tons a week, it is going to the roads which originally ordered it, and many of the roads which have not placed orders in advance are said to be badly in need of rail. On May 1 there were outstanding orders for approximately 435,000 tons, and three of the steel companies, the Carnegie, the Lackawanna and the Cambria, were out of orders.

Maintenance Problems Discussed

Problems connected with the 1919 maintenance of way program constituted one of the principal topics for discussion at a conference held at St. Louis on May 19 between Director General Hines, who has been making an inspection trip into the Southwest, and the seven regional directors. C. A. Morse, assistant director of the Division of Operation, in charge of maintenance of way matters, was also present at the meeting, which took up among other things, the available figures showing the rail and tie renewals in 1918 as compared with the test period and with the 10 years preceding federal control in connection with the requirements for this year.

The latest instructions regarding the preparation of the 1919 maintenance budgets are contained in a letter addressed by W. T. Tyler, director of the Division of Operation, to the regional directors in part as follows:

"I presume that in pursuance of the director general's letter of February 25 you have carefully studied the maintenance on each railroad for the test period and for 1918. Please have each federal manager as soon as possible submit to you the 1919 program for his railroad, on the basis that the maintenance of road and structures shall conform as closely as possible in the amount of labor and material used to the established average annual maintenance during the three year test period, but with regard to safe operation of properties under your charge, and to that end ask him to report promptly his program for calendar year 1919, divided as follows:

1. Number of ties.
2. Cubic yards of ballast.
3. Tons of rail and fastenings.
4. Value in dollars of ties, ballast, rail and fastenings renewals.
5. Value in dollars of renewals or necessary replacement of bridges, trestles or culverts.
6. Value in dollars of work necessary in connection with proper maintenance under present conditions of track, buildings, fences, ditches, signals, telegraph and telephone lines and other items of maintenance. The cost under this item to be expressed in one sum and generally should not exceed the average spent for the purpose during the annual average of the test period equated as to values of labor and material determined by each road."

When Is a Railroad Under Federal Control?

Some railroads were taken under the protection of the federal government; some railroads had federal operation thrust upon them; some were relinquished, and taken back, and several hundred other railroads do not know whether they have ever been under federal control or not. All these are some of the results of the President's proclamation of December 26, 1917, and the law of March 21, 1918, which were so worded that the several hundred think they know they were taken over but thus far some of them have been unable to make their convictions effective.

The questions as to who is to decide whether a railroad has been under federal control and by what process a final decision can most readily be reached became a perplexing problem at a hearing held before the Interstate Commerce

Commission at Washington last week on a petition of the Arkansas & Louisiana Midland, a railroad 102 miles long but apparently not a "system of transportation" as construed by the Railroad Administration, for the appointment by the commission of a board of referees to determine its just compensation under the federal control act. Incidentally the hearing brought out the fact that it is also a serious question how any of the several boards of referees already appointed by the commission may perform their functions as the comptroller of the treasury has ruled that the commission may not pay their expenses from any of its appropriations, and the Railroad Administration, the custodian of the revolving fund appropriated by Congress to defray the expenses of federal control, naturally is reluctant to pay the expenses of a board to decide how much it owes to a company which it claims it owes nothing.

The case presents a situation typical of that of a large number of the short line railroads, which, after having supposed they had been taken over, were relinquished by order of the director general on June 29, 1918, and now claim compensation as having been under federal control, while the Railroad Administration takes the position that no direct control was exercised over them and that they are not entitled to compensation. E. Ford, president of the Arkansas & Louisiana Midland, testified on Thursday that he had received and obeyed many orders from the Railroad Administration during the first six months of 1918, although he admitted that they had not required any important change in the operation of his road and that he had been in some doubt as to his status. He said, however, that much of his traffic was diverted. He did not recall any orders that had had any important effect, although he said that on instructions from Washington he had postponed any action on requests of employees for increased wages until after the general wage advance order had been issued and he found his road was not included. Then he had to advance wages out of the company's funds. He also remembered having received a long telegram which was delivered at his house about midnight, giving instructions as to how to comply with the daylight saving law. He had also been ordered to advance money out of the slender cash resources to help the employees buy Liberty Bonds which they expected to pay for out of a retroactive wage increase, and he had advanced his rates in accordance with General Order No. 28.

The Railroad Administration was represented by R. V. Fletcher, general solicitor, who had no witnesses ready and asked for a continuance of the hearing in order that he might present witnesses after he had learned the character of the testimony presented by the railroad. After some discussion the hearing was adjourned until Saturday, May 17. Mr. Fletcher had spoken of getting R. H. Aishton, regional director for the Western region during the time the road was receiving orders from the Railroad Administration, to testify, and Commissioner McChord had suggested that General Counsel Payne would make a good witness, but on Saturday Mr. Fletcher appeared again without witnesses, saying he had been unable to get Mr. Aishton. On cross-examination Mr. Fletcher attempted to show that the Arkansas & Louisiana Midland had failed to observe promptly some of the accounting instructions, such as those about opening a set of separate books for federal accounts. Mr. Ford said he could not claim to have followed all of the instructions because of insufficient clerical help and because many orders did not reach him till long after their effective dates; also he had frequently received a cancellation or modification of an order before he received the original order; but he made the point that many of the big roads had not been able to comply with the order to open separate books until months after the required date. The hearing was adjourned for half an hour while Mr. Fletcher went to find a witness on this point but the assistant director of accounting had just received a telegram summoning him to St. Louis to meet the director general and so he could not appear. By this time the commission showed some signs of impatience and it allowed the usual procedure to be varied sufficiently to allow counsel for both sides to explain in their oral argument some of the evidence that would have been testified to if witnesses had been present or if documents had not been delayed.

The argument of John S. Burchmore, representing the Arkansas & Louisiana Midland, brought out some of the circumstances attending the relinquishment of the short line railroads last June. He read a memorandum from C. R. Gray, then director of operation, to General Counsel Payne, dated June 28, the day before the general relinquishment, giving a list of railroads, including the A. & L. M., which he said required considerate treatment because they were in competition with larger roads and which he recommended the relinquishment of in order to give an opportunity to negotiate with them "on a fair basis," but he said it would probably be necessary to take them back later. This memo was headed "Retention or Relinquishment," which Mr. Burchmore thought was rather conclusive evidence that the roads were at the time under federal control. He also quoted from one of the form letters of relinquishment sent out by Mr. Payne, saying that while there was some doubt as to whether they had ever been under federal control they would be formally relinquished to remove any doubt.

Mr. Burchmore said that a federal manager had never been appointed for the A. & L. M. but that federal managers for the larger roads in its territory had not been appointed until after the date it was relinquished. Mr. McAdoo had issued an order appointing the corporate officers as his agents and this had been received and acted on by the president of the A. & L. M. just as he had received and acted on the other orders sent to him as to the other roads. After the relinquishment Mr. Payne had written to Mr. Ford saying that if his company felt damaged by not being under federal control he would be glad to discuss the terms of a contract for taking it back. Mr. Ford, however, had refused to sign one of the co-operative short line contracts, which do not provide for compensation.

Mr. Fletcher argued that as the road had not been under federal control its remedy lies in a suit in the Court of Claims rather than in the appointment of a board of referees, but said that if the commission should find otherwise he would join in the request for the appointment of a board. Mr. Burchmore said the act provides that "any claim" for just compensation not adjusted by the Railroad Administration must be referred to a board and that until that is done he could not apply to the court without waiving his claim that the road was under federal control.

At this point Commissioner Daniels raised the practical question as to what a board could do if the commission cannot pay its expenses and the Railroad Administration will not. The act provides that members of the Interstate Commerce Commission organization shall serve on such boards without additional compensation, but this does not provide for the reporters' fees for taking the record. Mr. Fletcher said he had not been advised of the Railroad Administration's attitude on this point. Then followed a general discussion as to who should decide whether the road had been under federal control. It was apparently agreed that the commission had no function except to appoint the referees, but that the boards would have no jurisdicion to decide anything but the amount of compensation. Mr. Fletcher thought time and litigation might be saved if the whole thing were put up to the Court of Claims but Mr. Burchmore suggested that he would prefer to ask a District of Columbia court to mandamus the commission to appoint the board.

The hearing was closed with an understanding that Mr. Fletcher would file a memorandum on the functions of the Court of Claims.

385,000 Surplus Freight Cars

The net surplus of freight cars on May 1 was 385,447, including nearly 20,000 on Canadian roads, according to reports compiled by the Car Service Section. This represents a larger number of idle cars than has been recorded at any time since April, 1908, except on March 1 and April 1 of this year. On March 1 the net surplus stood at 473,080 and on April 1 it was 446,685, so there was a reduction during April of 61,000. As shown by the following table, there were more idle box cars than any other class, including a large number stored in the western regions in readiness for handling the grain traffic but there was also a large proportion of surplus coal cars, due to the slack conditions in the coal trade.

SUMMARY OF CAR SURPLUSES AND SHORTAGES AS OF MAY 1, 1919.

	Surpluses.									Shortages.								
Regions.	Box.	Flat.	Coal & Gond.	Refr.	Stock.	Coke.	Furn.	Misc.	Total.	Box.	Flat.	Coal & Gond.	Refr.	Stock.	Coke.	Furn.	Misc.	Total.
Eastern	*9,632	562	36,429	644	357	3,478	7	1,484	52,593	241	67	0	21	2	0	0	0	331
Allegheny	407	35	45,694	84	537	1,771	0	922	49,450	84	10	0	0	0	0	0	0	94
Pocahontas	38	9	9,651	28	65	0	0	29	8,820	0	0	0	0	0	0	0	0	0
Southern	27,800	925	18,145	1,859	2,933	374	36	591	52,663	0	354	0	0	38	0	0	0	392
Northwestern	31,032	3,400	13,880	3,372	7,707	0	47	1,316	60,754	25	0	0	0	0	0	1	0	26
Central Western	44,537	1,988	20,345	3,582	8,613	303	575	158	80,101	543	0	720	0	0	0	0	0	1,263
Southwestern	40,293	3,479	8,243	1,352	5,538	220	595	2,565	62,285	0	0	0	0	0	0	0	0	0
Total	153,739	10,398	152,387	10,921	25,750	6,146	1,260	7,065	367,666	893	431	720	21	40	0	1	0	2,106
Canadian Roads	15,098	1,285	2,200	599	808	0	0	0	19,990	3	0	0	0	0	0	0	100	103
Grand Total	168,837	11,683	154,587	11,520	26,558	6,146	1,260	7,065	387,656	896	431	720	21	40	0	1	100	2,209

*Principally automobile cars.

Train Control Committee

The Committee on Automatic Train Control returned last week from its western trip after having inspected automatic stop installations at Spokane, Wash., and San Francisco and Oroville, Cal. The members of the committee were able to hold almost a continuous meeting in their car and made much progress in their study of the various plans and reports of service conditions that are before them for consideration. The next meeting of the committee will be held in New York on June 3, at which time the members will inspect automatic stops in the Interborough Subway, on the Brooklyn Rapid Transit system and in the tunnels of the Hudson & Manhattan and the Pennsylvania terminal. An inspector representing the committee has been oberving and making reports for several weeks on the operation of the Miller train control system on the Chicago & Eastern Illinois, and an inspector will probably be sent to report on the installation of the American train control system on the Chesapeake & Ohio. The committee will on later trips examine 15 or 20 installations, models or laboratory sets in the East, and will hardly be in a position to make recommendations to the Railroad Administration before fall.

Single Equipment Trust Proposed

Plans for the creation of an equipment trust to finance the 100,000 freight cars and 1,930 locomotives ordered by the Railroad Administration by a single issue of equipment trust obligations amounting to approximately $400,000,000, instead of having individual securities issued by each of the roads, are under consideration by the Association of Railway Executives and the Railroad Administration.

Of the 100,000 freight cars ordered, 44,542 had been built up to April 30 and 92,750 had been assigned to various companies, but only 25,570 had been accepted, while 18,972 were in storage at the car-building plants. Of the 1,930 locomotives ordered, all but 41 had been assigned, but all the assignments had not been accepted. The locomotives have been accepted as fast as they have been built, but various companies have objected to the assignments just as they have to the cars. Some of the objections are based on the inability to finance the equipment, some on the statement that the cars or engines are not needed, and some are based on the types, although the Railroad Administration has allowed the roads to exchange one type for another where it can be done before the builders have progressed too far with the building or the ordering of materials to make the change.

The circulars sent out by the regional directors asking for information as to the number and types of locomotives that will be required and whether the corporations will be willing to purchase locomotives of their own standards represent an effort to place some of the unaccepted locomotives, but it will not be possible to substitute individual or "made-to-order" designs for the standard types in many instances because the work on the parts for the standard types has been so far advanced.

Contracts Executed

The Railroad Administration has executed compensation contracts as follows: Central Vermont, $835,000; Lehigh & New England, $1,135,760; and Atlantic & Western, $12,-660; also co-operative short line contracts with the Kalamazoo, Lake Shore & Chicago; Erie & Michigan Railway & Navigation Company, and the Bowdon Railway.

The Railroad Administration has signed co-operative short line contracts with the Pecos Valley Southern, Chesapeake & Western, Akron, Canton & Youngstown, Arcade & Attica, Marion & Eastern and the Preston Railroad.

Conference on Equipment Allocation

The special committee appointed by the Association of Railway Executives to confer with the Railroad Administration regarding the allocation of the standard freight cars to the various companies has been in Washington this week and has discussed the matter with Director Shirley of the Division of Finance.

Demurrage Up to Director General

The question of reduction in demurrage rates which has been persistently demanded by the shippers is now before Director General Hines for decision on recommendations which have been made to him by the divisions of traffic and of operation.

The American Society of Civil Engineers will hold its forty-ninth annual convention at St. Paul and Minneapolis, June 17, 18, 19 and 20, with headquarters at the Radisson Hotel, Minneapolis. Tuesday, the 17th, will be devoted to business sessions in the morning and afternoon with a reception in the evening. Wednesday will be devoted to sightseeing trips by automobile about the city. On Thursday a trip will be made by automobile to the plant of the Northern States Power Company at Taylors Falls, Minn. On Friday afternoon the party will go by special train to Duluth and on the following day will tour the iron mines on the Missabe range.

Orders of Regional Directors

PROCEEDINGS BEFORE I. C. C.—The regional director Eastern region, by circular 1500-116A726, sends to federal managers regulations and suggestions, prepared by the Director of the Division of Traffic and the general counsel, at Washington, for defending before the Interstate Commerce Commission complaints against the railroads made to that body. The traffic assistants to the regional directors are to supervise these matters, and they are to look after compliance, by the railroads, with the various orders of the commission.

Superheaters.—The Eastern regional director, by circular 500-1-97A728, authorizes the application of superheaters to locomotives where all of the needed material is already on hand. The corporations must be consulted, but if material is on hand such consultation need not cause delay.

The Pocket List.—The Eastern regional director, by circular 1500-1-3-19A729, advises federal managers of a suggestion from the director general that in giving information to the Pocket List of Railroad Officials, or in correcting data in that periodical, care be taken to furnish full and correct post office addresses.

Maintenance Budget.—The regional director, Eastern region, by circular 2700A733, instructs federal managers as to detail requirements connected with preparation of maintenance budgets for 1919.

New Tracks for Industries.—The Eastern regional director, by circular 2700A734, advises federal managers that important propositions for industrial sidings should be dealt with by wire. The regional director should be informed how long a time will be needed to lay the track, and how soon it will begin to furnish revenue. This for the purpose of determining whether the improvement will produce profit during the present year. In connection with larger projects, requiring a longer time, the railroad corporation should be consulted.

Intoxicated Soldiers.—The Eastern regional director, by circular 2900-66A735, calls attention to complaints of the presence of intoxicated soldiers and sailors on railroad trains. Federal managers should see that trainmen and other employees enforce proper conduct, and especially in territory where drinking intoxicating liquors on trains by civilians is a violation of local laws.

Operating Statistics.—The regional director, Eastern region, by circular 1801-22A736, gives further instructions as to preparing, for the operating statistics section, data concerning worktrain cars moving in revenue trains.

Tinners' Convention.—The regional director, Eastern region, by circular 102-36A738, and the Northwestern director, by circular 77-1-93, announce approval of the convention which is to be held by the American Railroad Master Tinners', Coppersmiths', and Pipefitters' Association in June. Federal managers exercise their own judgment as to granting leave of absence and giving passes.

Heavy Loading.—A. H. Smith, regional director, Eastern region, by circular 500-13-1A741, sends to federal managers a letter from the director of the Division of Traffic, calling for continued efforts to have freight cars loaded to capacity. To increase minimum weights in tariffs would be a slow and difficult process, but it is believed that traffic representatives can continue to do good work with shippers and receivers. Shippers should be shown the economy of full loading and be reminded that voluntary action on their part will tend to stave off the day when arbitrary rules will have to be adopted. Where orders from consignees are alleged to be the cause for light loading, those consignees should be seen.

Tracers and Passing Reports.—A. H. Smith, regional director, Eastern region, by circular 600-1-6-A742, calls on federal managers for information as to their practice, and their recommendations, in regard to giving shippers fuller information concerning the progress of shipments. At the recent conference in Washington with the National Industrial Traffic League, shippers asked for passing reports of l. c. l. freight at transfer stations and for permission to ask information directly from local agents. Mr. Smith finds that present practice is not uniform; he desires advice as to improvement in practice and as to the probable cost of keeping the proposed records at transfer points, and of establishing a manifest system for keeping track of carload shipments.

Transportation of Liquor for Diplomats.—The regional director, Eastern region, by circular 600-174A743, calls attention to the legal aspects of the transportation of intoxicating liquors from a foreign country consigned to a diplomatic representative residing in the District of Columbia. The seller of liquor and the carrier are ordinarily liable to the penalty of the Reed law; but liquor sent from abroad to diplomatic representatives of foreign governments in this country may be transported by freight or express to its destination.

Operating Statistics.—The Eastern regional director, by circular 1801-22A744, promulgates additional instructions concerning revised statements of expenses after making adjustment for back pay, and for reporting locomotive and train costs on form OS6 and form OS7. By circular 1801-22A747 he calls for monthly statements of freight and passenger revenue, to be made on form OS8; this is the same information which is required annually by the Interstate Commerce Commission.

Blacksmiths' Convention.—The regional director, Eastern region, by circular 102-37A745, approves the annual convention of the International Master Blacksmiths' Association, to be held at Chicago, August 19, 20 and 21. Each road will follow its usual practice in regard to allowing blacksmiths to attend.

Diversion of Freight—Notice to Consignees.—The Eastern regional director, by circular 600-43-4A746, prescribes a form by which notice is to be mailed to consignees when a carload of freight is diverted in transit.

Record of Work at Enginehouses.—The Eastern regional director, by circular 1801-127A748, sends to federal managers revised instructions for reporting, monthly, the number of man hours worked at enginehouses. This report goes to Frank McManamy, Washington.

Annual Passes for Employees.—The Eastern regional director, by circular 2100-9A750, advises federal managers that where an employee requires an annual pass over other than his home road, that pass should include also his transportation over the home road, so that he will carry only one pass for all.

Preparations for Wheat Crops.—The Southwestern regional director, in circular 210, quotes an article which appeared in a weekly news letter issued by the United States Department of Agriculture concerning the possibility of the coming wheat crop congesting storage facilities and suggests that at interior points a canvass be made of the situation. The construction by farmers and shippers of additional storage facilities should be encouraged.

Consignments to Shipper's Order.—The Northwestern region, file 88-1-75, states that the provisions of circular, file 88-1-75, issued by the Northwestern regional director (*Railway Age*, February 7, page 349), apply only to shipments destined to points in Western Classification territory, Northwestern, Central Western, and Southwestern regions.

Report on Reclamation of Materials.—The Northwestern Regional Purchasing Committee, in supplement 7 to circular 10, gives a list of items of material being reclaimed by various roads in this region. The list is long and detailed, containing about 800 items.

Distinguished Service Medal for George Hodges

Record of His Work as Manager of Railroad Troop Movements Throughout the War

ANNOUNCEMENT was made on May 16 by Walker D. Hines, director general of railroads, that the distinguished service medal has been posthumously awarded to George Hodges, late manager of the Troop Movement Section of the Division of Operation of the Railroad Administration, who had organized and had charge of the troop movement work from the start.

The information was contained in a letter from Newton D. Baker, secretary of war, to the director general, under date of May 13, as follows:

"It is with sincere regret that I learn of the death of Mr. George Hodges, manager of the Troop Movement Section of the Division of Operation of the United States Railroad Administration.

"The services of the railroads during the great war are gratefully remembered, and I thank you for the suggestion that some suitable recognition of the work of the man who was largely responsible for their success might be made by the War Department. I take pleasure in advising you that, by direction of the President, and under the provisions of the act of Congress of July 9, 1917, the Distinguished Service Medal has been posthumously awarded to Mr. George Hodges 'for especially meritorious and conspicuous service as manager of the Troop Movement Section of the Division of Operation of the United States Railroad Administration. Mr. Hodges arranged all the details of the movement of troops from local draft boards to mobilization camps, between camps, or from mobilization camps to the ports of embarkation for shipment overseas. Troops in large numbers were moved on short notice and he was responsible for the successful co-ordination and carrying out of these movements.' "

At the beginning of the trouble with Mexico he was placed in charge of the American Railway Association special committee for co-operation with the military authorities. With the declaration of war against Germany in April, 1917, he was appointed assistant to the chairman of the Railroads' War Board. After the taking over of the railroads by the government, the organization under Mr. Hodges was made part of the United States Railroad Administration. On May 24, of the same year, he was put in charge of the Troop Movement Section of the Division of Operation.

He died very suddenly in Washington on March 14.

A brief account of the work of the Troop Movement Section was published in connection with the report of the Division of Operation in the *Railway Age* of January 10, which gave figures showing the extent of the troop movement from May 17 to November 10, the day before the signing of the armistice. C. F. Stewart, Mr. Hodges' successor as manager of the Troop Movement Section, has issued a circular containing a copy of Secretary Baker's letter, saying, "This splendid tribute to Mr. Hodges will be appreciated by all those who have so ably assisted the movement of the troops and through whose co-operation such a success was made possible." The circular also encloses a copy of the record to November 11, which was prepared by Mr. Hodges, and also a supplemental report showing the movement from November 11, 1918, to April 30, 1919, during which time there have been moved a total of 3,389,665 men, of which 1,583,942 were moved on regular trains and 1,805,723 on special troop trains. This is an average of 635,959 per month.

From May, 1917, to April 30, 1919, the Troop Movement Section has been responsible for the movement of a total of over 14,000,000 men, nearly half of whom have been moved on special trains. The maximum for any month of the entire period was 1,147,000 in July, 1918. This entire movement has been accomplished with only 16 accidents involving death or injury. The number of men killed was 39 and the number of men injured 335. The table gives the consolidated statistics regarding the movement from May, 1917, to April 30 of this year:

TROOP MOVEMENTS MAY, 1917, TO APRIL 30, 1919

1.	Troops Moved:			
	(a)	Drafted men from their homes	2,287,926	
	(b)	On regular trains	5,252,432	
	(c)	On special troop trains	6,851,915	
		Total		14,392,273
	(d)	Average per month	504,343	
	(e)	Maximum July, 1918	1,147,013	
2.	Cars Furnished:			
	(a)	Pullman, standard and tourist	90,773	
	(b)	Coaches for special troop trains	87,984	
		Estimated coaches for draft and regular train movements	69,802	
				248,559
	(c)	Baggage and express cars for special troop trains	16,084	
		Estimated baggage and express cars for drafted men	4,576	
				20,660
	(d)	Freight cars for special troop trains		24,029
		Total		293,248
3.	Special Troop Trains:			
	(a)	Number run	16,393	
		Estimated number required for drafted men	4,576	
				20,969
4.	Average Special Troop Trains:			
	(a)	Number cars per train	12	
	(b)	Distance per train	803	
	(c)	Number hours per train	40	
	(d)	Miles per hour	22	
	(e)	Men per train	418	
5.	Accommodations:			
	(a)	Number carried in Pullman cars	3,440,173	
	(b)	Number in coaches	8,664,074	
	(c)	Percentage in Pullman cars	28.4	

The following description of the work of the section outlining briefly its organization and methods was prepared by Mr. Hodges:

When diplomatic relations with Germany were severed, steps were at once taken to put together the machinery to handle troop movements upon a large scale, based upon the experience gained in the movement of troops to the Mexican border in 1916.

At the declaration of war on April 6, 1917, the skeleton of the organization was complete, and it only remained to supplement it as occasion arose for its development.

This skeleton consisted of a central office in Washington in constant communication with the War Department, a general agent with his staff at the four (afterward six) department headquarters, and a general agent in each state to superintend the railroad movement of the National Guard.

As necessity presented itself there were added successively a general agent at the headquarters of the construction division of the quartermaster corps, general agents at the increment camps and in charge of the railroad end of the construction of the cantonments and the National Guard camps (who remained in charge after the troops had occupied them), as well as others at embarkation camps and at ports.

The duties of these general agents have been to keep in touch with the officers to whom each was accredited, to ascertain what was desired to be done and to arrange through the appropriate channel in each case to do it; to see that trains and cars were provided at the time required; that the loading was done properly, and, in general, to translate into terms of action the necessities of the army.

There have been in service 127 of these; the closing of

some camps and the movement of the National Guard from their respective states have relieved a number from duty, and there remain 64.

It became early evident that to move successfully such large numbers of men would entail unprecedented use of telegraph wires, and that the brief cipher used in 1916 would not answer the purpose. To meet the necessity for secrecy and brevity, a cipher expert, J. Edwin Dempsey, was called in to devise an efficient code. This he did; the code work being his personal contribution; the railroads paying the necessarily heavy expense of publication. This code was also adopted by the quartermaster general for use in his department. It was later supplemented by a route code book, by which all routes were coded into one cipher word regardless of how many roads or junction points were included.

The movement of troops with their impedimenta and of selective draft men and recruits may be generally divided as follows: (1) The movement of the regular army to its increment camps. (2) The movement of the National Guard to its camps. (3) The movement of the National Army from their homes to their cantonments. (4) The movement of men from one camp to another to meet the needs of the service.

In addition to these there has been a constant stream of recruits moving from depots to camps and continuous movements of bodies of organized troops to camps or ports.

The movement of the regular army to increment camps was performed with great ease by reason of the relatively small number of men involved and their experience in travel.

Before speaking of further movements it should be noted that on June 1, 1917, none of the camps to which the National Guard or National Army were destined were more than just begun, and in some cases the locations had not been fixed.

The problem of bringing the material to these 32 large camps, as well as to the 15 or 18 aviation schools also under construction, that the work might proceed at top speed, was satisfactorily solved by successful co-operation between our Washington organization and the force of the construction quartermaster, General Littell, the liaison officer being C. E. Denney, general agent of this association, who was attached to General Littell's staff.

Altogether this construction work involved bringing to the various sites 139,905 cars of materials. This was accomplished by ordinary means and practically without setting up any priorities in movement. Although an extraordinarily large commercial and allied tonnage was also moving, it was before any large volume of government tonnage was under way with the confusion and congestion caused by the indiscriminate forwarding of such freight without regard to physical limitations or to the necessity for its orderly transportation and prompt release at destination.

The movement of the National Guard involved about 343,223 men. The guards of the several states were not as in 1916 mobilized in one place, but in many instances were picked up company by company at home stations, necessitating elaborate schedules to bring a regiment together before despatching it upon its long journey to the Southern camps. The entire movement was, however, made upon the schedule as outlined by the War Department. At our suggestion, it was twice suspended pending the movement of increments of the National Army.

The movement of the National Army was a most complicated one. Originating at upwards of 4,500 points in every county of every state, the men had to be brought within a given period of time to their cantonments. To do this involved scheduling every movement of every train, regular or special, on which any of these men traveled, placing these schedules in the hands not only of the railroads concerned but also in the possession of every one of the local exemption boards at points of origin. That it was done on schedule and without disorder or accident is noteworthy.

All our suggestions as to dates were accepted by the War Department; when these dates were set, all details were turned over to us. The schedules were prepared by the several passenger associations, and a competent representative was placed by the association in the office of the governor or adjutant general of each state during the movement to adjust any difficulties that might present themselves. We also were obliged to undertake the feeding of these men. This was done in some cases by using dining cars, in others in eating houses, and in others by supplying lunches on the trains.

Almost immediately upon the arrival of the National Army at its camps there began an inter-camp movement of large proportions. During a portion of this time, organizations of the National Guard were moving South. It was therefore frequently necessary to make suggestions as to appropriate dates for such movements to avoid overcrowding of roads and gateways. These suggestions were cordially accepted.

A review of the troop movements would not be complete without a reference to the extremely heavy demands made upon the railroads by the furloughs granted at the divisional camps. In many instances thousands have been furloughed for Saturdays or Sundays, and at Thanksgiving and at Christmas the number of men on leave was well above 100,000 in each case. The requirement in power to meet this has been serious in its effect.

The organization in Washington as it has been built up consists of:

A routing section under C. F. Stewart, which arranges the routes by which the troops travel subject to the approval of the quartermaster general. This section represents the passenger department of the railroads. It has an employee in the office of the quartermaster general.

A transportation section under J. W. Smith, which controls the arrangements for actual movement over the railroads involved, and keeps in touch with all necessary features of transportation.

A pullman section under C. W. Henry, placed with us by the Pullman Company, which apportions the available tourist cars under authorization for their use from the quartermaster general.

To these was added a liaison officer, Major R. E. Shannon, U. S. R. A., who acts as a point of contact with the War Department to acquaint us with its desires and it with our needs and preferences.

The concentration of these several functions in one place has reduced lost motion to a minimum and has secured the maximum of information being available at all times. As a result all the difficulties inherent in any scheme of co-operation have been removed as they appeared and a smoothly running machine is in operation which has been able to take care of any situation which has presented itself. It is sufficiently flexible to enable us to make the greatest possible use of the facilities of parallel lines in order to avoid overburdening any; to throw troops around congested areas, or, in fact, as it is now organized and related to the War Department, it is possible for us to so handle the movements as may best serve the physical necessities of the moment, except, of course, where an actual military necessity must govern.

This service has been made possible only by the cordial co-operation of officers of the army, and particularly those of the general staff, the adjutant general's office, the provost marshal general's office and of the quartermaster's corps.

Street railway conditions in cities where approval of rate advances has been refused or deferred, are to be investigated soon by a new government commission. President Wilson has cabled his sanction for creation of the commission. Fifty or more street railways are already in receivers' hands and many others are threatened with a similar situation.

Railway Developments in Foreign Countries

Officer of Southern Mexican Roads on Visit to United States; Export Figures for March

COLONEL PAULINO FONTES, general manager of the southern railways of Mexico under government control, is at present visiting the United States to arrange for the purchase of a larger volume of railway supplies. After visiting St. Louis and Chicago, he will arrive in New York on May 28. Colonel Fontes, who is a native of the state of Sonora, entered the railroad service in 1899 as a brakeman on the Southern Pacific Railway, lines south of Nogales, Sonora. He was promoted in a few years to freight conductor, and then was given a passenger run. In 1910 he left the Southern Pacific to join the revolution against the Diaz Government, and was given charge of all the military trains during the pre-Constitutional Administration of President Carranza. Then he became general superintendent of the Constitutionalist Railways, and later was appointed general manager of all the lines south of Mexico City, which position he now holds. Colonel Fontes is a graduate of the University of California and speaks English fluently. He is regarded in Mexico as one of the ablest men in government railway circles.



Col. P. Fontes

Belgian Inland Waterways Commission

A Belgian Waterways Commission has been established, the functions of which will be to prepare a program for the exploitation and organization of navigable waterways. The commission will work under the Ministry of Railways, Marine, Posts and Telegraphs, and will complete the work of the Inter-Allied Waterways Commission.

German Cars Turned Over to the Allies

No statistics are as yet available giving the exact amount of German railway stock handed over under the armistice conditions, says the Railway Gazette (London), in its issue of April 25, but it may be said that the amount of restitution to date is on a far larger and more satisfactory scale than the average newspaper reader might imagine. This is particularly noticeable in regard to freight cars. At practically every station and siding of importance throughout Belgium and northern France one sees today strings of German freight cars, which in fact seem to outnumber the native cars, and a very large percentage of the merchandise traffic now being handled is moved in enemy equipment. German locomotives are not so conspicuous, but they are also to be seen to a noticeable extent, and their external appearance is on the whole no worse than that of the average French and Belgian locomotive today. Passenger cars of all kinds have also been delivered in large numbers, ranging from the oldest type of third-class coach to the most modern corridor car de luxe. The German corridor equipment is being operated on the fast express services, and it was on a train largely made up of these former enemy vehicles that Lloyd George recently travelled from Boulogne to Paris. The corridor cars are in remarkably good condition.

Railway Construction in Mexico

According to the announcement of the Department of Communications and Public Works of the Mexican government, the Cananea Copper company and other American interests have filed application for a concession to construct a railroad from Cananea to Bahia Roca, a prospective deep-water port on the Gulf of California. The route of the prospective line is through a part of the state of Sonora that is rich in undeveloped mineral resources. The distance between Cananea and Bahia Roca is about 175 miles. At present the only railroad reaching Cananea is the one which runs down from the Arizona border. By obtaining connection with the deep-water port it will be possible for the big mining camp to receive supplies at lower cost, it is claimed. It will also afford means for shipping the smelter products by water.

Finland's Arctic Railway

The realization of the projected railway from Rovaniemi, on the Arctic Circle, north of the Gulf of Bothnia, to Petschenga, Finland's road to the Arctic Ocean, has been left in abeyance for some time, but is now to be proceeded with. The scheme originally emanated from the Russian Government, which urged or ordered Finland to construct a railway along the Pasvik to Petschenga, or in any case to make the necessary preparations. The North Railway went only as far as Rovaniemi, whence there remains a distance of about 300 miles to Petschenga, 120 miles as far as Kyro, and 180 miles on to Petschenga. The preliminary road, which was to precede the railway, has been almost completed from Rovaniemi, past Sodankyla to Kyro. It has a breadth of about 35 ft. half of which is intended for the future railway. The section from Nautsjoki to Tolleoi and Petschenga is built in an unsatisfactory manner, and the revolution stopped progress, at least as far as this Russian section is concerned. Finland, however, proceeded with the work, after the country's occupation by German troops, under the management of German officers, and a light railway was constructed as far as Kyro. The part played by the Germans in Finland then came to an end, but there is now a possibility that England will step in and help Finland to complete this important railway, which has possibilities from the industrial and commercial point of view. In this connection reference should be made to the contemplated Norwegian free port in East Finmark. Opinions have been divided as to where this port should be located, but advantages are claimed for Kirkenaes, both for sea and land traffic, and as regards timber and iron ore.

Europe to Build Own Railroad Equipment

American car builders are not basing their estimates of future business on prospects of big orders from either France or Great Britain, according to the opinion of W. H. Woodin, president of the American Car & Foundry Company as expressed to a representative of the New York Tribune.

"France, England and even Germany," said Mr. Woodin, "will probably be in a position before long where they will be able to supply their own needs in the railroad equipment

line. England, if necessary, can turn over to Canadian manufacturers for additional supplies.

"There should be an excellent market, however, for American-built cars in other parts of the world, particularly in South America, where the railroads are in need of equipment, but large orders are dependent on the ability of these countries to finance their purchases in this market. In my opinion the way this should be done is to offer the securities of the South American railroads direct to American investors. This method is better than to have the securities offered indirectly through some buffer corporation or syndicate which would demand a substantial profit for its work."

The American Car & Foundry Company has not taken any recent orders for foreign delivery, Mr. Woodin said. Substantial progress is being made on orders for freight cars placed with the company by the Italian government and India shortly after the signing of the armistice. A total of 13,250 cars is involved, of which 10,000 are to go to Italy and 3,250 to India. These contracts are valued at about $25,000,000.

Exports of Railway Track Material in March

Exports of railway track material in March totaling $193,987 for spikes, $3,051,611 for rails and $515,535 for switches, frogs, etc., were not as great as in January or February. Of the 48,955 tons of rails in March (comparing with 65,024 tons in January and 66,900 tons in February), 18,131 tons were destined for France and 6,060 tons for Japan. The figures, as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce, follow:

	Railroad spikes		Rails of steel		Switches, frogs, splice
Countries	Pounds		Tons		bars, etc.
Belgium	.....	.....	6,354	$353,712	$18,806
France	1,934,500	$78,678	18,131	1,074,519	209,190
Italy	.....	.....	2,258	201,400	44,030
Norway	.....	.....	215	10,500	.....
Canada	383,800	11,570	2,773	109,658	17,649
Costa Rica	.....	.....	.....	.....	99
Guatemala	10,000	560	.....	.....	.....
Honduras	.....	.....	1,386	78,572	7,390
Nicaragua	.....	.....	.....	.....	96
Panama	.....	.....	.....	.....	2,713
Salvador	875	58	.....	.....	10
Mexico	79,576	5,314	443	25,229	22,973
Barbados	11,600	551	140	9,514	2,313
Jamaica	.....	.....	4	300	.....
Other Br. W. Indies (except Trinidad and Tobago)	8,510	478	30	2,218	674
Cuba	368,606	18,292	2,314	149,047	66,901
Dominican Republic	9,000	514	54	3,022	2,158
Argentina	30,030	3,303	.....	.....	.....
Brazil	338,100	15,549	.....	.....	7,193
Chile	71,980	4,319	2,249	115,811	15,831
Colombia	11,700	739	447	31,561	3,053
Ecuador	.....	.....	.....	.....	295
Peru	16,200	805	595	39,955	4,742
China	.....	.....	1,584	113,688	2,884
Chosen	6,720	420	.....	.....	.....
British India	.....	.....	12	2,700	819
Straits Settlements	19,800	1,386	.....	.....	.....
Dutch East Indies	130,324	6,019	2,266	164,387	20,605
Japan	319,103	16,504	6,060	464,755	43,468
Russia in Asia	108,192	3,494	655	30,944	5,003
Siam	242,000	20,084	50	4,032	145
Australia	.....	.....	.....	.....	7,697
Philippine Islands	84,000	5,264	54	4,200	7,319
British West Africa	1,200	86	.....	.....	.....
British South Africa	.....	.....	881	61,887	1,479
Total	4,185,816	$193,987	48,955	$3,051,611	$515,535

Exports of Locomotives in March

The exports of locomotives in March totaled only 27 with a value of $852,224 as compared with 87 in January valued at $3,076,543 and 85 in February valued at $2,584,269. Of the March exports over half from the standpoint of value, namely 12 locomotives valued at $681,204 were exported to Chosen. The figures in detail as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce are as follows:

Countries	Number	
Canada	5	$18,000
Mexico	2	21,495
Cuba	3	52,125
Peru	2	39,700
Chosen	12	681,204
Straits Settlements	1	31,200
Dutch East Indies	1	5,500
Philippine Islands	1	3,000
Total	27	$852,224

Exports of Car Wheels and Axles in March

Exports of car wheels and axles in March totaled $686,281, a considerable increase over the total of $278,393 in January and of $541,630 in February. Shipments to Japan totaling $255,308 made up the largest item in the whole while Japanese China was second with $93,410. The figures in detail as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce follow:

Countries	
France	$31,387
Iceland and Faroe Islands	653
Italy	61,468
Norway	178
Canada	77,668
Costa Rica	2,490
Guatemala	111
Panama	779
Mexico	11,907
Jamaica	2,188
Other British West Indies (exc Bermuda, Trinidad and Tobago)	268
Cuba	12,355
Dominican Republic	850
Argentina	11,331
Brazil	12,792
Chile	390
Colombia	1,755
Ecuador	2,198
China	10,758
Japanese China	93,410
Chosen	6,200
Dutch East Indies	63,236
Japan	255,308
Australia	25,096
British West Africa	500
British South Africa	1,005
Total	$686,281

Orders Placed in U. S. Alarm British

Recent announcement of big orders placed in the United States when British factories were anxious for work has caused the nation some alarm, according to a communication to the Journal of Commerce, New York, from Liverpool, under date of May 1. With unemployment growing, the English manufacturers admit that they are suffering from competition with the Americans and point to the instance where an order for steel rails was placed by a Birmingham corporation in the United States. Fear is expressed that a $1,775,000 contract for locomotives has been lost to a United States firm, and discontent is growing as to the policies of reconstruction.

Reviewing the situation the Liverpool Journal deals with what it terms "unpleasant realities":

"The placing of an order for steel rails in the United States by the Birmingham Corporation is only one and perhaps the least striking instance of the kind. France also requires rails and recently offered contracts to English and American manufacturers for 750,000 tons of them. When the English manufacturers got down to absolute bare net cost, with no profit at all, they were still 30s per ton outside the price quoted by the American manufacturers. Orders for the first 500,000 tons have already gone to the United States. The remaining 250,000 tons were held over for English manufacturers, but the latter could make no certain promise of delivery owing to threats of strikes, and if they have not already gone they are likely to follow the first 500,000 tons to the United States. An order for about £375,000 (about $1,875,000) for locomotives was offered to the North British Locomotive Company. This is believed also to have been lost to the United States. It is a matter of common knowledge in the iron and steel and engineering industries that reconstruction orders for France and Belgium are going to the United States far more than they are coming to this country, although British manufacturers want the work.

"It may be asked why this state of affairs should exist, and we believe the explanation will be found in the statement of A. J. Robson of Sheffield, the chairman of several of the largest steel-making concerns in the North of England, that 'without a larger and cheaper production, home and export trade will be crippled.' If we are to preserve for the nation 'the position and influence and authority which they have gained by their sacrifices and efforts in the cause of human liberty and progress, and to bring into being such conditions of living for the inhabitants of the British Isles as will secure plenty and opportunity to all,' no further time must be lost in applying these economic principles which have enabled us during the past four and a half years to maintain production at the high level demanded by the circumstances and to insure security for the workers."

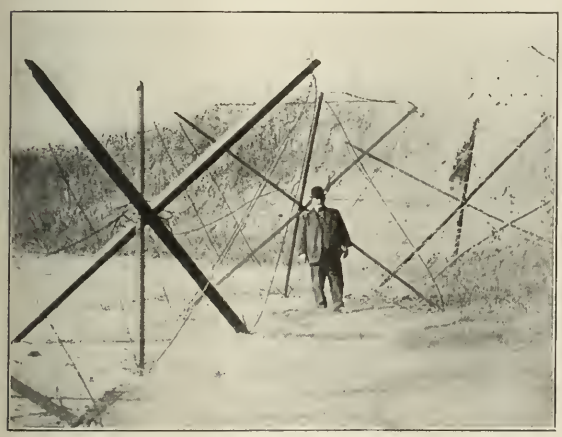
A New Form of River Bank Protection

By F. T. Morse

Office Engineer, Atchison, Topeka & Santa Fe, Topeka, Kansas

THERE ARE VARIOUS MEANS for fighting a river that is cutting its banks and many thousands of dollars have been spent by the railroads in protecting their properties from encroachment through various methods of protection, all of which involve the expenditure of considerable sums of money. For this reason attention is directed to a form of protection recently developed and put into service locally along the Kansas or "Kaw" river in the vicinity of Topeka, Kans.

This is a jetty which consists of one or more units, preferably at least four, and each unit consists of three structural steel angles, 16 ft. long, properly fastened together in the centre in the form of a jack stone, such as children use in playing jacks. The extreme ends of these three angles are fastened one to another with half-inch wire cable. Various sizes of angles have been used. The four or more units are fastened one to another by wire cable, attached to the centre of each unit, and this cable is fastened to a dead man some distance from the bank. The material is shipped in a knocked-down condition to the point of use. There each unit is assembled on the bank, the several units are properly tied together with one end anchored to the shore, and the whole jetty is rolled into place in the stream.



One of the Steel Jetties Just After Placing

At first sight it appears that there is little in this affair to protect the bank, but its apparent efficiency would seem to be due to the fact that the jetty decreases the velocity of the water passing through it sufficiently to deposit some of the sand being carried down stream by the swift current, and once a deposit is started it continues rapidly. Of course, brush catches in the prongs of the affair, but the jetty is not dependent upon this brush for results. In fact the builders claim better results where no brush interferes. Should brush lodge, and overturn the jetty, it is in the same position as before and unharmed.

The advantages of this jetty lie largely in its relatively cheap installation cost and to the short time required to place it, as compared with other means of bank protection. Experience with this construction indicates that the results are satisfactory. Then, too, the effect of this jetty in pushing the river away from the point of cutting is only moderate, so that the current is not turned sharply away only to have it do even greater damage at some point further down stream.



Deposit of Sediment Resulting from the Presence of Two Jetties

The pictures show the form of construction and indicate possible results. One photo shows a jetty just after installation. The other picture shows clearly that a bar or deposit is forming below the point where two jetties had been placed. The river had given more or less trouble here, and considerable money had been spent in a small way without much success until this jetty was placed in the fall of 1918. The picture was taken just after the heavy rains, and high water of March, 1919. In all of 37 places where jetties of this kind have been installed the river has stopped cutting.

If the protection is required for some distance along the river, it is necessary to place the jetties at intervals of from two hundred to three hundred feet. These jetties were developed by J. W. Kellner, manager of the Steel Jetty Company, Silver Lake, Kans., and are covered by patents.

At Galveston, Tex., on May 5, representatives of various grain organizations, the United States Railway Administration and the Department of Agriculture began an investigation of the inspection, grading and handling of grain at terminal points, the object of the meeting being to look into demurrage rates and delays in unloading. Among those who took part were W. J. Niergarth, St. Louis; J. W. Shorthill, York, Neb.; R. S. Hurd, Wichita, Kan.; Elmer Hutchinson, Arlington, Ind.; C. W. Crawford and N. J. Manley, representing the United States Railway Administration, and R. T. Miles, of Chicago, representing the Bureau of Markets, United States Department of Agriculture.

Additional Objections to Proposed Rules for Competitive Bidding

In addition to the statement outlining suggestions and objections to the rules for competitive bidding proposed by the Interstate Commerce Commission under the Clayton law, which were filed with the commission by a special committee appointed by the American Railroad Association, as reported in last week's issue, separate statements have been filed on behalf of the Baltimore & Ohio and Union Pacific railroad companies. George M. Shriver, vice-president of the Baltimore & Ohio, in a letter, expressed the opinion that the proposed regulations should not become effective because they seek to frame a single provision which will apply both to ordinary contracts for construction and supplies and also to financial transactions, and the proposed regulations as applied to financial transactions are impracticable. Mr. Shriver said that in a tender for bonds, stocks or securities the time for acceptance must in practice be very short and notice of acceptance must in practice close the transaction immediately. The proposed regulations provide 10 days for acceptance and 10 for the bidder to accept the contract and this after disclosure of the price at which the bidder would be willing to buy and the seller would be willing to sell. The company submits that to meet the ordinary conditions of the market it is practically necessary in the sale of securities that there be a definite closing of the transaction on the day bids are opened.

H. W. Clark, counsel for the Union Pacific, submitted that the subject matters are so different in nature and incidents that similar treatment of them is impracticable. There is no need, he said, in the case of proposed sales of securities for the requirement that specifications, drawings and the form of contract be prepared and copy offered for examination. All necessary description of the securities can be embodied in advertising or a more complete description can be printed for free distribution. The provisions of the tentative regulations in respect to advertising, he said, are in every respect inappropriate to the case of the sale of securities; particularly a requirement of two weeks' advertising is intolerable. Bankers, he said, cannot take the risk of making a bid for securities to remain good for any substantial period. Forty-eight hours would probably be ample notice. The time within which the most favorable bid must be accepted must be much less than 10 days and a provision for allowing another 10 days for the accepted bidder to sign the contract is quite impracticable. It was earnestly submitted that in the case of offerings of securities the regulations should permit a somewhat limited invitation for bids as an alternative to the general offering to the public. It was appreciated that under the act no person can be prevented from making a bid who learned of the offering and desired to submit a bid, but to require that offering of securities shall be made upon public advertising, inviting the whole world to bid, Mr. Clark said, would put a premium on the making of irresponsible bids by small and irresponsible bankers gambling upon the chance of their being able to form a syndicate in the event of the acceptance of their bid.

G. S. Fernald, general counsel of the Pullman Company, submitted a letter joining in the statement filed for the railroad committee.

The letter filed by Director General Hines said in part: "The director general, disclaiming any intention to express an opinion as to the character of the regulations proposed to be adopted, respectfully gives the commission to understand that the director general is not affected by the proposed regulations, since the Clayton act and particularly Section 10 thereof, has no application to the director general nor to railroads operated by him during the period of federal control. The language of the Clayton act, as well as of the provisions of the federal control act render this conclusion inescapeable." For the information of the commission he presented a brief statement outlining the purchasing methods of the Railroad Administration, showing that purchases of cars, locomotives and rail are made by the central purchasing organization and that other purchases are made by the purchasing officers of the individual roads acting under the supervision of the regional purchasing committees, but that all purchases of materials and supplies are made by the federal railroad organization.

Activities of Engineering Council

Information concerning the activities of Engineering Council was given by J. Parke Channing, chairman of the conference held in Chicago a couple of weeks ago, and has been amplified by data from other sources. Engineering Council was created three years ago by the four national societies of civil, mechanical, electrical and mining engineers, to which has since been added the American Society for Testing Materials, to represent these societies and the engineering profession in matters of common interest.

Since its organization it has furnished the government with approximately 4,000 names of engineers for service in the war. It co-operated with the Naval Consulting Board and the Army General Staff in reviewing 135,000 suggestions and inventions for war devices. It organized an employment bureau ten days after the armistice was signed, which has filed 2,500 applications for employment since December 1, 1918, and has placed 500 engineers in positions. It has created a National Service Committee with a chairman permanently established in an office at Washington, giving his time to work at the national capitol to service for engineers in all parts of the country, including a bureau to supply information concerning congressional and departmental activities. It co-operated with the fuel administrator and the Bureau of Mines in their campaign on fuel conservation and with the United States Chamber of Commerce in presenting information concerning water power while bills were before Congress.

Engineering Council joined with other organizations in securing from the War Department the exemption of engineering students from military service until their training was sufficiently advanced to make them valuable in the various technical services of the Army and Navy. It appeared before the Board of Railway Wages and Working Conditions at Washington in an effort to secure better classification and compensation of engineers in railroad employment. It has organized a committee on classification and compensation of engineers. It also has committees studying the problems of Americanization, curricula of engineering schools, the international affiliation of engineers, the licensing of engineers, patents and public affairs.

Engineering Council has participated in conferences regarding the organization of all fighting units so as to have a definite proportion of engineers and construction foremen among the officers to direct the necessary construction at the front, and the organization and establishment of the student army training corps. It appeared before a Senate Committee on invitation to explain the possibilities of a National Department of Public Works. It participated in the organization of a National Board for Jurisdictional Award, and will appoint one of the eight members of that body. It conducted a conference in Chicago from April 23 to 25 to determine whether it should advocate a National Department of Public Works as a result of which it has since organized to promote such a department.

General News Department

A record movement of troop trains was made last month —April—when the railroads of the country handled 1,009 special trains occupied by 720,623 soldiers.

The Fuel Administration has issued an order abolishing all of its rules relating to business in crude oil, fuel oil, gas oil, kerosene, gasoline and natural gas.

The Maryland Bankers' Association, at its convention at Atlantic City, N. J., on May 21, unanimously endorsed the "Warfield Plan" for the return of railroads to their owners and for permanent legislation relating to railroad regulation.

The Order of Railway Telegraphers is holding its national convention at St. Louis, Mo. Delegates and friends attending this convention numbered about 1,200. Walker D. Hines, director general of railroads, addressed the convention on Monday of this week.

The Tennessee Bankers' Association, the junior United States senator from New Jersey (former Governor Walter E. Edge), and the Louisiana division of the Travelers' Protective Association have declared in favor of returning to private ownership all railroads now operated by the government.

The Veteran Employees' Association of the Pittsburgh Division of the Pennsylvania Railroad held its annual reunion at Pittsburgh on May 16, with about 400 members in attendance. Among the enginemen present was Frederick Fleck, 90 years old, who entered the service of the railroad in 1854.

The Broadway Limited express of the Pennsylvania Railroad, running between New York and Chicago, 906 miles, in twenty hours, is to be restored on Sunday next. This train was discontinued on December 1, 1917, to relieve the congestion of traffic and to facilitate prompt movement of troops and government supplies.

The Brotherhood of Railroad Trainmen, at its convention at Columbus, Ohio, has adopted resolutions endorsing the proposed League of Nations, and requesting a new trial for Thomas J. Mooney, convicted in the San Francisco bomb plot. Among the speakers scheduled to address the convention was D. G. Robertson, Canadian Minister of Labor.

Damages to the amount of $900,060.34 were awarded in the suit of the Bethlehem Steel Company, tried at Jersey City, N. J., last week, to recover $2,900,000 for loss of ammunition destroyed by the explosion at "Black Tom," July 30, 1916. The defendant was the Lehigh Valley Railroad Company, and the trial was before Judge William H. Speer, of the Supreme Court. The damages granted were for the ammunition contained in sixteen cars, the jury not allowing damages of about $2,000,000 for explosives on barges.

The Brotherhood of Railway Clerks, in convention at Cincinnati, has adopted resolutions in favor of the establishment of a union of all railroad workers; also one in favor of government ownership of railroads. The name of the organization has been changed so as to include express and steamship clerks, and it now reads "The Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station House Employees." The convention voted to pay the grand president ten thousand dollars a year; the grand secretary $7,500; the grand vice-presidents, $4,000 each; organizers, $3,600 each; editor of The Clerk, $3,600. The salary of the grand president heretofore has been $3,500. Charles M. Owens, of Cincinnati, has been elected grand secretary. On Tuesday of this week, Walker D. Hines, director general of railroads, addressed the convention. In Portland, Me., on May 20, "The Brotherhood of Railroad Station Employees" opened its biennial convention.

The first sleeping cars in America—in the world—were those which were run on the Cumberland Valley between Chambersburg, Pa., and Harrisburg, in 1836 or 1837. This fact, stated for the purpose of correcting an error, is brought out in an interesting letter to the Philadelphia Record by M. C. Kennedy, president of the Cumberland Valley. And he calls attention to the fact that those two sleeping cars were kept in service more than 10 years, or until 1848. Chambersburg and Harrisburg are only about 52 miles apart, but by running a train at night, the Cumberland Valley accommodated passengers arriving in Chambersburg by stage in the evening from the west who wished to take the early train the next morning from Harrisburg to Philadelphia. Another historical date which is frequently misstated is that of the first mail car. In connection with the recent hearing at Washington on the subject of railway mail pay, it was stated that no attempt was made to distribute letters on the cars until 1862; but the fact is that a mail car was running between Boston and Albany in 1853. W. A. Davis, the clerk who is credited with having distributed letters between Quincy and St. Joseph, in 1862, is said to have copied the idea from England, by way of Canada, and it may be that the English post office sorted letters on the cars before 1853.

Atlantic City Exhibit

Secretary J. D. Conway, of the Railway Supply Manufacturers' Association, advises that the following firms have been allotted space in the exhibit for the mechanical conventions at Atlantic City, June 18-25. These are in addition to lists given in the *Railway Age* of April 18 and May 2:

American Car & Foundry Company	New York.
Brosius, Edgar E.	Pittsburgh, Pa.
Detroit Graphite Co.	Detroit, Mich.
Dixon Valve & Coupling Co.	Philadelphia, Pa.
Kaustine Company, Inc.	Buffalo, N. Y.
Loco, The, Light Co.	Indianapolis, Ind.
Macbeth-Evans Glass Co.	Pittsburgh, Pa.
Pulverized Fuel Equipment Corpn.	New York.
Safety, The, Nut & Bolt Co.	Cleveland, O.

Special Train from Chicago to Mechanical Convention

Arrangements have been made for a special train to accommodate railroad men from Chicago and points west who will attend the convention of the mechanical section of the American Railroad Association at Atlantic City, N. J., June 18 to 25 inclusive. The train will leave Chicago at 3 p. m., June 16, and will arive at Atlantic City about 5 p. m., June 17. The train will have club and dining cars, 12-section drawing room sleepers and 7-compartment drawing room cars. The diagrams are now open, and requests for reservations should be addressed to C. L. Kimball, 175 W. Jackson boulevard, Chicago.

Michigan Railroad Commission Abolished

The Lemire-Brower bill abolishing the railroad commission and creating in its stead a public utilities commission has been signed by Governor A. E. Sleeper of Michigan. The railroad commission automatically went out of existence with the signing of this bill. The members of the railroad commission were C. L. Glasgow of Nashville, A. A. Keiser of Ludington, and Charles S. Cunningham of Detroit. Four of the five members of the new commission have been appointed, as follows: William M. Smith of St. Johns, Chairman of the Industrial Accident Board; Samuel Odell of Shelby, state treasurer; William Potter of Hastings, and Sherman Handy of Sault Ste. Marie. The salaries of the commissionership are $7,000 a year, while the railroad commissioners received only $3,000.

Freight Car Economy—Revised

R. H. Aishton, regional director of the Northwestern region, in a recent letter stated that since the Food Administration has released its control over the loading of certain food stuffs, requiring cars to be loaded to full capacity, but 85 per cent of the capacity of cars in his region has been utilized in flour loading. "Had cars been loaded in March," said Mr. Aishton, "on the same basis as in December, the flour sent out from Minneapolis could have been carried in 1,207 fewer cars; that is to say, a saving of 20 per cent in cars; and the cost of movement was, of course, increased.

Society of Terminal Engineers

At the annual meeting of the Society of Terminal Engineers, held in New York on May 20, Francis Lee Stuart, who at various times has been chief engineer of the Erie and of the Baltimore & Ohio, and who was until recently chairman of the Engineering Committee of the Railroad Administration, was elected president for 1919 and 1920. The other officers elected were: Vice-presidents, John Meigs, E. H. Lee, Calvin Tomkins, Charles Whiting Baker and Maurice W. Williams; treasurer, W. Joshua Barney, and secretary, J. H. Leonard. The directors elected were General William H. Bixby, U. S. A.; B. F. Cresson, Jr.; Harwood Frost, H. McL. Harding, Richard Devens, George H. Kimball, M. A. Long, S. H. Libby, George E. Titcomb, T. Kennard Thomson, Edward Anderberg, Charles A. Rohr, H. C. Yost, Charles C. Hurlbut, R. H. McLain and R. H. Marriner.

Shipping Day Notice

The Pennsylvania Railroad has issued a revised list of shipping days for freight brought, for transportation by rail, to its five receiving stations in New York City, and on the first page prints the following notice:

"Shipping days provided herein for the receipt and forwarding of less than carload freight are established as a Preferred Service Schedule. Shippers have the right to route shipments over any line at the legal rates applicable, and of delivering freight at point of origin to such carrier on any week day, except holidays, during the established hours of service. It should be understood, however, that more satisfactory service will be obtained by delivering shipments on the shipping days specified, as if delivered on other days, freight cannot be given the full benefit of the preferred service schedule."

Winnipeg Strike

A strike of metal workers at Winnipeg, Man., at the beginning of last week, was followed on Thursday, May 15, by sympathetic strikes in numerous other lines of work, so that 30,000 men and women were out; and among the strikers were the city firemen, and employees of the gas and waterworks. More than sixty unions joined in the movement on one day. A general suspension of business resulted, but committees of strikers allowed delivery of bread and milk, and refrained from interfering with certain other essentials. This week reports indicated that railroad shopmen, clerks in railroad shops, dining-car conductors, and some other railroad employees had joined in the movement; and striking operators blocked business in the telegraph offices so completely that reporters went to other towns to send out news of what was going on. Railroad brotherhoods, not only at Winnipeg, but at other places in Canada, held meetings and adopted votes of sympathy, but no definite action of large bodies of railroad men has yet been reported.

Press despatches are contradictory and confusing. As we go to press the Associated Press says:

"Both labor leaders and employers believe that the critical period in the general strike has passed and that a settlement of the differences is in sight. Mayor Charles F. Gray is endeavoring to arrange for a meeting of union representatives and heads of the iron industry. A delegation of 24 men, representing the railway trainmen, on Wednesday urged the Provincial Government to act as conciliator and bring about industrial peace as soon as possible. There was no difficulty in maintaining order when, on Wednesday, many business concerns resumed activity. The strong force of mounted police on duty and thousands of troops mobilized in barracks has restrained any semblance of disorder. Hundreds of citizens have signed for vigilance service."

Order of Railroad Station Agents

The Order of Railroad Station Agents held its annual meeting at Washington this week, about 100 delegates being present. Resolutions were adopted asking Congress to retain the railroads under government control for the full period of 21 months after the proclamation of peace. Another resolution was adopted authorizing E. H. Morton, of Boston, president of the organization, to confer with other railroad labor organizations in an effort to unite all railroad labor organizations into one body to be known as the United States Railroad Federation or by some similar title.

Officers of various railroad labor organizations addressed the convention. A resolution was adopted demanding that a request be made of the director general that an early ruling be made as to what constitutes a supervisory agent, that the railroads may make a uniform adjustment. It was further resolved that as Supplement No. 13 recognizes the supervisory agent, the director general should order an adjustment made retroactive to the effective date of that supplement as of October 1, 1918.

Railroad Y. M. C. A. Membership Week

Reports received just as we are going to press indicate that the membership campaign of the Railroad Y. M. C. A., which is being carried on this week, will go "over the top." The following message was sent by Director General Hines to W. E. S. Griswold, one of the members of the International Committee, Railroad Department:

"I have recently learned that the Railroad Y. M. C. A. has set apart the week from May 18 to 24 as membership week, when they plan to increase their membership from about 110,000 to 150,000 railroad men. I also understand that following this membership campaign, the railroad department of the Y. M. C. A. is planning a movement among railroad men, including among other admirable features emphasis upon patriotism, thrift and health. I am very strongly of the opinion that the Railroad Y. M. C. A. is rendering a practical and helpful service which is appreciated by railroad men, railroad managements and the United States Railroad Administration. It affords me pleasure, therefore, to endorse the program in contemplation, and I will await with real interest further information as to its success."

To make things interesting, Elisha Lee, federal manager of the Pennsylvania Railroad, who is at the head of the Railroad Y. M. C. A. extension movement on that system, challenged C. W. Galloway, federal manager of the Baltimore & Ohio, as follows:

"At a meeting of the executive committee of the Pennsylvania Railroad, Eastern Lines, in connection with continental extension program of the Railroad Department Y. M. C. A., I, as system chairman, was directed to issue to the Baltimore & Ohio Railroad lines under your charge a challenge that the lines under my jurisdiction as system chairman will fill their quota before the lines under your jurisdiction. Please wire me if you accept the challenge."

Mr. Galloway, who is at the head of the Y. M. C. A. extension movement on the Baltimore & Ohio, replied to this challenge with this telegram:

"Answering your telegram 12th. With such friendly rivalry, contest becomes interesting, and we cheerfully accept your challenge. Your usual high speed will have to be increased to catch us."

The quota on the Baltimore & Ohio is 5,500 men, and this means that it will be necessary to renew the present membership of 3,000 and secure not less than 2,500 new members. The Pennsylvania Railroad has an equally difficult task to perform.

Railroad Employees' Subscriptions to Victory Loan

Officers and employees on railroads under government control throughout the United States subscribed a total of $138,637,250 to the Victory Liberty Loan. The returns from the seven regional directors show that out of a total of 1,841,267 employees, 1,417,042, or 77 per cent., subscribed to the loan. Employees on 13 roads showed subscriptions of 100 per cent. The Lehigh Valley, with a total of 20,295 employees, shows 100 per cent. Railroad officials and employees subscribed a total of $184,868,300 to the Fourth Liberty Loan. General offices of regional directors of Southern, Pocahontas, Allegheny, Southwestern and Northwestern regions subscribed 100 per cent. The general office of the Central Western region 99 per cent, and the general office of the Eastern region 96.8 per cent. Details are shown in the table:

Region	Officers and general office employes		Agents and station employees		Engineers and firemen		Conductors		Other trainmen	
	Per cent	Amount	Per cent	Amount	Per cent	Amount	Per cent	Amount	Per cent	Amount
Eastern	96.8	$5,739,200	85.9	$5,094,150	77.9	$2,505,750	87.6	$1,416,750	70.4	$1,734,150
Southern	84.1	2,643,350	48.2	1,965,750	38.9	796,400	57.9	581,450	41.4	644,700
Pocahontas	83.9	386,750	63.2	384,200	53.1	285,200	70.	160,650	45.0	152,300
Allegheny	83.56	3,918,850	84.38	3,029,350	65.61	1,803,200	75.32	980,000	57.17	1,291,550
South Western	85.4	2,604,050	79.7	1,562,400	68.1	809,650	68.9	462,200	57.9	571,900
North Western	97.	3,126,850	92.	2,923,200	72.	1,709,600	91.	980,550	73.	1,325,550
Central Western	99.	4,605,200	89.	3,703,880	80.	1,991,750	89.	949,050	81.	1,437,550
		$23,024,250		$18,662,930		$9,901,550		$5,530,650		$7,157,700

Region	Mechanical		Roadway department		Miscellaneous		Total amount subscriptions	Total number employees on roll	Total subscribing	Per-centage
	Per cent	Amount	Per cent	Amount	Per cent	Amount				
Eastern	89.5	$9,486,900	85.2	$5,223,700	87.1	$2,383,450	$33,584,050	400,219	344,715	86.1
Southern	58.5	3,458,300	29.9	1,520,250	57.6	934,800	12,545,000	264,804	128,387	48.48
Pocahontas	77.6	1,238,550	62.3	450,050	78.3	289,000	3,346,700	50,365	34,598	68.69
Allegheny	79.47	7,676,150	79.36	3,627,300	74.07	2,585,100	24,911,500	382,445	294,417	76.99
South Western	81.2	3,498,450	51.2	1,935,900	70.5	2,800,750	12,245,700	173,595	119,673	68.9
North Western	80.	5,261,050	80.	3,635,450	90.	1,542,700	20,504,950	248,057	204,748	82.54
Central Western	91.	8,186,110	84.	4,762,240	93.	2,315,250	27,951,050	300,580	266,001	88.5
Pullman Car Lines	.....	.....	.....	.....	.....	.....	1,696,300	21,061	20,759	98.½
Coastwise Steamship Cos	.....	.....	.....	.....	.....	.....	181,150	.....	2,364	.....
Mississippi-Warrior Waterways	.....	.....	.....	.....	.....	.....	9,600	.....	.....	.....
New York-New Jersey Canal Section	.....	.....	.....	.....	.....	.....	14,300	141	138	97.87
RR. Admin. (Ship Bd. Fund)	.....	.....	.....	.....	.....	.....	863,000	.....	.....	.....
Cent. Admin. (Wash. Office)	.....	.....	.....	.....	.....	.....	605,250	1,287	1,287	100.
Cent. Admin. (Regional Office)	.....	.....	.....	.....	.....	.....	168,700	.....	.....	.....
		$38,805,510		$21,154,890		$12,851,050	$138,637,250	.....	.....	77.

Golden Spike Celebration

The celebration at Ogden, Utah, on May 10, of the fiftieth anniversary of the completion of the first trans-continental railway in the United States was noticed in the *Railway Age* last week, page 1227. It drew together hundreds of veteran railroad men who were connected with the project and who related their recollections of the disappointments and discouragements met in the construction of the line and of its final success. These veterans were all guests of the city, and it was around them that the plans for the celebration were built.

The celebration was planned to be fully in keeping with the historical event, news of which, at 2:47 p. m., May 10, 1869, was flashed to Washington from Promontory, Utah, by the one word, "Done." This message was followed by three taps on the telegraph key, each given as the maul struck the golden spike; and these were repeated on the bell in the capitol at Washington proclaiming to the nation that the American continent had been successfully spanned. The message confirming this preliminary signal was signed by Leland Stanford, governor of Colorado; T. C. Durant, then president of the Union Pacific; Sidney Dillon, and John Duff, and said:

"The last rail is laid! The last spike is driven! The Pacific Railroad is completed! The point of junction is 1,086 miles west of the Missouri river and 690 east of Sacramento City." This message and many other relics of the event were lent to the city of Ogden by the Union Pacific Railroad Company and were on exhibition.

The building of the Pacific Railroad was begun at Omaha by the Union Pacific and at Sacramento by the Central Pacific on January 8, 1863. The large government subsidies stimulated all concerned to the highest speed, and the laying of the track became a race between the Union Pacific and the Central Pacific. The Golden Spike was presented by Doctor H. Herves, of San Francisco, and was made from 23 twenty-dollar gold pieces.

A prominent feature of the celebration was a great open air meeting for the pioneer railroad men at which addresses were given by Governor Simon Bamberger, of Utah; Paul Shoup, vice-president of the Southern Pacific Company, and William Hood, chief engineer of the Southern Pacific Company. Mr. Hood is a veteran of the trans-continental line, having entered the service of the Central Pacific in May, 1867, two years before the completion of the main line.

Exhibitors at Fuel Convention

Following is a list of the exhibits at the convention of the International Railway Fuel Association, which was held in Chicago this week at the Hotel Sherman:

American Arch Company, New York, N. Y.—Security sectional arch. Represented by W. L. Allison, John Neff, R. J. Himmelright, A. W. Clokey, C. T. Pfeiffer, J. T. Anthony, J. L. Nicholson, Minot R. Smith and W. E. Salisbury.

Anchor Packing Company, Chicago.—Packing for locomotives and power plants. Represented by John Landreth.

Barco Manufacturing Company, Chicago.—Three-V type metallic connections between engine and tender for air, steam and water; metallic steam heat connections between passenger cars; air reservoir joints, headlight generator joints, automatic smokebox blower fitting, joints for roundhouse blower and blow-off, coach yard and station metallic sets, and joints for expansion. Represented by F. W. Bard, C. L. Mellor and E. K. Carl.

Bird-Archer Company, The, New York.—Harder circulator plate and boiler chemicals. Represented by P. B. Bird, L. F. Wilson, J. A. McFarland, C. A. Bird, John Callahan and C. J. McGurn.

Broschart Threadless Pipe Coupling Company, Trenton, Mo.—Emergency train-line repair coupling. Represented by J. L. Broschart.

Detroit Lubricator Company, Detroit, Mich.—Lubricators and flange oiler. Represented by A. D. Hommard.

Dixon Crucible Company, Joseph, Jersey City, N. J.—Graphite and graphite products for railroad service. Represented by H. E. Hewson and F. R. Brandon.

Edna Brass Manufacturing Company, Cincinnati, O.—Lubricators, injectors and boiler checks. Represented by H. A. Glenn, D. B. Joseph and M. J. Mullen.

Fairbanks, Morse & Co., Chicago.—Literature on locomotive coal handling and storage plants.

Franclare Company, Chicago.—Hand-fired, self-cleaning stoker for power plants. Represented by C. H. Buck, Mr. Varney and Mr. Miller.

Franklin Railway Supply Company, New York.—Franklin butterfly door, engine and tender trucks, radial buffer and adjustable driving box wedge. Represented by W. C. Coyle, J. L. Randolph, C. W. Floyd Coffin, J. Sinkler, S. D. Rosenfeit and H. M. Evans.

Fuller Engineering Company, Allentown, Pa.—Literature on pulverized coal equipment.

Garlock Packing Company, The, Palmyra, N. Y.—Special packings for general railroad uses. Represented by W. G. Cook and C. W. Sullivan.

Gillespie, A. W., & Co., Chicago.—Economy locomotive firedoor. Represented by A. W. Gillespie and J. S. Seeley.

Hunt-Spiller Manufacturing Corporation, Boston, Mass.—Cylinder bushings, cylinder packing, valve packing, piston bull-rings, valve bushings, rod bushings and crosshead shoes. Represented by V. W. Ellet and E. J. Fuller.

Johns-Manville Company, H. W., New York.—Asbestos pipe and boiler insulation, steam traps, monolithic baffle walls, boiler wall coating, refractory cements, packings. Represented by J. C. Younglove, G. A. Nicol,

P. C. Jacobs, H. M. Butters, E. H. Willard, D. L. Jennings and P. R. Austin.

Leslie Company, The, Lyndhurst, N. J.—Steam heat regulators and removable injector coupling nuts. Represented by S. I. Leslie and J. J. Cizek.

Locomotive Feedwater Heater Company, New York.—Represented by W. L. Allison, E. A. Averill and W. T. Bennison.

Locomotive Firebox Company, Chicago, Ill.—Nicholson Thermic syphons. Represented by John L. Nicholson, Charles E. Hawley, Stuart Hawley and J. T. Anthony.

Locomotive Pulverized Fuel Company, New York.—Represented by Col. Donald McKay and C. M. Hatch.

Locomotive Stoker Company, Pittsburgh, Pa.—Photographs of duplex locomotive stoker. Represented by D. F. Crawford, W. G. Clark, A. N. Wilsie, O. B. Capps, D. T. Carlisle, J. J. Byrne, E. F. Milbank, C. E. Petersen, Ira Jordan, Eugene Prouty, R. G. Kelly and E. R. Funk.

Locomotive Superheater Company, New York.—Represented by R. M. Ostetman, R. R. Porterfield, George Fogg, B. G. Lynch, H. J. Spicer, R. J. Van Mater and G. E. Ryder.

Manning, Maxwell & Moore, Inc., New York.

Nathan Manufacturing Company, New York.—Injectors, lubricators, boiler check, gage cocks, non-lifting coal sprinkler. Represented by Otto Best, Richard Welch, W. R. Walsh and F. C. Davern.

National Railway Devices Company, Chicago.—Shoemaker vertical firedoor. Represented by Jay G. Robinson and A. F. Lind.

Ohio Injector Company, Chicago.—U. S. Standard injector, Chicago non-lifting injector, Ohio injector, Chicago lubricator, Chicago flange oiler, Chicago automatic drifting valve, Ohio water glass protector, Ohio boiler checks and Ohio feed hose strainer. Represented by A. C. Beckwith.

Okadee Company, The, Chicago.—Okadee blow-off valve, water glass protector, tank hose coupler, blower valve, front end hinge. Represented by A. G. Hollingshead, Harry Vissering, Charles R. Long, Jr., G. S. Turner and W. H. Heckman.

Pocket List of Railroad Officials, New York.—Represented by Charles L. Dinsmore.

Pyle-National Company, The, Chicago.—Incandescent electric lighting, turbo-generators, headlight cases and accessories. Represented by George E. Haas, William Miller and J. Will Johnson.

Railway Review, Chicago.

Reordway Company, The, Chicago.—Detrick suspended arch, Drake non clinkering furnace blocks, Hogan ash conveyor. Represented by Tom Gaughan and R. C. Warner.

Roberts & Schaefer Company, Chicago.—Photographs of coaling stations and sanding plants. Represented by Clyde P. Ross.

Signalite Manufacturing Company, Chicago.—Kerosene carburetors. Represented by G. A. Bauer.

Simmons-Boardman Publishing Company, New York.—*Railway Age* and Railway Mechanical Engineer. Represented by A. F. Stuebing, L. B. Sherman, J. M. Rutherford and N. H. Crossland.

W. S. Tyler Company, The, Cleveland, O.—Draftae spark arrester. Represented by J. H. Jackson and A. D. Busch.

U. S. Metallic Packing Company, Philadelphia, Pa.—Models 01 single and tandem Kink type packing. Represented by M. B. Brewster and H. E. Hyslop.

Vissering Company, Harry, Chicago.—Viloco firedoor, Leacy and Viloco sanders, Crescent metallic piston rod and valve stem packing, steam compression governor. Represented by G. S. Turner, Harry Vissering, Charles R. Long, Jr., and W. H. Heckman.

Vulcan Fuel Economy Company, Chicago.—Line of combustion instruments, Vulcan-Lastite boiler coating and metal protector. Represented by F. A. Moreland.

Vulcan Soot Cleaner Company, Du Bois, Pa.

Western Railway Club

The Western Railway Club on May 19 elected the following officers: President, G. S. Goodwin, mechanical engineer, C., R. I. & P.; first vice-president, J. Purcell, assistant to federal manager, A., T. & S. F.; second vice-president, E. J. Brennan, superintendent of motive power, C., M. & St. P.; secretary-treasurer, J. M. Byrne, chief clerk to mechanical assistant, Central Western Region; directors, E. B. Hall, assistant superintendent of motive power and car department, C. & N. W.; L. S. Kinniard, superintendent of motive power, C. & E. I.; W. H. Flynn, superintendent of motive power, Michigan Central.

Purchasing Agents' Section

The general committee of the newly organized Section 6 of the American Railroad Association (purchasing and distribution of supplies), held a meeting at New York on Friday, May 16, for the purpose of electing officers. H. S. Burr, superintendent of stores, Erie railroad, and formerly president of the Railway Storekeepers' Association, was elected chairman of the Section. E. J. Roth, manager, stores section, Division of Purchases of the Railroad Administration and formerly vice-president of the Storekeepers' Association, was elected vice-chairman of the Section, and J. P. Murphy, general storekeeper, New York Central (Lines West) and former secretary of the old association, was elected secretary for Section 6. Sixteen committees were organized to carry out the work of this section.

Traffic News

G. J. Vizard, heretofore assistant general freight agent of the Erie, at Chicago, has been appointed manager of the traffic bureau of the Little Rock (Ark.) Board of Commerce.

J. S. Thompson has been appointed district manager of the Southern Hard Wood Traffic Association in charge of the branch office at Louisville, Ky., effective June 1, to succeed R. R. May, resigned.

The peach crop of Georgia is expected to furnish for the Central of Georgia Railroad this year 6,000 carloads. Not much fruit will be shipped before June 1.

Reduced Fares for Conventions

Special rates of two-thirds of the usual round trip fares will be put into effect soon by the Railroad Administration for religious, fraternal and educational meetings. Regional directors will decide as to each convention, whether it is truly religious, fraternal or educational in nature.

A Self-Adjusting Time Table

[From the Alaska Railroad Record.]

New schedules for trains on the Alaska government railroad are announced to go into effect on Monday, April 21.

Service between Anchorage and Chickaloon will be twice weekly. Trains will leave Anchorage at 8:30 a. m. Mondays and Fridays; arrive at Chickaloon 4:15 p. m. Returning from Chickaloon, . . . Tuesdays and Saturdays. Service will be given once a week between Anchorage and Talkeetna; leave Anchorage at 8 a. m., Wednesday, and arrive at Montana the afternoon of the same day. At Montana, without delay, passengers, mail and baggage will be transferred to a motor passenger car, which will proceed to Talkeetna, arriving there the same afternoon. The motor car will return to Montana later in the afternoon, and the next morning the steam train will leave Montana for Anchorage * * * . The service between Anchorage and stations on Turnagain Arm will be given once a week. The train will not be operated on any definite day of the week, but whenever traffic warrants service.

Engineering Council Calls for Water-Power Legislation

Engineering Council, through its National Service Committee, M. O. Leighton, chairman, Washington, D. C., is urging upon engineers the importance of exerting influence to promote legislation by Congress to open up for development the water power sites of the United States. These sites are of two classes: (1) those privately owned on non-navigable streams, and (2) those on public lands or on navigable streams. The first class can be developed by the owners after complying with local laws, and over 25 per cent of these possible sites have been developed. Those of the second class cannot be developed without a permit from the United States, and less than 4 per cent of them are being utilized today. Bills to remedy this situation have been introduced in Congress at every session since 1910. Twice bills have been passed in different forms by both houses of Congress and sent to conference, and once (in the last Congress) an agreement was reached by the Conference Committee. These bills have given rise to extensive debate and a large amount of testimony and information is available in printed form, constituting an exhaustive study of the entire subject of hydro-electric development in this country and the laws relating thereto.

Engineers are asked to urge this matter on their Congressmen with a view to conserving fuel and labor. If engineers will show sufficient interest in this subject Congress may be expected to give it attention at the session now opening.

Commission and Court News

Increase in Rates Made in Competition With Water Routes

By the Act to Regulate Commerce, Sec. 4, "whenever a railroad in competition with a water route reduces a rate on freight to or from competitive points, it must not increase such rate unless the Interstate Commerce Commission finds that the proposed increase rests upon changed conditions other than the elimination of water competition." On August 21, 1916, a suit was brought in Oregon to enjoin an increase in rates on iron and steel from Pittsburgh to Seattle. The United States, the Commission and 16 railroads were joined as defendants. On appeal to the Supreme Court of the United States from judgment in the district court for Oregon dismissing the bill, the shipper's main contention was that, as the railroads had in 1916 reduced the rate from 80 cents to 65 cents, neither they nor the Commission had power to increase the rate without a prior finding by the Commission upon proper hearing "that such proposed increase rests upon changed conditions other than the elimination of water competition," and that no such hearing had been had or finding made.

In affirming the judgment of the district court, the United States Supreme Court, by Mr. Justice Brandeis, says that despite the original Act to Regulate Commerce and all amendments, railroads still have power to fix rates as low as they choose. The Commission's power over them in this respect extends no further than to discourage the making of unduly low rates by applying deterrents. It may forbid unjust discrimination, but the carrier under such an order may either raise the lower rate or lower the high one.

The last paragraph of section four (the long and short haul section) which was added by the Act of 1910, was designed to prevent the railroads from killing water competition by making excessively low rates. But Congress refrained from forbidding the carrier to reduce the rate and declined to confer upon the Commission power to prevent a direct action by reduction. The act still leaves the carrier absolutely free to make as low a rate as it chooses. This provision may become operative in any case where there has been competition between a railroad and a water line, inland or coastwise. But the question here is whether the prohibition applies where the rates were reduced with the approval of the Commission, given after hearing, by order entered on application of the carrier for relief from the operation of the fourth section (to meet competition via Panama canal).

It is held that the construction contended for by the plaintiff would rather ensure monopoly than preserve competition. If, contrary to the Commission's expectation, a rail rate reduced in competition with a water route for the avowed purpose of preserving competition by rail should result in eliminating the water competition, because so low as to drive the water carrier out of business, then the prohibitively low rate would have to be continued permanently and other water competition be thereby prevented from arising; unless, perchance, some changed condition should develop which might make removal of the bar possible. Or, if the reduction in the rail rate, sanctioned by the Commission under the fourth section as not unjustly discriminating against intermediate points, because forced upon the rail carrier by oppressive water competition designed to destroy its business to the port, should become thereafter unjustly discriminatory, because the water carrier, destroyed by its own rate cutting, abandoned the route, still the low rail rate and resulting discrimination would have to continue. Only compelling language could cause the court to impute to Congress the intention to produce results so absurd; and the language of the last paragraph is held to be clearly susceptible of the more reasonable construction contended for by the defendent carriers. Skinner & Eddy Corporation v. United States. Decided May 5, 1919.

Equipment and Supplies

Cars Accepted

The Pittsburgh, McKeesport & Youghiogheny has accepted 194 of the U. S. R. A. 70-ton gondola cars built by the Pressed Steel Car Company, making a total of 500 of these cars which it has accepted. These are the only standard cars accepted during the three weeks ended May 10.

Locomotives

The Norwegian State Railways are reported as having ordered 16 locomotives from the Baldwin Locomotive Works, and as having placed orders in this country also for a quantity of car wheels and axles.

Passenger Cars

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., is in the market for several electrically lighted passenger coaches of modern construction, with toilets and water tanks, seating capacity of 48 or more, and weighing about 15 tons. The coaches must operate around a 28 deg. curve.

Locomotive Deliveries Week Ended May 3

New locomotives were shipped to railroads under federal control during the week ended May 3, as follows:

Works	Road	Number	Type
American	N. & W.	8	USRA Mallet.
	P. L. W.	27	USRA Santa Fe.
	Southern	6	USRA Mount.
	C. B. & Q.	4	USRA 6W. Sw.
		45	
Baldwin	C. B. & Q.	2	Mikado.
	C. B. & Q.	2	USRA Mikado.
	C. B. & Q.	4	Santa Fe.
	P. R.	1	Mallet.
	T. & P.	2	Pacific.
	A. T. & S. F.	1	Mikado.
	A. T. & S. F.	1	Mountain.
	B. & O.	3	USRA 6W. Sw.
	E. J. & E.	4	USRA 8W. Sw.
	N. & W.	1	Mallet.
	L. V.	1	Pacific.
	S. P.	1	Santa Fe.
		23	
Total		68	

Locomotive Deliveries Week Ended May 10

The following locomotives were shipped to railroads under federal control during the week ended May 10:

Works	Road	Number	Type
American	N. & W.	3	USRA Mallet
	Penn. L. W.	4	USRA Santa Fe
	Southern	2	USRA Mountain
	N. & W.	7	USRA Mountain
	C. B. & Q.	2	USRA 6-w. Sw.
	Erie	1	USRA Pacific
	L. & N.	1	USRA Pacific
	P. L. W.	2	USRA 6-w. Sw.
		22	
Baldwin	Southern	4	USRA Mountain
	Ft. W. & D. C.	4	USRA Mikado
	Southern Pacific	2	Santa Fe
	A. T. & S. F.	1	Mikado
	I. H. B.	2	USRA 8-w. Sw.
	T. & P.	1	Pacific
	B. & O.	6	USRA 6-w. Sw.
	C. B. & Q.	1	Santa Fe
	T. & P.	4	Santa Fe
	C. B. & Q.	1	Mikado
		26	

Delivery of Standard Cars to April 30

The table on the following page gives a list of standard car deliveries to April 30:

Delivery of Standard Cars to April 30

Type	Contract number	Manufacturer	A. C. L.	B. & L. E.	B. R. & P.	C. C. C. & O.	C. & W. C.	C. & N. W.	C. B. & Q.	C. C. C. & St. L.	C. & S.	Ga.	I. C.	K. & M.	L. & N.	M. & O.	M. P.	N. C. & St. L.	N. Y. C.	N. Y. N. H. & H.	N. & W.	P. M. & Y.	S. P.	T. & O. C.	Total
40 Ton D. S. Box	8,571	Am. Car & Fdy. Co	450					1,250	500								16		500						2,716
40 Ton D. S. Box	8,572	Am. Car & Fdy. Co	300							750									500					250	1,800
40 Ton D. S. Box	8,573	Am. Car & Fdy. Co	200				300																		250
40 Ton D. S. Box	8,589	Am. Car & Fdy. Co							250																
Total																									5,266
50 Ton S. S. Box	8,574	Am. Car & Fdy. Co						500				300				500						500	100		1,600
50 Ton S. S. Box	5,179	Haskell & Barker						500											1,000				500		2,300
50 Ton S. S. Box	5,294	Pullman Car Co														500					800		400		1,700
50 Ton S. S. Box	14,144	Bettendorf Car Co				300																			300
Total																									5,900
50 Ton Comp. Gon	8,576	Am. Car & Fdy. Co						500	250				150		250	200		200	250						1,650
50 Ton Comp. Gon	8,577	Am. Car & Fdy. Co																	250						500
50 Ton Comp. Gon	8,578	Am. Car & Fdy. Co	50										150			200									400
50 Ton Comp. Gon	5,178	Haskell & Barker	250				500						50		150	200									400
50 Ton Comp. Gon	00-131	Pressed St. Car Co							500			100	500		400	200			500						1,600
50 Ton Comp. Gon	11,503	Standard Steel Car Co							250				300		200	200			500						2,450
Total																									6,600
55 Ton St. Hop	8,579	Am. Car & Fdy. Co		250			250				200			150										500	1,300
55 Ton St. Hop	8,580	Am. Car & Fdy. Co												150											150
55 Ton St. Hop	00-603	Pressed St. Car Co					250				200			250	300	400									2,750
55 Ton St. Hop	5,295	Pullman Car Co					300				200	300		250		200									1,750
55 Ton St. Hop	6,000	Ralston St. Car Co									200			200	200										400
55 Ton St. Hop	D5,108	Standard Steel Car Co		250			250				200			200		400									2,200
Total																									8,850
70 Ton St. Hop	00-604	Pressed St. Car Co																				454			954
Grand total			1,250	500	800	1,050	300	3,250	1,500	2,000	300	400	2,000	500	2,000	2,000	16	200	4,500	1,500	800	954	1,000	750	27,570

Supply Trade News

Julius Alsberg, consulting engineer, has removed his office from the Tribune building, Chicago, to the Marquette building, 140 South Dearborn street.

The Nathan Manufacturing Company, New York, has opened new offices in Chicago in the Great Northern building, 20 West Jackson boulevard, room 707, with **R. Welsh** in charge.

In announcing the appointment of **E. Roy Borden** as service engineer of **Mudge & Co.**, Chicago, in the *Railway Age* of May 16 (page 1232), the name was incorrectly published as E. Roy Gorden.

Vernon T. Brauns, manager of the railroad valuation department of the **American Blue Print Company,** Chicago, was promoted to general manager of all departments for this company, effective May 8.

Joseph Douglas Gallagher, director, vice-president and general counsel of the **American Brake Shoe & Foundry Company,** New York, died at his home in Glen Ridge, N. J., on May 20, at the age of 65. He was educated at Princeton University and at Ohio Wesleyan University, Delaware, Ohio. He was engaged in the practice of law in Newark, entering the firm of Whitehead & Gallagher, which later became Gallagher & Richardson. Mr. Gallagher became director and vice-president of the American Brake Shoe & Foundry Company when it was organized about eighteen years ago, and during the last four years was also its general counsel. This company did much work on munitions for the United States Government during the war, and overwork in this connection probably hastened Mr. Gallagher's death, which followed an operation in the Morningside Hospital.



J. D. Gallagher

Paul W. Koch & Company, Chicago, have opened Pacific coast offices in the San Fernando building at Los Angeles, Cal., the Rialto building, at San Francisco, Cal., and the Sherlock building, at Portland, Ore.

J. L. Phillips has been appointed a sales engineer of the **Okonite Company,** Passaic, N. J. Mr. Phillips for the last nine years has been with the General Railway Signal Company, and before that served in the signal department of the Northern Pacific, for eleven years.

The Duntley-Dayton Company, Chicago, has opened a branch office in the Century building, Cleveland, Ohio, under the management of **J. C. Sague.** This company has also opened a branch office in the Home Trust building, Pittsburgh, Pa., under the management of **W. M. Hankey.**

F. X. Meehan has been appointed advertising manager of the **Walter A. Zelnicker Supply Company,** St. Louis, Mo. Mr. Meehan was associated in various executive capacities with Fairbanks Morse & Co., for six years; the Atchison, Topeka & Santa Fe Railroad, Coast Lines, for two years and the St. Louis Smelting & Refining Works of the National Lead Company for two years.

The American Railway Equipment Company, Pittsburgh, Pa., on May 26, located its general offices in the Liberty building, Philadelphia, Pa., where **G. W. Mingus,** president of the company, will have his office. The company will retain an office in the Diamond Bank building, Pittsburgh, in charge of **R. C. Crawford.**

Ross F. Hayes has been appointed general sales manager of the **Curtain Supply Company,** Chicago. Mr. Hayes has been eastern manager of the company for 12 years, with headquarters at 50 Church street, New York, and will continue to act as eastern manager and retain his office in New York. Mr. Hayes was born at Lewiston, Me. He entered the service of the Boston Woven Hose & Rubber Company in 1888, remaining with that company for 16 years. He was a salesman in the rubber goods department in New England and New York state until 1893; and then served consecutively as city sales manager of the St. Louis branch for two years; New England representative of the bicycle tire department for two years; southern representative of the mechanical rubber goods department for two years, and as manager of the Philadelphia office until 1904. He then entered the service of the Curtain Supply Company, Chicago, as western representative, and since 1907 has served as eastern manager of the company, as above noted.



R. F. Hayes

W. L. Conwell, whose election as president of the **Safety Car Heating & Lighting Company,** with headquarters at New York, was announced in last week's issue, has been connected with that company since January, 1916. He was born at Covington, Ky., on January 25, 1877. He received his education in the public schools of Philadelphia and at the University of Pennsylvania, from which he graduated in 1898 with the degree of electrical engineer. He then passed the examination for first assistant engineer for the United States Navy, but received no appointment because of the close of the war with Spain. He was employed in contracting work as a timekeeper for the Tennis Construction Company, Philadelphia, becoming later chief engineer and secretary of the company. In 1901 he resigned to become city salesman of the Westinghouse Electric & Manufacturing Company in New York. He was later placed in charge of the isolated plant department of the company, and for five years, ending in 1911, was engaged in railway work. In that year he became vice-president of the Transportation Utilities Company, and later became also treasurer of the same company. In January, 1916, he was appointed assistant to the president of the Safety Car Heating & Lighting Company, and upon the death of R. M. Dixon, former president of that company in October, 1918, Mr. Conwell was made acting president.



W. L. Conwell

S. Gordon Hyde, who recently received his honorable discharge from service, has been appointed advertising manager of the **Buda Company,** Chicago, with headquarters at Harvey, Ill., to succeed **C. O. Powell,** who has accepted the position of assistant commissioner with the **Association of Metal Lathe Manufacturers,** Chicago.

J. R. Wilson, whose resignation as traffic manager of the Sacramento Northern with headquarters at Sacramento, Cal., was announced in the *Railway Age* of April 11 (page 975), has been appointed vice-president and assistant manager of the **Latourrette-Fical Company,** mechanical contractor at Sacramento, with headquarters in that city.

The Massey Concrete Products Corporation, Chicago, has opened a new office at 1405 Oliver building, Pittsburgh, Pa., in charge of **A. F. Humphrey,** resident manager, effective June 1, and **J. A. Higgs, Jr.,** has been appointed resident manager of the Southeastern district in charge of all sales in that territory, with headquarters at the Chandler Annex, Atlanta, Ga.

Oscar F. Ostby, president of the new firm of **Oscar F. Ostby & Co.,** recently incorporated, with offices at 1044 Grand Central Terminal, New York, as announced in last week's issue, was born on March 5, 1883, and received his education in the public schools of Providence, R. I. From 1901 to November, 1904, he was engaged in publicity work, following which he was connected with the Commercial Acetylene Railway Light & Signal Company, serving as president of the International Acetylene Association during 1910-11. Later, with the Refrigerator, Heater & Ventilator Car Company, serving with the latter as general manager. He has for some time represented the White American Locomotive Sander Company of Roanoke, Va., and since September, 1918, he has served as vice-president of the Glazier Manufacturing Company of Rochester, N. Y. The new firm will continue to handle the railway supplies hitherto handled by Mr. Ostby, and in addition, Mr. Ostby has been appointed exclusive railway distributer for Davidson high speed steel and tools, made by the Davidson Tool Manufacturing Company, New York. Mr. Ostby has been one of the leading members of the Railway Supply Manufacturers' Association and was its president in 1915-1916.



O. F. Ostby

Allied Machinery Company

The Allied Machinery Company of America has increased its capital stock to $5,000,000. This was made necessary by the decision of the American International Corporation to group all of its machinery export selling subsidiaries under one head. This move contemplates the complete absorption of the Allied Construction Machinery Corporation by the Allied Machinery Company of America. The Allied Machinery Company de France and the Allied Machinery Company d'Italia will retain their corporate entities, but their parent corporation will be the Allied Machinery Company of America rather than the American International Corporation as before. This is also true of the Horne Company, Ltd., of Japan, which was purchased early in the year by the American International Corporation.

All shares of the Allied Machinery Company of America

will, as before, be owned by the American International Corporation.

The Allied Machinery Company of America was formed in 1911 by interests associated with the National City Bank of New York to sell machine tools in Europe. In 1916 it was taken over by the American International Corporation, which immediately set about to expand and organize the business on a large scale. The business has increased rapidly, and today the company is operating in fourteen countries.

J. W. Hook will continue as president of the Allied Machinery Company of America, in general charge of the business. **F. A. Monroe, S. T. Henry** and **T. G. Nee** have been elected vice-presidents. Mr. Monroe is in charge of the administrative affairs of the company. Mr. Henry is in charge of sales and advertising, and Mr. Nee is at present in Japan, devoting his attention to the affairs of the Horne Company, Ltd. **R. P. Redier** is general sales manager of the company, with headquarters at Paris.

Samuel M. Vauclain Awarded Distinguished Service Medal

At a banquet given in his honor at the Bellevue-Stratford Hotel in Philadelphia on Saturday last, Samuel M. Vauclain, newly elected president of the Baldwin Locomotive Works, was presented by Benedict Crowell, assistant secretary of war, with the Distinguished Service Medal for the part he played in America's mobilization for war. The banquet was attended by some 600. Isaac Johnson, presiding judge of the Delaware County Court, presided, and addresses were made by Governor Sproul, General Muir, General Price, William I. Schaffer, attorney general of the state of Pennsylvania; Frank B. McClain, formerly lieutenant governor of the state, and by Mr. Vauclain.

Newly Elected President of Pulverized Fuel Equipment Corporation

Colonel Douglas I. McKay has been elected president of the Pulverized Fuel Equipment Corporation, New York, to succeed **John E. Muhlfeld,** who retires to return to consulting enginering practice.



Col. D. I. McKay

Since July, 1917, Colonel McKay has been engaged in war work. He was commissioned major in the Ordnance Department in charge of the raw materials branch of the gun division and purchased all raw and semi-finished materials used by the ordnance department and contractors for the ordnance department. Between August and December, 1917, these purchases amounted to $268,000,000.

In January, 1918, he was promoted to lieutenant-colonel in the National Army and appointed assistant director of purchase and supply. Here he had supervision over the purchasing operations of the several supply corps of the War Department, including the ordnance department, the quartermaster department, the medical corps, the corps of engineers and the signal corps. He was subsequently promoted to colonel, and continued in this capacity until he returned to civil life after the armistice was signed.

Colonel McKay is a graduate of West Point. Upon graduation he spent three years in the army, resigning to take the position of deputy chief of the aqueduct police, and six months later was made chief. Three years later he was called to New York City as first deputy police commissioner, in charge of the business administration of the department, and two years later was appointed police commissioner of New York.

He resigned the commissionership a year later to become assistant to the president of J. G. White Co., Inc., and two years later was elected vice-president and director, which position he held at the time he entered the United States army.

In addition to his duties as president of the Pulverized Fuel Equipment Corporation, Colonel McKay is also vice-president and director of the Chemical Foundation, Inc., director of the International Agriculture Corporation and director of the Botany Worsted Mills.

Railway & Industrial Engineers, Inc.

John E. Muhlfeld, president of the Pulverized Fuel Equipment Corporation, has resigned, and has associated with him several other engineers to form the Railway & Industrial Engineers, Inc., with offices at 25 Broad street, New York, to act as consulting and advisory engineers between the bankers, railroad and industrial corporations. Mr. Muhlfeld for the past five years has been specializing in the development of the "Lopulco" system for burning pulverized fuel in locomotives, stationary boilers and metallurgical and chemical furnaces, and for the past three and one-half years has been president of the Pulverized Fuel Equipment Corporation and the International Pulverized Fuel Corporation, has resigned as president of these corporations to devote his entire time to engineering work. Mr. Muhlfeld retains his interests in and remains a director of the Pulverized Fuel Equipment Corporation.



J. E. Muhlfeld

Trade Publications

STEAM JET AIR PUMPS.—Preliminary bulletin No. 113, illustrating and describing the Wheeler steam jet air pump is now being distributed by the Wheeler Condenser & Engineering Company, Carteret, N. J. This steam jet air pump has two or more steam jets working in series with a condenser between the jets, which permits more efficient operation. The pump is applicable to jet condensers, as well as to surface condensers. The bulletin explains the operating principles, gives reasons for high efficiency, describes the inter-condenser and shows an operating test curve. It includes a cross sectional drawing and shows how to connect double machines or triple machines to surface condensers.

STEEL TANKS AND BOILERS.—A cloth bound book of 96 pages, 6 in. by 9¼ in., has been published by the Coatesville Boiler Works of Coatesville, Pa., manufacturers of steel tanks for a large variety of uses, A. S. M. E. boilers and stacks, open hearth furnaces, blast furnaces, cement kilns, regenerators, etc., to show the vast scope of the business and the great variety of heavy steel plate work manufactured in the shops of this company. This is indicated in over 100 illustrations. Included in the book are the specifications for steam boilers formulated by a committee appointed by the American Society of Mechanical Engineers, in accordance with which Coatesville boilers are made. The book is designated as General Catalogue No. 240.

Railway Officers

Railroad Administration

Central

W. E. Rosenbaum, chief clerk of the St. Louis Eastern District Freight Traffic Committee of the division of traffic—Eastern Territory, has been promoted to secretary, with headquarters at St. Louis, Mo., to succeed **Edward Hart, Jr.,** who has resumed his duties as assistant general freight agent on the Baltimore & Ohio, with headquarters at St. Louis.

Federal and General Managers

J. D. Hawks, general manager of the Detroit & Mackinac, with headquarters at Detroit, Mich., has been appointed federal manager. This road has been released from the jurisdiction of **F. H. Alfred,** federal manager.

Operating

R. H. Waters has been appointed trainmaster of the Salt Lake Division of the Denver & Rio Grande, with headquarters at Thistle, Utah.

Wm. H. Duwe, inspector of train despatching on the Northern Pacific, at Spokane, Wash., has been promoted to trainmaster, with headquarters at Missoula, Mont.

J. D. Haydon, roadmaster of the Louisville & Nashville with headquarters at Louisville, Ky., has been promoted to superintendent of the Atlanta division with headquarters at Etowah, Tenn., vice **A. B. Bayless,** resigned.

J. E. Craver, superintendent of the Seattle division of the Northern Pacific, at Seattle, Wash., has been appointed acting general superintendent of the Western district, with headquarters at Tacoma, Wash., vice **I. B. Richards,** granted a temporary leave of absence, and **J. E. Campbell,** trainmaster at Seattle, has been appointed acting superintendent of the Seattle division, with headquarters at Seattle, Wash., vice Mr. Craver.

Financial, Legal and Accounting

Paul McKay, corporate treasurer of the Spokane, Portland & Seattle; the Oregon Trunk, and the Oregon Electric Railroad, has been appointed federal treasurer of these roads, with headquarters at Portland, Ore., vice **F. A. Smith,** resigned to accept service elsewhere.

A. H. Mongin, acting federal treasurer of the Green Bay & Western with headquarters at Green Bay, Wis., has been promoted to federal treasurer of this road, the Kewaunee, Green Bay & Western, the Ahnapee & Western and the Waupaca-Green Bay with the same headquarters.

Traffic

H. E. Whittenberger, whose appointment as federal manager of the Grand Trunk, Western Lines, was noted in the *Railway Age* of May 2, has made the following appointments on the Grand Trunk, Western Lines: **Robert L. Burnap,** assistant general freight agent of the Ann Arbor, the Detroit & Mackinac, the Detroit, Bay City & Western, the Grand Trunk, Western Lines, and the Pere Marquette, with headquarters at Chicago, becomes traffic manager of the Grand Trunk, with the same headquarters; **J. D. McDonald** becomes general passenger and baggage agent with headquarters at Chicago; **C. A. Gormaly** becomes division freight agent, with headquarters at Chicago, and **A. Z. Mullins** has been appointed division freight agent, with headquarters at Grand Rapids, Mich.

G. M. Riley, service agent on the Kansas City Southern, with headquarters at Houston, Tex., has been promoted to division freight agent, with headquarters at Shreveport, La. He was born in Houston, Tex., and began his railway career as a stenographer in the Houston office of the commercial agent of the Southern Pacific at Houston, later working in the auditor's and the superintendent's offices, at the same place. On January 5, 1909, he was promoted to soliciting freight agent for the Kansas City Southern, with headquarters at Houston, which position he held for two years until his appointment as general agent, with the same headquarters. He served in that capacity until the railroads were taken over by the government and the office of general agent was abolished at which time he was appointed service agent for the Kansas City Southern. This office he held until his recent promotion to division freight agent.

Lawrence B. Burford, who has been appointed assistant general freight agent of the Erie Railroad, with headquarters at New York, as has already been announced in these columns, was born in Washington, D. C., and graduated from the high school of his native town in 1897. Four years later he began railway work with the Erie Railroad as a clerk in the car record department of the local freight station at Chicago. He then held various positions in the local and general freight departments until 1907, when he was promoted to chief of tariff bureau, at Chicago, and in 1910 was transferred to New York. He was promoted to general agent in charge of the Baltimore agency in 1911, and four years later was appointed assistant to general traffic manager at New York. In 1917 he was furloughed and served under the British Ministry of Shipping at New York as assistant director until this year. He organized its grain traffic department and directed the inland transportation of supplies of grain and cereals for the Allied governments. He now returns to the service of the Erie as assistant general freight agent, with headquarters at New York.

Benjamin Cliffton Prince, whose appointment as assistant traffic manager of the Seaboard Air Line, with headquarters at Norfolk, Va., has already been announced in these columns, was born on August 17, 1877, at Americus, Ga., and in 1894-1895 was a student at Kentucky University, Lexington, Ky. He began railway work on September 1, 1891, as junior clerk to the auditor on the Savannah, Americus & Montgomery, now a part of the Seaboard Air Line. He subsequently served, with the exception of the time spent at college, consecutively in the traffic manager's office on the Chattanooga, Rome & Columbus, and then in the general freight office at Savannah, Ga., of its successor, the Central of Georgia. From 1897 to 1901 he was chief clerk to the traffic manager on the Florida East Coast, at St. Augustine, Fla., and then to 1906 was chief clerk to the division freight and passenger agent on the Central of Georgia, at Chattanooga, Tenn. In 1906 he served as commercial agent on the same road, at Atlanta, Ga. From 1907 to 1911 he was traffic manager of the Georgia, Florida & Alabama, at Bainbridge, Ga., and then to 1914 was assistant general freight agent on the Seaboard Air Line, at Jacksonville, Fla. He was then for four years, assistant to first vice-president, at Norfolk, Va., and since 1918 was assistant to traffic manager, until his recent appointment as assistant traffic manager, of the same road.

Engineering and Rolling Stock

B. H. Prater has been appointed engineer maintenance of way of the Oregon Short Line, with headquarters at Pocatello, Idaho, to succeed **R. B. Robinson,** whose appointment as engineer maintenance of way of the Union Pacific was announced in the *Railway Age* of May 9.

A. A. Woods, superintendent of the New Orleans & Northeastern Railroad and the New Orleans Terminal Company, with headquarters at New Orleans, La., who was appointed chief engineer maintenance of way and structures on the Southern Railway System, Lines West, with headquarters at Cincinnati, Ohio, as announced in the *Railway Age* of April 18, page 1027, was born at New Orleans, La. He graduated from Tulane University at New Orleans, La., in 1895, and entered railway service in July of that year with the New Orleans & Western (New Orleans Terminal Company) as

a rodman on location work. In October of that year he returned to Tulane University to take a post-graduate course. From July 1896, to July, 1897, he was employed as a draftsman in the maintenance of way department of the New Orleans & Northeastern, with headquarters at New Orleans, La., and was later employed as a draftsman in the mechanical department of that road, with headquarters at Meridian, Miss. In January, 1898, he was made assistant engineer on the Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific, with office at Vicksburg, Miss., and from September, 1899, to November, 1901, he was assistant engineer of the New Orleans & Northeastern with office at New Orleans, La. In November, 1901, he left that road, again entering the service of the Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific as engineer maintenance of way. From July, 1913, to February, 1915, he was engineer maintenance of way of the New Orleans & Northeastern, and in February, 1915, he was promoted to superintendent of that road, with headquarters at New Orleans, La. In January, 1917, he became superintendent also of the New Orleans Terminal Company, which position he held until he was appointed chief of the Southern Railway, Western Lines, in April, 1919, succeeding **Curtis Dougherty,** deceased.

Joshua D'Esposito, whose promotion to chief engineer of the Chicago Union Station Company, Chicago, was announced in the *Railway Age* of May 16 (page 1236), was born at Sorrento, Italy, on July 30, 1878. He received his education in naval architecture and marine engineering in the Nautical State School of Italy from which institution he graduated in 1897. Upon his arrival in this country he entered the service of the Pittsburgh Railway Company as a designing engineer, which position he held until the spring of 1904. He entered the service of the Pennsylvania Lines in March, 1905, as a designing engineer, in which capacity he served for two years, being made chief draftsman in 1907. In 1910 he began working on Chicago problems, being transferred to that city in 1913, at the time of the commencement of negotiations with the city of Chicago, which led up to the passage of the ordinances for the Chicago Union station. The following year he was promoted to assistant chief engineer of the Chicago Union Station Company, which position he held until November, 1917, when he was called into the service of the government as assistant manager of the Wood Ship division of the Emergency Fleet Corporation, in charge of the installation of machinery in wooden ships, with headquarters at Philadelphia, Pa. On January 1, 1919, he severed his connection with the Emergency Fleet Corporation and again took up his duties as assistant chief engineer of the Chicago Union Station Company, which position he held until his promotion to chief engineer on May 1.



J. D'Esposito

Purchasing

W. H. Clifton, lumber agent on the Baltimore & Ohio, Eastern lines, has been appointed assistant purchasing agent on the Baltimore & Ohio, Eastern lines; the Coal & Coke, the Morgantown & Kingwood, the Western Maryland, the Cumberland Valley and the Cumberland & Pennsylvania; **D. A. Williams,** general storekeeper of the Baltimore & Ohio, Eastern and Western lines, and the Western Maryland, has been appointed to assistant purchasing agent on all the above-named roads, and **H. P. McQuilkin,** assistant general storekeeper on the Baltimore & Ohio, Eastern lines, has been promoted to general storekeeper on all the above-named roads; all with headquarters at Baltimore, Md.

Corporate

Traffic

M. O. Bicknell, whose promotion to traffic manager of the Sacramento Northern, with headquarters at San Francisco, Cal., was announced in the *Railway Age* of April 25, was born at Vincennes, Ind., on March 22, 1869. He began railway work in January, 1888, with the Evansville & Terre Haute, at Vincennes, as bill clerk in the local freight office. The following year he was promoted to agent of the same road at Patoka, Ind. In November, 1891, he went to the Southern Pacific as operator and ticket clerk at Deming, N. M., since which he has been consecutively traveling freight and passenger agent with headquarters at El Paso, Texas, until August, 1895; general freight and passenger agent of the Maricopa & Phoenix at Phoenix, Ariz., until January, 1898; superintendent of the same road until January, 1902; general freight and passenger agent of the Arizona Eastern and Southern Pacific until 1907; assistant general freight and passenger agent of the Southern Pacific, Pacific System, with headquarters at Tucson, Ariz.; chairman Arizona Railway Commission at Phoenix, Ariz., until 1909; chairman trans-continental bureau at San Francico, Cal., until 1910; assistant to the president of the Sacramento Northern which position he held until his recent appointment.

Obituary

James W. Leonard, formerly, from January, 1911, to 1915, assistant to vice-president on the Canadian Pacific, at Montreal, Que., died on April 28, at Brampton, Ont. He was born in 1858 at Epsom, Ont., and began railway work in 1872 as a telegraph operator and agent on the Midland Railway of Canada. He later served on a number of different roads, until May, 1884, when he was appointed superintendent of the Canadian Pacific, and subsequently was consecutively general superintendent, Western division; manager of construction; assistant general manager, Eastern lines; general manager of the same lines, and assistant to vice-president of the same road. On January 1, 1915, he left the service of the Canadian Pacific to assume the general management of the Toronto Terminal Railway, at Toronto, Ont.

C. E. Dewey, freight traffic manager of the Grand Trunk Railway System, with headquarters at Montreal, Que., died on May 15, at Atlantic City, N. J. He was born in 1873, at Cheshunt, England, and in 1888 entered the service of the Grand Trunk as an apprentice clerk in the freight agent's office at Toronto, Ont. After serving as chief clerk to the division freight agent at Stratford and at Hamilton, he was appointed district freight agent at Stratford in 1899, and was promoted to district freight agent at Toronto in 1902. He went to Montreal in 1907 as assistant general freight agent, and in the following year was made general freight agent of the Central Vermont. In 1911, he was appointed general freight agent of the Grand Trunk Pacific at Winnipeg, and two years later he returned to Montreal and was appointed freight traffic manager of the Grand Trunk Railway System.



C. E. Dewey

EDITORIAL

Railway Age

Table of Contents will be found on Page 5 of the Advertising Section

Correction of a Statistical Error

A mistake in compiling statistics caused the *Railway Age* to make a misleading comparison in the editorial in its issue of May 9, entitled "The Railroads—a Bankrupt Industry," between the traffic handled in the first three months of 1916 and the first three months of 1919. It was stated in the editorial in question that in the first three months of 1919 the freight traffic of the railways was 85,000,000,000 ton-miles, while in the first three months of 1916 it was only 80,000,000,000 ton-miles, an increase in 1919 over 1916 of over 6 per cent. A recheck of the statistics shows that the total mileage in the first three months of 1916 was almost 90,000,000,000. With this correction, the statistics show that the ton mileage in the first three months of 1919 was 5 per cent less than in the first three months of 1916, while the total earnings of the railways were 38 per cent greater and the operating expenses 85 per cent greater.

Broadway Limited and 20th Century

The Pennsylvania's twenty-hour train from New York to Chicago, which was voluntarily discontinued before the roads had been taken over by the government, has now been restored. During this period of discontinuance, the two new west side subways in New York have been opened. This means that it is now more convenient to get from west side uptown New York City to the Pennsylvania Station than it is to Grand Central Terminal. It is now equally convenient to get from the downtown district to the Pennsylvania Station and to Grand Central; it is more convenient to get from a large part of Brooklyn to the Pennsylvania than to the Grand Central. Heretofore, the New Yorker leaving his home in almost any part of Manhattan or Brooklyn or leaving from his office could get more easily and quickly to the Grand Central Terminal than to the Pennsylvania Station. In the same way, travelers from Chicago have found the Grand Central the more convenient station at which to arrive in New York. All this has given the Twentieth Century a considerable advantage over the Pennsylvania's twenty-hour train. It would seem now that the situation is partly reversed. Will this in time enable the Pennsylvania to carry as many or more passengers on its fast New York-Chicago train as does the New York Central or will tradition of the Twentieth Century enable it to hold its own large business despite changed conditions in New York? In Chicago the situation still favors the Twentieth Century, the La Salle Station, which is used by the New York Central, being more accessible than the Union Station, which is used by the Pennsylvania.

The Zone Postal Rate System

Every concern or person that does business with the Post Office department nowadays has its or his grievance, while all persons and concerns that do business with it share in certain general grievances. All have a grievance because the service has so greatly deteriorated under the regime of Postmaster General Burleson. The postal employees have a grievance because of Mr. Burleson's autocratic methods. The railways have a grievance because the postal department, with the assistance of Congress, has so fixed their compensation for carrying the mails as to cause them to carry it at a loss. Publishers have a grievance because Congress, at the instance of the postal department, has established a zone system of charges for carrying newspapers and magazines. The readers of many newspapers and magazines will soon have a grievance because the zone postal rates are forcing many publishers to adopt zone subscription rates. We have just received an announcement that Collier's Weekly will continue to cost five cents a copy east of the Mississippi River but will be advanced to ten cents a copy west of the Mississippi River. Heretofore newspapers and magazines of all kinds have made the same subscription rates to all points within the United States and higher rates to foreign countries. As a result of the zone postal rate system the territory west of the Mississippi River has, so far as Collier's is concerned, been legislated out of the United States. The *Railway Age* and other papers published by the Simmons-Boardman Publishing Company have not yet adopted zone subscription rates, but if the existing zone postal law remains in effect it will become necessary to do so. Most publications with national circulations will be forced to discontinue charging flat subscription rates and to charge higher rates to subscribers living in parts of the country remote from the offices of publication.

The Grand Trunk Difficulties

At the "ordinary general meeting" of the Grand Trunk, held in London recently, the chairman, Alfred W. Smithers, mentioned the fact that a third offer had been made by the Grand Trunk to the Canadian government for terms under which the government could acquire the Grand Trunk and the Grand Trunk Pacific on the basis of an annual sum to be paid by the government, to be distributed by the directors. In January, 1918, the dominion government of Canada asked the directors of the Grand Trunk to name their terms. An offer was made by the company, was rejected by the government, which then made a counter offer; this counter offer was rejected and, after long negotiations a second offer was made by the company to the government but this also was refused. The situation as it is at present is absolutely unsatisfactory to everybody concerned. The government obtained the appointment of a so-called "receiver" for the Grand Trunk Pacific but this does not relieve either the Grand Trunk or the government from its guarantees of Grand Trunk Pacific securities. Worse than this, however, in a way, is the situation of the Grand Trunk, itself. Its subsidiary lines in the United States are being operated by the United States Railroad Administration and it is receiving, therefore, rental for these lines. The Grand Trunk in Canada, however, is being operated without government aid or guarantees. As Mr. Smithers points out, the railways of both the United States and of Great Britain are being operated under government guarantees but were it not for these guarantees, most of them would be in financial difficulties. The Canadian Pacific has been able to preserve its credit and to continue paying its dividends because it is financially the strongest great railroad company in the world and because it has, besides its railroad, many other profitable activities, including the operation of ocean steamship lines. The Grand,

Trunk, on the other hand, has a financial structure comparable to that of most of the moderately strong roads in the United States. What has happened and is happening to the Grand Trunk is a good example of what would happen to many railroad companies in the United States were the government guarantees to be withdrawn without some readjustment in the relations between expenses and income.

The Permit System of Handling Grain

While the general results of government operation of railways have not been satisfactory, some improved methods have been introduced which by all means should be retained. One of these is the permit system of handling grain. It was used with highly beneficial results last year, and Director General Hines has announced it will be used again this year. While it takes some machinery to operate it, the purpose and effect of the system are simply to prevent grain from being shipped from the farms in larger volume than it is possible for the railways satisfactorily to handle it. When the grain pours in to the central markets and the ports faster than it can be unloaded congestion at railroad terminals develops. Congestion renders it impossible for the railways to handle as much grain and other traffic as they could in the absence of congestion. Under the permit system the shipper is required to get a permit before he ships his grain and permission to ship is given only as fast as the railways can handle the grain and it can be unloaded at the terminals and ports. The use of the permit system is especially necessary when, as at present, the price of wheat is fixed by the government, and no farmer has any incentive to hold it after it is harvested. The use of the permit system would be beneficial to the farmers, the railways and the general public, however, even in years when the price of wheat was not fixed. In the framing of legislation for the regulation of the railways after they are returned to private operation power ought to be given to the Interstate Commerce Commission, or some other governmental body, to authorize, or even require, the railways, under the regulating body's supervision, to use the permit system in times of heavy traffic movement. Benefits might be derived at such times from extending the use of the permit system to commodities besides grain.

Outcome of the Steel Price Controversy

THE OUTCOME of the controversy over the prices of steel rails was not unexpected. The director general of railroads refused to accept prices fixed by the Industrial Board and advertised for bids. All the steel companies which responded, except one, bid the prices which had been indorsed by the Industrial Board. The one company which did not bid them asked for higher prices. The director general, under protest, has placed orders for 200,000 tons of rail with six companies at the lower prices bid. Director General Hines unquestionably has sincerely believed that the prices asked have been too high, and has made a vigorous effort to effect a railroad economy by getting them reduced.

On the other hand, there is no reason to doubt that the officers of the steel companies and the members of the Industrial Board were just as sincere in the belief that the prices offered were fair; and the steel companies could not reasonably have been expected to offer lower prices than those the Industrial Board had approved. So far as the public is concerned, it has not been given information sufficient to enable it to form an intelligent opinion as to the merits of the controversy. The tendency of business men generally has been to side with the steel companies, largely, no doubt, because of the general distaste of most business men for government operation of railways. Future developments regarding rail prices will be watched with interest. About 1,600,000 tons of rail are required annually for the normal maintenance of the railways under government control. Therefore, the orders which the director general has placed will provide for only about one-eighth of their annual requirements. In order to secure the greatest practicable economy in steel production and provide for the normal maintenance of the railways and for taking up deferred maintenance, other and much larger orders ought to be placed soon.

Looking at the matter from the standpoint of national welfare, it would seem that they ought to be placed on a basis of price which will tend to enable the entire iron and steel industry to prosper, just as railway rates ought to be so fixed as to yield a reasonable average return to all the railways. If railway rates were so fixed that only the roads which can handle traffic the cheapest could prosper the railroad industry of the country as a whole would soon be on the rocks; and the same principle which should cause railway rates to be so fixed as to be fair to both the "high cost" and the "low cost" railways should cause steel prices to be so fixed as to be fair to both the "high cost" and the "low cost" steel mills.

Mr. Brisbane Is Disappointed

ARTHUR BRISBANE, who receives a larger salary for writing in a plausible and emphatic style what Hearst would like to have the people believe than he could probably earn by writing what he knows to be the truth, rejoiced greatly when the government took over the railroads, because it represented at least one step toward following his advice that the government take the railroads for keeps. He expressed considerable worry for a time lest the government spend "millions of the people's money" to put the roads in "gilt-edge condition," as he called it, and then return them to their owners, but he found much to praise until the experiment had progressed sufficiently to demonstrate that Mr. McAdoo was not fulfilling all of his rosy predictions of what the government could accomplish that private management could not.

Now that the President has announced that the roads will be returned at the end of the year Mr. Brisbane finds that "nothing more outrageous is in the history of using public money for private benefit than the management of American railroads." This is based on his statement that the $1,200,000,000 appropriation asked by the Railroad Administration is "to meet the deficit, which means to patch up and rebuild the run-down properties," and that "the government admits that hundreds of millions spent on the roads will not be repaid to the taxpayers." Of course, Mr. Brisbane knows, even if many of his readers do not, the difference between upkeep and capital expenditures, and he knows that the $486,000,000 deficit, the part of the appropriation which Director General Hines admits will not be repaid, was incurred in following Mr. Brisbane's own advice to raise wages. He also knows that whatever patching up and rebuilding of the railroad properties is being done is also being charged up to the companies, and that the $775,000,000 which Mr. Hines says has been or will be advanced to the railroad companies for capital improvements represents the part of the appropriation which will be paid back to the government because the latter has good security for it. If the government should so regulate the railroads as to make it impossible for them to pay back the sum thus charged against them and the government has to foreclose on its lien, then Mr.

Brisbane will be given an opportunity to boast that Mr. Hearst brought about government ownership which he is not likely to be given except in that way.

Mr. Brisbane also objects because Mr. Hines has found it necessary to buy the comparatively small quantity of 200,000 tons of rail. He asks why the Railroad Administration, after having lived nearly a year and a half on the rail ordered before 1918, does not postpone this order and make the railroad companies buy the rail after they get their roads back. It would not, of course, be a part of the Hearst policy to tell the people that even government operation produces a certain amount of wear on the rail which it is necessary for safe operation to replace as a part of current upkeep expense.

Expedite the Railroad Appropriation

THERE IS NOTHING Congress can do which will produce a better effect upon general business than to pass promptly a bill providing the $1,200,000,000 fund for the Railroad Administration, for which Director General Hines has asked. A bill to appropriate $750,000,000 was introduced at the last session of Congress, but was defeated by a filibuster. The Railroad Administration was nearly out of money at that time. This was due to the deficit which it had incurred, to expenditures which it had made for additions and betterments and equipment and to advances and loans to the railway companies. Because of the failure to make an appropriation for it at the last session, it has had to borrow money from the War Finance Committee, to issue certificates of indebtedness for large sums, to leave large amounts of its debts unpaid, and to curtail sharply its expenditures for maintenance and improvements.

The skill and courage Director General Hines has shown in dealing with the conditions the want of funds presented to him have been admirable; but Congress ought not to allow the existing situation to last any longer than is unavoidable. The inability of the Railroad Administration to carry on needed maintenance and improvement work is having a very depressing effect upon industry. Its issuance of certificates of indebtedness to meet some of its debts and its failure to meet large amounts of them at all, have helped to increase the inflation of credits, which is becoming a menace to the country's welfare. The railway and railway supply companies to which it owes money have been obliged to borrow heavily from banks when they should have had the money the Railroad Administration owes them to carry on their businesses. Justice to those to whom the Railroad Administration, as an agency of the government, is indebted and the welfare of the country require that it shall be enabled as soon as practicable to pay its bills.

The letter Director General Hines wrote to Secretary of the Treasury Glass on May 24 discloses that of the $1,200,000,000 for which he asks, $486,184,940 is needed because of deficits which the government has incurred in its operation of the railroads. Of this, $236,184,940, it is shown, is the amount of the deficit incurred in the year 1918. This figure is $10,000,000 larger than the last official estimate of the deficit for 1918, and apparently is arrived at by adding to the expenses of the individual railways under government control the expenses incurred by the overhead organization of the Railroad Administration. The estimate of the deficit for the first four months of 1919 is $250,000,000. The original revolving fund provided for the Railroad Administration amounted to $500,000,000. It will be seen, therefore, that the deficit for 1918 and the first four months of 1919 practically consumed all of this.

Of the $1,200,000,000 additional for which Mr. Hines now asks, about three-quarters of a billion dollars represents amounts advanced or to be advanced for the account of the railroad corporations and $425,000,000 is temporarily tied up in working capital. If no more deficits should be incurred under government operation, this entire $1,200,000,000 would ultimately be returned to the government. But it appears probable that large deficits will continue to be incurred during the rest of the year unless rates are advanced.

The Railroad Administration should be enabled, not only to pay its outstanding debts, but to increase its expenditures for maintenance in order to bring the railways up to the physical condition they were in when it took them over, and it should also be spending more money for improvements. These things are needed, not only to put the railways in good shape, but for the welfare of the country during the period of transition from a war to a peace basis. The railroad appropriation bill introduced in the last Congress should not have been defeated. The one introduced in this Congress should be passed immediately.

The Case of the Engineer

TWO LETTERS to the editor appearing in this issue discuss the editorial published in the issue of May 2 concerning probable effects of wage standardization in railway engineering positions. Regardless of the merits of the recent campaign to increase the pay of technical men, the history of all collective bargaining goes to show that the success of employees in wresting standard wage concessions from their employers is almost always followed by a leveling of compensation rates, for two reasons: The employer usually will not pay more than the established minimum, and the organizations of employees usually strive to reduce the distinction between the efficient, intelligent workman and the drone.

However, the problem that confronts engineers today is not one of theories but of facts. Though organized efforts for material gain may have some unfortunate consequences such as the ones alluded to above, it is futile to dodge the fact that educated salaried men are confronted by an economic menace. "Something must be done," are the words on every engineer's lips. The situation is not one of a day's making. Engineers on railways, especially in the lower ranks, have been hampered by inadequate salaries for a period reaching back ten years or more. How long and clearly this situation has been recognized is shown by the discussion of the subject appearing in the *Railway Age Gazette* of March 16, 1917, page 437, in which a number of engineering educators expressed the attitude of the technical graduates toward railway positions.

But the subject is broader than railway employment. It is broader than the engineering profession. It touches the entire class of brain workers. For, while this important and ambitious stratum of society has given immediate compensation secondary consideration in its desire to secure the necessary training and experience for future advancement, labor, organized in many of its branches, has wrested concessions from capital in the form of increased wages and shorter hours. As a consequence the unorganized salaried worker finds himself doubly embarrassed. His income has not been advanced in proportion to that of the laborer, while the cost of living has greatly increased, largely owing to the fact that the productive efficiency of labor has not increased in proportion to the advances in its wages.

The overwhelming success of union labor, directly or indirectly resulting from the war, in getting higher wages, together with the contemporaneous upheaval in money values have served but to aggravate the condition, and the brain worker has come to feel that he is being ground between the

upper and nether millstones of capital and labor. No wonder that his mind turns to thoughts of organization.

If engineers must organize to promote their material interests, what form shall their organization take—or to put it on a more practical basis, what organization shall they join? For, as stated in our previous editorial, there are two well defined schools of thought on this subject, represented by those who believe that the "Founder Societies" of engineers should represent the engineer in his economic struggle and those who favor a strictly business organization like the American Association of Engineers. It is not within our province to answer this question. The individual must decide that for himself. However, it does not seem out of place to point to some of the considerations to be taken into account in making this decision.

The older associations and their common body, Engineering Council, have the advantage of numbers, resources, weight. They include a personnel which embraces the widest, most renowned and most respected of the professions. With all these advantages theirs is the opportunity of the time, if they have the foresight to seize it. Their disadvantages are mainly those arising from the inertia of large and old institutions given to using established methods and to following time-tried lines of thought. The fact that they represent the older and more thoroughly established members of the profession will insure that no false steps are taken. However, it may also tend to make the steps taken slow and few in number. A still further consideration is the doubt in the minds of the younger men as to whether their older brethren who have "arrived" are willing to recognize the young man's plight in full and sympathetic measure.

The American Association of Engineers represents itself as a business organization having the single purpose of furthering the material interests of the profession as a whole and of its members individually. It denies emphatically that it is a labor union or that its policies are to be remotely associated with those of organized labor. This view is borne out by the fact that its membership includes men in the highest as well as the lowest ranks of the profession, that not a few railway officers are included within its numbers and, furthermore, by the formation recently of several draftsmen's and engineers' unions affiliated with the American Federation of Labor and composed of men who, presumably, were not attracted by the outlook and policies of the American Association. In opposition to this view it must be recognized that this association includes among its members the more radical men of the profession, these being perhaps not so much its younger members as older men who have not been very successful. Moreover, there has been more than one attempt to stampede the organization into the American Federation of Labor, and into the adoption of union labor policies and methods.

While the prospects of the success of such attempts may be small, it is but fair to call attention to them, since it would be most unfortunate if commonly adopted by labor organizations should be introduced into the engineering profession. Seniority, limitation of output and the strike should have no place in engineering. Doubtless many members of the American Association of Engineers would make so earnest a fight against the adoption of these objectionable methods of labor unions that there is little prospect of their being adopted, in the near future at least. The tendency, however, is there and it must be carefully watched.

The older associations are also on trial. Their future is contingent largely on their retaining the interest and sympathy of the young men. The outcome will depend upon the extent to which these established institutions can turn their united and enthusiastic efforts to solving the problems of the present. It is true that they have undertaken the task but they must register progress in no uncertain terms.

Letters to the Editor

Conductors and Bull Dogs

CINCINNATI, Ohio.

TO THE EDITOR:

The article on Harmony and Safety published in the *Railway Age* of May 2, page 1104, sets forth a much needed lesson. I have been identified with railroads in the capacity of brakeman, freight and passenger conductor, train master and superintendent since the good old days of the link and pin and the hand brake, and have met with all dispositions from the mild angelic to the continual grouch, and have administered treatment from mild to heroic. Mild discipline will effect a permanent cure if properly administered. About three years ago I received a wire from Conductor Smith advising me that he would not take rear brakeman Jones out another trip. At about the same time I received one from Jones advising me that he would not go out with Smith another trip. I called them to the office and inquired as to the nature of their trouble. Smith said Jones would not answer when given instructions, and so on. Jones said Smith would not talk to him or show him their train orders. Both confirmed their messages, refusing to go out another trip on the same train. I then asked them if they knew why the bulldog and the striped hyena are the most vicious of fighters. Both replied that they did not. "Because they are the most ignorant," said I. "Both get a neck hold and won't let go." Smith and Jones smiled and said they did not want to be looked upon by their fellow employees and superior officers as human bulldogs and hyenas. "Then shake hands," said I, "and promise to be gentlemen in the future; be brothers in fact as well as in name." This mild treatment effected a permanent cure. It was harmony in the concrete. J. S. M.

Effects of Punitive Overtime

ST. LOUIS, Mo.

TO THE EDITOR:

Your editorial in the *Railway Age* of May 2 on the results that would obtain if train and enginemen were granted "punitive overtime" fails in my opinion to mention the most important thing that would result.

Every one knows that train and enginemen are just like any other class of workmen, some being very efficient, some passably so, others very inefficient, and a few disloyal to their employers. Some of them figure only on getting by as easily as possible and securing the most money possible, and in no other occupation that I know of can men hold on as easily as in the train and engine service, for the reason that it is very hard to give it close supervision. So many things can happen on a train that can be used as an excuse for delays that it is hard to locate the employees who are inefficient or disloyal; and to discharge a man for inefficiency or disloyalty good proof must be available.

On account of the things mentioned, I think the granting of punitive overtime to these men would be the most disastrous thing that was ever done.

All railroads have many men who take pride in taking a tonnage train over a 100-mile division in from five to eight hours, and do it almost every day. There are others who cannot do this; not because they do not wish to, but because it is not in them. There are still others who will not do it if it suits them better to make a little extra money by making a little overtime.

The result will be that the efficient and loyal crew will draw straight time, while the inefficient and disloyal crew will draw from 30 per cent to 60 per cent more for overtime, thereby putting a premium on inefficiency and disloyalty. This in my opinion will, sooner or later, ruin the efficient and loyal man in train and engine service.

There should be some way provided whereby loyalty and efficiency will be rewarded, instead of disloyalty and inefficiency. GENERAL MANAGER.

Engineering, a Profession or a Trade

PITTSBURGH, PA.

TO THE EDITOR:

The editorial in the *Railway Age* of May 2, 1919, entitled "Shall Engineering Be a Profession or a Trade," contained certain statements which the writer believes will be misleading to those of your readers who are not familiar with the recent activities of the American Association of Engineers, and he begs leave, therefore, to submit the following observations:

A profession or a trade is such when it is considered to be so by society. Any group of men who have a common specialized knowledge may claim its vocation to be a profession; but only when its specialized knowledge has been raised high above the attainments of most vocations, and when its fitness to carry out a particular, difficult, necessary work has been proven, will men generally concede its right to be dignified by the title of profession. The right of engineers to the use of this word is a comparatively recent acquisition. It was not until the requirements of engineering work compelled the development of a high order of engineer, and until the engineer had raised his capacity for service to society above the abilities of the trades, that engineers were so rewarded.

The assertion that this attainment may be lost by standardization of wages and positions, such as is proposed, and by collective bargaining, seems unfounded. So long as engineers expand their activities and develop their abilities to meet the ever increasing demands of society, just so long will they retain their standing as professional men; and whatever steps they may take toward improving their social welfare will not have a tendency to reduce the professional standard, providing there is no violation of the trust reposed in the profession by society.

Men everywhere concede the right of everyone to receive a compensation commensurate with his services; and since the compensation of engineers is obviously inferior to that received by other workers, the writer does not believe that any fair methods which may be used to bring it to a proper level will result in censure of the profession or loss of professional standing. Collective bargaining is not inconsistent with professional principles, provided one of the parties does not use unfairly any advantage he may possess. Surely a bargain consummated after a fair bidding between the contracting parties is less open to criticism than price-fixing by a group maintaining a monopoly; and yet the price-fixing method is the one used by the legal and medical professions. It is pertinent to remark, perhaps, that such price-fixing is scarcely different from the essential rules of action of trades-unions, but has met with little opposition, because the clients of the lawyers and physicians have not been organized to resist its application as the employers of labor have been able to resist the prices proposed by the trades.

Standardization of positions and working conditions may result in stifling individual ability and initiative if carried to the point where methods, operations, and processes are standardized. Nothing of this sort has been proposed, however, nor will it be; the only standardization proposed is of the titles used in railroad service, in order that a wage increase may be applied fairly.

Standard wages already exist in individual railroad organizations without causing a loss in professional standing; although at present the maximum wage for certain positions is standard, while the proposed schedule calls for a minimum wage. Knowing this to be true, the writer cannot see that if the Railroad Administration adopts the schedule proposed by the American Association of Engineers it will have the results you submit.

Railroad engineers do not propose to use trades-union tactics. This was evidenced by the sympathetic enthusiasm shown at the railroad engineers' conference in Chicago on March 17 at the reply of W. W. K. Sparrow, corporate chief engineer of the Chicago, Milwaukee & St. Paul, to the question as to what he would do should the railroads refuse to consider the schedule of wages proposed, when he said, "I would not strike." Those who witnessed that incident came away with the feeling that what was to be done could be accomplished, and would be, by no sacrifice of professional ethics.

You are right in saying that "present conditions call for sober thinking on the part of all engineers in railway service." It requires little thought, however, to decide to avoid trades-union methods—professional instinct will prevent that; but the question to be given serious thought is this: Is the pride in one's profession, and the pleasure of doing railroad work, worth the difference between the compensation offered to railroad engineers and that enjoyed by men of similar qualifications in other work? The writer can assure you that very many railroad engineers have already decided this question in the negative. CEDRIC B. SMITH.

The American Association of Engineers

CHICAGO.

TO THE EDITOR:

In an editorial appearing in your issue of May 2 you ask the question "Shall Engineering Be a Profession or a Trade?" You clearly indicate in your reply that it is your opinion the American Association of Engineers would make it a trade, while the older technical societies represented by Engineering Council would not. You say the American Association is patterned in many ways after the trade unions. Before deciding to join the American Association I studied this very carefully as I am strongly—I might say violently—opposed to the introduction of trade union methods into an engineering organization. I was thoroughly satisfied that the American Association, beyond being a business organization, as is the United States Chamber of Commerce, had nothing in common with trade unionism and had no intention of adopting trade union methods.

You say the membership of the American Association is apparently among the younger men in the field. If that is true, and it well may be, it is a good thing for the association and speaks well for its future. The American Association does not believe in its policy or its government being limited to those of the profession occupying high positions. It believes, as all pay the same entrance fee and annual dues, its governing council should be representative of all and it should be neither ruled by the rank and file or members of its superior grades, and that each and every one should be endowed with the same rights and privileges. In other words, its policy and its governing council are in the control of its members and are intended to express their desires and not, as is often the case, the desires and opinions of a select few who really represent but a very small minority of the profession as a whole.

You say the association has advocated standardization of

salaries and presented a standard wage scale to the wage board. Permit me to correct you; the association did nothing of the sort. It presented a sliding minimum scale for various positions, which is a very different thing. There is nothing in the association's recommendations, nor does it desire or believe in, restricting initiative or higher reward for ability or in making a position the measure of the compensation, but it does advocate a minimum within certain limits for certain positions, believing that if a man cannot earn that minimum he is not entitled to the position and should make room for some one who can.

I do not think, in view of the rapid monthly increase in its membership, that the American Association of Engineers requires a brief in its behalf, but as I believe your paper does not desire to intentionally mislead its readers I wish to correct what I believe is a wrong impression of the organization of the American Association.

W. W. K. Sparrow,

Corporate Chief Engineer, Chicago, Milwaukee & St. Paul; director, American Association of Engineers.

Heavy Loading of Cars

Pittsburgh, Pa.

To the Editor:

The United States Railroad Administration, through its Car Service Section, has recently issued an appeal to the shipping public, inviting attention to the accomplishments and the policy of the Railroad Administration with regard to freight car conservation, urging shippers to continue their efforts towards bringing about improved transportation conditions by continued heavy loading and pointing out that this co-operation of shippers has been a very material factor in compassing: 1. An increased car supply; 2., lessened congestion on the railroads, particularly at terminal points; and 3., improved service made possible by such lessened congestion.

The 13 shipping companies of the United States Steel Corporation have conducted a vigorous campaign for the heavier loading of cars, and during 1918 the average carload shipments of these companies was 91,500 lb. per car. The average marked capacity per freight car in this country is only 80,000 lb., and the average carload of all railroads throughout the country on all shipments, including the traffic referred to, was only 58,200 lb. per loaded car, or an average of 33,300 lb. per car less than the record made by the subsidiary companies of the United States Steel Corporation.

While the 13 shipping companies referred to increased the average carload on outbound shipments during 1918 only 3,600 lb. per car, there was effected an actual saving of 63,828 cars, as compared with the loading for the year 1917, when the average was 87,900 lb. per loaded car. This does not include the cars loaded with iron ore by the Oliver Iron Mining Co.,—also a Steel Corporation subsidiary—all of which were loaded to the average of 50 tons per car. To include these would have tended to increase the average load, but would have been misleading.

Taking the average haul per ton of revenue freight throughout the country of the individual railroad as 166 miles, and the loaded freight cars per train as 25 cars, the railroads throughout the United States were saved 10,595,448 car miles, or 423,818 train miles; the 63,828 fewer cars used means that these cars were in other service and at the average freight revenue of 16.13 ct. the saving of this number of cars actually resulted in increased earnings to the railroads of $1,709,045.76 without any increased operating expense.

During the last seven years, the 13 shipping companies of the United States Steel Corporation have increased the average carload from 69,200 lb. per car in the year 1911 to 91,500 lb. per car in the year 1918, an increase of 22,300 lb. per car, or 32 per cent, effecting a saving of 339,736 cars through the heavier loading of equipment.

The railroads, consignees and shippers themselves have been greatly benefited in the fewer number of cars switched and weighed, to say nothing of the relief from congestion on the railroads, particularly at terminal points, improved service made possible by lessened congestion, and the great saving in operating expenses that was brought about by the fewer cars, both empties and loads, that were kept out of the various classification and interchange yards of the railroads from point of shipment to destination.

This record proves conclusively the real value of conserving freight car equipment at all times, and if the shipping public generally would note the enormous saving in equipment that has been created by these companies with only 32 per cent increase in the average load in the period of seven years, how much could be accomplished if all shippers would adopt the United States Railroad Administration's rule of loading to 10 per cent above the stenciled capacity, or to firmly fix the rule to load to 100 per cent of the carrying capacity whenever possible. J. Fred Townsend,

Traffic Manager, National Tube Company.

Inequitable Sick-Leave Rules

New York City.

To the Editor:

I see no mention in your paper of an order which has just gone into effect on prominent roads affecting the compensation of employees who are paid by salary. These employees —draughtsmen, and clerks in engineering offices, clerks in other offices at headquarters, and many others—have had various benefits conferred on them by the supplements to the general wage order, but now a good deal of this is knocked over by a sweeping order providing that a deduction shall be made for any absence on account of sickness.

The justification for this order is, presumably, that a man who is allowed extra compensation when he works more than the normal hours, should equally be "docked" when he works less than the normal hours. To this the answer is that for nearly all salaried men the overtime provision is of no benefit; they never work overtime; while the deduction for illness in many cases will be a very costly matter. The net effect is a general reduction of salary.

Government employees, I understand, lose pay when off because of illness, but are allowed, in addition to the annual vacation, one day off a month. Railroad employees, under the new order, get the unfavorable end of this arrangement (the docking) and not the favorable end of it (the monthly allowance of a day off).

Consider the case of a salaried man who stays home for a couple of days with a cold, and for the next two weeks comes an hour early each morning and works on Saturday afternoon, to catch up with his work. Under the old arrangement, the usual American plan, his salary went on without interruption. Under the new order, he is docked for the days he is ill, and receives no allowance for the extra time he works to catch up; for under one of the "jokers" in the existing rules, there is no overtime allowance for the first hour of extra time in any day, nor for the first five hours of extra time on Saturday afternoon, in an office working the usual 38 hours a week.

Under the new rule, as anybody can easily predict, many a man with a cold or a slight digestive disorder will come to the office and mope around half sick, doing little work, for a week, instead of staying home for a day, as he would have done under the old arrangement, and getting cured up. The text of the order has not been given out, so far as I have seen. The persons to whom it applies are in general unorganized, and without means of making an effective protest against it.

E. D. C.



The Blockhouse on the Mexican Railway at Boca del Monte

A Trip Over the Railway Lines of Mexico

Situation Much Improved. Large Amount to be Spent to Replace Destroyed and Worn Out Equipment.

By P. Harvey Middleton
Executive Assistant, Railway Business Association

PART 1. GROWTH OF RAILWAYS AND PRESENT NEEDS

IT IS AN UNFORTUNATE FACT that the principal items of news from Mexico are reports of the activities of Villistas, Zapatistas, and Felicistas and of other rebels and bandits who infest certain portions of Mexico, and that the average American is convinced that Mexico is an industrial, physical, political and financial ruin. That this is far from the truth was strikingly emphasized to me on my trip through Mexico from April 11 to May 10.

When I was invited to make a trip over the railway lines



The Station at San Luis Potosi.

of Mexico under government control, I gladly availed myself of the opportunity to obtain at first hand facts and figures regarding transportation conditions. Leaving New York on April 8, we reached Laredo, Texas, on the morning of April 11. Here we laid over for a day. The Pullman Company will not at present allow any of its cars to cross the Rio Grande, and none of the American railway companies will permit their passenger or freight cars to go into Mexico. So on the morning of April 12 we crossed the river in an automobile to Nuevo Laredo and boarded the train of the National Railways of Mexico.

Our Pullman was a duplicate of the one we had traveled in from San Antonio to Laredo, and we began our journey to the Mexican capital at 11 a. m. through a country which differed but little from that on the American side, for this stretch of territory is one of the few in the Mexican republic that does not show mountains against the skyline. The line traversed the deserts of the great plateau and passed through hundreds of miles of dry and treeless plains. En route we passed many freight cars in bad order, with holes roughly patched with pieces of wood or tin, and at Monterey, which we reached in the late afternoon, we saw 30 locomotive frames standing within the steel skeleton of what was apparently once a repair shop. Our military guard of 40 soldiers, which we had taken on at Nuevo Laredo, was changed here for a fresh set. These traveled with us as far as San Luis Potosi, and here the guard was again changed for the run to the capital.

The journey by rail from Laredo to Mexico City was made with no other delay than that occasioned by locomotive troubles on steep grades, requiring in consequence a few more hours than in the old days of almost clock-like precision of operation, when the roads were in perfect condition and rolling stock was abundant. The arable land in the northern portion of the republic, confined to narrow limits at best, is either under cultivation or being put into condition for production, and as the central portion of the plateau was reached, and the fertile valleys of San Luis Potosi, Queretaro, Guanajuato, and other states were traversed, a scene of agricultural activity was observed. Piles of ore at various stations indicated that mining is active.

The railway from Laredo to Mexico City was originally a narrow gage line, built under American auspices. It was opened for traffic in November, 1888, and the widening to standard gage was completed in 1903. The length of the main line to the capital is 803 miles, and it is the shortest route between the frontier and the capital. On the journey the train crosses the states of Tamaulipas, Nuevo Leon, Coahuila, San Luis Potosi, Guanajuato, Queretaro, Hidalgo, and penetrates the state of Mexico.

Many stations and a great deal of rolling stock were destroyed on this line during the revolution, but the government has rebuilt tracks, bridges and stations, has repaired

and purchased rolling stock, and is still repairing and purchasing more as the income warrants. The heavy expenses have been met with no other source of revenue than the ordinary business of the line, with the necessity of carrying military guards on all trains at heavy cost.

Mexico's Shortage of Railway Equipment

We arrived at Mexico City at 2 a. m. on Monday, April 14, and on the following day I began an investigation at the offices of the Mexican Government Railway Administration with the object of ascertaining the extent of the deterioration of the physical equipment of the railways under government control. At the end of three weeks I was able to construct a table showing the shrinkage in the railway equipment of Mexico since 1913, as the result of revolutions and the lack of material with which to repair rolling stock. This table is given below:

SHRINKAGE IN MEXICAN RAILWAY EQUIPMENT

	Metric tons	Number destroyed or condemned since 1913
Standard gage box cars	13.6	41
	18.2	67
	22.7	62
	27.2	1,673
	36.3	1 630
Narrow gage box cars	20.0	254
	25.0	204
	27.2	16
	10.0	21
	20.0	270
	12.0	86
	20.0	27
Standard gage cattle cars	18.2	11
	22.7	4
	27.2	399
	36.3	309
Narrow gage cattle cars	20.0	45
	10.0	11
	27.2	5
	12.0	13
Standard gage gondolas	22.7	23
	27.2	407
	36.3	592
Narrow gage gondolas	20.0	22
	10.0	3
	25.0	44
Standard gage hopper cars	36.3	20
	45.4	151
Standard gage flat cars	13.6	12
	22.7	25
	27.2	176
	36.3	502
Narrow gage flat cars	25.0	124
	22.0	65
	12.0	24
Standard gage coke cars	22.7	8
	27.2	5
Standard gage tank cars	27.2	25
	36.3	106
	45.4	95
	20.0	2
	25.0	9
Narrow gage tank cars	25.0	16
Standard gage cabooses	13.6	82
	18.2	15
	22.7	61
Narrow gage cabooses	11.5	11
	10.0	28
	12.0	5
Standard gage ballast cars	13.6	35
	18.2	34
	36.3	18
	45.4	8
Standard gage passenger cars, combination first and second class	....	22
Narrow gage passenger cars, combination first and second class	....	12
Standard gage passenger cars, second class	....	55
Narrow gage passenger cars, second class	....	44
Standard gage combination, baggage, mail and express	....	38
Narrow gage combination, baggage, mail and express	....	19

Merely to bring the Mexican railways back to the state of efficiency existing under the American operating officials prior to the revolution it will be necessary to replace all the rolling stock mentioned above. In addition, it is estimated that there will be needed 87,500 tons of rails, accessories and supplies. Since 1910 revolutions have resulted in the destruction of over 10,000 freight cars. At the present moment on the lines north of Mexico City there are 5,000 freight cars laid up awaiting material with which to repair them, as well as 400 locomotives and 225 tank cars.

In view of this situation, large purchases of supplies must be made within the next twelve months to keep the railways running. Purchases are being made constantly by the New York office of the Mexican Government Railway Administration, which has a bank credit of about $250,000 a month for this purpose. Col. Paulino Fontes, general manager of the government lines south of Mexico City, is at the time of writing in New York with the object of increasing the funds available for this purpose, and in June V. L. Blanco, general purchasing agent of the lines north of Mexico City, will also visit New York to obtain prices for a large list of materials.



This Section Car Is All That Was Left of the Equipment of the San Jorges Bay & Eastern, Sonora After a Rebel Raid

Growth of Railways

It may be well here to give a brief review of the development of Mexico railways prior to the Carranza regime.



The Remains of the Round House of the San Jorges Bay and Eastern

Railway construction in Mexico started in 1854, when a line of ten miles was placed in operation between Vera Cruz and Tejeria. This line was gradually extended to the capital which was reached in 1873. From 1877 to 1882 Mexico built more miles of railroad than any other Latin-American country, the average yearly construction during that period being 428 miles. In 1905 the railway mileage

of Mexico amounted to 10,557, and in 1910 it was 15,260. There has been very little new mileage built since that date. Most of these railways have received subsidies from the Mexican government ranging from $6,000 to $10,000 per kilometer, according to the difficulty of the work.

In 1903 the Mexican minister of finance, Limantour, purchased $5,000,000 of 4½ per cent second debenture stock of the Interoceanic Railway. This purchase led soon afterwards to a further investment by the Mexican government in railway stock, this time with the express object of exerting its interests both on the policy and routine of the National Railroad Company, the stock of which was acquired by the government. Limantour visited New York and Europe in 1903, and while in the former concluded with Speyer & Co. an arrangement whereby the Mexican government became the owner of a block of shares of the National Railway which gave it a preponderating influence.



How the Rebels Leave an Engine—Stripped of Its Brass and Other Metal

In 1908 the National Railways of Mexico was incorporated in the United States to take over and unite the properties of the National Railroad of Mexico and the Mexican Central.

The latter system, which thus became part of the National system, was incorporated in Massachusetts in 1880. The Mexican Government offered a subsidy of $15,200 a mile, and the right was granted to import all materials for construction, repair and operation free of duty for 15 years, with the further right of exemption from taxation for 50 years, dating from the completion of the line.

The main line was built from Mexico City to Ciudad Juarez, 1,224 kilometers, branches and subsidiary lines bringing the total mileage up to 3,426 kilometers. The Central claimed that there were but four cities in the whole republic possessing anything over 5,000 inhabitants which were not served by one or other of its systems, main line branches, divisions or extensions. The largest and most important places outside of Mexico City itself which this railway serves are: Guadalajara, 125,000 inhabitants; Leon, with 70,000; Aguascalientes and Zacatecas, each with 40,000; Guanajuato and Queretaro, each with 45,000, and numerous other towns with populations ranging from 35,000 down to 1,000.

This railway serves the most fertile and productive portion of Mexico, carrying a great mineral traffic, and passing through the enormously valuable silver belt which formerly yielded one-third of the entire silver production of the world. It reaches manufacturing districts such as Jimenez, the cotton producing district of Lerdo, Torreon, where there are cotton mills; Aguascalientes, with woolen mills, silver and copper smelters, and also the location of the largest railway machine shops, and San Luis Potosi, with its population of about 60,000.

The International Railroad, now also a part of the National system, was started in 1882 by that great American



The Railways of Mexico

railroad pioneer, Collis P. Huntington at Ciudad Porfirio Diaz, and in six years it had reached Torreon. The next extension was to Durango, center of a rich mineral district, which was reached in 1902. Huntington surveyed the line from Durango to the Pacific port of Mazatlan, but it was never finished. The Mexican government has at present under consideration the completion of this line. Eighty miles have already been built west of Durango, but the remainder is in a mountainous region, where some 20 tunnels of various lengths and 30 large bridges will be required. It is estimated that the cost of the extension will be about $15,000,000, but the expenditure will be warranted by the opening of a rich agricultural, mining, and timber region. The International at present serves the rich coal fields of Coahuila, and furnishes the outlet for the coal and coke of the famous San Esperanza mines. Two-thirds of the revenue of the mines is derived from its mineral traffic.

On these northern lines, all standard gage, trains are being run without interruption except in a few districts, notably the line from Chihuahua to Ciudad Juarez, where the Villistas are operating. At the time I was in Mexico (April 11 to May 10) trains between Monterey and Matamoras, Monterey and Tampico, and Monterey and Torreon, were being operated without interruption, although a train was blown up by bandits between Monterey and Tampico, and traffic suspended for one day on April 11. Freight and passenger traffic has been augmented to a large extent. From Saltillo to Piedras Negras the coal traffic has increased



Maltrata Mountain on the Mexican Railway Between Mexico City and Vera Cruz. The White Line on the Hill Is the Railway

greatly, while passenger traffic is large and regular. The line from Tampico to San Luis Potosi, which had been temporarily interrupted, had been restored to operation. From this city to Laredo traffic is normal and has been for an extended period.

The lines south of Mexico City under government control are: The Mexican Railway from the capital to Vera Cruz; the Vera Cruz and Isthmus; the Tehuantepec National, the Alvarado Railway, the Pan American, the Interoceanic, the Mexican Southern, and several smaller lines. The most important of these is the Mexican Railway, the first line to put Mexico in touch with the outside world, length 264 miles.

The Mexican Railway is operated today under conditions absolutely unique in railroading. Running through the rebel-infested state of Vera Cruz, it is protected throughout its length by a system of forts, or block houses. There are 70 of these block houses, each connected by telephone, one about every four miles, built close to the track, on raised ground, with watch towers, manned with Carranza soldiers. Ditches are excavated around each fort, and these ditches are protected by barbed wire entanglements strung at a reasonable distance from the trenches and around them.

A Trip Through the Danger Zone

Owing to rebel activities no trains are operated on this line at night. I boarded the train at the Buenavista station, Mexico City, on the night of May 7, and we pulled out at



Train and Tunnel on the Mexican Southern

5 a. m. with a military guard and made an uneventful run across the central plateau to Esperanza. On leaving this station we soon struck the most perilous part of the run through the mountains, a mile and a half above sea level, from Esperanza to Maltrata. The line is almost unsurpassed from a scenic point of view, ascending from the valley of Mexico to the summit of the Sierra Madre, reaching its highest point at Acocotla, near San Marcos, an elevation of 8,310 feet. At one point, at Alta Luz, the train is 2,919 feet higher than the topmost point of Mount Washington, and we looked down upon the valley spread out like a chessboard thousands of feet below, as the train plunged around dizzy barrancas, over spidery bridges spanning profound cañons, or along the curving roadbed cut in the solid rock of the mountain side.

All the way down the mountains we could trace the road, its serpentine trail drawn in and out of the valley and along the ridges, ever and anon doubling upon itself, but ever descending. At the Maltrata Incline the scenery is indescribable, the eye dominating a thousand square miles of mountain ridge and tropical valley, and from the car window it looks for all the world like the view from an aeroplane. One's mind shudders at the possibilities of a stick of dynamite carefully placed by a bandit at this point. A few days before at Las Vegas, in these same mountains, on the narrow gage Interoceanic Railway, a train was dynamited by Felicistas and a number of persons killed.

Reaching Orizaba, we notice for a mile or so along the line great piles of wrecked railway equipment, the twisted frames of cars of every description, engine frames, wheels by the hundred with and without trucks, eloquent testimony to past revolutionary activity. Here we were joined by what they call the "explorers' train" to protect us from rebel attacks through the heavily wooded sections between

this point and Vera Cruz. This train consists of a locomotive and four cars filled with soldiers, with soldiers also riding on the car roofs, fully armed, and ready for instant action. Our train followed behind, with another carload of soldiers on the rear. We soon reach the most dangerous pass on the line, going through a series of tunnels and then



A Carranzista Guard at Boka Station on the Mexican Railway Waiting for the Train They Are to Protect Between Mexico City and Vera Cruz

creeping gingerly across the Metlac Bridge, 350 ft. long, built upon a curve of 325 ft. radius, on a 3 per cent grade, 92 ft. above the river. Eight cast and wrought iron pillars on masonry bases uphold it, and when a long train is winding across it the horseshoe effect is very striking. Shortly after this we reached Cordoba, and from here to the coast the run was through level country, Vera Cruz being reached at 6:15 p. m., the journey from the capital having taken a little over 13 hours.

Other Southern Lines

The Mexican Southern Railway, also operated by the government, runs from the city of Puebla to the city of Oaxaca, and was built with British capital. Two years were spent in completing the line, which passes through an exceedingly difficult country. The track parallels the Interoceanic line as far as Amozoc. The Interoceanic Railway was incorporated in 1888 by a special charter, the idea being to construct a line from Vera Cruz on the Gulf to Acapulco on the Pacific, but the line, which is narrow gage, is still far short of its ultimate destination.

The Tehuantepec National, recently purchased from the Pearsons of London by the Mexican government, was completed in 1907. The total length of the line, which crosses the Isthmus of Tehuantepec from the Gulf of Mexico to the Pacific, is 190 miles. There is also a small branch line. Fine harbors have been constructed at the ports of Salina Cruz on the Pacific and Puerto Mexico on the Atlantic. Large warehouses have been erected for the storage of freight. At both places trains are run up to the ship's side, where there are electric cranes for loading and unloading. There is a fine dry dock at Salina Cruz.

A large amount of traffic which formerly went around Cape Horn or across the Panama Railway now goes via Tehuantepec. This route is 1,200 miles shorter between New York and San Francisco than the Panama canal. Not only is it a shorter route to the Pacific ports of the United States, but to the Orient and Australia. Sugar cargoes, for instance, can be carried from Hawaii to New York via Tehuantepec, a distance of 5,305 miles, instead of carrying them around Cape Horn, over 12,000 miles. In the rebuilding of the Tehuantepec Railway and the improvement of the two ports $65,000,000 has already been spent.

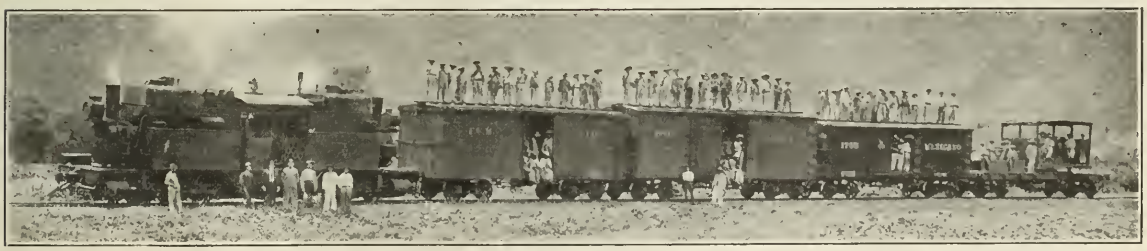
Equipment in Service

The following equipment is at present in use on the lines under government control:

Railways		Standard gage	Narrow gage
National Railways	Locomotives	767	295
	Passenger cars	497	258
	Freight cars	11,062	2,778
National Tehuantepec	Locomotives	47	...
	Passenger cars	12	...
	Freight cars	1,008	...
Vera Cruz & Isthmus	Locomotives	16	...
	Passenger cars	10	...
	Freight cars	193	...
Pan American	Locomotives	7	...
	Passenger car	1	...
	Freight cars	40	...
Vera Cruz to Alvarado	Locomotives	...	7
	Passenger car	...	1
	Freight cars	...	40
Mexican Railway	Locomotives	54	11
	Passenger cars	58	13
	Freight cars	569	105
Owned by shippers or rented to shippers	Locomotives	158	...
	Freight cars	3,263	...

The Central Railway was among the first in Mexico to adopt oil burning engines, and today practically all the Mexican railways use them. There are a large number of storage tanks, and special oil tank cars used for carrying petroleum from the wells to these tanks.

The number of employees on the railways under government control in Mexico is 31,588, of which only 69 are foreigners. Gross receipts for the year ended June 30, 1918, of the government lines (8,119 miles), amounted to $29,240,485 U. S. currency, and the operating expenses were $19,151,808, net operating income therefore being $10,088,677.



The "Explorers Train" Which Runs Ahead of the Passenger Train Between Mexico City and Vera Cruz

A Frank Talk on Railroad Labor Questions

Owners of Railroad Securities Should Be Prevented from Getting Undue Share of the Profits

By Walker D. Hines
Director General of Railroads*

To start with I want to tell you that my views with respect to the importance and advantage of organization in labor, have gone through a process of evolution. As you can well understand, with my early training I was naturally brought up to have serious doubts as to the desirability of labor organization at all. But long before I terminated my connection with the railroad companies my own powers of reasoning had led me to see that it was an inevitable and indeed a desirable evolution of civilization that there should be labor organizations to represent in a collective way the interest of the individuals who really do the work and produce the wealth of this world in which we live.

And I have come more and more to the conviction that it is the right thing and the advantageous thing, not only for the man who belongs to the particular labor order, but also for society in general, and indeed for business itself, that there shall be this effective method of representation for such an important element in the production of the wealth of the country. So that I approach the problems that have confronted me as director general in connection with labor matters with a spirit of entire cordiality toward the handling of these matters through labor organizations, and I am satisfied that they cannot be effectively handled either from the standpoint of the management or from the standpoint of society in any other way.

When we are dealing with such large problems as must be dealt with in the great industrial enterprise of the country, it has come to me by degrees, as I have thought over these things, that the classes whose interest needs to be considered primarily are made up of the human beings who do the work in this world, and of the human beings who are the ultimate consumers of the things produced in this world, and I don't think their interest can properly be represented except through the orderly processes of organization.

It is particularly a pleasure to me to have this opportunity to address one of the oldest of the labor organizations, and one which has been characterized throughout by a systematic and business-like method of procedure and particularly by strict observance of its own laws. And so I come before you to discuss the matters in a spirit of appreciation of the importance of labor organization in general, and especially in a spirit of admiration for the organization to which you gentlemen belong.

I feel that it is a part of the development of civilization that there must be an increasing participation on the part of the employees in any great enterprise in the management of the business of that enterprise. The old-fashioned idea that nobody was concerned in the business except those who furnished the capital has largely disappeared, and, of course, will have to disappear altogether because the people who furnish the work and who do the work are of the greatest importance in accomplishing the result and the business that is done is their business just as much as it is the business of the people who have furnished the capital. And there must, therefore, be a participation—there must be a voice on what is done on both sides on behalf of the people who do the work as well as on behalf of the people who furnish the money.

*From an address before the grand division of the Brotherhood of Railroad Conductors, St. Louis, May 19, 1919.

So that, believing that there will be that increasing participation on the part of the employees on these matters, I want to take advantage of this opportunity to tell you briefly some of the problems of this business in which, in a way, you are partners; and I think it will be of interest to you and it will be helpful to me to explain this situation.

With respect to the calendar year 1919, so far we have the tentative reports for three months, January, February and March, and even in those three months it appears that we have fallen $192,000,000 short of earning enough to pay the rental for the three months. The public sees this deficit and it sees the fact of federal control, and it says the deficit is due to government control. I think the public is mistaken in reaching that conclusion. The conditions of this year are somewhat different from the conditions last year, but the reason for this deficit, as I see it, can be fairly stated in this way:

In the first place, the increase in the cost of materials and supplies has been felt to a much greater extent in these early months of 1919 than in the early months of 1918. In the second place, the weather has been unusually favorable, and an exceptionally large amount of maintenance work has been done. In the third place, the increase in wages has shown more fully in these three months than in the three months a year ago, and the increase in the operating cost, due partly to wages and partly to increase in cost of materials has been very much more than the increase in the rates.

I should say broadly, that our increased costs would vary on the different railroads from 50 per cent to 80 per cent or 90 per cent, or more, taking materials, labor, and everything that goes to make up operating cost, whereas the transportation rates have been increased a little less than 25 per cent.

The fact is that every one of us knows in his own domestic affairs, and in every other relationship, that the purchasing power of the dollar has been greatly diminished by the high cost which has been the outgrowth of the war conditions. The purchasing power of the dollar has been diminished to such an extent that the dollar and a quarter which the Railroad Administration now gets for transportation service for which the railroad formerly received one dollar, goes much less far in meeting its cost than the dollar did before.

That, though, is not the whole story. To a very large extent this unsatisfactory condition for the first three months of 1919 has been due to a falling off in business. The passenger business has kept up pretty well, and in some parts of the country has shown an improvement.

Generally speaking, the freight business has fallen off seriously. That has differed in different parts of the country. I just came back from Texas, where they are not only very optimistic about prospects of large crops, but they are also feeling the effect of an extraordinary oil development in the northern part of the state, and the result is that in some parts of Texas there is an increase in the freight business as well as in the passenger business. But taking the country as a whole, there is a very considerable loss in the freight business, and that has gone far to create this large deficit.

I find a disposition on the part of some elements of the

public to think that there ought to be an immediate increase in transportation rates in order to take care of this deficit, but we see sometimes a peculiar inconsistency on the part of the gentlemen who urge that. They say, on the one hand, that the increase in cost is due to government control and will not happen under private management; but they say, on the other hand, that we ought to have the increase in rates so that when the private managements do get the railroads back they will be able to take care of these increased costs. I find that inconsistency running through the minds of a great many people.

My own judgment is that there are too many temporary conditions to justify any definite action at the moment in increasing rates. We are going to get some additional economy in operation, a reduction in the cost of material, and undoubtedly a very large increase in business, and these things are going to operate to make the conditions more favorable. And my own judgment has been that until we can make a better survey of that situation we ought not to make an increase in transportation rates, and the reason I feel that particularly is that I feel that an increase in transportation rates will immediately be reflected in an increase in the cost of living.

Whenever there arises any reason for an increase in cost of anything, the public has to pay the amount of the increase, and the amount of the increase in the price is several times as big as the reason justifies. So, if after study of the matter, it is discovered that the government ought to have $300,000,000 additional per year to pay the operation and rental, and increases the rates accordingly, there would be serious danger that after the increase had been passed along to the ultimate consumer of food and clothes and other things which we all have to buy, the public would pay a billion or a billion and a half on account of the $300,000,000 the government would be getting, because the prices would be increased by the manufacturer and the wholesaler and the retailer. Hence I feel that in the interest of the general consuming public we ought to be exceedingly cautious about making the increase in transportation rates. While an increase of rates beyond the 25 per cent may be necessary to take care of increased costs running from 50 to 80 or 90 per cent, yet improvements in conditions may accomplish a great deal in wiping out the deficit without any increase in the transportation rates.

About a month or so ago, when the responsibility came to me of deciding upon the issuance of Supplements 15 and 16 to General Order 27, I was aware of the attitude that a large part of the public would take. With that tendency to quick and short-cut reasoning, I knew there would be a general disposition to say that the railroads were running at a loss and therefore under no circumstances should there be an increase in wages.

I felt, however, that this was a case where the government was bound to do equity and justice, and that if the conclusion was reached that an increase was necessary in order to give the employees, whom you and the other trainsmen's organizations represent, a reasonable equality with other railroad employees, it was the duty of the government to do it; so I made those orders. And I undertook as far as I could to explain the situation to the public. My observation of the public has been that it has always failed to appreciate the important conditions which apply to the wages of the members of trainmen's organizations and to think that wages are all right, which are, in fact, decidedly below what they ought to be. And in the statement I made to the public I tried to point out the reason which I believe justified the stand that was taken.

There is a matter that is of very great interest to you that I want to speak on briefly, and that is the matter of punitive overtime in road service; of course, you understand when Supplements 15 and 16 to General Order 27 were issued I explained that I wanted that matter considered by the Board of Adjustment No. 1. Accordingly, the matter was referred to the Board of Adjustment No. 1 for a report, and I had hoped there would be a report from that board which would be exceedingly useful to me in reaching a conclusion. The Board, however, was not able to agree on a report and has submitted two separate reports which do not aid me in reaching a conclusion on this important subject. So that I have the responsibility, without the aid of the advice I had hoped to get from the board, to decide this very important question, and I will have to exercise that responsibility and make a decision.

Punitive Overtime

I want you gentlemen to bear in mind that that is a very serious responsibility. On the one hand, it is my duty, and I have in mind to see that justice is done to you gentlemen and your associates in the train service.

On the other hand, it is a question in which the general public also is interested. In view of the deficit which I pointed out to you, the condition is such that, in all probability, if there should be any increased cost on this account it would have to be met by an increase in rates, and therefore, whatever I do, I must be in a position to justify myself before the public which will have to pay those increased costs. I could not decide this matter without saying that I had investigated it and saying that I knew what it was going to cost. I must make such an investigation as will enable me to go before the public just as I did in regard to Supplements 15 and 16, knowing what the prospect was as to what it would cost and the reasons why it ought to be done.

Now that investigation is going forward and it is not going to be allowed to drag, and just as soon as possible, I am going to meet this very important and very difficult problem and announce a decision. In that connection I would like to remind you that the advantages which have come from government control of the railroads, to the employees of the railroads, have also been accompanied with some disadvantages. We never can in anything have the advantages without the disadvantages.

Now, as I look at it, more progress has been made in the recognition of the just rights of labor since federal control of railroads began, than was made in 20 or 25 years before that. I think it is one of the great milestones in the progress of civilization.

That has come about because the government could deal with the matter in a unified way and because the government felt that it must deal with these matters in a just and nondiscriminating way as far as possible. The fact that the matter is dealt with in that way does involve some delay, but after all it does not begin to equal the delay that was encountered under old conditions, and the results produced have been vastly greater. But still it is true that in any particular matter which the government has to deal with here, there might be what may be regarded as delay. That is partly due to the fact that when we try to deal with a matter for the entire United States, it is indispensable that report shall be obtained from many different railroads and shall be considered by the various agencies that we have created, and it takes some time to get the views of the different men that are to be consulted, because no one man has the physical power or the mental power to deal with all these matters. And in addition to that, when it gets to the director general, there is a question of physical limitation on his part. It is a question of how many hours there are in the day and how much can be done.

In general, I want to tell you that we are working all the time to try to get a more expeditious settlement of the

current labor problems that arrive. The work is tremendous. It had to be organized in a very hurried way. Nothing like it had ever happened before. Here are 2,000,000 employees, all their rights and grievances were concentrated on one responsibility, that responsibility being that of the general government. We had to organize various agencies to deal with these matters, because no one agency could deal with all of them. The organization of those agencies has been an experimental matter. We had to experiment and feel our way and find that some organization was not as good as we thought it was going to be, and that perhaps a different organization would be better. We have to try to avoid one clashing with another to some extent, and it is difficult to define their separate functions, so we have had to feel our way in this matter. We are still very much alive to the necessity of developing still further the organization which we have to deal with these problems, and this has been a matter of great consideration to me on this trip which I am now finishing, and I am hoping that by degrees we will perfect still more the agencies we have created to deal with these labor matters.

While I have dealt with these practical details, I hope you will appreciate a thing that is very clear to me, and that is, my cordial support of this great movement which was inaugurated under federal control and which has already made such progress in the recognition of the rights of the employees to operate the railroads. I think it is a great achievement of civilization, and I am glad to have had a part in it, and I hope that I can continue to promote that movement and to see the realization of further important results in the protection of the just interests of the employees of the railroads.

Now, in conclusion, gentlemen, I want to ask your help in another matter. I have been, as I have had the occasion to do so, appealing to the railroad employees to do everything in their power to increase the efficiency and productiveness of the Railroad Administration because I feel so strongly that whatever can be accomplished in that work is something gained for the people in general.

Of course, under federal control, if there are any profits, they belong to the government, and if there are any losses they have to be sustained by the government and eventually be paid by an increase in the rates which the public has to pay. My own judgment is that, however this general railroad question shall be solved by the Congress, there will be a solution which will make sure that in the future the profits earned by the railroads will be so regulated as to prevent any undue share of those profits going to the owners of railroad securities.

I think that two things, broadly, should be secured. One is a reasonable assurance of a net return to protect the situation, and another is an equally effective assurance that any additional return shall not go entirely to the holders of the railroad securities but shall be shared with the public in some proper form.

So that whatever can be done by railroad employees in increasing the efficiency of railroad operation will not only help in this period of federal control to protect the public, but, in my opinion, will continue to protect the public after that, because it will help to keep down the rates of transportation, and whatever can be done to keep down the rates of transportation will go far towards keeping down the cost of living and helping it get down from its high level. So that anything you gentlemen can do, either by your own work or by presenting an example to other employees, to increase the efficiency and to save waste, will lay a foundation for further protection of the general public through the prevention of unnecessary increases in rates, which, as I say, will be translated into several times that increase in the cost of living.

Orders of Regional Directors

PASSENGER Fares for War Industry Workmen.—Order 204 canceling Order 50 of the Southwestern regional director states that the current basis and authority for these fares is contained in the Western Passenger Traffic Committee's circular B-190, issued January 6, 1919.

Peddling in Cars by Soldiers.—The regional director, Eastern region, by circular 1600-158A751, promulgates a warning, received from the War Department, that men in uniform, presumably discharged soldiers are peddling and panhandling on trains. Such practice must be stopped.

Pass Restriction, Pennsylvania Trains.—By circular 215 the Southwestern regional director advises that only white passes issued personally by the director general will be honored on the "Broadway Limited" and trip passes will not be honored on that train unless specially authorized.

Railroad Business Mail.—Circular 212 of the Southwestern regional director refers to Circular S. V. 9 of the American Railroad Association. Under this it is permissible for one railroad under federal operation to carry traingrams for a second railroad under federal operation even though such traingrams pertain only to the business of the second railroad.

Car Hire Accounts.—The regional director, Eastern region, by circular 600-2—37A753, gives supplementary instructions for the settlement of passenger and freight car hire accounts, especially with the so-called "short line" railroads. Industrial railroads should not be considered as industrial common carriers, unless they have been definitely determined to be such by the Interstate Commerce Commission.

Tax on Service for Telegraph Company.—Order 205 of the Southwestern regional director calls attention to a letter from the manager of the telegraph section which states that the treasury department has ruled that the tax imposed by Section 500C of the revenue act of 1917 concerning interchange services performed by railroad and telegraph companies does not apply to railroad and telegraph companies furnishing for each other services which are necessary in the conduct of the business of each as a public utility.

Exchange of Telegrams with Short Line Railroads.—The Southern regional director, File 1635-14-6, directs that the cost of sending telegrams to short line railroads in connection with business in which the federal operated railroad and the short line railroad are mutually interested, shall be assumed by the sending line. This policy is to be observed by railroads charging telegrams to free telegraph allowance or by paying for them at commercial rates. Where a railroad has no free telegraph allowance available, arrangements should be made to send messages over railroad wires.

Bills of Lading for Shipments for Cuba.—The Southern regional director in circular 437, says that shipments of freight consigned to Cuban destinations may be taken under through export bills of lading via South Atlantic or Gulf ports, or under domestic bills of lading applying to one of these ports "for export." A domestic bill of lading applying through to Cuban destinations must not be used.

Prepayment of Watermelons. — The Southern regional director, in circular 438, calls attention to the Department of Agriculture's action in starting a campaign against the watermelon disease known as the stem-end rot. The fungus is prevalent in the South Atlantic states, and nearly 3,000 cars of melons were lost in 1918. A simple bluestone treatment applied to the cut stem at the time of picking or loading is found to be a preventive. The Department of Agriculture has asked the carriers to issue instructions that all shipments of watermelons from Florida, Georgia and South Carolina be required to be prepaid through to destination unless treated for the stem-end rot.

Recent Developments in Railroad Tie Situation

Large Deliveries Are Rapidly Eliminating Acute Shortage of a Few Months Ago. Present Outlook Promising

ARE THE ROADS going to be able to secure enough ties for their requirements this year? This is the question which has given maintenance of way officers most serious concern during recent months. That there has been a shortage, so acute as to be alarming, few will deny. That this condition has been relieved greatly in many areas during the last few weeks, is equally certain. However, this recovery is so recent and the shortage is still so serious on a number of roads that it is felt by many railway men that all danger has not yet been removed.

Shortages of Basic Track Materials

Ties and rails are the two basic and most essential materials in track construction. With adequate supplies of these, tracks can be maintained in safe condition; without them this is impossible. Following the inauguration of federal control of the roads, the railroad administration took over the purchase of both of these supplies. Their delivery to the roads has therefore been the province and problem of the Division of Finances and Purchases.

At the time the Government assumed the control and operation of the roads, the steel mills were behind in their deliveries of rails, while large tonnages were on order for delivery in 1918 and 1919. At the same time we were in the midst of the war, and the steel mills were diverting their maximum output to meet military requirements. This led to a marked reduction in the tonnage of rails rolled. As a result only 1,097,277 tons or 7,431 track miles of new rails were laid in 1918, as compared with 1,233,031 tons, or 8,233 track miles laid in 1917; 1,450,952 tons or 9,831 track miles laid in 1916, and a normal average of about 1,600,000 tons.

A similar deficiency has been experienced with reference to ties, although it has been brought about largely by other causes. In 1918, the number of ties placed in tracks was 78,958,224, as compared with 81,154,529 in 1917 and 90,140,076 in 1916. In other words the tie renewals in 1918 were only 88 per cent of those in 1916, while only 76 per cent as much rail was relaid. The tie situation is even more serious than is indicated by these figures, because of the depletion of the surplus normally carried in stock. It requires several months to season a tie ready for use, and some roads which treat their supply normally carry a year's requirements on hand. With the curtailment in production which occurred last year, this reserve stock was drawn on heavily and on many roads practically to the point of exhaustion to make the renewals shown above. On January 1, 1918, the roads under Federal control had on hand 38,528,530 ties, while one year later this stock had been reduced to 29,576,958, a decrease of 26 per cent.

It is because of these conditions that those in charge of track maintenance have shown so much concern over these deficiencies in the supplies of rails and ties. This is particularly true of ties for while rails can be produced quickly if occasion demands several months are required to get out and season a tie after it is cut in the forest, and even longer if it is to be treated. Because of this concern we present the following discussion of the present tie situation and the causes contributing to it.

Early Activities of Central Purchasing Division

Prior to the inauguration of federal control and the centralization of purchases of ties in the Division of Finance and Purchases, the roads negotiated directly for their ties with a variety of classes of sellers. Many roads bought all or a part of their ties from small producers on their lines. Where they had to go beyond their own lines they usually negotiated with contractors of larger output, although the Baltimore & Ohio sent its own tie agents onto foreign lines to purchase direct from the small producers. In the states along the Pacific coast, the production was secured almost entirely from the large operators who made their own ties. In the Appalachian, Ozark and Arkansas areas, probably 50 per cent of the production was handled by brokers who collected the output of small producers and sold these ties to the roads, some firms being both brokers and producers. In many instances these brokers advanced the money for the purchase of timber or supplies, taking their pay in ties. Again some contractors served primarily as tie purchasing agents for the roads, others had exclusive contracts, while still others sold their ties on specific contracts for definite numbers at a fixed price or on a cost plus basis.

These were the conditions prevailing when the Government took over the roads on January 1, 1918. At this time, following decreasing deliveries, prices were advancing rapidly, being raised as much as 25 cents per tie at a time in some instances. There was also active competition between roads for ties and some of the more prosperous lines were out-bidding the smaller roads for the ties produced along the latter lines, thereby taking from them their normal supplies. This also materially increased the cross hauling of ties. The situation was rapidly approaching confusion when about February 1, 1918, one of the smaller roads in the Southern region protested to the regional director regarding the action of a larger road in buying ties away from it along its lines. The regional director presented this protest to a meeting of his staff at which it was referred to the regional purchasing committee for consideration. About the same time a similar protest originated in the Western district where one road purchased all the ties off the lines of another road at an increase of 75 cents per tie in prices.

Before the regional purchasing committee had taken any action, the situation came to the attention of the director general, and he issued arbitrary instructions on March 13 to the effect that no road could pay more for ties than it was paying on December 31, previous. In view of the increases which had taken place in the interval between these dates, compliance with this order brought the purchase of ties to a standstill and many roads canceled all orders, although some roads disregarded this instruction insofar as purchases along their own lines were concerned. This order threw consternation into the ranks of the tie producers for no consideration was given to the ties produced on contracts or other assurance of higher prices and not delivered on the date of the order. Therefore all production of ties was also stopped. Impressed by the acuteness of the situation, the purchasing agents in the Eastern region met to consider the problem and decided to interpret this order as permitting the continuance of payment of the prices in effect on March 13 for ties produced along the lines of the purchasing road.

About this time the Forest Products section of the Central Purchasing Committee was created to handle the purchase of all ties and timbers required by the roads under Federal control. One of its early acts was the issuance of 12 basic principles to govern the purchase of ties, among which were the following:

No railroad under control of the Director General may

purchase ties on any railroad not under its control with which such road connects.

Any railroad under control of the Director General may purchase ties on any railroad not under his control with which such railroad connects.

The prices shall be fixed on the various lines by the individual railroad companies, subject to approval by the Regional Purchasing committee, and at such figures as will cause the production of a sufficient number of ties to meet the requirements of all the railroads.

Every railroad should endeavor to secure the maximum output of ties on its line, so that its own requirements can be met with the minimum amount of transportation.

Ties on railroads which produce more than are needed for their own use, should be transferred under the supervision of the regional committees to railroads on which a shortage exists.

Prior to this time data were compiled relative to all unfilled orders for ties held by contractors. This investigation showed that it was a common practice with some contractors to allow certain orders to remain unfilled if they were able to negotiate new contracts at higher prices on which they concentrated their output. The Central Advisory Purchasing Committee therefore arranged to take over all outstanding contracts and issued the following instructions early in May:

"1. All contracts or orders for cross ties placed prior to government action March 13, 1918, must be handled on their merits. Roads having such contracts or orders unfilled should immediately take up with the contractors the questions of completing shipment by June 15.

"2. There may be old contracts made at low prices that should be revised. In such cases the committee will consider such recommendations as the roads submit. In the event of any question as to adjustment of price, the matter should be taken up direct with the contractor and if an increase is warranted, the recommendation of the road interested should be submitted for approval to the Regional Purchasing Committee with full explanation.

"3. The receiving roads will continue to take up and inspect the ties the same as heretofore. It is hoped that all such contracts or orders as are not completed by June 15 should be given special consideration at that time as to the best means of handling and completing them.

"4. All embargoes on ties to be shipped from one road to another should be lifted and the ties moved as soon as possible.

"5. The road on which ties are produced will give every assistance possible to secure prompt completion of such orders and contracts.

"6. If there is any shortage of cars for moving ties, the matter should be brought to the attention of the regional director."

In June further instructions were issued canceling contracts for ties produced on foreign lines where this could be done, the local roads taking them over and accepting the ties.

Uniform Specifications and Prices

Up to this time ties were being purchased in accordance with the specifications of the different roads and in accordance with their inspection. There were therefore almost as many specifications as there were roads in the market, while there was an equal diversity of practices in the enforcement of inspection. The result was an entire lack of uniformity as to standards of manufacture, one road accepting as of relatively high-grade ties which another road rejected.

With the concentration of purchases of ties in the Central Purchasing Committee, it was a logical step to introduce standard specifications and standard inspection. Accordingly on June 11, standard specifications were issued, effective July 1, accompanied by uniform instructions for inspection. These specifications, which were published in the *Railway Age* of July 12, 1918, established five grades of both sawed and hewn ties and included ties for use with and without treatment. Their principal differences were in the reversion of the order of classification in common use, so that a No. 1 tie is now the smallest accepted, and in the establishment of a 6-in. by 6-in. pole tie or a 6-in. by 7-in. sawed tie as the smallest complying with the specifications.

Following the preparation of standard specifications and as a corollary to this step, was the establishment of uniform prices for the different classes of ties. These prices were established by the regional purchasing committees, subject to the approval of the Central Purchasing Committee, and are in general uniform for a given class of ties throughout a region, although they are being revised from time to time to meet changing market conditions. These prices have been fixed largely on the basis of the relative service life of the different classes of timber, a practice somewhat at variance with that of some roads which had accepted certain woods to the exclusion of others. These prices are paid alike to the large contractor producing many ties and to the small farmer cutting a few. To protect the producer during the interval between the cutting of a tie and its delivery, he has recently been assured of the maintenance of the present prices to June 30 in the far west, to September 30 in the Eastern region, and to December 31 elsewhere.

Following the establishment of uniform prices, they were posted throughout the tie producing areas in an effort to stimulate production among the small woodsmen. By this step the broker was largely put out of business for the producer, knowing the Government price, was not inclined to sell to another party at a lower figure. As a further aid in stimulating production, steps were taken to pay for ties promptly on delivery and acceptance.

In distributing the ties to the roads, the aim is to deliver them at the point of use as cheaply as possible, all factors, including transportation considered. All ties are inspected by the forces of the road along whose lines they are produced. A road requiring more ties than are produced along its lines makes requisition on its regional purchasing committee which places it with other roads in its region if possible or if not, forwards it to the Central Purchasing Committee which refers it to a purchasing committee in another region. As far as possible the Central Administration distributes the surplus ties of one region through the engineering assistants to the regional directors, although in some regions they are distributed to the individual roads direct from Washington.

Early in its activities, the Forest Products Section recognized the value of tie treatment and arranged for the continuance of this practice where it had been followed under private control and for its gradual extension to other roads. One of the early effects of the war was to shut off the importation of creosote oil from Europe. This resulted in a shortage of preservative materials in this country which forced many plants to close down. To maintain the output of treated ties at the maximum, the Forest Products Section took over the distribution of creosote late last fall, and since that time it has been alloting it to those commercial and railway-owned treating plants prepared to treat cross ties. It has also prepared and put into effect standard specifications for the treatment of ties by the different processes in common use. In this way it has been possible to operate more plants and more nearly to their capacity.

Attitude of Tie Producers

It is not to be expected that such radical innovations as have been introduced in the tie industry could be put into effect without criticism from those affected by these changes. The criticism has been very acute from the tie brokers, who are largely put out of business. It has also come from many tie contractors who have had to revise certain of their meth-

ods, and from railway men who blame the Central Purchasing Committee for the failure to receive the ties they require for the proper maintenance of their tracks.

The hostility of the tie producers was incurred first by the issuance of the order on March 13, referred to above, limiting the prices which could be paid for ties to those which had been in force on December 31, previous. Coming as this did without previous announcement and in the face of rapidly rising prices for practically all commodities, its result was to bring tie production practically to a standstill and to confront producers, who had incurred higher costs with the knowledge and consent of the purchasing roads, with the prospects of large financial losses. While this order has since been superseded, this sudden and arbitrary action, which is now generally admitted to have been ill-advised, served to create an antagonism towards the Central Purchasing Committee which has resulted in hostility to many of its later acts, more acute than those measures themselves warranted and has contributed directly to the curtailment of production.

One of the points at issue between the railroad administration and the tie producers is the recognition of the small producer. The tie contractors believe the practice of the Railroad Administration to be unfair towards them when it pays the same price to the small farmer who brings out a wagon load of ties produced during spare time as to the contractor who has invested a large amount of money in timber holdings, in equipment and in an organization. Furthermore, looking into the future, when the ties are cut from the wood lots along the tracks the farmers' source of supply is exhausted, while the tie contractor has the organization to go further back to new areas and get out ties. Also in the absence of a contract as at present, a contractor hesitates to organize on a big scale even though prices may be guaranteed for some time in advance as has recently been done.

The contractors and particularly the brokers, also criticise the action of the Railroad Administration in appealing to the small producer. By posting the prices paid all through the timber, it became impossible for the brokers to purchase ties from the small producers at prices which would enable them to make a profit. Many of these small producers in the Southern states were dependent for credit for timber holdings and for supplies on these brokers and with the removal of this credit they were forced into other work, and this output has been lost.

In justifying its attempts to stimulate production by appealing to the small producers, the Railroad Administration points to the large number of unfilled contracts in existence a year ago, and to the steadily decreasing output in practically all regions prior to the period of Federal control. It is further pointed out that in the Cumberland and Tennessee river areas and in the Pocahontas region where no changes in purchasing methods were introduced in 1918, the contractors were able to produce but little over 50 per cent of a normal supply. From the standpoint of the Central Administration it was therefore necessary to develop new channels of production.

Another point of difference lies in the fixing of prices uniformly over large areas or entire regions in disregard of freight rates. The contractors urge the establishment of prices at certain primary receiving points as at St. Louis and the Ohio river, the prices in the interior being below these figures by the amount of the freight. They maintain that competition buying in the past has been on this basis and has fixed the value of their stumpage. Now with uniform prices in the timber a foreign road is paying prices for ties varying as much as 25 cents, owing to the difference in freight charges. Furthermore, with various prices prevailing in the different regions, there may be a difference in price of several cents per tie between nearby points in adjoining regions.

Although there was considerable opposition at first to the standard specifications this was largely due to the underlying hostility previously engendered and has now largely disappeared. It was increased in some instances by the unwise or over-zealous interpretation of their provisions, a problem inherent to the training of a corps of 2,500 inspectors to a new system of operation. A point of controversy at first was the raising of the dimensions of the smallest tie coming within the limits of the specifications, the contractors protesting that this increased the wastage in the forests. When it was explained that the intent of the specifications was to discourage the cutting of small trees, and that ties smaller than No. 1 cut from the tops of trees producing larger ties would be accepted as usable rejects; this objection largely disappeared. At the present time, the majority of the tie producers feel that the uniform specifications are working to their benefit as well as that of the roads.

The position of the tie producers on the entire situation as expressed by a committee of their organization, the National Association of Tie Producers, in a recent appearance before the Division of Purchases at Washington is that roads on which ties are produced should continue to purchase at present prices such ties as are offered up to November 1; that any railroad may immediately enter into contracts with individual tie producers at prices not to exceed those now in effect at point of shipment up to November 1, provided the quantities and kinds of ties contracted for are approved by the Railroad Administration; that all cross ties should be inspected by regional inspectors at the point of shipment, and that the purchase of cross ties for delivery after November 1 should be made in accordance with the following plan:

1. The railroads should register their annual cross tie requirements with the Division of Purchases and all ties should be purchased in accordance with national standard specifications.

2. All ties should be inspected by regional inspectors in accordance with standard rules for application of the specifications.

3. Individual roads should enter into contracts for their tie requirements direct with responsible tie producers, filing copies of the contracts with the Railroad Administration.

4. All contracts should be awarded only after fair and open competition has developed the lowest price per tie obtainable from responsible tie producers.

Present Situation Is Encouraging

So much for the past and the causes contributing to the shortage. What is the situation at present? This can best be indicated by the statistics of ties purchased for recent months. Those for August, 1918, to March, 1919, inclusive, are as follows:

August, 1918	3,700,009	December, 1918	5,652,572
September, 1918	3,827,974	January, 1919	5,827,769
October, 1918	4,522,580	February, 1919	7,994,000
November, 1918	4,830,871	March, 1919	10,150,000

In the six months ending with March of this year, the purchases by regions have been:

Eastern region	2,793,792	Northwestern region	10,847,977
Pocahontas region	1,155,171	Central Western region	2,265,079
Southern region	11,143,048	Southwestern region	7,607,463

An interesting feature of this improvement is the large increase in the local production in the eastern states which were not commonly considered tie producing areas. A conspicuous example of this is the production which has been developed on the Pennsylvania Lines West of Pittsburgh where 199,377 ties were purchased in the first four months of this year as compared with a total of 68,563 ties purchased during the entire year of 1918, and 19,311 ties in 1917. In the first three months of this year the purchases in the

Eastern region were 200 per cent of those for the same period of the preceding year, although in fairness to this comparison it must be recalled that this period of this year was one in which there were favorable weather conditions, while at the same time a year ago the winter was one of unusual severity.

In general the ties have not been diverted far from their natural channels, although because of the acute shortage on the Eastern roads and an over-production of Douglas fir ties in the far west, approximately two million ties have been ordered from that region, one-half of which are being moved to points along the Atlantic seaboard by water, and the remainder are coming by rail for distribution to the eastern central states.

With normal annual requirements for renewal purposes of approximately 90,000,000 ties or a monthly average of 7,500,000 ties, it would appear that the crisis has been passed and that we are now assured of an adequate supply of ties. In fact, it is the hope of the Forest Products Section that not only will the roads receive all of their ties which they require for normal maintenance, but that they may also be able to replenish their depleted stocks. Others, equally gratified at the purchases of the last two months but less optimistic, point to the fact that the large deliveries during February and March have been facilitated by a number of conditions which may or may not continue. In most of the tie producing areas the past winter has been one of the most favorable ever encountered in the history of the industry with the result that it has been possible to make and to haul out to the railroads larger numbers of ties than ever before. Furthermore, although several weeks and frequently months normally elapse from the time ties are cut until they are delivered to the railroads, this period has been greatly decreased during recent months, because of the fear that the present high prices might be lowered at any time. Likewise, the conclusion of the war and the return of large numbers of men to civil life has created a surplus of labor in many regions, and this labor has been diverted temporarily to the production of ties. However, the evidence leads strongly to the conclusion that at least the urgent needs will be met.

The influence of these increased deliveries is being felt rapidly by the roads to whom the ties are being sent. One road which was in a bad way for ties early in March reported late in April that the deliveries during the intervening weeks were sufficient to relieve the situation materially. Another road using treated ties, the officers of which were equally alarmed last winter now state that the only alarm now existing is that there may be an over-production of treatable ties beyond the capacity of the treating plants to treat them.

In the Northwestern region the situation on April 1, 1919, has been tabulated as follows:

Production	
Ties placed in track since January 1, 1919	1,200,000
On right of way available for immediate use	9,300,000
At treating plants awaiting seasoning and treatment	1,900,000
Estimated production for balance of year	14,700,000
Oak ties due from other regions	4,000,000
Total available ties in Northwestern region for 1919	31,100,000

Disposition	
Renewals—Northwestern region	17,200,000
New side tracks and other construction	1,000,000
For seasoning and treatment at treating plants and for carry over for 1920	6,200,000
Export to other roads	6,700,000
Total	31,100,000

In the Southern region which is one of the principal tie producing regions it is estimated that the production in 1919 will be about 35,000,000 ties, or in excess of that of any previous year, although this is considerably short of fulfilling the program of the Forest Products Section for 44,000,000 ties, about one-half of which are scheduled for use on roads within the region and the remainder for shipment to other regions.

Large as the production of ties is in this region, this in itself is creating a special problem because of the large percentage of the ties now being produced which require treatment before insertion in the tracks. Nearly all of the roads in this region have been using ties untreated and they have neither the facilities, or in general, the desire to go to treated ties. In past years a large part of the ties shipped to roads in other regions have been of white oak and heart pine which were used untreated. This condition combined with the present demand for ties for immediate insertion in the tracks has depleted the supply of ties which can be used without treatment, while it is creating a surplus of treatment ties which will not be available for use until late this fall or early next spring, because of the time required for their seasoning and treatment. This condition is causing the Forest Products Section of the Railroad Administration and others to give serious attention to the encouragement of the use of treated ties.

Favorable as recent developments are the fact that the acuteness of the situation has not been relieved universally is indicated by the report from another road whose annual requirements are in excess of 2,500,000 ties and which was able to insert less than 1,500,000 ties last year, while at the same time reducing its surplus 500,000. For the first four months of this year only 20 per cent of its 1919 requirements had been received, while only 4 per cent of its renewals had been completed on April 1. This condition exists in spite of strenuous efforts which have been exerted by officers of the roads and others to promote local production with marked success, over 60 per cent of the ties secured since January 1 coming from its own local sources of supply.

One interesting development of the centralized purchase of ties has been evident on some of the smaller roads in the tie producing regions. In the past it has been the common experience that the larger and more prosperous roads would buy the better grades of ties from their lines, leaving to these roads the poorer ties which they could secure at cheaper prices. Under common control these roads are now receiving the same grades of ties as other lines, and as a result they are being placed in better condition than at any previous time in their history.

Conclusion

Although the tie situation is still complicated by wide differences of opinion many of these differences are being ironed out. The acute shortage of a few months ago is rapidly being relieved, and while the present high production may not possibly be maintained, it may confidently be expected that a sufficient number of ties will be secured to meet the ordinary needs of the roads for current maintenance and for such new work as may be undertaken this year, although deliveries will be delayed later in the season than usual. The placing in effect of standard specifications for ties, their inspection and treatment, is resulting to the mutual benefit of the producer and the user. The present specifications are a marked improvement and are producing a tie of superior quality.

While some of the actions of the Railroad Administration have been ill-advised and have resulted in unnecessarily disturbing the established methods of tie production, many of the innovations introduced will be of permanent benefit to the roads, and to the industry once they have become firmly established, and those in the field have an opportunity to adjust themselves thereto.

Fuel Association Convention a Big Success

Characterized by Large Attendance, Strong Addresses, Timely Reports and Lively Discussions

THE FIRST SESSIONS of the eleventh annual convention of the International Railway Fuel Association were reported in the *Railway Age* of May 23, 1919, page 1249. A list of the exhibitors was also given on page 1283 of that number. This article covers an account of the proceedings for the closing sessions of the convention.

The following officers were elected at the last session: President, H. B. MacFarland, Atchison, Topeka & Santa Fe; vice-presidents, W. J. Bohan (Northern Pacific), J. B. Hurley (Wabash) and W. L. Robinson (Baltimore & Ohio Western Lines); executive committee, J. W. Hardy (U. S. R. R. Adm.), M. A. Daly (Northern Pacific), C. M. Butler (Atlantic Coast Line), L. J. Joffray (Illinois Central), C. C. Higgins (St. Louis-San Francisco), and J. M. Nicholson (Atchison, Topeka & Santa Fe).

Equated Tonnage and Its Relation to Fuel Consumption

By R. N. Begien

Federal Manager, Baltimore & Ohio Railroad, Western Lines

Equated tonnage has a certain relation to fuel consumption. However, this relation is established through the medium of the trainload. The fuel consumption per gross ton mile decreases as the trainload increases, provided the speed of the movement does not suffer to such an extent as to increase the time on the road materially. The purpose of equated tonnage is to secure uniform loading of power, regardless of the kind of equipment or number of cars involved. It is a well known fact that an empty car has a much higher resistance per ton of weight than a loaded car. For example, a 20-ton empty will show a resistance in the neighborhood of 8 lb. per ton of weight, or 160 lb. total resistance to traction on a level. On the other hand, a 70-ton car shows a resistance of approximately 4 lb. per ton of weight, or 280 lb. of resistance to traction on a level. These figures are approximate, but for practical use are correct. Of course many other features enter into the question, such as temperature, wind, rate of grade, curvature, type of car, etc.

In order to make practical standards which can be placed in the hands of yardmasters, it is necessary to use certain adjustments in building up trains, and to modify them as is necessary in the judgment of the chief train despatcher to suit conditions under which the operation is conducted. If a locomotive is able to produce 30,000 pounds of effective tractive power behind the tender at rating speed, the train should have a combined resistance of 30,000 lb., irrespective of the character of the cars, and in order to accomplish this a certain arbitrary adjustment is added to the weight of each car, and the effect of this arbitrary adjustment is to automatically compensate the different weights of cars. This adjustment varies with the rate of grade, being about 15 tons per car on a .3 per cent grade, and about 2 tons per car on a 2½ per cent grade.

Building up a train tonnage, composed of the dead weights of cars, plus an adjustment, so that the combined resistance of the cars is equal to the effective tractive power behind the tender, give a tonnage which is known as an equated tonnage. The object is to secure uniformity of rating in order that the trains will always have a rated tonnage, irrespective of the kind of cars. There are a number of different ways of applying this principle, but unless some kind of equated tonnage is used it is not possible to rate trains accurately.

It is safe to say that any road which has not used the equated tonnage system, and which has through freight to haul, has not built up its trainload to the best possible advantage. Full trainload at uniform speed spells efficiency in fuel consumption, and the relation of equated tonnage to fuel consumption is evidenced through the trainload.

Proper train loading contemplates each locomotive handling the maximum trainload which it can move on the ruling grade at the economic speed. At such speed the locomotive is working most efficiently. An increased speed, which may be brought about by reduced trainload, will result in inefficient locomotive performance, while a reduced speed, brought about by overloading, will produce the same result. With all trains moving at the economic speed, the locomotives operating at maximum effort and hauling the uniform trains under these conditions, the fuel consumption, when measured on the ton mileage basis, will be minimum.

Discussion

All who discussed the paper agreed with the statements made. Representatives of three roads talked to some extent on the problem and stated that adjustment in tonnage is successful and productive of excellent results.

Lame Engines and Their Effect on Fuel Consumption

By J. W. Hardy

Fuel Supervisor, United States Railroad Administration

The purpose of this paper is to show in a practical way how fuel is wasted by lame engines (engines with valves out of adjustment). With this end in view, tests were made on the Southern Pacific between Houston and Galveston.

The engines used were of the following dimensions: Engine 267 was of the 4-4-0 type, having a total weight of 137,425 lb.; weight on drivers of 91,675 lb., and tractive effort of 21,240 lb. The cylinders were 20 in. by 24 in.; the valves 12 in. diameter inside admission piston type; the valve motion was the Stephenson link, set as follows: Valve travel 6 in., 1⅛-in. lap, 3/32-in. exhaust clearance, line and line in front motion, and ⅛-in. lead in back motion. The engines were equipped with superheaters and burned fuel oil.

Engine 265 was of practically the same design and dimensions, with the exception that the cylinders were formerly equipped with slide valves, which were replaced with piston valves, simplified steam chests with 10 in. diameter valve outside admission, 1-in. lap, 1/32-in. lead in forward motion, 1/32-in. back, and 1/16-in. exhaust clearance.

The engines in these tests were run eight trips in each case with one exception, test No. 2. The test was conducted with engine 267, which had considerable lost motion in its valve gear, and had made 16,700 miles since last shopping. Engine 265 was in the best of condition, having been turned out of the shops after being generally overhauled and superheated. The same engineer and fireman were used throughout the entire test.

The tests made numbered from 1 to 6 inclusive—Test Nos. 1 to 3 with engine 267 and 4 to 6 with engine 265. There were many places where we could get the lame engine, but we could not get the other conditions, necessary to prove waste due to improper valve adjustment. We thought it was easier, better and more reliable to make changes on the

engine than to attempt to work out the other conditions, many of which we had no control over.

The objects of the tests were to determine the fuel wasted by locomotives with valves out of adjustment (lame engines), and to see how lame a locomotive could be without loss of time or complaint on its condition. Where an engine is so lame it cannot make time or handle its tonnage, it immediately attracts the attention of the transportation department and is taken in and repaired. It is only in rare cases that engines go lame all at once. When this occurs, there is usually something lost, slipped or broken. This is noticed at once and is taken care of at the earliest possible moment; but, where the change takes place slowly and gradually, as it does by age and wear, we become more and more accustomed to it, and it is allowed to go on day after day and week after week wasting fuel all the time.

An oil burner was selected because a more accurate check could be made of the fuel used than with the coal burner. Measurements were taken just before starting, and on arrival, so that oil and water used represents what was actually used in pulling the train and making station stops. All conditions of engines and service were kept as near the same as possible, except the valve adjustment, which is shown at the heading of each test made.

There was a total of 5/16 in. lost motion in the valve gear of engine 267, but this was pretty well distributed, the engine not lame enough in any case to affect the schedule of the train. There was a noticeable kick in the engine when lame that was not there when squared.

With the slight change in valve adjustment shown between tests 1 and 3, there was a difference of 18.33 per cent in the fuel consumed; no other charge can be made of this loss of fuel than to the condition of valves. The waste would undoubtedly increase with heavier service or more distorted valve condition, this is proved by test No. 6 with engine 265. Test No. 2 is not recorded for the purpose of comparison, but to show the condition of valves after the engine was squared up by the travel at full stroke and pronounced O. K. More throttle had to be used with the engine in this condition than when the valves were as in Test No. 3.

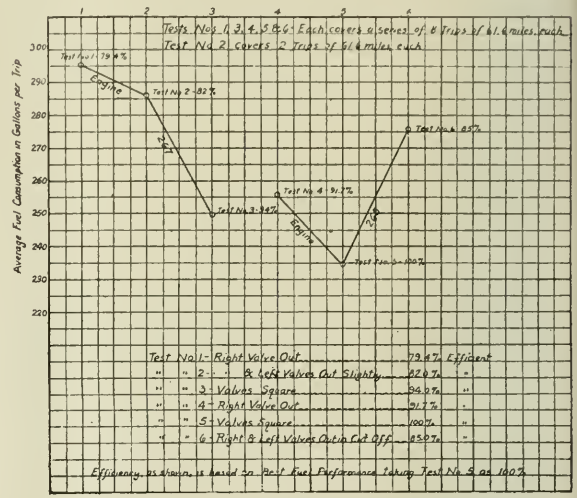
The valves govern the application of the power of steam to the locomotive and are of great importance to fuel consumption. It takes fuel to generate power, and it means a waste of fuel if this power is improperly used in the cylinders of our locomotives. The exhaust action is different when the engine is lame, causing a pulsating draft instead of a regular and constant pull on the fire. This wastes fuel in addition to the improper application of the power to the machine. Square engines steam better than lame ones, although these engines steamed well in both cases.

Valves out of square in a measure take the economical operation of the locomotive out of the hands of the crew. Their hands are practically tied because they are robbed of the control of the power applied to the locomotive in their charge. With an indifferent crew this loss will increase.

There is no way that we know of where we can get as good returns, and get them as quickly and at as little cost, as by squaring valves. It only costs a few dollars more to do this work well; it only costs a few dollars to do it at a time when it is needed and should be done, and it will often begin to pay dividends the first trip after it is done. Transportation people should want it done because the engine will pull more and pull out less draw bars when square than when lame, because the power is more evenly distributed in the cylinders and helps to prevent lunging and jerking when starting. The mechanical department people should do it because it cuts down fuel waste and the cost of locomotive maintenance. The crew should want it done because it makes their work easier and more pleasant.

There is liable to be less complaint on a lame oil burner, especially if she steams, than on a coal burner on account of less manual labor to fire the oil burner. Why spend money for brick arches, superheaters, etc., and then waste as much with valves out as we can save with both of them? Why spend money to generate steam and then not control its use? You can go to any union station or large freight yard and hear engines pulling out every day on long, hard and heavy runs that sound worse than either of these engines did. The question of proper valve adjustment is so important that it should be specialized on.

The cut-off and steam distribution on test No. 2 with engine 267 merits careful study. This engine was run over at full stroke; in fact, was more carefully gone over than this work is usually done; pronounced O. K., and, no doubt, under ordinary circumstances, would have run possibly for months in this condition. But note how much better this



Relation of Fuel Consumption to Valve Setting

engine did in Test No. 3 with valves properly adjusted and a little of the lost motion taken up.

The difference in the performance of engine 267 with valves lame and square was so much we decided to make a test with an engine having as little lost motion in the valve gear as possible. We therefore arranged for a test with engine 265. This engine was new, and when broken in the right go ahead blade was changed so the cut-off was as shown in test No. 4. This engine was quite lame only on one side, and this low down in the quadrant, and, as the lever was hooked up, it got better. As the engine did most of its work at close cut-off, this change only made a difference of about 9¼ per cent in the fuel used, but the engine had a very disagreeable kick on the right side when run at high speed and short cut-off.

Certain kinds of lameness are more wasteful than other kinds. The engine that is lame where it uses the most of its steam is the most wasteful. This is clearly brought out by test No. 6 with engine 265 which was made lame in the cut-off where it did most of its work by changing the back motion blades so the engine cut-off in the forward motion as shown above test No. 6.

In all tests where the engines were lame, the lameness was aggravated by its being more difficult to keep the valves lubricated, and both engines rode much harder while lame than when squared. An engine can sound square and still have valves improperly set. A condition of this kind can only be discovered by careful measurements.

My conclusions from these tests are that a waste of as much as 25 per cent of the fuel could be made by further

distortion of valves before the engines would begin to lose time or affect the train service.

VALVE SETTING AND FUEL CONSUMPTION FOR TESTS NOS. 1 TO 6 INCLUSIVE, WITH CUT-OFF AT 6 INCH PISTON TRAVEL

Test No. 1, Engine No. 267. Right valve out—cut-off—right side, front 5 1/16 in., back 10 7/16 in. Left side, front 7 1/4 in., back 7 3/4 in.
Test No. 2, Engine No. 267. Both valves out—cut-off—right side, front 7 7/16 in., back 5 7/16 in. Left side, front 7 7/16 in., back 5 7/16 in.
Test No. 3, Engine No. 267. Both valves square.
Test No. 4, Engine No. 265. Right valve out—cut-off—right side, front 8 1/2 in., back 3 1/2 in. Left side, front 6 1/2 in., back 6 1/8 in.
Test No. 5, Engine No. 265. Both valves square.
Test No. 6, Engine No. 265. Both valves out—cut-off—right side, front 3 1/4 in., back 8 7/8 in. Left side, front 4 1/2 in., back 7 1/8 in.
Per cent increase in fuel consumption Test No. 1—18.33 per cent.
Per cent increase in fuel consumption Test No. 2—14.63 per cent.
Per cent efficiency of engine in Test No. 1, considering engine in Test No. 3 as 100 per cent—84.5 per cent.
Per cent efficiency of engine in Test No. 2, considering engine in Test No. 3 as 100 per cent—87.25 per cent.
Per cent increase in fuel consumption Test No. 4—9.12 per cent.
Per cent increase in fuel consumption Test No. 6—17.70 per cent.
Per cent efficiency of engine in Test No. 4, considering engine in Test No. 5 as 100 per cent—91.6 per cent.
Per cent efficiency of engine in Test No. 6, considering engine in Test No. 6 as 100 per cent—84.9 per cent.

Discussion

Discussion brought out the fact that considerable saving in fuel could be made by proper setting and squaring of valves so that the maximum energy delivered by the steam could be given up at the proper time. One speaker expressed surprise that mechanical engineers have not paid more attention to the proper setting of valves and stated that the defect was a comparatively easy one to correct. He also stated that in many shops not enough attention had been paid to the qualification of the men who adjust the valves. Another speaker brought out the point in regard to lubrication that it is not the question of quantity of oil but of regular and uniform distribution. The same speaker advocated the use of indicators, but Mr. Hardy, in his closing remarks, pointed out that the use of indicators was not practical since so few knew how to apply the principle. He thought the use of standard trams for setting valves instead of indicators would be found more in line with practical methods.

Russian Method of Testing Locomotives

The methods of testing locomotives used on Russian railways was described in detail by G. E. Ledegeff, assistant chief of locomotive department, Russian Mission of Ways of Communication. The first locomotive testing laboratory of the world was installed at Kieff in 1882. During the next year the first attempts were made to determine the performance by establishing constant condition in actual service. This method has been developed to a high degree in Russia. It is now possible by means of road tests to draw up terms showing the tractive effort, steam consumption and the efficiency of the boiler and machinery for various conditions of speed, throttle opening and cut-off.

Storage of Coal by Railroads During 1918

By H. H. Stoek

Professor of Mining Engineering, University of Illinois

About two years ago the writer sent out a questionnaire to several hundred parties storing coal in quantities varying from a few tons stored in the ordinary house cellar to hundreds of thousands of tons as stored on the docks along the Great Lakes and by some of the large industrial concerns. The replies to this questionnaire were studied and a tentative set of conclusions drawn up, and sent to the parties who had answered the original questionnaire, with the request that they be thoroughly criticized. As a result of these criticisms, a revised set of conclusions was drawn up and published in Circular 6 of the Engineering Experiment Station of the University of Illinois, together with all of the data upon which the conclusions were based.

Realizing that during the period of the war the conditions under which coal was stored were unusual, because of the pooling of coal and because the coal furnished was dirtier and less carefully sized than under normal conditions, another questionnaire was sent out during the fall of 1918 to practically the same list of persons as the previous one, asking for the experiences of those who had stored coal during the year 1918 and for a criticism of the conclusions published in Circular 6. A similar questionnaire was sent to a large number of power plants in the State of Illinois, and a large number of fires in coal piles were studied during the summer and fall of 1918. In these several studies, railroad storage was only one of the problems included and furthermore, the study had particular reference to Illinois and Middle West coals.

On March 11 a conference was held in Chicago at which the general subject of railroad storage was discussed and the general conclusions in Circular 6 were endorsed. Each one was asked to furnish the writer his own conclusions upon railroad storage and copies of all instructions issued by railroads in his territory to be studied and summarized by a sub-committee consisting of Messrs. McAuliffe, Roesch, Collett, Hardy and the writer, at a meeting held in Urbana, March 25. At that meeting certain general conclusions were drawn up as representing what in the opinion of the committee represents safe practice at the present time and these preliminary conclusions were issued by Mr. McAuliffe in a circular addressed to the railroads of the country as a guide to them in storing coal during the spring and summer of 1919.

Why Should Railroads Store Coal?—The insurance feature of coal storage is so self-evident as not to need discussion, and the equalization of equipment throughout the year has been fully discussed in the reports of the several coal storage committees. (See also Railway Administration circular.)

Coal stored in summer costs less to transport than would the same amount hauled during the winter. By relieving the railroads of transporting so much coal during the season of peak load and high transportation cost, general freight traffic is helped.

Other reasons for storing coal by the producer or by the consumer need not be considered here, as the railroad is a transporting agent and not a producer of raw products or a consumer of finished products, excepting for its own needs.

The railroads are also interested in the storage of coal, because they are the largest users of it, using more than 25 per cent of the total output for their own uses, and since the transportation of the coal output forms about 34 per cent of the freight carried by the railroads of the United States, the railroads should, therefore, not only protect their own interests by storing coal, but should encourage both the mine operators and consumers to store coal so as to help stabilize the coal industry in order that it can be conducted more nearly up to its full time efficiency and thus decrease the present excessive but absolutely necessary overhead charge due to the fact that the miners of the country work only about 200 days per year.

Suggestions Regarding Storage of Coal by Railroads.—The replies to the questionnaire sent out in 1918 asking for experiences in storing coal during 1918 and for a criticism of the conclusions published in Circular 6, show that the experience of the past year has confirmed these conclusions in very great part.

(The conclusions included detailed instructions regarding the storage of coal as regards location of piles, season when coal should be stored, kinds and sizes which may be safely stored, methods of piling, ventilation and precautions to be taken to avoid spontaneous combustion.)

Summarizing these suggestions:

Each railroad should study its own storage problem in great detail. Get ready to store before it is time to begin

the actual storing by outlining a definite policy far enough in advance so that every one who will have to do with the storing can receive *definite* instructions, not merely suggestions. Then when storing begins, see that the instructions are carried out to the letter. Many failures have been due not to faulty instructions from the head office, but to the fact that they have not been followed.

When it is time to store, prepare a place carefully. Do not wait until the coal to be stored is on the track and then dump it anywhere to get it out of the cars. Specify the kind of coal that is to be stored and see that the specifications are carried out by having an inspector at each storage pile who is competent not only to inspect the coal furnished and reject it if not according to specifications, but who has authority to see that the storage instructions are carried out to the letter.

Prepare definite instructions as to the sizes of piles for different coals and for the different kinds of storage appliances that may be available.

Watch the stored coal carefully for any evidence of heating and if the temperature rises sufficiently, begin to move it in time. See that adequate machinery for handling the coal is available and always in condition to be used. Do not store coal unless you are prepared to do it properly and to watch it thoroughly after it has been placed in storage.

Attention to these details will very largely prevent heating of coal or if heating occurs will prevent a loss of coal from dangerous fires.

It should be understood that each coal storage is a distinct proposition, and while it is believed that the suggestions in this paper will be helpful to any one wishing to store coal, they are suggestions and guides only, based upon the experience of those who have stored coal. They are not absolute facts and subsequent experience may show changes to be advisable.

Effect of Storage Upon the Properties of Coal.—The heating value of coal as expressed in B. t. u. has been shown by experiments of the United States Bureau of Mines and by Professor S. W. Parr of the University of Illinois, to be very little decreased by storage. It must be admitted, however, that the opinion is very wide-spread that storage coal burns less freely than fresh coal. This opinion is by no means universal amongst railroad men, for in the latter pages of this paper giving the opinion of railroad men storing coal, it is distinctly stated by some that the storage coal burns better than the fresh coal.

Experiments at the University of Illinois have indicated that coal that has been in storage can be burned as readily as fresh coal if a thinner bed is kept on the grate and the draft properly regulated. This, of course, applies particularly to stationary plants as draft cannot be as well regulated in locomotive practice.

Insurance Adjustments.—An attempt has been made to obtain information regarding the adjustment of insurance in connection with the storage of coal but very incomplete information had been received at the time of writing. It is suggested that this subject is worthy of much more careful and extended study, possibly by a subcommittee of the Fuel Association.

Storage Systems

Choice of a Storage System.—In the choice of a storage system, the following points should be considered:

(1) The location, size, and topography of the available storage ground.

(2) The capacity of the desired installation, that is, the amount of coal which it is desired to load and unload in a given time.

(3) The cost of the plant.

(4) The cost of maintenance.

(5) The cost of operation.

(6) The amount of breakage to be permitted in handling the coal.

(7) The way in which the coal is received, in open or box cars, or in boats.

(8) The length of time the coal must be kept in storage.

(9) Climate: A dry climate with cold nights such as is found in Colorado, for instance, may give different conditions than will be found in Illinois, where there is a great deal of moisture in the air and the summer nights are almost as hot as the days.

The requirements of an ideal plant are:

(1) Adequate ground area, so that different kinds of coal may be stored separately if necessary.

(2) Adequate facilities for rapidly and economically transferring coal from cars or from boats into storage.

(3) Adequate facilities for rapidly and economically reclaiming the coal and for rapidly moving any part of the pile which shows evidences of taking fire.

(4) Adequate track facilities, with gravity facilities, if possible, for handling cars.

(5) Means for preventing undue breakage in handling.

(6) Adequate available water supply.

(7) Low cost of installation, maintenance, and operation per ton of capacity. A storage plant is in operation very irregularly and costs are likely to be correspondingly higher because of the heavy fixed charges, especially interest and depreciation.

(The paper gave detailed analyses of the advantages and disadvantages of methods of storage particularly applicable to railroad conditions. Replies to questionnaires summarizing the current practice and opinion regarding railway storage were also included.)

Discussion

The discussion hinged largely on bituminous coal storage fires. Several pointed out that such fires may occur to any kind of coal when stored under different conditions, but to aid in preventing fire proper preparation should be made for storage facilities. Dry high ground, if possible, should be chosen and clean even grade coal should be stored in the same pile. Dust veins should not be permitted. Different kinds of coal should not be mixed and use of water in small quantity was discouraged.

Fuel Department Organization

By T. Duff Smith
Fuel Agent, Grand Trunk Pacific

When one stops to consider the enormous amount of money spent by the railroads of the United States and Canada for fuel, it does seem strange that every road has not a fuel department. I will speak only of an up-to-date fuel department, and the duties and qualifications of its staff. I do not expect you all to agree with me, especially in many of the details, and trust that a full and frank discussion will enable the association to formulate a standard fuel organization which it can recommend for adoption on all roads. My organization plan would be as follows:



You will note the order in which I have taken them—from the production to final usage.

Taking them in the order shown on chart:

General Manager.—As the general manager is responsible for the economical operation of the road, I take it for granted that he is the one who is most interested in fuel economy, and therefore the general fuel agent should report direct to him.

General Fuel Agent.—The general fuel agent should be responsible for the purchase, distribution and accounting for all fuel. He should have a thorough knowledge of all fuels on his own line, and adjacent thereto, also keeping in touch with all new development, and in these days of labor unrest, he should keep well informed of the situation so that on any indications of approaching trouble causing closing of the mines, he will have sufficient stock on hand to protect his road. He should be familiar with the characteristics of the various coals, such as slacks, lignites, etc., by the use of which great economies can be made in fuel used in roundhouse plants, stations, tanks, etc.

He should have a knowledge of the various systems of handling and storing coals, so as to meet any contingency that may arise, and keep his actual handling costs to minimum. He should keep a close watch on his supplies and stocks protecting against any possible shortage by reason of unforeseen delays, wrecks, washouts, strikes, etc., at the same time being careful not to carry too heavy a stock in cars, thus causing extra cost by shrinkage, extra handling and interest on idle money.

The general fuel agent should purchase all fuel, under the direction of the general manager, after consultation with the superintendent of motive power, as to the merits and economic aspects of fuel required for various purposes. This I take to be very necessary on account of the multiplicity of designs of locomotives and boiler plants. We all know that a coal which proves economical on one type of locomotive or boiler is the very opposite on another type, yet we have to supply fuel for them all.

He should keep in touch with general superintendents, so that they may facilitate movement of cars, both loaded and empty, and also get advance notice of any extra supplies required on account of rushes of traffic, opening ballast pits, etc. He must also consult with them as to any permanent or temporary alterations required at coaling plants, especially when arranging to dump storage coal.

He should especially consult with the superintendent of motive power, as this is the department using by far the larger proportion of our fuel, and it is only by close co-operation of these two departments that we can make our best results in economy. On most roads we also have to rely on the motive power department to make all our tests, as we are not all in a position to maintain an organized testing department with all the necessary equipment. Where a performance sheet is compiled, it will not be possible to get any improvement in results unless these two departments are working closely together.

The general fuel agent should not spend too much time in his office, as all routine work there can be taken care of by his clerical staff. He should be out on the line as much as possible, getting in close touch with coal operators, his inspectors, master mechanics, in fact with every one who is at all interested in fuel, and thus gain information which will enable him to inaugurate new methods, thus making economies.

Inspectors.—As we cannot use the coal unless it is properly produced, the next to deal with are the inspectors. As I have often stated, I prefer practical miners for these positions. A practical miner, after a little outside training, is able to judge as to whether the coal is up to the proper standard of the mine, and in cases where coal is being tendered for loading which is not up to standard, is able to detect the cause of the trouble and apply a remedy.

The inspector's duties are principally to inspect the coal as delivered, but he also sees that cars are clean and in fit condition for loading, inspects the weighing and notes any differences between actual and marked tare. He should also report daily the number of cars of company coal loaded with destination, and the number of cars of commercial coal loaded, and should send a weekly report of local conditions at the mine.

Distributor.—After receiving the coal at the mine, it is necessary to properly distribute it, which is done by the fuel distributor. His title implies his work, and he must watch daily stocks on hand and in transit closely so as not to overstock or run short, also so as to get his coal carried without causing any holding back of revenue traffic on account of requiring coal rushed to any particular point.

Chute and Coal Handlers.—Having the coal at destination it is necessary to get it on locomotives or in boiler rooms by means of coal chutes or handling in some other economical manner. These are so closely connected with fuel costs that the handling of all fuel should be taken care of by the general fuel agent, either by contractor or men on the fuel payroll. By this means he has a constant and efficient check on the cost of this work.

Chief Clerk and Office Staff.—The office routine and records are taken care of by the chief clerk and staff and this does not require any explanation.

Accountant.—The accountant is responsible for passing all invoices and vouchers, making all charges of fuel issues and keeping the fuel stocks account.

Statistician.—The statistician's chief work is in compiling performance records, and any other similar reports required. I find myself unable to compile any coal performance reports from the fact that we have no means of obtaining accurate data as to the amount of coal supplied to any particular engine. It is all guesswork, so that to attempt to compile any comparative report of performance would be ridiculous and only a waste of time. I hope that the day is not far distant when every coal chute will be equipped with an automatic device, either weighing or measuring, so that we may know the exact amount of coal taken by each engine, but until such is installed I feel that all our efforts at comparisons are of no avail.

Fuel Supervisors.—The coal now having been mined, distributed and placed on the engines, the fuel supervisor comes in, and by his skill and training as an engineman develops the highest training and practice possible in his engineers and firemen, always looking to the little things that count so much and taking for his text "The most 100 ton miles for the lowest actual cost."

Such, in my opinion, is the complete organization of a fuel department, and such an organization with the motto "Service and Co-operation," with everybody living up to it, could make great savings for any road.

Co-operative Research and the Railway Fuel Problem

By Captain O. S. Beyer, Jr., U. S. A.

The influence of such fundamental items of railway operating expense as the cost of fuel and labor on the direction of developments, both mechanical and economical, in the industry has always struck me as a most important subject for consideration. When practices of locomotive and car construction or train operation of America are compared with those of Europe, striking differences are revealed. Intensive studies of the effect of basic cost items indicate more clearly than anything else the reasons why, for instance, the superheater, the mechanical stoker, the brick arch, the feed water heater, as well as the composite modern types of American locomotives themselves, assume tendencies in this country differing quite markedly from analogous tendencies in other countries. In fact, I do not think it an exaggeration to say that the whole course of American railway development is greatly influenced by the cost of fuel and labor. The problems created by the railway labor and fuel situa-

tion have a large economic background, which is very fundamental in its relation to the whole transportation industry. An analysis of this phase of the problem is a big subject in itself and cannot be elaborated here. Certain elements of the problem, however, are amenable to certain forms of solution which are becoming more and more important. Briefly, these particular solutions may be characterized as possible methods for increasing the productivity of the agencies creating the operating cost in question. To increase, as it were, the yield of fuel, to get more out of every pound, to utilize it more efficiently, is of more importance today than it ever was, and will become more and more so as each increment added to its cost places an additional premium on its efficient use.

The time has come, in my estimation, to survey the railway fuel situation, its problems and possibilities, with a thoroughness never attempted before. This association has succeeded, after several years of strenuous effort, in effecting a co-operation between many interests, whereby a piece of fuel research was accomplished which undoubtedly some day will be considered the inception of a movement contributing most extensively to the solution of the present-day railway fuel problem.

Since the committee on Fuel Tests handed in its report on the Test of Six Grades of Coal from a Franklin County, Illinois, Mine, at the 1917 convention, much has transpired. We have come to realize, as never before, the true significance of the scientific method in the solution of the problems in our industries, as compared with the slow, dull, expensive practices of cut and try, rule-of-thumb, or by whatever other term the awkwardness of much of the industrial progress of the past might be characterized. Perhaps no other event of international importance than the war for democracy has served to emphasize this so well. A new realization has developed among scientists, engineers, administrators, statesmen, concerning the value of the *scientific method* in the solution of industrial problems.

It is my intention to point out as far as this association is concerned that its greatest opportunity lies in the direction of continuing and developing as rapidly as possible the lead it took when, through its Committee on Fuel Tests, it brought together the many interests and secured the necessary funds which eventually made possible the report already mentioned. This was but a beginning and a beginning under most adverse circumstances.

As all this is indicative of what co-operation in research really means, the question which arises is, what can be done in this direction on behalf of contributing to the solution of the railway fuel problem? The Fuel Conservation Section of the United States Railroad Administration thoroughly appreciates the activities of this association. The extensive fuel and locomotive test facilities, but so meagerly used, at the Illinois, Iowa and Purdue experiment stations need but to be referred to. It seems, therefore, that the whole question reduces itself to one of initiative with the International Railway Fuel Association.

All these remarks would perhaps have little appeal were there not many important railway fuel problems pressing for solution. Consequently, in support of the remarks I have made above, the following fuel investigations, which can only be carried on in a sufficiently comprehensive way by co-operative research, are submitted for consideration by way of conclusion:

(a) *The Chemistry of Combustion.*—The theory of combustion as it exists today, applied to the burning of locomotive fuel, is incomplete, and fails to explain the occurrence of some very important phenomena, especially with reference to fires of varying thicknesses, clinkering, coking, the nature of the higher hydrocarbon products of combustion, etc.

(b) *Firing Practices.*—The purpose of this should be to determine the most economical combination of practice, devices and kinds of fuel in different territories possible. Maximum boiler capacities resulting from these combinations as well as relative smoke production should be determined.

(c) *Heat Absorption.*—A detailed experimental, as well as mathematical study of the process of heat transfer in the locomotive boiler should be made, especially with reference to the distribution of the heating surfaces between tubes, flues, combustion chamber and firebox.

(d) *Chemical and Physical Nature of Exhaust Gases.*—A splendid opportunity exists to investigate the products of combustion as they appear in the locomotive front end after they have done their work. The results might go a long way towards explaining the mysterious "unaccounted for" losses in the heat balance.

(e) *Accurate Smoke Measuring and Indicating Devices.*—Jointly with the foregoing investigation, attempts should be made to develop accurate smoke measuring and indicating devices.

(f) *The Drafting System.*—An investigation of the entire drafting system of the modern locomotive cannot be made too soon. The proportioning of ash pan opening, grate opening, gas areas between the end of the arch and the door sheet, of flues, tubes, and superheater damper, the space under the smoke box diaphragm, and the smokestack should all be carefully determined and general values for them expressed in empirical formulae having a wide range of application. This is far from accomplished today.

(g) *The Law of Resistance to Flow of Gases.*—Detailed study of the flow of gases through the locomotive boiler reveal possibilities for reducing their resistance to flow and perhaps at the same time suggest ways for effecting greater interchange of heat between these gases and the heating surfaces.

(h) *Radiation Losses.*—Very little is known about this important item, and in consequence losses resulting therefrom are thrown in with those considered as "unaccounted for." It is entirely possible to develop data on this point, especially with the perfected methods of pyrometry now in existence.

(i) *Locomotive Feed Water Heating.*—After a long period of development, the locomotive feed water heater is at last becoming available. As it stands today, it is perhaps one of the finest examples of the results of scientific experimentation applied to the solution of locomotive problems. The good work, however, should not stop. As long as feed water can be heated to still higher temperatures, as long as there are heat units still going up the stack which might be saved, the feed water heater investigation should continue.

(j) *Locomotive Boiler Performance.*—The whole general subject of locomotive boiler performance needs more study. Unfortunately the available reliable test data covering a sufficient range of performance is entirely too limited for this purpose. Consequently little opportunity exists for developing an extensive and well founded theory for locomotive boiler design.

(k) *Further Study of the Superheater.*—The superheater deserves further investigation. The work done at Purdue and especially at Altoona with varying lengths and diameters of superheater units has certainly contributed most valuable knowledge on this subject. As a continuation of this work the correlation between degree of superheat and boiler pressure as reflected in the steam economy of the engine should be worked out over wider ranges and mathematical determinations verified. Another very important question coming within this field is the effect of varying degrees of moisture in the steam entering the superheater.

(l) *Fuel.*—Investigation concerning fuel should primarily contemplate securing data on the relative steaming values of the fuel used in the railway service as determined

from a complete series of boiler performances as well as maximum evaporative capacity tests. The data should also include information on the spark and smoke production of the various coals and their clinkering and honeycombing qualities, in order, if possible, to tie up practical performances of coals with the characteristics indicated by proximate and ultimate analyses and other laboratory tests of selected samples. The fuels which should thus be investigated are: (1) Typical coals from all important mining districts. (2) Various commercial sized and some specially sized coals. (3) Land stored, water stored and freshly mined coals. (4) Powdered bituminous, anthracite, lignite and peat, together with combinations thereof. (5) Oil, lignite, anthracite and bituminous coals, coke, peat, briquets and possible mixtures of these fuels.

Complete information as outlined would enable the railroads more clearly to specify desirable and necessary characteristics of fuel and to select fuels with far more intelligence than can now be done. It would enable them to determine with much greater accuracy the actual value of the various fuels available instead of solving this vital question by the unscientific methods now employed of "collective bargaining" between coal salesmen and fuel or purchasing agents. Some tests have been made to determine the relative steaming value of and the maximum capacity obtainable from certain typical locomotive coals and a limited number of different sized coals. One railroad, which has developed this data for coal used on its lines, has effected economies which have paid in one year over tenfold the cost of making the experiments.

It is entirely possible mechanically to prepare fuel in a highly pulverized form and burn it in a locomotive furnace. The machinery for doing this has been developed and used with success. The next logical step is to determine accurately just what is the complete economic value of the utilization of pulverized fuel. The many general advantages which are bound to follow its use are, of course, recognized, but it is not known how much, for instance, the evaporation per pound of coal is increased at different rates of combustion. The heat balances over the complete range of boiler capacities of a few typical boilers fired with pulverized fuel have yet to be compared with the balances of these same boilers fired with ordinary fuel. And lastly, values as exactly as possible of the increase in capacity of the pulverized fuel fired boiler should be established. It is not yet possible completely and finally to judge the wisdom of either attempting to perfect or of widely introducing this system of combustion.

Discussion

S. C. R. Richards, director Engineering Experiment Station, University of Illinois, told of investigations conducted by that institution. The scope of the work is limited because of lack of funds. He hoped arrangements could be made to secure co-operation from railroads in carrying on work. J. M. Anthony spoke of the need for a scientific investigation to determine proper proportions of locomotive boilers, the design of which had been along empirical lines. W. J. Bohan advocated the formation of a committee representing the railroads to co-operate with universities in research work.

Front Ends, Grates and Ash Pans

During the past few years much attention has been given to results obtained from the performance of heavy Mikado and Santa Fe type locomotives. The committee felt that an analysis of some of the apparatus pertaining to the designs of front ends, grates and ash pans was pertinent, and accordingly sent a letter to the mechanical engineers of some of the larger railroads of the country, reading in part as follows:

"In connection with work by the Standing Committee on Front Ends, Grates and Ash Pans of the International Railway Fuel Association, we wish to compile data in regard to improvements in designs of front ends, grates and ash pans which some of the more important railroads have found to produce a saving in fuel. We would like to have this data in connection with the larger type locomotives, preferably the Santa Fe or the Mikado types.

"If your railroad has found a change in design within the last two or three years which is proving to be a more economical design than you originally had on front end arrangements, on grates or on ash pans, also if the designs you now use are giving very good economy, will you please send drawings showing the old and new designs and also advise as to the size of the locomotive, the class of service, the grade of fuel burned and any further information which you see fit to give regarding both old and new designs."

The response to these letters, together with information submitted by individual committeemen, has suggested a comparison of present practice with the practice of some fifteen years ago, particularly in reference to front end design when the Master Mechanics' Association in 1906 endorsed the Purdue University tests on front ends.

Front Ends:

The fundamental principle of the Master Mechanics' standard front end is that the height, H, of the portion of the stack extending above the smoke box and the distance, h, that the exhaust nozzle is below the horizontal center line of the smoke box be, for best results, as great as practicable. This being done, dimensions of certain importance are ascertained in accordance with the following formulae in which D is the diameter of the smoke box, P the distance the stack extends below the top of the smoke box, d the diameter at the choke of the stack, b the diameter of the base of the stack, and h the distance from the base of the stack to the choke or smallest dimension of the stack.

$$d = .21D + .16h$$
$$b = 2d \text{ or } .5D$$
$$P = .32D$$
$$p = .22D$$

It is to be remembered that the diameter of the smoke box on which tests were made in establishing the design factors for the standard front end was 74 inches, and that the maximum back pressure of the exhaust blast that produced the draft on this oil burning locomotive was only a little more than 4 pounds. These are conditions which do not prevail in general practice today. The diameter of the smoke box on the majority of larger engines is from 80 to 91 inches, and the back pressure is, far in excess of a maximum of 4½ pounds.

The function of the stack is a very important one in its relations to the drafting of the locomotive and its fuel economy. The diameter at the choke of the stack, as determined by the standard formula, is made a function of the diameter of the smoke box, as well as the distance of the exhaust nozzle below the center line of the smoke box. The question arises whether or not this is a proper basis of design with present-day practice with large locomotives, either using saturated or superheated steam, hand fired or stoker fired. Is this the proper equation to give maximum fuel economy? Does it give a stack that is large enough to take care of the exhaust steam and the exhaust gases and to deliver them properly and with such a degree of freedom that good fuel economy results?

By comparing the formulae with the practice on present prominent railroads, we find that the maximum calculated diameter of the stack at the choke is 23 inches and that the actual diameter is 21 inches. In this case the minimum area of the actual stack is 17 per cent below that required by the formula; no data have been established by experiment on this coal-burning Santa Fe type superheater locomotive

to show that a 23-inch or larger stack might not be used. This railroad in question is notably a leader in the large size of its stacks. Another railroad in an adjacent territory is using a 17-inch stack on this same type of locomotive.

An analysis of all the design dimensions referred to by the formulae is of great interest as a matter of comparison, and one might possibly draw the conclusion that the dimensions were made to suit other conditions and not made to follow the formulae in that they vary as much as 100 per cent in several instances.

What then is the state of the standard master mechanics' front end? It may possibly be expressed in the words of a prominent mechanical engineer when he said recently: "So far as present large power is concerned, there is no such thing as a standard master mechanic front end. On present-day power, using superheater steam, the arrangement will not permit such a front end."

The master mechanics' front end did not provide a front end netting which is common to most locomotives of today, so located as to extend from the table plate at an angle of about 40 degrees to the forward part of the smoke box. This location of the netting for interception of the exhaust gases makes accessibility of the front end rather difficult, and many designers have expended their efforts in developing a different arrangement of the netting or spark arrester.

The Chicago & North Western has had for several years a box arrangement known as the Slater front end which is claimed to give very satisfactory results. The Burlington has an arrangement differing widely from that of other railroads so far as form is concerned, having a basket form over the exhaust pot. The Rock Island has a cylindrical spark arrester. (See *Railway Age* December 6, 1918, page 993).

This road reports that it has several hundred locomotives fitted with this device, with the most gratifying results.

With these variations of designs of front ends the question arises with this committee as to what should be endorsed as the best form of arrangement of a standard front end and what should be the basis of design of the stack under present-day conditions. At this time the committee is unable to make recommendations.

Grates:

In studying the grates in use on large locomotives, we find that they are for the most part of the finger type, and are divided into four sections. During the past few years power shakers have been introduced on a considerable number of the larger locomotives. In such case the arrangement is such that the grates can be shaken either by power or by hand, and, of course, in a very much shorter time than by the former method.

There is a tendency on the part of several railroads to change from the finger type grates to the table type. Tests recently made on one road show a decided saving in fuel due to the change from the finger to the table grates.

Ash Pans:

The general design of ash pans must necessarily be adapted to the particular class of locomotives, some locomotives permitting a different arrangement than others. In general it would appear that the ash pan is designed to fill a space that has been left over after other parts of the locomotive have been utilized to the best advantage. So far as the type of hopper is concerned, it seems that the duplex hopper type is in most general use, although there are a considerable number of multiple hopper type ash pans in service.

In general the ash pan doors open so as to dump the ashes towards the back end, although on a few railroads the two doors open, the one towards the front and the other towards the back of the locomotive.

In many instances the mechanical engineers are not co-ordinate in their actions; the designs that are satisfactory on one railroad are sometimes discontinued on another. This is particularly true with reference to the sliding versus the hinged door.

The report was signed by H. B. MacFarland (A. T. & S. F.), Chairman; W. J. Bohan (N. P.), E. B. DeVilbiss (Penn. Lines), J. P. Neff (Am. Arch Co.), and Frank Zeleny (C. B. & Q.).

The Effect of Reducing Exhaust Nozzles to Overcome Front End Air Leaks

By F. P. Roesch

Supervisor, Fuel Conservation Section, Northwestern Region

The manager of the Fuel Conservation Section, United States Railroad Administration, under date of August 1, 1918, sent out Fuel Conservation Circular No. 8, addressed to all motive power officials concerned with locomotive maintenance. The circular called particular attention to the prevalence of air leaks around the outside steam pipes on superheated steam locomotives at the point where these pipes enter the smoke arch, and advised how these leaks could be detected by means of an ordinary torch test.

While in some instances the recommendations embodied in circular No. 8 were fully complied with, in other cases it was found that proper measures were not used, due, no doubt, to the fact that those interested in the maintenance of the locomotives did not realize the importance of the proposition.

The usual methods pursued in taking care of the air leaks around these steam pipes was to pack the opening between the pipe and gland with fibrous asbestos packing, either rope asbestos or plaster being used. Tests have proven that through the action of the exhaust this packing is gradually pulled into the front end, eventually leaving a clear opening. Where all of the packing in this manner becomes so pulled out, it leaves a combined opening around the two steam pipes in the average construction, equal to an orifice 8½ in. in diameter.

These air leaks, of course, do not occur suddenly, consequently the effect on the draft is gradual, and this in turn gradually reduces the steaming qualities of the locomotive. It is because locomotives gradually fail for steam that nozzle bushing is eventually resorted to, as did the steam failures occur suddenly no doubt the cause would be investigated and corrected.

In order to determine the exact effect of reducing nozzles and disarranging front end apparatus to overcome the effects of these leaks and to improve the gradually failing steaming qualities of the locomotive, the Fuel Conservation Section authorized a series of tests to be conducted to see what the losses amounted to in increased fuel consumption and decreased locomotive efficiency.

In conducting these tests no particular locomotive was selected, the locomotive tested being one in regular chain gang freight service and assumed by all concerned to be in good condition. Draft gages were used in front and behind the diaphragm, in the firebox and in the ash pan. In addition to the draft readings, pyrometer readings were also taken at stated intervals as well as cylinder indicator cards at various speeds and cut-off. A dynamometer car was employed in order to register the draw bar pull under varying conditions so that the results obtained would not be based on the tonnage alone, but equated on the train resistance. The tender was cut off, drained and weighed prior to taking coal on each trip. Only the coal consumed in actually pulling the train was taken into consideration, all coal used on sidings and at other stops being used from a separate source.

The locomotive tested was of the light Mikado type and superheated, having cylinders 26 x 30 in., 63-in. driving wheels, 200 lb. steam pressure, with a calculated tractive

effort of 54,720 lb. The tests were conducted over a double track freight division, 91 miles long, having a maximum grade of .67 per cent, the same engine crew being used throughout all tests.

The first trip was made with the locomotive as found. On the completion of this trip, the openings around the steam pipes were packed with rope asbestos, and it was found that the average draft in the front end was raised two inches, as shown by the draft gage. As this now gave a vacuum in the front end greater than necessary, to produce the desired vacuum in the firebox it was decided to open the nozzle a sufficient amount to reduce this.

On the first trip it was found that the draft gage in front of the diaphragm registered practically double the height of the column of water as registered by the draft gage behind the diaphragm, indicating that the draft plate was so adjusted as to offer quite an obstruction to the flow of gases from the firebox to the atmosphere. It was, therefore, decided to raise this plate in order to better equalize the draft.

On the next trip the openings around the steam pipes were again packed with asbestos and front end cement, as inspection on arrival showed that the greater part of the packing applied on the previous trip had pulled out. The nozzle was enlarged ⅛ inch in diameter, and the draft plate raised as noted in the preceding paragraph. On this trip the locomotive showed a marked decrease in the consumption of coal per 1,000 gross ton miles equated on the draw bar pull as registered by the dynamometer car. It also showed a decrease in cylinder back pressure at the same speed and cut off, due, of course, to the enlarging of the nozzle.

As the front end vacuum was still greater than necessary in order to maintain the proper firebox vacuum, it was decided to further increase the diameter of the nozzle on the following trip.

On the next trip the nozzle was enlarged ⅛ inch more in diameter, or a total of ¼ inch above the size originally carried. The draft sheet was left as adjusted on the previous trip. Finding, however, that the packing around the steam pipes had again partially pulled out, it was decided to seal these openings by means of plates made of No. 10 gage steel, slightly corrugated, the outer circumference of these plates being welded to the smoke arch on the inside of the arch and the inner circumference of the plates welded to the steam pipes. An electric welder was used, thereby permanently sealing these openings. On this trip, while the locomotive did not show any decrease in fuel consumption per 1,000 gross ton miles over the prvious trip, it did show an increase in locomotive efficiency, due to the further increase in the size of the exhaust nozzle, and as a point had now been reached where the fuel consumption and locomotive efficiency practically balanced, and it having been decided that any further increase in the size of the exhaust nozzle would affect the steaming of the locomotive to such an extent as to increase the coal consumption and thereby offset anything that might be gained through a further reduction in back pressure the tests were concluded on the basis of the last test run.

The final results can be briefly summarized in the following statement: Opening the nozzle ¼ inch or 4.5 per cent of the diameter, giving an increase of 9.3 per cent in area, resulted in a decrease in fuel consumption of 14.3 to 21.17 per cent, the comparisons as shown for the different trips wherein the larger nozzle was used being 14.3, 17.2, 18.2 and 21.17 per cent, the difference being due to variations in the quality of coal, weather conditions, etc. The efficiency of the locomotive was increased from 8.1 to 16.5 per cent, based on the averages at various speeds and cut off, as shown by indicator cards and dynamometer records. The locomotive steamed equally as well with the larger nozzle as with the one originally used. The raising of the diaphragm resulted in a better distribution of the draft over the fire, and this in turn decreased the fuel consumption approximately 3 per cent.

On the whole, the tests brought out forcibly the necessity of maintaining nozzles with the largest possible diameter consistent with good steaming; of maintaining air-tight front ends in order that the large nozzle can be successfully used, and of so adjusting the draft plate as to maintain an even distribution of draft over the entire grate surface, as well as to carry it at such a height as to provide ample area for the free flow of gases from the firebox to the stack.

Discussion

Good results in eliminating leaks around steam pipes were reported by using stuffing boxes. Rope asbestos was found to be more satisfactory than cements, but no material could be found that would remain tight for a week.

Other Papers

A paper was also read on Internal Combustion versus Steam Engine for Small Stationary Plants; by C. A. Lichty, inspector, purchasing department, Chicago & North Western.

Train Accidents In April[1]

THE FOLLOWING is a list of the most notable train accidents that occurred on the railways of the United States in the month of April, 1919:

Collisions

Date	Road	Place	Kind of accident	Kind of train	Kil'd	Inj'd
10.	Phila. & Reading	Locust Summit	xc	F.	3	0
26.	Ill. Central	Memphis	bc	F. & F.	5	6
29.	C. B. & Q.	Walshville	bc	F. & F.	0	3
29.	Del. L. & W.	Taylor	xc	F. & F.	4	1

Derailments

Date	Road	Place	Cause of derailment	Kind of train	Kil'd	Inj'd
8.	Chicago R. I. & P.	White, S. D.	b. rail	P.	1	0
10.	Union Pacific	Halford	snow	P.	2	1
11.	Pennsylvania	Emsworth	.....	F.	0	0
11.	Pennsylvania	Emsworth	.....	P.	0	0
13.	Cleve. C. C. & St. L.	Gillespie, Ill.	.....	P.	0	2
14.	Missouri, K. & T.	Hunter	b. wheel	F.	0	0
*22.	St. Louis-S. F.	Lawton, Okla.	unx	F.	0	3
27.	Denver & R. G.	Cimarron	d. car.	P.	0	34
29.	Lehigh V.	Newport	b journal	P.	0	23
*30.	Pennsylvania	Sabula	unx	F.	0	0

The train involved in the collision near Locust Summit, Pa., on the 10th of April was a through freight, consisting of locomotive 1050 and 35 loaded cars. Because of the breaking of a drawhead the engine and eight cars were moved forward to Gordon, where the eight cars were set off; and the engine, returning to its train, collided with the rear portion, which had been left standing on a grade but had started down the grade because of the leaking of the air cylinders. The train had been standing about 45 minutes, and none of the hand brakes had been set. Eighteen cars were badly damaged, and the conductor, one brakeman and the fireman were killed.

The trains in collision near Memphis, Tenn., on the 26th, were an employees' train, carrying men to work, about 7. a. m., and a locomotive without train; a butting collision in a dense fog. Both engines were damaged. This collision was not on the main track. Five employees were killed, and six were injured.

The trains in collision at Walshville, Ill., on the 29th (at 2:40 a. m.) were southbound freight No. 6,102 and northbound freight No. 6,122. Both engines and several cars were badly damaged. The southbound train had run

[1] Abbreviations and marks used in Accident List:

rc, Rear collision——bc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc. ——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

past the appointed meeting place, train orders having been overlooked. The road was blocked twelve hours. Two trainmen were injured.

The trains in collision at Taylor, Pa., on the night of the 29th of April were a yard freight of ten cars, standing motionless on a yard running track, and a train of three locomotives and one caboose, the engines moving backward and pushing the caboose. Of the five trainmen on the caboose, four were killed and one was injured. A switch tender had been directed to forbid the entrance of the train of locomotives on the track occupied by the standing cars, but neglected to do so, and is held responsible; also the man in charge of the standing freight is held responsible for failing to protect, either by a red light on the end car or by hand lantern.

The train derailed near White, S. D., on the 8th was westbound passenger No. 417. The engine was overturned, and the engineman fatally injured. The cause of the derailment is believed to have been a broken rail.

The train derailed near Halford, Kan., on the 10th was eastbound No. 186, a mixed train with two engines and a snowplow. Moving at about 20 miles an hour, the plow was overturned in a drift and both engines were derailed. One engineman and one fireman were killed, and the other fireman was injured.

The passenger train derailed at Emsworth, Pa., on the 11th of April was west bound express No. 1,007. The line of road at this point is four-track. A westbound freight had been derailed by the automatic application of the brakes, and several cars were thrown afoul of an eastbound track. These cars caused the derailment of an eastbound freight which came along within a few minutes. The path of the passenger train was also blocked, and this was the cause of the derailment of that train, only the engine and the baggage car being thrown off the rails.

The train derailed near Gillespie, Ill., on the 13th was westbound passenger No. 5. The engine and first three cars were thrown off the track and partly overturned. Two mail clerks were injured.

The train derailed near Hunter, Tex., on the 14th was a northbound stock train. Fourteen cars were ditched and about 300 animals were killed, part of them steers and part sheep. The derailment was caused by a broken wheel.

The train derailed on the St. Louis-San Francisco near Lawton, Okla., on the 22nd of April was extra freight No. 734, consisting of one locomotive and 21 cars, including 19 cars of oil. Fire broke out in the wreck and 9 cars of oil, the caboose and a pile bridge, about 300 ft. long, were burnt up. Estimated loss $27,000. One drover and two trainmen were slightly injured. The cause of the derailment was not determined.

The train derailed near Cimarron, Col., on the 27th was westbound passenger No. 315. Three coaches were overturned. Thirty-four passengers were injured, most of them not seriously. This section of the road is narrow gage. The baggage car, heavily loaded, was thrown off the track on a ten degree curve by the body side-bearings fouling bolts on the front truck.

The train derailed at Newport, Pa., on the 29th was an eastbound passenger ascending a steep grade at low speed. The second of the two locomotives hauling the train ran off the track, and with its tender, the first two cars and the tender of the leading locomotive, fell into the ditch. Twenty-three passengers were slightly injured. The cause of the derailment was a broken journal.

The train derailed at Sabula, Pa., on the 30th was an extra freight consisting of 44 cars. One or more cars in this train were derailed in Sabula tunnel, presumably by the fall of a brake beam, and the derailment was followed by a fire which destroyed 13 cars and contents, and damaged much other freight. Estimated loss $125,000. The fire raged 42 hours, and it is expected that the road through the tunnel will not be passable before July 1.

Electric Car Accidents.—At Muncie, Ind., on the 9th, a street car was struck by a freight train of the Lake Erie & Western, and three passengers in the car were killed and four injured.

Railway Affairs in Congress

WASHINGTON, D. C.

THE HOUSE COMMITTEE on appropriations was expected to take up this week consideration of the $1,200,000,000 appropriation asked by the Railroad Administration and to give Director General Hines an opportunity to explain it. The debate on the bill in Congress is expected also to give many members an opportunity to air their views on the subject of the government's management of the railroads.

Senator A. B. Cummins of Iowa has been made chairman of the Senate Committee on Interstate Commerce as expected. The other Republican members are C. E. Townsend, Michigan; Robert M. LaFollette, Wisconsin; Miles Poindexter, Washington; James E. Watson, Indiana; F. B. Kellogg, Minnesota; George P. McLean, Connecticut, and the following new members: B. M. Fernald, Maine; J. S. Frelinghuysen, New Jersey, and S. B. Elkins, West Virginia. The Democratic members have not yet been selected.

The Democratic members of the House Committee on interstate and foreign commerce are as follows: T. W. Sims, Tennessee; F. E. Doremus, Michigan; A. W. Barkley, Kentucky; Sam Rayburn, Texas; A. L. Montague, Virginia; Charles P. Coady, Maryland; A. G. DeWalt, Pennsylvania, and J. Y. Sanders, Louisiana. The names of the Republican members were published last week.

Senator Cummins announced that the Senate Committee on Interstate Commerce would be called together immediately and that the probable order of action would be as follows: First, the bill to restore the telegraph and telephone lines; second, the bill to restore the Interstate Commerce Commission's authority over rates; third, the Poindexter long and short haul bill, and finally the general railroad question. He said that after a concrete plan has been decided upon by the committee he planned to hold further hearings to allow the suggestion of changes considered advisable. Chairman Esch of the House committee expects to begin by holding a series of hearings.

It is reported that many members of Congress are preparing to discuss the action of the six leading steel companies in submitting identical bids on rail to the Railroad Administration and that there will be a demand for an inquiry by the Department of Justice.

The House appropriations committee has decided to include an appropriation of $2,000,000 for the Alaska railroad in the general deficiency bill.

Bills introduced in Congress affecting the railroads include the following: By Representative French, a bill, H. R. 1438, to promote the safety of travelers and employees by compelling common carriers to adopt uniform rules for the operation of trains and to use a uniform system of signals for authorizing the movement of trains. By senator Jones of Washington, S. 632, to prohibit trespassing. By Senator Townsend of Michigan, S. 647, to provide for federal incorporation of railroads, and S. 648, to amend the powers of the Interstate Commerce Commission. Senator Nugent of Idaho has presented to Congress resolutions adopted by the Idaho Legislature favoring the return of the railroads to private management as soon as it can be accomplished without confusion or losses.

Railway Developments in Foreign Countries

Head of England's Largest Railway Union on Visit Here; Reduced Fares in England Defeated.

J. H. Thomas, general secretary of the National Union of Railwaymen (Great Britain) and a member of Parliament, is on a visit to the United States, having arrived in New York on Saturday last. Mr. Thomas is a leader in British railway labor matters and conducted the negotiations with the British Board of Trade and the Railway Executive Committee which recently resulted in important concessions to the railwaymen.

German State Railways

The Constitutional Committee in Weimar, by an almost unanimous decision, recently laid down the principle of a united German State railway system. The Bavarian Government representatives alone protested. According to despatches the taking over of the whole of the railway systems by the State Government by means of an agreement until April, 1921, has been decided upon.

Simplon-Orient Express

The new Simplon-Orient Express left Paris on its first journey about the middle of April. The train will run daily via Dijon, Vallorbe, Lausanne, the Simplon Tunnel, Milan, Verona, Venice and Trieste. At Vincovce the train is divided, one section, on Sundays, Tuesdays, Thursdays and Saturdays, going via Verciorova to Bukarest; and the other, on Mondays, Wednesdays and Fridays, direct to Belgrade and eventually to Nish, Sofia and Constantinople.

London Traffic Congestion

The London members of the British Parliament decided May 6 to ask the cabinet to appoint a select committee to inquire into the question of London traffic and the steps that are necessary to relieve the present severe congestion. They took this step after hearing important evidence from the so-calld "combine" which controls the London District Railway, the tube railways and the motor omnibus services. One of the difficulties presented was a shortage of money to effect additions and improvements to the services in the way of building extensions to the tubes, purchasing more equipment, etc.

Prominent British Steel Men Not Worried Over American Competition

The bogey of American competition in the British iron and steel trades is regarded by one of Britain's foremost iron and steel men as undoubtedly exaggerated, says the American Chamber of Commerce in London.

Although the British prices have gone up as the result of the removal of the government subsidies, this expert says there is a tremendous demand among the neutral countries for iron and steel at almost any price, and expects this demand to take care of the British export production.

The American Chamber of Commerce in London understands on the other hand that British interests themselves are making extensive purchases of American iron and steel.

Another Mexican Railway Project

Several of the larger American and other foreign oil companies which are operating in the Gulf coast region of Mexico have joined in the project of constructing a railroad between Tampico and Tuxpam, a distance of about 125 miles. Among the corporations that are interested in the building of the proposed line are the Mexican Petroleum Company and the Eagle or Aguila Oil Company. Application for a concession to build and operate the road has been made to the department of communications and public works of the Mexican government. While the line will be primarily for the purpose of affording transportation for supplies and materials for the different oil fields it will do a general freight and passenger business.

Increase in Exports Over Pre-War Period

The increase in exports of railway supplies and of manufactures in general is clearly shown in a compilation recently issued by the National City Bank of New York. The compilation gives the figures of exports for the nine months ended March, 1919, as compared with those for the nine months ended March, 1914. The figures for locomotives and for rails are as follows:

	Nine months ended	
	March, 1919	March, 1914
Locomotives—		
Number	657	308
Value	$16,775,710	$2,918,714
Rails—		
Tons	422,046	282,621
Value	$27,693,550	$8,637,346

Australian Railway Development

A proposal is being considered in Australia of building a railway from the Northern Territory to the border of Queensland or continuing the Great Northern Railway to Camoweal or Lake Nash. The Queensland line is now at Dajarra. The route has not been surveyed, but the distance would probably be about from 120 to 150 miles, and with the exception of the first 10 miles from Dajarra the country presents no engineering difficulties. It may perhaps be found preferable to connect from the Great Northern line from Dobbyn by an extension through Mount Oxide, and Gregory Downs to the border north of Camoweal. Either of the proposals mentioned would fill the conditions of the proposal made by Lord Forrest to the Queensland Government in the early part of 1914, which was that Queensland should continue its railway to the border in the vicinity of Camoweal, so that the Commonwealth Government might extend the Pine River railway from Katherine to Newcastle, and through the Barclay tableland.

New Canals for Finland

Several important canal schemes are at present being put forward in Finland, with a view to extending the existing canals and establishing new connections between the many inland lakes and the Finnish and Bothnian Gulfs. The most important proposals before the Finnish Senate are those for connecting the lake of Paijanne with Safma Lake and with the Gulf of Finland. The route to be followed is along the Kymene River. Another project is a canal from Wiborg to the River Vuoksen and thence to the harbor of Kivisalmi, north of Kexholm, suitable for ships of 1,000 tons. The towns of Tammerfors and Bjorneborg and the communes on the Kumo River are agitating for a canal from the Bothnian Gulf to Lake Paijanne via Pyhajarvi Lempaala, and Valkeakoski. The old Saima Canal

may also be modernized by extending the width of the locks to 68m., thus enabling ships of 7000-800 tons from the inland waterways of Russia to pass through. With regard to the new railways some 650 km. are at present under construction at a cost of 250,000,000 Finnish marks.

New Railways Projected in Colombia

The Assembly of Antioquia, says a special correspondent to the Latin American section of the New York Sun, has approved the first project law, which orders the outline of the railway between a point on the Amaga Railway and the Department of Caldas, passing through Fredonia and other municipalities of the southwest, where agriculture thrives greatly. This project law authorizes the governor to arrange a loan of 5,000,000 pesos.

The national executive, says the same correspondent, has approved the provision of the departmental government for the reorganization of the work on the Puerto Wilches Railway. In Santander it has been agreed to receive at par (as they are not received in other parts) the bonds that the government issued, and the value of these, or $120,000, is to be used to prolong as far as possible the line of the existing railway. For handling the fund and reorganization of the work a commission has been created whose members are the Governor, the secretary of finance and Victor M. Ogliastri, Pedro E. Novoa and Ambrosio Mantilla.

Railway Extensions in Sweden

After some three or four years' work, the Special Commission appointed to draw up a scheme for a complete reorganization of the railway connections of Stockholm has now prepared a full and comprehensive plan, involving an outlay of from $25,000,000 to $30,000,000. The proposal is based upon the probable traffic 30 or 40 years hence. So far as the passenger traffic is concerned, a new line of access is placed east of the existing one, and will proceed across the Arstaviken (the future Hammarbyleden, a new and important harbor) on a bridge so constructed as to give a clear height of about 85 ft. above ordinary water level. The west trunk line will run in an almost straight line through part of Sodermalm, where a large station is to be constructed. From this station the railway will run in a northerly direction through a tunnel under the Maria Hill to the southern shore of Lake Malaren, which will be crossed on a viaduct, and thence will pass the western shore of the Riddarholmen, crossing the Norrström on another bridge, which joins the Klara shore to the west of the present line, the new line gradually falling as it approaches the Klara shore. The central station is to occupy the site of the present main station, and the departure and arrival passengers are to be kept entirely apart. The station, it is believed, could be finished in 1927.

Belgian Light Railway Construction

During the war a certain amount of information was available as to the damage inflicted by the Germans on the Belgian national light railways, and it is now possible, says the Railway Gazette (London) to supplement this by details gleaned on the spot. The damage falls under three heads: The taking up of tracks that could be used to better advantage elsewhere, which is a legitimate military action; the destruction or damage of lines to hamper the movements of the Allied forces after the armistice, and purely wanton damage undertaken out of spite or malice. Examples of all three abound, although it is often very difficult to determine under which category any individual damage falls. On certain routes one motors past mile after mile of light railway on which the ballasting, overhead wires, notice boards, etc., have been left entirely intact, but from which every rail and sleeper has been removed. Such lines seem without any doubt to have been removed in order to be employed by the Germans for legitimate purposes in districts nearer the scene of actual military operations. Elsewhere one sees miles of track partially damaged, one set of rails being more or less intact, while the other has been wrenched from its foundations and twisted. On other sections, lines have been rendered useless for miles on end by the dynamiting of every rail joint, so that the ends of each rail are curved upwards. There is a good deal of this particular destruction near the French frontier, and most of it seems to fall within the category of purely spiteful damage.

Publicity Department for Belgian Railways

The Belgian Ministry of Railways, Marine, Post, Telegraph and Telephone, has established a special department for press and publicity in charge of C. Joset as director with headquarters at Brussels. The establishment of the new department, says Consul Charles Roy Nasmith, Brussels, was brought about by a royal decree resulting from a report to the King by the Minister of Railways. This report, outlining the functions of the bureau, reads almost as if it had been written by an American, or, at least, by someone who had made a study of American conditions. It said:

> The advantage derived from publicity in commercial enterprises needs no longer any proof, and in order to be convinced of this it is only necessary to look around and see what is being done in other countries by public organizations and by private firms.
>
> The Ministry of Railways, Marine, Post, Telegraph and Telephone would increase by this means the income of its different departments.
>
> Also the public would be informed regularly and systematically of all the regulations, changes and reforms introduced from time to time to improve the different services in the interests of the population and to present, by means of an intelligent propaganda and publicity, the advantages derived from the changes.
>
> On the other hand the department possesses a wonderful means of publicity in its official publications, such as its railway time-tables, telephone directories, also in its thousands of waiting rooms, platforms, post offices, railway cars, steamers, where the public can find an excellent opportunity to advertise.
>
> Here is a source of considerable revenue which can be derived for the government if this means of advertising is made use of in centralizing all the services which have to do with this and suppressing the system of exploiting these opportunities through private sources.
>
> Last of all, in the interest of a good operation of the administration, it is most desirable to give continually in the public press all the criticism made concerning the organization and operation of the different public services of the Ministry of Railways, Marine, Post, Telegraph and Telephone, and these criticisms should be examined thoroughly without delay to see whether they are well founded, and, if so, remedies should be adopted at once as far as possible.
>
> For the above reasons I have the honor to propose to your Majesty the creating of a department for the press and publicity, whose action will extend to all the departments and administrations of the Ministry of Railways, Marine, Post, Telegraph and Telephone, and which will systematically put to profit all the advantages to be derived from the press and publicity.

Bill for Lower Passenger Fares on British Railways Defeated

The British House of Commons on May 7 defeated a bill introduced by a private member calling for the restoration of pre-war passenger fares and for the reduction of the 50 per cent increase introduced during the war. In the discussion considerable objection was made also to the "scandalous overcrowding" on the railways.

Mr. Bridgeman, parliamentary secretary to the Board of Trade, in opposing the measure on the part of the government introduced some interesting figures by way of explanation of the overcrowding. He showed that there was a serious shortage of equipment and explained that to reduce fares would encourage travel and result in greater congestion.

The present conditions of things, he said, made it quite impossible to do what was asked. There had been taken for the purposes of the war overseas, 1,600 passenger coaches and 700 locomotives. Of the locomotives, about 300, he thought, had now been returned to this country. Not one of these 300 was in action; every one was undergoing repairs. Of the 1,600 coaches, not one had yet been returned to this country. Owing to the war, the ordinary repairs and new construction had fallen seriously into arrears. In normal times in Great Britain 3 per cent of the

rolling stock was under repair, and something like 10 per cent of the locomotives. At the present time 10½ per cent of the passenger coaches and 20 per cent of the locomotives were under repair. The ordinary annual requirements to keep up stock in normal times was 600 or 700 new engines per year. During the war something like 100 or 200 engines had been constructed annually. That meant that during the years of the war there had been a loss of new engines, and those of the most modern and largest type, of 2,000. The normal new construction in coach building was something like 6,000 new coaches a year. During the war there had been practically none. The fact that England had thus lost a huge quantity of passenger coaches which ought to have been serving the public was no fault of the Board of Trade or the Railway Executive Committee. If fault there was, it should be placed on the Germans.

With regard to cheap fares he also said the companies' expenses were more than double what they were before the war. The public should be very thankful that the companies were only asking 50 per cent increase for what cost them over 100 per cent more. If the 50 per cent were taken off, the companies would be involved in a loss calculated at $100,000,000.

Sir Auckland Geddes, minister of national service and reconstruction (not to be confused with Sir Eric), acting in the absence of Sir Albert Stanley, president of the Board of Trade, who also spoke against the bill and showed that conditions were being remedied as fast as possible. He said that 2,677 trains had been restored within a few weeks. The Caledonian Railway of Scotland had added 250; the London & North Western, 650, in spite of the fact that the railway lines were still pressed with the necessity for carrying returning soldiers and still suffering for lack of men and supplies.

Missouri Pacific Saves $279,843 By Water Treatment

This Result is Equivalent to a Return of 181 Per Cent on Investment in 52 Plants

By R. C. Bardwell,
Chief Chemist, Missouri Pacific, St. Louis

During 1918, the water softening plants on the Missouri Pacific treated 1,368,305,000 gal. of water, removing from this water 3,589,473 lb. of scale forming matter. There are 52 water treating plants on this system, the majority being in the hard water district of the plains west of Kansas City, although the plant of largest capacity is situated at North Little Rock, Arkansas. These plants, which represent an investment of $154,300, have been in service from 2 to 13 years. On the basis of a saving of 11 cents per pound of incrusting matter eliminated before the water was delivered to the locomotives, as outlined by the Water Service committee of the American Railway Engineering Association in 1914 and corrected to conform with present high prices for labor and material, the total saving to the railroad from the removal of this scaling material amounted to $369,716. The cost of treatment, including labor, chemicals, maintenance, and 10 per cent on the investment to cover depreciation in treating facilities, was $89,873, leaving a net saving of $279,843 or 181 per cent on the amount invested.

The benefits resulting from water treatment are numerous but mostly of an intangible nature and difficult to convert into direct financial returns. However, values were placed on four items, the saving of fuel resulting from the removal of the insulating effect of the scale, the increased life of flues, the decreased repair work on flues and boilers in the roundhouse, and the saving in engine time while down for repairs. The average cost of coal was increased $0.90 per ton, a set of flues $216, engine time $12 per day, and roundhouse flue repairs 135 per cent over the prices used by the committee in 1914. The saving brought about by the reduction in engine failures and delays to traffic, and also the quicker turning of locomotives with the increased service is much greater, owing to the large increase in overtime rates for employees as well as stringent power shortage during this period.

Approximately 700 of the 1094 locomotives operated by this company were directly effected by the use of the treated water. The total gross saving of $369,716 is equivalent to a gross saving of $529 per engine or a net saving of $400, which appears reasonable in view of the generally improved performance.

The 3,589,743 lb. of scaling matter removed from the water would be equivalent to 36 carloads of 50 tons each. If this scale had been allowed to go into the locomotives a conservative estimate of the portion adhering to the tubes and sheets would not have been below 25 per cent. This means that with the untreated water an average of 1282 lb. of scale would have been deposited in each of the 700 engines, forming an insulating coating about ⅛ in. thick on all exposed boiler surfaces. As a matter of fact the scale would have been much thicker and heavier in some districts, as, on several divisions, ⅜ in. scale was not uncommon after 6 to 8 months' service before the installation of softening plants which caused large loss in locomotive operation.

The best available data indicates that an insulating scale of ⅛ in. thickness causes an increase of between 15 and 20 per cent in fuel consumption. Using the average rate of six pounds of water per pound of coal burned, 946,411 tons of coal were required to evaporate the 1,368,305,000 gal. of water into steam at boiler temperatures. It is safe to presume that at least 10 per cent more coal would have been consumed if the scale originally present had been allowed to accumulate on the tubes and sheets instead of having been removed before the water was given to the locomotives. The increased fuel consumption which would have followed the use of untreated water would have amounted to about 100,000 tons for the year 1918, which is an important item for the period, particularly when the general shortage of coal and cars is considered.

Of the 52 water treating plants on the system, 31 are of the intermittent type and 21 continuous. The majority were installed by company forces on designs furnished by the engineering department. The plants were designed to afford all possible use of facilities already existing at a minimum expense. Where convienent, an additional roadside tank was

installed with necessary air pipes for agitation and a steam jet or ejector for adding the chemicals. At small stations where the rate of pumping is low, a small inside tank with filter and mixing box was placed in the roadside tank and chemicals added continuously with the water. In large standpipe-type steel tanks good success has been secured by putting the chemicals and water through cylindrical downtake tube and drawing off the water at proper heighth after sufficient time has allowed clarification without use of filter. Good results have also been secured in a large capacity continuous plant with constant head and float regulator for the chemical proportioning.

RESULTS OF WATER TREATMENT ON MISSOURI PACIFIC

Station	Source of Supply	Raw Water Hardness in Grains Per Gallon	Annual Consumption in Gallons	Pounds of Scale Removed	Original Cost of Treating Facilities	Total Additional Cost for Treatment	Total Saving
Dupo, Ill.	Well.1*	29	145665000	496227	$ 8800	$ 7193	$33204
Prairie du Rocher	Well.1	25	32340000	97020	2000	1800	10672
Gorham, Ill.	Well.1	22	39840000	103584	7000	2037	11380
Bush, Ill.	Creek.o	7-61	62634000	106268	1900	2647	7720
DeSoto, Mo.	Creek.1	10-30	42891000	94360	6000	1936	10360
Blumark, Mo.	Well.1	44	36619000	201404	4200	5296	22184
Piedmont, Mo.	Creek.1	8-16	43944000	58732	4200	1208	6699
Sedalia	Well.o	19	26339000	57946	1500	1826	6374
Kansas City	River.1	12-22	139940000	232898	10000	9260	26198
Kans.Mo. Elevator	Well.1	51	4866000	31622	3200	1420	3476
Oak Mills, Kans.	Well.o	30	6146000	22126	1600	804	2433
Auburn, Neb.	Well. / Creek.o	30 / 16-32	19514000	58642	7500	2146	6449
Union, Neb.	Creek.1	8-16	16200000	16200	2000	739	1782
Weeping Water, Neb.	Creek.1	8-16	8069000	8060	2000	568	887
Berlin, Neb.	Well.o	28	1405000	5068	750	145	666
LaPlatte, Neb.	Creek.o	14-21	11759000	19990	750	307	2199
Greenleaf, Kans.	Well.1	26-44	8108000	32432	3000	920	3567
Concordia, Kans.	Well.1	32	6481000	26326	2300	828	2895
Jamestown, Kans.	Well.o	18	3998000	7996	750	272	879
Downs, Kans.	Well.o	16-18	16696000	33392	6000	1001	3673
Lenora, Kans.	Well.1	21	1641000	3928	350	187	433
Herington, Kans.	Creek.1	16-55	13182000	78732	3000	2215	8660
Gypsum Cy. Kans.	Creek.o	12-40	16191000	48573	3000	1191	5343
Marquette, Kans.	Well.o	24	16389000	49167	750	1466	5408
Bushton, Kans.	Well.o	17	13806000	26412	750	587	2906
Hoisington, Kans.	Well.1	16-19	57205000	120130	6000	1969	13214
Bison, Kans.	Well.o	16	8387000	13419	1000	290	1476
LaCrosse, Kans.	Well.o	14	5913000	7095	1000	255	780
Brownell, Kans.	Well.o	12	12275000	18412	750	535	2025
Pendennis, Kans.	Well.1	14	8566000	13704	2300	563	1607
Healy, Kans.	Well.1	12	4335000	4768	2300	389	524
Scott City, Kans.	Well.1	13	9926000	12902	2000	521	1419
Coronado, Kans.	Well.o	11	5732000	5732	1000	275	630
Selkirk, Kans.	Well.1	14	12844000	16690	2300	575	1836
Stuart, Colo.	Well.1	34	10791000	46401	2500	1049	6104
Eads, Colo.	Well.1	22	12623000	32718	2000	794	3588
Haswell, Colo.	Well.1	32	8359000	33476	2000	776	3652
Arlington, Colo.	Well.1	60	1879000	15032	1500	618	1650
Ordway, Colo.	Res.1	15-65	13036000	65190	3000	1808	7170
Fowler, Colo.	Res.1	12	2033000	2439	2500	497	269
Pueblo, Colo.	Well.1	13-30	29166000	64053	2500	1877	7040
Wichita Shops	Well.1	50	61580000	387854	3000	9090	42665
LeRoy, Kans.	Creek.1	11-48	13524000	27048	3000	1446	2970
Roper, Kans.	Creek.o	7-16	7052000	11283	750	667	1240
Coney, Kans.	Creek.o	12-25	5442000	11682	1000	490	1276
Cedarvale, Kans.	Creek.o	15-20	3825000	6492	1000	478	714
Winfield, Kans.	Creek.o / Well.	8-140 / 16	5296000	27800	1000	555	2958
Olcott, Kans.	Well.o	18	3853000	7706	800	330	847
North Little Rock	Well.1	22	229264000	504380	15000	12123	55581
Lexa, Ark.	Well.1	27	14881000	41666	3600	1395	4585
Wynne, Ark.	Well.1	22	45667000	70000	3600	1805	7700
McGehee, Ark.	Well.1	20	48900000	107580	4200	2460	11845
Total			1568305000	3589472	$154300	$89873	$369716

Note: Cost of Treating Facilities includes cost of additional tank where more than one is used, pipe lines, and other appurtenances.
Cost of Treatment includes cost of additional labor, chemicals, and maintenance, plus 10 per cent of investment in treating facilities.
* 1 indicates intermittent plant; o indicates continuous water softener.

The plants are operated by the regular pumpmen and maintained by the division water service forces. The treatment is regulated and general supervision given by chemists located at Little Rock, Ark., and Kansas City, Mo., these being convienent central points. Semi-weekly samples of both the raw and treated water are furnished these laboratories and results of these tests are reported to division as well as general headquarters. A limit of six grains per gallon for hardness remaining in the water after treatment is allowed for satisfactory results and all results above this limit necessitate an explanation. Frequent inspections are made at points where trouble is indicated or expected and inconsistencies corrected.

It has been found that an important item in securing satisfactory results from water treatment lies in adequate supervision. Any type of treating plant conforming to the three essential principles, proper chemical proportioning, suitable mixing and agitation, and sufficient settling period, will give satisfactory results with proper attention. Not only must the chemical formula and treatment be checked, but the satisfactory operation and condition of the facilities must be assured by frequent inspection. Lax attention may easily result in loss many times in excess of cost for adequate supervision. This supervision should not be confined to treatment alone but extends from inspection of quality and condition of chemicals through the operation of plant and to final action of the water as indicated by locomotive performance.

The accompanying chart shows the record of operation at each of the 52 plants. The source of supply and hardness of the raw water are noted. Figures are given for each plant showing the consumption, the amount of scale-forming solids removed, the cost of treating facilities, the cost of operation including chemicals, labor, maintenance, and 10 per cent for depreciation, and also the estimated saving secured.

The most serious trouble now encountered in locomotive operation and upkeep from the effect, or in conjunction with the use of water, is pitting. Its action is irregular in appearance and frequency variable, so that considerable difficulty is met in tracing cause or source. However, experience and records thus far made indicate that pitting on non-treated water districts has become more noticeable and severe than on districts where treated water is used. Investigations and experiments tend to indicate that water carrying a slight caustic soda alkalinity, which would also mean but a slight amount of scale, gives the best results in service. On two engine districts in Western Kansas and Eastern Colorado treating plants have been installed at all water stations so that this condition may be assured all water given to locomotives. These 25 plants have now been in service about two years and although the entire elimination of pitting has not been secured to date, the attack on fireboxes appears to have been stopped and the greatly improved condition and service of the flues would indicate that the small amount of pitting taking place may be due to scab pits on old flues which have been replaced in the boilers.

Summarizing the benefits of treated water as noted to date:

1.—A large saving has been made in fuel consumption owing to the elimination of heavy insulating scale.

2.—Roundhouse boiler repairs have been reduced on treated water districts from 30 to 60 per cent.

3.—Life of flues has been increased from 30 to 300 per cent with corresponding betterment of general boiler conditions.

4.—Pitting has been materially reduced with increased life of flues and fireboxes.

5.—Engine failures from boiler troubles on treated water districts have been very materially reduced with corresponding improvement in general traffic conditions.

The regular quarterly dividend of 1½ per cent of the Pennsylvania, payable March 31, goes to 110,374 stockholders. This compares with 108,546 stockholders on the Pennsylvania books last February, and with 103,003 stockholders in May, 1918, and with 93,639 in May, 1917. Only two per cent of the Pennsylvania dividends now goes abroad, comparing with 15 per cent of the total which was sent abroad before the war. This means that about $65,000,000 Pennsylvania stock has been returned to America since 1914.

Doings of the United States Railroad Administration

Orders for Open Hearth Rail Have Been Placed With Six Steel Companies; Price Protested.

WASHINGTON, D. C.

AN APPROPRIATION OF $1,200,000,000, instead of the $750,000,000 held up by the Senate filibuster at the last session, which the Railroad Administration got along without for a time by issuing certificates of indebtedness, is now required by the Railroad Administration to restore its "revolving fund" to a state of animation and to carry out through the balance of this year the purposes for which that fund was intended. This added to the $500,000,000 originally appropriated for a revolving fund would make a total of $1,700,000,000, of which practically all except the amount temporarily tied up for working capital has been expended or represents an obligation of the government, but $1,214,000,000 should eventually be repaid.

The estimate was transmitted by Director General Hines to the Secretary of the Treasury and by him submitted to Congress on May 24.

The amount now asked for includes $486,000,000 to cover the operating deficit for the 16 months of government operation of the railroads up to April 30, which alone is nearly enough to wipe out the original fund. In addition $425,000,000 is desired for working capital, which represents what the original appropriation has in fact been largely used for, because the deficit is more than covered by the amounts as yet unpaid to the railroad companies for rental. Another $775,000,000 represents amounts advanced or to be advanced for the account of the companies and which they will have to pay back. About $14,000,000 is for expenditures for inland waterways. Therefore $1,214,000,000 of the $1,700,000,000 which would be represented by the two appropriations should eventually be returned to the government.

The $486,000,000, representing the deficit shown by the figures now available up to April 30, Mr. Hines believes should be treated as loss due to the war and paid out of the treasury, which means by the taxpayers rather than by the shippers and passengers. Beyond that point he attempts no forecast but his recent speeches indicate that he hopes an increase in traffic, together with what economies in operation are found possible, will pull the roads through the remainder of the year. Until better information as to the tendency of future months is available he declines to decide the question of an advance in rates but presumably that would be the next step if the deficits should continue, unless these should be small enough to be absorbed from the working capital, although Mr. Hines does not promise that he will never ask for another appropriation.

In his letter to Secretary Glass Mr. Hines said:

"I have the honor to submit herewith an estimate in the sum of $1,200,000,000, to be immediately available and to remain available until expended, and to be added to and considered a part of the 'revolving fund,' provided for in Section 6 of the act approved March 21, 1918. This additional sum would be expended in the same manner and for the same purpose and under the same conditions as the amount appropriated in the above mentioned section.

"This appropriation is needed for:

Requirements for 1918

Amount necessary to defray operating deficit—the difference between the standard rental payable to the railroad companies, and the net operating income, for the year 1918..	$236,184,940
For net excess of current assets over current liabilities, partly available for the immediate working capital requirements	201,938,198
Improvements on inland waterways	2,641,886
Amounts advanced for account of railroad companies to enable them to pay in part their current liabilities	100,000,000
Amount of additions and betterments' expenditures, including equipment, made to the railroad companies' properties during 1918, which must be carried by the Railroad Administration for the time being	352,553,455
Loans during 1918 to railroad companies not immediately repayable	48,483,959
Total requirements for 1918	941,802,438
Less amount heretofore appropriated	500,000,000
Balance required for 1918	$441,802,438

Estimated Requirements for 1919

For amount of additions and betterments' expenditures, including equipment, made and to be made to the railroad companies' properties during 1919, which it is believed will have to be carried by the Railroad Administration for the time being	253,435,760
For improvements to develop inland waterways	11,700,000
For financing Boston & Maine Railroad Company reorganization	20,000,000
For operating deficit for first four months of 1919	250,000,000
For additional working capital	223,061,802
Total estimated requirements for 1919	$758,197,562
Grand total requirements for 1918 and 1919	1,200,000,000

"The operating deficit of $236,184,940 for the year 1918 was due largely to two facts: First, the winter of 1918 was unprecedented in its severity and in its costly effect on railroad operations; and, second, the increases in passenger and freight rates averaging about 25 per cent were in effect for only a few days in excess of six months, while heavily increased expenses due to war conditions were effective on an ascending scale throughout the twelve months.

"The operating deficit of approximately $250,000,000 for the first four months of 1919 is due in part to the cumulative high levels of cost, brought about by the war, for labor and materials and in part to the sudden and abnormal falling off of business as a result of the cessation of war activities, the sudden drop in the demand for fuel and for other basic commodities, and the general state of hesitancy due to the transition from war conditions to peace conditions. The fact that the present period is transitional and apparently on the eve of important changes has made it expedient to defer, until the matter can be more accurately measured, the consideration of the question, now frequently raised, of an increase in rates.

"In my judgment, the deficits for 1918 and for the readjustment period of 1919 are clearly losses due to the war and ought to be treated as such. By reason of the abnormal after-the-war factors tending to important changes in the situation, the estimate herewith submitted does not attempt to forecast results beyond the first four months of this calendar year.

"If the amount here requested shall be appropriated the total appropriation for the Railroad Administration will have been $1,700,000,000. Of this amount $1,214,000,000 will represent amounts which should be returned to the government, $425,000,000 thereof being temporarily tied up in working capital and $775,000,000 thereof representing amounts which have been and will be advanced for the account of the railroad corporations and which it will be their duty to repay as rapidly as practicable. About $14,000,000 will represent expenditures for equipment on Inland Waterways.

"Of the entire $1,700,000,000, $486,000,000 represents the aggregate loss to the government up to April 30, 1919, on account of the two deficits above explained.

"The sum of approximately $223,000,000 for increased working capital is requested because experience has demonstrated that the amount of working capital actually available for current use on December 31, 1918, was insufficient to admit of the free and unrestricted payment of payrolls

and vouchers for materials and supplies throughout the country. There is manifestly great advantage both in the economical purchase of materials and supplies, and the handling of such transactions to the satisfaction of the business public in having an ample supply of working cash."

That the Railroad Administration really needs the money, if any one is inclined to doubt it, can be made readily apparent by regrouping Mr. Hines' figures as follows:

Of the total of $1,700,000,000, at least $990,000,000 has already been actually expended or become payable:

Deficit	$486,185,000
Additions and betterments in 1918	352,553,000
Advances to railroads	100,000,000
Loans	48,484,000
Inland waterway improvements in 1918	2,642,000
	$989,864,000

Adding to this $425,000,000 for working capital makes $1,415,000,000, leaving to be expended in 1919 not more than the balance of $285,000,000, divided as follows:

Additions and betterments	$253,436,000
Inland waterway improvements	11,700,000
Boston & Maine reorganization	20,000,000
	$285,136,000
Grand total	$1,700,000,000

Some of the $253,000,000 has already been expended since the first of the year, but no report has been issued of the expenditures for capital account since January 1.

Up to April 30 the Railroad Administration had paid to the railroad companies on account of rental $494,913,615. As the total rental for 16 months amounts to about $1,237,000,000, this left a balance of $742,000,000 unpaid. Also $403,000,000 of standard equipment had been ordered, of which $164,000,000 had been paid for after delivery, leaving a balance of over $239,000,000 to be paid. This the Railroad Administration is still trying to make the railroads finance, and it is allowing them $100,000,000 on depreciation account to pay the first 25 per cent on it. About $149,000,000 of certificates of indebtedness had been issued up to April 30 on account of compensation and for equipment, but this amount is included in the $742,000,000 unpaid compensation and the balance payable for equipment.

The estimate now is $450,000,000 greater than that submitted by Mr. Hines on January 24. As the deficit estimated at that time was $196,000,000, and it is now $290,000,000 greater than that, only $160,000,000 of the increase is for other purposes. The $750,000,000 was made up of $382,000,000 required to settle accounts for 1918, and $368,000,000 to be used toward financing capital expenditures for 1919, of which $286,000,000 was for equipment, $12,000,000 was for waterways and $20,000,000 for the Boston & Maine, leaving $50,000,000 for additions and betterments. As only $285,000,000 of capital expenditures is provided for in the new estimate for 1919, the $1,200,000,000 apparently provides $83,000,000 less for capital expenditures than did the former estimate. The former estimate of the amount required to settle the accounts for 1918 is increased by $60,000,000 from $382,000,000 to $442,000,000, and the amount required for 1919 is increased from $368,000,000 to $758,000,000 or $390,000,000, of which increase $250,000,000 is for deficit and $223,000,000 for additional working capital, so the amount provided specifically for capital expenditures is $83,000,000 less than before.

The two estimates may be compared as follows:

Former estimate:	
To settle accounts for 1918, including $196,000,000 deficit	$382,000,000
For capital purposes in 1919	368,000,000
Total	$750,000,000
New estimate:	
To settle accounts for 1918, including $236,000,000 deficit	$442,000,000
Four months' deficit in 1919	250,000,000
For additional working capital	223,000,000
For capital purposes in 1919	285,000,000
	$1,200,000,000

The amount expended for capital improvements in 1918 was $575,000,000, and the amount carried over into 1919 of the budget authorized last year was $683,000,000, which was reduced by revision to $607,000,000, including $290,000,000 for standard equipment. Almost no new work has thus far been authorized since the first of the year. Therefore, as Mr. Hines estimates the amount of additions and betterments which will have to be carried by the Railroad Administration at $253,000,000, it would seem that if much new work is undertaken it will have to be financed by the companies. In connection with his former estimate, Mr. Hines calculated that the railroad companies would have to borrow $291,000,000 for capital improvements, while about $150,000,000 could be deducted from the companies' rental toward capital expenditures. This $150,000,000 plus the $253,000,000, which the Railroad Administration proposes to carry, would leave $204,000,000 for the companies to finance of the carry-over from last year, and this would be reduced by the $100,000,000 depreciation payment. Last year's capital expenditures were chiefly financed by the Railroad Administration, except that $214,000,000 was paid for by deductions from the companies' rentals in accordance with the provisions of the compensation contracts.

It is expected, however, that the passage of the appropriation, making possible the payment of the large amounts due the companies for rental, together with the prospect of the return to corporate management, would so improve the credit of the roads that the companies will undertake to finance a considerable program of improvements on their own account by way of preparation for the resumption of operation by the companies, especially as any improvement work undertaken now would hardly be completed much before the date set for the return of the properties.

Rail Orders Placed—Price Protested

The Railroad Administration on May 23 placed its first rail order since the railroads were taken over by the government; it was for 200,000 tons of open hearth rail, which was divided between the six leading steel companies, the Carnegie Steel Company, the Illinois Steel Company, the Tennessee Coal & Iron Company, the Colorado Fuel & Iron Company, the Bethlehem Steel Company and the Lackawanna Steel Company. The first three are subsidiaries of the United States Steel Corporation. The price is $47 a ton, which was the price proposed to and approved by the Industrial Board of the Department of Commerce. These six companies, according to a statement issued by Director General Hines, in response to the Railroad Administration's request for bids, submitted bids which are uniform in all respects as to price and conditions of manufacture and are in strict accordance with those proposed to and approved by the Industrial Board. A seventh company, the Midvale Steel & Ordnance Company, proposed prices $10 greater; in other words, $55 for Bessemer and $57 for open hearth.

Mr. Hines said the orders were placed in view of the immediate need for rail and "not only without approval of the prices, but for the reasons shown below, with emphatic disapproval of the prices and the manner in which they have been established." Mr. Hines said that when the Industrial Board approved the prices proposed by the steel interests it became at once apparent to him, and he so indicated in various discussions with representatives of the government, that that approval would encourage the steel interests to stand together on those prices, even though governmental approval was withheld. He felt, however, that "even so it would be far more in the public interest for the government to withhold approval and, if necessary, pay such prices for the time being under protest rather than endorse the prices, and that, too, for the entire calendar year, as was proposed

by the Industrial Board, and thereby give an official sanction to prices which were unreasonably high and which would merely serve as a starting point for still higher prices later on." "The result," he says, "has been in exact accordance with this forecast. That the action of these six companies in making uniform bids was taken under the leadership of the United States Steel Corporation is clear from the fact that immediately after the Railroad Administration announced finally that it would not approve the prices fixed by the Industrial Board, Judge Gary for the Steel Corporation took the initiative in announcing publicly that the Steel Corporation was strictly maintaining the prices approved by the Industrial Board, and that it seemed to him that would be the attitude of other manufacturers. The subsequent action of the Steel Corporation and the other manufacturers in submitting their bids has accorded completely with Judge Gary's announcement."

Apparently Mr. Hines feels that it is no longer possible to delay placing orders because of the controversy as to prices. He expected that, after the position taken by the steel companies in the negotiations while the Industrial Board was still in existence, they would not at first make any concessions in the price then offered, but apparently he hopes for a different result when bids are asked for an additional tonnage of rail. The present order is to be delivered by August 1 and will just about keep the mills going at the rate they have been delivering rails thus far this year. While the price represents a reduction of $10 as compared with the price named last year by the War Industries Board, which was never officially approved by the President, because of the opposition of Director General McAdoo, no orders were placed at that price by the railroads. Some orders were placed by the War and Navy Departments, and the same figure was applied to some export orders. The rail which has been delivered during 1918 and this year on orders placed before federal control has been at prices ranging up to $40 a ton, and the standard open hearth price prior to the war was $30, so that the present price represents an increase of 56 per cent.

In his statement announcing the order, Mr. Hines pointed to the large profits of the steel companies, saying:

"The Steel Corporation's annual report to its stockholders shows that after paying all wages and other operating and maintenance expenses and allowing most liberally for renewals and paying interest on debt of subsidiary companies, and also taxes other than war taxes and excess profits taxes, it had net earning on all rolled steel products of $21.58 per ton in 1916, $35.73 per ton in 1917, and $33.53 in 1918. It is a remarkable fact that in the calendar years 1917 and 1918 the net earnings of the Steel Corporation aggregated approximately $1,000,000,000, being in excess of the annual rental which Congress has sanctioned as reasonable for practically the entire railroad mileage in the United States. It is true the Steel Corporation had to pay out of these net earnings heavy excess profits taxes to the government, but even after paying these taxes, making liberal allowance for depreciation, and extraordinary replacement funds, and after paying interest on bonds and 7 per cent on preferred stock there remained an earning of 39.2 per cent on its common stock in 1917 and of 22.0 per cent on its common stock in 1918. The fact that excess profits taxes were paid out of the net earnings in 1917 and 1918 does not in any way detract from the accuracy of those net earnings as a measure of the productiveness of the war prices which were charged by the Steel Corporation.

"These figures of actual net earnings per ton on the entire output of the Steel Corporation are much more convincing than estimated costs of rolling a particular steel product at a particular mill. The estimated costs may show the greatest variation, but the ultimate result is an enormous profit to the stockholders of the corporation. The claim that the wages of labor would be endangered by a reasonable price on steel is therefore not convincing.

"Heavy profits are not confined to the Steel Corporation. It appears that the net earnings of the Lackawanna Steel Company were $12.40 per ton in 1916, $24.81 in 1917, and $19.88 in 1918; of the Republic Iron and Steel were $13.88 per ton in 1916 and $25.92 in 1917, and its profits for 1918 are not yet available; of the Colorado Fuel and Iron Company were $9.57 per ton in the year ending June 30, 1916, and $13.91 per ton in the year ending June 30, 1917. The Bethlehem Steel Company furnished no reports that give any information as to the profits per ton. In considering all these profits it must be remembered that the reductions from war prices which were proposed by the steel interests and are now being adhered to by them as the greatest reductions they are willing to make, are practically completely offset by the great fall in the price of scrap iron alone (which can be and is used largely as a substitute for pig iron in the manufacture of steel), without regard to the various other reductions in cost which are coming about as a result of readjustment to peace conditions.

"A seventh steel company, the Midvale Steel & Ordnance Company, in response to the request of the Railroad Administration for bids, proposed prices $10 in excess of the prices proposed by the other six companies. It is interesting to note that the company which made this proposal showed on all its steel products net earnings in 1916 of $24.62 per ton, in 1917 of $44.23 per ton and in 1918 of $35.93 per ton. Its apparent position now is that it cannot afford to make any reduction in the price of steel rail without reducing the wages of labor.

"It is important to remember that the present policy of the steel interests in adhering to high prices on the ground that the present high costs necessitate these prices, is a policy that does not work both ways. It is a policy to keep prices from going lower as business increases and costs diminish. It will be remembered that the Industrial Board announced that the public could not expect prices to be lower during this calendar year, but it gave the public no hope that they would not go higher. The resumption of business in the country will probably result in the substantial diminution in the cost of steel production, but unless the attention of the public is constantly centered on the situation there is danger that the steel interests will take advantage of the increased demand to increase the prices of steel still further, even in the face of declining costs.

"The situation in the steel industry is of greatest moment to the American public. The United States Steel Corporation is the largest producer and controls approximately 50 per cent of the output. It takes the lead in maintaining a price which, if its reports to stockholders are reliable, indicates a grossly excessive profit, and it does this for the avowed purpose of protecting alleged high cost producers, which, however, so far as they make detailed reports on the subject to their stockholders, also indicate large profits. In other words, the Steel Corporation appears to take the position that for the protection of other prosperous steel producers it is unwilling to initiate any competition in the steel industry and naturally these other producers are glad to follow this lead, and incidentally this position enables it to continue the enjoyment of very high profits. This condition operates to suspend the law of supply and demand when it could work in favor of the consumer, but it leaves that law free to operate with the greatest effect when it can work in favor of the manufacturer. This situation also works to deprive the public of the benefits of the increased efficiency due to the great combinations in the steel business. Those combinations are the result of public acquiescence, and yet all the benefits of them go not to the public, but to the private owners. The more powerful the combinations become the more successful they are in keeping up prices.

"These reasons lead me to reiterate that the prices in question are unreasonably high at present and will become progressively more unreasonable as business improves and conditions become more nearly normal."

Commenting upon Mr. Hines' statement, George N. Peek, formerly chairman of the Industrial Board, issued a statement saying that the board had brought about a $5 greater reduction than had previously been offered to the Railroad Administration. He said:

"The statement of the director general of railroads is perhaps misleading in that he uses as a basis for his deductions the profit showing of the past three years when steel mills were crowded to capacity on account of war demands.

and during a considerable part of which period prices were fixed by the government with the idea that production must be stimulated to the limit.

"If the director general desires to be fair, why does he not take selling prices for the pre-war period on rails, for example, and admit that to the pre-war price of rails, $30 a ton, there must be added approximately $20 per ton on account of the increase in direct labor cost alone, exclusive of the increase in cost of labor in transportation? And further, why does he ignore the fact that since the signing of the armistice steel prices generally have been reduced between 15 and 25 pr cent?

"The statement is further misleading in that Mr. Hines neglects to inform the public that the price at which he finally concludes to purchase rails, $47 per ton (the figure approved by the Industrial Board) is $5 per ton lower than the best the Railroad Administration was able to secure for itself before the Industrial Board considered present costs of production.

"I quote the following from page 27 of the minutes of the meeting of April 5 between the Industrial Board and Mr. Hines' representatives, Judge Lovett and Henry Walters, and H. B. Spencer, director of the Division of Purchases of the Railroad Administration:

"Mr. Peek—I understand the best price you were able to secure three weeks ago was $52 a ton. This price is $5 under that.

"Mr. Spencer—True."

The division of the order gives 100,000 tons to the three subsidiaries of the Steel Corporation; 40,000 to the Bethlehem Steel Company, and 20,000 to the Colorado Fuel & Iron Company. The exact division between the Carnegie, Illinois and Tennessee companies was to be adjusted in relation to the present capacity of the mills in order to get the quickest delivery and in order to give the preponderance to eastern mills. The tonnage has been apportioned to the seven regions as follows: Eastern, 40,000 tons; Southern, 28,400; Allegheny, 50,000; Pocahontas, 15,000; Southwestern, 29,000; Central Western, 28,600, and Northwestern, 9,000.

The allocation by roads is being made by the regional directors. About 45 roads are scheduled to receive the rail, which will be rolled and drilled in accordance with the individual specifications of each road.

Automatic Train Control Committee

E. L. Adams, formerly in the signal department of the Lake Shore & Michigan Southern, and for the last few years connected with the bureau of valuation of the Interstate Commerce Commission, has been appointed assistant to G. E. Ellis, executive secretary of the Committee on Automatic Train Control of the Railroad Administration.

Preparations for Handling Bumper Grain Crops

Director General Hines announces that the Railroad Administration is giving careful consideration to the measures necessary for the satisfactory transportation of the anticipated large crops of grains. The Department of Agriculture has estimated that the yield of winter wheat will exceed 900,000,000 bushels. A fair estimate of the yield of spring wheat approximates 300,000,000 bushels. The total yield of wheat this year will in all probability exceed the total of last year by from three to four hundred millions of bushels. No estimate of other grains is, of course, possible at this time, but barring unusual climatic conditions, it can perhaps be properly expected that the tonnage in grain that will be produced this year will exceed that of last year by a considerable margin.

The stable price fixed last year by the government on wheat naturally provoked a desire on the part of producer to realize his earnings as quickly as possible, and since a stable price has again been fixed by the government for this year's crop, it is assumed a similar condition will obtain. Last year this economic condition, coupled with more or less disarrangement in ocean tonnage and consequent disruption in shipping, resulted in such an acute situation at the interior grain markets and at seaports, that it became necessary to install the so-called "permit system," which was early made operative at the ports, and in September, 1918, at the principal interior markets. Arrangements are now being made to apply the same system this year.

The permit system, Mr. Hines says, is a highly beneficial system of controlling traffic at the sources to prevent serious congestion on the road and at destination. This system prevented in the fall of 1918 the serious transportation paralysis which had been experienced in former years due to widespread congestion of traffic which had been shipped but which could not be disposed of at destination. This was most apparent in the East, but its injurious effects were felt throughout the country. It was the principal cause of car shortages in every part of the country and slowed down the movement of traffic and impaired the transportation service everywhere.

While the permit system at the ports is still in operation, it was suspended a few months ago at the interior markets, due to improved ocean shipping and the fact that the bulk of the grain had been moved. It is, however, to be expected that the system will again be inaugurated with the opening of the new wheat season, and in view of that probability the Railroad Administration is already preparing the necessary machinery so that it may be prepared to act without delay at the proper time. Conferences have already been held with representatives of the grain corporation.

As graphically illustrating the necessity of regulating the transportation of this tonnage, and the results obtained from such regulation, the following facts are of value and interesting: For the nine months of the crop year, July 1, 1918, to May 1, 1919, there passed through the grain handling facilities of the country—elevators and mills—a total of 3,440,236,000 bushels of all grains, although the highest point of grain storage of all kinds, at any one time in that period, was 480,000,000 bushels. That is, in nine months the flow of grain was seven times the quantity which accumulated in storage at the highest point during that period. This is a direct illustration of the necessity of keeping the grain handling facilities of the country liquid, to avoid the distress to all interests that would follow the blocking of this flow of grain.

The permit system as operated last year contemplated the closest co-operation between the Railroad Administration and the United States Food Administration-Grain Corporation. The local representatives of the grain corporation were in daily contact with the grain control committees at each market, and in view of the very comprehensive data and information in their possession as to storage facilities, anticipated movements out of markets, the needs of different sections of the county, not only as to wheat but as to others cereals that flow co-incidentally with wheat, etc., were of invaluable aid in the accomplishment of the permit system with a minimum economic disturbance. The same character of assistance is being arranged for from the grain corporation, or the wheat director, in anticipation that it will be necessary to reinaugurate the permit plan within the next one or two months.

The wheat director is as vitally interested as the Railroad Administration that the grain tonnage shall be handled with the least possible friction as between all interests concerned, and is in entire harmony with the Railroad Administration as to the plans proposed in that direction.

It is stated to be the intention to keep the public fully in-

formed of the plans for the transportation of the enormous grain crop, and that through the co-operation of all interests concerned it should be possible to meet what otherwise might prove a difficult situation.

Regional Directors Congratulated on Victory Loan Showing

Walker D. Hines, director general of railroads, has sent the following telegram of congratulation to all regional directors:

"I desire to congratulate officers and employees of railroads under government control for the splendidly patriotic response made by them in the Victory Liberty Loan campaign. Out of a total of 1,841,267 employees, 1,417,042, or 77 per cent, subscribed for Victory Liberty Loan notes, a total of $138,627,250. Employees of 16 roads showed subscriptions of 100 per cent. This is a renewed demonstration of the loyalty of the railroad men of America."

Cost of Train and Locomotive Service Shows Gain in Efficiency

The total cost of train service, including locomotive service, in March was 119.5 cents per 1,000 gross ton miles, according to a monthly report compiled by the Operating Statistics Section, which shows that results are being obtained from the Railroad Administration's campaign for more economical operation. No comparative figure for 1918 is given but the cost in March represents a decrease as compared with February, when it was 126.5 cents. The cost of locomotive service per locomotive mile in March was 119.2 cents as compared with 100.1 cents in March, 1918. This also represents a decrease as compared with February of this year, when the figure was 120.7 cents. The cost of train service per train mile was 167.5 cents in March, as compared with 145.1 cents in March, 1918, and 169.3 cents in February of this year. The increase in cost of locomotive service in March this year over March last year was 19.1 per cent, and the increase in cost of train service was 15.4 per cent. All items of cost show increases as compared with last year except that of train enginemen, which was 18.8 cents in both years per locomotive mile and 21.3 cents, as compared with 21.8 cents per train mile. The item of trainmen shows an increase from 24.4 cents to 25.6 cents. The combined cost for trainmen and enginemen per 1,000 gross ton miles was 33.5 cents. The figures are reported by roads and by regions and districts. The combined figures are as follows:

	March, 1919	March, 1918
Cost of locomotive service per locomotive mile	119.2	100.1
Locomotive repairs	40.1	30.7
Enginehouse expenses	10.2	6.7
Train enginemen	18.8	18.8
Locomotive fuel	46.3	41.0
Other locomotive supplies	3.8	2.9
Cost of train service per train mile	167.5	145.1
Locomotive repairs } Enginehouse expenses }	57.1	43.4
Locomotive fuel	52.6	47.6
Other locomotive supplies	4.4	3.3
Train enginemen	21.3	21.8
Trainmen	25 6	24.4
Train supplies and expenses	6.5	4.6
	February, 1919	
Cost of train service per 1,000 gross ton miles	119.5	126.5
Locomotive repairs } Enginehouse expenses }	40.8	43.1
Locomotive fuel	37.5	40.3
Other locomotive supplies	3.1	3.4
Enginemen and trainmen	33.5	34.8
Train supplies and expenses	4.6	4.8

The comparisons with last year are disturbed to some extent by the factor of back pay being included in this year's figures, while last year's figures do not include the increases in wages which became effective later in the year. Most of the figures, however, show decreases as compared with February. Locomotive repairs and enginehouse expenses cost 2.3 cents less per 1,000 gross ton miles in March than in February, locomotive fuel 2.8 cents less, other locomotive supplies .3 cents less, enginemen and trainmen 1.3 cents less, and train supplies and expenses .2 cents less.

The January figures were shown only for individual roads, with no combined totals by regions or for the roads, as a whole.

Suits Against Director General

In General Order No. 18-B issued by the director general, General Order No. 18, issued April 9, 1918, as amended by General Order No. 18-A, issued April 18, 1918, is further amended to read as follows:

"It is therefore ordered that all suits against the director general of railroads as authorized by General Order No. 50 must be brought in the county or district where the plaintiff resided at the time of the accrual of the cause of action or in the county or district where the cause of action arose; or where the cause of action would, but for federal control, accrue against the initial carrier (as under Section 20, paragraphr 11), of the act to regulate commerce, such action may be brought in the county or district where the property was received for transportation."

Director General Hines has issued General Order No. 26-A, setting aside General Order No. 26 issued last May by Director General McAdoo as a war emergency order, which provided that suits against carriers for personal injury and freight damage claims brought in remote jurisdiction should not be tried during the period of federal control.

Punitive Overtime Up to Director General

The question as to whether the train service employees are to be allowed a punitive rate for overtime is again up to Director General Hines for decision. The brotherhoods have reiterated since the Railroad Administration has been in control their demands for time and a half for overtime which was waived during the negotiations which preceded the enactment of the Adamson law. When Supplements 15 and 16 to General Order No. 27 were issued by Director General Hines in April the matter was referred to Board of Adjustment No. 1 for a report. The board, however, was not able to agree, and has submitted two separate reports, one of which presumably represents the views of the brotherhood representatives on the board, while the other represents the views of the managers of the roads. Before deciding, Director General Hines has ordered an investigation as to the cost of paying punitive overtime in road service.

Contracts Executed

The Railroad Administration has executed compensation contracts with the Wiggins Ferry Company providing for an annual payment of $416,675.60, the St. Louis Merchants' Bridge & Terminal Railway for $412,427.56, the Wrightsville & Tennille, for $41,027, and the Louisville & Wadley, $5,367.

Ignes Fatui on the Track

[From the Omaha Bee.]

A thousand or more dollars' worth of automobile tires was stolen from a car in the North Western yards in Council Bluffs late Thursday night. A freight train was held up as is was approaching the Union Pacific transfer. Half a dozen red lights, were strung along the track, and when the conductor and his men went forward to investigate, after the train was brought to a sudden stop, they found nothing but the red lights. They were strung half a mile down the track, and it took several minutes to investigate. The delay gave the thieves all the time needed to break into the car containing the tires and get a truck load of them.

Convention of Master Boiler Makers' Association

Location of Brick Arches, Ash Pan Design and Best Method of Bracing Tenders Discussed

The Master Boiler Makers' Association opened its eleventh convention at the Olympic Theater, Chicago, on May 20. Several hundred members were in attendance at the meeting which was the first this association has held since 1916. At the opening session an address was made by Frank McManamy, assistant director, Division of Operation, U. S. R. A. Mr. McManamy spoke of the benefit to be derived from a full discussion of new methods and practices at conventions and mentioned particularly the importance of some of the topics which had been made the subject of reports to be presented at this meeting. In closing he dwelt on the necessity for thorough workmanship in locomotive repairs.

Following Mr. McManamy's talk D. A. Lucas, president of the association, delivered the presidential address. The remainder of the first day's session was taken up by the reports of the secretary and treasurer and the transaction of routine business.

On Tuesday morning, addresses were made by A. G. Pack, chief inspector of locomotive boilers, and R. H. Aishton, regional director of the Northwestern Region.

Application of Brick Arches to Fireboxes

The minimum distance between the grates and the lower part of the arch at the throat sheet for different classes of locomotives depends upon the local conditions; that is, the grade of coal being used, whether it fills up badly or not; and whether the firemen have been taught to shake grates and keep the fire worked down. There are a great many engines which have eight inches as a minimum distance between the grates and the lower part of the arch, and the railroads are getting along very successfully with it.

The proper distance from the door sheet to the top of the brick arch and from the crown sheet to the top of the brick arch for various classes of locomotives is also a local condition. Arches have been run in a great many cases as close to the crown sheet as 11 in. with good results, but some railroads insist that the arch shall not be closer than 16 to 18 in. The distance from the door sheet to the top of the arch is a distance varying greatly, depending upon the length of the firebox. The arch should be run as long as possible in all cases and the top of the arch should be up higher than the top of the door.

The report was signed by L. M. Stewart (A. C. L.), chairman.

An individual report on this subject was submitted by E. W. Young, general boiler inspector, C. M. & St. P., an abstract of which is given below.

It is impossible to set any figure for the minimum distance between grates and the lower part of arch tubes for different classes of locomotives, as so many variables must be taken into account. The distance from the grates to the lower part of the arch tube may be less with a throat sheet that sets back at an angle from the vertical than for a throat sheet which is vertical. It may be less where the grate is flat, than where there is a steep pitch of the front end of the grate, or it may be less in a short firebox than in a long firebox.

The distance from the grates to the lower part of the arch tube may be less in a compound locomotive with its mild draft than in a simple locomotive with its sharp draft. It may be less with one grade of coal than with some other grade.

On account of the variable conditions, it is impossible to set any figure. A good rule and a simple one may be stated as follows: Locate the arch tubes as high above the grates as the design of the firebox will permit. In some cases the arch tubes have had to be located as near as 8 in. to the grate, and yet satisfactory results have been accomplished; however, better results will be obtained if the throat sheet be such that the distance of 18 in. can be obtained between the grates and the arch tubes. The proper distance from the door sheet to the brick arch in various classes of locomotives is just as difficult to determine as it is to answer the first question. One answer might be stated as follows: The brick arch should approach the door sheet as near as possible without restricting the area between the arch and the door sheet, to a figure below the gas area through the flues. It is very seldom, however, that we find a case where the arch can be run as close to the door sheet as the above rule would dictate, due to the fact that under such a condition the gas area between the arch and the *crown sheet* is unduly restricted. It might be stated that an arch may be built back to within 24 in. of the door sheet, provided conditions other than the relation of the arch to the door sheet will permit.

A good rule in connection with arch designs is that an arch should be as long as conditions will permit, and it is usually the case that these conditions must be studied from two or three angles before we can decide just what the length of the arch shall be, or what the distance shall be between the arch and the door sheet. It would be very much easier to get an ideal arch if the arch were first designed and then the firebox built around it. If the latter condition existed, it would be very easy to answer the two questions, and they would read about as follows: The grates should be placed 18 in. below the front end of the arch tubes. The door sheet should be placed about 24 in. from the back end of the arch. It should be understood, however, that the above two specifications can rarely be made use of for the very reason that arches are built into fireboxes instead of fireboxes built around arches.

Arch tubes must be so located in the flue sheet that there will be access to the front end of the arch tube through the waterleg. In order to get this access through the waterleg, and through a plug hole in the outside throat sheet, arch tube locations are often found to be impracticably low and in such instances the special spacer block is used to elevate the front

Chicago, Milwaukee & St. Paul Railway.

Type	Distance between grates and lower part of arch tube, inches	Distance from door sheet to brick arch, inches
1-5	13½	45½
G-4	18	37
A-1	16	49
A-2 Straight top	13½	53½
A-2 Slope top	14	44½
B-4 Wide firebox	14½	64½
B-4 Narrow firebox	11½	67
G-6	13	46
K-1	24	59
L-2	23½	49
U. S. Standard Locomotives		
060	10	28
0B0	10	37
4- 6-2-A	13	53
4- 6-2-B	15	47
2- 6-2-A	13½	52
2- 8-2-B	15	47
4- 8-2-A	15	46
4- 8-2-B	15	42
2-10-2-A	14½	42
2-10-2-B	15	59

course of arch brick, so that practical firing clearance is obtained.

The distances discussed above as found on the different types of locomotives used on the Chicago, Milwaukee & St. Paul, and also on the United States Standard Locomotives, are shown in the following table.

The use of syphons in the place of arch tubes will, in very many cases permit of considerably better firing clearance, than can be obtained where arch tubes are used. There may be many cases of firebox construction, in which an arch on syphons will be practical, while arches on arch tubes would be impracticable. Syphons make a good foundation for a brick arch, and on account of being so substantial they make a practical device to take the place of arch tubes.

Discussion

The discussion developed the fact that there was considerable difference of opinion regarding the proper location of the arch. The point was brought out, however, that it is largely governed by local conditions. It is considered necessary to have the area between the arch and the crown or door sheet from 10 to 25 per cent greater than the area through the tubes.

Design of Ash Pan and Draft Appliances

Your committee has failed to locate a recognized rule for designing ash pans. The result of our investigations indicates that methods are largely the result of experiments which have developed designs which seem best suited to the type of locomotive and condition of service. The objective to be attained was a self-cleaning arrangement of sufficient storage capacity to prevent the necessity of dumping the ashes except at regular ash pan cleaning points; and to prevent the cinders from burning and warping the pan. The lower parts are designed to be practically air tight, air for draft being admitted at the upper parts only. Ash pan air inlets of eight classes of locomotives averaged 14 per cent of the grate area which, from information obtainable, seems to be about the average air opening in ash pans for coal burning engines.

With the modern wide firebox, pans are made wide at the top, projecting several inches beyond the mud ring with vertical sides to prevent sparks from falling or being blown out by side winds. These upper plates are sloped toward the hopper or storage part so that cinders will slide to the hopper. There seems to be a tendency to sacrifice this slope to obtain greater draft opening, which has resulted in some instances in the cinders piling up on the wings and shutting off the draft, as well as causing stuck grates and burned grates and connecting bars. Therefore the slope from the hopper to the edge of the pan should be not less than 30 degrees and rather than lose this slope, it is better policy, if possible, to get increased air opening from back or front.

When locomotives are being designed, the ash pan should be considered and provided for as an important part of the machine, and not as something to be hung on after the locomotive has been set up. The modern ash pan is expensive to construct and still more expensive to maintain, and the greatest possibility of improvement seems to be in the designers who may find it practicable to change the frame lines or other parts sufficiently to give relief where it is greatly needed.

Maintenance of Ash Pan

Slides, hoppers and dumps should be maintained in an operative condition. Grates should be maintained in first-class condition. Broken, burned, or warped grates should not be allowed in service. One bad grate often causes damage to a whole section and also causes waste of fuel and damage to the ash pan.

No air openings should be allowed in the ash pans except those provided for in the design. This is particularly important in the case of oil burning locomotive draft pans, for the reason that air leaks permitted at other points than those designed usually result in brick work troubles as well as interfering with the proper steaming of the locomotive.

Air leaks at the lower parts of coal burning locomotive ash pans are extremely undesirable and annoying, not only on account of burning and warping the plates of the ash pan, but particularly on account of sparks dropping and causing fires along the right of way. It is a mooted point whether fires set from locomotives are not more frequently from the pans rather than the stack.

Front End Draft Appliances

The method of determining the design of front end draft appliances has, no doubt, as its basic principle, what was known as the master mechanics' front end, and like other parts, constant experiments and experience develop a type of front or setting to suit the conditions.

All parts of ash pan and front end appliances should be carefully fitted and securely bolted in place so that there is no reasonable probability of any part becoming displaced, and should be maintained at all times in first-class condition, each part performing its full function strictly in accordance with the design, particularly draft openings and passages which govern the flow of air and gases through the firebox flues and smoke arch. Dampers which are designed to be operated should be maintained in an operative condition and air admitted only at such points as the drawings provide for. Draft passages should be maintained so that all the drafts will pass through those channels, which is not the case if loose or poor fitting plates are allowed. Draft appliances, which include deflecting plates, nozzle, petticoat pipe and stack, may be designed and adjusted to thoroughly clean cinders from front ends, and because plates were not well fitted, leaks direct to the stack may be sufficient to defeat the object of the design, causing cinders to accumulate in the front end, sometimes resulting in burning and warping front end rings and doors and overheating the lower joints of exhaust and steam pipes and developing leaks at those parts.

Front End Leaks

The committee is of the opinion that positively no air leaks should be permitted and that where front ends show indications of burning on account of the combustion of cinders, it is just as often the result of poor fitting plates and air leaks as it is of faulty design or of wrong adjustment of draft appliances. We also incline to the opinion that we should make use of the autogenous welding process to secure permanently to the smoke arch and flue sheet a suitable sheet iron border to which to bolt deflecting plates. This border may be spot welded when being applied or welded in solid. At any rate, it can be an absolutely tight fit, in fact, air tight, if desired. An arrangement of this kind will expedite the work of applying or removing deflecting plates and simplify front end inspection. Petticoat pipes should be maintained to practically a true circle free from holes or indentations, and be securely held in central position between nozzle and stack.

As an item of interest to this association, and to give an idea of the general dimensions of draft openings, the following is given. We find in eight different classes of coal burning locomotives the following comparative dimensions of draft passages:

Eight Coal Burning Locomotives.—Ash pan air inlets equal 14 per cent of grate area, or 39.5 per cent of grate opening, and is 4 per cent more than flue opening area. From this it would appear that pan opening and flue open-

ing are practically the same, while stack area is about 10 per cent of flue opening area.

Seven Oil Burning Locomotives.—These have the same stack opening, flue opening and grate area. They have no grates, but the air inlets through the fire or brick pan, also called the draft pan, are 28 per cent less than the flue opening area and are 69 per cent, or a little more than twice the stack opening. The comparatively small air openings to the fire in oil burning engines compared to coal may raise the question of whether or not we are allowing too much air to the coal burner, especially with a clean fire. We are of the opinion that the size and location of these openings have been worked out principally by experimental process and, while perfection may not have been attained, when we observe a good steaming oil burner at work one is pretty apt to conclude that there is not much room for improvement.

The effect of proper upkeep of ash pan and front end appliances is to save fuel and maintaining a high standard of condition of those parts saves labor, and effects an economy. Like many other economies not reducible to plain figures, we must accept the above statement because we know that well maintained draft appliances and ash pans do fully perform their functions of furnishing the necessary drafts for economical combustion of the fuel and prevent fires being set out and the destruction and loss of property, which is an important economical consideration. Well fitted and well secured parts of the draft appliances reduce the liability of displacement and failure on account of not steaming and loss of fuel due to poor steaming, and also reduce the necessity of constant changing of front end draft appliances, which is another considerable economy. Finally, well maintained draft appliances may well be considered the difference between a satisfactory, efficient locomotive, which everyone appreciates, and a poor steaming inefficient machine that no engineer wants to run.

The report was signed by Geo. Austin (A. T. & S. F.), chairman; E. J. Nicholson (C. & N. W.), F. Beyer (Penn. Lines), H. F. Weldin (Penn.) and H. B. Nelson (Mo. Pac.).

Discussion

Methods of eliminating the leaks around the steam pipe holes in the front ends were discussed at length. The best results were said to be secured by welding a plate around the opening.

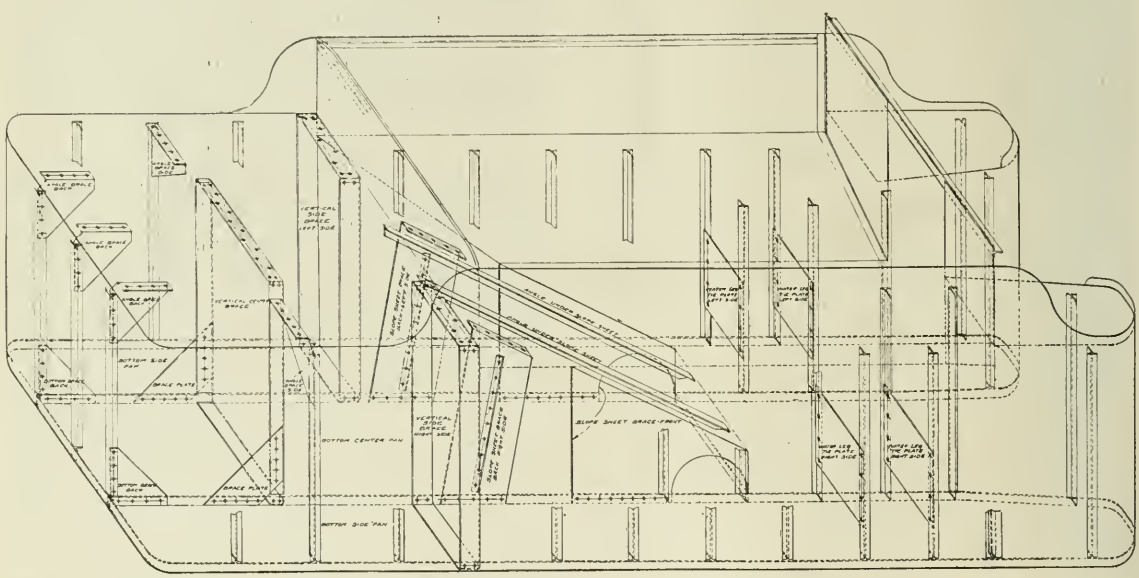
One member told of results which had been secured by the use of cast steel ashpans. He submitted an estimate of costs showing the expense of applying and maintaining sheet steel pans for 15 years to be $915, while the corresponding cost for cast steel pans was $214.

Bracing Locomotive Tenders

The object of bracing locomotive tenders is to make them strong to stand the stresses that take place when the engine is in motion and to prevent the sides and back of the tank from bulging outward. To do this braces are applied on the interior of the tank, and anchor lugs are provided to stop the tank from moving on the tender frame.

What then is the best method of doing this work? Our opinion is the application of T-bars 3 in. by 3 in. by ⅜ in. on sides and back spaced about 24 in. apart in a vertical position, the length of the bars to be equal to the height of the tank from bottom to top, these bars to be rivetted with not less than ⅝ in. diameter rivets spaced about six inches apart, zigzag.

The top of the tank at the rear end is braced by the application of T bars rivetted to the under side with gusset plates rivetted on the ends. The slope sheet in the coal space is braced by the application of two T bars rivetted to the under side, also supported by stay plates placed vertically and rivetted to slope sheet and the tank bottom reinforced by angle bars. Dasher or splash plates of ¼ in. or 5/16 in. thickness are used for the purpose of frustrating the rush of water in the tank; they also form a brace for the top and bottom of the tank. One plate is placed in the center between the coal slope sheet and the back of the tank. Two plates are placed on each side, these are rivetted to the top and bottom of the tank. The center dasher plate is flanged on the sides and rivetted to the top of the tank, also gusset plates are applied at the bottom and rivetted, which gives the dasher plate added strength. In order to make a permanent job all braces used in the construction should be rivetted and not bolted.



Recommended Method of Bracing Rectangular Tenders

This method of bracing is recommended for all rectangular

tanks made from steel plates of 5/16 in. thickness or less, because it gives better service than the old method of applying longitudinal angle iron bars with cross stays. Also it has the tendency to eliminate leaky rivets in anchor lugs. We are of the opinion that when *weight* is not taken in account when designing locomotive tenders if the tanks were made from heavier material, say steel sheets ⅜ in. thick, it would greatly simplify the matter of bracing as heavier material could be used which no doubt would be more satisfactory. However, with ¼ in. plates for tank sides and top, and 5/16 in. plates for the bottom of the tank this is the best method of bracing, as it braces the tank in all its principal parts, and still leaves plenty of space on the interior so that the inspector can move around easily to make his inspection or repairs when necessary.

The report was signed by Thomas Lewis (L. V.), chairman; E. J. Sweeney (N. Y. C.), J. J. Orr (D. L. & W.), J. P. Malley (St. L. & S. F.) and J. T. Johnson (A. T. & S. F.).

Discussion

The superiority of vertical over horizontal braces was generally conceded. One of the principal sources of trouble reported was the loosening of the transverse braces. This can only be overcome by good workmanship and by substituting rivets for bolts in these parts.

Acetylene Welding

The committee in presenting this paper realized that this topic has been before the convention for several years and has been thoroughly threshed out by the members. We find it at this time very difficult to write up any new facts on this subject, however, we believe the following information will be beneficial.

Apparatus

Many shops a few years back were equipped with portable generators, using what is termed "high pressure." Later, new apparatus was installed and shops were piped throughout for the acetylene and oxygen, using low pressure, which at this time is in pretty general use throughout the United States. There are a number of shops that still use the oxygen and acetylene gas furnished in holders with the oxygen holders containing 1,800 to 2,000 lb., and the acetylene holders from 200 to 250 lbs. pressure. Where this method is used it is necessary to have the different regulators for the oxygen as well as the gas for each welder. But where the low pressure system is used, it is only necessary to have the regulators where the gas is generated and the oxygen manifolded. It is the opinion of the committee that the low pressure system piped throughout the different departments, both oxygen and acetylene, will give the best results.

Welding Torches

There are several different makes of welding torches on the market today, and while they will all do good work with an experienced operator, some torches are more quickly regulated and do not back-fire as readily as some other makes. In most all cases the welding tips are made up of copper and give much better results than the brass.

Cutting Torches

Many different styles of cutting torches are on the market. Some will back-fire readily, where with others it is almost impossible to make them back-fire, and in some cases both with the welding and cutting torches where they do back-fire, they can be ignited quickly from the heated iron without re-adjusting; while, with other makes, it is necessary to shut off and start all over. This causes a loss of time as well as a waste of material.

Different shops have different methods and are seemingly getting good results. On the Chicago, Milwaukee & St. Paul we are and have been welding in all our side sheets, bolting up securely, and applying stay bolts and rivets before welding. We are also welding all our cross-seams by removing rivets, scarfing down, and welding up all holes and are not removing any stay bolts, and are getting first-class results. We are welding in all our door collars, inside and out; three-quarter door sheets, one-half flue sheets, top or bottom; full flue sheets; front sections of crown sheet; welding in bottom patches of front flue sheet, 12 in. to 20 in. high and cutting off all our stay bolts and radial stays with the torch. In fact, we are doing everything in the line of welding we may find to do, and the sheets we are welding are standing up good and giving us no trouble. The only trouble we do have at times is welding in patches in old side sheets, or where side sheets go to pieces rapidly due to poor water conditions. Where engines are in bad water territory, sheets do bulge between the bolts and at times the weld is pulled in two.

In visiting the different railroad shops, I find that on firebox work, such as applying fireboxes, side sheets and door sheets, the welding in most cases is being done with the acetylene torch. Shops visited had both the acetylene and electric welding outfits, but were using the electric outfit mostly for welding flues, mud ring corners and roundhouse work, where I believe the portable electric welding outfit will give good results.

At this time we have just installed the electric welding outfits and figure on welding in all flues, mud ring corners, side sheets, cutting out the center and welding in new without removing mud ring rivets. We also figure on doing considerable firebox and boiler work with the electric welder, where flanges on front or back flue sheet are still good, cutting out the center and welding in new.

The report was signed by Henry J. Wandberg (C. M. & St. P.), chairman; L. M. Stewart (A. C. L.), J. J. Davey (Nor. Pac.), John Harthill (N. Y. C.), P. F. Gallagher (B. & O.) and T. F. Powers (C. & N. W.).

Discussion

The discussion developed the fact that there was a great diversity of opinion regarding the advisability of welding firebox seams. Some condemned the practice as unsafe while others contended that with proper care welded seams could be made stronger than riveted seams.

Some roads reported good results from welded tubes while others reported that the use of this practice had been a failure because of cracks in the bridges of tube sheets. All agreed that experience was essential for the production of satisfactory work. Some roads check the ability of welders by requiring weld specimens regularly each month; these specimens are then broken in a testing machine.

Exhibitors at Master Boiler Makers' Convention

Following is a list of the companies exhibiting at the convention of the Master Boiler Makers' Association, Chicago, May 26 to 29, together with their representatives:

Air Reduction Sales Company, New York.—Automatic acetylene generators, compressed acetylene gas welding apparatus and supplies. Represented by E. L. Mills, B. N. Law, A. S. Kinsey, R. T. Peabody, A. C. LeQuellec.

American Arch Company, New York.—Security sectional arch. Represented by R. J. Himmelright, W. L. Allison, T. F. Kilcoyne, H. Darby, T. Mahor, G. C. Denney, G. Wagstaff, E. S. Nicholas, A. W. Clokey, J. P. Neff, J. T. Anthony.

American Flexible Staybolt Company, Pittsburgh, Pa.—American bolt, American plain radial stay, American reduced body staybolt, hollow iron staybolts, American rivet. Represented by R. F. Benson, C. A. Seley, L. W. Wedmeier, J. A. Trainer, M. M. McAllister, W. F. Heacock.

Besly & Co., Chas. H., Chicago.—Taps, dies and reamers. Represented by E. P. Wells.

Bird-Archer Company, The, New York.—Boiler chemicals, Harter cir-

culator plate. Represented by C. A. Bird, F. B. Bird, L. F. Wilson, H. L. Wheeler, L. L. Callahan, W. F. Robinour, L. H. Bush.

Boss Nut Company, Chicago.—Bolts, nuts and rivets, and Boss lock nuts. Represented by J. V. MacLam, A. W. Fogg, W. Wilcoxsen.

W. L. Brubaker & Bros., New York.—Taps, dies and reamers. Represented by W. L. Brubaker, W. S. Rose.

Castle & Co., A. M., Chicago.—Representing Lukens Steel Company, American Rolling Mill Company, Champion Rivet Company, Reading Iron Company, Detroit Seamless Steel Tubes Company, Lennox shears. Represented by G. R. Boyce.

Central Iron & Steel Co., Harrisburg, Pa.—Photographs of steel products. Represented by W. I. Moore.

Chicago Pneumatic Tool Company, Chicago.—Air and electric tools. Represented by A. C. Andriesen, A. E. Conrow, N. Thulin, H. J. Smith.

Cleveland Pneumatic Tool Company, Cleveland, Ohio.—Pneumatic tools, pressure seated valves, Bowes air hose couplings. Represented by H. S. Covey, A. Scott, H. C. Newton, R. E. Ahern.

Cleveland Punch & Shear Works Company, Cleveland, Ohio.

Cleveland Steel Tool Company, Cleveland, Ohio.—Punches, dies, pneumatic hammer rivet sets, chisel blanks. Represented by H. W. Leighton, Jr., W. S. Barnes, R. J. Venning, J. E. Stenger, T. B. Evarts.

Dearborn Chemical Company, Chicago.—Represented by G. R. Carr, J. D. Purcell, L. B. Bowen, T. H. Price, J. F. Roddy, I. H. Bowen, H. Rehmeyer, W. S. Reid.

Draper Manufacturing Company, Port Huron, Mich.—Double flue welder. Represented by T. Draper, J. A. McDonald.

Duntley-Dayton Company, Chicago.—Exhibiting—Pneumatic tools, Duntley-Dayton riveting and clipping hammers, "Red Devil" rivet cutter. Represented by H. P. Arnold, George Bardon, A. G. Rice.

Facssler Manufacturing Company, J., Moberly, Mo.—Boiler tube expanders and tube cutters. Represented by J. W. Facssler, G. R. Maupin.

Gary Screw & Belt Company.

Globe Seamless Steel Tubes Company, Milwaukee, Wis.—Exhibiting—Seamless steel drawn mechanical tubing.

Hauck Manufacturing Company, Brooklyn, N. Y.

Hilles & Jones Company, Wilmington, Del.—Punching and shearing machinery. Represented by W. H. Connell, Jr.

Imperial Appliance Company, Chicago.—Oxy-acetylene welding and cutting apparatus. Represented by R. B. McIntosh, E. N. Stevens.

Ingersoll-Rand Company, New York.—Pneumatic tools. Represented by W. Johnson, C. J. Little.

Keller Pneumatic Tool Co., Grand Haven, Mich.—Pneumatic tools. Represented by Mr. McCabe.

Key Boiler Equipment Company, St. Louis, Mo.—Key safety hand hold cap, tube plugs, master hold plates and tools. Represented by E. Key.

Key-Bolt Appliance Company.

Locomotive Superheater Company, New York. Represented by G. E. Ryder.

Lovejoy Tool Works, Chicago, Ill.

Macleod Company, Cincinnati, O.—Compressed air oil burner, oil burner rivet forge, oxy-acetylene welding and cutting outfit. Represented by A. G. Hauck.

Mabr Manufacturing Company, Minneapolis, Minn.—Rivet forge, oil fired-oil burning torches. Represented by H. H. Warner, A. E. Stenzel.

McCabe Manufacturing Company, Lawrence, Mass.—Pneumatic flanging machines. Represented by F. H. McCabe.

Nathan Manufacturing Company, New York City.—Exhibiting—Injectors, lubricators, boiler checks, boiler washer and tester, gage cocks, coal sprinkler. Represented by Otto Best, F. C. Davern, W. R. Walsh, R. Welsh.

National Railway Devices Company, Chicago.—Shoemaker vertical fire door. Represented by J. G. Robinson, E. J. Gemderson, A. F. Lind.

National Tube Company, Pittsburgh, Pa.

Oxweld Railroad Service Company, Chicago.—Represented by C. B. Moore, G. W. Crownover, M. W. Leighton, F. Hasse, C. H. Hanson, J. F. Parker, W. Jones, F. Furbeck, W. A. Champieux, H. C. Reid, H. W. Schulze, A. West, H. E. Bemer, J. W. Evanston, R. B. Alfonte, F. W. Shupert, S. Daffer, F. W. Frety, H. V. Gigandet, C. E. Allen, E. S. Richardson, O. F. Ladtkow, W. Robertson, W. Hogan.

Page Steel & Wire Company.

Parkesburg Iron Company, Parkesburg, Pa.—Charcoal iron boiler tubes.

Rego Welding Apparatus.

Rivet Cutting Gem Company, Cincinnati, O.

Rome Iron Mills, Inc., Rome, N. Y.—"Rome superior" staybolt iron, "Rome perfection" engine bolt, Rome hollow iron. Represented by B. A. Clements, C. C. Osterhout, E. Baker.

Ryerson & Co., Joseph T., Chicago.—Ulster special seamless hollow staybolt iron. Represented by H. Gray, J. P. Moses, J. Pomc, H. B. Hench, J. McGrath, E. W. Kavanaugh, E. S. Pike.

Scully Steel & Iron Company, Chicago, Ill.—Machinery small tools and everlasting blow-off valves. Represented by J. W. Patterson, J. A. Lindsley, Mr. Linkenfelter, Mr. Clark.

Torchweld Company, Chicago.—Welding and cutting equipment, portable and stationary plants, accessories and supplies. Represented by W. A. Slack, C. J. Nyquist, N. L. Fenstemaker.

Vulcan Engineering Sales Company, Chicago.—Hanna pneumatic riveters. Represented by J. T. Lee, J. O. Clark.

Welding Engineer, The.

Western Welding Equipment Company, Chicago.—Exhibiting K-G. welding and cutting apparatus. Lincoln arc welders, electric and oxy-acetylene supplies. Represented by R. V. Gardner.

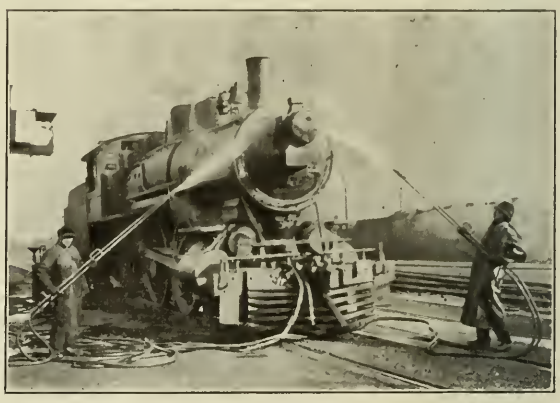
Wilson Welder & Metal Company.

Shipments of silver from the mint at Philadelphia to San Francisco during the past year, a part of the movement by which 265 million silver dollars were melted and transferred from this country to India, took 18 special trains, each train carrying from $5,000,000 to $10,000,000 in value. All of these movements were conducted in great secrecy.

A New Process for Cleaning Engines

The cost of wiping locomotives with oil and waste under present conditions is very high, and there are now few roads on which the engines are thoroughly wiped at the end of each trip. Furthermore, cleaning by hand forces the oil and dirt into cracks and fillets and leaves a coating of oil to which dust adheres very quickly. A method of cleaning locomotives which reduces the cost of the work and also eliminates the objectionable features mentioned is now being installed on railroads by the D. & M. Cleaning Process, Chicago. By this process a mixture of air, oil and water is sprayed onto the locomotive at a uniform pressure of about 90 lb. The nozzle discharges the mixture in a spray which is directed against the surface to be cleaned at an angle of about 45 deg. from a distance of about 18 in.

One gallon of oil is used to about 300 gal. of water, the proper mixture being secured by regulating valves attached to a special oil tank. The mixture of oil and water is carried to the nozzle by a ¾ in. rubber hose, the stream being



Cleaning Locomotives by the D. & M. Process

broken up at the nozzle by air supplied through a ½-in. nipple. The air and water pressure should be as nearly equal as possible and approximately 90 lb. per sq. in. The temperature of the water should be about 100 to 120 deg. F. as cooler water does not produce as good results. The oil used is a light straw colored gas oil or petroleum distillate having a paraffine base and ranging in gravity from 32 to 36 deg. The cleaning can be done inside the roundhouse if desired, but is more conveniently handled at some point on the track by which the engines reach the house. No difficulty is experienced in using the process in severe winter weather, and it has been operated with entire success at zero temperature.

When the D. & M. process is regularly used, locomotives can be thoroughly cleaned by two men in from 10 to 12 min. The cost, including labor, material and up-keep of equipment will not exceed 30 to 40 cents per cleaning. The first cleaning requires more time, as it is necessary to remove the accumulated dirt and oil. The advantages of the process as compared with hand wiping are: greatly decreased cost due to the saving in labor and wiping waste, a saving in time both in cleaning and repairing and a more complete cleansing of the surfaces, which makes thorough inspection possible.

The John Fritz Medal for the current year has been awarded to Major-General George W. Goethals, U. S. A., in recognition of his work as builder of the Panama Canal.

General News Department

The shops of the Pullman Company at Ludlow, Ky., were destroyed by fire on the night of May 20, together with six sleeping cars; estimated loss, $225,000.

Prison terms of from five to eight years were imposed by the United States Court at St. Louis on May 24 as punishment for robberies of freight cars committed by eight former employees of the Wabash Railroad at Brooklyn, Ill. The trial in the court lasted five days. The men were a yardmaster, an assistant yardmaster, a chief clerk, two other clerks, a switchman, a watchman and the watchman's brother.

The Public Service Commission of New York (Second District, headquarters, Albany), announces that its inquiry into the general subject of the prevention of collisions, decided upon in connection with the investigation of the rear collision at South Byron, N. Y., last January, will be begun in New York City on Wednesday, June 18. There will be a public hearing at the office of the commission in the Hall of Records, on Chambers street, near the City Hall.

Short Line Meeting

Walker D. Hines, director general of railroads, will address the meeting called by the American Short Line Railroad Association to be held at Washington next week. He will speak at noon of the first day's session, Tuesday, June 3. In addition to the several hundred short line and trunk line railroad officers who will attend, an effort is being made to secure the presence of as many Congressmen as possible as guests.

Railroad Y. M. C. A. Membership Drive

Just as we go to press word is received that the Railroad Y. M. C. A. Continental Membership Drive which was held last week has gone well over the top. Some districts have not yet sent in their reports and it will be some days before the final figures are announced.

Safety in Track Work

On the Pittsburgh division of the Pennsylvania Railroad, by general order, track foremen, signal foremen, and carpenter foreman are directed never to obstruct the main track so as to interfere with the safe passage of trains at full speed without first having permission from the superintendent in writing. When any such work is done flagmen must be sent in both directions. Automatic block signals, if such are in use, must be set in the stop position, and after the work is done the foreman must see that the track circuit has been restored so that the automatic signals will work properly. When permission to disturb the track is sent to a foreman by telephone he must write down the message and repeat it, as would be done in the case of a train order.

Broadway Limited Restored

The Broadway Limited, the 20-hour New York-Chicago express train of the Pennsylvania Railroad, was put in service last Sunday, in accordance with the announcement made last week, after a suspension of 18 months. President Samuel Rea, in congratulating the regional director on having recognized the rights and the insistent demands of Philadelphia, Baltimore and Washington, said that in 1917 no less than 38 per cent of the passengers on this train came from those three cities. For the first trip (May 25) it was necessary to put on an additional sleeping car in both directions to accommodate the travel.

The Post Office Department announces that mail will be carried on this train; and that in the lower part of New York City, letters can be posted considerably later than heretofore, the mail bags being sent by way of the Hudson tunnel to Manhattan Transfer, 7 miles west of New York, where the through train is stopped to have the steam locomotive attached in place of the electric engine. The Post Office Department expects to pay for this service at the rate of $75,000 a year.

Training Disabled Soldiers for Railroad Work

The Federal Board for Vocational Education has issued a 35-page pamphlet, for the benefit of disabled soldiers, sailors and marines, telling what kinds of work they may be able to find in the field of transportation, including steam railroads, street railways, wagons, automobiles and ocean steamships and harbor craft. The government stands ready to educate and re-educate disabled men, and the educational department in the military and naval hospitals will give inquirers all needed information. This pamphlet is designed to aid individuals in choosing a vocation. It tells what kind of work must be done, and what qualifications are required, in the case of telegraphers, train despatchers, station agents and other station workers, yardmasters, clerks, ticket examiners and traffic department employees; shop work, boiler making, blacksmithing, electrical work and car repairs; track work and train work—the engineman, the fireman, the brakeman and the conductor. The work on electric railways and on ocean and harbor vessels is described in the same way. The Federal Board for Vocational Education, which is ready to give all possible aid to disabled soldiers, has offices in Boston, New York, Philadelphia, Pittsburgh, Baltimore, Washington, Atlanta, New Orleans, Dallas, St. Louis, Cincinnati, Chicago, Detroit, Kansas City, Minneapolis, Denver, San Francisco and Seattle.

A Waterway Discussion

"Inland Waterway Transportation—Is Our Policy Right or Wrong?" was the subject of a discussion before the City Club of Chicago and the Western Society of Engineers at the rooms of the City Club on Monday noon, May 19. Theodore Brent, traffic manager of the Mississippi-Warrior Waterways Barge Commission, United States Railroad Administration, took the affirmative and Professor Harold G. Moulton, of the Department of Political Economy, University of Chicago, the negative.

After outlining briefly the history of waterway development in this country and its decadence in recent years, Mr. Brent described the activities of the Railroad Administration during the past year in establishing barge service on the lower Mississippi river and elsewhere, and told of the nature of the service now offered and the amount and extent of the traffic carried. He advocated the extension of the deep waterway through the Illinois river to Chicago.

Professor Moulton opened his argument with the statement that in order to place the cost of waterway transportation on a basis comparable with that of railway service it is necessary to include the fixed charges in waterway improvements and also the maintenance costs, which is rarely done. On the basis of such a complete record of cost he had found that none of the larger inland waterways of Germany (commonly cited as the most successful) affords as cheap transportation as the railroads, with the exception of the Rhine river. He also criticized the common practice of comparing the cost of water transportation on the oceans and the great lakes with that on the railways as not being comparable with the cost of transportation on the inland waterways. He mainained that a careful analysis of complete costs would show rail transportation to be more economical than that on the inland waterways in nearly all cases and criticized the waterway advocates for their failure to present such analyses instead of general arguments.

REVENUES AND EXPENSES OF RAILWAYS

THREE MONTHS OF CALENDAR YEAR 1919

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss)	Increase (or decr.) comp. with last year
					Maintenance of										
		Freight	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Balto, Ches. & Atlantic	87	$184,880	$81,975	$274,257	$33,684	$48,842	$2,865	$185,674	$10,647	$281,712	102.71	7,455	$9,486	$ [illegible]	[illegible]
Balto., Ohio, Chgo. Terminal	91	.....	12	·351,247	100,950	139,276	3,268	362,470	27,816	648,317	184 58	—297,070	90.295	—387,[illegible]	97,[illegible]
Bangor & Aroostook	632	1,085,036	210,664	1,349,735	286,198	318,304	12,121	558,995	40,376	1,236,294	91.15	119,440	63,000	56,104	—[illegible]7,554
Beaumont, Sour Lake & Western	118	230,580	62,274	307,066	70,256	56,285	5,513	152,298	15,411	299,763	97.62	7,303	8,100	—29	154,5[illegible]
Belt Ry. Co. of Chicago	31	.....	.....	704,697	58,833	148,925	820	528,153	24,095	760,827	107.97	—56,131	46,853	—102,984	35,[illegible]5
Bessemer & Lake Erie	217	1,757,711	100,349	1,950,503	225,753	916,628	33,894	877,151	61,380	2,068,712	106.06	—118,209	43,500	—161,771	117,338
Bingham & Garfield	37	330,734	8,218	355,147	94,345	121,313	4,915	104,533	14,873	345,455	97.27	9,692	22,029	—12,337	312,451
Birmingham Southern	29	123,430	.....	169,095	11,212	19,804	2,134	71,826	9,737	114,713	67.84	54,382	9,634	44,035	34,133
Boston & Maine	2,258	8,585,927	4,598,806	14,835,471	1,931,737	3,355,995	117,165	9,060 581	510,449	15 056,002	101.48	—220,531	518,090	—738 666	49,618
Buff. & Susquehanna	296	482,905	22,021	516,499	120,302	250,151	5,479	191,113	22,124	589.169	114.07	—72.670	9,750	—82,420	—156,985
Buff., Rochester & Pitt	589	3,090 811	356,443	3,558,106	536,257	1,219,890	43,505	1,775,239	99,488	3.686,169	103.59	—122.063	81,000	—263 505	183,501
Canadian Pac. Lines in Maine	233	738,597	184,784	963,204	95,322	233,168	7,825	663.504	12.694	1,012,513	105.11	—49,309	33,000	—82,309	33,617
Carolina, Clinchfield & Ohio	282	1,233,439	89,582	1,350,014	243,833	339,158	12,098	429,986	40.843	1,065,578	78.93	284,436	48,900	235,524	—31,620
Central of Ga.	1,918	2,930,827	1,500,048	4,943,494	1,022,894	1,159,206	103,944	2,246,132	171,866	4,697.019	95.01	246,475	153,416	92,221	—1,[illegible]8,721
Central of New Jersey	684	7,143.645	1,702,646	9,692,374	1,198,775	2,797,775	58,611	4,903,683	246,744	9,252.958	95.46	439,416	472,459	133,[illegible]	338,515
Central of New England	301	1,270,379	75,174	1,412,759	286,223	367,375	6,750	787,889	36,874	1,490,174	105.47	—77,415	48,000	—125 [illegible]	239,397
Central Vermont	411	857,160	235,724	1,196.574	138,349	346,280	17,784	844,154	53,188	1,460.900	117.07	—204,326	52,200	—256,545	50,386
Charleston & Western Carolina	342	557,529	172,904	763,448	142 689	143,704	14,340	361 169	16,472	678,373	88.86	85.075	25,500	59,575	—104,937
Chicago & Alton	1,050	4,051,297	1,400.634	5,755,578	887,726	1,566,379	71,083	2,637,893	141,044	5 335,885	92.71	419 693	171,206	248,[illegible]53	96,10[illegible]
Chicago & Eastern Ill.	1,131	4,059.852	1,167,863	5,626,611	944 080	2,247.643	63,613	2,688,311	145,429	6,101,792	108.44	—475,181	238.592	—715,077	—557.896
Chicago & Erie	269	2,049,171	215,842	2,436,163	246,871	428.962	31,851	1,360.869	84,575	2,162,675	88.77	273,488	100,895	172,554	643,974
Chicago & N. W.	8,090	19,052,112	7,535.333	28,893,988	3,673,746	6,790,425	211,083	14,975,303	737,282	26,616,774	92.11	2,277,213	1,425,000	849,[illegible]66	667,688
Chicago, Burlington & Quincy	9,372	23,918,686	7,342,011	33,405,843	4,350,026	7,075,832	260,801	14,033,744	948,415	26,936.116	80.63	6,469.727	1,267,318	5,186.008	330,777
Chicago Great Western	1,496	3,156 068	1,362.431	4,844,429	593,569	1,184,344	83.736	2,324,238	132,439	4,354.188	89.88	490,241	177,973	312,309	—58,175
Chesapeak & Ohio	2,493	11,823,746	3,476,639	16,099,938	2,756,628	3,830,599	113.164	6,758,759	341,979	13,900,634	86.33	2,199,304	510,841	1,685,676	—271,648
Chicago, Ind. & Lou.	657	1,751,907	599,321	2,576,402	314,606	662 350	36.384	1,102,196	71,778	2,210,661	85.80	365,741	95.665	269.924	231,335
Chicago Junction	12	.....	.....	823,686	259,972	155.236	311	712,081	24,172	1,151,771	139.83	—328,085	6.712	—334,798	—208,346
Chicago, Milwaukee & St. Paul	10,273	22,624,842	6,573,104	31,840,869	3,220,320	10,153,816	248,283	16,112,289	911.518	30,766,728	96.62	1,074,141	1,545,342	—478,201	—310,762
Chicago, Peoria & St. L.	247	467,969	72,523	360,855	114,295	184 863	7,556	238,809	28.990	574,508	159.20	—213,653	22,166	—235,833	—168,500
Chicago, Rock Island & Gulf	474	799,633	231,250	1,086,190	199,869	223,876	19,329	518,235	33,875	997,476	91.83	88,714	39,465	49 078	—262,901
Chicago, Rock Island & Pac.	7,723	15,676,823	6,571,191	23,609,625	4,134.039	6,171 632	279.737	11,088,204	589,158	22,362,303	94.71	1,247,322	1,044,983	200,684	—1,858,948
Chicago, St. Paul, Minn. & Omaha	1,749	4,125,529	1,674,458	6,264,476	570,423	1,234.446	60,286	3,157,628	174,148	5,246,815	83.75	1,017,662	311.787	704,561	248,007
Chicago, Terre Haute & S. E.	374	884,711	65,520	970,106	164,292	454,925	11,330	372,461	24,579	1,033,367	106.52	—63,261	43,500	—106,762	40,410
Cin., Indianapolis & Western	321	455,265	142,116	660.093	119,995	213,056	12,235	381,369	36,266	764,179	115.76	—104.086	30,729	—134,815	—238,730
Cin. New Orleans & Tex. Pacific	337	2,963,050	977 733	4,136,657	403.977	1,333,692	65,936	1,489,769	96,808	3,414.522	82.54	722,135	116.999	603,916	348,761
Cin. Northern	251	586,724	51,449	653.187	124,627	160,137	7,163	227,502	13,676	533,104	81.61	120.082	24,500	95,514	78,019
Cleveland, Cin., Chic. & St. L.	2,395	10,708,417	3,577,362	15,445,290	2,155,297	3,483,566	223,947	6,554,910	299,768	12,828,720	83.05	2,616,571	555,000	2,058,207	118,081
Colorado & Southern	1,100	2,522,287	452,242	3,122.998	357.560	737,896	25,153	1,205,714	110,128	2,453.435	78.56	669,564	141.000	527,135	—203,987
Colorado & Wyoming	41	75,957	3,473	290,625	23,232	53,492	270	146,734	11,741	235,469	81.02	55.156	12,000	43,156	—6,555
Cripple Creek & Colo. Springs	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cumberland Valley	163	1,012,460	189,124	1,287,650	238,510	289.537	19,116	598,629	35,532	1,183,092	91.87	104.558	28,207	76,271	173,097
Delaware & Hudson Co.	868	6.577,539	643,089	7,635 547	1,110,958	2,420 842	54,998	3,598,708	326,466	7,621,553	99.81	13,994	180 000	—171,[illegible]89	1,288,052
Delaware, Lackawanna & Western	955	12,043,329	2,680,290	16,330,156	1,467 438	3,521,178	104,509	7,390,378	337,003	12,977,612	79.46	3,352.544	902,000	2,449,600	296,076
Denver & Rio Grande	2,640	5,409,741	1,172,765	6,903,886	769.958	2,200,742	53,737	2,656,658	206,594	5,983.074	86.66	920,812	300,000	619,414	—712,660
Denver & Salt Lake	255	393,600	59,021	471,124	149,070	282,465	2,522	339,773	15,826	789,656	167.61	—318,532	27,000	—345,547	—121,747
Detroit & Mackinac	382	238,857	81,028	343,718	53,768	117,715	15,922	186,537	52,297	426,239	124.00	—82 522	16,882	—99,404	76,891
Detroit & Toledo Shore Line	61	565,078	.....	581,113	38,418	44,676	1,119	162,235	7,336	253,196	43.57	327,917	36,496	291,415	115,293
Detroit, Toledo & Ironton	457	819,175	35,608	914.915	251,350	334 560	8,390	455.529	37,317	1,087,147	118.82	—172,231	25,932	—198,179	111,720
Duluth & Iron Range	292	267,265	71,171	377,173	144,676	266,181	1,450	365.888	39,970	818.153	216.91	—440,980	20,503	—461,807	—2,237
Duluth, Missabe & Northern	410	409,106	118,757	598,118	308,306	371,662	6,653	448,132	46,205	1,184.845	198.09	—586,728	29,927	—616,654	200,735
Cin., Lebanon & Northern	76	172,074	21,206	229,977	42,411	54,422	3 899	162,321	2,648	265,701	115.53	—35,725	12,561	—48,286	2,759
Wichita Falls & N. W.	328	304,541	100,274	424,485	140,713	70,295	3,222	212.958	20,015	447.201	105.35	—22,716	27,582	—50,412	9,248
Duluth, South Shore & Atl.	599	671.098	231,515	956,954	166,510	199,272	18,383	567.125	29,506	993.504	103.82	—36,550	57,000	—93,571	14,928
Duluth, Winnipeg & Pac.	178	441,296	74,987	539,674	50,847	102,534	7,116	253,740	24,783	444,240	82.32	95,434	27,346	68,086	49,915
East St. Louis Connecting	3	.....	.....	269,033	33,904	112 543	941	182,805	9,277	339,470	126.15	—70,437	9,111	—79,548	37,698
El Paso & Southwestern Co.	1,628	2,473,100	503,983	3,128,871	380,299	598,183	28,470	867,621	73,897	1,968,520	62.91	1,166,350	187,627	972,685	—559,515
Elgin, Joliet & Eastern	822	4,744,697	18	5,637,992	450,741	1,327,992	18 659	2,103,720	77,876	3,978,651	70.56	1,659,340	159,750	1,499,590	1,421,670
Erie	1,989	15,080,383	2,826,457	19,729,517	2,221,139	6,825,987	175,087	10,967,970	610,854	20,918,581	106.02	—1,189,064	703,722	—1,897,167	608,940
Florida East Coast	764	1,494,921	1,181,198	2,965,791	459,947	525.884	25,938	1,388,949	57,282	2,485.450	83.80	480 341	116,427	363,739	—768 862
Ft. Smith & Western	253	249,796	73,599	347,702	64,111	84.040	10,766	135,832	18,533	313,974	90.29	33,728	15.000	18,698	—8,978
Ft. Worth & Denver City	454	1,701,351	619,816	2,438,510	279,286	512,231	16,153	973,618	78,684	1.866 877	76.55	571,632	57,750	513,822	38,571
Ft. Worth & Rio Grande	235	167,910	133,058	322,575	85,005	87,850	530	217.995	23.699	415,079	128.67	—92.503	9,537	—102,250	—124,394
Fonda, Johnstown & Gloversville R. R.	88	66,286	184,115	261,377	28,154	26,852	1,491	114.351	14 166	185,015	70.78	76,363	14,700	61,663	—17,418
Galveston, Harrisburg & San Ant.	1,382	1,449,639	1,270,966	4,967,324	770,492	1,060,921	56,458	2,051,976	156,793	4,138,047	83.30	829,276	156,615	671,651	—787,369
Galveston Wharf	13	.....	.....	194,925	42,784	2 605	987	78,513	4,289	151,103	77.51	43,822	34,200	9,622	—48,666
Georgia	328	959,494	492,916	1,565,305	173,336	253,286	17,553	711,811	50,805	1,204,307	76.93	360,998	18,850	342,142	—36,514
Georgia, Southern Florida	402	700,329	349,816	1,145,876	191,559	261.613	15,992	516,737	28,259	1,014,722	89.55	131.155	40,850	90,175	—3,617
Grand Rapids & Ind.	569	1,101,253	379,574	1,630,453	290,644	402.274	30,497	982,626	68,409	1,698,132	104.15	—67,679	76,699	—144,395	—119,298
Grand Trunk Western	1,002	3,594,385	675,532	4,656,607	581,160	943.776	37,800	2,350,431	122,914	4,052,939	87.03	603.669	150,414	451,557	—1,283,471
Great Northern	8,254	16,572,153	3,961,917	22,496,187	3,584,772	5,091,952	156,037	10,569,051	463,381	20,124,324	89.46	2,371,863	1,251,439	1,118,936	1,469,855

REVENUES AND EXPENSES OF RAILWAYS

THREE MONTHS OF CALENDAR YEAR 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of									
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Gulf & Ship Island	307	$370,207	$119,814	$539,212	$166,813	$119,874	$10,529	$229,566	$25,332	$553,177	102.58	—$13,965	$28,487	—$42,487	—$172,352
Gulf, Colorado & Santa Fe	1,930	2,941,297	1,110,437	4,263,237	857,256	703,204	31,952	1,849,580	134,456	3,571,624	83.77	691,614	213,503	476,365	—717,826
Gulf, Mobile & Northern	424	422,150	118,352	573,642	119,833	169,396	15,020	282,361	29,556	616,205	107.41	—42,562	31,011	—73,621	—174,920
Hocking Valley	350	1,104,279	257,059	1,451,010	313,463	813,810	17,085	715,419	62,572	1,921,025	132.39	—470,015	171,200	—645,379	—518,454
Houston, East & West Texas	190	405,181	121,210	549,702	98,356	73,221	2,373	245,149	12,514	431,613	78.51	118,089	18,474	99,482	—34,267
Houston & Texas Central	856	1,329,958	519,793	1,950,567	402,159	397,314	22,534	900,898	51,341	1,778,905	91.19	171,662	102,072	66,558	—462,156
Illinois Central	4,782	17,341,456	5,734,731	24,757,032	4,538,652	6,845,992	207,513	10,743,601	690,619	23,091,465	93.27	1,665,567	1,235,003	425,193	—2,393,797
Indiana Harbor Belt	116	.....	.....	1,519,781	254,329	365,628	5,031	964,321	47,708	1,637,016	107.71	—117,235	30,162	—147,397	125,291
International & Great Northern	1,159	2,240,851	719,622	3,168,331	827,686	896,205	37,811	1,673,553	109,719	3,560,360	112.37	—392,030	90,000	—482,462	1,156,117
Kanawha & Michigan	176	546,220	166,282	745,120	143,839	367,485	7,049	363,895	37,690	919,958	123.46	—174,838	53,655	—228,493	—295,081
Kansas City, Mexico & Orient	272	176,138	38,882	226,418	102,969	127,413	3,707	166,335	21,282	421,705	186.25	—195,287	18,781	—214,088	—133,936
Kansas City, Mexico & Orient of Tex.	465	190,314	32,999	237,723	97,342	132,509	3,662	186,334	21,058	440,905	185.47	—203,182	14,985	—218,170	—193,992
Kansas City Southern	774	2,695,547	552,425	3,510,732	653,932	847,526	51,442	1,479,766	130,100	3,152,635	89.79	358,098	211,529	144,809	—875,250
Kansas City Terminal Co.	25	.....	.....	309,301	36,008	82,602	.....	167,277	3,724	293,669	94.95	15,632	60,450	—44,823	—36,730
Lake Erie & Western	962	1,966,037	173,424	2,232,966	357,533	722,385	34,485	1,018,580	70,748	2,199,662	98.51	33,304	77,000	—43,937	—181,182
Lehigh & Hudson River	96	544,969	11,754	578,219	62,769	162,968	4,799	277,675	16,824	525,035	90.80	53,184	15,000	38,181	—5,355
Lehigh Valley	1,436	10,869,364	1,189,378	13,443,799	1,686,065	4,126,275	106,083	687,921	305,668	13,149,087	97.80	294,712	440,175	—145,603	771,241
Long Island	398	1,176,998	2,913,607	4,574,997	793,647	837,827	22,921	2,748,475	138,413	4,593,279	100.40	—18,282	274,661	—293,897	—397,621
Los Angeles & Salt Lake	1,168	2,850,259	982,326	4,036,976	664,655	852,853	47,341	1,346,287	88,297	3,093,680	76.63	943,297	195,051	747,778	256,097
Louisiana & Arkansas	302	386,455	107,849	515,861	129,166	116,218	10,282	246,407	18,973	521,047	101.05	—5,185	34,050	—39,263	—148,030
Louisiana Western	207	539,985	338,855	910,417	110,609	170,283	11,900	275,518	33,231	605,628	66.52	304,789	28,795	275,831	—175,482
Louisville & Nashville	5,013	17,473,844	6,228,152	25,005,562	4,108,139	6,271,140	309,835	10,511,445	551,108	21,848,186	87.37	3,157,375	754,276	2,400,333	—1,727,901
Louisville, Henderson & St. Louis	199	494,095	169,910	686,184	148,677	88,524	21,988	270,890	22,360	552,439	80.51	133,745	12,000	121,488	—17,562
Maine Central	1,216	2,774,239	1,000,047	4,026,800	591,323	1,019,543	30,757	2,596,879	116,178	4,355,524	108.16	—328,723	226,870	—555,608	—15,080
Maryland, Delaware & Virginia Ry Co.	82	166,448	71,867	244,340	24,697	42,283	1,351	181,162	6,192	255,685	104.64	—11,345	5,199	—16,544	—31,151
Michigan Central	1,861	11,625,801	3,875,902	16,764,194	2,502,825	3,481,899	196,603	6,798,777	309,009	13,492,441	80.52	3,265,753	480,000	2,784,516	1,088,834
Mineral Range	101	244,012	1,492	251,296	28,593	66,271	968	136,141	2,972	234,972	93.50	16,324	9,900	6,424	18,891
Minneapolis & St. Louis	1,646	2,031,723	643,285	2,803,201	554,950	771,724	30,475	1,617,794	89,442	3,056,444	109.03	—253,244	157,572	—411,707	—609,139
Minn. & International Ry. Co.	195	181,108	71,267	265,165	46,019	46,209	1,639	154,490	10,960	259,316	97.79	5,849	13,134	—7,294	—47,796
Minn., St. Paul & Sault Ste. Marie	4,243	6,827,169	1,674,254	8,999,583	1,136,950	2,180,807	67,225	4,242,538	208,047	7,871,143	87.46	1,128,469	565,080	564,940	424,198
Missouri & North Arkansas	365	236,475	102,522	363,269	217,761	127,120	4,508	174,330	23,291	546,423	150.41	—183,154	19,662	—203,174	—206,345
Missouri, Kansas & Texas	1,714	5,277,151	1,890,289	7,537,658	1,706,924	2,277,655	59,230	2,812,003	233,795	7,112,505	94.36	425,154	271,065	153,842	—554,079
Missouri, Kansas & Texas of Texas	1,796	3,169,015	1,734,116	5,312,939	1,102,947	1,059,099	48,404	2,948,023	216,818	5,420,975	102.03	—108,036	147,070	—256,974	—424,909
Missouri, Okla & Gulf	332	229,027	52,401	297,544	137,853	129,045	4,727	195,162	19,855	487,211	163.74	—189,667	25,507	—215,591	—169,475
Missouri, Pacific	7,108	14,490,297	4,721,406	20,602,728	4,426,953	5,153,517	214,217	9,503,764	596,012	19,981,763	96.98	620,965	799,179	—184,860	—3,746,271
Mobile & Ohio	995	2,783,920	540,641	3,521,424	593,486	1,299,760	65,861	1,720,031	113,543	3,798,356	107.86	—276,932	157,499	—434,886	—457,164
Monongahela	108	726,171	61,068	804,477	185,350	106,364	2,663	273,282	19,610	587,270	73.00	217,207	15,000	202,188	113,040
Monongahela Connecting	6	.....	.....	561,782	90,353	202,820	1,540	313,027	21,065	628,805	111.93	—67,023	7,011	—74,033	—98,071
Montour R. R.	54	189,381	5,191	210,286	64,168	138,852	3,970	75,450	18,666	302,532	143.86	—92,246	—6,886	—99,133	—35,918
Morgan's La. & Texas R. R.	400	1,165,719	521,527	1,782,145	254,506	409,696	23,398	812,329	58,148	1,564,235	87.77	217,909	92,225	124,914	—543,747
Nash., Chatt. & St. L.	1,247	2,786,423	1,296,229	4,416,852	983,255	1,255,466	96,076	2,173,829	134,346	4,680,631	105.97	—263,778	150,000	—414,212	—1,164,177
Nevada Northern	168	271,459	35,003	424,706	49,550	68,047	2,759	127,103	13,419	261,292	61.52	163,415	54,967	108,445	—174,359
Northern Alabama	112	276,924	38,764	325,188	76,994	16,516	3,777	225,335	5,442	328,063	100.88	—2,876	10,200	—13,076	—84,611
Newburgh & South Shore R. R.	7	.....	.....	402,145	49,509	81,291	.....	190,825	10,591	332,216	82.61	69,929	22,717	47,212	100,593
Grand Trunk Lines in N. E.	172	789,484	91,226	1,024,211	283,366	140,624	8,760	712,683	41,289	1,276,019	124.58	—251,808	34,500	—286,308	—41,098
Mississippi Central	164	152,548	73,501	234,320	55,767	91,182	4,096	97,552	16,228	264,825	113.01	—30,505	9,975	—40,488	—106,292
New Orleans & N. E.	398	984,936	329,445	1,478,432	187,241	403,579	22,168	786,038	43,011	1,460,549	98.79	17,883	85,071	—67,246	—388,860
New Orleans Great Northern	284	383,261	116,651	527,157	114,577	114,266	6,895	227,262	22,642	486,940	92.37	40,217	32,230	7,688	—102,212
St. Louis Transfer Co.	6	.....	.....	249,569	31,861	65,424	640	139,571	6,391	233,887	93.71	15,682	300	15,382	—9,568
New Orleans, Texas & Mexico	191	279,375	89,092	407,183	95,388	112,936	6,514	147,393	17,506	385,417	94.65	21,766	30,000	—8,268	—214,963
New York Central	6 075	43,491,611	17,901,874	68,765,905	9,285,763	15,244,583	583,411	32,111,714	1,834,265	60,126,279	87.43	8,639,626	3,043,990	5,592,307	2,106,734
New York, Chicago & St. L.	572	5,510,321	437,905	6,114,763	757,909	1,145,679	76,501	2,428,819	161,517	4,578,412	74.87	1,536,350	165,000	1,370,987	1,361,437
New York, New Haven & Hart.	1,965	9,866,708	9,642,771	21,943,870	2,915,052	5,327,305	116,345	12,280,978	828 425	21,940,846	99.98	3,024	804,000	—806,900	—2,262,729
New York, Ont. & Western	569	1,332,670	286,415	1,986,615	306,844	676,948	24,524	1,093,477	75,720	2,177,514	109.61	—190,899	74,100	—264,964	—381,488
New York, Phila. & Norfolk	121	1,317,040	360,848	1,814,652	160,375	364,898	25,175	857,948	33,928	1,494,163	82.38	320,489	51,075	269,414	284,222
New York, Susq. & Western	135	596,591	157,646	875,050	97,627	149,465	4,963	595,425	23,561	871,284	99.56	3,766	66,299	—62,578	—40,003
Norfolk & Western	2,087	14,490,748	2,450,835	17,776,726	2,388,441	5,126,621	103,849	6,712,539	293,226	14,683,234	82.59	3,093,492	780,000	2,313,183	10,047
Norfolk Southern	907	1,017,006	382,629	1,506,967	324,408	343 084	21,880	761,446	59,718	1,511,503	100.30	—4,535	59,882	—64,500	—254,645
Northern Pacific	6,565	16,499,165	4,257,586	22,202,067	3,039,966	4,130,993	192,082	8,877,580	560,132	17,043,201	76.76	5,158,866	1,553,412	3,602,521	—304,823
Northwestern Pacific	507	609,960	409,596	1,128,910	329,302	195,525	14,576	603,050	36,602	1,184,177	104.89	—55,267	66,158	—121,663	—319,375
Oregon Short Line	2,347	6,224,177	1,483,730	8,253,419	1,649,160	1,469,547	47,348	2,687,180	250,145	6,263,049	65.88	1,990,370	533,891	1,456,016	—602,290
Oregon—Wash. R. R. & Nav. Co.	2,069	4,180,162	1,505,163	6,257,711	1,304,697	1,029,697	81,284	2,662,228	280,741	5,467,270	87.36	790,441	342,677	447,179	—159,065
Panhandle & Santa Fe	772	861,592	220,134	1,141,637	345,746	421,267	11,407	681,916	47,299	1,501,112	131.48	—359,475	48,351	—408,160	—724,033
Pennsylvania Co.	1,754	14,817,467	4,445,271	21,428,935	3,186,710	6,492,107	196,556	10,992,276	552,334	21,551,094	100.57	—122,159	865,520	—988,723	—1,488,691
Pennsylvania Railroad	5,360	53,741,685	22,485,353	84,040,500	11,174,115	23,395,884	696,765	41,399,535	2,205,849	80,435,993	95.71	3,604,507	2,574,358	1,027,070	5,381,835
Peoria & Pekin Union	19	99,708	13,977	293,000	50,336	86,670	2,122	227,642	16,163	384,934	131.37	—91,933	28,500	—120,433	—80,831
Pere Marquette	2,232	5,643,089	1,128,280	7,292,185	1,042,670	1,513,938	68,623	3,323,902	206,643	6,165 940	84.55	1,126,245	147,753	978,152	778,608
Phila. & Reading	1,127	11,621,420	2,441,258	15,185,034	1,659,267	4,866,402	102,320	9,381,273	395,939	16,454,153	108.35	—1,269,119	429,684	—1,698,750	—2,575,890
Pitts. & Lake Erie	224	6,326,423	586,992	7,581,803	1,454,681	2,017,943	46,062	2,673,834	125,932	6,322,867	83.39	1,258,935	226,500	1,032,435	—7,669

The $400,000,000 Car Trust Certificates

A joint meeting of members of the Association of Railway Executives, bankers, the War Finance Corporation and the Railroad Administration was held on May 27 to discuss the further plans for issuing a joint series of car trust certificates, covering the 100,000 freight cars and 1,930 locomotives ordered by the government. The bankers present at the meeting included Pierrepont V. Davis, vice-president of the National City Company; Arthur M. Anderson, of J. P. Morgan & Co.; Jerome Hanauer, of Kuhn, Loeb & Co.; Francis M. Weld, of White, Weld & Co.; E. B. Sweezy, vice-president of the First National Bank; George W. Davison, vice-president of the Central Union Trust Company; E. V. R. Thayer, president of the Chase National Bank; James Speyer, of Speyer & Co.; Harold Stanley, vice-president of the Guaranty Trust Company; A. A. Tilney, vice-president of the Bankers' Trust Company; Charles S. Speare, of Brown Bros. & Co.; and G. Frederick Hawkins, of Kissel, Kinnicutt & Co.

Eugene Meyer, Jr., managing director, and Alfred A. Cook, counsel, were present in behalf of the War Finance Corporation. Swager Shirley, F. Q. Brown and Sanford H. E. Freund represented the railroad administration.

Members of the Association of Railway Executives who attended included T. De Witt Cuyler, chairman; Alfred P. Thom, counsel; Howard Elliott, W. W. Finley, Charles Hayden, W. G. Besler, C. A. Peabody, Mark W. Potter, Daniel Willard, E. G. Buckland, E. M. Hyzer and Marvin Hughitt.

Aviation

The United States Navy seaplane, NC-4, completed a trip across the Atlantic Ocean on Tuesday, May 27. Lieutenant-Commander A. C. Reid, with a crew of five men, landed at Lisbon, Portugal, the evening of that day in 9 hours 43 minutes, from Ponta Delgada, Azores, 800 miles. The NC-4 left Trepassey, Newfoundland, on May 16, and reached the Azores in about 17 hours, but had to wait there until the 27th for favorable weather before continuing the journey. The total flying time from Newfoundland to Lisbon, about 2,000 miles, is given as 26 hours 41 minutes.

The United States Post Office Department announces that in the first week of the airplane mail service between Cleveland, Ohio, and Chicago, Ill., 28 of the 30 possible trips were successful. The distance, about 350 miles, was made on one trip in less than three hours. One of the pilots, Frank McCusker, was killed by an accident to his airplane at Cleveland on May 25.

On May 27, four airplanes of the War Department completed a cross country flight of 3,300 miles from Texas to the Pacific Coast and return. These fliers, for considerable distances, made speeds of 140 miles an hour and higher. Two of the airplanes flew over the Grand Canyon. One of these flew at an altitude of 13,000 ft., while the other flew down into the Canyon, about 600 ft. below the edge.



Photo from International Film Service

Repairing the Railway Cut by the Rioters Near Cairo, Egypt

Traffic News

Charles E. Wallington, an attorney, has been elected president of the Toledo Transportation Club.

The number of vessels passing through the Cape Cod canal, from August, 1918, to April, 1919, averaged 468 a month, as compared with an average during the corresponding months one year ago of 235 vessels. The increase in tonnage of cargoes was 185 per cent.

Freight loading of railroads in the Northwestern region for week ending May 20, compared with the corresponding period last year shows a decrease of approximately 9.5 per cent, 149,125 cars being loaded in the week ending May 20, 1919, as compared with 164,635 for the same period last year.

The recent order of the director general authorizing a rate of one and one-third fare for the round-trip for conventions of religious, fraternal, educational, charitable and military organizations involves so much detail that it is found impossible to make it effective for meetings convening earlier than June 10. It is necessary to print and distribute several million certificates to 50,000 or more ticket offices, and to correspond with various organizations for the purpose of establishing regulations as well as to prepare tariffs and file them with the Interstate Commerce Commission.

Montana, its advantages and possibilities, is the subject of the latest illustrated booklet issued by the Agricultural Section of the Railroad Administration for distribution among homeseekers and others. S. V. Stewart, governor of the State, contributes a foreword to the booklet: Montana is no longer to be considered a mining and grazing state with little agricultural land. In the past ten years 30,000,000 acres of public lands within the state have been filed upon for homesteads, and there are 83,000 farms in the state. Unirrigated farms with wheat production records of from twelve to forty bushels an acre and which are within a reasonable distance of a railroad and a town with school facilities may be bought for $15 to $40 an acre, while irrigated land sells for $40 to $150 an acre.

Minnesota Drinking-Cup Law

The Minnesota legislature has passed a law requiring individual drinking cups on all cars used for transportation of passengers. There must be pure drinking water and a sufficient number of cups, or a fountain. The law becomes effective on June 1, 1919. A fine of not less than $25 nor more than $100 is prescribed as the penalty for failure to comply with the law. Cups and fixtures must be kept in a sanitary condition.

Dry Canada

[From the Buffalo Courier]

That it is still dangerous to smuggle booze through Canada was shown at St. Thomas on May 20, in the trial of employees of the Pullman company, accused of smuggling whisky from Buffalo into Canada in a parlor car. The men, mostly of a dusky hue, trembled visibly when they appeared in court, the judge having ruled that it was just as much an offense to smuggle whisky through dry Canada as it is to import it into dry Canada. The contention was set forth that the liquor was being carried in a parlor car of Buffalo to Detroit train No. 45, and not for delivery within the Dominion; but the three men were fined $200 apiece and costs. The whisky was discovered when the authorities at St. Thomas got a tip that a shipment was on its way to Detroit. That city is as dry as Sahara, and it is a very high-paying business at the present time, a quart of good whisky bringing as high as ten dollars.

Commission and Court News

Interstate Commerce Commission

The Commission has announced its intention of investigating the rates, charges, rules, regulations and practices applicable to freight transportation in Illinois as compared with those applicable in Ohio and Michigan, and also those in Central Freight Association territory.

Rates on Coal from Western Kentucky

Ohio Valley Coal Operators Association v. Illinois Central Railroad Company, Director General, et al.

Upon complaint attacking the rates on bituminous coal, in carloads, from mines in western Kentucky on the Illinois Central, Louisville & Nashville, and Kentucky Midland railroads, to points in Mississippi Valley and southwestern territories, Illinois, and various other northern and western states, the Interstate Commerce Commission finds:

The rates assailed are not shown to be unreasonable *per se*, nor are they shown to be unduly prejudicial except to the extent stated in the following:

The rates from mines on the Illinois Central to points in Texas by way of Mississippi River crossings south of East St. Louis are unduly prejudicial to the extent that they exceed the rates from mines on the Illinois Central in southern Illinois to the same points through the same crossings.

The rates from mines on the Illinois Central and the Louisville & Nashville to East St. Louis and St. Louis, proper, are unduly prejudicial to the extent that they exceed by more than 57.5 cents per ton the rates from mines in the Illinois Central's inner group and the Louisville & Nashville's Belleville group, respectively, in southern Illinois to the same destinations.

The rates from mines on the Illinois Central and Louisville & Nashville to East St. Louis, as applied on traffic for beyond, are unduly prejudicial to the extent that they are not lower than the rates from the same mines to East St. Louis, proper, by at least 12.5 cents per ton.

The rates from mines on the Illinois Central to Chicago, to points in the northwest as defined in this report, and to points in Illinois north of and including Mattoon and Decatur, are unduly prejudicial to the extent that they exceed the rates from mines on the Illinois Central in the southern Illinois group by more than 25 cents per ton.

The rates from mines on the Louisville & Nashville to Chicago are unduly prejudicial to the extent that they exceed the rates from mines on that road in the Eldorado group in southern Illinois to Chicago by more than 25 cents per ton.

The rates from mines on the Kentucky Midland Railroad are unduly prejudicial to the extent that they exceed the rates from mines on the Illinois Central in western Kentucky to the same destinations. (Decided May 1.)

Personnel of Commissions

John H. Delaney has been appointed rapid transit construction commissioner for New York City. This office takes over the functions of the former Public Service Commission in connection with the construction of new subway and elevated railroads in New York City. The single commissioner, to perform the other functions of the Public Service Commission, Lewis Nixon, was appointed several weeks ago.

Court News

Causes of Action While Under Federal Control

The federal district court for the Northern District of Nebraska holds that General Order No. 50, providing for the substitution of the Director General of Railroads in case of actions against railroads for causes arising since government control was assumed, is warranted, notwithstanding Section 10 of the Act of March 21, 1918, C. 25, providing that actions or suits may be brought against such carriers, for the Director General is the carrier, being analogous to a receiver, and it is proper that he be substituted in place of the railroad company.—Rutherford v. Union Pacific, 254 Fed. 880. Decided January 11, 1919.

Substitution of Director General as Defendant

The federal district court for the Southern District of New York holds that the provision of General Order No. 50 of October 28, 1918, that pleadings in pending actions against a railroad company for injuries "may" be amended by substituting the Director General, and dismissing the company as defendant, must be construed as permissive only, in view of the Federal Control Act provision that carriers, while under federal control, shall be subject to all laws and liabilities as common carriers, and that actions may be brought against them, "and judgments rendered as now provided by law," and such substitution of parties will not be made on motion of the defendant.—Jensen v. Lehigh Valley, 255 Fed. 795. Decided February 1, 1919.

United States Supreme Court

Effect of Misdescription of Lost Goods in Bill of Lading

In an action to recover the value of furs lost in transit in interstate commerce, the railroad resisted the claim on the ground that the goods were misdescribed in the bill of lading as "one case D. G." (dry goods). This was done by a mistake of the local expressman, and not with the intention of fraudulently misrepresenting the nature of the shipment. The filed freight rates were first class (65 cents) for dry goods and double first class for furs. The Supreme Court of the United States refused to sustain the railroad's contention, for the reason that a clause in the bill of lading provided for the contingency of misdescription as follows: "If upon inspection it is ascertained that the articles shipped are not those described in this bill of lading, the freight charges must be paid upon the articles actually shipped." The court holds that the effect of this provision is that a misdescription of the character of the goods, not attributable to fraud, does not affect the liability of the carrier for a failure to deliver the goods.—N. Y. Central v. Goldberg. Decided May 19, 1919.

Federal Employers' Liability Act Decisions

The Supreme Court of the United States, reversing a judgment of the Supreme Court of Idaho, holds that an employee of a railroad which was engaged in interstate commerce, injured while filling with earth a wooden trestle bridge, 1200 ft. in length, was himself engaged in interstate commerce. The court considers the state Supreme Court fell into error in regarding the fill as new construction so unrelated to the conduct of interstate commerce over the bridge at the time the accident occurred that the work being done might be regarded as not related to or necessary to the safe conduct of that commerce.—Kenzell v. Chicago, M. & St. P. Decided May 19, 1919.

The Supreme Court of the United States holds that an employee of an interstate railroad, injured while engaged in taking care of a camp car used by a gang of bridge carpenters who were employed by the railroad in the repair of the bridges and bridge abutments upon the line, and who cooked the meals for himself and the other members of the gang, was engaged in interstate commerce within the Federal Employers' Liability Act. The significant thing, in the court's opinion, was that the employee was employed by the railroad to assist, and was assisting, the work of the bridge carpenters by keeping their bed and board close to their place of work, thus rendering it easier for the railroad to maintain a proper organization of the bridge gang and forwarding their work by reducing the time lost in going to and from their meals and their lodging place.—P. B. & W. v. Smith. Decided May 19, 1919.

Equipment and Supplies

Locomotive Deliveries Week Ended May 17

The following locomotives were shipped to railroads under federal control during the week ended May 17:

Works	Road	Number	Type
American	Penn. L. W.	1	USRA Santa Fe
	L. & N.	5	USRA Pacific
	N. & W.	2	USRA Mount.
	Penn. L. W.	2	USRA 6W. Sw.
		10	
Baldwin	Ft. Worth & D. C.	1	USRA Mikado
	Sout. Pac.	3	Santa Fe
	Southern	1	USRA Mount.
	B. & O.	2	USRA 8W. Sw.
	L. H. B.	4	USRA 8W. Sw.
	Tex. & Pac.	1	Santa Fe
	A. T. & S. F.	1	Mikado
	C. B. & Q.	1	Santa Fe
	A. T. & S. F.	1	Pacific
		15	
	Total	25	

Locomotives

The Northern Railroad of France has ordered 50 Mikado locomotives from the Baldwin Locomotive Works.

The Norwegian State Railways, noted in last week's issue as reported to have ordered 16 locomotives from the Baldwin Locomotive Works, placed orders for 18 locomotives with that company, including 2 ten-wheel, 6 Consolidation, 7 Prairie and 3 six-wheel switching locomotives.

Freight Cars

The South Porto Rico Sugar Company has ordered 65, 30-ton, all-steel cane cars from the American Car & Foundry Company.

The H. & H. Refining Company, Kansas City, Mo., has ordered 20, 40-ton, 8,000-gal. tank cars from the American Car & Foundry Company.

The Robert Dollar Steamship Company, San Francisco, Cal, has ordered from the American Car & Foundry Company 100 high-side gondola cars for export to China.

Signaling

The Paris, Lyons & Mediterranean has under consideration the question of installing automatic block signals on 500 miles of its lines.

The Central Railroad of New Jersey has ordered a 36-lever improved Saxby & Farmer interlocking machine from the Union Switch & Signal Company,, for installation at Elizabethport, N. J.

The Norfolk & Portsmouth Belt Line has placed an order with the Union Switch & Signal Company, Swissvale, Pa., for the necessary material to be used in an interlocking to protect traffic over the Elizabeth river drawbridge at Norfolk, Va.

A special meeting of the National Industrial Traffic League will be held in Milwaukee, Wis., on June 11, 12 and 13, to finish business left over from the New Orleans meeting and to take action on the resolutions submitted at that meeting looking toward the forming of a program for the regulation of railroads.

Supply Trade News

Colonel Frederic A. Molitor has returned from military service abroad and has resumed his practice of engineering at 34 Nassau street, New York.

L. M. Sawyer, vice-president of the Chicago Steel Tape Company, Chicago, has been elected president, succeeding Lewis A. Nichols, deceased.

W. L. Garland, manager of the Philadelphia (Pa.) office of the Safety Car Heating & Lighting Company, has been elected a vice-president, with headquarters at Philadelphia, Pa.

Fred H. Jones, resident manager of the General Railway Signal Company at New York City, has resigned that position, effective June 1. He is to engage in the manufacture and sale of railway appliances in Chicago.

The Pollak Steel Company, Cincinnati, announces the appointment of the B. W. Parsons Company, 1001 Pioneer building, St. Paul, Minn., northwestern sales representative, in St. Paul, Minneapolis, Duluth and the Iron Range district.

The Massey Concrete Products Corporation, Chicago, has appointed P. E. Longstreet resident manager of the Western district. Mr. Longstreet is in charge of all sales in that territory with headquarters at 925 South Sixth street, West, Salt Lake City, Utah.

The North American Car Company, Chicago, has purchased a 23-acre tract at 135th street on a joint right of way of the Indiana Harbor Belt, the Baltimore & Ohio Chicago Terminal and the Chicago, Rock Island & Pacific, upon which a car construction and car repair plant will be built in the near future.

W. J. Crombie on May 1 became associated with the Gustin Bacon Manufacturing Company, 1021 Filbert street, Philadelphia, Pa. Mr. Crombie formerly served with the Baltimore & Ohio, the Delaware, Lackawanna & Western and of late years with the Belmont Packing & Rubber Company, Philadelphia.

George Shields, who was purchasing agent of the American Car Company, St. Louis, for ten years, and later served with the National Safety Car & Equipment Company since its organization, has become associated with The Dayton Manufacturing Company as sales representative, with headquarters at Dayton, Ohio.

The Bay City Foundry & Machine Company, Bay City, Mich., manufacturer of coal conveyors, saw mill machinery and hoists, has purchased the business of the Howlett Construction Company, Moline, Ill., manufacturer and builder of the Williams, White & Co., coaling stations. W. E. Howlett, manager and engineer of the Howlett Construction Company, will be manager of the railroad coaling station department of the consolidated company. This consolidation will unite the engineering facilities of the two companies and enable them to manufacture their own machinery.

Westinghouse Electric & Manufacturing Company

The report of the Westinghouse Electric & Manufacturing Company for the year ended March 31, 1919, shows gross business amounting to $160,379,942, an increase of nearly $65,000,000 over the preceding year. This is the greatest volume ever reported in the history of the company, and compares with a gross business of $43,733,646 in the year preceding the war, 1914. After the deduction of operating expenses of $129,271,556, the net manufacturing profit for the year was $31,408,386, or more than double the net manufacturing profit, in the year ended in March, 1918, and approximately seven times the net manufacturing profit of 1914.

Other income brought the gross income to $32,731,648. After all charges and the deduction of Federal taxes, amounting to $15,395,846, there was a surplus available for dividends of $15,059,097, or the equivalent of $10.63 a share on the outstanding common shares of $50 par value after providing for preferred dividends. In the preceding year the earnings applicable to the common were equal to $10.68 a share.

The gross earnings, the report says, include the earnings of the J. Stevens Arms Company and the New England Westinghouse Company. The latter plant will hereafter be devoted to the manufacture of industrial motors and automobile starting and lighting apparatus, thus relieving a crowded condition at Newark and certain departments at East Pittsburgh. Negotiations are in progress for the sale of the company's holdings of 5 per cent prior lien debenture bonds of Electric Holdings of London, which were received in payment for the holdings of the British Westinghouse Electric & Manufacturing Company. Inventories were approximately $1,000,000 less than in the report of the preceding year. The report shows orders on hand as of April 1, amounting to $76,248,000, excluding the orders cancelled as a result of the armistice.

The general balance sheet follows:

ASSETS

Property and plant	$41,806,414
Investments	21,592,258
Current assets:	
Cash	14,127,249
Cash with agents and others	675,342
Cash on deposit for redemption of debentures, bonds, notes and for interest and dividends	154,264
Notes receivable	2,980,343
Accounts receivable	38,500,133
Working and trading assets:	
Raw materials and supplies, finished parts and machines, work in progress, goods on consignment and apparatus with customers, inventoried at cost or less	59,550,261
Other assets:	
Patents, charters and franchises	5,137,421
Insurance, taxes, etc., paid in advance	361,573
Deferred charges to operations	8,225
Total	$184,893,483

LIABILITIES

Capital stock:	
Preferred	$3,998,700
Common	70,813,950
Funded debt	6,305,000
Fifteen year five per cent notes	10,000
One year notes, due February 1, 1920	15,000,000
Real estate purchase money mortgages	120,000
Current liabilities:	
Notes payable—current bank loans	5,280,000
Subscriptions to Liberty Loan bonds	8,186,782
Accounts payable	10,905,700
Interest, taxes, royalties, etc., accrued, not due	15,843,338
Dividend on preferred stock, payable in April	69,977
Dividend on common stock, payable in April	1,239,244
Advance payments on contracts	4,613,675
Unpaid debenture certificates, bonds, notes and interest and dividends	154,264
Reserve:	
Against inventories, notes and accounts receivable, etc.	6,145,120
Profit and loss—Surplus	36,207,733
Total	$184,893,483



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Party of American Soldiers Starting Out for a Day's Outing on Mount Renard in the French Alps

Financial and Construction

Railway Financial News

BOSTON & MAINE.—Judge Julius M. Mayer, in the Federal District Court, signed a decree, upon the consent of Frank M. Swacker, Assistant United States District Attorney, granting permission to James L. Doherty and other federal trustees, to postpone from October 1, 1919, to October 1, 1920, the sale of the stock of the Boston & Maine standing in the name of the Boston Railroad Holding Company, and the securities of the various leased companies, which was ordered disposed of by the decree of dissolution obtained by the government on October 17, 1914, in its Sherman anti-trust suit against the New York, New Haven & Hartford.

CINCINNATI, HAMILTON & DAYTON.—By a Cincinnati court order all of the unmortgaged securities held by this company in outside corporations are to be auctioned to help satisfy creditors' claims amounting to about $55,000,000.

GEORGIA COAST & PIEDMONT.—This road, which was to have been sold at Brunswick, Georgia, on May 6, but had no bidders on the ground, will be again offered for sale on Tuesday, July 1.

GRAND TRUNK.—See editorial elsewhere in this issue.

LOUISIANA & NORTHWEST.—This property will be offered for sale at public auction on June 19 at the court house in Homer, La., by W. P. Leary, special master in chancery. The road operates 121 miles of line between Magnolia, Ark., and Natchitoches, Louisiana.

NEW YORK, NEW HAVEN & HARTFORD.—Judge Manton in the Federal District Court of New York has denied the application of Harold Norris and other minority stockholders for the appointment of a limited receiver to prosecute liability and restitution suits against the former directors of this road. Because of the filing of this opinion the proceedings for the appointment of a permanent receiver were put over to the June term.

Railway Construction

TEXAS & PACIFIC.—Plans have been prepared by this road for the construction of a divisional terminal at Eastman, Texas, at an approximate cost of $500,000, but as yet no authority has been issued for their construction.

LIVE OAK, PERRY & GULF.—Contracts have been given recently to J. D. Donnahoo, Jacksonville, Fla., to build four miles of the Econfena river extension west, and to build a bridge across the Aucilla river. The company now has work completed on about five miles of the total extension, which is to be about ten miles long.

Trade Publications

PNEUMATIC TOOLS.—In a temporary catalogue, containing 48 pages, issued pending the publication of a larger book, the Keller Pneumatic Tool Company, Grand Haven, Mich., shows briefly its line of pneumatic tools, including valve and valveless types of rotary and piston drills, which are new additions to the line. All models of Keller-made master-built chipping hammers, riveting hammers, holders-on, dolly bars, jam riveters and sand rammers are illustrated and described, with detailed specifications and information as to the uses for which each is designed. This company has also published a four-page folder containing a list of its special tool making and production equipment, with a few illustrations of representative operations and productions.

Railway Officers

Railroad Administration

Federal and General Managers

Colonel N. L. Howard, whose appointment as assistant to the federal manager of the Chicago, Burlington & Quincy, with headquarters at Chicago, was announced in the *Railway Age* of May 16 (page 1236), was born at Fairfield, Iowa, and received his education in the United States Military Academy at West Point, N. Y., from which institution he graduated in 1907. Shortly after his graduation from West Point he entered the service of the Chicago, Burlington & Quincy as a civil engineer. Later he was transferred to the operating department as trainmaster at Centerville, Iowa. He next acted in the capacity of assistant superintendent at Galesburg, Ill., and then as superintendent of the Burlington division, at Burlington, Iowa, until 1916, when he was transferred to the Hannibal division at Hannibal, Mo. In June, 1917, he was recommended for a commission as lieutenant-colonel in the Chicago railway regiment, the 3rd Reserve Engineers, and in July of the same year entered military service as lieutenant-colonel in the 3rd Reserve Engineers stationed at Chicago. In May, 1917, he joined the 13th Engineers, and in July of the same year was sent abroad, landing in France in August. Upon his arrival in France he was detached from the 13th Engineers and placed on duty with the director general of transportation until the spring of 1918, when he was returned to the command of the 13th Engineers, then stationed in the Verdun sector. On July 8, 1918, Lieutenant Colonel Howard was promoted to colonel. While in command of the 13th Engineers he saw service in the Champagne, St. Mihiel and Meuse-Argonne offensive, and on February 22, 1919, he was awarded the Croix-de-Guerre by the French High Command. On February 28, 1919, he was relieved of his command and returned to this country in March, when he entered the services of the Chicago, Burlington & Quincy as assistant to the federal manager.



Col. N. L. Howard

Operating

E. K. Merkle, trainmaster on the Colorado lines of the Denver & Rio Grande with headquarters at Pueblo, Colo., has been transferred to the Salt Lake division with headquarters at Thistle, Utah, succeeding **J. W. Barrett,** who has been transferred to Helper, Utah, in place of **M. J. Ruland,** who has been moved to Provo, Utah, to take the place of **E. S. Wright,** who has been transferred to the Colorado lines of the Denver & Rio Grande.

Engineering and Rolling Stock

George H. Webb, colonel of the 16th Engineers (Railway regiment), has resumed his former duties as chief engineer of the Michigan Central, the Chicago, Kalamazoo & Saginaw and the Detroit Terminal, with headquarters at Detroit, Mich.; **J. F. Deimling,** acting chief engineer of these roads has resumed his former duties as assistant chief engineer, with headquarters at Detroit, to succeed **George H. Harris,** who has been performing the duties of assistant chief engineer and will now assume the duties of special engineer on these roads.

Purchasing

H. P. McQuilkin, whose appointment as general storekeeper of the Baltimore & Ohio, the Cumberland Valley, the Western Maryland and the Cumberland & Pennsylvania, with headquarters at Baltimore, Md., has already been announced in these columns, was born on February 6, 1887, at Martinsburg, W. Va., and was educated in the public and high schools of his native town. He began railway work on April 1, 1905, as distributor in the stores department of the Baltimore & Ohio at Cumberland, Md., and the following year served as clerk in the motive power department. He was out of railway work from October, 1906, to September, 1910, and then became storekeeper on the Baltimore & Ohio, at Connellsville, Pa. He was later storekeeper at Washington, Ind., and from April, 1914, to December, 1916, was district storekeeper for the Baltimore & Ohio and the Cincinnati, Hamilton & Dayton at Cincinnati. He was then, to April, 1918, chief clerk to the general storekeeper on the Baltimore & Ohio at Baltimore, and subsequently served consecutively as chief clerk to the purchasing agent until June, 1918, and assistant general storekeeper, until his promotion to general storekeeper on the same road.

Corporate

Executive, Financial, Legal and Accounting

James L. Minnis, vice-president and general solicitor of the Wabash, with headquarters at St. Louis, Mo., has resigned to engage in the practice of law in St. Louis.

H. A. Dixon, district engineer of the Pacific district of the Canadian National, with headquarters at Vancouver, B. C., has been appointed chief engineer, Western lines, with headquarters at Winnipeg, Man., to succeed **A. T. Fraser,** deceased.

Operating

G. E. MacDonald, of the MacDonald-Marpole Company, Ltd., Vancouver, B. C., has been appointed general manager of the Pacific Great Eastern, with headquarters at Vancouver, B. C., to succeed **G. L. Courtney,** who has resigned.

Traffic

S. J. Witt has been appointed general freight agent of the Akron, Canton & Youngstown Railway Company, with offices at Akron, Ohio.

Engineering and Rolling Stock

W. F. Connal has been appointed mechanical engineer of the Canadian National, with headquarters at Toronto, Ont., to succeed **H. D. Cameron,** who recently resigned to enter the employment of the Robinson Connector Company, Montreal, Que.



Photo from International Film Service

One of the Cars Destroyed in the Riots in Egypt

EDITORIAL

Railway Age

Table of Contents will be found on Page 5 of the Advertising Section

The Cost of Neglecting Auxiliaries

A striking example of the economy of a high standard of equipment maintenance is to be found in the report on the air consumption of locomotive auxiliary devices presented at the recent convention of the Air Brake Association. To one who has not made a special study of the situation, the air used by these devices would seem negligible, yet tests under actual working conditions demonstrated that the cost of the fuel required to supply air for their operation ranged from $100 to $300 per year per locomotive, depending upon the type of air compressor used. Furthermore, it was found that the maximum air consumption under certain conditions was so great that it taxed the capacity of the compressor and resulted in a shortage of air to supply the train line which might easily prove disastrous. If to the cost of fuel for air supply is added the increased wear and tear on the equipment and the probable loss due to delays and engine failures, no further evidence is needed to prove that the additional expenditures required to maintain auxiliaries in first-class condition will result in a substantial saving.

The Barriers Should Be Removed

THE CURRENT AGITATION for the re-organization of industry has resulted in the formulation of various theories designed to improve the relations between employers and employees. Both parties are, beyond doubt, putting their best thought into the problem, but, in the main, the results have been discouraging. Generally speaking, the plans advanced by the employers depend for their efficacy on so-called welfare work, and those advanced by the employees, which usually aim chiefly at advances in wages and reduction of hours, are presented through their organizations. Both fall short of the mark for the same reason, the lack of personal contact between the interested parties. Many employers have for a long time realized that the best of plans, no matter how well thought out or how feasible they look on paper, will not work in practice owing to the lack of a sympathetic understanding. Consequently some of them are proceeding on another tack. Instead of following a predetermined plan they are making it their business to learn the viewpoint of the other fellow and, based on the knowledge gained, undertake improvements. Many of these improvements seem minor on their face, but often good results are obtained by them. To be concrete, a foreman is a comparatively small cog in a large organization. Investigation has proved, however, that he is in many cases a barrier rather than a connecting link between the employer and the men. The conception the men have of the company is dependent on the attitude of the foreman. To them he represents the company. If he is of the wrong type and is permitted to carry prejudice into his relations with the men he discourages ambition, discharges good men or keeps them in unsuitable positions and keeps the employer ignorant of the true conditions. Denying a foreman the right to discharge may seem to be of little consequence. But where it has been tried, on the railroads or in industrial plants, and the power given to someone higher up known to be fair to both sides, benefits have sometimes resulted. A plan providing that no man on the permanent forces of the engineering department may be discharged or reduced in rank or pay without the approval of the chief engineer is in effect on a certain eastern road. The improvement which has resulted in this instance is sufficient to warrant further trials in this and other departments.

Emigration Now Exceeds Immigration

In the first four months of this year less than forty million dollars' worth of new work, chargeable to additions and betterments, was authorized by the Railroad Administration. This is far below normal, leaving a corresponding accumulation to be authorized and carried out in the near future. When contemplating any program of construction the question of man power is important. For this reason it is interesting to note that in the four years ending December 31, approximately one million immigrants came into this country, although the number arriving each year steadily decreased during this period and in 1918 the net increase to this country's population through immigration was only about 16,000. It was announced recently, that in the six months since the armistice was signed, nearly 400,000 emigrants have left the country through the port of New York alone. Nearly 1,400 requests for passports to Europe are now being received daily at New York, most of the applicants being immigrants of short residence in this country, Italians predominating. From these figures it seems apparent that in the five months of this year the country has sustained a net loss of 250,000 in population or a decrease of 50,000 monthly, by far the greater proportion being of the class from which railroad and industrial labor is largely recruited. These figures suggest that the worries over the construction and maintenance programs will not be over when the money for carrying them out is made available.

Mr. Gray on Government Operation

ONE OF THE MOST INTERESTING and instructive addresses which have been delivered on our government's experience in operating the railways is that which was made by C. R. Gray, formerly director of operation of the Railroad Administration, before the St. Louis Railway Club on April 22. An abstract of Mr. Gray's address is published elsewhere in this issue.

Mr. Gray told of a number of vital problems, such as that of getting food to the Allies and coal to New England, with which the Railroad Administration was confronted and the way in which they were solved. It is easy for anybody who heard or who reads his address to understand why it was impossible for the railways to handle the essential war business of the country and at the same time be economically operated.

Mr. Gray's comments upon the labor situation were especially interesting. He showed clearly that the wage advances made as a result of the recommendations of the Railroad Wage Commission so completely disrupted all the old relationships between the wages of different classes of employees that immediate readjustments became absolutely neces-

sary. At the same time, he sees clearly the disabilities under which the government works in the handling of labor problems. One of these disabilities, as he pointed out, is that the government must make uniform scales of wages throughout the country regardless of differences of conditions; and the law of supply and demand, which, to a large extent, governs the wages paid by private concerns, cannot operate in the case of a business under government management. If in a certain district there happen to be conditions which force up the wages of men employed by private concerns in a particular line of work the government has only two alternatives. First, it may refrain from advancing wages to this special class of men in that particular territory; in that case it will not get enough men. Second, it may advance the wages to that special class of men in that particular territory. In that case it will be forced, regardless of differences in conditions in different parts of the country, to make a similar advance in wages to all workers of that particular class throughout the country. "Of the different things which I encountered which satisfied me that federal operation of all of the railroads would be an economic mistake," said Mr. Gray, "that was the most effective." He might have added that of all the things which have tended to increase railway expenses under government operation more than they would have been increased under private operation none has produced such potent effects as this real, or apparent, necessity for the Railroad Administration paying the same wages and prices throughout the country regardless of differences of conditions.

Mr. Gray paid high tribute to the loyalty with which railway officers have worked under government operation. He said that after Mr. McAdoo "had made trips over the country and had met these officers, with the greatest gratification he told me that in all his life he had never met a set of men who so measured up to what the emergency required as the railroad officers of this country." And of the men who entered the service of the government none rendered more tactful, loyal, arduous and effective service than Mr. Gray himself. It was fortunate for the railway officers of the country that when the demands made upon them under government operation were the greatest, and when the criticisms being heaped upon them were the most malignant, Director General McAdoo had associated with him as one of his principal lieutenants as fine and representative a type of the American railway operating officer as C. R. Gray.

Mr. Gray did not exaggerate, but spoke the simple truth, when he said, "that the men who stood behind this movement and supported it in every way, and worked themselves beyond everything that they had ever done before to hold up the highest traditions of the profession, were the railroad officers."

Michigan Central

In 1918 the Michigan Central earned a profit over and above the rental which the government had to pay for it of over $7,000,000. This profit, of course, accrues to the government. The rental which the government paid to the corporation was $8,052,000. The amount which the property earned through operation was $68,520,000, or $15,641,000 more than the property earned in 1917. The Michigan Central consists of 1,862 miles of line, of which the main line, as will be seen on the map, runs from Buffalo along the north shore of Lake Erie to Detroit and from there across the southern end of the state of Michigan to Chicago. It formed one of the northern routes over which traffic was sent from the West to Atlantic seaboard points, avoiding the congestion of the Pittsburgh gateway. In 1918 the road handled 29,653,000 tons of revenue freight, an increase over 1917 of 2,412,000 tons. The average length of haul was a little longer in 1918—175 miles, as compared with 171 miles in 1917. Thus, the total ton mileage of revenue freight was 5,203,000,000, an increase over 1917 of 10 per cent. The number of passengers carried one mile was 588,696,000, an increase of 13,596,000, or about 2 per cent.

Total operating expenses amounted to $51,070,000, an increase of $12,781,000. The Michigan Central operating ratio was 74.53 in 1918, comparing with 72.41 in 1917.

The maintenance costs of the Michigan Central increased about in proportion to the increased maintenance costs on other roads. Thus, maintenance of way and structures cost $7,705,000 in 1918, an increase of $2,315,000; maintenance of equipment cost $12,382,000, an increase of $4,356,000. Sometimes it is well to pause a moment to get a full realization of what the increases in unit costs of repairs and renewals to a railroad property have amounted to in the last few years. We used to think of $2,500 as a fair amount for cost of repairs per locomotive, $900 per passenger car, $75 per freight car, and $1,500 for maintenance of a mile of road. The following table shows the unit maintenance costs on the Michigan Central for 1917 and 1918:

	1918	1917
Maintenance of way per mile	$4,116	$2,817
Repairs, exclusive of renewals and depreciation per locomotive	5,365	3,550
Repairs, exclusive of renewals and depreciation per passenger car	1,382	757
Repairs, exclusive of renewals and depreciation per freight car	132	77

With an increase of 10 per cent in freight business and with an increase in labor hour costs and unit of material costs, commensurate with that on other roads, the transportation expenses of the Michigan Central increased by only 27 per cent and amounted, in 1918, to $28,214,000. If there were very many other roads in the country which had made such a showing as the Michigan Central did in 1918, the American railroad problem would be far less alarming than it now is.

In 1918 the average trainload of revenue freight amounted to 698 tons, an increase over the previous year of 43 tons. Car loading was much better in 1918 than in 1917, the average tonnage per loaded car being 22.39, an increase of two tons over 1917. The Michigan Central carried a much larger proportion of bituminous coal in 1918 than in 1917. Of the total 29,653,000 tons of all revenue freight carried in 1918, 7,848,000 tons were bituminous coal, whereas in 1917, of the total 27,240,000 tons carried, 6,340,000 tons were bituminous ocal. It is rather interesting to note that the tonnage of dressed meats, amounting in 1917 to only 184,000 tons, amounted in 1918 to 421,000 tons, and the tonnage of other packing house products, amounting in 1917 to only 189,000 tons, amounted in 1918 to 502,000 tons.

Like the other principal New York Central lines, the Michigan Central will have to do some permanent financing when the roads are turned back to their owners, but there is this much to be said, if any American railroad is to have its credit fully restored, on a basis of its earning power under present labor and material costs, the Michigan Central ought to stand high in the ranks of the roads bidding for money. The corporation, at the end of 1918, had on hand $1,398,000 cash and the government owed it $5,056,000 for rental due, $2,713,000 for cash taken over on January 1, 1918, $5,488,000 for agents' and conductors' balances of that date; and $8,070,000 for materials and supplies. The agents' and conductors' balances can, of course, be disregarded since that item will presumably balance itself when the roads are returned. The Michigan Central had outstanding at the end of 1918 $22,885,000 loans and bills payable. It owed the government $4,362,000 for additions and betterments, $2,943,000 for "corporate transactions," and $10,365,000 for liabilities as of December 31, 1917, paid by the government.

Can the Michigan Central keep up under present conditions the profitable operation as shown in 1918? In the first three months of 1919 the property earned $16,764,000 gross and operated on a ratio of 80.52 and had an operating income of $2,785,000. This operating income is more than the operating income for the first three months of 1918 by $1,089,000.

The following figures show the results of operation under the government. This is not the corporate income account:

	1918	1917
Mileage operated	1,862	1,862
Freight revenue	$45,949,560	$33,898,247
Passenger revenue	15,901,585	12,859,299
Total operating revenues	68,520,087	52,879,434
Maintenance of way and structures	7,705,080	5,389,671
Maintenance of equipment	12,382,137	8,206,084
Traffic expenses	738,990	865,239
Transportation expenses	28,214,019	22,211,260
General expenses	1,149,799	973,012
Total operating expenses	51,070,072	38,289,136
Taxes	1,899,790	1,762,795
Operating income	15,542,761	12,814,097

Corporate Income Account

	1918
Rental	$8,052,127
Gross income	8,955,107
Net income	2,569,563
Dividends	749,456
Surplus	1,820,107

Cleveland, Cincinnati, Chicago & St. Louis

Had the Cleveland, Cincinnati, Chicago & St. Louis been an independent company without strong banking support, it would quite probably have had to go through a receivership in 1913 or '14. At the end of 1913 the company had outstanding $91,943,000 of funded debt and $57,067,000 of stock, of which $10,000,000 was preferred. It had loans and bills payable of $7,454,000, and total current liabilities, including these loans, of $14,416,000. There was but $3,646,000 cash on hand, and, including this cash, but $11,093,000 current assets. In 1913 the road had failed to earn its fixed charges by $2,698,000, which debit to profit and loss wiped out the small previously existing surplus and left a debit to be carried to the balance sheet of $1,390,000. The funded debt was at the rate of about $46,000 a mile, and gross earnings amounted to less than $17,000 per mile.

The road had been seriously damaged by unprecedented floods, with the prospect that not only would considerable expenditures on capital account be needed in the immediate future, but that there would be attendant heavy charges for maintenance. Making a full allowance for a loss of $1,200,000 in revenues on account of the flood (which now seems unduly high), and $400,000 added to operating expenses, the road had an operating ratio of 83.2 per cent. It would have been exceedingly difficult to have gone to a disinterested banking house, either on the basis of these figures or of a physical inspection of the property, and to have raised the necessary funds for continued solvent operation.

The Big Four, being a subsidiary of the New York Central, was enabled to escape financial disaster and was thus given a chance to pull itself out of its difficulties by increased earnings, accompanied by economies in operation. In 1914, $1,500,000 was spent for additions and betterments to roadway and $4,949,000 was expended for new equipment. In 1915, $1,045,000 was spent on additions to roadway and $3,689,000 for equipment; but against this equipment charge there was a credit for equipment retired of $1,390,000, leaving a net increase in investment in equipment of $2,299,000. In 1916, $1,605,000 was spent for additions and betterments to road, and $1,408,000 for equipment, less $1,809,000, value of equipment retired, leaving a net decrease in investment in equipment of $401,000. In 1917, $2,222,000 was spent for additions and betterments to road, and $5,616,000 for equipment, less $1,525,000 value of equipment retired, leaving a net increase in investment in equipment of $4,092,000. During the years 1913 to the end of 1917, the outstanding funded debt increased from $91,943,000 to $105,248,000, but in the meantime the mileage had increased from 2,014 miles to 2,387 miles, so that funded debt was at the rate of only $44,000 per mile, as against $46,000 per mile in 1913. The increase in funded debt of approximately $13,000,000 was the result of a decrease in outstanding debentures and an increase in outstanding equipment trust certificates, miscellaneous obligations and the establishment of a debt of $6,017,000 to affiliated companies.

During this time loans and bills payable were reduced from $7,454,000 to $3,763,000, and cash on hand remained around $3,000,000.

The total of $6,372,000 for additions and betterments to road and of $10,939,000 for equipment was provided for, partly through the increase in debt to affiliated companies, and partly through surplus earnings put back into the property. In 1914 there was still a deficit after the payment of interest charges, but in 1915 there was net income of $3,405,000 and in 1916 of $8,332,000, from which, however, $750,000 was charged off for equipment depreciation not taken up through adequate charges to maintenance in previous years, and there was also $375,000 paid out in dividends on the preferred stock. In 1917 there was $5,258,000 net income available for dividends, and the full 5 per cent, calling for approximately $500,000, was paid on the preferred stock. This left, after sinking fund charges, $4,657,000 to be transferred to the credit of profit and loss. The 1916 and '17 surplus wiped out the previous debit to profit and loss and left a credit balance, December 31, 1917, of $9,661,000.

Under government operation the Big Four continued its remarkably fine showing. In 1918 the property earned $71,404,000, an increase over 1917 of $18,753,000. It is an astounding fact that the operating ratio was within a fraction of one per cent as low in 1918 as in 1917 (72.68 in 1918 and 72.29 in 1917). The ratio of transportation expenses (the out-of-pocket cost of moving the business) was actually less—39.52 in 1918 and 40.76 in 1917. The rental which the government is to pay is $9,939,000. The net income which the government received in 1917 was $14,689,000; this is after paying expenses and rentals.

In 1918 the Big Four handled 43,056,000 tons of freight, an increase of 3,385,000 tons over 1917, and the average haul per ton was 178.8 miles, as against 178.0 miles in 1917. The ton mileage handled, therefore, amounted to 7,010,000,000 in 1918, an increase of 638,000,000 ton miles. The average receipts per ton per mile were 7.12 mills in 1918, as against 5.66 mills in 1917.

The average revenue trainload was 779 tons; this compares with 691 tons in 1917 and 457 in 1913, the year before the flood. The average load of revenue freight per loaded car mile was 27.4 in 1918, as against 25.0 tons in 1917.

Of the many factors which have gone to make up this history of the imminently successful rehabilitation of a road under conditions which were dragging many other railroads on the way to bankruptcy, notwithstanding the fact that they appeared in 1914 to be in a far better condition than the Big Four, one or two stand out beyond all the others.

One of these is the wonderful spirit of co-operation and teamwork which was infused into the organization. In all lines of human endeavor, it is possible for a born leader of men to use a desperate situation as a stimulus to efforts that would be unthinkable under ordinary conditions. The Big Four was in a desperate situation, but the organization came back with a united effort that is worth admiration. The other feature about this remarkable story of rehabilitation is the courage shown in providing facilities in addition to

repairing flood damages. It takes no ordinary brand of courage to order new locomotives and rolling stock when the road faces possible receivership and when the market for equipment trust certificates is extraordinarily bad, but this is what the management of the Big Four did, and the results in 1918 are a monument of justification.

The following figures show the results of operation under the government. This is not the corporate income account:

	1918	1917
Mileage operated	2,396	2,396
Freight revenue	$49,934,631	$36,077,390
Passenger revenue	15,359,128	12,009,346
Total operating revenues	71,403,970	52,650,920
Maintenance of way and structures	7,298,040	4,378,438
Maintenance of equipment	13,894,337	9,808,408
Traffic expenses	882,576	1,042,726
Transportation expenses	28,229,455	21,459,558
General expenses	1,201,871	1,054,131
Total operating expenses	51,895,289	38,059,421
Taxes	3,538,918	2,144,868
Operating income	15,592,011	12,436,999
Net operating income	14,688,938	10,536,475

Corporate Income Account

	1918
Rental	$9,938,597
Gross income	10,772,278
Net income	4,736,706
Dividends and appropriations	627,350
Surplus	4,109,356

New York Central

The results of operation of a railroad under government control in the calendar year 1918 are not necessarily a criterion of the net earning power of the property under private operation and with competitive conditions. On the other hand, in the east the year's operations were, generally speaking, an acid test of the ability of a property and the organization to handle a greatly increased business satisfactorily. Where a road had superimposed on it a management not intimately familiar with its problems or not necessarily sympathetic with its particular line of development, or where it was called upon to handle a character of traffic which it was not naturally best fitted to handle, 1918 operating results were hardly a fair criterion of what may be expected of the property in the future. On the other hand, where a property showed up remarkably well under the conditions in 1918, it is fairly safe to assume that that property had been put in remarkably good shape prior to 1918 and that its chances of profitable operation in the immediate future are more than fairly good. This latter is the case with the New York Central.

Up until ten years or so ago the eastern end of the New York Central (what was then the New York Central & Hudson River) was looked upon as a high class passenger road with a large proportion of fast and bulky, but light freight business, more comparable in its operating problems to some of the English roads than any of the other trunk line railroads. When the Lake Shore & Michigan Southern and the New York Central & Hudson River were merged, the Lake Shore's heavier train load and larger proportion of coal and ore pulled up the average train load for the whole system, but even in 1914 the revenue freight train load averaged for the system only 642 tons. In the calendar year 1918, with operating conditions in the first three months of the year that were unprecedentedly unfavorable, the New York Central had an average revenue train load of 891 tons and the train load including company freight averaged 970 tons. The gain over 1917 in revenue train load was 47 tons. The average tonnage of revenue freight per loaded car was 26.36 tons in 1918 as against 24.15 tons in 1917. It is notable that while the average number of loaded cars per train mile was 33.80 in 1918 as against 34.94 in 1917, the average number of empty cars per train was 18.05 as against 16.59, so that the gross tonnage hauled behind the drawbar increased much more than is indicated by the increase of 47 tons in revenue train load.

These figures for operation are cited before discussing the financial results of the year's operation because they are so essential to an understanding of the financial showing made.

When the roads were taken over by the government, A. H. Smith, president of the New York Central, was appointed regional director of the Eastern region, but remained also president of the corporation. In June Railroad Administration officers severed their connection with the corporations, and for the last seven months of the year, therefore, the property was operated under P. E. Crowley, federal manager in the Eastern region, acting under A. H. Smith as regional director.

To repeat once more, the financial results of operation of the railroad properties under federal control do not affect the amount available for interest and dividends on the corporation's securities. The New York Central's rental due from the government was fixed at $55,803,000. This left, after the payment of interest, corporate expenses, etc., and war taxes $24,465,000. From this, on the New York Central's books, is subtracted $6,548,000 for expenses applicable to the period prior to January 1, 1918, and settled for the account of the corporation by the United States Railroad Administration. This left $17,917,000 net corporate income. The five per cent dividends call for $12,480,000. So much for the corporation income account.

The property—5,682 miles—earned in 1918 from its operation as a railroad $269,271,000, or $53,003,000 more than in 1917. After paying operating expenses and taxes there was $47,342,000 railway operating income in 1918, as against $52,068,000 railway operating income in 1917. Against the expenses of 1918, however, had been charged the $6,195,000 lap-over expenses accrued prior to January 1, 1918. Making the necessary adjustments and figuring in rent and hire of equipment there was a net income of $52,230,000, comparing with $55,803,000 rental due to the corporation from the government. Had the property been operated on its own account it would have had after paying interest charges, approximately $14,300,000 available for dividends, with dividend requirements of $12,480,000. When we compare this with the financial showing of some of the other eastern roads it looks exceptionally good.

Unfortunately the balance sheet statement of the New York Central (the corporation) is not so encouraging, but this is primarily due to the fact that the New York Central has a heavy proportion of funded debt to stock and has not in recent years been able to do the long term financing which it wanted to do. The corporation has approximately $250,000,000 of stock and $688,000,000 of long term debt. At the end of 1918 the company had $41,963,000 loans and bills payable and owed the government $16,651,000 for additions and betterments and $21,512,000 for liabilities of December 31, 1917, paid by the government. There was on hand at the end of 1918, $8,993,000 cash and the government owed the company $27,672,000 on account of rental, $13,407,000 for cash taken over January 1, 1918, $9,617,000 agents' and conductors' balances, $34,240,000 materials and supplies and $6,919,000 assets as of December 31, 1917, collected by the government. The totals are $73,342,000 current liabilities and $73,927,000 deferred liabilities, with $48,917,000 current assets and $74,477,000 deferred assets.

Were the railroads to be handed back to their owners tomorrow, from an operating point of view the New York Central would be in a strong position comparatively. The organization is intact, the physical condition of the property is good, and owing to its ability to handle increased traffic during the first trying months of 1918, it has gained rather than lost, from a traffic point of view, through being operated by the government. In regard to the condition of the property a

word should be said about maintenance expenses in 1918. Total maintenance of way expenses amounted to $31,868,000, an increase of $11,163,000 over 1917. Maintenance of equipment expenses amounted to $57,313,000, an increase over 1917 of $18,866,000. These increases in maintenance of way expenses reflect no more than the increased unit costs of labor and material. As a matter of fact, however, the physical condition of the New York Central would indicate that the federal officers have been able to pretty well keep up the old standard of maintenance and especially is this so in regard to maintenance of way.

In 1918 a net total of $40,735,000 was spent for additions and betterments. Of this amount $11,433,000 was expenditures made by the federal manager, $13,002,000 was the cost of equipment assigned to the New York Central by the United States Railroad Administration, $8,511,000 was expenditures by the corporation for additional equipment and $4,783,000 was expenditures by the federal manager on leased property.

The policy pursued by the New York Central in regard to purchases of equipment in recent years is of especial interest in the light of operations in 1918. On January 1, 1915, there were 1,774 locomotives on hand in freight service, 795 in passenger service and 680 in switching service. During 1915 forty-six freight locomotives were added and 142 freight locomotives, 34 passenger locomotives and 15 switching locomotives retired. In 1916 there were added 123 freight locomotives, 11 passenger locomotives and 26 switching locomotives; there were retired 140 freight, 44 passenger and 33 switching locomotives. In 1917 there were added 64 freight, eight passenger, 113 switching and 10 electric locomotives, and there were retired 81 freight, 19 passenger and 17 switching locomotives. In 1918 there were added 231 freight, 43 passenger and 86 switching locomotives, while 26 freight, 13 passenger and 3 switching were retired. This is a total of 464 freight locomotives added and 399 retired.

The operation of the New York Central in 1918 demonstrated probably to the satisfaction of most of the federal officers in charge the wisdom of prompt replacement of obsolete equipment and the absolute necessity, if American railroads are to meet the ever progressing needs of the country, of the continued purchase of new equipment before the need for such equipment becomes desperately pressing. The financial results on the New York Central in 1918, although not affecting the pocketbook in that year, at least of security holders, probably demonstrated very clearly to most of the corporation's directors the wisdom of the policy in regard to purchasing equipment.

The following table shows the principal figures for operation of the property of the New York Central under federal operation. This is not the corporation income account:

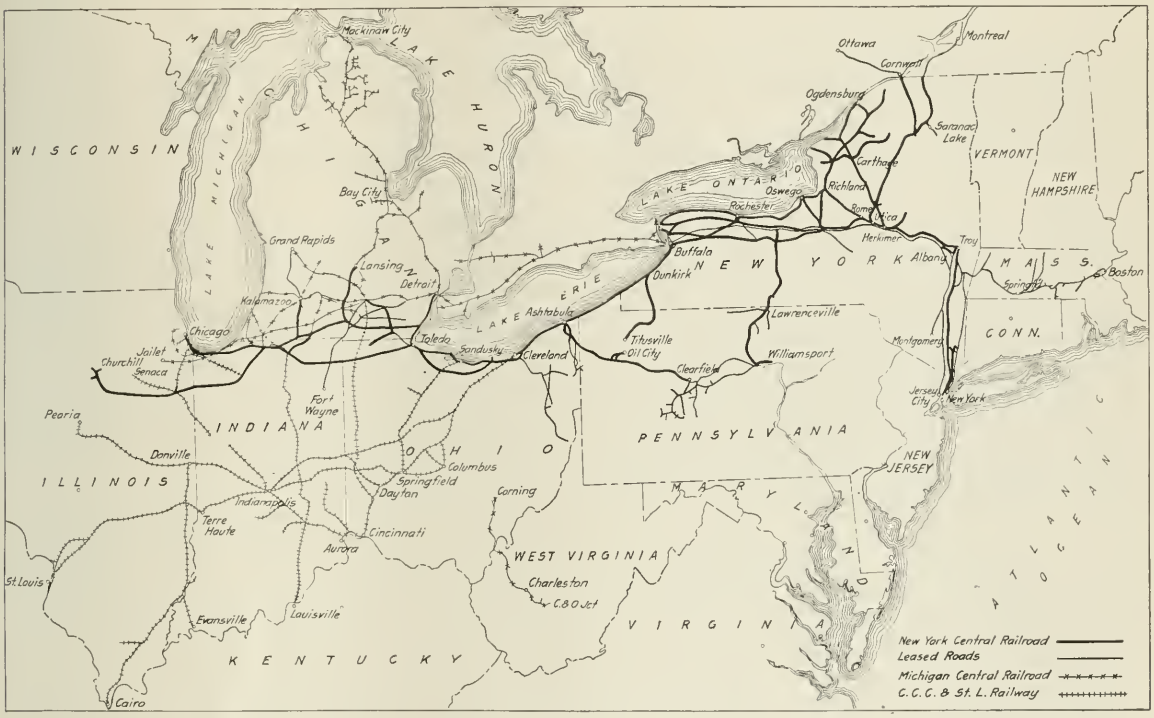
	1918	1917
Milcage operated	5,682	5,685
Freight revenue	$175,869,945	$135,979,337
Passenger revenue	60,370,139	49,987,343
Total operating revenues	269,270,957	216,267,517
Maintenance of way and structures	31,867,769	20,704,306
Maintenance of equipment	57,312,738	38,446,594
Traffic expenses	2,572,460	2,929,824
Transportation expenses	109,405,171	83,627,440
General expenses	6,239,315	4,923,016
Total operating expenses	210,637,849	153,597,905
Taxes	11,273,156	10,594,036
Railway operating income	47,342,357	52,056,181
Net income	46,035,896*	51,090,931

*Expenses subtracted to arrive at this figure include $6,194,712 accrued prior to January 1, 1918, which the administration has paid on account of the corporation.

CORPORATE INCOME ACCOUNT

	1918
Rental from the government	$55,802,631
Other income	13,471,252
Gross income	69,270,921
Net income	24,465,345
Dividends	12,479,610
Surplus	11,985,735*

*The company on its books substracts from this amount $6,548,000 expenses accrued prior to January 1, 1918, paid on the corporation's account by the administration.



The New York Central, the Cleveland, Cincinnati, Chicago & St. Louis and the Michigan Central



A. H. Smith



A. T. Hardin



J. H. Hustis



H. A. Worcester

Eastern Region Under A. H. Smith as Director

The Complicated Problem Caused by Congestion in 1917-18 Completely Worked Out

Alfred H. Smith, director of the Eastern region of the Railroad Administration, has resigned to return to the presidency of the New York Central. Mr. Smith was the first regional director appointed by William G. McAdoo, and at the outset had under his jurisdiction the territory now included not only in the Eastern region but in the Allegheny and Pocahontas regions as well. He faced a situation of great difficulty requiring firmness and the ability to make quick decisions. Mr. Smith possesses these qualifications to a marked degree. Throughout his handling of the Eastern territory, he showed entire fearlessness and took the initiative to an extent that has seldom been equalled in government service.

A. T. Hardin, who has been assistant regional director and also director of the Central District of the Eastern region, has been appointed regional director of the Eastern region. Mr. Hardin has worked with Mr. Smith for many years. When Mr. Smith became general manager of the New York Central & Hudson River in 1903, Mr. Hardin was engineer of maintenance of way, and in 1905 was appointed assistant to the general manager. A year later, Mr. Smith was elected vice-president and Mr. Hardin was made assistant general manager and his authority was extended over the other New York Central lines at the time of the extension of Mr. Smith's authority; when Mr. Smith became president, he was elected vice-president in charge of operation, maintenance and engineering.

The eastern railroad situation has now been straightened out; there is no congestion; the roads are seeking traffic; the Pittsburgh gateway is opened; New England is supplied with coal; and the old familiar problems of holding down expenses and securing additional business are again to the fore. When, however, A. H. Smith was appointed regional director of the Eastern region in January, 1918, the Pittsburgh gateway was completely blocked; there were lines of loaded cars extending back from the Atlantic seaboard for many miles; the thermometer varied between 5 deg. below zero to 30 deg. below zero; one storm after another buried yards and main lines deep under thick frozen snow; New York harbor froze up; a coal famine threatened everywhere in the east; and government priority orders had so interfered with each other that only with the utmost difficulty and the exercise of extraordinarily sound judgment could any superintendent tell what traffic he should try to move first. Passenger trains were stalled; trainmen and yard and switchmen fought the cold and wind, rising sometimes to 70 miles an hour, but a day's work under such conditions as these accomplished less, often, than would two hours' work under normal conditions.

The Eastern ports—Norfolk, Baltimore, Philadelphia, New York and Boston—were the crucial points in the situation both as regards supplies and munitions for the Allies and for getting our own army overseas.

The best that the new regional director could hope to do was to quickly form a loyal organization of the men actually on the ground and so direct and co-ordinate this organization as to bring order out of chaos. The president of each railroad in the Eastern region was directly responsible for the operation of his road to the regional director, but an advisory organization was formed which consisted of six presidents' committees as follows: New England district, James H. Hustis, receiver of the Boston & Maine, chairman; New York, Niagara and Frontier district, W. H. Truesdale, president of the Delaware, Lackawanna & Western, chairman; Central Traffic district, J. J. Turner, vice-president of the Pennsylvania lines west, chairman; Philadelphia, Baltimore and Pittsburgh district, Samuel Rea, president of the Pennsylvania Railroad, chairman; Hampton Roads district, N. D. Maher, president of the Norfolk & Western, chairman; and the Michigan and International Boundary district, F. H. Alfred, president of the Pere Marquette, chairman.

This organization endured until June, 1918, when federal and general managers were appointed in place of the presidents of the roads. When this change took place, Mr. Smith recommended the appointment of the president or the operating vice-president, in charge of the property in each case, as federal or general manager.

Thus, since A. T. Hardin, vice-president of the New York Central, had been taken into the organization of the region, P. E. Crowley, vice-president of the New York Central, was made federal manager of the New York Central; E. J. Pearson, president of the New Haven, was made federal manager of that property; A. J. Stone, vice-president in

charge of operation of the Erie, was made federal manager of that property; H. M. Biscoe, vice-president of the Boston & Albany, was made federal manager of that property; E. M. Costin, general superintendent of the Cleveland, Cincinnati, Chicago & St. Louis, was made federal manager of that property; and this policy was pursued even to the appointment of separate general managers for the Central of Vermont and for the Canadian Pacific lines extending into New England.

The line of action taken in regard to personnel had probably a very important effect on operating conditions. The size of the region made it necessary to subdivide it into districts and each district director, himself familiar from long experience with conditions in his district, was surrounded with federal and general managers, operating properties with which they were thoroughly familiar and in sympathy with. It might have been perfectly logical and feasible to have combined a number of the roads in some of the districts, certainly in the New England district, under one general manager or federal manager, but it was felt that it would be a grievous mistake to make a change under the tremendous stress of last year's railroad conditions which, however logical in itself, would, for the time being, deprive any property of the man most familiar and most sympathetic with its problems.

Prior to the assumption of government control, there was competition for through business between the New York Central, the Erie, the Lackawanna, Lehigh Valley, Pennsylvania and Baltimore & Ohio. With the placing of the first four within the Central district of the Eastern region, not only was competition eliminated between these roads but a choice of routes was made available by which it became possible to segregate certain classes of shipments to one or other of the roads and to so arrange freight schedules as to permit of a quick shifting of traffic from one route to the other to meet temporarily abnormal conditions. Furthermore, the fact that all of the roads were under government control eliminated competition with the two important roads in what later became the Allegheny region—the Baltimore & Ohio and the Pennsylvania.

The New York Central, in so far as its trackage, exclusive of terminals, is concerned, probably had, in 1917, a larger margin of safety in so far as actual road movement of freight was concerned than had any of its important competitors. The other three roads had a considerable margin of capacity in road movement of freight, and the joint utilization of all of these roads is thought to have very considerably increased the total of this margin of capacity.

The New York Central had been foresighted and courageous in buying both cars and locomotives in 1916 and 1917. At the time, the cost of this equipment had seemed very high and naturally purchases were entered upon only after the most careful consideration. The bitter weather of December, January and February crippled the locomotives, especially of the Pennsylvania, to a dangerous extent. For a while, the problem was one of diverting both east and westbound business from the Pittsburgh gateway and especially from the railroads between Pittsburgh and Philadelphia and Baltimore.

Peculiar Difficulties of the Situation

The situation was not one for punctilious niceties or sensitive fear of criticism. Mr. Smith was a New York Central man, and the competition between the New York Central, the Pennsylvania and other eastern trunk lines had, in times past, been keen. While it was true that the government was guaranteeing a rental to each road on a basis of business handled under free competition, there was, even under the regional system adopted, the possibility that some roads would look with suspicion on anything that was done to divert traffic from their lines. On the other hand, the operating officers of the lines from which it was necessary to divert traffic, themselves, apparently, were fully aware of the needs of the situation. Up until May 31, when the Allegheny and Pocahontas regions were formed, it is probable that everyone in authority concerned with the operation of the roads in the Eastern region felt the urgent necessity of turning traffic away from the Pittsburgh district. The Pennsylvania Railroad, itself, had cars above normal on its lines amounting to 19,000 in January, to 27,000 in the early part of February, and to 10,000 in the latter part of February. Car movement, because of the severe weather, was far below normal, as far even as 50 per cent below normal at times.

The Allegheny and Pocahontas regions were formed out of the Eastern region in June, and the problems of these two regions have already been described at some length in the *Railway Age*. The carving out of these two new regions, left the Eastern region a somewhat oddly formed territory. This territory was divided into three districts: the New England district, under James H. Hustis as district director; the Ohio-Indiana district, which included both the Cleveland, Cincinnati, Chicago & St. Louis and the Pennsylvania lines west, under H. A. Worcester, formerly vice-president of the Cleveland, Cincinnati, Chicago & St. Louis; and the Central district, under A. T. Hardin. This left, of course, former New York Central officers predominating in the regional organization. The Pennsylvania lines west and the Pennsylvania Railroad, itself, were still, in June, July and August, under very heavy pressure. Even as late as August 27, 1918, the traffic officers of the Pennsylvania lines west issued a circular approved by G. L. Peck, federal manager, as follows:

"The volume of raw materials and finished products essential to the war program has reached such immense proportions in the Pittsburgh district that there is no transportation capacity left for the handling of other car load traffic through the district, either eastbound or westbound, which it is possible to divert via other routes.

"Beginning at once, eastbound car load traffic should, to the fullest extent possible, be diverted to other available routes, and, where practicable, shippers should be requested to use other initial lines, the routes of which will avoid the Pittsburgh gateway.

"The use of the Pittsburgh gateway should be similarly restricted on traffic originating on connecting lines.

"The general rule contained in the book of general instructions for the government of agents, which instructs agents, when routing is not otherwise ordered, to forward freight via the route paying the Pennsylvania system roads the most revenue, is superseded with respect to the traffic referred to herein, and available routes via short-haul junctions should be utilized."

The Central District

During the entire year, 1918, the New York Central made a very good showing comparatively. In the editorial review of the annual report of this company, appearing elsewhere, an attempt is made to analyze the reasons for this, but it is proper to say here that the generous provisions which had been made for motive power and rolling stock for the New York Central were a most important factor. During the severe winter weather, the northern lines were not so completely prostrated as were the southern lines of the Eastern region. Officers and employees were, apparently, more accustomed to the very low temperatures and high winds than were the railroad men of the southern lines. This, of itself, was a help to the New York Central, and, coupled with the fact that they had a greater margin of equipment to fall back on, gave the organization a feeling of reliance that may have been lacking on a road like the Erie, for instance, which was short of power.

The Erie

The Erie situation is particularly interesting. Under F. D. Underwood, a crooked, high-grade, single track, run-down railroad was transformed into a New York-Chicago double-track, modern, fairly low-grade trunk line. The financial difficulties that had to be overcome were appalling; and the road was on the verge of bankruptcy more than once. A transportation machine was built up, capable of handling, except for locomotives, much more traffic than the road was getting in 1910 to 1913. In the working out of keen competition for freight, the Erie, with its uncongested through line, bid for and received a very large share of the fast freight between Chicago and New York. Refrigerator business, both fruit and dressed meats, came to it in large quantities. This is an expensive business to handle, both because of the speed required and the large proportion of tare weight (also empty car movement) which it involves. Had conditions remained normal, the Erie might have succeeded in building up a freight business to fill in its capacity and profitably retain a good part of its fast freight business. War conditions intervened, however; the Erie had become known as a fast freight line. Business, which had to be moved at great expense, was dumped on to it at first by the manufacturers of munitions and supplies for the Allies, and later when the United States government took over the roads, the Erie had to carry a large proportion of perishable freight and other traffic which required high speed and a high proportion of tare weight to load.

The amount of freight which the Erie has handled, as reflected in its gross earnings, was very large, but this does not begin to show the increase in gross tonnage (revenue tonnage and weight of equipment) which the road handled.

New England District

New England has often been likened to a great receiving yard, and the simile is a good one. To every hundred loaded cars received, only about 75 are sent out. The greatest problem was to get coal into New England for the great number of munition and arms factories in that district and for the vast number of other industries of the district engaged in war work. For a period of two years, the coal tonnage brought into New England was doubled. This, in itself, is an achievement which the railroads of that district may feel justly proud of.

There was little roundabout routing of freight within New England, even before government control. The Boston & Maine was being gotten into good shape before the beginning of 1918; the smaller roads were in general in quite good shape as compared with the character of traffic they were called on to handle. The Boston & Albany was in fine shape, but the New York, New Haven & Hartford was still in a process of rehabilitation after years of operation as an adjunct to banking schemes and plans of consolidation, all of which may have been for the good of New England in the long run, but which had so overshadowed the operating necessities of the road as to make the problem of the successors to former President Mellen a difficult one. A serious congestion in this great receiving yard would have tied up New England industries to a disastrous extent.

The problem of preventing congestion within New England was met in what appears now, in the light of more than a year's experience, the only safe and practical way. Permits were issued to shippers outside of New England to ship to New England ports, only when there was a reasonable certainty of boat accommodations being provided to handle expeditiously the freight that was so consigned. The New England district management took upon itself the task and responsibility of ascertaining the capacity of ships due and sailing dates, nature of cargo, etc., and permits were issued for freight to move into New England for export in the light of this information. The Railroad Administration was helped by the fact that little, if any, United States government freight was shipped through the port of Boston. In the first years of the European war, large shipments came down to Boston from the Canadian roads, but by the time the New England district was formed, the Canadian roads were in shape to handle the business for export largely through their own ports, although all during 1918 considerable Canadian traffic found its way out through Portland.

It was not, therefore, a hard thing, so far as physical elements went, to control the flow of traffic into New England. The very fact that the district director had, what might be called a strangle hold on the manufacturers of New England, made the exercise of his authority liable to be particularly irritating. It is a remarkable tribute to the personality of the district director that a free and quite drastic exercise of this authority did not, to any alarming extent, stir up antagonism in New England. Without repetition, or without going at great length into details, it is impossible to draw a clear picture of the extent and intensity of the difficulties which were overcome in handling this New England situation. The people of New England are prone to be severe critics, as presidents of New England railroads have found in the past. On the other hand, they are amenable to reason and have a strong sense of fair play. They have had, in the past, some examples of poor railroading, but showed themselves, during 1918, capable of understanding and appreciating good railroading.

The record made in handling the situation in New England with the New Haven still under the cloud of the Mellen regime and the Boston & Maine in receivers' hands, with a dangerous coal shortage and unprecedented business activities, should go down in the history of American railroading as one of the achievements of which railroad men may well be proud.

The Ohio-Indiana District

On June 1, the committee at Pittsburgh, mentioned heretofore, of which J. J. Turner of the Pennsylvania was chairman, was abolished; and H. A. Worcester was appointed district director. At this time, the Pennsylvania lines west had an accumulation above normal of about 15,000 cars eastbound and 500 cars westbound. The problem before the district director, therefore, was one of immediately relieving this situation. Both the Baltimore & Ohio and the Erie were used to divert cars; the Baltimore & Ohio at Columbus for movement to Harrisburg, and the Erie and the New York Central for westbound business. By July 8, the situation had been cleared up and embargoes were lifted. The Cleveland, Cincinnati, Chicago & St. Louis during the whole of 1918, was in particularly good shape. Some account is given elsewhere of the rehabilitation of this road following the floods of 1913. Heavy purchases of equipment in 1916 and 1917 were a very important factor in the operation of the property under its federal manager, and the ability of the road to handle increased business was an important factor in the operation of the entire Ohio-Indiana district.

Conclusion

It should be said in conclusion that the organization which the eastern regional director formed immediately on taking charge, contained every evidence of a desire to handle the situation with as little disturbance of the rights of each of the individual roads in this territory as was possible. Drastic measures were needed and no hesitancy was shown in applying these measures. A. H. Smith, in accepting the eastern regional directorship, took upon himself war duties of a peculiarly trying nature where failure might have meant unspeakable disaster. He carried these duties out with a fearlessness that has won admiration from railroad men all over the country as well as government officers with whom he has dealt and with whom he has been on the best of terms.

Some Interesting Features of Federal Operation*

Some of the Critical Situations Which Confronted the Railway Administration in Meeting War Time Needs

By Carl R. Gray

President Western Maryland Railroad Company; Formerly Director of Operation, U. S. Railroad Administration

WHY were the railroads taken over by the government? The reasons were three-fold: The first was financial, the second was because of the necessity for a stabilization of the labor situation, and the third was because of the utter impossibility of their functioning as corporations in the matter in which the government demanded and needed.

Three serious situations confronted us at that time. The volume of business late in 1917 was very great, while about December 1 we went into the longest continued, and most severe weather conditions of which the Weather Bureau has any record. This continued until practically the latter part of March. We had at Hampton Roads (Norfolk and Newport News), for nearly three months, frozen coal in the cars, where they never had a frozen car of coal in all the history of that part of the country.

Coal Situation Serious

The coal situation was the most serious. The stock had been largely used up. New England ordinarily depends upon coastwise shipping for its coal, and the coastwise ships had been taken for overseas traffic. That presented the most serious single situation at that time, because, in addition to the industrial danger, there was absolute fear of suffering. For several months we were on the verge of real suffering in that northern part of the country. The production of the year previous had been the record one up to that time, larger by 12 per cent than the preceding year and aggregating 544,000,000 tons of soft coal.

The Fuel Administration advised us that, to meet absolute necessities, there had to be produced 635,000,000 tons of soft coal. The Railroad Administration took hold on the 28th day of December, 1917. At that time, weather conditions were frightful, beyond comparison. We had a passenger train, as I recall, stuck in the snow in the streets of Syracuse. Up to that time, the northern lines from Buffalo were subjected to the least strain from the war conditions, and had been our safety valve; but with the severe weather conditions, they, too, became affected, so that in the month of January we fell behind 79,000 carloads of coal.

The most drastic measures had to be adopted, and the use for other purposes, of that class of cars which would load coal, had to be denied to everybody. The railroads which had the greatest potentialities in the production and transportation of soft coal had to be isolated as trunk lines. It became necessary to cut in two the great Pennsylvania line, and the Baltimore & Ohio system, so as to enable them to devote their entire energies to the movement of soft coal.

In the month of February, we got on our feet with the production of soft coal. In that month we increased over the record year 24,366 cars. In March 13,000; April, 64,000; May, 27,000; June, 92,000; July, 150,000; August, 160,000; September, 128,000.

Now, what was done in the handling of coal was also reflecting itself in the production of steel. The steel curve commenced to go downward in September, 1917; it went down at an alarming rate; the curve of actual coal production went down from October, 1917, even more radically. Of course, the one depended absolutely upon the other. Seventeen per cent of the blast furnaces were shut down in January for want of fuel and before that situation could be gotten in hand 22 per cent was reached on February 1. The blast furnace is the basis of steel production and of course steel is the most essential of all products used in connection with the war.

Allies Food Shortage Threatened to End War

The food situation can hardly be overstated; we had to watch New England, but in some way the seriousness as affecting the European situation had not been fully appreciated. On the night of February 8, the director general told me that a committee from the Council of National Defense had asked to see him at nine o'clock the next morning; but that he had to go to the capital, so he had asked them to see me. At nine o'clock two cabinet ministers, the chairman of the Shipping Board, the food administrator and the fuel administrator came in. They had cablegrams from the three Premiers of Great Britain, France and Italy to their respective ambassadors, stating that unless the food program promised by Mr. Hoover was not only maintained, but the deficiency made up, that the war would be over on April 1. I asked Mr. Hoover what he had promised, and he said 1,160,000 tons a month, commencing with January 1.

I said: "How much have you furnished?" He said: "In January 750,000 tons; February is one-third gone, and we are going at the rate of 500,000 tons; so unless the situation is remedied, we will reach the first day of March over 1,000,000 tons short. There is just one month between that time and the time these gentlemen have given as the ultimate date." The message from the French Premier said that the French rations had been reduced to the armies in the field; the Italian message said that the rations had been reduced twice to the armies in the field, and could not be again reduced. Mr. McAdoo approved the action that was recommended, and that night an order was sent out which absolutely forbade the loading of box cars, except at freight houses, for anything except food. That was carried to the extreme that we went into the large industries in the East and in the Southeast, and pulled out the empty cars where they had been placed to load. We set out trains of loads, and we moved those empties in preference to everything. While this condition existed, from February 9, with all its rigor until March 1, and in a more elastic form until the 15th of March, there was not one single complaint made by anybody in the United States that reached Washington with regard to it. That order remained in effect, the only exceptions being on behalf of the War Department, until about March 1. Then it was relaxed somewhat. On March 15, we had every elevator on the Atlantic coast filled with grain, and we had 6,615 cars of other food up against the seaboard. I don't believe I ever dictated a letter in which I took so much genuine satisfaction as I did the letter which I dictated for Mr. McAdoo's signature, to the three ambassadors, in which I called attention to this former call of theirs, and to the representations made at that time, and called their attention to the 6,615 cars up against the water-front. And then, as a sort of a stinger, I added to the letter that while we would regard with the most serious concern the placing of an embargo on food

*Abstracted from an address delivered before the St. Louis Railway Club on April 22, 1919.

for the Allies, unless they could improve the situation, we would be compelled to take that action. From then until the armistice was signed, which, of course, means for all time, there never was a moment when there was a lack of a large surplus of food for the Allies against our seaboard.

Congestion on Eastern Lines

Another interesting feature was the movement of troops. At the time we were struggling with the coal and food, we were at the same time facing a most acute situation which arose with regard to transportation of troops. We were advised by the military authorities that they had arranged for the immediate movement overseas of 1,000,000 of troops.

I would like you to visualize that situation for a minute; the congestion in the United States was all in one locality. Everything else in the shape of blockades was a reflex of that condition. If you draw a line from Portland, Me., to Albany, N. Y., and over to Rochester, down to Harrisburg, and over to Baltimore, east of that line, you have it all.

There were, when the Railroad Administration took hold, in the territory east of Chicago and St. Louis and north of the Ohio and Potomac Rivers, 62,247 delayed loads; that means loads delayed short of their destination and which it was not possible to move, and which had not moved within 24 hours. There was held at and west of St. Louis 31,421 cars; at and west of Chicago 24,000 odd; at and south of the Ohio River gateways 14,000 odd; south of the Potomac River gateways 15,000 odd. There was a total of 148,810 delayed loads; nearly all for the limited territory I have outlined. The War Department decided to move practically all of those troops to New York, and therefore it meant an added load in this congested territory. From the first of January to the time of the armistice, the railroads moved a total of 6,496,000 troops, and the maximum was in July, when we moved 1,147,013 men, an average of 748 miles each. That is the largest troop movement ever made in the history of the world. A large proportion of these men were brought entirely across the continent. It takes 59 trains of passenger and 59 trains of impedimenta to move a division of troops.

One of the difficulties that brought the railroads into the congestion, in the first place, was the peculiarity of their responsibilities as common carriers. Now, when that was complicated by the war power of the government to require its freight to be moved in absolute preference and priority, and then when you turn loose a swarm of young men clothed in uniform, invested with the power of the United States government on the railroad men of this country who are, in themselves, taught to respect authority, and each one of those officers functioning with respect only to his individual interests, you can very readily see one of the causes of congestion of the railroads.

We tried, at Pittsburgh, before federal control, to carry out instructions; and we put a switch engine at work there at Pitcairn, on the Pennsylvania, to carry out the instructions with respect to strict priority. That engine switched an entire day—and got out seven loads. That is just a sample of what was done in a yard which ordinarily handled from five thousand to seven thousand cars. So that it was absolutely impossible to carry out our work under those circumstances. We hear a great deal of discussion of the question of whether or not the handling of the railroads was economical. I do not need to tell you that there was not anything economical about it; there is nothing economical about war; war itself is a waste, as is everything connected with it. Transportation was wasted; it had to be wasted, to do these things which this government needed to have done.

The Labor Situation

The other situation that I referred to was the matter of labor. Railroad men, as a class, have never been equitably paid; there is not a man of us who has had to handle large numbers of railroad employees who has not felt that, outside of the specialized classes of railroad men, we were a training school for the other industrial activities of this country. When the Wage Commission was appointed by the director general to go into this question it found that of 2,000,000 employees, 51 per cent received under $75 a month; and that 80 per cent, 1,600,000 of the 2,000,000, got less than $100.

The Lane Commission was appointed, and made its findings admittedly on the ground of justice, as distinguished from the equitable arrangements and relationships as between wages which had grown up in the railroad business. They took the man's earnings, instead of his rating. Where a man in a certain class was working longer than any other, you can see that his average earnings would be larger, while their rating would be the same. For instance, a fireman would work ordinarily more regularly than a brakeman. While the rates were relatively the same, the average earning of the fireman was greater; that penalized the firemen, in that award, because they started in with the $50 earnings basis; all earnings of $50 or lower were given a flat increase, I think of about 45 per cent; from that it went up in the shape of a cone, until it reached $250 a month and higher, where they allowed no increase. It resulted in giving conductors 12½ per cent increase and brakemen 39½ per cent increase, thereby overturning the relationship between those classes of employees which had always been adjusted with respect to each other. The firemen were raised 34½ per cent; the engineers 11½ per cent, so the firemen went out of relationship with the engineers; the firemen went out of relationship to the brakemen; the engineers were out of relationship to the conductors. One of the grotesque results was that we had in the West, firemen earning more money than the engineers on the same engines; and there were other applications of rates on thse different bases.

The Wage Commission recognized that this would happen as a result of these readjustments, and it also left for future consideration any question of the competition that we had to meet with respect to other industries—notably the Shipping Board. With regard to the mechanical crafts, we were paying all the way from 35 cents an hour on some railroads to 53 cents an hour, the highest rate for skilled mechanics. The Shipping Board and the ship-building companies were paying from a minimum of 74 cents up to 93 cents—and there was no question of skill. A man who could learn to run a riveting hammer or who could drive a nail and handle a saw was a mechanic, and got those rates.

Now, the result was that most of the best men had been drawn out of our shops; only the older men, and those with strong home ties remained. In fact, the more or less inefficient men were left to us. That was the first adjustment which had to be made.

When the rate was put up to 68 cents it was still 6 cents under the lowest rate paid by the ship builders, and it was worthy of note that their rate was almost immediately increased to a minimum of 80½ cents.

The government has a great many disabilities to work under when it comes to the handling of labor. One is that it must be consistent. You cannot say to a man when you have one employed who is repairing a Maine Central car on the Florida East Coast that he should be paid any differently or under any different conditions from a man who is repairing a New York Central car on the Grand Trunk; so that the government, after all, was forced to an even level with those things. The law of supply and demand which can obtain where there is individual employment is almost eliminated in this case, on the part of the government. It also means this—it is one of the most striking features, it seems to me, of the inadequacy of government operation,—that it has to be on a dead level. And, if you are short of men in a competitive territory, you have to let it go; otherwise, it means that you

have got to make a raise over the whole country. Of the different things which I encountered which satisfied me that federal operation of all of the railroads would be an economic mistake, that was the most effective.

There was another peculiar development: When the director general took hold, he said to the railroad employees, "You must not strike; it is unspeakable—it is unthinkable that men engaged in transportation shall be permitted to strike against their government."

They very promptly said to him: "What are you going to give us in place of this right? Because there is where our protection comes; our contracts provide that we shall carry our grievances through to a certain designated officer of the railroad, and then in default of an equitable adjustment we have a right to strike; now you take that away, and you leave us absolutely at the mercy of the railroad officers."

The result of that was the selection, first, of Board of Adjustment No. 1 for train and enginemen, which was a bi-partisan board; there were four railroad officers, all expert in the handling of labor matters; they were geographically selected from the different branches of railway service, and there were four labor men, one from each of the four big organizations.

When these men were selected, Mr. Carter, the Director of the Division of Labor, and I spoke to them; we told them that they were expected to construe as would a supreme court the contracts which each of the different railroad companies had with the employees in that service. The manner in which it should be handled was stipulated; it was to be presented in an orderly way, and satisfactorily to all sides, and it supplied this agency in place of the right to strike, which had been arbitrarily withdrawn.

The result of that is very interesting. When I left Washington, Board of Adjustment No. 1 had rendered 210 decisions, and not in one single case had there been a dissenting vote. It had been absolutely unanimous.

It seems to me that men have to be pretty dumb if they let an object lesson like this pass by. Out of all this is certainly going to come some advantage—from this experience we have had with an even balanced bi-partisan appellate court.

The point about it is that one side or the other does not dare to bring a matter in there without having a very strong element of justice involved. One of the difficulties that we observed was that the railroad officers themselves were not as careful about preparing their cases as the men were. This is a thing, of course, which very easily adjusts itself; but I have believed that under such a system employed in the United States, there could be better discipline, and that the subordinate officer, if he conceived this thing in the right spirit, would feel impelled to apply discipline under this principle very much more than he would under the old plan, because he never knew then, whether above him, somewhere, might not be an officer who would be weak enough to give way and practically nullify his use and value. Here is an evenly balanced court of final resort, and you have to win over one side or the other—one, at least, before you can get a decision.

I would be very derelict in my duty if I did not say that the men who stood behind this movement and supported it in every way, who worked themselves beyond anything that they had ever done before, to hold up the highest traditions of the profession, were the railroad officers. By a strange fate, in this case, they were the last to be recognized.

I wish I could tell you many of the things that came to the surface when the Railroad Administration was forming—all the complaints that came to Washington, personally and generally, in which the director general was solemnly advised that the railroad officials were laying down on him—cases in which he was told that they purposed to deliberately defeat all the plans of the Administration.

Anybody but a man eminently well poised would have been stampeded by the situation. But the time came, after he had made trips over the country and had met these officers, when, with the greatest gratification, he told me that in all his life he had never met a set of men who so measured up to what the emergency required as the railroad officers of this country.

Railway Administration Collects Tie Statistics

C. A. MORSE, assistant director maintenance in charge of engineering and division of operation, United States Railroad Administration, has collected statistics showing the number of ties inserted for maintenance purposes by the roads under federal control separately for the three years of the test period, for the ten fiscal years from 1908 to 1917, inclusive, and for the calendar years 1917 and 1918, on the basis of which he has prepared an estimated program of renewals for this year. From the summary of this information, given herewith, it is noted that the average renewal of ties per mile of track for all roads under federal control for ten-year period (258) varies by only one per cent from that of the test period (261). The serious handicap under which the maintenance department labored in 1917 is indicated by the fact that a renewal of only 224 ties is shown, a decrease of 14 per cent, while in 1918 this figure was only 214, or a decrease of 18 per cent from the standard of the test period. To take up this deficiency the estimated program for 1919 contemplates the replacement of 282 ties per mile or eight per cent above the standard established by the test period.

STATISTICS OF TIE RENEWALS ON ROADS UNDER FEDERAL CONTROL

Region	Mileage: Main tracks	Mileage: All tracks	Mileage: Per cent sidings to all tracks	Test period: Years ended June, 1915	Test period: Years ended June, 1916	Test period: Years ended June, 1917	Test period: Average test period	Average, ten fiscal years 1908-1917
Eastern	45,093	68,795	34	21,418,229	15,437,157	14,477,924	17,046,906	17,439,624
Allegheny	28,222	44,056	36	12,365,703	11,203,789	10,250,718	11,279,377	10,356,666
Pocahontas	6,060	8,887	32	3,467,486	3,629,486	3,175,235	3,432,515	2,532,878
Southern	41,316	55,420	25	18,436,374	18,710,978	16,166,189	17,782,366	16,879,416
Southwestern	32,808	43,622	25	12,905,094	14,530,062	10,936,410	12,765,499	13,089,762
Central Western	53,956	71,818	25	17,518,794	18,044,571	15,011,501	16,850,922	17,201,663
Northwestern	52,370	71,130	26	15,820,199	16,655,411	14,592,271	15,657,858	14,793,386
Total, All Regions	259,825	363,728	29	101,931,879	98,211,454	84,610,248	94,835,443	92,293,395

Region	Calendar year 1917	Calendar year 1918	Estimate, Calendar year 1919	Average ties per mile—all tracks: Test period (Average)	Ten years (Average)	Calendar year 1917	Calendar year 1918	Estimate year 1919
Eastern	14,716,486	14,490,867	18,968,941	248	254	214	211	276
Allegheny	8,017,991	7,619,407	12,259,789	256	237	182	173	278
Pocahontas	2,945,760	2,575,800	3,129,640	387	287	335	289	352
Southern	15,597,217	14,495,516	20,951,893	321	315	282	262	378
Southwestern	10,683,613	9,634,298	11,626,191	293	309	245	221	267
Central Western	14,579,825	15,812,793	17,930,719	235	243	203	220	251
Northwestern	14,870,492	13,048,624	17,231,525	220	208	209	183	243
Total, All Regions	81,411,384	77,677,305	102,098,698	261	258	224	214	282

Mileage as of December 31, 1918, and is mileage maintained.
Total "Average Test Period" includes eighty-four small roads with 6,847 miles and 1,625,896 ties, which roads do not enter total "Average Ten Years" because of incomplete reports.

Federal Control of Rates Upheld by Supreme Court

THE POWER OF THE PRESIDENT, exercised through the director general of railroads, to establish rates for application to intrastate as well as to interstate traffic, superseding the authority of the states, was upheld by unanimous decision of the United States Supreme Court rendered on Monday. The decision specifically upheld the freight and passenger rate increases made by order of Director General McAdoo last June, and decrees of the North Dakota Supreme Court enjoining the Northern Pacific Railroad and Director General Hines from enforcing the order in that state were reversed. The court ruled against the decision of the lower court that held that the existing intrastate rates and regulations were left in effect as the exercise of police power. The federal authority was sustained on the ground that it was the exercise of a war power and that to construe it as being limited by state authority would be but to deny its existence. In a similar opinion the court sustained the federal government in establishing telegraph and telephone rates for intrastate business, but from this opinion Justice Brandeis dissented. The opinion of the court in the railroad case was given by Chief Justice White.

"No elaboration," Chief Justice White said, in rendering the opinion, "could make clearer than do the act of Congress of 1916, the proclamation of the President exerting the powers given, and the act of 1918 dealing with the situation created by the exercise of such authority, that no divided but a complete possession and control were given the United States for all purposes as to the railroads in question.

"But, if it be conceded that, despite the absolute clarity of the provisions concerning the control given the United States, and the all-embracing scope of that control, there is room for some doubt, consideration of the general context completely dispels hesitancy. How can any other conclusion be reached, if consideration be given the comprehensive provisions concerning the administration by the United States of the property which it was authorized to take, the final obligations under which it came, and all the other duties and exactions which the act imposed, contemplating one control, one administration, one power for the accomplishment of the one purpose, the complete possession by governmental authority to replace for the period provided the private ownership theretofore existing? This being true, it must follow that there is no basis for the contention that the power to make rates and enforce them, which was plainly essential to the authority given, was not included in it.

"Conclusive as are these inferences they are superfluous, since the portion of Section 10 in express terms confers the complete and undivided powers to fix rates.

"A brief consideration of the contentions relied upon to the contrary will at once show the mistaken premises upon which they rest. Besides, the presumption in question but denied the power exerted in the adoption of the statute and displaced by an imaginary hypothesis the dominant presumption which arose by operation of the Constitution as an inevitable effect of the adoption of the statute, as shown by the following:

"(A) The complete and undivided character of the war power of the United States is not disputable. On the face of the statutes it is manifest that they were in terms based upon the war power, since the authority they gave arose only because of the existence of war, and the right to exert such authority was to cease upon the war's termination. To interpret, therefore, the exercise of the power by a presumption of the continuance of a state of war limiting and controlling the national authority was but to deny its existence.

"(B) The elementary principle that under the Constitution the authority of the government of the United States is paramount when exerted as to subjects concerning which it has the power to control, is indisputable. This being true it results that, although authority to regulate within a given sphere may exist in both the United States and in the states, when the former calls into play constitutional authority within such general sphere the necessary effect of doing so is that, to the extent that any conflict arises, the state power is limited, since in case of conflict that which is paramount necessarily controls that which is subordinate.

"Again, as the power which was exerted was supreme, to interpret it upon the basis that its exercise must be presumed to be limited was to deny the power itself.

"Thus, while admitting that the power which was conferred to initiate rates, when considered in and of itself, included all rates, it is nevertheless said that such power must be presumed to be limited to the only character of rates which under the prior law the Interstate Commerce Commission had the power to consider, that is, interstate rates, because the new rates, when initiated, were to be acted upon by that body. As, however, the statute in terms gives power to the Interstate Commerce Commission to consider the new rates in the light of the new and unified control which it creates, the error in the contention becomes manifest, even putting out of view the fact that by the effect of the duty imposed and the new control created the new rates applying to the new conditions were within the purview of the power which the Interstate Commerce Commission previously possessed.

"The relief afforded against the officer of the United States proceeded upon the basis that he was exerting a power not conferred by the statute, to the detriment of the rights and duties of the state authority, and was subject therefore to be restrained by state power within the limits of the statute. Upon the premise upon which it rests, that is, the unlawful acts of the officer, the proposition is undoubted, but in view of our conclusion the acts of the officers complained of were authorized by the law of the United States."

The court lost little time in arriving at a conclusion in these cases, which were argued on May 5. The railroad case was selected as a test to determine a difference of opinion between the director general and the state authorities.

L. E. Shepherd, heretofore vice-president, was elected grand president of the Order of Railroad Conductors, at the convention of that brotherhood in St. Louis, on May 29, succeeding A. B Garretson.



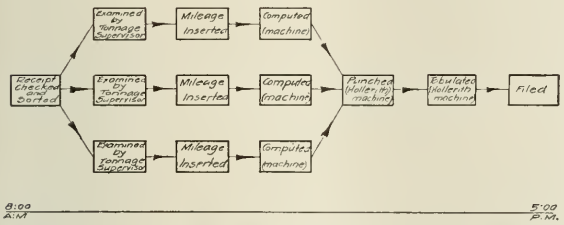
Turkish Refugees Fleeing Towards Constantinople

Compilation of Operating Statistics Reports

The Value of These Reports Depends on Promptness and Care in Obtaining the Basic Figures

THE SEVEN REPORTS called for by the Operating Statistics Section of the Division of Operation of the United States Railroad Administration have been in use since August, 1918. Although the forms used for making these reports are standard for all roads, there is a considerable difference in the methods used in gathering the figures and working these figures up. Where the names of roads are used in this article, it is not meant to imply that other roads may not be using just as good or better methods.

While the operating statistics are for use by the central and



Method of Handling Statistical Reports in Delaware & Hudson Office.

regional administrations as a check on each road under a federal or general manager, it is the consensus of opinion of the operating officers, with whom the *Railway Age* has been corresponding on this subject, that these statistics are of great direct value to division superintendents, general superintendents and general managers.

The first five forms deal with freight and passenger train performance, locomotive performance, and car performance. Locomotive performance is supplemented by a report O.S.-4 on the distribution of locomotive hours. The basic information which is required, in regard to freight train performance, is the train mileage divided as between east and west, together with the locomotive miles and car miles, the gross and net ton mileage and the train hours. All of this information may be obtained from conductors' wheel reports, or these reports may be supplemented by train despatchers' sheets and enginemen's time slips. A number of roads use train conductors' wheel reports only, and these reports are checked against a train roster to check against errors in not reporting trains in.

On some roads the conductors' wheel reports are mailed directly to the car accountant's office, where the necessary mileage and tonnage information and potential tonnage are added and the multiplications and divisions are made generally by some kind of mechanical calculating device. On other roads the train despatchers' sheets and conductors' wheel reports are received in the superintendent's office and the figures transferred there to daily reports of train performance with weekly or monthly summaries of these reports.

For instance, on the Lehigh Valley the statistics for OS-1, except light locomotive mileage, are compiled in the division offices daily, where a report is made showing individual train performance. This report is forwarded to the superintendent of transportation, where it is checked and the locomotive mileage entered to the credit of individual locomotives. Totals of the daily reports are transferred in the superintendent's office to a summary sheet covering four periods, the first three of seven days each and the fourth the remainder of the month. These summary sheets are sent to the superintendent of transportation's office at the end of each period and are checked and returned to the division office to have the next period entered. When the month is complete the sheets are retained by the superintendent of transportation.

The Illinois Central is another example of a road working up the original data in the superintendent's office. On the Illinois Central all the figures for OS-1, OS-2 and OS-3, with the exception of items 5, 16 and 26, and OS-5, with the exception of items 1-6, inclusive, are worked up in the division superintendent's office from conductors' wheel reports, despatchers' train sheets, time slips, and master mechanics' or foremen's reports. The forms OS-1 to OS-5, inclusive, are actually filled out in the car accountant's office, to which the reports mentioned above are sent. Thus freight conductors arriving at the end of their run detach the narrow sheets from the broad copies of their wheel reports (the broad or large sheet is shown herewith) and forward them to the car accountant so that there may be no delay in posting the movements of cars. The conductors then send the large copies to the superintendent's office, where the basic data is drawn off, as shown on Illinois Central form 1038; the large copies are then sent to the car accountant's office to be filed.

On the Southern Pacific train miles and locomotive miles

UNITED STATES RAILROAD ADMINISTRATION, W. G. McADOO, Director General of Railroads [Form C T 80A-Revised-1918]

CHICAGO, ROCK ISLAND & PACIFIC RAILROAD
CHICAGO, ROCK ISLAND & GULF RAILROAD

MECHANICAL DEPARTMENT

Telegraphic Report of Power Detention for 24 hours ending

At _____ 11:59 P. M. _____ 19___ Locomotives in service on _____ Division

	Class of Service	Locomotive Number	Time Arrived At Assigned Track	Time Arrived In House	Time O. K.'d to Trans. Dept. For Service		Time Accepted For Service by Transportation Department	Time Placed on Assigned Track	HOURS HELD		CAUSE OF DELAY Mechanical Dept.	CAUSE OF DELAY Transportation Dept.
					O. K. Given				By or On Order of Mech. Dept.	After reported Ready by Mech. Dept. for Service From Trans. Dept.		
					At	For						
	"A"	"B"	"C"	"D"	"F"	"G"	"H"	"J"	"K"	"M"	"N"	"O"
1												
2												
25												

This report must be signed jointly by the Roundhouse Foreman and Yard Master and telegraphed daily by symbols to the Chief Dispatcher.

Roundhouse Foreman _____ Yardmaster _____

SEE INSTRUCTIONS ON REVERSE SIDE OF THIS FORM

Power Detention Report

UNITED STATES RAILROAD ADMINISTRATION
W. G. McADOO, DIRECTOR GENERAL OF RAILROADS
LEHIGH VALLEY RAILROAD
SUSQUEHANNA & NEW YORK RAILROAD
BUFFALO CREEK RAILROAD

Distribution of Locomotive Hours _____ Division _____ 19____

Date	UNSERVICEABLE LOCOMOTIVES																								AVERAGE NUMBER OF LOCOMOTIVES																					
	AWAITING REPAIRS					UNDERGOING REPAIRS					STORED OR AWAITING SALE					TOTAL UNSERVICEABLE					GRAND TOTAL					SERVICEABLE					UNSERVICEABLE					TOTAL										
	Frt.	Pass.	Yard	Mix. Spec. Work	Total	Frt.	Pass.	Yard	Mix. Spec. Work	Total	Frt.	Pass.	Yard	Mix. Spec. Work	Total	Frt	Pass.	Yard	Mix. Spec. Work	Total	Frt.	Pass.	Yard	Mix. Spec. Work	Total	Frt	Pass.	Yard	Mix. Spec. Work	Total	Frt	Pass	Yard	Mix. Spec. Work	Total	Frt.	Pass.	Yard	Mix. Spec. Work	Total					
	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	Hrs.	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	Na.	%	Na.	%	No.	%	No.	%	No.	%	No.	%	Na.	%

UNITED STATES RAILROAD ADMINISTRATION
W. G. McADOO, DIRECTOR GENERAL OF RAILROADS
LEHIGH VALLEY RAILROAD
SUSQUEHANNA & NEW YORK RAILROAD
BUFFALO CREEK RAILROAD

Distribution of Locomotive Hours _____ Division _____ 19____

DATE	SERVICEABLE LOCOMOTIVES																																														
	ON ROAD OR IN YARD						AT TERMINALS						IN ENG HOUSE—M OF E DEPT						IN ENG HOUSE—C T DEPT						TOTAL						STORED						TOTAL SERVICEABLE										
	Freight		Pass		Yard		Freight		Pass.		Yard		Freight		Pass		Yard		Freight		Pass		Yard		Freight		Pass		Yard		Freight		Pass		Yard		Freight		Pass		Yard						
	Hrs	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%	Hrs	%					

UNITED STATES RAILROAD ADMINISTRATION
W. G. McADOO, DIRECTOR GENERAL OF RAILROADS
DELAWARE AND HUDSON RAILROAD

DISTRIBUTION OF LOCOMOTIVE HOURS

FORM 304 REVISED

ASSIGNED DIVISION _____ CLASS OF SERVICE _____ ENGINE NUMBER _____

DATE	SERVICEABLE																						UNSERVICEABLE					COAL					
	ON ROAD AND IN YARD SWITCHING SERVICE							TERMINAL		IN ENGINE HOUSE					TOTAL			CAUSE OF DELAYS																
	DIVISION OR TERMINAL	DIRECTIVE	FREIGHT	PASS	YARD SWITCHING	MIXED SPECIAL WORK	TOTAL	NUMBER	A TO B	MECHANICAL		TRANSPORTATION		TERMINAL	TERMINAL	ENGINE HOUSE			ENGINE HOUSE	YARD	STORED	TOTAL SERVICEABLE	AWTO REPAIRS	UNDERGOING REPAIRS	STORED OR AWAITING SALE	TOTAL UNSERVICEABLE	GRAND TOTAL	TONS HARD	TONS SOFT	TOTAL			
										B TO C	C TO D	D TO E	E TO F	F TO G	A TO B F TO G	MECH. B TO D	TRANS. D TO F	TOTAL B TO F															
Transfer																																	
1																																	
2																																	

Distribution of Locomotive Hours

UNITED STATES RAILROAD ADMINISTRATION
W. G. McADOO, DIRECTOR GENERAL OF RAILROADS
DELAWARE AND HUDSON RAILROAD

FORM 578

MOVEMENT OF ENGINES AT _____ 24 HOURS ENDING 6 A. M. _____ 191__ DIRECTION _____ NORTHWARD OR SOUTHWARD

	ENGINE NUMBER	ARRIVED				TIME				TIME OF DEPARTURE			TRAIN NUMBER	TIME FROM									REMARKS	
		DATE	YARD A	ASH PIT B	ENG. HOUSE C	REPORTED BY R'D NO.	READY D	ENG. CREW ORDERED	TO LEAVE E	DATE	FROM ENG. HOUSE F	FROM YARD G		A TO B	B TO C	C TO D	D TO E	E TO F	F TO G	A TO B	TIME FROM D TO F		DELAYS AT ROUND HOUSE	DELAYS IN YARD
			hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.		hrs.	hrs.		hrs. min.	hrs. min.	hrs. min.	hrs. min.	hrs. min.	hrs. min.	hrs. min.	hrs. min.	hrs. min.			
1																								

Movement of Engines

UNITED STATES RAILROAD ADMINISTRATION
W. G. McADOO, DIRECTOR GENERAL
Lehigh Valley Railroad

Freight Train Performance ——— Bound ——— Division ——— 19——

Train	Engine Number Helper	FROM	TO	Engine Miles: Light	Engine Miles: Loaded	Time Boarded: Eng. Crew	Time Boarded: Train Crew	Left Yard	Ar. Yard	Off Duty: Eng. Crew	Off Duty: Train Crew	Time on Road: H	Time on Road: M	Initial Term: Eng. Crew H	Initial Term: Eng. Crew M	Initial Term: Train Crew H	Initial Term: Train Crew M	Final Term: Eng. Crew H	Final Term: Eng. Crew M	Final Term: Train Crew H	Final Term: Train Crew M	Total Time on Duty: Eng. Crew H	Total Time on Duty: Eng. Crew M	Total Time on Duty: Train Crew H	Total Time on Duty: Train Crew M	Overtime: H	Overtime: M	Miles per Hour Road	Train Miles	CAR MILES: Light	CAR MILES: Load	CAR MILES: Cab	Eng Rating in Ton Miles	Gross Tons Moved One Mile	Net Tons Moved One Mile	TON MILES: Loss	TON MILE LOSSES: Gain	% Rating Hauled	TON MILE LOSSES: Fan Schedule	TON MILE LOSSES: Train Limit	TON MILE LOSSES: No Cars to Move	TON MILE LOSSES: Condition of Power	TON MILE LOSSES: Turning Power	TON MILE LOSSES: Other Causes	Pounds of Coal Consumed	Pounds of Coal Consumed per M. Tons	REMARKS

Freight Train Performance

UNITED STATES RAILROAD ADMINISTRATION
W. G. McADOO, DIRECTOR GENERAL OF RAILROADS
LEHIGH VALLEY RAILROAD
SUSQUEHANNA & NEW YORK RAILROAD
BUFFALO CREEK RAILROAD

Daily Summary of Freight Train Performance. ——— Bound. ——— Division. ——— 19——

Date	No. of Trains Run	TIME CONSUMED: Road	Initial Term	Final Term	Total	Overtime	AVERAGE TIME: Road	Initial Term	Final Term	Total	Train Miles	Engine Miles: Loaded	Engine Miles: Light	CAR MILES: Loaded	CAR MILES: Empty	CAR MILES: Cab	Aver Miles per Car per Day	Engine Rating in Ton Miles	TONS MOVED ONE MILE: Gross	TONS MOVED ONE MILE: Net	TON MILES: Loss	TON MILES: Gain	% Rating Hauled	POUNDS COAL CONSUMED: Total	POUNDS COAL CONSUMED: Per M Tons	% Overtime to Hours Worked	MILES PER FREIGHT TRAIN MILE: Loco	Loaded Car	Empty & Cab	Total Car	Gross Ton	Rating Ton	Net Ton	HRS PER FREIGHT TRAIN HOUR: Train	Gross Ton	Net Ton	Net Ton Miles Per Loaded Car Mile	% Loaded to Total Car Miles	% Net Ton to Gross Ton Miles	% Gross Ton to Rating Ton Miles
		H M	H M	H M	H M	H M	H M	H M	H M	H M																																

Daily Summary of Freight Train Performance

J-12-18-10M

UNITED STATES RAILROAD ADMINISTRATION
WALKER D. HINES, DIRECTOR GENERAL OF RAILROADS

Illinois Central Railroad—Yazoo & Mississippi Valley R. R.

DAILY REPORT OF ALL FREIGHT TRAINS:

_____DIRECTION (DATE)_____191__ SHEET No._____
(NORTH OR EAST BOUND—SOUTH OR WEST BOUND)

_____DISTRICT _____DIVISION

TRAIN NO	ENGINE NO	FROM STATION NO	TO STATION NO	TRAIN HOURS	LOCOMOTIVE MILEAGE: Loaded	Light	Light with Caboose	Pusher or Helper	Road Switching	WORK (NON-REVENUE): Loaded	Light	Helping	GROSS Ton Miles Expressed in Tons of 2000 Lbs	Potential Ton Miles (Engine Rating)	NET Ton Miles Expressed in Tons of 2000 Lbs	Average Actual Ton Miles Per Train Mile	Per-cent Eng. Efficiency Utilized	FREIGHT CARS: Loaded	Empty	FREIGHT CAR MILES	Loaded	Empty	Caboose	Milk	NON-REVENUE: Loaded	Empty	Caboose

Daily Report of All Freight Trains

INSTRUCTIONS

Form 1030

Show every train and engine moving on the District, except all Passenger, Special Passenger or Mixed trains and Yard Engines.

Use one sheet each day for Northbound freight trains and another for Southbound freight trains.

In classifying Northbound trains, begin each day with all "A" trains in one group then "B" trains, then "Local" trains, then "Special" trains, then "Work or non-revenue" trains with a sub-total for each class, leaving at least two spaces between each different class of mileage, and show the proper sub-headings, i. e., "A," "B," "Local," "Special" or "Work" trains, immediately above each class. Sub-totals for each class of train should be carried forward from day to day from the beginning of the month in order to show at the end of the month the grand total of each class.

Perform the same operation for all Southbound trains, using a separate sheet each day and carrying the totals forward the same as the Northbound sheet.

Superintendents will split the mileage, tonnage, etc., according to Districts where a train operates over two or more Districts, showing on each District Sheet the proper proportion of the mileage, etc., of such train.

Where a train operates over two Divisions the mileage, etc., should be split between the Divisions. The Conductor's wheel report should in such case be made in duplicate and a copy sent to the Superintendent of each Division over which the train operates.

Include every train or engine departing before midnight regardless of the time it arrives at destination. A train departing at 12 midnight, consider as 12:01 A. M. of succeeding day.

Do not report special freight trains or chartered trains, such as circus and theatrical trains run under contract, or trains for Federal or State governments carrying troops or material, notation as to nature of service performed should be shown opposite such entry.

On branches where the general direction of the Branch is nearly East and West, when moving toward the East the schedule will be classified as Northbound, and when moving toward the West, it will be classified as Southbound.

Loco. mileage to be actual miles run, figured from the authorized stations list. Pusher mileages and the return light movement must be actual miles made, that is, the number of trips multiplied by the distance.

When two engines pull a train, the regular engine and the helping engine must be shown under proper heading. An engine placed in rear of train must be reported as pusher.

The combined totals of Locomotive mileage "Loaded" and "Light with Caboose," constitute Train Mileage.

Classification of Train, Loco. and Car Miles, effective July 1, 1914, should be used as a guide for making this report.

ROCK ISLAND LINES.—TRAIN DISPATCHER'S DAILY REPORT OF TRAIN AND ENGINE MOVEMENTS

FORM C. T. 64-A

INSTRUCTIONS.

1. Original report to be forwarded to Car Accountant each day as soon as all trains have cleared.
2. All information called for by the different headings must be given.
3. Round trips must not be reported "and return," but movement in each direction must be given.
4. If no trains or engines are run, write "Blank" across the face of the report.
5. When a regular train is abandoned, let it be shown on sheet with word "abandoned" with cause.
6. When a foreign engine is used give initial.
7. When more than one engine is used in hauling train, show the assisting engine directly below the regular engine, ditto-ing conductor and Train No., giving name of Engineer with Station between which each engine ran and time.
8. This report to be made up in following order giving West and East for each class: 1st, Passenger. 2d, Freight. 3d, Mixed. Show all Light Engines under non-revenue trains, in proper column.
9. Opposite Light Engines show reason moved in column of remarks.
10. Work Service freight trains are divided into "Work" and "Freight;" "Work" are trains the expense of operating which is chargeable to M. of W. & S. or A. & B. "Freight" are all other work freight trains engaged in Company business the expense of operating which is not included in Engine and Train Service Accounts.
11. All entries must be checked with classification of Locomotive Miles shown on CT 60 and reported accordingly.

_____DIVISION

Date_____191__

Trains Authorized To Carry Passengers: Pass.	Trains Authorized To Carry Passengers: Revenue Freight and Mixed	Light Freight Trains (Eng. and Caboose)	ORDINARY FREIGHT TRAINS	ENGINE NUMBER	CONDUCTOR	ENGINEER	TERMINAL LEAVING: Station	Time	Date	TERMINAL ARRIVING: Station	Time	Date	TIME ON ROAD: Hours	Mins.	REMARKS
					TRANSPORTATION SERVICE RAIL LINE TRAINS										

Despatcher's Daily Report

are taken from reports of train and locomotive movements, which are compiled in the offices of the various division superintendents from despatchers' train sheets and forwarded daily to the accounting department. This data is assembled on a working sheet with columns provided for the various train and locomotive miles segregations, as prescribed by the Interstate Commerce Commission classification, the freight train and locomotive miles being further segregated as to direction, east and west, with a line for each day of the month. Separate sheets are used for each operating division, and data entered thereon daily from the report of train and locomotive movements. These sheets are footed and balanced at the end of each quarter-monthly period, with separate total for the month. At the close of the month totals are transscribed to a recapitulation sheet having all the train and locomotive mileage segregations printed across the top and the names of the various divisions down the left hand margin. This sheet when totaled gives the total for the entire system.

Car miles, gross ton miles and net ton miles are abstracted daily from conductors' car and tonnage reports. Separate abstracts are made for each train operated, abstracts printed in black being used for eastbound movements and printed in red for westbound movements. These abstracts are checked against the report of train and locomotive movements daily to insure that an abstract has been made for each train operated. At the time of making this check, information for train hours is abstracted from report of train and locomotive movements and entered on each abstract in a place provided. Rating ton miles are then taken from rating tables for each train and entered on the abstract in the proper place. At the close of each quarter-monthly period these abstracts are sorted as to direction and by divisions and recapitulated. At the close of the month totals for the four quarterly periods are combined and transferred to recapitulation sheet by divisions to arrive at a total for the system.

Form C. T. 61
UNITED STATES RAILROAD ADMINISTRATION
Director General of Railroads
CHICAGO, ROCK ISLAND & PACIFIC RAILROAD
COAL TICKET
№ 317051

_____ Station _____ 191_

Eng. No._____ Train No._____

Engineer
Assigned to _____ Division

Class of Service_____

Tons Taken (Engineer's Estimate)_____

_____
Engineer.

_____
Fireman.

Tons Taken (Fuel Foreman's Estimate)_____

_____
Fuel Foreman.

24039 General Manifold Co., Pat. Jan. 8, 1901.

Fuel Ticket

The Delaware & Hudson revised its conductors' reports so as to show all the basic information required for OS-1. By recording this information on a Hollerith card, an analysis can be made of statistics by classes of engines, trains and train runs, etc. The Delaware & Hudson, however, gets its locomotive and train mileage statistics not from conductors' wheel reports, but from enginemen's mileage reports to the office of the auditor of disbursements.

The reports, which are for the greater part received on the night trains, are sorted into operating divisions by the regular night car record office force, and their receipt is checked against a report made by the superintendents showing all trains run, thus insuring the receipt of a report for each. By this method the reports are ready for handling at the beginning of the second work day following the operation.

The reports for each division are first inspected by a tonnage supervisor, who is a man with considerable transportation experience, particularly as to the apparent accuracy of the information shown in columns 11 and 12, as well as the accuracy of the report in general. As an example, if a train moves from terminal "A" to terminal "B" and handles 73 cars with but one engine reported, the tonnage supervisor detects an error at once, as his familiarity with the operation of that district tells him that this number of cars would require a pusher, which through error had been omitted from

THE DELAWARE AND HUDSON COMPANY FORM 2385-A
ENGINEMAN'S DAILY REPORT OF LOCOMOTIVE MILEAGE

191
DATE | ENGINEMAN'S NAME | USE OF ACCOUNTING DEPT.

ROAD MILEAGE

ENGINE NUMBER	TRAIN NUMBER	FROM	TO	CLASS OF SERVICE	MILES

SWITCHING AND WORK SERVICE

ENGINE NUMBER	STATION, YARD OR LOCATION	HOURS	MINUTES	CLASS OF SERVICE	MILES

THE COLUMNS BELOW ARE FOR THE USE OF ACCOUNTING DEPT. ONLY

CODE NUMBER	DIVISION	CLASS OF SERVICE	DAYS SERVICE	MILEAGE NORTH	MILEAGE SOUTH	MILEAGE TOTAL	FUEL ISSUED NORTH STATION	FUEL ISSUED NORTH TONS	FUEL ISSUED SOUTH STATION	FUEL ISSUED SOUTH TONS	FUEL ISSUED TOTAL

(SEE OTHER SIDE)

Engineman's Daily Report of Locomotive Mileage

report by conductor. This also enables the tonnage supervisor of each district to keep in close touch with the performance of continuous movement freight trains, tonnage trains, pick-ups and drops, way freights and other special movements, as occasion demands. In other words, it enables him to keep a finger on the pulse of his district.

The insertion of mileage, distance between points which cars move, is simply a matter of routine. Comptometers are used for computing these reports, all work on each report being completed at one operation; that is, accumulated total of tons being multiplied by distance, giving ton miles, etc. The punching and tabulating is done on the Hollerith machines. The practical advantage claimed for the method of handling as outlined is that at the end of the second work day following the operation, figures are available showing by

directions, divisions, tonnage rating districts and train runs the following:

(a) Train loading efficiency (per cent of gross ton miles to rating ton miles).

(b) Train movement efficiency (gross and net ton miles per train hour).

(c) Locomotive efficiency (gross and net ton miles per serviceable locomotive).

(d) Car handling efficiency (net ton miles per car per day).

This information is available within 72 hours from the time of the events which it records.

anthracite and bituminous. On the Erie the OS-3 reports are made up in the auditor of disbursements' office, while on the New York, Chicago & St. Louis the report is prepared by the mechanical department and forwarded on the 10th day of the month following that in which the report is made.

On the Missouri Pacific the fuel agent makes up these figures for tons of fuel consumed, getting his data from reports from fuel stations. A similar practice is followed on the Denver & Rio Grande.

On the Cleveland, Cincinnati, Chicago & St. Louis the figures for fuel consumed are compiled in the superintendent

REPORT OF FREIGHT CARS HANDLED IN			TOTAL NO. CARS HANDLED THIS TRIP				SHEET NO.	
Train	Direction	Division	Engine	From	To	Miles	Engineman	Fireman
Left	At M.	191						
Arrived	At M.	191						
Caboose	From	To	Conductor					
Caboose	From	To	Brakemen					

	CAR INITIALS	CAR NUMBER	Day of Month	STATION NUMBER Taken at	STATION NUMBER Left at	KIND	CAR MILES Loaded	CAR MILES Empty	WEIGHT TONS Net	WEIGHT TONS Tare	WEIGHT TONS Gross	CAR CONTENTS	FINAL DESTINATION	REMARKS OR SEALS E. or N. Side	REMARKS OR SEALS W. or S. Side	REMARKS OR SEALS End or Top
O																
1																1
O																

Broad Sheet of Conductor's Fuel Report

The figures for form OS-2 on most of the roads are obtained from daily reports of train and locomotive mileage.

Form OS-3

Form OS-3 is a report of locomotive performance which includes mileage made and tons of coal consumed. The figures for mileage are obtained from the same sources as similar figures for OS-1 and OS-2, but the practice in regard to tons of coal consumed varies quite widely. For instance, on the Southern Pacific these figures are obtained from a report of fuel delivered to locomotives, furnished monthly to the accounting department by keepers of fuel stations. For locomotives engaged in two or more classes of service during the month the segregation is made on the basis of construc-

of motive power's office from reports received from the fuel department, and copies are sent direct from the superintendent of motive power to the operating officers. On the Atchison, Topeka & Santa Fe fuel consumption of locomotives is compiled by the stores department from daily reports of fuel issued to locomotives. On the Chicago, Rock Island & Pacific, tons of coal consumed is computed for each class of service separately by operating divisions by the auditor of disbursements directly from fuel tickets required from each coal chute or where coal is delivered to locomotives.

Form OS-4

In the preparation of the figures for OS-4, which is a distribution of locomotive hours, there is an opportunity and a

FORM 1814-A

UNITED STATES RAILROAD ADMINISTRATION

W. G. McADOO, DIRECTOR GENERAL OF RAILROADS

DELAWARE AND HUDSON RAILROAD

DAILY REPORT OF COMPANY FUEL ISSUED TO LOCOMOTIVES AT _____ STATION, DATE _____ 191__

ENGINE NUMBER	POUNDS COAL HARD	POUNDS COAL SOFT	POUNDS COAL TOTAL	TIME ENGINE COALED	ENGINE NUMBER	POUNDS COAL HARD	POUNDS COAL SOFT	POUNDS COAL TOTAL	TIME ENGINE COALED	ENGINE NUMBER	POUNDS COAL HARD	POUNDS COAL SOFT	POUNDS COAL TOTAL	TIME ENGINE COALED
					FORWARD					FORWARD				

Daily Report of Fuel Issued to Locomotives

tive mileage, determined by converting actual mileage in the different classes to an equivalent of one class. The ratio of fuel consumed per thousand miles by locomotive classes for the preceding 12 months are prepared by accumulating the mileage and fuel consumption of individual locomotives of the various types when engaged in one class of service.

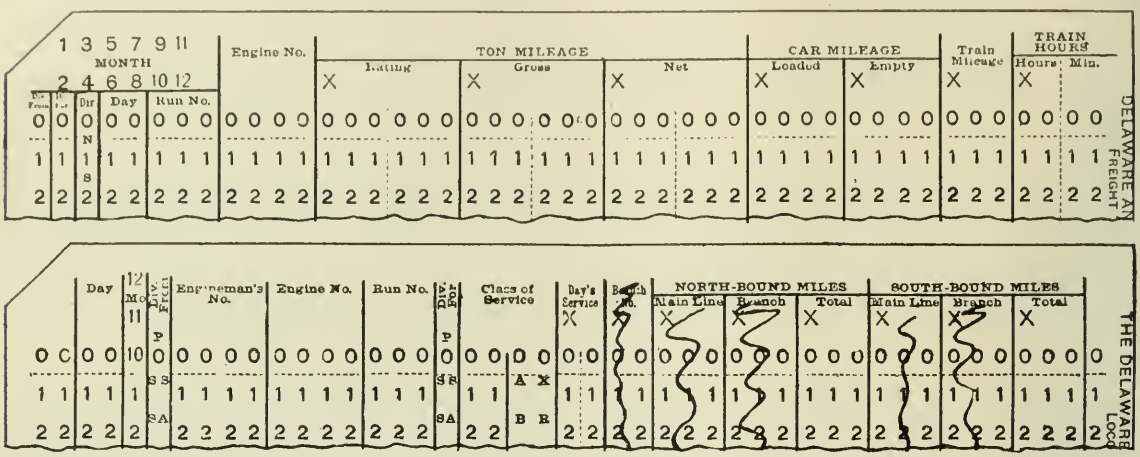
On the Pere Marquette the tons of coal consumed are obtained from monthly coal reports compiled from the enginemen's coal checks. On the Lehigh Valley the information is obtained from a daily report from each fuel station foreman, which shows the coal issued to individual locomotives in each class of service and divides this coal into various grades of

temptation for great inaccuracy. On the Rock Island, where great care is being taken to obtain the fullest possible benefits from the new operating statistics forms, a new form of report has been worked out by which the full time of every locomotive owned and operated will be shown each day and recapitulated at the end of each month. On the Denver & Rio Grande this OS-4 report is prepared from reports received by the superintendent of motive power from all roundhouse points and terminals. On the Great Northern the original data used are the time slips and train despatchers' reports, which are checked against and used in conjunction with the reports furnished by the mechanical department, showing

the number of hours locomotives are awaiting repairs, undergoing repairs and are stored or awaiting sale.

On the Missouri Pacific this OS-4 report is compiled in the chief despatcher's office from train sheets, and this is balanced against the reports furnished by enginehouse forces and a complete accounting for the entire 24 hours is required for each locomotive. On the Erie the report is prepared by the general mechanical superintendent. On the Pere Marquette the information for OS-4 is obtained from special reports rendered by each roundhouse foreman. Where the covers time of locomotives in hands of or awaiting orders of mechanical department for repairs, when held more than 24 hours on that account; locomotives in shops or enginehouse undergoing repairs, when held more than 24 hours on that account; and locomotives stored or awaiting sale, including vacated or condemned locomotives. This information is then assembled and reported by each division to the accounting department on Form OS-4, where reports for the ten divisoins are consolidated.

On the Delaware & Hudson the preparation of the figures

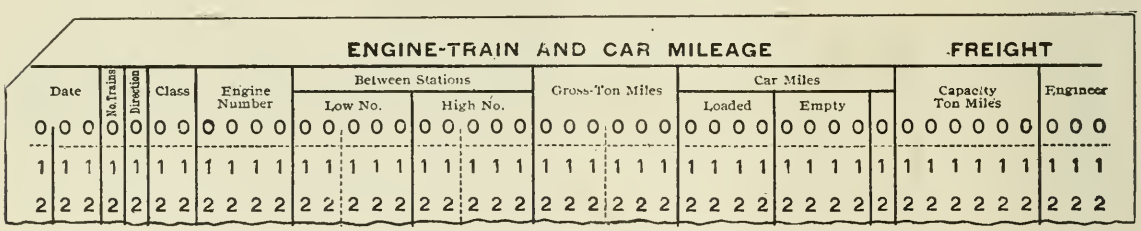


Holerith Cards of the Delaware & Hudson

yard office is located near the roundhouse, the report is rendered jointly by the roundhouse foreman and the yard master.

On the Southern Pacific form OS-4 is compiled for each of the ten operating divisions, report for each division being made in the office of the division superintendent. A separate sheet is used to assemble the time of each locomotive, a separate line on the report being used for each day of the month. Columns are provided for class of service, time on road, terminal delay, time in enginehouse (separately for mechanical and transportation departments), awaiting repairs and undergoing repairs, with separate column for time off

for OS-4 is carried out through the medium of chronological record of distribution of locomotive hours for each individual locomotive, Exhibit "C." The road time is obtained from the engineers' time slips, from which they receive their pay, these being available (loaned to Bureau of Operating Statistics by Auditor's office) currently through the month. The terminal and in-enginehouse time is derived from the daily record of movement of engines at terminals, which is received daily from each engine terminal. Stored and unserviceable time is derived from daily advices from the superintendent of motive power. The coal consumed is derived from the daily report made by each coaling station and for-



Holerith Card of the Minneapolis, St. Paul & Sault Ste. Marie

division, thus allowing for a balance of 24 hours for each locomotive. Information for the first two items is obtained from the despatchers' sheets. Terminal delay is taken from despatchers' sheets used in conjunction with the turning power record, described below. The other information is taken from special forms made at each enginehouse or point of layover and termed, turning power record and locomotive shop hours for OS-4. The turning power record covers time of each locomotive handled in the enginehouse in one day, showing time in, time out, hours awaiting or undergoing repairs, and awaiting service. Report of locomotive shop hours

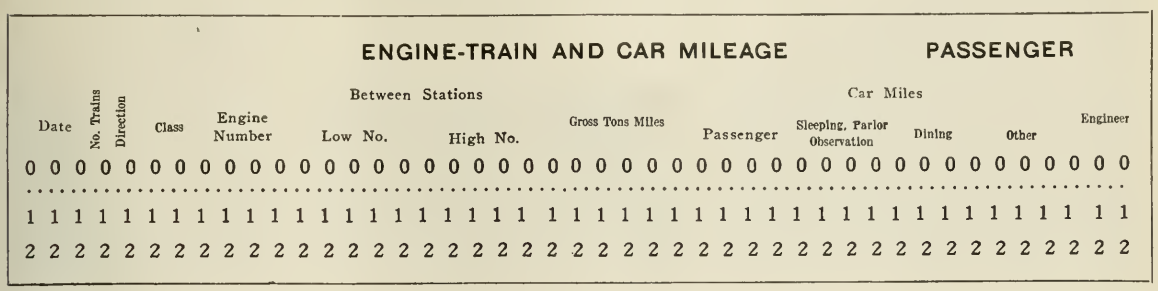
warded daily. It will be noted that the form for distribution of locomotive hours provides space for inserting, by symbols, the division and direction over which engines are moving, as well as terminals at which they are held. Space is also provided for entering through the medium of a symbol record the principal causes of terminal delay.

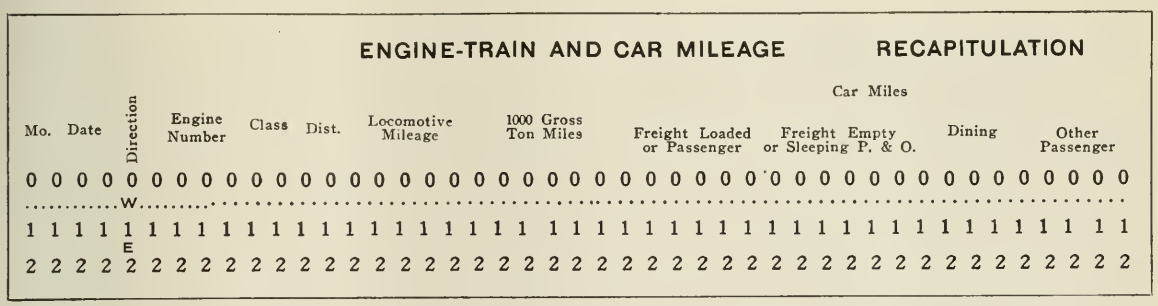
The particular advantage seen in the chronological record of the individual locomotive is that the failure of any engine's daily hours, including road service and at terminals, to total 24 indicates an error or the non-receipt of some essential report, and a blank space in the day's record points the way

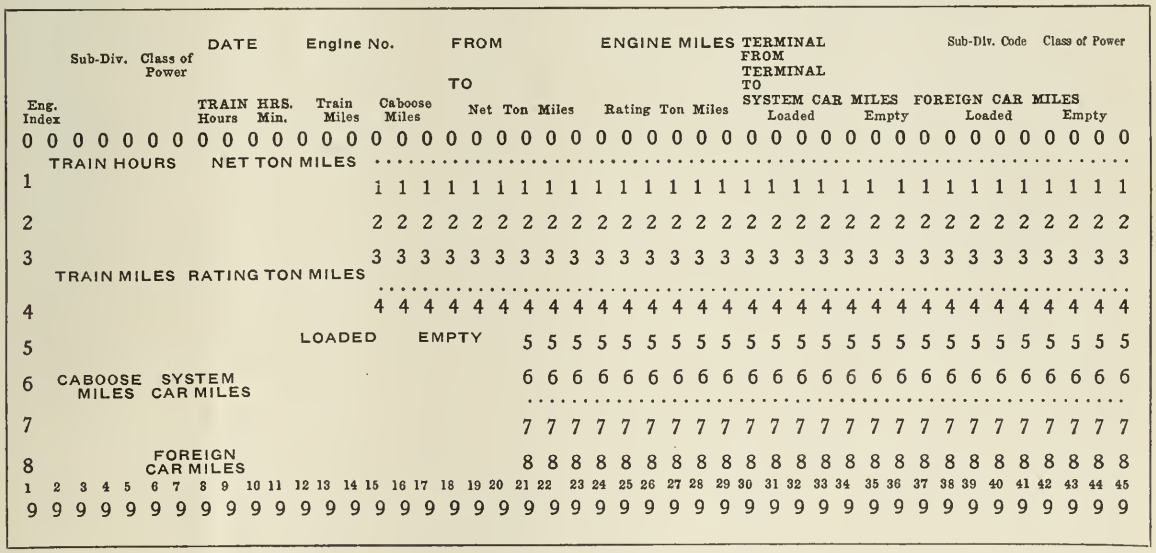
to its correction. The necessary additions and cross footings are made through the medium of comptometers, the two right-hand columns of which are adjusted to "break" at 60, thereby adding hours and minutes at one operation, which is a time saving device of primary importance. The practical value of these reports is derived from daily tabulation of stand-by time at terminals and unused time which elapses (in the case of pooled locomotives) between "ready for service" and

Form OS-5

The figures for form OS-5 are in general obtained from the same sources as the figures for OS-1 and OS-2. For instance, on the Rock Island the detailed information for freight car performance called for on form OS-5 is secured as follows: The number of cars owned is furnished the car accountant's office monthly by the general mechanical superintendent and is taken from the historical records maintained







Holerith Cards of the Rock Island

"marked"; this latter figure acting as a barometer in connection with the storage of locomotives. The complete reports are made monthly by operating districts, copies being placed in the hands of both general and division officers of the transportation department and general officers of the mechanical department.

in the office. Serviceable cars on line daily is determined by the car accountant from an inventory taken from his reports on the first day of each month, with a daily debit and credit adjustment figured from the summary of all interchanges currently received. The home and foreign cars in or awaiting shops daily is taken from daily telegraphic car

reports accumulated in each train despatcher's office and forwarded to the superintendent of transportation's office, who furnishes this data daily by divisions to car accountant. The net ton miles and total car miles shown on this report are figures direct from conductors' freight wheel reports in car accountant's office.

One fundamental difference between different roads, in compiling operating statistics, is the use or non-use of the Hollerith machine. The Chicago, Rock Island & Pacific appears to have tackled this question of the use of this machine for these operating statistics in a common sense and fearless way. It will be noticed that the figures are put on a Hollerith card in pencil and then punched on the card by Hollerith operators, and the holes are punched where necessary through the written-on figures.

Nearly all of the roads use some kind of mechanical devices for checking totals and for performing divisions and multiplications. The comptometer is the most commonly used machine, but some roads are using Burroughs non-listing machines in its place and others are using the Monroe calculating machine, the Millionaire, the Brunsviga and the Midget calculating machines.

Department of Transportation Proposed by Railway Executives

A REVISED PLAN of railroad regulation proposed by the Association of Railway Executives was outlined by Alfred P. Thom, counsel for the association, in an address at the meeting of the American Short Line Railroad Association on June 4. The plan provides for the creation of a department of transportation, consisting of three men appointed by the President, who would be charged with the duty of determining the public policy as to the requirements of the public in the way of transportation facilities and service and the financial requirements of the carriers necessary to meet the public demand, and would present the situation to the rate-making tribunal as the representative of the public. This plan, Mr. Thom said, has been adopted by the railway executives as a substitute for the proposed appointment of a secretary of transportation as a cabinet officer, which is regarded as unwise because of the danger of too much political influence. It would remove the settlement of railroad questions from the domain of controversies between the railroads on one side and the public on the other and would also promote a feeling of confidence among investors. The department, he said, should consist of the best men in the country, to be paid salaries of, say, $25,000 a year, and to be appointed for long terms of office, except that he suggested that the first appointees be selected for terms of two, three and four years, respectively.

It is proposed that the country be divided into rate-making districts and that the department should study the amount of operating revenues the carriers in each district should have to pay: (1) all expenses for operation and maintenance, including labor; (2) a fair return on the value of the property devoted to the public service, and (3) a surplus sufficient to afford a basis of credit and attract the investment of new capital; this amount to be certified to the commission, which would be required to accept it unless good cause were shown to the contrary, as a basis for its rate decisions.

The plan also provides for the creation of regional commissions, consisting of one representative from each state, to decide local questions. The railway executives also propose a permissive system of consolidation, under federal authority, and the supervision of security issues by the Interstate Commerce Commission, while the police powers and taxing powers of the several states would not be interfered with.

"The railway executives have arrived at very definite conclusions as to the solution of the railroad problem," Mr. Thom said. "We regard it primarily as a problem of finances. We have every other element needed except the assurance of the financial strength necessary to make the railroad service adequate to the public needs. The government can no longer regulate the railroads with reference mainly to the restriction of their charges; it must look to what is necessary to provide adequate service."

He opposed the plan of a guaranteed return as leading inevitably to government ownership, because, he said, the government is not going to take the responsibility of a guarantee without taking control. He also opposed the proposal for what he termed "a guarantee out of the pockets of the shippers," in other words, a rule that rates be made sufficient to provide a return of 6 or 6½ per cent on the investment, because the fixed percentage would not be adjustable to changing economic conditions. The percentage, he said, would have to be fixed with relation to the economic conditions of today and if these were so changed as to leave it too high, the reaction would probably sweep private ownership off the earth. Also, he said that no matter where the percentage starts, when Congress gets through with it, it will not be so high that Congressmen will not feel easy in going home to defend it, and any percentage they would feel ready to defend would be too low for the railroads to live on. Moreover, the exact percentage could be argued but once, before Congress, and the rate once determined would remain until changed by another act of Congress.

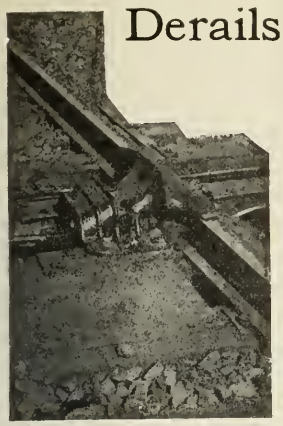
"The principle we adopt must be adjustable," he said. "Regulating bodies heretofore have gone on the principle of making rates as low as they could. Can we expect a body that has spent its official life in trying to keep down rates to have the confidence of the investing public? Regulating bodies are in an exposed condition, always subject to political pressure which they must resist before taking any action toward advancing rates. Something must be done to remove the settlement of this question from the controversial atmosphere of litigation in which the selfish interests of the railroads appear to be arrayed against the public. We cannot win in a controversy with the public. We must have a public body to determine as a public question the needs of the public for service and the amount of money which will be provided for those needs and then become a party before the rate-making body as the representative of the public and not of either side."

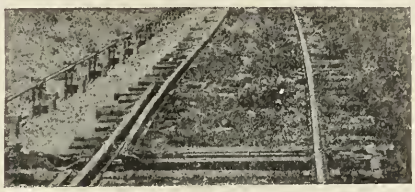
Mr. Thom declared also that provision must be made for the transition of the railroads back to private management. This cannot be done, he said, without some preparation, because the railroads are not in the condition in which the government took them over. At that time operating expenses were consuming 70 to 72 cents out of every dollar of railroad earnings, while the government has found it necessary to add to the expenses, as one item, the increased labor cost of approximately $1,000,000,000 a year until in recent months operating expenses have taken 95 to 97 cents out of every dollar of earnings.

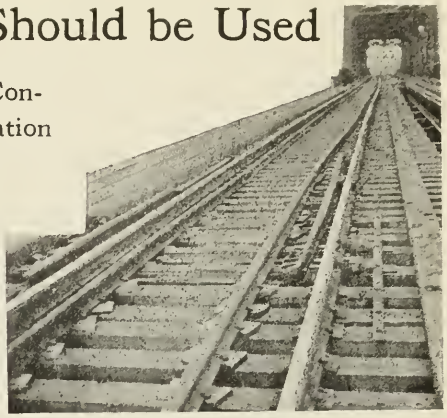
"The government is not in a position to return today what it took over," Mr. Thom said. "The law ought to provide a definite date for the return to private management, and there should be an inquiry by some governmental authority as to what should be done to restore the conditions which the government has disturbed, and especially the proper relationship between revenues and expenses. The government has no right to restore the railroads in a bankrupt condition. We therefore propose that until the Interstate Commerce Commission or other government authority can establish an earning capacity in keeping with the expense account, the present guarantee of compensation should, in morals and in right, be continued."

Derails and Where They Should be Used

A Study of the Types Used, the Conditions Governing Their Application and the Results Obtained.







Three Types of Derails

DERAILS ARE EMPLOYED so universally and are so common a part of the present roadway construction that but a passing thought is ordinarily given to their use. Railway men are familiar with the common practice on their own lines and seldom realize the wide variance in the use of this device on other roads. For instance, some roads like the New York Central, Lines East, make it a practice to install derails on passing tracks, while others like the Long Island are abandoning them for this purpose. The Illinois Central and the Chicago, Rock Island & Pacific make it a practice to install derails on all tracks that lead out to the main line on which cars may stand, while the Chicago, Milwaukee & St. Paul and the Chicago, Burlington & Quincy use them in such tracks only where adverse grades or other conditions warrant. On some lines it is the practice to place derails in turntable leads, while many other roads do not require protection at such points but may install derails at special locations such as at the foot of coal chute inclines, on breaker tracks or on tracks running through shop buildings for the protection of the buildings.

It is the general practice on the Lehigh Valley to use pipe-connected derails, while the Long Island prefers the hand throw type. Some roads use the pipe-connected type in automatic signal territory only, while others use the hand throw type irrespective of signals. Again some lines like the Philadelphia & Reading connect up all derails with the signal circuits through switch circuit controllers whether the derails are pipe connected or hand thrown, while other roads like the Delaware & Hudson use the switch circuit controller on hand throw derails, but not on the pipe connected type in automatic signal territory.

Again the tendency toward the more general use of derails varies greatly. The Rock Island, for example, is extending their use, while the Chicago Great Western has recently removed them from passing tracks. Practice again varies regarding the use of the split point or the block type of derail. Some roads use the split point in special cases only, others like the Northern Pacific make the split point type the standard, while the general tendency of many other roads is toward the use of the block derail.

As indicated above, the frequency and the conditions under which derails are used vary greatly. For this reason the *Railway Age* has secured and tabulated data covering the practices on 48 representative railroads in all parts of the United States and Canada in order to ascertain the conditions governing their installation at other than interlocking plants. In this investigation the following questions were asked:

(1) Are derails placed on all passing and other tracks connecting with main tracks or on only those with particularly adverse conditions as to grade, vision, etc., or are they omitted from all such tracks? Is any distinction made between passing and industry tracks in this connection?

(2) Are derails commonly installed in tracks leading to turntables or at other special locations apart from the main track?

(3) Is the split point or block derail used?

(4) To what extent is the use of derails modified in automatic signal territory? Are derails in automatic signal territory equipped with switch circuit controllers?

(5) To what extent are the derails pipe-connected to the switch stand or hand thrown?

(6) Is the tendency toward the more general use of the derail, and if so under what conditions?

(7) Have any recent instances occurred where the use of derails has demonstrated the worth of their application?

The information received was tabulated in the table accompanying this article, but in studying this table it is to be understood that it indicates the general practice of individual roads, numerous exceptions to which will be found in the discussion following.

Sixteen of the 48 roads replying to the circular of inquiry install derails on both passing and industry tracks; 13 install them only on industry tracks, while 19 install them only at locations where particularly adverse conditions as to grade, vision, etc., prevail.

Installation on Both Passing and Industry Tracks

In considering the installation of derails on both passing and industry tracks many different practices again exist. Some roads place derails on both classes of tracks irrespective of the conditions existing, while others make exceptions to this rule and use derails only where adverse conditions are present. Again derails may be omitted at certain points on lines on which the general practice is to equip all sidings with derails because grade conditions may not warrant their use, while still other roads will protect all main line turnouts and omit this protection on branch lines where traffic is light. Derails are omitted on passing tracks by some roads because these tracks are only used for the purpose indicated and it is felt that, with a train in the clear, there is no need of derails as the cars are under the control of the engineman. However, on other lines the management feels that it is as important to place derails on these tracks as on industry and business tracks because the derail definitely marks the clearance point and forces obedience in observing it, thus preventing a train stopping at a point of limited clearance.

Many roads make it a practice to install derails on both passing and industry tracks, including the Pennsylvania Rail-

road, the New York Central, Lines East, the Baltimore & Ohio, the New York, New Haven & Hartford, the Delaware, Lackawanna & Western, the Lehigh Valley, the Erie, the Cleveland, Cincinnati, Chicago & St. Louis and the Philadelphia & Reading. Among other roads reporting the installation of derails on part or all of their passing tracks are the Boston & Maine, the Louisville & Nashville, the Chesapeake & Ohio and the Chicago Great Western, while still other lines place them on passing tracks under certain conditions only. Typical of such roads are the Chicago, Rock Island & Pacific, the Illinois Central, the Norfolk & Western, the Nashville, Chattanooga & St. Louis and the Seaboard Air Line.

It is interesting to note some of the variations existing among roads that make it a general practice to install derails on both passing and industry tracks. In this connection the Pennsylvania Railroad installs either a split switch derail or a Lackawanna & Western, but all other locations on this road are equipped with them. Road G (in the table), located in the central part of the country, makes it a practice to place derails on all sidings connected with the main track. On this road derails derailing in one direction only are used on passing sidings and yard leads, while at stations and industrial sidings those derailing in both directions are installed and it has been found that in some instances that trainmen have pushed cars in over the derails on such sidings with the result that they have become grooved and fail to derail cars running out over them. The only exception in the use of derails made by the Cleveland, Cincinnati, Chicago & St. Louis is on some branch lines, where the traffic is light; in such territories the sidings are not equipped with them.

While the Boston & Maine does not place derails on all passing or other tracks connected with the main track a large

TABLE SHOWING THE GENERAL APPLICATION OF DERAILS ON VARIOUS RAILROADS

ROAD	Derails Used on Tracks Leading to Main Line				How Operated		Used in Special Locations		Type Used		Use in Automatic Signal Territory			
	Passing	Industry	Both Passing and Industry	Only Where Grade or Other Conditions Warrant.	Pipe Connected	Hand Thrown	Turntable Leads	Other Special Locations	Split Point	Block	Pipe-connected Without Switch Circuit Controllers	Controllers Used on Hand Throw Derails	Is Tendency Towards More General Use	Has Their Value Been Demonstrated
A.T.&S.F.				Yes	Yes	Yes	No	No		Yes	Yes	Yes	Yes	No
A.C.L.		Yes				Yes	No			Yes		Yes(?)	No	Yes
B.&O.			Yes		Yes*	Few	No			Yes	Yes(a)		Yes	Yes
B.&M.	Partly	All New			Yes	Yes		Yes	Yes	Yes*	Yes	Yes	Yes	
C.of Ga.		Yes				Yes	No	No		Yes*		Yes	No	Yes
C.&O.	Yes			Yes	Yes	Yes	No	No	yes	Yes	Yes(a)	Yes	Yes	Yes
C.&A.				Yes	Yes	Yes	No	No	Yes	Yes			No	No
"A"			Yes		Yes*	Yes	No	Yes	Yes‡	Yes			Yes	Yes
C.B.&Q.				Yes	Yes*	Few	No	Yes		Yes*			Yes	Yes
C.C.W.	Few			Yes		Yes	No	No	Some	Yes	No	No	No	No
C.M.&St.P.				Yes		Yes	No	No	Yes	Yes*		Yes	Yes	
C.R.I.&P.		Yes			Yes*	Yes	Some	Some	Some	Yes*	Yes	Yes	Yes	Yes
C.C.C.&St.L.			Yes		Yes	Yes	No	No		Yes*	Yes	Yes	No	Yes
C.&S.				Yes		Yes	Few	Few	Some	Yes*			Yes	Yes
D.&H.			Yes	Yes	Yes	Yes	No	Few		Yes*	Yes	Yes	Yes	Yes
D.L.&W.		Yes				Yes	No	Yes	Yes	Yes*	No	Yes	Yes	Yes
D.&R.G.			Yes			Yes	No	Few		Yes*			Yes	Yes
Erie		Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes(a)		Yes	Yes
I.C.		Yes			Few	Yes	Yes	Yes	Some	Yes*		Yes	Yes	Yes
"B"	Few	Yes				Yes	No	Few	Yes*	Few			Yes	Yes
L.V.		Yes			Yes*		Few	Few	Few	Yes*	Yes	Yes		Yes
L.S.		Yes			Yes	Yes*	No	No	Yes	Yes	Yes(a)	Yes	No	Yes
L.A.&S.L.				Yes		Yes	No	No	Yes	Yes		No	No	Yes
L.&N.	Yes!	Yes			Yes	Yes	No	No	Yes	Yes	Yes		Yes	Yes
"C"				Yes		Yes	No	No	Few	Yes*		Yes	No	Yes
"D"				Yes	Yes*		No	No		Yes*	Yes		Yes	No
M.&St.L.		Yes				Yes	No	Yes	Some	Yes*			Yes	Yes
M.St.P.&S.S.M.				Yes	Yes	Yes*	No	No		Yes*				No
M.K.&T.		Yes				Yes	Yes			Yes*		Yes		Yes
"E"		Yes				Yes	Some	Few		Yes*		No	Yes	No
M.&O.		Yes				Yes*	No	No		Yes			Yes	Yes
N.C.&St.L.		Yes				Yes	Seldom	Yes	Yes	Yes*		Yes	Yes	Yes
N.Y.C.(East)			Yes		Yes	Few	No	No	Some	Yes*	Yes	Yes	Yes	Yes
N.Y.C.&St.L.				Yes	Some	Yes	No			Yes*		Yes	Yes	No
N.Y.N.H.&H.			Yes		Yes*	Few	No	Few	Few	Yes*	Yes	Yes	No	No
N.&W.		Yes			Yes		No	No	Some	Yes*	Yes(a)		No	Yes
"P"				Yes		Yes	No	No	Few	Yes*			Yes	No
N.P.				Yes		Yes	No	No	Yes*	Some		No	No	Yes
P.R.R.			Yes		Yes	Some	No	No	Yes	Yes	Yes		No	Yes
"G"			Yes		Yes	Yes‡	No	No		Yes*	Yes(a)	Yes	No	Yes
P.M.				Yes	Yes	Some	No	No		Yes*	Yes	Yes	No	No
P.&R.			Yes		Yes	Yes	No	Few	Yes	Yes	Yes(a)	Yes	No	Yes
"H"				Yes		Yes	No	No		Yes*		No	Yes	Yes
S.A.L.		Yes			Yes		No	No		Yes*			No	No
S.P.				Yes	Few	Yes	No	No	Yes	Yes		Yes	No	Yes
S.P.(Lines)				Yes		Yes		Yes	Yes	Yes		No	Yes	No
U.P.		Yes			Few	Yes	No	No	Yes	Yes*		Yes	Yes	No
C.P.R.				Yes	Few	Yes	No	Few		Yes*	No	No	No	Yes

* General Practice. ! In Automatic Signal Territory. ‡ In Special Cases. (a) Equipped with Circuit Controllers.

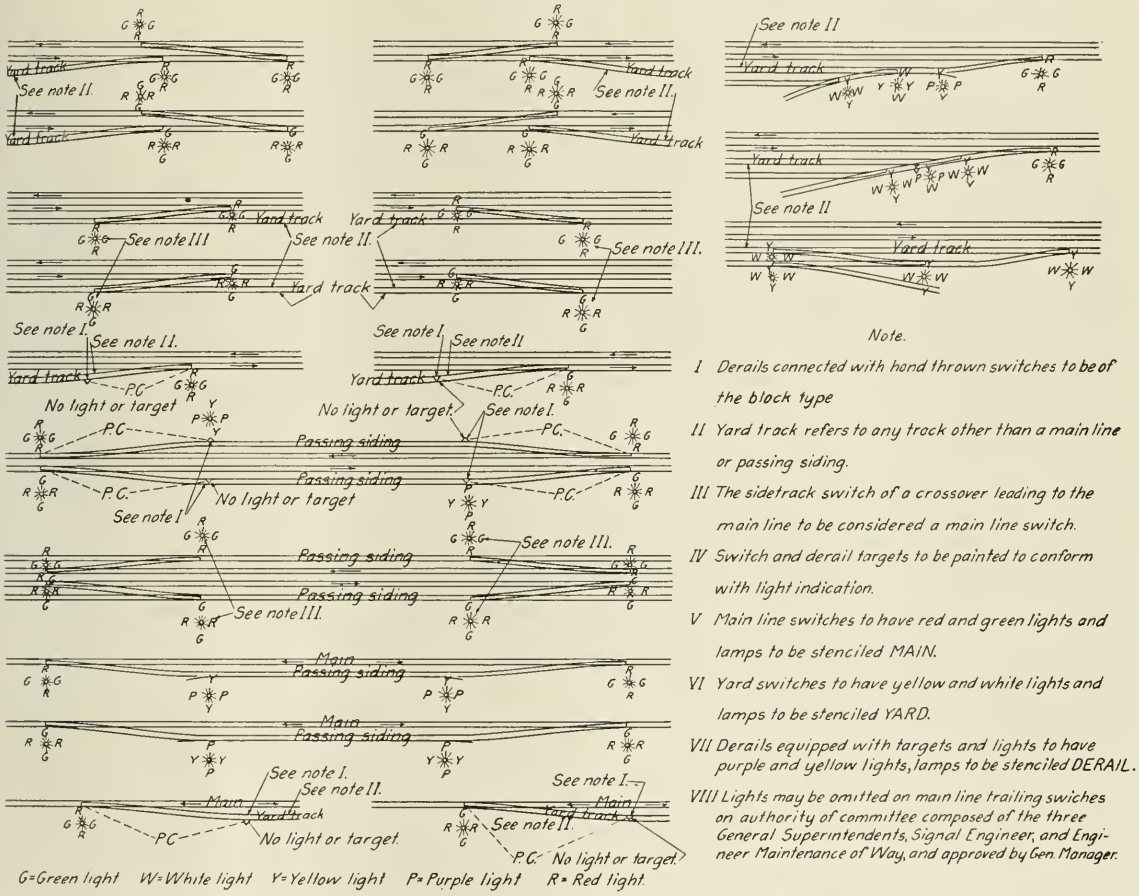
block derail in combination with the split point on all exterior passing sidings and on all other tracks connected with the main track where it is possible under any circumstances for speeds to exceed 12 miles an hour; when the speed cannot exceed this rate the block derail is used with the guide rail and if the sidings are of infrequent use the hand throw derail is used either independently or with the guide rail. It is not the general practice to equip interior passing sidings with derails. Apart from this no distinction is made on this line between passing sidings and industrial or other tracks connected directly with the main track. The only exception made to the installation of derails on all tracks by the New York Central, Lines East, is their use on passing sidings located between main tracks and even these passing sidings are sometimes provided with derails when they are located on a grade which may allow a car to move toward the main track. The upper ends of the passing sidings located on heavy grades are not protected by derails on the Delaware, proportion of these tracks are so equipped and the number is gradually being increased. At the present time the Chesapeake & Ohio has installed derails on approximately 90 per cent of its passing tracks and it is the practice to equip such tracks with this device.

The practice of the Philadelphia & Reading is to place derails on all tracks leading to the main track except on the end of passing sidings in automatic signal territory that are not interlocked, while the Louisville & Nashville places derails on passing tracks in automatic signal territory only. Road A (in the table), located in the central part of the United States, makes it a practice to place derails on passing sidings in connection with the installation of new automatic signals.

The Rock Island, the Illinois Central, the Norfolk & Western, the Nashville, Chattanooga & St. Louis and the Seaboard Air Line place derails on passing tracks where they are used to set out cars at the station or where adverse conditions may

exist. The Lehigh Valley places derails at the fouling points on all passing sidings and industrial tracks where there may be danger of cars dropping and fouling other tracks.

The Long Island no longer requires the use of derails on passing sidings and is abandoning them for this purpose, while the Missouri, Kansas & Texas and the Minneapolis & St. Louis do not make it a practice to install derails on such tracks. The Chicago Great Western has a few derails on passing tracks, but this is not the general practice, and recently a number of derails have been removed from passing tracks because with only a few such places so equipped there was a liability of oversight on the part of trainmen and this condition caused more frequent derailments than if the derails were entirely dispensed with.



The Use of Derails Under Different Conditions on the New York, New Haven & Hartford

The Use of Derails on Industry Tracks

The conditions governing the installation of derails on industry tracks vary considerably on the different roads using them for protection at such points. Some lines make it a practice to place derails on all industrial tracks, irrespective of grade or speed conditions, while others omit them at points where the grade of the industry track falls from the main line. Still other lines place derails only on tracks where there is a possibility of cars being blown or pinched out to foul the main track.

Among the roads installing derails on station, industry, business and private tracks are the Delaware, Lackawanna & Western, the Lehigh Valley, the Long Island, the Boston & Maine, the Louisville & Nashville, the Norfolk & Western, the Missouri, Kansas & Texas, the Seaboard Air Line and the Minneapolis & St. Louis. It is the practice of the Lackawanna to install derails on all industrial sidings, while the Atlantic Coast Line occasionally omits their installation where the grade of the industry track falls from the main line. On the Boston & Maine it is now the standard practice to use derails on all new industry tracks, and the same practice applies on the Nashville, Chattanooga & St. Louis. While the entire road is not equipped at the present time this work is being done gradually and the places where derails are needed the worst are being equipped first. Road G, located in the central part of the country, installs a derail, derailing in both directions on station and industrial sidings.

The practice on the Union Pacific is to place derails on all tracks where cars are set out if these tracks are connected with the main line or if they are branch tracks, derails are then placed somewhere between such tracks and the main line for its protection. Other lines make it a practice to place derails at the fouling points on all industrial tracks where grade conditions warrant and on all tracks where cars are left standing if there is the slightest possibility of their being blown out or pinched out where they might foul the main line. Some roads following this practice are the Lehigh Valley, the Rock Island, the Illinois Central and the Mobile & Ohio.

The use of derails on the Central of Georgia is in line with

the following maintenance of way rule: "Main track must be protected by approved derailing devices so located that derailed cars will clear the main line on all tracks leading therefrom excepting passing sidings. They must be set and locked for derailment at all times except when in use."

The Use of Derails Under Special Conditions

The managements of some roads feel that proper protection is provided, not by the universal application of derails, but by their location at places where grade or other adverse conditions warrant. For example, on some roads derails are placed on sidings on which the grade descends toward the main line, while others place them at points where high winds exist which may blow cars out of the sidings. Again some states have recognized the necessity of derail installations under certain conditions and have passed legislation accordingly. In such cases the practice on the various roads in the states is more or less uniform. In Texas the following requirements are prescribed by law: "It shall be the duty of every railway corporation operating any line of railway in the state of Texas within six months after the passing of this act to place good and safe derailing switches on all of its sidings connecting with the main line of such railways and upon which sidings cars are left standing; provided, that no derailing switches shall be required where the sidings connect with the main line on an upgrade in the direction of the main line of one-half of one per cent or over; provided, further, that no derailing switches shall be required on inside tracks at terminal points where regular switching crews are employed."

Among the railroads installing derails on tracks where grade or other conditions warrant may be mentioned the Atchison, Topeka & Santa Fe, the Northern Pacific, the Union Pacific, the Delaware & Hudson, the Southern Pacific, the Chicago, Burlington & Quincy, the Chicago, Milwaukee & St. Paul, the Canadian Pacific, the Chicago & Alton, the Chesapeake & Ohio, the Pere Marquette, the Minneapolis, St. Paul & Sault Ste. Marie, the New York, Chicago & St. Louis, the Los Angeles & Salt Lake, the Chicago Great Western, the Denver & Rio Grande and the Colorado & Southern.

The practice on the Atchison, Topeka & Sante Fe, the Southern Pacific, Atlantic System and the Canadian Pacific is to install derails according to the grade conditions; the Santa Fe installs them at the ends of all tracks (excepting the passing tracks and wyes) where the grade ascending toward the main line is less than 0.5 per cent, while the Southern Pacific Lines install them on all tracks connecting with the main line except yard or other tracks on which switch engines are used, provided such tracks are not on a descending grade of 0.5 per cent or over. The Canadian Pacific protects the main track by derails where a siding may be used for storing cars having a gradient of 0.2 per cent or over toward the main line so located that there is danger of a runaway car getting either directly or through an intervening siding to the main track. These derails are placed on tracks coming off the main track or any other one leading to it.

The Northern Pacific places derails only on these tracks where particularly adverse conditions exist as to grade, vision, etc. Ordinarily derails are not placed on passing tracks unless they are also at times used as storage tracks. They are placed on all industry tracks where the grade toward the main line is such that a car could move when the brakes are off. Through the prairie country, which is subject to very high winds, this road places derails on all tracks where there is danger of cars being blown out on the main line, the entire matter being left to a considerable extent to the judgment of local officers. It is not the practice of the Southern Pacific to place derails on passing tracks and other tracks connected with the main line, but they are installed on such tracks wherever these are on a grade approaching a main line or at points in level territory where unusual conditions such as high winds prevail. It is also its practice to put in derails on short spur tracks where cars that are set out for loading ordinarily come close to clearance points to prevent cars moved by the shipper from fouling the main track. The Chicago, Milwaukee & St. Paul makes it a point to install derails generally on main line turnouts only and restricts their use to points where grades are such that cars could easily run out on the main line or be blown out by heavy winds.

Installation of Derails at Turntables, Drawbridges and Other Locations

The general tendency of the railroads is not to install derails in turntable leads or at other special locations in yards or points not connected directly with the main line. However, in this respect the practice varies considerably on different roads, some installing derails in turntable leads, others at the foot of tracks leading from coal chutes, at box car loaders, around breaker tracks or for the protection of shop buildings.

Among the roads making it a general practice to install derails on tracks leading to turntables and like places involving risks are the Illinois Central, the Erie and the Missouri, Kansas & Texas. Other roads using them to a limited extent at such locations include the Lehigh Valley, the Chicago, Rock Island & Pacific, the Boston & Maine, the Baltimore & Ohio, and the Colorado & Southern. The Lehigh Valley, the Rock Island and the Boston & Maine make it a practice to install derails on tracks leading to turntables and other special locations where the grade is unfavorable, where there is a possibility of engines running out on the main track or at points where accidents have occurred or are liable to happen.

The Baltimore & Ohio and the Colorado & Southern have installed derails in a few special locations on tracks leading to turntables and at other points.

The New York, New Haven & Hartford makes it a practice to place derails at drawbridges. At these locations they are placed in tracks both with and against the direction of traffic. It is the practice of the Chicago, Burlington & Quincy to also use derails on tracks approaching drawbridges.

Some roads make it a practice to protect box car loaders, coal chutes and repair tracks. The only special locations apart from the main track on which derails are used on the Delaware & Hudson are at box car loaders and around some of the breaker tracks, but this is indirectly a protection to the main track. A road in the central part of the country, road *A* in the table, installs derails on tracks leading to elevated coal chutes whether these tracks are connected into the main track or otherwise, but it is not the regular practice to treat other special locations in a similar manner. The Minneapolis & St. Louis uses derails to protect shop buildings beyond car repair tracks where these tracks run through the buildings, and a road in the Southwest, road *B* in the table, uses derails on repair tracks.

Among the roads installing derails at special locations apart from the main track such as industrial tracks or similar spurs which are located on bad grades or at points where cars are liable to foul the running tracks, may be mentioned the New York, New Haven & Hartford, the Delaware, Lackawanna & Western, the Southern Pacific Lines, the Philadelphia & Reading and the Nashville, Chattanooga & St. Louis.

In general, derails are not installed on tracks leading to turntables but in a number of cases they are used to protect other special locations on the Delaware, Lackawanna & Western, the Southern Pacific, the Delaware & Hudson, the Chicago, Burlington & Quincy and the Canadian Pacific Railways.

The Use of Split Point and Block Derails

Three classes of derails are used by the railroads replying to the circular. These types are the split point, the block and the lifting rail derail. The split point derail is used at places where high speed conditions prevail or on curves of a certain degree and at points where there must be no possibility of a train or car getting by. One objection to the use of this type is that a break is made in the track. The lifting rail derail is another type of high speed derail which can be installed without breaking the track, but it is used mostly within the limits of interlocking plants. The block derail is one that can be applied at almost any location without cutting the track and can be used advantageously in a large number of places where speed or curve conditions are not too severe, or when not prohibited by law. Some roads report the split point as standard and others the block type, but practically all use both kinds, depending on conditions such as their location on a curve, their use on important passing tracks in high speed territory, the speed of trains, and where the type of derail is specified by law. In some cases the type of derail used on a siding is determined by whether it is a permanent or a temporary one.

Some of the roads make it a practice to use the split point type on main line tracks and on all tracks immediately connected with the main line and where high speed movements occur. Among these roads may be mentioned the Santa Fe, the Lackawanna, the New York, New Haven & Hartford, and the Louisville & Nashville. On these lines the block type derail is used for other locations. The Norfolk & Western uses the block derail except at places where it is prohibited by law, in which case the split point type is used, while the Los Angeles & Salt Lake uses a split point derail in locations that are particularly hazardous, while the block derail is used at other places. A road in the Southwest, road *H* in the table, uses a block derail except at the foot of coal chute inclines, when the split point derail is installed.

The Baltimore & Ohio uses a derail of the lifting rail type on main tracks and at the outlet of important passing tracks in high speed territory, but the block derail is used elsewhere. In some cases the Louisville & Nashville uses the lifting rail type derail for locations in high speed territory, while the Burlington uses this type on the main track, but the block derail is being used for all new installations and replacements for side tracks.

The New York Central, Lines East, the Southern Pacific and a road in the central part of the country, road *A* in the table, make it a practice to use the split point derail on the inside of curves or where grade conditions may warrant.

The New York Central, Lines East, uses the split point on the inside of curves where they are sharper than one degree, while road *A* does not specify any certain curvature for its use at such locations. On the Southern Pacific the block derail is used only where grades are less than one per cent; at points where grades are greater, the split point type is employed.

The standard derail on the Northern Pacific is the split point, but the block derail is used in special locations. The split point derail was adopted as standard because the conditions are a little different from those existing on roads in other parts of the country, as in the timber regions along the Northern Pacific a great many temporary tracks are built and remain in for a year or two. After they have served their purpose they are then removed. This road found difficulty in matching up material recovered from the derails used in the temporary tracks, and many times the recovered material went to the scrap pile because of some missing parts. As these tracks are frequently needed in a hurry and many delays were experienced in getting and installing the derails, it was felt to be better practice to use the split point, as this is always available. Under other circumstances the block derail would likely have been favored as a standard. The practice of a road in the Southwest, road *B* in the table, is to use the split point derail with the low pony switch stand to operate it, similar to the one used for back track switches. The standard practices and the types of derails used by other roads are as listed in the table.

Derails in Automatic Signal Territory

Considerable variation exists in the application of derails to sidings connected to the main line in automatic signal territory. Some roads make it a practice to use switch circuit controllers connected up with the derails whether they are pipe connected or hand thrown; other roads use the circuit controller only in connection with hand thrown derails, while still others make it a practice to use pipe-connected derails in such territory without connecting them up to the signal system. The reports received indicated that 14 railroads use both pipe connected and hand thrown derails in automatic signal territory, 7 roads use pipe-connected derails, and 16 use hand thrown, while 11 report no automatic signal territory.

Where a pipe-connected derail is used in automatic signal territory, some roads do not make it a practice to use the circuit controller operated by the derail, inasmuch as the signal system is controlled through one located at the main line switch which operates the derail. In this connection it is the general practice to install pipe-connected derails without circuit controllers on the Atchison, Topeka & Santa Fe, the Pennsylvania Railroad, the New York, New Haven & Hartford, the Chicago, Rock Island & Pacific, the Delaware & Hudson, the Louisville & Nashville, the Lehigh Valley, the Boston & Maine, the Cleveland, Cincinnati, Chicago & St. Louis, the Pere Marquette, and the Nashville, Chattanooga & St. Louis.

As a safety measure and in order to indicate the position of the derail when it is not connected to the main line switch but is handled separately, a number of the roads use switch circuit controllers attached to the derails. Some of the roads following this practice are the New York Central, Lines East, the New York, New Haven & Hartford, the Santa Fe, the Rock Island, the Boston & Maine, the Delaware & Hudson, the Lehigh Valley, the Big Four, the Pere Marquette, and the Nashville, Chattanooga & St. Louis.

As an additional safeguard circuit controllers are connected to all derails in automatic signal territory whether these derails are pipe-connected or hand thrown on a number of roads, among which are the Baltimore & Ohio, the Delaware, Lackawanna & Western, the Long Island, the Union Pacific, the Southern Pacific, the Philadelphia & Reading, the Chicago, Milwaukee & St. Paul, the Norfolk & Western, the Chesapeake & Ohio, the Erie and the Central of Georgia. While the Nashville, Chattanooga & St. Louis has no derails in automatic signal territory, which is limited, were derails to be installed in such territory they would be equipped with circuit controllers.

Those roads not using the circuit controllers on derails, whether pipe-connected or hand thrown, in automatic signal territory, include the Chicago & Alton, the Southern Pacific Lines, the Canadian Pacific, the Los Angeles & Salt Lake, and the Chicago Great Western, while the Northern Pacific uses them to a very limited extent. It has not been the practice of the Illinois Central to use circuit controllers on derails in automatic signal territory in the past, but on new signal installations made in the past two years they have been installed and the practice will be continued on future work. The Missouri, Kansas & Texas uses the block derail in automatic signal territory in the majority of cases, but when it is necessary to use the split point this type is then equipped with the circuit controllers.

The Use of Pipe-Connected and Hand Thrown Derails

The practice of using a pipe-connected or a hand thrown derail, like the use of the split point or block type varies greatly on the different roads, as revealed in their answers to the questionnaire. The standard practice on some roads is toward the pipe-connected type, while others incline toward the hand thrown derail. Again some roads have about an equal number of both types in service with no preference expressed, while the use of pipe-connected derails on other systems has been discontinued for certain locations. Practically all the roads, however, have both types of derails in service.

Among the roads making it a standard practice to pipe-connect all derails where they operate with main line switches are the Lehigh Valley, the Erie, and the Burlington. All derails installed since 1916 on the Chicago, Rock Island & Pacific have pipe connections to the main line switch stands on all tracks connecting with the main line. The general practice on a line in the central part of the country, road *G* in the table, is to connect derails by pipe lines to the main track switches on passing sidings and yard leads leading to the main track except in the State of Indiana. Derails on station and industry sidings connected with the main track are hand thrown. In the State of Indiana the law requires lights on non-interlocked derails on passing sidings and on yard leads connected with the main track, and on this road these derails are not pipe-connected to the main line switch but are hand thrown.

The New York, New Haven & Hartford and the Atchison, Topeka & Santa Fe make it a general practice to pipe-connect all new installations to the main line switch stands. There are, however, exceptions in special cases and both types are employed.

The Pennsylvania Railroad, the Baltimore & Ohio and the Cleveland, Cincinnati, Chicago & St. Louis make it a standard practice to pipe-connect all derails to switch stands where these protect main track movements except on unimportant branch lines or where tracks are infrequently used. At such locations the hand thrown derail is employed.

The New York Central, Lines East, has about 80 per cent of its derails pipe-connected to and operated by the switch stands, 14 per cent connected to and operated by a separate lever working a facing point lock, 5 per cent interlocked, while 1 per cent are hand thrown. Approximately 75 per cent of the derails on the Delaware & Hudson and on the Pere Marquette are pipe-connected, while on the Delaware & Hudson about 18 per cent are thrown with an ordinary switch stand instead of by hand.

On the Boston & Maine the majority of the derails are thrown by independent switch stands, but these are gradually being replaced by the pipe-connected type. The Louisville & Nashville connects derails in automatic signal territory with pipes to the switch stands, while those outside this territory are hand thrown.

The general practice of the Illinois Central is to use a hand thrown derail and only in a few cases are the derails connected with the switch stands by pipes, while on the Missouri, Kansas & Texas the derails are all hand thrown and a derail sign is also used to indicate their location. A very small percentage of the derails on the Union Pacific and the Southern Pacific are pipe-connected; it is not the practice of the Union Pacific to operate them in this manner, while the practice of pipe-connecting them on the Southern Pacific has been discontinued. The Long Island has approximately 50 per cent of its derails still pipe-connected, but on all new work they are no longer connected in this manner, while the Chicago Great Western has taken out all pipe-connected derails and maintains only those that are thrown by hand.

Approximately 95 per cent of the derails on the Northern Pacific are of the hand thrown type, while on the Chesapeake & Ohio and the Minneapolis, St. Paul & Sault Ste. Marie probably 50 per cent of the derails installed are pipe-connected, the rest being hand thrown. The general practice of the Chicago & Alton is to use the hand thrown split point derail except on side tracks, having a heavy grade descending to a passing track or main line, in which case the pipe-connected derail is installed. The practice of the Canadian Pacific is to use a hand thrown derail except in the vicinity of interlocking plants or in other locations where it may be felt desirable to pipe-connect them to switch stands.

The Use of Derails and the Value of Their Application

In view of the very general use of derails as expressed above, the general opinion of the railroads is that the derail is a desirable safety device and while many of the roads have had no recent occurrences showing the worth of their application, derails have, however, demonstrated their value in the past. The installation of derails on the roads has prevented cars from moving out of sidings due to wind or grade or because the brakes were not properly set, or at locations where cars were moved by outside parties as at coal mines and like industries. The value received in protecting traffic and preventing damage in the past makes their use fully justified, in the opinion of a number of the roads.

Many of the roads report instances having occurred as demonstrating the value of derail installations. The Delaware & Hudson has recently had four instances where cars started to move out of sidings because the brakes were not properly set and the cars were derailed, preventing more serious damage occurring. Many instances have happened on the Rock Island where the use of derails has demonstrated the wisdom of their application, while other accidents have occurred where the failure to put derails on certain tracks has shown the necessity for such a device. On the Northern Pacific derials have quite often prevented the main track from being fouled by cars, while the Canadian Pacific reports that many instances have occurred where the lack of derails has proved their necessity. Cases have occurred on the Nashville, Chattanooga & St. Louis where cars have been started out of sidings from various causes and were derailed before causing trouble, while the Minneapolis & St. Louis in the last several years has had cars blown out of the side tracks by wind storms which have run for some distance on the main track. Derails are felt to be an effective safeguard in such occurrences.

There is a tendency on some lines to extend or make more general the use of derails; among these roads may be mentioned the New York Central, Lines East; the Baltimore & Ohio; the Delaware, Lackawanna & Western; the Chicago, Milwaukee & St. Paul; the Chicago, Rock Island & Pacific; the Lehigh Valley; the Illinois Central, the Boston & Maine; the Union Pacific, and the Nashville, Chattanooga & St. Louis. It is the intention of the New York Central to install derails on all connections of side tracks and main tracks, while the tendency of the Baltimore & Ohio is toward their general use to prevent the fouling of main tracks, runaways down steep grades, over running into open draws and to some extent into pits, such as turntable pits, etc. The Delaware, Lackawanna & Western and the Boston & Maine, in connection with recent construction work, equip all new tracks with derails. The Lackawanna places them on tracks regardless of grade, while the Boston & Maine is equipping existing tracks as rapidly as labor and material conditions will permit. It is the general practice on the Lehigh Valley, the Union Pacific, the Delaware & Hudson and the Illinois Central to install them at all danger points or where conditions may require. The number of derails in service is increasing each year on the Chicago, Milwaukee & St. Paul, but no recent instances have occurred demonstrating the wisdom of their application. This road reports daily derailments having occurred due to

the installation of derails which would not happen if the tracks were not protected with them. However, the damage done by such derailments is generally not great and greater damage could result were the derails omitted at such points. The tendency of the Rock Island is to have all tracks leading to the main line on which cars are placed properly equipped with derails, while the Nashville, Chattanooga & St. Louis is extending their use and feels that their application on industrial tracks to prevent shippers from pushing cars beyond the clearance point alone justifies their use.

Esch-Pomerene Bill to Increase Commission's Powers

Many Amendments to Commerce Act Proposed But Few Radical Changes in System of Regulation

WASHINGTON, D. C.

CHAIRMAN JOHN J. ESCH, of the House Committee on Interstate and Foreign Commerce, introduced in the House on Monday, June 1, a bill to further amend the act to regulate commerce, embodying ideas for the regulation of the railroads after their return to private management. This bill, which was also introduced in the Senate by Senator Pomerene, represents what may be termed the conservative school that favors a minimum of disturbance of the interstate commerce law while bringing about a greater degree of co-operation and of joint use of facilities between railroads, as opposed to the more radical ideas which have been expressed and will be embodied in a bill by Chairman Cummins, of the Senate committee, and which have been advocated by Director General Hines, providing for a government guaranty and a reorganization of the railroads. Mr. Esch is known to have consulted closely with the legislative committee of the Interstate Commerce Commission in drafting the bill, and it represents in general the ideas expressed on behalf of the commission by Commissioner Clark during the Senate committee hearings in January and by Commissioner McChord in a personal statement published on Monday morning. The powers and duties of the commission are considerably increased; it is given a freer hand in several ways along lines on which it has repeatedly made recommendations to Congress. Both because it represents the views of the commission and because of Mr. Esch's position and his high standing and long experience in matters of railway legislation, the bill is expected to have strong support in Congress.

Changes in Rate Sections

The authors of the bill evidently do not agree with those who believe it necessary that the Interstate Commerce Commission should be given a specific mandate to make rates adequate from the standpoint of a return on the investment, but the proposed rule of rate-making goes so far as to say that "the commission in reaching its conclusion as to the justness and reasonableness of any rate, fare, charge, classification, regulation or practice shall take into consideration the cost of labor and other operating costs in so far as they become material in any case under investigation," which is what the commission has always claimed it has done. The bill, however, gives the commission power to prescribe minimum or absolute rates, and, while leaving undisturbed the rate-making powers of the states, it gives the commission a power of joint action with state commissions in proceedings bringing state rates into issue and authorizes the commission to remove undue preference or prejudice or any undue burden upon interstate or foreign commerce which may be caused by state action.

The period of suspension of a rate is limited to 120 days by eliminating the provision for a re-suspension for six months, and if the hearing cannot be concluded within the period of suspension it is provided that the proposed rate shall go into effect, but in case of an increased freight rate or charge the commission may require the interested carriers to keep an accurate account of the amounts received and upon the conclusion of the hearing and decision may require the carriers to refund with interest such portion of the increase as shall be found not justified. The prohibition of pooling in section 5 of the act is qualified by the words "except upon specific approval by order of the commission," and it is provided that the commission may approve the unification, consolidation or merger by purchase, lease, stock control or otherwise of two or more carriers, or the pooling of their traffic, earnings or facilities, under terms to be prescribed by it.

Provision for the supervision of security issues and the expenditure of the proceeds is made substantially in the language of the Rayburn bill, passed by the House in 1914, and the authority of the commission, by the issuance of certificates of public convenience and necessity, is required for the construction of new lines or extensions or the abandonment of a line of railroad.

Increased Powers

The regulating powers of the commission are also proposed to be increased by giving it jurisdiction to require a carrier to provide safe and adequate facilities or to extend its line or lines, and whenever the commission shall be of opinion that shortage of equipment, congestion of traffic or other emergency requiring immediate action exists in any section of the country, it is authorized to suspend the carriers' rules and make its own directions with respect to car service and the interchange and use of locomotives, cars and other vehicles, without regard to ownership, during such emergency. This broadens the provisions of the Esch-Pomerene car service act. The commission is also authorized to require joint or common use of terminals upon such terms as it may prescribe and to give directions for preference or priority in transportation, embargoes, or movement of traffic under permits, and in time of war or threatened war the President may certify to the commission that it is essential that certain traffic shall have preference and the commission shall give the necessary directions.

Aside from this emergency power the commission is authorized to require the terminals of any carrier to be open to the traffic of other carriers upon such just and reasonable terms and conditions, including just compensation to the owners, as it may prescribe. It may also require railroads and water carriers to construct suitable docks and terminal connections for the interchange of freight or passengers. The commission is given a freer hand in dealing with complicated rate adjustments by a provision that whenever it is of the opinion, after full hearing, that *any* rate, fare or charge, classification, regulation or practice "is or will be" unjust, unreasonable, or otherwise unlawful, it may prescribe what will be the reasonable rate, fare, or charge, etc., or the maximum or minimum to be thereafter observed. This is apparently to meet such cases as are often encountered by the commission in which it is difficult to make the change desired without disturbing other rates not immediately involved,

and it would seem as if the language was broad enough to give the commission almost complete authority over rates. The present rule giving the commission's orders a life of two years is changed to provide that they shall remain in force for a specified period or until further order.

The commission is authorized to prescribe the divisions of joint rates or fares and in time of car shortage, congestion or other emergency may establish temporarily such through routes as in its opinion are necessary or desirable in the public interest, regardless of the general provision against requiring railroads to "short-haul" themselves.

The case involving the commission's efforts to examine correspondence of the Louisville & Nashville is recalled by a provision that the commission may have access to all documents, papers and correspondence.

The provisions of the act are extended by the proposed amendments to cover companies engaged in the transmission of intelligence by wire or wireless and to water carriers and all pipe line companies, telegraph, telephone and cable companies operating by wire or wireless and "all persons, natural or artificial, engaged in such transportation or transmission as aforesaid as common carriers for hire" are declared to be common carriers.

The term "water" is to include the lakes, rivers, canals and other inland waterways within or bordering on the United States or the territory of Alaska, the Panama Canal, and all waters within or without the three-mile limit from the coast of the United States or the territory of Alaska traversed by vessels permitted to engage in the coastwise trade. The definition of the term "railroad" is broadened to include car floats, lighters, terminals, and of "transportation" to include locomotives and vessels.

The term "car service" is defined to include the "use, control, supply, movement, distribution, exchange, interchange and return of locomotives, cars and other vehicles used in the transportation of property, and the supply, movement and operation of trains by any carrier subject to this act," and it is made the duty of every carrier by railroad subject to the act "to furnish safe and adequate car service" and to establish just and reasonable rules, regulations and practice with respect to car service, and the commission is given discretionary power to prescribe such rules and regulations, including the compensation to be paid by carriers for the use of each other's locomotives or other vehicles as well as cars.

Mr. Esch has prepared a synopsis of his bill in which he says, in part:

"The prohibition imposed by the Panama canal act upon railroad-owned vessels is modified to permit such vessels to continue in service, even when competition may be excluded, prevented, or reduced, if the commission finds such service in the public interest.

"The commission can order docks and tracks of carriers to be connected and suitable docks to be constructed by either the rail or water carrier and determine the sums to be paid by either.

"To prevent destruction of inland water transportation and for other purposes, the commission is given power to prescribe 'joint rates or maximum or minimum or maximum and minimum' joint rates, and also proportionate rates.

"The commission is authorized to fix the division of rates between carriers. Under the exercise of this power it will be possible for weak lines or so-called independent short lines to receive such share of the joint rate as will enable them to live.

"Pooling of freight and earnings, unification, consolidation or merger may be permitted by the commission upon complaint, or upon its own initiative without complaint, provided it finds these 'to be in the interest of better service or greater economy in operation.' The absorption of the so-called 'weak sisters' may thus largely be met without resort to compulsion, federal incorporation, or other complicated, protracted, and probably unconstitutional methods.

"One of the evils of the past has been the construction of parallel or unwarranted lines, resulting in weak, unprofitable and speculative roads. The bill requires that, before there can be any extension or construction of new lines, or acquisition or operation of any line, a 'certificate of convenience and necessity' must be secured from the State regulating body of New York, Wisconsin and other States.

"The 'transmission of intelligence,' as effected by wire or wireless system, is to be more fully placed under the commission. The interstate commerce act omitted to give the commission authority for complete regulation of these systems. The bill seeks to do this, except as to business wholly intrastate. To this end the commission can order extensions of lines, if in the public interest, prohibit rebates and discriminations require the filing and publication of rates and schedules, prohibit the doing of business or the collection of charges unless and until such publication has been made, and require transmission to be continuous from place of origin to destination.

"The practice of state commissions in reducing intrastate rates and thereby placing an undue burden upon interstate traffic has created a growing sentiment in favor of placing the rate-making wholly under the Interstate Commerce Commission. The bill does not do this, but prescribes a method of adjusting differences by allowing the state commissions to sit with the Interstate Commerce Commission and participate in the hearings, but the latter is to make the findings. Any undue burden placed upon interstate or foreign commerce is, under the bill and following the decision of the Supreme Court in the United States in the Shreveport cases, declared to be unlawful. The findings of the commission and orders based thereon 'shall be observed, any act, decision or order of any state or state authority to the contrary notwithstanding.'"

Some of the principal changes in the law proposed by the Esch bill are shown in the following paragraphs, the new language being printed in italics.

"From and after , 19 , no carrier by railroad subject to this act shall undertake the extension of its line of railroad, or the construction of a new line of railroad, or shall acquire or operate any line of railroad, or extension thereof, or shall engage in transportation under this act over or by means of such line of railroad, or extension thereof, unless and until there shall first have been obtained from the commission a certificate that the present or future public convenience and necessity require or will require the construction, or operation, or construction and operation, of such line of railroad, or extention thereof, and no carrier by railroad subject to this act shall abandon any portion or all of its line of railroad, or the operation thereof, unless and until there shall first have been obtained from the commission a certificate that the present or future public convenience and necessity permit of such abandonment.

"The application for and issuance of any such certificate shall be under such rules and regulations as to hearings and other matters as the commission may from time to time prescribe, and the provisions of this act shall apply to all such proceedings. Upon receipt of any application for such certificate the commission shall cause notice thereof to be given to the railroad commission, or public service or utilities commission, or other appropriate authority, of each state in which such line of railroad, or extension thereof, is proposed to be constructed or operated, or any portion or all of such line of railroad, or the operation thereof, is proposed to be abandoned, with the right to be heard as hereinafter provided with respect to the hearing of complaints or the issuance of securities.

"The commission shall have power to issue such certificate as prayed for, or to refuse to issue it, or to issue it for a portion or portions of a line of railroad, or extension thereof.

described in the application, or for the partial exercise only of such right or privilege, and may attach to the issuance of said certificate such terms and conditions as in its judgment the public convenience and necessity may require. From and after issuance of such certificate, and not before, said carrier by railroad may comply with the terms and conditions of such certificate or attached to the issuance thereof and proceed with the construction, operation, or abandonment, covered thereby. Any construction, operation or abandonment contrary to the foregoing provisions of this section may be enjoined by any court of contempt jurisdiction at the suit of the United States, the commission, any commission or regulating body of the state or states affected, or any party in interest, and any carrier knowingly violating any of the foregoing provisions shall be guilty of a misdemeanor and upon conviction shall be liable to the penalties provided for violation of this act.

"The commission may, after hearing, in a proceeding upon complaint or upon its own initiative without complaint, authorize or require by order any carrier by railroad subject to this act, party to such proceeding, to provide itself with safe and adequate facilities for performing as a common carrier its car service as that term is used in this act, and to extend its line or lines, and any carrier subject to this act engaged in the transmission of intelligence, party to such proceeding, to provide itself with safe and adequate facilities for performing as a common carrier its service of transmission as that term is used in this act, and to extend its line or lines; Provided, That the commission shall find that such provision of facilities or extension, is reasonably necessary in the interest of public convenience and will not impair the ability of the carrier to perform its duty to the public."

Sec. 5. That the first paragraph of section five of the commerce act be amended to read as follows:

"That, *except upon specific approval by order of the commission as in this section provided,* it shall be unlawful for any common carrier subject to this act to enter into any contract, agreement or combination with any other common carrier or carriers for the pooling of freights of different and competing railroads, or to divide between them the aggregate or net proceeds of the earnings of such railroads, or any portion thereof; and in any case of an agreement for the pooling of freights as aforesaid, each day of its continuance shall be deemed a separate offense: *Provided, That whenever the commission shall be of opinion, after hearing upon application of any carrier or carriers subject to this act, or upon its own initiative, that the unification, consolidation or merger by purchase, lease, stock control, or in any other way, similar or dissimilar, of two or more carriers subject to this act, or of the ownership or operation of their properties, or of designated portions thereof, or that the pooling of their traffic, earnings or facilities to the extent indicated by the commission, will be in the interest of better service to the public, or economy in operation, or otherwise of advantage to the convenience and commerce of the people, the commission shall have authority by order to approve and authorize such unification, consolidation, merger, or pooling, under such rules and regulations, and for such consideration as between the said carriers and upon such terms and conditions, as shall be found by the commission to be just and reasonable in the premises.*

"The commission may from time to time, for good cause shown, make such supplemental orders in the premises as it may deem necessary or appropriate, and may by any such supplemental order modify or set aside the provisions of any previous order as to the extent of the pooling, or as to the rules, regulations, terms, conditions or consideration currently moving in respect of any unification or consolidation of operation and not of ownership, or of pooling, so heretofore approved and authorized.

"The carriers affected by any such order shall be, and they are hereby, relieved from the operation of the 'anti-trust laws,' as designated in section one of the act approved October 15, 1914, entitled 'An act to supplement existing laws against unlawful restraints and monopolies, and for other purposes,' and of all other restraints or prohibitions by law, in so far as may be necessary to enable them to effect any unification, consolidation, merger or pooling so approved by order under and pursuant to the foregoing provisions of this section."

Sec. 6. That the fourth paragraph of section five of the commerce act be amended by adding at the end thereof the following:

"Provided further, That the commission may in like manner extend the time during which such service by water may continue to be operated until its further order after hearing, even where it finds that competition may be excluded, prevented, or reduced, if it also finds that the service is in the interest of the public and of advantage to the convenience and commerce of the people, and that a discontinuance thereof would be substantially injurious to the commerce or localities affected."

Sec. 13. That section thirteen of the commerce act be amended by adding at the end thereof two new paragraphs reading as follows:

"Whenever in any investigation under the provisions of this act there shall be brought in issue the lawfulness of any rate, fare, charge, classification, regulation, or practice made or imposed by authority of any state, the commission, before proceeding to hear and dispose of such issue, shall cause such state or states to be notified of the proceeding. The commission may confer with the authorities of any state having regulatory jurisdiction over the class of persons and corporations subject to this act with respect to the relationship between rate structures and practices of carriers subject to the jurisdiction of such state bodies and of the commission; and to that end is authorized and empowered, under rules to be prescribed by it, and which may be modified from time to time, to hold joint hearings with any such state regulating bodies on any matters wherein the commission is empowered to act and where the rate-making authority of a state is or may be affected by the action taken by the commission. The commission is also authorized to avail itself of the cooperation, services, records and facilities of such state authorities in the enforcement of any provision of this act.

"The commission shall have authority, after full hearing, to make such findings and orders as may in its judgment tend to remove any undue preference or prejudice as between persons or localities in state and interstate or foreign commerce, or any undue burden upon interstate or foreign commerce, which is hereby forbidden and declared to be unlawful, and such findings or orders shall be observed while in effect by the carriers parties to such proceeding affected thereby, any act, decision, or order of any state or state authority to the contrary notwithstanding."

Other Bills

The question of getting the telegraph and telephone lines returned to their owners was given precedence for the time being over the more complicated matter of railroad legislation by both the House and the Senate committees on interstate commerce, both of which began hearings on the situation regarding the wire companies last week. The Senate committee on Tuesday ordered a favorable report on the bill providing for the immediate return of the wire companies. The House committee switched on Monday to the daylight saving law which apparently has divided the country into two opposing camps, that of the farmers, who prefer to have the law repealed to adjusting themselves to a new relation between clock time and sun time, and that of the urban population that is getting the benefit of an additional daylight hour.

Chairman Esch of the House committee is planning to use his bill as a mark to shoot at at the railroad hearings which he proposes to hold as soon as the committee's docket is cleared of some of the less intricate questions, and Chairman Cum-

mins of the Senate committee has not yet introduced the bill embodying his plan of railroad reorganization which he plans to have his committee work on before holding hearings.

Director General Hines and Swagar Sherley, director of the Division of Finance of the Railroad Administration, were given a hearing before the House appropriations committee on Tuesday on the $1,200,000,000 appropriation asked by the Railroad Administration.

Senator Cummins has reintroduced as S. 641 the bill he introduced at the last session limiting the President in his rate-making power to the powers formerly possessed by the railroads before federal control by restoring the complete jurisdiction of the Interstate Commerce Commission, which is now limited to a review of rates after they are put into effect by the President, and making it clear that the carriers while under federal control shall be subject to all laws and liabilities as common carriers. The Senate committee on Tuesday ordered the bill to be reported favorably.

Senator Cummins has also reintroduced his concurrent resolution to provide for the creation of six joint congressional committees on reconstruction, one of which would be known as the joint congressional committee on interstate transportation, for the purpose of investigating and reporting on the permanent relation which the government should sustain to the common carriers, whether the railroads should be returned to their former owners and operated as heretofore, or whether government operation should continue with or without government ownership; or if private ownership is to continue and private operation resumed, what system of regulation and control will be best adapted to secure efficiency in service, reasonable rates and fairness to the capital invested. The committee would also study the relation which should be established between inland water transportation and the railways.

Senator McKellar has introduced a bill providing that where freight is offered to a common carrier to be transported by it to some foreign port, the initial carrier shall be required to issue a through bill of lading and all steamship carriers designated in such bill of lading shall carry out the contract entered into by the initial carrier under penalty of not being permitted to use the ports of the United States should they be guilty of non-compliance.

Senator Cummins has also introduced a bill, S. 1025, making it unlawful for any common carrier to charge a higher rate over the same line and in the same direction for the interstate transportation of any article or commodity having been grown, produced or manufactured in the United States than it charges for a like article or of a substantially similar article or commodity when imported into the United States from a foreign country and that the proportion of all through rates received by carriers transporting such imported articles or commodities shall be held to be the rate or charge made and received for the transportation thereof in this country. It is also provided that no common carrier in conforming to the foregoing provision shall increase any rate without the approval of the Interstate Commerce Commission entered after a full hearing upon an application for such increase.

Another bill introduced by Senator Cummins, S. 1026, provides that carriers shall receive and transport with each passenger tendering the same baggage, including the sample baggage of such passenger, not exceeding 150 pounds for an adult and 75 pounds for a minor less than 12 years old, without compensation other than the passenger transportation charge. Baggage in excess of the weight specified is declared to be excess baggage and the carriers are required to carry such excess baggage with the passenger, provided that carriers shall be required to carry baggage only on trains equipped with a baggage car. Samples, goods, wares, appliances and catalogues of commercial travelers or their employers used both for the purpose of transacting their business and carried with them solely for that purpose, when securely packed and locked in substantial trunks or sample cases of convenient shape and weight for handling, are declared to be sample baggage within the meaning of the act. It is also provided that in the case of the loss or damage to such sample baggage the carrier shall not be liable for any greater proportion of the value or of the damages than the excess baggage fare bears to the current rate of freight nor for any greater amount than the value.

Overwhelming Sentiment Against Government Ownership

BY A QUESTIONNAIRE conducted recently by the Association of Railway Executives (61 Broadway, New York) it is shown that the general public, as estimated by editors all over the country, would vote seven to one against government ownership of railroads. The questionnaire was answered by nearly 6,000 editors of daily and weekly newspapers throughout the country. It was sent to every editor in the country (13,424) and brought replies from 44 per cent; and 83 per cent of those replying reported their communities in favor of a resumption of private management.

The questionnaire was completed before President Wilson announced in his recent message to Congress that the government would relinquish control of the railways at the end of the year. Editors were asked not to give their personal opinions, but to appraise the sentiment in their communities. The four chief questions were as follows:

1. Does public opinion in your judgment seem to favor the return of railroads to private ownership and operation as soon as this can properly be accomplished?
2. If so, is this opinion in part based on the desire to see competition in service and facilities restored?
3. What is the present sentiment in your community on government ownership and operation of railroads?
4. What has been the feeling regarding the proposal to extend the period of government operation for five years?

On the first question 83 per cent voted yes, 11 per cent voted no, 4 per cent doubtful and 2 per cent expressed no opinion.

On the second question 75 per cent voted yes, 6 per cent no, with 5 and 14 per cent doubtful and blank respectively. On the third, 78 per cent estimated public sentiment as against government ownership, 11 per cent for, with 7 per cent doubtful and 4 per cent blank. On the fourth, the vote was: Against, 74 per cent; for, 10 per cent; doubtful, 9 per cent; blank, 7 per cent.

Canvass of the replies from different states, north, south, east and west, showed that sentiment on this subject was not divided on party lines, Texas and Pennsylvania, Maine and Tennessee showing similar percentages. The strongest sentiment against government ownership was found to be in New England and the south, sections widely apart in political sentiment. Only 4 per cent of New England editors and 7 per cent of southern editors reported their people favoring government ownership.

The Trans-Canada Limited, the new through express train of the Canadian Pacific, which was put in service on June 1, runs every day in the week and will run from Toronto as well as from Montreal. From both Montreal and Toronto the train has compartment cars, and ordinary sleeping cars. It has no coaches. On the first day the train left Montreal with seven cars, and about 85 passengers. For all of the trains making this four-day run the equipment required is 59 sleeping cars, 15 dining cars, 12 observation cars, 5 compartment cars, 12 baggage cars, and 24 locomotives. The estimated value of this equipment is $6,000,000.

Railway Developments in Foreign Countries

Materials Required for Mexican and Siberian Railways; Problem of Railway Transportation in Italy.

There is a hard fight going on, says George Mallet in a recent issue of the Weekly Bulletin of the Canadian Department of Trade and Commerce, between the owners of vested and prospective interests in the neighborhood of the projected routes of the next Transandine railway.

While a party of government engineers are busy surveying the Lonquimay route, which is designed to open up important international intercourse between the Atlantic port of Bahia Blanca and the Pacific port of Lebu, running through the heart of the Chilean coal mining zone, a determined attempt is being made to counterattract public attention to the Nuble route, which runs through San Carlos and San Fabian.

Extensions of Kansas City, Mexico & Orient

According to announcement by the department of communications and public works of the Mexican government, the Kansas City, Mexico & Orient system in this country is to be greatly extended just as soon as provisions can be made by the company for resuming construction work. At the time the revolutionary period began, nearly nine years ago, the main line of the Kansas City, Mexico & Orient was getting well along toward completion. Two unfinished gaps in Mexico and a 50-mile stretch of country in Texas are all that are lacking to make the line complete between Kansas City, Mo., and the port of Topolobampo, on the Pacific coast. The division which runs from Chihuahua to Marquez lacks only 75 miles of reaching the Rio Grande. From Chihuahua the track of the Mexico Northwestern is used as far as Sanchez. The next division is from Ojo del Buey to Los Hornillos. Then follows another unfinished gap to Fuerte. From Fuerte to Topolobampo the road has been in regular operation for several years.

The company has made application to the department of communications and public works for a concession to construct branch lines to Guadalajara, San Luis Potosi, Aguas Calientes and a number of other cities and towns.

Demand for Locomotives and Structural Steel in France

Reconstruction of industry or "reconstitution," as the French prefer to term it, for the word implies the genesis of a new order of things rather than a resettlement of the old, is undoubtedly the most vital problem which faces France today, says the Bulletin of the Federation of British Industries in a recent issue. It is a question which presents enormous difficulties by reason of its various possible solutions.

In some quarters it is strongly felt that if France is to retain what monetary wealth remains to her, the production of the materials required must of necessity be undertaken within her own borders. On the other hand the impatient producer, whose works in the war-damaged area have been destroyed, maintains that the industrial renaissance is of sufficient urgency to warrant unrestricted importation from foreign sources of all materials not immediately obtainable from the home manufacturer.

As a third illustration may be cited the case of the manufacturer whose business, so far from suffering injury has actually been expanded by the demands of the war added to the fact that the destruction of industry in the northeastern area has considerably contracted the productive resources of the country. From his point of view unrestricted importation is directly opposed to the interests of French industry.

Whatever may be the best policy for France as a whole, all authorities are agreed that the first undertaking in the redevelopment of industry in the devastated area must be the building and equipment of new railways. The embankments and cuttings of the old railways have not been greatly harmed. Steel rails are plentiful and there is no great shortage of sleepers or permanent way material.

It is however in the matter of structural steel-work for bridges that a want is felt and it is doubtful whether that want can be supplied by French steel works alone during the forthcoming summer.

Military Railways in France

It is common knowledge that the railway network laid down in France by the British military authorities, and including both standard gage heavy lines and narrow gage light tracks, amounts to a total of hundreds of miles, says the Railway Gazette (London) in a recent issue. Considerable construction was also carried out by the American Army. Among the problems connected with the "clearing-up" of the war areas is that of the disposal of these railways. Both the British and American authorities have been willing to allow France to retain such lines as may be required for ordinary commercial purposes or would be of use during the period of reconstruction, but a good deal of the mileage is not required by the French Government. This applies to both standard and narrow gage track. For example, one section of main line which before the war was only a double track line has been quadrupled by the British, and the extra tracks are now being taken up, since local opinion considers them unnecessary for the normal gage light railway, which were extremely useful for hauling men and materials within the actual war zone, but are laid in districts where the commercial traffic which would now offer would be of so slight and unremunerative a nature as to render their retention quite unnecessary, while lines of this nature are not always suited to civilian requirements. An Allied Commission is now to investigate the whole question. This commission will have plenary powers to decide on the future of all the railways constructed in France by the British and American armies for war purposes, and the surplus track, etc., will be offered to the world's buyers.

The Fourth Lyons Fair

The Lyons Fair which took place from March 1 to 15 was most successful not only from the standpoint of the number of exhibitors which was considerably over that of any preceding year, but also from the point of view of the diversification of the products shown.

So many were the applications for space that the fair will henceforth be held in two sections, one in the spring from March 1 to 15 and one in the fall, from October 1 to 15. Machinery, transport materials, and similar products will be included in the latter.

At the fair this spring there were 618 American firms represented, as compared with 527 in 1918; 25 in 1917 and only 4 at the first fair in 1916. Canada was represented by 55

concerns and the Canadian National Railways and the Canadian Pacific Railway each had considerable space.

Belgium Needs Telephone and Telegraph Material

During the German occupation a great quantity of material and accessories belonging to the Belgian government-owned telegraph and telephone systems, says Consul Charles R. Nasmith, Brussels, was destroyed or taken away by the enemy, so there is a great need of material at the present time.

American firms who wish to make offers for the sale of electrical apparatus or other material for telegraph or telephone installations might be interested to know, he says, that bids should be submitted to the Administration des Telegraphes et des Telephones, Hotel des Postes et des Telegraphes, Place de la Monnaie, Brussels. Each bid, according to official information just received at the consulate, should be accompanied with descriptions, photographs, etc., when it has to do with apparatus. As for the cables, specifications must be given, and whenever possible samples should be sent.

Railway Extensions in Siberia

The Times (London) in a recent issue prints a telegram from Omsk, the seat of the Kolchak government, saying that the government of Admiral Kolchak has decided to begin the construction of a railway from Krasnoufimsk (west of the Urals) to Tomsk, western Siberia (a distance of over 800 miles).

This line, which is intended to relieve the Siberian Perm-Samara Railways, should greatly contribute to the development of the productive forces of Siberia and the Urals.

What the Siberian Railways Need

L. D. Wilgress, Canadian trade commissioner at Vladivostok, has sent to the Weekly Bulletin of the Canadian Department of Trade and Commerce a long list of materials, giving an idea of what was needed for the Siberian railways for the first four months of 1919.

In speaking of the Siberian railway situation, Mr. Wilgress says that the hope is expressed by those competent to express an opinion that the new inter-allied control will be able to restore the normal railway facilities to normal working order in from five to six months.

The plan for the inter-allied control of the Siberian railways, as noted in the *Railway Age* of March 14, page 612, gives the Chinese Eastern Railway and the various railway systems in Siberia over to the control of two boards: (1) Technical; (2) Military, under the general supervision of a special inter-allied committee. Mr. John F. Stevens, chief of the American Railway Commission in Siberia, is appointed president of the Technical Board, and he is to be assisted by the special corps of American railway engineers, who have been investigating conditions for over a year. The Russian personnel of the railways is to be retained.

"It remains yet to be seen as to whether this plan will prove workable," says Mr. Wilgress. "The railway situation is the fundamental problem in the economic restoration of Siberia. The re-establishment of normal transport will bring about a resumption of trade with foreign countries.

"At the present time it is practically impossible for the co-operative societies and private firms to ship goods into the interior in the ordinary way, and the port of Vladivostok is congested with supplies which it will take several months to clear. It is estimated that over 1,000,000 tons of goods are lying at Vladivostok awaiting transport into the interior, while nearly 1,000,000 tons of Siberian products are also lying at points along the railway line awaiting transport to ocean ports for shipment abroad. It may be said that the railway facilities are completely disorganized, and it is with great difficulty that military and other essential supplies are transported to destination.

"The greatest need is for new locomotives, spare parts for the repair of the existing rolling stock, lubricating oil, and other supplies essential for the operation of a railway system. The British and American governments have already, through their respective commissions, begun to take energetic measures for the relief of the situation. A consignment of locomotives is being imported by the British Railway Commission, and supplies of lubricating oil and other materials are coming forward from the United States.

"One of the objects of the agreement just concluded is to co-ordinate these various activities of the principal powers interested in the relief of the Siberian Railway system."

The list forwarded by Mr. Wilgress is given below. The difficulty of securing the materials noted, he says, is largely instrumental in the present disorganization and breakdown of the Siberian railway facilities.

Materials Required for the Siberian Railways

Classification		Quantity
Petrol	poods*	100,000
Benzine	"	2,000
Mineral oil, also naphtha	"	20,000
Cylinder oil, viscosin type for super-heaters	"	10,000
Car axle oil	"	250,000
Indigo copying paper	reams	500
Graphite in powder for foundry works	poods	300
Muriatic acid for soldering	"	1,000
Sal ammoniac, in lumps	"	50
Sal ammoniac, in powder	"	50
Glue for joiner's works	"	200
Glue for painting works	"	200
Asbestos packing, width from 1/10 in. up to 1⅛ in.	"	300
Steatite packing, width from ⅜ in. up to 1⅛ in.	"	900
Glass paper from No. 0000 to No. 4	sheets	60,000
Emery paper from No. 00 to No. 5	"	30,000
Paper from No. 0000 to No. 5	"	20,000
Emery cloth from No. 0 to No. 4	"	20,000
Cloth from No. 000 to No. 7	"	50,000
In powder, large, intermediate, small	poods	30
In lumps from 4½ in. to 12 in.—		
Section square, semi-circular, circular, flat and trihedral	pieces	200
Powder, large, middle, small and dust	poods	100
Rings of special dimensions by sketches	pieces	600
Rubber hoses between locomotive and tender of different dimensions	"	1,200
Rubber hoses for Westinghouse brakes—		
Length, 610 mm.	"	3,000
Length, 760 mm.	"	1,000
Rubber packing rings for Westinghouse brakes—		
No. 2	"	3,500
No. 3	"	3,000
Rubber rings for gage glasses of different sizes	"	10,000
Rubber rings for passenger engines	"	1,000
Rubber cloth of different width without layers	poods	80
Rubber with one layer	"	100
Rubber with two layers	"	30
Gage glasses for boilers and tanks from—		
⅜ in. to ¾ in. and from 12 in. to 18 in.	pieces	12,000
Safety glass, Klinger	"	200
Iron gas pipes, d. from ¼ in. to 4 in.	1 foot	140,000
Connecting parts for gas pipes (counter screws, crosses, nipples, branch pipes, three-way pipes, set-square, flanges)	"	20,000
Smoke-consuming pipes for boilers	"	30,000
Gun metal pipes int. d. 1 3/16 in. to 2⅞ in.	poods	3,000
Wire iron netting of simple and diagonal plaiting with holes from 1 mm. to 10 mm.	sq. arshines	10,000
Steel balls d. from 5/32 in. to ¼ in.	pieces	2,000
Engine, tender and car tires, by sketches	"	10,000
Babbitts for cars	poods	4,000
Babbitts for engines	"	4,000
Lead	"	21,000
Tin	"	5,000
Zinc in plates	"	700

* 1 pood = 36 pounds.

British Railway Costs Under Government Control

Continued requests for information on the part of the British Parliament and promises on the part of the government brought out on May 14 an official statement by the Board of Trade "showing the cost of running the railways of Great Britain during the period of government control" and covering the period from August 5, 1914 to December 31, 1918.

The statement shows a balance of receipts over expenditures and in excess of the guarantee of the compensation paid to the railroad companies. The receipts, however, include a

total of £112,000,000 as an estimate covering government traffic if charged at authorized pre-war rates.

The statement was prepared by Sir Albert Wyon and Sir William Plender, and is supplemented by a Board of Trade statement signed by Sir Auckland Geddes, minister of national service and reconstruction.

According to the accounts the receipts and expenditures were as follows:

	Receipts	Expenditure	Balance
1913.....	£118,700,935	£75,127,210	£43,573,725
1914.....	47,918,188	31,782,832	16,135,356
(Aug. 5 to Dec.31.)			
1915.....	130,358,044	85,028,262	45,329,782
1916.....	145,871,085	95,756,706	50,114,379
1917.....	164,279,430	108,877,932	55,401,498
1918.....	177,584,321	131,326,295	46,258,026

The revenue includes not only the receipts from the ordinary passenger and goods traffic, but the estimated value (reckoned at authorized pre-war rates) of government traffic during the war. For each year of control this value is:

1914 (from Aug. 5)	£3,500,000
1915	10,279,104
1916	20,649,126
1917	35,698,554
1918	41,917,024
Total	£112,043,808

These figures do not include the value of additional services performed by means of steamboats, docks, canals, etc., which may be estimated roughly at from £10,000,000 to £15,000,000.

£95,313,607 in Compensation

The compensation payable to the railway companies in respect of control periods is limited to the net receipts of the year 1913, with the addition of 4 per cent on capital expenditure brought into use since the beginning of the war. The compensation actually so paid is given in Sir Auckland Geddes' statement as:

1914 (from Aug. 5)	£15,946,839
1916	14,039,674
1917	24,075,768
1918	41,251,326
Total	£95,313,607

The above figures, states Sir A. Geddes, include provisional allowances for deferred maintenance of permanent way, rolling stock, and plant; but do not include any provision for "extra wear and tear." This item cannot be ascertained at present; but the auditors advise that the cost of making good the "extra wear and tear" will be considerable.

Sir A. Geddes also gives a revised estimate of costs for the current financial year. The figures of £90,000,000 to £100,000,000, he says, were quoted by the minister-designate (Sir Eric Geddes) in moving the second reading of the ministry of ways and communications bill. These figures were the best estimate then available of the increased cost of working during the two years of extended government guarantee, as compared with the cost in 1913. The following is the present estimate of increased cost in working during the financial year ending March 31, 1920, as compared with 1913:

War wage and other concessions, £57,000,000; eight-hour day, concessions recently granted or under consideration, £20,000,000 to £25,000,000; extra cost of materials and coal, £27,000,000; total, £104,000,000 to £109,000,000.

The Problem of Railway Transportation in Italy

In response to the criticism of the Italian railway service at the present time, a statement has recently been made public by the director general of the Italian State Railways, which outlines some of the difficulties with which the railway administration has been confronted and the steps that have been and will be taken for improvement. The report, which has been translated and sent to Commerce Reports by Trade Commissioner H. C. MacLean at Rome, is of special interest to American readers for the emphasis it places on the assistance rendered by the American railway supply field and for the outline it gives concerning future requirements. It will be borne in mind that the Italian State Railways have recently ordered 150 more locomotives in the United States (from the American Locomotive Company) in addition to the 150 mentioned.

The abstract forwarded by Mr. MacLean follows:

Special emphasis is laid on the fact that since the signing of the armistice the requirements of the military authorities in the matter of railway transportation have not been reduced to the extent that the general public expected. During October, 1918, the last month of the war, 22,592 trains were operated for the transport of troops and various military supplies; in March, 1919, the military authorities still required 16,251 trains. In the matter of supplies, the average number of freight cars loaded daily with war materials in October, 1918, was 6,300, while the number averaged only 3,000 in March, 1919. This reduction made possible a large increase in the transportation of goods for the general public. In October, 1918, the average number of cars loaded at the ports with merchandise for the public was only 450 per day, whereas in March, 1919, it reached an average of 2,300 cars. For grain, rice and flour, 700 cars per day were loaded in March, as against 400 in October. For wine, there are loaded to-day 260 cars, as against 50 in the same period of the former year.

Prompt Delivery of American Orders

The most serious obstacle which must be overcome if the railroad administration is to furnish the service maintained previous to the war arises from the fact that the rolling stock employed on the Italian railways is in bad condition. This is because the Italian firms specializing in the construction of railway materials were obliged during the war to devote practically all of their energies to the manufacture of munitions, and little could be done in the matter of new construction or repairs. The railroad administration did, however, succeed in obtaining the delivery of most of the material ordered before the war which was in process of construction in July, 1914, amounting to 300 locomotives, 570 passenger cars, 550 baggage cars, and 5,300 freight cars. In addition, orders were placed in the United States for 3,000 freight cars and 100 locomotives, and in Italy additional orders for 114 steam locomotives, 76 electric locomotives and 6,100 freight cars. The director general states that it was possible to obtain prompt delivery of the material ordered in America, which contributed materially to the solution of the railway problem during the war, and adds that the locomotives were especially useful, being well adapted to hauling heavy military trains. On the other hand, he calls attention to the fact that the delivery of the equipment ordered in Italy was held up, so that up to the present time it has been possible to obtain only 24 steam locomotives, 38 electric and about 1,200 cars.

In addition to the orders placed by the railroad administration during the war, the ministry of arms and munitions and the commission for national fuels, appreciating the lack of transportation facilities, endeavored to obtain for their own use a considerable number of railway cars in order to facilitate the movement of military supplies and fuel for the army. In November, 1917, the ministry of arms and munitions placed an order for 1,000 freight cars, and in June, 1918, the commission for national fuels ordered 10,000 cars. These orders were given to Italian firms, who were assured by both the ministry and commission that the question of furnishing the materials required for the construction of the cars would be taken care of. In spite of this assurance, serious delays occurred, and at the present time only the first

1,000 cars ordered in 1917 by the ministry of arms and munitions, and about 120 cars of the 10,000 ordered by the commission for national fuels, have been delivered.

Owing to the difficulty in obtaining deliveries from Italian manufacturers toward the end of the war, the railroad administration placed additional orders in America for 150 locomotives and 10,000 cars. Of these locomotives, 35 have already reached Italy, 80 are in transit or in process of being delivered in America, and the remainder will probably be delivered during April. Of the cars, about 1,000 have already been delivered, and as deliveries are being made with regularity, it is believed that the entire number will be available before the end of 1919.

Needs of Italian Railways for Five Years

At the end of the war the railroad administration, realizing the urgent necessity for a betterment in the matter of rolling stock, and to insure the continuance of activity on the part of the Italian firms which had been exclusively engaged in the manufacture of military supplies, immediately took up the question of placing new orders for equipment with Italian firms, and a program covering the needs of the railways for the five years following the war was presented to the interministerial committee charged with promoting and co-ordinating the action of the various branches of the government during the transition period following the cessation of actual hostilities. This program included the purchase of 524 steam and electric locomotives, 1,200 passenger cars, 600 baggage cars, and 5,000 freight cars, of which, however, it has only been possible to place orders for 520 locomotives, 640 passenger cars, 300 baggage cars, and 2,850 freight cars, distributed among the different Italian manufacturers according to their capacity.

There are therefore actually in construction 770 steam and electric locomotives, 640 passenger cars, 300 baggage cars, and 27,700 freight cars, to which will soon be added additional orders which are in process of distribution among Italian firms, covering 560 passenger cars, 300 baggage cars, and 2,150 freight cars, which are still needed to complete the five-year program mentioned above.

Equipment Found in Recovered Territory

Regarding recovered territories, the director general states that on the railroads of the Trentino and of Julian Venezia 350 locomotives, 700 passenger and baggage cars, and 9,260 freight cars were found, to which should be added 123 locomotives, 100 passenger cars, and 2,360 freight cars which the Italian Armistice Commission at Vienna has decided should be delivered as compensation for equipment which was removed at the time of the armistice. It has also leased 64 locomotives from the Austrian and Czecho-Slovak railroads for the transportation of food trains, which are being operated for Austria and Bohemia. From the number of locomotives which Germany must deliver to the Allies, 200 former German locomotives have been allotted to Italy by France.

Traffic Adjusting Itself to Peace Conditions

The acute period in railway transportation seems to have passed, and the director general is of the opinion that from now on a gradual improvement may be expected. It is stated that the lines in the invaded regions and in the newly recovered territories have, with few exceptions, been put in such shape that, although conditions are not normal, the regular traffic is possible. The report upon the service at the port of Trieste shows that in March, 1919, an average of 239 cars per day were loaded, which approaches the average for the year 1913, when the traffic was considered unusually heavy. On the entire Italian system those lines which during the war suffered sudden changes which interfered with the regular operation of trains are having their former service gradually restored, and traffic as a whole is slowly becoming adjusted to the peace-time conditions. As has been stated the military requirements are gradually diminishing. During December, 1918, the average number of cars loaded daily was 8,610. This number was increased March, 1919, to 11,110, and in April it is expected that it will reach an average of 12,000 cars.

Both Coal and Rolling Stock Needed

An improvement in Italian railway service will depend upon two factors—an adequate supply of coal and an increase in the amount of rolling stock available. The hope is expressed that the matter of fuel will be benefited by the settlement of labor troubles in England, which so materially reduced the amount which Italy had expected to receive from this source, and by the urgent representations made by the Italian delegation at Paris, which have caused the Allies to give serious consideration to the problem of overcoming Italy's lack of fuel. With respect to rolling stock, a total of 10,600 passenger cars, 4,160 must be repaired, and the repair shops, instead of the largest possible production, are making little progress. This is due not only to the difficulties which surround the transition from war to peace activities, but especially to labor conditions. Every effort is being made by the railroad administration to stimulate the activity of both the State and private shops, and in this connection a meeting was recently held at Rome to discuss the matter. This conference was attended by the government officials and by all the manufacturers of railway materials.

Additional Passenger Trains

During the last months of the war, the total average mileage of passenger trains for the public was about 80,000 kilometers (49,710 miles) per day. This average has been gradually increased until 89,000 train kilometers (55,302 miles) was the average at the end of March, 1919, without including the service established on the lines of the recovered territory in Venito and in the Trentino and Julian Venezia. Beginning May 1, 1919, a further increase of 7,000 kilometers (4,350 miles) per day will be made by the provision of additional trains on the lines which need them the most, among which are included additional through trains on the Rome-Florence-Milan and Rome-Genoa-Turin routes.

Railway Supplies in Mexico

The Railway Business Association has issued in pamphlet form an article by P. Harvey Middleton, executive assistant of the association, on his recent trip to Mexico to investigate railway conditions in that country. The article parallels to an extent the two articles by Mr. Middleton in the *Railway Age* of last week and this week, respectively, and in addition is supplemented by an extended list of materials which are to be purchased by the Mexican Government Railways for the lines south of Mexico City. The list is given in great detail and includes a wide variety of supplies. Requisition numbers are added to facilitate its use by those who may desire to submit quotations.

The list in detail is as follows:

List of Materials Required by Railway Lines South of Mexico City

Quotations for these items will be requested either by Mr. Silviano Pruneda, Purchasing Agent, Estación Buenavista, Ferrocarril Mexicano, Mexico, D. F. or by Mr. F. P. de Hoyos, General Agent, Mexican Government Railway Administration, Woolworth Building, New York.

	Requisition numbers
1,000 car wheels, 33-in. diameter	AG-693, AC-2315
1,000 car wheels, 30-in., narrow gage	CE-75, AC-4163
2,000 car wheels, 33-in., standard gage	CE-75, AC-4163
6,500 tie plates	113-CV, AC-2751
Locomotive tires	AG-776, AC-2771
Locomotive tires	AG-778, AC-2772
Channels, plates, tank sheets	AG-824, AC-2773
Bars, bolts, clamps, drills	AG-830, AC-2797
Boiler flues	AG-886, AC-2860
2,000,000 sq. ft. pine	CE-75, AC-4163
1,000,000 sq. ft. oak	CE-75, AC-4163

1,000,000 sq. ft. miscellaneous lumber....CE-75, AC-4163
Locomotive tires....CE-75, AC-4163
Steel firebox plate....CE-75, AC-4163
Steel plates for tank cars....CE-75, AC-4163
Air gages....AG-331, AC-4152
80 60-gal. casks for water....628-CV, AC-4162
10 rolls wire and 250 kilos of nails....628-CV, AC-4162
10 tons lime....AG-370, AC-4132
5 tons lime....621-CV, AC-4123
10 tons lime....CV-519, AC-3761
*1,000,000 cross ties, standard gage....CE-75, AC-4163
*500,000 cross ties, narrow gage....CE-75, AC-4163
Accessories for Pintsch gas....CE-75, AC-4163
100 pairs catches, deck sash, A. & W. Co., No. 35....AG-42, AC-183
20 kilos chalk white, lump....AG-42, AC-183
50 kilos cord, bell, hemp, ⅞-in....AG-42, AC-183
30 kilos rivets, deck sash, o. 3, A. & W....AG-42, AC-183
70 kilos rivets, tinned, iron, various sizes....AG-42, AC-183
76 gross screws flat head, brass, various sizes....AG-42, AC-183
6 wheel "Barnes" pipe cutters, No. 3....AG-42, AC-183
240 kilos wire, copper, soft drawn, various sizes....AG-42, AC-183
5 kilos wire, brass spring, 1/32-in....AG-42, AC-183
5 kilos wire, brass spring, No. 16....AG-42, AC-183
24 sheets asbesto millboard, ⅛-in. x 40-in. x 40-in....AG-42, AC-183
24 sheets asbesto millboard, sheets 1/16-in. thick, 40-in. wide....AG-42, AC-183
100 kilos asbesto rope, ½-in....AG-42, AC-183
24 pieces burners, acetylene, ¼-in., Colonial No. 2....AG-42, AC-183
144 pieces burners, "Dual" No. 2....AG-42, AC-183
144 pieces burners, "Dual" No. 3....AG-42, AC-183
36 kilos carborundum....AG-42, AC-183
Carborundum wheels....AG-826, AC-2769
144 pieces gaskets lubricator, 3/16-in. hole, 1⅛-in. diam., 4-ply....AG-42, AC-183
144 pieces gaskets lubricator, for Detroit No. 21, Bull Eye Lubricator....AG-42, AC-183
Packing cloth insertion, various sizes....AG-42, AC-183
50 kilos putty, Commercial, in bladders....AG-42, AC-183
790 kilos, bolts, machines, various sizes....AG-42, AC-183
100 mts. chain, straight, link iron, ⅜-in....AG-42, AC-183
100 mts. chain, straight, link iron, 1¼-in....AG-42, AC-183
108 packages cotters spring, various sizes....AG-42, AC-183
2 kegs nuts, hexagon, tapped U. S. S., ⅞-in....AG-42, AC-183
2 kegs nuts, hexagon, tapped, 1⅛-in....AG-42, AC-183
2 kegs nuts, square, tapped, ⅝-in....AG-42, AC-183
3 kegs rivets, cone-head, boiler burden, iron, ¾-in. x 2-in....AG-42, AC-183
3 kegs rivets, cone-head, boiler burden, iron, ¾-in. x 3½-in....AG-42, AC-183
1 keg washers, cut, ⅜-in....AG-42, AC-183
1 keg washers, cut, ½-in....AG-42, AC-183
1 keg washers, cut, ¾-in....AG-42, AC-183
1 keg washers, cut, ⅞-in....AG-42, AC-183
50 pieces bushings, ½-in. x ¾-in....AG-42, AC-183
50 pieces bushings, 1-in. x ¾-in....AG-42, AC-183
50 pieces couplings, reducing, ¾-in. to ¼-in....AG-42, AC-183
50 pieces couplings, reducing ½-in. to ⅜-in....AG-42, AC-183
50 pieces couplings, reducing, ¾-in. to ½-in....AG-42, AC-183
50 pieces couplings, wrot, ¼-in....AG-42, AC-183
100 pieces couplings, wrot, ¾-in....AG-42, AC-183
50 pieces couplings, wrot, 1¼-in....AG-42, AC-183
50 pieces elbows, malleable, beaded, ¼-in....AG-42, AC-183
50 pieces couplings, wrot, 1-in....AG-42, AC-183
100 pieces elbows, malleable, beaded, ¾-in....AG-42, AC-183
50 pieces pipe, wrot iron, 1-in....AG-42, AC-183
50 pieces couplings, wrot, 1¼-in....AG-42, AC-183
50 pieces pipe, wrot iron, 1½-in....AG-42, AC-183
20 pieces pipe, wrot iron, 2-in....AG-42, AC-183
50 pieces plugs, cast for screw pipe, ¼-in....AG-42, AC-183
25 pieces plugs, cast for screw pipe, ⅜-in....AG-42, AC-183
25 pieces plugs, cast for screw pipe, ¾-in....AG-42, AC-183
25 pieces plugs, cast for screw pipe, ½-in....AG-42, AC-183
25 pieces plugs, cast for screw pipe, 1¼-in....AG-42, AC-183
50 pieces tees, malleable, beaded for screw pipe, ½-in....AG-42, AC-183
50 pieces tees, malleable, beaded for screw pipe, ⅜-in....AG-42, AC-183
50 pieces unions, common, malleable, ½-in....AG-42, AC-183
50 pieces unions, common, malleable, ¾-in....AG-42, AC-183
50 pieces unions, common, malleable, 1¼-in....AG-42, AC-183
25 pieces unions, common, malleable, 1½-in....AG-42, AC-183
10 pieces Globe valves, brass, screwed, ¼-in....AG-42, AC-183
10 pieces Globe valves, brass, screwed, ⅜-in....AG-43, AC-183
10 pieces Globe valves, brass, screwed, ½-in....AG-42, AC-183
12 pieces Globe valves, brass, screwed, ¾-in....AG-42, AC-183
12 pieces Globe valves, brass, screwed, 1-in....AG-32, AC-183
1 piece gage, steam locomotive, brass, 6¾-in., black drail, white figures 300-lb. pressure....AG-42, AC-183
24 mts. tubing, copper, seamless, 5/16-in., O. D. 3/32-in. thick, 12 ft. 6 in. length....AG-42, AC-183
24 mts. tubing, copper, seamless, 2-in., O. D. 5/32-in. thick, 15 ft. length....AG-42, AC-183
24 mts. tubing, copper, seamless, 2¼-in., O. D. ⅜-in. thick, 12 ft. 6 in. length....AG-42, AC-183
50 lts. Enchrelyptum....AG-42, AC-183
5 rolls gold leaf ribbon, XX, ½-in....AG-42, AC-183
5 rolls gold leaf ribbon, XX, 1¼-in....AG-42, AC-183
100 kilos plaster of paris....AG-42, AC-183
2 pieces crucibles, No. 80....AG-42, AC-183
50 sheets iron, planished, No. 22, U. S., sheets, 28-in. x 72-in....AG-42, AC-183
2 sheets lead, sheets ⅛-in....AG-42, AC-183
500 kilos steel angle, ¼-in. x 3¼-in. x 3¼-in....AG-42, AC-183
500 kilos steel angle, ½-in. x 3½-in. x 3½-in....AG-42, AC-183
500 kilos steel angle, ½-in. x 3¾-in. x 3¾-in....AG-42, AC-183
500 kilos steel angle, ½-in. x 4-in. x 4-in....AG-42, AC-183
2 sheets steel fire box, sheet 5/16-in. x 52-in. x 92-in....AG-42, AC-183
1 sheet steel fire box, sheet 5/16-in.x 80-in. x 80-in....AG-42, AC-183
200 kilos steel, machine, round, ¼-in....AG-42, AC-183
3,000 kilos steel, spring ⅜-in x 7-in....AG-42, AC-183
1,000 kilos steel, spring, ⅜-in. x 7-in....AG-42, AC-183
4 sheets steel, tank, 1/32-in. x 48-in. x 120-in....AG-42, AC-183
6 sheets steel, tank, 1/16-in. x 48-in. x 120-in....AG-43, AC-183
6 sheets steel, tank, ⅛-in. x 48-in. x 120-in....AG-42, AC-183
6 sheets steel, tank, 3/16-in. x 48-in. x 240-in....AG-42, AC-183
400 pieces brake beams, R. H. Acme I. H....AG-42, AC-183
600 pieces flues, boiler, charcoal....AG-42, AC-183
125 wheels, cast iron, for freight cars....AG-42, AC-183
72 wheels, handcar....AG-309, AC-3945
16 sets taps, hand machinists, U. S. S....AG-42, AC-183
190 pieces pneumatic material....AG-42, AC-183
20 taps, patch bolts....AG-42, AC-183
60 mts. burlap....AG-42, AC-183
3 rolls canvas....AG-42, AC-183
80 kilos hair, curled F. M. Black, grade of Armour Curled Hair Works....AG-42, AC-183
100 ft. plush, quality "E," red....AG-42, AC-183
100 pieces lamps, incandescent....AG-42, AC-183
10,000 pairs baggage checks....518-CV, AC-3778
2,480 pairs tieplates....155-AC, 3784
800 chisel points....AG-543, AC-2008
200 separators for accumulators....AG-297, AC-1145
10 tons babbitt metal....AG-312, AC-3948
100,000 car seals....AG-328, AC-4010
500 towels for Pullman....CD-46, AC-4005
3 tons antimony....AG-358, AC-4058
15,300 hose for air brake....AG-279, AC-3817
3,150 hose for air brake....AG-360, AC-4063
5,000 partitions....610-CV, AC-4064
20,000 kilos of lime....610-CV, AC-4064
500 kilos of borax....AG-338, AC-4079
50 water barrels....AG-359, AC-4059
Picks, bars, jacks, etc....363, AC-4062
300 boxes of carbide....AG-349, AC-4037
Tubes, rods and valves....169, AC-4048
Electrical material....AG-368, AC-4131
52 manometers....AG-330, AC-4151
13 windows various sizes....589-VC, AC 4025
15,000 incandescent lamps....AG-261, AC-3742
854 Pac. burners, 5 barrels of globes....AG-211, AC-3681
2,100 pieces pipe, screw, lap welded....AG-210, AC-3680
50 cases pure turpentine....AG-379, AC-4142
Adzes, axes and handles....AG-346, AC-4003
Narrow gage freight cars....78-CV, AC-2653
Blocks and tackle....AG-793
24 tires, 5½-in. wide, rough rolled, 43⅞-in....AG-596, AC-2179
700 galvanized plates....AG-47, AC-3232
50 pieces brake beam heads....AG-181, AC-3589
45 window glasses of various sizes....451-CV, AC-3523
20 machetes....179-AG, 4130
American yellow pine, various sizes....AG-895, AC-2961
Bengal lights and torpedoes....AG-41, AC-3226
50 levels....AG-182, AC-3590
Electric lanterns....AG-653, AC-2235
48 rules of interchange books....38-LA, AC-2720
Stationery....607-CV, AC-4077
Transparent curtains....171-AC, 3980
Padlocks....AG-344, AC-4001
Wire netting....AG-314, AC-4006
380 pieces steel spring....AG-336, AG-4013

* Ties are usually bought in the Mexican market.

Quotations are also required for air brake equipment and tank cars. All material for repair of locomotives and cars must be in accordance with the specifications of Master Car Builders. Competitive bids are obtained and ordered are placed on basis of quality as well as price.

Return of Brigadier General Atterbury

Brigadier General William W. Atterbury arrived at Hoboken, N. J., from France on May 31, and was at once discharged from the army; after a short vacation he will resume his duties as vice-president of the Pennsylvania Railroad.

General Atterbury wears three decorations, the Distinguished Service Medal of the United States Army, the French Legion of Honor, and the British Order of the Companion of the Bath. With him on his return were the following members of his staff: Captain J. A. Appleton, formerly yardmaster at West Philadelphia; Captain J. V. Reath, formerly secretary to Mr. Atterbury as vice-president of the Pennsylvania Railroad; Lieutenant W. H. Myers; A. J. Bonsall, and R. E. Nichols. Captain Appleton was general superintendent at Gievres; Captain Reath was adjutant general, and Lieutenant Myers was the representative of the transportation corps at Angiers.

In a brief review of his experience of 21 months in France, General Atterbury said:

It was perfectly clear from the very outset that, to take care of the tonnage the A. E. F. would bring into France, it would be necessary to utilize to the maximum every berthage accommodation not already in use and that in addition to all of this it would be necessary to provide new port facilities; and the splendid dock project at what we called American Bassens, just outside of Bordeaux, was undertaken and carried out to completion. Here was erected out of the mud bank of the Garonne river a modern ten-berth dock, with 40 electric gantry cranes. This project constitutes one of the distinctive achievements of the A. E. F. in France.

The personnel on the French railroads when America entered the war was becoming serious. By reason of the war, there was no source of supply from which could be recruited an adequate number of suitable employees, the strain of three

years of work under war conditions was telling on the men, and the calibre of the personnel on an average was not so high as in peace times. The A. E. F. had to provide transportation forces commensurate with the added burden which it placed upon the French railroads, and in addition, such supplemental forces in the way of car and locomotive repairmen, track men, etc., as could be brought over from the States consistent with the requirements of the combatant troop program. In equipment, likewise, the French had reached a rather serious stage when the Americans began to arrive in France. A considerable percentage of the cars and engines had been captured by the Germans in the big drive at the beginning of the war, and an excessive number of bad-order cars and locomotives had accumulated. One of the first steps taken on behalf of the A. E. F. was to send to France experienced car and locomotive repair forces. A car-erecting plant was built at LaRochelle, to take care of cars coming in a knocked-down condition from the States, and for a locomotive-erecting plant at St. Nazaire to take care of knocked-down locomotives arriving at that port.

In addition, the plan was developed of having locomotives sent to us from the States in a practically completed state on special ships, thus involving but little work in assembling when they reached us, and, what was much more important, relieving the port of St. Nazaire to that extent, as we could take care of the partially erected locomotives at Brest. Throughout the war the car and locomotive situation was one of the vital factors entering into the conduct of combatant operations. There never was a time when it was not essential to produce the greatest practicable efficiency out of the equipment available. To give an idea of what the program to have 4,000,000 men in France by the Summer of 1919 meant, it may be stated that we were arranging to have in France by that time 4,000 locomotives and 98,000 cars. To supply an army of that size we were planning for the reception and discharge of 101,000 tons of cargo per day at the ports. The condition of the French railroads when I reached France in September, 1917, was surprisingly good, considering the fact that they had been operating more than three years under war conditions, that no new rail had been laid within that time, and that the force they had been able to keep on maintenance of way was practically negligible. For the manner in which the French railroads met the requirements of the Allied Armies I have nothing but the highest commendation. At no time was there the semblance of a breakdown in the transportation machinery of the country, despite the great overload placed upon it, and the results achieved are a splendid tribute to the efforts of the French transportation authorities.

To expand adequately the capacity of the French railroads involved the planning and construction of immense storage yards and additional engine houses; the laying of supplemental tracks, the rearranging and extension of existing tracks and, in general, everything that goes into the enlargement and expansion of a railroad to meet greater needs. Behind each of the main ports we had stupendous storage layouts; then we had what we called our intermediate storage—about midway between the ports and the army zone—and then came our storage developments in the Advance Section.

Several of these yards are the largest in the world and in general they represent the last word in modern yard construction. The plans for the development at Gievres called for 264 miles of track, 1,152 turnouts, 4,410,000 square feet of covered storage and 10,387,000 square feet of open storage. At the time of the armistice 132 miles of track, 3,552,000 square feet of covered storage and 6,000,000 square feet of open storage had been completed. The project covers an area of 2,600 acres.

It is hardly necessary to say much about the performance of the Army Transport Service in France, which is a branch of the Transportation Corps, because I think the performance of that department has spoken for itself and that its achievements are perhaps the best known of any of the branches of the Transportation Corps. It may be interesting, however, to state that we hope to reach the figure of 340,000 as the number of Americans shipped back to the United States during the month of May, as compared with the record figure of approximately 312,000 reached in September, 1918, in connection with the movement of troops to France. The Transportation Corps as authorized provides for 6,000 officers and 200,000 soldiers. This was the force we figured would be needed properly to meet the requirements of an American Army in France of 4,000,000. At the time of the armistice we had in the corps 1,810 officers and 46,976 soldiers.

I cannot speak too highly of the work of our transportation men in France. No body of men worked harder or more industriously and no body of men is entitled to greater credit. In the Corps we had some of the leading railroad and shipping men of America. These men came to France at great personal sacrifice, and in the development of the organization of the Corps worked more strenuously than they had ever done before in their lives. I have never seen a more hearty spirit of co-operation than that manifested by these officers in the carrying out of the assignments that fell to their lot in the army life, and there is nothing of which I am more proud than to have been associated with them in the work in France.

Our relations with the French and the British were of the most pleasant and harmonious character. They made it perfectly clear right from the start that they were at all times at our service for the benefit of any advice or suggestions they might be able to offer by reason of their longer experience in the war, and we availed of their assistance to great advantage. This spirit prevailed not alone in connection with the respective staff organizations, but extended throughout the entire working of our transportation relationship. In addition they rendered us valuable service in connection with the loan of facilities at times when, pending the provision of our own, we otherwise should have been greatly handicapped.

Note From "Rails and Sails"

General Atterbury's departure from France on May 21 was the occasion of a notice in Rails and Sails, the service periodical published by army men, which said in part:

"With this issue Rails and Sails, on behalf of the officers and men of the Transporation Corps, takes leave of Brigadier General W. W. Atterbury, Director General of Transportation. . . . It is given to few men to step out of civil life and become immediately one of the important leaders of a great army in an epoch-making struggle of the world and to become one of the most prominent figures in the preservation of civilization. To do this and to perform the task ably and adequately is the severest test that can come to any American. General Atterbury met this test successfully and performed the task set for him in a manner to win the highest encomiums of his own Commander-in-Chief and of the great leaders of the Allied Armies. He has won the esteem of his brothers-in-arms and of his subordinates. The name of Atterbury will be linked with that of Pershing as the name of Knox is linked with that of Washington and Scott with that of Grant. General Atterbury's return to civil life means the severing of an official tie that easily became a personal one. It is a great thing to be a soldier and a great thing to be a military leader, but the greatest thing of all is to be a kind, able and patriotic civilian. When General Atterbury takes off khaki and puts on the garb of a plain American he will be uniforming himself for even greater tasks. Vale, duce magno! Ave, civitate majore!"

Short Line Problems Discussed at Washington

Demand Adequate Rates and Fair Divisions, Also Special Provision in Appropriation Bill

THE TROUBLES AND PROBLEMS of the short line railroads as well as the situation confronting the railroads generally were discussed at a meeting of about 200 short line railroad officers, which was attended also by a number of officers of the larger roads, held at Washington on Tuesday, Wednesday and Thursday of this week at the call of the American Short Line Railroad Association. Bird M. Robinson, president of the association, presided, and addresses were made by John J. Esch, chairman, and Thetus W. Sims, former chairman of the House committee on interstate and foreign commerce; Walker D. Hines, director general of railroads; Senator Oscar A. Underwood of the Senate committee on interstate commerce; H. C. Hall of the Interstate Commerce Commission; T. De Witt Cuyler, chairman, and Alfred P. Thom, counsel, of the Association of Railway Executives, and others, after which the delegates present considered the particular problems of the short lines informally with a view to adopting a plan of action.

President Robinson's Address

President Robinson in his address said in part:

The condition now confronting the rail transportation companies of the country, especially the short line railroads, is not only distressing but appalling. That deplorable condition is chargeable almost wholly to agencies and influences beyond their control, and it demands the undivided attention of all concerned. The return of the railroads on January 1 accentuates the necessity for Congress to act before that time, and the serious condition confronting the roads makes it imperative that the laws to be enacted must be helpful and constructive. That can be accomplished only in one way, and that is for the people engaged in the business to aid the Senators and Representatives in arriving at correct conclusions. The acute situation confronting us not only justifies but demands that delegates to this meeting carefully consider all questions involved, for the subject cannot be dealt with from the limited point of the short lines only, and decide upon what should be done for the good of all concerned, after which the delegates can and should confer fully with their respective Senators and Representatives and give them accurate, intelligent and necessary information so as to aid them in enacting a law that will protect the transportation business and at the same time properly safeguard the interest of the public.

As a war measure, the government took actual possession of all of the main line railroads, and a part of the short lines, at the beginning of 1918, and it is now operating such lines, leaving the balance of the roads to battle with the constantly rising tide of adverse and ruinous conditions, most of which are caused by government regulation and restrictions, and as a direct result of the operation by the government of a part of the lines.

In view of all of the facts we must recognize that the government is the all overshadowing and all dominant power with which the owners of the railroads must deal in the future. Under the circumstances, we have deemed it wise to ask some of the leading government officials to appear before this meeting and present their views as to what should be done with your properties. Our invitations have been accepted, and you are therefore to have the pleasure of hearing from representatives from each of the three branches of the government having to do with the control and operation of our rail transportation system.

We realize that the short line railroads cannot hope to be prosperous if the main lines are not in that condition, and for that reason we should do all that we can to induce the government to relax its strangling hold upon all roads and permit them to proceed with their business in an orderly and profitable way. In view of the fact that we must take into consideration the condition of the main line roads, we have extended an invitation to the members of the Association of Railway Executives, and to members of the National Association of Owners of Railroad Securities to be present at this meeting and participate in its proceedings.

We find from investigation that members of Congress are somewhat confused by the great variety of suggestions and plans that have been offered, and there is considerable comment, some of it critical, over the fact that the people interested in the railroads do not agree among themselves as to what should be done, and we feel that there is justification for that criticism. We fear that that condition, if not corrected, will result in one of two things—either that Congress will finally do nothing more than adopt a few amendments to the existing interstate commerce act, in other words, do some patch work, or that it will enact some radical legislation that will be detrimental, possibly seriously so, to the railroads and their owners, and to the public as well.

We feel that the people interested in rail transportation business should make every effort to harmonize their different points of view, and join in presenting to Congress suggestions for constructive, helpful legislation.

The President, by his proclamation, and the director general, by notices served by wire, took over all of the railroads, including the short lines. Subsequently, it was announced in behalf of the director general that he did not intend to take or to retain practically all of the short lines.

Congress, in the federal control act, definitely included the independently owned and operated short line railroads engaged in public transportation, and thereupon the administration announced that it would exercise, what we regarded as a very doubtful authority contained in the act, and relinquish practically all of the short lines. Thereupon Congress passed a joint resolution, definitely including under government control the short lines involved, but while that joint resolution was being considered, the administration hastily issued letters, giving notice that the respective roads had been relinquished from government control.

President Wilson, on July 11, 1918, vetoed the joint resolution and said in his message to Congress:

"I quite agree that practically all of these should be retained and that they should not only be retained, but that they should be accorded a fair division of joint rates—a fairer division than some of them have been accorded hitherto—an equitable allotment of cars, and motive power, and fair routing arrangements."

That promise has not been met, either in letter or spirit. Director General McAdoo openly and notoriously disregarded it in every way, and his administration not only did not give a fair division of joint rates, allotments of cars and motive power and fair routing arrangements, but he actually and ruthlessly took from the short lines practically all of their competitive business and attempted to decrease their divisions.

We finally succeeded, after months of effort, in inducing Director General McAdoo to agree upon a standard form of contract which the government was to make with the short

lines, but we found it most difficult to induce the administration to actually make the contracts with the individual lines. The policy pursued was to procrastinate, and when a contract was made, to limit the benefits that would go to the short line making it. In every case presented in which any substantial benefit would move to the respective short lines, the administration would in some way and for some reason decline to enter into the contract. In the meantime, it continued the practice of diverting the competitive business, of forcing up the wages of employees, in increasing the prices of cross ties and other material produced on the short lines, and in many other ways inflicting heavy losses without giving any consideration or benefit in return.

Director General Hines has exhibited a much more considerate and favorable disposition towards the short lines, but when he came into office the die was cast. The assistants and employees, especially a large part of the traffic and operating officials, located in various parts of the country, had had instilled into them the belief that the rights of the short lines were to be disregarded, and while Director General Hines no doubt desires to correct that situation, he has not taken hold of it in that vigorous way which is necessary to reverse all that has been done.

It has become apparent that former employees of several of the main line companies, now the representatives of the Railroad Administration in the various sections, are constantly and effectively diverting the business of the short lines and taking from them their just and equitable rights. In fact, some of us are convinced that there is a conspiracy to so cripple the short lines at this time as to render them helpless, if not to make them bankrupt. We have called attention of the administration to this apparent combination, but unfortunately have not succeeded in inducing them to stop such activities. It is quite apparent that a large part of the administration's traffic and operating officials in the various sections of the country are secretly but certainly working for the future good and protection of the companies with which they were formerly respectively connected, and with which most of them expect to become re-associated after the roads are returned to their owners, hence the incentive to absorb all things possible from the short lines and possibly others.

The lot of the short line railroads, which aggregate about 35,000 miles, has been a sad one. As a rule, the owners were encouraged to construct them by the connecting main line, and especially by the communities which they penetrate, and as a rule the connecting lines promised to co-operate with and aid them, supplying cars free of charge, and promising adequate divisions of joint rates. Unfortunately, those promises have, to a large extent, not been fulfilled, notwithstanding the large volume of business produced by such lines and the great service rendered to the people on the line.

The states in which these roads were built frequently made alluring promises, and in most cases promptly after the road was completed sought to reduce charges for services rendered to the lowest possible amount. As a result of these two factors, many of the short lines have been prevented from becoming a financial success. In other words, they were not permitted to earn sufficient to make an adequate return to the capital invested, and they were thereupon thrown into bankruptcy and condemned as failures. In fact, it is frequently said that a particular line "ought never to have been built," and that reason is assigned why the respective line shall not be permitted to increase its charges and divisions.

If present conditions are to be the standard by which we are to measure the propriety of the construction and efforts in the past, we will be forced to condemn the establishment of a large number of business enterprises that have not succeeded to the extent expected, and must recognize that a large numbers of the Senators, Representatives, members of state legislatures, as well as a large part of the government officials, ought never to have been elected. That standard will also force us to recognize that a large part of the legislation affecting railroads and other lines of business ought never to have been passed.

We must deal with existing conditions and recognize that the people who have constructed the short line railroads must be permitted to charge a sufficient amount for the services rendered and must receive out of the joint rates such a division as will enable them to conduct the business and have a reasonable return on the funds invested, or if they are not to have such a right they must be accorded the privilege of removing the rails and recover the funds invested as far as that is possible.

The right to remove railroads of that character is universally contested on the ground that the people in the various communities are vested with certain rights. In weighing the two rights involved, the government should recognize the fact that as a rule those roads penetrate undeveloped sections where the value of property is low and the coming of the road instantly causes a very substantial advance in values. In the event the railroad is not permitted to earn a living, the owners should be permitted to remove it, and the local citizens will, to all intents and purposes, be restored to their former status.

Justice demands that rates and divisions of these lines shall be such as to enable them to live, or that they shall be permitted to discontinue the business and remove the property.

Competitive conditions are such that the interline or joint rates from points on the short lines to points beyond cannot, as a rule, exceed the rates from points on the connecting lines in that district or zone. If the rates from such short line points are higher, it will decrease the volume, if it does not prevent the movement of the traffic. These conditions make it necessary that the short line roads shall be accorded a very substantial proportion of the joint rate. In fact, the short lines must at once receive from the government a very substantial increase in the divisions. That increase should in some instances run at least 100 per cent, and possibly more, to enable the respective lines to meet the greatly increased burdens and losses that have been incurred as the direct result of the illegal act of the Railroad Administration in excluding them from federal control, and because of the rank injustice inflicted in the operation of the main lines by the administration.

Congress will, without doubt, pass an act prior to July 1 appropriating for the Railroad Administration, from one billion to one billion two hundred million dollars for the purpose of paying the amount due the roads under federal control and meeting other obligations. The owners and officers of the short lines should immediately present to Congress full information as to the unjust treatment that has been administered to them. They should show the losses that have been incurred and that the administration is not only continuing to divert their business, but is resolutely refusing to give them adequate and necessary divisions of the joint rates. Without any attempt to be vindictive, these representatives of the short lines should show that they are being deliberately deprived of their just rights, hence should urge and insist that Congress allocate and set aside at least $50,000,000 of its appropriation to be used exclusively in adjusting and paying to the short lines the amount legally and equitably due them.

We should insist that Congress, in that appropriation act, shall include mandatory instructions to the Interstate Commerce Commission to immediately take into consideration the existing status of the short line railroads, the injury and injustice done them as a result of the government control of certain lines, and that said commission, without delay, authorize and direct in such cases as may be brought before them, such increase of the division of joint rates as will

enable said lines to meet the losses that have been incurred, to render adequate transportation facilities to communities served and to receive such reasonable returns on the investment therein as the commission may determine; the instructions to the commission to include directions to make the increased divisions effective as of such date prior to January 1, 1919, as the condition of the respective line may require.

The owners and operators of the short lines should give prompt and great consideration to the various propositions now pending before the interstate commerce committees of Congress. They should aid in the preparation and securing the adoption of helpful, beneficial legislation for the transportation systems at large, and they should give special attention to the provisions in the proposed law affecting the rights of the short lines.

The permanent legislation to be enacted must contain definite provisions conferring upon the Interstate Commerce Commission not only the power but the duty of determining the proportion of joint rates going to the respective short lines. The act should provide that the commission must act promptly, in the event the lines interested do not agree as between themselves, and that it shall award to the short lines such increase of the divisions of joint rates as will enable said lines to meet their expenses, render adequate transportation facilities to the communities served, and receive just compensation for the use of their property.

We should recognize that the entire transportation system of the country should be placed in a healthy condition; that the main lines should receive rates sufficient to meet all of their legitimate expenses, including the necessary liberal divisions to short lines, and an amount sufficient to meet all other charges, including an adequate return on their properties. The time is opportune. The very seriousness of the present situation is our strength, hence let us take counsel together. Let us determine what will be fair and just, and then go forth and fight until we win.

Other Addresses

Mr. Esch discussed his bill to provide for the regulation of the railroads after their return by the government, which he said is not a perfected bill, but represents an effort to crystallize public opinion along definite lines. His statement that the bill does not propose a government guarantee elicited applause. Mr. Esch said he believed a plan of guaranteeing a fixed return would inevitably lead to government ownership, and that the railroads should be allowed to work out their own destiny, under proper regulation but without shackles. He also opposed the idea of a regional consolidation of railroads, saying he wished to preserve competition and the enterprise and initiative that have made the American railroads the greatest in the world, and the idea of a secretary of transportation, because such a plan, he said, would be too susceptible of political influence. Mr. Esch said that it was his opinion, and he thought it was the intention of Congress, that the short line railroads should have been included in the system under federal operation.

Mr. Sims, chairman of the House committee during the last Congress, said he did not believe any of the proposed plans for dealing with the railroads would be unaccompanied by difficulties in operation. He thought the completion of the commission's valuation of the railroads would be of great value in the solution of the problem, but he was afraid that the constant increase of value due to the growth of communities would lead to constantly higher rates, and said that if that is going to happen it may be necessary for the government to buy the right of way and terminals and lease them to companies for operation. Mr. Sims said the short lines were "short on mileage but long on political influence"; he told of his unsuccessful efforts to get the joint resolution intended to prevent the relinquishment of the short lines passed last June in time to head off the order of relinquishment.

Director General Hines discussed his ideas for a permament solution of the railroad problem by consolidating the railroads into a few competing systems, made up of strong and weak roads and providing some workable standard of what railroad regulation ought to produce so that each company could have rates that would enable it to earn a designated return on an official valuation and an additional amount to be put back into the property without capitalization, any excess earnings to be divided between the company and the government. He said he believed increased costs have come to stay, and that unless some such plan is worked out it will become more and more difficult for the roads to get along. It is most important, he said, that the problem be promptly dealt with because general business conditions are suffering until it is settled, because the government is not in position to put large amounts of money into improvements that cannot be completed for several years, and the railroad corporations are not in a position to furnish large amounts of capital till they know where they are coming out. Mr. Hines said that his thought was that the short lines should be provided for and should be included in the general plan of consolidation.

Senator Underwood declared that the proper solution of the railroad question represented the most important problem now before the country after the conclusion of the peace treaty. He said that while surface conditions indicate prosperity in the country no permanent business prosperity can be expected when there is no demand for builders' supplies, and at the present time there are idle furnaces, idle factories and idle freight cars. The war industry has been demobilized, but the peace industry is not yet mobilized, and we are being carried by confidence and credit which alone cannot last long. There must be a remobilization of peace industry or disaster will lie in our path. Business cannot function in the future with its hands tied and business is waiting for Congress to take the wartime shackles from its hands. The railroad problem, he said, goes into every business office in America. The value of their securities is uncertain, and the railroads cannot consume builders' supplies when they have no credit. Business is slowed down until this great problem is solved. He felt confident that Congress has the ability and the judgment to solve the problem if the people will give it a chance, but the job will be done better if rocks are not thrown at it while it is engaged on the task. The key to the arch, he said, is the financial situation. When that is solved the other problems take care of themselves. The railroads must have an earning capacity not only sufficient to take care of the existing capital, but to attract new capital for development, and no one can make that possible but the government. He thought the people had never been in a better humor to do the right thing by the railroads than now, but that the railroads must make some concessions, and one of them is the speculative profit.

Mr. Cuyler said the railroads ought to go back to private management very much as before, so far as corporate organization is concerned, and as untrammeled as is possible consistent with proper reglation. The railroads do not expect to return to former conditions without change, he said, but the shackles should be broken and cast aside, and they should have greater authority for consolidation and coordinated action and a rule of rate-making that will place it beyond peradventure that rates shall be sufficient to meet the wages and the costs of operation and maintenance. He believed that such a rule could be enacted without a government guarantee. He said the federal government should supervise the issuance of securities and that all necessary regulation should be provided for.

"There never was a more mistaken idea," Mr. Cuyler said, "than that the railroads broke down of their own inertia. They were given the wrong kind of medicine by way of regulations, and if the proper medicine is applied the patient

will become stronger than ever. I believe the American people are going to insist on the preservation of private initiative and ownership and public protection for private ownership."

Mr. Cuyler and Mr. Thom both expressed a desire to bring about complete co-operation between the big companies and the short lines, saying that the fundamental problems are the same.

The session on Wednesday afternoon was addressed by S. Davies Warfield, president, and Luther M. Walter, general counsel, of the National Association of Owners of Railroad Securities, and by Commissioner H. C. Hall, of the Interstate Commerce Commission.

Mr. Warfield and Mr. Walter explained the terms of the Warfield plan for future railroad regulation and showed in what manner it would prove of benefit to the short lines. Both expressed their confidence in the Interstate Commerce Commission and pointed out that its work would no doubt be assisted by a definite directory principle established by Congress as to rates and the return allowed under them. They explained how the provision in the Warfield plan for rates sufficient to give a 6 per cent return on the property investment as a whole combined with the division of earnings in excess of that amount on the part of the larger roads would on the one hand provide sufficient return for all roads and on the other provide also for a similar return for the smaller and short line roads. They also pointed out the advantages that might accrue from the provisions of the plan in the way of supplying equipment, in securing proper divisions of interline rates, in unification of terminals, etc.

In bringing to the attention of the meeting the salient principles of the Esch-Pomerene Bill introduced in both houses of Congress on Monday, Commissioner Hall said that it represented the views of the commission and was felt to be the best plan offered because it was simplest. It would require the least amount of charge and gave the best opportunity to use forces of regulation already in existence. He sketched briefly the progress towards the provisions embodied in the bill and spent some time in pointing out the advantages in it from the standpoint of the short lines.

Mr. Hall spoke at some length concerning the lessons derived from the war and showed how an attempt had been made to embody them in the proposed bill. "I am not among those," he said, "who believe that the Railroads' War Board was a failure," and added that in his opinion the War Board accomplished more than the railroads had ever accomplished in this or in any other country. It was handicapped by laws meant to discourage exactly the unification it was trying to bring about. Also he said that he took part in the preparation of the report of the Commission to the President relative to the control of the railroads during the war, but that he had had no idea of segregating the short lines.

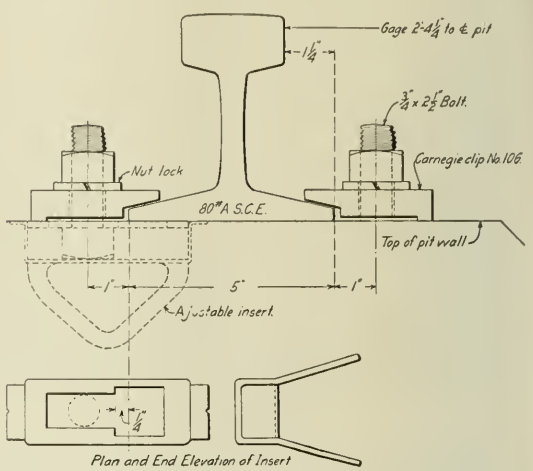
Among the advantages he thought would accrue to the short lines through the proposed bill, Mr. Hall instanced the provision relative to the Commmission's authority over divisions of interline rates; the equal opportunity the act will offer to every carrier "to earn its own living," the provision that consolidations of roads, joint use of terminals, pooling of tonnage, etc., would be under the control of the Commission. "If I interpret this right," he said, "this would mean that the short lines cannot be starved down and then become absorbed at a price the absorber road chooses to pay."

The meeting gave a rising vote of confidence in the Commerce Commission.

In the general discussion the short line officers had a good deal of complaint to make of their treatment by the government and the Railroad Administration and considerable satisfaction was expressed at the prospect of a termination of federal control. Some placed the blame on the officers of the trunk lines and some on the government. An officer of a California line said that on most of the rates the big lines had not allowed him any part of the increase in rates ordered last year. A number of resolutions were expected to be introduced and acted upon at the session on Thursday.

Use of Bolt Inserts for Rail Fastenings in Roundhouse

THE FASTENING of rails to the walls of track pits in the new roundhouse of the Toledo & Ohio Central at Columbus, Ohio, was accomplished in an effective manner by the use of bolt inserts embedded in the tops of the concrete walls. Instead of embedding timber blocks in the walls to which the rails could be spiked in the ordinary manner or embedding bolts head down, direct in the concrete, metal inserts were used as shown in the drawing. These inserts are essentially metal boxes containing a receptable for a bolt head with



Details of the Bolt Insert and Manner of Application

a suitable slot for inserting the bolt and with wings extending into the concrete for the necessary anchorage. The particular advantage of this method of fastening the rails lies in the fact that the bolts may be renewed whenever damaged by a derailment or otherwise. The inserts are made by the Truscon Steel Company, Detroit, Mich., and were placed in pairs as indicated in the drawing, the pairs being spaced 4 ft. center to center along the pit walls.



Central News Photo

The Railway Station at Soroka, an Allied Base on the Murmanesk Archangel Railway

Doings of the United States Railroad Administration

Director General Hines and Staff Now on Inspection Trip; Prospects of Additional Rail Orders

WASHINGTON, D. C.

DIRECTOR GENERAL HINES and members of his staff left Washington on Thursday for another inspection and speaking trip, via the New York, New Haven & Hartford to Boston, the Boston & Albany to Albany, the New York Central to Chicago, the Rock Island to Denver, the Burlington back to St. Louis, the Illinois Central to Birmingham, and the Seaboard Air Line from Birmingham back to Washington. Mr. Hines expected to return to Washington on June 14.

Accounting Circulars

On the ground that federal control constitutes all railroads operated by the government as a single system the Division of Accounting, in Accounting Circular 94, directs that the assessment and collection of war taxes on shipments of company material transported by one carrier under federal control for another carrier under federal control shall be discontinued at once. If it is decided that this rule shall be made retroactive further instructions will be issued.

Accounting Circular 88 (revised) cancels P. S. & A. Circular 33 prescribing rules for the settlement of per diem between railroads under federal control and roads not under federal control and directs that the rules prescribed in Circular C. S. 59 issued by the Car Service Section, effective May 1, shall be followed.

Rate Advance Possible

The possibility of an advance in rates was again discussed by Director General Hines when he appeared before the appropriations committee of the House on Tuesday to explain the need for a $1,200,000,000 appropriation, but he said he was not ready to decide the question until the conditions to be expected of the latter part of the year are more definitely known. Mr. Hines pointed out, however, that rates are relatively very low because the percentage of increase made last year was much less than the percentage of increase in expenses and in the prices of wages and commodities generally and that the government is merely protecting the public against the higher prices that would result from an increase in rates. He showed that during the first four months of this year wages were 50 or 52 per cent higher than in the corresponding period of 1917, but declared that a similar situation existed in most industries, and that the costs of materials and supplies have increased from 55 to 70 per cent. He felt, however, that if a decision to advance rates were reached now the amount might either be made too high or too low, which would require still another advance and, therefore, the decision should be deferred. Mr. Hines also appeared before the committee on Wednesday.

Freight Traffic Movement and Car Performance for April

The volume of freight traffic showed an even greater decline in April than in March, according to the monthly report of freight traffic movement and car performance compiled by the Operating Statistics Section. The net ton miles of revenue and non-revenue freight amounted to 28,629,739,000, a decrease of 24.6 per cent. The net ton miles per mile of road per day were 4,134, as compared with 5,471 in April, 1918. Train miles decreased 23.4 per cent; car miles decreased 19.1 per cent. The average number of freight cars on line daily was 2,445,731, a decrease of 2 per cent. Of these 2,288,988 were reported as serviceable, the percentage of unserviceable cars being 6.4 per cent, as compared with 5.2 per cent. The report shows clearly that with the reduction in traffic the loading of cars and trains is being decreased. The net ton miles per train mile (tons per train) averaged 674, as compared with 685 in April, 1918, a decrease of 1.6 per cent. The net ton miles per loaded car mile also show a decrease, from 29.3 to 27.3, or 6.8 per cent. The percentage of loaded to total car miles was 68.1, as against 68 last year. The average miles per car per day also show a decrease, from 25.5 to 21.1, a loss of 17.6 per cent, and the net ton miles per car day in April averaged 390 against 507, a decrease of 23.1 per cent.

Policy of the Railroad Administration as to Public Improvements

Walker D. Hines, director general of railroads, has sent the following letter to the regional directors respecting relations with public bodies as to public projects resulting in charges to capital account, or in charges to operating expenses in connection with capital expenditures; or with respect to taxes and assessments:

"The Railroad Administration is disposed in favor of the resumption or development of public works and improvements. In cases where the only objection thereto is to the present comparative cost of labor and material, no protest will be made on behalf of the Railroad Administration. Even where the burden upon the Railroad Administration in a particular district would be relatively a large part of the total cost, the mere difference between the cost of work being done now and being done somewhat later is not sufficient to justify an attitude of opposition by the Railroad Administration to a policy of resumption or prosecution of public works.

"The Railroad Administration should not identify itself with opposition to proposals looking to such development or resumption of public works unless the case is exceptional and it is clear that the expenditure will be improvident, or that the project is actually in a private interest and involves the public interest only to a slight degree and the private interest involved will not assume the expense of the work. Nothing herein shall be construed to relate to facilities covered by General Order No. 15.

"Representatives of the Railroad Administration should at all times make it clear to the public authorities that responsibility for capital expenditures rests upon the railroad corporations and not upon the Railroad Administration, and unless specifically authorized by the Division of Law, shall speak only for the Railroad Administration in proceedings before public service or state railroad commissions, or officials of cities, counties or municipalities.

"The Railroad Administration may use its moral suasion to get the railroad corporations to consent to go ahead with public improvements and to finance improvements. However, no federal administration officer should take any action or make any committal, the effect of which would be to deprive a corporation of an opportunity to present its objection to the expenditure.

"In view of the fact that the amount of money available for capital expenditures is always limited, if a project will not be beneficial to the public in proportion to the expense, or can better be postponed pending the completion of more im-

portant capital expenditures, the railroad corporation, which will have to supply the capital, should present the conditions to the proper authorities.

Bond Issues or Special Assessments.—"Railroad administration officials will not take any action for or against any proceeding, the purpose of which is to authorize a bond issue or special assessment, but will as fully as practicable keep the corporate officer of each interested railroad advised so that if the corporation desires to take any action, it may do so.

"In cases involving a special assessment chargeable to capital account in which the corporation does not make financial arrangements to pay the assessment, there is no obligation upon the director general to furnish the money. In such case the question is one between the public authorities and the railroad corporation.

Projects Which Involve Charges to Capital Account that the Corporation Agrees to Assume, But Which Also Involve Charges to Operation.—"If such a project is agreed to between the corporation and the public body and the financial arrangements have been satisfactorily disposed of, the Railroad Administration will assume, as to operating expenses, the amount properly chargeable to it, but this policy should not prevent the federal officer from presenting the objections, if any, which may develop to the project from an operating standpoint, nor from designating, wherever possible, the most economical method of carrying out any such project whenever there is more than one way of providing the proposed facility, or improving the existing facility, or from designating a better method of reaching the result if there is one available.

Discussions With, or Proceedings Before, Public Service or State Railroad Commissions, or Officials of States, Counties or Municipalities.—"The general practices in connection with negotiations with, or before such public authorities preceding the issuance of an order, either formal or informal, should be along the following lines:

"(a) Immediately upon receiving notice that any question affecting capital expenditures is to be taken up, notice should be given as information, to the proper officer of the corporation so that the corporation may participate in the consideration or hearing before the public authority, and where such projects involve the consideration of existing franchises or charters, unusual care in protecting the rights of the corporation, to notice should be exercised.

"The United States Railroad Administration representatives should assure themselves that the public authorities have given the corporation the notice required by law.

"(b) The representatives of the United States Railroad Administration will in such proceedings handle to the best advantage all matters involving maintenance, transportation and other items included under operation, and may be called as witnesses for the public, or the corporation, as well as for the Railroad Administration.

"(c) It will be entirely proper to respond to any requests from a municipality, county or state for information in regard to material and labor costs, and to volunteer such data so that all concerned may get the benefit of the information in the hands of the Railroad Administration officials.

"(d) Single complete items involving a charge to capital expenditures of $1,000 or less should be promptly reported to the corporation to give the corporation the opportunity of handling the matter with the public authority, but in the discretion of the federal manager the work should not be delayed if, and when, in his opinion, a prompt disposition of the matter will be the proper action under all circumstances.

Compliance with Orders Issued by Public Authorities.—"If and when a proceeding before the public authority has resulted in a definite order involving a charge to capital expense, the matter should be promptly reported to the Division of Capital Expenditures, with the position of the corporation officer clearly expressed, together with the recommendations of the federal manager and regional director."

Operation of the Permit System

Walker D. Hines, director general of railroads, has authorized the following statement regarding the application of the permit system:

"Several days ago the Railroad Administration advised the interested shipping public of the plans in contemplation for the handling of the anticipated large grain crops, and stated that it was expected that the permit system would be re-inaugurated with the opening of the new wheat season. Experience last year demonstrated that the permit system of handling traffic was by far the most efficient, and indeed the only way of protecting the shipping public from the car shortages and transportation failures which arose when the eastern terminals were clogged with traffic. Embargoes without the permit feature have proved highly unsatisfactory, disrupting not only operating conditions of the railroads, but also the trade arrangements of shippers.

"The results of the operation of the permit system at the ports had proved so beneficial to all interests that the plan was adopted last year as a means to control shipments to the interior grain markets as quickly as it developed that some control of movement was necessary in order to keep the railroads in a position to do business continuously. Considering the immense territory and the importance and volume of the commodity involved, the results were satisfactory to all interests.

"An embargo temporarily stops all traffic, or all traffic in certain commodities. It is wave-like in its operation. It lacks flexibility. The permit system as applied to grain movement contemplates a regular flow of grain to each market to the maximum ability of the ocnsignees' facilities at the terminal to unload. It also regulates the current movement acocrding to the ability of the railroad to handle. It contemplates a more equitable distribution of equipment with consequently greater benefit to all shippers. It avoids congestion at terminals and in transit, and it consequently results in a freer and heavier movement of grain from the farms because it is restricted only by the available unloading facilities at the markets.

"The permit system will be applied this year the same as last year. A grain control committee will be selected to operate at each primary or terminal market. Each committee will be composed of three members, two representing the operating and traffic departments, respectively, of the Railroad Administration, and the third the transportation division of the United States Grain Corporation. A shipper desiring to ship to any particular market will apply through the railroad agent at point of origin, to the grain control committee at such market, for the necessary permit, which will be promptly issued if conditions admit of the prompt delivery to and acceptance by consignee at destination. A copy of the permit when issued will also be transmitted by the grain control committee to the proper transportation officer of the railroad via which the shipment is to be made so that necessary action may be taken with respect to the furnishing of equipment.

"It will be readily appreciated that not only will producers and shippers of grain be benefited by this regulation in transportation, but the entire shipping public will be benefited in that the channels of commerce will be kept free of congestion, car detention largely eliminated, and the maximum use of all equipment more highly developed."

Contracts Executed

The Railroad Administration has executed a standard compensation contract with the Terminal Railroad Association of St. Louis for $2,574,510, and also co-operative short line contracts with the Minneapolis, Red Lake & Manitoba, the Flint River & Eastern, and the Roscoe, Snyder & Pacific.

General Order 59 Revoked

Director General Hines has issued General Order 59-A, revoking General Order 59, issued on February 26, which required the railroads to file monthly reports of traffic statistics covering 58 principal commodities.

B. & O. Chicago Terminal Transferred

Effective on June 1, 1919, the Baltimore & Ohio Chicago Terminal Railroad was transferred from the Northwestern region to the Allegheny region, according to Circular No. 84 issued by the director general.

Prospects for Additional Rail Orders

The Railroad Administration is not planning on immediately placing additional orders for rail, although it is recognized that more will be needed and it will probably be necessary to place orders by August 1, when the 200,000 tons just ordered will be delivered. Although the annual requirements of the railroads are usually figured at above 1,500,000 tons for renewals only and not including any new construction, and this figure represents approximately the average of the 10 years ending with 1917, the average rail renewals during the three-year test period ending June 30, 1917, amounted to only about 1,350,000 a year and this is the amount which the Railroad Administration, under the law and its contracts with the railroad companies, is obligated to provide for the years 1918 and 1919. Last year about 1,100,000 tons was used for renewals, so there was a shortage of about 250,000, which would make the requirement for this year 1,600,000. To meet this there was on order on January 1, of the old orders placed by the railroad companies, about 1,100,000 and the recent order makes a total of 1,300,000 to be delivered this year. This apparently would require an additional order of 300,000 tons merely to keep even and it is understood that before the negotiations with the Peek committee were undertaken the Railroad Administration had contemplated an initial order of 500,000 tons. There is also an additional requirement of about 90,000 tons to make the carry-over into 1920 equal to the tonnage on hand at the end of 1917. This amounted to 460,865 tons. On January 1 there was on hand only 369,223 tons, and if the roads are to be returned on December 31 the Railroad Administration would doubtless be obligated to turn over the equivalent of the carry-over into 1917. This would indicate that 390,000 tons is the minimum that must be ordered for this year for upkeep alone, to say nothing of any new work.

During the negotiations between the corporations and the administration over the terms of the standard compensation contract some apprehension was expressed on behalf of the railroads that they might be called upon to pay, by deduction from their rental, for so-called "excess maintenance" which the Railroad Administration might find necessary. Most of such apprehension has doubtless disappeared during recent months, but it would seem that if the administration simply provides for meeting its contract obligations any deferred maintenance accruing during the three years before federal control will be accumulated proportionately during the two years of government control. Moreover, the companies which took advantage of the option afforded them, at the time the old standard price of rails was raised, of saving part of the increase by placing orders for future delivery, will have been deprived of the benefit of their foresight. An interesting question may be raised when the accounts are unscrambled after the end of the year as to whether the government is indebted to the railroads merely for the price of the rail delivered on advance orders of the companies which it has used, or whether it will owe them an equivalent tonnage of rails at the increased prices.

Maintenance Expenditures to Be Checked More Closely

Changes in the organization of the Division of Operation made on June 1, by which W. J. Cunningham and A. M. Burt were appointed assistant directors, are understood to indicate that special attention is to be given to the problem of maintenance expenditures involved in the obligation of government to return railroad properties in as good condition as when taken over, or to perform same amount of upkeep as during the test period. Professor Cunningham has been appointed chairman of the committee on maintenance expenditures, which also includes Mr. Burt, in charge of engineering and maintenance of way, and Frank McManamy, in charge of mechanical matters. Director General Hines has issued an order to the regional directors to limit maintenance of way expenditures for June, in general, to the average ratio to the operation expenses of the test period. This is to afford an opportunity for a closer check and will be followed by more definite instructions for the balance of the year. The order is not a hard and fast one, and is not intended to curtail necessary work. Regional directors are given authority to exceed the limit in emergency cases. The Administration has been proceeding on the plan of measuring upkeep by expenditures during the test period, but the government also has the option of returning the railroad property in as good repair and with as complete equipment as on January 1, 1918, and on this basis there has been some over maintenance on some of the properties which it may be necessary to check in order to expend the proper amount on others.

Orders of Regional Directors

CLAIMS AGAINST WAR DEPARTMENT.—A. H. Smith, regional director, Eastern region, by Circular 401-14A765, advises federal managers to file with the War Department, promptly, all claims for cost of construction or maintenance of tracks which have been laid for the accommodation of the War Department. Under the act of March 2, 1919, these claims must be presented before June 30. Where claims are pending for work of this kind done prior to January 1, 1918, such claims may be combined, in a joint claim, with bills for similar work done since that date.

Intensive Loading of Freight Cars.—The southern regional director, in Circular Letter No. 439, urges continued efforts toward heavy loading of freight cars. See *Railway Age,* May 23, page 1274 (order of Eastern regional director). The need of the meeting of competition will frequently be urged by shippers as a reason for light loading, but where orders from consignees are given as the cause for such, the shippers will nearly always be willing to join in efforts to induce consignees to so arrange their affairs as to order the maximum amounts possible, for the interests of the shipper and the carrier in the matter are identical.

Sodium Nitrate; Hazards in Storage.—A. H. Smith, regional director, Eastern region, by circular 600-179A766, promulgates a special report, received from the Fire Loss and Protection Section, covering hazards in the storage and handling of nitrate of soda in bulk at railroad terminals. When this substance is stored in a frame building it may be better, in case of fire, to allow the building to be destroyed rather than to use much water.

Safety Appliances on Freight Cars; Time Limit September 1.—A. H. Smith, regional director, Eastern region, by Circular 500-92A767, calls the attention of federal managers to the laws of Congress, the orders of the Interstate Commerce Commission and the rules of the Master Car Builders' Association, designed to insure the complete equipment of all freight cars with the legal safety appliances by September

1, 1919. Foreign as well as owned cars should be equipped under certain regulations.

Capital Expenditures on Maintenance Work.—A. H. Smith, regional director, Eastern region, by Circular 2700-A662A, gives further details in connection with D. C. E. Circular 20, in relation to securing the consent of corporations for certain expenditures. For work of any nature, if delays occur in securing the corporation's attitude, the federal manager should wire the regional director for authority to proceed, giving the circumstances necessary to explain the need of special despatch.

Advertising.—Order 208 of the Southwestern regional director quotes instructions with respect to expenditures for advertising issued originally by the regional director of Western railroads in Circular 50, dated March 23, 1918, and adds amendments to these instructions authorizing the exploitation of local excursions and the promotion of travel to local tourist resorts. In cases where two or more roads are interested in a given resort publicity expenditures should in every case be joint. All plans for promotive advertising, after approval by the federal manager, will be referred to the Western Passenger Traffic Committee for review and approval.

Rental Charges on Cars.—Order 207 of the Southwestern regional director cancels Orders 183 and 185 previously issued by the Southwestern regional director pertaining to rental charges on locomotives and other equipment and outlines new rates for locomotives, dining cars, locomotive cranes, etc., effective March 1. These rates do not abrogate those named in any contracts which have been executed prior to the effective date.

Navy Department Recruiting Posters.—Supplement 2 to Circular 201 of the Southwestern regional director directs that the army and the navy be treated alike in the posting of notices in stations. (*Railway Age,* April 18, page 984.)

War Savings Posters.—Supplement 6 to Circular 39 of the Northwestern regional director states that permission has been given the United States Treasury Department to display one War Savings poster in each railroad station.

Transportation of Employees of Steamship Lines.—The Northwestern regional director in Supplement 51 to Circular 20 states that it will not be the policy of the Railroad Administration to issue transportation to officers and employees of ocean steamship lines.

War Risk Insurance Posters.—The Northwestern regional director in Supplement 5 to Circular 39 states that permission has been granted the Public Health Service of the Treasury Department to place a poster in each railroad station, informing the beneficiaries of the War Risk Insurance where medical and surgical care for soldiers, sailors, marines and nurses discharged from military duties can be obtained.

Freight Car Distribution.—The regional director, Eastern region, by a circular dated May 3, calls renewed attention to the instructions concerning the loading of freight cars to points off the loading road. The average percentage of home cars on owning lines is not increasing as fast as it should, and federal managers are now called upon to prohibit the use of system cars, except open-top pool cars, for off-line loading if other suitable cars are available.

Sailing Day Plan.—The Northwestern regional director gives instructions for the handling of schedules for the movement of less than carload freight superseding circular 70 (*Railway Age,* May 2, page 1100).

Gasoline in Wrecks.—The regional director, Eastern region, by circular 602-31A701A, promulgates further advices from the Bureau of Explosives as to precautions to be taken after the occurrence of a train accident where tank cars of gasoline are involved. Wrecking outfits usually have a power pump to transfer liquids, but the use of this involves some risk of fire, and it is suggested that in transferring oil the wreckers should use a portable pump that can be operated by connecting to the air brake line.

Inspection of Fruits and Vegetables.—A. T. Hardin, regional director, Eastern region, by circular 600-172A737A, advises that the extent to which railroads shall make use of the services of the Department of Agriculture in the inspection of fruits and vegetables is left to the discretion of the federal manager. Information concerning the activities of the Department of Agriculture has been sent to the federal managers to enable them to avail themselves of this service if it is more efficient than that already in effect.

M. W. Expenditures; Ten-Year Comparisons.—A. T. Hardin, regional director, Eastern region, by circular 2700A768, calls upon federal managers for tabulated statements, from all roads in class 1, giving expenditures, by years, for maintenance of way and structures from 1908 to 1917 inclusive; also calendar years 1917 and 1918. The blanks for this data are OS 10-A and OS 10-B. Blueprint copies will be acceptable for the purposes of the Central Administration.

Locomotive Fuel Contracts.—Supplement 17 to Northwestern Regional Purchasing Committee Circular 3 contains the following clause which will be incorporated in all contracts for locomotive fuel: "In the event the railroad is released from federal control before the expiration of this contract, it is understood that the corporate owners have the option to be exercised at their pleasure, of being substituted for the director general of railroads, as to the benefits and obligations of this contract, effective upon the date the owners assume control." This will not require the approval of the corporate companies at this time.

Embargoes, Eastern Region.—A. T. Hardin, regional director, Eastern Region, by circular 2000-15A642A, issues revised rules governing embargoes, taking effect June 10. The New England Embargo Bureau is abolished, and instructions are given for exchanging information between the office of the regional director at New York and that of the district director at Cincinnati. All embargoes are to be promulgated to all interested by wire and confirmed by mail on the same day.

Wages of Trainmen.—The regional director, Eastern Region, by circular 1200-4-56A770 interprets supplement No. 15 to the rules defining local freight services. The term pick-up train includes any freight train running on a through freight schedule which picks up or sets off cars at five or more places.

Cars Rented to War Department.—The regional director, Eastern Region, by circular 500-51A773 promulgates an order from the Division of Operation to the effect that where freight cars are furnished for the War Department, the rental rate is to be uniformly $3 a day, beginning with June 1. Various rates have heretofore prevailed.

Discipline.—The regional director, Eastern Region, by circular 1200-362A772, promulgates an order from the Division of Operation, that in all cases, and regardless of the wording of agreements upon the subject, employees in train and engine service must be granted a complete investigation before final application of discipline. A man may be held out of service for the investigation, but the investigation in every case must be given before action is taken. The employee should be confronted with the evidence presented against him and in such a way that he may be enabled to meet it and make a defense.

The boatmen in New York harbor, by the result of the agreement reached a month ago, following the general strike, have had their pay increased from $5 to $15 a month, with overtime for all work in excess of ten hours a day. The agreement, if ratified by the unions, will run for one year from April 21, 1919. It affects about 4,500 men.

The Second Pan-American Commercial Conference

That the development of trade between the United States and the countries of Central and South America is going to depend in no small degree upon the extension of railway lines financed by capital from the United States was one of the strong points among the many brought out at the Second Pan-American Commercial Conference in Washington this week. The leading representatives of many of these countries in the United States were among the speakers and they, as well as others, brought out the necessity of railroad transportation to make available the tremendous natural resources of these countries. They emphasized that much, if not most, of the capital needed for this railway development must come from this country and showed the opportunity that was awaiting the investor in them as well as the trader who would exchange American made goods for the commodities that such new railways would make available.

The conference opened its sessions at the Pan-American building, in Washington, Monday afternoon with about 1,000 diplomatic, commercial and trade representatives of the United States and Latin America in attendance. The conference is the second of its kind (the first having been held in 1911). It lasted five days, with morning, afternoon and evening sessions, at which were discussed all aspects of trade between the United States and Central and South America.

The first session on Monday afternoon was called to order by John Barrett, director general of the Pan-American Union, and presided over by William C. Phillips, assistant secretary of state, in the absence of Frank L. Polk, acting secretary of state and acting chairman of the governing board of the Union. Addresses were made by Thomas R. Marshall, vice-president of the United States; by Beltrán Mathieu, ambassador from Chile; by Ignacio Calderón, minister from Bolivia; by F. H. Gillett, speaker of the House of Representatives, and by Homer L. Ferguson, president of the Chamber of Commerce of the United States.

Beginning with the Monday evening session and continuing over the three sessions on Tuesday, the several Central and South American countries were discussed by representatives of the respective countries, the countries being taken up in alphabetical order and opportunity being afforded for the asking and answering of questions. At the evening sessions stereopticon and motion pictures were shown of the countries then under consideration.

At the Tuesday morning session, in addition, the conference was addressed by Dr. Francisco Tudela y Varela, ambassador of Peru, and by William C. Redfield, secretary of commerce. The Tuesday afternoon session was similarly addressed by Henry P. Fletcher, United States ambassador to Mexico.

The Wednesday morning session was devoted to shipping and other transportation, including aviation; that of Wednesday afternoon to trading methods, including merchandising, business ethics, export and import combinations; and that of Wednesday afternoon to such matters as parcel post, trade marks, trade regulations, packing, etc.

The morning session on Thursday was devoted to financing, investments, credits, government aid to commerce; Thursday afternoon session was devoted to engineering aids to commerce, including railways and highways, waterways, harbors, etc.

The Friday morning session was planned to be devoted to commercial intelligence, including advertising, publicity, etc. Friday afternoon to educational and social auxiliaries to commerce, to be followed on Friday evening by a reception and garden party on the grounds of the Pan-American Union.

Secretary of Commerce William C. Redfield in his address at the Tuesday morning session pointed out the new facilities made available for Latin American trade in the last few years, and referred particularly to shipping, banking, the growth of our productive capacity and the capital available for investment in other countries. He pointed out that even before the war there were times when there was overproduction and expressed the view that with the increased capacity now existing, export trade was an absolute necessity. He stated his hope that in the future our commerce with foreign countries would be on a permanent and instructive basis and of a kind that would prove of mutual benefit to buyer and seller. The country, he said, is now suffering from an "overdose of prosperity" and he pointed out that as a creditor nation we must be prepared to invest large sums abroad to compensate for the large balances in our favor. This investment he hoped would prove of three-fold value: (1) through the direct return on the investment, (2) as assisting the normal flow of trade, and (3) through the development of wealth by the use of capital as, for instance, in the case of railways, which would open up new regions and make available the great resources now impossible of access.

The minister from Bolivia and the ambassador from Peru both referred to the advantages to be gained by the investment of United States capital in railways in those countries.

"The United States," said Ignacio Calderon, minister from Bolivia, "is now in a position to provide the necessary capital for the construction of railroads and the development of the industries and resources of the southern nations, and besides helping their progress acquire economically the same preponderating position that its policy of right and justice has given to it throughout the world. The investment of American capital would foster our common interests and contribute more than any other thing to the increase of commerce and of our friendly relations."

A Large Timber Treating Retort

The construction of what are believed to be the largest timber treating retorts ever installed in the United States has just been completed for the Chicago & North Western by the Wm. Graver Tank Works, Chicago, and they have been shipped to the wood preservation plant of



Timber Treating Retort Ready for Shipment

that road at Escanaba, Mich. These retorts are 113 ft. long and 6 ft. 2 in. in diameter. Their combined weight is approximately 180 tons. They are built to withstand a working pressure of 175 lb. The doors, which weigh 6 tons each, swing on roller bearing hinges.

The Universal Aviation Company is the name of a concern announced as having been organized at Detroit, Mich., to establish regular airplane transportation between that city and Cleveland. The distance between these two cities in an air line is only about 80 miles, or less than half the shortest route by railroad.

Internal Combustion vs. Steam Engines for Small Plants*

By C. A. Lichty
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THE SUBJECT of the Internal Combustion versus Steam Engines for Small Stationary Plants permits a wide field of survey. It is assumed that the subject should be limited here primarily to plants for railroad purposes and in sizes not to exceed 40 to 50 hp.

Upon the advent of the gasoline engine it was predicted by many that it would soon put the steam plant out of business, especially at the smaller power stations. But steam was the old reliable for so many years when it was the only power available that where it was once established it has not always been the policy to substitute the newer type of engine during the natural lifetime of the old plant, especially where coal and labor were cheap and where the quality of the water was good for steaming purposes. At some of the important water supply stations steam pumps have been in use ever since the road was built, some of them continuing for years after it was definitely determined that other power was more economical and equally reliable. Some authorities maintain that the larger and more important pumping stations can be operated most successfully by steam, while others are substituting internal combustion engines, even in the immediate vicinity of the coal fields. Many, especially on the northern roads, maintain steam plants, making use of the exhaust steam by running it into the water to keep it from freezing in the tank; besides, when the pump is not in service live steam can be used for the same purpose, as well as to thaw ice from spouts, valves, etc. In most of the states steam plants are subject to a rigid inspection. For instance, in the state of Illinois boilers must be inspected and tested four times per year, and operated only by a licensed engineman.

One of the principal reasons for getting away from the steam pumping plant, in many places, and this may also apply to other steam plants, is on account of frequent renewals of boiler sheets and flues. In some cases boilers have to be changed out in from six months to a year, depending on the nature of the water, necessitating the boilers to go to the shop for repairs. This entails considerable annoyance and expense. The expense for the maintenance of the internal combustion engine is perhaps slightly in excess of that required for the steam engine, but it is seldom necessary to send either type to the shop unless the entire apparatus is in need of overhauling.

Tests for efficiency as far back as 1882 showed that the gasoline unit was an active competitor with the steam plant for small installations, and about 10 years later it was generally conceded that it had gained the supremacy, but just about that time the rapid development of the multi-cylinder, small type of engine used so extensively for propelling automobiles, trucks, motorcycles, airplanes, etc., created such a demand for gasoline as to give the larger sizes of internal combustion engines a temporary setback until it could be arranged to operate them successfully with kerosene and the cheaper grades of fuel oil, since which time they have again made considerable progress.

The cost of installation of the two types of plants under consideration, of like proportions, may differ but little except for plants ranging from 1 to 10 hp., where the oil equipment would be much less. In fact, for plants of this size steam can scarcely be considered a competitor. In some installations of from 20 to 50 hp. the oil engine may be more expensive than the steam engine and boiler. When the additional space for the housing of the latter and its fuel is taken into consideration, it is doubtful if, in many instances, the steam plant has any advantage in cost.

There is little room for doubt but that the oil engine is much more economical in the matter of attendance. The steam boiler requires nearly an hour to get up steam and almost constant attention thereafter for firing and all of the other necessary requirements, while the oil engine can be started in an instant, and when properly installed and adjusted the attention required is only nominal. It is well known that many of the smaller pumping stations are successfully operated by agents, baggagemen, sectionmen, etc., when conveniently located, in connection with their other duties, requiring but a small share of their time.

A steam plant necessitates about six times the space for transportation and storage of coal that oil does; besides the latter may be conveniently stored underground, where it is entirely out of the way. For reasons just stated the labor required for the handling of coal and ashes is several times that for oil. Some roads require coal to be delivered to small power plants in considerable quantities during certain seasons of the year in order to render cars and labor available for other purposes when they are most needed. The result is that the coal is most always stored outside, where it deteriorates to some extent and is liable to be stolen or may catch fire from spontaneous combustion. A leading authority from one of the prominent railroads estimates that the loss of fuel from all sources in connection with a steam plant sometimes runs as high as 40 per cent, while in the case of oil it is very slight.

The Diesel type of oil engine has reached such a stage of economical operation, together with the small amount of space required for engine and fuel as to come into general use for boats and ships and all kinds of stationary plants from 6 to 500 hp. They operate successfully with all of the cheaper grades of oils except those having a decided asphaltic base, and the manufacturers now claim that they will soon be able to operate on such oils as well.

The thermo-dynamic efficiency of the semi-Diesel and true Diesel engines range roughly from 20 to 35 per cent. The economy in fuel consumption therefore is large when compared with the consumption for ordinary steam engines when it is recalled that the efficiency of the small 4-valve Corliss engine is about 6 per cent; the Corliss compound 9 per cent, and the triple-expansion engine rarely reaches 18 per cent. It is a well-known fact that the simpler types of steam pumps are the most wasteful.

The cost of the different fuels varies, of course, in the different localities, but there is scarcely any place in this country where oil can not enter into competition with coal for the purpose outlined in this subject, while, on the other hand, in many localities the steam plant can not enter into competition. A concrete instance of the relative merits of the two types is cited in the case of a steam plant in a small town which was recently replaced with a modern type of oil engine for operating a small electric lighting plant, where it is stated that the former cost of operation of 20 cents per kw. has been reduced to 4 cents by the new installation. It is not known whether the total difference was due to the change, but no doubt much of it was. In this particular case both coal and oil were produced within 100 miles of the plant. One of our prominent railroads recently installed an oil engine at a pumping station where steam had been in use many years, and a total saving of fuel and labor has effected a saving of from 30 to 40 per cent. Both types of plants are in such general use and their characteristics so well known that when all of the conditions are taken into consideration it should not be difficult to determine which should be selected for any particular locality.

*Abstract of a paper presented at the convention of the International Railway Fuel Association.

General News Department

W. G. Lee has been re-elected president of the Brotherhood of Railroad Trainmen.

The Railway Fire Protection Association will hold its annual meeting at the La Salle Hotel, Chicago, on October 21, 22 and 23.

The Baltimore & Ohio Chicago Terminal has been transferred from the Northwestern region to the Allegheny region, according to Circular 84 issued by the Director General. The change became effective June 1.

The Spokane & Inland Empire, in co-operation with farmers of Spokane county, Wash., has agreed to engage men to patrol the right of way on all its lines outside of the city of Spokane in an effort to exterminate the squirrels which annually destroy great quantities of grain raised on farms adjacent to the railroad. These men will plant poison in squirrel holes on the railroad's property and poison will also be sold to the farmers, who will apply it in a similar manner on their farms.

Five hundred miles in five hours, 40 minutes, 42 seconds, was the speed of Wilcox, the victor in an automobile race on a track at Indianapolis, Ind., on May 31. This speed is at the rate of 87.12 miles an hour. For the first 275 miles the average was 91.34 miles an hour; but some of the contesting cars had accidents, and two of these resulted in fatal injuries to the occupants, three men being killed, two of them by being burned to death; and thereafter the speed of the survivors was not quite so high. Of the large number of contestants, three were very close behind the winner at the end.

The "No-Accident Campaign" on the railroads of the Southwestern Region for the month of May, has resulted in a marked improvement, speaking generally, but in the oil fields of Texas the number of casualties shows a large increase. For the first twenty days of the month, the general result, throughout the region, is a decrease of 60 per cent in the number of casualties to employees; but in the oil districts a number of roads showed large increases, many new and inexperienced men having been employed since last year.

Officers and clerks of the general offices of the International & Great Northern, moving from Houston, Tex., to Palestine, because of the contract between the railroad company and the city requiring the maintenance of general offices in Palestine, arrived in the latter city on Thursday morning last, in a special train. Other departments follow this week and later. Many clerks in Houston resigned their positions rather than move away from the city. The traffic manager, and the general freight agent will retain their headquarters at Houston.

A. H. Smith, Regional Director of the **Eastern Region,** in bidding official farewell to the federal managers, expressed his thanks to the officers and employees "for the great assistance and loyal effort afforded me and the co-operation displayed between everyone through the very trying months when hostilities were in progress. The prompt movement of troops in such large volume and the efficient handling of traffic is truly a commendable accomplishment. During the unification of the railroads, as was necessary, there has been no feeling whatever. This indicates a breadth of view and loyalty to the Government. The co-operation of every man has been hearty. . . ."

The "Safety-First Movement" on railroads includes, of course, the interests not only of employees but of all other persons as well; and especially persons driving automobiles over railroad crossings. Robert Scott, chairman of the General Safety Committee of the Atlantic Coast Line, has addressed a special letter to the clergymen in the towns along the lines of his road asking their assistance and co-operation in warning automobile drivers of the importance of the rule to stop, look and listen before crossing a railroad track. The clergymen are especially appealed to because, says Mr. Scott, "the majority of automobile owners in each community are of the best type of citizens, and it is this class, which, as a rule, attend some church regularly."

Chicago railroads, on the occasion of the recent arrival of part of the 33d Division of the army from France, demonstrated the efficiency of their terminal facilities. A total of thirteen special troop trains were moved from New York to Camp Grant, Rockford, Ill., on schedule time without disarranging the customary traffic of the roads. Of the thirteen trains, three arrived at Chicago over the New York Central, three over the Pennsylvania, three over the Baltimore & Ohio, two over the Grand Trunk, and two over the New York, Chicago & St. Louis. Five trains departed from Chicago over the Chicago & North Western, three over the Chicago, Milwaukee & St. Paul, three over the Chicago Great Western, and two over the Illinois Central. The results were obtained through absolute holding to schedule by the Chicago terminal manager's office, the War Department and the hotels where the men were entertained.

The American Association of Engineers has announced a plan of organization for the formation of railroad sections. It provides for the formation of such sections on any railroad where there are 10 or more members or prospective members of the association. In general there should be only one section of any one railroad system, but when the system is large and is divided for general operation and administration by the railroad itself into two or more parts, there can be more than one section if those railroad members so desire. Each railroad section will elect its own officers and may establish its headquarters at any point on the lines of the road, but preferably at the location of the general engineering offices.

The Pennsylvania Railroad Section of the Association will hold its first convention at Pittsburgh, Pa., on June 28. It is planned to have a business meeting in the forenoon and a banquet in the evening. The headquarters of this section will be at the Fulton building, Pittsburgh.

Western Society of Engineers

J. H. Waterman, superintendent of timber preservation, Chicago, Burlington & Quincy, Galesburg, Ill., will present a paper before the Western Society of Engineers, Chicago, on Monday evening, June 9, on "Results Obtained from Treatment of Track Ties and Bridge Timbers."

Utah Central Anniversary Celebration

The Utah State Historical Society has started a movement for a celebration commemorating the laying of the last rail of the first railroad to reach Salt Lake City from the Missouri River, to be held at Salt Lake City on January 12, 1920. Business and social organizations in the city have been invited to participate and the plans, as tentatively prepared, are similar to those for the celebration recently held at Ogden, commemorating the driving of the Golden Spike which completed the first trans-continental railroad. Andrew Jenson, president of the Historical Society, worked on the Utah Central at the time of its building. The Utah Central was completed on January 10, 1870, the last spike being driven

by President Brigham Young in the presence of 15,000 people. The road was 36 miles long from Ogden to Salt Lake, connecting the city with the recently completed Union Pacific. The road is now a part of the Denver & Rio Grande. Salt Lake City had existed for 22 years as a lone community in the midst of the great American desert.

Export Traffic

According to a report on overseas traffic for the week ended May 28 at the North Atlantic ports, there were 27,924 cars of export freight on hand, exclusive of bulk grain and coal, compared with 28,443 cars for the same day of the preceding week. There were 7,998 carloads of export food on hand at these ports, compared with 7,890 carloads as of May 21. The export situation at the port of New York continues to show improvement. The British government has cleaned up practically all the steel on the ground for its account and will commence to bring in steel from interior points. There were 1,574 cars of provisions on hand on the morning of May 29 consigned to the British, French and Italian governments, the Belgian Relief Committee, Food Administration and Packers Relief. There were stored in elevators at North Atlantic ports on May 28, 13,751,076 bushels of grain. There was received during the week 6,620,496 bushels, while 7,081,201 bushels were cleared. At South Atlantic and Gulf ports as of May 24, there were 10,550 carloads of export freight on hand, as against 9,751 cars as of May 17. There were 5,331,475 bushels of grain stored in elevators at the same ports on May 17.

Advances to Railroads By War Finance Corporation

Advances to railroad companies and the Railroad Administration by the War Finance Corporation up to May 14 amounted to $181,710,090. The advances from April 23 to May 14 were as follows:

Central Railroad of New Jersey, $1,468,800; Philadelphia & Reading, $1,000,000; Lehigh Valley, $240,000; Baltimore & Ohio, $1,700,000; Boston & Maine, $216,800; Buffalo, Rochester & Pittsburgh, $449,600; Central Vermont, $128,800; Chesapeake & Ohio, $400,000; Chicago, Burlington & Quincy, $1,520,000; Chicago, Rock Island & Pacific, $436,800; Delaware & Hudson, $753,000; Hocking Valley, $100,000; Illinois Central, $1,700,000; International & Great Northern, $387,200; Missouri, Kansas & Texas, $342,000; New York, New Haven & Hartford, $1,312,000; New York, Susquehanna & Western, $100,000; Pere Marquette, $140,000; San Antonio & Aransas Pass, $53,000; Spokane, Portland & Seattle, $100,000; Virginian Railway Co., $775,000; Wabash, $976,000, and Western Maryland, $213,600.

Prevention of Collisions

The secretary of the New York Public Service Commission, Second District, advises that among the men who are expected to attend the hearing on the collision problem in New York City next week (announced in the *Railway Age* last week, page 1333), are Major Azel Ames, New York; Frank Rhea, New York; C. H. Morrison, New Haven; Daniel Willard, Baltimore; Julius Kruttschnitt, New York; E. W. McKenna, New York; S. M. Felton, Chicago; W. L. Derr, Clarion, Ia.; J. B. Fisher, Philadelphia; G. L. Peck, Pittsburgh; A. R. Whaley, New York; J. O. Young, Newark, N. J.; D. H. Schweyer, Easton, Pa.; Frank J. Sprague, New York; James L. Truden, Boston.

The hearing will be conducted by the commission, Charles B. Hill (chairman), Frank Irvine, John A. Barhite, Thomas F. Fennell and J. A. Kellogg; with C. R. Vanneman, chief of the division of steam railroads. It will be held in the Hall of Records, Chambers street, near the City Hall, beginning at 10 a. m. on Wednesday, the 18th.

Honor to British Dead

[From the Railway Gazette, London]

St. Paul's Cathedral was filled with a congregation of about 4,000 persons at the memorial service on Wednesday afternoon last, when honor was shown to nearly 19,000 railway men who, in the service of their country, have made the great sacrifice. There were many characteristics in the service that will make it memorable to those who had the privilege of being present. There was the presence of the king, thus signifying once more the interest shown by his majesty in the railway service; the large number of railway chairmen, directors and chief officers, together with representatives of the Board of Trade and other government departments, of the naval and military forces, of the men's widows, and the over 3,000 relatives of those railwaymen who have fallen. The exquisite and appropriate music provided by the orchestra under Colonel Galloway was, in itself, a marked feature. The address of the Bishop of Peterborough was in keeping with the spirit of the occasion—one of gratitude to those who have fought, and of determination that there shall be a new permanent way of peace and good-will built on righteousness, justice and fellowship among men.

Progress on Alaskan Railway Construction

Figures showing the total amount of work done in the construction of the Alaskan Government Railway from the beginning of activities to April 30, 1919, were published in the Alaskan Railroad Record of May 13. On the main line 148.02 miles of track, 8.28 miles of sidings, 0.92 miles of spur tracks and 8.05 miles of terminal yard tracks have been laid, while on branch lines 37.72 miles of track, 2.36 miles of sidings, and 6.97 miles of spur tracks have been built. A total of 8,502,847 cu. yd. of material has been placed in embankments, 554,750 lin. ft. of piling has been placed in temporary and permanent structures, 3,000 cu. yd. of concrete has been deposited, 9½ miles of wagon road have been built, and 243 miles of temporary and permanent telegraph lines have been erected.

Alaska has warm sunshine and grass, and the Spring is not so backward as might be imagined, nevertheless the operation of railways has its peculiarities. The Alaska Railroad Record of May 13, says that work had just been undertaken to open a section of the line which has been closed by snow slides for some time, sluicing being resorted to to remove a heavy snow bank lying across the track at mile 76. At another point on the line a ditcher has been working, removing mud slides from the track.

Telegraph Superintendents' Convention

The Telegraph and Telephone Division of the American Railway Association—formerly the Association of Railway Telegraph Superintendents—will hold its annual meeting at La Salle Hotel, Chicago, on June 11, 12 and 13. There are six committees. Committee No. 1, on construction and maintenance, will present four reports by four sub-committees. (1) Preliminary draft of a pole line specification. (2) A progress report on a crossing specification. (3) Complete specification for installation of underground conduits. (4) Complete specification for transposition of telephone circuits.

Other committees will report on (a) preliminary draft of specification for installation of telegraph and telephone equipment in railroad offices. (b) Protection against electrolysis. (c) Preliminary draft of specification for protection against lightning and against high power circuits. (d) Advances and development in the telegraph and telephone field. (e) Report on message traffic, mailgrams, censoring, etc.

There will be an election of officers and members of certain committees. On the evening of June 12 there will be a banquet at the La Salle Hotel.

The chairman of this division is Martin H. Clapp, manager of the Telegraph Section of the United States Railroad Administration, 18th street and Pennsylvania avenue N. W., Washington, D. C.

Manufacturers of Mechanical Handling Equipment

All manufacturers of mechanical handling machinery and equipment and accessories in the United States are invited to attend the coalition meeting of the Material Handling Machinery Manufacturers' Association (35 West 39th street, New York City), which will be held at the Hotel Astor, New York City, on Wednesday, June 11, morning, afternoon and evening. This includes makers of cranes, winches and hoists; elevators; gravity and power conveying machinery and ap-

paratus; industrial truck, tractors and trailers; bulk handling machinery, and all makers of equipment and accessories such as storage batteries, bearings, ropes for hoists, buckets, electric controllers and apparatus, etc.

The advertising managers of the companies manufacturing these products are also invited to hold a preliminary conference at Hotel Astor the evening before, at which time it is planned to form an advertising council.

Among the speakers for the day meeting are James H. Collins and Francis Holley. Mr. Holley will tell how educational and industrial moving picture films are distributed throughout the world so that they reach millions of people. At the evening meeting, addresses will be made by former Senator Theodore Burton and Murray Hulbert, Commissioner of Docks of New York City.

The committee having the meeting plans in charge consists of W. J. L. Banham (chairman), Otis Elevator Company; Frederick Stadelman, of Wellman-Seaver-Morgan Company, and E. Logan Hill, of Heyl & Patterson.

The Canadian Strike Situation

The general strike at Winnipeg continues, although executives of the railway brotherhoods, acting as strike mediators, have succeeded in obtaining proposals of settlement both from the Metal Trades Council which started the strike, and from Winnipeg employers. The negotiations, which have been conducted by the brotherhood mediators, have been strictly secret, but it is understood that the principle of collective bargaining, one of the planks in the strikers' platform, was recognized in both settlement proposals. The next step, insofar as the brotherhoods are concerned, is to submit a compromised plan to the two factions. No extensive disorders have been reported, the strikers being inclined to avoid open breaks which would result in the calling in of the military forces which have been mobilized and are ready for immediate action.

Railway mail clerks of the Winnipeg division who have been on a sympathetic strike, have returned to work. The strikers appeared before Gideon Robertson, federal minister of labor, and asked permission to resume their work. Having made their application before the expiration of a 24-hour ultimatum issued by the government, they were allowed to return to their former positions.

The Winnipeg police force has not been called out on a sympathetic strike, although the men have refused to sign an agreement not to affiliate with any organization that might be called out on a sympathetic strike in the future. However, the men have not indicated that they intend to join in the general strike.

At Toronto, where a general strike has also been in progress for several days, the Metal Trades Council, again the instigator of the strike, has issued an appeal urging other workers who have inaugurated sympathetic strikes in its behalf to return to their jobs. No trouble has been reported at Toronto with railroad employees. General strikes called in sympathy with the Winnipeg strikers at other points in Canada do not appear to be serious and business at such points as Vancouver, B. C., Edmonton, Alta., Calgary and Lethbridge where sympathy strikes have been called is continuing as usual.

Latest reports indicate that at Winnipeg railroad shopmen and commercial telegraph operators were returning to work, and that at Toronto the general strike had lost its vitality.

"Cut Off One from the Hind End"

Leaving a passenger car while continuing the train at full speed is a custom which American passenger conductors have long since outgrown (and which, indeed, many of them probably never heard of); but in England the fashion is still favored, as will be seen by the following note from the Railway Gazette of London:

"One of the welcome signs of the return of our railways to more normal conditions is found in the new Great Western timetable where 'slips' are shown off the 10:30 a. m. Paddington at Taunton and the 8:30 a. m. Plymouth at Westbury. When war conditions began to press heavily upon the country the system of slipping coaches from express and other through trains had to be abandoned. The Great Western employ a very safe and simple mechanism for slipping coaches, and had for many years developed a most important series of services to branch lines by means of slip coaches which offered many advantages over the alternative arrangement of stopping the through train and either putting off coaches or causing the passengers to change into the branch train. In pre-war days the 'Limited' 10:30 a. m. ex Paddington had a through run to Plymouth, doing the journey in 4 hours 7 minutes, and three slips were dropped at Westbury, Taunton and Exeter respectively. To give the same branch connections without the slips would have prolonged the journey to the West at least 30 minutes—a serious delay to an important train. We have no doubt that as opportunity offers these slip services will be resumed. They have been greatly missed, and their resumption will materially add to the comfort of the traveling public."

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

Air Brake Association.—F. M. Nellis, 165 Broadway, New York City.

American Association of Demurrage Officers.—F. A. Pontious, Supervisors of Demurrage and Storage, C. & N. W. Ry., Chicago.

American Association of Dining Car Superintendents.—E. H. Thayer, St. Louis-San Francisco R. R., St. Louis, Mo.

American Association of Freight Agents.—R. O. Wells, Illinois Central, Chicago. Next meeting, June 17-20, Cleveland, Ohio.

American Association of General Baggage Agents.—J. E. Quick, Port Huron, Mich.

American Association of Passenger Traffic Officers.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

American Association of Railroad Superintendents.—J. Rothschild, Union Station, St. Louis, Mo.

American Electric Railway Association.—E. B. Burritt, 8 W. 40th St., New York. Next convention, October 6-10, Atlantic City, N. J.

American Electric Railway Manufacturers' Association.—C. F. J. Dell, 50 E. 42nd St., New York.

American Railroad Master Tinners', Coppersmiths' and Pipe Fitters' Association.—Otto E. Schlinck, 485 W. 5th St., Peru, Ind.

American Railroad Association.—J. E. Fairbanks, 75 Church St., New York.—

Operating Section (including former activities of Association of Railway Telegraph Superintendents' and Railway Storekeepers' Association).

Engineering Section (including former activities of Railway Signal Association).

Mechanical Section (including former activities of Master Car Builders' and Master Mechanics' Association).

Traffic Section (including former activities of Freight Claim Association).

Transportation Section (including former activities of Association of Transportation and Car Accounting Officers).

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Austin Station, Chicago. Next convention, October 21-23, 1919, Cleveland, O.

American Railway Engineering Association.—E. H. Fritch, 431 South Dearborn St., Chicago.

American Railway Master Mechanics' Association (see American Railroad Association, Mechanical Section).—Acting Secretary, V. R. Hawthorne, 431 South Dearborn St., Chicago. Next annual convention, June 23-25, 1919. Atlantic City, N. J.

American Railway Perishable Freight Association.—E. F. McPike, 135 E. 11th Place, Chicago. Regular meetings, 2d Wednesday in March and September.

American Railway Tool Foremen's Association.—R. D. Fletcher, 6202 Greenwood Ave., Chicago. Next convention, August 27-29, Hotel Sherman, Chicago.

American Society for Testing Materials.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Next meeting, June 24-27, 1919, Hotel Traymore, Atlantic City, N. J.

American Society of Civil Engineers.—Charles W. Hunt, Engineering Societies Building, 33 W. 39th St., New York. Regular meetings, 1st and 3d Wednesday in month except July and August, 220 W. 57th St., New York. Next annual convention, June 17-20, Hotel Radisson, Minneapolis, Minn.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York.

American Short Line Railroad Association.—T. F. Whittelsey, 708 Union Trust Bldg., Washington, D. C.

American Train Despatchers' Association.—D. L. Darling, Northern Pacific Ry. Spokane, Wash. Next convention, June 17-20, Hotel La Salle, Chicago.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md.

Association of Manufacturers of Chilled Car Wheels.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Semi-annual meeting with Master Car Builders' Association.

Association of Railway Claim Agents.—Willis H. Failing, C. R. R. of N. J., Jersey City, N. J.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Next meeting, October, 1919, Chicago.

Association of Railway Telegraph Superintendents (see American Railroad Association, Operating Section).—W. L. Connelly, N. Y. C. R. R., Gibson, Ind.

Association of Transportation and Car Accounting Officers (see American Railroad Association, Transportation Section).—G. P. Conard, 75 Church St., New York.

Bridge and Building Supply Men's Association.—M. J. Trees, Chicago, Bridge & Iron Company, Chicago. Next annual convention, October 21-23, 1919, Cleveland, O.

Canadian Railway Clubs.—James Powell, 46 Aberdeen Ave., St. Lambert (near Montreal), Que.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November, and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. R. McMunn, New York Central, New York.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, Lehon Company, 45th and Oakley Sts., Chicago.

EASTERN RAILROAD ASSOCIATION.—D. G. Stuart, Washington, D. C.

FREIGHT CLAIM ASSOCIATION (see American Railroad Association, Traffic Section).—Lewis Pilcher, R. F. & P., Richmond, Va.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 856, Insurance Exchange Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, B. & O., Lima, Ohio. Next convention, August 19-21, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 51st St. Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabash Ave., Winona, Minn. Next convention, October 21-23, 1919, American Annex Hotel, St. Louis, Mo.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION.—F. W. Hager, 1323 Hurley Ave., Ft. Worth, Tex. Next annual convention, October 21-23, 1919, American Annex Hotel, St. Louis, Mo.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next meeting, September, 1919, Chicago.

MASTER CAR BUILDERS' ASSOCIATION (see American Railroad Association, Mechanical Section).—Acting Secretary, V. R. Hawthorne, 431 South Dearborn St., Chicago. Next annual meeting, June 18-21, Atlantic City, N. J.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES' COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York. Next annual convention, October 14, 1919, Indianapolis, Ind.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—George A. J. Hochgrebe, 623 Brisbane Bldg., Buffalo, N. Y. Regular meetings, 3d Tuesday in each month, Tenjost Hall, Buffalo, N. Y.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Bldg., Washington, D. C. Next annual meeting, June 11, 1919, Hotel Commodore, New York.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Next annual meeting, December, 1919, Buffalo, N. Y.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month except June, July and August, Colonial Annex Hotel, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—D. C. Welty, Missouri Pacific R. R., St. Louis, Mo.

RAILWAY ELECTRIC SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—D. L. Eubank, Galena Signal Oil Company, Richmond, Va. Next annual meeting, September, 1919, Hotel Sherman, Chicago.

RAILWAY FIRE PROTECTION ASSOCIATION.—G. L. Ball, St. Louis-San Francisco Ry., St. Louis, Mo.

RAILWAY REAL ESTATE ASSOCIATION.—James P. Nelson, President, C. & O., Richmond, Va.

RAILWAY SIGNAL ASSOCIATION (American Railroad Association, Engineering Section, Signal Division), H. S. Balliet, Bethlehem, Pa., 75 Church St., New York. Next meeting, June 26 and 27, "The Breakers," Atlantic City, N. J.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, N. Y. C. R. R., Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Next annual meeting, June 18-25, 1919, Atlantic City, N. J.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Next annual convention, September 16-18, 1919, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, West Nyack, Rockland County, New York.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, Western Ry., of Ala., Atlanta, Ga.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago. Next convention, August 27-29, Hotel Sherman, Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Next annual convention, September 16-18, 1919, Auditorium Hotel, Chicago.

TRAVELING ENGINEERS ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., Cleveland, O. Next annual meeting, September 9-12, 1919, Hotel Sherman, Chicago.

WESTERN ASSOCIATION OF SHORT LINE RAILROADS.—Clarence M. Oddie, Mills Bldg., San Francisco.

WESTERN RAILWAY CLUB.—J. M. Byrne, Chief Clerk to Mechanical Assistant, Central Western Region, 547 Jackson Blvd., Chicago. Regular meetings, 3d Monday in month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—Edgar S. Nethercut, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except July and August.

Traffic News

The Montana Freight Rate Association asks for interline freight rates upon both class and commodity rates. At the present time Montana has no interline rates except on coal and cement, and it is claimed that the present system of rate making confines business of Montana cities almost exclusively to the railroads upon which they are situated and to the advantage of outside competition.

Changes in passenger train service between San Francisco, Cal., and Goldfield, Nev., cutting the time between the two cities by nearly 12 hours and providing night travel across the desert in both directions have been announced by W. R. Scott, federal manager of the Southern Pacific. The new service begins on June 8, and follows a conference held before the Nevada State Railroad Commission to devise means of accommodating the increased travel to the new gold fields.

Loading of freight in the Northwestern region for the week ending May 27, shows a decrease of 8,077 cars from the records established for the corresponding week last year. The comparative size of the present wheat crop as compared with that of last year is shown by an increase of 5,725 cars of grain and grain products loaded. The number of cars of livestock and miscellaneous freight loaded show slight increases while the number of cars of coal and coke, lumber and forest products and ore loaded during this period show a decrease from the records established last year.

The William Graver Tank Works, East Chicago, Ind., has petitioned the Chicago Eastern District Freight Traffic Committee for a fabrication-in-transit arrangement at East Chicago, Ind., in lieu of the existing arrangement which permits only fabrication of iron and steel framework or sections for bridges and buildings. It is desired to extend the application of this arrangement to cover iron and steel in carloads, fabricated into iron and steel framework or sections for bridges, buildings, towers, tanks, stand pipes, steel riveted pipes and smoke stacks. The petition is based on the fact that competitors now enjoy such an arrangement in connection with fabrication-in-transit privilege at Greenville and Sharon, Pa.

The report of the Market Survey Committee, composed of representatives of various organizations of the grain trade, the Bureau of Markets of the Department of Agriculture and the Car Service Section of the Railroad Administration and formed to study conditions of grain markets east of the Rocky mountains to the end that greater uniformity may be had in the inspection of grain and greater efficiency in the handling of grain cars, contains several interesting conclusions and recommendations concerning the transportation phase of the problem. It is suggested in the report that railroads assign certain designated tracks as a "grain hold yard" and so far as possible place all of the grain cars that arrive upon these tracks. During periods when there is an unusual rush of grain, making it necessary to hold some of the cars on other tracks, the railroads should give the grain inspection officials a location notice of the cars. Regarding the unification of terminals under the Railroad Administration the report states that this unification has made it possible for carriers to adopt practices which have materially increased efficiency in the handling of grain and it is recommended that these practices be continued when the railroads are returned to private control. To decrease the necessity for embargoes or the use of a permit system the committee suggests that prompt inspection be made upon inbound and outbound cars and that disposition orders be given promptly. To further increase the efficiency of this work it is recommended that the railroads should provide some central location for the receipt of such orders and should also arrange to have them promptly executed after they are received.

Commission and Court News

Interstate Commerce Commission

Oral arguments in the railroad valuation cases set by the Interstate Commerce Commission for May 26 at Washington have been postponed, at the request of the President's Conference Committee on Valuation.

The Commission has issued a supplemental order in the 15 per cent case allowing carriers to preserve the groupings of points of origin and destination in Central Freight Association territory which have heretofore been observed in making joint rates between that territory and the southwest. Joint through rates applying in both directions between Central Freight Association territory and the southwest may be increased, subject to the western classification, by amounts applying to the various sections prescribed in the order. This is because the joint through rates between C. F. A. territory and the southwest have been maintained for many years on a relationship which would be seriously modified by a strict compliance with the commission's previous orders in this case and that such orders would further result in breaking up the method of grouping points of origin which has existed for a series of years.

Referees to Determine Compensation of Arkansas & Louisiana Midland

The Interstate Commerce Commission, without deciding whether or not the Arkansas & Louisiana Midland was ever under federal control, has announced its decision to appoint a board of referees, as petitioned for by the company, to determine its just compensation in accordance with the provisions of the federal control law. The board consists of Commissioner C. C. McChord, P. J. Farrell, general counsel, and A. G. Hagerty, attorney-examiner. The appointment of the board was opposed by the Railroad Administration on the ground that the road had been relinquished and that no direct control had ever been exercised over it. The hearing before the commission on the application for the appointment of a board was reported in the *Railway Age* of May 23.

State Commissions

The Railroad Commission of Georgia has completed its 46th annual report. It shows a decrease of 53 miles in the length of railroad in the state, a large decrease in the number of persons killed on steam railroads, but an increase in the casualties on street railroads. Although the activities of the commission have been limited by federal control of railroads, especially as relates to mandatory orders, the work of the commission has been heavy. It has been continually necessary for the commission to handle matters with the federal authorities, the proceedings frequently involving more time and labor than would have been necessary under former conditions. During 1918 the number of subjects handled was less than in 1917, but in the first three months of 1919 the number was larger than in the same period of any previous year.

Court News

Knowledge of Real Character of Shipment

A corporation is not chargeable with knowledge of facts which become known to its agent unless the agent in the line of his duty ought and would reasonably be expected to communicate the knowledge to his principal. Applying this rule, the Circuit Court of Appeals, Seventh Circuit, holds that the knowledge of the real character of a shipment, by an employee, such as a car repairer or trackman, who has no function whatever with respect to receiving or classifying freight, would not ordinarily be the knowledge of the company.—Elgin J. & E. vs. U. S., 253 Fed. 907.

Safety Appliance Act

The Circuit Court of Appeals, Third Circuit, holds that an employee of an interstate railroad whose injury was caused by the failure of the company to comply with the requirements of the Safety Appliance Act as to automatic couplers, may recover therefor, although not himself employed in interstate commerce.—Devine vs. B. R. & P., 253 Fed. 948.

Federal Control—District of Suit

The federal district court in Nebraska holds that under Sections 8 and 10 of the Act of Congress of March 21, 1918, and despite Section 9 thereof, orders of the Director General that suits against carriers while under federal control should be brought in the county or district where the plaintiff resided at the time of the accrual of the action, were not effective to limit that right, and, where authorized by state law, a plaintiff might sue in a district other than that in which he resided at the time of such accrual upon a cause of action not arising out of the railroad company's duties as a common carrier.—Friesen v. Rock Island, 254 Fed. 875.

Doing Business in a State

The Circuit Court of Appeals, Fifth Circuit, holds that a foreign railroad company, not undertaking to do within the state any of those things for which it is incorporated, although it has managers in the state who direct its operations in other states, and which employs only the clerical force necessary for that purpose and uses the mails and interstate telegraphs in transmitting orders, is not to be regarded as doing that character of business which renders it subject to personal judgment in the courts of the state for a tort committed in another state.—Atchison, T. & S. F. Co. v. Weeks, 254 Fed. 513. Decided December 20, 1918.

Stay of Action Under General Order No. 26

The federal district court for the Southern District of New York holds that General Order No. 26, dated May 28, 1918, providing that "upon a showing by the defendant carrier that the just interests of the government would be prejudiced by a present trial of any suit against a carrier under federal control * * * the suit shall not be tried during the period of federal control" is within the powers conferred by Congress and the President, but an application for a stay is addressed to the discretion of the court, and the burden rests on the defendant to show that its interests would be substantially prejudiced by a present trial.—Marnick v. Pennsylvania, 254 Fed. 748. Decided June 12, 1918.

Joint Use of Railroad Property—Injuries to Servants of Other Road

While the law of Illinois requires each company, in case of the joint use of railroad property, to exercise ordinary care for the safety of employees of the other company, the Circuit Court of Appeals, Eighth Circuit, holds, in an action against one company by an employee of the other for personal injuries, that the defendant, which owned its own right of way, was under no duty to guard it for employees of the other company, whose terminal facilities it used; there being no usage of the defendant's right of way by such employees.—Friedman v. Vandalia, 254 Fed. 292. Decided October 28, 1918.

Actions Against Railroads Under Federal Control

The federal district court for the Eastern District of Missouri holds that the amended regulation No. 18a, promulgated by the Director General of Railroads, April 18, 1918, providing that "all suits against carriers while under federal control must be brought in the county or district where the plaintiff resided at the time of the accrual of the

cause of action or in the county or district where the cause of action arose," as applied to suits in the federal courts, is within the authority conferred on the President by Act March 21, 1918, providing for federal control of railroads during the war and authorizing the President to make regulations therefor. It is also held that the act is within the war powers of Congress and constitutional.—Wainwright vs. Pennsylvania, 253 Fed. 459.

Severance of Railroad Property for Foreclosure Sale

The Circuit Court of Appeals, Seventh Circuit, holds that in the separation of a railroad into parcels for sale under the foreclosure of divisional mortgages, a court of equity is not bound by any hard and fast rule to fix the division to correspond absolutely with the several mortgage grants, but the division should be made so as to leave each parcel as nearly as may be in a situation to be operated as a railroad. Applying this rule in the foreclosure of constituent mortgages on the property of a consolidated railroad company, the court held that the division located in Indiana should be given a line to Chicago, and that it was proper, other creditors and lienholders being protected, to sell, with one of the constituent parcels, equipment used for the operation of that parcel, though it was not subject to the mortgage or the lien. A railroad without equipment can serve no function.—Metropolitan Trust Co., vs. C. & E. I., 253 Fed. 868.

Action Against Railroads Under Federal Control

In an action by a switchman against his employer railroad for personal injuries, the Texas Court of Civil Appeals holds that General Orders Nos. 18 and 18a of the Director General of Railroads, dated April 9 and 18, 1918, in so far as they require all suits against carriers under federal control to be brought in the county or district where the plaintiff resides or resided at the time of the accrual of the cause or in the county or district where the cause arose, is inconsistent with and contrary to section 10 of the Act of Congress of March 21, 1918, providing that "actions at law or suits in equity may be brought by and against such carriers and judgments rendered as now provided by law"; and that the General Order No. 26 of the Director General, dated May 23, 1918, ordering that actions and suits under General Order No. 18 should abate during federal control, is inconsistent with and contrary to the same section.—El Paso & S. W. v. Lovick (Tex.), 240 S. W. 283. Decided March 27, 1919.

Discriminations While Embargo is in Force

Under the statute declaring it a misdemeanor to knowingly offer, grant, solicit, or receive, rebates, etc., the mere offer by a carrier is held by the federal district court for the Southern District of New York to be an offense. But indictments charging that, while an embargo on transportation of hay was in force, a railroad did unlawfully offer and give permits for transportation to certain shippers, while others similarly situated did not receive certain permits, were held insufficient to charge the offense of discrimination, it not being alleged that there was any transportation. If there is no transportation, the mere giving of a permit is an idle act, although the case might be different if the railroad "offered" to transport. Transportation pursuant to authorization to one shipper, and denials to others similarly situated is a violation of the statute. Although the embargo was illegal, that does not make discriminatory transportation under it legal.—U. S. L. V., 254 Fed. 332. Decided January 29, 1919.

The federal district court for the District of New Jersey holds that, where defendant shippers by misrepresentations, etc., obtained transportation despite an embargo, prosecution could not be defeated because the embargo had not been submitted to the Interstate Commerce Commission and its reasonableness ascertained and adjudicated. The defendants were charged, not with having secured discriminations by means of the embargo, but in violation of it; therefore, the reasonableness of the embargo was not in question. Carriers by railroad have, of course, the power to lay embargoes for the proper conduct of their business.—U. S. v. Metropolitan Lumber Co., 254 Fed. 335. Decided November 30, 1918.

Equipment and Supplies

Equipment Requirements for Canadian Northern

Officers of the Canadian Northern estimate that $35,000,000 will be spent for new equipment during 1919. Presumably this includes new locomotives, cars and track material.

British Railways Buying Ties in America

Sir James Bail, chief engineer of the London, Brighton & South Coast, who has been in charge of timber production in Great Britain during the war, is in the United States purchasing cross-ties for the British railways. He has placed orders for 2,000,000 redwood, Oregon fir and long leaf pine ties and has taken options on about 1,500,000 oak ties. The annual tie requirements of the British railways are about 5,000,000 ties.

Cars Built in Railroad Shops

New cars were constructed in railroad shops during the month of April as follows:

Freight—					
Stock	...	...	7	...	7
Hopper	...	...	...	29	29
Gondola	...	...	...	1	1
Flat	...	4	...	12	16
Coke rack	...	...	...	...	...
Work car	2	3	...	7	12
Miscellaneous	...	...	...	7	7
Freight cars	...	...	...	...	...
Caboose	19	23	3	5	50
Box	10	5	150	154	319
Refrigerator	...	...	...	...	...
Total freight equipment	31	35	160	215	441
Total passenger and freight	31	35	160	215	441

No passenger-train cars reported.

Locomotive Deliveries

Locomotives were shipped to railroads under federal control during the week ended May 24, as follows.

Works	Road	Number	Type
American	L. & N.	6	USRA 8-w. Sw.
	Southern	1	USRA Mount.
	N. P.	4	USRA 8-w. Sw.
	A. C. L.	5	USRA Pacific
	C. B & Q.	10	USRA 8-w. Sw.
	P. L. W.	2	USRA 6-w. Sw.
	N. & W.	1	USRA Mount.
	C. C. C. & St. L.	2	USRA Santa Fe
		31	
Baldwin	Southern	2	USRA Mount.
	I. H. B.	2	USRA 8-w. Sw.
	B. & O.	4	USRA 6-w. Sw.
	T. & P.	2	Santa Fe
	C. B. & Q.	1	Mikado
	C. C. & O.	1	Mallet
	A. T. & S. F.	3	Pacific
	P. & R.	1	Mallet
	A. T. & S. F.	2	Mount.
	S. P.	4	Santa Fe
	U. P.	1	Santa Fe
	Sou. Ry.	3	USRA Mount.
		26	
	Total	57	

Locomotives

The Pennsylvania Equipment Company, Philadelphia, Pa., is in the market for a locomotive of about 12 tons, and 40-in. gage.

The Korean Government has ordered 12 Mikado type locomotives from the American Locomotive Company. These locomotives will have 25 in. by 28 in cylinders, 160,000 lb. weight on drivers, and a total weight in working order of 206,000 lb.

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., is in the market for a second-hand Mogul type locomotive, weighing 60 tons, with wheel centers of 44 in., and 18, 19 or 20 in. by 24 in. cylinders, to be in first-class condition, for southern delivery.

Supply Trade News

Harold E. Wade has been appointed president of the **Fairmont Gas Engine & Railway Motor Car Company,** Fairmont, Minn., succeeding **Frank E. Wade,** deceased.

Edward Walters, sales engineer for the **American Steel Foundries,** Chicago, has resigned to enter the employ of the **Keyoke Railway Equipment Company,** Chicago, as salesman, with headquarters at Chicago.

E. C. Ryan, representative of the **Electric Controller & Manufacturing Company** with headquarters in New York, has been promoted to manager of the Chicago branch with office in the Monadnock building, Chicago.

W. L. Garland, who has been elected a vice-president of the **Safety Car Heating & Lighting Company,** with headquarters at Philadelphia, Pa., as was briefly noted in our issue of May 30, was born in Blair county, Pennsylvania. He completed his apprenticeship at the Altoona shops of the Pennsylvania Railroad in 1892; he then served in various departments of the shops for five years, and later took up locomotive and car design. In 1901 he was appointed chief car inspector on the Pennsylvania Railroad. In 1907 he was appointed general agent of the Safety Car Heating & Lighting Company, and in 1909, was promoted to manager. Mr. Garland was commissioned a major in the Corps of Engineers and was assigned to the 87th Battalion, Military Railroads. He was released from active service on the signing of the armistice.



W. L. Garland

The Duntley-Dayton Company, Chicago, has taken over the sales agency for the Red Devil rivet cutting guns, made by the **Rice Manufacturing Company,** Indianapolis, Ind., for all territory east of the Rocky mountains.

The Bordon Company, Warren, Ohio, manufacturers of the Beaver die stocks and die cutters, has opened a downtown Chicago office at 549 West Washington street, in charge of **Charles A. Green,** Chicago representative.

Lieut. E. D. Stearns, who served in the aviation corps of the United States Army, has been appointed sales manager of the H. K. Ferguson Company, Cleveland, Ohio. Before entering military service, Lieut. Stearns was a partner of the Fort Pitt Engineering Company, Pittsburgh.

The Pollak Steel Company, Cincinnati, Ohio, has appointed **D. E. Sawyer** general manager of sales, with headquarters at 120 Broadway, New York, effective July 1. Mr. Sawyer was formerly connected with the Illinois Steel Company, and assistant steel director of purchases of the War Industries Board.

The Stark Rolling Mill Company, Canton, O., has appointed **George W. Scott** district manager for the Chicago territory, with headquarters at 1119 Marquette building. Mr. Scott was formerly Chicago representative of the Pittsburgh Steel Company. **Thomas F. Murphy** has been appointed district manager for the Canton territory. He was formerly connected with the American Sheet & Tin Plate Company.

Jno. T. Mahoney, purchasing agent of the **Buda Company,** Chicago, with headquarters at Harvey, Ill., has been promoted to sales manager of the truck and tractor engine department, to succeed **Lon R. Smith,** who has resigned to become general sales manager of the **Midwest Engine Company,** Indianapolis, Ind.

The **International Oxygen Company,** Newark, N. J., has appointed **Preston Belvin** district sales engineer, in charge of the Pittsburgh district sales work, with office at 1310 First National Bank building, Pittsburgh, Pa. The Chicago office, in charge of **Philip G. Wesley,** has been removed from 223 Railway Exchange building to 817-820 Chicago Stock Exchange building, 30 North La Salle street.

The Haywood Company (T. G. Haywood and M. L. Bugbee) has opened offices in the Alaska Commercial building, San Francisco, Cal. The company will do an importing and exporting business, particularly in steel products, machinery, contractors' and railroad equipment and engineering specialties. Mr. Haywood was formerly manager of the Pacific Car & Foundry Company, with headquarters at Portland, Ore.

Major J. L. Terry, formerly of the St. Louis office of the **Q and C Company,** New York, and now with the American Expeditionary Forces, Transportation Service, with headquarters at Rennes division, France, expects to return home in the near future. **Lieut. L. T. Burwell** and **E. C. Zimmerman,** both of the New York office, are out of military service and back in their old positions traveling out of New York and **Lieut. C. M. Brennan** is also out of the service and is again located with the Chicago office.

Vernon T. Brauns, whose promotion to general manager of all departments of the **American Blue Print Paper Company, Chicago,** was announced in the *Railway Age* of May 23 (page 1286), was born at Port Chester, N. Y., on August 22, 1879. At the age of 19 years he entered the employment of Whitston & Little, Chicago, as a salesman, dealing especially with specialty sales work. In February, 1915, he entered the employ of the American Blue Print Paper Company as a sales representative, and while in the services of that firm he promoted with success the newer photostat and amblucolitho processes. In the summer of 1918 he entered the government service at Camp Custer, Battle Creek, Michigan, as chief clerk in the supervising engineer's office of the Camp Custer extension, in which capacity he served until January, 1919, when he again re-entered the employment of the American Blue Print Paper Company as manager of the railroad valuation department, which position he held until his recent promotion as general manager of all departments on May 8.



V. T. Brauns

R. P. Lamont, president of the **American Steel Foundries,** Chicago, has authorized the announcement that the contract for the purchase of the Griffin Wheel Company has been signed. Negotiations for the taking over of the latter property by the American Steel Foundries have been under way for some time and many reports of the completion of these negotiations have been circulated, all of which have been unfounded. According to Mr. Lamont no further information is available at this time as to the details of the purchase but a statement will be issued in the near future.

The Buffalo Forge Company, Buffalo, N. Y., announces that **Lieut. C. C. Cheyney** has returned from service in the United States Navy, and is now in charge of its Chicago office and store. Lieut. Cheyney had charge of the mechanical repair shops at the naval aviation station, Pensacola, Fla., where from 500 to 1,200 men were employed during the war. **Captain H. H. Downes**, 12th U. S. Engineers (Railway), has returned from France, and after receiving his discharge expects to take charge of the Buffalo Forge Company's interests in the St. Louis territory. Captain Downes' regiment was one of the first to go to France, sailing in July, 1917.

E. L. Ryerson, Jr., has received his honorable discharge from the army and has returned to the **Joseph T. Ryerson & Son Company**, Chicago, as vice-president and works manager after nearly two years of absence. Mr. Ryerson left early in 1917 to handle production engineering work, as a civilian, with the Aircraft Production Board at Washington, D. C. He was later commissioned first lieutenant in the Signal Corps, U. S. Army, Aviation Section, and was subsequently promoted to captain at which time he was transferred to the Division of Military Aeronautics as engineer officer and assigned to March Field, Riverside, Cal., at which place he qualified as a pilot, receiving the rating of reserve military aviator.

Stanley J. Quinn, secretary of the American Manufacturers' Export Association, has resigned to accept a position with one of the members of the association, effective May 31. He has been succeeded by **Robert F. Volentine**, who for the last several months has been associated with the Brooklyn Chamber of Commerce. The newly elected secretary, in addition to his activities in connection with the Brooklyn Chamber of Commerce, served during the war as district director of the Northeastern Division of the War Department's Commission on Training Camp Activities. In 1917 he was named by Mayor Mitchel as president of the Park Board, City of New York. Prior to that he served as secretary of the Department of Parks and as a member of the staff of the New York Bureau of Municipal Research.

Jay L. Hench, assistant district sales manager of the **Lackawanna Steel Company**, at Chicago, has been promoted to district sales manager, with headquarters at the same point. Mr. Hench was born at Hinsdale, Ill., on April 11, 1885, and after graduation from the high school of that place entered Cornell University in 1903, in which institution he specialized in iron and steel metallurgy. He began his business career in the fall of 1905, at which time he entered the employ of the Illinois Steel Company in its south works at South Chicago, Ill., where he was engaged for one year in practical work in the open-hearth and Bessemer departments of that plant. The following five years he was in the employ of Joseph T. Ryerson & Son, Chicago, most of which time he was acting in the capacity of sales representative in Indiana and Michigan, with headquarters at Chicago. He resigned from that position in 1911 to enter the service of the Lackawanna Steel Company, with which company he was assistant district sales manager, with headquarters at Chicago, prior to his recent promotion.



J. L. Hench

Victor E. Karminski & Company, New York, has been incorporated to engage in export merchandising of iron and steel products, with the followings officers: **Victor E. Karminski**, president; **H. L. Landau**, first vice-president in charge of sales; **J. H. Allen**, vice-president in charge of purchases; **Alexander Karminski**, treasurer, and **M. Frank**, secretary. The offices of the company are at 291 Broadway. **Victor E. Karminski** was one of the founders of the W. J. Crouch Company, which later merged with Rownson, Drew & Clydesdale, Inc. Mr. Karminski became secretary and joint general manager of the combined companies, from which position he recently resigned. **Mr. Landau** served as expert sales manager of the Buffalo Specialty Company and then for the Baker-Vawter Company. He later became connected with the Vulcan Steel Export Company which he left to become associated with Mr. Karminski in the W. J. Crouch Company, and after the merger he acted as assistant and general sales manager for Rownson, Drew & Clydesdale. **Mr. Allen** has had 19 years' experience in the steel business. He organized the Manhattan Rail Joint Company which was later sold to the Elyria Iron & Steel Company. He also served the Vulcan Steel Products Company and then became purchasing agent for the W. J. Crouch Company, later becoming vice-president and general purchasing agent for Rownson, Drew & Clydesdale. **Alexander Karminski**, treasurer, was for 12 years connected with the banking house of Asiel & Company.

Trade Publications

IRON CEMENT.—The Smooth-On Manufacturing Company, Jersey City, N. J., has issued a revised edition of Smooth-On Instruction Book No. 16. This edition, like its predecessors, is made up of descriptions of engine and boiler room repairs of all kinds. These are described by the men who made them in such a way that similar problems can be quickly solved by others. The book is well illustrated by actual photographs and drawings. Among the subjects covered are engine repairs, pump repairs, boiler and tank repairs, valve repairs, wheel pit and engine bed construction, etc.

ELECTRIC HEADLIGHTS.—The second edition of an instruction book covering the installation, care and operation of Sunbeam turbo-generators and headlights has been published by the Schroeder Headlight & Generator Company, Evansville, Ind. The information given in this book is quite extensive and not only deals with the Sunbeam turbo-generators and headlights, but contains considerable information pertaining to incandescent headlights in general, as well as many useful tables and formulae. It also contains many drawings and photographs showing detail parts and wiring arrangements.

ELECTRIC FURNACES.—Booklet 5-B, published by the Electric Furnace Company, Alliance, Ohio, is an attractive 24-page catalogue describing the Baily types of electric furnaces for melting non-ferrous metals. These types embrace pusher type continuous furnaces for heating and annealing steel, copper, brass and aluminum, automatic control type continuous furnaces for heat treating steel castings and forgings, and car type furnaces for annealing steel, copper, brass and aluminum, and have electrical capacities of from 150 kw. to 1,500 kw., and furnace capacities of 1,000 lb. to 10 tons per hour. These furnaces are all of the resistance type and have several distinct features. The booklet contains illustrations of a number of actual installations and records of tests made with the equipment in several industrial plants.

STOKER FIRED LOCOMOTIVES.—The Locomotive Stoker Company, Pittsburgh, Pa., has published an attractive booklet of 96 pages, bound in heavy cardboard covers, illustrating some of the principal types of locomotives that have been equipped with mechanical stokers by the Locomotive Stoker Company, which include the largest and most powerful locomotives constructed, as well as the standard locomotives of the United States Railroad Administration. The various types of locomotives considered to be in the stoker class are grouped in sections, each page containing an illustration of a representative locomotive of different railroads, with a table of the principal dimensions. After each section is a tabulation which permits of a direct comparison of the like dimensions of all locomotives of that class. These tables should be of special interest to mechanical engineers designing new locomotives, as well as to those contemplating installing stokers on old locomotives.

Railway Financial News

BROOKLYN RAPID TRANSIT.—Receiver Lindley M. Garrison has been authorized by the Federal District Court of New York to issue $20,000,000 of receiver's certificates.

CENTRAL OF GEORGIA.—This company has sold to Kuhn, Loeb & Co. $8,000,000 ten-year 6 per cent collateral trust bonds. They were offered to investors at 99, or at 6⅛ per cent basis.

In a letter to the company's bankers, President Lawton, of the Central of Georgia, calls attention to the fact that the company has paid continuously since July 1, 1912, 6 per cent dividends on its $15,000,000 preferred stock and 5 per cent upon the $5,000,000 common stock. All the stock of both classes, except directors' qualifying shares, is owned by the Illinois Central. Proceeds of the $8,000,000 bonds just sold are to be used to pay off temporary loans made for capital purposes and to pay for such expenditures to be made. Except for a small issue of equipment certificates in 1916, this is the first bond issue of the road since 1907. The bonds are to be secured by deposit of $11,000,000 par value 6 per cent refunding and general mortgage bonds, series A. This is a new mortgage to be created, authorizing bonds limited to three times the capital stock, including bonds reserved for refunding of existing issues, and maturing April 1, 1959.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—See editorial elsewhere in this issue.

DENVER & RIO GRANDE.—The Equitable Trust Company of New York has issued the following notice: "The receiver of the Denver & Rio Grande finds himself unable to pay the interest on the 5 per cent improvement bond mortgage due June 1. The necessary appropriation bill not yet having passed Congress, the government has failed to pay to the receiver sufficient of the actual earnings of the road and the court is disinclined to permit the receiver to borrow on warrants showing earnings. It is expected, however, that within the sixty-day period of grace allowed by the mortgage the necessary appropriation will have been passed and the receiver thus placed in funds to take up the June 1 coupons. Meanwhile these coupons will be purchased from holders desiring to sell the same by the Equitable Trust Company on account of the Western Pacific Railroad Corporation on presentation at the office of the trust company."

LEHIGH VALLEY.—The directors on Wednesday declared the regular quarterly dividend of 2½ per cent on the preferred stock, but the common dividend was cut from 2½ per cent to 1¾ per cent. These two disbursements will be made July 5 to stockholders on record June 14 provided the company receives payment from the United States Government, now due.

In connection with the dividend cut, President E. E. Loomis said: "This action has been taken because we believe it is the conservative thing to do at this time. Paying 10 per cent dividends under existing conditions leaves too small a margin of safety for careful management. If the future earnings of the Lehigh Valley Railroad and its controlled properties should justify it, the board will give careful consideration to an increased distribution to stockholders."

MICHIGAN CENTRAL.—See editorial elsewhere in this issue.

NEW YORK CENTRAL.—See editorial elsewhere in this issue.

READING COMPANY.—Alfred H. Smith has been elected a director to succeed William K. Vanderbilt, Jr.

The week beginning June 22 and ending June 28, has been designated as "no accident" week on all railroads in the Northwestern region. The campaign will be conducted by the Safety Section and detailed instructions are to be issued to all safety supervisors on each road in an effort to maintain a 100 per cent safety record during this week.

Railway Officers

Railroad Administration

Federal and General Managers

R. N. Hudson, general superintendent of the Louisville, Henderson & St. Louis, with headquarters at Louisville, Ky., has been appointed general manager, and the office of general superintendent has been abolished.

Operating

D. R. MacBain, superintendent of motive power of the New York Central, Lines West of Buffalo, has been appointed assistant general manager of the Lines West, with headquarters at Cleveland, Ohio.

F. G. Hoskins has been appointed superintendent of the Baltimore Terminal division of the Baltimore & Ohio Eastern Lines, and the Western Maryland, with headquarters at Baltimore, Md., vice **R. A. Grammes**, resigned.

B. F. Van Vliet, division superintendent of the Chicago, Milwaukee & St. Paul, with headquarters at Milwaukee, Wis., has been appointed superintendent of the Des Moines division with headquarters at Des Moines, Iowa, vice **E. W. Lollis**, transferred.

C. L. Fike, acting assistant superintendent of the Eastern division of the Western Pacific with headquarters at Elko, Nev., has been promoted to assistant superintendent of the Eastern division with jurisdiction over the Deep Creek Railroad. Mr. Fike will retain the same headquarters.

Ralph Peters, Jr., who was granted a furlough for service with the Railway Transportation Corps of the American Expeditionary Force in France, has returned and will resume his position as assistant superintendent of the Long Island Railroad. **E. B. Kessler**, assistant superintendent at Jamaica, N. Y., will resume his former position as freight trainmaster, and **John Roe**, acting freight trainmaster, has been granted indefinite leave of absence on account of sickness.

Financial, Legal and Accounting

G. A. Leber has been appointed auditor of the Trans-Mississippi Terminal Railroad, with headquarters at New Orleans, La.

Traffic

G. S. Trowbridge has been appointed assistant general freight agent of the St. Louis-Southwestern, with headquarters at St. Louis, Mo., succeeding **J. E. Allen**, who has resigned to engage in other business.

Walter S. Williams, traveling freight agent of the Chicago, Rock Island & Pacific with headquarters at Des Moines, Iowa, has been promoted to division freight agent with the same headquarters succeeding **George W. Williams** who has resigned to engage in other business.

J. S. Henney has been appointed assistant general freight agent of the Toledo, St. Louis & Western, with headquarters at St. Louis, Mo., vice **B. H. Coyle**, division freight agent, resigned, and **R. L. Dore**, assistant general freight agent, has been appointed division freight agent with headquarters at Frankfort, Ind.

Engineering and Rolling Stock

George T. Anderson, roadmaster on the Kansas City Southern, with headquarters at Spiro, Okla., has been promoted to general roadmaster of the Midland Valley, with jurisdiction over the road, bridge and building, and engineering departments, with headquarters at Muskogee, Okla., succeeding **Charles Kaighn**, who has been promoted to valu-

ation engineer of the Midland Valley with headquarters at Muskogee. The jurisdiction of **V. V. Kirkpatrick**, valuation engineer of the Missouri & North Arkansas and the Midland Valley has been withdrawn from the latter road.

E. G. Lane, chief engineer of the Baltimore & Ohio, Western Lines, and the Dayton & Union, with headquarters at Cincinnati, Ohio, has had his jurisdiction extended over the maintenance of way department of these roads.

Joseph Chidley, assistant superintendent of motive power on the New York Central, Lines West of Buffalo, at Cleveland, Ohio, has been appointed superintendent of motive power of the Lines West, vice **D. R. MacBain**, promoted.

Purchasing

C. R. Couchman, tie and timber agent on the Pere Marquette, has been appointed assistant purchasing agent and general storekeeper, vice **N. C. Foss**, who has entered the service of the Grand Trunk Western Lines, and **W. W. Bracy**, stationer, has been appointed tie and timber agent vice Mr. Couchman, both with headquarters at Detroit, Mich.

Special

W. J. Flynn has resigned as chief of Secret Service and Police Section, Railroad Administration, to become chief of Bureau of Investigation, Department of Justice.

Corporate

Executive, Financial, Legal and Accounting

E. W. Meyer has been appointed assistant to the receiver of the Denver & Salt Lake, with headquarters at Denver, Colo.

William Sharpe, formerly statistician in the president's office of the Chicago & Alton and later in charge of the insurance department at Chicago, has been appointed auditor with the same headquarters.

Traffic

H. C. Martin, general freight agent of the Grand Trunk, with headquarters at Montreal, Que., has been promoted to freight traffic manager, vice **C. E. Dewey**, deceased. Mr. Martin entered the service of the Grand Trunk in 1888, and served in the local freight office in Chicago. He subsequently was consecutively agent of the Lackawanna and Grand Trunk fast freight line, chief of the tariff bureau, and assistant general freight agent, all on the western lines of the Grand Trunk. In 1911 he was appointed general freight agent of the Grand Trunk System, with headquarters at Montreal, and on June 1 was promoted to freight traffic manager with jurisdiction over the lines east of the Detroit and St. Clair rivers.



H. C. Martin

Lorne Macdonald, division freight agent on the Grand Trunk, with office at Toronto, Ont., has been promoted to assistant general freight agent, with office at Montreal, Que., vice **F. J. Watson**, promoted. Mr. Macdonald entered the service of the Grand Trunk in 1887, as apprentice clerk at Montreal. Two years later he was appointed secretary to the general traffic manager and in 1901 became secretary to the freight traffic manager. In 1903, he was appointed division freight agent at Hamilton, and in 1907 was transferred to Toronto, which position he held until his promotion on June 1, to assistant general freight agent in charge of the lines east of the Detroit and St. Clair rivers.

Frank J. Watson, assistant general freight agent on the Grand Trunk, with office at Montreal, Que., has been promoted to general freight agent vice **H. C. Martin**, promoted, effective June 1. Mr. Watson entered the service of the Grand Trunk in 1884, in the freight traffic office, at Toronto, Ont. In 1892, he was appointed traveling freight agent, with office at Montreal, and four years later became chief clerk to the district freight agent at Hamilton. The following year he was transferred to Stratford. He later served as district freight agent at Montreal, and in 1911 was appointed assistant general freight agent on the Grand Trunk System, from which position he is now promoted to general freight agent, with jurisdiction over the lines east of the Detroit and St. Clair rivers.



F. J. Watson

Purchasing

Horacio V. Garza has been appointed assistant purchasing agent of the National Railways of Mexico, with office at New York, vice **F. P. de Hoyos**, who was local purchasing agent. Mr. de Hoyos remains as general agent of the National Railways of Mexico as well as purchasing and general agent of the Southeastern Lines of Mexico.

Obituary

E. Hampton Coombs, formerly general eastern passenger and freight agent of the St. Louis-Southwestern, with headquarters at New York City, died at Bowling Green, Ky., on May 23, at the age of 50 years.

George W. Hulsizer, superintendent of telegraph and signal engineer of the Chicago & Alton, the Chicago, Peoria & St. Louis, the Peoria & Pekin Union and the Peoria Railroad Terminal with headquarters at Bloomington, Ill., died in that city on May 30 of heart failure, following an attack of acute indigestion. Mr. Hulsizer was born at Clinton, N. J., on September 1, 1872. He began railway work in 1893 in the engineering department of the Lehigh Valley. Shortly afterward he learned telegraphy and entered the employ of the Chicago & Alton with which company he remained until 1900 in the capacity of telegraph operator and agent. He returned to the Lehigh Valley in 1900 and after a few months on construction work he was assigned to the maintenance staff. In October, 1901, he became assistant foreman of signal construction in which position he remained until the following summer when he entered the service of the signal department of the Chicago & North Western as a repairman on pneumatic work with headquarters at Chicago. Two and a half years later he was appointed signal supervisor of the Iowa division with headquarters at Boone, Iowa. In September, 1907, he resigned to enter the employ of the Southern as assistant to the electrical and signal engineer at Washington, D. C. On November 1, 1909, he was appointed signal engineer of the Chicago & Alton with headquarters at Bloomington, Ill., and on April 1, 1914, when the signal and telegraph departments were consolidated he was appointed superintendent of telegraph and signal engineer. In July, 1918, his jurisdiction as superintendent of telegraph and signal engineer was extended to include the Chicago, Peoria & St. Louis, the Peoria & Pekin Union and the Peoria Railroad Terminal.

EDITORIAL

Railway Age

Table of Contents will be found on Page 5 of the Advertising Section

Government Control and Accounting Officers

Since a year ago this June, there has been a sharp cleavage between federal railroad officers and corporate railroad officers. This cleavage has been carried even to the various associations, whose primary object is the advancement of the science of particular branches of railroad work. Not so, however, with the Railway Accounting Officers' Association. This association, which is composed of railway accounting officers not only from the United States, Canada and Mexico, but from the principal foreign countries of the world, has drawn no distinction between federal accounting officers and corporate accounting officers. It was recognized both by the Railroad Administration and the corporations, as well as by the accounting officers, themselves, that the interests of the corporations and of the government, in so far as accounting was concerned, were identical. What was wanted by both was the most economical, scientific and broadly intelligent accounting that could be procured. This could be arrived at only by co-operation and a full understanding between federal and corporation auditors, and a strict adherence to professional ethics comparable to the ideals of the bar association and the federal courts. This has been worked out splendidly; there has been thorough co-operation between the administration and both federal and corporation auditors. The Railway Accounting Officers' Association, which held its annual convention at New York this week, is to be congratulated on the part it has played in acting as the medium through which this co-operation and understanding could be achieved.

Turntables Past and Present

Wooden turntables of the A-frame type have become objects of curiosity. They were turned by hand, by a few men usually, and sometimes by the entire roundhouse force. Later, turntables were built of steel. The use of man power for turning them was continued for a time, but various forms of tractors were experimented with. Man power is still used in some places, but it is not common practice. Steam and air operated tractors were used with various degrees of success. They did succeed in relieving many men detailed for moving the tables, but eventually electric power was found to be most suitable. Then came the problem of the best way to apply the power. A single tractor attached to one end of the table running on the circle rail was looked upon for a time as best practice. It was found, however, that the sand used for increasing traction caused trouble, as the turntable trucks had to run over it. To obviate this difficulty, a second circle rail was added and in a few cases a circular rack was used in connection with a gear on the tractor. All of these developments were applied to tables of the balanced type. It was necessary to spot the locomotive before the table could be turned. Spotting takes time, and such tables are apt to get a permanent twist or set which makes it impossible to line up the table at both ends with a through track, and has caused derailments. The Pennsylvania has developed a table supported at the center and at both ends. It does not pitch when a locomotive is moved on or off. It is not necessary to spot the locomotive, and it may be turned end for end in 60 seconds. The manner in which this has been accomplished is described elsewhere in this issue.

The Accounting Officer as an Executive

The Pocket List of Railroad Officials has always listed the accounting officers in the same classification as executive officers, but accounting officers, themselves, have not always taken both the authority and responsibility which go with such a classification. There has been a great change, however, in the last ten years. Since accounting is a profession rather than a business, the foundations for a broader view of authority and responsibility were present in this department long before any but a few of the individual officers thought of themselves as other than confidential bookkeepers. The change that has taken place, however, since 1907 has been significant. The chief accounting officers of railroad companies no longer feel that their sole responsibility is to a single officer or group of directors, who assure them their position and salary. They recognize a fiduciary responsibility to the security holders of the company which gives them an added duty and a new self-respect. More than this, however, the accounting officer is not only beginning to realize—for many of them have theoretically accepted the fact for years—but actually puts in practice a function of his work which is more adequately suggested by the word "executive" than by the words "accounting" or "auditing." It is possible for a chief accounting officer of a railroad to be the confidant and adviser of the heads of all of the other departments. For such a work as this, no mere bookkeeping machine, accurate as it may be to the hundredth part of a mill, is adequate. Such a man must be a living, individual personality, sympathetic with the problems of his associates, ready to help through suggestion rather than through purely destructive criticism, ready to give out information rather than to merely absorb. Such is the newer ideal of an accounting officer, and such is the ideal that the Railway Accounting Officers' Association is attempting to cultivate.

Pan-American Commercial Conference

Despite the great wealth of material presented during the five-day session of the Second Pan-American Commercial Conference in Washington last week, none of those who attended the conference could have come away without a clear idea that one of the most important necessities for trade between the two continents is transportation, both by water and railroads. The need for new railway construction was especially brought into evidence by those who spoke for the west coast, particularly Peru and Bolivia, and the hope was expressed that it would be through the investment of American capital that these extensions would be made. The *Railway Age* trusts that no one who has been following its articles on the railways of foreign countries during the last few months has failed to realize the advantage that American investments in foreign railroads will bring in the way of purchases of equipment and supplies for the construction

and maintenance of these railroads. Those who spoke on the subject in Washington, however, brought out another important point, namely, that the construction of these railroads is going to open up important areas and make available tremendous resources of raw materials urgently needed in the United States and which will help us in trade in many lines with the countries in which these investments may be made. During the last few months the major part of our railway supply exports has been principally to European countries, and to a large extent also to Japan or to Japanese controlled railroads in China. This business, most of the big manufacturers have had the vision to see, is to a certain extent temporary. It is necessary to help the recently warring nations to get on their feet, as was clearly brought out by Mr. Vanderlip in his address before the conference, but these countries when they have gotten on their feet will be builders and possibly exporters of railway materials themselves. It is in the new countries, such as those of Latin America, that the more permanent and lasting export business will develop. It is clearly in order to hope, therefore, that American bankers and investors will find it to their interest to make the most of the big opportunities that lie before them in the Latin-American countries.

Railroading by Appropriation

THE REPORT of the Railroad Committee of the Chamber of Commerce of the United States, whose recommendations are being submitted to a referendum vote, gives as its first argument against government ownership the statement that under government ownership the development of railroad facilities would depend upon Congressional appropriation, which would prevent the anticipation of the transportation needs of the country. It says that appropriations would not be made in the amount and at the time needed to insure adequate development of the railroads, and that "political considerations might also control the amount of appropriations and the objects for which they were made."

A striking illustration of this point has been given not only by the failure of the railroad appropriation at the last session, but also this week by the action of the House of Representatives in reducing the appropriation asked by the Railroad Administration from $1,200,000,000 to $750,000,000, because the appropriations committee, only five of whose members heard the testimony offered by Mr. Hines and Mr. Sherley, disagreed with them as to the requirements. Possibly the general unpopularity of the Railroad Administration contributed to some extent to the passage of the bill for the reduced amount, but the fact that the vote was so large—305 to 4—indicates that the members followed the advice of the committee. None of the members of the committee pretended to have any better understanding of the situation than Mr. Hines and Mr. Sherley; they were merely following a general rule of trying to reduce appropriations, and they apparently felt that Mr. Hines would be less generous with Uncle Sam's money if they limited the amount he can have at one time, because the committee's report held forth a prospect of granting more later in the year.

The chairman of the committee expresses the opinion that the future needs of the Railroad Administration are problematical, but there is nothing problematical about its needs to date. He also says the Railroad Administration should not have ordered so many cars and locomotives, but that is not ordinarily considered a good business reason why cars and engines that have been contracted for should not be paid for. A good many other people criticize the Railroad Administration's deficit, but that does not afford a good argument as to why the government should not pay, or pay without undue delay, the rentals it has promised to the owners of the properties that were commandeered by the government, especially since they were firmly removed from any possible influence on the factors contributing to the deficit.

Another bad feature about railroading by appropriation is that it sometimes leads to the practice of spending the money before it is appropriated. In this case the fact of the war excuses many things which would not otherwise have been justified, but now that hostilities have ceased many Congressmen who voted for the bill were inclined to overlook the fact that most of the money was spent last year by Director General McAdoo, although some of the bills did not become payable till this year. About half of the deficit has accrued under Mr. Hines' administration, but it had its origin last year.

The members of the committee apparently were somewhat alarmed at the size of the capital expenditures made by the government to be charged against the railroad companies, although the appropriation asked for would provide only about $8,000,000 in addition to what the government has already contracted for or committed itself to and the reduction of the amount allowed now can have little or no influence on that amount. It also indicated a belief that a reduction in the appropriation would hasten their efforts to pay back the amounts the government has charged against them, to a considerable extent against their volition, and it is possible that the result will be in that direction, but only a Congressional committee would be expected to calculate that permanent financing to repay the government for capital expenditures may be appreciably expedited by withholding the payment of the amounts which the government owes concurrently.

Prospects of Improved Regulation

THE APPARENT TREND of opinion in Washington regarding railway legislation indicates that neither the Interstate Commerce Commission nor Congress has learned much from the country's past experience with railway regulation. The sentiment there, which reflects the general sentiment of the nation, is overwhelmingly in favor of a return to private operation. But the fact that a return to private operation, without a thorough reform of our sysem of regulation, will not solve the railway problem, does not seem to have been grasped. A few months ago the nation seemed to be moving toward a solution of the railway problem. Today it seems to be moving away from it.

Probably the best available index of the sentiment in Washington regarding future regulation is afforded by the Esch-Pomerene bill, the salient provisions of which were published in the *Railway Age* last week. This bill is understood to express the ideas of a majority of the Interstate Commerce Commission as to the railway legislation which should be passed. There is reason to believe that it also expresses the present views of a majority of those members of Congress who are convinced that the railways ought to be permanently restored to private operation. The bill, on its face, admits the justice of almost every criticism which those who strongly believe in private management have in the past directed against the policy of regulation. Furthermore, almost every one of its provisions would, if adopted, tend to cause some improvement. But the bill deals adequately with hardly one of the things which it touches. Furthermore, it fails to deal at all with some of the most important parts of the railway problem.

For many years it has been pointed out that the prohibitions of the anti-trust law and the anti-pooling law against railway agreements and consolidations are contrary to the public interest. The Esch-Pomerene bill concedes the justice of this criticism. Instead, however, of providing that the railways may make any agreement or consolidation which the regulatory authority may not hold prejudicial to the public interest, it prohibits any agreement or combination

except such as the Interstate Commerce Commission may hold will be to the public interest. This puts the entire burden of proving the desirability of an agreement or combination upon the carriers instead of putting it upon those who may oppose an agreement or combination. It proceeds upon the false assumption that every agreement or combination must be wrong which cannot be proved to be right.

The real crux of the whole railroad problem is the question of credit. The Esch-Pomerene bill proposes to give the Interstate Commerce Commission authority to fix not only maximum but also minimum rates, and even the exact rates which the carriers must charge. This is a move in the right direction. Such a provision would not only help the Commission to correct unfair discriminations, but might even enable it to order advances in rates which it might consider needed from a revenue standpoint. The bill also provides that in fixing rates the Commission shall take into consideration the cost of labor and other operating costs, and it limits the suspension of advances in rates to 120 days. These are all good provisions. But they do not go far enough. They concede, in effect, that past regulation has denied the railway companies adequate revenues, but give no assurance that opportunity will be given in future to earn adequate revenues. Surely there is no good reason why, in regulating rates, the Commission should fail to consider also the cost of capital as well as the cost of operation. Nevertheless, the bill ignores the fact that in order to provide good service and adequate facilities, the railway companies must be able to raise adequate capital; that in order to raise adequate capital they must be able to pay as much for it as other classes of concerns do; and that they cannot pay the going rate for capital unless they are allowed to earn adequate net operating income.

Some of the worst shortcomings of regulation in the past have grown out of the attempts of state authorities to further the supposed selfish interests of the people of their own states at the cost of the railways and the rest of the nation. There is need for a clear-cut provision prohibiting the states from adopting any regulation which will interfere with federal regulation or burden interstate commerce. The Esch-Pomerene bill contains no such provision. It prescribes a method of adjusting differences between the state and interstate authorities by allowing the state commissions to sit with the Interstate Commerce Commission and participate in hearings, the latter, however, to make the findings. It is impossible from the wording of the bill to determine whether it takes any real authority from the states or gives any real authority to the Interstate Commerce Commission.

While the bill is so drawn as to exclude the thought that its authors contemplate giving the railway companies much more opportunity to prosper in the future than they had under the old system of regulation, it is generous in enlarging the powers of the Interstate Commerce Commission. It gives the Commission exclusive authority to regulate the issuance of railroad securities, and also large authority to regulate railroad operation. In other words, the Commission, under this bill, would resume its regulation of the railways with increased power. But there is no provision in the bill which would tend to make it a fairer or abler regulating body. The salaries of its members were fixed at $10,000 some years ago. There is no provision for increasing this. The members of the Commission have seldom been selected because of their special qualifications. There is no provision which is intended or adapted to cause better qualified men to be appointed in future.

One of the most vital parts of the railroad problem is the labor part. Under government operation all classes of employees have become organized. The railroad problem will not be solved under either private or government operation without legislation providing definitely for the just settlement of railroad labor controversies without strikes or lockouts. The Esch-Pomerene bill ignores the labor problem.

The success of regulation under such a measure as the Esch-Pomerene bill would depend very largely upon the policy of the Interstate Commerce Commission. But railway managers and financiers lost confidence in the Commission before government operation was adopted, and there is no reason for believing, and nobody does believe, that it has had any change of mind or heart. The utterances of its members do not indicate that it has. Therefore, it cannot be assumed that any regulatory legislation the success of which would be dependent almost entirely upon the way in which the Commission administered it would command confidence where confidence is most needed or be of much benefit. The greatest need of the country from a transportation standpoint is the renewal of the expansion of railway facilities. The old policy of regulation practically stopped the expansion of facilities before government operation was adopted. There is no reason for hoping that legislation such as the Esch-Pomerene bill would cause a substantial revival of railroad development. It is all right as far as it goes; but it does not go far. It would put a patch here and there upon the old system of regulation, but would not adequately reform it.

Why an Advance in Rates Will Be Necessary

THE *Railway Age* has been contending for some time that the railways cannot be returned to private operation with safety to the companies or the public without either a temporary continuance of the present guarantees of standard return or a substantial advance in rates. An advance in rates before government operation is terminated would be preferable to a temporary continuance of the guarantees because the latter would render it necessary for the companies later to seek an advance in rates rendered necessary by government operation and which the government itself ought to make.

Commissioner McChord, of the Interstate Commerce Commission, in a recent statement, has indicated that the companies have nothing to fear from a return to private operation because, as he implies, the Commission will, in future, as in the past, permit the railways to earn adequate net returns. This statement affords more ground for pessimism than optimism. The Commission has not in the past let the railways earn adequate returns.

There are many persons who favor a return to private operation, but who try to show that a substantial advance in rates will not be necessary. They imply there will be an increase in traffic and in operating efficiency, which will enable the railways to get along on present rates.

Facts speak louder than theories. In the first four months of the three "test years" the net operating income earned, on which the guarantees of standard return are based, averaged $239,000,000. In the first four months of 1919 the net operating income earned was $65,000,000, or only 28 per cent of what it averaged in the "test years." The guarantees to the companies amount to $936,000,000 per year. If the railways should do as badly in proportion in the entire 12 months of the year as they did in the first four months, the government's deficit for the year would be approximately $675,000,000.

Let us see what kind of showing it may be assumed the railways could make if they should have a very large increase of traffic. The largest increase of freight traffic they ever had was in the year ended on June 30, 1916. It was 24 per cent and the increase in freight earnings which resulted was 21 per cent. This enormous increase in freight traffic was handled with an increase of only 9 per cent in operating expenses. The increase in operating expenses was

unprecedentedly small in proportion to the increase in traffic and total earnings, and in consequence the increase in net earnings was unprecedentedly large.

Let us suppose now—having in mind the actual experience of 1916—that in the first four months of 1919 the freight traffic had been 24 per cent larger than it actually was; the freight earnings 21 per cent larger, and the operating expenses only 9 per cent larger. What would have been the outcome? The freight earnings would have been $219,500,000 more than they were, the operating expenses $124,000,000 more, and the net earnings $95,500,000 more. Assuming that all other things had remained the same, this entire $95,500,000 would have been carried to net operating income. In that case, instead of having only $65,000,000 net operating income in the first four months of 1919, the railways would have had $160,000,000. This would have been only 67 per cent as much as the net operating income actually earned on the average in the first four months of 1915, 1916 and 1917, on which the guarantees are based. If the railways should throughout the entire year earn only 67 per cent of the government's guarantees to the companies, the government's deficit for the year would be about $310,000,000.

But, for many reasons, it is wholly irrational to base an estimate on the assumption of any such enormous increase of traffic as occurred in 1916. Let us make an estimate on the assumption of a total traffic equal to that of the first four months of 1918, which was approximately 17 per cent greater than that actually handled in the first four months of 1919. If the same relationships had prevailed between the different factors as did prevail in 1916, a 17 per cent larger freight traffic in 1919 would have yielded about 15 per cent larger freight earnings and caused 6½ per cent greater operating expenses. Freight earnings in the first four months of 1919 would then have been $157,000,000 greater than they actually were, operating expenses $89,500,000 greater, and net earnings about $67,500,000 greater. If all this larger amount of net earnings had been carried to net operating income, the net operating income for the four months would have been $132,500,000. This would have been only 56 per cent of the amount of net operating income which the railways earned on the average in the "test years." If in the entire year the railways should earn only 56 per cent of the guaranteed standard return, the government's deficit for the year would be about $412,000,000.

The foregoing estimates demonstrate, as conclusively as any estimates can, that no increase in traffic which is at all likely, and which it is conceivable existing railway facilities could cope with, would be anywhere near sufficient by itself to make the net earnings of the railways adequate. But, it is said, there will be a great increase of efficiency and economy under private operation. The high opinion which certain persons have acquired of the efficiency of private operation is as astonishing as it is extraordinary. A few years ago the principal argument made against advances in rates was that the railways under private management were inefficiently operated and before asking for advances in rates should increase the efficiency of their operations. Now many of the very persons who formerly based their opposition to advances in rates on the alleged inefficiency of private operation are opposing advances in rates upon the ground that when the railways are returned to private operation there will be a great increase in the efficiency of their management!

The *Railway Age* quite gladly concedes the superiority of private management. It was engaged in defending the efficiency of private management when these same people were attacking it. But the reduction in expenses which the companies would have to effect in order to make both ends meet would be at the very least one-third of a billion dollars a year and, in the absence of a large increase of traffic, probably would be three-quarters of a billion dollars. We submit that those who contend the railway companies can, in a very brief time, reduce expenses so enormously do too great honor to private management. Their conversion to belief in the great efficiency of private management has been so sudden and complete as to suggest that it may not be wholly sincere and disinterested.

Furthermore, be it remembered that in 1916, when the big increase in traffic came, the railways were being privately operated; that it was efficient private operation which enabled them to handle 24 per cent more freight with only 9 per cent more expenses; and that, as the foregoing estimates are based on the actual experience of 1916, they assume an increase in economy as great as that of 1916. And in spite of all this, the estimates indicate that with an increase of 17 per cent, or even 24 per cent, in freight, the railway companies could not live on the present rates.

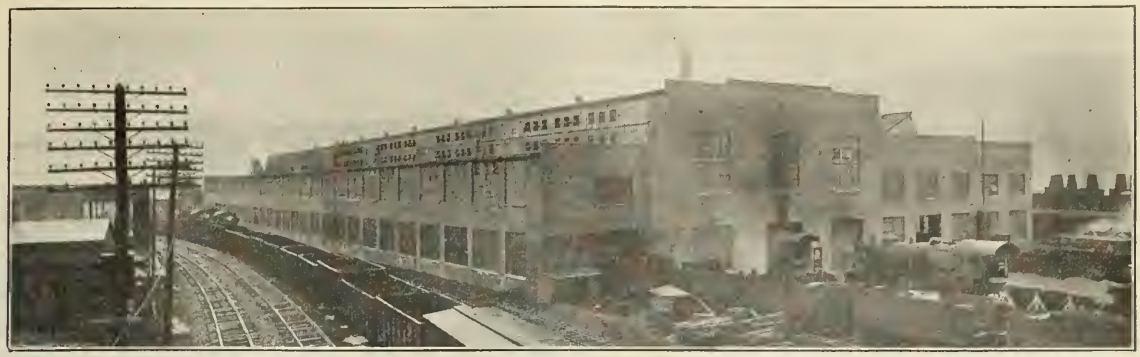
Experience has shown that it is far easier to talk about vast economies than it is to make them. It was in the railway fiscal year 1911 that Louis D. Brandeis made famous the proposition that by "scientific management" the railways could save one million dollars a day in operating expenses. At that time the operating expenses of the railways were $5,250,000 a day, wages being $3,311,000 a day. Six years later, in the last month of private operation—December, 1917—operating expenses had increased to $8,120,000 a day, wages being $4,940,000 a day. One year later, in the last month of government operation, for which we have wage statistics—January, 1919—operating expenses had grown to $11,300,000 a day, wages being $7,500,000 a day; and both expenses and wages are still about the same per day as in January. It will be noted that the increase in expenses per day in the six years, 1911 to 1917, was $2,870,000 a day, while in the single year 1918 it was $3,180,000 a day.

Mr. Hines estimates the government's deficit for the first four months of this year at $250,000,000. On his basis of calculation the deficit was just $2,500,000 a day. Why not page Mr. Brandeis? If ever there was a time when the savings he said could be effected were needed, it is now. But, instead, the public is paging the companies whose alleged inefficiency he criticised. The companies undoubtedly can operate the railways much cheaper than the government; but the margin between necessary outgo and needed income has become, under government operation, very large, and to act on the assumption that it can be bridged without a substantial advance in rates would be ruinous.

New Books

Government Ownership of Railroads. Compiled by Edith M. Phelps. 200 pages, non illustrated, 5½ in. by 7¾ in. Bound in cloth. Published by the H. W. Wilson Company, New York. Price $1.25.

This compilation of addresses on the subject of government ownership of railroads, one of the Debators' Handbook Series published by this company, contains, in addition to representative addresses on the subject, a complete brief of both the negative and affirmative of the subject and an extensive bibliography which carries the subject beyond the articles included in the volume. The addresses included in the book are divided into three classes, namely, general discussion, affirmative discussion and negative discussion, and under each of these three heads are included reprints of addresses made by prominent railroad men and students of the railroad situation in the United States at the present time. The articles included in this compilation have been selected with great care and present the principles set forth by both advocates and opponents of federal ownership of railroads.



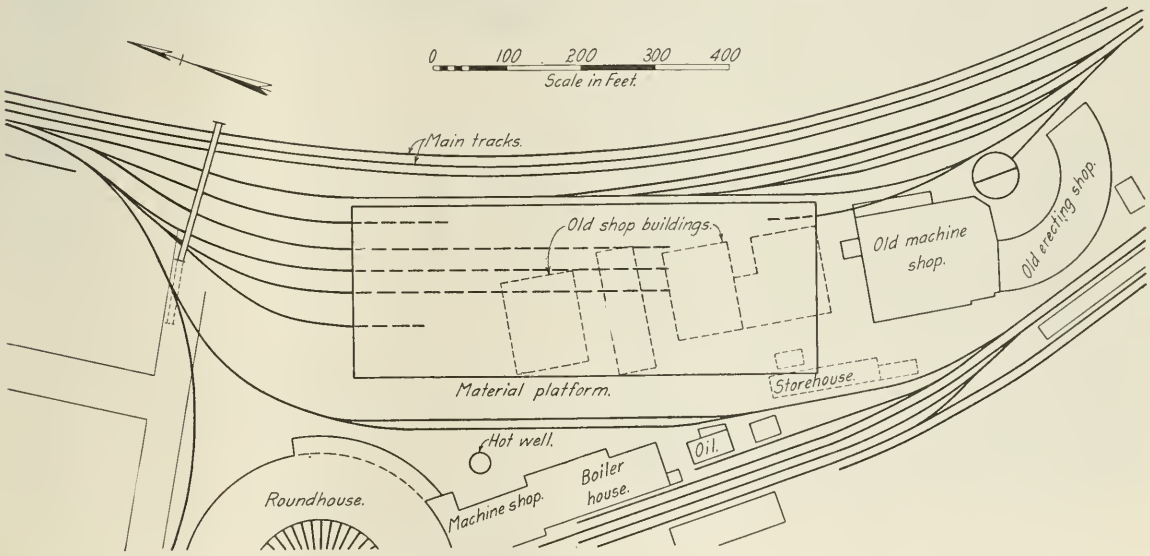
Exterior of the Shop Building

A New Locomotive Repair Shop Built for the B. & O.

The Plant Typifies the Most Modern and Advanced Ideas in Design of Facilities of This Character

WORKING UNDER THE NECESSITY of continuing the old facilities in operation during construction and in a district where a general relocation was precluded through the lack of available space which made it necessary to erect the new building around and over certain of the old ones, the Baltimore & Ohio has completed the construction of a locomotive heavy repair shop at Glenwood, Pa., which embodies many interesting features. Including equipment the new plant represents an expenditure of more than $1,700,000. It replaces an old roundhouse (which had been used as an erecting shop), a machine shop and three steel frame buildings with corrugated siding, which had been used respectively as a blacksmith shop, boiler shop and tank shop. The last three buildings occupied parts of the site of the new structure and were kept in operation while the new shop was constructed above them. The old erecting and machine shop buildings remain, the former being converted into a tank shop, while the latter will be used for tank shop machinery. The new plant provides space under one roof for the facilities formerly housed in the converted and abandoned buildings.

The construction of the Glenwood shop and a similar one at Cumberland, Md., marks an important step in the development of the operating facilities of this road. For years prior to the war its shop facilities had been inadequate to meet the demands of traffic and the road regularly contracted for certain heavy repairs to its engines to be made at the Baldwin Locomotive Works because of the lack of space in its own shops. In the winter of 1917-1918 this lack added materially to the congested conditions existing on the road and the neeessity for relief became imperative. As a result of the studies made to determine the means of relief, the construction of two shops was authorized, one at Cumberland, Md.,



Layout Map Showing the Relative Location of the New and Old Buildings

which is intended for the care of the heavy power used on the mountain divisions and expected to have an output of 30 engines per month, and the other at Glenwood, for handling other than mountain power, which is expected to have an output of 45 engines per month.

Each of these new shops has a monthly capacity in excess of any of the old shops on the system, the largest of which is located at Mt. Clare (Baltimore), with smaller shops at Washington, Ind., and Newark, Ohio. The Glenwood shop is typical of the new departures in design and, being the larger of the two new shops, is described in detail below.

The Shop Is of Longitudinal Type

Differing radically from the usual shop of this character, space is provided in the new building for a store house for mechanical stores which is complete in every detail. This store house is of reinforced concrete construction, and is designed for six stories, five of which have been built. It is located in the southwest corner of the shop building, occupying five 22-ft. panels in the length of the building and 42 ft. in width. The first four floors are devoted to storage purposes. They are equipped with all modern conveniences for storing and handling material and for the comfort of the employees. The fifth floor is devoted to offices occupied by the storekeeper and the superintendent of the shop. Two elevators, one for freight and one for passengers, have been provided, both of which were furnished by the Otis Elevator Company, New York.

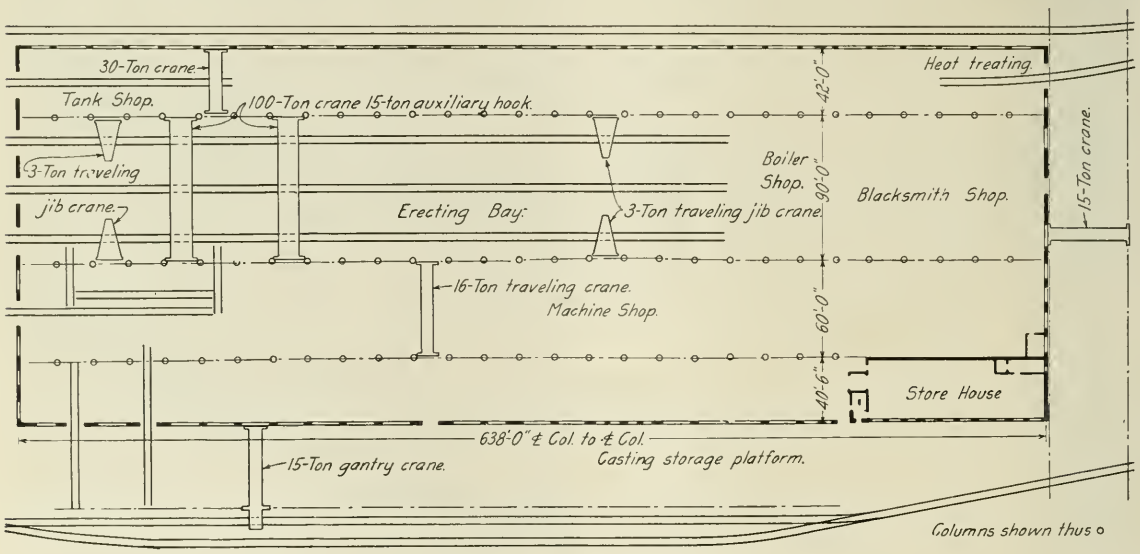
The shop building is of steel frame construction with brick curtain walls supported on concrete foundations. It has a total length of 635 ft., center to center of outside columns, and a width of 232 ft. 6 in. Longitudinally the shop contains 29 panels with the columns spaced 22 ft. center to center. Transversely the column spacing from east to west is 42 ft., 90 ft., 62 ft., and 40 ft. 6 in., dividing the building into an east bay, a clear story and two west bays. From north to south the first 20 panels of the clear story are devoted to the erecting shop. The east bay adjoining the erecting shop contains the tank shop; the welding department which includes space for superheater pipe work; the cab shop and the tin shop. These departments are located in the order named with the tank shop at the north end of the building.

The two west bays adjoining the erecting shop contain the machine shop. Generally speaking, the heavy work is grouped in the inside west bay where crane service is available. The bench work is also located in this bay on the side adjoining the erecting shop. Crossheads, pistons, driving boxes and car wheels are handled in the outside west bay towards the north end of the building. The serving tool room, toilet and wash rooms and shower baths are housed in the six panels of this bay adjoining the spring shop.



Typical View of the Store House Equipment

The boiler shop occupies the four panels adjoining the end of the erecting shop on the south, with the flue repairing department in the east bay and the heavy boiler shop tools in the inside west bay. The spring repair shop is located in the outside west bay adjoining the boiler shop. The remaining five panels in the south end of the building are occupied by the blacksmith shop with the exception of the outside east bay which is taken up by the store house.



Arrangement of the Shop Facilities

A gallery floor extends along the west side of the shop for the full length between the store house and the north wall. It is 40 ft. wide, occupying the west bay of the building. This floor provides space for a manufacturing tool room; facilities for electrical repairs; millwrights and machine tool repairs on

the north end and for stokers, air pumps, injectors, etc., on the end adjoining the store house. It also provides space for an apprentice school; offices for the assistant shop superintendent, the general foreman and the supervisor of shop schedules and his clerks, and toilets for men and women. The comfort facilities also include a women's rest room.

Access to the gallery floor may be had from the main shop floor by means of elevators and stairs, two of each being provided, or directly from the store house. In addition, two



View of the Machinery

landing platforms served by the 15-ton crane in the inside west bay are provided for handling materials between the shop floor and the gallery.

Provision for handling castings and heavy materials outside the building has been made by means of a platform 50 ft. wide which extends all along the west and south walls of the building. The south platform is equipped with a 15-ton crane and the west platform with a 15-ton half gantry crane. Two lye vats with a drain table and shears are also provided on these platforms.

The planning of the layout for the new facilities was complicated by the condition that the only available site was occupied in part by three of the old shop buildings, none of which could be dispensed with during construction and by the necessity of locating the building clear of the limits of a future four-track project through this territory. In the final location determined upon, as may be seen on the map, the new building was placed at an angle with the old ones, leaving space to the east for four main tracks and a shop track.

The building rests on a gravel and clay foundation figured to have a bearing value of 6,000 lb. per sq. ft., making piling unnecessary. The concrete in the foundations and in the reinforced concrete store house was placed by means of distributing towers, one week being required in the construction of each floor of the store house.

Beginning at the north end the steel frame of the main shop was erected with a locomotive crane up to column 22, south of which the presence of the old buildings made this method impractical. From this point stiff leg derricks mounted on each main column line raised the columns through the roofs of the old buildings and swung the new roof trusses to place over the roofs of the old buildings. In the east bay it was possible to use the locomotive cranes for the full length of the building.

The building is heated by hot air, the system consisting of two 200-in. fans, furnished by the Consolidated Engineering Company, New York, direct connected to two 11-in. by 10-in. horizontal Erie Victor engines. The plant is a so-called twin system with one fan at each end of the building. Before passing through the fan the air is heated by 72-in. ventostacks, furnished by the American Radiator Company, placed two tiers high and 6 stacks wide. The fans discharge into concrete heating ducts, forcing the air to outlet boxes at the columns and along the side walls of the building. Each fan supplies heat to one half of the shop.

Three concrete engine pits are provided in the erecting shop. These are equipped with plug outlets every 44 ft. for direct current arc welding purposes. A pipe trench along the center pit with connections to all the pits, carries air, water and steam lines. A blow-off line is also provided, making it possible to run a locomotive into the shop for repairs under its own steam.

The shop doors are the Kinnear wooden rolling type. The material used in the floor varies with the location and the requirements. Buffalo asphalt blocks on a concrete base are used in the machine tool bay, and in the wheel and tank shops. H. W. Johns-Manville mastic is provided in the main erecting bay and cinders in the blacksmith, boiler and spring



The Erecting Bay

shops. The roof consists of Barrett Specification roofing laid on 3-in. yellow pine sheathing. Particular attention has been given to the provision of special equipment for the comfort and convenience of the employees. Toilets, sinks and shower baths have been provided on each floor; individual steel lockers for personal belongings have been installed, and 21 double drinking fountains have also been provided at convenient points.

The operation of the machines, cranes, etc., is all electrical. The power is received from the Duquesne Light & Power Company through a transformer station at 11,000

volts where it is reduced to 440 and 110 volts. The new substation equipment comprises a complete switchboard for the distribution of the power to the old and new shops with 300-kw. motor generator sets for furnishing direct current to the cranes, elevators and tools.

Shop Equipment

Approximately 200 tools are provided in the shop, 65 of which are new, the remainder being those transferred from the old blacksmith and machine shops. Most of the tools are direct motor driven, although group drives are used in some cases.

A feature of the erecting shop is the use of two 100-ton cranes for unwheeling locomotives. These cranes span the three engine pits, thus making them available for locomotives on all three tracks. Four 3-ton traveling jib cranes are also provided in this shop. A 30-ton crane in the tank shop and a 15-ton traveling crane in the inside machine shop bay completes the crane equipment inside the shop. The crane equipment on the platforms has already been mentioned.

The track layout for the plant consists of a shop track which parallels the building on the east, stub tracks into the heat treating, the tank, and the wheel shops, the three pit tracks in the erecting shop and two tracks serving the storage platform.

Work was begun in May, 1918, and completed in April of this year.

The construction of these shops was in charge of H. A. Lane, chief engineer of the Baltimore & Ohio, assisted by M. A. Long, assistant to the chief engineer and architect. Westinghouse, Church, Kerr & Co., Inc., were the contractors.

Railroad Appropriation Cut to $750,000,000

House Believes Additional Amount Can Await More Definite Information; Mr. Hines' Testimony

WASHINGTON, D. C.

THE APPROPRIATION of $1,200,000,000 asked of Congress by Director General Hines to enable him to pay his bills and temporarily finance the capital expenditures of the railroad companies, was reduced to $750,000,000 by the House appropriations committee on Monday, and the bill was passed on Tuesday by a vote of 305 to 4.

In reporting the bill, the committee cut the figure to that arrived at by Mr. Hines in his request of the previous Congress, on the ground that the estimates of the requirements were so indefinite and uncertain that any additional amount may well await future action by Congress. The committee stated in its report that the sum it recommended will meet the situation until the latter part of the year, when the needs are more clearly apparent, and "when the Railroad Administration will be in a much better position to state what further amount the government will be called upon to appropriate to fulfill the provisions of the federal control act." The report said the committee felt that much depended on the extent to which the railroads are able to finance themselves and upon operations for the remainder of the year and expressed a belief that $750,000,000 will make suitable provision for the present and immediate future needs. In this connection the committee considered the ability of the War Finance Corporation to render some assistance.

Apparently Mr. Hines and his finance director in their testimony before the committee last week failed fully to impress upon the members the extent to which they were being asked to pay for a "dead horse." It is understood that the administration estimates its requirements up to the end of July at $1,000,000,000. Mr. Hines expressed some uncertainty as to whether the situation during the remainder of the year would be such that it would be good policy to increase rates, although he said that present rates are not sufficient to offset the costs, but his entire testimony appeared rather conclusive that most of the sum asked for had already been spent. The $486,000,000 deficit has already been incurred, the $425,000,000 for working capital, Mr. Hines says is tied up in the business, and of the $775,000,000 to be advanced to the railroad companies $352,500,000 was expended in 1918, $100,000,000 was advanced to them last year to meet current liabilities, $48,500,000 was loaned to the New Haven last year, and of the $253,000,000 to be advanced for this year $245,000,000 represents equipment already ordered. That makes a total of $1,657,000,000. In addition, $14,000,000 was asked principally for equipment already ordered for the inland waterways and $20,000,000 which Mr. McAdoo promised to finance the Boston & Maine reorganization, leaving less than $9,000,000 for new railroad capital expenditures.

Practically the only possibility of shrinkage is in the item for working capital, but the requirements of the Railroad Administration would be reduced if the railroad companies could finance and promptly pay back to it the amounts already expended for capital improvements and part of the equipment payments will not become due till the latter part of the year. The committee apparently depended largely on the possibility of railroad financing and the proposed plan of financing the equipment by a general equipment trust.

Also, after hearing Mr. Sherley's account of the expedients the Railroad Administration was forced to adopt in order to get along without an appropriation since the first of the year, the committee may have figured that the speed of the revolving fund might be increased if there is less of it.

Mr. Hines Before the Committee

In discussing this question before the committee, Mr. Hines said: "It is my definite policy, and I certainly will be warmly supported in that by the director of the Division of Finance, to use every means to get the railroad companies to reimburse us as rapidly as possible for that entire $775,000,000, but I do not think we can make a successful start on that until we are able to clear the decks with them and get them in a position where they can no longer claim that they are unable to finance, because they had to use their credit so largely to borrow money with which to pay their current liabilities that ought to be taken care of by the government. The minute we can clear that up, we can then begin to bring pressure to bear to make them reimburse us and their general credit situation will be improved by the fact that we have paid them off, and we can, as the year progresses, more and more bring about a reimbursement to the government. But the important fact, as I look at it, is not that we are asking for this $775,000,000, or any part of it, to enable us to give more moneys to the companies, but we are asking it to enable us to carry what we have either already spent or are directly committed for. The $245,000,000 that we are committed for to the equipment companies and the $20,000,000 to the Boston &

Maine, and everything else, is already absolutely out of pocket."

"This appropriation requested does not undertake to forecast the situation beyond April 30. I felt that the conditions were so speculative that the situation cannot be forecast with any degree of accuracy. The prospect is that it will change from month to month, and the reasonable indications are that it will change for the better rather than for the worse. The appropriation made undoubtedly would enable us to carry the situation on until we have a much more correct measure as to what is involved in the way of additional loss, assuming that we do not make an increase in rates. I have felt at the moment that the Railroad Administration ought not to make an increase in rates and thereby set in motion the influences on the cost of living and the cost of doing business that I have mentioned, but to wait until they could get a better idea of the situation, and, since the thing was entirely speculative and since the present appropriation would adequately protect the situation for several months to come, the wise course was not to attempt to forecast what would be needed beyond April 30, but to simply ask for the appropriation up to that date."

The votes against the bill were cast by Representatives Anthony, Ramseyer, Woodward and Thomas. There was no serious opposition to the bill and several members urged an increase in the amount but did not press an amendment. Chairman Good of the appropriation committee defended the reduction on the ground that the future needs were problematical and he joined with some of the other members in criticizing the expenditures of the Railroad Administration. Congressmen seemed to have some difficulty in appreciating the difference between operating and capital charges or the fact that much of the money owed by the Railroad Administration for rental and equipment is due now while the capital charges against the railroads are expected to be permanently financed. Mr. Cannon, who spoke for the bill and expressed great confidence in Mr. Hines, said that the $750,000,000 will not be expended immediately. Others seemed to think that the 100,000 cars ordered last year represented an unusually large order, savoring of extravagance, and many members took delight in criticising the administration as one of the creations of the Democratic party.

There is a belief that some at least of the members of the committee felt that if there is to be an increase in rates it ought to come soon, in order that the government may get the benefit of it, rather than be postponed for the benefit of the corporations next year. But at the same time the House was trimming the appropriation an effort was being made in the Senate to take away the director general's arbitrary power to make rates by restoring the former authority of the Interstate Commerce Commission, which would make it more difficult to raise rates.

One of the most prolific sources of information regarding the operations of the Railroad Administration and the views of the director general is Mr. Hines' testimony before various Congressional committees and the statistical statements which are filed with the committees in connection with his testimony. The hearings before the appropriations committees are in executive session, but are made public when the printed reports of the hearings are given out. Director General Hines and Swagar Sherley, director of the Division of Finance of the Railroad Administration, appeared before a sub-committee of the House Appropriations Committee on Tuesday, Wednesday and Thursday of last week to explain the need for a $1,200,000,000 appropriation. Mr. Hines was pressed by members of the committee to explain the reason for the increase. Chairman Good asked what condition the administration would have been in if the original appropriation had been made and there had been no additional session of Congress. Mr. Hines replied that, as things have turned out, the Railroad Administration would have been greatly hampered, but he pointed out that the information available at that time was necessarily based on estimates, and that the extent of the falling off in traffic was not fully realized, and also that his expectations of a reduction in expenses had not been fully realized. Some of his statements ought to make interesting reading for one W. G. McAdoo.

"The fact is," he said, "that this situation is so abnormal and so fundamental in character that I believe it is beyond the capacity of the human intellect to absorb it all at once. The things dawn upon us by degrees. The whole scope of the developments which are the outgrowth of the war did not begin to impress themselves fully on me until I had an opportunity after the adjournment of Congress to travel around over the country and come into personal contact with the federal managers. I am not sure it has fully dawned on me yet."

Situation Underestimated

Mr. Hines said that when the January figures were received it seemed reasonable to assume that the heavy operating costs were due to a very large extent to the fact that they had not got away from the war basis, and that the saving in operating costs for subsequent months would be decidedly pronounced. The result has not shown that, he said. It has indicated that the costs are due much more to the fact that the increase in cost has been entirely out of proportion to the increase in rates than to any temporary condition of being on a war basis.

Mr. Cannon asked why the business should not be conducted either by increasing the rates or decreasing the expenses, as to make one hand wash the other.

"As a permanent policy, that is undoubtedly the proper policy," replied Mr. Hines. "The question is whether it is wise to increase the rate level enough now before we can measure better the results that will come from an enlarged business. I think it would be much better to hold this situation where it is until we get more light on how it is going to work." Mr. Hines said that the expenses were not reduced during the first four months of the year because the increasing costs were manifesting themselves to a greater extent right along and the maintenance expenses have been increased because of the weather being favorable for maintenance work.

Possibility of a Rate Increase

The discussion repeatedly led to the question of an increase in rates, but Mr. Hines said his judgment is that a satisfactory idea of operations on the basis of the new conditions which have been created by the war cannot be formed before the latter part of this year. Chairman Good asked if it would not have to be done before the roads are turned back to private ownership.

"That would be a very proper time to do it, undoubtedly," said Mr. Hines. He declared that he did not find that the increased expenses can be accounted for by any fundamental difference in the method of operation, that the men who are now operating the roads would, perhaps in 99 cases out of 100, continue to operate them under private control and would continue to employ the same methods they are free to employ now in getting economies. He estimated the increased cost of labor as compared with 1917 as 50 to 52 per cent, and the increased cost of materials at about 35 per cent, and he declared that the increase in wages has been proper and ought not and cannot be reduced, and should be accepted simply as one of the developments of the war. He did not believe that anybody who will study the facts will take the responsibility of saying that the costs are substantially greater than they ought to be.

"It is perfectly clear to me," he said, "that a 25 per

cent increase in rates is not going to offset the increase of something over 50 per cent in wages and, anywhere from 35 to 40 per cent in the cost of materials. The only possible hope will be through a large increase of business which we would do at a relatively large net profit. How far that will be the case it is impossible to forecast. Certainly, however, there is a very strong argument that could be made for the view that that increase in business could not possibly produce enough additional net profit to make up for this loss in the purchasing power of the dollar. The railroads get $1.25 in revenues where they used to get $1.00, and they have to pay out from $1.50 to $1.70 where they used to have to pay out $1.00.

"It seems to me that this deficit of $250,000,000 for the first four months of 1919 is not due to unnecessary or improper expenses, but is simply due to the fact that the government for the time being is keeping down the transportation rates to the public. The expense cannot be reduced, but the government has kept down the rates to the public, and that is the cause of this deficit. That raises a very important question of policy as to what ought to be the government's attitude on that subject. My own judgment is that for the moment the transportation rates ought not to be increased, because there are various factors that promise to work in the direction of cutting down this deficit as the months go by. If we make an increase now which would take care of the deficit on the present volume of business, I think it would clearly be more than necessary when business resumes under normal conditions unless, of course, the very making of the increase would set in motion so many increases in railroad costs as to offset the value of it, and, of course, that would happen to some extent."

Mr. Hines said if the government should undertake to raise $300,000,000 or $400,000,000 to take care of the situation it would probably result in the consumer paying three or four times that much in the last analysis, whereas the costs are already on such a high basis as to be detrimental to the active resumption of business. In addition to the expected increase in traffic, Mr. Hines said that there promises to be some decrease in the cost of materials and supplies, and that many federal managers hope to get a greater degree of efficiency from labor because railroad employment has been made more attractive. This, he said, however, was speculative.

Chairman Good pointed out that the deficit of $250,000,000 for four months is calculated by comparison with four-twelfths of the standard return, which is greater than the proportion naturally expected to accrue during the first part of the year. Mr. Hines said he felt it was better to put it on the basis of one-twelfth of the rental per month because the contract so provides, than to be in the attitude of having understated the loss, but that if $250,000,000 is appropriated on account of the deficit up to April 30 it undoubtedly will all be absorbed before the most profitable part of the year is reached.

"I think in all probability," he said, "with the large business that we will make a much more favorable showing in the latter part of the year, but I have no idea that that showing will be such that we will then have no deficit at all, except such deficit as would be indicated for the first four months on the basis of apportioning the rental suggested by your figures."

"But in assuming $250,000,000 as your deficit for four months," said the chairman, "you have assumed that for the rest of the year the railroads will not any more than break even."

"I think I am justified in making that assumption," said Mr. Hines. "It is speculative, but it is my best judgment that even with favorable conditions the operating income for the last eight months of the year will not be more than the rental for the last eight months of the year."

Mr. Hines also presented some estimates based on the conditions of 1917. Assuming the same number of employees working the same number of hours in 1919 as they worked in the calendar year 1917, he estimated the increased pay chargeable to operating expenses, as compared with the rates in effect in December, 1917, would be $852,000,000. He thought the prospects were very good for moving as many ton miles of freight in 1919 as were moved on the average during the three pre-war test years, and he estimated that, assuming the same volume of traffic as in 1917, the 25 per cent increase in rates, both freight and passenger, would bring in about $906,000,000; in other words, leaving only $44,000,000 to cover increases in material costs.

"The conclusion cannot be drawn from that statement," said Chairman Good, "that the total increase in rates will pay all the increased cost of operation of the railroads?"

"No," said Mr. Hines, "if we do not have a larger business than we had in 1917, I do not think it will. We cannot expect that the increase in rates will pay the increased cost. That is my best judgment." He added that the increased cost of materials and supplies would consume a great deal more than the $44,000,000.

The chairman asked about the possibility of economies resulting from unification.

"I do not recall that I spoke of any additional results from unification," said Mr. Hines. "I think we have already gotton the benefit both last year and the early part of this year of the economies from unification."

The chairman asked why, with the Railroad Administration running behind each month the $50,000,000 of annual income paid for the privilege of riding in Pullman cars was cut off. Mr. Hines replied that Director General McAdoo was of the opinion that with the signing of the armistice it was desirable to get away from any distinctly war burden, and he added that one effect of the removal of the charge has been to bring about a great deal more travel in Pullman cars and to increase a good deal the ordinary revenue from the use of Pullman cars.

Unification Economies in the Past

The chairman also asked as to whether there would be any additional drain on the treasury to make good for deferred maintenance. Mr. Hines said he had been giving that matter a great deal of thought and that a very careful analysis was being made of the situation, which probably would be different as to different roads, but his best judgment of the situation as a whole was that at the present time the administration is fully up to its contract obligations in respect of maintenance of roadway and structures and equipment. The chairman asked if the Railroad Administration had fortified itself in any way to provide for any contingency that might arise with regard to maintenance.

"We have fortified ourselves only in this way," replied Mr. Hines. "We have done so much that if anything we are ahead of the contract instead of behind it, but we have set up no additional fund on that account."

Asked regarding the number of men employed in 1918 as compared with that during the test period, Mr. Hines said it was very difficult to get satisfactory figures. He said the railroads had employed no more men than were necessary to produce the results, except that it was necessary to use some inexperienced labor during the war, but that, generally speaking, the increase in employees, when there has been any, has been due largely to the adoption of the eight-hour day.

Railroad Officers Loyal

Chairman Good asked Mr. Hines about reported charges that some railroad men had been doing everything in their power to discredit government operation of the railroads. Mr. Hines said a great many charges of that sort were cur-

rent during 1918, especially during the early part of the year, and every time a specific charge of that sort came up an endeavor was made to investigate it, but, he said, "I do not recall a single instance where we found any evidence of bad faith on the part of any railroad official. In many cases we found evidence of what appeared to be extraordinary bad judgment or inattention to a particular situation, but considering the extent of the railroad business, that percentage has been very small. My best judgment is that they are all honestly trying to give a perfectly successful and proper service under federal control."

Corporations Must Finance New Capital Expenditures

Mr. Hines pointed out that the biggest item in the appropriation is $775,000,000, which has been or will be invested for the account of the railroad corporations and will be returnable by them from time to time, as they are able to return it. He said that the settled policy of the Railroad Administration is that for the future it will make no improvements on railroad properties unless the railroad companies undertake to finance them, except in extreme cases, and he pointed out that while the estimate provides for $352,000,000 for capital expenditures for last year, it only provides for $253,000,000 for this year, of which $245,000,000 is for the equipment ordered by the Railroad Administration, and while there is an estimate for capital expenditures for the year of $653,000,000 either the corporations will have to finance the difference or the improvements will not be made unless there is some extreme urgency. He also said that the policy is going to be, as soon as the government is able to pay the railroads their rental, to force the corporations to reimburse the government for what they owe it "before they go ahead and make a lot of additional improvements on their property." "No important new work should be undertaken through corporate financing," he said, "before the corporation has satisfied us as to what it owes us."

In connection with the equipment, Mr. Hines brought out the fact that the equipment being built this year will cost only $245,000,000, instead of $286,000,000, as previously estimated, because it was bought on a basis subject to diminution if the builders' costs were less than their estimates, and the government is getting some benefit from that. He also showed that to May 28 a total of 1,257 of the 1,930 locomotives ordered had been delivered, and 52,954 of the 100,000 standard freight cars. It is estimated that the car deliveries will be completed by October 1 and the locomotives by December 1.

Standard Return $940,000,000

Mr. Hines' testimony also showed that the estimated amount of the standard return guaranteed to the railroads has been increased from $928,000,000, the estimate used in his previous testimony, to $940,669,104 for all roads under federal control. For the Class I roads and switching and terminal companies, the standard return is $905,035,136. He explained that the $940,000,000 figure was based on the actual compensation agreed on in each case where an agreement has been reached and the standard return without any addition where an agreement has not been reached, plus an allowance of $1,500,000 as a reserve to take care of additions to compensation that might be made in other cases. He gave a statement showing the claims for compensation in addition to the standard return which had been allowed, as follows:

Baltimore & Ohio	$2,136,932.00
Chicago, Milwaukee & St. Paul	440,082.39
Carolina, Clinchfield & Ohio	173,798.41
Northwestern Pacific	172,479.59
Missouri & North Arkansas	161,230.00
Kansas City, Mexico & Orient	140,926.61
Georgia & Florida Railroad (including Augusta Southern)	116,000.00
Western Pacific	86,229.76
St. Louis Southwestern	67,303.78
Cumberland & Pennsylvania	19,885.50
New York, Susquehanna & Western	19,807.00
Wrightsville & Tennille	16,531.21
Salina Northern	15,000.00
Van Buren Bridge Co.	11,126.47
Louisville & Wadley	2,819.57
Trinity & Brazos Valley	100,000.00
Gulf, Texas & Western	29,734.80
Total	$3,709,887.09

In addition, claims amounting to $38,474,095 had been denied to June 1, claims amounting to $546,796 had been withdrawn, claims for $26,285,606 were pending on June 1, and claims amounting to $798,843 had been denied and were pending before the Interstate Commerce Commission boards of referees.

Mr. Hines showed that his estimate of $236,000,000 for the deficit for 1918 was made up of $216,328,314 for the steam roads, $4,597,503 for sleeping car lines, $2,685,730 for carriers by water, $1,143,358 for inland waterways, $3,647,143 for the expenses of the director general's organization, $9,500,000 for the deficit of the American Railway Express Company, and other miscellaneous items. The electric railways had an income of $319,231.

The estimated deficit of $250,000,000 for the first four months of 1919 includes $236,000,000 for steam roads and also deficits for the carriers by water and inland waterways, and an estimated deficit of $10,000,000 for the express company. The electric railways and sleeping car lines showed some income. The expenses of the director general's organization for four months were given as $2,849,000. This would be at the rate of $8,547,000 for a year, as compared with $3,647,000 last year. Mr. Hines, at the request of the committee, filed a statement of the pay-roll of the Railroad Administration as of May 31, 1919. The pay-roll as of December 31, 1918, was published in the *Railway Age* of May 2, but some changes have since been made.

Mr. Sherley's Testimony

Further details of the Railroad Administration's finances were explained by Swagar Sherley, director of the Division of Finance, who was chairman of the appropriations committee during the last Congress. Mr. Sherley said that of the $563,782,324 expended in 1918 for capital expenditures, $149,814,794 was deducted from the rental and $61,514,076 was offset by amounts due the companies on open account. This left a balance of $352,553,455, which must be carried for the benefit of the companies. Of this $117,000,000 was for standard equipment. The cost of the equipment ordered by the Railroad Administration was estimated at $402,221,468, but it is believed this will be reduced to $363,373,335, which leaves $245,585,643 to be paid for this year. The railroads have insisted this ought to be paid for by the government, but it is the expectation that they will ultimately accept most of it. Of the cars, Mr. Sherley said, 48,800 have been accepted by the roads and of the locomotives 947, in the sense that the companies have indicated how they propose to finance the equipment, and in addition many roads have indicated their willingness to accept the allocations. None of the companies has finally closed the financial transaction.

Some of the companies felt very bitterly about the allocation of equipment but Mr. Sherley had tried to adjust the matter by arranging a plan for assisting the companies to finance it, and he has been holding conferences with the executives on a plan by which the administration would apply $121,000,000 of depreciation funds due the companies at the end of federal control to the payment of the initial 25 per cent and general equipment trusts would be floated for the balance payable in 15 annual instalments. This plan, he said, had not progressed to the point where he could say it would go through or not and it might take two months to work out the details. Meanwhile some of the stronger roads that are prepared to finance their part of the equipment at once are being held off so that their credit may strengthen the entire plan. Failing an amicable arrangement, the Railroad

Administration will distribute the cars to the railroads and treat them as their property.

For 1919 the estimate of capital expenditures is $830,051,065, of which it is expected the railroads will themselves finance $576,615,905, leaving $253,000,000 that the government will have to carry for the present. The $830,000,000 is made up of $317,229,011, the revised carry-over from the 1918 budget (exclusive of standard equipment), $267,237,011 estimated new work for 1919, and $245,000,000 for standard equipment.

The chairman expressed surprise that it should be necessary to carry capital expenditures for the stronger companies. Mr. Sherley explained, however, that it was merely temporary, sometimes to keep the company from borrowing at excessive rates, and that in the case of the stronger companies it was expected they would be able to pay back very soon, but that it was necessary for the government to pay the money in the first instance, especially while the government was nearly monopolizing the investment markets.

"To the extent then to which the committee would feel that these roads which are perfectly solvent can finance their own expenditures, just to that extent, your estimate could be reduced," said the chairman.

"I think not," replied Mr. Sherley. "Your question implies that what can be done in the future can be done now."

The Skimping Process

In reply to a question as to how the Railroad Administration has financed its activities since the adjournment of Congress, Mr. Sherley gave an interesting description of the agility of the "revolving fund" representing what was left of the original $500,000,000 appropriation and the operating income. The available money in the hands of federal treasurers, he said, was "simply pooled and then distributed as best we could to the various roads, having to skimp all of them."

On January 1 there was in the treasury of the Railroad Administration $78,188,531, but by calling upon the various federal treasurers about $14,000,000 more was obtained in January. Then various railroad companies were called on to repay loans and $57,000,000 more was received, and some money was received from the express company, making a total of $81,000,000. In February $31,000,000 more was taken in, but in the two months $89,000,000 was paid out in loans and compensation, $36,000,000 was advanced to federal treasurers who needed it, and $48,000,000 was paid for cars and locomotives. This ran down the balance to $14,795,000 at the end of February, and at the same time the federal treasurers had outstanding vouchers and payroll checks aggregating approximately $258,000,000 but only $129,500,000 of cash.

Then when Congress adjourned without passing the appropriation some drastic effort was necessary. The War Department paid $100,000,000 for services rendered but not all vouchered. The Navy Department paid $10,000,000. Then $50,000,000 was borrowed from the War Finance Corporation largely on the collateral of the New Haven note and its collateral. The Pennsylvania Railroad also came to the relief of the Railroad Administration by advancing $22,000,000 to pay bills owed by the federal management of its line in order to protect its credit and permitted the administration to credit upon money due for compensation, applying it against additions and betterments. These payments, however, did not provide sufficient cash and the expedient of issuing certificates of indebtedness was adopted. Of these $47,842,500 were issued to railroads in March, $79,517,300 in April, and $57,831,500 in May, a total of $185,191,300. In addition, $49,118,146 of certificates were issued to equipment companies.

As a result of the pooling, Mr. Sherley said, there was called into the central treasury from all sources from January 1 to the end of May, $355,000,000 and $350,000,000 was paid out in cash, so that at the end of May "we had managed, by skimping and not paying bills except as we had to, to improve our balance a little bit," to $76,000,000, but there were in the treasurer's office vouchers for $46,714,000 covering amounts due equipment companies and on May 21 the federal treasurers had $156,673,000 cash on hand and vouchers and payroll checks outstanding amounting to $174,000,000. In other words, if the administration had undertaken to liquidate it would have had only about $12,000,000 except agents' and conductors' balances, against certificates amounting to $234,600,000. "In other words," he said, "the Railroad Administration has gone along by getting everybody who owed it any money to pay as promptly as possible, giving its promise to pay when necessary, and by not paying a lot of its vouchers outstanding."

Mr. Sherley filed a statement of the disbursements and expenditures from January to May, inclusive, which included under the head of administration expenses $848,471 for general expenses and $2,670,712 for its payroll.

Compensation

Regarding the payment to railroads for rental, Mr. Sherley said that while some roads have received compensation in advance of what was due them for 1918, "speaking by and large, we have not yet gotten up to the point where we have paid for 1918" and $441,000,000 is owing to them for 1918, plus $230,000,000 for the first quarter of 1919, or a total of about $671,000,000, although the amount for 1919 is subject to some deductions.

A. W. McLean, acting managing director of the War Finance Corporation, testified that the total railroad loans made by the War Finance Corporation to May 31 amounted to $198,785,890, of which $6,870,480 has been repaid, leaving a balance outstanding of $191,915,410. This includes $50,000,000 advanced to the director general. Of the total, $59,566,200 was secured by certificates of indebtedness of the director general. In addition, $1,000,000 was advanced to the Bettendorf Company on certificates. He expressed the opinion that conditions probably will arise under which the corporation would feel that it was not justified in making any more loans to railroads.

Passed By Senate

The Senate passed the railroad appropriation bill of $750,000,000 with no debate and with no effort to increase the amount. The bill now only requires the President's signature to make it effective.



Photographed by American Red Cross

Armenian Refugees

Referendum on Remedial Railroad Legislation

National Chamber of Commerce Asks Votes of Its Members on Recommendations of Its Committee

The Chamber of Commerce of the United States has submitted to its members ballots for a referendum vote on a series of 10 recommendations of its Committee on Railroads on remedial railroad legislation. In order to inform the members as fully as practicable on subjects submitted to referendum, a carefully selected committee is appointed by the chamber to analyze each question and report its conclusions. The purpose of the referendum is to ascertain the opinion of the commercial organizations of the country, not to secure the approval of the recommendations voiced in the report. The board of directors in authorizing the submission of the report to referendum neither approves the report nor dissents from it. Only the vote of the member organizations can commit the chamber for or against any of the recommendations submitted by the committee, and until such vote is taken the report rests solely upon the authority of those who have signed it. The list of recommendations on which the members are asked to vote for or against, submitting their ballots on or before July 24, is as follows:

1. The committee recommends adherence to the policy of corporate ownership and operation, with comprehensive regulation.
2. The committee recommends return of roads to corporate operation as soon as remedial legislation can be enacted.
3. The committee recommends adherence to the period of federal control as now fixed unless and until impossibility of remedial legislation in this period clearly appears.
4. The committee recommends permission for consolidation in the public interest, with prior approval by government authority, in a limited number of strong competing systems.
5. The committee recommends a requirement that railroad companies engaging in interstate commerce become federal corporations, with rights of taxation and police regulation reserved for states.
6. The committee recommends exclusive federal regulation of capital expenditures and security issues of railroads engaged in interstate commerce, with provision for notice and hearing for state authorities.
7. The committee recommends federal regulation of intrastate rates affecting interstate commerce.
8. The committee recommends a statutory rule providing that rates in each traffic section shall yield an adequate return on a fair value of the property as determined by public authority.
9. The committee recommends payment into a fund of a share of the excess earned by any railroad system under application of the above statutory rule over an equitable minimum return upon fair value of property, this fund to be used as Congress directs for strengthening general railroad credit and increasing general railroad efficiency.
10. The committee recommends a federal transportation board to promote development of a national system of rail, water, and highway transportation and articulation of all transportation facilities.

The pamphlet which accompanies the ballots contains the report of the Committee on Railroads and also a statement of the arguments in the negative on its recommendations. As an appendix to the report there is presented an analysis of the various plans for remedial railroad legislation that have been proposed in the hearings before the Senate Committee on Interstate Commerce and through other channels. There is also a special statement of unusual interest regarding the plan of the committee for carrying out its recommendation that railroads engaged in interstate commerce shall be required to change from state to federal corporations. The report of the committee is as follows:

Report of the Committee on Railroads

The committee is opposed to government ownership and operation of the railroads in the United States. It is also opposed to their purchase by the government for lease to private corporations to operate. The committee favors a comprehensive system of government regulation and believes that more adequate facilities, a more progressive and economical service and lower rates can be secured from corporate than from government ownership and operation of the railroads. The committee is opposed to government ownership and operation because:

First: Under government ownership the development of railroad facilities would depend upon congressional appropriations which would prevent the anticipation of the transportation needs of the country. Appropriations would not be made in the amount and at the time needed to insure adequate development of the railroads. Political considerations might also control the amount of appropriations and the objects for which they were made.

Second: The interest rate which the government would have to pay to secure railroad capital would not be lower than the rate paid by corporations. To acquire the railroads the government would have to pledge its credit for eighteen to twenty billions of dollars, at a time when other large financiering must be done. It would be difficult for the government to dispose of the securities required to purchase the railroads, and it would be necessary for the government to secure from five hundred million to one billion dollars of new capital each year. If the government were to assume the burden of financing the railroads at the present time when the war debt is so large, its interest rate would necessarily be as high as, if not higher than, the rate at which corporations could secure capital.

Third: Government operation is seldom, if ever, as efficient as corporate management. Competition, the incentive to efficiency and progress in private enterprises, is absent from the government administration of affairs. Individual initiative is less, bureaucratic methods are more characteristic, and the services rendered are less progressively efficient.

Fourth: While the government would presumably select officers and employees by means of efficiency tests, political influences would almost certainly be given weight in selecting men for official positions.

Fifth: Unless the government adopted the policy of fixing low rates and fares with the intention that any resulting deficit from operations should be placed as an increased burden of taxes upon the general public, rates and fares would be higher under government than under private operation. Under government operation expenses rise in relation to income and the charges imposed by the government, if a deficit is to be avoided, must be higher than those which it would be necessary to permit railroad corporations to make.

Sixth: The political effect of government ownership and operation of railroads in the United States might be serious. There are now about 500,000 civil employees of the government. The addition to the public services of 2,000,000 rail-

road employees, the majority of whom are voters, would constitute a force of about 2,500,000 government employees interested in controlling the policy of the government as regards wages, hours and conditions of service. Such a body of employees might easily exercise a controlling influence upon state and national politics.

The committee is convinced that it would be unwise for the government to retain the railroads longer than is necessary to enact the legislation required for the return of the properties under conditions that will be just to the owners and will insure to the public adequate transportation facilities by properly financed railroads. This legislation should be enacted as soon as possible and before the government retires from railroad operation. It would be a hardship to the public and unjust to the owners of the roads were the government to return the properties without first removing the obstacles to efficient and economical operation of the railroads by their owners, without revising past methods and agencies of government regulation, or without adopting measures that will enable the carriers to obtain revenues sufficient to provide the public with adequate facilities and efficient service. As soon as this legislation has been enacted, government operation of railroads should end.

The director general of railroads has recommended that the period of possible government operation of railroads be extended until January 1, 1924, in order that a test may be made of the possibilities of government operation of railroads in peace time and that the government may carry on the work it has begun of developing the use of waterways, of connecting them with the railroads and of articulating rail and water traffic. The director general presents a picture of a national transportation system resulting from the balanced development and the traffic articulation of waterways and railroads.

The Railroad Administration is to be commended for having sought to increase the use of waterways and to organize their traffic, to bring about a development of port terminal facilities and to unite rail lines and water channels into a general system of transportation. This work so wisely begun should be continued by the government until accomplished, even though it is advisable to return the railroads to their owners at an early date. Suggestions for the development of a unified national system of rail, water and highway transportation are embodied in this report.

The committee hopes that legislation for the return of the railroads can be enacted during the present calendar year. Every effort should be made to frame and pass the necessary laws, and it is believed that the necessary legislation can be enacted within 21 months after the proclamation of peace—the period of possible government operation of railroads under the act of March 21, 1918.

To press upon Congress that it shall declare its inability to enact the necessary legislation within a given period, before it has undertaken the task, would be unwise. It is the belief of the committee that Congress, confronted by the grave railroad situation now existent, will apply itself energetically to the consideration of the legislative measures required for its cure, and will be able to accomplish its task within the statutory period now prescribed for federal control. If Congress should find its task impossible of accomplishment within the time prescribed, then, and not until then, should an extension of the period of federal control be made.

It is the opinion of the committee that legislation should be enacted that will facilitate the early grouping and the ultimate consolidation of the railroads in the United States into a limited number of strong competitive systems. The grouping should be about the present large systems and not by territorial subdivisions of the country.

The existence of so many railroad systems as there now are increases the difficulty of co-ordinating their facilities and services to the extent necessary to secure the most economical operation. Moreover, some of the present roads are financially weak and their continuance as separate systems complicates the government's problems of rate-making, of the common or joint use of equipment and facilities, of the regulation of security issues and of re-establishing the financial credit of the railroads as a whole. If the railroad systems that are financially unstable and the many systems of minor importance can (subject to the approval of the government, and under conditions which it may prescribe) be grouped, or consolidated, with a limited number of strong systems, a better service can be rendered and a larger development of lines, terminals and other facilities will be possible.

Without sacrificing the benefits of competition in service, the government should facilitate the co-ordination of railroad facilities and services, the common use of equipment, and the joint use and development of terminal facilities, when in the public interest.

The consolidation of railroads, as well as the co-ordination of their facilities, should be subject to the approval of the government; and, with such authorization required, the railroads should be encouraged to work out the natural grouping of systems and to combine their facilities in the interest of traffic economy and of financial stability.

Many states have laws against the combination of railroads, and in the constitutions of several states there are provisions prohibiting the acquisition by a railroad of another competing line. The obstacles which these state laws and constitutional provisions place in the way of the associated activities and the consolidation of railroads may be removed by changing the status of railroad companies from state to federal corporations, as recommended in this report.

While favoring the early grouping and ultimate consolidation of the railroads in the United States into a limited number of strong systems, which shall be built upon the large systems which have developed in response to commercial needs, the committee feels that competition among these systems, in service (not in rates), is desirable from the standpoint of the public and will lead to greater efficiency of operation on the part of the railroads. *In all kinds of business the most effective incentive to improvement and to economy of operation is competition.* In the case of the railroads the same charges must be made for similar services. The rates, and, to a large extent, the practices of carriers must be regulated by the government, but regulation does not preclude the possibility of active competition in service. In facilitating railroad consolidation, the government need not, and in the interest of the public should not, eliminate railroad competition.

By Referendum 21, which was submitted by the Chamber of Commerce in September, 1917, the commercial organizations of the country, with comparatively few dissenting votes, declared themselves in favor of the enactment of a federal incorporation law and also a law requiring all carriers now subject to the jurisdiction of the Interstate Commerce Commission, or which may hereafter be created, to organize under a federal incorporation act.

It has been represented to the committee by jurists who have given the matter careful consideration that Congress can enact a statute that will provide a simple process of converting state railroad companies engaged in interstate commerce into federal corporations by methods similar to those followed in changing state banks into national banks.

If such a plan shall be found by Congress to be constitutional and feasible, the committee recommends the nationalizing of railroad corporations engaging in interstate commerce, by the enactment of a statute similar in principle to that of the national bank act which provides a direct method of converting state banks into federal institutions.

In requiring railroad companies to change from state to

federal corporations, Congress should provide that the states shall retain the power of taxation and police regulation of the property of the federal railroad corporations.

The organization members of the Chamber of Commerce of the United States, in acting upon Referendum 21, voted almost unanimously in favor of federal regulation of the issuance of the securities of railroad companies engaged in interstate commerce. It is the opinion of your committee that federal authority should also regulate large capital expenditures.

In acting upon applications of the railroads for the approval of security issues and capital expenditures in federal agency will need to inquire as to the public necessity for the work proposed to be done, the amount of capital that will need to be expended, and, if securities are to be issued, what amount thereof will need to be authorized to enable the carriers to obtain the funds required for the execution of the work which the government may find to be of public necessity.

In order that the state authorities may assist the federal agency to obtain as complete knowledge as possible of the local needs for additional railroad facilities and of the expenditures required to meet those needs, the federal agency should require a railroad company, applying for permission to issue securities or to make a large expenditure of capital, to file with the authorities of the states in which the railroad in question is located copies of the original petition to the federal agency which should notify the interested state authorities of the hearings upon applications for approval of securities issues and capital expenditures in order that they may have full opportunity to advise as to the actions they favor.

This recommendation was approved by the organization members of the Chamber of Commerce of the United States in November, 1917, with comparatively few dissenting votes. This action having been taken shortly before the United States took over the operation of the railroads, Congress has had no opportunity to act upon the question. It is therefore deemed necessary and important by the committee that this recommendation shall be included in its present report as a part of the plan for remedial railroad legislation.

The experience of the past two years has confirmed the committee in its conviction that regulation by the several states of such intrastate rates as affect interstate commerce interferes with the effective and uniform regulation of interstate rates by the United States government. Indeed, conflict, detrimental to the public interest, has arisen with respect to the jurisdiction of the state commissions and the Interstate Commerce Commission over intrastate rates even when it was clear that such rates affected the interstate rates subject to the regulatory power of the federal government.

For these reasons the committee feels it a requirement of the existing situation that the organization members of the Chamber of Commerce should again declare their opinion upon this question, in the light of the developments since November, 1917.

The interests of the public require that the income of the railroad companies shall be sufficient to enable them to secure readily and economically the capital necessary to provide adequate facilities. In carrying out this principle special difficulty results from the fact that the same rates will yield the more prosperous companies greater revenue than they need while the less prosperous companies, due to their unfortunate situation or to their past history, are unable to secure income sufficient to enable them either to develop their facilities in proportion to the needs of the public, or to perform the services required by the section of the country in which the roads are located.

Your committee believes that the most practicable way to provide the railroads of the United States, as a whole, with adequate revenue, and thus to re-establish railroad credit, is to authorize the Interstate Commerce Commission to divide the country into such traffic sections as may seem to the commission wise, and to direct the commission by a statutory rule to fix such rates and fares as will yield the railroad companies, in each of such traffic sections as shall be designated by the commission, aggregate revenues which will provide—after allotment has been made for renewals and depreciation—a net return that will enable the carriers to furnish the public with adequate facilities and efficient and economical service.

The committee is not in favor of a government guarantee of a minimum return to each railroad company, either upon its capitalization or upon the property which it devotes to the public service. A government guarantee would tend to lessen initiative and to cause both the prosperous and the unprosperous roads to feel less responsibility for efficient management.

While not favoring a government guarantee of a minimum return, the committee believes that Congress ought to adopt a statutory rule providing that the public authority which fixes the railroad rates assure reasonable revenues to the railroads as a whole and in each of the natural traffic sections of the country. The committee is of the opinion that such a statutory rule can be enforced without placing an unjust burden upon the public and without causing individual railroad companies to obtain excessive profits.

For the purpose of securing an equitable enforcement of a statutory rule of rate making and of enabling the railroads of the United States as a whole and by natural traffic sections to secure adequate revenues without permitting individual companies to obtain excessive profits, your committee recommends the enactment of a statutory rule providing that individual railroad systems, that may obtain from rates fixed by public authority net corporate income in excess of an equitable minimum return upon their property devoted to the public service, shall turn over such share (one-half or one-third) of their excess profits to a fund to be employed, as Congress may direct, to strengthen the credit of the railroads as a whole and to enable them to serve the public with greater efficiency.

The proposed statutory rule would deprive none of the present prosperous roads of an equitable or even a liberal return upon their property devoted to the public service, nor would it take away from them the incentive to economical and efficient management. At the same time, it is believed that the excess profits of the more prosperous companies will be sufficient to create a fund by means of which the credit of the railroads as a whole can be substantially strengthened. Your committee believes it will be possible for the Interstate Commerce Commission to establish general schedules of rates and fares that will provide the railroads of the United States as a whole with adequate revenues, and that will prove effective in re-establishing railroad credit.

The development of a national system of transportation is a public necessity. Up to the present time the steam and electric railways, the waterways and highways have been developed separately without reference to a common plan and without thought of creating, from the various agencies of transportation, a unified system.

The time has come when the waterways of the country as a whole should be systematically developed according to a definite plan. Their larger use should be made possible by connecting them with the railroads at river, lake and ocean ports and by enabling shippers to send their traffic by the most economical combination of rail and water routes.

The work which the Railroad Administration has so happily begun of providing for the traffic use of important rivers and canals, and of articulating the railroads with the waterways in a traffic sense, should be continued after the railroads have been returned to their owners.

The development of highway transport should be facili-

tated with a view to the co-ordinated use of all transportation agencies. While the people of the United States have been creating an exceptionally economical system of transportation by rail, highways have been relatively neglected and the expenses of carrying freight to and from the railroads are, in most instances, greater than the cost of the railroad haul. The systematic development and the organized use of hard surface highways greatly reduce the transportation burdens borne by the people of the United States.

It is especially important that provision should be made for the common use and construction of terminal and transfer facilities at all the larger traffic centers of the country; but, unless some federal authority is vested with power to bring about the common use of terminal and transfer facilities, and their joint construction by the carriers (in so far as that may be in the public interest), it is practically certain that the present expensive methods of terminal operation will be indefinitely continued.

The development of a unified national system of transportation is an executive task that can be performed only by creating a board primarily administrative in purpose and organization. The Interstate Commerce Commission, in the regulation of rates and in the supervision of the capital expenditures and the security issues of railroads, will have as much work as it can successfully perform. Your committee has not suggested taking from the Interstate Commerce Commission any of the functions it has thus far exercised, but has recommended a large addition to the duties of the commission. It would be unwise to impose upon that body the large and exacting task of guiding and facilitating the development of a national system of rail, water, and highway transportation. That work should be undertaken by an especially created Federal Transportation Board.

The members of the Committee on Railroads are: George A. Post, chairman; Walter S. Dickey, F. C. Dillard, Stephen A. Foster, Edward J. Frost, Thomas F. Gailor, Emory R. Johnson, Charles E. Lee, W. Z. Ripley, Alexander W. Smith and Charles F. Wright.

Compulsory Federal Incorporation for Consolidated Railroad Systems

The committee recommends "that railroad companies engaging in interstate commerce shall be required to change from state to federal corporations" and says in its report, "It has been represented to the committee that Congress can enact a statute that will provide a simple process of converting state railroad companies engaged in interstate commerce into federal corporations by methods similar to those followed in changing state banks into national banks." At the request of the committee, Alexander W. Smith, of Atlanta, Ga., has prepared the following statement of the plan referred to in this recommendation:

Various plans have been suggested for improving the transportation systems of the United States. For instance, it is proposed that the government shall authorize the consolidation of individual railroads into large systems which necessarily involves interference with competition in local territory between lines that were previously competitive. If that is undertaken in some states under the present corporate organization of railroads, it will run counter to constitutional inhibitions. Has the federal government power to override the constitution of a state by undertaking to authorize such railroads to consolidate, so long as they are creatures of the state and subject to the provisions of its constitution?

A corporation is a fictitious person. It has many attributes of a living being. It contracts, incurs obligations, owes duties to the government that creates it, and is subject to the constitutional control of that government. When we consider things desirable to be done in connection with our transportation systems, it is well to investigate some of the legal aspects involved; take a view of the range-lights and shoal stakes, so to speak, that mark out the legal channels through which we can safely travel, else we may run on the rocks.

The National Association of Owners of Railroad Securities and their counsel appear to have considered the subject of federal incorporation solely on the basis of creating new federal corporations, and undertaking to transfer into them existing state corporations, and their assets and liabilities. That is practically impossible. Take the Southern Railway Company as a concrete example. It is a system made up of more than 100 separate railroad corporations. It owns some of them; it controls others under long leases, and others by majority stockholding. It has effected their merger by all the known methods of putting one railroad under the operative control of another. Their obligations under the kaleidoscopic arrangements it has made in bringing the system together could not be transformed and lifted out of the several state corporations and set down in a new federal corporation. As a business proposition, it would be impracticable.

In view of these difficulties, the railroad executives have thus far turned away from the proposition of federal incorporation. But there lies right on the surface a method to accomplish the same result in a perfectly simple way, viz., the passage by Congress of a general federal incorporation act along lines parallel to the laws for incorporating national banks, and nationalizing state banks. If a state bank desires to become a national bank, it makes application to the comptroller of the currency on certain forms supported by proper vote of its stockholders and directors, and a certificate is issued authorizing it to be thereafter a national bank. The Supreme Court of the United States has decided that when a state bank is thus converted into a national bank, there is no change in its identity or corporate existence, and no interruption of the continuity of its business. Its allegiance by that act is transferred from the state to the nation, but the corporation is the same; its assets and liabilities are the same; and no transfer is necessary from the one to the other, because there never is but one corporate creature. (Metropolitan Bank v. Claggett, 141 U. S., 520.)

What a simple plan that would be if it is deemed necessary for the interstate railroad systems to become national corporations!

While Congress has no power to compel a state bank to become a national bank, because a state bank is no part of the fiscal machinery of the nation, it is submitted that it does have the power to compel a railroad system that is now engaged in interstate commerce to become a federal corporation.

The power of Congress to create a bank at all was contested until it was settled by the Supreme Court that such power was implicit in the power delegated to Congress to issue money and handle its finances. Jurisdiction of Congress over a railroad engaged in interstate commerce is delegated in a specific, plain, explicit, all-inclusive and plenary paragraph of the Constitution committing to it control over interstate commerce and all its instrumentalities.

If it be true that Congress has only implied power to charter a bank as a piece of machinery in its fiscal system it must be true that if Congress finds in the development of transportation that state lines have been wiped out, and that commerce disregards artificial obstructions, and that necessary machinery in carrying on interstate commerce is a railroad corporation, the express grant of exclusive jurisdiction over such commerce carries with it the power to create such a corporation.

If that is true, can it *compel* a state railroad company engaged in interstate commerce to become a federal corporation? No one questions its power to create such corporations, *ab initio*.

It has been decided by the Supreme Court of the United

States that no single state can create a railroad company and endow it, as a matter of law, with the right to operate its lines in any other state. Indiana and Ohio tried to do this conjointly. They created two railroad companies, each endowed with the same name, and having the same officers, directors and stockholders. The tracks owned by these two companies came together at the state line. Every effort was made to create a single corporation with the right to do business in both states. The Supreme Court held that there were two separate and distinct corporations and that, in the very nature of the case, one state could not give the power to its creature to go into the domain of another sovereignty of equal dignity and do business there, except by permission of the other state. Hence it is that all roads that cross state lines do business outside their native state by comity between the states. Comity is a privelege merely and not a legal right. (O. and M. R. R. Co. v. Wheeler, 1 Black, 286.)

The Southern Railway Company was able to merge its constituent lines running through 11 states by reason of the voluntary, but not necessarily concurrent, action of the several states and their corporate creatures. First, the states either by special acts or by general laws gave statutory permission for the railroad corporations to combine. Second, all constituent corporations had to take appropriate corporate action, through stockholders and directors according to by-laws and charter provisions, authorizing the particular step necessary to a merger. So that each of the constituent corporations was put into the combination by virtue of its own action taken by permission of its creator. Thus, by virtue of the express consent of the several corporations and of the express legislative sanction of the 11 states in which the Southern Railway system operates, something was created different from the aggregate of corporate powers previously vested in the subsidiary companies. The Virginia corporation known as the Southern Railway Company became an instrumentality of interstate commerce, not by virtue of comity among these 11 states, but because it crosses the lines of said states and hauls interstate commerce through them as a single entity and by virtue of the action of each of the states, and of the concurrent or supplemental action of the owners of each of the properties. Whether they intended it or not, it is a fact that every one of those states, and every one of those corporations, by such action, voluntarily submitted themselves to the jurisdiction of Congress through its exclusive control of interstate commerce, whenever it sees fit to act.

Congress has never exercised that power, but with all due respect to the eminent counsel who have raised legal objection to compulsory federal incorporation, no satisfactory reply has yet been made to the legal conclusion involved, viz., that Congress has the power, if it chooses to exercise it, to say that every system of railroads engaged in interstate commerce by virtue of consolidating constituent lines (and no other such system can legally exist unless originally created by Congress): "You are now an instrumentality of interstate commerce, and in the development of the commerce of this country it has become necessary that full jurisdiction of your functions shall be vested in the federal government. Therefore, you are required to transfer your allegiance from the state of your incorporation to the United States of America, in order that the federal government may take such steps hereafter in the control of your business and in the promotion of the interests of interstate commerce as from time to time it sees fit." Congress could then establish consistent and uniform control of all systems of interstate carriers.

If federal incorporation is made permissive only it is questionable whether Congress will not be embarrassed by some of the lines declining to accept federal charters. Many of them have tax exemptions and special charter privileges which they would hesitate to imperil. Voluntary action would certainly destroy these privileges, while, under compulsory action, these property rights might be preserved under other provisions of the Constitution not necessary to be here elaborated.

It should be repeated that this argument is confined to those lines which, by voluntary action, have been consolidated into interstate systems. They have thereby waived the right (if it exists) to object to Congress doing anything with them that it may desire to do if they expect to continue in interstate commerce.

As to the necessity of federal incorporation, there does not seem to be any room for argument. If the federal government is to vise and control the issuance of railroad securities, upon what principle, without the voluntary cooperation of the state corporation, can Congress interfere with its issue of stocks and bonds expressly authorized under its state charter? They may be not necessarily connected with its interstate commerce. Their proceeds may be needed for other purposes. Many railroad corporations engage in business other than transportation. The exercise of control over the securities of a state corporation by Congress is much harder to justify under existing law than the power to compel federal incorporation by interstate systems. The basis of the securities, especially the original issues, is the charter of the constituent companies, and not of the holding or operating company. Rights in these are vested and protected by the federal Constitution itself. But when the corporation operating the interstate system is compelled to transfer its allegiance to the federal government, subsequent issues of its capital stock and bonds may be regulated as Congress directs.

The contractual relation between a state and its corporate creature presents no obstacle to compulsory federal incorporation of interstate systems hereinbefore described, because the state has consented in advance that that may happen. When the state gave permission to its corporation to become a part of the instrumentalities of interstate commerce by virtue of its legal merger into an interstate system, it relinquished its right to object to any sort of control over that corporation which Congress might choose to exercise. Of course, until Congress exercises control the allegiance of the corporation remains with the state that created it. The argument is that both the states and the corporations, by virtue of the necessities of the consolidation that produced the interstate system, have contracted in advance that Congress may exercise jurisdiction over this legally established instrumentality of interstate commerce if, in its discretion, such action will promote the interests of interstate commerce. Such jurisdiction has been exercised in numberless ways. If, without destroying the corporation itself, it may be converted from a state corporation to a federal corporation, there is no legal reason why Congress may not constitutionally require it to make the change.

The national transportation conference called by the Railroad Committee of the chamber held its final meeting at Washington on June 5 and 6 and adopted a plan of remedial railroad legislation which it is expected will be presented at the first opportunity before the Congressional committees.

Careless marking and packing of goods sent by express, an evil which has been the cause of many delays and losses, has been in large degree cured, according to statements of officers of the American Railway Express Company, by the "drive" which has been made by that company during the past few weeks. Meetings of employees have been held in all of the principal cities and towns, and the men have been lectured on their duties in this respect; and large shippers are said to have aided the reform by seeing that their shipping departments paid better attention to the rules.

Railroad Y. M. C. A. Membership Drive

By John Moore

General Secretary, Railroad Department, International Committee, Y. M. C. A.

THE MEMBERSHIP WEEK drive of the Railroad Young Men's Christian Associations exceeded expectations. The goal was 40,000 new members, while the total secured exceeded 48,000. Some railroad associations made remarkable records. Albany, N. Y., for example, lifted its membership from 500 to over 1,500 men; Atlanta, Ga., from 682 to 1,065; Portsmouth, Ohio, from 680 to 1,140; Ennis, Tex., from 208 to 498; Derry, Pa., from 148 to 742; East Youngstown, Ohio, from 300 to 990; West Albany, from 260 to 794; Jersey City, N. J., which already had a total membership of 2,457, raised its membership to 3,000; the Pennsylvania Railroad Department at Baltimore, Md., secured 1,724 new members, while at Altoona, Pa., 953 were obtained. On the Pennsylvania Railroad alone nearly 14,000 new members were secured, and from all parts of the country come interesting stories of the remarkable work of individual men. To illustrate, at Secaucus, N. J., an Italian machinist, working in conjunction with two waitresses in the Association restaurant, secured over 100 members.

Among the beneficial results of Membership Week, apart from the total of new members secured, were:

First—The organization of more than 10,000 workers who not only obtained the 48,000 new members, but while so doing valiantly and successfully defended the Association against the charges of the prejudiced, the unreasoning and the malicious.

Second—The unusually large number of important operating officials who gave to Membership Week not alone their sympathetic co-operation, but also their practical leadership, giving time, strength and interest without stint. Among a long list of such men might be mentioned J. H. Hustis, district director of the New England District of the United States Railroad Administration; Elisha Lee, federal manager of the Pennsylvania Railroad; W. J. Fripp, general manager, New York Central Lines; C. W. Galloway, federal manager, Baltimore & Ohio; Chas. H. Ewing, federal manager, Philadelphia & Reading; G. R. Loyall, assistant federal manager, Southern Railroad Lines; E. W. Grice, manager purchases, stores and safety, Chesapeake & Ohio.

Third—There was a fine response by railroad men, for not only did nearly 50,000 of them join but many other thousands who for reasons beyond their control could not do so at present expressed the warmest sympathy for what the Association has done and is doing. Leaders of the international and local brotherhoods stood by the organization royally. Many of the most effective workers during the week were those high in the councils of the labor organizations. While the drive was in progress the Order of Railway Telegraphers, holding its annual convention in St. Louis, passed a resolution of cordial endorsement of the work of the Railroad Young Men's Christian Association.

Fourth—There was the heartiest co-operation from the Washington Administration. No clearer evidence of this fact could be given than the following telegram received from Director General Hines on the first morning of the week:

> I have recently learned that Railroad Young Men's Christian Association has set apart the week May 18 to 24 as Membership Week, when they plan to increase their membership from about 110,000 to 150,000 railroad men. I also understand that following this Membership Campaign, the Railroad Department of the Y. M. C. A. is planning a movement among railroad men, including among other admirable features, emphasis upon patriotism, thrift and health. I am very strongly of the opinion that the Railroad Y. M. C. A. is rendering a practical and helpful service which is appreciated by railroad men, railroad managements and the U. S. Railroad Administration. It affords me pleasure, therefore, to endorse the program in contemplation and I will await with real interest further information as to its success.

Fifth—It was a demonstration to the railroad world that the Railroad Young Men's Christian Association was equal to a great task. It is safe to say that this organization was never in the eye of the railroad world in its history as during these days. More than two score of family and technical railway journals gave large space to the Railroad Young Men's Christian Association, its plans, methods and ideals. They carried the story of Membership Week, and all it stood for, into the homes of literally hundreds of thousands of railroad men.

Sixth—It meant a steadying of the forces, both secretarial and lay, of the organization; the railroad associations have now learned by experience, after having put the question to its constituency that they are strengthened and not weakened by the vicissitudes of the past year; that there are tens and hundreds of thousands of men who believe in this important work all the more when it is under fire and put to the test. Membership Week added to the confidence of those who, while unshaken, were still somewhat troubled by the evanescent clamor of these turbulent days.

Seventh—Membership Week paved the way for the greater things to follow. It was not an end of itself, but only a means to an end—it was but the beginning of the larger developments to follow. In the near future equally well organized comprehensive and universal campaigns will be operated for the promotion of activities programs. Definite weeks will be set apart for the wider and more thorough organization of religious work, educational work, work for boys in railroad communities, and for new emphasis upon such vital features as health, happiness, Americanization and thrift. What the Railroad Department has demonstrated it can do in securing members it can also do in serving members. The only excuse for Membership Week was that it prepared the way for what is to follow.

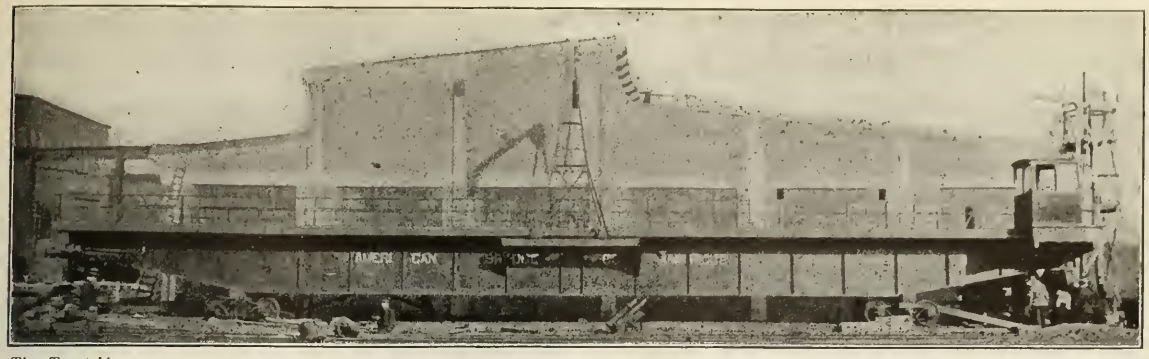
Eighth—These memorable days opened the way for new associations. To illustrate, at one point where there is no railroad association 600 men agreed to join provided an association could be organized there; while at a number of other points seed was sown that will mean the springing up of new associations to serve railroad men.

Ninth—Membership Week also brought new possibilities of extension to many existing railroad associations. For example, Albany, N. Y., even before the week had closed, had decided upon improvements and alterations costing $15,000 so that the association might more adequately care for the large number of new men who had joined. Elsewhere throughout the country secretaries and directors are now employed in making a study of how to adapt and enlarge present equipment so as to meet the new and pressing demands.

Tenth—Membership Week brought the Railroad Department to the attention of many leading foreign railroad officials who are in America at present, and who expressed the keenest interest in Membership Week while in progress, and surprise and appreciation at the remarkable results.

This drive, resulting in securing nearly 50,000 new members, was conducted in the face of unusual difficulties. For example, first, the unsettled conditions of the railroad world at present; second, the fact that large numbers of men had been dropped from the payroll during the usual spring dismissal; third, the still embarrassing though rapidly dying criticism of Association work overseas; fourth, the fact that it followed hard upon the Victory Loan and was conducted during the week when the Salvation Army and Methodist Centenary were conducting nation-wide campaigns, while there were also in operation numberless local campaigns of one sort or another.

The executive committee in charge of Membership Week was composed of the following railroad men: E. W. Grice, Chesapeake & Ohio; G. E. Chance, Illinois Central; C. A. Skeele, Pennsylvania Lines West; C. A. Merrill, Boston & Maine; J. T. Sleeman, P. & L. E.; R. V. Carter, Louisville & Nashville; Tull C. Waters, Southern, and C. Manning, Grand Trunk.



The Turntable

New 110-Ft. Turntable Built for the Pennsylvania

An Adjustable Center Permitted the Adoption of a Continuous Three-Point Supported Type Table

A CENTER BEARING, adjustable vertically over a range of one inch by means of screw-operated wedges, is one of the main features in the 110-ft turntables recently designed by the Pennsylvania Railroad and which are now being installed at certain of its more important engine terminals. This vertical adjustment has permitted the development of plans for tables of the three-point supported type, the design of which includes many novel and interesting features, especially in the avoidance of the use of tables of the usual balanced type with their objectionable features, particularly in tables of such extreme length.

These 110-ft. turntables were designed in anticipation of the increased requirements at engine terminals incident to the impending introduction into service of new Mallet engines of the HC1's type, one of which is now under construction in the company's Juniata shops. These locomotives have a wheel base of 97 ft. 3¾ in., an over-all length of 105 ft. 9¼ in., and an estimated weight of 555,000 lb., exclusive of the tank, which weighs 219,000 lb., or a total weight complete of 774,000 lb. Owing to the extreme depth of the turntable girder required for a balanced table of such great length, and further because of the operating conditions which make it difficult to spot a locomotive of this size and weight with any degree of accuracy, it was deemed inadvisable to construct the turntable along the usual lines of the balanced type of table. Furthermore, the teetering action of the balanced type table has an undesirable effect on the approach rails and outside trucks, due to pounding, which is augmented seriously as the length increases. It was therefore decided that the new tables should be of the continuous girder three-point supported type, with the weight of the table and its load distributed over the center and the four end trucks. Exclusive of the tractors and center the table complete with the end trucks has a weight of 75 tons.

Reliability of service, together with low maintenance costs, were the main objectives of the design while in the preliminary studies particular attention was given to the requirements of traction. Time studies were made of the various turntable operations at existing tables and the information thus secured was utilized in the design of the 110-ft. turntable tractors to insure that the operating cycles of the new table, with its greater loads, would not exceed those at the smaller tables and that the new tables would be able to turn an engine end for end in 60 sec. Special attention was given to starting and stopping the table in order to avoid excessive whip action, with the result that the maximum acceleration does not exceed 0.35 ft. per sec. with a maximum circumferential speed of the table of 240 ft. per min.

Reliability of service has been further provided for by the utilization of two tractors, either of which is capable of turning the table under emergency conditions. These two tractors are provided with sufficient traction to eliminate the use of sand for traction purposes and the consequent hard running of the turntable trucks due to increased rolling resistance. These two tractors travel on the same circle rail as the turntable trucks.

Low maintenance costs are further ensured by the permanent character of construction employed through the foundation, the circle rail, the circle wall, the bridge, the deck, and the electrical apparatus. In the design of all parts simplicity, accessibility and interchangeability are the chief objectives. Cast iron was utilized wherever possible because of its resistance to corrosive action. For the same reason galvanized iron was used for hand rails.

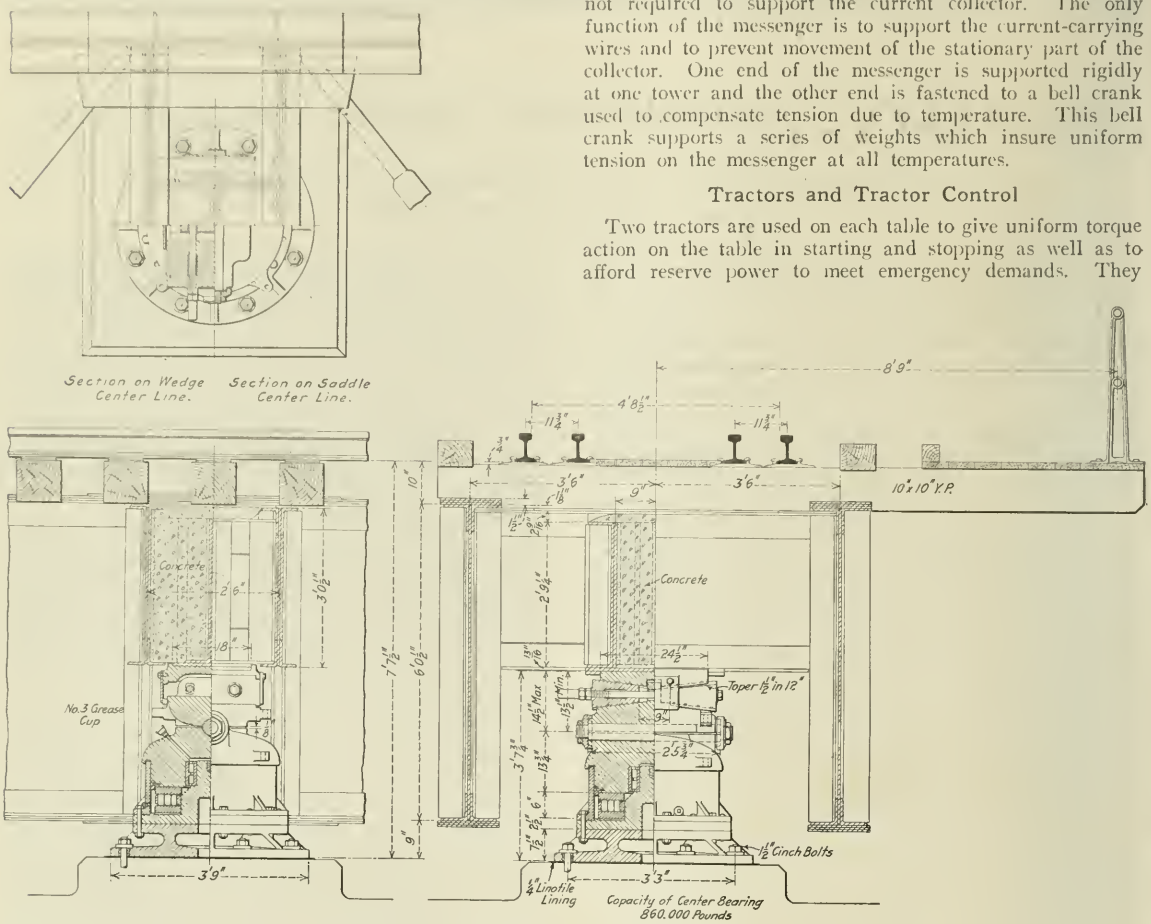
To eliminate the pounding out of the approach rails and approach rail supports at the table ends and at the approach rails, cast steel end ties were installed at the ends of the turntable bridge and cast iron coping castings were used on the coping wall, the cast steel end ties being lined to the exact center line of the turntable bridge and brought to alinement and level by means of stereotype lining between the end tie and the girder flange plate and secured to the turntable bridge by means of eight one-inch bolts. Diametrically opposite tracks to the turntable are also perfectly lined. The same permanent character of construction is employed in the pit, where the circle rail of 150-lb. section, bent cold, is held in place on 33 cast iron support castings firmly secured to the concrete. The adoption of the three-point supported type table permitted of the use of girders only 6 ft. ½ in. deep, reducing materially the depth of pit required. These pits are drained from the center to a sump from which the discharge is by gravity or a syphon according to conditions.

The Center

In order that this table should function properly on its three points of support it is necessary that one of the supports be adjustable so far as vertical alinement is concerned. This adjustment is accomplished in the center by means of

screw-operated wedges, the total range of adjustment being one inch. As the load of the table comes down on the sole plate it bears on wedges, which in turn, through their wedge castings, bear on the equalizing hinge pin, thence on the thrust bearing proper. This thrust bearing is of the roller type with a babbitt liner between the lower roller race and the center casting to insure uniformity of bearing pressure. The load from the turntable center is transmitted to the concrete center pier through a ¼-in. linotile liner, which insures a uniform resilient bearing for the steel casting on the concrete.

The capacity of the center bearing is 860,000 lb. and it is fully grease lubricated. It has been designed and built with a view of making it accessible for inspection or repairs.



General Arrangement of the Turntable Center

The upper half of the center proper can be removed from the base casting and the entire center slid out of position and passed up through the deck of the table; to perform this operation it is only necessary to jack up the table approximately three inches. All the adjustment wedges and the wedge screws are thoroughly protected against corrosion and grit. The center is all of steel except for the housing shell which is of cast iron.

Current Collector

Overhead current collectors for the usual type of balanced turntables, must be suspended from the overhead wires, owing to the fact that any portal construction over the center of the table must necessarily oscillate back and forth over a considerable distance, when the locomotive is moving on or off the table. Since stability in this direction is secured in these tables through three points of support, and the table does not rock on the center bearing, the collector is bolted securely to the center of the portal.

The collector in itself is of interest in that it is of the sectional type, made up of standard parts, and may be used for direct current, or one, two or three phase alternating current collection as required. It is weather, gas and steam proof.

Structural steel poles placed on opposite sides of the engine house circle, support the overhead wire. One messenger wire is provided instead of the usual two and it is not required to support the current collector. The only function of the messenger is to support the current-carrying wires and to prevent movement of the stationary part of the collector. One end of the messenger is supported rigidly at one tower and the other end is fastened to a bell crank used to compensate tension due to temperature. This bell crank supports a series of weights which insure uniform tension on the messenger at all temperatures.

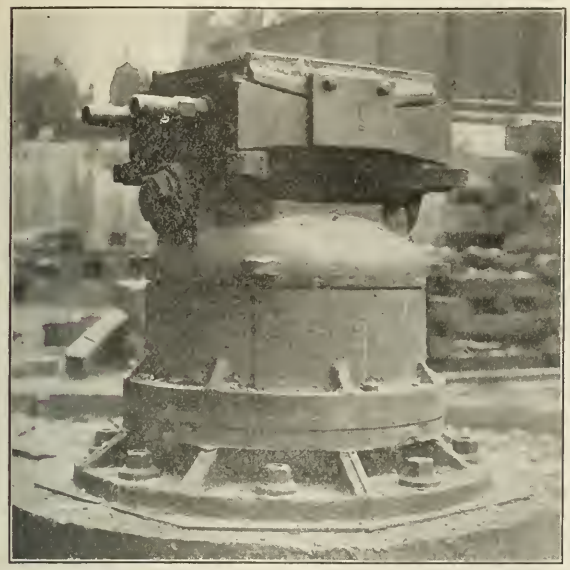
Tractors and Tractor Control

Two tractors are used on each table to give uniform torque action on the table in starting and stopping as well as to afford reserve power to meet emergency demands. They are operated in multiple from one controller located in a cab on one end of the table.

There are three points of particular interest in connection with the tractors and their control. The first is that two motors are used, one on each tractor, of approximately 30 hp. each. This is considerably more power than is used on the ordinary type of table but since a table of this kind does require more power for operation than one in which the locomotive is balanced on the center bearing, and since the operation is fast and must always be dependable, one tractor working alone, can be used to operate the table in an emergency.

The second point of interest is the controller. A type of

controller has been developed which is used to control one or both motors, and which may be used on any table of this type without regard to the kind of electric power available. The same controller may be used for direct current,



The Center Is Adjustable by Means of Screw Operated Wedges

single phase, alternating current, three phase alternating current, and three-wire or four-wire two phase current.

The third point of interest lies in the fact that the motors are equipped with solenoid brakes. The brakes are applied instantly when the controller is moved to the "off" position and are released automatically when power is applied. The brakes are adjusted so that the braking effort corresponds to the maximum torque of the motor. With this type of table the solenoid brakes make it possible to operate the table without any of the so-called locking devices to hold the table in alinement with the approach tracks.

For direct current, 27½-hp. motors are used and 30-hp. motors have been adopted as standard for alternating current. Power is transmitted from the motor to the driving wheels through two sets of gears and intermediate shaft, with a total gear reduction of 25 to 1. As the tractor is provided with plain cylindrical tires, it was necessary to include in the design a suitable thrust bearing to care for lateral thrust on the drive wheel and the tractor. This thrust bearing is located on the inner side of the tractor.

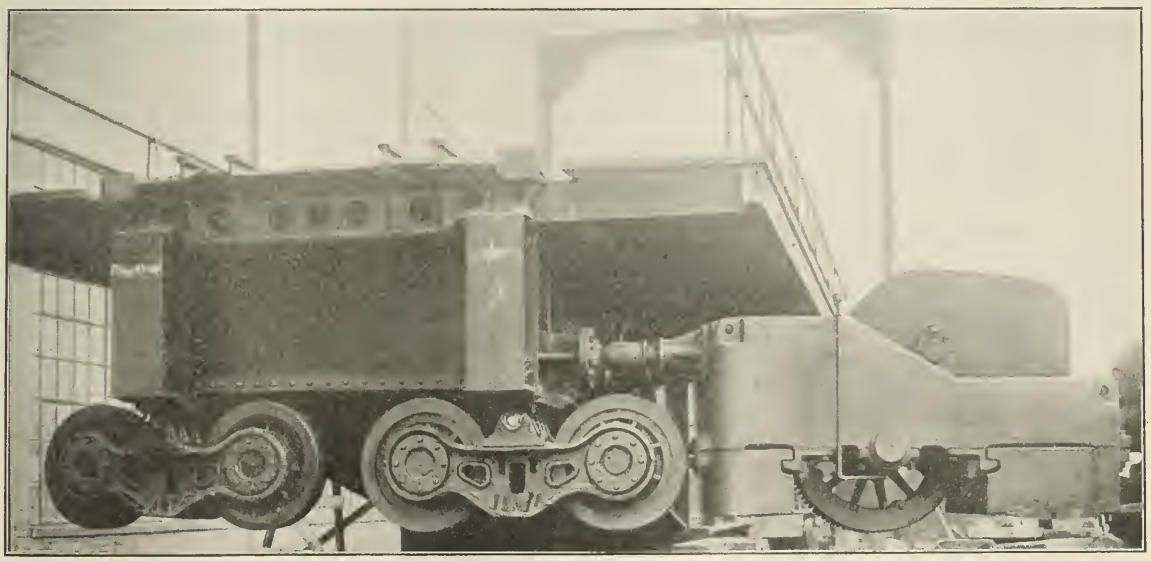
In case of accident to either motor or to any part of the driving mechanism, electrical cutouts are provided for cutting the damaged motor out of service without affecting the operation of the other motor, while the solenoid brakes can be blocked in the "off" position. A motor may be disconnected mechanically by removing the split main gear or by removing the motor itself.

The two tractors engage the table through ball and socket connections located at the end of the stabilizing arms. All bearings of the tractors are grease lubricated. The tractor weighs approximately 23,000 lb. in working order, giving a total tractive effort of 12,000 lb. per table.

The tractor frames, on account of the weight required, are made of solid cast iron with suitable ballast weights suspended from the lower surfaces. Special attention is given to the machining up of all mechanical parts with a view to insuring absolute interchangeability for repairs. All gears are fully enclosed against the weather. The tractor wheels have cast iron centers and steel tires and are provided with cast steel cut gears. The bearings are all of brass.

When operating at night the table is lighted by floodlights on each end which illuminate the approach rail ends. The operator's cab is electrically heated and is lighted with a small, well shaded lamp to keep down the reflection.

The end trucks on the table are of the cast steel frame type with hinge connection centers. The hinge casting is provided with a compound angle in order to give proper angularity in all directions. The center line of hinge pins are in radial planes intersecting at the common center of rotation. All truck wheels are 30 in. in diameter, coned, with steel tired treads and cast iron centers. They are pro-



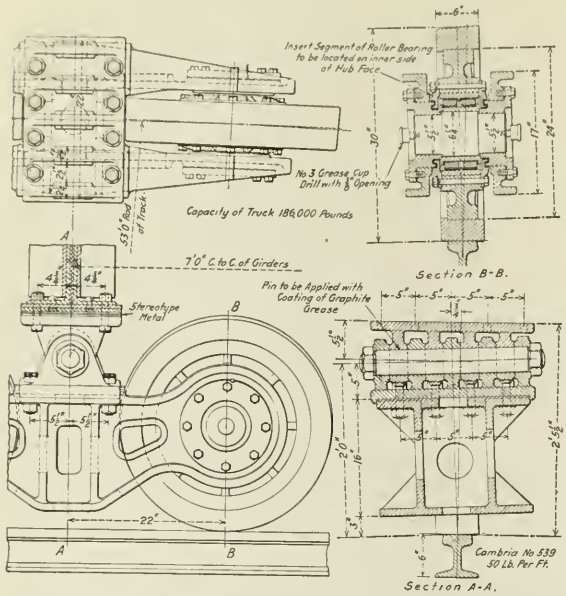
The Trucks and Tractor

vided with roller bearing centers with the bearing enclosed in a labyrinth casing, the details of which will be clear from an inspection of the truck drawing. The trucks are fully grease lubricated.

The truck hinge castings as well as the end steel ties on top of the girder are lined to the girder flanges by means of stereotype metal. The trucks each have a capacity of 186,000 lb. and travel on the same circle rail as the tractors. They may be removed by taking out the hinge pins located in the hinge casting at the girder.

Coping Wall

In order to insure that there will be no settlement at the coping wall on account of pounding due to the engines, cast iron coping castings were employed instead of wooden sills. These castings are arranged one for each approach track and are thoroughly embedded in concrete and bolted thereto.



Details of the Truck Construction

These coping castings are accurately alined to the approach tracks and weigh about 9,000 lb., are 5 ft. 6 in. long, 12 in. deep and 30 in. high. They are made of one-inch material.

The circle rail on which the trucks and tractors run is 106 ft. in diameter and is supported on 33 support castings, each 9 ft. 4 in. long, 10 in. high and 12 in. wide and made of ⅞-in. material. The end cast steel ties on the bridge have a maximum depth of 12 in., a minimum width of 8⅜ in. and a flange width of 5 in., and are made of one-inch material. They support both the traction rail and the guard rails and are lined to the bridge girders by means of ⅜-in. stereotype lining.

The design of this table was developed under the direction of A. S. Vogt, mechanical engineer, now retired on age. Tables of this type have been installed at Pitcairn, South Philadelphia, Erie, Kane and Renovo, Pa., and at Gardenville, N. Y. Others will be installed in the near future at Wilmington, Del., Youngwood, Pa., Pitcairn, emergency table, and at East Altoona.

The number of cars of grain loaded in the Central Western region in May increased 30.6 per cent over the records for May, 1918; coal increased 40.3 per cent, and livestock 7.7 per cent.

Restoration of I. C. C. Rate Power Proposed

THIS HAS BEEN a hard week for the Railroad Administration in Congress. After the House had reduced its appropriation by $450,000,000, thereby renewing interest in the prospect for a rate advance, which Mr. Hines says seems necessary, but which he desires to postpone as long as possible, an effort was made in the Senate to pass Senator Cummins' bill to restore the former jurisdiction of the Interstate Commerce Commission over rate-making by depriving the director general of the authority to initiate rates without suspension by the commission, which would interpose an obstacle to a rate advance. The bill was taken up in the Senate on June 10 and was debated on the following day. It was introduced by Senator Cummins at the last session, but failed of passage. In its report on the bill, the Senate Committee on Interstate Commerce said: "It failed only because it was impossible to secure a vote upon it in view of the expiration of the Congress. It is believed that substantially all the members of Congress and the people of the country desire its prompt enactment into law."

The bill provides that during the period of federal control the right to initiate or change rates, fares, charges, classifications, regulations and practices, exercised by the carriers now under federal control prior to December 29, 1917, shall hereafter be exercised by the President or by the director general of railroads, but such right as to interstate commerce shall be exercised under all the limitations and conditions which were imposed upon said right by the act to regulate commerce. Senator Cummins said the purpose is to restore to the commission its full and complete authority over the railway rate structure. The war is now over, he said, and he thought it was the desire of every person, the Railroad Administration included, that the jurisdiction which the commission formerly had should be restored.

"I am led to make that remark," he said, "not from any communication which I have had with the officers of the administration, but because it has become the policy of the Railroad Administration to refer these matters largely to the Interstate Commerce Commission. The Railroad Administration has discovered the impossibility of dealing with railroad rates in a way just to the public, to the shipper and to the government itself. The bill does nothing more than put the President and the director general in the stead of the railway companies, so far as initiating rates is concerned, and when the rates have been initiated the commission has the same authority over them for suspension, for revision and for investigation that it formerly had over the railway companies."

Senator King, expressing sympathy for the bill, asked whether those in charge of the railroads might not attempt to lay the blame for the future losses and deficits upon this legislation. He said that government operation will be a failure and will involve expense and extravagance no matter who is in control of it, and he did not want to impose restrictions which would make it more difficult.

Senator Nelson of Minnesota strenuously opposed the bill because he said, while it restores to the Interstate Commerce Commission the full control of interstate rates, it leaves intrastate rates absolutely under the control of the Railroad Administration. Senator Cummins said that was the judgment of the committee as to what ought to be done during the balance of the war control period because to transfer to one branch of the federal government the right to revise or suspend rates which have been initiated or published by another branch of the federal government is a very different thing from restoring to the several states their power over intrastate commerce. He said the bill will

stand upon its necessity as a war measure and that if the rates which have been made by the director general are to be reduced in the various 48 states of the Union without any possibility of co-operation and without any possibility of relating the rates to each other, the railroad losses at the end of the present year may reach $750,000,000. While many of the advocates of the bill have been inspired by the thought that it would prevent the director general from a further increase in rates, Senator Cummins said that was not his purpose.

"I think," he said, "that rates will have to be very much increased all over the country. I am sorry to say that; no one regrets to say it more than I do, but unless a miracle happens our total loss at the end of the year cannot be fairly estimated at less than $600,000,000 or $650,000,000. Somehow we must bring the expenses of the railroads and the revenues of the railroads into closer relation with each other. If we do not we are lost in hopeless bankruptcy. We will not only have imposed upon the United States a vast doubt, but we will have so impaired our transportation facilities that they will not answer the demands of commerce. There is no man who is so anxious to return these properties to private operation as I am, but if we were at this moment to pass a bill such as the telegraph bill, there is not a railroad, possibly save two or three, that would not be in the hands of a receiver within 30 days."

Senator Pomerene expressed himself in hearty accord with respect to getting the rate-making power out of the hands of the director general's office, but said that it was necessary that there should be some general legislation bearing on the subject. He had consented to the report of the bill in its present form because the director general had increased rates inequitably and had attempted to formulate a committee or commission which was operating independently of the Interstate Commerce Commission. He pointed to some of the very large increases in rates in the middle west and said he wanted to get as much as possible of the rate-making powers taken away from the director general's office "out of the hands of some of the incompetents" and restored to the Interstate Commerce Commission.

The Senate committee held hearings on Tuesday and Wednesday on the Poindexter bill for a rigid long and short haul clause. H. C. Barlow of the Chicago Association of Commerce, J. C. Lincoln of the New York Merchants' Association, and C. L. Chandler of the Boston Chamber of Commerce, vigorously opposed the bill, which has strong support in the committee. A large number of western Congressmen have also introduced similar bills.

Chairman Esch of the House Committee on Interstate Commerce is hoping to begin public hearings on the proposed general railroad legislation either next week or the following week, to continue perhaps for two months. The Senate committee is planning to tackle the problem in executive sessions, working on a draft of a bill and calling in various men to advise it from time to time, although Senator Cummins may introduce his bill as a starter.

The Second Pan-American Commercial Conference

Need for Railway Extensions and Investment of American Capital Among Points Considered

"YOU TO THE SOUTH of us must help to restore European industry," said Frank M. Vanderlip, until recently president of the National City Bank, to the thousand or more delegates in attendance at the Second Pan-American Commercial Conference which ended its sessions in Washington on Friday evening of last week. "This does not mean financial advances," he continued. "I believe there should be a group of nations, including those which are here represented and some of the neutrals of Europe and possibly England, which should lend not money in the form of credits but materials, equipment"—and in this Mr. Vanderlip included railway supplies as an important factor—"and food necessary to start those industries. Charity is not needed nor loans by one government to another. I believe that securities can be created and floated in these several countries in proportion to the amount in which the loans are made and I believe that this expedient will avert the great catastrophe."

The conference was addressed also by Edward N. Hurley, chairman of the shipping board; Charles M. Schwab, president of the Bethlehem Steel Corporation; Thomas R. Marshall, vice-president of the United States; F. H. Gillett, speaker of the House of Representatives; by several trade and diplomatic representatives of the Latin American countries as well as by other leaders of North and Latin America, and there were few aspects of trade and commercial relations that did not receive careful and detailed consideration in the five days of the conference from Monday to Friday.

As briefly noted in last week's issue, page 1385, several speakers pointed out the need of railway development in Latin America and the advisability of investment of American capital with the end of bringing the building of these railroads and making accessible the great mineral and other resources of these countries.

The Thursday afternoon session was entirely devoted to the subject of engineering aids to commerce and at this session papers were read on railroads, roads, etc., one of the more important of these being an address by Percival Farquhar, who has been a leader in South American railway development.

Peru

"If the development of its commerce is of the greatest importance to Peru, the investment of capital in productive undertakings is of still greater moment," said Dr. Francisco Tudela y Varela, ambassador from Peru, who addressed the conference on Tuesday. "Few countries offer a better field for remunerative investments than Peru. Irrigation, the building of railways and good roads, as well as mining, are especially to be recommended. * * *

"With regard to railways, it is enough to state that the whole future of Peru is bound up in the construction of railroads, and that all those which have been projected offer returns of absolute security for the capital which may be invested in them. Several mining zones of great richness would be at once available by the construction of a few hundred miles of railway lines. To mention coal alone, although Peru possesses immense layers in different regions of the country, this article is still imported from abroad to complete the deficiency of home production. A railway of only 15 miles, branching from the one which starts from the splendid port of Chimbote, would solve the problem of coal supply sufficient for the needs of all the republic and

would initiate an era of domestic prosperity of almost incalculable value."

Venezuela

"I should like very much to apprise this conference of the legislative efforts Venezuela has made in the last few years in order to be ready for the full development of her immense and untold resources and to offer inducements to foreign capital and to industrial enterprises," said José Santiago Rodriguez, of the special financial mission from Venezuela. "The law of railroad concessions, for instance, is conceived in a very generous spirit. Concessions of this kind are granted to Venezuelan or foreign companies and also to private individuals. The privilege for the exploitation of railroads may be extended to cover a period of 4 years, and during that time no concession is granted for the establishment of another line or the construction of aerial cables which may compete with such railroad, within a zone of 20 km. on each side of the line. It is sufficient, however, that an option be reserved in the contract in order that the extension of the road may be lengthened if the contractor should desire. The companies entering into such contracts are not subject to the payment of any special taxes; they are granted the full title of the national waste lands (belonging to the nation) for their lines, stations, offices and depots. The railroad proper may be built within a line 60 metres wide. Railroad companies wishing to build a railway in Venezuela may also obtain lots of land still larger for the purpose of establishing colonies thereon and this may include grants of 100 hectares of land for each kilometer of railroad constructed. As these enterprises are considered of public utility, the law recognizes their right of expropriation of private land where the railroad line offices and depots are to be located. Besides these advantages they are granted the following franchises: Free introduction for the first 25 years of the material, machinery, tools and other apparatus necessary for the construction, exploitation and maintenance of the lines; the right to cut from the national forests, without any indemnity whatsoever, the necessary lumber for the construction and maintenance of the lines; the right to use from the national lands the necessary material for the same purposes; permission to build telegraphic and telephonic lines for the service of the company and lastly; the privilege that the employees and working men employed by the company shall not be liable for military service except in case of international war."

Mexico

Information concerning the railways of Mexico was given by Juan B. Rojo, charge d'affaires, and Francisco de Hoyos, purchasing agent in New York for the Mexican Government Railways. Señor Rojo said that conditions in Mexico were much better than people in the United States were inclined to believe. He said that earnings on the Mexican railways were greater than they had ever been despite the loss of 10,000 cars and a very severe shortage of motive power, although he did admit that traffic was running "with more or less regularity." He also said that efforts were being made to come to agreement with the United States Railroad Administration relative to through traffic arrangements and that Mexico was trying to secure power from railroads in the United States.

Bolivia's Need for Railways

An informative paper on the railways of Bolivia by Julio Lamora, financial agent of the Bolivian Government, was read at the Thursday morning session, and a detailed printed report covering somewhat the same ground was presented to the delegates by Joel Manuel Gutierrez, Bolivian consul general at New York. Bolivia has tremendous natural resources, to a great extent inaccessible for lack of railway connections, and Senor Zamora is now in this country as the representative of his government endeavoring to secure a loan of some $7,500,000 for new railway construction. In speaking of this situation, Senor Zamora said in part:

The Bolivian people have realized that the most sensible thing to do in order to be in readiness for the natural development of its unexploited riches is to construct railroads; therefore, the collective effort of the republic has been directed to their construction. Bolivia not only produces silver, gold, tin, tungsten, antimony, bismuth, copper, etc., as is generally known at the present time, but she also possesses fertile regions suitable for agriculture, wonderful plains for cattle raising on the north and northeastern territory, and vast forests which produce all fruits and woods known to the world. Unfortunately exploitation on a larger scale cannot now be effected, due to the enormous distances separating these regions from the consuming towns or seaports.

With the desire to reach by rail the most distant and wealthiest places of the republic, a plan was inaugurated in 1916 and a contract entered into with the National City Bank and Speyer & Co. to construct a system of railroads by means of a construction company, capitalized with five and a half million pounds and secured as follows: The American firms contributed three million pounds in first mortgage debenture notes on the railroad to be constructed, and two and a half million pounds were subscribed by the Bolivian Government on income bonds issued on second mortgage, which are to be cancelled in the year 1932. This contract was duly carried out by both parties. The roads were constructed and the capital entirely expended. These roads are now in full operation and their profits are increasing daily, thus confirming the expectations which originally induced the capitalists to undertake the work.

The railroad system now completed and in operation comprises the following lines: Oruro-La Paz, Oruro-Cochabamba, Potosi-Rio Mulato to join the main trunk line of the Antofagasta-Oruro, and the line from Uyuni, another station of the main system, towards the Argentine Republic, joining the Central Norte Argentino, which has the same standard 3 ft. gage as the Bolivian railroads, and which is also the gage of the Arica-La Paz Railway.

The completed system will link the Atlantic and Pacific oceans by a railway starting in Buenos Aires, and terminating in the Pacific port of Arica.

The above shows the great international importance of this work in the completion of which the Bolivian Government is so keenly interested and for which it is seeking a million and a half pounds loan which will be explained further on.

The capital obtained through the Speyer contract was only enough to carry out the work of those lines as above stated and it is the aim of the Bolivian Government to continue the extension of the railroad system securing fresh capital and new contractors. Those lines to be constructed, or in the course of construction, are:

(a) Atocha-Tupiza Railroad, with an estimated cost of one million pounds sterling, to join to the Argentine System. I have stated before the international significance of this road and I shall only add that it goes through a region of unexhausted wealth where the "Quechisla" and "Oploca" mines are located.

(b) Potosi-Sucre Railroad, now under construction by the government. It is estimated that one million pounds will be necessary for its completion. This line has industrial significance as it is the first to be extended into the productive eastern agricultural and petroleum districts.

(c) Cochabamba-Santa Cruz Railroad; surveys on this

line are actually being made, and it is also very important, as it will connect the Speyer System with the wealthiest district of Bolivia, a zone which produces rice, sugar, woods and similar tropical products, and also cattle. The actual production of which is now very limited, due to lack of cheap transportation facilities.

(d) Railway from La Paz to a navigable point on the Beni River. This itself means a very important route running through vast and wealthy agricultural regions to the heart of rubber plantations. It is now under construction by the government with American capital. To start this work Bolivia secured a loan of five hundred thousand pounds, through the banking house of Chandler & Co., and this sum will only suffice to reach the Yungas zone. Its principal production consists of cocoa, coffee, tobacco, fruits and woods. We now require the necessary capital to extend this line to the Beni.

Here, to interest American capital on the loan required by the Bolivian Government, I want to point out the following:

The Speyer System, which runs through the heart of Bolivia, has been constructed with American capital, and will be the exclusive property of Americans the moment they return to the Bolivian Republic the two and a half million of pounds which represents the share of the Bolivian government on second mortgage bonds.

All the benefits of these railroads, and the increased value that they will attain through the development of the country, will also benefit the owners. There is no doubt that these four lines will ultimately be joined to the South American system of railroads, and that they will bring into closer contact regions now far distant. These facts will be of such interest to American capitalists that the necessary funds that Bolivia needs for the extension of these lines will assuredly be forthcoming.

Railways in the Americas

By Percival Farquhar

In the Americas railways have preceded wagon roads and have been the means of transportation and development of the interior in a sense not true with the eastern hemisphere.

There is a general similarity of conditions between South America and the United States as distinguished from Europe outside of Russia, in that transportation averages large distances to the seaports owing to the great bulk of the countries, compelling attention to grades, train loads, etc., not necessary in western Europe where no portion of any country is distant more than a few hundred miles from a seaport on the Atlantic or on the North, the Baltic, the Mediterranean, the Adriatic and the Black Seas, penetrating the continent in so many places.

In the United States railways have been constructed by private initiative and capital with the one exception practically of the mountain and desert link of the first transcontinental line, and their location and construction were carried out with a view to operating results, as the only expectation of remuneration was from the net earnings to be obtained through the transportation of freight and passengers. Trunk lines with low grades, capable of carrying heavy train loads, have enabled transportation in the United States to be carried at the lowest rates of any part of the world. The well distributed, cheaply mined coal of good quality has contributed to this also. As a result railways in United States paralleling river and canal navigation have largely superseded the latter in the economical handling of freight.

One great problem that railways in new countries have to meet is the opening of sparsely settled, undeveloped territory in order to permit of its settlement and development. Here, unless railways come first, the development may be long delayed, and this has led many South American countries to foment the construction of railways by a guarantee of interest on the capital necessary to construct them. Where this has taken the form of a guarantee per kilometer or mile of railway construction, it has led to the location of the railway with a view to cheap construction for such unit of length and a constant use in both directions of the maximum of grade allowed in the concession; with the result usually that such railways cannot transport the produce of the country from more than a hundred miles in the interior, and can never be made into an efficient apparatus of transportation no matter how much money may be spent on them. This character of construction should be limited to branches of well located trunk lines and in cases where they themselves could not become trunk lines or have a heavy traffic. In many cases the temptation of the meter gage railway has been yielded to owing largely to the sharper curves of which it admits and some small economies of construction. But the penalty paid in the operation of the narrow gage railway increases with its length and the lessened stability of the trains requires much better upkeep of the track than is the case with the standard gage, and for obvious reasons, when once fastened on a country, the narrow gage is difficult to be gotten rid of. In a country like Argentine, where in general there are no cuts, no fills and no bridges, the narrow gage adopted by some foreign railway interests and by the Argentine Government lines has the less defense. The bulk, of the railways of Argentine are 10 inches wider than the standard gage and yet the cars and locomotives are no wider than American standard gage cars, which deprives these railways of the great advantage of the heavier train loads which the wider gage should give them.

The largest of the European countries and one which at present would hardly be considered a guide for anything in the economical sense, Russia, has successfully used a formula for railway construction which not only is theoretically sound, but has worked unusually well in practice. Under this the so-called private railways were constituted with somewhat less than one-half of the railway mileage in European Russia and gave an efficient transportation system with the next lowest rates in the world to those of the United States. The principle was that of enabling capital to be raised at the lowest rate of interest possible by loan of government credit, at the same time securing efficiency in the expenditure of this capital in the construction of the railways and in their operation afterwards through private management with a sufficient financial stake in the results. The state furnished 19/20 of the capital in the form of guaranteed bonds and private capital 1/20 in the form of stock. The net earnings went somewhat as follows: 2 per cent on the guaranteed 4½ per cent bonds, then, say, 2 per cent on the stock, then 1 per cent on the bonds, and then 2 per cent on the stock, then the balance 1½ per cent on the bonds, completing the 4½ per cent interest guaranteed, and then 2 per cent on the stock, completing 8 per cent dividends, after which the surplus net earnings were divided in some cases four-fifths to the state and one-fifth to the stock, or in some cases 9/10 to the state and 1/10 to the stock, that is, in a proportion either four-fold or two-fold greater to the stock than the proportion of money represented by it.

The directors were elected by the stockholders of the company and the railway was operated with a keen sense of the advantage of valorizing the property in the interest of the stockholders. As a matter of fact, before the war the stocks of these private railways earned so well even at the lowest rates of transportation of any railways in Europe, that they sold from 200 per cent to 500 per cent on their invested capital and no one grudged their returns and the state fared well on its proportion.

The feature of this plan is to make it at all times the

interest of the private capital and its managers to locate and construct the railway with a view to its operation and to manage its operation efficiently, and this is one of the reasons the government gives the stock some of its results before it gets its full returns on the bond capital.

This formula, with some variations, might well suit the conditions of the railway development in the Americas, especially South America. In fuel South America has been handicapped compared with the United States and with Europe. The further increase of miners' wages and reduction of the hours of labor in Wales, hitherto South America's chief source of supply, emphasize her need to develop local fuel, possibly powdered Brazilian and Chilean coal which gives good efficiency, and there are great areas of oil in the Andean slopes both east and west. Oil is the widest distributed of fuels and is found in quantity where formerly geologists considered it impossible to exist, and is not unlikely to be found in other areas of South America where it is not now known. Cheap fuel is a key to the problem of cheap transportation in South America, and cheap fuel is not likely to be obtained from another hemisphere.

New railway construction in the Americas now confronts special difficulties in the high cost of rails, rolling stock, material, supplies and labor for some construction and also fuel for operation, likely to continue indefinitely; and the indisposition on the part of the public authorities and public sentiment in all countries to allow railways to make much profit even in the rare cases where their rates and concessions would permit them to do so, to say nothing of the present unusual demands from so many sources converging on the money markets of the world. It is not easy to foresee just how the requirements for railway development of the Americas in the near future are to be met.

This is a grave enough problem in the United States concerning the danger of not meeting demands upon transportation of which we have had repeated warning from one of our greatest railway authorities, James J. Hill, but it is even more serious for our South American neighbors whose total railway mileage is 45,000 compared with 270,000 in the United States, half the area of South America. This disproportion is even greater than it seems, as half the area of the United States is arid, semi-arid or roughly mountainous, which is several times the proportion of South America, which must be subtracted from possible area of development.

In addition to the new construction, there is a vast amount of deferred betterments on the existing railways in the Americas, rolling stock, sidings, new rails, additional terminal facilities, etc. The legislation of the Congress of the United States in connection with turning back the railways here will determine to what extent these betterments here can be financed and carried out.

The railways in Latin America have been financed practically entirely with European, especially with British, capital, and the railway companies concerned have been organized as a rule in the countries furnishing this capital. It cannot now be determined to what extent Great Britain and other European countries will be able to finance the requirements of their railway companies in this hemisphere, but it would seem that the demands on them for capital at home and from their colonies might not leave available sufficient funds for their railways in Latin America, so that they may wish the United States to join in this financing which will run into large figures. This, at the same time, would aid materially in the interest of the stability of the investment.

In such case some formula must be worked out which would enable the United States to join. As the world's peace depends largely upon the ability of the present principal allies to continue to work closely together, industrial co-operation in investment in foreign fields would be helpful.

Short Line Convention

A DEMAND THAT CONGRESS give immediate and intensive consideration to the general railroad problem with the object of stabilizing the transportation system and allowing an adequate basis of rates, was voiced in resolutions adopted at the convention called by the American Short Line Railroad Association held in Washington last week.

Most of the time during the first two days of the meeting was devoted to speeches, which were reported in last week's issue. At the concluding session on Thursday afternoon there was a general discussion of resolutions presented by a committee on resolutions, together with others presented by individual members.

The meeting expressed great confidence in the Interstate Commerce Commission, and it was recommended that the commission should be given the power to establish divisions of rates as well as the general level of rates on an adequate basis. The resolutions also favored the consolidation of railroads with adequate protection to the short lines, increasing the power of the commission over intrastate rates and the continuation of rates established by the director general until changed by the commission. It was also recommended that the benefits given to the lines that have signed the co-operative contract shall be applied to other short lines.

It was proposed that the President appoint a committee to devote itself to securing proper legislation for the short lines and a special assessment to meet the increased expenses of the association was voted. The proposal was made that one or more members of experience in the management of short line railroads should be appointed to the Interstate Commerce Commission and that in any appropriation which Congress might make for taking care of the railroads while under federal control at least $50,000,000 should be set apart to pay the operating deficit of the short lines since March 21, 1918, and to reimburse them for losses occasioned through federal control of the railroad system. It was the sense of the convention that Congress should immediately restore the rate-making powers of the commission with instructions to establish such rates as will meet all the obligations of the government under the federal control act.

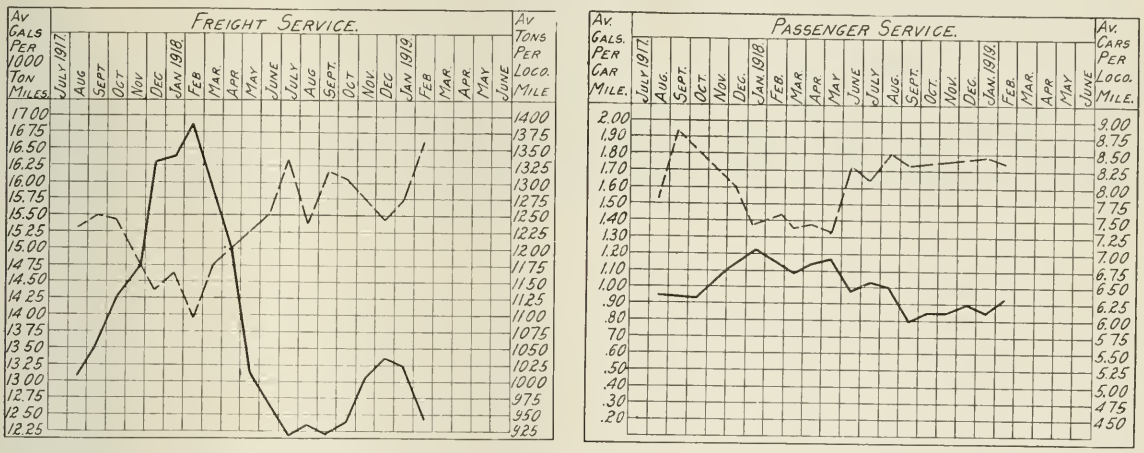
The officers of the association were re-elected as follows: President, Bird M. Robinson, Washington, D. C.; assistants to the president, Ben B. Cain, W. M. Blount and L. S. Cass; secretary and treasurer, T. F. Whittelsey, Washington, D. C.

Senator A. B. Cummins, chairman of the Senate Committee on Interstate Commerce, and Senator E. D. Smith, chairman of the committee during the recent session, also addressed the meeting on June 5. Senator Cummins expressed sympathy for the condition of the short lines, saying they had been the victims of "the most grievous injustice ever practiced by a civilized government upon its people," and "a monument to the stupidity of those who controlled the Railroad Administration," but that Congress would do all in its power to remedy their condition. He also outlined his plan for dealing with the railroad situation generally, providing for a government guaranty of a specified percentage above which railroads might be allowed to earn with good management and efficiency, and a consolidation of the railroads into 18 or 20 systems. He dwelt especially on the idea that railroads cannot compete successfully at the same rates without increasing the rates for the weaker lines to a point which would create universal revolt against the profits of the stronger lines, and declared that consolidations and a government guaranty presented the only feasible solution. He spoke of the government's operation of the railways as a lamentable failure, and while admitting that the "experiment" had not been conducted under the most favorable circumstances, he asserted a firm conviction that government operation of any business would inevitably be less economical than private management.

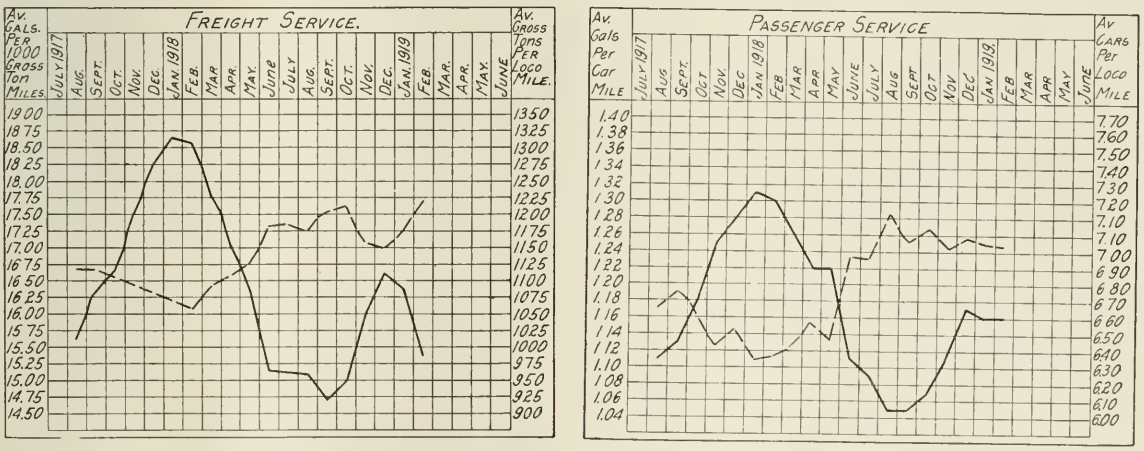
Combining Statistics of Fuel Performance and Locomotive Loading

THE WAGES of train and engine crews and the cost of locomotive fuel are the largest items of expenditure on railroads. The fuel bureau of the Southern Pacific had adopted an unusual method of bringing to the attention of the officers and employees the fluctuation in the average tons or cars per locomotive mile, the average fuel consumption and also the inter-relation of these two important factors which so largely affect the cost of fuel and wages. The performance from month to month is shown on charts of the form reproduced below. These permit of ready comparisons between different months for the same district or between different divisions or districts for a corresponding period. It will be noticed that an increase in the trainload is accompanied in almost every instance by a decrease in the consumption of fuel per thousand ton miles. Below the chart for the Tucson division are comparative statistics for the last month for which results are shown and for the corresponding month of the previous year. The reduction in the fuel consumption during the month of February effected a saving of $60,767 on this division alone.

The second set of charts shows the performance secured on the Southern Pacific lines south of Ashland, Oregon. In this



Monthly Records of Fuel Consumption and Train Load, Tucson Division. Solid Lines Indicate Fuel Consumption. Dotted Lines Indicate Train Load



Monthly Records of Fuel Consumption and Train Load, Southern Pacific Lines South of Ashland, Ore. Solid Lines Indicate Fuel Consumption. Dotted Lines Indicate Train Load.

COMPARATIVE FUEL CONSUMPTION, TUCSON DIVISION, SOUTHERN PACIFIC

Month and year	Service	Locomotive miles	Gross ton miles (thousands)	Gallons fuel oil consumed	Average gallons per 1,000 gross T. M.	Average gross tons per locomotive mile	Compared with February, 1918 Loss	Compared with February, 1918 Gain	Value fuel oil
February, 1918	Freight	351,552	384,561	6,470,891	16.83	1,094	.....	.....	.....
February, 1919	Freight	237,514	324,524	4,644,783	12.46	1,366	.....	1,416,956	.....
			Car miles		Avg. gallons per car mile	Avg. cars per loco. mile			
February, 1918	Passenger	150,090	1,135,407	1,302,759	1.15	7.56	.....	.....	.....
February, 1919	Passenger	118,700	989,230	914,798	.92	8.33	.....	219,849	.....
Total	.....	.....	.....	.....	....	....	.....	1,636,805	$60,767

Price fuel February, 1918, $1.30 per barrel. Price fuel February, 1919, $1.56 per barrel.

district the fuel saving for February, 1919, compared with the same month of the previous year amounted to 3,325,824 gal. of fuel oil in freight service and 1,100,630 gal. in passenger service, making a total for the month of 4,426,454 gal. of fuel oil valued at $161,190.

Railway Electrification in Brazil

That the American railway supply manufacturer is going to do a large and successful business in Brazil is beyond all doubt in the mind of Dr. Francisco de Monlevade, of the Paulista Railway of Brazil, who is now in this country investigating the possibility of electrifying 75 miles of the main line of the important railroad system of which he is the general superintendent.

Brazil, said Dr. de Monlevade to a *Railway Age* representative, imported even before the war a large portion of its railway supplies from the United States. Its imports of locomotives from the United States were more than from all other countries combined in 1912 and 1913, for example, while in 1912 total imports of railway supplies from the United States were exceeded by those from only one country—Belgium—while Germany supplied only one-half as much as the railway supply imports from this country.

Dr. de Monlevade in pointing out the splendid opportunity for American railway supply manufacturers instanced the fact that the United States was now better fitted than ever to do a big business in Brazil and in the markets of the world, while at the same time, the other countries which formerly supplied large quantities of railway supplies were short of materials; in some cases their industry was paralyzed and at any rate they would have to work to fill the demands in their own countries before they could regain their former position in the world in general.

Dr. de Monlevade has been in this country for a number of weeks. It is by no means his first visit here. He is, in fact, a well traveled man and counts many friends whom he has visited in this country and abroad. His present trip, as noted above, is to investigate the possibilities of electrifying some 75 miles of the main line of the Paulista Railway, the richest and one of the most important railroads in Brazil.

The Paulista Railway, Dr. de Monlevade explained, serves the important coffee growing district of Sao Paulo and handles 75 per cent of the total production of that commodity from the district in question. It was built some 50 years ago and was in reality an extension of the far-famed Sao Paulo Railway with which it connects at Jundiahy and over which its trains reach the sea coast at Santos. The line was built by Brazilian capital, and is still in Brazilian control, although some 30 per cent of its capital stock is owned by the Brazil Railway interests. It, today, is a system of 1,850 miles, capitalized a $25,000,000 with a funded debt of only $5,000,000, but so well has it earned money for its owners that it is valued at nearer $100,000,000. It has gross earnings of $8,000,000 yearly, an operating ratio of only 47 per cent and has paid its stockholders from 10 to 12 per cent annually for the past 20 years. After hearing these facts, one is not surprised to hear also that the railway is in the same physical condition as the better railroads in our own country or that its track is stone ballasted, that the line has all modern stations and that it operates a high grade Pullman and restaurant car service, etc.

Dr. de Monlevade took particular pleasure in pointing out in the interview with the *Railway Age* representative that the larger part of the locomotives on the line are of American build and that the shops are equipped with American machine tools. The road builds most of its freight and passenger sars in its own shops; although it has to import iron-work and accessories from other countries.

It has been noted that the line carries 75 per cent of the coffee produced in Sao Paulo, the total production being 11,000,000 bags of 60 kilos (about 130 lb.) each, annually. Ten years ago this made up about three-quarters of the total revenue of the Paulista Railway, but so great has the general development of the territory served by the road been that today coffee makes up only about 38 per cent of the total revenue.

The importance of the electrification of a road of this kind can therefore readily be seen, for as Dr. de Monlevade pointed out, the Paulista Railway is a leader in railroad development in Brazil and in addition to extensions of electrification on its own line, there is little doubt that other lines may also adopt electrification.

The reasons for electrification in Brazil, said Dr. de Monlevade, are explained principally by the country's severe shortage of coal combined with great possibilities of hydro-electric development. Coal, before the war, cost about $12 a ton delivered at Santos and Jundiahy, but to day it costs nearer $30 and during the latter part of the war could hardly be obtained at any price. The Paulista Railway, in fact, was so hard pressed, that it had to burn wood on its locomotives and used no less than 30,000,000 cubic feet of wood last year. And yet with wood as fuel the road for months handled 400-ton passenger trains with Pacific type locomotives at 40 miles an hour over two per cent grades, and its wood-burning Consolidations pulled over these grades trains weighing 700 tons.

Dr. de Monlevade has made a very careful investigation of this fuel situation and found himself confronted with the necessity of securing wood from sources further and further in the interior and the probability that on the return to normal conditions coal would at best approximate $20 a ton. This is the reason he is going to electrify his line in part now and to a much greater extent later. The first section to be electrified will be the main line from Jundiahy inland to Cordeiro. He has three available supplies of electrical power in the power companies in Sao Paulo, and in fact there are developments already aggregating 200,000 hp. in the state by that name. In addition to the possibility of securing power thus, the Paulista Railway has itself secured water rights near its line aggregating some 35,000 hp. Dr. de Monlevade in speaking of these matters emphasized that the Paulista Railway will itself be well able to finance this electrification project and extensions in the future if the plans work out as hoped, and that it will not be necessary to secure loans or credit outside to help pay for them.

Dr. de Monlevade spoke of the promise of Brazil as a nation. The development of Brazil, he said, has hardly begun. There are tremendous and immensely rich areas in northern Brazil that at present are almost inaccessible, but which in the course of time will be opened and made available. The present development is in the southern part of the country. No less than two-thirds the population of Brazil, he said, is in the south, namely in the states of Minas Geraes, Rio de Janeiro, Sao Paulo, Parana and Rio Grande do Sul. Nearly all the railway development amounting to some 20,000 miles is in the south and centers in the main around the cities of Rio de Janeiro and Santos. It will be many years, possibly decades, before the development of the great northern areas takes place, he said, but the potentialities of development in the Amazon valley are limitless.

"No accident week," in the Central Western region will be from June 22 to June 28, inclusive. Arrangements have been made for issuing special bulletins and holding rallies and moving picture exhibits, and safety committee men will plan to appeal personally to each one of the 305,000 employees in the region.



The Thirty-first Annual Meeting of the Railway Accounting Officers' Association

Railway Accounting Officers Association

Annual Meeting of Unusual Interest Because of Inter-Related Problems of Federal and Corporation Accounting

THE THIRTY-FIRST annual meeting of the Association of Railway Accounting Officers was held at the Hotel Commodore, New York, June 11 and 12. There was the largest attendance of any convention ever held.

By unanimous consent the regular order of business was set aside on Wednesday morning and the association listened to an informal address by Charles A. Prouty, director of the division of accounting of the United States Railroad Administration.

Mr. Prouty briefly reviewed his own connection with railroads as a lawyer, as a member of the Interstate Commerce Commission, dealing with traffic men, as director of the division of valuation dealing with engineering officers, and now as director of the division of accounting dealing with accounting officers.

He said that he had frequently heard lately the opinion expressed that government management of railroads was a dead issue; that the experiment which had been tried had proved a failure. He cited the instance of a congressman who said that he had been in favor of government ownership of railroads all his life but he was now utterly opposed to it. Mr. Prouty explained this change of front as due to the fact that the congressman's train had been two hours late. He cited the instance of another man who had discussed the question of government ownership for many years, and who now freely expressed the opinion that the subject would not be open to discussion for the next 25 years. With all of these, former Commissioner Prouty disagreed entirely. He said that he believed that the experiment of government operation had been tried out under circumstances which precluded its being a conclusive experiment; he believed that the economies to be gained by a central organization had not been given any chance under war conditions to show themselves in their true values.

Mr. Prouty expressed the opinion that it was only a question of time, and not a very long time, either, when the people would demand a real try-out of government operation of railroads.

Mr. Prouty concluded his remarks with a sincere expression of thanks to the accounting officers with whom he had had been associated for the last two years.

Mr. Prouty's address was followed by the committees' reports.

The Executive Committee

The committee has held two meetings since last annual meeting of the association. C. B. Seger, formerly president and controller of the Union Pacific, resigned January 31, 1919, after 37 years' continuous railroad service, to become president of the United States Rubber Company. The executive committee unanimously recommended that honorary membership be extended to Mr. Seger.

Recognition of the Association

The committee authorized the president to write a letter to Professor Henry C. Adams, expressing appreciation on behalf of the association for the recognition which he has given to the association in his book, "American Railway Accounting," which carries this dedication:

To the members of the American Association of Railway Accounting Officers in remembrance of their efficient co-operation in working out a system of accounts for American Railways is this commentary respectfully dedicated.

Accounting Circulars and General Orders Relating to Accounting

On December 12, 1918, President Berger wrote the Secretary as follows:

Sometime ago we discussed the question of preparing a synopsis, through the various committees, of rulings relating to accounting matters that are covered by the various general orders and P. S. & A. circulars, issued by the United States Railroad Administration, the idea being to incorporate this matter as information in our next year's agenda and annual report.

After considering the matter further, it would seem to me

to be a better plan to reproduce such general orders and circulars in their entirety, grouping each order or circular with the amendments that may have been issued to it.

It occurs to me this information will serve two useful purposes.

(a) As a great convenience to all members of the association as a book of ready reference.

(b) It will perpetuate as a part of our association file and record all actions affecting accounting methods taken, by the United States Railroad Administration during the period of Federal control.

The committee directed that such circulars and general orders as relate to accounting be incorporated in the agenda and report, but separated in an appropriate manner from the text of committee reports.

Membership Changes

During the current year the committee has admitted into the association 97 new members. As of April 21, 1919, the association has 780 active members, representing 310,712 miles of railroad, also certain express companies and water carriers—an increase (as compared with April 21, 1918) of 62 active members. The association is now carrying the names of 65 persons on its honorary rolls.

The report was signed by R. E. Berger, president.

General Accounts

The committee held one meeting during the year.

Annual Report to I. C. C.

It is the opinion of the committee that it will be impracticable during the period of federal control to make one report on behalf of a road under federal control, covering both corporate and federal matters. The committee believes that two separate and distinct reports should be made if it is decided that the operating results of the Railroad Administration are to be reported to the commission.

Expense of Corporate Organization, and Lap-Overs

The committee recommended that salaries and expenses of corporate general officers, their clerks and attendants shall be charged to the appropriate primary accounts under the commission's classification of operating expenses.

Lap-Over items of revenues clearly applicable to the period prior to January 1, 1918, shall be credited to income account No. 519, "Miscellaneous income," and charged to general balance sheet account No. 722, "Other deferred assets."

Lap-Over items of expense clearly applicable to the period prior to January 1, 1918, shall be charged to income account No. 551, "Miscellaneous income charges," and credited to general balance sheet account No. 770, "Other deferred liabilities."

Alexander Wylie, chief examiner of accounts, approved—on behalf of the Bureau of Carriers' Accounts Interstate Commerce Commission—the foregoing.

Scrap Rail Sold in Excess of Original Cost.

The committee adopted the following resolution, but suggested that the whole matter, together with this resolution, should be taken up by the Interstate Commerce Commission's representatives with the railroad administration:

Whereas, The principles which should govern the credits for scrap rail released are no different than those which should govern the credits for other scrap dervied from renewals and replacements. To attempt to ascertain or estimate carefully the original cost of scrap removed in each instance would involve a large amount of labor at a time when the demand for conserving man-power is at the maximum and tests our patriotism, and

Whereas, The increases in the prices of scrap are, in a large degree, consistent with the increases in the prices of corresponding new material, and

Whereas, the apparent abnormal conditions with regard to scrap rail are due to the fact that because many carriers had wisely contracted ahead for new rail requirements, the prices of scrap have temporarily advanced ahead of the advance in the prices of new rail purchased, therefore, be it

Resolved, That no change should be made at this time in the existing methods of accounting for the scrap rail derived from renewals or replacements.

Car Repair Bills

Under date of December 14, 1917, J. Kruttschnitt, chairman of the executive committee of the Southern Pacific, wrote A. D. McDonald, second vice president, as follows:

Referring to reports of the M. C. B. Association committee which is investigating bills for car repairs, might corrective measures not to be developed by joint action of the M. C. B. Association and the association of accounting officers? The M. C. B. rules covering repairs chargeable to owners are extremely complicated and overtax the intelligence of the man actually doing the work. His records are usually grimy and hard to decipher, and a good deal of guess work must be done by those making repair bills when in doubt as to the original crude records. Bills are frequently of such small amount that the cost of preparation and mailing exceeds the amount involved. The work would be greatly simplified, would be more accurate and subject to a better check, if M. C. B. rules could be changed so that car users should assume liability for small repair items, say those under $2. This would greatly reduce the number of bills and expenses of accounting, and seems worthy of trial. These small items would probably be equalized on one line by the assumption of corresponding items on those of its connections.

On December 18, 1917, Mr. McDonald replied to Mr. Kruttschnitt as follows:

I am of the opinion that the plan which you suggest would simplify matters. It occurs to me that it would be advisable to agree upon certain classes of small repair items, the handling line to assume all such expenses. With a flat minimum of $2 applied to all classes of repairs, it apparently would be necessary to make a record of the cost in each case in order to determine whether the amount exceeded the prescribed minimium.

I am forwarding your letter to the president of the association and copy to Mr. Plant, and will advise you of the action taken.

The committee recommends that this matter be left with it for further consideration and report.

Compilation of Net-Ton Miles

The committee expressed itself as being in favor of the compilation of net ton-miles from wheel reports.

The report was signed by A. H. Plant, chairman.

Freight Accounts

The committee held three meetings during the year.

Overcharge and Agency Relief Claim Rules

Inasmuch as overcharge and agency relief claims are generally handled by accounting officers, your committee believes that the Railway Accounting Officers Association should adopt methods and rules for the handling of such claims. Therefore, in accordance with article XI of the constitution, notice is hereby given of proposed amendments to the constitution for action at the 1920 meeting of the association. The intent and purpose of the proposed amendments being:

To make rules in connection with overcharge and agency relief claims mandatory and binding.

To confine the voting power in connection with such rules to the chief accounting officers, or the members of the association directly in charge of overcharge claims and agency relief claims.

To provide for the imposition of penalties upon members who fail to adjust claims in accordance with such rules and requirements.

It is intended that these provisions shall not in any way

interfere with the present procedure, rules and voting power of the Railway Accounting Officers Association relating to other accounting matters.

As a means of putting into effect, voluntarily, the overcharge and agency relief claim rules, pending action on the constitutional amendments at the 1920 annual meeting, your committee recommends that the association now adopt the following resolutions:

Resolved, that the president shall forthwith appoint two special committees, each to be composed of three members. One such committee shall be known as the special arbitration committee; the other such committee shall be known as the special appeal committee. The personnel of each such committee shall be of one member from the eastern territory, one member from the western territory, and one member from the southern territory.

The secretary of the association shall forthwith ascertain by circular from each road represented in the association whether it will or will not voluntarily follow the rules recommended by the Committee on Freight Accounts for disposition of Overcharge and agency relief claims for the period up to the 1920 meeting of the association.

Correction Minimum

The committee has given the matter further consideration, and is of the opinion that the $1.00 minimum should be substituted for the 25-cent minimum where the latter appears in the recommendations of the association, but that paragraph 19 of the 1917 synopsis, page 12, should be amended commencing with the word "provided," sixth line, so that it will read as follows:

Provided, however that corrections in the freight, advances, prepaid or proportions which collectively amount to a net sum of less than $1 shall not be included in statements of differences or correction accounts, except that if such differences affect the settlement with at least one of the interested carriers, including the settling carrier, to the extent of $1 or more, adjustment shall be made with all carriers interested.

Waybills for Astray Freight

The committee has given the matter further consideration, and is of the opinion that the proposed plan, while embodying features that are theoretically desirable, is more elaborate than will be found practicable for general use, for the reason that the present R. A. O. A. plan, if observed by all carriers, will substantially accomplish all necessary results. It is recommended that in the event the revenue waybill reference is not shown and the settling carrier has at the time initiated a tracing file, reference to that file should be shown on the interline abstract.

Waybills for Freight Checked Short

The committee is of the opinion that when waybills covering less than carload shipments become separated from the freight, they shall be promptly mailed to billed destination by the agent at the junction, transfer, or other station where shortage is discovered, after noting thereon by whom and to whom mailed. In the event that waybills apparently cover an entire carload, the agent discovering the shortage may hold the waybills not to exceed 48 hours, in an effort to locate the car.

Tracing Unreported Waybills

By reason of the frequent diversion of traffic, freight reaches destination, in many instances, via other roads than those to which waybilled, and also, by reason of the inefficiency of station forces, improper information is frequently shown on the forwarded reports.

The committee is of the opinion that no tracing for waybills should be made until the abstracts of the current and succeeding month of all other carriers, who might have received such freight, have been checked. and that two copies of the waybill should accompany the first tracer, and such waybills to be accounted for in accordance with paragraphs 41 and 42, 1917 Synopsis.

Application of $1.00 Correction Minimum

The committee is of the opinion that all waybills voided, regardless of the minimum, should be reported. If the waybill has been reported at original figures and subsequently voided, correction minimum should govern.

Size of Stamps to Be Placed on Waybills

Your committee recommends that paragraph 168 of the 1917 synopsis be revised to read:

All stamps placed on the face of waybills shall not exceed 1x1½ inches; round stamps not to exceed 1½ inches in diameter.

Uniform Application of General Order No. 30.

General Order No. 30 provides that:

Effective July 1, 1918, the following regulations shall govern the settlement of all inter-road bills, statements and accounts rendered by one carrier under Federal control against or for account of another carrier under such control.

(1) Settlements by vouchers and the drawing of drafts in settlement of individual inter-road bills, statements and accounts rendered by one carrier under Federal control against another carrier under such control, except as provided for in paragraph (2) hereof, shall be discontinued.

(2) The regulations herein prescribed shall not include:

(a) Settlement of accounts between a carrier under Federal control and a carrier not under such control.

(b) Settlement of accounts between carriers under Federal control for transactions which do not properly belong on the Federal books of either carrier interested.

The director, Division of Accounting, has ruled that "It is entirely proper to settle all items through the medium of the inter-road settlement, provided by General Order No. 30, regardless of whether they accrued prior or subsequent to January 1, 1918."

It is the opinion of the committee that, in order to insure uniformity in practice, all items subject to junction settlement, should be covered by a monthly certificate of settlement, R. A. O. A. Standard Form No. 119, in full for the amount due each railroad, prepared in triplicate. The creditor carrier shall state the account and issue the certificates, two for the use of the creditor carrier and one for the use of the debtor carrier, such certificates to be signed by each agent involved, and preparatory thereto, bills for the various classes of service, subject to junction settlement, must be exchanged currently for approval as has been the practice heretofore. The agent of the creditor carrier shall send the certificates in duplicate to his auditor; one to be retained for record and the other to be stamped, indicating the month included in settlement, and forwarded to the auditor of the debtor carrier.

The committee is of the further opinion that the classification of accounts, as provided for in P. S. & A. Circular No. 67, statement of settlement of inter-road bills and accounts, should be amended to include junction settlements.

Definition of astray freight, less than carload freight which is marked for destination and which has become separated from the regular revenue waybill.

The report was signed by J. A. Robinson, chairman.

Passenger Accounts

The committee has held three meetings for the consideration of accounts during the year.

When this work reaches the point warranting report to the association, the committee will submit such a report.

Code Classification and Remarks Data

The committee recommends the adoption of the following code as a substitute for certain common terms:

Class		Class	
DS	Discharged Soldier	Exch	Exchange
FS	Furlough	HS	Home Seekers
Cy	Clergy	AYT	All Year Tourist
Ch	Charity	WT	Winter Tourist
Emp	Employee	ST	Summer Tourist
Col	Colonist	Spl	Special Excursion
Gv	Government	Dvt	Diverted
LG	Land Grant		

Correction Report—Remarks

ED	Error in Division
EA	Error in Apportionment
Rd	Redeemed
TT	Ticket Tracer
Cl	Claim for Increased Proportion
CnE	Coupon Enclosed (Never appears on regular report)
UR	Unreported

Excess Charges on Baggage

The committee recommends that in order to guard against failure on account of oversight or otherwise of collecting agent to account for prepaid check on which the valuation charges are collected, issuing carrier should report the check number to the terminal carrier, with notation "Excess value," and when not reported, the terminal carrier should trace issuing carrier.

Disposition of Ticket Stock

Director C. A. Prouty requested the committee to express its opinion as to the proper manner of handling ticket stock when an agency is either closed temporarily or permanently or when stock is returned for cancellation.

The committee is of the opinion that ticket stock recalled for cancellation, or turned in on account of an agency being closed permanently or temporarily, should be forwarded to the passenger accounting department. Such ticket stock should be destroyed if there is no reasonable prospect of its further use.

The report was signed by C. G. Weaver, chairman.

Disbursement Accounts

The committee has held two meetings during the year.

Forms for Additions and Betterments

As directed by the association, the committee has given the matter further consideration, and recommends that this subject be left with it for further consideration, pending final decision by the director, division of valuation, Interstate Commerce Commission, regarding revised Circular No. 3, and the determination of the information desired by him.

Dining and Sleeping Car Expenses

The committee is of the opinion that the difference in classification of the expense of outside and inside cleaning of dining cars is clearly provided for in account No. 402, "Train Supplies and Expenses," and account 441, "Dining and Buffet Service—Other Expenses." The latter expense is consistently chargeable to the operation of dining cars for the reason that the work of inside cleaning is a necessary part of the conduct of the service usually performed by the dining car department employees, except at terminals, where the cost can be readily determined. The work is incident to a special service not related to the appearance or handling of the train.

With respect to dining car provisions destroyed or damaged in wrecks, the committee is of the opinion that in conformity with the rules and practice for the disposition of losses through destruction or damage of supplies, material, etc., by charging the account which would have been charged had the supplies or material been used for the purposes for which they were provided, it is proper that the value of such provisions should be charged as a part of the expense of the operation of dining cars.

Mechanical Devices

The committee recommends that the association receive, as information, the following article appearing in the Santa Fe Magazine for November, in regard to conserving man-power through the use of mechanical devices in disbursement accounting work, which represents the development of machine and bureau work in the several offices of the Santa Fe accounting department extending over a period of years.

It is the policy of the Santa Fe to have each office or department of the company originate and finally complete all accounting work pertaining to its own department. It is also required that each office or department certify to the accuracy of accounting work performed by it, thus insuring that all payrolls, bills, vouchers, distributions, statistics and other documents reach the audit office in proper form for final audit.

Under this arrangement the work falling to the disbursements division of the accounting department consists mainly of:

(1) The final proof of all accounting work.
(2) Recording accounts receivable and accounts payable, and effecting settlement thereof.
(3) Assembling distribution of expenditures for final entry in the accounts and records, and preparation of statistics.

Each of the foregoing operations involves more or less routine mechanical labor in the verification of figures, the recording of documents and the preparation of statistics.

With a view to increasing the accuracy of the work and economizing in cost, a critical review of all clerical work has been made from time to time during the past ten years, with the object of segregating from other work the work of a routine character, which may be taken care of through the medium of mechanical devices, with assigned women operators.

In this time of national need it is highly important that man-power be conserved to the greatest possible extent. Therefore it behooves us to employ women in office work wherever possible. This has been accomplished in a considerable degree by the disbursements division of the accounting department in the following manner:

(1) By the full utilization of mechanical devices, with assigned women operators, as hereinafter described.
(2) By a studied discrimination of clerical work as between that of major importance and of a routine nature, and the assignment of the latter to junior clerks and women.
(3) Through a method of arriving at the relative efficiency of operators of mechanical devices, with a view to increasing the output by equalizing the work among the several operators.
(4) By careful planning, making intensive time studies and establishing standard unit costs of work for comparison with the actual unit cost.
(5) By centralizing the work assigned to operators of mechanical devices and placing the operators in charge of a head clerk, as more fully described hereunder.

Chiefly, the value in centralizing mechanical devices, such as typewriters, non-listing adding machines and bookkeeping machines, lies in the fact that the services of the operators may be utilized as a whole rather than individually. In the case of the operators being scattered over the main office in

the various departments, at times the two or three operators assigned to each department may become overloaded with work or they may be without work entirely. It is extremely difficult either to give them help from other operators or to furnish, through them, assistance to other departments. The same holds true in the event of sickness or vacations. By having a central organization other operators may be used to perform the work which would otherwise have been done by the absent operator. Then, too, in the case of a large rush job, all or as many of the operators as are necessary may be drafted to hurry the job to completion.

The supervisory feature of the organized bureau, with a regularly assigned head of department and assistants, is all-important and highly beneficial. Instead of the individual operator working for several clerks, none of whom is particularly interested in the development of the operator, each clerk clamoring for his work first, all operators are working for one man, who, through his assistants, is enabled to distribute the work to the operators in such manner as to complete all the work assigned to the bureau according to its relative importance.

The good results of such an organization are further enhanced through the ability of the head clerk and his head operators or assistants to train the machine operators thoroughly in the most efficient methods, short cuts, general knowledge of the work and their machines, closer application on the part of the operators to the work to be done, neatness and accuracy of the finished product; also, the initiative of the operator may be developed and the responsibility attendant to her position impressed upon her, to the ultimate benefit of both herself and employer. On the other hand, many an operator, slow, backward, apparently unable to grasp details or to follow ordinary instructions, may be coached and developed into a first-class operator; otherwise she might plug along and finally be dismissed from service on account of general inefficiency. The truly "hopeless" may be weeded out; thus the personnel of the department or bureau becomes one of increased efficiency and output, one of greater intelligence and more value in dollars and cents.

Prior to the introduction of any considerable number of calculating machines in connection with disbursement work, it was the practice to have stenographers, with their typewriters, located on the main working floor of the office, also such calculating machines as were then in use, such as adding machines and crank calculating machines, all located and used indiscriminately on the main working floor. Needless to say, they were the cause of considerable annoyance to men performing mental labor.

With the foregoing in mind, and following the introduction of dictating machines, it was concluded to segregate all operators using mechanical devices of every nature, placing them in one part of the room, this room being partitioned from the main office with double windows, with air space between which has had the effect of entirely eliminating all noise from the main working floor. This has tended to materially increase the efficiency of the clerical force and has enabled the concentration of all work of a mechanical nature in the machine bureau.

While the double partition just mentioned eliminated the noise and confusion of the typewriters and other mechanical devices so far as the outside clerical force was concerned, the volume of noise in the bureau was so great that it seriously affected the more nervous operators and materially affected the concentrative ability of the members of the department as a whole. Consequently, after much investigation, it was decided to treat the ceiling of the machine-room acoustically, this consisting simply of lining the ceiling with a felt preparation, which absorbs or neutralizes the noise and reduces reverberation to a minimum. The whole is covered with a porous cloth, which makes a neat finish in appearance.

This, together with the use of a pad made of the same material and placed under each machine, has, it is estimated, eliminated 60 to 70 per cent of the noise. As a result the operators are better able to concentrate their minds on the work and are free from the irritability and nerve-racking feeling resulting from the constant noise and confusion.

There recently has been installed a counter arrangement between the machine bureau and the main working floor, approximately 35 feet in length, over which windows have been placed which can be raised or lowered from either the inside or outside and under which a number of compartments have been placed which can be pulled from either side. This counter is used for the purpose of transmitting to and from the bureau the work which has to be performed. The counter is situated about the center of the working floor of the office, which makes it readily accessible to the clerks using the loose leaf records, voucher indexes and so forth, which are prepared in the bureau. Another result of the counter arrangement is the elimination of confusion and interruptions resulting from clerks being compelled so often to enter the machine room. A set of "instruction tickets" has been provided to indicate the work to be performed, various colors, representing the degree of "rush" desired for the work. This counter, coupled with a carefully studied program for distributing the work by messengers, results in a considerable saving in the time of the clerks and machine operators.

The more important mechanical devices and the classes of work being performed therewith are herewith briefly described:

Sorting and Tabulating Machines.—A punched card is used in connection with these machines as a medium for condensing distributions of payrolls, bills, vouchers, journal entries and so forth, according to Interstate Commerce Commission primary account numbers, classes of service, operating divisions, accounting districts, and states, also charges to additions and betterments by jobs covered by authorities for expenditures, and wage statistics for the annual report to the Interstate Commerce Commission. The distribution of vouchers and bills are condensed in the audit office instead of in the offices of the various departments where such documents are prepared.

These machines are electrically operated and assemble the punched cards by account numbers, etc., and finally summarize the totals according to the manner desired. Through the use of these machines all intermediate condensing sheets are dispensed with. At the same time the initial and final records are complete and intact and the cards are available at any and all times for quick sorting and tabulating for special information, such as the distribution by accounting districts, which information may not be required for current use. The punching of the cards is all proof-read, which affords absolutely accurate basis data, as a mechanical error on the part of the machines in sorting and tabulating is impossible.

Other machines, such as calculating machines, operated by crank, and slide rules, are used in proving averages in performance statistics, initially computed on key-driven non-listing machines in the machine-room.

Non-Listing Computing Machines.—These machines come first in importance as time-savers. There is no comparison to be made between the key-driven non-listing machines as computers and the old-style method of mental calculation. It has been found by experience that an operator on these machines is able to turn out from 300 to 350 per cent more work.

All mechanical computations encountered in verifying the footings and extensions of bills, vouchers, payrolls and other documents are made with these machines. The first ma-

chine of this type was introduced in the disbursements department in Topeka in 1909, since which time eleven additional machines have been installed. Experience also has demonstrated that, in addition to being far more rapid than mental calculating, the machine work is more accurate, particularly when women operators are assigned to the machines. Practically every class of work which it is possible to do on these machines has been assigned to them. The operators are taught the most up-to-date short-cut methods of manipulating the machines, thus obtaining full efficiency of operation.

Bookkeeping Machines.—The introduction of bookkeeping machines in connection with disbursement work is more or less an innovation; in fact, the Santa Fe is pioneering in this respect in this section of the railroad world. After having assigned all routine mechanical calculating work, such as proving footings, extensions and averages, to machines, our attention was next directed to the preparation of records by the use of mechanical devices, such as

(1) Register of audited bills and vouchers.
(2) Ledger of bills collectible—miscellaneous and car repairs.
(3) Index of audited vouchers.
(4) Record of foreign roads' bills payable.
(5) Record of charges to additions and betterments by Interstate Commerce Commission accounts and by authorities for expenditure.

By using loose leaf forms it is possible to prepare all of the foregoing records with computing typewriters or other mechanical devices. There is just as much time to be saved in the preparation of records by the use of typewriters as is saved in conducting correspondence. A typewritten record is far more economical and neater than a record prepared with pen. The indexes and other records used are very similar to those being installed in a great many banks and are of the so-called "rapid-fire index" variety.

It might be said in regard to the ledger of bills collectible that the second month the scheme was in vogue the operator, who had never before operated a bookkeeping machine and who had had no previous experience in ledger posting, secured her balance after 52 hours of actual work, without making an error, whereas under the old method 90 to 100 hours were required.

Transcribing Car Repair Bills.—A very great saving in time has been effected through the use of typewriters equipped with adding devices in the complete preparation of M. C. B. bills for car repairs, the name of the railroad being inserted and the totals of the bills secured as they are written. These totalizers save the time of a non-listing machine operator adding, and the time of the same operator or another verifying the work of the first, as in accounting work every computation is verified.

A word might be said regarding the keyboard of these machines. The figure keys are placed on the bottom row of the machine, immediately above the space bar. The tabulating keys are hung to the frame just below the space bar. Thus we have all three in a close, compact space. While this may seem a small matter, the actual saving in time is very great. This is applicable only to work wherein but little or no descriptive matter has to be written.

As a matter of convenience, a rack for holding repair cards has been provided for the use of the operator in connection with transcribing these bills, aiding both accuracy and speed. All work in connection with the preparation of car repair bills and the issuing of vouchers in payment of foreign roads' car repair bills for the Santa Fe system is taken care of in the office of the auditor of disbursements at Topeka by the use of two machines.

Dictating Machines.—Dictating machines are used in connection with routine correspondence. These machines have proven particularly valuable in making it possible to locate all transcribers in the machine bureau. A considerable saving also is made in that none of the transcribers' time is consumed in taking dictation.

Line-a-Time.—To further assist statement writers in accuracy and speed in operation, a device known as the line-a-time has been installed for each typewriter used for transcribing statements. It does away with the use of a ruler in following the line across the page, and through its use a great saving is made in not having to rewrite statements on account of "getting off the line."

Duplicating Work.—When several copies of a statement or circular letter are desired, hectograph or stencil originals are made on the typewriter, and an office boy runs the desired number of copies off on a duplicator or mimeograph, thus saving several writings on the typewriter that would otherwise be necessary.

This work is very closely supervised by the head clerk in charge of the machine bureau; in fact, the boys handling this class of work are directly under his supervision. The original or master copies of all hectograph or stencil work are inspected by the head clerk personally before being turned over to the boys to be run off.

Other Labor-Saving Practices.—To further conserve clerical man-power a number of other practices have been adopted, such as an intercommunicating telephone system, whereby the auditor, chief clerk or head clerks may talk with each other without the need of calling a central station; a file-room for all working records has been provided and placed in charge of a junior clerk, who, with one assistant, also has charge of all office stationery and attends to the opening of the mail and distribution thereof to the various heads of departments.

The file-room is connected with the main office by a window, which makes it unnecessary for the clerks to go into the file-room. A number of office boys are employed as messengers to distribute mail, stationery and records directly to the various desks and other offices in the building, also documents for verification, transcribing or recording to and from the machine bureau counter, thereby making it unnecessary for clerks to leave their desks for any reason excepting that of transacting business with each other.

Relative Efficiency of Operators.—As the number of operators in the machine bureau began to increase it was realized that some record should be had of the output of each operator, with a view to equalizing the amount of work turned out by the various operators. The work in the machine bureau naturally divides itself into two principal classes:

(a) That performed on calculating machines of the non-listing type.
(b) Correspondence, records, bills, statements, etc., prepared on the typewriter.

In the absence of any mechanical means of securing a record of the output of the non-listing calculating machines, it was arranged to secure the relative efficiency of the operators by the assignment of a fair average standard time for the most important operations, based on previous time studies and tests of the work of all operators. A record is secured of the actual work performed by means of so-called job tickets, similar to those used in printing shops and in manufacturing plants and by the use of a stamp with an electric clock attachment which automatically records the hour and minute the work was turned over by the head operator to the individual operator, and when completed and returned.

All work is distributed to the non-listing machine operators by a head operator, who also makes the clock record referred to. The number of units of work are counted by a student operator. Special separate job tickets have been provided for

all the more important classes of work. Consequently very little of the time of the head operator is required in making a record of the class of work and of the time the work is turned over to the individual operators, and when completed.

A monthly statement is prepared by the head clerk of the machine bureau, showing the relative efficiency of all non-listing machine operators and of operators on each and all of the more important classes of work. When these records were first started a very marked difference existed in the relative efficiency of the various operators. However, the efficiency has been brought up to a fair average excepting for the new student operators, who show a relatively lower efficiency. About 75 per cent of the time of the computing machine operators is taken on regular scheduled work, the balance being on miscellaneous or work of such character that it is impracticable to assign standard or schedule time.

A cyclometer especially manufactured for the purpose is attached to each typewriter, which affords a mechanical means of securing the output of such machines. This device records the number of key or space bar strokes, through the operation of the escapement wheel at the back of the typewriter. A certain number of key punches or space bar strokes (180) registers one unit on the machine. By taking a record of the reading of the cyclometer at the beginning of the month and at the close and multiplying the difference between the two readings by 180 affords a record of the aggregate number of units of work turned out. This, divided by the actual number of hours on the machine, gives the average number of units per hour.

For comparative purposes typewriter work has been divided into four classes, viz.: Correspondence, statements, car repair bills, bookkeeping.

A standard number of units per hour has been allotted for each of these classes of work, and the relative efficiency of each operator is secured by dividing the actual number of units per hour by the standard number of units allowed per hour.

On certain statements and classes of work on which it is desired to obtain the cost of preparation and writing separately, in the typewriting division of the bureau, a clock ticket is used, this being originated by the clerk preparing the statement. All data, with the exception of the name of the operator, cyclometer reading and time, is filled in by the originating clerk. The head statement operator assigns the work and stamps the time, she also having a time clock similar to the one in the non-listing machine division. The operator performing the work inserts the cyclometer reading.

When the work is completed, all information being shown on the ticket, the head operator detaches the time portion each day and turns the accumulated slips over to the timekeeper, who condenses the data as required. It should be stated that the timekeeper just mentioned is a non-listing machine operator, who devotes all her time not required on timekeeping work to regular non-listing machine work. The computations made by her in the timekeeping work are practically all made with the aid of her machine. When all efficiency records and time reports for the month are completed by her they are handed to the head clerk in charge; thus, through the utilization of mechanical devices, a great deal of the time of the head clerk is saved in preparing such documents.

To illustrate better the efficiency records afforded for the machine bureau, forms are herewith submitted.

All operators employed are occasionally given set tests for the purpose of ascertaining their accuracy, speed and knowledge of necessary operations and their relative efficiency as to accuracy and speed on identically the same work. A similar test is given student graduates prior to their permanent employment.

Students. Two students are kept in training at all times for non-listing machine work. In addition to a regular course of study allotted them they are drilled on actual work, in order that when a vacancy occurs an operator comparatively familiar with the work to be performed will be ready to step into the position. The course is free of cost to the students and within a short time affords a fair salary on work which involves but little fatigue.

One typewriter operator and stenographer is kept in training to fill any vacancy which may occur in the regular force. An inexperienced graduate of a business college is selected and placed on actual work, being paid a salary therefor commensurate with the work performed, the minimum, however, being what is considered a living wage. As she develops, her salary is increased, and, when a vacancy occurs, such as mentioned, she is assigned to the regular force as junior operator, and another student is selected to succeed her. This method guards against being compelled to employ an operator inexperienced in the work of this department.

Any student, before being accepted as such, is rigidly examined in the essential subjects, such as arithmetic, writing, spelling, and, in the case of typewriter operators and stenographers, the additional subjects of typewriting and shorthand also are given, and it is ascertained if the "touch" system was followed in learning to operate the machine.

General. Recently a woman operator has been assigned to a listing adding machine, which is used only for the purpose of drawing off balances in various ledger accounts. A woman also calls figures to the typewriter operators where necessary to do so on account of the size of the statements and to expedite the work on rush statements.

The number of women employed on mechanical devices and in other respects, except that of doing clerical labor, constitutes approximately 30 per cent of the total disbursements department office force. The number of office boys, file clerks, etc., constitutes about 5 per cent of the force, making a total of something over 35 per cent of the force engaged on mechanical devices and office-boy work, thereby taking care of work which was at one time in part assigned to higher priced male talent.

Experience thus far gained indicates that women in our employ in the capacities mentioned are superior to men, and at the same time, by relieving the men of routine and mechanical labor involved in extensions, footings, pen postings of records, etc., the latter have a greater amount of time for the application of mental effort, thereby affording them greater opportunities for study and advancement and consequently more pleasure in their work.

Time Studies and Classification of Work. With a view to conserving the time of higher priced clerks and reducing the cost of accounting, intensive time studies are being made of all the more important classes of work handled in the disbursements department. For this purpose the work has been segregated into five general classes:

(1) Executive (supervision).

(2) Inspection (traveling accountants and recheck work).

(3) Work of importance (requiring mature judgment, experience and expert ability).

(4) Routine (work which can be assigned to junior clerks and female help).

(5) Mechanical (all work involving mechanical computations, transcribing and posting records).

For the purpose of securing the distribution of time of all men employed on clerical work, time study blanks have been provided. The distribution of time is secured in units of tenths of hours. For convenience a time study clock has been provided which at a glance gives the time in hours and tenths of hours. It is the object ultimately to provide a standard unit cost for all of the more important operations or classes of accounting work for comparison with actual unit costs, thereby to ascertain the gain or loss resulting from

the actual unit cost being higher or lower than the standard unit cost. A form of unit cost and efficiency report reflecting unit cost information is prepared semi-annually. This report is particularly valuable in connection with subsequent changes in methods and practices to ascertain thereby what may have been the effect of such changes on the unit costs.

Computing Machines for Use in Division Offices and the General and Division Stores. Realizing the need of improving the character of basic accounting data at the source, computing machines are at present being installed in local and division offices and the general store and division stores, under the supervision of the accounting department.

After a very thorough investigation a combination computing and non-listing adding machine was selected for division office use. The type of machine secured was selected owing to its ready use by unassigned inexpert operators. These machines have proven particularly valuable in division office work in connection with time records and the preparation of payrolls, payroll distributions, vouchers, bills, statements, etc., originated in the offices of superintendents, master mechanics, general and division stores and others.

A number of assigned women operators on key-driven non-listing calculating machines also have been employed in division offices with very satisfactory results.

In connection with the preparation of payrolls, distributions, statements and basic data for completion reports required under Valuation Order No. 3, it is thought that very extensive use can be made of typewriters or bookkeeping machines, equipped with adding and cross-adding devices, so that, upon the figures being transcribed, totals and balances will have been secured. A number of these machines are now on trial in superintendents' offices.

The work of extending the use of mechanical devices in connection with store and division accounting and in generally improving the methods and character of accounting work at the source is being supervised by accounting department representatives. Ultimately accounting work in all outside offices of the company will be systematized, the cost measured and more extensive use made of mechanical devices, corresponding to the practices now followed in the general office. This will not only tend to conserve clerical manpower, but will economize in the cost and insure more accurate basic data.

Cleaning Enginemen's Rest Houses

The committee is of the opinion that the expenses incident to cleaning and care of enginemen's rest houses at division points should be charged to account No. 402, "Train Supplies and Expenses."

Work Equipment in Transportation Service

The committee is of the opinion that the mileage of work equipment moved in transportation service trains shall be classified as "transportation service" car miles, under the appropriate account. Pay cars and other business cars, for purposes of the classification of car miles, are to be considered as other passenger train cars and accounted for under accounts 822, "Passenger Train Car Miles," 823, "Mixed Train Car Miles," or 824, "Special Train Car Miles," as may be appropriate. The miles run by commercial and work equipment moved in freight, mixed and special trains in transportation service, when loaded with company or commercial material, shall be included as miles run by loaded freight cars. When cars designed for carrying commercial or other material are moved in transportation service trains without load, they shall be classified as miles run by empty freight cars. Miles run in transportation service trains by exclusive work equipment which is not designed to carry load, such as snow plows, flangers, derricks, pile drivers, wrecking cranes, tool cars, camp outfit cars, shall be appropriately included, according to the class of trains in which moved under accounts 821, "Freight Train Car Miles," 823, "Mixed Train Car Miles," or 824, "Special Train Car Miles," under a sub-heading "Exclusive Work Equipment."

The report was signed by A. P. Disbrow, chairman.

Address by President R. E. Berger

The history of the Railway Accounting Officers' Association and its achievements have been referred to in more or less detail from year to year, and although it is not my purpose to go over the same ground, your indulgence is asked for a moment while I touch upon what may be termed its sentimental side.

For after all, it is in the sentimental phase of life we find the inspiration that gives us breadth of vision and a better grasp of things worth while; that causes us to be forgetful of self, therefore, considerate of others; that makes this old world of ours seem good to live in; that enables us to fit, the better, into the duties and the perplexities which crowd the days and that helps us to be better men and cheerier companions.

Of such a nature is the general spirit of friendliness and goodfellowship that for so many years has been gathering strength within our ranks, until today it constitutes a force, immeasurable by ordinary standards and silent of operation, yet entering as a powerful influence into all of our dealings with each other and with the Association. It is this feature that has particularly impressed me as being one of the most fortunate, as well as valuable possessions of our organization.

One of the fundamental purposes of our Association was to obtain the benefits that might be expected to follow from a free interchange of business ideas. The discussions and comparisons of methods, early paved the way for the transaction of business in a more neighborly manner. The old style of correspondence, too often acrimonious and at times to the point of discourtesy, soon became a thing of the past, giving way to association influences under which strong and lasting friendships were formed. In the old days nearly all communications were addressed to strangers, men whom we did not know and perhaps had never seen, while today practically every letter is addressed to a "friend" and the transaction of business by comparison, has indeed become a pleasure.

The natural outcome of such a change in the personal relations between accounting men was to engender a desire for co-operation.

Now, the full benefits of co-operation cannot be realized, unless there exist a spirit of friendliness among those who have come together to work for the common good of all. Not much can be accomplished with a man who persists in believing himself always right, for to him it is the whole human race that's wrong. Co-operation means that individually-cherished ideas must at times be shattered and abandoned and give way to the will of the majority. There must be, so to speak, losers where there are winners of a proposition, and no matter how pleasant it may be to be called a "good loser," there are few men who do not better enjoy saying it of the other fellow. Then again, a "good winner" is as admirable as a "good loser," poise being extremely valuable in either case. Unquestionably one of the hardest things for a man of conviction to acquire is that degree of self-discipline that will make it possible for him to carry out with absolute loyalty, plans of the majority which run counter to his own ideas.

The good-fellowship, the atmosphere of friendliness, together with the broad principle of democracy embodied in our Constitution which accords equal rights to every member regardless of rank are the underlying and sentimental forces that lend to our Association the charm that brings to it the loyal support and the affectionate regard of its members with a willingness to sink personal preferences; forces that have been potent influences for its success.

The past year has been an exceptional one in that it embraces practically the first twelve months of the period of active Federal control of the common carriers of the United States, a new situation created by the exigencies of the war. Special conditions had to be constantly met and important changes of methods worked out in detail and installed.

Through the wisdom and foresight of its founders and the able conduct of its affairs during the many years of its existence, the Railway Accounting Officers' Association, as it is constituted today, is an organization whose methods of procedure are so flexible and possess such a high degree of adaptability, that it has found but little difficulty in adjusting itself to the extraordinary conditions which presented themselves. Its aim is to initiate, as well as to promote methods that are considered to be for the best interest of railway accounting as a science and as a profession. It is inconceivable, therefore, that there should ever arise any situation, no matter how unusual in character, if it come within the scope of railway accounting, that could not and would not be successfully handled by our association.

From the date the United States Railroad Administration was created and assumed the supervision of the carriers, our association has, with the hearty support of its executive and other committees, concentrated its energies in an endeavor to co-operate to the fullest extent with the Railroad Administration, through the medium of the division of accounting. Let me add that this action is in conformity with and a continuance of the established policy of at all times and under any conditions rendering the utmost possible service in connection with railway accounting matters. The division of accounting was invited to make all practical use of our facilities in Washington and of the committees of our association. It affords me much gratification to be able to advise you that our proposals have been met in a fine spirit of co-operation by Mr. C. A. Prouty, director, division of accounting, and that the most cordial relations now exist between the Administration officers and our organization.

Your attention is directed to pages 143 to 250 inclusive of the Agenda wherein are reproduced in their entirety all of the General Orders and Circulars, relating to accounting matters, issued by the United States Railroad Administration up to the date the Agenda was printed.

Aside from the convenience afforded our members by this book of ready reference, it was considered both desirable and consistent that these orders and accounting circulars should be thus perpetuated in the records of our Association, as they cover many important questions and innovations, in the determination of which our several committees gave their time without stint to the Railroad Administration.

I am sure it will be of interest to you all to know that our association represents 310,712 miles of railroad; also all of the express companies operating in North America and most of the inland and coastwise steamship lines. That it can no longer be looked upon as an "American" body only, but stands out prominently as an international organization, exercising a world-wide influence in railway accounting affairs, is evidenced by the fact that its present total membership—790—comprises practically every important railroad, not only in the United States, but also in Canada, Mexico, Panama, Brazil, Argentine, Ecuador, Cuba, Hawaii, Philippine Islands, England, New Zealand and Japan; in fact, there is hardly an important nation in the world that has not at some time had occasion to make use of our association or some of the data compiled by it.

Since our last annual meeting, 127 new members have been admitted. This is a high-water mark, and represents the largest increase in membership in any one year of our association's existence.

From time to time during the year, inquiries with reference to the record, experience and qualifications of some of our members have been received by the secretary from commercial concerns and others, who were seeking the services of men experienced along special lines of accounting work.

Your president in his official capacity has likewise been approached by members who for various reasons were seeking new locations and engagements.

The association is to be congratulated upon being thus recognized as standing in such a relation to the members themselves and with the business public. Believing that it should place itself in a position to serve its members in whatever way it can best be of use, I recommend that the secretary be authorized to collect and keep up currently data of a biographical and business experience nature in connection with each member. Such a record would enable the secretary to promptly and intelligently respond to inquiries received, and to him members should also be made to feel free to apply for information, in a confidential way, if desired.

This record would be found of considerable value in other features of our association work, particularly in making readily available reliable data regarding the experience of members under consideration for committee assignments, where herotofore we have been largely dependent upon personal knowledge. In connection with the work of the standardization of forms and methods, it has devolved upon me to appoint quite a number of special sub-committees. In making these committee assignments, their membership was drawn in about equal proportion from the eastern, southern and western carriers, the interests of the New England, Southwestern, Northwestern and Transcontinental carriers being taken care of in one or the other of these groups.

This grouping as to geographical locations was decided upon with the thought that the members of sub-committees so constituted could get together with the least inconvenience and would be better equipped to arrive at conclusions more nearly representative of the needs of the carriers in all sections of the country. Might we not with advantage make provision to apply the same principle in the appointment of our standing committees, for example, the committees on freight, passenger and disbursement accounts?

With equal representation as between the east, south and west, each regular committee could resolve itself into three regional sub-committees of equal number, with a chairman, to whom subjects might be referred for consideration and report to the general committee. The members of each regional sub-committee would be able to get together for conference, with a minimum amount of traveling, loss of time and expense, and I believe that local conditions and the interests of the carriers generally would be better served.

A change of especial importance, one that will increase the responsibilities and add to the prestige of our organization, has resulted from placing the settlement of overcharge and agency relief claims under the supervision of accounting officers. It seems proper that the rules and regulations governing such matters should be formulated by this body and the report submitted in this connection by the Committee on Freight Accounts is, therefore, of more than ordinary interest.

It affords me pleasure to speak of the co-operation of the officers and the high order of the work of the several committees, in connection with the various matters referred to them.

Special mention is also made of the versatility, the energy, and the efficient services of our secretary, Mr. Woodson. He is one of the mainstays of the association and has been a right-arm to the president.

Officers were elected as follows: A. D. McDonald, president; J. G. Drew, first vice-president; E. R. Woodson, second vice-president, and J. J. Ekin, third vice-president. H. H. Laughton, C. D. Branderif and C. P. Crawford were elected members of the executive committee.

Railway Wages and Freight Rates

THEODORE PRICE, actuary of the United States Railroad Administration under Director General McAdoo, presented a study of railway rates and costs of living in the Outlook for April 30, in which he argued that the large deficit in government operation of the roads is due to the fact that present rates are insufficient to meet the high cost of operation, particularly the high labor costs. In his article, Mr. Price stated that as we look back over the records since 1896, we are driven to the conclusion that railroading is the only business in the United States in which the charge for the service rendered or the article sold does not bear some relation to the cost of production. In the case of transportation, the cost of production is in the last analysis the cost of the labor employed, for whether this cost of labor is reflected directly in the wages paid, or indirectly in the cost of the materials (fuel, oil, steel, etc.) purchased, makes little or no difference. If coal costs more, it is because the miners are better paid. If steel rails are higher, the advance reflects the higher wages paid for their fabrication. If oil has increased in price, the enhancement is due to the greater cost of the human energy required for its production; and so it is all along the line.

The cost of providing transportation is almost entirely made up of the cost of labor. There may be some who will take exception to this statement and claim that since the interest paid on the capital invested or borrowed does not go into the wage-earner's pocket, it is not accurate to assert that this element of cost fluctuates in relation to the cost of labor or the cost of living, which have latterly become terms that mean nearly the same thing.

This might be true, were it not for the fact that all parts of a railway are constantly wearing out and have constantly to be renewed. The amount of the original investment and the rate of interest thereon may be static, but the material or labor used in necessary replacement as the rails or bridges first purchased wear out represents human energy that must be paid for at the market rates. It is therefore clear that, except as to the profits paid out in dividends or carried to surplus account (which aggregate hardly more than 10 per cent of the entire gross revenue), the railway business is simply one of buying and selling human energy, either physical or mental.

In the light of this statement it would be natural to expect that railway rates, railway wages, and the cost of living would fluctuate in unison, but this has not been the case. Since 1896, until Mr. McAdoo raised them last summer, freight and passenger rates have been practically unchanged and wages were advanced but little, while the cost of living has steadily increased. A careful study will show that, even including the advances established last summer, freight and passenger rates are but 12 and 20 per cent higher, respectively, than they were in 1896, while the cost of living has risen over 200 per cent.

It is not surprising that under such conditions the railway employees were impelled to use every means at their command to secure an increase in their pay, and that the railway managers resisted their demands because the Inter-State Commerce Commission would not permit an advance in rates.

Discontent, strikes, reluctant concessions to the wage-earners, impaired efficiency, and the near bankruptcy of the railways were the consequence, complete insolvency being averted only by the action of the Government in taking over the transportation industry on January 1, 1918.

When this was done, it immediately became clear that a substantial advance in the wages of railway employees was necessary in order to retain their services and enable them to live. It was granted, and freight and passenger rates were afterward advanced by 25 and 50 per cent, respectively, in the hope that the increased revenue secured would offset the increased cost of labor.

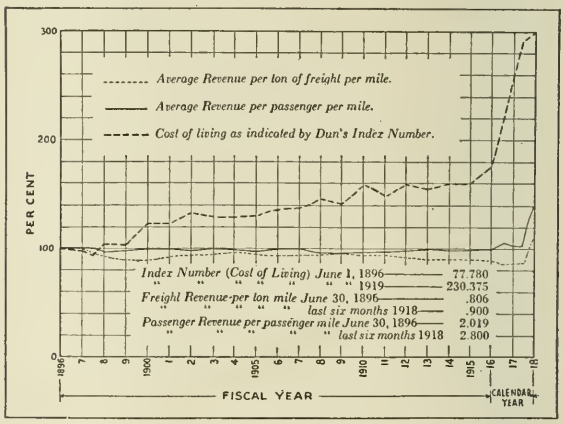
The advance in wages allowed, plus the advance in the cost of supplies, has, however, proved to be greater than the increase in revenue, resulting from the advance of rates, and a deficit of approximately $200,000,000 for the first year of government operation is the result.

This deficit is plainly due to the previous maladjustment or lack of adjustment between costs and rates.

If in 1896 it had been practicable to establish, and there had been established, an index number wage and an index number freight and passenger rate in the railway business, how much trouble and distress would have been avoided!

Now that the railways are under a single management, is it not practicable to do something of the kind? It should not be necessary to advance rates in the same proportion that wages were increased. Allowance should properly be made for the greater operating efficiency that is the result of scientific progress and the reduction in overhead costs that is possible with an increased density of traffic, but the experience of the last twelve months shows that the public do not object to paying higher rates when there is good reason for them; and no clearer *demonstrandum ad hominem* of their reasonableness can be furnished than the evidence of increased cost of living and of labor that the index number supplies.

The editors of the Outlook, commenting on Mr. Price's argument, conclude that "it is a mathematical deduction that railway rates must go up also to meet this necessary rise in wages or else the railways will be bankrupt." Reproducing a chart showing the relation of rates to the cost of living, they say: This table and chart give in graphic form facts



A Cartographic Comparison Between Railway Rates and Cost of Living

discussed in Mr. Price's article. A glance at the chart shows at once that the cost of living has steadily, and in the last two or three years enormously, risen. This is indicated by the upper black broken line. The solid black line shows that from 1896 to 1917 passenger rates remained practically stationary. The dotted line indicates that during the same period freight rates decreased.

A combination of commodities, for instance, which cost $77.77 on January 1, 1896, cost on October 1, 1918, $233.22, and on March 1 of this year $217.3. But passenger rates were the same in the early part of 1918 that they were in 1896, and freight rates were a trifle less.

It is perfectly clear that the wages of employees must go up with the cost of living. It is equally a mathematical deduction that railway rates must go up also to meet this necessary rise in wages or else the railways will be bankrupt.

Doings of the United States Railroad Administration

Director General Hines Says Maintenance Is Up to Contract Obligations. Earnings for April

WASHINGTON, D. C.

NOT THE LEAST of the many complicated problems confronting the Railroad Administration has been that of establishing and putting into effect a program of maintenance expenditures. While many railroad corporation officers as well as many officers of the operating organization have been expressing concern that their roads were not being properly maintained, the Railroad Administration organization, because of its duty to protect the government, apparently has a worry of another kind, fearing that it will spend more for maintenance than is called for by its contracts with the companies. Therefore, it has issued orders for the month of June intended to control the situation until a check can be made and Director General Hines, in testifying last week before a Congressional committee, expressed the opinion that, broadly speaking, on April 30 the roadway and structures were in fully as good condition as on January 1, 1918, and that the equipment was in as good condition and as a whole, probably in better condition than it was on January 1, 1918.

"My best judgment of the situation as a whole is that at the present time we are fully up to our contract obligations in respect of maintenance of roadway and structures and equipment; that taking the whole thing together for all the roads together, we are fully up to our contract requirements," he said.

The problem includes two phases, the operating or engineering problem of getting the necessary work done and the accounting problem of ascertaining and reporting the condition of the property or the amount of upkeep performed during the period of federal control as compared with the condition at the beginning of federal control or the upkeep during the test period. As the prospects for an early return of the roads have become more definite, the necessity for having the accounting data as a measure for the amount of work to be performed this year has assumed a new importance, but the detailed accounting work has been so vast that it was found impossible to secure the necessary information by the time the year's maintenance work was started.

During the first part of the year both the maintenance department of the Division of Operation and the Accounting Division were engaged in a co-operative effort to develop a system of uniform records for preparing and recording data relating to the degree of maintenance of the roads during the test period and the period of federal control, but in order to furnish instructions to the regional directors and federal managers the maintenance department got its directions out first. These were first put in the form of a letter from C. A. Morse, assistant director of the Division of Operation, to the regional directors directing the preparation of a maintenance program and budget for 1919 on each railroad based on the amount of upkeep necessary to make the average for 1918 and 1919 equal to the average for the test period after equating for differences in labor and material costs.

This was followed by the issuance in March of Circular No. 28 of the Division of Operation, which was accompanied by five forms on which to record the comparative data for the two periods, both for the purpose of complying with the provision in the contracts for an analysis of the maintenance expenditures at the end of each year of federal control and to set the program for the current year. Compliance with this circular, however, would require so much clerical work and possibly duplication of the data to be asked by the accounting department that it was suspended for a time and instructions were issued to have budgets prepared that would carry out the general idea of matching the maintenance for 1919 and 1918 with that of the test period. Because the general standard was known it was thought that maintenance work need not be delayed while the elaborate data required to measure it accurately was being gathered.

Meanwhile, there has been a wide apparent discrepancy between statements of many railroad men that the maintenance on their roads was being kept below standard and those of officers of the Railroad Administration who have been talking about the large amount of maintenance work being prosecuted. The latter take the position that, taking everything into consideration, a large number of roads have been maintained to better than the required standard, and that while there may have been under-maintenance of way and structures on some properties, there has been over-maintenance on others, particularly in maintenance of equipment. Because an excess on one road cannot be used as an offset against the obligations of the government to another property, and would be difficult if not impossible to collect, Director General Hines found it necessary to issue an order, as briefly noted in last week's issue, limiting the maintenance of way expenditures for the month of June to the percentage of operating revenues, which the same expenses bore to total revenues of each road during the test period, pending more explicit instructions as to the program for the balance of the year. Mr. Hines explained in his instructions that this was not a hard and fast rule, and that it was not intended to stop any necessary work, but the regional directors were given authority to exceed the limit where necessary to meet emergencies, and the order has been somewhat modified.

Whereas, in the instructions heretofore issued the amount of maintenance during the test period has been used as the standard or yardstick for the maintenance during federal control, the new instructions will combine this standard with that of the condition of the property when taken over on January 1.

The contracts between the railroads and the government provide as the standard of upkeep the expenditure or payment into funds of such sums as may be requisite in order that the property "may be returned to the company in substantially as good repair and in substantially as complete equipment as it was on January 1, 1918," and there is a proviso that the annual expenditure and charges for such purposes during the period of federal control of an amount equal to the average annual expenditure and charges during the test period, with some adjustments and allowances for differences in the cost of labor and materials, shall be taken as a full compliance with the foregoing covenant.

In other words, the obligation of the government is to return the properties in as good condition as when taken over, not to equal the average of the test period, and while equalling the average of the test period has been regarded as representing a full compliance with that obligation, it has been found by experience that the test period standard is not always an equitable or practical one, and that in some cases would represent a greater expenditure than would be required to keep the property in the condition of January 1, 1918. For example, a railroad may have made such

large expenditures for improvements and maintenance during the test period that an equivalent operating charge for 1918 and 1919 is not necessary to keep up to the condition in which the property was taken over. Or it may have deferred maintenance to such an extent during the last half of 1917 that an amount less than the test period standard will meet the obligation. On the other hand, many railroads had deferred maintenance during the test period which, it is stated, has been more than made up during the period of federal control, but this does not assist the government greatly in making up any deferred maintenance that may have accrued since January 1, 1918, on other roads.

The contract does provide that excess maintenance requisite for the safe operation of the property shall be made good by the company by deduction from its rental, but the power to make such deductions is practically very much limited. It is stated that the operating officers of some roads that have earned sufficiently to do so without calling on Washington for the cash have taken advantage of the opportunity to put their roads in better condition in many respects than they were during the test period or even before, and that even where there has been a shortage of ties or of rail there has been an opportunity to do perhaps more of some other kind of work.

With the close of the accounts only a little over six months away the administration is preparing to devote special attention to maintenance expenditures, and to the budgets which are coming in with a view to coming out as nearly even as possible at the end of the year, and the question of whether the condition as of January 1, or the standard of the test period is to be used as the mark to be attained will be taken up with the corporations for determination in accordance with the circumstances in each case.

In 1918 the expenditures of the Class I roads for maintenance of way and structures were $653,868,000, an increase of 46.7 per cent over those of 1917. The expenditures for maintenance of equipment were $1,108,030,000, an increase of 60.4 per cent, while the total operating expenses increased 40.2 per cent. For the three months ending March 31, 1919, the maintenance of way and structures expenses were $171,787,000, an increase of 38.8 per cent over 1918, while the maintenance of equipment expenses were $285,846,000, an increase of 37.4 per cent. Total operating expenses increased only 26.3 per cent. Both in 1918 and in the first three months of 1919 the maintenance of way expenses were about 16 per cent of total operating expenses and maintenance of equipment consumed 27 per cent. The maintenance of way expenditures for the first three months of this year were 15.3 per cent of the operating revenues as compared with 13.3 per cent for the entire year 1918 and 11.1 per cent for the test period. The maintenance of equipment expenses for the three months were 25 per cent of operating revenues as compared with 22 per cent for the year 1918, and 16.7 per cent for the test period.

The subject of maintenance expenditures was rather fully discussed by Director General Hines in his testimony before the House appropriations committee, in reply to a question from the chairman of the committee regarding the claim that the maintenance has not been kept up to standard, and that there will be a considerable loss to the government in order to make good deferred maintenance. Mr. Hines said that the Railroad Administration had received, so far as he knew, no specific complaint from any company with regard to maintenance of equipment, that undoubtedly as to locomotives the condition is far better than it was when the government took over the railroads because, generally speaking, they were not in good condition on January 1, 1918, and they are in very good condition now.

He would not undertake to say that the condition of the roadway and structures was in all respects on January 1, 1919, as it was on January 1, 1918. He thought in many respects it was a good deal better, but in some respects it might not have been as good, because probably less rail and cross ties were put into the property last year than usually, and there was some shortage of labor. But, he said, taking the roadway and structures and equipment together, the average condition of the property as a whole is as well off as it was on January 1, 1919. He said the favorable weather had made it possible to make up for work not done last year, that a good deal of rail that was not put in last year has already been put in this year, and that as of April 30, the Railroad Administration could claim that the roadway and structures by themselves were in as good condition as on January 1, 1918, in addition to the balance in its favor on the equipment.

Mr. Hines said he thought the railroad companies had fallen into two or three errors. They assume, he said, that the standard contract obligates the government to put into the property each year of federal control, on an average, the quantities of material and labor that were put into the property on an average per year during the test period. That is not the case, he said. The obligation is to turn the property back in substantially as good condition, and it will be practicable on many railroads to do that without expending as large quantities of labor and material as were expended during the test period on an average, and where it is practicable the government does not have to put in a larger amount. The provision that the same quantities of labor and material may be used is not an obligation, but is an option which the government may take if it is more favorable than the other standard. Again, he said, the companies have attached great importance to the fact that the shortage of rail and ties proved a deterioration in the property as a whole. He thought that was not true, because it was frequently made up in other ways. He mentioned that many railroads in the test period were building up their property, while generally the railroads did not keep up their property in the last six months of 1917 as well as they did during the test period.

"It has been the tradition of the subordinate official," Mr. Hines said, "as against his own superior officer or as against any one else, that he wanted to maintain his property just as well as he could, and if he could maintain his property better than the corporation wanted it maintained he would do it because he just naturally wants his property in the best condition he can have it, and I take it that the subordinate officials will be just as anxious to do that under federal control as they were under private control, and that they will spend all the money on maintenance that they can get to spend.

"Now, since the interest of the government is very distinct from the interest of the corporation, and since the government interest is to see that he does not spend any more than the contract requires, it becomes necessary to look with special care on the perfectly natural tendency of all subordinate railroad officials to build up their property; but they would not do it out of disloyalty to the government. It is out of loyalty to the property they are holding, and they build the property up regardless of the policy of their own corporation, if they can get the money to do it. I do not regard that as any reflection, but I do mean it is a matter that the government must look after very closely in order to see that the property is not over-maintained through the enthusiasm of the subordinate officials to have the best property they can have."

Mr. Hines also put in the record the following statement regarding the materials and supplies on hand and purchased last year:

1. The total of material and supplies on hand January 1, 1918, for Class I railroads was $493,071,344, as follows:

Fuel	$35,843,843
Rail	31,516,292
Ties	28,989,691
Other material	396,721,528
Total	$493,071,344

2 The total of purchases during the calendar year of 1918, was $1,676,928,525, as follows:

Fuel	$559,536,491
Rail	48,803,940
Ties	28,989,681
Other material	396,721,528
Total	$1,676,928,525

3. Figures showing the average purchases made during the test period are not available at this time.

Earnings and Expenses for April and Four Months

The net operating income of the railroads for April, according to the Interstate Commerce Commission report covering 184 Class I roads and 17 switching and terminal companies, was $26,115,214, as compared with $71,407,370 in April, 1918, and $78,000,000, which is one-twelfth of the standard return. Director General Hines has issued a statement estimating the deficit for April as $58,000,000, but this takes into account the expenses of the Railroad Administration and some other items. For four months of this year the net operating income was $65,916,807, which is $247,000,000 less than the total rental for all roads for four months. The commission's figures follow:

Item	April				Four Months			
	Amount		Per mile of road operated		Amount		Per mile of road operated	
	1919	1918	1919	1918	1919	1918	1919	1918
1. Average number miles operated	233,421.34	234,090.82	....	....	233,432.55	234,060.02	....	....
Revenues—	Dollars	Dollars	Dolls.	Dolls.	Dollars	Dollars	Dolls.	Dolls.
2. Freight	265,331,620	264,477,396	1,137	1,130	1,041,505,022	911,999,901	4,462	3,896
3. Passenger	89,320,636	72,466,908	383	310	344,665,692	274,451,352	1,476	1,172
4. Mail	4,302,180	4,602,459	18	20	17,107,420	18,088,989	73	77
5. Express	11,217,915	9,525,143	48	41	33,536,420	36,945,804	144	158
6. All other transportation	9,291,624	10,321 273	40	44	36,572,701	35,557,938	157	152
7. Incidental	9,325,230	9,854,549	40	42	40,812,448	35,554,338	175	152
8. Joint facility—Cr.	542,209	535,566	2	2	2,191,987	1,775,559	9	8
9. Joint facility—Dr.	163,683	142,882	1	1	653.329	526 511	3	2
10. Railway operating revenues	389,167,731	371,640,412	1,667	1,588	1,515,738,361	1,313,847,370	6,493	5,613
Expenses—								
11. Maintenance of way and structures	63,395,089	47,089,998	272	201	235,405,556	170,943,407	1,009	730
12. Maintenance of equipment	94,673,848	73,456,326	406	314	380.773 257	281,519,143	1,631	1,203
13. Traffic	4,022,260	4,239,014	17	18	**14,773,860**	**18,270,327**	63	78
14. Transportation	168,618,560	145,898,702	722	623	693,053,178	584,678,248	2,969	2,498
15. Miscellaneous operations	3,870,257	2,932,236	17	13	14,085,429	11,548,888	163	150
16. General	10,357,862	8,381,082	44	36	41,089,517	33,932,967	176	145
17. Transportation for investment—Cr.	505,797	434,778	2	2	2,052,234	1,802,192	9	8
18. Railway operating expenses	344,432,079	281.562,580	1,476	1,203	1.377,628,563	1,099,090,788	5,902	4,696
19. Net revenue from railway operations	44,735,652	90,077,832	191	385	138,109,798	214,756,582	591	917
20. Railway tax accruals (excluding "War Taxes")	15,951,709	15,118,470	68	65	61,215,830	59,543,084	262	254
21. Uncollectible railway revenues	58,246	41,839	...	...	239,254	210,079	1	1
22. Railway operating income	28,725,697	74,917,523	123	320	76,654,714	155,003,419	328	662
23. Equipment rents	d 1,552,163	d 2,350,454	d 7	d 10	d 6,000,086	d 8,567,958	d 26	d 37
24. Joint facility rents (Dr. bal.)	1,058,320	1,159,699	5	5	4,737,821	4,483,828	20	19
25. Net of items 22, 23 and 24	26,115,214	71,407,370	111	305	65,916,807	141,951,633	282	606
26. Ratio of operating expenses to operating revenues, per cent.	88.50	75.76	...	...	90.89	83.65	...	...

d—Debit item.

Director General Hines authorized a statement saying that by reason of this unfavorable operating income for the month of April the Railroad Administration will incur a deficit for the month of April of approximately $58,000,000 after deducting one-twelfth of the annual rental due the railroad companies, making the total deficit for the four months of January, February, March and April approximately $250,000,000, after deducting four-twelfths of the annual rental. This estimate of deficit includes not only the large railroads but all other railroads under federal control, the expenses of the central and regional administrations, the operation of inland waterways under control of the Railroad Administration, as well as some incidental and miscellaneous items.

"In April, as in January, February and March," he says, "this unfavorable showing is due in large part to the falling off of business. It is also due in part to the heavy increases in wages and costs of materials. The Railroad Administration is not unlike other industrial undertakings in the increases in wages and costs of materials, but is unlike these other enterprises in that the latter have made corresponding increases in the prices of what they sell while the Railroad Administration has made an increase in transportation rates of only 25 per cent, which is a far less percentage than the increase in wages and costs of materials. As I stated a month ago, my judgment is that the present conditions are too abnormal to serve as a basis for any general change in the level of rates, and that it is preferable to defer action on that subject until there shall have been a fuller opportunity to get a more reliable, and possibly a more normal, measure of the conditions, meanwhile resorting to every practicable economy, studying the situation with the greatest care, and keeping the public fully informed as to developments."

The commission has also issued a statement giving the revenues and expenses for April and four months of the individual roads having operating revenues above $25,000,000 for 1918, representing 79.5 per cent of the Class I roads. Of these 7 had deficits in April and 11 had deficits for the combined four months. The combined net operating income for April was $22,288,705 as compared with $56,000,771 in April, 1918, and for four months it was $59,864,300 as compared with $107,976,968.

Railroad Administration Expenses

The total expenses and payroll of the Railroad Administration are now running at the rate of $703,000 a month, or $8,436,000 a year, as compared with $3,647,143 in 1918, according to information given by the Railroad Administration to the House appropriations committee last week. One statement filed with the committee gave the expenses for the first four months of this year as $2,849,000. Another statement gave separately the general expenses and payrolls by months from January to May, inclusive, $848,472 for general expenses and $2,670,712 for payrolls, or a total of $3,519,184 for five months. At this rate the payroll for a year would be $6,432,000. For the month of April the general expenses were $110,785 and the payroll $529,020. For May the figures cover payment for one and one-half months and include $262,482 for general

expenses and $807,641 for payroll. For January the figures cover only half a month. The force of the Railroad Administration increased considerably during the latter half of last year, and some additions have been made this year by changes in organization. The figures include both the central and regional organizations.

Committee on Automatic Train Control

A. M. Burt, heretofore assistant general manager of the Northern Pacific, who was appointed on June 1 assistant director of the Division of Operation, has also been appointed chairman of the Committee on Automatic Train Control, succeeding C. A. Morse, resigned. The committee spent four days last week in New York inspecting the operation of automatic stops in the subways and tunnels of the Interborough Rapid Transit Company, the Brooklyn Rapid Transit Company, the Hudson & Manhattan and the Pennsylvania terminal, also the experimental apparatus of Frank J. Sprague and one or two other devices. The trips in use in the subways are of the Kinsman type, using apparatus furnished by the signal companies and circuits designed to meet local conditions. The committee found that the conditions under which these are used are very special and quite different from those of a steam railroad with mixed traffic. The committee will probably make another inspection trip next month.

War Department Locomotives Turned Over to Railroads

The director general has accepted from the War Department the custody of 200 locomotives which were originally constructed for the Russian government, and has arranged until further notice to continue the operation of that equipment on federally operated lines.

Prior to the present arrangements, the lines using these locomotives were obligated to the War Department for a rental based upon $45 per locomotive per day. The amount payable was considerably in excess of that required under the present agreement, which is 6 per cent per annum upon a valuation of $55,000 per locomotive, or an annual rental of $3,300 per locomotive from the date it went into service, or pro rata for any fractional part of a year. The agreement for the use of these locomotives provides that they shall be fully maintained at the expense of the director general.

Orders of Regional Directors

U. S. R. A. Standard Cars; Repairs.—The regional director, Eastern Region, by circular 500-101A771 promulgates a notice from the Division of Purchases that when it becomes necessary to make repairs on standard freight cars, or standard locomotives, orders for material, before being placed, should be referred to the director of the division, H. B. Spencer, Washington, so that any surplus material accumulating at the car plants can be properly distributed.

Atlantic City Conventions.—A. T. Hardin, regional director, Eastern Region, by circular 1301-75A731A, advises federal managers of a letter from Frank McManamy, assistant director, division of operation, calling attention to the importance of sending mechanical officers to the conventions to be held June 18-25. Mr. McManamy says: "Information has been received from various railroads indicating that instructions in my letter of May 3 are not fully understood. These instructions were not simply permission for representative members of Section 3, Mechanical, American Railroad Association, to attend the convention at Atlantic City, if they desired to do so, but was intended to be instructions for them to attend a business meeting of this association. There are many matters of importance to come before that meeting, therefore it is desired that representative members be directed to attend."

Bulletin Boards for Brotherhoods.—The regional director, Eastern Region, by circular 1500-80A777, instructs federal managers to provide places at shops for the posting of circulars and notifications issued by employees or their organizations.

Capital Expenditures less than $1,000.—A. T. Hardin, regional director, Eastern Region, by circular 2700-A776, quotes a letter from Washington calling attention to apparent violations of the spirit of the rule which allows federal managers to make expenditures, chargeable to capital, without first consulting the corporation, provided the total expenditure is less than $1,000. Corporations have made protests that many items coming within the limit are really parts of a general program, and do not properly stand by themselves. Among such items are:

(1) Office facilities—typewriters, tabulating machines, desks, etc., spread over eight or ten months. (2) Machine tools evidently part of a general improvement of shop facilities but split up into single purchases. (3) Expenditures incident to heavier rail, divided up into monthly charges, giving no indication of the scope of the program. (4) Fencing, divided up into short sections * * * (5) Tie plates and rail anchors, divided up into short sections. (6) Rebuilding freight cars reported under the heading of the individual car number. Federal managers are advised to refer such matters, where possible, to the corporate officer, to avoid these objections.

Pay of Claim Agents.—A. T. Hardin, regional director, Eastern Region, by circular 1200-4-56A774, promulgates the views, not mandatory, of the administration as to salaries suitable for employees in the personal injuries claim department. These rates, following conferences with the National Order of Railroad Claimmen, are quoted as follows:

Position	Minimum	Maximum	
Investigators—those who investigate personal injuries, fires, killing of stock, etc.	$125	$150	first year
	135	165	second year
Adjusters or claim agents—those charged with responsibility of making investigations and adjustments.	150	200	first year
	200	225	second year
	225	250	third year

After service of five years, salary may be graded up to maximum of $4,000 yearly, according to capacity, territory and general responsibility.

Mr. Hardin thinks that in the Eastern Region the salaries already compare favorably with the scale here quoted; but where this is not the case the federal manager is called upon to submit his recommendations.

Preparations for 1919 *Cotton Crop*—Circular 217 of the Southwestern regional director quotes a circular issued May 22, by W. S. Turner, secretary of the Arkansas Cotton Trade Association, Little Rock, Ark., relative to preparations which should be made for the movement of the 1919 cotton crop similar to circulars which have been issued concerning the 1919 wheat crop.

Bills of Lading for Shipments to Cuba.—Circular 264 of the Central Western regional director similar to Circular 437 of the Southern regional director (*Railway Age,* May 30, page 1304).

Claims Against War Department.—The regional director, Eastern Region, by circular 401-14A765C, gives further instructions concerning the presentation to the War Department of claims for expenditures in the construction of side tracks, and for other things. A "Claims Board, transportation service, War Department," in charge of Brigadier General F. T. Hines, has been established to attend to all disputed claims. Federal managers should send to him not only claims concerning the construction of side tracks, but also any disputed claims, whether for freight charges, demurrage, storage, passenger cars, baggage cars, engines, derricks, or other facilities.

Railway Developments in Foreign Countries

Construction Projects Under Consideration in Several Places. Conditions in Belgium

THE PRESIDENT OF PERU has been authorized by Congress to obtain a loan of $1,500,000, gold, at 7 per cent annual interest and an accumulative annual amortization of one per cent to be used in the construction of the Jatunhuasi Railroad.

The Venezuelan department of public works has recently signed a contract with Senor Jose Antonio Redondo, by which the National Government leases to him the Santa Barbara-El Vigia Railway, a national property in the states of Zulia and Merida.

Several capitalists of the United States are reported to be interested in a project for constructing a railway which, extending from the port of Manzanillo in the Dominican Republic, shall traverse the northwestern territory, passing near Santiago and along the southern part of the Yaque and extending nearly to the pines region, terminating at La Vega.

New Trans-Australian Line

Mr. Watt, acting prime minister of Australia, has informed Mr. Peake, premier of South Australia, says a correspondent in the Times (London), that the administration of the Federal Railways is studying schemes to connect north and south by a line from Hergott Springs to Port Darwin.

The proposed line would have a total length of about 1,600 miles. At Hergott Springs, in the south, it would connect with the existing line to Adelaide, which is 200 miles farther south. Port Darwin, the northern terminal, is in the Northern Territory.

"Squatters" Hold Siberian Cars

The technical board in charge of operations on the Trans-Siberian Railroad, says an Associated Press despatch from Omsk, has completed an inspection of the line between Omsk and Perm and has returned. It is awaiting the arrival in Omsk of John F. Stevens, chairman of the board, who is on his way to Omsk from Harbin.

Members of the board believe that the most serious problem before them in the rehabilitation of the Trans-Siberian lies in the ousting of some 14,000 persons who have taken possession of freight and passenger cars along the road. These people are holding the cars, hoping that they will soon be able to return home, and are not disposed to relinquish the rolling stock which they have seized.

Transandine Line Blocked

The heaviest snowstorms in recent years have probably stopped communication between Argentina and the west coast, by way of the Transandine Railway, until spring.

Snow slides have torn up the Transandine Railway at points and wrecked the bridges, making it impossible to operate the bi-weekly train between Buenos Aires and Valparaiso.

Several prominent North American business men were among those caught in the snows of the Andes and forced to return to Buenos Aires to resume their journey northward by the east coast route.

Officials of the Transandine Railway state that it will hardly be possible to repair the road before the spring months of September or October.

The blocking of the Transandine Railway by snow slides is practically an annual occurrence. In 1912, 1914 and 1915 the road was inoperative for 140, 188 and 141 days, respectively.

Exports of Cars in April

Exports of freight cars in April, numbering 1,005, with a value of $1,913,728, were double those of February, when 583, valued at $957,128, were shipped. Nearly half the cars exported in April were destined for Italy, and the larger part of the other half to France. The detailed figures compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce follow:

Countries	Passenger cars for steam railways		Freight and other cars for steam railways	
	Number	Dollars	Number	Dollars
France	....	.....	350	827,730
Italy	....	.....	550	943,800
Canada	5	120,141	7	15,961
Mexico	....	.....	27	24,911
Trinidad and Tobago	....	.....	2	7,200
Cuba	3	25,000	69	94,126
Total	8	145,141	1,005	1,913,728

Carranza Urges Building of Railroads in Mexico

President Carranza on June 6 sent a message to the Mexican senate asking Congress to authorize the national executive to construct three railways connecting undeveloped regions of Mexico with those already developed.

The first railway suggested by the president would connect a point between Magdalena and Hermosillo, in the State of Sonora with Ensenada, in lower California. The second would unite the town of Peto, Yucatan, with Bacalar and Santa Cruz, in the territory of Quintana Roo. The third line suggested would connect Santa Lucrecia, in the State of Vera Cruz, with the State of Campeche, which has no railways.

In the introduction to his message, the president says that the government hopes to form a centralized railway system by which both the northern and southern frontiers of Mexico will be connected with Central Mexico, thereby "opening rich undeveloped regions, uniting national thought and ideals and ending the present isolation."

French Commission Visits Westinghouse Works

The French Commission now in this country to investigate railway electrification projects has arrived at Pittsburgh, after having visited Altoona. It will spend several days there to inspect the works of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, and to examine the electric locomotives now under construction for operation on the Hell Gate route of the New Haven, and the new electric passenger locomotives being built for the Chicago, Milwaukee & St. Paul.

The commission is headed by Professor Mauduit, professor of electrical engineering of the University of Nancy, and Major D'Anglarde, representative of the Minister of Public Works, and in addition consists of Parodi, chief electrical engineer of the Paris-Orleans Railway; Sabouret, assistant manager of the Paris-Orleans; Japiot, chief mechanical engineer of the Paris, Lyons & Mediterranean; Ferrand, electrical engineer of the Paris, Lyons & Mediterranean; Debray, electrical engineer of the French State Railways; Barilliot, electrical engineer of the French State

Railways; Bachellery, assistant manager of the Midi Railway; Leboucher, assistant motive power superintendent of the Midi Railway, and Balling, chief engineer of the Paris-Orleans.

The commission will be the guests of E. M. Herr, president of the Westinghouse Electric & Manufacturing Company, during its stay in Pittsburgh.

Exports of Car Wheels and Axles in April

The exports of car wheels and axles in April, valued at $946,304, were considerably in excess of the shipments of $686,281 in March, and were the largest for any month so far this year. Japan and Japanese China were the largest customers, while considerable quantities were exported to Canada and the Straits Settlements. The figures in detail as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce are as follows:

Countries	Car wheels and axles Dollars
France	22,789
Gibraltar	930
Italy	94,909
Russia in Europe	2,050
England	207
Scotland	4,000
Canada	169,422
Guatemala	397
Panama	9,600
Mexico	6,384
Trinidad and Tobago	133
Cuba	18,624
Dominican Republic	254
Brazil	5,165
Chile	476
Ecuador	1,298
Peru	8,789
China	1,416
Japanese China	125,874
British India	1,280
Straits Settlements	109,500
Dutch East Indies	53,803
Japan	278,834
Russia in Asia	26,831
Australia	3,222
New Zealand	22
Egypt	95
Total	946,304

Greek Railway Improvements

In view of the proposed linking-up of the Greek and European railway systems in Macedonia, according to reports from Athens, the Greek Government has sanctioned the construction of certain work and other improvements on the Piraeus-Athens-Larissa and Salonika railway, which will cost 35,000,000 fr. ($7,000,000). The work has already begun, under the supervision of a competent staff of Greek and European engineers. A number of short tunnels, the length of which in all is about 1,300 metres, and eight or ten bridges, each 10 metres in length, are being constructed to improve the section between Athens and Larissa; while the bridges between Papapouli and Topsin, on the Larissa-Salonika line, will be made of iron and reinforced concrete, at an expenditure of 4,000,000 fr. ($800,000). These bridges, it is estimated, will require 1,000 tons of iron, and will be constructed in Greece with the exception of two, one for the River Bistritza (Haliakmon) and one for the River Kara-su (Navroneri), which have been ordered in Europe (the country is not mentioned). Four hundred large houses will be built along the line for the railway officers, attendants and workmen; also workshops and engine sheds at the Piraeus, Lianocladi and Larissa. M. Venizelos is particularly interested in the completion of all these works, taking an active part and supervising the orders given for the necessary materials. As regards the material, it is stated that the Greek Government will buy the railway material belonging to the British Headquarters in Macedonia, which a committee of experts has already gone to value, while large quantities of iron and implements for the works are being sent from France. Offers for the supply of railway passenger cars at reasonable prices were made (it is said) direct to M. Venizelos from Canada; while sleeping and dining cars will be sent in due time by the respective companies. In the meantime the reconstruction and repairs of the Serbian railways, so badly damaged or destroyed by the war, are progressing. The trains run now as far as Uskub, and it is hoped that within a month or two the remainder of this line will have been repaired and thus the union of the Greek and European railways will be effected.

Railway Extensions in Brazil

Plans are under consideration for the construction of a new railroad in the state of Sao Paulo, Brazil. The proposed line is to extend from Pederneiras through Agua Limpa, Saturno, and Poco Alcalino de Quilombo to the Batalga River at Rainha dos Anjos do Batalha, thence northwest to Miguel Calmon, traversing about 70 miles through a very fertile region, rich in woods.

It is also planned to run a railroad line which will connect the three mountain towns, Petropolis, Therezopolis and Friburg. The route will be one of the most picturesque and fascinating in the country.

The president of Brazil recently specified the dates for the construction and delivery of the following railway lines: From Sao Sebastiao do Paraiso to Passos, December, 1920; the Biguatinga to Jacuhy extension, February 24, 1921; and November 15, 1921, for the Pratinha to Santa Rita de Cassia branch, and the extension from Passos to kilometer 24.5 toward Sao Jose de la Barra.

What Happened to Belgium's Railroads

A clear idea of the thorough use of the Belgian railway lines by the Germans during their occupation of that country, of the attempts to Germanize the system completely and information concerning the preparations made by the Germans to destroy the system completely before their departure, are given in an article in the Belgian Reconstruction Section of the Times (London) Engineering Supplement for April.

The enemy, the article says, made the fullest possible use of the Belgian railway and light railway system during his advance, his period of occupation, and his retreat from the country. The main line tracks were under enemy control and operation immediately and worked by men of the railway corps largely recruited from the German railway staffs. Complete plans for taking over and controlling the railways had been worked out before the invasion, which even contained schemes for "improving" certain portions and connections of the system for the benefit of the invading armies. These were immediately put in hand as he advanced, and were carried out as rapidly as possible. Control was so complete and effective that when his period of occupation was near an end the Belgian railway system was completely Germanized. Signalling systems were altered or reinstalled to bring them into line with the German system, and other sweeping alterations were made. The Belgian and French locomotives and rolling stock which had fallen into the hands of the enemy were worked to destruction, and, finally, elaborate plans were made for a systematic destruction of the whole main railway system in preparation for a possible hasty retreat. Stations, railway buildings, signal boxes, viaducts, and stretches of the permanent way were mined, and destruction gangs were ready to cut telegraph and telephone wires and put all signalling apparatus out of gear.

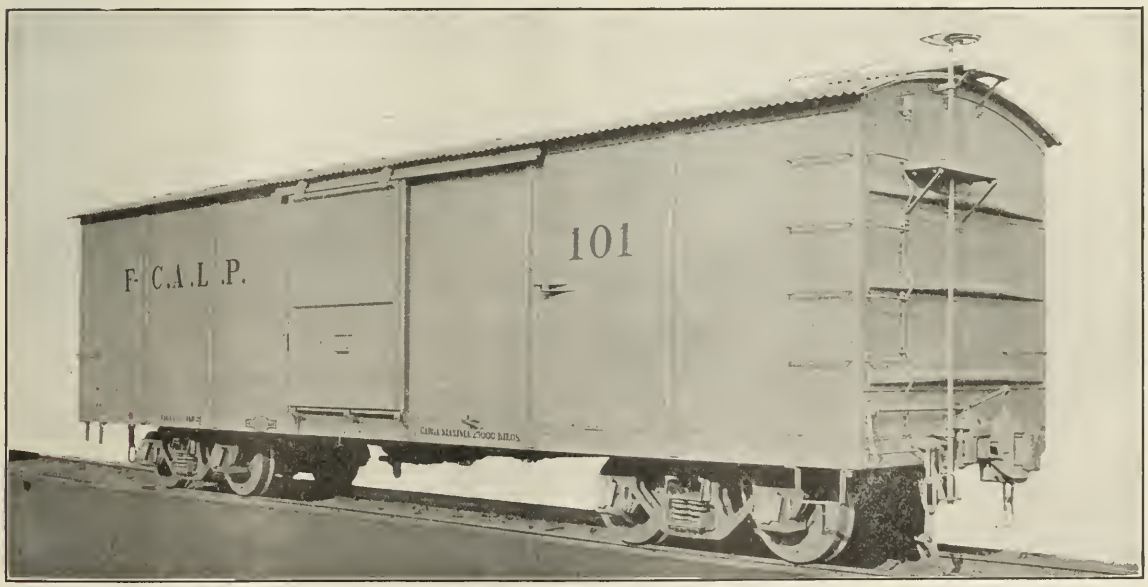
When the retreat began the enemy carried out many of his schemes of destruction, but, happily, not all of them. It was possible to resume certain services immediately after the armistice, and the work of re-establishing the principal routes was at once put in hand and is being carried on with all available resources of labor and material. A manifest

improvement was visible even during a three weeks' visit to the country, and every week new trains are put into operation and running times accelerated. The Central Industrial Committee's estimate of supplies immediately needed includes 500 kilometres of rails, 23 kilogrammes per metre weight; 250 sets of points; 250 17-ton locomotives; 200 10-ton box trucks, 6,000 tipping wagons of various capacities, and 1,000 ordinary goods trucks, and this estimate has only been drawn up from the transport point of view in connection with Belgian industries. The actual requirements of the Belgian State Railways for reconstruction are enormous. They have, however, been met to some extent by German material—principally locomotives and rolling stock—delivered in accordance with the armistice terms. The Belgian rolling stock left in the country is almost unusable, and that returned from Germany is worn out and dilapidated to the point of uselessness. It is for that reason that rolling stock—both for passengers and goods—throughout Belgian is nearly entirely of German origin.

Two interesting projects are mentioned in connection with the future reconstruction of the Belgian railways. One provides for a universal electrification of the whole system, the power to be supplied from high-tension, polyphase generating stations erected in the coal-producing areas, which will feed converter sub-stations established at the necessary places along the line. The other is to denationalize the railways and place them in the hands of a company, State-controlled and State-guaranteed, which will operate them to the best adventage of the nation. Both these are plans in the air at present, but they open up interesting possibilities for the future.

Light Railways

For its size Belgium had a larger and more highly efficient system of light railways than any other country in Europe. The enemy took the fullest advantage of this during his period of occupation. For a time the light railways were left alone, and were the only means of traveling available for the civilian population of the country. At a time when they needed means of light transport in the area behind their front line the Germans began to levy heavy contributions upon the permanent way and rolling stock belonging to the light railway systems. The most important part of these systems is controlled by the Société Nationale des Chemins de Fer Vicinaux, whose chief inspector reports that at least 1,700km. of track were taken up from the light railway systems during the German occupation and laid down again in places where the Germans had need of transport. All the locomotives and rolling stock were commandeered and shifted to various parts of France and Belgium. The enemy's need for light transport at one time became so acute that he linked his Belgian light railway systems up with similar systems in the occupied portions of France, notwithstanding the fact that the gage of the French system is two cm. less in width. The inspection staff of the S. N. C. V. has made a tour of investigation and has succeeded in discovering a good deal of the commandeered rolling stock in the front line areas. Much of this, however, is not available for immediate return, as it is being used by the military authorities for their own purposes. The permanent way material torn up and relaid in other parts of the country is being repaired to some extent, but traffic congestion is causing delay and there is naturally only a certain proportion of the material which is useful, much of it being very badly worn. Orders for new rails have already been placed, and it is hoped to get quick delivery of 1,000,000 lengths. Reconstruction of the light railway system, which is a vital factor for quick distribution and collection of light goods in Belgium, is being pushed forward as quickly as possible, and the first important line is expected to be completely opened for traffic in six weeks' time.



This car is of all-steel construction and follows American principles of design with automatic couplers, Buckeye Pedestal trucks, Westinghouse air brakes, etc. It is of metre gage. Its inside dimensions are: length 32 ft. 6 in.; width, 7 ft. 9 in., and height, 6 ft. 2 3/16 in. The car weighs 12,719 kilos (28,000 lb.) and its maximum capacity is 25,000 kilos (55,000 lb.).

One of 100 Steel Box Cars Recently Built by the Pullman Company for the Arica-La Paz Railway of the Chilean Government System.

General News Department

E. J. Manion, of the New York, New Haven & Hartford, New Haven, Conn., has been elected president of the Order of Railroad Telegraphers, in place of **H. B. Perham.**

In Louisiana the business hours for freight houses are from 8 a. m. to 5 p. m. with an intermission from noon to 1 p. m.; but any carrier may open at 7 a. m. if it so desires. This is a rule which has just been issued by the railroad commission of the state, in place of its former rule; the commission holding that to keep the houses open longer would conflict with the principle of the eight-hour day.

A Correction

In the issue of June 6, page 1385, reference was made to two timber treating retorts made for installation at the C. & N. W. treating plant at Escanaba, Mich., and the statement was made that these retorts, which were 113 ft. long and 6 ft. 2 in. in diameter, were believed to be the largest timber treating retorts ever installed in the United States. Investigation has since shown that this statement is wrong and that there are numerous retorts in operation in this country larger than those mentioned above.

Senate Passes Cummins' Bill

Just as we are going to press, word is received that the Senate has passed the Cummins' bill which gives the Interstate Commerce Commission jurisdiction over interstate rates, but leaves the matter of state rates in the hands of the director general of railroads. The bill was amended providing that no change can be made in intrastate rates without 30 days' notice. An amendment was also made requiring the Railroad Administration to pay out of the compensation due to the railroads judgments based on claims that accrued before federal control.

Burlington Relief Department

The thirtieth annual report of the Relief Department of the Chicago, Burlington & Quincy Railroad Company covering the fiscal year ending December 31, 1918, shows an excess of disbursements over receipts of $110,583. The net contributions of members and income from investments totaled $620,295, whereas the benefit orders carried by the treasurer and the interest on cash advanced by the railroad totaled $730,888. However, the operation of the relief department since its inception in 1889 show that receipts have been in excess of benefit orders paid to the total of $329,799. The payments made by the railroad company from its own funds in establishing, operating and maintaining the relief department from 1889 to 1918 inclusive totaled $2,189,234. Records of the benefits paid out show that the average number of cases of accidents equals 10.4 per 1,000 members, the average number of cases of disability equals 53.3 per 1,000 members and the death rate for each 1,000 members averages 15.4 per cent.

Railroad Men Wanted in Russia

A request has been received at the office of the chief of engineers, War Department, Washington, from the Russian Railway Service Corps for additional men to serve on Russian railroads. At the present time there is need for first class accountants, store and material men, stenographers, shop superintendents, trainmasters, traveling engineers, roundhouse foremen, car foremen and foundry superintendents. These men will not be in the United States Army but will wear a uniform and be members of the Russian Railway Service Corps, a separate service formed for the specific purpose of handling railway matters in Russia. Accountants and store and material men will receive from $2,000 to $2,500 a year, shop superintendents approximately $5,000 a year, trainmasters and traveling engineers $2,500, roundhouse foremen and car foremen $2,000, and foundry superintendents $3,000. Col. J. M. Wright, Director General of Military Railways, Office of Chief of Engineers, Washington, D. C., is handling inquiries concerning the service.

Social Status of Railway Men

Statement by Lord Shaughnessy, Chairman of the Board of Directors of the Canadian Pacific Railway.

I have just returned from England. There the situation of labor is a cause of anxiety. Nominally the problem between labor and employers is a question of hours and rates of pay. To my mind, and it will be so here, there is something beyond that now. It is not only a question of hours and rates of pay, but of the actual status of men who are performing such a large portion of the work of building up industries and making themselves as strong an influence as the capitalists and employers. It is a question of what their social status is to be in the future. We may take it for granted beyond question that the working man of the future, the working man of today, must be permitted and enabled and assisted, he and his wife and children, to lead quite a different existence to that of the past. They must not be confined to the narrow, sordid lives that have been theirs hitherto. They must have the opportunity to enjoy the good things of life that those in higher positions have enjoyed.

"Bunk"

H. M. Mayo, superintendent of safety of the Southern Pacific lines in Texas, the Gulf Coast Lines, and other roads, in bulletin No. 19, issues a little homily on the remark of an employee, after the adjournment of a safety meeting at which he was a visitor, that the safety work was "bunk." Do you believe it? says Mr. Mayo; "personally I should hate to think so, if only for the sake of our twenty-three odd thousand employees who need safe and steady jobs because of the wives and babies, particularly when it comes high to live at all. Why knock? It would be an impossible task to please everybody; yet if an earnest work to save lives and prevent injury is "bunk," then it will have to go at that.

"From January 1 to March 31 members of safety committees and others have made nearly 1,200 safety recommendations of which over 60 per cent have been adopted, and conditions and practices which threatened the safety of our men have been corrected. Is this bunk? Who gets the benefit of the safety work? . . . I wish the chap who does not sympathize with the safety work would talk to a member of one of the safety committees. Safety means life, happiness, efficiency and satisfaction. Get the safety habit and don't knock."

Thanks to British Railways

A report by the American Red Cross, recently issued, gives warm praise to the railroads of England for their courtesies during the war. The report says:

"Supplies valued at about $15,000,000 were handled by the London headquarters of the American Red Cross during the war. To the railroads of Great Britain, the American Red Cross owes a great debt of thanks, for not withstanding their depleted staff and the terrific strain upon their roads, they always gave ample space and careful attention to our supplies. When the railroads were laying embargoes for weeks at a time on all classes of material except war supplies, they never refused our shipments. They carried Red Cross supplies at half rates and the unloading of Red Cross freight always received preferential treatment; and every possible courtesy was shown by the staffs of the railways. The Port

of London Authority granted all its dock privileges free of charge, and every possible accommodation was granted even when the docks were greatly pressed for space. The English customs also gave unusual privileges to the American Red Cross. No duty was charged on tobacco, cigarettes, chocolates and other supplies of a dutiable nature which were brought into the country for hospital and canteen distribution. The facilities given us for shipping goods in bond were very exceptional. . . ."

Winnipeg Strike

Although the Central Strike Committee at Winnipeg, which is in general charge of the strike in that city, maintains that the general strike will continue and will even be extended, the situation seems to be gradually adjusting itself, and the general strike called in support of the metal trades union seems to be losing force. Great pressure has been exerted by international unions, conservative trades union men and representatives of the railway brotherhoods, the latter acting as mediators at Winnipeg to bring the strikers and employers together for a settlement of their differences, but this pressure has not caused any great changes in the plans of the radical leaders of the strike. Latest reports indicate that the negotiations of the representatives conducted by the railway brotherhoods have come to naught because of the stand taken by the employers.

The attitude of the returned Canadian soldiers at Winnipeg has been instrumental in alienating sympathy from the strikers, and their action has prevented a show of violence on the part of the strikers.

The Brotherhood of Railroad Car Men has revoked the charters of two of its local unions at Winnipeg and that of a third at Edmonton. The American Federation of Labor has disapproved of appropriating money for organizing "one big union." Other heads of international unions are preparing to issue similar orders, it is said.

On Thursday of this week, Mayor Gray, of Winnipeg, gave notice that at the next sign of disorder among strikers he would ask for troops to keep order.

Telegraph and Telephone Lines Returned to Private Operation—Strike of Operators

Control of the operations of the telegraph and telephone lines, which were taken over by the government in July, 1918, was restored suddenly to the owners of the properties by an order issued by Postmaster General Burleson on June 5. The order, however, retains a degree of federal control over the companies. The rates fixed by the government, the financial relations between the companies and the government, and the order prohibiting discrimination against employees because of union affiliations will be continued, unless Congress orders otherwise, or until federal control is finally terminated by the proclamation of peace. Immediately after the issuance of the order the president of the Commercial Telegraphers' Union issued orders extending the strike of Western Union operators at Atlanta to the entire southeastern section, predicting that it would be extended later to the entire Wesetrn Union system and to other companies. The postmaster general stated that his action was taken because the President had recommended the return of the properties and in view of the action of the Senate and House committees looking to a return. The companies, he said, are now "free to formulate and put into effect their own policies unrestricted by government control, which is to continue in any case a few weeks, and thus be able to prepare themselves for a complete resumption of the management of their properties." The Senate committee had voted to report a bill, introduced by Senator Kellogg, to return the properties of their properties." The Senate committee had voted a bill, introduced by Senator Kellog, to return the properties to their owners immediately after its passage and the House committee was holding hearings on a similar bill. Only a few hours before the announcement, J. C. Koons, first assistant postmaster general, and chairman of the wire control board, had testified before the House committee, suggesting June 30 as a good date for the restoration of private management. The operating board created to direct the management of the wire lines is relieved of its operating duties and directed to wind up its affairs.

The Kellogg bill was passed by the Senate on June 10 after a brief debate and without a roll call. It provides that the present rates shall be continued for 90 days.

The strike of telegraph operators was ordered to go into effect on Wednesday morning, June 11, but at this writing (Thursday) seems to have caused but little disturbance. Some cities report from 10 to 30 per cent of the operators out, but at most of the important points the message service appears to be going on about as usual. The Postal Company appears to have suffered more than the Western Union, but in the offices of both companies strikers were returning to work. Among the operators of the Western Union there is a separate organization of employees which seems to be friendly to the management; and the company this week announced that $1,000,000 in back pay was to be distributed to loyal employees.

New agreements have been signed with the operators by the Federal Telegraph Company, a combination of land and radio telegraphs on the Pacific Coast.

American Association of Railroad Ticket Agents

The American Association of Railroad Ticket Agents held its first annual convention at Chicago, June 9 and 10. The opening session of the convention was to be addressed by R. H. Aishton, regional director of the Northwestern region, but Director General Walker D. Hines, who was passing through Chicago on an inspection trip, spoke in place of Mr. Aishton, telling the members of the association of his approval of the objects for which the association was formed and discussing the relation of efficiency on the part of employees, especially ticket agents, to the present railroad situation. Mr. Hines said, in part:

"The railroads of the country are in a very serious need at the present time of any additional efficiency that can be effected, and any additional economies that can be adopted in the use of supplies and in the carrying on of the business. The increase in wages and the increase in cost of materials has been very much in excess of the increase in rates, and that condition, coupled with the temporary falling-off in freight business, has produced a very serious deficit. We ought to consider very carefully just how much can be accomplished through the introduction of more efficient methods. I feel the very greatest interest in keeping down the increase in rates just as far as possible, because I think the great thing to accomplish is to keep down as far as we can the cost of living to the American public; to you, to me and to all the rest of the public. What you can do in making your work more productive, and in the minor economies you can practice in the matter of railroad supplies, will, in the aggregate, represent an enormous saving which will be an important factor in reducing the amount of increase which must be made in rates."

Echoes of the War at the Atlantic City Conventions

Several innovations have been introduced in the evening programs at the mechanical conventions, which will be held at Atlantic City, June 18-25. The program on Saturday evening will be in the nature of an appreciation of the railroad and railroad supply men who went into the service. Josephus Daniels, secretary of the navy, will make an address, expressing such appreciation. It is expected that Brigadier General W. W. Atterbury, who has just returned from France, and who was director general of transportation under General Pershing, will be present and make an address. Other speakers will be Col. Henry W. Hodge, senior member of the firm of Boller, Hodge & Baird. Col. Hodge will speak particularly on the achievements of our railroad regiments in France. Senator Walter E. Edge, New Jersey's war governor, will also make an address.

On Monday evening, June 23, an address will be made by Major E. D. Campbell, Railway and Seacoast Section, Artillery Division, Ordnance Department, United States Army, Washington, D. C., on Railway Artillery, at the Hippodrome, from 8:30 to 10:00 o'clock. The address will be illustrated by motion pictures and lantern slides.

REVENUES AND EXPENSES OF RAILWAYS

THREE MONTHS OF CALENDAR YEAR 1919

Name of road.	Average mileage operated during period.	Operating revenues			Maintenance of		Operating expenses				Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Lehigh & New England	226	$584,839	$4,981	$651,552	$122,370	$173,005	$6,650	$294,591	$27,913	$624,297	95.81	$27,254	$25,830	$1,424	—$49,567
Pitts. & Shawmut	103	241,537	14,149	258,616	95,018	111,590	4,601	105,650	9,122	325,981	126.05	—67,365	2,914	—70,279	—100,126
Pitts. & W. Va	63	255,789	29,270	320,936	164,624	112,274	3,206	149,736	15,637	468,739	146.05	—147,804	36,422	—184,225	—170,204
Pitts., Cin., Chicago & St. L	2,383	13,667,591	4,835,485	20,940,762	2,582,292	6,436,433	238,899	10,398,222	496,804	20,349,042	97.17	591,720	698,466	—107,540	65,745
Pitts., Shawmut & Northern	204	214,183	20,111	242,869	61,751	127,435	2,790	109,158	21,084	322,231	132.67	—79,362	5,530	—84,911	7,374
Fort Reading	21	357,496	.....	589,375	48,378	66,255	38	314,588	2,925	432,182	73.32	157,193	27,000	130,193	149,534
Richmond, Fred. & Pot	77	1,042,644	876,221	2,051,372	167,739	241,510	12,794	654,791	39,733	1,138,748	55.51	912,624	40,235	872,339	486,373
Rutland	415	539,869	285,605	985,340	199,588	289,796	24,936	509,934	32,432	1,056,687	107.24	—71,347	55,697	—127,075	88,505
St. Joseph & Grand Island	258	492,347	111 045	637,346	156,673	81,986	5,332	432,276	34,651	716,467	112.41	—79,122	26,433	—105 617	—204,120
St. Louis, Brownsville & Mexico	548	778,880	330,359	1,171,806	196,107	205 417	15,116	366,062	48,106	830,808	70.89	340,998	30,000	310,867	—4,135
St. Louis, Merchants Bridge, Terminal	9	.....	21,337	655,691	160,876	176,450	2,311	527,754	18,244	885,636	135.06	—229,945	24,000	—253 945	—254 334
St. Louis-San Francisco	4,761	11,712,531	4,881,779	17,514,464	3,182,194	3,973 883	141,618	7,230,552	516,171	14,985,674	85.56	2,528,791	662,450	1,857,564	192,492
St. Louis, San Francisco & Texas	134	235,867	41,363	299,400	68,789	61,893	2,925	202,658	13 741	350,006	116.90	—50,607	4,127	—54 777	—167,551
St. Louis Southwestern	939	2,430,122	465,154	3,009,671	748 535	739 532	53,088	1,010,981	115,990	2,692,354	89.62	312,317	111,420	199,978	—998,518
St. Louis Southwestern of Texas	814	1,013,900	326,845	1,427,575	461,527	564,844	617,344	693,804	71,992	1,804,634	126.41	—377,059	63,000	—440,175	—626,173
San Ant. & Aransas Pass	732	680,560	242,885	984,916	291,922	311,658	18,522	525,356	56,784	1,202,156	122.05	—217,240	45,000	—262,311	—376,509
Seaboard Air Line	3,563	6,467,484	2,997,871	10,407,686	1,585,204	2,317,341	180,869	4,990 055	308 641	9,461,663	90.91	946,024	405,000	539,396	—802,598
South Buffalo Ry. Co	11	129,800	.....	381,689	37,875	57,196	839	187,855	4,871	288 637	75.62	93,052	7,650	85,402	55,711
Southern R. R.	6,982	18,210,164	8,614,815	29,103,894	4,694,352	7,563,132	362,811	13,053,528	796,722	26,646,691	91.55	2,457,203	964,233	1,471,095	—4,663,760
Southern in Mississippi	278	240,680	149,994	419,827	116,498	64,432	6,279	221,052	12,866	421,124	100.30	—1,297	27,000	—28,299	—74,575
Southern Pacific	7,049	24,569,047	9,309,331	36,462,152	6,985,680	7,756,506	325,914	14,651 862	873 361	31,254,614	85.71	5,207,538	1,829,892	3,367,498	—2,374,371
Spokane International Ry. Co	156	157,970	42,031	205,802	34,233	21,632	4 749	80 480	13,250	154,035	74.84	51,767	12,037	39,731	—21,269
Spokane, Portland & Seattle	554	1,197,916	343,386	1,669,763	380,374	279,998	17,336	608,776	57,939	1,347,890	80.72	321,874	177,600	144,148	—536,069
Staten Island Rapid Transit Co	23	213,470	188,321	472,163	66,093	68,651	2,866	268,836	26,529	432,975	91.70	39,188	35,000	4,165	119,504
Tennessee Central	293	472,588	130,174	645,481	253,751	189,407	9,424	302,655	19,452	774,690	120.01	—129,209	15,405	—144,712	—150,901
Terminal R. R. Ass'n of St. Louis	36	.....	10,249	880,610	235.149	231,122	2,544	430,989	19 563	927,788	105.36	—49,178	84,750	—133 928	—205 168
Texarkana & Ft. Smith	81	240,004	48,797	315,478	61,617	63.712	2,641	127,293	9,965	260,993	82.72	54,486	19,375	35,098	—58,729
Texas & New Orleans	469	1,165,563	478,698	1,747,925	374,744	589,392	15,427	704,058	43,954	1,769,834	101.25	—21,909	63,257	—87,764	—532,408
Texas & Pacific	1,946	5,333,436	2,009,445	7,692,097	1,423,501	1,733,607	79,577	4,062,156	217,234	7,575,919	98.48	116,178	254,912	—139,423	—1,323,727
Toledo & Ohio Central	435	1,443,837	194,539	1,715,407	355,135	624,972	19,053	806,787	46,784	1,859,085	108.38	—143,679	95,505	—239,216	—83,304
Toledo, Peoria & Western	247	226 952	144.166	315,600	75.678	114.289	6.517	188,411	17,658	400,367	126.85	—14,767	25,500	—40,267	—8.112
Toledo, St. Louis & Western	454	1,488,702	79,890	1,637,722	270,406	393,807	15,981	701,333	35,593	1,417,117	86.52	220,605	78,000	142,501	—9,956
Trinity & Brazos Valley	368	241,587	53,245	309,765	122,299	131,025	4,889	178,924	22,312	459,449	148.32	—149,684	17,144	—166,893	—81,916
Ulster & Delaware	128	99,624	39,589	190,375	35.358	55,453	3,695	149,929	13,985	260,094	136.62	—69,719	13,800	—83,572	—50,120
Union Pacific	3,614	18,363,020	4,537,139	24,612,099	3,546,083	4,614,589	130 687	7,705,210	678,428	17,211,806	69.93	7,400,293	501,528	6,896,620	2,051,810
Union R. R. of Penna	35	.....	.....	1,769,780	159,256	433,542	793	932,145	22,187	1,546,867	87.40	222,912	19,284	203,628	727,960
Utah Ry	98	286,307	1,482	290,820	34.491	77,207	784	59,426	6.055	177,964	61.19	112,857	12,210	100,646	—50,936
Quincy, Omaha & Kansas City	255	166,715	73,570	245,598	68,303	32,373	784	128,774	4,073	233,808	95.19	11,790	9,009	2,745	25,026
Vicks., Shreve. & Pacific	171	510,480	221,717	788,431	154 392	169 766	7,355	309,696	23,957	671,194	85.13	117,237	28,250	88,886	—95,668
Virginian	518	1,868,249	153,322	2,241,868	486,996	723,287	15,387	1,058,917	46,159	2,314,426	103.24	—72 558	111,200	—183,762	—577,025
Wabash	2,519	7,824,177	2,026,843	10,568,088	1,514,506	2,208 637	148.412	6,022,902	321,708	10,272,172	97.19	295,916	319,203	23,863	—177,436
Washington Southern	35	432,914	611,598	1,161,476	102.430	110.554	8,886	356,272	19,572	607,454	52.30	554 022	19,834	534.177	293.651
West Jersey & Seashore	361	803,600	1,203,340	2,187,980	572,967	479,211	21,450	1,363,239	64,259	2,514,291	114 91	—326.311	120,188	—446,915	151,669
Western Maryland	707	2,750,997	230,494	3,253,151	692,200	1,137,136	57,386	1,551,414	124,005	3,592,168	110.42	—339,017	129,600	—468,617	—412,819
Western Pacific	1,011	2,000,431	269,512	2,361,116	696,159	537.268	33,286	903,741	63,573	2,278,870	96.51	82,246	134,025	—51,828	—637,481
Western Ry of Alabama	133	368,295	234,827	649,455	80,869	142,159	8.353	258,940	19,205	519,137	79.93	130,318	22,500	107 817	—30,332
Wheeling & Lake Erie	511	1,745,581	139,804	2,084,453	490.029	688,696	19,329	1,095,592	76 367	2,376.454	114.00	—292.001	164,600	—456.601	—483,819
Yazoo & Mississippi Valley	1,382	3,999,565	1,317,803	5,537,846	943,049	1,204,319	41,716	2,240,232	152.352	4,447.989	80.31	1,087,856	204.600	882,912	—389,574
Pekiomen R. R	41	204,460	17,981	233,792	12,835	16.419	30	108.499	949	138.787	59.36	95,005	5.400	89,605	44 029
Phila., Bethlehem & N. E	71	.....	.....	247,333	29,893	33.460	750	141,472	4,251	209,825	84.83	37,508	5,283	32,225	—18,324
Southern Steamship Lines	...	2,444,005	115,251	2,686,622	30,424	443,509	33,978	2,034,758	70,202	2,612,872	97.25	73,749	35,050	38.700	149,954
MONTH OF MARCH, 1919															
Lehigh & New England	229	167,008	1,878	181,602	42,648	56,846	1,870	87,801	9,010	198,012	109.03	—16.410	8.610	—25,021	—100,467
MONTH OF APRIL, 1919															
Alabama & Vicksburg	141	153,038	59,745	228,274	37,854	56,108	$1,356	$91,533	$9,275	$197,894	86.68	$30,380	$10,701	$19,627	—$39,069
Ala. Great Southern	312	617,590	161,991	828,982	116,054	238,332	14,983	331,907	18,996	715,436	86.30	113,546	24,561	88,964	—149,991
Ann Arbor	301	227,707	52,574	300.614	69,616	58,914	6,097	180,234	11,361	296,285	98.55	4,329	16,700	—12,427	—43,383
Arizona Eastern	377	172,893	42,525	235,921	87,119	40,266	2,759	101,586	17,527	252,026	106.82	—16.105	16,281	—32,398	—181,948
Atch., Topeka & Santa Fe	8,636	8,578,987	3,500,707	12.818,623	2,021,332	3,047,279	180,845	4,700,296	246,162	10,135,555	79.06	2,683,068	557,062	2,119,754	—2,510,530
Atlanta & W. Point	93	112,053	90,117	222,411	28,809	41,383	2,997	80,791	6,105	160,848	72.32	61,563	8,500	53,063	—18,707
Atlanta, Birm. & At	639	306,480	68,322	390,530	123,605	136,945	7,664	250,207	13,267	531,153	13,600	—140,623	16,000	—156,679	—132,740
Atlantic City	177	117,954	162,626	297,129	48,099	46,497	1,374	162,165	920	257,173	86.55	37,956	12,000	25,956	—32,731
Atlantic Coast Line	4,875	3,852,272	2,099,613	6,312,476	816,086	1,253,924	60,367	2,545,514	110,337	4,813,970	76.26	1,498,507	210,000	1,287,037	—15,142
Balto. & Ohio Chicago Terminal	91	.....	.....	120,878	34,726	44,263	1,001	127,191	15,932	227,433	18,815	—106,555	26,542	—133,114	—38,626
Balto. & Ohio	5,145	9,485,655	2,575,768	13,301,950	2,123,242	4,369,976	171,628	5,946,293	402,945	13,115,318	98.59	186,632	367,527	—181,063	—1,515,143
Balto., Ches. & Atl	87	82,793	36,668	124,813	10,815	26,985	863	73,582	3,009	115,253	92.34	9,560	3,160	6,400	—5,657
Bangor & Aroostook	632	357,675	83,905	460,632	80,686	113,244	5,488	155,416	13,179	372,443	80.85	88,189	21,000	67,185	—72,490
Beaumont, Sour Lake & Western	118	95,993	28,006	129,005	25,103	21,389	1,290	38,815	5,493	92,089	71.38	36,916	2,700	34,207	—50,393

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of—									
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.				
Belt Ry. Co. of Chicago	31	.....	.....	$256,398	$24,545	$51,392	$378	$166,257	$7,489	$250,341	97.63	$6,058	$15,682	—$9,625	—$53,100
Bessemer & Lake Erie	247	$862,917	$33,132	916,426	89,410	296,056	10,288	322,840	19,160	737,026	80.42	179,395	14,500	164,890	—34,260
Bingham & Garfield	37	81,125	1,904	86,929	34,776	37,707	1,107	22,290	4,137	100,262	115.33	—13,333	2,899	—16,232	—139,837
Birmingham Southern	29	39,895	.....	58,224	3,553	9,854	620	24,035	3,457	41,518	71.31	16,707	1,770	14,937	11,823
Boston & Maine	2,258	3,083,656	1,791,886	5,484,928	753,152	1,100,454	33,975	2,981,130	165,936	5,067,485	92.38	417,443	175,686	241,547	—552,688
Buff. & Susq. R. R. Corp.	296	138,027	7,370	150,309	36,901	78,383	1,747	56,511	7,097	180,638	120.17	—30,329	3,250	—33,579	—31,758
Buff., Roch. & Pitts.	584	731,991	122,322	891,079	135,385	350,128	12,850	510,506	32,385	1,044,077	117.16	—152,998	27,000	—179,998	—281,546
Canadian Pacific Lines in Maine	233	252,941	82,330	347,612	39,834	82,704	2,695	205,437	2,957	333,626	95.97	13,987	11,000	2,987	—11,232
Carolina, Clinchfield & O.	282	410,326	29,595	446,074	84,376	115,276	5,657	184,367	12,964	402,629	90.26	43,445	16,300	27,145	—70,057
Central New England	301	412,158	21,849	468,901	130,188	88,642	2,984	279,685	13,557	514,580	109.74	—47,679	15,000	—63,762	—196,532
Central of Georgia	1,918	1,139,492	439,251	1,774,179	338,547	371,228	28,674	717,054	61,542	1,515,813	85.43	258,366	65,945	192,216	—297,719
Central R. R. of New Jersey	684	2,595,100	639,053	3,482,129	462,439	820,678	23,784	1,693,477	80,971	2,998,118	86.10	484,010	157,439	326,571	—106,391
Central Vermont	411	325,901	81,302	448,730	76,501	114,301	6,327	267,391	18,868	483,493	107.74	—34,763	17,400	—52,262	—99,674
Charleston & Western Carolina	342	218,749	51,180	279,548	36,556	48,475	2,564	115,728	6,624	209,948	75.10	69,600	8,500	61,099	9,415
Chesapeake & Ohio	2,506	4,016,895	1,065,232	5,438,226	780,049	1,222,615	36,874	2,021,496	113,534	4,203,903	77.30	1,234,322	172,000	1,062,078	—474,476
Chicago & Alton	1,050	1,380,201	464,729	1,980,677	325,689	531,442	28,220	843,540	60,178	1,798,147	90.78	182,530	55,500	126,686	—202,086
Chicago & Eastern Ill.	1,131	1,321,740	353,332	1,828,764	273,729	748,377	27,590	811,344	47,639	1,916,759	104.81	—87,995	79,500	—167,840	—414,161
Chicago & Erie	269	617,342	109,693	805,622	116,570	201,845	9,636	413,359	28,091	772,660	95.91	32,963	27,678	5,249	—148,353
Chicago & Northwestern	8,090	6,382,865	2,532,344	9,840,279	1,631,451	2,046,101	83,111	4,847,798	239,442	8,930,497	90.75	909,782	475,000	433,949	—694,162
Chicago, Burl. & Quincy	9,372	7,688,322	2,488,690	11,161,012	2,219,609	2,110,215	89,574	4,357,140	318,841	9,244,761	82.83	1,916,250	465,387	1,449,920	—1,485,431
Chicago Great Western	1,496	1,020,138	436,117	1,585,432	384,469	440,803	21,380	712,494	45,695	1,618,264	102.07	—32,831	54,975	—87,982	—300,248
Chicago, Ind. & Lou.	657	656,952	215,125	952,839	114,074	203,444	13,363	368,251	28,071	736,764	77.32	216,075	32,502	183,557	—27,192
Chicago Junction	12	.....	.....	240,650	70,511	50,765	129	309,666	7,122	337,593	140.43	—97,543	3,261	—100,804	—146,784
Chicago, Milwaukee & St. Paul	10,647	3,529,013	2,349,804	11,967,300	1,649,505	3,518,625	101,863	5,424,946	320,759	11,032,717	92.19	934,582	539,670	392,046	—390,134
Chicago, Peoria & St. L.	247	106,139	20,542	135,427	36,289	65,291	2,968	79,908	8,769	193,225	142.67	—57,798	7,400	—65,198	—48,454
Chicago, Rock Island & Gulf	474	266,667	89,013	377,269	64,458	65,226	6,297	158,850	12,372	307,884	81.61	69,385	13,155	56,132	—71,268
Chicago, Rock Island & Pacific	7,592	5,534,232	2,191,508	8,272,617	1,459,707	1,942,759	106,323	3,513,863	—206,212	7,291,065	88.13	981,552	348,275	632,634	—1,133,095
Chicago, St. Paul, Minn. & Omaha	1,749	1,331,537	557,755	2,031,349	271,425	361,711	23,073	935,716	59,317	1,666,159	82.02	365,189	102,160	262,514	—34,975
Chicago, Terre Haute & Southeastern	374	259,677	20,019	287,356	47,188	154,719	3,069	113,986	7,957	328,347	114.26	—40,992	14,500	—55,492	—79,187
Cincinnati, Ind. & Western	321	154,006	46,603	225,971	48,794	60,424	4,423	124,579	13,175	251,901	111.47	—25,930	10,243	—36,173	—53,780
Cincin., Lebanon & Nor.	76	53,134	5,459	74,477	19,254	18,365	1,196	43,587	818	83,221	111.74	—8,745	4,441	—13,185	17,531
Cincinnati, New Orleans & Texas Pacific	337	1,091,267	258,828	1,435,789	223,980	421,155	27,516	466,929	33,446	1,184,049	72.46	251,741	39,000	212,631	—139,918
Cincinnati Northern	251	243,389	15,720	266,079	42,010	58,769	2,369	85,633	5,268	194,108	72.95	71,972	8,500	63,460	16,197
Cleveland, Cincinnati, Chic. & St. Louis	2,395	3,638,226	1,182,265	5,279,820	756,119	1,067,939	88,684	2,098,604	123,174	4,174,348	79.06	1,105,472	185,000	920,202	—545,145
Colorado & Southern	1,100	776,812	190,522	1,027,463	163,141	232,380	8,117	367,293	36,502	813,500	79.17	213,964	47,000	166,646	—62,406
Colorado & Wyoming	41	22,713	1,204	88,885	10,574	17,018	40	34,046	3,726	65,403	73.58	23,482	4,000	19,482	—7,148
Cumberland Valley	163	324,119	64,473	419,958	112,393	96,910	6,962	161,240	10,884	389,034	92.63	30,924	9,162	21,603	—163,699
Delaware & Hudson	868	2,198,923	213,395	2,557,678	325,194	688,236	16,356	1,296,458	102,342	2,459,926	96.14	97,752	60,000	37,743	84,663
Delaware, Lack. & Western	955	3,838,764	965,192	5,450,195	449,906	1,158,354	54,837	2,606,393	109,265	4,439,368	81.45	1,040,827	318,427	720,669	—726,408
Denver & Rio Grande	2,593	1,566,489	496,121	2,236,386	462,344	643,600	18,126	751,520	63,637	1,975,896	88.35	260,490	100,000	160,033	—430,545
Denver & Salt Lake	255	155,049	29,644	191,431	68,179	73,403	1,428	122,869	4,311	270,191	141.14	—78,760	9,000	—87,783	—7,108
Detroit & Mackinac	381	78,678	31,495	109,267	21,865	29,529	1,148	77,300	9,021	138,863	127.08	—29,597	8,439	—38,035	—56,359
Detroit & Toledo Shore Line	61	149,465	.....	154,180	15,069	12,719	444	46,383	2,841	77,456	50.24	76,724	8,250	68,474	—20,555
Detroit, Toledo & Ironton	457	246,690	9,948	284,417	69,686	106,037	2,755	131,828	13,258	323,564	113.76	—39,147	8,500	—47,647	—23,511
Duluth & Iron Range	292	456,740	22,842	516,228	57,221	48,400	484	172,236	15,242	293,664	56.88	222,564	25,733	196,770	341,107
Duluth, Missabe & Northern	410	1,052,935	48,943	1,130,206	136,065	139,617	2,461	255,225	22,356	557,160	49.29	573,046	62,999	510,048	739,475
Duluth, South Shore & Atlantic	599	230,881	90,446	341,503	56,446	70,783	3,224	178,133	9,799	324,405	94.99	17,098	19,003	—1,918	—34,037
Duluth, Winnipeg & Pacific	178	123,075	24,985	151,593	35,273	29,527	2,642	67,631	8,561	143,983	94.97	7,610	7,580	30	—6,580
East St. L. Connecting	3	.....	.....	92,206	17,219	25,091	273	58,765	3,481	104,829	113.68	—12,623	2,000	—14,623	10,221
El Paso & S. W.	1,027	808,188	186,911	1,051,951	128,777	186,557	10,297	271,366	26,287	630,487	59.93	421,464	48,363	372,765	—193,985
Elgin, Joliet & Eastern	830	1,425,565	7	1,631,494	159,697	397,577	8,075	632,622	25,855	1,223,788	75.01	407,706	51,647	356,060	—146,388
Erie	1,989	4,978,635	1,102,019	6,801,845	974,620	2,840,757	63,368	3,674,536	197,505	7,804,789	114.74	—1,002,945	269,475	—1,274,880	—1,399,773
Florida East Coast	76	506,044	233,485	834,316	165,866	166,226	6,094	416,010	17,253	792,528	94.99	41,788	27,779	13,998	—442,972
Fonda, Johnstown & Gloversville	88	35,865	63,423	102,314	10,043	8,263	569	37,144	5,091	61,111	59.72	41,203	4,900	36,303	1,737
Fort Smith & Western	253	90,200	21,851	120,803	27,998	27,875	3,705	48,911	6,336	115,070	95.25	5,733	5,000	213	—2,633
Fort Worth & Denver City	454	550,742	238,926	824,231	88,188	152,666	2,379	287,398	25,600	558,588	67.76	265,643	19,250	246,177	134,669
Fort Worth & Rio Grande	235	46,423	46,783	101,078	39,449	18,236	1,901	59,875	3,054	122,514	121.21	—21,436	2,983	—24,533	—28,413
Galveston, Harrisburgh & San Ant.	1,382	1,047,244	467,988	1,600,061	257,979	373,601	17,147	597,614	52,509	1,313,060	82.05	287,061	52,206	232,704	—317,685
Galveston Wharf	13	.....	.....	69,275	20,451	124	890	25,783	1,377	54,313	78.40	14,962	13,300	1,662	—28,190
Georgia R. R.	328	347,357	145,322	528,309	51,148	74,908	10,793	241,034	15,802	393,857	74.55	134,452	5,950	128,490	—36,404
Georgia Southern & Fla.	402	239,450	79,600	350,551	64,520	93,209	8,262	159,346	9,916	335,894	95.81	14,658	13,550	—71,063	—74,464
Georgia & Florida	348	59,193	15,831	80,726	31,978	17,336	2,156	28,236	6,654	116,359	144.14	—35,633	4,218	—39,851	—25,415
Grand Rapids & Ind.	569	422,316	144,001	608,911	105,915	143,735	9,587	305,545	23,354	589,302	96.77	19,609	25,950	—6,342	—105,419
Grand Trunk Western Lines	1,001	1,301,443	299,358	1,736,048	198,353	353,405	12,413	905,551	49,453	1,521,917	87.66	214,131	50,188	162,319	—85,678
Great Northern	8,252	5,263,616	1,385,550	7,370,704	2,058,682	1,374,879	57,089	3,223,326	152,340	6,982,828	94.73	387,876	428,652	—41,378	140,966
Gulf & Ship Island	307	127,030	40,193	182,473	57,255	49,791	3,698	73,458	8,466	193,048	105.79	—10,575	11,408	—21,998	—65,685
Gulf, Colorado & Santa Fe	1,937	1,022,620	387,400	1,515,299	373,056	274,773	18,876	685,464	48,965	1,394,714	92.04	120,585	71,168	48,098	—350,402
Grand Trunk Lines in New England	172	325,963	39,526	506,760	79,946	44,749	2,368	270,166	10,357	532,563	105.09	—25,803	11,500	—37,303	—25,182
Gulf, Mobile & Northern	402	145,520	38,071	194,790	45,039	58,310	4,976	113,633	9,827	231,785	118.99	—36,995	11,636	—48,642	—80,030
Hocking Valley	350	620,455	92,994	765,558	98,347	272,832	7,270	261,423	20,956	660,729	86.31	104,830	57,067	47,763	—24,574
Houston & Texas Central	847	408,330	203,329	661,960	131,591	122,543	8,548	279,208	18,871	560,706	84.70	101,269	34,023	57,017	—79,502

Commission and Court News

Interstate Commerce Commission

The Commission has issued an order making numerous amendments to its regulations for the transportation of explosives and inflammable and other dangerous articles.

State Commissions

The Public Service Commission of Pennsylvania, acting on complaints of the State Highway Department has ordered the abolition of six highway grade crossings, one each at Girard, at Martin's Creek Junction, at Port Clinton, and at Youngsville, Warren county, and two at Dallas. In each case the commission apportions the shares of the expense to be borne respectively by the county, the state, the township and the railroad company.

United States Supreme Court

Apportionment of Cost of Joint Interlocking

The Puget Sound & Willapa Harbor found it necessary, in the construction of a new line in 1914, to cross at grade, at two places, tracks which had been laid in 1890-92 by the Northern Pacific. The Willapa is organized under Washington laws, the Northern Pacific under Wisconsin laws. The Washington Public Service Commission granted the required permission, subject to the condition that suitable interlocking signals, of a type to be agreed upon by the two companies, should be installed at the crossings. The companies agreed on all the conditions, except as to the cost of installing and maintaining. On submission of the question to the Commission, it decided that the entire expense should be borne by the Willapa. The Supreme Court of the State reversed this decision, and ruled that the expense should be divided equally between the two companies. The Northern Pacific argued that when it entered the state of Washington and constructed its line, an act of the Legislature, passed in 1888, was in effect which gave to railroad companies formed under the act the right to cross any other railroad theretofore constructed, but subject to conditions which the State Supreme Court held, in 1908, in State v. Northern Pacific, 49 Wash. 78, required the junior company to pay the entire cost of the crossing, including the installing and maintaining of interlocking where necessary; that this constituted a vested right of property in the senior company, and that the later statute of 1913, which the Supreme Court held, in this case, required it to bear one-half of the cost of installing and maintaining the apparatus, deprived of its property without due process of law.

The Supreme Court of the United States holds that at most the earlier statute, and the interpretation which the State Supreme Court placed upon it, was a rule of law applicable to the assessment of damages in a proceeding to appropriate a crossing to which a junior company was entitled by the statute. It was no part of the charter of the Northern Pacific, which was organized under the Wisconsin law, and that company had no vested right to insist that the rule should not be changed by statute or by court decision. While that was sufficient to dispose of the case, the court added that the act of 1913 was passed in an obviously legitimate and customary exercise of the police power of the State to protect travelers and employees from injury and death at such crossings. It has long been settled law that the imposing of uncompensated charges, involved in obeying a law, passed in a reasonable exercise of the police power, is not a taking of property without due process of law within the meaning of the 14th Amendment. The judgment of the Supreme Court of Washington was therefore affirmed.—Northern Pacific v. Puget Sound & Willapa Harbor. Decided June 2, 1919.

Equipment and Supplies

Locomotives

The Danish State Railways have ordered 16 Mogul locomotives from the Baldwin Locomotive Works.

Lourenco Marques (Portuguese East Africa). The Baldwin Locomotive Works recently received an order from these interests for five Santa Fe and three Pacific type locomotives.

Federated Malay States.—The Railway Gazette, London, reports, in a recent issue, that the Crown Agents for the Colonies are considering tenders for 20 engines and tenders for the Federated Malay States Railways.

The Nigerian Railways have ordered 10 Mountain type locomotives from the American Locomotive Company. These locomotives will have 18-in. by 23-in. cylinders, 42¾-in. diameter drivers, 89,500 lb. weight on drivers, and a total weight in working order of 133,000 lb. They are equipped with superheaters.

Italy.—Commerce Reports in its issue of June 4 contained the following foreign trade opportunity: "29580—The purchase of a number of locomotives is desired by an importer in Italy. Correspondence should be in French or Italian. References." Further details may be obtained from the Bureau of Foreign and Domestic Commerce at Washington or from any of its district and co-operative offices.

Freight Cars

W. R. Grace & Co., San Francisco, Cal., desire to lease on long time fifty 8,000-gal. tank cars.

The Peking Sui Yuan Railway, China, is inquiring for 100 40-ton, high side gondola cars with steel underframes.

The Aboy & M. Hernandez Company, New York, is inquiring for one gasoline electric passenger car for export to the Netherlands.

The Soeraboya Machinery Trading Company, New York, is inquiring for one trolley freight car for export to the Dutch East Indies

The Live Poultry Transit Company, Chicago, has ordered 100 poultry cars from the Mount Vernon Car & Manufacturing Company.

The Kendall Refining Company, Bradford, Pa., has ordered three 40-ton, 8,000-gal. tank cars from the American Car & Foundry Company, Chicago.

The D. E. Hewitt Lumber Company, Huntington, W. Va., has ordered six 10-ton logging cars from the American Car & Foundry Company, Chicago.

Iron and Steel

Chicago Union Station.—Contracts have been let to the Bethlehem Steel Company, South Bethlehem, Pa., by the Chicago Union Station Company for a quantity of frogs, switches and approximately 200 tons of 130-lb. rail. The total value of the contract is approximately $50,000. The Joliet Bridge & Iron Company, Joliet, Ill., has also been awarded a contract for approximately 650 tons of steel to be used for the construction of the superstructure of a foot subway in connection with the South Canal street viaduct. The contract for the construction of the Taylor street superstructure was awarded the George A. Fuller Company, New York, last week.

Supply Trade News

W. R. Gillies has resigned as mechanical engineer of the Oregon Short Line, with headquarters at Pocatello, Idaho, to enter the employ of the **Union Asbestos & Rubber Company,** Chicago, as assistant to the president.

P. Harvey Middleton, for seven years executive assistant of the **Railway Business Association,** has resigned to accept a position with the foreign trade department of the **Guaranty Trust Company,** New York. Mr. Middleton takes up his new duties on June 16.

Major Charles E. Sholes has been elected vice-president, director and general sales manager of the **Edison Storage Battery Company** to succeed Harrison G. Thompson, who has resigned to organize and conduct the Transportation Engineering Corporation of New York. Major Sholes has heretofore been identified with the construction, operation and management of chemical industries. He was the active member of the Creditors' Committee of the Aetna Explosives, Inc., during the receivership. During the war he served as major in ordnance, first as chief of the chemical branch, which attended procurements of platinum, cotton linters, alcohol, acids, etc., and as army representative before the War Industries Board, and numerous other committees and boards. He was subsequently made contracting officer for the United States on the staff of Col. Lamont, and retains his rank in the Officers' Reserve Corps. He is also chairman of the Society of Chemical Industry.



Major C. E. Sholes

E. G. Buckwell, secretary and manager of sales of the **Cleveland Twist Drill Company,** Cleveland, Ohio, sailed on May 12, for a three or four-month tour of Europe. He will make an investigation of trade conditions throughout England and the continent.

The Allied Steel Castings Company, Harvey, Ill., which is controlled by the Chicago Malleable Castings Company and the Universal Draft Gear Attachment Company, Chicago, will install a 10-ton open hearth furnace to supplement the present Wellman-Seaver-Morgan 5-ton tilting furnace, which will be enlarged.

Joseph Robinson, formerly president of the **Robinson Connector Company, Inc.,** announces that he is no longer connected with that company in any managerial capacity and has no supervision over the mechanical details of construction of the automatic hose connector, of which he is the inventor and which bears his name.

The McMyler Interstate Company, Cleveland, Ohio, makers of car dumpers, locomotive cranes, ore and coal handling machinery, scraper and railroad equipment, with works at Bedford, Ohio and at Warren, Ohio, has opened a branch office in the Merchants Exchange building, San Francisco, Cal., with **L. A. Somers** as district representative.

The National Steel Car Company, Hamilton, Ont., will not be purchased by the American Car & Foundry Company. Negotiations looking toward the absorption of the former by the latter at one time looked promising, but have now been broken off for the reason, it is said, that the American company was unable to offer terms that were satisfactory to the National Steel Car Company.

The manufacture and sale of Lundie tie plates up to this time handled by **John Lundie,** 52 Broadway, New York, has been taken over by the **Lundie Engineering Corporation,** at the same address, with the following officers: John Lundie, president; **Percy Holbrook,** vice-president; **Eugene Brandeis,** treasurer, and **R. W. Crawford,** secretary. The Chicago office at 30 North La Salle street, is in charge of **C. Z. Moore,** manager of sales.

Col. E. J. Hall, first-vice-president of the **Hall-Scott Motor Car Company,** San Francisco, Cal., recently received the distinguished service medal from the government, by reason of his having designed the major portion of the liberty motor and also having an excellent record as chief of the Technical Section, Air Service, in charge of aviation engineering, inspection, and acceptance of airplane parts and equipment with the A. E. F. in France, England and Italy.

E. A. Hitchcock has been elected vice-president of the **Bailey Meter Company,** Cleveland, Ohio. He will supervise the training of technical graduates for the company's service and sales departments. During the past six years he has been connected with the E. W. Clark & Co. Management Corporation, as advisory, consulting and power sales engineer. Previous to that time he was professor of experimental engineering at Ohio State University.

J. W. McCabe, until recently district manager of sales at Buffalo, N. Y., for the **Chicago Pneumatic Tool Company,** Chicago, has been appointed special representative for the company's foreign trade department and will leave shortly for an extended trip throughout the Orient, the Philippine Islands, and Australia. **W. H. White,** has been appointed acting district manager of sales at Buffalo to take charge of that territory during Mr. McCabe's absence.

The Gary Screw & Bolt Company, Chicago, has awarded contracts to the Folwell-Ahlskog Company, Chicago, for the repairing of its mill buildings at Gary, Ind., which were recently damaged by fire, and for the erection of an additional steel and concrete warehouse which will cost approximately $40,000. The repairing of the mill buildings will be completed not later than June 15, and the new warehouse building will be completed and ready for occupancy not later than August 1.

W. G. Balph has been appointed manager of the Safety Switch Section of the **Westinghouse Krantz Factory,** Brooklyn, New York. As head of this section, Mr. Balph will have entire responsibility for the sale of all Krantz products, and, in addition, will have charge of the extension and development of this company's line of safety switches. Prior to working as salesman in the New York office, Mr. Balph was head of the Fan Motor Division with offices at East Pittsburgh, Pa.

The Standard Car Construction Company and the **Standard Car Equipment Company** were merged on June 4, under the name of the **Standard Tank Car Company,** with head office and works at Sharon, Pa., and branch offices at New York, St. Louis and Chicago. **John Stevenson, Jr.,** is president and **G. F. Wood-Smith** is vice-president of the new company, which will continue all the functions of the two companies, both as to the building and leasing of tank cars and all forms of steel plate construction.

O. D. Conover, formerly vice-president and chief engineer of the T. W. Price Engineering Company of New York and production manager of the Ludlum Electric Furnace Corporation, has resigned to become production and sales engineer on foundries and steel plants of the **Austin Company,** Cleveland, Ohio. Mr. Conover has had broad experience as engineer in charge of the design and construction of a large number of steel plants, foundries, electric furnaces and other equipment both in this country and abroad. His headquarters will be at Cleveland.

Transportation Engineering Corporation Organized

Harrison G. Thompson, who on June 1, 1919, resigned from his position as vice-president and general sales manager of the Edison Storage Battery Company, has incorporated the Transportation Engineering Corporation, with offices at 200 Fifth avenue, New York. The officers are as follows: H. G. Thompson, president; F. V. McGinness, vice-president, and Harold H. Smith, secretary-treasurer. The new corporation will act as railway distributors for the Edison Storage Battery Company and for the Automatic Transportation Company, of Buffalo, New York. It will handle the Edison Storage Battery for train lights, railway signalling, multiple unit control, and for other purposes to which storage batteries may be applied. It will also handle the complete line of industrial trucks, tractors, and industrial engines as manufactured by the Automatic Transportation Company, with such apparatus as charging equipment, incident to the above lines.



H. G. Thompson

Mr. Thompson became associated with the Edison Storage Battery Company in 1910, and was elected a vice-president in 1913. He was born at Weston, Mass., in 1875. In 1896 he entered the service of the Pullman Company, and after having been with that company for two years was made foreman of electricians. In 1900 he resigned to become foreman of the battery department of the Riker Motor Vehicle Company, but left the latter at the time of its absorption by the General Vehicle Company, of Hartford, Conn., to become associated with W. L. Bliss, one of the pioneers in electric car lighting development. In 1905 he entered the service of the Pennsylvania Railroad and was placed in charge of electric car lighting, with headquarters at Jersey City, N. J. About one year later he became electrical superintendent of the Safety Car Heating & Lighting Company, New York, and was in charge of that company's electrical laboratories during the development of its first electric car lighting system. In December, 1909, he was appointed manager of the railroad department of the Westinghouse Storage Battery Company and later for a short time, was in the employ of the United States Light & Heating Company, New York. In July, 1910, he became manager of the railway department of the Edison Storage Battery Company; in July, 1915, he was appointed general sales manager, and became also vice-president of the company in July, 1918.



F. V. McGinness

Francis V. McGinness, who recently resigned as railway sales manager of the Edison Storage Battery Company, is vice-president of the new corporation. He graduated from Columbia University, School of Engineering, with the degree of electrical engineer in 1910, and then spent a short time in the engineering departments of the New York Telephone Company and the New York & Queens Light & Power Company. He became connected with the Edison forces in 1911, being then engaged in experimental work in Mr. Edison's laboratory. At this time he also received a thorough training in the manufacture of the Edison battery. He was later appointed assistant manager of the railway department of the Edison Storage Battery Company, and in March, 1916, he was promoted to manager of the same department.

Harold H. Smith, electrical engineer of the Edison Storage Battery Company, becomes secretary-treasurer of the newly formed Transportation Engineering Corporation. Mr. Smith graduated from the Polytechnic Institute, Brooklyn, N. Y., in 1909, with the degree of E.E. For one year thereafter he was employed by the Pennsylvania Tunnel & Terminal Railroad, in the office of the chief engineer of electric traction, in connection with the New York electrification of the Pennsylvania Railroad. He then joined the staff of the laboratory of Thomas A. Edison, at Orange, and for several years was engaged in research work in connection with the Edison Storage battery. Later he became connected with the selling department of the Edison Storage Battery Company in the capacity of engineer and retained that position up to the time of his recent resignation.



H. H. Smith

Material Handling Machinery Manufacturers' Assn.

The semi-annual meeting of the Material Handling Machinery Manufacturers' Association was held Wednesday, June 11, at the Hotel Astor, New York. The aims of the organization are to obtain co-operative publicity for the manufacturers and users of material handling machinery and to show the general public that such machinery is a benefit to them. The manner in which these aims are to be realized was outlined and discussed, and it was decided that technical magazines and moving pictures would afford the desired means.

The Engineering Committee has been at work investigating conditions and methods used for handling materials in various parts in the United States and foreign countries, and has collected a large fund of information pertaining to what kind of machinery is available. Articles containing this information will be submitted to technical magazines. Particular stress will be laid upon the handling of freight between cars and ships, and at freight transfers.

Moving pictures are being taken of all kinds of material handling machinery, and these will be assembled in composite films to be sent to any one who cares to use them. A buyer or a manufacturer can see all manner of machinery in operation in this way, without traveling to various parts of the country. These films will also be sent to educational and civic organizations. The Y. M. C. A. has applied for the use of these films in the United States and abroad, and the Bureau of Commercial Economics, Washington, D. C., has offered to add these to the films they exhibit in all countries.

In the way of educational work, the association will show, by the same means, how such machinery promotes public welfare. They will show that labor is not replaced by the machinery, but that the laboring man is retained to operate the machine, and his standard of work and his wage are thus increased.

Any manufacturer who wishes to have moving pictures taken of his handling machinery can have this done by the association photographers, and any one who wishes can make arrangements for using the composite films. All communications should be addressed to Zenas W. Carter, secretary and manager, the Material Handling Machinery Manufacturers' Association, 35 West 39th street, New York.

Railway Construction

Athabasca, Grande Prairie & Fort Vermillion. —Incorporated in Canada with $1,500,000 capital to build a railway from some point at or near the junction of the Solomon river with the Athabasca in the province of Alberta northwest to a point near the junction of the Smoky river with the Muskeg river in the same province and passing through the Grande Prairie district north to Peace River Landing and terminating at Old Fort Vermillion, about 60 miles. The incorporators are Charles A. Barnard, William K. McKeown, Lorne C. Herdman, Thomas G. Potter and George E. Chart, all residents of Montreal, Que.

Chicago, Burlington & Quincy.—A contract has been let to the Wells Brothers Construction Company, Chicago, for the construction of the superstructure of a viaduct in Canal street, Chicago, in conjunction with the building of the new Union Station. Three team tracks will be placed under Canal street and the street traffic will be carried for 800 ft. on a viaduct over these tracks. The viaduct will be 100 ft. wide with a 70 ft. roadway and 20 ft. and 10 ft. sidewalks at the sides. Work on the caissons for this structure was started November 15, 1917, and completed May 15, 1918, involving the construction of 120 caissons.

Eastland, Wichita Falls & Gulf.—Maney Brothers & Company, Oklahoma City, Okla., have been awarded the contract for the construction of a road approximately 100 miles long from May, Brown county, Texas, to New Castle, Young county, Texas, passing through Rising Star, Mangam, Eastland, Wayland, Park Field, Breckenridge, Crystal Falls and Murray. Grading for the new road is now in progress north and south from Eastland, the grading contracts calling for 18,000 cu. yd. per mile. The road will have maximum grades of 0.75 per cent south of Eastland and 1 per cent north of Eastland. At the present time approximately 140,000 cu. yd. of the grading has been completed. The line passes through what promises to be a large paraffin base oil producing territory. There is now in the district to be served by the road a large truck and wagon traffic over very bad roads which are often impassable. The principal commodities which will comprise the road's traffic are oil, cotton, merchandise, machinery for oil wells, wheat and other farm products and also some coal. O. B. Colquitt, Dallas, Texas, former governor of Texas, is president of the new road, and C. H. Chamberlin, Eastland, Texas, formerly chief engineer of the Texas & Pacific, is chief engineer.

North-West Route Limited.—A bill has recently been passed in the Canadian House of Commons authorizing the incorporation of this new railway company with $1,000,000 capital to build a line in the Canadian Northwest. The incorporators are Sir John Keltie, Thomas L. Gilmur, Bernerd Spring-Wright, Ernest S. Hulmwood, all Englishmen. The headquaters of the new company will be in London, Eng. The plans call for building a railway from Baker Lake, North West Territory, northwest to Schultz Lake and from a point near the junction of the Hanbury and Thelon rivers in a westerly and southwesterly direction to a point at or near Old Fort Reliance at the eastern end of Great Slave lake, a distance of about 100 miles.

Charles E. Elmquist, president of the National Association of Railway & Utilities Commissioners, has been elected chairman of the federal electric railways commission appointed by President Wilson to investigate the financial and operating conditions of electric railways. Other members are: Edwin F. Sweet, assistant secretary of commerce; Royal Meeker, commissioner of labor statistics; Louis B. Whele, general counsel of the War Finance Corporation; Charles W. Beall of the Investment Bankers' Association; P. H. Gadsden of the American Electric Railway Association and W. D. Mahon, president of the Amalgamated Association of Street and Electric Railway Employees.

Railway Financial News

Boston & Maine.—The annual meeting, which is regularly held early in April, has been adjourned again until July 17. Election of directors was due to come before the meeting but this has been deferred owing to the fact that if the consolidation goes through as anticipated, it would be manifestly unfair to have directors for the entire system elected solely by the Boston & Maine stockholders and without representation from the present leased lines.

The Supreme Court of Boston on June 10 dismissed the petition of Edward F. Brown, of Ipswich, and other minority stockholders of the Boston & Maine, for annulment or amendment of a decree of the Massachusetts Public Service Commission authorizing consolidation of the unfunded debt of the company with that of its leased lines. The petitioners gave notice of an appeal.

Chicago & Eastern Illinois.—The public sale of this road at Danville, Ill., has been postponed until September 9.

Chicago, Rock Island & Pacific.—At a meeting of the directors on Tuesday, no action was taken on the preferred dividends. After the meeting the following announcement was made:

"The company made application some time ago to the director general of railroads for the approval of the regular semi-annual dividend upon the preferred stocks, without which approval the directors cannot declare a dividend, but the director general has refused to approve the payment of such dividend at this time, basing his refusal upon the statement that the road has not signed its contract with the government, has not accepted the allocation of equipment made to it by the director general, and has not through its corporate channels financed the additions and betterments made by the federal administration.

"The standard return of the Rock Island is approximately $16,000,000, which is sufficient for all fixed charges and the full dividends upon the 7 per cent and 6 per cent preferred stocks and a margin of some 2 per cent upon the common stock. The company has not signed the contract with the government because its claims for additional compensation have so far been declined, and it considers the allocation of equipment unreasonable. The directors have not been willing to assume the responsibility of waiving these claims until they have exhausted every possible legitimate effort to have them recognized. These matters are having the active attention of the officers, and the board is hopeful that the dividend on both classes of preferred shares can be declared at an early date."

Pittsburgh, Cincinnati, Chicago & St. Louis.—The Ohio Public Utilities Commission has authorized this company to issue $20,000,000 of its 15-year 6 per cent debenture gold bonds, dated January 1, 1919, and due January 1, 1934. The proceeds will be used in paying the Railroad Administration for improvements made and to reimburse the company's treasury for funds expended for improvements.

Southern Pacific.—There has been a total conversion to June 2, 1919, of $27,272,310 face value of this company's 4 per cent convertible gold bonds. These were converted into common stock of the Southern Pacific at the rate of $130 par in bonds for $100 par in stock. These conversions amount to substantially one-third of the issue, and leave issued and outstanding $54,541,690 of these bonds. The conversions called for the issuance of $20, 928,700 stock, and, as nearly all of them were made after December 31, 1917, the amount of stock outstanding is now greater by $20,000,000 than shown in the last annual report when the company had issued $272,000,000. The net reduction in liabilities through the conversions amounts to $6,293,610. On the other hand, total disbursements will be slightly increased. With a diminution of $1,090,892 in fixed charges will come an increase of $1,258,722 in dividend requirements, or a net increase of $167,830.

Railway Officers

Railroad Administration

Central

W. J. Cunningham, who has been manager of the Operating Statistics Section of the Division of Operation since its organization last spring, has been appointed assistant director of the Division of Operation and also chairman of a special committee on maintenance expenditures. V. P. Turnburke, assistant manager of the Operating Statistics Section and formerly statistician of the Great Northern, has been appointed manager of the section to succeed Mr. Cunningham, and F. L. Sears, heretofore chief clerk of the section, has been appointed assistant manager.

A. M. Burt, assistant general manager of the Northern Pacific, has been appointed assistant director of the Division of Operation of the United States Railroad Administration at Washington, D. C., in charge of engineering and maintenance, succeeding Charles A. Morse, resigned to resume his former position as chief engineer, Chicago, Rock Island & Pacific, effective on June 1. Mr. Burt was born at Syracuse, N. Y., on May 1, 1866. He began railway work as a rodman on the Colorado Midland in 1885. In 1889 he went with the Northern Pacific as an instrument man, later being appointed assistant engineer. From 1892 to 1897 he was assistant engineer on the Adirondack & St. Lawrence, the Wisconsin Central and the Chicago & North Western. On January 1, 1897, he re-entered the service of the Northern Pacific, as supervisor of bridges and buildings, and in March, 1901, was appointed assistant superintendent. From October, 1902, to January 1, 1914, he was superintendent of various divisions in Dakota, Montana and Washington. From the latter date until April 1, 1918, he was chief engineer maintenance of way, with headquarters at St. Paul, Minn.; he then was appointed acting general manager of the lines east of Paradise, Mont., and later became assistant general manager of the same road, with office at St. Paul, Minn.



A. M. Burt

Regional

G. H. Ingalls, traffic assistant of the Eastern Region, has been appointed senior traffic assistant to the regional director, Eastern Region, with offices at Chicago.

Federal and General Managers

W. J. Harahan, federal manager of the Seaboard Air Line and associated roads, has been appointed federal manager also for the Atlantic & Western Railroad, with office at Norfolk, Va.

Operating

J. H. Johnson, assistant to general superintendent on the Northern Pacific, has been appointed acting superintendent of the St. Paul division with headquarters at Minneapolis, Minn.

C. L. Nichols, general superintendent on the Northern Pacific, with headquarters at St. Paul, Minn., has been appointed assistant general manager, with headquarters at St. Paul, vice A. M. Burt, who has been appointed assistant director, Division of Operation, United States Railroad Administration, Washington, D. C.

F. G. Minnick, operating assistant of the Monongahela Railroad, the Pittsburgh & Lake Erie, and the Pittsburgh & West Virginia, with headquarters at Pittsburgh, Pa., has been appointed assistant federal manager of these roads, also of the Lake Erie & Eastern and the West Side Belt Railroad. The office of operating assistant has been abolished.

Financial, Legal and Accounting

Paul C. Hamlin has been appointed general solicitor of the Lehigh & New England, with office at Philadelphia, Pa., vice Leroy E. Reed, deceased.

Traffic

William A. Holley, assistant general freight agent in charge of coal traffic for the Chicago, Burlington & Quincy, with headquarters in Chicago, has resigned to accept the position of traffic manager for the Central Illinois Coal Traffic Bureau, with headquarters at the same point. This bureau was recently organized by a group of large coal operators in Illinois for the purpose of handling in a uniform manner all traffic matters of interest to the members and their customers.

Engineering and Rolling Stock

W. L. Robinson, superintendent of fuel and locomotive performance of the Baltimore & Ohio with headquarters at Cincinnati, Ohio, has been promoted to division master mechanic of the Illinois division, with headquarters at Washington, Ind.

S. U. Rhymer, general signal inspector of the Chicago & Alton, has been appointed signal engineer and superintendent of telegraph, with headquarters at Bloomington, Ill., succeeding George W. Hulsizer, notice of whose death appeared in the *Railway Age* of June 6, page 1396. Mr. Rhymer's appointment became effective June 4.

Lieutenant-Colonel William G. Arn, formerly assistant engineer, maintenance of way, of the Illinois Central, with headquarters at Chicago, has returned to his former position after 22 months' service with the 13th Engineers (Railway) Regiment. Lieutenant-Colonel Arn went overseas in July, 1917, as a captain and served in the St. Mihiel and the Meuse-Argonne offensives. While in France he was promoted to major and later to lieutenant-colonel, returning to this country in April, 1919. L. H. Bond, who has been acting as assistant engineer, maintenance of way, during Lieutenant-Colonel Arn's absence, has been assigned to other duties.

Corporate

Executive, Financial, Legal and Accounting

Charles H. Godfrey has been appointed special auditor of the Grand Trunk with office at Montreal, Que., to fill the vacancy caused by the death of Charles Percy.

Traffic

Gordon A. McGuire has been appointed commercial agent of the Grand Trunk, with headquarters at Buffalo, N. Y., vice E. J. Hilliard, promoted.

Engineering and Rolling Stock

C. S. Gzowski, Jr., has been appointed special engineer to vice-president of the Canadian National Railways, with office at Toronto, Ont.

E. C. Johnson, acting chief engineer of the Pacific Electric Railway Company, with office at Los Angeles, Cal., has been appointed chief engineer, vice George E. Pillsbury, retired, and the position of assistant chief engineer has been abolished.

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WE GUARANTEE that of this issue, 17,000 copies were printed; that of these 17,000 copies, 15,406 were mailed to regular paid subscribers to the Railway Age and the Railway Mechanical Engineer; 119 were mailed to advertisers, 300 were provided for counter and news companies' sales, new subscriptions, bound volumes, copies lost in the mail and office use; and 1,175 copies for distribution at Atlantic City.

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A Record-Breaking Exhibit

The 301 exhibits this year occupy about 93,500 square feet of floor space. This is a very considerable increase over the record exhibit of 1913, when 277 exhibits required a floor space of 87,360 square feet. Noteworthy features this year are the large machinery exhibits with many of the machine tools in actual operation and the high standard of the exhibits from an educational standpoint. Many new devices have been developed since the last convention and are shown on the pier. This, with the fact that the number of railroad men at the convention this year will be very much larger than usual, means that those who are demonstrating the advantages of their devices will have an extremely busy time. The track exhibits have a number of unusual features, including the Pennsylvania Railroad exhibit of a simple Mallet locomotive and hopper and gondola cars of over 100 tons capacity. The Railway Supply Manufacturers' Association is to be commended for taking advantage of a splendid opportunity to co-operate with the Railroad Administration in helping railroad visitors to get the most out of the exhibits. Assistant Director of Operation McManamy has asked that those who attend the convention report back in writing to their superiors on those things which specially attracted their attention as being of practical value to meet the peculiar conditions on their road. Mr. McManamy does not wish to check up or criticise those who are attending the conventions, but is simply desirous of using these means of helping the men to get the best practical results from their attendance at the conventions.

The Maximum Capacity of Freight Cars

The Pennsylvania hopper and gondola cars which are being exhibited at the convention this year, a description of which appears on another page in this issue, mark another step in the extension of the use of cars of over 100 tons capacity for mineral traffic. The first 100-ton car to be built was that of the Woodward Iron Company, which went into service in 1916. Since that time the Virginian Railway has built four 120-ton experimental cars, and the Norfolk & Western has built both hopper and gondola cars of 180,000-lb. capacity. All of these cars are carried on six-wheel trucks, and most of them, including the Pennsylvania cars, are designed to take full advantage of the loading capacity of 6-in. by 11-in. axles. At the present time this is the largest standard M. C. B. axle, and it is evident that any material increase in capacity above 120 tons must require a larger axle, or trucks with more than three axles. It is a serious question whether wheel loads greater than those permissible with 6-in. by 11-in. axles concentrated on the small area of contact between the rail and wheels of 33-in. diameter will be acceptable from the standpoint of track maintenance. Furthermore, unloading facilities for open-top cars are an important factor in determining the size and capacity of these cars, and will probabl ynot be universally adapted, even to cars in the 100-ton class, for some time to come. The use of trucks with more than three axles, while not inherently impossible, would probably involve an increase in weight which might largely offset the advantage of the increased capacity which such a truck would make possible, thereby keeping the ratio of paying load to full load at a figure which would show no advantage for the larger car over cars with six-wheel trucks. It seems probable ,therefore, that no serious attempt will be made to develop freight cars of more than 100 to 120 tons capacity, at least for many years to come.

Exports of Railway Supplies.

The railway supply industry is gradually working around to a peace time basis in export trade, although possibly not as rapidly as many enthusiasts might have wished. Within the past few months, large and important orders have been received from a wide range of countries. Locomotive orders have been received from France, China, Italy, South Africa, South Manchuria, Korea, Nigeria, the Federated Malay States, Argentina, Norway and Denmark, while not long since an order for cars was received from India, which is usually regarded as exclusively a British market. The export trade in railway supplies is apparently in its second stage; the first being to meet war-time demands, and the second to meet the demands of reconstruction—the third will be that in which the permanent peace-time market will be dealt with. Railway supply concerns are now furnishing the equipment which Mr. Vanderlip includes among the necessities that we must send to help the countries of Europe get on their feet industrially, and filling in here and there for the railways of other countries that cannot buy in their regular markets but that must have equipment to operate their railroads. In fact, as has been emphasized before, the business that we are now doing is in many cases to countries that will, in normal times, be our competitors as manufacturers of railway supplies themselves. The point is that the real work still lies ahead, namely, in securing business in the neutral countries or in the countries of the new world that, as a rule, do not manufacture railway equipment themselves. The business that is naturally to be expected from these countries has as yet hardly begun to materialize, presumably because of lack of credits and diffi-

culties of financing; but that it is coming is as certain as it is that nearly all these countries have almost had to do without new railway materials and supplies for five years, and that in consequence their railways are exceedingly short of cars, locomotives and accessories of all kinds.

Amalgamation of the Associations

The merging of the Master Car Builders' Association and the American Railway Master Mechanics' Association, which has repeatedly been proposed and discussed at past conventions, is now an accomplished fact. By the action of the Executive Committees of the two organizations, their amalgamation as Section 3 of the American Railroad Association was effected several months ago and this action will be submitted to the members for their approval during the convention. To review the successive steps which lead up to the amalgamation would be superfluous, as the report of the General Committee covers this subject.

In a way the present arrangement is on trial, as it was adopted by order of the director general and might be terminated at the expiration of the period of government control. In view of the fact that the merger of the two associations has in the past been rejected by vote of the members whenever it has been proposed, the attitude that will be assumed in this instance is not easy to forecast. The matter will have to be decided, probably in the near future, and while the present arrangement is in effect the members should consider its advantages and disadvantages in order that they may be able to judge whether its continuation would prove desirable or undesirable. In the past the members have been unwilling to see either association lose its identity. The same objection will no doubt be raised again and the question to be decided is whether the practical advantages to be gained by the amalgamation will outweigh these sentimental objections.

It is significant that the officers and members who have been working most actively under the new order are heartily in favor of it, because of the many advantages that have become apparent during the time it has been in force. In general the benefits are those secured through a more logical organization. An example is found in the work of the Committee on Car Trucks, which, through the co-ordination of the Mechanical Section with the other sections of the American Railroad Association, has been able to complete work which otherwise would probably have been carried over until the next convention, if not longer. The desirability of a means of securing co-operation with associations representing other departments of the railroads has been evident, but in the past there has been no way of bringing together the conflicting interests. Another advantage accruing from the new arrangement is the elimination of duplication in the work of committees.

The achievements of the Master Car Builders' Association and the Master Mechanics' Association have been so important in improving the design and construction of cars and locomotives that these organizations should not be allowed to pass out of existence unless some other agency is provided for carrying on the work they have so ably prosecuted. The consolidation of the associations as the Mechanical Section of the American Railroad Association promises to effect a broadening of their activities. None of the work carried on heretofore will be curtailed and, with the active support of the executives assured, further investigation can be carried on under the most favorable conditions. The mechanical department is facing big problems and the new organization promises to afford better opportunities than have existed for working out their solutions.

At least, this is the way the matter looks now. More experience may possibly develop objections to the present arrangement which are not now apparent.

A Justified Spirit of Optimism

The present conditions in the railway and railway supply fields are anything but satisfactory. Railways having more than 90 per cent. of the mileage in the country are in the hands of the government, and their expenses are so high in proportion to their earnings that thus far this year they have incurred a deficit averaging more than $60,000,000 a month. Because they are in the hands of the government, their financial management is largely dependent upon appropriations made by Congress. At its last session Congress failed to pass a bill making an appropriation of $750,000,000 for the Railroad Administration, which was needed. When the Director General, at the present session, asked for an appropriation of $1,200,000,000, Congress, without any good reason, provided only $750,000,000. The roads will be returned to private operation within a comparatively few months, and, because of this and its shortage of funds, the Railroad Administration is making no expenditures for additions and betterments which the companies will not authorize and finance. The companies, not being in possession of their properties and most of them being unsatisfactorily situated financially, are holding down their appropriations for additions and betterments as much as they can. In consequence of this combination of circumstances, the orders being placed by the railways with railway supply companies are comparatively small, those for materials and equipment to be used in additions and betterments being unprecedentedly small.

The foregoing facts do not make a picture contemplation of which is adapted to inspire optimism on the part of railway men and railway supply concerns. Nevertheless, there is being manifested by them a very marked spirit of optimism. The exhibit of the railway supply manufacturers at the June conventions, which begin today, is the largest and best ever known.

There is good ground for the spirit of optimism being displayed. In the first place, it is evident, as already indicated, that the railways are going to be returned to private operation soon. The threat of government ownership of railroads, which has hung over the railway and railway supply fields for years, and especially for the last year and a half, no longer exists. It has ceased to exist because the public has seen the experiment of government operation tried and does not like the results. The public may appraise the results correctly or incorrectly, but there is no doubt it has decided that they are unsatisfactory.

Not only are the railways going back to private operation, but they undoubtedly are going back under a system of regulation which will be fairer and wiser than that which prevailed before government control was adopted. The new policy may not and probably will not be entirely just and satisfactory from the railway point of view, but that it will be an improvement over the old system there can be no doubt, since every bill that has been introduced in Congress which has any chance of passage would result in improvements in regulation.

The main purpose for which improvements in regulation are needed is to so rehabilitate the credit of the railways as to enable them to raise sufficient capital adequately to develop their facilities. This fact is not quite as clearly recognized in Washington as it should be, but

it is recognized by many Senators and Representatives who will have a leading part in framing the new railway legislation, and there is very good reason for hoping that the legislation finally passed will have as its main purpose and effect the enabling of the railways to earn adequate revenues. The fact that the country has had an experience with government operation and greatly dislikes it promises in the long run to be of the greatest help in securing the establishment of a fair and wise system of regulation.

If the railways are returned to private operation under regulation which assures to them opportunity to earn adequate revenues, there is certain to be an important revival of the expansion of railway facilities and of the purchase of materials and equipment incidental to such a revival. The railways today, because of the recent heavy decline of freight traffic, have nominally a large surplus capacity; but, as a matter of fact, under normal conditions of business, they would be entirely unable, with their present capacity, to satisfactorily handle the country's business. They will have to make vast expenditures for additions and improvements to make their capacity equal to the productive capacity of the country, and they will have to make very large expenditures to take up the deferred maintenance which has been accruing for some years. The large expenditures for supplies and equipment which the railways ought to make and which it appears probable that they will make, once they begin to get on their feet again after they have been returned to private operation, should result in the placing of a large business with the railway supply and equipment manufacturers.

There is, besides, a prospect that the railway equipment and supply manufacturers of the United States will be able to do a larger business abroad than they have in the past. American manufacturers have not been able to increase their export business as much in proportion since the Armistice as it was expected that they would be. This has been true of manufacturers of railway supplies and equipment among others, but in anticipating the orders to be received from abroad not enough allowance was made for the drastic readjustments which would have to occur before the countries which have been at war could get down to a normal economic basis; and, furthermore, it was not anticipated that the deliberations and negotiations concerning the Treaty of Peace would be dragged out as they have been. Economic conditions throughout the world are bound to remain very abnormal until peace finally has been signed. Every economic and financial expert who has investigated conditions abroad since the war has returned with the conviction that American manufacturers, including manufacturers of railway equipment and supplies, will be able after peace has been signed to do a much larger business abroad than heretofore, provided our banking concerns show enterprise and skill in making the needed credit arrangements and our manufacturersrs show enterprise and skill in going after the business.

On the whole, therefore, while the present situation in the railway and railway supply fields is far from satisfactory, the general outlook in those fields is favorable. Before the railways can get on their feet, there will have to be a revival of freight traffic, a substantial advance in rates and legislation reforming the old system of regulation. The revival of traffic will unquestionably begin when this year's large crops commence to move. The fact that an advance in rates will have to be made seems now to be generally recognized. The needed legislation is on the way. There is justification for the spirit of enthusiasm and optimism being manifested in the railway and railway supply fields.

Program for the Week

THE SESSIONS OF THE CONVENTION will be held in the Greek Temple on the Million Dollar Pier. The headquarters will be at the Marlborough-Blenheim Hotel, where the office of the president, secretary and executive committee will be located.

The Enrollment Committee will be located at the entrance to the pier. Each member of the Association, immediately on arrival, should go to the enrollment booth, register and procure his membership button. Members will also be furnished with badges for their families. Cards for registration will be furnished at the enrollment booth at the entrance to the Pier.

Members are requested to be in their seats promptly at 9.30 A. M.

Wednesday, June 18, 1919

MORNING SESSION—9.30 A. M. TO 1.30 P. M.

Prayer	9.30 A. M. to 9.35 A. M.
Address of Welcome by Mayor of Atlantic City	9.35 A. M. to 10.00 A. M.
Address by the Chairman	10.00 A. M. to 10.30 A. M.
Action on Minutes of Annual Meeting of 1918 (M. C. B.)	10.30 A. M. to 10.35 A. M.
Report of Secretary and Treasurer (M. C. B.)	10.35 A. M. to 10.50 A. M.
Appointment of Committees on Subjects, Resolutions, Correspondence, Obituaries, etc.	10.50 A. M. to 11.00 A. M.
Unfinished Business	11.00 A. M. to 11.05 A. M.
New Business	11.05 A. M. to 11.15 A. M.
Report of General Committee, including Announcement of Nominations for Members of Nominating Committee	11.15 A. M. to 11.30 A. M.
Discussion of Reports:	
Nominations	11.30 A. M. to 11.40 A. M.
Standards and Recommended Practice (M. C. B.)	11.40 A. M. to 12.10 P. M.
Train Brake and Signal Equipment	12.10 P. M. to 12.40 P. M.
Brake Shoe and Brake Beam Equipment	12.40 P. M. to 1.30 P. M.

AFTERNOON SESSION—3.00 P. M.

The General Committee decided that it would be advisable to have a session devoted exclusively to a discussion of the revision of the Rules of Interchange and that it form a part of the proceedings.

At this session the following reports of committees will be considered:

1. Arbitration
2. Revision of Prices for Labor and Material.
3. Depreciation for Freight Cars.
4. Revision of Passenger Car Rules of Interchange.

ENTERTAINMENT.

10.30 A. M.—Band Concert at Entrance Hall, Million Dollar Pier. Royal Scotch Highlanders' Band.

3.30 P. M.—Orchestra Concert and Impromptu Dancing. Entrance Hall, Million Dollar PiPer. Fry Philharmonic Orchestra. Tea wil be served at 4.30 P. M. in Entrance Hall.

9.00 P. M.—Informal Dance. Ball Room, Million Dollar Pier. Royal Scotch Highlanders Band.

Thursday, June 19, 1919

9.30 A. M. TO 1.30 P. M.

Discussion of Reports on:	
Car Wheels	9.30 A. M. to 10.00 A. M.
Standard Blocking for Cradles of Car Dumping Machines	10.00 A. M. to 10.30 A. M.
Specifications and Tests for Materials (M. C. B.)	10.30 A. M. to 11.30 A. M.
Welding Truck Side Frames, Bolsters and Arch Bars	11.00 A. M. to 11.30 A. M.

Couplers	11.30 A. M. to 12.00 M.
Draft Gear	12.00 M. to 12.30 P. M.
Questions proposed by Members	12.30 P. M. to 1.30 P. M.

ENTERTAINMENT

10.30 A. M.—Band Concert, Entrance Hall, Million Dollar Pier. Royal Scotch Highlanders' Band.

3.30 P. M.—Orchestral Concert and Impromptu Dancing. Entrance Hall, Million Dollar Pier. Fry Philharmonic Orchestra. Tea will be served at 4.30 P. M. in Entrance Hall.

9.30 P. M.—Carnival Night. Special Features. Ball Room, Million Dollar Pier. Royal Scotch Highlanders' Band.

Friday, June 20, 1919

9.30 A. M. TO 1.30 P. M.

Discussion of Reports on:	
Safety Appliances	9.30 A. M. to 9.45 A. M.
Loading Rules	9.45 A. M. to 10.15 A. M.
Car Construction	10.15 A. M. to 10.45 A. M.
Car Trucks	10.45 A. M. to 11.30 A. M.
Train Lighting and Equipment	11.30 A. M. to 12.00 M.
Tank Cars	12.00 M. to 12.30 P. M.
Questions Proposed by Members	12.30 P. M. to 1.30 P. M.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert at Entrance Hall, Million Dollar Pier. Fry Philharmonic Orchestra.

3.30 P. M.—Band Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier. Royal Scotch Highlanders' Band. Tea will be served at 4.30 P .M. in Entrance Hall.

9.30 P. M.—Grand Ball, Ball Room, Million Dolar Pier. Royal Scotch Highlanders' Band.

Saturday, June 21, 1919

9.30 A. M. TO 12.00 M.

Consideration of Rules of Order	9.30 A. M. to 10.00 A. M.
Election of Officers, General Committee and Nominating Committee—Presentation of Badges to Retiring Officers, Etc.	10.00 A. M. to 12.00 M.

ENTERTAINMENT

10.30 A. M.—Band Concert at Entrance Hall, Million Dollar Pier. Royal Scotch Highlanders' Band.

8.30 P. M.—A special program has been prepared in appreciation of the railway and railway supply men who went into the service during the war. The speakers will be Hon. Josephus Daniels, Secretary of the Navy; Brigadier-General W. W. Atterbury, Col. Henry W. Hodge, and Senator Walter E. Edge, New Jersey's war governor.

Sunday, June 22, 1919

3.30 P. M.—Sacred Concert. Music Rooms of Marlborough-Blenheim. Fry Philharmonic Orchestra.

Monday, June 23, 1919

9.30 A. M TO 1.30 P. M.

Address of Vice-Chairman	9.30 A. M. to 10.30 A. M.
Action of Minutes of 1918 Annual Meeting (M. M.)	10.30 A. M. to 10.35 A. M.
Reports of Secretary and Treasurer (M. M.)	10.35 A. M. to 10.50 A. M.
Discussion of Reports on: Standards Recommended Practice (M. M.)	10.50 A. M. to 11.20 A. M.
Mechanical Stokers	11.20 A. M. to 11.50 A. M.
Individual Paper on "Standarization," by Mr. Frank McManamy	11.50 A. M. to 12.30 P. M.
Questions Proposed by Members	12.30 P. M. to 1.30 P. M.

10.30 A. M.—Band Concert. Entrance Hall, Million Dollar Pier. Royal Scotch Highlanders' Band.

3.30 P. M.—Orchestral Concert and Impromptu Dancing. Entrance Hall, Million Dollar Pier. Fry Philharmonic Orchestra. Tea will be served at 4.30 P. M., in Entrance Hall.

9.00 P. M. Major E. D. Campbell, Railway and Seacoast Section, Artillery Division, Ordnance Department, United States Navy, will make an address in the Hippodrome on "Railway Artillery." There will be an Informal Dance in the Ball Room, Million Dollar Pier. Royal Scotch Highlanders' Band.

Tuesday, June 24, 1919

9.30 A. M. TO 1.30 P. M.

Discussion of Reports on: Fuel Economy and Smoke Prevention	9.30 A. M. to 10.00 A. M.
Specifications and Tests Materials (M. M.)	10.00 A. M. to 10.30 A. M.
Design and Maintenance of Locomotive Boilers	10.30 A. M. to 11.00 A. M.
Locomotive Headlights	11.00 A. M. to 11.30 A. M.
Superheater Locomotives	11.30 A. M. to 12.00 A. M.
Individual Paper on Carbonization in Valve Chambers and Cylinders of Superheated Steam Locomotives; Its Cause, Effect on Lubrication and Maintenance, and Proper Measures to Overcome Same, by Mr. F. P. Roesch	12.00 A. M. to 12.30 P. M.
Amalgamation of other Mechanical Associations with Section III—Mechanical of the American Railroad Association	12.30 P. M. to 1.00 P. M.
Questions Proposed by Members	1.00 P. M. to 1.30 P. M.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert. Entrance Hall, Million Dollar Pier. Fry Philharmonic Orchestra.

3.30 P. M.—Band Concert and Impromptu Dancing. Entrance Hall, Million Dollar Pier. Royal Scotch Highlanders' Band. Tea will be served at 4.30 P. M. in Entrance Hall.

9.30 P. M.—Mardi Gras Dance. Ball Room, Million Dollar Pier. Royal Scotch Highlanders' Band.

Wednesday, June 25, 1919

9.30 A. M. TO 1.30 P. M.

Discussing of Reports on:	
Design, Maintenance and Operation of Electric Rolling Stock	9.30 A. M. to 10.00 A. M.
Individual Paper on "The Use of Bronze for Valve Snap Rings and Piston Surfaces, and Bull Rings in Large Cylinders, to Prevent Rapid Wear and Cutting of Cylinders and Valve Bushings" By Mr. C. E. Fuller.	10.00 A. M. to 10.30 A. M.
Discussion of Reports on:	
Train Resistance and Tonnage Rating	10.30 A. M. to 10.45 A. M.
Subjects	10.45 A. M. to 11.15 A. M.
Powdered Fuel	11.15 A. M. to 11.25 A. M.
Resolutions, Correspondence, Etc.	11.25 A. M. to 11.35 A. M.
Auditing	11.35 A. M. to 11.40 A. M.
Unfinished Business	11.40 A. M. to 11.45 A. M.
Questions Proposed by Members	11.45 A. M. to 12.30 P. M.
Closing Exercises	12.30 P. M. to 1.00 P. M.

Special Train from Chicago

A large number of friends greeted the arrival from Chicago to Atlantic City, on Tuesday, of the Special Convention Train. The train left Chicago Monday afternoon, at 3.00 o'clock, and arrived here at 5.37 o'clock Tuesday afternoon. It consisted of ten standard Pullman cars, two dining cars and one club smoker. There were 148 passengers aboard. The trip was made with no particular incident.



Railway Supply Manufacturers' Association

Has Come Through the War Stronger Than Ever and Has Prepared a Record-Breaking Exhibit

THE RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION which has charge of the exhibits and the social features at the conventions, has been remarkably successful this year in arranging for the largest and most complete exhibit that has ever been shown.

The officers and the executive committee are to be heartily congratulated upon the results of their work. These officers, by the way, were elected in 1916, but have had to hold over during the war period because of the fact that no meetings of the associations were held during that time. Their task during this period has been no easy one. It was expected that a convention would be held in 1917, and it was not until our country actually entered the World War, on April 6 of that year, that the final decision was made not to hold the meeting. The casual observer may not realize the great amount of detail work that is required to set up an exhibit on the Million Dollar Pier, and possibly very few of the attendants at the conventions realize that a large part of the work of preparing the booths and getting the material into shape must, of necessity, be done weeks and weeks before the meetings are actually held. On April 1, 1917, the officers of the Railway Supply Manufacturers' Association realized that there was a possibility of postponing the June conventions, and the progress of the work at Atlantic City was slowed up as much as possible. It was not until April 6 of that year, however, that a definite decision was reached that the conventions would not be held.



E. H. Walker
President

A large part of the material which had been used could, of course, be salvaged, but all of the labor in preparing the booth structures and taking them down and storing them was lost. It soon became apparent that the war would last for an indefinite period and that it would not be possible to arrange for any exhibitions during war times. Under these conditions, the association practically closed its office at Pittsburgh and practically became inactive until the end of the war.

Immediately after the signing of the armistice the officers realized that the present year would undoubtedly see a record-breaking convention, and they immediately got in touch with the officers of the mechanical associations and with the Railroad Administration representatives and started active work in preparing for the present exhibit. Every possible bit of space on the Million Dollar Pier has been made available that could be used for exhibits without going to an unreasonable expenditure. For instance, if additional space could be added without paying out more than the exhibitor would regularly pay for it, it was done. Reference to the diagram on another page in connection with the detail information for the exhibits will indicate how successfully every bit of space on the pier has been taken advantage of. Even at this, however, it has been necessary for exhibitors in many cases to double up.

It is noteworthy that the representatives of the mechanical department of the Railroad Administration have

R. S. M. A. Officers

Executive Committee Members
and
Committee Chairmen



C. H. Gayetty
Chairman, Enrollment Committee



J. F. Schurch
Chairman, Finance Committee



LeGrand Parish
Vice-President



P. J. Mitchell
Chairman, By-Laws
and Resolution Committee



L. S. Wright
Chairman
Transportation Committee



J. G. Platt
Chairman,
Exhibit Committee



E. H. Bankard, Jr.
Chairman,
Entertainment Committee



Capt. G. H. Porter
Chairman, Hotel Committee



C. W. Beaver



C. P. Cass



C. D. Eaton



F. E. Beal



J. D. Conway
Secretary-Treasurer



H. G. Thompson



George A. Cooper



G. R. Carr



Wm. McConway, Jr.

given very cordial and hearty co-operation to the officers of the Railway Supply Manufacturers' Association in helping to make this year's exhibit a success. The entertainment features this year are of a most simple nature, and the convention promises to be one of the most business like that has ever been held. The Railway Supply Manufacturers' Association has co-operated in trying to make it so, and incidentally has prepared for distribution among railroad men specially designed note-books which will enable them easily to note those things which they see or hear on the pier that they may wish to report back to their managements.

The work of the association is in the hands of the officers, consisting of the president, vice-president and secretary-treasurer, and the executive committee, consisting of twelve members. The chairman of several of the subcommittees are members of the executive committee, although three of the most important committees—the entertainment, the enrollment and the transportation—are headed by men who are not on the executive committee.

The president of the association, who was elected at the 1916 convention and who has had to give a very large amount of his time to the affairs of the association during the interim, is Edmund H. Walker, vice-president of the Standard Coupler Company, New York. Mr. Walker was born in Kingston, Ohio, December 10, 1871. He has had a varied experience in several departments of a number of western roads, and became connected with the Standard Coupler Company in February, 1905. He has been active in the Supply Association for many years.

The vice-president of the association is LeGrand Parish, president of the American Arch Company and of the Lima Locomotive Works, Inc.

John D. Conway, of Pittsburgh, has been secretary-treasurer of the association for several years.

Executive Committee

The twelve members of the executive committee come from seven geographical districts as follows: First district (New England states and Canada), one member: J. G. Platt, Hunt-Spiller Mfg. Corporation, Boston, Mass. Second district (New York and New Jersey), three members: C. D. Eaton, American Car & Foundry Company, New York; C. W. Beaver, Yale & Towne Mfg. Company, New York, and H. G. Thompson, Transportation Engineering Corporation. Third district (Pennsylvania), two members: Philip S. Mitchell, Philip S. Justice & Co., Philadelphia, Pa., and W. McConway, Jr., McConway & Torley Company, Pittsburgh, Pa. Fourth district (Ohio, Indiana and Michigan), two members: J. F. Schurch, the T. H. Symington Company, Rochester, N. Y., and G. A. Cooper, Frost Railway Supply Company, Detroit, Mich. Fifth district (Illinois, Wisconsin, Iowa and Minnesota), two members: G. H. Porter, Western Electric Company, Chicago, Ill., and G. E. Carr, Dearborn Chemical Company, Chicago, Ill. Sixth district (Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Kentucky and Tennessee), one member: F. E. Beal, Magnus Co., Inc., Atlanta, Ga. Seventh district (states west of the Mississippi river, including Louisiana, but excepting Iowa and Minnesota), one member: C. P. Cass, Westinghouse Air Brake Company, St. Louis, Mo.

The members of this committee who were elected at the 1916 convention were Messrs. Beaver, Cooper and Thompson. Wm. McConway, Jr., was elected to fill the unexpired term of C. E. Postlethwaite, who moved out of the Pittsburgh district. The members who retire this year and whose places will be filled at the election next Saturday are Messrs. Beal (Sixth district), Messrs. McConway and Mitchell (Third district) and Porter (Fifth district).

Exhibit Committee

All of the members of the exhibit committee are on the executive committee. J. G. Platt is chairman, and the other two members are G. R. Carr and C. W. Beaver.

Entertainment Committee

This committee has charge of all entertainment features. E. H. Bankard, Jr., general sales agent of the Globe Seamless Steel Tubes Company, Chicago, is chairman. The other members are E. C. Brown, Dearborn Chemical Company, Chicago, Ill.; J. M. Brown, Elwell Parker Electrical Co., Chicago, Ill.; L. O. Cameron, Railway Supplies, Washington, D. C.; F. T. Connor, Carbon Steel Company, Chicago, Ill.; J. R. Forney, Ralston Steel Car Co., Washington, D. C.; R. H. Gwaltney, T. H. Symington Co., New York, N. Y.; Ellsworth Harding, Railway Supplies, New York, N. Y.; R. J. Himmelright, American Arch Co., New York, N. Y.; J. C. C. Holding, Midvale Steel & Ordnance Co., Philadelphia, Pa.; Langley Ingraham, Yarnall Paint Co., Philadelphia, Pa.; W. K. Krepps, Crucible Steel Co. of America, New York, N. Y.; W. M. Melcher, Massachusetts Mohair Plush Co., Boston, Mass.; A. C. Moore, Safety Car Heating & Lighting Co., Chicago, Ill.; N. C. Naylor, Railway Steel Spring Co., Chicago, Ill.; G. A. Nicol, H. W. Johns-Manville Co., New York, N. Y.; W. H. Oliver, Republic Iron & Steel Co., Philadelphia, Pa.; H. E. Passmore, Grip Nut Co., Columbus, Ohio; J. L. Paxton, Paxton-Mitchell Co., Omaha, Neb.; S. W. Sargent, American Steel Foundries, Philadelphia, Pa.; H. N. Scott, Griffin Wheel Co., Chicago, Ill.; L. B. Sherman, Railway Age Gazette, Chicago, Ill.; J. E. Slimp, Unit Railway Car Co., Boston, Mass., and W. M. Wilson, Flannery Bolt Co., Chicago, Ill.

Transportation Committee

The purpose of the Transportation Committee is to oversee and assist in the handling of the roller chairs, automobile service and other local transportation features at Atlantic City during the conventions.

The chairman of this committee is L. S. Wright, of the railway sales department of the National Malleable Castings Company, Chicago. The other members of the committee are A. W. Brown, Griffin Wheel Co., Chicago; C. J. W. Clasen, The Bettendorf Co., Bettendorf, Iowa; W. G. Cook, Garlock Packing Co., Chicago; H. E. Greer, Camel Co., Chicago; H. E. Daniels, West Disinfecting Co., Chicago; L. R. Dewey, American Brake Shoe & Foundry Co., Chicago; Charles Derby, Joyce-Cridland Co., Dayton, O.; F. A. Elmquist, Sherwin-Williams Co., Cleveland, O.; George Fogg, Locomotive Superheater Co., Chicago; J. W. Fogg, Boss Nut Co., Chicago; B. H. Forsythe, Grip Nut Co., Chicago; W. H. Foster, Galena Signal Oil Co., Bay Side, L. I.; E. L. Georger, Pratt & Lambert, Chicago; B. C. Hopper, American Steel Foundries, St. Paul, Minn; J. C. Kuhns, The Burden Iron Co., Chicago; J. P. Landreth, Anchor Packing Co., Chicago; A. L. McNeil, Central Electric Co. Chicago; Thomas Mahar, American Arch Co., Chicago; Bruce Owens, Magnus Company, Chicago; L. S. Peabody, Railway Steel Spring Co., New York; J. H. Rodger, Safety Car Heating & Lighting Co., Chicago; R. J. Sheridan, Chicago Railway Equipment Co., New York; J. E. Tarelton, Union Draft Gear Co., Chicago; J. G. Tawse, Spencer-Otis Co., Chicago, and C. N. Thulin, Duff Mfg. Co., Chicago.

Enrollment Committee

This committee has charge of the enrollment of members for both the railway and the supply associations. The task is a difficult one and requires that the members of the committee be on the job for long periods during the conventions.

The chairman of the committee is C. H. Gayetty, who is with the Quaker City Rubber Company, Philadelphia. The other members of the committee are: G. A. Barden, Duntley-Dayton Co., Philadelphia; J. E. Brown, O'Malley-Beare Valve Co., Chicago; S. H. Campbell, Western Railway Equipment Co., St. Louis, Mo.; G. W. Denyven, Parkesburg Iron Co., Boston, Mass.; W. S. Edger, Midvale Steel Co., Philadelphia; Harry Jacques, Simmons Hardware Company, St. Louis, Mo.; S. I. Leslie, The Leslie Company, Lyndhurst, N. J.; L. D. Mitchell, Detroit Graphite Co., Chicago; F. V. McGinness, Transportation Engineering Company, New York; Gilbert E. Ryder, Locomotive Superheater Co., New York; James A. Stevens, Devoe-Reynolds Co., New York; and F. H. Smith, Gold Car Heating & Lighting Co., New York.

Other Committees

There are several other committees which are made up entirely from members of the Executive Committee. These include the Finance Committee, J. F. Schurch, chairman; George H. Porter and William McConway, Jr. The Hotel Committee is composed of George H. Porter, chairman; C. P. Cass and H. G. Thompson. The Committee on By-Laws and Resolutions has as its chairman P. J. Mitchell; the other two members are F. E. Beal and C. P. Cass.

Post Office

United States mail addressed care of Secretary's Office, Million Dollar Pier, Atlantic City, N. J., will be taken care of and distributed to exhibitors' booths.

Members are requested not to send general circular matter for distribution to other exhibitors, as this is a violation of the Association Rules.

Railway Supply Manufacturers' Annual Meeting

The annual meeting of the Railway Supply Manufacturers' Association will be held in the Convention Hall, on Young's Million Dollar Pier, Saturday, June 21. The hour of the meeting will be announced by bulletin.

The meetings for the election of the executive committee will be announced by special poster.

Registration

The registration was specially heavy yesterday. During the convention the enrollment booth will be operated in accordance with the following schedule:

Wednesday,	June 18.....	9 A. M. to 1 P. M.	2 to 6 and 7 to 8 P. M.
Thursday,	June 19.....	9 A. M. to 1 P. M.	2 to 6 and 7 to 8 P. M.
Friday,	June 20.....	9 A. M. to 1 P. M.	2 to 6 and 7 to 8 P. M.
Saturday,	June 21.....	9 A. M. to 12 M.	7 to 8 P. M.
Sunday,	June 22.....11	A. M. to 12 M.	2 to 4 P. M.
Monday,	June 23.....	9 A. M. to 1 P. M.	2 to 6 P. M.
Tuesday,	June 24.....	9 A. M. to 12 M.	2 to 5 P. M.
Wednesday,	June 25.....	9 A. M. to 11 P. M.	

Telephones

A distinct improvement has been made in the telephone service this year. A central switchboard, with necessary operators, has been established on the Pier in connection with fifteen long-distance booths, conveniently located in as many sections of the Pier.

Shopmen on Canadian Roads to Strike To-day

Press dispatches indicate that all relations between the officials of Division No. 4, Railway Shopmen of America, and the Canadian Railway War Board have been severed, and that a strike has been called to begin to-day. The union officials claim that 40,000 men will be involved.

The Entertainment Features

A glance at the entertainment program will indicate the unpretentiousness of its features. Except for the special event of Saturday night, the program consists largely of dancing. The simplified form of organized entertainment was deemed advisable after mature deliberation.

High Officers of Railroad Administration Coming

As a result of a meeting which is to be held in Atlantic City on Thursday, more of the principal operating executives of the railways of the United States will be here where they can attend the conventions and see the exhibits than ever was the case before in the history of the mechanical conventions.

The special occasion, aside from the conventions, which will bring them here, will be a meeting of the Executive Committee of the American Railroad Association. J. E. Fairbank, general secretary of the American Railroad Association, arrived here yesterday to make arrangements for the Executive Committee meeting. The members of the Executive Committee include three heads of divisions of the United States Railroad Administration and all the regional directors, and are as follows:

W. T. Tyler, Director, Division of Operation, United States Railroad Administration; Charles A. Prouty, Director, Division of Accounting; T. C. Powell, Director, Division of Capital Expenditures; A. T. Hardin, Regional Director, Eastern Region; C. H. Markham, Regional Director, Allegheny Region; N. D. Maher, Regional Director, Central Western Region; B. F. Bush, Regional Director, Southern Region; Hale Holden, Regional Director, Central Western Region; B. F. Bush, Regional Director, Southwestern Region; R. H. Aishton, Regional Director, Northwestern Region; W. J. Jackson, Federal Manager, Chicago & Eastern Illinois; E. H. Coapman, Federal Manager, Southern Railroad; E. E. Calvin, Federal Manager, Union Pacific; H. E. Byram, Federal Manager, Chicago, Milwaukee & St. Paul; J. M. Hannaford, Federal Manager, Northern Pacific; G. L. Peck, Federal Manager, Pennsylvania Lines West of Pittsburgh; J. E. Gorman, Federal Manager, Chicago, Rock Island & Pacific; A. J. Stone, Federal Manager, Erie Railroad; H. G. Kelley, President, Grand Trunk Railway, Montreal, Que.

The executive committee is constituted as above as a result of the recent reorganization of the association under government control. At the meeting this week the committee will elect a new president of the association and transact a large amount of other important business incidental to the reorganization.

General Secretary Fairbanks visited the convention exhibit yesterday in company with Secretary Hawthorne, of the Mechanical Section.

Rolling Chairs

THE TRANSPORTATION COMMITTEE will provide rolling chairs for members and guests of the convention wearing official badges, from the following stations, between the hours indicated, from June 18 to June 25, inclusive:

	A. M.	P. M.
The Pier	9.00 to	6.00
Marlborough-Blenheim	9.00 to	6.00
Traymore	9.00 to	6.00
Chalfonte Hotel	9.00 to	6.00
Chelsea Hotel	9.00 to	6.00
Young's Hotel	9.00 to	6.00
St. Charles Hotel	9.00 to	6.00
The Breakers	9.00 to	6.00
	P. M.	P. M.
All entertainments on Pier	8.30 to	10.00

Unoccupied chairs may be stopped at any point on the Boardwalk, except between the Marlborough-Blenheim and the Pier, and they may be used in either direction.

Convention chairs are not allowed to wait more than fifteen minutes. The Transportation Committee will consider it a favor if members or guests of the Associations will report to the committee any inattention on the part of an attendant. If the number on the chair is given, it will facilitate checking the complaint.

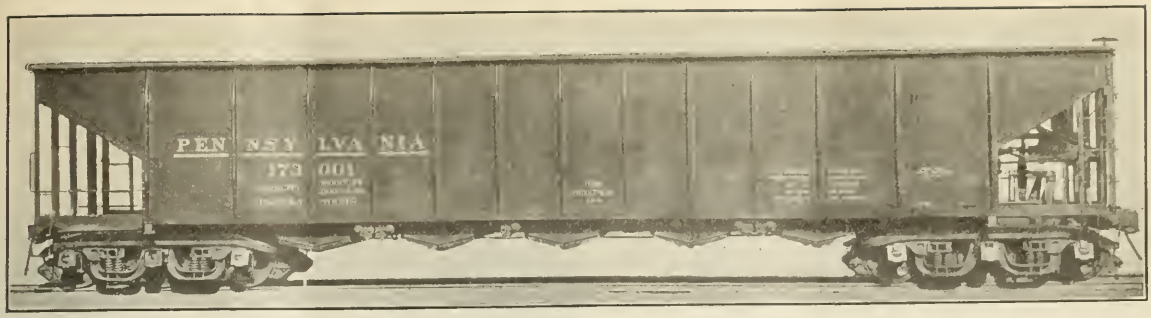
No rolling chairs will be allowed on the pier during the convention. The aisles will be pretty well filled with the large number of visitors, and the rolling chairs would cause an undesirable congestion.

Registration, American Railway Association, Sec. III, Mechanical

Allison, W. L., Franklin Ry. Supply, Marlborough.
Bentley, H. T., S. M. P., C. & N. W., Marlborough.
Brazier, F. W., S. R. S., N. Y. C., Marlborough.
Burns, T. J., S. R. S., M. C., Haddon Hall.
Callahan, J P., M. C. B., E. J. & E., Osbourne.
Chambers, C. E., Mech. Asst. Reg. Dir., Allegheny Region, U. S. R. R. A., Dennis.
Chamberlin, J. T., S. M. P. (Ret.), B. & M., Colonial.
Corinth, A. B., G. C. I., A. C. L., Shelburne.
Coutant, M. R., M. M., Ulster & Delaware, Osborne.
Craig, James, Chf. Draftsman, B. & H., Colonial.
Crawford, D. F., Traymore.
Crone, S. A., Past Pres. M. C. B., Dennis.
Crownover, G. M., S. M. P., C. G. W., Shelbourne.
Cooper, F. R., Gold Car Heating & Lighting Co., Dennis.
Cunningham, D. G., A. S. M. P., D. & R. G., Strand.
Demint, S. W., C. I. I., Estelle.
Dobson, W. E., Gen. Aud., Cambria & Ind., Alamac.
Dolan, S. M., Traymore.
Duffey, G. J., M. M. Lake Erie & Western, Chalfonte.
Endsley, L. E., Prof. Univ. of Pitts., Chalfonte.
Everett, Ira, G. C. I., Lehigh Valley, Dennis.
Fairbanks, J. E., Gen. Secy., A. R. A., Marlborough.
Ferguson, George M., Supt., Lake Ter., Galen Hall.
Ferry, F. C., M. M., L. H. & St. L., Shelburne.
Fetner, W. H., S. M. P., C. of Ga., Arlington.
Flory, B. P., S. M. P., N. Y. O. & W, Marlborough.
Giles C. F., S. M., L. & N., Chalfonte.
Hall, E. H., S. C. D., C. G. W., Mascagni.
Harris, C. M., West Elec. & Mfg. Co., Traymore.
Hawthorne, V. R., Sec., Mech. Sec. A. R. A., Marlborough.
Jacobs, H. W., M. M., Santa Fe, Traymore.
Johnson Frank, M. M., So. Ry., Osborne.
Jones, H. W., M. M., P. R. R., Elberon.
Kinney, M. A., S. M. P., Hocking Valley Ry., Traymore.
Kilpatrick, R. E., M. M., Chalfonte.
Lenz, John S., M. C. B., Lehigh Valley, Dennis.
Lewis, W. N. (Ret.), S. M. P., N. W., Marlborough.
Lovejoy, George R., G. F., Detroit Ter., Phillips.
McEcatters F. R., Supt. Union R. R., St. Charles.
Macheeney, A. C., Detroit Lubricator Co., Pennhurst.
Mahlhaner, W., Gen. M. M., B. & O., Osborne.
Mechling, J. E., Supt. M. P., P. R. R. Lines West, Craig Hall.
Millar, E. T., G. C. I., B. & M. R. R., Colonial.
Miller, Geo. A., S. M. P., Florida East Coast, Osborne.
Miller, Wm., S. D., Erie, Arlington.
Montee, A. J., M. M., Bir. So., Schlitz.
Moore, B. R., S. M. P., D. & I. R. R., Traymore.
Munroe, J. T., S. S., Erie, Pennhurst.
Osmer, J. E., S. M. P., Ann Harbor, Chalfonte.
Oviatt, H. C., A. M. Supt., N. Y. N. H. & H., Chalfonte.
Painter, J. H., Shop Supt., A. C. L., Chalfonte.
Parks, G. E., M. E., M. C., Brighton.
Rae, Clark H., Asst. Supt. Mchy., L. & N., Shelburne.
Ramsdell, T. M., M. C. B., Oregon, Washington R. R. & Nav. Co., Chalfonte.
Riley, G. N., S. M. P., Mck Conn. R. R., Marborough.
Ripley, C. T., G. M. I., A. T. & S. F., Shelburne.
Rohrback, Geo. T., M. C. B., J. Dold Ref. Line, Chalfonte.
Searles, E. J., Shaffer Equip. C., Dennis.
Selloy, Samuel H., C. F. C. D., B. & A., Pennhurst.
Senger, J. W., M. C. B., N. Y. C., Ambassador.
Sheehy, Fred I., V. P. & C. M., Chicago Short Line Ry.
Slayton, C. E., Asst. Supt., St. J. & G. I., Arlington.
Smith, R. D., S. M. P. & R. S., B. & A. Ry., Dennis.
Stubbs, F. W., M. E., C. G. W. R. R., Maccagni.
Sullivan, J. J., S. M., N. C. & St. L. Ry., Shelburne.
Thiele, C. F., C. C. I., Penna. Lines, Dennis.
Thompson, Geo., M. C. B., N. Y. C., Ambassador.
Totten, E. C., D. C. C. F., N. Y. C., Pennhurst
Walsh, F. O., S. M. P., Georgia, Haddon Hall.
Wildin, G. W., Westinghouse Air Brake Co., Chalfonte.
Wright, R. V., Mgr. Edt., *Railway Age*, Dennis.
Watkins, H. W., M. C. R., S. P., Chalfonte
Williams, A. G., Penna Lines West, Craig Hall.
Zweibel, C. A., S. C. R., U. S. R. R. A., Chalfonte.

Special Guests

Alleman, C. W., G. S., P. & L. E., Sterling.
Rankard, E. H., Chairman Purchasing Committee, U. S. R. A., Allegheny Region, Marlborough.
Biscoe, H. M., Fed. Mgr., B. & A.
Blake, F. H., Asst. to C. C. I., P. R. R., Craig Hall.
Browning, A C., Com. Rep., Sec. 3, Mech., A. R. R. A., Marlborough.
Burch, R. L., G. C. For., Kan. City So., Estelle.
Chambers, Andrew (Ret. Engr.), P. R. R.
Courtney, A. S., Asst. Eng. M. P., P. R. R. W. L., Craig Hall.
Cowgill, C. P., G. S. M P, P. R R, Morton.
Cuthbert, J. A., Engr., P. R. R. Miller's.
Dunn, P. T., M. M., Penna. Lines, Dennis.
Egbert, Elisha, Engr., C. R. R. of N. J.
Emmerson, C. H., M. C. B., E. J. & E., Ogden.
Ermatinger, G. A., Asst. Supt. Equip., U. S. R. R. A., Clarendon.
Fentress, H. S., G. C. I., N. & S., Shelburne.
Gaffney, J. F., Yard Conductor, W. J. & S. R. R.
Gorman, John C., Supt., McKeesport Con., Galen Hall.
Geske, Julius, G. C. F., Chicago Short Line.
Grace, W. H., G. F. C. D., Louis. & Ark., Dennis.
Henderson, Juan, G. I. Locos., United Rwys. of Havana, Cuba, Dennis.
Horne, R. F,. Ins., U. S. N. Bur., S. E., Craig Hall.
Hunt, R. B., M. E., Florida East Coast, Osborne.
Hussey, F. A., M. M., B. & A., Pennhurst.
Kast, William G., M. C., Brighton.
Kuhlke, W. F., M. M., Charleston & N. C., Continental.
Lamb, W. G., M. M., Waterloo-Cedar Falls & North., Osborne.
Lynch, George, C. J. C. Im., U. S. R. R. A., Borton.
Marsh, E. P., Gen. For. Pass. Repairs, C. & N. W., De Ville.
Martin, K. H., Gen. Equip. Ins., So. Ry., Craig.
Mead, Daniel N., M. M., Chicago Short Line.
Morris, J E., Div. For., F. E. C., Osborne.
Mounce, R. S., C. F. Car Repairs, Erie, Pennhurst.
Nash, C. C., G. C. D., C. & N. W., De Ville.
Nelson, C. J., G. C. D., C. & N. W., De Ville.
Norris, W. B., Gen. For., P. R. R.



105-Ton Hopper Car Built by the Pennsylvania Railroad

P. R. R. Maximum Tonnage Hopper and Gondola Cars

Designed for Maximum Loading of Six 6-in. by 11-in. M. C. B. Axles; Will Carry About 120 Tons

INCLUDED IN THE PENNSYLVANIA RAILROAD track exhibit, which is located on the Reading tracks near the Boardwalk, are two open top cars of all-steel construction, one a self-clearing hopper and the other a drop bottom gondola, both of which are carried on six-wheel trucks. The hopper car has a marked capacity of 105 tons and the gondola 110 tons.

The railroad had designed a maximum tonnage mineral traffic car prior to Federal control, and with the consent of the Railroad Administration the two cars were recently completely at the company's car shops, Altoona, Pa. The six-wheel trucks have M.C.B. 6-in. by 11-in. axles, with a maximum loading at the rail of 52,500 lb. each, or 157,000 lbs. per truck. The cars are so designed as not to exceed Cooper's E60 loading of 6,000 lb. per lineal foot. .

The hopper car, which is known as Class H-26, has a light weight of 83,600 lb. and a marked capacity of 210,000 lb., which with the customary allowance of 10 per cent. for overload gives a ratio of paying load to gross load of 73.4 per cent. The space capacity is 3,500 cu. ft. level, with about 375 cu. ft. added when heaped, or a total of 3,875 cu. ft.

The gondola, known as Class G-23, has a light weight of 74,600 lb., with a marked capacity of 220,000 lb. Allowing 10 per cent for overload, this car has a ratio of paying load to gross load of 76.5 per cent. The cubical capacity as stenciled is 3,660 cu. ft.; when heaped the car holds 4,000 cu. ft. The gross weight of each type when loaded to capacity is such that the axles are fully loaded to the M.C.B. rating of 50,000 lb. each, or 52,500 lb, at the rail.

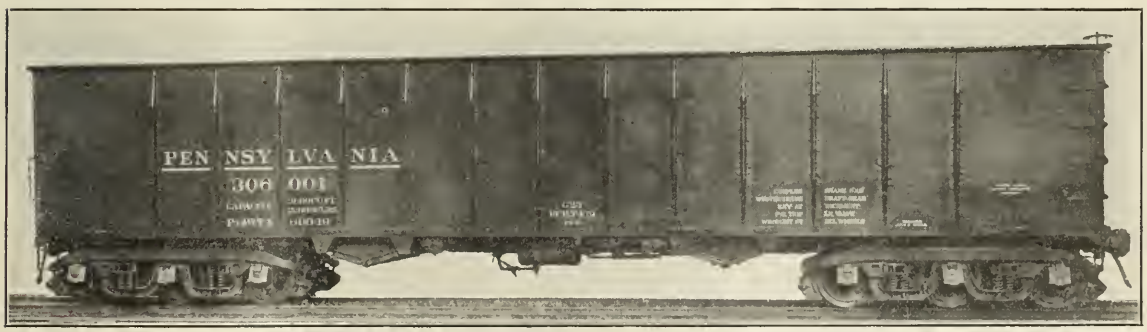
The principal dimensions of the two cars are shown in the following table:

	Hopper Class H-26	Gondola Class G-23
Light weight	83,600 lb.	74,600 lb.
Length over end sills	55 ft. 6 in.	50 ft. 0 in.
Length inside	53 ft. 8 in.	48 ft. 6 in.
Distance from center to center of trucks	42 ft. 0 in.	36 ft. 6 in.
Width over all	10 ft. 2 in.	10 ft. 2 in.
Width inside	9 ft. 4⅞ in.	9 ft. 4⅞ in.
Height above rail	11 ft. 6 in.	11 ft. 6 in.
Height inside	.....	8 ft. 1¼ in.
Truck wheel base	9 ft. 0 in.	9 ft. 0 in.
Truck journals	6 in. by 11 in.	6 in. by 11 in.
Truck weight	17,200 lb.	17,200 lb.
Marked capacity	210,000 lb.	220,000 lb.
Cubical capacity, level full	3,500 cu. ft.	3,660 cu. ft.
Additional contents, heaped	375 cut. ft.	340 cu. ft.

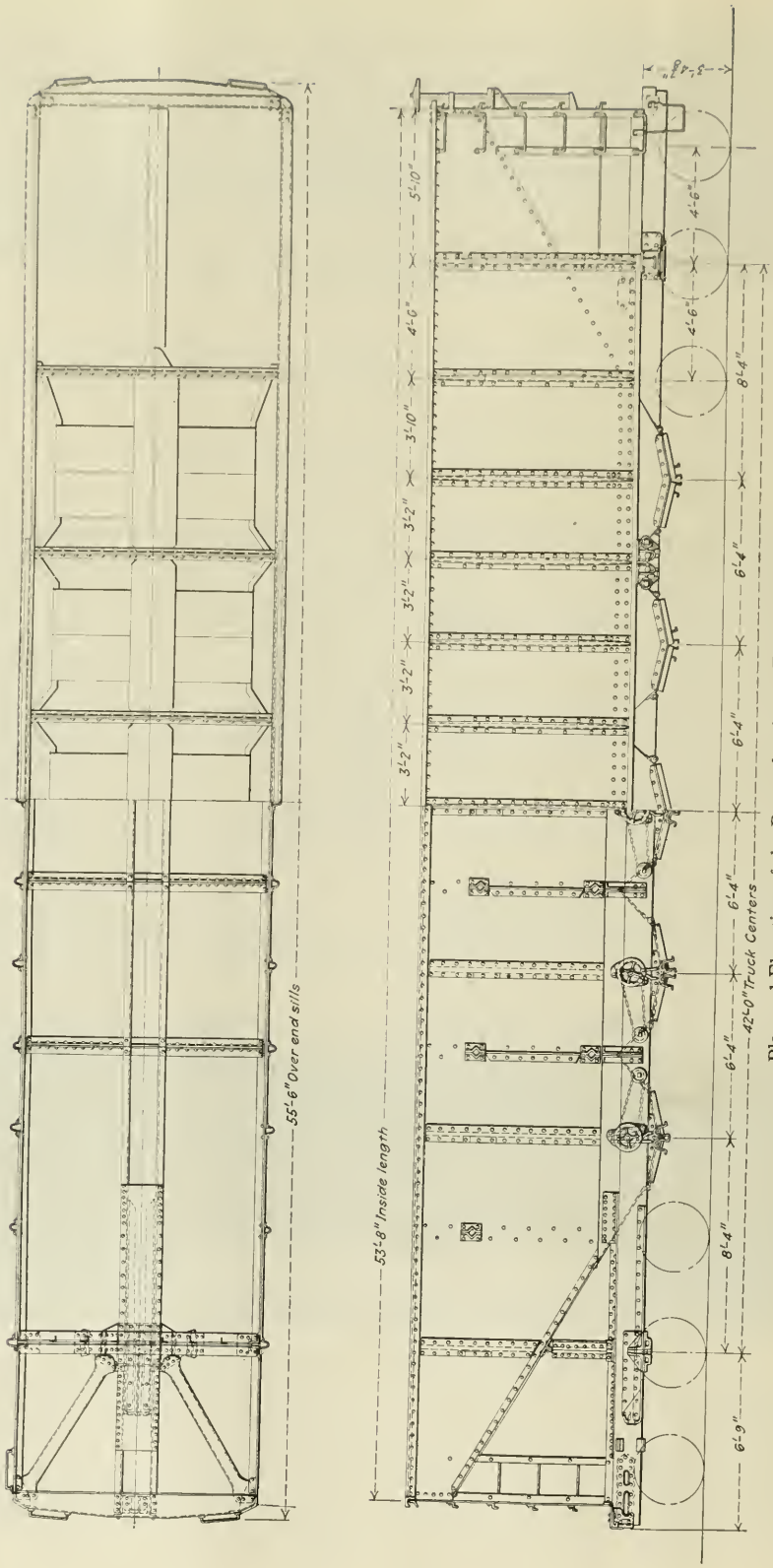
The Trucks

The most interesting feature of these cars is the six-wheel truck design. The arrangement of this truck provides for double the number of sets of bolster springs used with the four-wheel truck, thus making possible the use of the class *D* spring of 50-ton cars with four wheel trucks and 5½-in. by 10-in. axles on 100-ton cars with six wheel trucks and 6-in by 11-in. axles.

The trucks are equalized on a principle similar to that employed in the design of the Pennsylvania standard six-wheel passenger truck. The middle axle, however, is



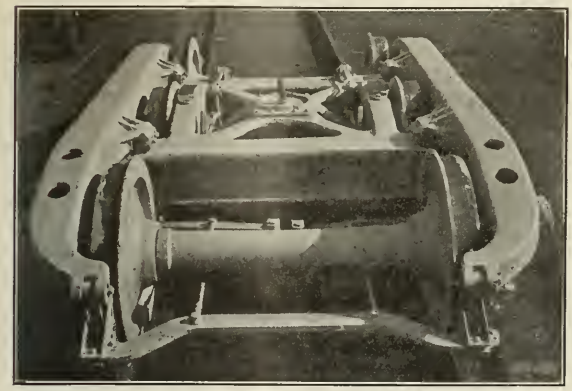
Pennsylvania 110-Ton Gondola Car



Plan and Elevation of the Pennsylvania 105-Ton Hopper Car

practically floating and is restrained in service only by the equalizers. Vertical projections on the ends of the equalizers resting on the middle pair of journal boxes extend up through openings in the bottom of the side frame casting, the size of which limits the lateral motion of this axle to a maximum of 7/8 inch in either direction.

A clear idea of the design of this truck may be obtained from an inspection of the photographs and drawings. It will be seen that the side frames are steel cast-



The End of the Six-Wheel Truck Showing the Bolster Casting

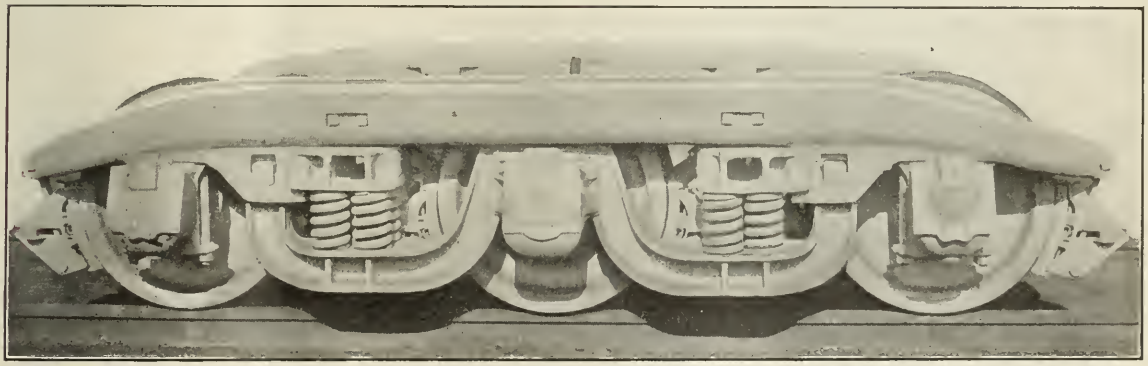
ings of the box girder type, to which the standard journal boxes of the two outer axles are bolted. On each side frame just inside of the two outer journal boxes are pockets in each of which the end of the equalizers is secured by a gib, an offset on the under side of which holds it in position laterally. The top surfaces of the gibs are slightly crowned laterally, while the corresponding surfaces in the top of the holes through the equalizers are slightly crowned longitudinally to provide in effect a one-point bearing between the equalizer and the gib and thus permit the equalizer freely to adapt itself to any position the middle axle may assume in service. The journal boxes on the middle axle are of the pedestal type and, in addition to resting on the tops of the boxes, the equalizers are designed to fit between the pedestal flanges on the sides of the boxes.

The bolster is a unit steel casting, which spans the middle axle and rests on four sets of springs, each of which is seated on one of the squalizers. This casting is made up of two transverse members of I-section, on the ends of which are the bolster spring seats. These are tied together by longitudinal members which span the middle axle and are closed with binders below the axle, applied after the truck is assembled. These binders form the longitudinal tension members and also retain the middle axle in case the truck should be lifted. The side bearings are bolted to the top surfaces of the longitudinal members of the casting. The load on the center plate is supported by diagonals of channel section, which join the sides of the opening for the middle axle near the bottom of the longitudinal members. The whole structure is further stiffened by diagonal braces across the top. The outer faces of the four bolster spring seats are provided with flanges between which fit the equalizer support projections on the side frames. The two sides of the truck are thus held in alinement at right angles to the axles.

The Hopper Car

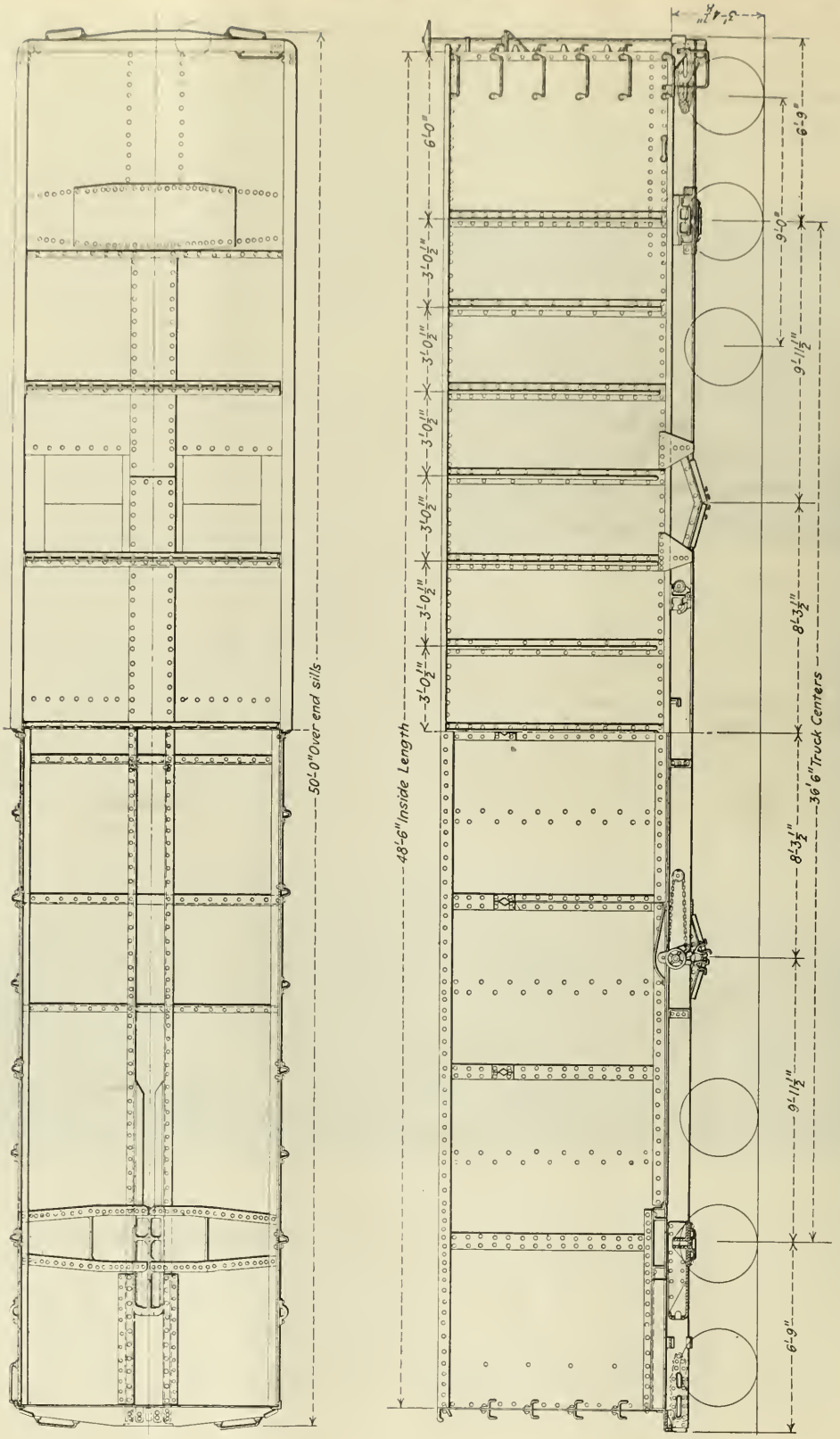
In general, the design of the Class H-26 hopper car is similar to that of the Class H-24, 85-ton hopper cars, a description of which has previously been published.* The design embodies continuous center sills of uniform section, which take the buffing stress, while a considerable portion of the load is carried by the side construction. The center sills are 10-in., 30-lb. channels spaced 12 7/8 in. back to back. From a point 4 ft. 1 in. in front of the bolster, extending back under the end of the ridge sheet in the hopper, a cover plate 3/8 in. thick is riveted to the top flanges of the channels. At the end of this plate the center sills are secured to the ridge sheet by a flanged connection designed to provide for uniform strength. The ridge sheet, which is secured to the center sills between each pair of hoppers at the diaphragm connections and to the bottom flanges of the sills at the center of each hopper, performs the functions of a cover plate throughout the length of the hopper.

The bolster is of the vertical web plate type and is placed above the center sills under the slope floor sheet. It is made up of a 1/4-in. web plate with two 5-in. by 3-in. by 3/8-in. angle flanges both at the top and bottom, the flanges of the upper angles being riveted directly to the slope floor sheet, while the lower ones extend across the car above the center sill cover plate, and at the ends are secured to the bottom members of the side frame. The bolster web plate is stiffened by six 2 1/2-in. by 2 1/2-in. by 1/4-in. vertical angles. The side bearings are carried by castings framed into the center sill channels on either side



The Pennsylvania Six-Wheel Freight Truck

*See the *Railway Mechanical Engineer* for April, 1917, page 191.

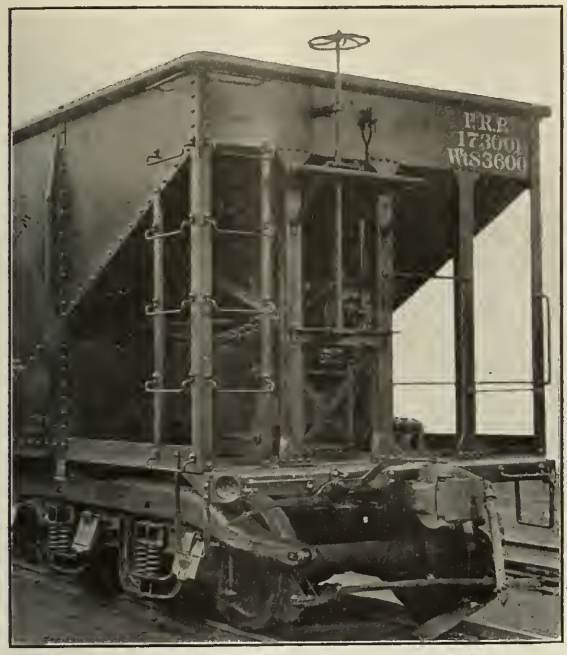


Plan and Elevation of the Pennsylvania 110-Ton Gondola

and tied together by a ½-in. plate tension member extending across the bottom of the center sills. Between the sills is a filler casting which supports the center plate and extends forward to form the rear draft gear stop.

The bottom member of the side frame is a 4-in. by 6-in. by ¾-in. angle, which is continuous from corner post to corner post. The end sills are of pressed steel ⅜ in. thick of Z-section, with the inner flange turned up. The end sills are tapered and have a maximum width at the center of 11⅛ in.

There are four intermediate diaphragms located be-



End View of the Hopper Car

tween the hoppers, which transfer the major portion of the load from the center to the side construction. The diaphragms, like the bolsters, are of the single plate type with ¼-in. web plates, reinforced at the bottom by two 4-in. by 3½-in. by 9/16-in. angles, the vertical flanges of which are broached out at the center sills, while the horizontal flanges are continuous and are riveted to the bottom flanges of the center sills. The top of the web plates terminate between the bottom flanges of diamond section crossties of pressed steel, which extend across the car just above the center sill ridge sheets. Between the top flanges of these crossties are riveted gusset sheets, the tops of which in turn terminate between the bottom flanges of another set of diamond shaped crossties, the center lines of which are located 26 in. below the top of the car.

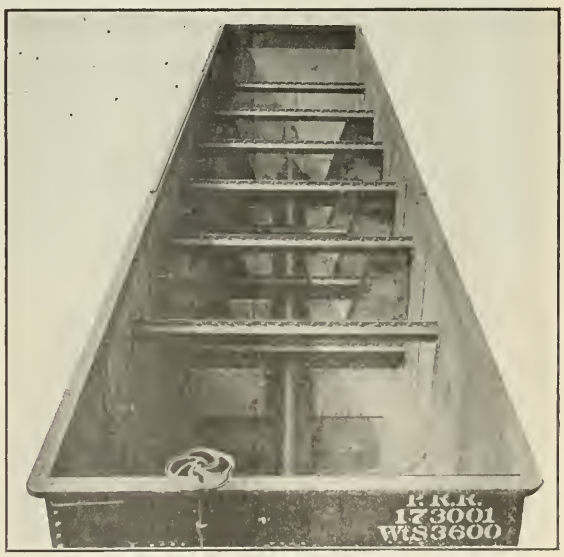
The transverse hopper slope sheets are riveted to the web of the intermediate diaphragms and to the bottom of these sheets are riveted the door hinge castings. The outer sides of the hoppers are formed of slope sheets which are riveted at the top to the sheets of the side construction. To the bottom of each of these sheets, which are flanged down vertically, is riveted a stiffening angle, against which the doors close. The insides of the hopper are formed by a continuation of the ridge sheets, which are riveted for a distance of 11 in. on either side of the center of the hopper to a sheared angle, the horizontal flange of which is riveted to the lower flange of the center sills. The bottom of this sheet is stiffened on the inside by a ¼-in. plate 2½ in. wide, against which the doors close.

The door operating mechanism is a device which is standard on Pennsylvania hopper cars. The doors for each pair of hoppers are operated separately by a shaft extending from the side to the center of the car under the hopper slope sheet, driving by means of a chain connection a toggle link lifting device which is located between the center sills over the center line of the hopper openings.

The side construction is made up of four component parts, consisting of a 5-in., 19.3-lb. bulb angle top member, the 4-in. by 6-in. by ¾-in. angle side sill previously mentioned, 13 pressed steel posts of flanged U-section on each side of the car, and the 3/16-in. side sheets. Alternate posts, together with inside butt strips, form the joint for the adjacent side sheets, these joints being located over the centers of the hoppers, so that the sheets are continuous at the intermediate diaphragms. The end construction is composed of a bulb angle at the top, of the same section as that along the sides of the car, the vertical portion of the ¼-in. hopper end sheet, 3½-in. by 3½-in. by ½-in. angle corner posts and three intermediate vertical ties of pressed steel channel section, riveted to the end sheet at the top and to the vertical flange of the pressed steel end sill at the bottom. The bulb angle at the top of the side construction is reinforced for a distance of 20 ft. at the middle of the car by a piece of 2½ in. by ½ in. section riveted along the top.

The Gondola

The gondola car, which has a rated capacity of 110 tons, while differing in length and necessarily in other

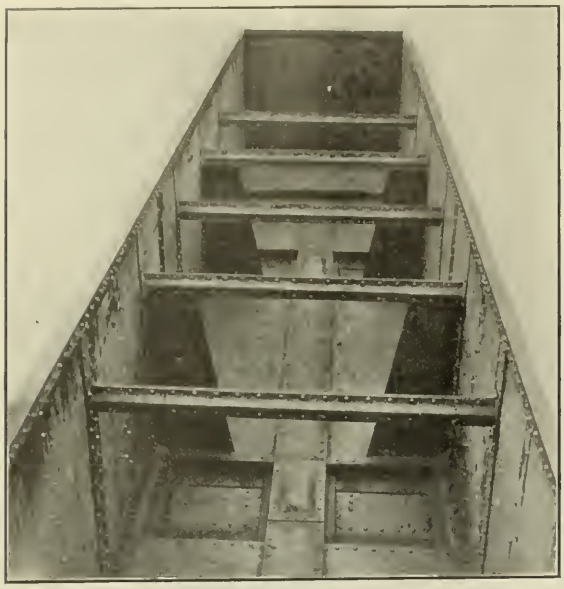


Interior of the Hopper Car

features due to the difference in the type of the car body, follows essentially the same general features of design as the hopper car. Like that of the hopper car, the underframe is built up on center sills of 10-in., 30-lb. channel section and 4-in. by 6-in. by ¾-in. angle side sills. The

same type of pressed steel end sill is also used. The center sill is reinforced by a ⅜-in. top cover plate, which is continuous between the bolsters and is riveted over the floor plates.

In order to keep the interior of the lading space free from obstructions, it was necessary to employ a different type of bolster construction from that incorporated in the hopper car. The bolster is built up of two cast steel arms of wide U-section, one on either side of the center sills. To secure adequate strength the depth of these castings is such that the tops are six inches above the top of the center sill flanges. As shown in the illustrations, the



Interior of the Pennsylvania 110-Ton Gondola Car

floor plates from the inside of the bolsters to the end of the car are raised to pass over the top of the bolster, to avoid pockets at the ends of the car. The two bolster castings are tied together at the top by a ½-in. cover plate 4 ft. 11 in. long, which is placed above the ¼-in. floor sheets. The compression member of the bolsters is completed by the center sill filling casting which, like that in the hopper car, extends forward to form the draft gear back stop and a ½-in. bottom cover plate, extending across under the center sills is riveted to the bottom of the bolster castings.

In the floor of the car are two pairs of hoppers closed by doors and door operating mechanism of the same type employed on the hopper car. The center line of these hoppers is located 8 ft. 3½ in. on either side of the transverse center of the car. Two single plate intermediate diaphragms of ½-in. pressed channel section are located at the inner ends of the hopper openings. These diaphragms are of uniform section, 10 in. deep. To the lower flange of each diaphragm is riveted a ½ in. reinforcing plate which extends across the car under the center sills. Since the bottom of the side sills is at floor level, the outer ends of these diaphragms extend below the side of the car and are secured to the side sills by a gusset plate, the lower end of which is flanged under the diaphragm.

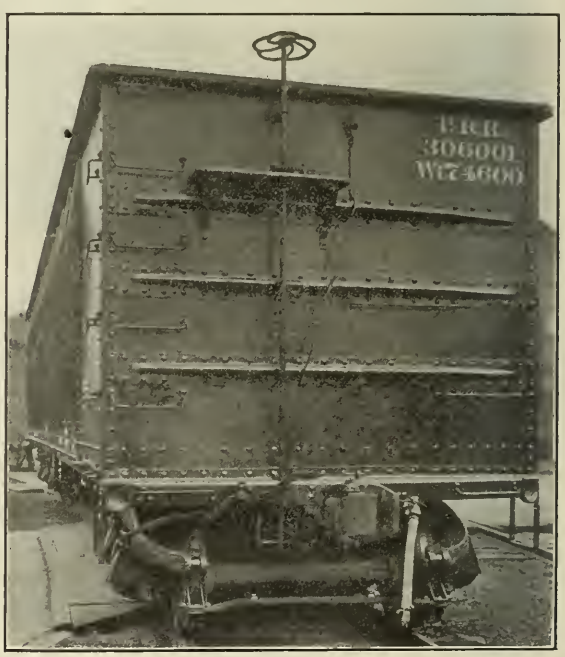
Pressed steel members of similar shape, but of ¼-in. material, are employed to form the outside hopper end sheets and are secured to the side of the car in the same manner as the intermediate diaphragms. The drop door hinge castings are riveted to the inside of the diaphragms. The hopper side sheets are secured to the center sills, on the inside, and to the vertical flange of the side sills, at the sides of the car.

The body design is similar in the type of members employed to that of the hopper car. It is composed of a 4-in. by 6-in. by ⅜-in. side sill at the bottom, a 5-in., 19.3-lb. bulb angle at the top, pressed steel side posts of U-section and the 3/16-in. side sheets.

The side sheets are joined at alternate posts and the joints are covered by butt strips on the inside, riveted through the flanges of the posts. There are five pressed steel crossties of diamond section, which are located 26¾ in. below the top of the car. Gusset sheets are placed over the intermediate diaphragms to which they are riveted through the floor sheets. The tops of these plates are riveted between the lower flanges of two of the crossties, and at the sides they are riveted through the sheets and butt strips to the side posts.

The ends of the car are built up of ¼-in. sheets riveted at the bottom to the flange of the pressed steel end sill, at the corners to the 3½-in. by 3½-in. by ½-in. angle corner posts, and are finished at the top with a bulb angle of the same section as that used on the sides of the car. They are reinforced by three horizontal stiffening members of flanged U-section, similar to the side posts.

The trucks on both cars are fitted with clasp brakes, which are operated by 14-in. by 12-in. brake cylinders.



The End of the Gondola

On the hopper car advantage has been taken of the space under the slope sheet to raise the air brake cylinder so that an easy connection for the hand brake is obtained with a short brake staff. Connection from the cylinder to the foundation gear is made through a system of vertical and horizontal levers located just in front of and below the brake cylinder

Cutler and the Red Cross

Friends of Otis H. Cutler, who is well known among convention attendants because of his connection as a director with a number of important railway supply companies, are pointing with pride to the unique and responsible position which he now holds as acting chairman of the board of governors of the League of Red Cross Societies. While the delegates to the Peace Conference were discussing the final form of the terms of peace to be handed to the German plenipotentiaries, five men, representing the Red Cross Societies of America England, France, Italy and Japan, meeting nearby, affixed their signatures to the articles governing a new league formed to combat disease and human suffering throughout the world. These five men were Henry B. Davison, chairman, representing the American Red Cross; Sir Arthur Stanley of England, Comte de Kergorlay of France, Count Frascars of Italy, and Prof. Ninagawa of Japan.

Undoubtedly the League of Red Cross Societies will be more or less intimately related to the League of Nations. The organization is voluntary, non-political, non-governmental, and non-sectarian. Mr. Davison was elected chairman of the board of governors, the league having been conceived by him and being made possible by the support given to the movement by the American Red Cross. Sir Arthur Stanley, in addressing the board, made this statement: "It would not have been possible to call this League of Red Cross Societies into existence if it had not been for the generosity with which the American Red Cross gave us the money in order to start operations, but it would have been even more impossible to launch this league if it had not been for the splendid enthusiasm and initiative of our first chairman, Mr. Davidson. * * * I believe that the bringing together of the humanitarian interests of every country in the world will go very far toward the establishment of permanent peace and will do much to place the League of Nations on a firm foundation."



Left to Right—Lieutenant-General Sir David Henderson, Director-General of the League; Otis H. Cutler, Acting Chairman of the Board of Governors; Professor Ninagawa, of the Japanese Red Cross; Sir Arthur Stanley, of the British Red Cross; Henry Davison, Chairman of the Board of Governors; Count Frascara, of the Italian Red Cross; Count de Kergorlay, of the French Red Cross; Dr. Stockton Axson, Secretary-General of the League.

Board of Governors and Directing Officers of the League of Red Cross Societies

The objects of the league are: First, to encourage and promote in every country in the world the establishment and development of a duly authorized voluntary, national Red Cross organization, having as purposes the improvement of health, the prevention of disease and the mitigation of suffering throughout the world, and to secure the co-operation of such organizations for these purposes. Second, to promote the welfare of mankind by furnishing a medium for bringing within the reach of all peoples the benefits to be derived from present well-known facts and new contributions to science and medical knowledge and their application. Third, to furnish a medium for co-ordinating relief work in case of great national or international calamities.

It became necessary for Mr. Davison to return to America in the interests of the league immediately after its formation, and Otis H. Cutler was appointed acting chairman of the board of governors to represent Mr. Davison in his absence. This will make it necessary for Mr. Cutler to remain abroad for some weeks. Mr. Cutler has been active in the development of the American Red Cross, and during the war was manager of the Insular and Foreign Division of the American Red Cross. Mr. Davison, in announcing the appointment of Mr. Cutler, spoke in the highest terms of his services during the war and added that but for Mr. Cutler's remaining to represent him at Paris, it would not have been possible for him to leave Europe at this time.

Conventionalities

Among the early arrivals to attend the conventions were Alexander Turner, president Bronze Metal Co.; Horace Parker, president Bradford Draft Gear Company, and Frank H. Clark, president Chambers Valley Company and Elvin Mechanical Stoker Company. They motored down from New York Sunday.

Many of those who have been attending the conventions regularly at Atlantic City will be saddened by the death of Miss Lulu Hubbard Marvel. Miss Marvel died at the home of her brother, Joseph H. Marvel, 1925 Pacific Avenue, Atlantic City, on March 27 last. She had been ill eighteen months. She was an expert stenographer and usually was in charge of the official stenographic forces at the conventions held at Atlantic City.

Cuba has commenced to subscribe her quota of the convention attendants in the arrival of probably one of the best-known railroaders on the Island, Juan Henderson, general inspector of locomotives of the United Railways of Havana, who is stopping in Philadelphia until the arrival of some of his compañeros. Juan reflects the spirit of the modern Latin-American's quest of knowledge in his statement that a few months' leave of absence granted by his company will be spent in the U. S. A. studying American railroad practice and the English language.

The dean of Superintendents of Motive Power, W. H. Lewis, of Norfolk & Western fame—a westerner originally—received a refreshing breath of western air when he met at the convention, his old protege, Dan Cunningham, whom he raised, now assistant superintendent of motive power of the Denver & Rio Grande. Mr. Lewis says he is proud of the job—probably referring to Mr. Cunningham. Mr. Lewis retired from active service on the Norfolk & Western since the conventions were last held in Atlantic City, but he arrived early this year, looking as happy and hearty as ever.

The excellent work of E. Hoover Bankard, Jr., Chairman of the Entertainment Committee, in planning and arranging the entertainment features for this year's gathering, is deserving of more than passing notice. In many ways the conditions this year have been quite unusual and difficult of meeting. During the late winter months Mr. Bankard devoted considerable time to the affairs of the Entertainment Committee, and later on he found it necessary to be ""on the job" in Atlantic City" a week or more before the arrival of the convention people.

Has anybody been attending these conventions longer than 37 years? If not, Frank W. Edmunds, general eastern sales manager of the Schroeder Headlight and Generator Company, New York, holds the long-distance record. He and Mrs. Edmunds came in from New York yesterday and will stay throughout this convention and the railway signal convention, which is held in Atlantic City on the 26th and 27th. This is Mrs. Edmunds' first mechanical convention, although at the signal convention she is one of the advance guard and is affectionately known as "Mother" to almost the entire attendance.

Have you noticed that each year there are more and more "farmers" among us? No, not "farmers," but rather, as applied specifically to railway and supply men, agriculturists. Of course, you know the difference between a farmer and an agriculturist, the former making his money in the country and spending it in the city and the latter making his money in the city and spending it in the country. Many of our people are taking their troubles to the country and communing with nature. The latest addition to the ranks is "Farmer" Charlie Jenks, of Cleveland, who has acquired a farm just outside the limits of his home city. In business life he is Charles D. Jenks, president of the Damascus Brake Beam Company. Mrs. Jenks accompanied her husband to Atlantic City this year.

The Joliet Railway Supply Company business family is indeed well represented at the convention this year. It consists of Mr. and Mrs. Frederick L. Sivyer and Miss Sivyer, Mr. and Mrs. J. H. Slawson and daughter, Mr. and Mrs. Charles A. Carscadin, Mr. and Mrs. R. W. Burnett and Mr. and Mrs. J. E. Simons. This, by the way, is Mr. Simons's twenty-sixth M. C. B. and M. M. Convention without a miss. The party is quartered at the Traymore, with the exception of the Carscadins, who are stopping at the Marlborough-Blenheim. Mr. Sivyer is president of the Joliet Railway Supply Company, Sivyer Steel Casting Company, North Western Malleable Iron Company and a stockholder in the Chain Belt Company and the Natural Car Equipment Company.

Mr. and Mrs. R. H. Weatherly, who motored down from New York on Monday to attend he convention, were accompanied here by Mrs. Weatherly's sister, Mrs. George E. Alt, also of New York City. Mrs. Alt was made a widow by the war. Her husband was of English birth, and came to this country when he was quite a young man. They were living on a large estate near Charlottesville, Va., when the war began in Europe in 1914. Mr. Alt was a loyal Britisher, and as soon as hostilities commenced he sailed for England, entered the British army and became a captain. He was killed while participating in the heavy fighting about Ypres in the spring of 1915. Captain Alt's father was a business man in his later life, but was formerly a colonel in the British army, so the Captain came of a family which had a military tradition which he well maintained. Mrs. Alt returned to New York Tuesday Evening.

Major E. A. Simmons, president of the Simmons-Boardman Publishing Company, publishers of the *Railway Age*, and Mrs. Simmons, expected to be here throughout the convention, but have not arrived yet. Major Simmons, accompanied by his wife and their little daughter, went to Europe, early in April, to open a new European office for this company in London. They expected to be back before this, but the sailing dates of the steamship Caronia, on which they were to have come, was changed. They are now expected to arrive on the Aquitania late this week or early next week. They were accompanied to Europe by Robert E. Thayer, until recently Mechanical Department Editor of the *Railway Age*, and managing editor of the Railway Mechanical Engineer, who has gone abroad to remain as European editor of the *Railway Age* and the other Simmons-Boardman publications. Mr. Thayer will make his home and headquarters in London. During the war, Major Simmons was in the Emergency Construction Division of the Quartermaster's Department of the United States Army, but secured his discharge just before going to Europe, and is now back in civilian life. He and Mrs. Simmons will come down to the convention if they get back in time.

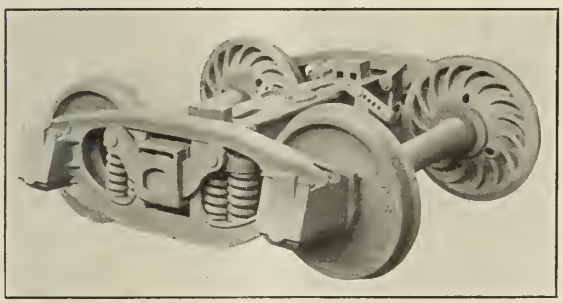
New Devices Among the Exhibits

Truck For Cars of 70 Ton Capacity

THIS TRUCK WAS PRODUCED by the Bettendorf Company, Bettendorf, Iowa, to meet the growing demand for cars of greater carrying capacity than those having trucks with 5½-in. by 10-in. journals and is structurally different from the present type of trucks. It is constructed for cars of 70 tons capacity using axles with 6-in. by 11-in. journals, and although the capacity of the truck is limited only by the size of the axles, the heights are no greater and might even be less than those of the ordinary trucks of lesser capacity.

Especial attention has been given to the design of the springs and because of the heavier spring steel required to sustain the load, with a consequent lesser deflection per coil, a greater length was necessary than heretofore employed. The method of bolster suspension not only permits the application of longer springs, but allows a greater depth of bolster ends as well. It also applies the load on the side frames near the journal boxes instead of at the center of the frames, thereby greatly reducing the stresses in the side frames.

The manner of guiding the bolster is another feature worthy of note and is accomplished by providing slots in the ends of the bolster both forward and behind the columns, through which the carrier bars pass and rest on the trunions of the spring caps, thereby forming the



Truck for 70-Ton Capacity Car

support for the bolster and locking the side frames securely into position. These equalizer or carrier bars passing through the bolster at a point on a level with the journal bearings deliver all side thrust to the frames without any tendency to tilt the side frames, thereby eliminating the necessity for a spring plank.

As above stated the springs are located away from the center of the side frame; this construction produces stresses at the points of load application that give a factor of safety of from 45 to 50 per cent greater than if the load were applied at the center of the side frame as is the case with the usual truck construction.

The bolster ends may be made 12 in. or even more in depth without increasing the height of the trucks over present construction, with the consequent increase in strength due to the greater depth.

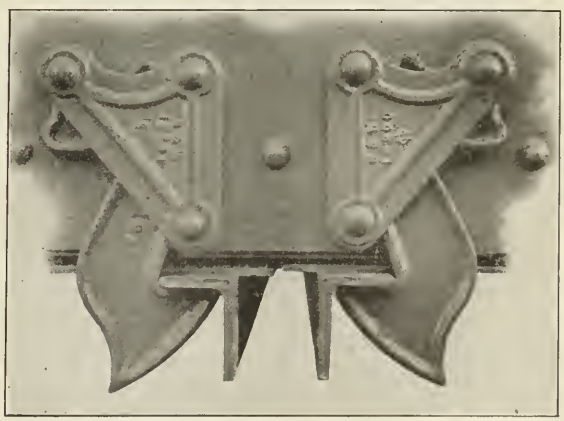
The absence of the spring plank and also of all bolts, nuts and rivets, together with the reduction in number of parts, is worthy of note, as well as the fact that even with springs of unusual length and bolster ends of great depth, the height overall is not increased, nor the clearance above the rail encroached upon.

In designing this truck care has been taken to provide for the necessary flexibility and strength. It may be dismantled or assembled quite as readily as any other type. The truck is of unusually neat appearance with great strength, light weight, easy riding qualities, more clearance above the rail and lesser total height than usual.

Other products displayed by the Bettendorf Company comprise a comparison between the United States Railroad Administration type of truck side frame and the regular Bettendorf type, and a new type of Bettendorf frame of *U*-cross section, all interchangeable with each other. Two samples of each are on display, one of each with comparative parts in position mounted on automatic weighing scales to show the differences in weights, and one of each after having been subjected to test loads showing comparative strengths.

Drop Door Mechanism

A DROP DOOR LATCH and lock of simple and effective design is exhibited by the Wine Railway Appliance Company, Toledo, Ohio. It may be applied to bottom doors; all the parts are on the outside and are bottom doors; all the parts are on the utside and are easily accessible for operation or for repairs. The latch is in the form of a hook secured to the car at each side, which engages an angle iron forming the door stiffener and projecting beyond the side sheets. The locking device consists of a dog secured to the side of the car, which falls in the locking position when the latch is closed. No winding shaft is used, the doors being raised



Hopper Doors Closed and the Device in Locked Position

by hand, the latch and lock falling into place by gravity. The door may be opened easily by disengaging the latch, which can be done easily and quickly. A saving in weight of from 200 lb. to 2,000 lb. is said to be effected

by the use of this device, dependent on the design of the old mechanism and the number of doors in the car.

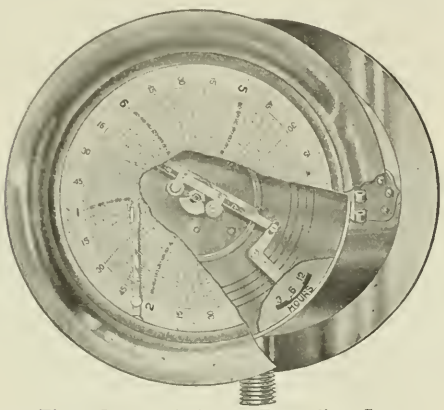
Air Pressure Gages and Testers

The exhibit of the Ashton Valve Company, Boston, Mass., contains several new features. A protected dial air pressure gage has been devised for use in conjunction with the ordinary rear end train brake cock, or for use by air brake inspectors. The dial and the glass



Protected Dial Gage

are set considerably below the surface of the gage rim and are protected by three bars secured to the rim and at the center of the gage. These bars protect the gage from injury by coming in contact with any of the small projections on the railings of cars and they may be struck

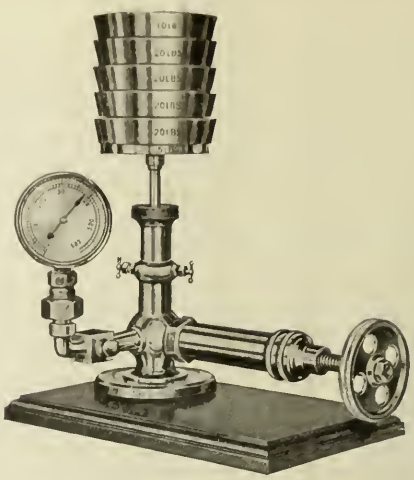


Three-Speed Air Brake Recording Gage

with sufficient force to bend the bars without damage to the glass.

The three-speed air brake recording gage is designed for the use of air brake inspectors in making tests or for recording the operation of air brakes, as may be desired. It consists of a rotating chart and a capillary glass pen with a platinum tube point, operated by a high grade clock movement. A specially designed tube eliminates excessive vibration and the pen may be refilled or cleaned without being taken apart or detached from the gage. This gage is especially adapted for use where a variable speed is desired for the chart.

An improved dead weight pressure gage tester has an adjustable double area piston, which permits both high and low pressure testing up to a maximum of 1,000 lb. pressure with only one-quarter of the usual number



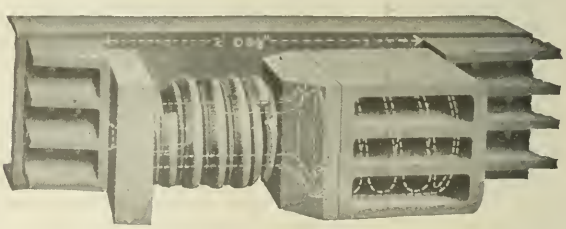
Double Area Pressure Gage Tester

of weights. Two small valves placed on opposite sides of the vertical cylinder provide means of adjustment from the double area piston for low pressure work to the single area piston for high pressure work. These valves may be operated as desired, while the tester is in use, and without removing any of the parts. This machine is said to be equal in accuracy to a mercury column and much more convenient to use.

Interchange Casting for Spring Draft Gear

A special draft casting designed by George L. Harvey for the Frost Railway Supply Company, Detroit, Mich., is on exhibition. The purpose of this casting is to fill the space of 2 ft. 5/8 in. by 12 7/8 in. specified by the United States Railroad Administration for the new standard freight cars, and at the same time permit the use of the Harvey friction spring gear together with one standard M. C. B. spring.

The arrangement consists of a rectangular casting enclosing any desired capacity of the standard M. C. B. springs, with a follower plate having a circular opening



Harvey Spring Draft Gear with the Interchange Casting

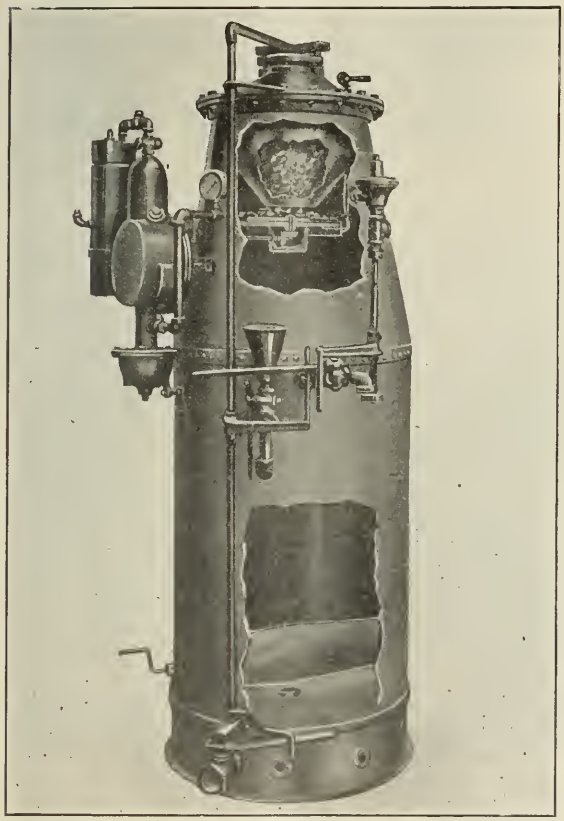
through which protrudes a hollow bar or arm. The back end of this bar is enlarged and is in contact with the M. C. B. spring; at the front end it bears against and is supported at the front follower plate by a suitable pin and bulb and carries the Harvey friction spring. Under

a buffing stress the force of the blow is transmitted through the front follower and the bar to the M. C. B. spring and as they travel backward the Harvey friction spring gear comes into action between the follower plates.

This casting is not sold by the Frost Railway Supply Company, but was designed for them by Mr. Harvey to permit the application of the friction spring draft gear; it may be used by the railroads without charge or royalty.

The Airco Acetylene Generator

An acetylene generator of the carbide to water type is exhibited by the Air Reduction Sales Company, New York. The generation of the acetylene is regulated by means of a water motor which is operated by the gas passing through it to the service pipe. This type of feed gives an even distribution of carbide over the entire surface of the water in the generating chamber and prevents overheating of the water, thus producing cool gas of a high quality. Carbide 1¼ in. by ⅜ in.



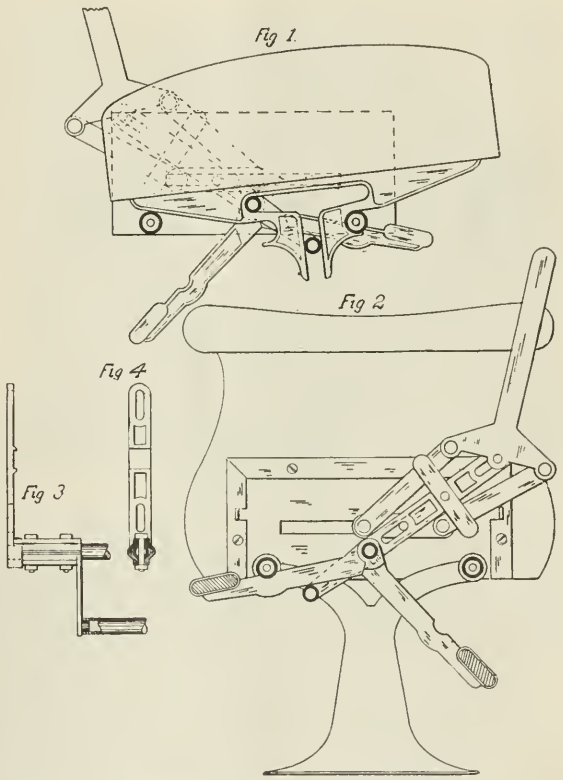
The Airco Generator Complete

is used and gives a maximum gas yield with low even generation without material pressure fluctuation.

The acetylene is generated only when gas passes through the motor and any derangement of the feeding mechanism or leaks in the generator automatically prevent further feeding of the carbide, thus providing unusual safety of operation. The carbide is fed into the water only as gas is used, making it impossible to build up excessive pressure. This gives a uniform pressure in the service line at all times. Interlocking safety devices insure safe operation and there are no springs, clock work, weights or other intricate mechanism to get out of order.

Scarritt Simplex Coach Seat

An improvement in the pull-over type of coach seat is exhibited by the Southern Railway Supply and Equipment Company, St. Louis, Mo., who are the general sales agents of the makers, the Scarritt Car Seat and Manufacturing Company. The distinctive fea-



Details of the Simplex Coach Seat

tures of the Simplex pull-over mechanism are the short reversing levers which eliminate lateral motion and the center righting lever which moves the base or fulcrum, to which the reversing levers are attached, from side to side. The details of construction are shown in the illustration.

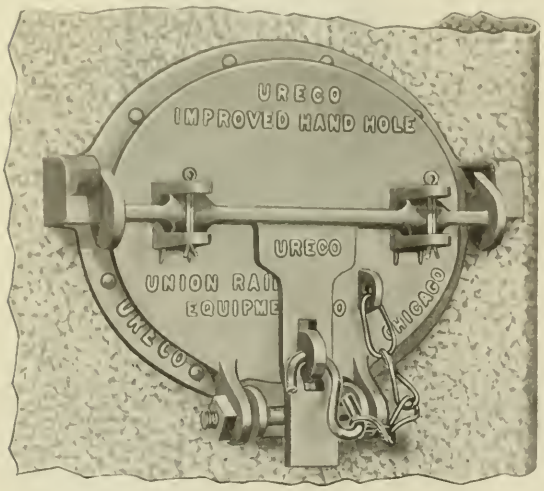
Fig. 1 shows a cross section with the seat carrier and foot rest in position; Fig. 2 the aisle end, inside, reversing lever with sliding base and the hinged foot rest; Figs. 3 and 4 show the center lever and method of attaching, and the righting and foot rest lever tri-bar. Any of the parts may be easily detached for repairs.

The wall and aisle plates are connected by two steel tubes. The pull-over mechanism is attached to steel rods passing through these tubes, while the pedestal is attached to the tubes and is adjustable so that it may be securely bolted to the floor girder. The head roll is smooth on top and the tilt of the seat is comfortable. The seat cushions are constructed of Scarritt double

springs with spring edge all around, and a muslin inner cover with genuine black curled hair. All of the metal parts are of malleable iron or steel.

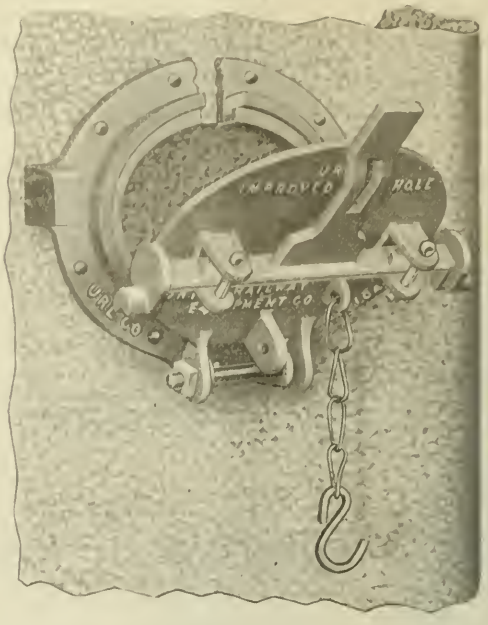
Refrigerator Car Specialties

A BRINE TANK HANDHOLE which can be quickly opened without mutilation of the gasket, with consequent leakage of brine on the car floor, is shown in the illustration. It is designed to avoid any possible leakage when the tanks are filled with brine and for convenience in exposing the opening in the tank when it is desired to clean the tank. The operation of the Ureco



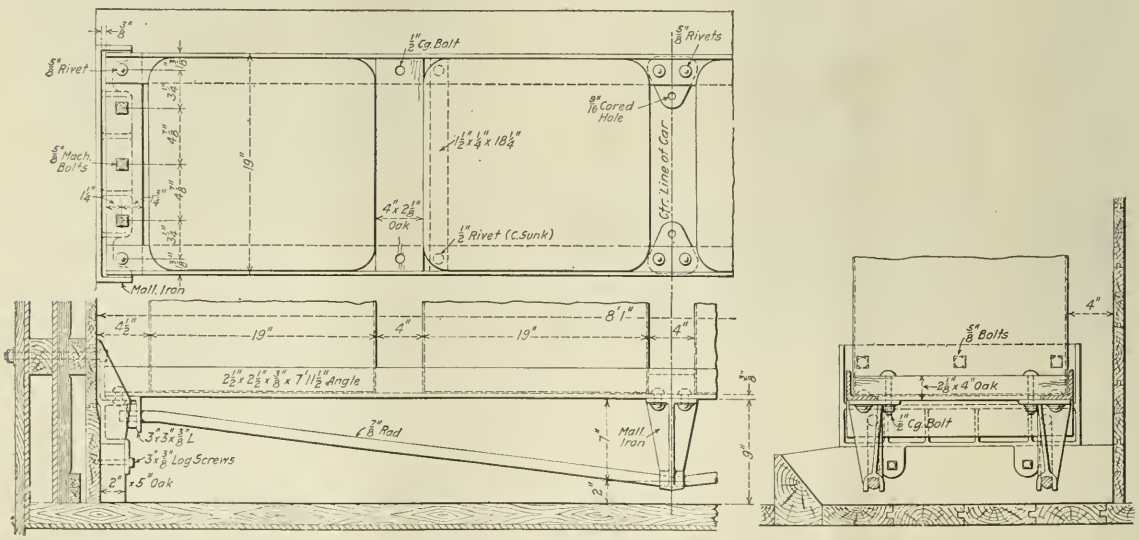
Hand Hole Cover Closed

handhole, as it is called, requires only that the hook be removed from the lug holding the lever, after which the lever is raised up, which disengages the lugs on the end of the bar and allows the cover to drop down, the operation requiring but a moment's time. To close the handhole the cover is raised, the lugs on the crossbar engaging in the brackets at the sides, and the handle is pushed down, compressing the cover against a rubber gasket, which makes the device leak proof. The handhole is made of malleable iron, fully galvanized.



Hand Hole Cover Open

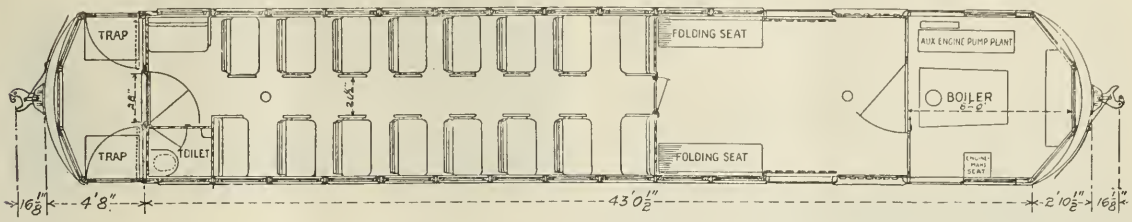
The tank supports illustrated in the drawing are designed for convenience in removing brine tanks when necessary, and eliminating all bearing of metal in the drip pan beneath the tanks. Heavy expense has been experienced in maintaining the drip pans because of the corrosion resulting from metal supports for the tanks resting on the pan. The Ureco support is formed with a truss arrangement which has ample carrying capacity for the tanks when loaded with ice and avoids any bearing points on the pans. The refrigerator car specialties described are the products of the Union Railway Equipment Company, Chicago.



Ureco Brine Tank Support

An Oil-Burning, Steam-Propelled Unit Railway Car

The Unit Railway Car Company, Boston, Mass., has on exhibition the Unit car, which is steam-propelled with direct drive on the front axle of the forward truck, which also carries the engine or motor. This car is of all-steel construction and is designed for single end operation. It is arranged with a boiler room and baggage and passenger compartments.



Floor Plan of the Unit Railway Car

The superstructure is of the side girder type, having side posts of twin T-iron, with a wood filler, extending from the sills to the top plates and securely riveted to the sills, steel side sheathing, belt rail and top plates. The roof is of the plain arch or "turtleback" type on steel carlines and ash furring. It is built up of ½-in. narrow tongued and grooved poplar and covered with No. 8 cotton duck, well stretched and with an application of white lead under and on top of the canvas. The baggage compartment side doors are of the single sliding type and single swing doors give entrance from the baggage compartment and from the vestibule to the passenger compartment. The side windows are fitted with single two-part sash, arranged so that the lower part may be raised, and the end windows have single sash arranged to lower inside the sheathing. The vestibule has platform trap doors over the steps at each side and side doors which swing back against the car body, providing ample room for entrance to the passenger compartment.

The passenger compartment has Agasote headlining, Agasote side lining down to the heater pipes and Transite board behind the heater, all secured to the car body with suitable battens and molding. The baggage compartment and the inside of the boiler room partition are lined with sheet steel.

The flooring is of yellow pine laid double, with paper insulation between the two layers and securely fastened to yellow pine nailing strips which are bolted to the underframe. In the boiler room the floor is covered with No. 16 gage sheet steel.

Ample ventilation is provided by modern ventilators in the roof of the car. The seats are of the high back, head roll type. There are 17 seats in the passenger compartment, seating 34 passengers, 13 of the cross seats being reversible and three cross seats and one longitud-



The Fully Equipped Unit Railway Car

GENERAL DIMENSIONS

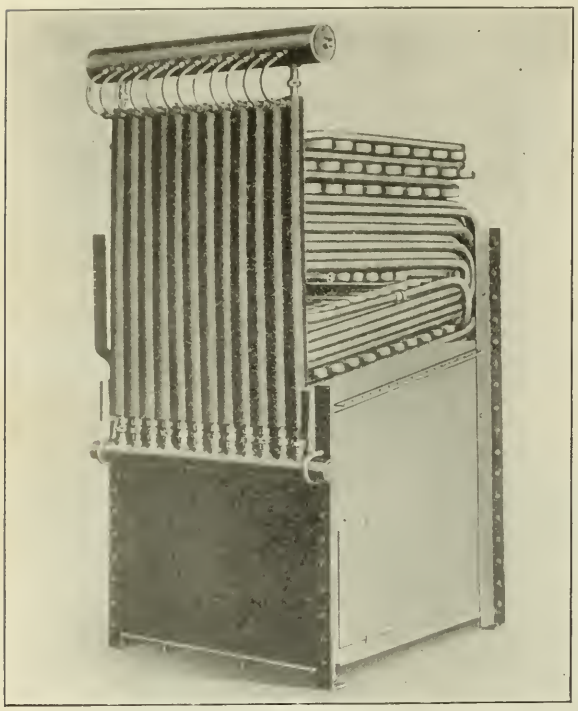
Length over bumper	50 ft. 7 in.	Truck centers	28 ft. 0 in.
Length over dasher	49 ft. 7 in.	Height from rail to center of draw-bar	2 ft. 10½ in.
Length of main passenger compartment	24 ft. 4 in.	Height from rail to bottom of side sill	3 ft. 2¾ in.
Length of platform	4 ft. 8 in.	Height from rail to top of roof	11 ft. 11½ in.
Length of boiler compartment	8 ft. 0 in.	Height from rail to top of radiator	14 ft. 6 in.
Length of baggage compartment	12 ft. 0 in.	Height of rear entrance door opening	6 ft. 6 in.
Center to center of side posts	2 ft. 8 in.	Seating capacity of passenger compartment	34
Width over side sheathing	8 ft. 6 in.	Seating capacity of baggage compartment	8
Width of aisle	1 ft. 9½ in.	Total seating capacity	42
Length of cross seats	3 ft. 2 in.		

inal seat being stationary. There are also two folding seats in the baggage compartment, each seating four persons.

The underframe is of all steel construction, having side sills of rolled steel plate, bumpers of six-inch rolled steel channels and pressed steel bolster of M. C. B. design. The entire underframe is strongly braced with angles and gusset plates.

Sectional Water Tube Boiler

The boiler consists of water tubes, a superheater and an economizer. Each section of the boiler consists of a vertical header into which U-shaped Shelby cold drawn seamless steel tubes are welded. The header of these sections is connected to a steam drum at the top by seamless tubing bent to a parabolic form and connected to the steam drum by a special stub end connection. The lower end of the vertical header connects with a mud



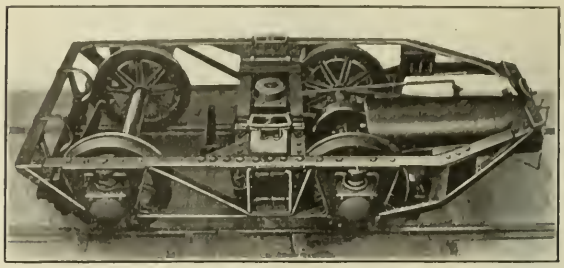
Sectional Water Tube Boiler

drum of 2¾-in. steel tubing, the connection being made by a special ¾-in. Monel metal union. This construction permits the removal of any of the sections for repairs and the boiler may be continued in use by plugging the holes until repairs are made and the section replaced. Each section of the boiler contains 22.2 sq. ft. of heating surface. A stay rod made from cold drawn steel tubing passes through the center of the steam drum and serves as a dry pipe from which the steam may pass from either end to the superheater.

The superheater is constructed of 1¼-in. outside diameter, 13-gage seamless tubing and is placed within the loop formed by the U-shaped boiler tubes. It contains 63.8 sq. ft. of heating surface and superheats the steam to a temperature of 650 deg. F. It can also be removed easily for inspection or repairs.

The economizer is constructed in a manner similar to that of the superheater and is placed directly above the U-shaped boiler tubes. It contains 90 sq. ft. of heating surface.

The firebox or combustion chamber is directly below the boiler tubes and is constructed of hot rolled No. 16 gage sheet steel, riveted to the angle irons supporting the boiler. The combustion chamber is lined with firebrick, covered with a wash of high temperature cement, and covered on the outside with insulating material 2½



Front Truck with the Engine Installed

in. thick. This insulating material is extended over the tubes in varying thicknesses and the entire boiler and combustion chamber is enclosed in a jacket of hot rolled No. 16 gage sheet steel. A special combustion tile is inserted in the front wall at the bottom of the chamber, through which the air and the atomized fuel enters. The fuel oil is atomized by a special atomizer and mixer and is maintained at an incandescent temperature by a pilot burner, thus giving a constant and efficient supply of steam under all normal conditions. Either crude or refined oils may be used as fuel.

The construction of this boiler insures the rapid gen-



Interior of the Passenger Compartment

eration of steam and a steam pressure of approximately 700 lb. may be obtained in from 10 to 20 minutes, depending on the atmospheric conditions.

The Engine

A double cylinder engine with valves of the balanced piston type is mounted on the front truck and is direct connected to the forward axle. The cylinders are of cast iron with cast steel cylinder heads and are accurately bored and finished. The piston rods are integral with the crosshead and are of drop forged steel. The cylinders

are lagged and jacketed to prevent condensation as much as possible. The crank shaft is of chrome nickel steel and runs in roller bearings. The valve gear is of the Stephenson link type and the control is automatic except at starting and stopping, when it is controlled by the throttle valve, and in the reverse which is accomplished by the Stephenson link motion. The entire engine is enclosed in an axle housing and sheet metal jacket. The drive gear runs in oil, which is thrown by the gear to all parts of the gear case, insuring thorough lubrication to all the running parts. A radiator conforming to the shape of the arch is installed on the roof of the car. This engine develops 60 hp. under normal conditions but in an emergency this may be materially increased.

The trucks are of the modified arch bar type with swing bolsters, double coil springs over the journal boxes, bolsters of 7/16-in. pressed steel plate with malleable iron spring seats and pressed steel end stops and side wear plates. The front or driver truck has a wheel base of 6 ft. 1 in. and the trailer truck has a wheel base of 5 ft. 6 in. The wheels have malleable iron centers with steel tires, 34 in. in diameter, and of M. C. B. contour. The bolster of the driving truck is off center 25 in. toward the driven axle, thus making about two-thirds of the entire weight of the car effective for traction.

The lighting system was installed by the U. S. Light & Heat Corporation, the current being supplied by a small direct-current generator driven by an auxiliary engine located in the boiler room and in the forward part of the car. Storage batteries are provided and are carried under the car in a suitable wood and steel box. The passenger compartment is lighted by Mazda lamps with Holophane reflectors located over the center aisle, and the vestibule with similar lamps located over the side steps. The headlight is equipped with a 250-watt Goldenglow lamp. The car is heated by the exhaust steam from the auxiliary engine, which passes through a system of piping extending along the sides of the car, the steam rising from the pipe coil to a condenser located on the roof of the car. The condensation flows from the condenser to a tank located under the car from which it is again pumped to the boiler for use in generating steam.

The car is equipped with an air compressor driven by the auxiliary engine and the Westinghouse A. M. M. air brake equipment. A high power drop-handle geared hand brake is also provided. The brake rigging, couplers and other parts of the equipment conform to M. C. B. standards. This car was in successful operation for several months, but was withdrawn from service for the purpose of installing an improved boiler and engine and placing it on exhibition at this convention.

Air Brake Cylinder Packing Set

An air brake cylinder packing set designed to overcome the objectionable features of a leather packing has been developed by the H. W. Johns-Manville Company, New York, and is part of its exhibit.

This packing set consists of an asbestos packing cup with a spring steel expander ring. The packing cup conforms to the bore of the cylinder and being constructed of layers of impregnated asbestos it is proof against heat, pressure and condensate and does not become porous. These advantages are of great importance as the brake cylinders are usually so located that the packing is subjected to intense heat, which rapidly dries out leather packing, leaving it in a porous and consequently a leaky condition.

The expander ring is formed of flat cold rolled spring steel, with one edge rolled over a spring steel wire expander, and gives a flat contact surface of one-half inch. This ring is placed inside of the asbestor packing cup which it holds in close contact with the cylinder for the full width of the ring. The ring is a marked improvement over the old style round ring expander, as it gives a flat contact against the packing and the cylinder wall



Packing Cup and Expander Ring

of about four times that of a round ring and practically eliminates air leakage.

This packing set was applied on the United States Railroad Administration standard cars and locomotives and has been made standard on a number of railroads for locomotive tenders and water scoop air cylinders.

Creco Reversible Chair Casting

The Chicago Railway Equipment Company, Chicago, is showing a new reversible Creco four-point support chair casting. This casting may be applied to either side of the brake beam strut, thus eliminating the use of a right and left hand casting, and is of particular value when the four-point support is being applied to old equipment.

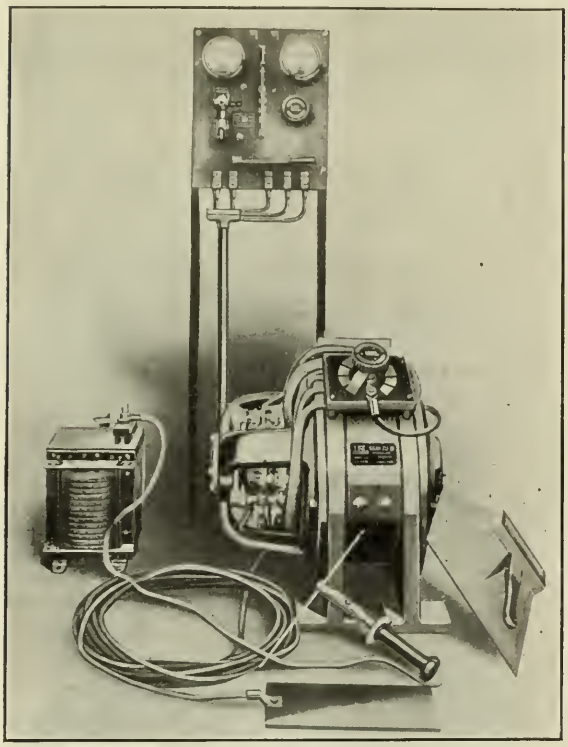


Reversible Chair Casting for Creco Four-Point Support

The Creco four-point support and safety device is adaptable to practically every type of truck and modern brake beam, and this design of chair casting greatly simplifies the application of the four-point device to the varied designs of trucks and brake rigging.

Portable and Stationary Electric Arc Welders

The U. S. Light and Heat Corporation, Niagara Falls, N. Y., has developed two electric arc welding machines, either of which may be used as portable or stationary equipment. These machines have been designed particularly to meet the requirements of railroad work. For shops where it is practicable to bring the parts to be welded to within 50 or 75 ft. of the welding apparatus, the welding machines with their auxiliary equipment are made up for stationary mounting on floors or platforms. The same machine, mounted on a truck, and equipped with more compact auxiliary apparatus provides a portable welding outfit which may be taken



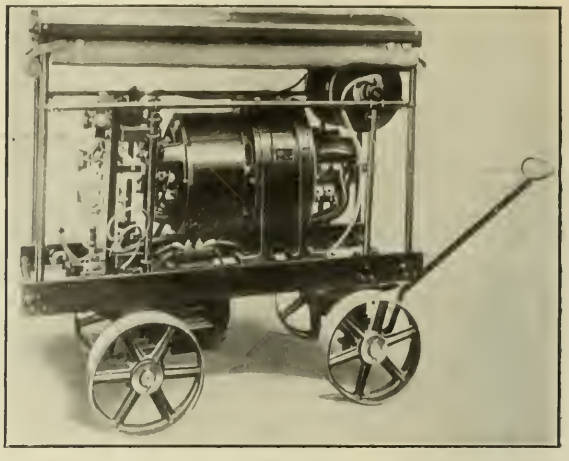
Converter Type Welder for Stationary Mounting

directly to the work, whether it be in the shop or yard. With a rated capacity of 4 kw. the machines give 200 amperes direct current, or less, with an arc voltage of 17 to 22 volts and an open circuit voltage of from 35 to 65 volts.

For use on 100 to 125 volt d. c. circuit the machine is made in the form of a convertor. The convertor weighs 665 lb., and delivers current at the arc through the stabilizing reactor with an efficiency of from 65 to 70 per cent.

On all other kinds of electric supply circuits, the welding machine is made in the form of a motor generator. This machine consists of a 7½ hp. alternating current or direct current motor with a 4 kw. welding generator. The generator is inherently regulated, compound wound, self excited and has a drooping voltage characteristic. It is claimed that both the generator and the convertor produce an arc particularly suited to arc welding.

For portable use, either machine is mounted on a truck, and equipped with a panel, reactor, cover and cable reel.



Motor-Generator Type Welder Mounted on Truck for Portable Service

The truck is 28 in. wide, 55 in. high, over all, 54 in. long and weighs, with complete equipment, about 1500 lb.

Cincinnati Rivet Head Catcher

An attachment to the Cincinnati rivet cutting gun, for the purpose of catching the rivet head as it is cut off, thus eliminating the possibility of flying rivet heads injuring persons nearby, is shown by the Rivet Cutting Gun Company, Cincinnati, Ohio.



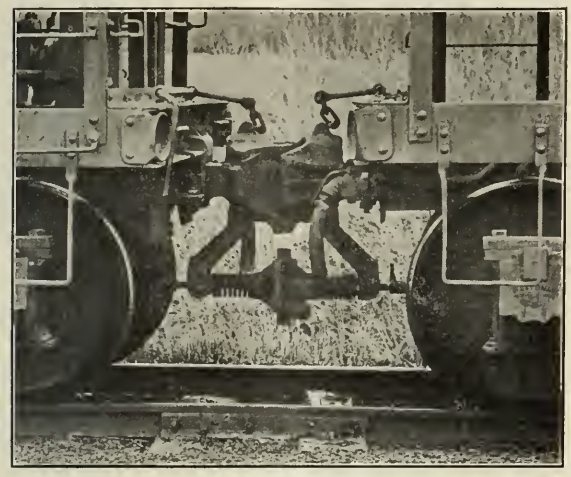
Rivet Catcher in Use and (in the insert) the Pocket Exposed

This device is simple, is easily applied to the cutting gun and is inexpensive and effective. The catcher consists of a metal receptacle which slips over the end of the cutting bar and has a pocket fitting over the rivet head, and into which it falls when it is cut off. The use of this

rivet head catcher makes it unnecessary for workmen in the vicinity of a rivet cutting operation to guard against flying rivet heads and consequently enables them to give closer attention to the particular work in which they may be engaged.

American Automatic Hose Connector

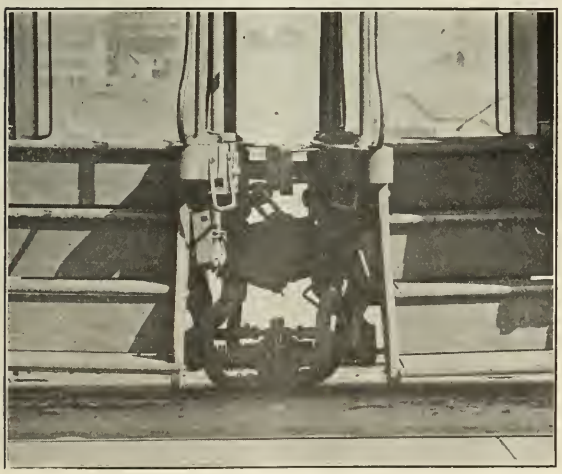
An automatic device for connecting air and steam hose between cars has been developed and is exhibited at the booth of the American Automatic Connector Company, Cleveland, Ohio. This connector is



Air Line Connector on Freight Equipment

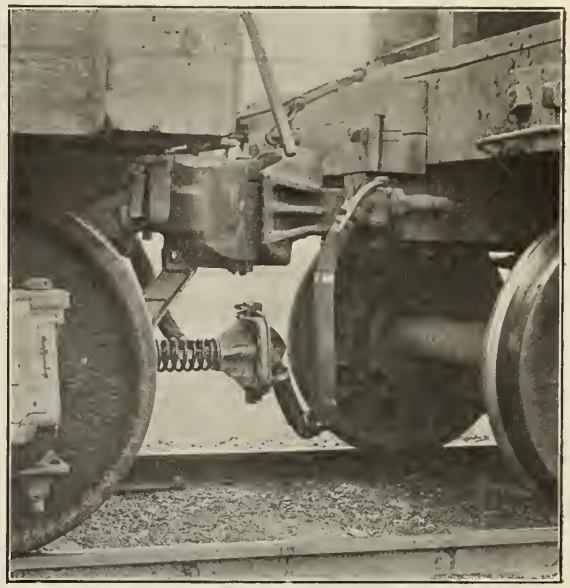
of the butt face type with an inclined guide at one side and a recess or opening at the other, the guide being hollowed out on one side.

The air brake port is located in the center, the signal line



Air, Steam and Signal Connector for Passenger Equipment

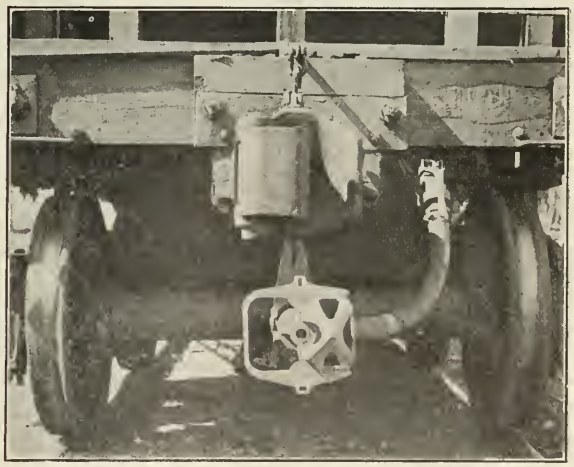
3½ in. above and the steam line 4 in. below the center in the vertical center line of the connector face. The bottom end of the connector bracket and the back of the spring seat form a universal joint which permits vertical and lateral movement of the device on curves or under bad track conditions. The connectors when coupled are kept in close contact by a compression spring having a resistance of 900 lb., which, with the gaskets at each of



Connector With Interchange Attachment

the ports of the connector insures a constant contact and a safe hose connection. The gathering range or scope of the device in the coupling operation is 7½ in. vertically and 7 in. horizontally, and it will couple on high and low cars with equal facility, the bearing face when coupled being 12 in. by 11 in.

The connector consists of six parts, five malleable iron castings and one steel spring, and weighs 50 lbs. It is attached to a lug cast or welded to the car coupling with two bolts and can be attached or removed by one man in



Face of Connector With Air Line Port for Freight Equipment

a few minutes. An interchange attachment is provided for use where some cars in the train are not equipped with the automatic connectors, and it can be quickly attached to the device by means of a lug and a pin inserted through slots at the top and bottom of the con-

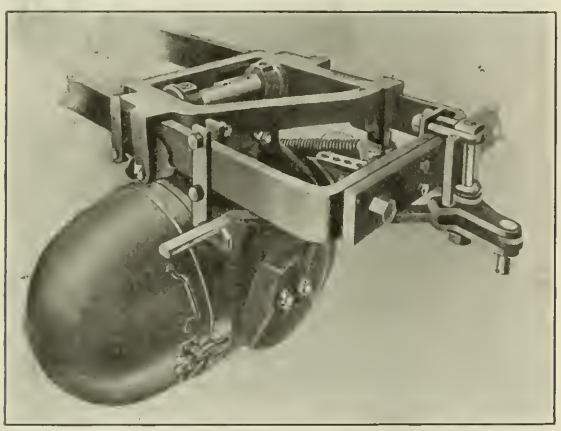
nector face on the vertical center line. The lowest point of the connector when coupled or uncoupled is 12 in. above the top of the rail.

This connector has been in service on the Temiscouata Railway, Province of Quebec, Canada, on a passenger train and has traveled 200,000 miles with excellent results. The Copper Range Railroad has also applied these connectors to eight locomotives, 18 passenger cars and 100 ore cars of 40 to 50 tons capacity having both friction and spring types of draft gear. Under severe weather and road conditions and on tracks having maximum curves of 19 deg. and 3.8 per cent grades, the connectors are reported to have proved very efficient and are especially adapted to service requiring frequent coupling and uncoupling.

Car Lighting Equipment

The Electric Storage Battery Company, Philadelphia, Pa., has introduced into the car lighting field a new type of battery jar and cover and a new type of belt tightening device for its body-hung generators.

The battery tank consists of a compound rubber jar with a double flanged alloy cover. It has been designed to eliminate the troubles which have been experienced

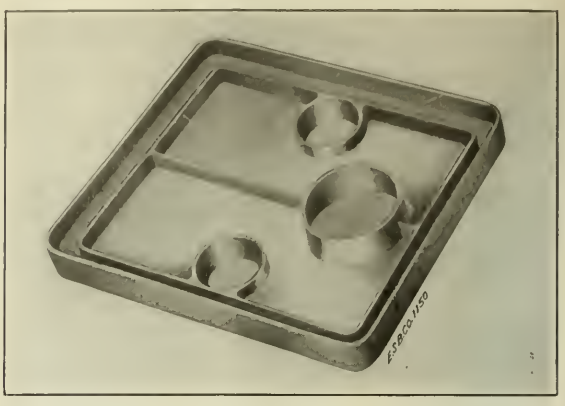


Body Hung Suspension, Showing Belt Tension Release Lever and Tension Adjuster

in the past with the lead lined tanks, due to the development of leaks in the lead lining. These leaks are largely caused by electrolytic action of current escaping from a grounded cell, the effect of which is to corrode the lining. The rubber jar is not subject to this corrosive action. These jars are made of "Giant" compound, which was furnished to the United States Government on a large scale during the war. This compound has been used extensively for storage batteries in mining locomotives and other conditions probably more severe than those to be met in train lighting service.

The double flanged alloy cover protects both the inside and outside of the upper edge of the jar. This cover is sealed with a newly developed sealing compound, which the makers claim permits the cover to be removed and applied again without the application of heat and at the same time forms a perfect seal and will not run at the highest operating temperature encountered. The cells are assembled in two-compartment, solid wood crates and are held in place with paraffin treated wooden shims.

The belt tightening device has been developed for body-hung generators. In the former design of the body-hung suspension, the belt tension was adjusted by means of an adjusting screw. The new device has a lever by which the suspension carriage may be moved forward to the operating position, or may be moved back



Double Flanged Cover for Rubber Jar

quickly toward the truck to release the belt when necessary. An adjustment is provided for taking up the stretch of the belt so that the proper belt tension may



Cell Complete in Compound Rubber Jar with Double Flanged Cover

be maintained without the necessity of cutting the belt. The generator may be mounted right hand or left hand; the generator terminal box, safety chain and spring mounting are reversible, and a right hand or left hand suspension carriage may be had as desired.

The number of women employed in the metal-working industries in Germany increased from 12,968 in 1914 to 624,688 in 1917.—*Machinery.*



The Railway Supply Manufacturers' Association Exhibit

Both the Number of Exhibitors and the Space Occupied Far Surpass All Previous Records

THE EXHIBITS THIS YEAR have smashed all records, not only in relation to the number of exhibitors and the square feet of space occupied, but also in the character of the exhibits. Never has there been so much care taken to emphasize the educational features of the exhibit and to make preparation for giving the railroad men a comprehensive, clear-cut idea of the various devices and their advantages. There are 301 exhibitors, and the exhibits occupy 93,467 square feet of space. There would have been more exhibitors had the space been available. The exhibit committee has utilized every bit of available floor space for exhibition purposes; the track exhibit is exceptionally large.

A study of the diagram of the pier will indicate that the space facing the Boardwalk, which has hitherto been used for lounging purposes, has been divided up into nine different exhibit spaces. The main building or ball room has had additional exhibits placed in it, the most notable of which is the artillery and munitions exhibit at the main entrance. Additional exhibit spaces have been added at the ends of the Aquarium Court, as the space between the Main Building and Exhibition Hall is termed. Exhibition Hall, which was only partially occupied in 1916, is completely filled this year, and the passage through its center connecting to the Machinery Hall extension has been closed up, and is used for exhibit spaces. Additional booths have been placed between the two incline ways leading to the Annex, and a large additional space has been placed alongside of Convention Hall.

A complete list of the exhibitors, together with details of their exhibits and the list of their representatives, follows:

List of Exhibitors

Acme Machine Tool Company, The, Cincinnati, Ohio.—Cincinnati Acme No. 3 universal flat turret lathe. Represented by Fred E. Winkelman and other company officials. Space 162.

AGA Railway Light & Signal Company, Elizabeth, N. J.—Car lighting equipment. Represented by J. K. Howard. Space 380.

Air Reduction Sales Company, New York, N. Y.—Oxy-acetylene apparatus and gases. Represented by A. R. Ludlow, A. S. Kinsey, C. D. Trout, J. A. Warfel, H. F. Weldin, R. T. Peabody and E. L. Mills. Space 614.

American Abrasive Metals Company, New York, N. Y.—Feralun anti-slip treads, as car steps, door saddles and floor plates; Feralun brake shoes; Feralun rubber blades. Represented by H. Weaver Mowery, Ellsworth Burger and R. C. Davison. Space 626.

American Arch Company, New York, N. Y.—Model of locomotive firebox with a double set of 4-inch arch tubes supporting a set of model Security arch brick; all to scale of ¼ size. Represented by Le Grand Parish, John P. Neff, W. L. Allison, J. T. Anthony, R. J. Himmelright, George Wagstaff, T. Mahar, W. W. Neale and T. F. Kilcoyne. Spaces 414-416-422-424.

American Automatic Connector Company, Cleveland, Ohio.—American automatic connector; Cleveland low water alarm; Talmage hand brakes; steam chest and cylinder lubricating drifting valve; blow-off valves; diverting valves. Represented by J. G. Talmage, M. A. Barker, Frank M. Roby, J. Frank Walker and Alfred F. Letherer. Spaces 354-361.

American Brake Company, St. Louis, Mo.—Reception booth.—Represented by R. E. Adreon. Space 19 to 29.

American Brake Shoe & Foundry Company, New York, N. Y.—Reinforced brake shoes for locomotives and cars; malleable iron locomotive and car brake heads and keys. Represented by F. W. Sargent, W. S. McGowan, C. D. Pettis, John Hoffhine, A. H. Elliot, E. A. Gregory, W. L. Heinz, M. N. Trainer and E. L. Janes. Space 418.

American Car & Foundry Company, New York, N. Y.—In booth and on cars on the exhibit tracks will be shown field and railway artillery, projectiles, tractors and interesting material supplied by the U. S. Ordnance Department. Represented by Clark D. Eaton, Scott H. Blewett, J. M. Keller and M. H. Connelly. Space 3.

American Flexible Bolt Company, Pittsburgh, Pa.—American staybolts; rivets; hollow iron; reduced body solid bolts; marine staybolts, hollow or solid, reduced bodies. Represented by C. A. Seley, R. W. Benson, J. A. Trainor, W. F. Heacock, L. W. Widmeier and M. M. McCallister. Space 543.

American Insulation Company, Philadelphia, Pa.—Magnesia pipe and boiler coverings; asbestos and high temperature cement; asbestos paper and millboard; asfaltslate shingles; Carey flexible cement roofing; built up asphalt and asbestos roofs; Carey Elastite expansion joint; Ezola mats; rubber roofings; Carey wallboards and other Carey products. Represented by John W. Latchum, Benjamin T. Conwell, Jr., Harry E. Rowell, H. A. Burkley, A. H. Wilson and E. S. Walls. Space 322.

American Locomotive Company, New York, N. Y.—Flexible staybolts; power reverse gear; intercepting valve; piston valve. Represented by J. D. Sawyer, W. P. Steele, J. B. Dunn, C. K. Lassiter, G. H. Weiler, G. P. Robinson, C. M. Muchnic, F. J. Cole, C. J. Mellin, J. G. Blunt, W. F. Weller and J. Partington. Space 623.

American Malleable Castings Association, The, Cleveland, Ohio.—A collection of malleable iron castings, illustrating the uses of the metal in car construction. Testing machines will be operated, to show the physical properties of malleable iron. Represented by S. H. Standish, James S. Llewellyn, A. O. Buckins, Jr., F. A. Kavanaugh, W. R. Dean and F. J. Buckley. Space 189.

American Mason Safety Tread Company, Boston, Mass.—Mason safety tread; Stanwood car step; Karbolith car flooring. Represented by Henry C. King and Edward F. Kuemmerle. Space 542.

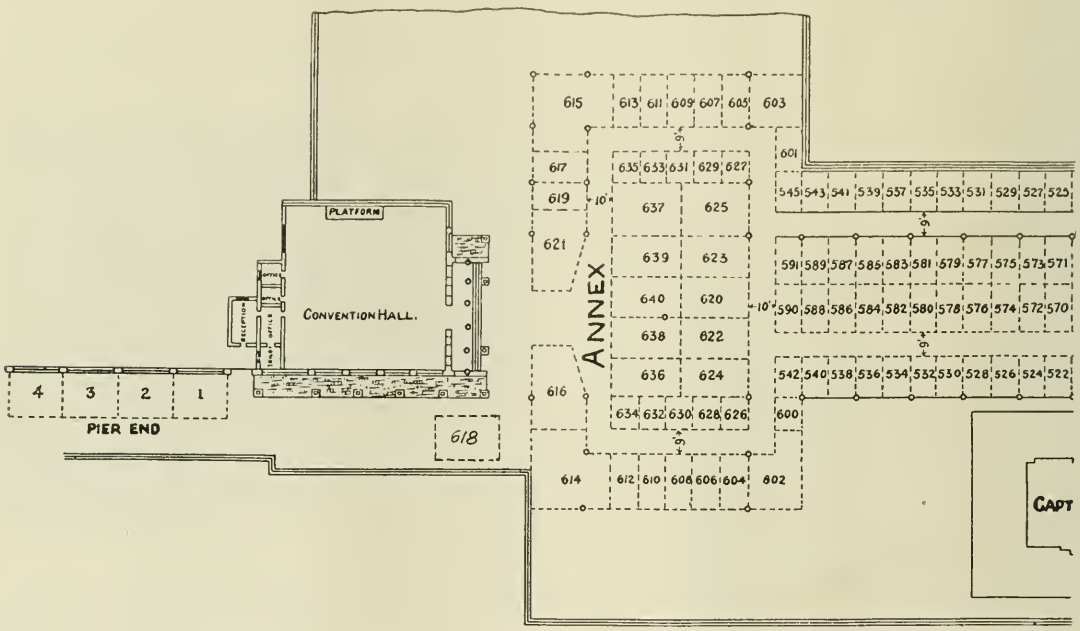
American Rolling Mill Company, The, Middletown, Ohio.—Corrosion resisting iron sheets; Armco polished sheets of locomotive jackets; Armco alloy coated sheets for passenger car roofing and other purposes; microscopical exhibit, showing structure of iron and steel sheets and plates. Represented by G. F. Ahlbrandt, T. Wade Jenkins, R. O. Griffis, J. A. Aupperle and W. J. Beck. Spaces 586-587.

Anchor Packing Company, The, Philadelphia, Pa.—Air pump and throttle packings; valve packings; sheet packings; Pahlow air valves. Represented by W. R. Haggart, J. P. Landreth, J. F. Edmonds and D. J. P. Murray. Spaces 373 375.

Ashton Valve Company, The, Boston, Mass.—Safety valves and gauges for locomotive and stationary boilers; single, duplex and triplex air gauges; dead weight gauge testers and standard test gauges; three speed air brake and wheel press recording gauges; portable boiler test pumps. Represented by A. C. Ashton, H. O. Fettinger, J. F. Gettrust and J. W. Motherwell. Space 518.

Association of Manufacturers of Chilled Car Wheels, Chicago, Ill.—One 33" 625 chilled iron wheel for 30-ton cars; one 33" 700 chilled iron wheel for 40-ton cars; one 33" 725 chilled iron wheel for 50-ton cars; one 33" 850 chilled iron wheel for 70-ton cars; one pair 850-lb. M. C. B. wheels for 70-ton cars, mounted on axle with flange increased 3/16 of an inch, as recommended by our association. Represented by George W. Lyndon and F. K. Viol. Spaces 633-635.

Atkins & Company, Inc., E. C., Indianapolis, Ind.—Atkins Kwik Kut metal cutting machines; No. 3 metal band saw machine; Atkins AAA hack saw blades; circular metal cutting saws; hack saw frames; Atkins silver steel hand saws; metal saw



Arrangement of Exhibit Spaces at the Convention Hall End of the Pier

American Steam Gauge & Valve Manufacturing Company, Boston, Mass.—American improved locomotive steam, steam heat and duplex air brake gauges; muffled and open pop valves; American hydraulagraph; American trainagraph; American dead weight gauge tester and general locomotive and power plant appliances. Represented by P. H. Ryan, Charles C. Kilander and H. B. Nickerson. Space 374.

American Steel Foundries, Chicago, Ill.—Simplex clasp brake; Economy cast steel draft arm; Davis steel wheel; Ajax and Hercules brake beams; Simplex and American coupler pockets; Simplex coupler; Atlas safety guard and third point support; cast steel bolsters; Vulcan trucks. Represented by G. E. Scott, R. H. Ripley, G. F. Slaughter, J. W. Dalman, D. T. Harris, W. J. Lynch, Theo. Cook, T. H. Hopkirk, J. V. Bell, T. D. Kelley, F. B. Ernst, P. A. Martin and W. H. Graul. Space 193.

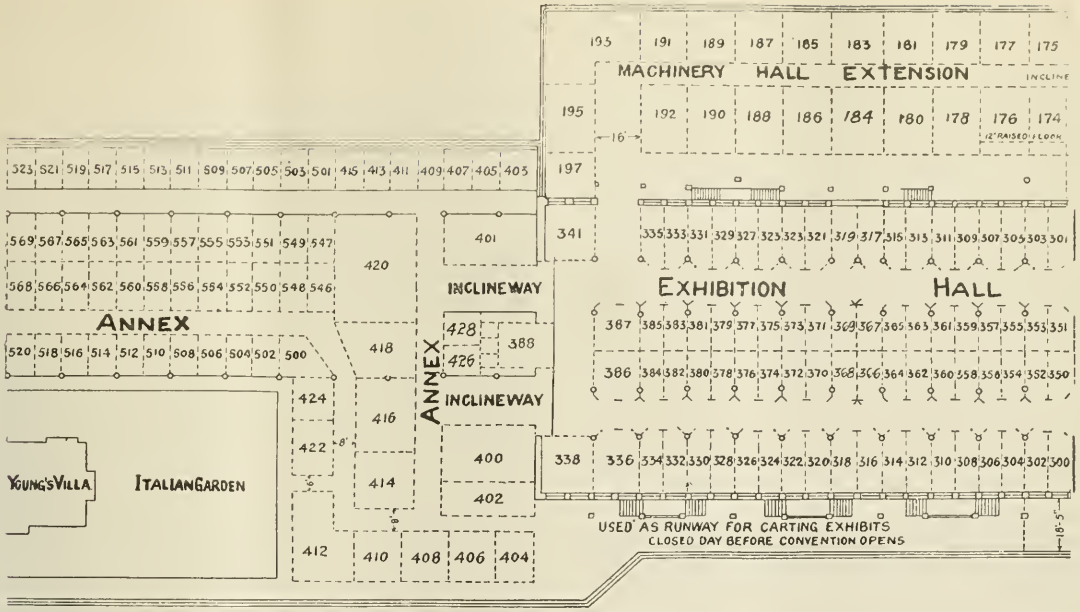
American Tool Works Company, The, Cincinnati, Ohio.—Lathes, shapers and radial drills. Represented by J. C. Hussey, H. W. Schatz and R. S. Alter. Spaces 105-107-109-111-113.

blades. Represented by T. H. Endicott, W. L. Timpone and T. A. Carroll. Space 174.

Atlantic Hand Brake Corporation, The, Buffalo, N. Y.—Rack showing the Atlantic hand brake attached to one end of a dynamometer and the other end is attached to the ordinary staff brake. Represented by Chas. E. B. Smith and Jno H. Weidemiller. Space 4, pier end.

Baker, R. & L., Company, Cleveland, Ohio—Type QTQ Baker electric industrial tractor; type DUQ Baker electric utility truck. Represented by George L. Weiss, Harry B. Grieg, J. Harry Killius and Nathaniel Platt. Space 36.

Barco Manufacturing Company, Chicago, Ill.—Barco flexible joints; engine tender connections; car steam heat connections; roundhouse blower connections; coach yard steam connections; smoke box blower fitting; Barco cross head and shoe. Represented by F. N. Bard, C. L. Mellor, Charles Thomas and F. H. Stiles. Space 607.



Arrangement of Exhibit Spaces in Exhibition Hall, Machinery Hall Extension and Part of the Annex

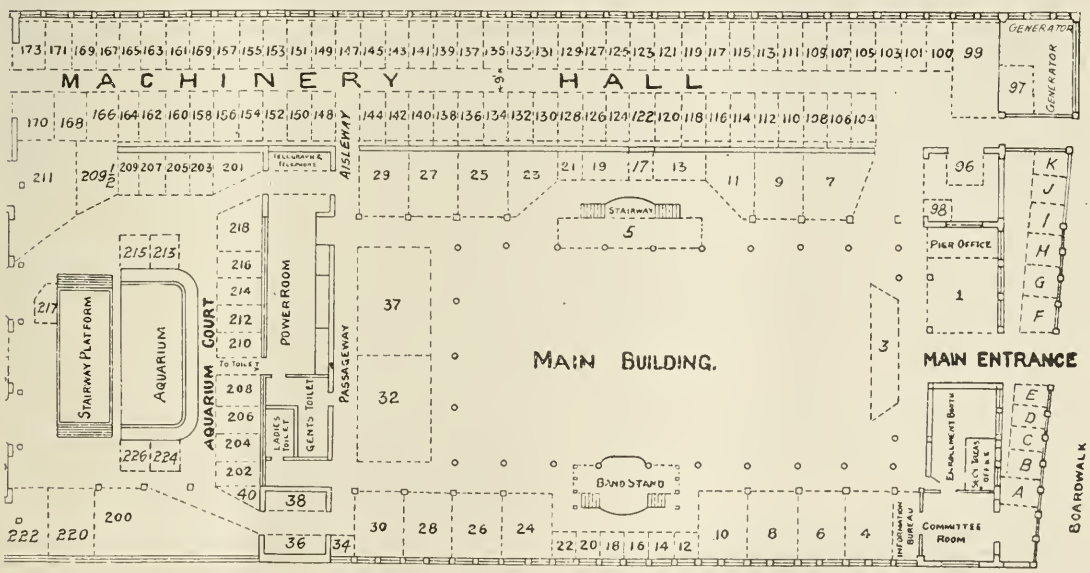
Barrett Co., The, New York, N. Y.—Everlastic fibrecote; front end engine paint; elastigum elastic adhesive cement; everjet elastic paint; carbosota grade one creosote oil; rubber roofings and sheathings. Represented by W. S. Babcock, K. C. Barth, C. T. Bilyea and W. J. Hickerson. Spaces 316-318.

Bastian-Blessing Company, The, Chicago, Ill.—Rego welding and cutting apparatus. Represented by W. S. Hartsock, F. R. Goehler, H. H. Hirshon, W. H. Girdler and C. W. Davis. Space 3, Pier End.

Beatty Machine & Manufacturing Company, Hammond, Ind.—New combination punch, angle shear, bar shear and coping machine; Hammond never slip portable floor crane. Represented by W. R. Beatty. Space 96.

Besly & Company, Charles H., Chicago, Ill.—Number 16 Besly wide face ring wheel grinder; Besly taps. Represented by Edward P. Welles, C. A. Knill and John F. Gurns. Spaces 140-142.

Bettendorf Company, The, Bettendorf, Iowa.—Section of Bettendorf girder beam center sill; 40-ton capacity Bettendorf truck; 70-ton capacity semi-equalized truck; display of two types of Bettendorf and one U. S. R. A. truck, side frames, showing comparative weights on automatic scales; display of two types of Bettendorf and one U. S. R. A. truck, side frames, showing distortion after being subjected to comparative test loads. Represented by J. W. Bettendorf, J. H. Bendixen and C. J. W. Clasen. Space 200.



Arrangement of Exhibit Spaces at the Boardwalk End of the Pier

Bird-Archer Company, The, New York, N. Y.—The Bird-Archer polarized metallic boiler chemicals and introducing the Harter circulating plate for locomotive boilers. Represented by P. B. Bird, C. A. Bird, L. F. Wilson, J. A. McFarland, T. A. Peacock, W. E. Rudenour and W. W. Burden. Space 37.

Blackall, Robert H., Pittsburgh, Pa.—Blackall ratchet brake lever, U. S. Government type; improved Lindstrom brake lever with back-off cap for vestibule passenger cars; improved Lindstrom brake lever—tunnel brake layout for application to inside and outside of blind end baggage cars; standard ratchet brake levers for passenger and freight equipment. Represented by Robert H. Blackall and E. Emery. Space 627.

Blevney Machine Company, Greenfield, Mass.—Patent polishing and finishing machines; grinding machines; friction clutches. Represented by W. S. Howe and A. H. Belinke. Space 304.

Boss Nut Company, Chicago, Ill.—Boss lock nuts. Represented by J. A. MacLean, J. W. Fogg and W. G. Willcoxson. Spaces 370-371.

Bowser & Company, Inc., S. F., Fort Wayne, Ind.—Self-measuring oil and gasoline pumps; oil storage tanks and metering devices. Represented by E. M. Savercool, C. C. Fredericks and W. T. Simpson. Space 28.

Bradford Draft Gear Co., New York, N. Y.—Draft gears. Represented by Horace Parker, Harry F. Lowman, H. C. Priebe, Charles F. McCuen, William A. McWhorter and Edward H. Barnes. Spaces 554-555.

Brewster Company, Inc., William, New York, N. Y.—Bond bits; high speed twist drills, reamers and countersinks; high speed milling and gear cutters and hobs; etchograph electric marking machine; Bull Dog demagnetizer; electro lead burn. Represented by William Brewster, William E. McCabe and Frederic B. Squires. Space 213.

Brosius, Edgar E., Pittsburgh, Pa.—Brosius automatic single hoist grab buckets; Brosius single hook grab buckets. Represented by Edgar E. Brosius and D. C. Schultz, Sr. Space 34.

Buckeye Steel Castings Company, The, Columbus, Ohio.—Models of Major M. C. B. couplers, truck side frames, truck bolsters and Buckeye draft yokes. Represented by S. P. Bush, J. G. Bower, F. J. Cooledge, G. T. Johnson and J. C. Whitridge. Space 603.

Buda Company, The, Chicago, Ill.—Buda-Ross model G. W. electric headlight. Represented by Mark A. Ross, H. P. Bayley and W. F. Davis. Space 550.

Buffalo Brake Beam Company, New York, N. Y.—Brake beams and brake beam parts. Represented by S. A. Crone, E. C. Farlow, A. E. Crone, E. Strassburger, A. Gordon Jones and E. J. Kreiger. Space 552.

Bullard Machine Tool Company, The, Bridgeport, Conn.—Bullard 54" Maxi-Mill; Bullard 36" vertical turret lathe; Bullard 8" Mult-Au-Matic. Represented by E. P. Bullard, S. H. Bullard, F. B. Smith, John W. Bray, John Beirne, J. H. Sharley, F. E. Hatch, Jr., F. S. Lincoln and C. H. Keller Space 99.

Byers Company, A. M., Pittsburgh, Pa.—Genuine wrought iron pipe. An exhibit board showing different kinds of pipe joints, welds, bends, signal pipe, pipe sizes, method of identification of Byers pipe. Also an exhibit of the materials employed and the different stages of manufacture of Byers pipe. Represented by W. W. Williams, T. L. Lewis, S. P. Broome and E. A. Small. Spaces 580-581.

Cambria Steel Company, Philadelphia, Pa.—See Midvale Steel and Ordnance Company. Space 637.

Camel Company, Chicago, Ill.—Top and bottom supported freight car door fixtures; burglar proof freight car door locking arrangements. Freight car door starter arrangements. Represented by P. M. Elliott, J. F. Comee, H. E. Creer and W. han. Spaces 386-387.

Carbic Manufacturing Company, Duluth, Minn.—Carbic cakes; portable acetylene lights and generators; oxy-acetylene welding and cutting equipment. Represented by D. C. Duncan, G. B. Van Buren, W. H. Norden and M. V. Crouse. Space 329.

Carborundum Company, The, Niagara Falls, N. Y.—Reception booth. Represented by W. W. Sanderson, R. S. Marvin, H. P. Frost, C. C. Lathrop, C. C. Schumaker and J. W. Fraser. Spaces 548-549.

Carnegie Steel Company, Pittsburgh, Pa.—Rolled steel wheels for freight car, passenger train car and engine truck service; locomotive piston blanks; gear blanks; electric tool steels; carbon steels; track bolts and spikes; railway cross ties; industrial wheels; crane track wheels; large sized rolled steel wheels for French Government Railroad. Represented by W. G. Clyde, John E. Woods, C. L. Wood, C. C. Cluff, R. B. Woodworth, T. W. Williams, N. B. Trist, J. B. Arnold, L. C. Bihler, H. W. Summers, Charles Orchard, J. C. Shields, Samuel Fray, Jr., and L. W. Conroy. Space 420.

Chambers Valve Company, New York, N. Y. Chambers locomotive throttle valve. Represented by Frank H. Clark. Space 188.

Chase & Company, L. C., Boston, Mass. Mohair plush upholstery for railroad coaches, steamships and automobiles; Leatherwove upholstery for railroad coaches. Represented by H. T. Wight and W. P. Underhill. Space 10.

Chicago-Cleveland Car Roofing Company, Chicago, Ill.—Photographs of products. Represented by R. C. Dudley, T. N. Russell, J. E. Tesseyman, James L. Stark, T. H. Williams, R. C. Munro and K. M. Hamilton. Space 506.

Chicago Pneumatic Tool Company, Chicago, Ill.—Boyer pneumatic riveting and chipping hammers; Little Giant air drills and grinders; Little Giant electric tools and grinders; Boyer staybolt riveters; Boyer holder-ons; Boyergrip riveting hammer attachment; improvements in design and construction of both electric and pneumatic tools; hammer rock drills. Represented by H. A. Jackson, W. P. Pressinger, W. H. Callan, H. D. Megary, H. L. Dean, C. B. Coates, T. J. Hudson, A. C. Andresen, Edw. Aplin, H. J. Kimman, H. E. Epley, E. H. Crossen, H. W. Clarke, L. C. Sprague, F. S. Sargent, A. M. Brown, R. F. Eissler, T. D. Slingman, Ross Watson, T. G. Smallwood, Nelson B. Gatch, W. H. White, H. W. Buker, George J. Sheppard, H. G. Barbee, C. W. Cross, A. E. Conrow and Norman S. Thulin. Space 621.

Chicago Railway Equipment Company, Chicago, Ill.—Creco, Drexel and Diamond special brake beams; Creco, Drexel and Economy roller side bearings; Creco third point support and safety device; Creco four point support and safety device; Creco combination brake beam support and safety device. Represented by E. B. Leigh, C. Haines Williams, E. A. Lebeau, R. J. Sheridan, F. T. De Long, G. N. Van Sweringen, E. G. Busse and R. H. Pilson. Space 639.

Chicago Varnish Company, Chicago, Ill.—Reception booth. Represented by R. K. Buckman, S. M. Dolan and Edwin Besuden. Space 523.

Cincinnati Bickford Tool Company, The, Cincinnati, Ohio.—One 5' motor driven plain radial drill; one 28" motor driven upright drill. Represented by H. M. Norris, J. G. Schmidt and L. Quackenbush. Spaces 164-166.

Cincinnati Grinder Company, The, Cincinnati, Ohio.—One No. 2 12" x 36" Cincinnati manufacturing plain grinding machine, motor driven. Represented by Arthur C. Hoefinghoff and Walter F. Stegner. Space 162.

Cincinnati Milling Machine Company, The, Cincinnati, Ohio.—No. 5 plain Cincinnati miller; No. 4 vertical Cincinnati miller; 24" automatic duplex miller; No. 1½ plain Cincinnati cutter grinder. Represented by George W. Binns, Millard H. Romaine and A. J. Baker. Spaces 164-168-170.

Cincinnati Pulley Machinery Company, The, Cincinnati, Ohio.—Automatic drilling machines; Avery Sensitive drilling machines. Represented by L. B. Patterson, J. G. Hey, J. F. Mirrielees, L. H. Pratt and D. A. Patterson. Spaces 141-143.

Clark Car Company, Pittsburgh, Pa.—Extension side dump car. Represented by H. E. Chilcoat Space on track.

Clark Tructractor Company, Chicago, Ill.—Clark tructractors for industrial and railway freight house and platform transportation and haulage. Represented by Robert A. Shiverick and Warren B. Eldred. Space 402.

Clipper Belt Lacer Company, Grand Rapids, Mich.—Clipper belt lacers and belt hooks; twisted rawhide and "Fibro" waterproof pins. Represented by William F. Kall. Space 314.

Commonwealth Steel Company, St. Louis, Mo.—Models of cast steel tender frame mounted on cast steel trucks; combination double body bolster and platform with cast steel end frame—vestibule end; combination double body bolster and platform with cast steel end frame—blind end; six-wheel passanger car truck with clasp brake; cast steel locomotive cradle with Delta trailer truck; cast steel locomotive cradle with KW trailer truck; cast steel pilot and bumper beam. Represented by Harry M. Pflager, George E. Howard, B. V. H. Johnson, Charles S. Shallenberger, William P. Stout and William Sheehan. Spaces 386-387.

Commonwealth Supply Company, Richmond, Va.—Lewis power reverse gear; Moss universal chuck; Gary-Moss expanding mandrel. Represented by Thomas J. Leahey and S. H. Lewis. Space 610.

Consolidated Car-Heating Company, Albany, N. H.—Locomotive steam heat exhibit; Thermostat exhibit panel; door engine; electric cab heaters; air heaters; truss plank and panel electric heaters; switches; quick opening end valves. Represented by C. S. Hawley, W. S. Hammond, L. P. Hynes and G. E. Oakley. Space 530.

Crane Company, Chicago, Ill.—Crane locomotive pop valves; blow-off valves; cab valves; Crane tilt steam traps; Crane railroad unions and union fittings; steel valves; Crane safety automatic stop and check valves; marine pop valves; blow-off valves for stationary boilers; Crane sta tite round house blower valves; Crane CC pressure regulators. Represented by F. D. Fenn, John B. Jordan and Fred W. Venton. Spaces 502-504.

Crosby Steam Gage & Valve Company, Boston, Mass.—Locomotive pop safety valves, new high efficiency type; steam pressure gauges; chime whistles; globe and angle valves; blow-off valves—quick opening type; pressure recording gauges for wheel presses, continuous record. Represented by Edward C. Kenyon and J. J. McCormick. Space 632.

Crucible Steel Company, Pittsburgh, Pa.—Reception booth.—Represented by F. Baskerfield, W. D. Wintersmith, F. A. Lawler, W. K. Krepps and A. E. Jones. Space 382.

Curtain Supply Company, The, Chicago, Ill.—Curtains with ring fixtures and Rex all metal rollers; ring curtain fixtures; Rex all metal rollers; vestibule curtain outfits with Rex opening shield, steel roller and release handle; Regal vestibule curtain release handle; Rex canvas diaphragms; steel diaphragms; upper buffer springs; Regal upper buffer spring. Represented by Ross F. Hayes, Thomas P. O'Brian and Ralph Brown. Space 638.

Damascus Brake Beam Company, Cleveland, Ohio.—One channel beam for freight car; Anglerod beam for freight car; No. 1 Waycott special beam for passenger car; heavy 6-wheel Waycott special beam for passenger car; No. 2 Waycott beam for freight car; miscellaneous forgings; Brascott freight car ladder; No. 1 indestructible stake pocket; side door handle (square hole), side door handle (round hole). Represented by C. D. Jenks and C. E. Meyer. Space 619.

Davis Boring Tool Company, St. Louis, Mo.—Davis expansion boring tools; Davis Expansion reamers. Represented by George Edward Gill and William Morgan. Space 4, Pier End.

Davis Machine Tool Company, Inc., Rochester, N. Y.—Close coupled tool room lathe; "Liberty Lathe" designed for motor transport corps, U. S. A.; Davis cabinet lathe; 16" engine lathe; 16" shaper; No. 1 keyseater; No. 2 keyseater; 20" drill. Represented by John M. Fitzgerald and L. D. Farmer. Spaces 100-101-103.

Dearborn Chemical Company, Chicago, Ill.—Showing method of Dearborn water treatment for prevention of scale formation, corrosion, pitting and foaming. Waters analyzed. Operators of analytical laboratories; NO-OX-ID rust preventive. Represented by Robert F. Carr, George R. Carr, J. D. Purcell, G. W. Spear, Edward C. Brown and E. M. Converse. Spaces 6-8.

Detroit Graphite Company, Detroit, Mich.—Railway paint specialties. Represented by L. D. Mitchell, W. D. Waugh, H. U. Birdseye and J. J. Hogan. Space D.

Detroit Lubricator Company, Detroit, Mich.—Locomotive lubricators; locomotive flange oilers; force feed oilers. Represented by A. D. Homard and A. G. Machesney. Space 640.

Dickinson, Inc., Paul, Chicago, Ill.—Models, photographs and full size roundhouse ventilators, smoke jacks and small stove jacks. Represented by A. J. Filkin. Space 203.

Dixon Crucible Company, Joseph, Jersey City, N. J.—Graphite lubricants; silica-graphite paint; belt dressings; engine front finish; brake cylinder lubricant; pipe joint compound; graphite crucibles; full line of pencils. Represented by Herman Price, J. J. Tucker, H. A. Nealley, Wm. Ernst, W. A. Housten, H. L. Hewson and L. H. Snyder. Space 24.

Dixon Valve & Coupling Company, Philadelphia, Pa.—Hose couplings; hose clamps; throttle valves. Represented by C. W. Thomson. Space B.

Draper Manufacturing Company, The, Port Huron, Mich.—Pneumatic flue welder; pneumatic superheater flue welder. Represented by Thos. Draper. Space 532.

Dressel Railway Lamp Works, The, New York, N. Y.—Electric headlights; classification lamps; gauge lamps; lanterns. Represented by F. W. Dressel, F. W. L. Dressel, H. L. Hoskinson, B. P. Claiborne and J. C. Snyder. Space 362.

Duff Manufacturing Company, The, Pittsburgh, Pa.—Lifting jacks. Represented by E. A. Johnson and C. A. Methfessel. Space 401.

Dunbar Manufacturing Company, Chicago, Ill.—Vestibule diaphragms car window curtains and fixtures; weatherproof windows; Kass safety treads and step boxes; vestibule curtains and fixtures; steel doors and fixtures for passenger train equipment; Chanarch steel flooring; Gosso sanitary beds; folding tail gates; drawn steel mouldings; pressed steel shapes and steel stampings of all kinds. Represented by H. U. Morton, T. K. Dunbar, Wm. Wampler, G. H. Ord, H. B. Chamberlain, F. S. Harper and C. D. Morton. Space 609.

Duntley-Dayton Company, Chicago, Ill.—Pneumatic tools, electric tools and Red Devil rivet cutters. Represented by W. O. Duntley, C. A. Duntley, G. A. Barden and A. G. Rice. Spaces 383-385.

Du Pont Fabrikoid Company, Wilmington, Del.—Railway car seats; dining car seats; leather substitutes; a Cadillac roadster with entire surface covered with Craftsman Fabrikoid. Represented by C. L. Petze, C. H. Silkman, L. Kirkpatrick and A. H. Berwald. Space 404.

Edgewater Steel Company, Pittsburgh, Pa.—Rolled steel wheels; locomotive and car wheel tires. Represented by W. V. D. Wright, M. R. Jackson, J. H. Baily and J. P. Rapp. Space 222.

Edison Storage Battery Company, Orange, N. J.—Edison alkaline storage battery for railway train lighting, railway signaling; industrial trucks and tractors; commercial vehicle and delivery wagons; storage battery locomotives; mine lamps; meter testing; manhole lighting; ignition and lighting. Represented by W. F. Bauer, H. W. Stortz and E. T. Sawyer. Space 636.

Edna Brass Manufacturing Company, The, Cincinnati, Ohio.—Locomotive injectors; lubricators; reflex water gauges; boiler check valves and coal sprinklers. Represented by B. I. Kaufmann, E. O. Corey, H. A. Glenn, R. B. Burgheim, J. E. Dillon and M. J. Mullen. Space 305.

Edwards Company, Inc., The O. M., Syracuse, N. Y.—Window fixtures; metal extension platform trap doors; all metal sash balances; top, bottom and side weather stripping; metal stop casings and parting strips. Represented by O. M. Edwards, Sr., E. F. Chaffee, C. H. Rockwell, R. T. Axe, O. M. Edwards, Jr., and Harold Edwards. Spaces 527-529-531.

Electric Arc Cutting & Welding Company, Newark, N. J.—Welders; hoods; electrode handles; electrodes. Represented by W. J. Murray. Space 373.

Electric Controller & Manufacturing Company, The, Cleveland, Ohio.—Automatic controlling device for both direct current and alternating current motors. Represented by R. G. Widdows, M. D. Goodman, H. K. Hardcastle and A. A. Piper. Space 300.

Electric Railway Journal, New York, N. Y.—Copies of Electric Railway Journal and other McGraw-Hill publications, including the Electrical World, Engineering News-Record, Ingenieria Internacional, the Electric Railway Directory. Represented by H. W. Blake, C. A. Babtiste, H. H. Norris, J. J. Rockwell, C. W. Squier, C. T. Baldwin, F. H. Behrens, W. Buxman and Mason Britton. Space 7.

Electric Service Supplies Company, Philadelphia, Pa.—Keystone turbo-generator; Keystone locomotive headlight switch; "Golden Glow" locomotive headlight. Represented by L. A. Darling, A. H. Englund, C. J. Mayer, J. R. McFarlin, E. E. Hedler, J. W. Porter and W. J. Bryan. Space 426.

Electric Storage Battery Company, The, Philadelphia, Pa.—E. S. B. constant voltage axle light system in operation with "Chloride Accumulator." Storage batteries for industrial trucks and railway signal service. Represented by J. Lester Woodbridge, F. G. Beetem, T. L. Mount and H. E. Hunt. Space 624.

Electro Dynamic Company, Bayonne, N. J.—One complete A. C. motor; 1 complete D. C. motor; 1 A. C. stator without windings; 2 compensators; 1 lamp regulator; 1 field or general regulator; 3 15" battery connectors; 3 48" battery connectors. Represented by D. B. Wilson, D. N. Balderston, L. Schofield, H. J. Lamb, H. J. Fuller, C. A. Mudge and E. Heitman. Space A.

Elvin Mechanical Stoker Company, New York, N. Y.—Elvin locomotive stoker. Represented by Frank H. Clark. Space 188.

Elwell-Parker Electric Company, The, Cleveland, Ohio.—Electric storage battery industrial trucks; battery charging apparatus. Represented by Lucian C. Brown, George W. Brown, Fred B. Fink, Capt. Jarvis S. McCrea, Joseph M. Brown, Frank B. Ward, Fred B. Neely and Capt. Frank Kelly. Space 341.

Enterprise Railway Equipment Company, Chicago, Ill.—Models of all types of load discharging cars including gondolas, hoppers, general service, ballast and grain; also safety devices used on United States Railroad Administration hopper and gondola cars. Represented by Argyle Campbell, Walter L. Gunnison and C. Dewey Hummason. Spaces 582-583.

Ewald Iron Company, Louisville, Ky.—Reception booth. Represented by Baylor Hickman, G. O. Boomer, H. E. Pierce, E. V. Shackleford, S. F. Sullivan and R. F. Kilpatrick. Space 535.

Fire-Gun Manufacturing Company, Inc., 115 Fourth Avenue, New York, N. Y.—No. 1 and No. 2 Fire-guns in brass and assorted colors. Represented by Dr. J. C. Gooch. Space 207.

Flannery Bolt Company, Pittsburgh, Pa.—Tate flexible staybolts for water space; adjustable crown stays; flexible flush staybolts; flexible drilled (hollow) staybolts; F. B. C. solid flexible staybolt (new design); F. B. C. hollow flexible staybolt (new design); installation tools for the application of "Tate" and "F. B. C." staybolts; model of section locomotive boiler with complete installation—all types. Represented by J. Rogers Flannery, B. E. D. Stafford, George E. Howard, F. K. Landgraf, W. M. Wilson and E. I. Doods. Spaces 590-591.

Flower Waste and Packing Company, Bayonne, N. J.—Journal box packing. Represented by F. J. Clair. Space 508.

Ford Company, The J. B., Wyandotte, Mich.—Only samples of cleaning material, it being principally a reception booth. Represented by W. P. Scott, W. E. Ratz, George E. Gordon, George Lawrence, S. C. Tompkins, B. N. Goodell, W. H. Todd and Mr. Stiers. Space 521.

Foster Company, The Walter H., New York, N. Y.—Improved bolt turning and threading machine equipped for radial, crown and side stays; turning and threading from forged blanks; N. E. W. spacing and punching machine—semi-automatic operated by compressed air. Represented by J. A. Eden, Jr., Walter H. Foster, H. L. Kenah and N. E. Woods. Spaces 127-129.

Franklin Railway Supply Company, Inc., New York, N. Y.—Franklin automatic adjustable driving box wedge; Franklin automatic driving box lubricator; Franklin automatic fire door; Economy trucks; McLaughlin flexible conduits; Franklin ball joints. Represented by J. S. Coffin, S. G. Allen, H. F. Ball, W. H. Coyle, J. L. Randolph, C. W. F. Coffin, H. M. Evans, S. D. Rosenfelt, W. T. Lane, H. R. Stafford and B. S. Allen. Spaces 414-416-418-422-424.

Frost Railway Supply Company, The, Detroit, Mich.—Harvey friction spring gears; "Interchange" draft castings; Detroit metal weather strips. Represented by Harry W. Frost, George A. Cooper and George L. Harvey. Space 560.

Fuller Engineering Company, Allentown, Pa.—Locomotive equipped with apparatus to burn pulverized fuel. Represented by Walter D. Wood. Space on track.

Galena-Signal Oil Company, Franklin, Pa.—Reception booth.—Represented by L. J. Drake, L. F. Jordan, J. E. Linahen, J. W. Bunn, W. O. Taylor, W. A. Trubee, E. G. Johnson, J. C. Tipton, E. Hawker, G. E. McVicar, B. H. Grundy, D. L. Eubank, S. S. Shields, Robert McVicar, E. V. Sedgwick, C. McNair, W. H. Foster, W. L. Trout, J. E. Hall, William Holmes, George L. Morton and T. J. Powell. Space 32.

Garlock Packing Company, The, Palmyra, N. Y.—Special packings for railroad shops and roundhouses; for air pumps, throttles, compressors, accumulators, steam hammers, stationary engines and pumps. Represented by H. N. Winner, W. G. Cook, J. E. Hillerman, H. J. Ramshaw, Phil Arnold, C. F. Flood, E. O. Roby, Isaac McAllister and L. P. Duggan. Space 516.

General Electric Company, Schenectady, N. Y.—Electric welding equipments; motors; industrial control; steam flow meters; turbo headlight sets; miscellaneous electrical equipments for steam roads. Actual demonstration of the electric welding equipment will be carried on throughout the Convention. Represented by W. J. Clark, Charles Fair, R. E. Woolley, C. A. Raymond, J. J. Liles, C. K. West, G. H. Gilbert, R. G. Standerwick, B. C. Tracy, R. E. Moore, C. H. Williams, H. W. Stewart, P. O. Noble, John Roberts, F. P. Jones, J. F. Myrick, F. S. Hartman, P. A. Dyer, W. L. Merrill, J. A. Seede, J. M. Hollister, J. W. Ham, C. Dorticos, D. B. Rushmore, B. S. Pero, John Eaton, R. S. Bennett, D. K. Frost, C. F. Lawrence and L. W. Shugg. Spaces 161 to 173.

Gilbert & Barker Manufacturing Company, Springfield, Mass.—Oil storage systems; self-measuring pumps; storage tanks; power pumps; portable tanks. Represented by W. C. Halsey, J. E. Ham and Elmer M. Kling. Spaces 321-323.

Gillespie & Company, A. W., Chicago, Ill.—Economy locomotive fire door; Henrikson journal bearing boring machine. Represented by A. W. Gillespie and J. S. Seeley. Space 365.

Globe Seamless Steel Tubes Company, Chicago, Ill.—Boiler tubing. Represented by F. W. Renshaw, E. H. Bankard, Jr., F. J. O'Brien and W. H. V. Rosing. Spaces 526-528.

Gold Car Heating & Lighting Company, New York, N. Y.—Vapor, combination pressure and vapor, pressure, hot water and electric car heating systems. Thermostatic control for all types of car heating systems and buildings; ventilators for railway cars; pressure regulators. Represented by Edward E. Gold, E. B. Wilson, A. B. Strange, F. R. Cooper, E. J. Ronan, W. H. Ivers, J. O. Brumbaugh, A. Sheldon, F. H. Smith, F. O. Bailey and G. E. A. Letourneau. Spaces 350-351-352-353.

Gould Coupler Company, New York, N. Y.—Cast steel truck bolsters; malleable iron journal boxes; automatic slack adjusters; cast steel truck side frames; cast steel body bolsters; friction buffers; friction draft gears; cast steel pilot beams; electric car lighting equipment; storage batteries; freight, passenger and engine couplers; turbo-generators for locomotive headlight. Represented by Commodore Charles A. Gould, C. E. Rood, W. F. Richards, G. B. Young, P. H. Simpson, M. R. Shedd, W. H. Sauvage, G. R. Berger, W. F. Bouche, William Garstang and D. C. Davis. Spaces 209½-211.

Gould & Eberhardt, Irvington, N. J.—Showing a 28" invincible type shaper, arranged with constant speed motor and selective type gear box, with automatic starter and dynamic brake control apparatus. Represented by H. Ezra Eberhardt and Charles L. Cameron. Space 187.

Grand Rapids Grinding Machine Company, Grand Rapids, Mich.—Two motor-driven Grand Rapids drill grinders; 4 belt-driven Grand Rapids drill grinders; 1 No. 1 Universal grinder; 1 No. 2 cutter, reamer and drill grinder; 1 Grand Rapids casting grinder. Represented by S. Owen Livingston and J. DeKoning. Space 181.

Graver Tank Works, William, Chicago, Ill.—Model Graver type "K" water softener; model Graver pressure filter; 110-gallon Graver underground gasoline storage unit; specimen heavy steel plate riveting and welding. Represented by W. R. Toppan and J. J. Felsecker. Space K.

Greenfield Tap & Die Corporation, Greenfield, Mass.—Nutter & Barnes cutting off machines; "Wells" universal grinders; G. T. D. threading machines; Maxi staybolt top; taps and dies; screwplates; gauges; reamers. Represented by L. H. Taylor, W. A. Cook, F. W. Strecker and F. H. Hoffman. Spaces 308-310.

Grip Nut Company, Chicago, Ill.—Grip nuts. Represented by W. E. Sharp, A. B. Chadwick, C. J. Wymer, Albert Roberts and H. E. Passmore. Space 175.

Hale & Kilburn Corporation, Philadelphia, Pa.—Walkover car seats and reclining chairs; steel car interior finish; steel car doors; steel truss-plate car partition and flooring. Represented by H. C. Minor, A. F. Old, R. H. Pilson, H. R. Rochester, J. R. Strain and P. J. Tucker. Spaces 408-410.

Hammett, H. G., Troy, N. Y.—Staytite metallic packing for piston rods and valve stems; Trojan bell ringers; triple valve bushing rollers. Represented by H. G. Hammett, A. O. Van Dervort and E. C. Sawyer. Space 512.

Hanna Locomotive Stoker Company, Cincinnati, Ohio.—Full-sized stoker—type H 1. Represented by W. T. Hanna, W. A. Austin and L. J. McConnell. Space 217.

Haring, Ellsworth, New York, N. Y.—Park gate extra special superlative high speed steel and tool steels; Monel metal wires; fine brass; bronze and nickel wires; nickel sheets and specialties. Represented by Ellsworth Haring. Space 20.

Harrington, Son & Co., Inc., Edwin, Philadelphia, Pa.—Peerless hoist; Harrington improved screw hoist; Peerless army type hoist; plain traveler, lower flange of I-beam; geared traveler, lower flange of I-beam. Represented by Roger Sherron, A. M. Harrington, W. J. Somerset, James A. Slaughter, G. W. Schwager and M. W. Christian. Space 185.

Hauck Manufacturing Company, Brooklyn, N. Y.—Portable heaters; storage battery repair outfits; thawing outfits; preheating burners; crude oil furnace burners; kerosene torches; melting furnaces; oil burners; pumping stations; weed burners; tire heaters; rivet forges. Represented by John D. Moore. G. A. Nelson, J. R. Jarvis, G. N. Broadhurst and Arthur E. Hauck. Space 320.

Heald Machine Company, The, Worcester, Mass.—No. 61, cylinder grinding machine for use on air brake parts and valve motion units or parts which cannot be revolved when grinding; No. 71, internal grinding machine used on bushings, valves and small parts that can be revolved; No. 22, rotary surface grinding machine; magnetic chucks. Represented by Samuel M. Hershey, William Erickson, James H. Cafferty and S. T. Massey. Spaces 147-149.

Heywood Bros. & Wakefield Company, Wakefield, Mass.—Samples of reed furniture; Perfektone reed music cabinets; nickel-plated seat mechanism which reverses automatically; samples of seats used on various railroads in the United States. Represented by E. C. Lang, Bertram Berry, Frank N. Grigg, C. A. Van Derveer and George E. Cornwall. Spaces 520-522-524.

Hunt-Spiller Manufacturing Corporation, South Boston, Mass.—Air furnace gun iron castings. Represented by W. B. Leach, Gordon Dexter, J. G. Platt, A. B. Root, Jr., V. W. Ellet, J. M. Monroe, E. J. Fuller and C. L. Galloway. Spaces 562-563.

Hutchins Car Roofing Company, Detroit, Mich.—Models all-steel flexible car roofs. Represented by D. W. Hawksworth, M. F. Ryan, F. M. Whyte, A. R. Wilson, C. F. Pape and W. D. Thompson. Space 525.

Hyatt Roller Bearing Company, New York, N. Y.—Hyatt roller bearings as used in railway service cars, freight house trucks, baggage wagons, machine tools, line shafting, counter shafting; a large moving model of a Hyatt roller bearing; small railroad cars equipped with plain bearings and with Hyatt bearings to show comparison, and a lantern slide projectograph machine for illustrating the many uses of Hyattt roller bearings. Represented by D. Gleisen, P. C. Gunion, E. E. Eby, T. P. Cunningham, M. F. Lawrence and H. K. Porter. Space 9.

Illinois Steel Company, Chicago, Ill.—Tie plates; track bolts; track spikes; screw spikes. Represented by Edwin S. Mills, John Brunner and J. B. Arnold. Space 420.

Imperial Appliance Company, Chicago, Ill.—See Standard Railway Equipment Company. Space 428.

Independent Pneumatic Tool Company, Chicago, Ill.—Piston air drills and reamers, non-reversible and reversible; pneumatic grinders; stay bolt drivers; hoists; pneumatic chipping hammers; pneumatic caulking hammers; pneumatic flue heading hammers; pneumatic light riveting hammers; pneumatic long-stroke riveting hammers; sand rammers; electric drills and grinders; pneumatic tool hose to hose couplings; close corner drills. Represented by R. S. Cooper, R. T. Scott, F. B. Hamerly, H. F. Finney, F. J. Passino, F. H. Charbono and A. L. Schuhl. Space 557.

Industrial Truck Company, Holyoke, Mass.—Tractors, underslung load carrying and elevating load carrying. Represented by Edwin F. Moody, S. L. Ayr and Theodore T. Ludlum. Space 1.

Ingersoll-Rand Company, New York, N. Y.—Showing "Little David" type of pneumatic tools. Represented by George A. Gallinger, W. A. Johnson, D. A. Fulton, George S. Johnston, P. J. Christy, Charles Little, M. O'Connor, F. W. Gaw, R. H. Cunningham, L. W. Schnitzer and Robert F. McCreadie. Spaces 588-589.

International Pulverized Fuel Corporation.—See Pulverized Fuel Equipment Corporation, 414-416-422-424.

Iron City Products Company, Pittsburgh, Pa.—Rees double worm gear drive jacks. A number of different designs and sizes from 2 to 25 tons capacity with testing machine to demonstrate jacks under load. Represented by E. E. Arnold and C. A. Conklin. Space 618.

Jefferson Union Company, Lexington, Mass.—Jefferson unions, flanges and malleable iron pipe fittings. Represented by Daniel T. Groff. Space 16.

Jenkins Bros., New York, N. Y.—Jenkins valves, in brass, iron and cast steel; mechanical rubber goods including Jenarco and "96" sheet packing and gaskets, Jenkins discs; pump valves; compressed asbestos jointing; Selclo blow-off valves. Represented by Frank Martin and B. J. Neely. Spaces 558-559.

Johns-Manville Company, H. W., New York, N. Y.—Air brake cylinder packing cups and expander rings and gaskets; slack adjusters; insulating materials; pipe coverings; hair felts; boiler lagging; roofings; packings; pump valves; insulating cements; high temperature cements; ceilinite; ebony and asbestos wood; transite asbestos wood smoke jacks; asbestos paper and millboard; vitribestos; fire felt; fibre conduit; sheet fibre; metallic flexible conduit; tape; fire extinguishers; fuses; asbestos shingles; boiler wall coating; mastic; waterproofing materials; 85% magnesia and fire felt for locomotive boiler lagging; salamander insulaton for steel passenger and postal cars; Keystone hair felt insulaton for refrigerator cars. Represented by J. E. Meek, G. A. Nicol, J. C. Younglove, P. C. Jacobs, F. J. Horne, H. G. Newman, G. C. Christenson, J. H. Trent, C. E. Murphy and H. Flannagan. Spaces 570-571.

Johnson Bronze Company, New Castle, Pa.—Babcock water gauge protector; bronze engine, and car brasses. Represented by P. J. Flaherty, G. P. Blackiston and F. H. Babcock. Space 373.

Joliet Railway Supply Company, Chicago, Ill.—Huntoon brake beams; Huntoon truck bolsters; Joliet journal boxes; Peerless, Burry & Perry side bearings; Hartman center plates; Burnett reinforced box car end; Burnett angle cock holder; Burnett train pipe anchor; Rex emergency knuckle. Represented by by J. H. Slawson, F. L. Sivyer, C. A. Carscadin, J. E. Simons, R. W. Burnett and V. J. Burry. Space 611.

Jones & Company, Inc., B. M., New York, N. Y.—Mushet high speed steels; extra best Titanic carbon tool steel; Taylor's best Yorkshire iron. Represented by W. H. White, Ray G. White, Fred J. Holden and B. C. Heacock. Space 208.

Jones & Laughlin Steel Company, Pittsburgh, Pa.—Miscellaneous steel products. Represented by Roland Gerry, Robert Geddis, R. M. Kilgore, G. C. Fogwell, T. G. Roberts, G. B. Mitchell, E. A. France, R. T. Rowles, F. S. Slocum, J. P. Replinger and J. K. Barker. Spaces 409-411.

Joyce-Cridland Company, The, Dayton, Ohio.—Jacks for every railway service; hydraulic, full automatic, geared ratchet and lever; 35-ton journal jack, control lowering; geared screw jack; pulling and pushing jacks. Represented by C. D. Derby, W. F. Bippus, C. W. Ripsch, W. I. Clock and A. S. Beattys. Space 605.

Justice & Company, Philip S., Philadelphia, Pa.—Reception booth. Represented by Philip J. Mitchell. Space 509.

Karry-Lode Industrial Truck Co., Inc., Long Island City, N. Y.—One model No. 1 all steel utility electric industrial truck; one model No. 2 all steel low platform warehouse electric industrial truck. Represented by Ernest Tarof, H. A. Spalding and J. M. Breitenbach. Spaces 317-319.

Kaustine Company, Inc., Buffalo, N. Y.—Kaustine system toilet apparatus. Represented by D. A. Evans, F. B. Shalters and C. W. Kelly. Space 335.

Keller Pneumatic Tool Company, Grand Haven, Mich.—Riveting, chipping, caulking, beading and scaling hammers; jam riveters; pneumatic tool safety devices; pneumatic drills; woodboring machines and grinders; sand, bench and floor rammers; holders-on; hammer holders-on; dolly bars; rivet sets; chisel blanks; hose couplings. Represented by W. H. Keller, J. G. Osgood, J. B. Corby, G. M. Kenyon, W. W. Shaw, J. C. Campbell, L. A. Zarling, C. Humphrey, J. E. Mills, H. C. Browne, E. E. Knox, A. M. Andresen, W. J. Devlin, H. I. Kahn, W. F. Delaney, W. H. Woody, F. S. Eggleston and Mr. Coates. Space 197.

Kerite Insulated Wire & Cable Company, The, New York, N. Y.—Kerite insulated wires and cables. Represented by P. W. Miller, J. W. Young and J. A. Renton. Space 384.

Kershaw Corporation, Newark, N. J.—Rapid railway mail and message exchange system. Full sized device used in tests conducted at Port Newark terminal, Pennsylvania R. R., Newark, N. J. Represented by Frank A. Bross and Henry Kershaw. Space 13.

Kevoke Railway Equipment Company, Chicago, Ill.—Cast steel friction draft gear; keyed cast steel coupler yokes; keyless cast steel coupler yokes. Represented by R. J. Cook, E. Walters and George C. Murray. Space J.

Keystone Drop Forge Works, Chester, Pa.—Standard and special drop forgings. Represented by Geo. H. Berlin and Wm. J. McDevitt. Space 368.

Landis Machine Company, Waynesboro, Pa.—A 2" Landis double head bolt threading machine, motor driven; a 4" pipe threading and cutting machine, motor driven; a 2" stationary pipe die head; an 8" stationary pipe die head; a 2" automatic die head; Landis chaser grinder. Represented by C. N. Kirkpatrick, F. C. Delcher, J. W. Willis, E. E. Bohm and J. W. Frey. Spaces 131-133.

Lansing Company, New York, N. Y.—One 3 wheel tractor and 3 trailers. Represented by E. L. Card, M.F. Christensen and W. B. Tourtellotte. Space 324.

LeBlond Machine Tool Company, The R. K., Cincinnati, Ohio.—LeBlond lathes, milling machines and cutter grinders. Represented by Edwin D. Nichols and Wm. O. Strauss. Spaces 157-159.

Lehon Company, The, Chicago, Ill.—Mule-hide plastic car roofing; burlap back car roofing; waterproof insulating fabric for refrigerator cars; saturated burlap; membrane for reinforcing the waterproofing of concrete in tunnels, subways, bridges; canvas for coach, caboose and engine cab roofing; waterproof insulating papers for refrigerator cars; composition roll roofings; waterproof sheathing papers and asphalt shingles for buildings. Represented by Tom Lehon and Chas. V. Eades. Space 18.

Liberty Export & Import Corporation, New York, N. Y.—See Liberty Steel Products Company.

Liberty Manufacturing Company, Pittsburgh, Pa.—Liberty type (air and water operated) arch tube cleaners; Lagonda type (air and water operated) arch tube cleaners. Turbine cleaners of every description to clean every type of boiler condenser or evoporator tubes. Represented by Henry A. Pastre. Space 98.

Liberty Steel Products Company, Inc., New York, N. Y.—Davis solid trust freight and passenger brake beams; Liberty built-up brake beams; "Stefco" sectional steel buildings; Clark tructractors; nuts, bolts and rivets. Represented by J. W. Weinland, N. O. Aeby, R. P. Townsend, R. M. Smith, S. W. Midgley, J. M. Borrowdale, W. C. Schneider, J. H. Siebert, W. E. Fowler, W. S. Ottinger, C. W. Gridley, T. L. Lawry, E. L. Capehart, Frank Harrison and C. K. Drury. Space 618.

Liberty Tool Company, The, Baltimore, Md.—Portable drilling presses; stay bolt heading attachment; dolly bar; rivet heating furnaces; portable torches. Represented by E. Oliver Grimes, Jr., E. S. Astin, Andrew B. Moore and Peter P. Beck. Space 213.

Loco Light Company, The, Indianapolis, Ind.—Loco light generator in operation; headlight case. Represented by H. H. Tomlinson, C. C. Vossler and Fleming Brothers. Space 333.

Locomotive Feed Water Heater Company, New York, N. Y.—Model locomotive feed water heater and full size boiler feed pump. Represented by George M. Basford, Earl A. Averill, Walter H. Lovekin, C. R. Fairchild, A. R. Frankhauser, C. R. Hardy and H. V. Jones. Space 416.

Locomotive Firebox Company, Chicago, Ill.—Nicholson thermic siphon—its construction and application. Represented by John L. Nicholson, Chas. G Hawley and Stuart Hawley. Space 332.

Locomotive Lubricator Company, Chicago, Ill.—A 1919 model locomotive force feed lubricator, with diaphragm terminal check valve. Represented by O. H. Neal, C. W. Rudolph and W. J. Schlacks. Space 574.

Locomotive Stoker Company, Pittsburgh, Pa.—Type "D" duplex stoker; type "D" slope sheet coal pusher. Represented by C. D. Barrett, W. S. Bartholomew, J. J. Byrne, O. B. Capps, D. T. Carlisle, W. G. Clark, D. F. Crawford, N. M. Lower, L. E. Osborne, C. F. Pennypacker, E. Prouty, E. Ryan, L. V. Stevens and A. N. Willsie. Spaces 403-405-407.

Locomotive Superheater Company, New York, N. Y.—Pyrometer for superheater locomotives; developments in construction of superheater units; stationary superheaters. Represented by Geo. L. Bourne, F. A Schaff, R. M. Ostermann, G. E. Ryder, R. R. Porterfield, W. A. Buckbee, A. C. McLachlan, Geo. Fogg, H. B. Oatley, N. T. McKee, C. A. Brandt and Chas. H. True. Spaces 422-424.

Lodge & Shipley Machine Tool Company, The, Cincinnati, Ohio.—One 16"x6' portable selective head lathe with belted motor drive in leg; one 24"x10' selective head manufacturing lathe with belted motor drive on head; taper attachment; connected compound and plain rests; multiple length and cross feed stops; four-way tool block; high duty tool block, pan, pump and tubing. Represented by J. Wallace Carrel, H. J. Breitenbach and J. E. Kordenbrock. Space 170.

Long, Jr., Company, Chas. R., Louisville, Ky.—Samples of railway paints and paint films. Represented by Chas. R. Long, Jr., Harry Vissering, Guilford S. Turner, W. H. Heckman and Samuel W. Russell. Space 577.

Lucas Machine Tool Company, Cleveland, Ohio.—No. 32 "Precision" horizontal boring, drilling and milling machine. Represented by W. L. Cheney and F. P. Sprague. Space 138.

Ludlum Steel Company, Watervliet, N. Y.—Seminole unbreakable chisel steel; Mohawk extra high speed steel. Represented by P. A. E. Armstrong, S. T. Pearsons, C. J. Poore, James Cran and R. P. Devries. Space 334.

Lunkenheimer Company, The, Cincinnati, Ohio.—Valves; lubricators; oiling devices; oil and grease cups; injectors. Represented by Howard J. Evans and Andrew Lauterbach. Spaces 309-311.

McCabe Manufacturing Company, Lawrence, Mass.—Tube sheet for locomotive fire-box. Represented by Fred H. McCabe. Space 312.

Macbeth-Evans Glass Company, Pittsburgh, Pa.—Guage glass; lantern globes; chimneys, headlight; signal lenses; car lighting glass. Represented by Frank J. Lepreau. Space 364.

McConway & Torley Company, The, Pittsburgh, Pa.—Pitt pivoted passenger coupler; new developments in coupler and yoke connections. Represented by Wm. McConway, Jr., Stephen C. Mason, I. H. Milliken, H. C. Buhoup and W. J. Regan. Spaces 501-503-505.

McCord & Company, Chicago, Ill.—Journal boxes. Represented by Judson A. Lamon, L. A. Shepard and F. W. Craig. Space 629.

MacLoed Company, The, Cincinnati, Ohia.—Oil fuel rivet forges; portable sand blasts for cleaning bridges and steel cars; file sharpening and cleaning machine; flue welding apparatus; portable oil burners. Represented by Walter MacLeod and A. H. Schmidt. Space 186.

MacRae's Blue Book Company, Chicago, Ill.—MacRae's Blue Book. Represented by Alex Smith and L. R. Rollins. Space 22.

Mahr Manufacturing Company, Minneapolis, Minn.—Mahr No. 1-C steel car repair torch outfit; No. 2 boiler shop torch; Mahr self-contained type torches; oil fuel rivet forges and safety automatic shut-off valves. Represented by J. A. Mahr, J. R. Matthews and R. B. Ecker. Space 538.

Manning, Maxwell & Moore, Inc., New York.—Putnam gap lathe; Putnam slotter; Putnam planer; Putnam axle lathe; Putnam geared head lathe; National rivet header; National Heading machine; National hammer header; National bolt cutter; National tapper; Defiance rail drill; Defiance vertical drill; Defiance horizontal boring mill; Cincinnati crank planer; Cincinnati traverse head shaper; Cincinnati crank shaper; Woodward & Powell planer; Ashcroft steam and pressure gauges; Metropolitan injectors; Consolidated safety valves; Tabor indicators; Ashcroft paper tester; Ashcroft thickness gauge; Hancock inspirators; Hancock main steam valve; Hancock boiler check valve; Hancock hose strainer; Hancock cylinder cocks; Hancock oil cups; Hancock globe and angle valves; H. D. ejectors. Represented by A. J. Babcock, N. J. Derby, F. E. McKee, H. D. Carlton, P. M. Brotherhood, F. J. Baumis, J. Soule Smith, J. H. Bush, C. L. Brown, H. E. Lott, E. R. Frost, J. W. Spraggins, C. A. Spraggins, K. L. Ernst, Charles Harmon, Jr., James Briscoe, E. L. Fickett, Paul Dayton, Joseph Wainwright, B. T. Williston, W. H. Williston, F. J. Mawby, Thomas Stevens, P. G. Marsh, Jr., B. J. Mihans and H. Fenner. Spaces 104 to 136.

Massachusetts Mohair Plush Company, Boston, Mass.—Mohair plushes for car seats. Represented by William W. Melcher. Space 631.

Mead-Morrison Manufacturing Company, East Boston, Mass.—Mead-Morrison type "U" grab bucket for crane and derrick work; Mead-Morrison electric car puller. Represented by D. W. Coe, C. D. Bray, F. O. Clukies and R. C. Smith. Space 326.

Metal & Thermit Corporation, New York, N. Y.—Thermit and appliances; sample welds; samples of carbonfree metals and alloys produced by the Thermit process; large sample weld on a 9" crankshaft; materials for demonstration pipe welding for the purpose of welding locomotive superheater units; sample of superheater unit so welded. Represented by F. W. Cohen, W. R. Hulbert, H. D. Kelley, H. S. Mann, E. B. Bloom, J. G. McCarty and W. Aldrich. Space 184.

Midvale Steel and Ordnance Company, Philadelphia, Pa.—Twisted axles; bolster spring; rolled gear blanks; turbine bucket wheel; wheel center; and illustrations featuring wide range of products. Represented by J. C. C. Holding, L. B. Morris, L. R. Steur, E. Price, Jr., Frank Krouse, Joseph De Cray, Samuel Griffith, R. V. Sage, C. E. Keenan, F. W. Sager, H. E. Rowe, A. C. Howell, Stuart Hazlewood, J. C. Thomson, H. O. Williams, G. A. Richardson, J. K. Bayliss, Frank Huff, A. D. Wade, H. H. Neele, John Welsh, William Thornhill and Mr. McCarrigle. Space 637.

Milburn Company, The Alexander, Baltimore, Md.—Milburn acetylene generators; cut-weld combination torch; cutting torch; Milburn equal pressure welding torch; portable carbide lights. Represented by A. F. Jenkins and C. R. Pollard. Space 4, Pier End.

Miner, W. H., Chicago, Ill.—Friction draft gears; side bearings; safety hand brakes; refrigerator car door fasteners; drawbar yokes. Represented by W. H. Miner, A. L. Canavan, Bradley S. Johnson, J. R. Mitchell, J. F. O'Connor, W. E. Robertson, A. P. Withall and George A. Johnson. Spaces 584-585.

Mudge & Company, Chicago, Ill.—Mudge peerless ventilator; Mudge Slater removable box front end; Mudge Salvit compound. Represented by Burton Mudge, Karl J. Eklund, George W. Bender, William B. Ross and Sherman C. Amsden. Space 201.

Mutual Manifold Company, The, Baltimore, Md.—Way-bills; bills of lading; freight bills—triplicate and quadruplicate; telegraph blanks. Represented by Philip S. Carpenter. Space 376.

Napier Saw Works, Springfield, Mass.—Metal band saw with hydraulic feed. Represented by G. W. Fleming. Space 228.

Nathan Manufacturing Company, New York, N. Y.—Locomotive injectors; lubricators; boiler checks; water gauges, Klinger, Delco and fittings; check valves; steam valves; feed water strainer; boiler washers and testers; steam fire extinguishers; oil cups; gauge cocks; whistles; cylinder and drain cocks; globe and angle valves. Represented by Edward S. Toothe, Otto Best, J. G. Arn, J. F. Farrell, William Brumble, Harry Gettys, Richard Welsh and James Currie. Spaces 578-579.

National Car Wheel Company, Pittsburgh, Pa.—Star special cast iron car wheels for freight and tender service, from 60,000 lbs. to 140,000 lbs. capacity. Represented by John Howard Yardley, H. E. McClumpha, E. H. Chapin, R. H. Tate, J. Francis Weisbrod, H. L. Garvin, D. C. Davis and A. H. Strickland. Spaces 572-573.

National Lock Washer Company, The, Newark, N. J.—Models of car curtains; car curtain fixtures; window locks; sash balances; weather stripping; curtain rollers; national rib lock washers. Represented by C. H. Loutrel, F. B. Archibald, J. Howard Horn, R. L. Cairncross, A. T. Thompson and Daniel Hoyt. Space 541.

National Malleable Castings Company, The, Cleveland, Ohio.—Couplers; journal boxes; miscellaneous car castings. Represented by S. L. Smith, O. W. Loomis, James S. Slater, L. S. Wright, J. J. Byers, T. W. Aishton, R. T. Hatch, Charles H. McCrea, E. O. Warner, Charles A. Bieder, H. L. Mausk, Benjamin Nields, Jr., J. V. Davison, Jr., W. E. Coffin, George V. Martin, H. T. Krakau, George R. Farrell and E. H. Schmidt. Spaces 613-615.

National Railway Appliance Company, New York, N. Y.—Economy power saving meters; Johnson fare box—motor driven, in operation; Gog automatic drain valve; samples of flaxlinum; Garland ventilators; Anglo-American varnishes and enamels. Represented by B. A. Hegeman, Jr., Charles C. Castle, Harold A. Hegeman, Fred C. J. Dell, W. C. Lincoln, Frederick C. Dunham, J. Turner Martyn and Charles H. McCormick. Space 622.

National Railway Devices Company, Chicago, Ill.—Shoemaker vertical firedoor. Represented by Jay G. Robinson, E. J. Gunnison and A. F. Linds. Space F.—G.

National Tube Company, Pittsburgh, Pa.,—Reception booth. Represented by George N. Riley, P. J. Conrath, J. T. Goodwin and J. W. Kelly. Spaces 546-547.

Newton Machine Tool Works, Inc., Philadelphia, Pa.—Showing a 6" swivel head slotting machine; 26" blade bar type cold saw cutting-off machine; duplex keyseat milling and cottering machine; locomotive radius link milling machines. Represented by N. P. Lloyd and R. G. Holmes. Spaces 117-119-121.

New York Air Brake Company, The, New York, N. Y.—Reception booth. Represented by B. Pratt, C. E. Leach, S. T. Toby, N. W. Lyon, N. A. Campbell, William Owens and George Kliefges. Space 30.

Niles Bement Pond Company, New York, N. Y.—Moving pictures of railroad machine tools in actual shop operation. Represented by George Mills, Charles Lyle, N. C. Walpole, D. H. Teas, B. S. Skinner, H. F. Welch and E. L. Leeds. Space 180.

Norton, Incorporated, A. O., Boston, Mass.—High speed self-lowering lifting jacks. Represented by Arthur O. Norton, Harry A. Norton, Frank L. Gormley, Henry J. Wilson, George R. Law, Charles H. Smith, Jr., and F. B. Hartman. Space 551.

Oakley Machine Tool Company, The, Cincinnati, Ohio.—One No. 2 Oakley grinder—power feed, motor driven; one No. 2 Oakley universal cutter and tool grinder. Represented by Abbot A. Thayer and Irwin Newsome. Space 115.

Oesterlein Machine Company, The, Cincinnati, Ohio.—The "Ohio Tilted Rotary," which is a new continuous production, semi-automatic heavy duty milling machine, motor driven, which will be rigged up and turning out a different job each day of the Convention, showing both application and operation. Represented by Geo. M. Meyncke, Nick Baechle and Chas. D. Oesterlein. Space 145.

Okadee Company, The, Chicago, Ill.—"Okadee" blow off valves; blower valves; roundhouse washout valves; tender hose couplers; reflex water gauges; water glass protectors; automatic drain valves; locomotive front end hinge. Represented by A. G. Hollingshead, Harry Vissering, Chas. R. Long, Jr., W. H. Heckman and G. S. Turner. Space 575.

O'Malley-Beare Valve Company, Chicago, Ill.—Valves; multiplate; globe; angle; check; "Y" body; all types locomotive valves; shut off and blow out valve, and new type gauge cocks. Represented by J. E. Brown, E. O'Malley, J. N. Gallagher, T. O'Malley and J. M. Pigott. Space 177.

Oxweld Railroad Service Company, The, Chicago, Ill.—Reception booth. Represented by H. W. Jacobs, R. R. Browning, E. S. Richardson, J. P. Furbeck, William Leighton, George Thompson, C. B. Moore, M. C. Beymer, J. P. McWilliams, H. W. Schulze and G. M. Crownover. Space 5.

Page Steel and Wire Company, New York, N. Y.—Armco iron electric welding wire; Armco iron oxy-acetylene welding wire and "Copperweld" copper clad steel wire. Represented by W. T. Kyle, C. A. McCune, G. A. Paff and E. C. Sattley. Space 307.

Paige & Jones Chemical Company, Inc., New York City, N. Y.—Boiler feed water treatment. Represented by Fred O. Paige and H. N. Bennett. Space 363.

Pantasote Company, New York, N. Y.—Pantasote curtain upholstery; Agasote headlining, roofs, wainscoting and flooring; Steelasote; Electrosote. Represented by John M. High, Wm. A. Lake and Wm. Anderson. Space 401.

Parkesburg Iron Company, Parkesburg, Pa.—Model of flue sheet showing correct method of applying Parkesburg charcoal iron boiler tubes; small samples of Parkesburg charcoal iron boiler tubes for marine, locomotive and stationary boilers. Represented by H. A. Beale, Jr., George Thomas, 3rd, W. H. S. Bateman, R. J. Sheridan, G. W. Denyven, G. A. Cardwell, J. R. Wetherald, W. P. Canby and G. H. Woodroffe. Space 388.

Paxton-Mitchell Company, Omaha, Neb.—Metallic packing. Represented by James L. Paxton, D. E. Murphy and R. C. Fielding. Space 533.

Penn Iron & Steel Company, Creighton, Pa.—Reception booth. Represented by Henry F. Gilg and Chas. J. Nieman. Space 40.

Penn Seaboard Steel Corporation, Philadelphia, Pa.—Reception booth. Represented by T. Burd Zell, Craig Adair, Paul W. Day and Wm. F. Baker. Space 608.

Pilliod Company, The, New York, N. Y.—A quarter size running model Baker valve gear; standard parts for Baker valve gear; sectional low water alarm. Represented by E. J. Barnett, J. J. Donovan, K. J. Eklund, F. E. Pilliod, R. V. Pilliod, J. D. Purdy and R. H. Weatherly. Space 191.

Pocket List of Railroad Officials, The, New York, N. Y.—The Pocket List of Railroad Officials. Represented by J. Alexander Brown, Harold A. Brown and Charles L. Dinsmore. Space 7.

Pratt & Lambert, Inc., Buffalo, N. Y.—Two steel car sections showing Vitralite railway enamel; one large rack of display panels showing standard shades of Vitralite railway enamel. Represented by J. P. Gowing, J. R. Mickle and E. L. Georger. Space 612.

Pratt & Whitney, New York, N. Y.—See Niles-Bement-Pond Company, Space. 180.

Pressed Steel Car Company, New York, N. Y.—Reception booth with photographs. Represented by J. F. MacEnulty, N. S. Reeder, C. E. Postlethwaite, J. S. Turner, W. H. Wilkinson, J. H. Mitchell, H. H. Gilbert, K. C. Gardner, C. C. Clark, H. S. Hammond, Chas A. Lindstrom, B. D. Lockwood, J. F. Streib and L. O. Cameron. Spaces 545-601.

Pressed Steel Manufacturing Company, The, Chicago, Ill.—See Standard Railway Equipment Company. Space 428.

Pulverized Fuel Equipment Corporation, New York, N. Y.—Model of powdered fuel burning locomotive; literature on pulverized fuel. Represented by H. D. Savage and M. C. M. Hatch. Spaces 414-416-422-424.

Pyle-National Company, The, Chicago, Ill.—One type "K-2" 500-watt maximum capacity turbo-generator; one type "E-2" 500-watt normal capacity turbo-generator; one type "E" 1500-watt turbo-generator; one type "T" 2½ K. W. turbo-generator; one type "M" 3½ to 7 K. W. turbo-generator; one special 18" incandescent case and reflector fitted with No. 1450 lamp stand; one standard 18" incandescent case and reflector fitted with No. 1450 lamp stand; one model of the Young valve gear. Represented by R. C. Vilas, J. Will Johnson, Wm. Miller, R. C. Shaal, J. E. Kilker, O. W. Young, C. P. McGinnis, R. L. McIntosh, R. L. Kilker, Geo. E. Haas, J. L. Reese, A. R. Allen, E. M. Thomas, C. T. Tewkesbury and C. F. Owens. Spaces 602-604-606.

Q and C Company, The, New York, N. Y.—Q & C piston rod packing; piston lubricator; car and engine replacers; skid shoes or track skates and Gilman-Brown emergency knuckles. Represented by E. R. Packer, C. F. Quincy, F. F. Kister, W. W. Hoit, Edgar M. Smith, L. T. Burwell, J. V. Wescott and R. J. McComb. Space 510.

Quigley Furnace Specialties Company, New York, N. Y.—Hytempite, high temperature cement for bonding and repairing fire clay and silica brick furnace linings. Insulbrix. A cellular insulating refractory brick. Powdered coal apparatus for transporting, distributing and burning powdered coal and other fuels. Represented by W. S. Quigley and L. G. McPhee. Space 302.

Railway Devices Company, St. Louis, Mo.—"Western" angle cock holder; "Perfection" brake ratchet; "spiral" pipe clamps; "Iron Horse" or pedestal; "Sta-Rite" uncoupler and attachments. Represented by Louis A. Hoerr, Roland M. Hoerr and Sterling Campbell. Space 616.

Railroad Herald, The, Atlanta, Ga.—Copies of The Railroad Herald. Represented by E. C. Laird. Space 376.

Railway Materials Company, The, Chicago, Ill.—Steel back brake shoes. Represented by W. M. Simpson, I. B. Lesh, Geo. F. Allen and E. C. Folsom. Space 561.

Railway Review, Chicago, Ill.—Copies of weekly publication. Represented by Willard A. Smith, Harold A. Smith, J. E. Gougeon, A. E. Hooven, C. L. Bates, L. H. Lozier, Robt. B. Armstrong and John Lammedee. Spaces 12-14.

Railway Storage Battery Car Company, New York, N. Y.—Operating exhibit on tracks of Atlantic City and Shore Railroad of 50' steel combination passenger and baggage Edison Battery car, in service between Atlantic City and Ocean City. Represented by L. Klopman, F. N. Koziell and C. A. Wipf. Space 634 and on exhibition track.

Reading Specialties Company, Reading, Pa.—Car replacers; skid shoes; rail benders; guard rail clamps; replacer clamps; street car replacers; portable derails; rail braces. Represented by J. Turner Moore, M. G. Moore, B. J. Buell, J. J. O'Connell, A. P. Haines, W. J. Zimmerman, W. H. Doherty L. G. Schmitt and Chas. F. Ludstone. Space 620.

Reliance Electrice & Engineering Company, Cleveland, Ohio.—Reliance direct and alternating current motors; Bardons & Oliver cutting off machine. Represented by C. L. Collens, H. M. Hitchcock, A. M. MacCutcheon, A. W. Ray, H. J. Fisher, S. G. Boyd and R. Timmerman. Spaces 135-137-139.

Republic Iron & Steel Company, Youngstown, Ohio.—Reception booth. Represented by H. L. Rownd, W. B. Topping, C. S. McKinley, W. H. Oliver, W. H. Hunter and Frank Phalen. Spaces 517-519.

Rich Tool Company, Chicago, Ill.—High speed drills, reamers, forged rivet sets and chucks; milling cutters. Represented by W. B. Sullivan, F. H. Whiteside, C. M. Conner, T. H. Carlin, Jr. and J. L. Crowley. Space 303.

Rivet Cutting Gun Company, Cincinnati, Ohio.—Flexible rivet cutting guns; flexible slag guns; rivet catchers. Represented by J. M. Crowe and L. K. DeBus. Space 513.

Robinson Connector Company, The, New York, N. Y.—The Robinson automatic train pipe connector. Represented by A. R. Whaley and H. D. Cameron. Spaces 328-330.

Robinson Exhaust Company, Boston, Mass.—Robinson exhaust nozzle. Represented by Gordon Dexter, Frederic Parker, J. G. Platt and V. W. Ellet. Spaces 564-565.

Rogers Company, H. A., New York, N. Y.—Moncrieff's gauge glasses; tubular glasses; Perth brand—up to 200 pounds steam pressure; Unific brand—up to 400 pounds steam pressure; Beacon red; lubricator glasses; reflex gauge glasses; gauge glass strips; glass protector slides. Represented by Harry S. Griffith. Space 372.

Rogers Journal Packing Company, Inc., Chicago, Ill.—Stecos journal packing; Paine toggle bolts and expansion shells. Represented by Charles A. Elsy. Space 628.

Rome Iron Mills, Inc., New York, N. Y.—Samples of Rome superior staybolt iron; Rome Perfection engine bolt iron; Rome hollow staybolt iron. Represented by B. A. Clements, Major Weston Jenkins and C. C. Osterhout. Spaces 414-416-422-424.

Ryerson & Son, Joseph T., Chicago, Ill.—Ulster special solid staybolt iron; Ulster special seamless hollow iron; engine bolt iron; complete Ryerson flue shop equipment; complete Ryerson spring top equipment; flue cleaners; Ryerson friction saw for rail cutting. Represented by H. A. Gray, J. P. Moses, A. W. Willcuts, H. T. Bradley, E. W. Kavanagh and J. H. Craigie. Space 176.

Safety Car Heating & Lighting Company, The, New York, N. Y.—Pintsch mantle light; car lighting electric generators; car lighting fixtures; Oxy-Pintsch metal cutting equipment; electric fans. Represented by W. L. Conwell, J. A. Dixon, A. C. Moore, W. L. Garland, George E. Hulse, L. Schepmoes, H. K. Williams, R. H. Harvey, J. H. Rodger, H. D. Donnell, V. S. Henry and J. S. Henry. Space Stairway Platform.

Safety Nut & Bolt Company, The, Cleveland, Ohio.—The Stevenson safety nuts, bolts and washers, spring clips, U bolts, shackle bolts and turn-buckles. Represented by E. Ellis Clepper, R. D. Stevenson and W. W. Bonnell. Space 17.

Sargent Company, Chicago, Ill.—Sargent safety water gauge; Ironclad water glass protector; Loedige quick acting blower valve; Remi guage cock; Sargent automatic feed grease cup; Martin self-locking grease plug. Represented by George H. Sargent and George S. Garren. Space 600.

Schaefer Equipment Company, Pittsburgh, Pa.—Schaefer truck lever connections; Schaefer detachable brake jaws; K. C. repair card holder. Represented by Frederic Schaefer, E. J. Searles, H. G. Doran and S. M. Hindman. Space 511.

Schroeder Headlight & Generator Company, Evansville, Ind.—Turbo-generator for electric headlights; electric headlights; oil headlights; electric headlight accessories. Represented by W. A. Carson, F. W. Edmunds, J. Henry Schroeder, L. B. Jones, W. T. Manogue and A. J. Leonard. Spaces 367-369.

Sellers & Company, Inc., William, Philadelphia, Pa.—Table exhibit of locomotive injectors and accessories pertaining thereto. Represented by Strickland L. Kneass, Charles T. Wilson, John D. McClintock, Edward L. Holljes and James R. New. Space 625.

Shepard Electric Crane & Hoist Company, Montour Falls, N. Y. —Two electric hoists, one electric winch, and accessories. Represented by A. J. Barnes, R. H. McGredy, H. W. Gledhill and W. C. Briggs, District Manager of New York Territory. Space 215.

Simmons-Boardman Publishing Company, New York, N. Y.—Copies of the Railway Age; Railway Mechanical Engineer; Railway Maintenance Engineer; Railway Electrical Engineer; Railway Signal Engineer; Locomotive Dictionary and Cyclopedia, Car Builders' Dictionary and Cyclopedia, and other railroad literature. Represented by E. A. Simmons, L. B. Sherman, Henry Lee, S. O. Dunn, R. V. Wright, C. R. Mills, F. S. Dinsmore, A. F. Stuebing, C. B. Peck, F. H. Thompson, C. N. Winter, F. C. Koch, H. H. Marsh, J. P. Risque, A. G. Oehler, J. M. Rutherford, R. H. Smith, J. G. Little, F. J. Fischer, C. W. Foss, F. W. Kraeger, H. L. Burrhus, J. E. Anderson, S. B. Outwater, L. R. Wolff, N. H. Crossland, C. L. Fletcher, A. E. Ortlinghaus and T. E. Crossman. Space 1.

Simmons Hardware Company, St. Louis, Mo.—Electric welded ware; gray super-seated cylinder cock; shovels; scoops; hickory handles. Represented by J. B. Webb and H. W. Jacques. Space 331.

Simonds Manufacturing Company, Fitchburg, Mass.—Metal cutting circular saws—both solid and inserted tooth; hack saw blades; files; car builders' saws; an inserted tooth metal saw with high speed steel teeth will be in operation, and a newly designed metal saw sharpening machine for keeping high speed steel teeth in perfect condition will be demonstrated. Represented by H. B. McDonald, R. D. Baldwin, B. F. Kelly and S. Patterson. Space 306.

Smith Locomotive Adjustable Hub Plate Company, The, Chicago, Ill.—Locomotive driving wheels mounted on axle with both solid and sectional adjustable hub plates (lateral devices) therein; literature and catalogs. Represented by A. J. Sams and R. G. Long. Spaces 602 to 606.

Smoke Jack Company, The, East Boston, Mass.—Standard mill type smoke jack, assembled; Standard mill type smoke jack, crated for shipment; model of mill type smoke jack; photographs of installations. Represented by Robert McKillop, Walter Richardson and Daniel W. Coe. Space 220.

Southern Locomotive Valve Gear Company, Knoxville, Tenn.—Valve gear; Murden blow-off valve; Brown power reverse gear. Represented by W. S. Murrian and E. L. Chollman. Space 230.

Southern Railway Supply & Equipment Company, St. Louis, Mo. —Saunders car stopper; Scarritt car seats. Represented by Laurance Boswell and Blake C. Howard. Spaces 313-315.

Southern Wheel Company, St. Louis, Mo.—One pair of new M. C. B. design 33" No. 700 wheels on axle, the wheels having flanges 3/16" thicker at base line than M. C. B. standard; one pair of Southern Wheel Company special No. 800 33" wheels on axle, the wheels having flanges 3/16" thicker at base line than M. C. B. standard; one pair Southern Wheel Company special No. 800 wheels on axle, with flanges 3/16" thicker at base line than M. C. B. standard, which have been in service for 17 months under 50-ton steel hopper coal car Atlantic Coast Line R. R. These wheels will be shown on track, with standard frog and guard rail to show guard rail clearance. Represented by Frank C. Turner, F. O. Bunnell, J. B. Spencer and Sam C. Watkins. Space 418.

Southwark Foundry & Machine Company, Philadelphia, Pa.—Southwark Mason washer press; spring banding press; boiler tube welding machine. Represented by W. H. Harman, F. G. Schranz and G. Harry Case. Space 178.

Speedograph Corporation, Newark, N. J.—Loco-Recorder, model K, speed, time and distance recording instrument for road engines; loco-recorder, model L, recording instrument for switch engines, showing idle and working time, in hours and minutes, the speed at any point or time and exact mileage covered. Represented by H. H. Smith, A. F. Wallbillich and R. V. Paterson. Space 630.

Standard Asphalt and Refining Company, Chicago, Ill.—Sarco mineral rubber floor, refrigerator compound, fabric and No. 6 waterproofing; Sarco battery sealing compound; Sarco pipe coating. Represented by R. F. Trumbull. Space 381.

Standard Car Truck Company, Chicago, Ill.—Trucks, models and specialties on pier; two cars on Mississippi Avenue track exhibit. Represented by J. C. Barber, J. T. Milner, Lee W. Barber, F. L. Barber and E. W. Webb. Spaces 190-192.

Standard Coupler Company, New York, N. Y.—Friction draft gears. Represented by George A. Post, A. P. Dennis, E. H. Walker, R. D. Gallagher, Jr., and George A. Post, Jr. Space 500.

Standard Railway Equipment Company, New York, N. Y.—National bottom supported car door fixtures; Murphy XLA flexible roof; Imperial type "B" release rigging; Imperial centering device; Carmer release rigging; steel end; Fowler upper buffer spring; carlines. Represented by W. P. Murphy, A. C. Murphy, G. T. Cooke, S. G. Rea and A. A. Frank. Space 428.

Standard Stoker Company, Inc., New York, N. Y.—A working model of the Standard Stoker for locomotives will be shown in booth 4. In booth 338, there will be motion pictures showing the operation of a Standard stoker on a locomotive now in service; also pictures of our electric steel furnace at Erie, Pa., and the assembling of stokers in the machine shop. Represented by James A. Carey, F. H. Cunningham, Harvey L. Walker, Eugene duPont, Alexis I. duPont, Clarence E. Pratt, D. B. Fawcett, J. B. Lininger and W. C. Carter. Spaces 4 and 338.

Stone Franklin Company, New York, N. Y.—Stone-Franklin single battery coach equipment operating with 23 cells Edison A-4H. Represented by Ralph G. Coburn, Charles E. Walker and Harry D. Rohman. Space 406.

Strong-Kennard & Nutt Company, The, Cleveland, Ohio.—Safety devices in the form of clothing, surgical appliances, goggles, eye protectors and masks. Represented by B. W. Nutt, Thomas P. Scully, J. H. Hopper and F. B. Frank. Space 514.

Swind Machinery Company, Philadelphia, Pa.—Bradford lathe; Gray's sheet metal cutter; Barnes drill; Willard lathe; Leland-Gifford drill; Oesterlein grinder. Represented by L. H. Swind, J. E. Brandt, W. J. Powers and M. R. Carson. Space 97.

Symington Company, The T. H., New York, N. Y.—Farlow draft attachments; Symington journal boxes; Symington flexible dust guards. Represented by T. H. Symington, C. J. Symington, J. F. Schurch, R. H. Gwaltney, T. C. deRosset, I. O. Wright, A. H. Weston, C. R. Naylor, W. G. Hoffman, Jr., and D. S. Barrows. Spaces 568-569.

Talmage Manufacturing Company, The, Cleveland, Ohio.—American automatic connector; Cleveland low water alarm; Talmage hand brakes; steam chest and cylinder lubricating drifting valve; blow-off valves; diverting valves. Represented by J. G. Talmage, M. A. Barber, Frank M. Roby, J. Frank Walker and Alfred F. Letherer. Spaces 354-361.

Trumbull Waste Manufacturing Company, Philadelphia, Pa.—Curled Tampico journal packing; cotton wiping waste. Represented by R. R. Bilter. Space H.

Tuco Products Corporation, New York, N. Y.—Tuco products; flexolith flooring; national standard roofing; resisto insulation; Tucork insulation; national trap door; universal trap door; K-1 kicker lock; deck sash ratchets; Imperial car window screens; universal car window screens; Reliance sash balances; Perfection sash balances; preservative; metallic steel sheathing; Brown weatherstrips; Giessel sanitary water cooler; Berwick electric rivet heater. Represented by David W. Pye, L. F. McNally, Frank N. Grigg, Garrett Burgert, W. J. Elliott and J. W. Coleman. Space C.

Underwood Corporation, H. B., Philadelphia, Pa.—One portable cylinder boring bar; one portable cylinder boring bar attached to cylinder showing method; one circular planer tool; one heavy type rotary planer; one dome facing machine; one 8" crank pin truing machine set upon crank. Represented by D. C. Hutchner. Space 301.

Union Connector Company, St. Louis, Mo.—Union connectors for passenger service and accessories; "Union Jack" truck. Represented by Charlton A. Alexander and L. D. Woodruff. Space 378.

Union Draft Gear Company, Chicago, Ill.—Cardwell friction draft gear type G class 11-A; Cardwell friction draft gear type G class 11-A-compound. Represented by J. R. Cardwell, L. T. Canfield, C. H. Tobias, H. Barnard, J. W. Hathaway, W. G. Krauter, J. E. Tarelton and C. J. Gorman. Spaces 413-415.

Union Metal Products Company, Chicago, Ill.—See Standard Railway Equipment Company. Space 428.

Union Railway Equipment Company, The, Chicago, Ill.—Ureco metal roof; drop brake shaft; refrigerator brine tank valves; hand holes and tank supports; Ureco coupler centering device; uncoupling lever; Ureco pipe clamp. Represented by Wm. B. Hall, A. F. O'Connor and A. C. Lewis. Space E.

Union Spring & Manufacturing Company, Pittsburgh, Pa.—Journal boxes. Represented by L. G. Woods, F. E. Schaeffer, J. W. Chandler and A. C. Woods. Space 553.

United Engineering & Foundry Company, Pittsburgh, Pa.—Working model of steam hydraulic forging press and photographs of forge shop installations. Represented by Arnold P. Bark. Space 540.

U. S. Light & Heat Corporation, Niagara Falls, N. Y.—Complete carlighting; axle equipments; direct current arc welder converter; alternating current arc welding motor generator. Represented by W. L. Bliss, H. A. Matthews, R. H. Van Nest, R. Bauer and W. B. Turbayne. Spaces Welding at Pier End No. 2 and in Hall 325-327.

United States Metallic Packing Company, The, Philadelphia, Pa.—Models of King metallic packing; Gollmar bell ringer; Leach pneumatic track sanders and Security knuckle and wrist pin. Represented by Elliott Curtiss, M. B. Brewster, J. S. Mace, R. R. Wells, J. T. Luscombe, J. E. Keefe, L. B. Miller and Harry E. Hyslop. Space 566.

Unit Railway Car Company, Boston, Mass.—Steam driven unit car. Represented by H. C. Dodge, F. O. Stanley, B. J. Moses, W. J. Lavarre, J. F. Slimp, P. H. Gentzel, A. R. Crapo and H. Edwards. Space Track space Mississippi Avenue.

Universal Car & Hose Coupler Company, Oklahoma City, Okla.—Automatic car and steam hose coupler. Represented by J. H. Funk, O. H. LeCompte, Joseph LeCompte and J. A. Houle. Space 38.

Universal Draft Gear Attachment Company, Chicago, Ill.—Universal cast steel re-inforcing draft arms, coupler yokes and malleable draft lugs and plates. Represented by C. J. Nash and C. C. Kinsman. Space 515.

Universal Equipment Company, The, Toledo, Ohio.—National Gregory automatic fire door. Represented by Frank I. Isbell. Space H.

Vapor Car Heating Company, Inc., Chicago, Ill.—Passenger train car heating; vapor system of heating; steam pressure system of heating; combination steam and hot water heating system; car heating specialties; steam specialties; emergency stoves; ventilators. Represented by Egbert H. Gold, Joseph E. Buker, S. Higgins, E. A. Schreiber, B. A. Keeler, E. E. Smith, H. F. Lowman, R. P. Cooley, Wm. Damm, L. B. Rhodes, F. F. Coggin, F. A. Purdy, C. E. Lowell, N. F. Burns, and E. C. Post. Spaces 210-212-214-216-218.

Vissering & Company, Harry, Chicago, Ill.—Viloco and Leach types locomotive sanders; Viloco fire door; forged steel draw bar yoke; steam compressor governors; Crescent metallic piston rod and valve stem packing; Viloco bell ringers. Represented by Harry Vissering, G. S. Turner and W. H. Heckman. Space 576.

Walworth Manufacturing Company, Boston, Mass.—Walworth cast iron, malleable and steel pipe fittings, brass and iron body valves; Genuine Walworth Stillson wrenches; Parmelee wrench, Walco Hex wrench; "Bostong" wrench and full line of tools. Kewanee union and specialties. Represented by L. F. Hamilton, H. S. Patterson and H. T. Goodwin. Space 412.

Warner & Swasey Co., The, Cleveland, Ohio.—One No. 2A universal hollow hexagon turret lathe with bar equipment and 5 H.P. General Electric motor; No. 3A ditto with chucking equipment and 10 H.P. Reliance motor. This machine to operate on piston valve followers using both "Stellite" and high speed steel cutters. Represented by L. K. Berry, E. R. Gardner, H. E. Witham, C. E. Neubert and Walter Loegler. Spaces 123-125.

Watson-Stillman Company, The, New York, N. Y.—High speed ball bearing screw jack with automatic lowering device; Watson-Stillman hydraulic jacks; 250-ton crank pin press (hydraulic); Stauchian pipe bender (hydraulic); 15-ton telescopic hydro-pneumatic pit jack; hydro-pneumatic accumulator; four plunger motor driven pump; hydraulic leather packings. Represented by E. A. Stillman, G. D. Kershaw, H. D. Nitchie, W. B. Updegraff, F. T. West, C. Wessels, E. E. Radeck and E. B. Fleming. Spaces 151-153-155.

Waugh Draft Gear Company, Chicago, Ill.—Waugh draft gear with auxiliary cushion; passenger car buffing device, type "H"; stub buffer for express and refrigerator cars; draft gear with side carrier plates adaptable for U. S. standards; Anderson friction draft gear, type "B"; Chaffee draw 34 bar centering devices. Represented by J. M. Waugh and S. T. Rowley. Spaces 537-539.

Wayne Oil Tank and Pump Company, Fort Wayne, Ind.—One-barrel signal oil outfit; cross sectional view of two-barrel cylindrical tank (underground) and pump; two-barrel outfit with barrel cradle; cross section of two barrel cellar tank and pump; two long distance pumps; three long distance pumps. Represented by R. S. Bohn. Space 206.

West Disinfecting Company, New York, N. Y.—Automatic deodorizing appliances; Coro Nolcum disinfectant and cleanser; fumigators; insector machines and liquids for exterminating the insects; liquid soaps and dispensers; metal polish; paper towels and cabinets; portable steam sterilizer for sterilizing water coolers; stock car sprays. Represented by H. E. Daniels, C. P. Williams, W. L. Larry, J. A. Martinka, T. F Kelly and Chas. Auerbach. Space 26.

Western Machine Tool Works, Holland, Mich.—One six foot extra heavy duty plain radial drill. Represented by G. J. Bosch. Space 222.

Western Railway Equipment Company, St Louis, Mo.—"M. C. B." malleable journal wedges; "Western" brake jaws; "Linstrom locomotive siphon; "Security" dust guards. Represented by Louis A. Hoerr, Roland M. Hoerr and Sterling Campbell. Space 616

Western Steel Car & Foundry Company, New York, N. Y.—See Pressed Steel Car Company. Spaces 545-661.

Westinghouse Air Brake Company, Pittsburgh, Pa.—Reception booth. Represented by A. L. Humphrey, W. S. Bartholomew, G. W. Wildin, C. C. Farmer, E. A. Craig, J. R. Ellicott, C. J. Olmstead, C. P. Cass, Robert Burgess, C. R. Ellicott, John B. Wright, S. G. Down, F. H. Parke, F. V. Green, T. L. Burton, F. M. Nellis, F. H. Whitney, J. S. Y. Fralich and R. E. Adreon. Space 19 to 29.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.—Arc welding motor-generator; small turbine generator unit; motor driven grinder; small portable drills; electric fans. Represented by J. C. McQuiston, J. C. Bair, J. Andrews, J. A. Albercht, W. P. Cochan, C. M. Harris, F. O. Kirkpatrick, H. C. Mode, R. F. Moon, W. H. Patterson, Charles Rabbons, R. J. Ross, H. Stinemetz and E. W. Wise. Spaces 19 to 27.

Wheel Truing Brake Shoe Company, Detroit, Mich.—Various forms of abrasive shoes designed for grinding car wheels and locomotive driver-wheels. Represented by J. M. Griffin and Perry Allen. Space 507.

White American Locomotive Sander Company, Inc., Roanoke, Va.—Graham-White perfect shown in operation. Represented by John E. Graham, James Frantz and Oscar F. Ostby. Space 205.

Whiting Foundry Equipment Company, Harvey, Ill.—Working models of type "R" electric crane trolley and Whiting electric screw-jack locomotive hoist; photos, drawings and catalogs of foundry equipment, cranes and railway equipment, such as coach hoists, turntable centers and tractors, transfer tables, car wheel foundries. Represented by R. H. Bourne, R. S. Hammond and G. W. Ristine. Space 179.

Wilmarth & Morman Company, Grand Rapids, Mich.—New Yankee drill grinders; Wilmarth & Morman universal grinders and surface grinders. Represented by Joseph H. Hazley and B. C. Saunders. Space 183.

Wilson Corporation, The J. G., Norfolk, Va.—Rolling wood doors; rolling steel doors. Represented by M. S. Tremaine, P. H. Wilson, R. T. McKnew, L. H. Myrick, Geo. D. Dodge, H. H. Charles, E. A. Baker, E. Doscher and A. H. Dodge. Space 336.

Wilson-Imperial Company, Newark, N. J.—Car cleaning methods and sundries specialties connected with the up-keep of passenger cars. Represented by J. MacNaull Wilson, Ellsworth Wilson, D. J. Giles and William McCandless. Spaces 202-204.

Wilson Welder & Metals Company, Inc., New York, N. Y.—Wilson plastic-arc welder. Represented by J. O. Smith, R. S. Drummond and Claude Hartford. Spaces 224-226.

Wine Railway Appliance Company, The, Toledo, Ohio.—Wine freight car ladders; side bearings; hopper door mechanism; ventilators. Represented by William E. Wine, William F. Cremean, Cyrus J. Holland, R. F. Tillman, J. L. Tillman and L. J. Tillman. Space 366.

Wood Iron & Steel Company, Alan, Philadelphia, Pa.—Reception booth. Represented by L. G. W. Carpenter, W. W. Lukens and C. O. Hadley. Space 11.

Woods & Company, Edwin S., Chicago, Ill.—Anti-friction side and center bearings for freight cars, passenger cars and locomotives. Represented by Albert G. Welch, H. M. Perry and A. A. Weigel. Space 617.

Wyoming Shovel Works, The, Wyoming, Pa.—Veteran red edge locomotive scoops; red edge locomotive scoops. Represented by H. T. Potter and E. L. Ruby. Space 209.

Yale & Towne Manufacturing Company, New York, N. Y.—Chain blocks; electric hoists; trolleys (I-beam) winches; portable floor cranes; locks and hardware. Represented by C. W. Beaver, A. L. Connor J. F. Stoldt, H. R. Butler and W. C. Bigelow. Spaces 148-150.

Railway Age

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WE GUARANTEE that of this issue, 17,000 copies were printed; that of these 17,000 copies, 15,406 were mailed to regular paid subscribers to the Railway Age and the Railway Mechanical Engineer; 119 were mailed to advertisers, 300 were provided for counter and news companies' sales, new subscriptions, bound volumes, copies lost in the mail and office use; and 1,175 copies for distribution at Atlantic City.

THE RAILWAY AGE is a member of the Audit Bureau of Circulations (A. B. C.) and the Associated Business Papers. (A. B. P.)

Brake Shoe and Brake Beam Report

The report of the Brake Shoe and Brake Beam Equipment Committee, which was presented during yesterday morning's session, was received without discussion, not because of any lack of interest in the subject, but because in a large measure the report is a forecast of what may be expected in the way of definite proposals for consideration next year. There is much in the report which is of great interest and will undoubtedly be carefully considered by the membership of the Mechanical Section. In general, the plan of procedure which the committee proposes to follow is to be highly commended. The five suggested steps in which subjects before the committee will be advanced to the point of consideration for advancement to the standards of the Section will offer ample oportunity for the formation of well digested and crystallized opinions on the part of the membership, so that better ballot action may be of a more intelligent nature than it has been some times in the past. One point mentioned in the report is worthy of especial attention. This is the effect of the change in the relative location of the center loop hanger opening of the brake head and the center line of the brake beam strut, raising the center of the hanger above the center of the strut. The result, under load, is an eccentrically loaded brake shoe, with a tendency for greater wear at the bottom than at the top. With the brakes released the brake heads will tend to drag at the top, while hanging free at the bottom. The proposal that the standard and recommended practice sheets of the association show a method of laying out the brake head, rather than mere detailed dimensions of the finished heads, is an excellent one, as it should avoid all possible misunderstandings in the interpretation of the standard, whatever it may be in its finally adopted form. The suggestion of the committee that the judgment of a committee member may be of an opposite character in his official capacity from that exercised in the capacity of a representative member is open to question. If the members of a committee cannot support the recommendations to which they attach their signatures as committee members, when acting on the same propositions in the letter ballot, they have little right to expect the support of the association as a whole to the propositions which they propose that the association adopt for universal application.

Track and Other Outside Exhibits

Track exhibits this year are probably the most remarkable that have ever been seen at any convention during the history of the association. The exhibit of railroad equipment alone is unusually extensive and interesting, but in addition to the railroad equipment there are a number of heavy railroad mounts for the Army and Navy Ordnance that are not only noteworthy because of the natural interest attaching to equipment of this nature at the present time, but also because of the problems which had to be solved by the designers to provide for the extraordinary stresses to which equipment of this sort is subjected. It is of interest to note that in some cases this equipment differs very little from standard railroad practice. Two of the Army rifles, the seven-inch and the eight-inch, the mounts of which are of the well-car type, are carried on standard M. C. B. trucks, a 50-ton truck in one case and a 70-ton truck in the other. As a whole, this part of the exhibit is a remarkable demonstration of the adaptability of the manufacturers of railway equipment, who, in the time which has elapsed since the last convention in Atlantic City, have produced large quantities of ordnance and other munitions in addition to their regular products.

Statistics of Exports

The *Railway Age* has referred in the past to the good work being done by the Latin-American Division of the Bureau of Foreign and Domestic Commerce in connection with its reports on railways and markets for railway supplies in various South American countries. It now desires also to express its appreciation of the work being done by another of the divisions of the bureau —namely, the Division of Statistics. That division for the past few months has been compiling detailed figures of exports of all kinds, classified by countries of destination, and has included the tabulation of export figures of railway supplies under the following heads: locomotives; cars; car wheels and axles, and railway track material. The figures in question have been reproduced in the foreign railway news column of the *Railway Age,* and, we believe, have served a real purpose, not only in stimulating interest in export trade, but in showing that this interest is proving a most practical one. The tabulation by countries of destination is especially valuable, as it enables the observer to see into what markets our trade is expanding and permits the drawing of

definite conclusions therefrom. The figures as compiled by the division for the year thus far are as follows:

Month	Locomotives No.	Locomotives Value	Freight Cars No.	Freight Cars Value	Car Wheels and Axles Value
January	87	$3,076,543			$278,393
February	85	2,584,269	583	$957,128	541,630
March	27	852,224			686,281
April	55	2,193,168	1,005	1,913,728	946,304

The increase in the exports of car wheels and axles in the four months is especially encouraging, although the exports of cars and locomotives are not very large. It should be borne in mind, however, that they represent in reality the beginning of our peace time export trade, and will no doubt increase from month to month as conditions generally improve. It is to be hoped that the bureau will keep up this work and thereby supply an indication of the increase in exports of railway supplies that is rightly to be expected.

Depreciation of Freight Cars

THE PROLONGED and animated discussion of the report presented by the Committee on the Depreciation for Freight Cars shows that the members generally were greatly interested in the subject. The accurate determination of the average life of cars is extremely important because of the large amount of money involved in the settlement for destroyed cars. The committee is to be commended for its work in compiling statistics regarding the average life of wooden and steel equipment to be used as a basis for the rate to be applied under various conditions.

One point brought out very clearly in the course of the discussion was the impracticability of settling for cars on any but an average basis. The conflicting statistics regarding the life of steel cars shows the extent to which the type of construction, the weight of the car, the standard to which it is maintained and the service to which it is assigned affect the life and consequently the rate of depreciation. Obviously, the effect of these factors cannot be evaluated in fixing the settlement price and the average age at which the cars are dismantled furnishes the only satisfactory data on which to base the depreciation rate.

The limiting of depreciation to 50 per cent. of the value now probably strikes a bare average for all cars. Extensive studies have shown that the estimated service life based on the physical condition alone does not decrease more than 40 per cent. in actual service, but the older equipment, of course, must be retired, due to obsolescence, even though the individual parts of the car may be in good condition. If it were practical to make a separate classification for the older types of equipment, the maximum depreciation might be increased to an amount equal to 100 per cent. minus the scrap value.

Some road will, no doubt, question the advisability of applying the same rates of depreciation to the truck that are applied to the car body. Many roads make a practice of setting aside the trucks removed from cars which are dismantled and applying them under company service for less capacity equipment, such as stock cars. The long life of the truck and the high scrap value of the wheels and axles would seem to call for a rate of depreciation lower than that which is fixed for the car body.

The work of the committee during the past year furnishes an excellent foundation for the development of a thoroughly logical basis for settling for destroyed cars. The continuation of its investigation, particularly with regard to the life of steel cars and the establishment of a separate rate for rebuilt cars, promises to furnish data that will eliminate many of the principal objections to the former rules covering this subject.

Government's Debts to Railway Supply Companies

NO OTHER PEOPLE IN THE COUNTRY will be so glad to see the $750,000,000 railroad appropriation bill passed by Congress as the railway supply people. The experience of the railway supply people with Government operation has been, in the main, a distinctly unpleasant one. They were at first confronted with what was regarded as a demand that they should, in dealing with the railways under Government control, pool their patents and forego the royalties upon them. Next, an attempt was made to force them to sell to the Government on a lower basis of profit than any other class of concerns that was doing business with the Government. Later they were presented with a ruling of the Attorney-General of the United States to the effect that every concern selling any kind of goods to the Government railways must insert in the contract a warranty—later modified—that no commission was or would be paid to any agent for having got the business.

But perhaps the thing which, under Government control, has caused the supply people more trouble than anything else has been the delay of the Government in paying its bills. When the railroad appropriation bill was killed by a filibuster at the last session of Congress, the Railroad Administration owed the railway equipment and supply concerns many millions of dollars. The passage of that bill would have enabled the Administration to meet its obligations. Its defeat rendered it impossible for the Railroad Administration to pay its debts. In consequence, for months the Government has owed the railway equipment and supply companies vast sums of money. In order to continue to carry on their business, the supply companies have been obliged to borrow large sums from the banks, on which they have had to pay interest. They had to do this borrowing because the Government did not pay them what it owed them, but on a large part of its indebtedness to them the Government has not paid interest. In consequence, the companies have had to strain their credit at the banks and to incur losses by paying interest on money which they should have received from the Government instead of being obliged to borrow it.

It is not the fault of the Railroad Administration that its debts to the railway supply companies have not been promptly paid, but it is the fault of the Government. Congress is a branch of the Government, and it was its failure to pass the needed legislation which left the Railroad Administration without adequate funds. Congress is now engaged in partially repeating its former performance. Director General Hines asked it at the present session to appropriate $1,200,000,000 for the Railroad Administration. He estimated that this amount would be required to carry the administration through to the end of the present year. Without any investigation, Congress has cut the appropriation to $750,000,000. This amount, it is understood, will be sufficient only to enable the administration to meet its existing obligations, and, as soon as they are settled, it will have to begin to go into debt again.

The Government has always borne the reputation of being a bad customer to do business with. The railway supply concerns can bear testimony that in its dealings with them during the last year and a half it has fully lived up to its reputation.

Program For To-day

9.30 A. M. TO 1.30 P. M.

Discussion of Reports on:	
Car Wheels	9.30 A. M. to 10.00 A. M.
Standard Blocking for Cradles of Car Dumping Machines	10.00 A. M. to 10.30 A. M.
Specifications and Tests for Materials (M. C. B.)	10.30 A. M. to 11.30 A. M.
Welding Truck Side Frames, Bolsters and Arch Bars	11.00 A. M. to 11.30 A. M.
Couplers	11.30 A. M. to 12.00 M.
Draft Gear	12.00 M. to 12.30 P. M.
Questions proposed by Memebrs	12.30 P. M. to 1.30 P. M.

ENTERTAINMENT.

10.30 A. M.—Band Concert. Entrance Hall, Million Dollar Pier. Royal Scotch Highlanders' Band.

3.30 P. M.—Orchestral Concert and Impromptu Dancing. Entrance Hall, Million Dollar Pier. Fry Philharmonic Orchestra. Tea will be served at 4.30 P. M. in Entrance Hall.

9.30 P. M.—Carnival Night. Special Features. Ball Room, Million Dollar Pier. Royal Scotch Highlanders' Band.

Cornell Dinner

THE REGULAR ANNUAL dinner for Cornell men will be held on Friday evening, June 20, at the Traymore. All Cornellians are requested to register with L. H. Lynder at the booth of the Joseph Dixon Crucible Co., Space 24 in the Main Building, before Friday noon.

Railway Club Secretaries Meet

THE ANNUAL MEETING of the Society of Railway Club Secretaries is scheduled for 10 o'clock this morning in Room 192 of the Blenheim. Several questions of unusual concern to the railway clubs are to be taken up. The business session will be followed by a "round table" luncheon for the secretaries and their guests.

Chicago Pneumatic Installs Railroad Department

THE CHICAGO PNEUMATIC TOOL COMPANY announced yesterday the appointment of L. C. Sprague as manager of the railroad department and C. W. Cross as assistant manager. These appointments are effective July 1. Mr. Sprague is at present district manager at New York and Mr. Cross has been acting as special railroad representative at Chicago.

Pennsylvania Directors Visit Track Exhibit

THE BOARD OF DIRECTORS of the Pennsylvania Railroad, holding a meeting in Philadelphia yesterday, adjourned the meeting, and, accompanied by President Rea, came to Atlantic City, arriving at three o'clock in the afternoon for a visit of inspection of the Pennsylvania equipment on exhibition at the conventions this year. This includes the most powerful electric locomotive in the world, a new simple Mallet type locomotive and the road's class Ils Decapod. They also visited the cars on Georgia Avenue. They returned to Philadelphia at five o'clock.

Vice-President Parish Resigns

LE GRAND PARISH, who was elected vice-president of the Railway Supply Manufacturers' Association at the 1916 convention, has asked to be relieved from his position because of the pressure of other duties. Mr. Parish was looked upon as the logical candidate to succeed President Walker. His action means that it will be necessary to look elsewhere for the new president.

Executive Committee, A. R. A.

THE MEETING of the Executive Committee of the American Railroad Association, reference to which was made in yesterday's daily, is scheduled to be held at the Marlborough-Blenheim at 11 o'clock this morning. It is expected that the work of the meeting will be finished early in the afternoon, and that the members of the committee will later pay a visit to the exhibit.

Canadian National Railways in Market for Passenger Cars

THE TORONTO GLOBE of June 14 contains the following item: "Tenders on twenty mail cars and twenty first-class coaches are being asked for by the Canadian National Railways. If the order is placed it will constitute the largest rolling stock order placed by any railway since the outbreak of hostilities. At an estimated cost of $20,000 per car the order is worth $800,000."

The Informal Dance Last Evening

THE INFORMAL RECEPTION and dance on the Million Dollar Steel Pier last night marked the formal commencement of the week's entertainment features. From 8 until 9 o'clock a band concert and reception were greatly enjoyed. The dance program was then commenced. This consisted of the fox trot, one step and the now called old-fashioned waltz. The Royal Scotch Highlanders' Band furnished the music. At 11 o'clock the pier orchestra succeeded the "Kilties" and played until midnight.

The evening's affair was well handled by the following gentlemen: L. B. Sherman, chairman; W. M. Wilson, N. C. Naylor, G. A. Nichol and W. M. Melcher.

Meeting of Railway Car Manufacturers' Association

DR. W. F. M. Goss, president, and C. S. Sale, assistant to the president of the Railway Car Manufacturers' Association, are here, and will attend a meeting of the Association, which is to be held at the Marlborough-Blenheim at 1.30 P. M. to-day. The Association, as its name implies, is composed of the manufacturers of railway cars. It was organized in February, 1917, primarily to do research and other similar work in connection with the construction of the 100,000 standard freight cars ordered by the Railroad Administrator last year. About 48,000 of the cars have now been built, and

it is expected that all of them will be finished in September.

Dr. Goss was formerly dean of the Engineering College of the University of Illinois, and Mr. Sale was formerly in charge of the engineering experiment station of the same university. Some years ago Mr. Sale was an associate editor of the *Railway Age*.

Delivery of Standard Equipment

THE RAILROAD ADMINISTRATION has compiled the following statement showing the delivery of its standard freight cars and locomotives to May 28:

LOCOMOTIVES.

Type	Average Tractive Power *Pounds*	Number Contracted for	Total Tractive Power *Pounds*	Number Delivered May 28
Light Mikado	54,600	655	35,763,000	533
Heavy Mikado	60,000	233	13,980,000	98
Light mountain	53,900	40	2,156,000	32
Heavy mountain	58,000	15	870,000	13
Light Pacific	40,700	43	1,750,000	23
Heavy Pacific	43,800	20	876,000	10
Light Santa Fe	69,400	94	6,524,000	75
Heavy Santa Fe	74,000	175	12,950,000	117
Light mallet	80,300	30	2,409,000	15
Heavy mallet	106,000	106	11,236,000	25
6-wheel switch	39,100	255	9,971,000	226
8-wheel switch	51,200	145	7,424,000	90
Reading consolidated	50,000	30	1,500,000	...
Undetermined types	.....	89	4,922,000	...
Total	58,200	1,930	112,331,000	1,257

Estimated date when deliveries will be completed, December 1, 1919.

FREIGHT-TRAIN CARS.

Type	Number	Total Capacity *Pounds*	Number Delivered May 28
50-ton single-sheathed box	25,000	1,250,000	8,669
40-ton double-sheathed box	25,000	1,000,000	10,386
50-ton gondola	20,000	1,000,000	14,243
55-ton hopper	25,000	1,375,000	18,330
70 ton gondola	5,000	350,000	1,326
Total	100,000	4,975,000	52,954

Estimated date when deliveries of cars will be completed, October 1, 1919.

Supplementary List of Exhibitors

THE FOLLOWING is in addition to the list of exhibitors published in the *Daily Railway Age* of June 18th, page 1479:

Acar Manufacturing Company, New York, N. Y.—Acar signal device—blue flag. Represented by Chas. R. Powell. Space 376.

Baldwin Locomotive Works, Philadelphia, Pa.—Gun mount on Pennsylvania track, off Boardwalk, four blocks from pier, with 14-inch naval rifle. Gun is 50-calibre, 65 feet long; weight of mount is 650,000 pounds; total length of mount, 110 feet. One caterpillar tractor mount, with 7-inch gun. Represented by Samuel M. Vauclain, C. A. Bourgeios, W. H. Leary, Lieut. A. H. Showalter, U. S. N.; John H. Kindle, U. S. N.; G. Greenough, A. H. Ehle, A. W. Hinger and Chas. W. Werst. Space P. R. R. track, west of pier, on Boardwalk.

Cleveland Tractor Company, Cleveland, Ohio.—Industrial "Cletrac." "Crawler" tractor for heavy hauling over rough or soft footing. Represented by Walter A. Hall. Space on unloading platform on Boardwalk, opposite pier.

Dale-Brewster Machine Company, New York, N. Y.—Western heavy duty, radial drill. Represented by Jas. J. Dale. Space 222.

Davison Tool Manufacturing Corporation, New York, N. Y.—High-speed tool steel cast to form. Represented by Oscar F. Ostby. Space 205.

Mercury Manufacturing Company, Chicago, Ill.—Industrial tractors—3 and 4-wheel machines. Represented by L. R. Duffield, J. S. Kunkle, C. H. Clair and K. A. Wood. Space on unloading platform, on Boardwalk opposite pier.

Richardson Scale Company, Passaic, N. J.—Model of a car unloading device for emptying grain out of box cars and showing operation with grain. Represented by Henry Richardson. Space 38.

Four Wheel Drive Auto Company, The, Clintonville, Wis.—U. S. Army standard ordnance truck, driven on all wheels. Truck in operation. Represented by R. M. Newbold. Space on track at Mississippi Avenue.

Special Programs for Saturday and Monday Evenings

PRESIDENT WALKER, of the Railway Supply Manufacturers' Association, made an announcement at the convention yesterday morning, in behalf of the Committee on Arrangements, concerning two special meetings that are to be held on Saturday evening of this week and Monday evening of next week. On Saturday evening there will be a meeting in the Ballroom on the pier in appreciation of the services of the railroad men and railway supply men who have participated in war activities.

Secretary of Navy Daniels will speak on behalf of the Administration for both the War and Navy Departments. Colonel Henry W. Hodge, who was assistant chief engineer of the American Expeditionary Forces in France, will speak of the work of the railroad men. General W. W. Atterbury has been invited to be present and has not said "No." He wants to come and is trying to make his arrangements accordingly.

On Monday evening Major E. D. Campbell, of the Railway and Seacoast Section, Artillery Division, Ordnance Department, United States Navy, will make an address on heavy artillery. The address will be illustrated by moving pictures and will be given in the Hippodrome. Major Campbell has been detailed to make this address by the War Department. Following the address a representative of the Navy Department will show pictures illustrating the effects of the 14-in. guns.

President Walker also called attention to the fact that some of the large guns are on exhibition on the track on Georgia Avenue and ten cars of light and heavy army artillery are on Mississippi Avenue.

Baldwin Locomotive Works Exhibits Improved Mounts for Heavy Guns

THROUGH AN OVERSIGHT the exhibit of the Baldwin Locomotive Works was not included in the list of exhibitors published in yesterday's issue. Two interesting gun mounts—a 7-inch caterpillar mount and a 14-inch railway mount—built for the United States Navy at the Eddystone plant, are among the track exhibits on Georgia Avenue.

The caterpillar mount is one of a number of this type which have been built for use on rough roads and soft soil. The actual bearing pressure under the treads is approximately 10 pounds per square inch. The mounts are transported in the field by means of tractors of 120-hp.

The railway mount represents an improvement over those built during the war which did such effective service abroad. When firing at high angles with these first mounts it was necessary to jack up the gun and transfer its weight to a specially designed foundation in order to absorb the shock and to provide room for the recoil The mount now on exhibition, however, is so designed that the gun can be fired at angles up to 43 degrees without relieving the trucks of its weight. The trucks are four in number, each having five pairs of wheels, making a total of 40 wheels under the mount. The average load carried on each pair of wheels is approximately 15 tons.

This exhibit is shown through the courtesy of the Ordnance Department of the United States Navy and the Pennsylvania Railroad, and is in charge of naval officers and enlisted men, together with several Baldwin representatives. It is open for inspection, to all holders of official badges and official admission cards, between the hours of 10.00 A. M. and 4.00 P. M.



American Railway Association, Section III, Mechanical

First Session Included Address by Chairman Chambers and Presentation of Several Reports

THE OPENING SESSION of the first annual convention of the American Railroad Association, Section III, Mechanical, was held in the Greek Temple on Young's Million Dollar Pier, Atlantic City, Wednesday, June 17, 1919.

The chairman, C. E. Chambers, mechanical assistant, Allegheny region, United States Railroad Administration, called the meeting to order at 9.50 o'clock. The Reverend Newton W. Cadwell, pastor of the Olivet Presbyterian Church, invoked the Divine Blessing.

The convention was welcomed to the city by Mayor Bacharach.

Address of the Mayor

I am not sure that you will agree with me that it is a mere matter of form for me to be here this morning to welcome you to this great playground of America, this great convention city of America, because you must surely realize that men and women who have been doing so much, not only during the period of war, but previous to the war—and I am sure that after you are out of government control you will do as much for the government in the future as you have in the past—you must surely realize that you are welcome, not only in Atlantic City, but in any city of this great country of ours.

We are glad to have you here, not alone because of the fact that you represent the wonderful and great industry that you do, not alone because of the fact that you have such a wonderful convention in our city—I understand one of the largest exhibits since the World's Fair—and not alone because you have such a large representation—we are pleased and proud and glad to have you here, for all of these reasons—but above all we are glad to have you here because we know that you represent true Americanism.

We, in our city, are proud of many things—we are proud of our magnificent boardwalk, 5 miles long, 100 feet wide, where a quarter of a million of people promenade at one time. We are proud of our magnificent streets, cleaner and better lighted we believe, than any other city in the country. Proud of the magnificient force of men who patrol our beach, and protect the lives of our five million bathers in a season. We are proud of our magnificent hotels, of our business establishments, but above all, in this city of ours, where there is no manufacturing industry, no munition plants, we are proud that there has never been a drive for any patriotic purpose, or any purpose whatsoever, but what Atlantic City always has gone "over the top," and, in addition, my friends, over 3,500 of our best young manhood went forth to fight for your country and my country.

We did not wait for Congress to act, but from the day that the first soldier and sailor left this city, we took care of their dependents. We organized what we called the Liberty Club, in which the chair pusher on the boardwalk, the proprietor of a magnificent hotel, the street cleaner, the banker, were all members, and from the day that the first boy left our city to fight for this country, we took care of his dependents, not in a mean or miserly manner, but in a manner befitting the dependents of sailors and soldiers of the American Army and Navy. These boys are now returning, and as they left here with an easy conscience, we can meet them with an easy conscience.

There is one thing we have long been proud of—we have the finest and purest water in the country, and after July 1st we feel that the people will appreciate what fine water we have in Atlantic City.

In this city of ours we permit no flags except the Nation's flag, which represents something to be paraded on our streets, nor do we permit meetings of any sort unless they represent 100 per cent Americanism.

So we are pleased to have you here because we know that you represent true Americanism. You and I may not agree upon the question as to whether the government should or should not retain control of the railroads—I, for one, believe that the railroads should go back to the people that own them and who know how to properly run them. Now that the war is over, I feel that the practical men who have always been at the head of the railroads know more about running the railroads than the people at Washington know about running them.

I trust that your stay in our city will be a beneficial one, not alone to yourself and the members of your organization as individuals, not alone to you as an organization, not alone to the great industry which you represent, but to our country as a whole, and so, in behalf of the people of Atlantic City, I extend to you, and through you to all those who are in attendance at these conventions, a most cordial and hearty welcome to this great city of ours. I want to assure you that if the ladies present do not too seriously object, that to-night at least curfew

shall not ring. In behalf of the citizens of the city I present to you not only the key to our city, but the key to the hearts of the people of Atlantic City.

In behalf of the Association, Chairman Chambers thanked the Mayor for the kind welcome and then delivered his opening address.

Address of Chairman, C. E. Chambers

To be selected as the presiding officer of so great an association is one of the highest honors that can come to a man in the mechanical profession, and as such, I extend to you a most hearty welcome to this first annual meeting of Section III—Mechanical, of the American Railroad Association, and what would have been under the old organization, the fifty-third annual convention of the Master Car Builders Association.

The unusually large attendance to-day indicates that we have not lost interest from the fact that the regular annual conventions were postponed in the years 1917 and 1918. Since our coming together in this city in June 1916, the great war in Europe, which at that time clouded our future, assumed greater strength, until on April 6th, 1917, we found ourselves forced into the World's greatest war, which was only terminated November 11th, 1918, after a loss of many of our brave boys, and resulting in almost complete disarrangement of our American commerce. Now that peace seems assured, let us trust and pray that none present to-day may live to see a re-occurence of such a disgraceful and uncalled for waste of human life, and the world's necessities.

As the last President of the Master Car Builders' Association, I feel mindful that I should say something as to the organization and activities of that association.

The Master Car Builders' Association, in its beginning a voluntary organization, composed of Master Car Builders and foremen of railway car shops, was formally organized at Springfield, Massachusetts, Wednesday, May 15th, 1867, and held its first annual convention at Altoona, Pa., September 18th, 1867, at which time the date of the subsequent annual conventions was set for the second Wednesday of June each year. The subjects to be considered assumed proportions requiring more than one day's session, and later certain designated days in the month of June were selected for the annual conventions, which have obtained from that time up to the present date, with very few exceptions. At the meeting referred to, 41 master car builders were present, when a constitution and by-laws were adopted. Previous to this, and dating back as far as 1864, several informal meetings were held as follows:

The objects of the association were the advancement of knowledge concerning the construction, maintenance and service of railroad cars and parts thereof, by investigations through committees and discussions in convention; to provide an organization through which the members and the companies they represent, might agree upon such joint action as might be required to bring about uniformity and interchangeability in the parts of railroad cars, to improve their construction and to adjust the mutual interest growing out of their interchange and repair, but the action of the association was only of a recommendatory character, and was not binding upon any of its members, or the companies represented in it.

Formation and Development of the M. C. B. Association

The reasons for the formation of such an organization may be stated as follows: Prior to the date of the organization, cars were confined almost, if not entirely, to the roads for which they were built and to which they belonged. The inconvenience of trans-shipping freight when carried long distances soon made it necessary to run cars over more roads than one, and as the demand for carrying freight further without breaking bulk increased, some improvement was necessary in order to carry it without unloading and as rapidly as possible. This brought into existence different express or fast freight lines which operated over two or more roads in different sections of the country. It was soon found that difficulties were constantly occurring in regard to the repairs of these cars, and that they were often delayed when far away from home by not having the right kind of materials on hand to replace broken parts. Some plan had to be devised to obviate the evil, and as the Master Car Builder was deeply interested in the physical condition of the car, an organization of these men was effected to take care of the prompt repairs.

Up to the year 1882, the organization was wholly voluntary. It received no financial support whatever from the railroad companies which were the owners of the property intrusted to the care of the Master Car Builders, and the improvement of which was the chief subject of consideration and discussion at their meetings, the expenses of the organization being met by assessment on the individual members. Neither were the railroads directly represented in the association, excepting by such exertions in behalf of their employes as the Master Car Builder might choose to make, if he were a member. It was, therefore, thought that if the association was so organized that each railroad company could be represented by a vote in its deliberations proportionate to its interests, or in other words, to the number of cars it owned, and if the work which the association had done and should do was adequately explained and understood by the chief executive officers of the railroads of the country, that they would be inclined to co-operate with the association and assist in its work. An amendment was therefore introduced at the convention in June, 1881, the purpose of which was to create a new class of members, to be called "Representative Members" with the status and privileges indicated above and described in amendments to the constitution of the Master Car Builders' Association.

The proposed plan of reorganization of the association was submitted to the chief executive officers of the railroads of this country, Canada and Mexico, and received practically unanimous approval. At an adjourned meeting held at Niagara Falls, New York, on October 10, 11 and 12, 1882, the proposed reorganization was ratified and adopted.

The number of cars represented in the association is practically 3,000,000, the cars of Canadian and Mexican railways being included in the above enumeration. Its membership extends to England, France, Russia, India, Australia, Japan, China, Argentina, Chili, Brazil, Cuba and the Philippines, officials of railroads in those countries wishing to avail themselves of the information contained in its proceedings relating to the construction and operation of cars.

As a result of the reorganization in 1882, the scope of the work of the association developed and broadened very materially. Through the financial support furnished by the railroad companies, investigations and tests of practically every part of a car have been, and are constantly being carried on, to furnish equipment of the necessary strength and designs to meet the varying requirements of the traffic of the country.

Standardization of Car Parts

The question of uniformity in the construction of cars whereby the parts of cars used by one railroad may be used in repairs of the cars of another road has been constantly before the association. As an indication of what has been accomplished in this direction, the following comparison of some of standard parts necessary to keep on hand for repairs at the date of reorganization (1882) and the present time is cited:

	1882	*1918*
Axles	56	5
Journal boxes	58	5
Couplers	26	2
Brake shoes	20	1
Brake heads	27	1

The parts enumerated above are only a few of those used in the repairs of cars, but if all were named, it would increase the list to enormous proportions. A condition similar to that indicated above exists wherever any considerable number of cars are interchanged between railroads.

Among the more important developments made by the asso-

ciation, may be mentioned the adoption in 1887 of the automatic coupler for cars, thus doing away with the link and pin coupler and the necessity for going between cars to couple them together. It may be said at the present time, it is the universal standard of all the steam railroads in the country. Another noted achievement was the adoption in 1888 of the automatic air brake as the standard of the association. To-day, every car in the country is equipped with this device. Following its adoption, a code of instructions for the proper operation of the air



C. E. Chambers
Chairman, General Committee

brake has been prepared and generally distributed among railway employes.

The railroad car of to-day is simply a vehicle of transportation, no matter by what railroad it is owned, the object being to furnish a vehicle suitable for the lading, and transport that lading to destination as expeditiously as possible. The railroad car is subject to very severe handling in trains and certain defects naturally develop which need to be kept in repair.

Rules Governing Interchange and Repairs

To take care of this condition this association has formulated and maintains rules for the interchange of traffic in so far as they relate to the physical condition of the car, so that the traffic itself may not be delayed. By these rules of interchange, the immense movement of traffic between railroads is carried on with a minimum of delay due to the defective condition of the car. The efforts of the association through these interchange rules were: (1) To establish rules which will uniformly permit of the prompt interchange of traffic between the various railroads without undue delay to the shipment of the car, which might be brought about by a difference of opinion between the receiving and delivering line as to responsibility for the physical condition of the car or the method of loading on open top cars. (2) To provide, through allowances, as given in the rules, prices to be charged for materials, detail times for completing the various items of repairs and a uniform labor rate per hour for the work. (3) Uniformity in compiling charges as between car owners for the maintenance of the equipment of the country. (4) Fixed allowances to enable car owners to properly check bills for car repairs made against them by other handling companies. (5) To provide methods for reimbursing car owners for the destruction or damage to their cars by other handling companies. (6) The compulsory use by car owners of detail standards of construction as brought about through the operation of the rules, so that when the association felt that certain standards of construction were necessary for the safe operation of cars, they would not be permitted to be interchanged without the use of these standards.

I might mention at this time that no country in the world has gone so far with standardization of railway equipment as have the United States, Canada and Mexico, particularly by reason of standard gage track, which permits of the interchangeability of cars throughout the entire area mentioned. I might cite as an instance Australia, with about seven railway systems and six different gages of track. At no interchange point can a car be interchanged from one railway system to the other, resulting in all freight being transferred at the end of each line.

In 1887, an Arbitration Committee was established for the settling of disputes arising under the rules between members of the association in reference to a correct understanding of the rules with reference to car maintenance and also as to correctness of charges. During this period, approximately 1,200 cases have been arbitrated.

The association promulgated rules for the loading of materials on open cars, thereby preventing the shifting of loads in transit and the consequent accidents. The safety appliances approved by the Interstate Commerce Commission were its standards, and their rules were distributed to the members. In 1903, as the result of serious accidents in the transportation of inflammable liquids, it became necessary for the association to regulate the construction of tank cars, and in that year the first specifications were issued, not only making immediately necessary requirements for cars then in existence, but prescribing much higher standards for cars to be built. As new uses for tank



W. J. Tollerton
Vice-Chairman, General Committee

cars arose, the specifications have been modified to suit them, and since the establishment of the Bureau of Explosives this association and the bureau have closely co-operated in all matters relating to tank cars. The result has been to materially strengthen the rules relating to their construction and use. At the present time, such cars are provided not only for the transportation of the petroleum products, but also for food products, as well as poisonous liquids, such as liquefied gases.

Amalgamation of Railway Mechanical Associations

About ten years ago it was suggested that the Master Car Builders' Association and the American Railway Master Mechanics' Association, consolidate under one organization to be called the American Railway Mechanical Association, or some suitable name. Committees on consolidation were appointed by each association and reports rendered in the negative. On one or two occasions since, the question was again brought up, with a similar result.

Early in the year 1918, after the railroads had been taken over by the United States Government, the Director General requested that the individual associations of railway officers be amalgamated into one body, the American Railway Association, made up of different sections, each section to carry on its respective part of the railway program, and having its Chairman, Vice-Chairman and General Committee continuing the same subject committees, holding their regular accustomed annual meetings or conventions and submitting their findings to the Executive Committee of the parent association for approval and placing into effect.

On May 2nd, 1918, a meeting was called by the president of the American Railway Association to comply with the request of the Director General that the several Associations be amalgamated to form one congress of Associations, inviting the attendance of the presidents of the different voluntary railway associations. It was decided to put the matter to a vote of the executive committees of the different bodies, resulting in a favorable vote for amalgamation by the American Railway Master Mechanics' Association, and the Master Car Builders' Association. What was formerly the American Railway Association was changed to the American Railroad Association, of which the American Railway Master Mechanics' Association and the Master Car Builders' Association were combined, and known as Section III—Mechanical, and as such we convene to-day at our first annual convention.

As the Master Car Builders' Association, the rules were recommendatory and not mandatory. As Section III—Mechanical of the American Railroad Association, the rules will be made mandatory, and the efforts of the committees handling the different subjects will, therefore, be much better recognized. In the past, much overlapping committee work has been done, by reason of the different bodies having individual committees to handle subjects that might in some day effect them, but under the present organization, this duplication of work should be minimized, for all subjects of a mechanical nature will be referred to Section III, and its findings will be final. You will, therefore, recognize how carefully a committee must consider a subject before making final submission, which means, without question, placing into effect.

Prospects for Further Development

The membership should not in any way decrease, but on the contrary, should increase, for the reason that railroads can have as many members as they desire, there being no limit placed as to the number of associate members a railroad may wish to have represent them in the section, although on letter ballots affecting standards, votes will be on the basis of locomotives and cars owned, and ballots cash by representative members designated by the railroads.

There will be no dues paid by the members, for the reason that the railroad companies, through the American Railroad Association, by assessment, will pay the expenses of the section, but affiliated members will be charged a reasonable amount for the proceedings and literature furnished them throughout the year. It is, therefore, apparent that our interests should grow and the scope of activities be greatly broadened, and I predict that through such an arrangement, it will be so entirely satisfactory to the members of both the Master Car Builders' Association and the American Railway Master Mechanics' Association, that after the railroads have been turned back by the government to the corporate owners, no one will wish to return to the old methods of handling the matters pertaining to the locomotive and car departments.

I would also suggest for your serious and careful consideration that the Air Brake Association, American Railway Tool Foremen's Association, Chief Interchange Car Inspectors and Car Foremen's Association, International Railway Master Blacksmiths' Association, International Railway General Foremen's Association, Master Boilermakers' Association, Master Car and Locomotive Painters' Association, American Railroad Master Tinners, Coppersmiths and Pipe Fitters' Association, Association of Railway Electrical Engineers, and the Travelling Engineers' Association be made a part of Section III—Mechanical, and the committees which in most instances have been overlapping, become committees in Section III—Mechanical. This, to my mind, would not only very much strengthen their efforts, but would also make it possible to immediately put into effect their accepted recommendations, for the reason that they would have the approval and backing of Section III—Mechanical, which is an identified part of the American Railroad Association.

The work of designing a standard box car was undertaken by the Master Car Builders' Association some years ago, and owing to the slow progress made, the matter was referred to a committee of presidents of the American Railway Association for further development. In due time, however, the matter was turned back to a committee of the Master Car Builders' Association for completion, and was just about completed when the railroads were taken over by the government. During the period of federal control, 100,000 standard freight cars of different capacities and types have been arranged for and partially built.

The Master Car Builders' Association should be credited with having done remarkably well under the old organization and arrangement. The ardor and enthusiasm of committees has been dampened many times by reason of failure to approve their recommendations after they had conscientiously spent much time on their work. They were not supported constructively by statements from negatively voting roads, as to the reason for their having so voted. It is suggested that, under the new organization, negatively voting roads should be obliged to sustain such a negative vote by a statement covering the reason therefor, together with constructive suggestions.

Activities of Committees

It may not be amiss here to call attention to what seems to be a misconception on the part of some of the members of committees in writing their reports. They seem to have the opinion that what is required of them is to prepare a series of questions, which are sent to members, and that all the work which the committee can be expected to do thereafter is to report and tabulate the replies received in answer to those inquiries. In most cases, a report on any subject should involve much more work than this.

A committee report frequently relates to some subject which is imperfectly understood, or in which there is apparently a diversity of practice, the reason for which is not evident. In most cases, the list of questions formulated by a committee indicates that they are not giving the subjects sufficient study to know what information is really desired. The committee should give the subject such prior study as to develop clearly the points on which facts must be obtained before conclusions can be drawn. In most cases, it is a diversity of practice which, if possible, is to be reconciled. In such cases, the questions should include suggestions, which would develop the reasons for such diversity. Finally, when answers to these questions are received, the committee should be a little more than a tabulating machine. They should present to the association, in all cases, their conclusion, giving the reasons therefor, remembering that the association looks to the committee for guidance in taking neccessary action.

I would ask you to carefully consider the individual papers which will be presented at this convention, for in them will be brought out many beneficial thoughts for our future service. I would direct your attention to the report of the Committee on Standards, and suggest not only that its present recommendations be carried out, but that standarization, so far as is practicable, be given serious consideration in the future, especially as applied to freight car equipment. The difficulty experienced in the operation of freight car equipment, when pooled, evidenced the necessity of closer co-operation in the design of common parts necessary in the repair and upkeep of the equipment. Many parts can be standardized without interference with the many requirements. We have reached the time when freight car equipment of given capacities should be considered of entirely interchangeable parts, which are subject to breakage, or wear and tear.

I would ask that you give serious consideration to the report of the Committee on Car Trucks, calling for the restencilling of freight car equipment in a manner which will take care of the long debated question of axle loading, not only increasing the possible load on much freight car equipment, but also taking care of the weaker constructed cars that should not now permit of the regular 10 per cent. overloading.

The report from the Committee on Train Brake and Signal Equipment should receive careful consideration, as there are many changes which can yet be made without interference, that will add greatly to the practicability of interchange movement.

There is no more important committee than the one handling Brake Shoe and Brake Beam Equipment. The adoption of a standard brake beam for freight car equipment is of vital concern to all railroads, and in the design, due consideration should be given to the existing equipment, and if possible, it should be made entirely interchangeable with the present type of truck. I would, therefore, ask your serious consideration of the recommendations of that committee before its acceptance or disapproval.

I would ask that you show your appreciation of the untiring efforts of the Arbitration Committee by adopting their recommendations. I do this knowing that few of the members realize the amount of time and energy devoted by this committee each year to the questions involved.

There is practically nothing recommended by the Committee on Prices for Labor and Material, by reason of the abnormal period passed through during war conditions, which necessitated changing prices, which it was thought could be best accomplished by the addition of an agreed percentage, rather than undertaking to make a complete revision of all prices. It now seems pertinent, however, that the entire subject should be reviewed and recommendations made at the 1920 convention, for a complete new set of prices.

I would ask your serious consideration of the report of the Committee on Depreciation of Freight Cars. The importance of this subject merits a free discussion. An adequate depreciation which does not provide a reserve, which added to the scrap value of the retired equipment, replaces the original cost, really means that we are consuming the capital investment. On the other hand, it must not pad the expense of operation as a means of providing concealed assets.

The large interchange of passenger car equipment during the past two years had made it necessary to recommend several changes in the passenger car rules of interchange, and I request that you make a careful study of the recommendations of that Committee.

The Committee on Standard Blocking for Cradles of Car Dumping Machines has made some helpful recommendations. A casual observation of our open top cars of the older type signifies the necessity for changes in this practice, and everything possible should be done to protect this equipment from the present abuses.

A number of recommendations have been made by the Committee on Specifications and Tests of Materials, and knowing the difficulty encountered by many of the railroads in obtaining personal knowledge and the exhaustive study made of the subject by the committee, I recommend the acceptance of their report.

The Committee on Welding Truck Sides, Bolsters, etc., was continued from 1918, and requested to make a further study of the art. An extensive report has been submitted as to reliable practices consistent with our service, and inasmuch as this is a subject of vital importance to all, I request your careful consideration before adoption or rejection.

I would direct your serious thought to the report of the Committee on Couplers, and ask your careful consideration of its recommendations. There is no longer any question as to the practicability of the standard coupler, and the only thing involved is the expense brought about in the changes asked for.

I would direct your attention to the expiration of the time limit in which all cars are to be equipped with safety appliances, namely, September 1st, 1919. There are yet many thousands of cars in the United States and Canada not equipped, and after that date, no car will be allowed to be used until so equipped. This will mean that the carrying road will be required to make such application on whatever cars remain on its line before offering them in interchange.

By reason of the numerous commodities offered for shipment during the past two or three years, the Committee on Loading Rules has had considerable activity, and a number of recommendations have been made for your acceptance.

I would ask your careful consideration of the report of the Committee on Train Lighting and Equipment. Their report is an interesting one, and worthy of careful study. I would suggest that their recommendations be accepted, and the committee continued.

I would ask your hearty support to the Committee on Tank Cars. This has been probably one of the most active committees during the war period, by reason of the many new products presented for transportation, and the promptness of action required. Just now some perplexing problems are in progress that need the backing of the Mechanical Section and the Bureau of Explosives.

In calling your attention to the inroads on our members by the grim reaper, Death, I feel it pertinent to remind you of the remarks of President MacBain at the 1916 convention, calling attention to the long and faithful service of former Secretary Joseph W. Taylor, who at that time, had been with the association 26 years; during 17 of which he had been secretary. While his name is not included in the report of the past year, yet since our last convention in Atlantic City, he has left his labors on earth for his eternal reward. I make special mention of him, because of his long and continued service.

I would also call your attention to the passing on of Dr. Angus Sinclair, Editor of Locomotive Engineering, and a member of both the Master Car Builders' and American Railway Master Mechanics' Association, having served for more than 18 years as treasurer of the American Railway Master Mechanics' Association. Up to the time of his death, Dr. Sinclair was probably one of the most generally known mechanical men in the United States.

To the officers of the association, and especially the secretary and general secretary, I express my sincere thanks for the splendid assistance accorded me during my term of office. To our fellow workers, the Railway Supply Mens' Association, I extend thanks for their continued efforts in making our conventions what they are. To the Hotel Mens' Association, I also desire to extend thanks for their splendid part in arranging for the comforts of our members and families. In closing, I trust the sessions at this convention will be but a repetition of the past, and that great good may come from them to the public at large. The members of the association, I again thank for the privilege of serving during the past three years.

Association Business

The minutes of the 1918 convention were adopted as printed.

The chairman announced that, as the Executive Committee had held several meetings during the period since the last convention and had matters well cleaned up, the usual session on the night prior to the opening of the convention was omitted.

Report of General Committee

As authorized by Articles VI of the Constitutions of the American Railway Master Mechanics' and Master Car Builders' Associations, the Executive Committees have during the past year taken action on several important questions. This action is outlined in this report of the General Committee and your approval is respectfully requested.

On January 28, 1918, the Director General of Railroads issued General Order No. 6, directing that "Carriers' operating revenues shall not be expended for the payment of persons or agencies constituting associations of carriers, unless such association is approved in advanced by the Director General." The Master Car Builders' and American Railway Master Mechanics' Associations made application and received temporary approval for the use of the funds already on hand to pay the current expenses of the association until April 30, 1918. On April 26, 1918, the Director General approved, until further ordered, the



F. McManamy



V. R. Hawthorne
Secretary
Mechanical Section, A. R. A.



F. F. Gaines



C. B. Young



J. S. Lentz



M. K. Barnum



I. S. Downing



J. E. Fairbanks
Secretary
American Railroad Association



C. E. Fuller

Members of the General Committee in Charge of the Mechanical Section of the American Railroad Association



J. W. Small



T. H. Goodnow



A. Kearney



C. F. Giles



J. E. O'Brien



A. P. Prendergast



J. Coleman



H. R. Warnock



W. H. Winterrowd

Members of the General Committee in Charge of the Mechanical Section of the American Railroad Association

American Railway Master Mechanics' and the Master Car Builders' Associations and authorized making such assessments, and the carriers paying the same, as may be necessary for the current expenses of the association.

On January 10, 1919, the Director General of Railroads issued Circular No. 70: "To provide, during the period of Federal control, a responsible channel through which the Director General may obtain recommendations for the advancement of railroad practice." The scope of the American Railroad Association (formerly American Railway Association) has been enlarged and among other associations covers the former activities of the American Railway Master Mechanics' and Master Car Builders' Associations. Railroads under Federal control are members of the association (American Railroad Association) and are directed to be represented and participate in the activities of each section through their proper officers.

On May 2, 1918, a conference of presidents of voluntary railroad organizations was held at 75 Church Street, New York, at the call of Acting President Thompson, of the American Railway Association, to comply with the request of the Director General that the several associations be amalgamated to form one congress of associations.

On May 14, 1918, the Executive Committees of the American Railway Master Mechanics' and Master Car Builders' Associations held a joint conference at Chicago. A plan was outlined and was submitted to the joint conference of the several railroad organizations. Since that time the American Railway Association (Order No. 70) has been changed to the American Railroad Association and its scope enlarged so as to include, among other associations, The American Railway Master Mechanics' and Master Car Builders' Associations.

On November 19, 1918, the Executive Committee of the Master Car Builders' Association, at a conference held with Acting President Thompson, of the American Railway Association, agreed to accept the proposed method of organization for the American Railroad Association and to become a part of the Mechanical Section of that organization.

On December 5, 1918, a special committee composed of the presidents and representatives of the Executive Committees of the American Railway Master Mechanics' and Master Car Builders' Associations held a conference at 75 Church Street, New York, and prepared tentative Rules of Order to govern the Mechanical Section.

On February 1, 1919, a joint conference of the Executive Committees of The American Railway Master Mechanics' Association and the Master Car Builders' Association was held at 75 Church Street, and tentative Rules of Order for Section III—Mechanical, were approved and adopted, and a tentative General Committee to govern the section was elected.

The committees of the American Railway Master Mechanics' Association and the Master Car Builders' Association have been continued and will handle their work as they have in the past. No change in personnel, outline of work or procedure in handling reports has been made except that the secretary of the section will act as secretary of all committees.

The scope of the activities of the associations will be greatly enlarged, and in the future the Mechanical Section will handle exclusively all work pertaining to the mechanical design, maintenance and repair of railroad motive power and rolling stock.

All memberships in the American Railway Master Mechanics' and Master Car Builders' Associations are transferred to the Mechanical Section of the American Railroad Association. Representative members are appointed by their respective railroads, as in the past; all others on the membership lists will be termed affiliated or life members of the Mechanical Section.

At at meeting of the General Committee for Section III—Mechanical, of the American Railroad Association held at the Traymore Hotel, Atlantic City, N. J., Monday, February 17, 1919, the following resolutions were passed:

Resolved, That all accounts accruing against the Master Car Builders' Association and the American Railway Master Mechanics' Association be requested to audit the books and accounts shall be paid out of the treasury, and be it further

Resolved, That the funds of the Master Car Builders' Association and the American Railway Master Mechanics' Association, on hand in its treasury as of February 28, 1919, shall be transferred to the Treasurer of the American Railroad Association, including all books, papers and accounts payable and accounts receivable, and be it further

Resolved, That the Auditing Committee of the Master Car Builders' Association and the American Railway Master Mechanics' Association be requested to audit the books and accounts of the Secretary and Treasurer, as of midnight, February 28, 1919, for the purpose of closing the transactions of these associations and transferring all funds and accounts thereof to the Treasurer of the American Railroad Association as of the same date and hour, and be it further

Resolved, That the office furniture, fixtures, stationery, records, files, etc., as indicated in the inventory when submitted by the Auditing Committee as of February 28, 1919, shall be transferred to the American Railroad Association, and be it further

Resolved, That any securities which may be transferred to the Treasurer of the American Railroad Association are to be held by him as custodian and are only subject to the orders of the General Committee, and be it further

Resolved, That before the scholarship funds of the American Railway Master Mechanics' Association are transferred to the Treasurer of the American Railroad Association, a committee of three be appointed by the Chairman to take whatever steps may be necessary to protect the continuation of such fund.

The necessary details in connection with the transfer of activities, funds and securities of the American Railway Master Mechanics' Association and the Master Car Builders' Association have been consummated and the interests of the above named associations properly safeguarded.

The committee, in accordance with Section 2 (f) of the Rules or Order, offers the names of the following members as candidates for the Committee on Nominations:

F. W. Brazier, New York Central; Jos. Hainen, Southern; W. J. Robider, Canadian Pacific; J. Purcell, A., T. & S. F.; J. J. Hennessey, C., M. & St. P.; J. T. Wallis, Pennsylvania; D. R. MacBain, New York Central; H. T. Bentley, C. & N. W.; Willard Kells, Atlantic Coast Line, and A. C. Deverell, Great Northern.

Secretary's Report

The report of the Secretary, which was appended to the report of the General Committee, showed the receipts of the Master Car Builders' Association from June 18, 1918, to March 21, 1919, to be $33,224. The disbursements during the same period were $22,720, leaving a balance of $10,503. The receipts of the American Railway Master Mechanics' Association were $10,085, and the expenses $5,343, leaving a balance of $4,741.

The membership statement submitted by the secretary showed the Master Car Builders' Association to have 1,029 members, and the American Railway Master Mechanics' Association 1,047 members. The memberships in both associations have been transferred to the American Railroad Association, and are classified as follows: Representative members, 442; affiliated members, 1,085; and life members, 108, making a total of 1,635 members. All those holding life membership in the Master Car Builders' Association, or honorary membership in the Master Mechanics Association, and all members who have served as president of either association, together with representative members who have been in good standing in either association for twenty years or more, have been designated as life members.

The report as read was accepted.

Report of the Committee on Scholarships

The Committee on Scholarships, consisting of W. J. Tollerton, C. E. Fuller and H. R. Warnock, submitted a report in accordance with the resolution adopted by the General Committee. It was found that the scholarships at the Stevens Institute of Technology are perpetual, and the absolute property of the association, having been endowed from the entertainment fund left over from the convention of 1872, and the interest which accumulated on this fund until 1891. It was decided, by the General Committee, that the earnings on the bonds and securities of both associations, held in trust by the treasurer, should be prorated among the holders of the four scholarships at the Stevens Institute of Technology each year. Since 1903 Joseph T. Ryerson & Son have provided scholarships, which have been awarded by the American Railway Master Mechanics' Association, and the company has agreed to continue this arrangement with the Mechanical Section of the American Railroad Association.

The report is signed by C. E. Chambers (Chairman), United States Railroad Administration; W. J. Tollerton (Vice-Chairman), Chicago, Rock Island & Pacific; Frank McManamy,

United States Railroad Administration; C. B. Young, United States Railroad Administration; F. F. Gaines, United States Railroad Administration; T. H. Goodnow, Chicago & North Western; H. R. Warnock, Chicago, Milwaukee & St. Paul; J. E. O'Brien, Missouri Pacific; A. P. Prendergast, Texas & Pacific; J. W. Small, United States Railroad Administration; C. F. Giles, Louisville & Nashville; C. E. Fuller, Union Pacific; I. S. Downing, Cincinnati, Cleveland, Chicago & St. Louis; Jno. S. Lentz, Lehigh Valley; Jno. R. Gould, Chesapeake & Ohio; A. Kearney, Norfolk & Western; M. K. Barnum, Baltimore & Ohio; Jas. Coleman, Grand Trunk, and W. H. Winterrowd, Canadian Pacific. This report was accepted as read.

Report of Committee on Nominations



F. W. Brazier
Chairman

As the present General Committee is a tentative committee to serve only until this convention, the committee nominated a chairman and seven members for the General Committee to serve for two years, and a vice-chairman and seven members of the General Committee to serve for one year. This will provide that future nominations for the General Committee can be made for the regular two-year term in accordance with the Rules of Order. In addition, Frank McManamy, assistant director, Division of Operation, U. S. R. A., C. B. Young, manager, Inspection and Tests Section, U. S. R. A., and F. F. Gaines, chairman, Board of Railroad Wages and Working Conditions, U. S. R. A., are also members of the General Committee representing the Railroad Administration in accordance with Section 2 (b) of the Rules of Order.

The committee nominated the following to serve for two years:

For Chairman, W. J. Tollerton, G. M. S., Chicago, Rock Island & Pacific. For Members of the General Committee, J. T. Wallis, G. S. M. P., Pennsylvania; T. H. Goodnow, S. C. D., Chicago & North Western; W H. Winterrowd, C M. E., Canadian Pacific; C. H. Hogan, A. S. M. P., New York Central; J. E. O'Brien, M. S., Missouri Pacific; A. Kearney, S. M. P., Norfolk & Western, and C. F. Giles, S. M., Louisville & Nashville.

To serve for one year: For Vice-Chairman, Jas. Coleman, S. C. D., Grand Trunk. For Members of the General Committee, J. W. Small, Mech. Asst., Southern Region; Jno. S. Lentz, M. C. B., Lehigh Valley; H. R. Warnock, G. S. M. P., Chicago, Milwaukee & St. Paul; C. E. Fuller, S M. P., Union Pacific; Samuel Lynn, M C. B., Pittsburgh & Lake Erie; A. P. Prendergast, M. S., Texas & Pacific, and Jno. R. Gould, S. M. P., Chesapeake & Ohio.

The report is signed by F. W. Brazier (Chairman), New York Central; J. Hainen, Southern; W. J. Robider, Canadian Pacific; John Purcell, Atchison, Topeka & Santa Fe, and J. J. Hennessey, Chicago, Milwaukee & St. Paul.

This report was accepted.

Report on Standards and Recommended Practice (M. C. B.)

After consideration of the present Standards and Recommended Practice of the Master Car Builders' Association, together with replies received to the Circular of Inquiry, sent to all members, the committee submits the following report:

Journal box and details. (standard. Pages 472-476. Sheets M. C. B. 3, 6, 9, 12-C.)

A subscriber requests information as to whether the skeleton brass, as shown in Fig. 1, meets M. C. B. requirements. The committee is of the opinion that the journal bearing in question does not conform to standard M. C. B. construction.

Lettering and marking of cars. (standard. Pages 611-616. Sheets M. C. B. 26, 26-A and 26-B.)

A member recommends a standard stencil including the wording, style and size of lettering, and location, for marking cars that have had journal boxes repacked, suggesting the words "Repacked 1-10-19" in 1-in. block letters and figures, located on the outside of the car as close as possible to the middle of the car, but not behind any doors.

The committee has referred this matter to the Arbitration Committee with the suggestion that the rule in question be revised to require this stencil to appear at diagonal right-hand corners of car and to recommend to the association that this stenciling should be shown on M. C. B. Sheets 26 and 26-A.

Lettering and marking of cars (standard. Pages 611-616. Sheets M. C. B. 26, 26-A and 26-B.)

A member calls attention to the difficulty experienced by yard clerks and other similar employes in deciphering the numbers on stock cars at night, primarily due to the fact that the numbering and lettering of this type of car is ordinarily on a letter board located near the eves of the car, and suggests that a standard method be established for applying the marking on stock cars to overcome this difficulty. The committee believes the location indicated for house cars on M. C. B. Sheet No. 26 meets all the requirements.

The Western Weighing and Inspection Bureau calls attention to a variation in the size of figures used to indicate the light weight of cars, which light weight is a very important factor in arriving at correct freight charges on a large percent of carload freight. An analysis of the information furnished indicates that cases of improper size of letters and figures are the result of light weighing stations using the wrong-sized stencils, and



Fig. 1.—Skeleton Journal Box, Brass

the attention of the members is called to the fact that light weighing stations should be furnished with the correct size of stencils, so as to comply with M. C. B. standard lettering, as shown on Sheets Nos. 26, 26-A and 26-B, and that when stenciling the new light weight care should be used to completely obliterate the old stenciling, and a good grade of paint used and applied in a strictly workmanlike manner.

Pipe unions (standard. Page 618.)

The standardization of pipe unions, both flat and ball joint types, as concerns the contour and interchangeability of parts, which was a matter of special investigation with the A. S. M. E. and A. R. M. M. Association, in accord with the action of the 1916 convention, and which was dormant during the war period, has again been taken up with those associations. Progress only, at this time, is reported.

SPECIFICATIONS FOR BOLTS AND NUTS (STANDARD. Pages 619-623.)

A member calls attention to the difference in the specified dimension of bar stock for rods and nuts between the association's specifications and commercial practice, and suggests that the specifications be revised to permit acceptable tolerances. The committee suggests the matter be carried over for further consideration and report.

STEAM AND AIR CONNECTIONS FOR PASSENGER CARS (RECOMMENDED PRACTICE. Pages 918. Sheet M. C. B. Q-1.)

Under instructions from the General Committee, the matter of steam heat hose couplers was to be investigated and a recommendation made to the United States Railroad Administration for a standard in so far as interchangeability and locking are concerned. The committee has canvassed the situation with the manufacturers and users of steam heat hose couplings, and owing to considerable variation in the type of locks on couplers as now in use and the fact that the openings do not properly register, the committee can, at this time, only report progress.

DEFINITIONS AND DESIGNATING LETTERS OF GENERAL SERVICE FREIGHT EQUIPMENT CARS. (RECOMMENDED PRACTICE. Pages 946-949.)

A member recommends separate designating letters for single-deck and double-deck stock cars. The committee concurs with the recommendation and suggests that the designation "S. M." for stock cars, be revised by eliminating the words "or double"; that a new designation be provided, "S. C." reading the same as designation "S. M.—Stock Cars" with the exception of substituting the words "convertible single or double deck" for words "single or double deck"; and that another new designation be provided, "S. F." substituting the words "fixed double deck" for the words "single or double deck."

STANDARD FRICTION DRAFT GEARS

The following was suggested by a member: "There are several makes of friction draft gears which will go into the prescribed space of 12⅞ by 24⅝ in., but some of these gears use a modified front stop which has a limiting stop in combination, which limiting stop encroaches upon the rectangular clearance, quoted above. By comparatively slight modifications in the castings of the various gears, however, and also in the travel, they could all be made to go into the same space, including the use of the limiting stop, and we would recommend that this matter be referred to the Draft Gear Committee to see if it can not be worked out." The committee has referred this to the Committee on Draft Gears.

MISCELLANEOUS

A member suggests that a limit should be placed on the welding and reclaiming of various parts, such as couplers, side frames, etc., and that the practice of welding should eliminate any possibility of relying on the judgment of one man as to whether or not the part in question would be serviceable after being thus repaired. The committee has referred this subject to the Committee on Welding Truck Side Frames, Bolsters and Arch Bars.

The report is signed by T. H. Goodnow (Chairman), Chicago & North Western; C. E. Fuller, Union Pacific; A. R. Ayers, New York, Chicago & St. Louis; O. C. Cromwell, Baltimore & Ohio; O. J. Parks, General American Tank Car Corporation; Willard Kells, Atlantic Coast Line; C. F. Thiele, Pennsylvania, and A. G. Trumbull, Erie.

After the reading of the printed report, Mr. Goodnow said:

Since the report was printed, a member of the association made a suggestion, which has been turned over to the committee, but on which no action has been taken, and I simply read it at this time as it can be included in the report if the association sees fit to act on it. It is as follows:

"I would suggest that the standard lettering on freight cars be reconsidered with a view to simplifying the same. The points I wish to bring out are the following:

"The present stenciling calls for the capacity in pounds and cubic feet, and it is generally understood that the cars can be loaded to 10 per cent. beyond the marked capacity. I believe the terms 'nominal capacity' and 'load limit' should be used in preference to avoid overloading the car axles, the maximum load limit being based on the difference between the light weight of car and the total weight as noted in column A of table on axles in M. C. B. Rule No. 86. Likewise some standard should prevail covering the size of letters used in the lettering, showing the name of the railroad company. Reference to specialties, such as triple valves, coupler shanks, brake beams, etc., can be omitted.

"In order to reduce the number of stencils to a minimum, option should not prevail as to the use of two or three-inch letters for any of the legends, as one or the other size should be standard."

F. F. Gaines: Referring to the committee's report in regard to the steam heat coupler, the Committee on Standards of the United States Railroad Administration has spent considerable time on that subject during the past year, and it seems proper to suggest that the standards they have adopted be the M. C. B. standard, at least during the period of federal control, and should be incorporated in this report as it is finally submitted.

The Chairman conferred with the Administration, and that will be taken care of. Any papers and standards that they may have had will be included in the report of this committee. If there are no further remarks, we will take up the next paper.

George S. Goodwin (C. R. I. & P.): I would like to ask whether it is the intention of the Arbitration Committee to publish the stenciling for the repacking of boxes. This was covered on page four, and the suggestion was made there that the boxes be marked "Repacked 1-10-19" and referred to the Arbitration Committee. They made no mention of it in the report. These cars are being marked now with all kinds of stenciling, and I think some standard marking of cars should obtain.

Chairman: Does any member of the Arbitration Committee want to make any answer to that?

Mr. Goodnow: I understand that the Arbitration Committee did not include that in its report to the present convention; just why no action was taken on that I am unprepared to say.

Mr. Fuller: At the time of the meeting of the committee that report was not before the committee; therefore, no action was taken on it.

Chairman: It is my understanding that this will be incorporated in the writing of the Rules.

J. A. Donahey (A. C. & Y.): The lettering and marking of cars, where it speaks of "light weighing stations," should be "re-weighing stations."

Chairman: We will see that that is corrected.

Mr. Goodnow: I would like to ask regarding the action on the motion to adopt this report, whether or not it included the letter which I read. For the benefit of the Committee on Standards, I really think it should not include that. The Committee on Standards has been more the custodian of the historical records of the Association. It is not an investigating committee, and this carries with it certain changes in the M. C. C. standards which I don't think ought to be acted on this year, but rather that they be carried over.

Mr. Fuller: When I made that motion I did not intend to include anything other than the committee's report.

Chairman: Well, that will be the understanding. The letter, as I understand it, was simply a suggestion for consideration.

Mr. Goodnow: It was really a recommendation for a change in the present M. C. B. standards.

Mr. Fuller: I did not understand that was a part of the committee's report, but was something that came in afterwards. My motion was merely to carry the committee's report only.

Mr. Goodnow: I would like to say for the benefit of the Committee on Standards that it has been the practice in sending out the circular of inquiry by the Committee on Standards, for suggestions, to confine these suggestions to matters of recommended practice and standards. Frequently subjects are sent to the Committee on Standards, which really apply to the work of standing or special committees and these suggestions should go to those committees. As the Committee on Standards cannot meet, until very near convention time, it has no opportunity to investigate the suggestions made, and can only refer them to the special or standing committee, which is directly concerned with the suggestion made; very often these suggestions reach the Committee on Standards too late to go before the convention. Those members who have suggestions which properly fall within the province of the work of other committees, should send them to the chairman of the General Committee direct, or to the particular committee concerned, and thus get the suggestions before the committee where they will be acted on.

The Committee on Standards in its report this year, so far as standardiation is concerned, offers very little, if anything, of importance, and it will greatly expedite the handling of suggestions, if, for example, any suggestions which properly apply to the Truck Committee, or any other committee, go direct to those committees, not to the Committee on Standards. I make that suggestion in conformity with the suggestion made by the chairman in his address regarding the work of committees.

C. E. Fuller: Are not the suggestions all sent to the secretary?

Mr. Goodnow: They have not been in the past.

Mr. Fuller: Sent to you?

Mr. Goodnow: Sent to me as chairman of the Committee on Standards and Recommended Practices.

Mr. Fuller: Then I make a motion that in the future all suggestions of that kind be sent to the secretary of the association, and that the secretary send them to the proper committee, if there is a committee appointed to handle the matter to which the suggestion refers, otherwise that it be handled by the General Committee.

W. E. Dunham (C. & N. W.): I understand, after having conferred with the Secretary, that that is the procedure which will be followed out in the new organization; that all matters of this kind go through the Secretary, or the General Committee.

Chairman: That is my understanding. Are there any further remarks on Mr. Fuller's motion?

The motion was seconded, put to vote and carried.

J. J. Tatum (U. S. R. A.): I would like to ask Mr. Goodnow a question in connection with the marking on stock cars. It seems to me that that matter was brought up by the yardmen, who have to read the marking on the stock cars for their protection. In other words, they wanted safety, they wanted their lives protected. Now, the committee says, that "Your committee believes the location indicated for house cars on M. C. B. Sheet No. 26 meets all the requirements." I would like to ask Mr. Goodnow if he has consulted the Safety Section or any of the safety sections of the various railroads, as to whether or not that location would give the yardmen the protection they need, or whether the committee has simply decided it from the establishment of the marking shown in our records.

Mr. Goodnow: I would say that the majority of the roads have already adopted the practice of putting a number board on stock cars, and if they comply with the present M. C. B. standards they must do that to get the number down to a certain height from the top of the rail. The only way in which you can do that is to put an additional number board on the car and put a number on it. I think a large number of the stock cars are being taken care of in that way, and that is the only way in which they can be taken care of, and it meets the safety requirements. It came up on our road, through the Safety Section and several years ago we adopted the practice of putting on an additional board which carries the number at the height required under that standard.

Mr. Tatum: I agree with what Mr. Goodnow says, as far as that goes, but as a matter of fact the yardmen have complained of the location of the marking as shown by the marking sheets issued by the M. C. B., and it seems to me that the Committee on Standards should know if the location designated by the sheet referred to will give them the protection they need. I believe that the Committee on Standards should interview the men in the yard, who are doing this work.

Mr. Goodnow: The Committee on Standards will be glad to take that action. There is only one location for a number on any car at the present time, and that is definitely established in the standard. It is at a height in range with the line of vision of the average individual. That standard was established at the suggestion of the American Railroad Association some years ago and was included in the present M. C. B. standards at the suggestion of that association. It is not the number at the top along the eaves of the car where the ordinary stock car is numbered at the present time. The standard location on box cars is the standard location for that number. It has not changed on any particular style of equipment—it must be the same on stock cars or box cars or any house cars.

Mr. Tatum: I still agree with Mr. Goodnow as to what he said, but I am not convinced that we have satisfied the men who have to read this marking. Suppose we had to change our entire marking, to some other method of marking, to give the men the proper protection. If there is a possibility of loss of life, under the present method of marking, we should prevent that possibility by changing the system of marking, and I believe the Committee on Standards should consult the safety sections of the various railroads doing this work, in order to determine whether or not it is satisfactorily located, and to locate the marking in that position where the men will get the protection they need. I suggest that that part of the subject be referred back to the committee for consideration.

F. F. Gaines: I think perhaps we can satisfy the point that Mr. Tatum brings up without very much work. If the standard location is that which is now shown; if it can be made a safe place by putting up a number board, and it becomes the standard of the association, it necessarily also becomes imperative to use that location, and do away with the old eaves lettering.

Chairman: I believe the matter was looked into from all sides before a decision was reached, as to the best position for the number board over the rail in the case of stock cars, and in taking action on stock cars it was decided to make it standard with other cars as heretofore shown. This was done by the arrangement of a number board, which could be placed at the proper height from the ground, to agree with the position of the number as on box or house cars. There is no objection to the suggestion made by Mr. Tatum, that the Committee on Standards shall write to the different railroad safety committees to ask if they have any suggestions to offer in connection with the matter. I imagine you will have as many suggestions as there are railroads, but you will at least receive information on the subject, and to that extent I think it would be advisable.

John McMullen (Erie): Inasmuch as the question has been raised by Mr. Tatum, from a safety point of view, it might be well to put these number boards closer together, rather than to have them spread apart, as they generally are—have the number board and the name of the road closer together, so there will be no space in which a man can insert his hand to climb up on the truck and the car. Another question is whether or not the number board should be placed higher on a stock car than on a house car, for the reason that the number board is likely to get smeared through the slats of the car.

Mr. Goodnow: We will be glad to confer with the Safety Section, as Mr. Tatum suggests. I do not see how, in connection with what Mr. McMullen says, that the number board can be changed. The number on the car is now placed where a man of ordinary height will best see it, when he is reading the numbers on successive cars in a train, and I think the numbers on stock cars are sufficiently high from the floor of the car to be kept in good readable condition. However, if it is the desire of the convention that we make any special location for stock cars, we can go into the matter further, but I think the main thing to do is, as far as possible, to keep a standard location for numbers, and then our clerks and those who have to read the numbers on the cars, and often get them in a hurry, need not look all over the car, but can look at one place on the car and get the number. That is an important feature in keeping a standard location for the numbers on all cars where it can be maintained.

F. F. Gaines: In order to put the association on good ground. I move that the subject of lettering on stock cars be referred to the committee for further consideration, and in giving it further consideration, they confer with the Safety Section, so that every item in connection with the matter will be taken care of.

C. E. Fuller (U. P.): Mr. Tatum made a suggestion. I ask him if he has heard of any complaint in regard to the location of the number of the stock cars on the board, which is a standard of the association.

J. J. Tatum: The Safety Section of the U. S. R. A. brought the matter to my attention, and asked me to have the M. C. B. Association do something to locate the marking so that it would protect the men who have to read it. They have had various complaints from men all over the country, that their lives were in jeopardy many times in trying to read the marking on the cars. The communications which they referred to me were referred to the Arbitration Committee for action, and were forwarded by that committee to the Committee on Standards. We have heard their action on the subject, as indicated in the report,

but it is a question whether the standards committee decided for the Safety Section or the various safety committees of the different railroads, that that was a safe location. I know, and you do, too, that the man who does the work knows more about the work to be done than the man who does not do it.

Mr. Fuller: Do you know whether they were referring to the numbers just under the eaves, or the numbers on the board about the height of the average man's eye?

Mr. Tatum: The statement was made that the numbers had been located in various places on the car, that there was no standard location, and that they did not think that the locations had been approved by the various railroads or were satisfactory. They did not say that the M. C. B. location on the box car was satisfactory or not satisfactory, but it appeared to me, inasmuch as they took exception to the location of the numbers on the stock cars, that the Safety Section was the proper section to consult and to ascertain from them what the objections were. We must stay with the Safety Section for all time, and we must do everything to protect the lives of the men who are more or less penalized in doing the work; there is no better way to solve the problem than to make it absolutely satisfactory to them.

Mr. Fuller: Is not a great deal of the trouble due to the fact that a number of the railroads have not complied with the standards, and have introduced variations in the standards, which has brought about the trouble?

Mr. Tatum: That may be true, but is it not better for us to find out whether that is so? We do not now know which is right and which is wrong, and we should find out. If our marking is right, when placed in the location established by the M. C. B. Association, then let us say it is right and approved by the safety sections of the railroads, and insist on the marking being located at that place for the safety of the men who are involved.

Mr. Fuller: That is just the reason I raised the question, because Mr. Tatum's remarks did not indicate whether the standard marking was wrong or not. I will second Mr. Gaines' motion, that the committee take up the question with a view of determining whether the standard location is proper or not. There is no necessity of this committee investigating a thousand and one heights. It is a uniform height that we have got now that should be used. Apparently, it has not been used, and I will second Mr. Gaines's motion.

Mr. George Gibbs (P. T. & T.): Was not this marking originally settled on because of a recommendation from the Car Service Association? Mr. Hill was then chairman. I have a recollection that they sent a communication to us through the American Railroad Association, recommending the uniform placing of these markings and suggesting the position for them, and giving the reasons, I should say, ten years ago. I suggest that the same body that made that recommendation be brought into this.

Mr. Goodnow: Mr. Gibbs is correct in what he says. The standard marking of cars, so far as the operating feature of it is concerned, was handled in that way. It was handled by the Committee on Relations of the American Railroad Association, and included in the M. C. B. standards at their suggestion, and as a result of the adoption on the part of the Association by letter ballot.

Mr. Tatum: I believe the position taken by Mr. Gibbs is well taken and I think that the American Railway Association should be brought in as a committee that passed on that marking and recommended it.

I. S. Downing (C. C. C. & St. L.): It seems to me this matter should go to the Transportation Department of some section. It is not a mechanical matter. So far as the safety is concerned, or the putting of the board down low enough for a man to get hold of, they might take hold of the slats in the stock car; they might take hold of the door. I don't think we ought to handle it except to send it back to the committee, or that part of the section of the American Railway Association, that told us to locate it in that location.

Chairman: I think that a subject of that kind is strictly a mechanical subject, and should be referred to none but Section III. They naturally would have to confer with the people who were affected in making their report, but it is rightfully a mechanical question.

Mr. Goodnow: If the motion, as now before the association, prevails, I think it will take care of it, as it simply will get the approval of the Safety Section on the standard location. If we get that approval, then the whole matter is settled.

R. H. Kleine (P. R. R.): I was chairmani of the committee that fixed the present location for height of lettering on the cars. It was done at the request of the American Railroad Association about ten years ago. The distance from the top of the rail to the bottom of the board is, as I recall the figures, 5 ft. 9 in. with a variation of 6 in. either way. That is about as low as you can get a board on a house car and still get your capacity marking and your lightweight markings, underneath the same, and it was entirely agreeable to the American Railroad Association at that time. I believe the complaints in regard to the location of the present lettering is on cars that are not stenciled in accordance with the present standards.

Chairman: I think the motion will properly take care of it.

The motion was unanimously carried.

Mr. Goodnow: As there is only one item that should go to letter ballot as I see it now—and that is "Definitions and Designating Letters of General Service Freight Equipment Cars"—the matter of separating the double deck, single deck, and convertible deck stock car, that should be included in the motion, so that one item will go to letter ballot this year.

Chairman: If there are no objections, that will be included in the motion. So ordered.

Committee on Train Brake and Signal Equipment



T. L. Burton
Chairman

Since the annual meeting of the M. C. B. Association in June, 1918, nine subjects have been referred to the Train Brake and Signal Equipment Committee, on which the following report is submitted:

PART I. Air Brake Maintenance

Acting under direction of the Executive Committee, the Train Brake and Signal Equipment Committee met in Buffalo on November 6th last, with the secretary, representatives of the Fuel Conservation Section, United States Railroad Administration, and the President of the Air Brake Association, for a discussion on the condition of freight brake equipment and means of improving it. As a result of this meeting, Circular No. 20 on Air Brake Maintenance was issued by the Executive Committee and approved by the United States Railroad Administration.

PART II. Adjustment of Brake Power on Tank Cars

Under date of December 28, 1918, a communication was received from the secretary enclosing an exchange of correspondence and blue-prints with the Tank Car Committee and the American Car & Foundry Company, and a request from the Executive Committee to have the Train Brake and Signal Committee review the question of hand brake power for tank cars, which was done. The committee's recommendations have been issued to the members in Circular S-III No. 3.

PART III. Air Brake Hose Coupling Packing Rings and Gages

The committee's attention has been called to the fact that the recommended practice packing ring gage shown on Sheet *Q-1* does not provide for tolerance dimensions of the flange of the air brake hose coupling packing ring shown on Sheet 18-A, and it has been suggested that this gage drawing should be revised to show minimum and maximum slots for the flange of the packing ring.

For years packing rings have been supplied in large quantities with less variation in flange thickness than can be detected with a

gage, and to make the change suggested would unnecessarily increase the chances for brake pipe leakage, therefore the committee does not concur in the suggstion; on the contrary it believes: (a) The gage shown on sheet *Q-1* should be advanced to standard. The gage and packing ring to be drawn to larger scale and shown on the same sheet. (b) The packing ring drawing in the specifications should show nominal dimensions only, the tolerance dimensions to be provided for in the gage. (c) The packing ring specifications should include instructions on the use of the gage.

PART IV. Brake Installation

Attention has been called to the large number of loose brake cylinders, reservoirs and pipe clamps on freight cars, secured with bolts having single nuts. The committee's recommendations will, racks, many of which are in use, be discontinued. It believes, however, that the use of the two racks should be made optional, and when a new rack is installed it should be the later type, and when the older racks require extensive repairs they should be converted. The proposed revised instructions on cleaning and testing triple valves, therefore, include drawings and operating instructions for both racks.

PART VII. Stenciling Brakes

The Air Brake Association and the Northwest Air Brake Club recommend changing the stenciling for brake cylinders and triple valves when cleaned, lubricated, etc., so that but two lines will be required, one line to show the place, month, date and year of cleaning, and one line to show the initials of the road on which the work is done, the stencil to be applied to both sides of the

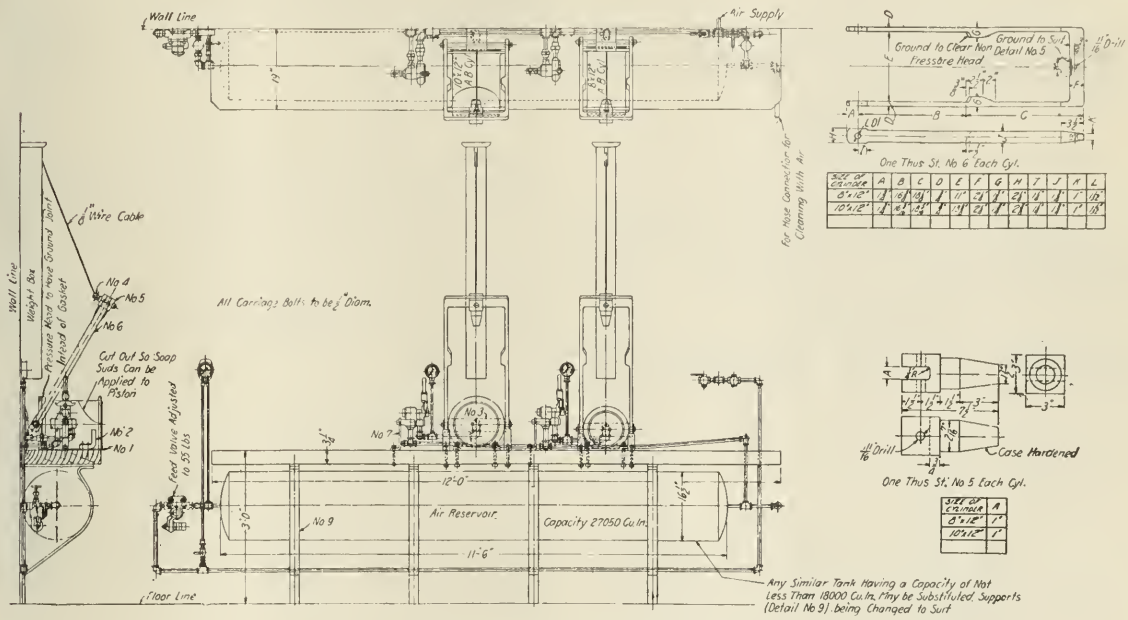


Fig. 1.—Brake Cylinder Packing Lever Test Rack

therefore, include a revision of Sheets 18 an1 *Q*, to include double or lock nuts for such bolts.

PART V. Cleaning, Lubricating and Testing Brake Cylinders

It has been suggested that the brake cylinder piston and packing leather when removed should be taken to a shop conveniently located, where the leather should be cleaned by a man assigned to this work, and tested on a test rack. This method of cleaning and testing packing leathers is employed on several roads with most satisfactory results, and the committee believes the suggested method should be extended and ultimately made standard practice. Drawings for suitable test racks are, therefore, included in Exhibit *C-1*, to which suitable reference is made in the proposed instructions on annual repairs to freight brakes (Exhibit *C*).

PART VI. Triple Valve Test Rack

Since the triple valve test rack, for which drawings are shown in existing instructions for cleaning and testing triple valves, was brought to the attention of the association, an improved test rack has been developed and is in extensive use on many roads. The committee also understands that many of the old racks have been converted to the later type, which can easily be done, and that any cleaned or repaired valve that will pass the prescribed test for the later rack will also pass the test prescribed for the older rack. The use of the former rack will, therefore, not conflict with the rules and instructions governing the cleaning and testing of triple valves.

While the committee recognizes the superiority of the later rack, it does not feel justified in recommending that the older car or reservoir. The recommended form of stencil is concurred in, but the necessity for stenciling both sides of the reservoir or car is not conceded.

PART VIII. Retaining Valves for Freight Cars

Attention has been called to the large number of different types and capacities of retaining valves required in order to make proper repairs to foreign cars, and it has been recommended making 15-30 and 25-50 lb. spring type retainers standard for all new cars built in the future, the 15-30 lb. valves to be used on cars under 80,000 lb. capacity, and the 25-50 lb. valves to be used on car of 80,000 lb. capacity and over, and that a suitable test be formulated for cleaned or repaired retaining valves.

The matter of testing retaining valves is provided for in the proposed revised instructions on the maintenance of freight brakes, but the committee is not in possession of information which would justify it in recommending standard capacity retaining valves for all freight cars offered in interchange, and doubts if such information can be had without making some road investigations, which the committee to date has not been able to make. It believes, however, the association would be justified in adopting, as recommended practice, two-pressure spring type retaining valves of such capacity as may be required by individual roads, leaving the question of standard capacity open for further consideration, and so recommends.

If this recommendation carries, and a standard capacity retainer of the two-pressure spring type should subsequently be adopted, any retainers of this type then in use can, if they should not be of the capacity adopted, be easily converted to standard by simply changing the springs, which can be done at a very

nominal cost. Meanwhile the weighted type and the single pressure spring type retainers will have been abandoned for new equipment, and, in many cases, for repairs, thus going a long way toward accomplishing the object sought, *i. e.*, to reduce the number of valves carried in stock for repairs.

PART IX. RULES AND INSTRUCTIONS ON THE MAINTENANCE OF FREIGHT BRAKES

At the request of the General Committee, the standard instructions on the maintenance of freight brakes have been revised and divided into the following parts, as shown in Exhibits *A*, *B*, *C* and *D*.. (a) Test and repairs to brakes in terminal yards. (b) Test and repairs to brakes on shop or repair tracks with brake stencils in date. (c) Annual repairs to brakes with stencils out of date. (d) Cleaning, lubricating and testing triple vales.

PART X. AIR BRAKE REPAIR TOOLS AND DEVICES

Several roads have submitted drawings showing useful tools and devices for use in making air brake repairs to freight cars. The committee reviewed a number of drawings submitted, some of which are shown in Exhibit *C-1*.

Recommendations

The committee recommends submitting to letter ballot:

FOR RECOMMENDED PRACTICE

1. That Sheet *Q* be revised by adding a note reading: "Bolts securing brake cylinders, auxiliary reservoir and pipe clamps, to have double nuts or lock nuts." 2. The adoption of spring type duplex retaining valves for freight equipment cars.

FOR STANDARD

1. Advancing to standard the recommended practice gage shown on Sheet *Q-1* for air brake hose coupling packing rings. The gage, and the hose coupling packing ring now shown on

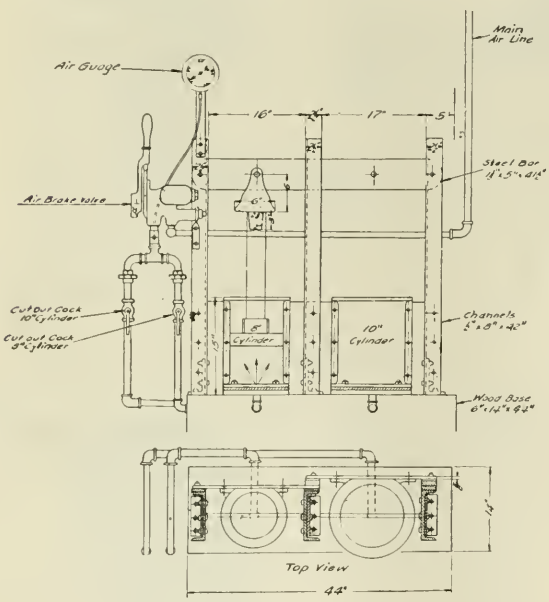


Fig. 2.—Brake Cylinder Packing Leather Test Rack

Sheet *18-A*, o be shown on one (new) sheet. 2. That Sheet 18 be revised by adding a note to read: "Bolts securing brake cylinders, auxiliary reservoirs and pipe clamps to have double nuts or lock nuts." 3. Revised rules and instructions on the maintenance of freight brakes as shown in Exhibits *A*, *B*, *C* and *D*, voting separately on each exhibit.

The committee recommends that the following subjects be included in next year's work of this or a similar committee: 1. Revision of existing rules and instructions on the operation of train brake and signal equipment. 2. Cleaning and testing brake cylinder packing leathers in a room or shop instead of under the car. 3. Capacity of standard retaining valves for freight cars. This subject to include such investigations as may be found necessary on the operation of retaining valves in grade service.

Rules and Instructions Governing the Maintenance of Brake Equipment on Freight Cars

EXHIBIT *A*.—TEST AND REPAIRS TO BRAKES ON CARS IN TERMINAL YARDS

1. Freight cars in terminal yards should have the air brakes tested as follows:

INCOMING TRAINS

2. Freight trains, on arrival at terminals where inspectors are stationed to make immediate brake inspection and repairs, shall have the slack stretched and shall be left with the brakes fully applied in service application. Inspection of brakes should be made as soon thereafter as practicable and any needed repairs made, or promptly mark for repair tracks any cars that cannot otherwise be repaired.

OUTGOING TRAINS AND YARD TESTS

3. While the train is being charged, make a visual inspection of retaining valves and retaining valve pipes, position of angle cocks and hose, and examine closely for leaks from the brake pipe and its connections, and make necessary repairs to reduce this leakage to a minimum when the brake system is charged to standard pressure.

4. When the brake is charged to standard pressure, make a 15-lb. service reduction, after which a second examination of the train should be made to determine: (a) Brake pipe leakage. (b) If triple valve will operate on service application. (c) Piston travel. (d) Brake cylinder leakage. (e) If the brakes release properly.

5. If, during this test, the brake pipe leakage, as indicated by the brake pipe gage, exceeds 8 lb. per minute, it should be reduced to 8 lb., preferably 5 lb., and if the piston travel is less than 6 in. or more than 8 in. it should be adjusted to 7 in. All defects found shall be repaired in the yards or the car sent to the shop or repair track for necessary attention.

6. In addition to the above terminal tests, at the last terminal inspection point prior to descending mountain grades, it must be known that a sufficient number of retaining valves are in good operating condition to control the train.

EXHIBIT *B*.—TEST AND REPAIRS TO BRAKES ON CARS ON SHOP OR REPAIR TRACKS WITH STENCILS IN DATE

1. All cars on shop and repair tracks (with stencils in date) should be connected to a yard air plant equipped with testing apparatus, and a dummy coupling attached to the hose on the opposite end of the car. The pipe, including angle cocks, cut-out cock and hose, to be tested under a pressure of not less than 70 lbs., using soapsuds for this test when weather conditions permit. All possible leakage should be eliminated. Any hose found porous or leaking around the fittings, or otherwise defective, and any cocks found leaking at the top of the key should be removed.

TYPE OF RETAINING VALVE	Position of Handle	Initial Cylinder Pressure	Combined leakage from the cylinder, retaining valve and pipe must not exceed that shown below Number pounds leakage per minute
15 lb. Single Pressure Spring and Weighted Type	.....	10 lb.	7
15-30 lb. Double Pressure Weighted Type	.....	20 lb.	10
15-30 lb. Double Pressure Spring Type	High	20 lb.	10
	Low	10 lb.	7
25-50 lb. Double Pressure Weighted Type	.....	40 lb.	14
25-50 lb. Double Pressure Spring Type	High	40 lb.	14
	Low	15 lb.	9

2. The brake cylinder must be tested for leakage with a gage attached to the retaining valve exhaust or triple valve exhaust port, and the triple valve tested with a specified testing device to determine whether it will apply and release properly in both service and emergency applications. If the triple valve fails to pass this test or the brake cylinder leakage exceeds 12 lb. per

minute, the entire brake equipment must be given the attention specified for cars requiring annual repairs when the stencil is out of date. If the triple valve and brake cylinder pass the prescribed test, the retaining valve and its pipe must be tested, and the combined leakage from the cylinder, retaining valve and retaining valve pipe must not be greater than is specified in the table on the preceding page.

3. When giving brakes this attention, see that the brake pipe is securely clamped, angle cocks in their proper position with suitable clearance (see M. C. B. Sheet 18), hose and couplings in good conditions, reservoirs and cylinders tight on their supports, the supports securely attached to car, and that piston travel is table on the preceding page.

EXHIBIT *C*.—ANNUAL REPAIRS TO AIR BRAKES ON FREIGHT CARS

Exhibit C follows closely the instructions for Lubricating and Inspection of Brake Cylinders as published on page 524 of the Proceedings of the Master Car Builders Association for 1918 with the following additions:

19. When the brake cylinder and triple valve are cleaned, the following additional work should be performed: Retaining valve cleaned by removing the cap, wiping or blowing out all dirt and seeing that the valve and its seat are in good condition, the retaining position exhaust port open and the valve proper well secured to the car in a vertical position; pipe clamps applied where missing, and tightened where loose, hose and angle cocks turned to their proper position. Pipe joints, hose, release valve, angle and cut-out cocks should be tested under a pressure of not less than 70 lb., using soapsuds for this test when weather conditions will permit. The retaining valve and its pipe must be tested and the combined leakage from the cylinder, retaining valve and retaining valve pipe must not be greater than is specified in the following table:

TYPE OF RETAINING VALVE	Position of Handle	Initial Cylinder Pressure	Combined leakage from the cylinder, retaining valve and pipe must not exceed that shown below. Number of pounds leakage per minute.
15 lb. Single Pressure Spring and Weighted Type.....	.....	10 lb.	5
15-30 lb. Double Pressure Weighted Type	.....	20 lb.	6
15-30 lb. Double Pressure Spring Type	High	20 lb.	6
	Low	10 lb.	5
25-50 lb. Double Pressure Weighted Type	.....	40 lb.	8
25-50 lb. Double Pressure Spring Type	High	40 lb.	8
	Low	15 lb.	6

20. Stenciled dates on brake cylinders or auxiliaries should not be changed unless paragraphs 1 to 19, inclusive, have been complied with.

NOTE.—It has been found good practice, where conditions will permit, to install a brake cylinder packing leather test rack similar to Figs. 1 or 2, Exhibit *C-1*, in a suitable building close to where the brakes on cars receive attention. When such a rack is installed ,the piston, when removed from the cylinder, should be taken to the rack and cleaned, lubricated and tested, in accordance with instructions for cleaning and testing these parts on cars. The expander ring should also be tested in a gage, and metal covers for protecting the leather from damage through handling should be provided.

Exhibit *C-1* includes drawings of tools and test devices for use in testing and repairing air brake equipment on freight cars including a gage for brake cylinder leather expanders, protectors for brake cylinder packing leathers and brake testing devices.

Exhiibt *D* covers the cleaning, lubricating and testing of triple valves and corresponds with the standard instructions on page 522 of the 1918 Proceedings of the Master Car Builders' Association with minor revisions and also the Triple Valve Tests and Instructions for Operating Triple Valve Test Racks shown on page 526. To this is added a section covering instructions for operating the No. 2 triple valve test rack.

The report is signed by T. L. Burton (Chairman), New York Central; B. P. Flory, New York, Ontario & Western; J. M. Henry, Pennsylvania; L. P. Streeter, Illinois Central; R. B. Rasbridge, Philadelphia & Reading; W. J. Hartman, Chicago, Rock Island & Pacific and G. H. Wood, Atchison, Topeka & Santa Fe.

T. L. Burton: There is one paragraph which does not appear in the report which the committee subsequently decided should appear and that is an acknowledgment of its indebtedness to the Air Brake Association, especially its president, Mr. Berry, for the hearty assistance and co-operation rendered the Train Brake and Signal Committee during the current and previous years in the work which has been before that committee.

Mr. Hennessey: I move the report be accepted and referred to letter ballot.

Mr. Gaines: I would like to have the mover amend that motion, so that in printing the note on sheet 2, in the portion "double or lock nuts" the word "'or" be omitted, and have it read "have lock nuts," that being the practice of the Railroad Administration at the present time.

Mr. Hennessey: I don't accept that amendment.

Mr. Fuller: We ought to have that made a little clearer. Do I understand, Mr. Gaines, that you do away with the practice of using a double nut or a single nut and a lock nut, and go to some so-called nut that takes the place of both—is that your idea?

Mr. Gaines: That is not our idea. The practice of using double nuts has been generally discontinued in preference to using a nut and a lock nut. That is what I wish to convey; instead of leaving it optional whether you were going to use double nuts or a nut and a lock nut, that you make the nut a lock nut mandatory as being the better practice.

Mr. Hennessey: If that is the idea, I will accept the motion that way.

Mr. Fuller: I don't understand that.

Mr. Gaines: Do you want to use two nuts or a nut and a lock nut? What is the better practice?

Mr. Fuller: What is your motion?

Mr. Gaines: My motion was to omit the double nut and just make it a nut and a lock nut.

Mr. Fuller: I don t think there is any particular objection to that, but it is rather revolutionary. I don't believe the time is ripe to put into a rule something that you can't do and won't do. I believe that the recommendation should say "a nut and a lock nut is preferable," but to prohibit the double nutting out in the woods is going so far that we won't be able to accomplish it to-day.

Mr. Gaines: In reply to Mr. Fuller, I don't think that if you were out in the woods, and had to put a double nut on, there is anything that will prohibit you doing it; but I think it is wrong to specify double nuts as being better than a nut and lock nut.

Mr. Fuller: What is the use making rules here that we know people will not obey. That is just our trouble. We make rules and go home and don't obey them, and won't do it.

Mr. Gaines: We don't make it mandatory by doing that, but you give the preference to the best practice. On new equipment I think we should start out with a nut and a lock nut.

Mr. Fuller: I am trying to make the rule consistent, and if I understand your motion, it makes the proper repairs a nut and a lock nut, and it is improper repairs if two nuts are used.

Mr. Burton: I believe that the committee can add a word or two that will make it entirely satisfactory to those who have participated in the discussion so far. Mr. Fuller has stated that they thought, that so far as getting results was concerned, either method would be satisfactory, probably the lock nut more desirable than the other; but we did not feel like going so far as to specify lock nuts instead of double nuts. My suggestion is that the last sentence on the proposed note be revised to read that the committee's recommendation will, therefore, include the revision of Sheets 18 to include double or lock nuts, preferably the latter.

Mr. Fuller: I will accept that.

Mr. Burton: I think the committee will do that without a motion.

Mr. Hennessey: I will accept that.

Mr. Goodnow: Before the motion is put, it seems to me they have omitted one item from their letter ballot which should be included, and that is the matter of stenciling referred to on the bottom of page 3, because that will mean a change in the present standards, and it should be recommended.

Mr. Burton: It is shown here as a part of the proposed revised instructions on the maintenance of freight brakes, of which that stenciling would be a part, and reference should perhaps have been made to the fact. I just noticed from reading the report of the Committee on Standards that this proposed stenciling seemed to agree with what they proposed, and if you adopt the standard practice on the automatic air brakes, you automatically adopt the form of stenciling.

H. W. Watkins (S. P.): There is nothing in this report that provides for the draining of reservoirs and the stenciling of them. We find that our reservoirs contain a considerable amount of water; condensation and corrosion get back into the valve and cause trouble, and I believe that the reservoirs should be drained out at the time the cylinder and the triple valve are cleaned, and so stenciled. I think this committee should include that in their report.

Mr. Burton: The condition referred to is largely a local one, and I doubt the necessity of providing specific instructions on draining auxiliary reservoirs on freight cars for the purpose of removing moisture and stenciling them to cover. You understand this is a freight car proposition exclusively. If that should be necessary, why then I would say that the thing to consider is putting the bleed cock in the bottom of the reservoir where it is drained every time it is used, but I think the protection afforded by having the relief valve at the top offsets any advantages of having the drain cock at the bottom.

Mr. Watkins: When we first put the automatic brakes on our equipment, there was a bleed cock put in for that very purpose, but it was abandoned, and a plug was put in, *and that plug is never removed*. The result is that water and condensation is carried around in these reservoirs for years, and there is corrosion. It is just as important to have your reservoirs cleaned as it is the cylinders for a perfect brake.

Mr. Burton: Why not request some committee to consider that in connection with this other work?

Chairman: That will have to come up after this first motion is disposed of. I will dispose of the first motion and then you can make your motion.

The motion was put and carried.

Mr. Watkins: I move that the question of draining and stenciling reservoirs be considered by the committee for next year.

Mr. Gaines: I second the motion.

The motion was then put to vote, and lost.

H. M. Curry (N. P.): I speak on this motion as the author of it. I think it is very essential this should be done if you leave off the stenciling end of it. I don't think we ought to leave the matter as it now stands, because we in the northern country have had considerable trouble with water in the air brake apparatus. I don't think we ought to let ti rest this year.

Chairman: If I were in the northern country, or in the country where these things seemed necessary, and the head of a railroad, I would see that the proper instructions were issued, so that my men would take care of these particular things that gave us annoyance, and I believe that is the proper way to do.

Mr. Curry: This is one point that you apparently overlook. These cars may come from the South to the North, and we have encountered considerable trouble on that account.

Chairman: The first time they reach your rails they can be drained.

Mr. Curry: That is all right. When they reach our rails there is a whole lot of drainage; we find it necessary. You are putting the practical burden on the Northern Pacific and the Northern roads, of taking care of all the work to drain the cars that come to our country.

Chairman: I believe that that thing will adjust itself. There is some other section than the North that has to do a lot of things you don't have to do.

Mr. Fuller: I make the motion.

Report on Brake Shoe and Brake Beam Equipment



B. B. Milner
Chairman

THE COMMITTEE MET in Chicago on April 22, confronted by a rather peculiar situation. By letter ballot of 1917, the "No. 2 Brake Beam," shown on Sheet *R* of that year, had been adopted as recommended practice, but by a close margin. This "No. 2 Brake Beam" was not a complete beam, certain details having been omitted in order to save it from being lost as were its predecessors in the letter ballots of 1912, 1913, 1914 and 1916. In 1918, a completely detailed beam, built upon the results of the 1917 letter ballot, appeared among the M. C. B. Standard Sheets as the result of special Executive Committee action suggested in connection with the car equipment built by the Railroad Administration, it being evidently thought that a beam supposedly used on the 100,000 administration cars would be fit for adoption and that such large initial use of a beam would be a favorable beginning for any standard.

On account of the generally unsatisfactory situation, which has obtained in connection with the committee's work, particularly with regard to the adoption of a standard No. 2 Beam, it was the opinion of the committee that the difficulties or objections which have beset its work and have operated to keep the committee from making the desired contribution to the advancement in the state of the art, should be reviewed for your information and for the benefit of the committee in planning for its future work.

In addressing itself to the brake beam and brake shoe problem of the country, the committee has not benefited by an adequate knowledge of the brake beam conditions of the country. It should appear impractical to divorce new equipment design from the maintenance of old as well as the maintenance of new, or to attempt to treat new and old equipment entirely independently, one of the other. Yet that appears to have been virtually attempted. Without knowledge of the country's brake beam conditions, the committee has, in the past, submitted to you for adoption, a beam which, on account of lack of adequate clearance between the spring plank and wheels, could not be applied to, many thousands of cars. The committee is now, through the medium of a questionnaire, collecting from all the roads, brake beam information essential for passing judgment upon brake beam problems.

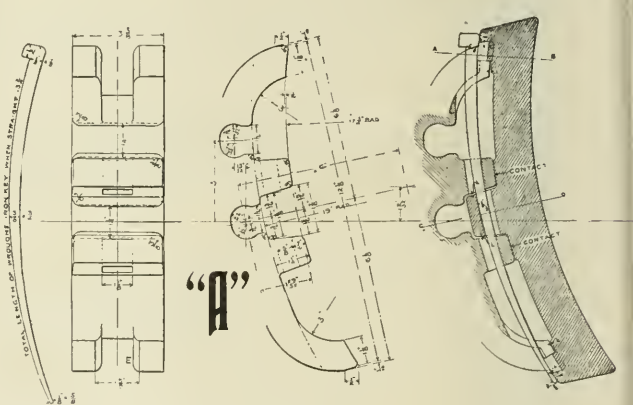


Fig. 1

Large numbers of dimensions shown upon drawings submitted for adoption, and in some cases, adopted, have caused dissension with some, and, with others, confusion because of an attempted use or interpretation not clearly intended by the committee or specifically contemplated by some of the members in casting their letter ballots. For example, in the 1917 Proceedings, page 394, the statement is made that "The committee recommends a revision of the present face of contour shown on Sheet M. C. B. 17, including the contract of the shoe to the head in the revised contour of the head . . . it being understood that only the contour lines of the head, where the shoe is in

contact with the head, are under consideration," introductory to question 81, "Do you approve of the above recommendation?"

A comparison af the 1916 brake head drawing identified as *A* upon Fig. 1 of this report and the brake head drawing which action upon the above question gave place in the standards as shown by Fig. 2, will justify and reflect, very apparently, the cause for the dissension and confusion referred to, notwithstanding the following note which the 1917 Sheet 17 bore—"Dimensions affecting contour, lugs and slots only are standard. Other dimensions for information only." The present committee submits that such notes are very likely to be overlooked and that text in the report or explanations of the meaning of letter ballots qualifying the significance of information, particularly dimension information, on Standard and Recommended rails to the center of the face of new shoes, were adopted in 1894, as follows: for inside hung beams, 13 in.; for outside hung beams, 14½ in.," but has never appeared upon any of the Standard or Recommended Practice Drawings.

Failure to exhibit this dimension upon the drawings has, it is believed, contributed to some further confusion which the 1917 letter ballot action unwittingly occasioned. Upon the brake head drawing *A* of 1913, 1914, 1915 and 1916 Standard Sheets, Fig. 1, the (unmarked) radial line drawn from the wheel center intersects the horizontal (unmarked) center line of the strut at a point which is the center of the center loop hanger opening. This same situation has obtained and has been generally used since before introduction to the Standard and Recommended Practice Sheets in 1907. Note, however, that upon

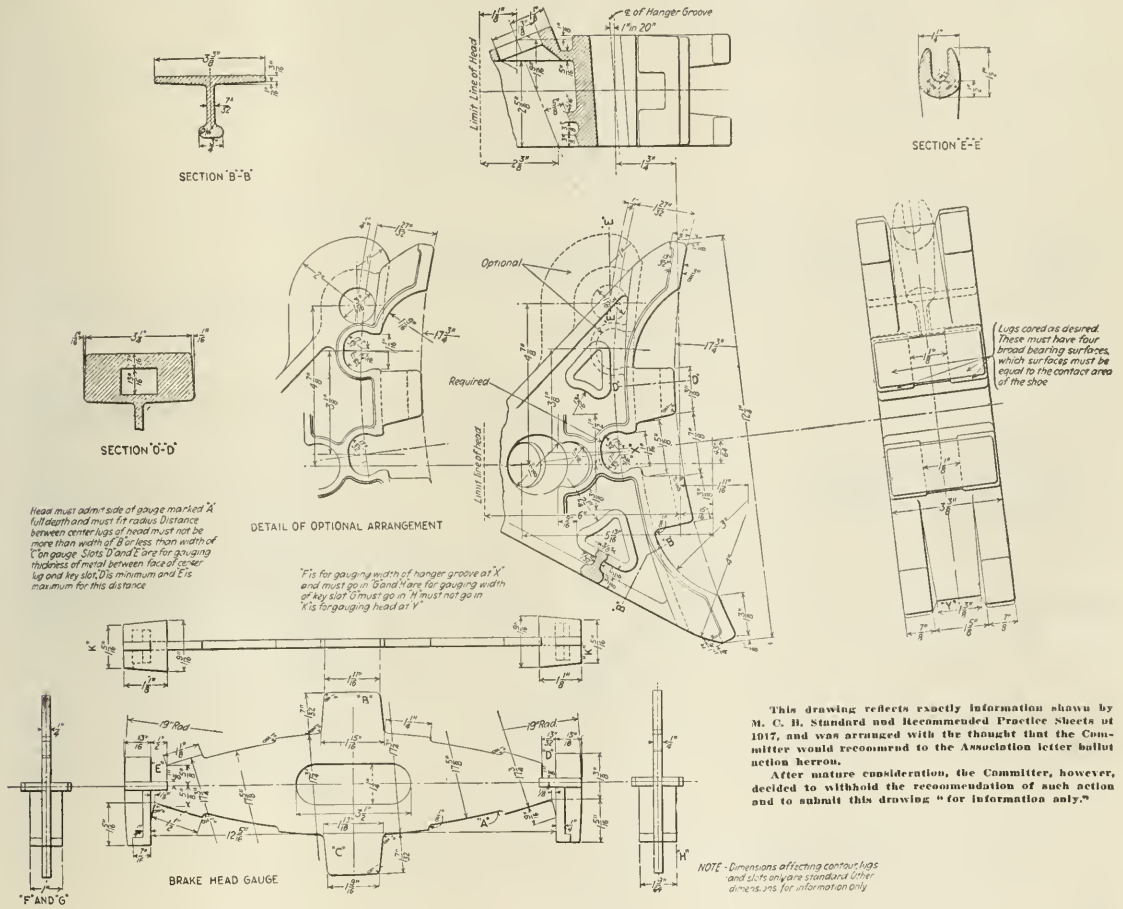


Fig. 2

Practice Sheets, is even more apt to confuse. All that was said on this matter in the body of the report of that year was ". . . the committee has strengthened the head design as well as the bearing surface of the head to the shoe and eliminated the 1/16-in. offset between the two center lugs of the head and the outside lugs where they engage the ends of the shoe." This very meagerly covers what the drawings reflect.

Again, while unauthorized dimensions or dimensions which had not specifically received formal approval, occasioned dissension and confusion through finding place upon Standard and Recommended Practice Sheets, it is suggested that the service has suffered because some dimensions which have been formally approved, have never appeared in the drawings. One, very important, has appeared each year for years in the text of the Standard and Recommended Practices as follows: "Standard heights of brake beams, when measured from the tops of the

what was adopted in 1917 (Fig. 2, this report), this radial line intersects the horizontal referred to, at a point much farther back and that the center of the center loop hanger opening remaining upon it (the radial line), is raised very significantly, although these facts were not referred to, much less explained, in the 1917 report or in the letter ballot circular of that year.

Such a situation would be positively obviated by adopting, either directly or indirectly, but clearly represented upon drawings, a process of laying out brake heads and brake beams such as the accompanying Fig. 3 presents. This one has been in most general use among manufacturers for years, being their interpretation of what found place in the Standard and Recommended Practices in 1907 and remained unchanged until 1917. The committee is on the point of soliciting from the representative members, statements of any reasons for not adopting the procedure which Fig. 3 would clearly fix, with any proposed

suggested plans, and hopes to recommend for adoption next year some such fundamental and basic procedure, the importance of which is reflected by Fig. 4, which presents a cut resulting from superimposing upon one of the many heads received upon the Administration cars in accordance with the plan of layout antedating 1917, the one head furnished in accordance with the 1917 18 layout.

The committee is not, and probably will not be, for some time, in position to recommend for adoption a "Standard Beam," that is, a beam having all of its detailed dimensions duly standardized, but plans to include in its reports, beams and parts thereof fully dimensioned for the benefit of any who may be concerned in such information, and to arrange for adoption next year, from the 1917 Standard and Recommended Practices and from whatever of the questions referred to in this report the committee may be able to decide and agree upon, drawings exhibiting those dimensions only which have had definite approval. The committee will then assume to recommend for formal adoption dimensions missing from the Standard and Recommended Practice Sheets, just as rapidly as the committee's judgment will support and warrant.

This committee has not, in the past, benefited by reason of much constructive criticism. In order to make progress, the committee should, at least, benefit by the reasons for a negative ballot, if definitely constructive criticism can not be furnished.

We have heard from time to time in the past of the representatives of some roads trying to force matters, others being on the defensive either on account of pending damage to them, or of simply a disinclination to change anything, and then, too, of the selfish influence of manufacturers' interests. It is the belief of the present committee, that each of its members should enter upon the committee work independent of the operation of any such impending factors, contributing to the fullest their individual engineering judgment, skill, experience, etc., to the solution of the country's brake beam and brake shoe problems.

The committee plans to arrange adequate trial of the gages shown in this report and other gages which the committee's canvass of the representative members brings forth, and so ultimately recommend adopting the best of the lot.

The committee finds approximately four pages in the text of the Standard and Recommended Practices devoted to brake shoes and beams, all of which is or could be advantageously represented on Standard or Recommended Practice drawings, and contemplates recommending, with the adoption of New Standard and Recommended Practice drawings next year, that the association approve eliminating from the Standard and Recommended Practice text all unnecessary duplication, reducing it to very little more than specifications for Brake Shoes and for Brake Beams.

The committee proposes to solicit from the exponents of various views on disputed questions, written argument sustaining their respective positions. During the current year, the matter of prescribing the process of laying out, upon the drawing board, a standard brake head and beam, previously referred to in the text and Fig. 3, will be so pursued, and the association may anticipate our recommending action on the matter next year. Another question which will, in all probability, be similarly handled, but later, is that of brake beam hanging arrangement. We anticipate it will be sometime before one hanging can be made standard to the exclusion of other arrangements. On these accounts, the committee plans to, just as far as possible, forecast, in its reports, the work which it sees ahead and to, just as soon as possible, indicate, subjects which are or will be in the way of being placed before the association for letter ballot action. Prin-

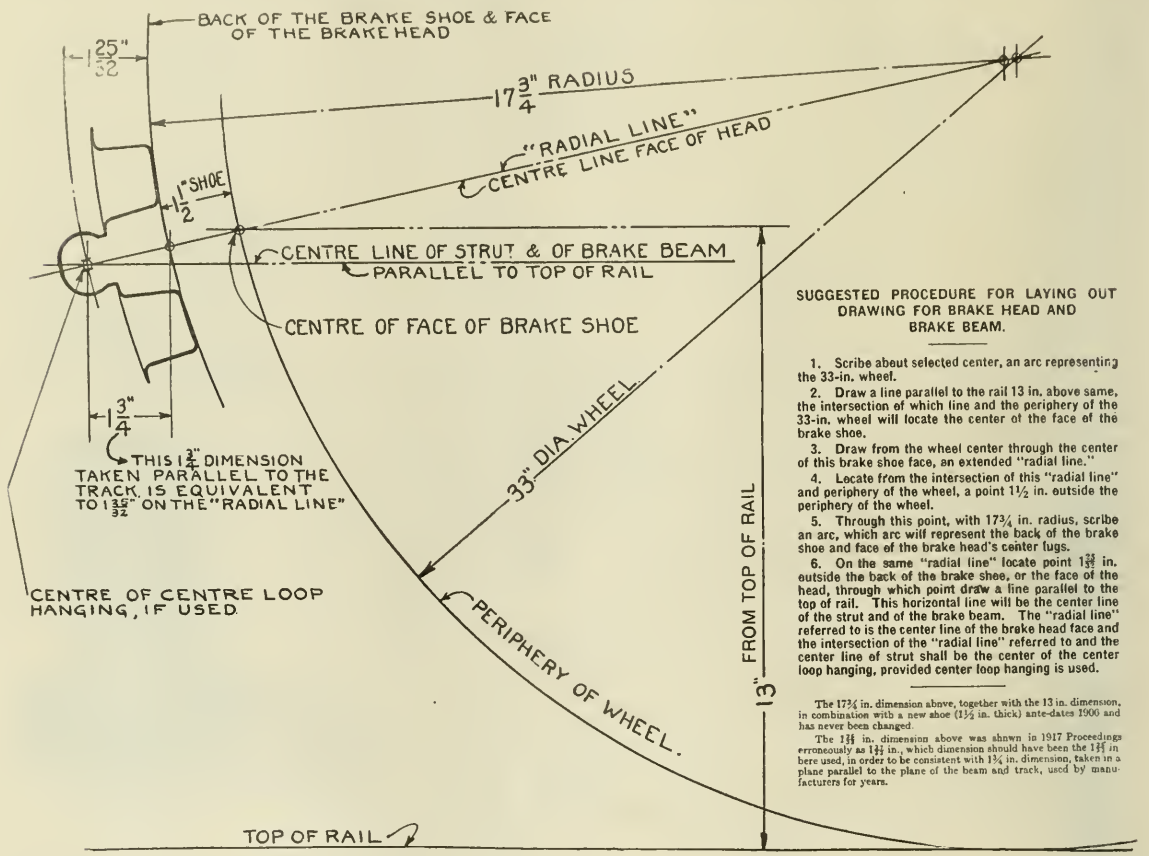


Fig. 3

ciples or subjects may then occupy several consecutive stages in some such order as follows: (1) mention in report, (2) study, (3) approval of the principle involved, (4) suggestion or recommendation of trial, (5) Recommended Practice, under which it may be said that no mistake is made in applying the principle, and (6) Standard Practice, in which stage the principle should be used, maintenance practices should be in the direction of applying the principle or should at least be consistent therewith, and a new car is not a car without it.

The committee is of the opinion that its work and the work undertaken for it which has been reported in the Proceedings, should be classified and indexed so that any part of the history of the subject should be immediately available to any one interested therein. Such an index we propose to arrange as a part of our next year's report.

Likewise, the committee is considering the advisability of presenting next year a report on the "state of the art," both as regards brake beams and brake shoes, the latter being now suggested because of the following quoted from the 1917 report, page 155 of the Proceedings of that year: In its Circular of

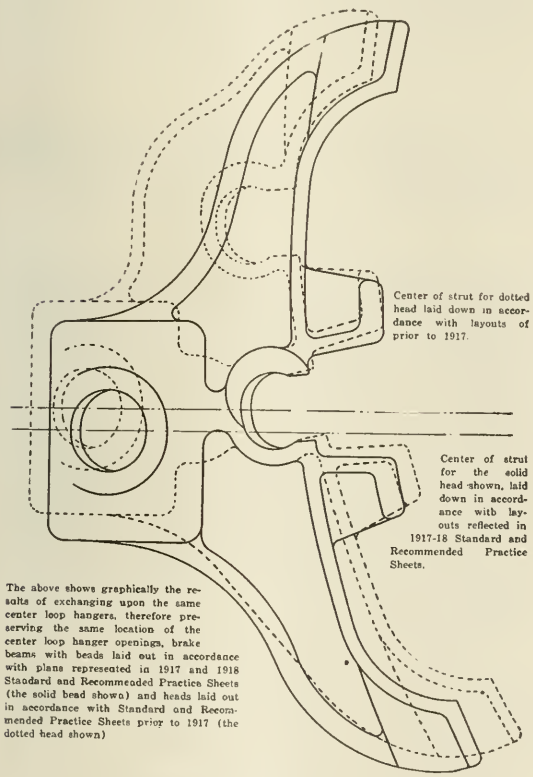


Fig. 4

Inquiry, the committee requested the members to furnish designs of steel back brake shoes which they were manufacturing and to advise if they were free from patents. The replies indicate that such forms of steel back brake shoes as are being manufactured by the members and which would be acceptable as Recommended Practice of the association are not free from patents, and probably will not be until 1919; that one of the members is using a steel back brake shoe of his own manufacture which is free from patents, but this design does not incorporate carrying the steel back reinforcement around the key lug. The committee therefore feels that until the above mentioned date it can not offer to the association as Recommended Practice any design of steel back brake shoe which would be free from infringing any valid existing patents."

(The committee submitted with the report several plates showing information incorporated in the standards from 1906 to 1916 and called attention to the successive changes.

Two other plates showed 12 different designs of brake heads which were applied to the order of 100,000 cars for the Railroad Administration.)

Considering the many things obviously wrong or subject to criticism in the Standard Sheets of 1918, particularly in view of the additions and changes represented therein which had never been before the committee, the fact that the Standard Sheets of 1917 were accepted by letter ballot, although by a very close vote the impossibility of the committee's being able to present a recommended decision on many of the disputed questions in the time available after its organization for this year's work, and prevalent criticism directed to the arrangement of the Standard Sheets and their illegibility on account of the smallness of the drawings and dimensions, the committee decided upon presenting a rearrangement of the 1917 sheets to larger scale.

Aside from the difficulties already referred to in this report, the committee will address itself to the following questions or suggestions, with the hope that upon some of them conclusive report may be made next year: The question of increasing the No. 2 Beam capacity from 12,000 to 15,000 lb., and the counter suggestion that a new beam, No. 2½, with a capacity of 15,000 lb., to be recognized among the Standards, comes from several members.

A member suggests that full recognition be given the top hanger opening.

Dimension and details upon compression and tension members.

A member suggests covering of various types and locations of third point suspension lug, and that the hole in this lug should be 13/16 in. for a ¾-in. pin, in lieu of the larger pin shown on the present strut drawing.

It is suggested that the strut should be dimensioned to show the minimum distance from the pin hole to the ends of the slot; that the chamber in the compression member should be "not less than ¾ in.", instead of ⅞ in. The strut and compression member fastening with key is objected to, together with the use of nuts on the ends of compression members, it being believed that these arrangements might be replaced by better ones.

Some believe that the vertical dimension between the centers of the loop hanger opening should be restored from 3⅛ in. to 3 in.; that the width of the center head lugs be reduced from 1⅜ in. to 1¼ in.; that the upper pot hook hanger hole should be 1¾ in. above the center line of the upper loop hanger opening, and that the cross section of metal in the pot hook hanger opening should be changed to a single ribbed style.

Some believe that the 1/16-in. clearance back from the 17¾-in. radial line on the top and bottom head toes should be restored; that the width of opening in the brake head for the brake key should be shown as "not less than ⅝ in. instead of 13/16 in.; that the length of the face of the head lug shown precisely as 3¼ in. should be replaced by a minimum dimension, say 3 in., and that the head lug note reading "Lugs cored as desired. These must have four broad bearing surfaces, etc.," should be changed to "Lugs cored as desired. These must have four *full* bearing surfaces, etc."

A member suggests that the width at the base of the tie lug openings should be re-established from 1⅜ in. to 1¼ in., and the head gage changed accordingly; that 5/32-in. radius should be added to the adjacent corners on the head gage; that the ⅛-in. radius at the bottom of the *B* and *C* head lug opening should be made 3/32 in. instead of ⅛ in., because, otherwise, the gage will not "bottom" in the head. It is further suggested that the brake beam outline and salient dimensions thereof should be inserted inside of the limiting outline drawing, together with interchange dimensions, that is, angle of strut, spacing between shoes, etc., and that the 19¼-in. maximum width of limiting outline opening should be extended to within 1 9/16 in. of the end of such opening.

A member suggests that the *A* and *B* openings of the brake shoe gage should be changed from 1¼ in. to 1 7/32 in.; that the base of these openings should be a radius of 18 31/32 in., in lieu of 19 in., and that strut markings should be changed from the rear to the front end of the strut, because of being, in that location, more easily seen.

It is also suggested that the "outside beam hanging 14½ in." should be eliminated; that

"Center of Brake Shoes 60 in.," should be changed to "center to center of face of brake heads 60 in. on the plane of the strut center," and that the center of the third point suspension should

be specified as 10 11/16 in. from the center of the face of the head.

The committee carefully considered the advisability of suggesting letter ballot action on the question of substitutes in Standards for present 1918 sheets 17, 17 A and 17 B of this report, but finally concluded that the 1918 sheets referred to might as well stand during the coming year, it being understood that the committee anticipates recommending replacement thereof by appropriate letter ballot action in 1920.

The report is signed by B. B. Milner, Chairman, New York Central; Prof. Chas. H. Benjamin, Purdue University; T. L. Burton, New York Central; C. B. Young, United States Railroad Administration; H. K. Fox, Chicago, Milwaukee & St. Paul; G. H. Gilman, Northern Pacific; T. J. Burns, Michigan Central, F. M. Waring, Pennsylvania.

E. B. Milner: The committee assumes to submit this report as a progress report, and requests an extension of time covering the next year, in which to consider and report to you if possible definitely upon many questions which this report indicates as requiring time for further study.

C. F. Giles: I move that the report be received and the committee continued to report at the next meeting.

The motion was carried.

The meeting then adjourned until 3 P. M.

The Afternoon Session

The proceedings of the afternoon session which took up the consideration of reports of the Committees on Arbitration, Revision of Prices for Labor and Material, Depreciation for Freight Cars and Revision of Passenger Car Rules of Interchange will be published in to-morrow's issue.

Apologies to the Camel Company

PRINT SHOP SURGERY amputated a line from the items included in the exhibit list statement made for the Camel Company yesterday. By this operation W. W. Darrow, A. B. Wegener, Arthur Allen and Belden D. Jones, of that company, were omitted from the names of those attending. The spaces of the company also were given incorrectly. The correct spaces are 534-536.

Canadian Delegates Missed From Convention

THE DEADLOCK between the Canadian Railway War Board and Division No. 4, Railway Shopmen of America, has made it necessary for all of the mechanical officers on the Canadian roads to remain on their jobs. They will be greatly missed because they have been a most important factor in all of the conventions which have been held during recent years.

The following are the most important demands made by the employees' committee:

1. Increases in rates for helpers from 45 cents per hour to 70 cents; for the machinists, blacksmiths, carpenters and similar tradesmen, ranging from 53 to 68 cents per hour, to 85 cents.
2. Forty-four-hour week as compared with forty-eight hours now in vogue in round houses and operating yards and forty-seven hours in main shops.
3. Double time for overtime in place of time and one-half.
4. Thirty days' holiday with full pay each year.
5. Extended issuance of annual free transportation.

Upon some of the foregoing and on a number of minor points the board has already made concessions. The employees have been informed that an eight-hour day has been granted, with Saturday afternoon holiday, where that privilege is already enjoyed, and the payment of punitive overtime for work performed on Saturday afternoon, where provided for in existing agreements.

Other points, however, are involved gravely affecting not only the solvency of Canadian railways, but the ability of Canadian business concerns to meet foreign competition. The board has declined to conclude negotiations or to give definite assurances except and until the same points in negotiation by the main branch of the same labor organization, constituting 90 per cent of its membership, with the United States Railroad Administration in Washington have been announced.

The Track Exhibits

THE large number of track exhibits this year has required that practically every available track be occupied, and of necessity the exhibits are somewhat scattered. The following is a list of the exhibits and the tracks on which they will be found:

Pennsylvania Cars

Three cars are being exhibited this year by the Pennsylvania Railroad, a 105-ton hopper car, a 110-ton gondola and a general utility express and baggage car. These cars are located south of the pier entrance, on Georgia Avenue, near the Boardwalk.

The Locomotives

Three locomotives are on exhibit, one a powerful electric freight locomotive, built by the Pennsylvania Railroad and the Westinghouse Electric & Manufacturing Company, a simple Mallet locomotive, just completed at the Juniata shops of the Pennsylvania Railroad, and the class I is Decapod locomotive, the first of which was built by this road about two years ago. These three locomotives are located on track 5 of the Pennsylvania electric train station at Tennessee Avenue. Bus service between the hours of 2.30 and 4.30 P. M. will be maintained by the Westinghouse Company between the Boardwalk and the Tennessee avenue station for the benefit of those who wish to visit the locomotive exhibit. The busses will make frequent trips, starting from Arkansas Avenue at the Boardwalk, just in front of the pier entrance.

The Army Ordnance Exhibit

The American Car & Foundry Company has on exhibit at Mississippi Avenue four heavy railway gun mounts. These are a 14-in. army rifle, a 7-in. rifle, a 12-in. mortar, an 8-in. rifle and an armored ammunition car for railway artillery.

In addition to the track exhibit, the American Car & Foundry Company also has a number of field artillery pieces, which are being exhibited near the Boardwalk, between the MarlboroughBlenheim and the Brighton hotels.

A Four-Wheel Drive Automobile

The Four-Wheel Drive Auto Company, Clintonville, Wis., has on exhibit, on Mississippi Avenue, a three-ton truck with four-wheel drive, used by the Army for handling ammunition.

Self-Propelled Cars

The storage battery cars, being exhibited by the Railway Storage Battery Car Company, and in operation between Atlantic City and Ocean City, leaves the Boardwalk on Virginia Avenue, at 10 A. M. and 3 P. M. daily. The round trip requires one hour and forty minutes.

The steam-driven car, exhibited by the Unit Railway Car Company, is located on Mississippi Avenue.

The Naval Ordnance Exhibit

The Baldwin Locomotive Works is exhibiting, on the Georgia Avenue tracks, a 14-in. railway gun mount and a 7-in. caterpillar gun mount, built for the United States Navy.

R. S. M. A. Nominations

The Nomination Committee of the Railway Supply Manufacturers' Association has nominated as president W. S. Bartholomew, president of the Locomotive Stoker Company, and vice-president of the Westinghouse Air Brake Company. It has nominated as vice-president J. F. Schurch, of the T. H. Symington Company. Mr. Schurch has been located at Rochester, N. Y., but expects shortly to remove to Chicago.

Registration, American Railway Association, Sec. III, Mechanical

Ayers, A. R., S. M. P., N. Y. C. & St. L., Marlborough.
Boyer, Chas. E., C. C. I., Penna., Runnymede.
Brogan, Jas. P., Asst. M. C. B., D. L. & W., Blackstone.
Brown, M. C., M. M., South Georgia, Haddon Hall.
Carroll, W. P., Genl. Supt., E. B. & A. C. Whiting Co., Schlitz.
Dickson, J., S. M. P., S. P. & S., Ambassador.
Duffy, A. F., Mgr. Safety Section, U. S. R. R. A., Blackstone.
Durham, Geo. S. M. P., W. L. E., Strand.
Frye, A. D., Pietmont & Northern, Strand.
Gibbs, A. W., C. M. E., P., Chelsea.
Gillis, H. A., Seaside.
Corell, W. T., Monticello.
Grewe, H. F., M. M., Pitts & West Va.
Hainen, J., Staff Officer Mech., V. & S.
Hartley, Geo. B., Solvay Process Co., St. Charles.
Henry, J. M., A. G. S. M. P., Penna., Chelsea.
Irvine, William, M. M., U. P., Haddon Hall.
Kiesel, W. F., Jr., N. E., Penna., Chelsea.
Kilroy, P. M., M. C. B., St. L. & S. W., Breakers.
Klinefeld, R. B., F. C. R., Newburgh & South Shore, Seville.
Kneass, Strickland L., Wm. Shellers Co., Ltd., Chalfonte.
Knox, W. J., M. E., B. R. & P., Arlington.
Lavallee, J. L., Mech. Supt., Strand.
McConville, H. A., I. F. C. R., L. & N.
McIlvaine, C. L., S. M. P., P., Chalfonte.
May, Walter, M. M., C. C. C. & St. L., Chalfonte.
Mercur, R. E., T. M., Westmoreland Coal Co., Seaside.
Miller, R. S., M. C. B., N. Y. C. & St. L., Traymore.
Needham, E. F., S. L. & C. D., Wabash, Alamac.
O'Neil, W J., M. Supt., C. R. I. & P., Breakers.
Pardue, W. T., M. C. B., Seaboard Air Line, Haddon Hall.
Peiffer, Chas. E., Master Car Building, B. R. & P., Arlington.
Ralston, J. A., M. E., Union, Marlborough.
Sasser, J. W., S. M. P., N. S., Chelsea.
Sitterly, W. H., G. C. I., P., New Clarion.
Smith, C. B., M. E., B. & M., Chelsea.
Stork, W. A., F. C. R., L. V., Regent.
Taylor, F. C., G. C. I., P. B. & W., Berkshire Inn.
Thomas, F. H., V. P. & G. M., Bellefonte Cent., Craig Hall.
Thomas, R. V., S. M., Tex., Okla. & East., De Villa.
Turner, John A., M. M., C. St. P. M. & O.
Van Slyck, Frank, G. M., Fairport Painesville & East., St. Charles.
Wallis, J. T., G. S. M. P., Penna., Chelsea.
Way, E. S., S. E., Gen. Amer. Tank Car Corp., Haddon Hall.
Weight, G. C., G. C. I., P., Berkshire Inn.
Weiler, G. S., G. C. F., G. C. & S. F.
Werst, C. W., Baldwin Loco. Works, Marlborough.
Wieseckel, G. F., S. M. E., W. Md., Dennis.

Special Guests

Allen, Edgar O., Supr. Car Repairs, Kas. Okla. & Texas, Arlington.
Allen, Edgar O., Jr., Supr. Car Repairs, Kas. Okla. & Texas, Arlington.
Anderson, C. M., Reg. Supr. of Safety, U. S. R. R. A., Blackstone.
Belk, M S., Gen. Air Brake Insp., S., Arlington.
Beyer, F. A., Supt. of Shops, Frisco & M. K. & T., Oshorne.
Butler, T. F. M. M., P., Craig Hall.
Burns, R. C., Chief Air Brake & Steam Heating Insp., P. East, Haddon Hall.
Calmback, G. M., Supr. of Welding, K. C. S., Traymore.
Clewell, C. W., Asst. Equip. Agent, Penna.
Col, T. W., M. M., N. P., Ambassador.
Coulter, A. F., Gen. Car. Fore., Union, Channell.
Darden, C. M., M. E., N. C. & St. L., Breakers.
Diehl, W. T., Gen. Storekeeper, M. & O.
Duncan, J. N., M. M., F. D. D. M. & S.
Durham, Edwin, S. M. P., W. & L. E., Strand.
Femino, Alexander, Car Repairman, W. J. & S.
Ferrier, N. A., Supr. Shop Mach., N. Y. C., Haddon Hall.
Flinn, R. M., M. M., P. West, Craig Hall.
Graham, A. A., M. M., F. W. & R. G., Osborne.
Gregg, C. W., Supr. of Safety, U. S. R. A., Blackstone.
Groten, N. N., Russ. Miss. of Ways of Commun., Terminal.
Heiser, H. F., C. C. S. M. P., So. B., Pennhurst.
Hinger, A. W., For. Mgr., Baldwin Loco. Works, Marlborough.
Kirkendall, Arthur, Reg. Supr. of Safety, U. S. R. A., Blackstone.
Klingel, W. C., Car Repairer, W. J. & S.
Lundberg, C. H., Supt. Car Plant, Santa Fe, Blenheim.
Martin, William, Supr. of Equip., U. S. R. R. A., Breakers.
Mercur, Henry, Westmoreland Coal Co., Seaside.
Needham, H. S., M. M., P., Seaside.
Morris, Wm. W., Asst. to Dir. of Pur., U. S. R. A., Galen Hall.
Oelkers, A. H., Asst. Supt., S. P.
Owens, R. H., M. C. B., Cosden & Co., Breakers.
Pape, W. Howard, Mech. Supt., Cosden & Co., Breakers.
Parker, W. V., Gang Leader, W. J. & S.
Peters, R. F., M. E., St. L. & San Fr., Traymore.
Puckett, J. W., Gen. For. Car Repairs, S., Arlington.
Ramsdell, T. M., Jr., O. W. R. R. & Nav. Co., Traymore.
Richman, John, C. C. I., Penna. Lines, Craig Hall.
Riggs, J. R., M. M., Penna. Lines, Osborne.
See, P. V., M. M., H. & M., Pennhurst.
Schaller, Frederick, Gen. Air Brake Insp., P., Haddon Hall.
Scott, C. E., P. A., St. L. & S. F. & M. K. & T, Marlborough.
Shreeman, M., G. F., South Buffalo, Pennhurst.
Smith, E. S., Asst. M. C. B., F. E. C., Osborne.
Stokes, Willard N., Adv. Depart., P & R., Strand.
Stoll, W. J., C. I. Ins., Pennhurst.
Strous, C. E., M. M., L. & W. B. C.
Suaning, B., M. E., Danish State Rwys., Marlborough.
Timmey, H. W., Draftsman, P. & R.
Tolley, S. J., Gen. Car For., Santa Fe, Blenheim.
Wentzell, R. L., Car Repairman, W. J. & S.
Willes, Howard. Clerk, A. R. A., Arlington.
Williams, C. B., Car Repairman, W. J. & S.
Wilt, W. L., M. P. Accountant, Penna. Lines, Dennis.
Wink, L. R., D. W. Gen. For. Car Shop, C. & N. W., De Ville.
Winter, P. C., M. E., C. M. & St. P., Shelburne.
Woods, Charles K., Asst. Supt., U. S. R. R. A., St Charles
Yeager, J P., Gen Car Fore., Pitts. Shaw. & Nor.
Yorke, T. H., M. M., O. W. R. R. & N., Haddon Hall.

The extent of the moving picture industry in the United States may be judged from the fact that about 300,000 kilowatt-hours of electric current are used daily merely for moving picture machines. The investment in the machine industry alone, devoted to moving picture machines, has been estimated at $11,000,000. Probably 5000 machines are worn out annually, and the total amount of money absorbed by the industry may be estimated at about $500,000,000 a year.—*Machinery*.

Conventionalities

Oscar Haywood, of the Tousey Varnish Company, is accompanied to the convention by his mother, Mrs. A. W. Haywood.

G. E. Carson, district master car builder of the New York Central at Albany, is accompanied by Mrs. Carson this year. Their daughter, Virginia, was married on June 2d to M. Croisant, an attorney in Albany.

J. A. MacRae, mechanical engineer of the Minneapolis & St. Louis, is attending the convention, and from his appearance seems to have fully recovered from a serious operation last winter.

W. R. Haggert, vice-president; Samuel Bennett, Western representative of the Anchor Packing Company, are all accompanied by their wives to the convention this year. Mr. and Mrs. Haggert and Mr. and Mrs. Bennett live in Philadelphia and Mr. and Mrs. Landreth in Chicago.

Norman C. Naylor, of the Railway Steel Spring Company, who arrived from Chicago on the Special, Tuesday, will be joined here Saturday by his sister, Mrs. J. Larned Green, of New York, who will remain over Sunday. Mrs. Green has never attended the convention before.

C. C. Hall, master car builder of the Cuba Railway at Camaguey, Cuba, arrived last night and is stopping at the Francis Hotel. Mr. Hall brings the regrets of George E. Knight, superintendent motive power of the same road, who was unable to attend the conventions this year.

Mr. and Mrs. C. F. Massey, of Chicago, who have been attending the conventions of the signal associations for some years, already are here, and will stay for the signal convention, which will closely follow the mechanical convention. Mr. Massey is president of the C. F. Massey Company.

H. L. Irving and H. C. Delcher, inspectors of the Baltimore & Ohio test department at Baltimore, are at the Martinique. They have been specially delegated to report their impressions to the Test Bureau of the B. & O. on their return. Both admit that the convention will pass every known test to which it can be subjected.

John S. Lentz, master car builder of the Lehigh Valley, who has been treasurer of the Master Car Builders' Association for many years, says that his name was misspelled for the first time in his 40 years of attendance at the conventions in the registration list reported in yesterday's daily.

Among those who arrived on the special train from Chicago was W. J. Tollerton, vice-chairman of the Mechanical Section. Mr. Tollerton is stopping at the Marlborough-Blenheim, and has with him Mrs. Tollerton and his two children, Miss Frances Lee and Robert William.

Mr. and Mrs. Frank J. Lepreau and son, Frank, Jr., are this year attending their first mechanical convention. Mr. Lepreau, who is manager of railway sales of the Macbeth Evans Glass Company, Pittsburgh, has for years been identified with the Edison interests and is one of the old guard at the signal conventions. He will, of course, remain over to attend the semi-annual meeting of the Signal Division at the Breakers before returning.

Fred A. Meckert is attending the convention this year in the role of the new general manager of the Fort Pitt Spring & Manufacturing Company, Pittsburgh. Mr. Meckert was for years with the Standard Steel Works at Philadelphia, having severed that connection last March to accept his present position. He is stopping at the Shelburne.

W. P. Borland, chief of the Division of Safety of the Interstate Commerce Commission, with Mrs. Borland and a party of three, motored from Washington to Atlantic City on Tuesday to attend the convention. Mrs. Borland was so severely burned by the wind and hot sun that she was confined to her room yesterday, but will be out again today.

Captain George Hull Porter, who formerly was manager of the central district of the railroad department of the Western Electric Company, comes to the conventions this year as manager of the entire railroad department. Captain Porter was in the Signal Corps of the army during the war, and was assigned to special signal work on outpost wires.

Arthur Allen, vice-president of the Holden Company, of Montreal, Canada, is here for the convention. The Holden Company represents a number of important United States concerns in Canada, including the Camel Company, McCord & Company, the American Brake Shoe and Foundry Company, the Chicago Pneumatic Tool Company, the Pyle-National Company and the Bradford Draft Gear Company.

We regret to see our old friend, Walter B. Leach, walking with crutches, but Mr. Leach himself is very glad to be able to walk even with the aid of the crutches. On account of sickness there was a long period during the last two years when he was hardly able to get around at all. Recently, however, he has been getting better, and while he still walks with much difficulty, he hopes he is now on the road to recovery. Mr. and Mrs. Leach, who have been regular attendants at the conventions for years, arrived Monday.

The first man we saw after our early arrival in Atlantic City was John D. Hurley, president of the Independent Pneumatic Tool Company. According to custom of many years standing Mr. Hurley has a habit of getting on the ground early and making his plans for contributing to the success of the gathering. Mrs. Hurley is with him—at the Marlborough-Blenheim.

R. S. Cooper, vice-president of the company, and F. J. Passino, southeastern representative, are at the Traymore.

Major John L. Woods died in Pasadena, California, June 13. This simple announcement in the daily will be read with sincere regret by the many friends of Major Woods now in Atlantic City. Major Woods was a veteran of the Civil War. In business life he was connected in a managerial way with the Allen Paper Car Wheel Company, McKee, Fuller & Company (both corporations later on being merged into the Steel Tired Wheel Company, of New York), the Railway Steel Spring Company and the Buckeye Steel Casting Company. Major Woods leaves a widow, but no children. He was the father of the late Edwin S. Woods, president of Edwin S. Woods & Company.

Edwin B. Leigh, president of the Chicago Railway Equipment Company, arrived in Atlantic City on the opening day and registered at the Traymore. Mr. Leigh has recently been honored with the vice-presidency of the National Manufacturers' Association. C. Haines Will-

iams, vice president of "Creco," is also attending the conventions. Fred De Long and Arthur Wyman will probably not be able to be here this year. Mr. Leigh recently has written and published a pamphlet entitled "Value of Railway Plant Compared with That of Other Industry," which is an interesting contribution to the discussion of the relation of the railroad industry to general prosperity.

George E. Scott is returning to his duties as first vice-president of the American Steel Foundries. In July of 1917 he severed his business and home ties in Chicago, moved to Washington and entered actively in Red Cross service. He became assistant general manager of the American Red Cross and later its general manager. He literally worked day and night and his record of achievement is a splendid one. Now that he is again an American Steel Foundries man he is in Atlantic City, accompanied by his sister, Miss Cornelia Scott, who, by the way, has also been an earnest Red Cross worker in Washington since we entered the war.

One of the former attendants at the conventions who will be missed by many friends this year is Samuel T. Fulton. Mr. Fulton, who was vice-president of the Railway Steel Spring Company, became ill with pneumonia in the latter part of last March, at his home in New York, and died within a few days. Before going in the railway supply business Mr. Fulton was a railway man, his last railway position being assistant to the president of the Rock Island Lines. He was widely known, and nobody ever knew Sam Fulton who was not glad and proud to call him a friend.

Ethan I. Dodds motored down with his family from Central Valley, N. Y., to Atlantic City, arriving here at 3 p. m. Tuesday. He left his farm at Central Valley at 5 a. m. and made the run of 200 miles in 10 hours. At least 50 miles of the trip was through a fog and one hour was used to repair a puncture and eat lunch. Mr. Dodds is accompanied by his wife, his son, Ethan I., Jr., and his daughter, Miss Dorothy. Mr. Dodds' name, by the way, was misspelled in connection with the list of representatives of the Flannery Bolt Company in Wednesday's Daily.

Charles L. Humpton, manager of the tube mill and director of the Parkesburg Iron Company, Parkesburg, Pa., died at his home in Parkesburg on May 26 at the age of 48. Mr. Humpton was taken ill just a few days before and his trouble almost immediately developed into bronchial pneumonia. He served for many years with the Parkesburg Iron Company in various departments; for some time he was connected with the Philadelphia office, where he devoted his time to the railway trade. He was one of the old-timers at these conventions.

Frank McManamy, who has come to the conventions in past years as chief locomotive inspector of the Interstate Commerce Commission, has come this year as assistant director of the Division of Operation of the United States Railroad Administration in charge of the mechanical department. He is accompanied by Mrs. McManamy, and they arrived from their home in Washington, D. C., on Tuesday evening. To the broad view Mr. McManamy took of the desirability of holding the convention and exhibit in Atlantic City this year and of having as many mechanical officers as practicable attend, is very largely due to the great success of the convention and exhibit. Mr. McManamy expressed satisfaction yesterday both because of the size of the crowd attending the convention sessions and the magnitude and completeness of the display of railway equipment and machinery.

The first thing that Juan Romañach, locomotive superintendent of the Cuba Cane Sugar Corporation of Havana, inquired about on his arrival at the convention was, "Where's Hale?" Otis R. Hale, overdue, is superintendent of motive power of the United Railways of Havana. When last seen on Monday, Hale was reported as alive in New York. In addition to Romañach, Mr. Hale is sought by several manufacturers who have inquired for him.

Secretary John D. Conway, of the Railway Supply Manufacturers' Association, you must remember, came here long before the rest of us. He looked around Atlantic City in odd moments, and somewhere he glimpsed this placard: "TAKE A SKY TRIP OVER ATLANTIC CITY." Now, Secretary John is not a "flyer" by nature or choice. The stock market never did interest or excite him; in fact, on his travels he prefers the way freight to the "Century" and the "Broadway." But the



Secretary Conway About to Go Up in an Airplane

placard interested him, and he pondered over the vision of a real thrill in his young life. He thought of it day and night, and after he had made all arrangements for our coming and had figured out the last detail of making that splendid exhibit on the Steel Pier, he came to the conclusion that his life's work was practically ended—all but the thrill. He nearly decided definitely to give the pier and the exhibit the "once over" from above, but he might have changed his mind had he not, in an unguarded moment, told a friend of his intention. Well, the friend told the story to a friend, and soon several friends heard of the plan. Then it was all over, except the flight. Thursday, June 12, 1919, at 4 P. M., Secretary John and Lieut. Bob Shank, the hero of many hours in the air, made a beautiful "hop-off" from Aviation Field, Atlantic City, in the lieutenant's plane. Let Secretary John finish the story: "We made a beautiful start. I had no sense of leaving the ground. We ascended rapidly to a height of 3,000 feet and then flew over the city. It was a beautiful sight—an experience I will never forget. I felt perfectly safe from the very start, and enjoyed it more than I can tell you. Every man should go. It's the life."

The Man Who Saw

Don't Spit on the Matting

The Man was told that the matting on the floor in some of the booths has chameleon-like characteristics this year, due to the peculiar qualities of the coloring with which it is dyed.

Water spilled on the matting will transform it from the conventional grass green to black. Visitors, in deference to a sense of orderly color, should refrain from expectorating on the floor.

Co-operation

To The Man Who Saw them it was evident that in some way The Four in the discussion were in some manner "out of luck."

"I counted every box—six of them—none of them contained the drills."

"Well, we're in bad all right. We had better wire home for drills, or else we don't demonstrate."

"Why, there are all kinds of drills here; let's see what we can do."

The Man followed them, interested in the results. A partly emptied box of assorted twist drills invited The Four into the booth of the drill exhibitor. They told their hard luck tale and were given the drills with the admonition, "You can use all you want, but be sure to tell them whose drills you are trying to burn up."

The Light Cure

The master mechanic from Cuba complimented the electric headlight maker upon the substitution of incandescent lamp bulbs for the troublesome carbons. The headlight maker seemed pleased.

"But," added the Locomotive Man, "they have become so popular with the engineers that they will, on every possible occasion, remove the high-powered bulb from the headlight, place it in the cab, and put the smaller cab lamp in the headlight."

Overcome by curiosity, The Man asked the most natural question in the world:

"But how do you overcime this; can't you cure them of the habit?"

"Well," said the Locomotive Man, "it got so after awhile that we had to resort to extreme measures to prevent the over brilliant illumination of the comfortable cab at the expense of the front end. When we put in a new headlight bulb now, we seal the door with a car seal. If the engineer wants a new one he has to produce the old lamp and the seal."

A Forecast

The Man was interested in the latest developments in the construction of what someone has termed "the real money earner on the railroad." He wondered, as he sought the booth of the maker of locomotives what shape the tendency of design would assume under the private control of railroads, which is considered imminent. What features of standardization would remain? What innovations would be conspicuous by their absence in future design?

The builder quickly dispelled any idea The Man might entertain as to their intention of perpetuating some of the mistakes which have resulted from the headlong plunge into standardization. He admitted that perhaps some of the lessons learned during the war would be profitable—but he couldn't think of them just then.

"Take limitations," said he. "Hundreds of standardized locomotives are operating on lines to-day deprived of steam dome space because they were ordered built to a minimum clearance established by a road to which, perhaps, was allotted a small number of the standard locomotives, after all. We shall correct that, and meantime we are urging those who are so afflicted, to reconstruct these domes and give their engines dry steam."

The Man saw that the builder meant business. And he suspected that the return of the roads would signal the repeal of regulations which, under the stress of apparent urgent necessity, had imposed unpractical ideas on the carriers.

A Pow-wow on the Pier

The early bird in quest of the worm had nothing on The Man. He was abroad early, and a slowly rising fog revealed the outlines of the Pier, toward whose entrance he made his way with deliberation. Just as he had passed the first three or four exhibits he glanced up. Smoke apparently arose from a booth some distance down the aisle. Where there is smoke there must be fire, he thought, and the enjoyable ease of his stroll suddenly developed into a trot. As he ran his mind quickly framed him as a possible hero—perhaps he would shine in to-morrow's Daily as The Man Who Saw and quenched a threatening blaze on the pier! Visions of congratulations increased his speed.

Anticipation is truly the joy of life; by contrast, realization pales into cold and morbid insignificance. As The Man, somewhat shy of breath, arrived at the scene of his suspected blaze he gazed upon a comfortable smokefest of no mean proportions! There were those who sat, and those who stood. Most of them inhaled cigarettes, some puffed black cigars, and two or three contributed their bits with well seasoned pipes. But all smoked furiously as the argument waxed hot and the smoke cloud grew denser.

"Why, this is the best mechanical convention ever held," escaped through the cloud to the ears of The Man who leaned against a post and fumbled for a cigarette.

"Believe me," volunteered a member, lighting another stogey, "the Railroad Administration knew what it was doing when it encouraged this show."

"You're right," said Joe, "I have attended these conventions since Hector was a pup and nothing like this was ever pulled off before—possibly, never again. Why, I remember——."

Here he was intercepted by one of the listeners with a request for "a little tobacco." One who perceived the psychological chance assumed the floor. Respectful deference was accorded the "old timer," a superintendent of motive power, who delivered a lesson born of up-hill toil against odds and the observance of a lifetime of "conventions."

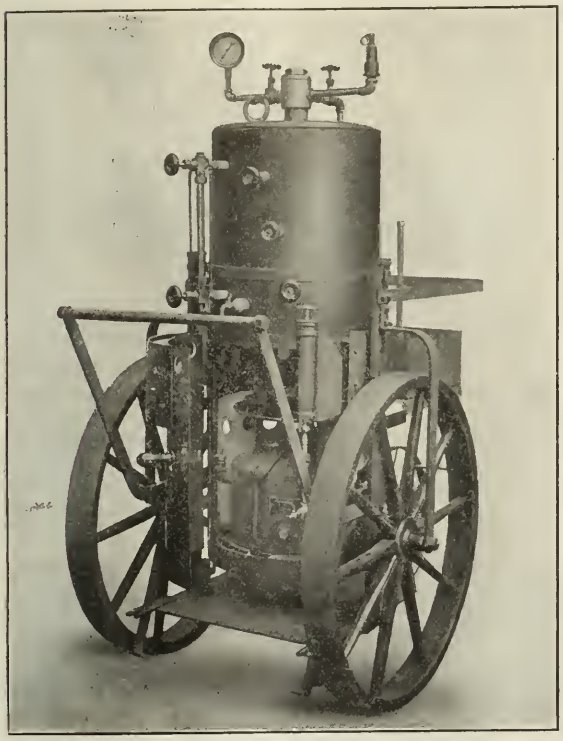
"Boys, listen to the voice of Nestor," he said. "Ten years ago I made the statement just made by Joe. I never thought that another convention would eclipse the one we saw that year—and look what has happened! Put away the pipes and let's get to work. Let's go out among these exhibits and study them. If you can't remember it all, write it down. Think of some of these things as possible solutions of your problems."

As the smoke subsided, The Man Saw. And he felt, as he quietly withdrew, that there *was* some fire behind that smoke after all; a fire of determination to make it pay; a fire of enthusiastic appreciation of the railway mechanical brains of a continent, and the far-sightedness of a nation of contributors to their welfare, stretched along the pier.

New Devices Among the Exhibits

A Portable Steam Sterilizer

THE WEST DISINFECTING COMPANY, New York, is exhibiting an improved portable steam sterilizer which is intended for use in railroad yards for sterilizing water coolers used in passenger cars and stations. The sterilizer consists of a steam boiler, a fuel tank and burners and an air pump, all substantially secured in an



The Sterilizer Mounted Ready for Use

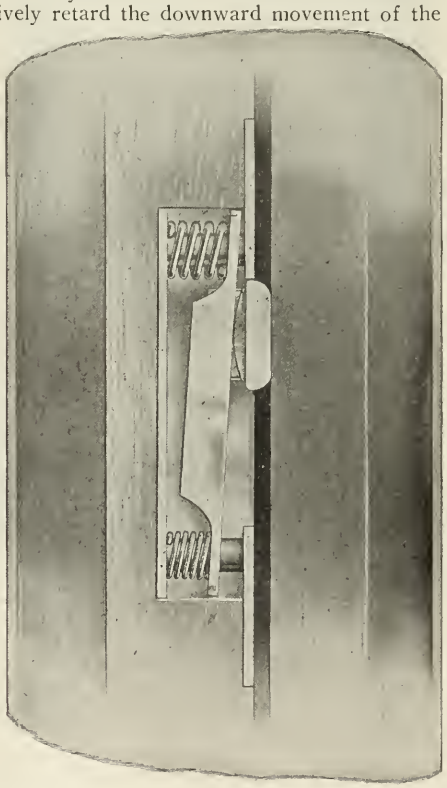
iron frame work mounted on heavy wooden wheels and using kerosene vaporized under air pressure as fuel.

The boiler shell is constructed of open hearth sheet steel having a tensile strength of 55,000 to 65,000 lb. per sq. in. It is 14 in. in diameter and 22 in. in height with convex top and concave bottom. The seams are lap joint, and after being securely riveted, and the various pipe connections inserted, the entire boiler shell is galvanized and thoroughly tested under a pressure of 200 lb. per sq. in. The fuel tank is of sheet steel, 12 in. in diameter and 9 in. high, with seams brazed or riveted. Both the boiler and fuel tank are provided with fusible plugs having a melting point of 300 deg. F. Three Giant burners, constructed of bronze, are provided and are especially adapted for use with kerosene. A brass screen in the central supply pipe of these burners reduces carbonization to a minimum and a clean-out hole is also provided. The burner tip can be removed for cleaning. A priming pan or cup fits around the supply pipe of each burner and is supported on an asbestos partition between the burners and the fuel tank.

The boiler, fuel tank and burners are encased in a Russia iron jacket lined with asbestos, which makes the danger of communicating the flames to surrounding objects extremely remote. This apparatus is equipped with adjustable safety valves, safety water gage, steam gage and other safety devices. The capacity is about 10 gallons nd the working pressure from 15 to 50 lb. per square inch according to requirements. The device may readily be moved to any desired location without damage to the apparatus or danger to surrounding objects.

A Car Window That Will Not Drop

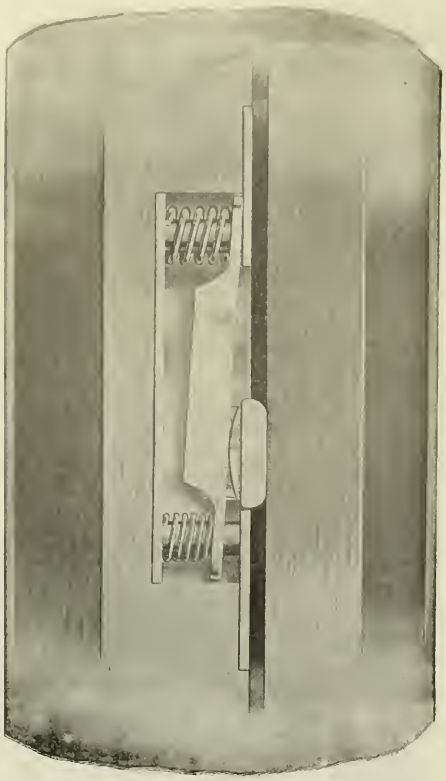
ABATEMENT OF THE NUISANCE of the car window which may suddenly and without warning drop on the hand or the arm of an unsuspecting passenger, is obtained by the device illustrated herewith, which will effectively retard the downward movement of the sash,



Shoe Automatically Slides to the Top in Lowering the Sash

thereby preventing damage to the sash frame, glass and sash lock. As indicated in the illustrations the springs are of different strengths. One photograph shows the device applied to a sash which is raised, and it will be noted that the heavy spring is at the top. In raising the sash the shoe compresses the weaker spring, allowing

the sash to be raised with comparative ease, at the same time preventing all rattle. In lowering the sash, the shoe automatically slides to the top and compresses the heavy spring, as is shown in the second illustration. This increased pressure gives sufficient friction to prevent the



Application of Compression Brake Device to Sash

sash from falling and at the same time holds the sash firmly against the outer stops when the window is closed.

If preferred, this device can be placed on the edge of the stop casing adjacent to the sash, in which case application is made with the heavy spring at the bottom. This attachment is known as the compression brake device No. A-151 and A-152, and is manufactured by the O. M. Edwards Company, Syracuse, N. Y.

New Cleaning Materials for Railways

THE WYANDOTTE METAL CLEANER is especially adapted to cleaning driving boxes and rods, brake rigging and other locomotive parts and is said to render metal surfaces chemically clean without pitting the metals or causing rust. It is further claimed that this is accomplished without creating any objectionable fumes and that by its use the amount of time devoted to cleaning is reduced to a noticeable degree. This material is manufactured by the J. B. Ford Company, Wyandotte, Mich., who have samples of it on exhibition.

For cleaning the interior of box and refrigerator cars and coaches, a material having sweetening and deodorizing as well as cleaning properties, has also been brought out by this company; the success of this material is said to be due to the absence of soap greases, caustic and sal soda. The name of the compound is Wyandotte Sanitary Cleaner and Cleanser.

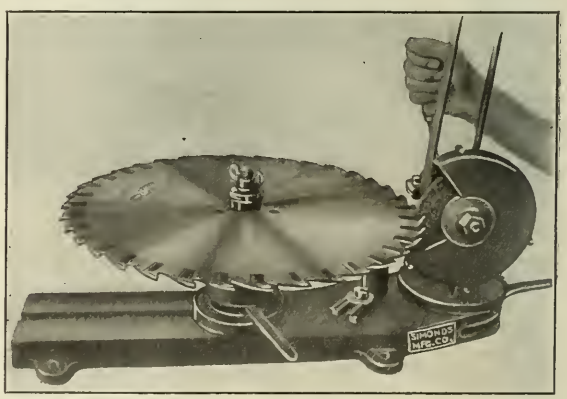
The cleaning of tile, marble, rubber and cork mats and all similar furnishings that are mopped or scrubbed, as well as floors, walls and woodwork in offices, shops, coaches and elsewhere is accomplished by a compound known as Wyandotte Detergent, another product of the above company.

Styles in Car Lighting Fixtures

SEVERAL NEW TYPES of car lighting fixtures have been put on the market by the Safety Car Heating and Lighting Company, New York. The totally indirect type has succumbed and signs seem to point to the gradual elimination or refinement of the semi-indirect type, possibly due to the cost of maintaining light colored headlinings in perfect condition for light reflection. The brilliancy of the modern gas filled electric lamp has revived the bowl type of deck fixture and has also brought into vogue the enclosing bowl type. The illumination with both of the fixtures shown in the illustrations produces a soft, restful effect, and when fitted with gas filled lamps they provide ample light for all purposes.

Inserted Tooth Metal Saw Grinder

A LIGHT, INEXPENSIVE MACHINE for quickly and accurately grinding the inserted teeth of metal saws is shown in the photograph. It is a self-contained, portable affair and may be screwed down on a bench and driven from the line shaft. The movement of the saw in the path of the grinding wheel is governed by the lever which is seen protruding from the base. Stops are provided for governing the "bite" of the wheel, and adjustment is furnished to neutralize the wear of the 5½-in. by ½-in. by ½-in. hole, 46-J vitrified Norton grinding wheel, which has a 45-deg. bevel. The teeth may be ground on the top by using a cup wheel and turning the wheel head at right angles to the position maintained in grinding the face of the teeth.

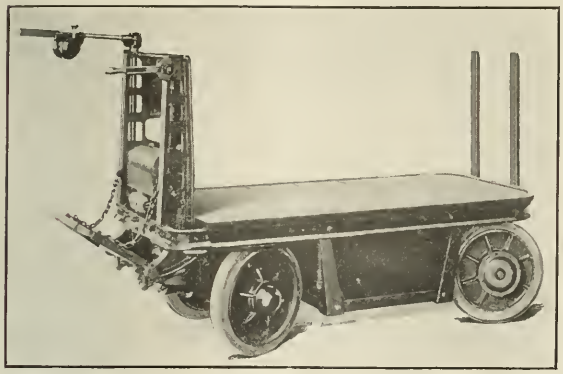


Grinder for Sharpening Inserted Teeth on Metal Saws

This handy little saw sharpener is at work in the booth of the Simonds Manufacturing Company, Fitchburg, Mass.

Electric Trucks and Tractors

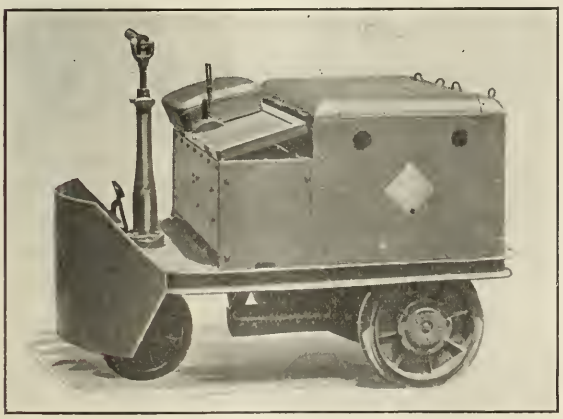
FOUR TYPES OF ELECTRIC TRUCKS and tractors have been developed and improved by the Elwell-Parker Electric Company, Cleveland, Ohio, particularly to meet the needs of the railroad field. The type EH truck is equipped with large wheels, high lift elevating platform and interlocked control mechanism. The drive wheels are 21½ in. in diameter with 3½-in. treads, and the trailing wheels are 15 in. in diameter with 3½-in. treads. The vertical motor is direct-connected to a single reduction worm and runs in a dust tight oil case. The brake is located between the motor and differential and



Truck Designed for Operation Over Rough Pavements and Soft Yards

is operated by one of the two foot pedals. The driving axle is of the full floating type.

The lifting mechanism is operated by a separate motor especially designed for a service differing from that of the heavier propelling motor. The motor is high off the floor away from the dirt and possibility of damage. This lifting motor may be started or stopped at the will of the operator at any point in the upward or downward travel of the platform, or it may be started and left to automatically stop when the load has reached its highest or lowest position. The upward travel of the

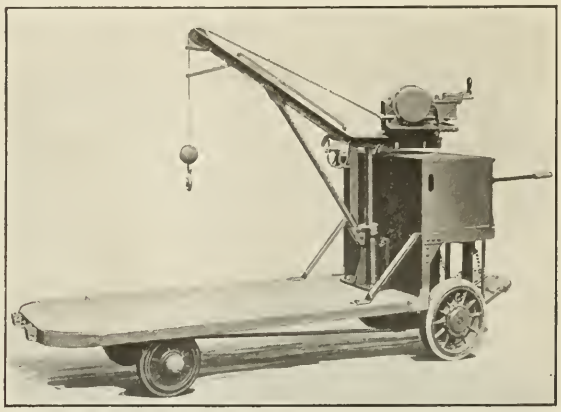


Three-Wheeled, Light Weight Tractor

platform may be set any lift up to 4½ in., assuring clearance for the separate tray on which the load is carried.

A special device protects the elevating mechanism in case the platform should catch under some immovable object. The platform is three-point supported. It rests on vertical links when up and is steadied by guides on each side. A heavy, hot-riveted steel frame provides support for the equipment and protects it against abuse.

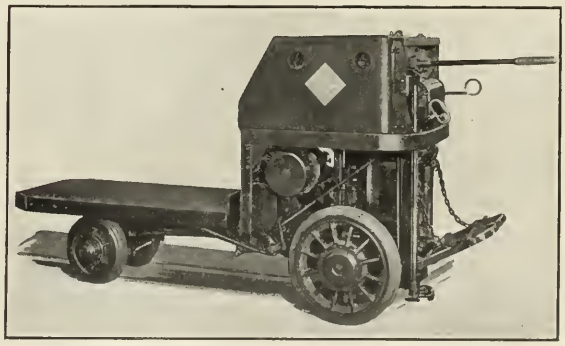
The type CC truck with a revolving crane has been designed for service where heavy castings are stored



Truck Equipped with Revolving Crane

beyond the reach of a traveling crane. The crane is electrically operated, has a capacity of 1,000 lbs. and a reach of 4 ft. It is used to load heavy pieces on the truck and transfer them to machine or forge shops for finishing. The truck has a carrying capacity of 3,500 lbs. and operates at a speed of 400 ft. per min.

The type IK truck with wheels 20 in. in diameter and battery located beneath the platform, so that all of the platform may be used for loading space, is especially designed for operation over poorly planked platforms,



Elevating Platform Truck

rough pavements or soft yards. The motor in this truck is large enough so that it cannot be injured by the battery, even though the motor is at a standstill, with the current full on. This makes fuses unnecessary and assures the climbing of inclines from yards to loading platforms. The capacity of the truck is 4,000 lb., and it operates at a speed of from 400 to 550 ft. per min.

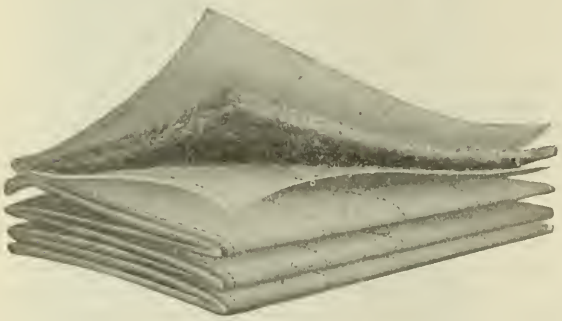
The type TA tractor is a light weight, high torque, short turning tractor for operation where machines or construction restricts operating room. This tractor has three wheels and carries a battery of 50 per cent greater capacity than a standard truck. It cannot be operated unless the driver is on the seat, which automatically closes the circuit breaker connecting the controller to the bat-

tery. There is no fuse in the motor circuit as the motor will absorb all the current the battery can deliver.

The motor is direct connected through a single reduction worm on a full floating drive axle. The wheels are 20 in. in diameter with 3½-in. treads, and may be fitted with chains for outside work. The operator sits on a cushioned seat and is protected by a stout dash in front. The tractor has a normal drawbar pull of 6 tons, and turns practically in its own length.

Refrigerator Car Insulation

One of the most vital features in the construction of refrigerator cars is the use of an efficient insulating material. The H. W. Johns-Manville Company, New York, is showing the Keystone hair felt insulation, which was used in the construction of the



Keystone Hair Felt Insulation

refrigerator cars built in this country and sent to France for the purpose of transporting fresh meats to the American Expeditionary Forces. This hair felt insulation consists of a cushion of specially treated hair placed between two sheets of insulating paper and securely bound together at the edges and at several intermediate points, making an insulation one-half inch thick. The results in refrigerator efficiency obtained by the use of this hair felt insulation are said to be most satisfactory.

Reinforced Flanges for Freight Car Wheels

It is claimed that there are over 650,000 33-in. wheels of various weights with flanges thicker than the Master Car Builders' and Master Mechanics' standards in service in the United States today in both freight car and engine tender service.

The Southern Wheel Company, St. Louis, Mo., has on exhibit three pairs of wheels on axles, the wheels having flanges 3/16-in. thicker at the base line than the present Master Car Builders' and Master Mechanics' standard flange. Wheels with the flange as described above have been recommended by the Association of manufacturers of Chilled Car Wheels. One pair of the above-mentioned wheels—the 800-lb. special wheel—has just been removed from service under a 50-ton steel, hopper bottom coal car on the Atlantic Coast Line Railroad and the wheels show practically no wear on either the front or back of the flange.

The three pairs of wheels mentioned above are shown on a standard section of track with a No. 4 frog and guard rail, with standard 1¾-in. guard rail clearance.

Improvement in Journal Packing

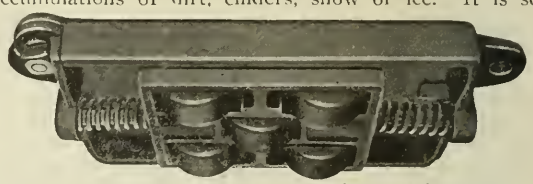
Because of the scarcity and high price of wool it has been necessary to find substitute materials for use in journal packing. The resiliency in journal packing was in the past derived almost entirely from the wool in the packing mixture, but with the great reduction in the proportion of wool waste, various fibrous and metallic substitutes have been used. The Rogers Journal Packing Company, Chicago, has improved and developed the old Rogers journal packing, under the trade names of Stecos and Fracar.

The Stecos packing for high speed service consists of 25 per cent. of wool waste with a mixture of cotton, pieces of sponge and steel shavings. The capillary action is provided chiefly by the cotton; the resiliency imparted by the wool, sponge and steel shavings makes a packing mixture that will resist the tendency to glaze over and remains in a resilient condition for a long period. The pieces of sponge, being highly absorbent, act as reservoirs of oil throughout the whole mass as it rests in the journal box.

A cheaper form of packing is the Fracar, which is composed of colored cotton waste, sponge and steel shavings, and is intended for use in freight service.

Drexel Multiple Roller Side Bearing

In the illustration below is shown a roller side bearing adapted for use under extremely heavy equipment. It is of the multiple interposed roller type, which provides large contact surfaces. Being of the inverted design, it does not become inoperative through accumulations of dirt, cinders, snow or ice. It is so



Inverted Multiple Roller Side Bearing

constructed that all parts are open to close inspection. This side bearing is made by the Chicago Railway Equipment Company, Chicago.

Sand on Axle-Generator Belts

The Safety Car Heating and Lighting Company, New York, has developed a device to prevent slipping of axle generator belts for trains operating in severe winter weather. This device operates by automatically depositing sand on the belt. A small motor is mounted on the frame of a small metal case located at some convenient place on the car. Geared to the armature shaft of the motor is a valve operating mechanism, whereby a valve is opened at predetermined intervals, releasing air under pressure from the air brake system. The velocity of this air passing through an injector carries a spray of sand onto the generator belt, counteracting any effects of ice on the pulleys. The sand is stored in the locker or some other suitable place and feeds through a pipe to the injector. The motor operating this device is connected directly to the lighting generator so that the sander is only in operation while the train is in motion. When the service of the sander is not required it is disconnected from the axle generator by a switch.

EDITORIAL

Railway Age

Table of Contents will be found on Page 5 of the Advertising Section

Director General Hines has issued a statement appealing to railway employees to give him their energetic co-operation in trying to operate the railways more economically. It will be interesting to see whether Mr. Hines' appeal has any perceptible effect. Railway labor has received advances in its wages and concessions affecting its conditions of work since government control was adopted which are costing approximately a billion dollars a year. The government is incurring a deficit in operating the railways which is running at the rate of about three-quarters of a billion a year. If cordial and energetic co-operation could be brought about between railway managers and employees in devising and carrying out efficiency methods, probably a large part if not practically all of this deficit could be wiped out without any increase in the hours of work or a reduction of the wages of a single railway employee. The result would necessarily be a large reduction in the number of employees, because wages are so large a part of total railway expenses that without increases in efficiency having the direct effect of reducing the number of men employed, no large economies can be effected. It has seldom been possible on any individual railway and never possible on the railways as a whole to secure the good understanding and co-operation between the managements and the men necessary to obtain the greatest efficiency and economy. Thus far it has proved even more impracticable to secure this co-operation under government operation. Frankness requires us to express some skepticism as to whether Mr. Hines' appeal will do any good. The duty of railway employees, in view of the vast increases in wages they have received, is plain, but, unfortunately, the supposed rights of railway employees occupy a larger place in their thoughts than their duty. In this respect, of course, they are merely human; most people think and talk a great deal more about their rights than about their duties. As long, however, as both employees and employers in the various lines of industry constantly subordinate consideration of their duties to consideration of their rights, the difficulties in the way of securing the increases in industrial efficiency which are needed to further the best interests of all, will not be removed.

Mr. Hines' Appeal to Labor

A syndicate of American bankers, headed by the National City Company of New York, have arranged to sell in this country $25,000,000 of Swedish Government twenty-year six per cent bonds. The offering price of these bonds is 99½, which is approximately the same price at which the Norwegian Government six per cent bonds, sold in this country some time ago, are now dealt in on the open market. The Swedish loan is particularly interesting for a number of reasons. In the first place, prior to the war, Sweden bought railroad supplies both from Germany and from Great Britain, and was, moreover, a fairly large manufacturer of machinery and tools herself. The proceeds of the present loan are, presumably, to be used in the purchase of machinery and tools, textiles, and possibly some other goods in this country. It is understood that the machinery and tools include some railroad supplies. Another interesting point about the loan is the indication which it gives of the change that has taken place since the signing of the armistice and the lifting of the restrictions on foreign exchange. At one time in 1917, a Swedish krona was worth a little over forty-seven cents in New York. The parity of American and Swedish money makes the krona worth a little over twenty-six cents. At present, the krona is selling in New York at about twenty-six cents, and before the offering of the loan, was selling at about twenty-five cents. In the four months ended April 30, 1919, exports from the United States to Sweden amounted to over $38,000,000, while our imports from Sweden were between $2,000,000 and $3,000,000. The large premium at which kronars were selling in this country in 1917 and 1918, was due, not to an excess of Swedish imports into the United States over United States exports to Sweden, but to the fact that England and other of our allies were importing heavily from Sweden and settlement for these transactions was being made through New York at a time when the exchange rate of the pound sterling in New York was "pegged," that is, fixed arbitrarily. The large premium on the krona in New York was the reflection of the relations between our allies and the Scandinavian countries, and even during the war, Sweden was an importer from the United States rather than an exporter to this country. The ability and willingness of this country to place credit at the disposal of Sweden marks a definite stage in the progress of gaining a market for American goods in that country.

Sweden Bidding In Our Markets

Mr. Borland's report on the Fort Washington collision of January 13, noticed on another page, brings out the fact that there were failures at five points; nothing new or surprising, perhaps, yet a fact to be noted, lest we concentrate too fully on the main point, the mistake or neglect of the engineman. The second point is the failure of the monitorship of the fireman. This weakness is so nearly universal that there is, perhaps, no occasion for discussing it; though in this case the fact that the engineman and the fireman were in separate cabs adds significance to the point. The third point is the engineman's defective record. It is not for a distant critic to say that a better man should have been on this engine; circumstances may have afforded various reasons for having this man there; but the fact remains that when a superintendent sets out to have his best trains manned by the best men he has undertaken to sustain his road's reputation at a vital point, and is bound to give reasons for any condition lower than perfection. The fourth failure was in the weakness of the brake power. This cannot be called a major feature, for all space-interval and flagging rules provide for a margin of safety; but this was one point in the aggregate of reasons why the railroad, in this case, did not reach 100 per cent safety and save the fourteen lives. The fifth point was the negligence of the flagman. It is no different from a hundred other cases, except that the evidence in this case is peculiarly strong, clear and understandable. On this point Commissioner McChord has given us a two-page excursus (which we print following the notice of the official report) which operating officers may do well to paste in their scrapbooks. He does not present any facts that they did not

The Fort Washington Collision

know before, but his Bureau of Safety has given him a telling array of citations, which give "body" to his dissertation and which will be useful to refresh one's memory when going to the confessional or in any quiet night season. If any reader is so busy as to be deterred by the length of this essay on flagging he will do well to turn to the fourth paragraph from the end, about "the human tendency toward minimum effort"—toward what some people call laziness.

Investment in Foreign Securities

Nine investment bankers out of ten will tell you that when it comes to investments, the American people have no imagination. In Indiana one of the standard investments is gravel road bonds. Why? Not because it is a particularly sound investment, but because the investor can go out and see his security, or at least a gravel road similar to the one which his investment will help to pay for. If the American public is really devoid of imagination in regard to investments, the task of establishing a great American export business is nearly hopeless. The United States Investor, in a recent issue, tells of a contract which France is to place in this country for 100,000 cattle which we secured in competition with the Argentine, simply because this country was able to finance the purchase; in other words, extend credit to France, whereas the Argentine was not able to do so. American bankers, except a very few, know nothing about foreign investments. The few, however, who are working on this problem of financing American exports have at their command the resources of some of the largest financial institutions in the United States. It ought to be possible for these bankers to arouse the imagination of the general public. Recently there have been two very interesting advertising campaigns carried on in the East, based on the expectation of arousing the romantic imagination of comparatively wealthy people. One was a series of advertisements illustrating the various phases of pearl fishing. The other was a campaign carried on by a firm selling furs, the advertisements illustrating the life of the fur trapper in the far north. Englishmen with their supposedly less imaginative perception will buy shares in a diamond mine in South Africa, a rubber plantation in Brazil, and an oil well in Mexico. Would it not be worth while for the banking interests which are forming great combinations to aid American exporters to make an attempt through a campaign of advertising, to help the American people visualize the romance of foreign investment?

Abuse of the Locomotive Whistle

One more evidence that, in many of our everyday affairs, war conditions have passed, is found in the renewal of complaints of the whistle nuisance. The problem of making all enginemen reasonably careful in the prevention of noise—whether by whistles, or bells, or pop valves or by just plain banging of cars—is one small burden from which the careful superintendent is never free; but for the past year or two people who rightfully might complain have held their peace. The following press despatch from Macon, Georgia, serves as a reminder that the problem is still a live one:

> Macon, Ga.—Being an alderman in the city of Macon at the present time, lacks a whole lot of being the sinecure it is imagined. People living in the vicinity of the various railroad lines have combined to stop the blowing of whistles during the night. The matter comes before the city council regularly each week, but so far, the kickers have failed to get results. Petitions failing to have their effect, new tactics have been adopted, and now each night the aldermen are roused from their slumbers in the dead of night by telephone, some stranger calmly informing the alderman that "the whistles are blowing."

The despatch may be somewhat colored, but its elements are true to life. This note is not being written with the idea of reforming all of the enginemen, or even of telling them their duty; but to cite a praiseworthy rule on the noise nuisance, that of the Pennsylvania Railroad, which is printed in another column. To make the practice as praiseworthy as the rule, however, it is necessary to pay constant attention to those clauses which we have printed in italics. All of the principal roads have a rule on this subject; how many trainmasters find themselves able successfully to enforce those italicized features? Rule 468 seems to refer to noises which are considered objectionable, not by the railroad, but by the citizens, those of reasonable minds and those of the other kind. Mr. Statler, the hotel-keeper, professes to be able always to admit that complainers are right; can it be done in this matter? How long does it take to teach the average engineman to use the whistle "judiciously"? What percentage of the whistle signals on your road are no louder and not a second longer than is actually necessary?

Interstate Commerce Commission and Adequate Railway Revenues

Assuming that the railways are to be returned to private operation, the heart of the railroad problem is the question of how the companies are to be assured net operating income adequate, first, to enable them to pay returns on their outstanding obligations and refund them as they become due, and second, to raise sufficient new capital to improve and enlarge their facilities enough to handle the commerce of the country.

The new legislation may work fairly successfully, though defective in other respects, if it deals clearly, wisely and effectively with this question. However perfect it may be in other respects, if it does not deal clearly, wisely and effectively with this question, it will be a failure, because under it private operation will be a failure.

Before government operation was adopted regulation had proved a failure because it had denied to the railways the opportunity to earn adequate returns. This is denied in some quarters. It is denied in a recent public statement by Commissioner McChord of the Interstate Commerce Commission. He points out that net operating income in the three years 1915-1917, which immediately preceded the adoption of government control, was the largest in amount ever earned in three consecutive years. This proves nothing as to the wisdom and success of the old policy of regulation.

The most pertinent and convincing evidence regarding the success or failure of the old policy of regulation, is afforded by the facts as to the tendency of railway development under it. Before the state legislatures and commissions and the Interstate Commerce Commission began to make reductions and prevent advances in rates regardless of advancing operating costs, the mileage of new railways built in the country annually was about 5,000 miles. Since 1907 new construction has never equalled 5,000 miles in any year, and in the last three years before the United States entered the war, it was only 3,563 miles, an average of less than 1,200 miles a year. There were corresponding declines in the other facilities provided.

This downward tendency of the provision of new facilities was of course reflected in the statistics regarding new investment. The investment made in road and equipment in 1910 was $778,000,000 and in 1911 $808,000,000. In 1911 the Interstate Commerce Commission rendered its decision in the first rate advance case, refusing to grant the carriers the advances for which they asked. In the next year—1912—the investment made was $680,000,000; in 1913, $478,000,000; in 1914, $584,000,000; in 1915, $311,000,000 and in 1916, $268,000,000. In every year from 1911 to 1916, ex-

cept 1914, there was a decline in investment; and in 1916 the investment made was less than one-third what it was five years before.

Why was there this decline in investment? The average percentage of net operating income on cost of road and equipment earned in each year from 1910 to 1915, inclusive, as reported by the Commission, was as follows: 1910, 5.73 per cent; 1911, 4.87 per cent; 1912, 4.62 per cent; 1913, 5.12 per cent; 1914, 4.19 per cent; 1915, 4.09 per cent. The average return in the five years ending with 1905, according to the Commission, was 4.97 per cent; in the five years ending with 1910, 5.41 per cent; and in the five years ending with 1915, 4.56 per cent. The percentage of return earned in 1915 was the smallest in any year since 1899. The tendency of net operating income under government regulation down to and including the fiscal year ended on June 30, 1915, explains the decline of investment.

But, it is said, in the three years 1915-'17 the railways earned the largest operating income they ever earned in any three years. What was that due to? In the fall of 1915 the railways began to feel the effects of the tremendous increase of industrial activity in this country which had been caused by the war in Europe, and in the year ended on June 30, 1916, there was an increase of 24 per cent in freight traffic, and of 21 per cent in freight earnings. No such increases in volume of traffic and in earnings ever occurred before, or probably ever will again. The traffic and earnings in the calendar year 1916 were larger still. In the calendar year 1917, they showed a still further increase, although because of large increases in expenses there was a decline in net operating income.

The foregoing facts show that under ordinary business conditions in the United States in the five years up to and including the fiscal year 1915 the policy of regulation followed resulted in a steady decline of the percentage of income earned by the railways. This crippled the companies in raising new capital. Then suddenly, owing to abnormal conditions created by the war, there was a tremendous increase in traffic and earnings, and in consequence a large increase in net operating income. The policy of regulation had nothing to do with this increase in traffic, or the large increase in operating income which it caused. If normal conditions had continued the percentage earned probably would have continued to decline.

Railways officers and investors know this. Therefore railway men and investors judge of the effects which the old policy of regulation would produce in future, not by the abnormal results caused by abnormal conditions in 1916 and 1917, but by the normal results produced by normal conditions and regulation in the years preceding 1916. They know that just before this abnormal increase in traffic came, more miles of railways were in the hands of receivers than ever before. They know this affords a better measure than the earnings of 1916 and 1917 of the fairness and wisdom of the old policy of regulation.

But this is not the whole story. The enormous increase of business came so quickly that for a time it was impossible for the increase in railway expenses to keep up with it. But in 1917 the expenses again began to grow faster than the earnings. This was especially true as to the railways in eastern territory. They asked for an advance of 15 per cent in freight rates early in 1917, but were given only half of it. Finally in December, 1917, when it had become clear that a large advance in rates would be necessary if increased expenses were to be offset, the Interstate Commerce Commission side-stepped the acute problem presented by sending a special report to Congress in which it said, in effect, that it could not grant the advance in rates which were needed to keep the railway companies solvent. Within a month government control was adopted. A few weeks afterward the Commission granted another advance of about 7½ per cent in the freight rates of the eastern railways; and before we had had six months of government control freight rates throughout the country were still further advanced 25 per cent, and passenger rates 50 per cent.

To one who knows this record it is futile to say that the railway companies need have no fear of future regulation by the Interstate Commerce Commission. They have the best of grounds for fearing any legislation which would leave almost entirely in the hands of the state commissions and the Interstate Commission the determination of what measure shall be applied in deciding what the railways shall be allowed to earn.

There are available certain other methods which may be adopted. Congress may fix by law the percentage of return the railways shall be allowed to earn, and on what basis. It may specifically instruct the Commission to so fix rates as to make net operating income sufficient to enable the railways adequately to develop their facilities. It may delegate the determination of what return they shall be allowed to earn to some other governmental body. The Esch-Pomerene bill is fatally defective because it leaves the determination of this question to the Commission without in any way indicating that rates, as a matter of public policy, must be made adequate.

Are the Roads Being Over-Maintained?

THE RAILROAD ADMINISTRATION appears to have suddenly become obsessed with the fear that it is over-maintaining the railways and that heroic measures must be adopted to prevent this. An order was issued by the Director General on May 27, instructing Federal managers to so hold down maintenance of way expenditures that the ratio of these expenditures to the operating revenues for June would not exceed the average yearly ratio during the three-year test period. This drastic order must have presupposed that the ratio of maintenance expenditures to operating revenues during the test period is a fair measure of what present expenditures should be. Any such assumption would be grossly erroneous. That the Railroad Administration has since realized this is indicated by the fact that the order has since been annulled, at least for June.

The obligation of the government to the railway companies with respect to the maintenance of their properties is set forth in the standard contract, by the terms of which the director general is required so to maintain each property that it will be "returned to the companies at the end of Federal control in substantially as good repair as it was on January 1, 1917," provided that an annual expenditure for such purpose equal to that of the test period, equated for changes in costs of labor and materials, shall be considered as full compliance with this obligation. The fear of the Railroad Administration that the government will exceed its obligation in this respect is in direct contrast with the anxiety on the part of most railway men that the government will leave them with a large accumulation of deferred maintenance at the termination of the period of federal control, settlement for which will be made only after extended controversy, if at all.

According to the figures on which this order was based, maintenance of way expenditures consumed 15.3 per cent of the operating revenues for the first three months of 1919, as compared with 11.1 per cent for the same months of the test period, and 12 per cent for the entire test period. Rather than indicating excessive maintenance, these figures reflect the radical changes in conditions during the last four years which make these ratios valueless for comparative purposes. All costs of operation have risen greatly during this interval, those for the first three months of 1919 being 85 per cent greater than for the same period of 1916, while earnings

increased only 38 per cent. It is this failure of earnings to keep pace with expenditures that has brought the operating ratio up to 91.5 per cent, as compared with 72.4 per cent three years ago, and has reduced the operating income from $214,000,000 in the first quarter of 1916 to $45,977,752 in 1919. No further data should be necessary to demonstrate the undesirability of attempting to apply pre-war relations between earnings and any part of expenses to present conditions. With the ratio of all operating expenses to earnings increased from about 70 per cent in the test period to over 90 per cent at present, to suggest that one large item of expense shall be made to bear the same ratio to earnings that it did in the test period borders on the absurd.

The director general stated in his order that the ratio for the calendar year 1918 was 13.3 per cent, as compared with 12 per cent for the test period, thus intimating that the roads were over-maintained during 1918. That this is purely a paper comparison which is not supported by the physical facts is best indicated by a comparison of the tie and rail renewals of last year, with those of the test period, these being the only two materials the 1918 replacements of which have been tabulated and made public. The rail renewals failed by 250,000 tons, or approximately 20 per cent, to reach the test period average of 1,350,000 tons, while tie renewals failed by 17,000,000, or 18 per cent, to meet the test period standard. Other important units of maintenance renewals are equally in arrears. It is therefore difficult to see how the Raiload Administration can justify its apparent position that the roads are being over-maintained.

The order was also ill-advised because it applied alike to the road which started its work early and had a large part of its season's program completed and to the road which was only starting. It was issued at a time when the best progress could be made and before the call of the harvest field depleted the forces. Its drastic nature is indicated by the fact that it would have required the laying off of as many as three to four thousand men on each of several Middle-Western roads.

It is unfortunate that the order was issued, and it is to be hoped it will not be renewed since maintenance of way expenditures should be determined by physical needs and facts and not by statistical ratios which are meaningless unless considered with reference to physical facts.

New Books

Efficient Railway Operation. By Henry S. Haines. 709 pages. The Macmillan Company, New York.

It is peculiarly difficult to get a true perspective in discussing the efficiency of American railroad methods. Louis D. Brandeis, when he was counsel for the Interstate Commerce Commission, raised a widespread but rather superficial discussion of the railroad question by asserting that a million dollars a day was being lost through inefficiency in railroad operation. A traveler who meets with a discourteous ticket seller or a grumpy conductor makes a mental comparison between the railroad business and the hotel business, forgetting that it is ten times easier to change a hotel clerk or to correct his errors, than in the case of a conductor. A shipper whose freight goes astray, possibly because of poor marking, compares the efficiency of the railroads to that of the large drygoods company and gives the railroad a very low rating. But these are unweighed averages, all of them. A careful and scientific investigation into the efficiency of American railroads has seldom been made even on a limited scale.

Government operation of railroads has afforded a helpful contrast by which the general public has been able to judge of the efficiency of railroad operation in America, at least in many of its aspects, under private operation. Colonel Haines, however, studies the question from the point of view of the scientific student. He examines the factors which go to make up the business of transportation by railroad; he examines these in the light of history, in the light of comparisons with other countries and with other businesses and from the ideal standpoint—that is, in the light of what could be hoped for in the solution of the problems that they present. The work is undertaken in a strictly critical spirit; but at the same time it is the spirit of a friend, not an outsider, for the author has a full knowledge of the problems involved.

Colonel Haines is a veteran of the veterans, having served in both the mechanical and the engineering departments away back before the civil war. He was superintendent of the Charleston & Savannah through that war, and was the chief operating officer of the Plant System for 15 years ending with 1895. He had a wide acquaintance, and was president of the American Railway Association for nine years, 1887-96. This practical experience is reflected throughout the book in a wealth of detail, sometimes contained in the text itself; sometimes in the invaluable appendices. From this point of view the book may be regarded as both a text book and a reference work of incalculable value to railroad men. It would be hard to say whether the ambitious train master or the general manager would gain most from its possession and study. To the younger men it answers, for the period which it covers, as a very useful historical sketch.

The scope of the book is very broad. After a brief but fascinating history of transportation from the dawn of history, the author describes in some detail the modern developments of motive power, of rolling stock, of substructure and superstructure of roadway, traffic, transportation and what he calls operation. By traffic, Colonel Haines means service, which includes safety, speed, car supply, etc. "Transportation" is self-explanatory, but by operation he means real control of operation, including both transportation and what he calls traffic.

The chapters on operation are possibly the most interesting in the book. They will be appreciated by the general reader as well as by railroad men. After all, it would be useless to show that American engineering skill and American ingenuity had devised the best tools for transportation of which we have any knowledge, if it could not be shown also that American genius for organization had so utilized these tools as to get from them a large measure of their potential efficiency. In this chapter on operation, Colonel Haines critically examines American railroad organization and the methods used for control of the organization, and sums up his conclusions in this regard as follows:

"The exercise of executive control of a high order requires a combination of knowledge and experience with natural ability, a sense of justice and honesty of purpose. These qualifications have been eminently conspicuous in the men who have brought our railroad system into the state of efficiency by which our national resources have been marvelously developed and our prosperity augmented; and, furthermore, by which railway operation elsewhere has largely profited. It is not to be expected of our railroad managements that they have attained the highest possible stage of efficiency, nor is this claimed for them, for the field for investigation in railway operation is continually broadening, as in other fields for research. General practice will always lag behind the pioneers in every art. In this respect, it will be difficult to prove that our railway managements compare unfavorably with those in other countries or with the directors in other fields of production or distribution at home or abroad."

So broad is the scope of the book that it is out of the

question to discuss any but a very few of the points which the author covers. There are many points on which practical railroad men, as well as other competent critics in the railroad field might disagree with the author. For instance, while most railroad men would agree that questions of policy should be left to the board of directors, how far this should apply in regard to "terms and conditions of employment" is a question about which there is no settled agreement. Colonel Haines would relieve operating officers entirely of such matters; but our Central Railroad Administration at Washington, which undertook to relieve the federal managers entirely of just this responsibility has not yet demonstrated its success. Whether many American boards of directors are able, ready and willing to do any better may be seriously questioned.

It is a rare thing to find a practical man who can write really well about the art, profession or business in which he has proved himself an expert. This rare combination, however, is found in the author of "Efficient Railway Operation." The writing is both polished and scholarly. It shows no signs of old age. It has a leisurely tone that is quite unusual in present-day writing on technical and professional subjects. The book, however, is not technical, except, of course, in the statistical tables in the appendices. Any well-educated layman can understand and appreciate the discussion not only of the history of the development of the railroads but of the operation of the roads and the engineering features which have gone to make this development possible. The book is, therefore, thoroughly well worth reading consecutively.

It is also a valuable reference work. The index is comprehensive and very carefully made. This is said with a full knowledge of how extremely rare it is to find a comprehensive index for even a short treatise.

A bibliography, so-called, is included, but apparently what is meant is a list of books which the author consulted, for certainly no attempt is made to give a complete list of even the most important books that have been published in the last 10 or 15 years on railroad subjects.

Colonel Haines has spent on this work a period of three or four years which, at his age, he might have claimed as a well earned leisure; but the literary and historical workshop seems to be his natural element—and this is a condition for the existence of which all students of railroad history will have occasion to be grateful. To foreign readers the book may be of somewhat less absorbing interest than to the American, because of its wealth of details which they will perhaps be likely to skip over; but in no other place can they find such a rich collection of facts combined with lucid and rational comment.

The book is not free from errors; in such an extensive and laborious undertaking no author could expect to attain perfection except by referring every chapter to a committee of specialists. The development of the electric train staff is credited (page 393) to the General Electric Company instead of to Tyer, Thompson and the engineers of the Union Switch & Signal Company. A foot note on page 394 gives the erroneous impression that yellow is the night color indication (in fixed signals) for "proceed" on the Pennsylvania Railroad. The distance from New York to Chicago, over the Pennsylvania Lines (page 588) is given as 870 miles, some 36 miles less than is shown in the time-tables. However, these errors are but as the small dust of the balance in a great mass of facts in which the reader gains interesting information on every page.

It is hard to conceive of anyone reading Colonel Haines' book with an open mind and a clear understanding who can fail to agree with the author that in this field of railroad operation Americans have made a brilliant record of efficiency; that American railway operation is in the highest degree efficient operation.

Letters to the Editor

The Selection of Local Officers

FORT WORTH, TEX.

TO THE EDITOR:

Since government control of railways became effective there have been many statements in the press about the lack of discipline, non-observance of rules and general inefficiency of railroad men, especially in train, engine and shop service. The truth of most of these allegations is evident to all who are not entirely blind to plain facts.

The writer recently re-read an article by E. H. Heath, published in the *Railway Age* of November 16, 1917. The author is a very close observer and a good judge of human nature, and he hits the "bull's-eye" in almost every paragraph. The general manager of today is rather dull of comprehension if he is not studying evident facts and their causes. Mr. Heath points out the principal reason for unrest and loose discipline, but his statement should be amplified by the following addition: "Some local officials vie with each other to find ways and means to violate the contracts that exist between the brotherhoods and the railroads."

There has been a great change in railroading in the past 10 years and local officials who would have been a success 15 years ago may be failures today.

My early training began under a superintendent who had served in the ranks as a civil engineer and he fairly had the itch to learn the practical side of train movement as well as all other branches that go to make transportation successful. This man climbed from the position of superintendent of a subdivision to general manager of the greatest railroad in the country, and this was done by the force of his ability in about seven years. The next best superintendent I worked for was in the West and he was taken from the freight department. If all the other local officials I have worked for in the past 30 years were put into these two men's shoes, they would rattle like peas in a gourd.

Chief clerks generally make better local officers than despatchers for the simple reason that they are better "mixers" and are in a position to hear all transportation problems debated. Mr. Heath states, "Efficiency comes through persistent instructions by an efficient field staff, explaining the why as well as the how." Many local officers apparently think that efficiency is in the atmosphere and we absorb it as we do air. Efficiency in the rank and file of railroad employees is simply a result of good management. If the general manager does not know whether the general superintendent, superintendent and trainmaster know the factors of successful transportation, how can he be successful?

The braking problem on railroads gives the best illustration of the effects produced by the "I don't knows." A prominent air brake man wrote me some time ago, "We have tried for 30 years to have the trains handled smoothly." I admitted it was a fact, but added that we had been trying all that time to use devices which we did not properly understand, and had failed to notice that the devices could not do in actual service what they did in the instruction car.

Engine crews are the only employees on a railroad who receive a progressive examination. They are literally surrounded with inefficiency, neglect, incompetency and theory. Despite this mass formation and attack on all sides, they are expected to deliver 100 per cent efficiency. The engineers have the experience and others have the theory.

This letter is not written to direct attention to the important fact that local officials must be trained, trained and for modern ideas.

AN OBSERVER.

Flagging and Its Relation To Railroad Accidents.

Review of American Experiences with the Flagging Rule; Things Needed to Improve the Practice

By C. C. McChord
Interstate Commerce Commissioner

THE REPORT of the Interstate Commerce Commission upon a rear-end collision which occurred on the Philadelphia & Reading Railroad near Fort Washington, Pa., on January 13, 1919, has recently been issued. The collision was between two passenger trains originating at Philadelphia; it occurred about 15 miles north of that city. One of these trains, a local consisting of 8 wooden coaches, left Philadelphia at 5:30 P. M. and was stopped and delayed just south of Fort Washington on account of a preceding freight train blocking the track. The following train, known as the Scranton Express, left Philadelphia at 6 o'clock. The engineman of this train stated that an automatic block signal located about 4,000 feet south of the point of accident indicated clear, and he proceeded past this signal with undiminished speed; under the circumstances, however, this signal should have been in the caution position. Approaching the point of accident, his view of the track ahead was obstructed by an overhead highway crossing with bridge abutments close to the track, also a railroad bridge over the Philadelphia & Reading track, together with sharp curves and trees located along the right of way.

The flagman of the preceding train had gone back some 1,500 feet for the purpose of protecting his train, but on account of the local circumstances, the engineman of the Scranton Express was unable to see him in time to bring his train to a stop before colliding with the preceding train.

The colliding locomotive telescoped in the rear coach of the local train for a distance of about 45 feet, entirely demolishing that car. Thirteen passengers and one employee were killed and twenty-two passengers were injured.

A thorough investigation and extensive tests of the signal system at this point were made by the employees of the railroad company as well as by representatives of the Interstate Commerce Commission. This investigation disclosed no condition which could have caused a false indication of the signal, and the conclusion was reached that the engineman either misread or overlooked the caution signal indication.

A contributing cause of the accident was the failure of the flagman of the local train to go back far enough to insure full protection to his train. The investigation disclosed that the flagman went back a distance of approximately 1,500 feet from the rear end of his train and he was within the range of vision of the engineman of the approaching train for an additional distance of about 750 feet. As the results of this accident show, sufficient distance was not provided to enable the engineman of the express train running at full speed to bring his train to a stop before reaching the point of collision. Tests made subsequent to the accident with a similar train confirm the conclusion that the flagman was not in position to warn the engineman of the approaching train of danger in time to enable him to prevent the collision.

The rule of the Philadelphia & Reading Railroad Company prescribing the flagman's duties in a case of this character provides that when a train stops or is delayed under circumstances in which it may be overtaken by another train, the flagman must go back immediately with stop signals a sufficient distance to insure full protection. According to evidence in this case a period of at least 15 minutes elapsed between the time the local train stopped and the time the express train approached. It is clear, therefore, that the flagman had ample time to have continued back far enough to insure full protection to his train.

The flagging rule on the Philadelphia & Reading Railroad is similar to the rule in effect on practically all railroads in the country. Some roads have elaborated upon this rule to the extent of specifying minimum distances which are considered to provide adequate flagging protection. But experience has shown that on account of the widely varying factors affecting flagging protection, such as speed and weight of different trains, weather conditions, grade and curvature of track, it is impracticable from an operating standpoint to make this rule specific and absolute in its requirements. It is, therefore, a practical necessity to rely to a very considerable extent upon the experience, discretion and judgment of a flagman for the proper protection of his train under the local circumstances and operating conditions existing in each case. This is true not only with respect to the interpretation of the requirements of a rule when applied to any particular location, but also to the judgment of the man as to what constitutes adequate protection under any given circumstances.

It is a universally recognized principle or requirement where automatic block signals are in use that the signal system must not be relied upon entirely for protection; the fact that train movements are protected by automatic block signals does not alter the requirements of the flagging rule. Under the circumstances in the Fort Washington wreck, if the engineman of the express train had properly observed the caution indication of the automatic block signal involved, he would, no doubt, have been able to bring his train to a stop after seeing the flagman in time to prevent the accident. But the flagging rule contemplates that adequate protection shall be furnished in a case of this character, even though the engineman, as in this case, overlooks or for any reason fails to heed the signal indications. Had the flagman gone back as far as the available time permitted in this case or at least the maximum distance required for bringing a train running at full speed to a stop, he would have been able to warn the engineman of the presence of the preceding train in time to prevent the collision, notwithstanding the failure of the engineman to heed the signal indication. The flagman had had nearly 15 years' railroad experience and his service record was good. He exercised poor judgment in this case, and no doubt relied upon the automatic signals.

The Interstate Commerce Commission has been conducting investigations of serious railroad accidents for the past eight years. Since July 1, 1911, a total of 567 accidents have been investigated, of which 358 were collisions, and in 111 of these collisions flagmen were involved to a greater or less degree. Of the 358 collisions, 139 were rear-end collisions, and in this class of accidents there were 76 in which flagmen were involved. Of the total of 111 collisions in which flagmen were involved, 57 occurred on lines operated by the block system, while 54 occurred on lines where no block system was in use.

The records disclose case after case in which flagmen neglected or failed fully to carry out the requirements of the rules. In some instances it has developed that experienced men have grown careless and have acted in a perfunctory manner, apparently without realizing their responsibility.

There are also a large number of instances in which the flagman exercised poor judgment, due either to failure properly to realize what was required of him in a particular

case, or to lack of experience and sufficient instruction by experienced railroad men. Many instances may also be cited showing lack of proper supervision of men when entering railroad employment, or when assigned to trains as flagmen.

Another condition which has been found to exist is the fact that conductors too seldom give their flagmen specific instructions with reference to proper protection of their trains. In a large number of cases conductors have apparently taken it for granted that flagmen with comparatively little experience know what is required of them and can be depended upon properly to perform their duties. In many cases a suggestion from the conductor or a few words of instruction as to what was expected of the flagman would probably have prevented serious accidents.

One of the most disquieting features of the record of accidents in which flagmen were involved is the fact that a considerable percentage, and some of the most serious accidents which have been investigated, occurred on lines equipped with modern automatic block signals. The fact should be recognized that lines equipped with such signals carry the densest and fastest traffic in the country and perhaps in the world. It is a fact that frequently fast trains are run at such brief intervals that when a train is unexpectedly stopped or delayed, there is not time for a flagman to get back far enough to provide adequate protection for his train.

A Compendium of Flagrant Cases

An examination of the records of accident investigations suggests the following general classification of accidents resulting from the lack of proper flag protection.

1. *Carelessness and failure to realize responsibility of the position of flagman by experienced men.* Accidents wherein experienced flagmen fail properly to perform their duty are surprisingly common. In a recent case of this character, a train had been standing 25 minutes on the main line without protection; the flagman had visited various saloons during the preceding night and was in no condition to work. This man had had more than 7 years' experience as a trainman. In another rear-end collision, a passenger train had stopped at a flag station on account of low steam. The flagman went back and in about 20 minutes returned to the train to obtain a fusee on account of his lanterns beginning to burn low and also to see how much longer the train would be delayed. He had started back the second time, but had gone only 2 or 3 car lengths beyond the rear of his train when the following train passed him. At no time did he have any torpedoes with him, and he was unable to light the fusee as there was no cap on it. This flagman was a man of nine years' experience in train service.

In another case a train stopped with rear-end about half a mile outside of yard limits; the engineman whistled out a flagman, and the conductor told the flagman they would be there about two hours, but did not give him specific instructions to flag, as he was qualified and he considered him to be trustworthy. The flagman said he did not know the location of the yard limit board and thought his train was within yard limits, so he remained in the caboose reading and writing. Train stopped at the usual point and he said he had never gone back to flag in the month he had been running over this part of the road. Train had been standing one and one-quarter hours at the time of accident. Flagman had had eight years' experience of which four was as a flagman.

2. *Inexperienced and incompetent men.* In a rear-end collision between two passenger trains, resulting in the death of 14 persons and the injury of 200 persons, the collision occurred at night. The flagman did not go back a sufficient distance, and did not use either fusees or torpedoes, although he had both with him. The flagman entered the service of the company 24 days before the accident, had no previous railroad experience, and had not been examined on the rules.

In another case the flagman of a work train was given verbal instructions to go to the next station on a preceding train and hold all trains in the opposite direction until his own train arrived. The evidence indicates that when a passenger train approached from the opposite direction he did not unfurl his flag and the signal he gave was such that the engineman of the passenger train took it for a wave of the hand or a salute, acknowledging it with two short blasts of the whistle and resuming full speed. No torpedoes were used, although the flagging rule required their use in all cases. The flagman had been in railroad service a total of only four months and had never been instructed, examined or qualified as a flagman.

In another case of this character, the flagman at fault had been employed on this road less than one week, but had had some previous railroad experience. He was assigned to duty as a flagman by the trainmaster's clerk; the only question asked was whether or not he had a watch. No instructions were issued to him, and he received none from his conductor during the trip. He stated that he went out without any knowledge of the operating rules and did not even have a time table; and that he paid only half a dollar for his watch.

In another case the investigation developed that men were employed for train service by a trainmaster's clerk who had never been examined on the rules. The examination given was very perfunctory and consisted merely of filling in answers to questions contained in a printed form which was supposed to be checked over by the clerk and supplemented by such explanations or instructions as he might give.

These and many similar cases point clearly to the menace of employing incompetent and careless men in responsible positions, and emphasize the need for the most rigid enforcement of rules and for frequent inspection and test by officers in order that they may know absolutely that rules necessary for the safe operation of trains are understood and obeyed.

3. *Poor judgment on the part of experienced flagmen.* The Fort Washington accident described above is an example of this class. In another case, a rear-end collision occurred on a six-degree curve, 550 feet from the point of curvature. From that point, there was 150 feet of tangent, 475 feet of 2-degree curve, and 1471 feet of tangent. The grade was descending for several miles, averaging about one-half per cent. The accident occurred during the day time, in clear weather. The flagman went back a distance of 30 car lengths, which brought him to the tangent 1,471 feet in length, and there put down two torpedoes. He then walked back and forth between the torpedoes and his train, being about 24 car lengths from his train when the following train passed him. According to the evidence, the engineman could not see the flagman until within about 8 car lengths of him, although his fireman and head brakeman could have seen the flagman a distance of 60 or 75 car lengths. The head brakeman called attention to the flagman, and the engineman made service application of the air brakes when about 12 or 15 car lengths from the flagman. The speed of the train at the time of collision was very low, the weight of the 85-car train contributing materially to the damage. The flagman had had more than a year's experience and had a good record.

Accidents due to errors of judgment on the part of responsible employees cannot be entirely eliminated; the most that can be expected is to reduce their occurrence to a minimum by care taken in employing men for train service and by educating them to the responsibilities and duties of their position; also by making the rules as definite and specific as practicable.

4. *Lack of definite instructions or misunderstanding of instructions.* In one case of this character the conductor sent the flagman forward to assist in switching in place of an inexperienced head brakeman; he told the head brakeman to look out for a following passenger train but received no acknowledgment from him. The head brakeman said he had not been instructed to flag the passenger train and thought the reason no attempt was made to protect was because the conductor had time on that train. Head

brakeman had been in the service less than four months.

In another case the conductor of a work train sent a flagman to a station with verbal instructions to hold all trains until his train arrived, but the flagman understood that he was to hold all but first class trains. He failed to hold a passenger train, and a collision resulted. This flagman had never been instructed or examined on the rules, although he had been in the service of the railroad company 9 months. He had had some previous railroad experience.

Accidents due to the misunderstanding or misinterpretation of flagging instructions in connection with work train operation are common. Such cases occur because instructions are given verbally and without sufficient care to know that they are properly understood. Many roads require by rule that flagging instructions be given in writing and make it the flagman's duty to show his written instructions to the enginemen of trains flagged. This rule should be universal and should be strictly observed.

5. *Dense traffic or trains operated so close together as not to allow necessary time for flagman to go back a sufficient distance to provide full protection.* There have been a considerable number of disastrous accidents in which this was a contributing cause. In one case several years ago four sections of a fast freight train were being run at high speed in a dense fog at intervals of only about 5 minutes apart. The engineman of the third section decided that in view of the weather conditions it would be unsafe to attempt to go to the next station, 4.4 miles distant, in 10 minutes and clear an opposing passenger train. He therefore slowed down in order to take siding. As the flagman opened the caboose door on his way out to protect, he heard the fourth section approaching and called to the conductor to jump, but the latter did not have time to do so. The last open telegraph office was 5.6 miles distant, and the fourth section travelled that distance at an average speed of 48 miles an hour and intended going to the station beyond to clear the passenger train. The third section had been running at a lower rate of speed, and this, coupled with a minute or two lost when making the stop at the siding, enabled the fourth section to overtake the third section. There have been recent examples of accidents of this character, attended by much more serious results. In one of them, the first train stopped at 3.13 a. m. in a dense fog on account of an interlocking signal being in the stop position. The signal was cleared and the flagman called in, but when endeavoring to start, the engine stalled. The flagman again started back, but had gone only one or two car lengths when he heard the following train approaching. In the meantime, the engineman had started the train and it had traveled 6 or 7 car lengths before it was struck, at 3.18 a. m. The accident was due either to the engineman missing the automatic signal indications entirely or to his misreading them on account of high speed and dense fog. In another accident, a train stopped at 3.55 a. m. and the flagman started back, seeing the approaching train after he had gone but a few car lengths. When he saw that the engineman of the following train was disregarding the automatic signal indications, he began to run toward that train and was back about 700 feet when it passed him, colliding with his own train at 3.57 a. m. The accident was due to the engineman being asleep, but could probably have been prevented had the flagman had time enough to go back a proper distance and put down torpedoes, which he had with him.

In view of the evidence furnished by the accident investigations which have been conducted by the Interstate Commerce Commission, it is apparent that the safety of railway travel may be greatly enhanced by more careful attention to the requirements of proper flagging. This is a matter that should receive the constant attention of railway operating officers, by the promulgation of definite and easily understood rules, as well as by adequate measures to insure that the rules are understood and obeyed. The position of flagman should be made a preferred job, and should be invested with more importance and dignity than is at present the case. Extraordinary precaution should be taken to insure that only competent men having a keen sense of their responsibilities, are given this position. In addition, special measures should be taken to see that flagmen are fully instructed in the performance of their duties, and that constant supervision over all details of their employment is given.

In connection with this important matter full consideration must be given to the human tendency toward minimum effort. Individuals are naturally indolent; they do not wish to exert themselves unnecessarily, and they are aroused only when ease is more unbearable than action. Men rarely do the best of which they are capable. They grow to the smallest dimensions of their job and then stop. No more effort is expended to perform a task than is required to produce a satisfactory result, and what is "satisfactory" is usually a variable quantity. There being no standard, the result obtained is generally far below the individual's capacity. It requires severe effort on the part of an individual to maintain his highest level of efficiency, and effort is a strain that he is loth to make. Consequently, he is contented with efforts that produce fair results.

Applying the fact of this well-known human tendency to the subject of flagging, the necessity for constant supervision and admonition, even with men of the highest grade, is apparent. Take a conscientious man of good intelligence, having a full sense of the responsibility imposed upon him, and at the outset he will exercise extraordinary care, and make a tremendous effort to do his job well. Then, as he becomes more familiar with the details of his task, the human tendency to do things in the simplest way, in a way requiring the least expenditure of energy, causes his efforts to relax, perhaps at first gradually and imperceptibly, until he is finally acting much below the level of efficiency demanded by the safety of his train. To counteract this tendency requires constant and intelligent effort on the part of railway operating officers. They should be especially vigilant in this regard, bearing always in mind that they themselves are subject to the same psychological propensity as are their subordinates. It is highly essential for them to know that men of the proper calibre are placed in these positions in the first instance.

On many roads flagmen of passenger trains are prohibited by rule from riding on the rear of an observation or private car. Such a prohibition is not in the direction of safety, and wherever the rule exists it should be rescinded. A seat should be reserved exclusively for the flagman just inside the rear door looking out. It should be made compulsory for a flagman to ride in the rear end of the last car of the train, as that, or on the rear platform, is the only place where he can ride and properly protect his train.

Occasionally accidents occur due to the existence of dangerous operating practices which have grown up with the full knowledge of responsible officials and which they have failed to take steps to correct. When such conditions exist, they are usually found in and around yards, interlocking plants and other points where train movements are more or less congested. In connection with one such accident, the superintendent stated that in his opinion it was a safe practice for transfer trains to use the main track within yard limits on the time of a first-class train, provided the crew of the transfer train were told by someone that the first-class train was late. Such operation is in violation of all rules provided for the safeguarding of train movements, and when responsible officials are acquainted with and acquiesce in the continuance of such practices, accidents are bound to occur. Not only that, but the effect on the employees under their jurisdiction is detrimental to a proper performance of their duties, for slackness and inattention by officials to violations of the rules on the part of employees will be reflected in their daily work and can only result in the occurrence of those accidents which it should be the duty of all officials to prevent to the best of their ability.



On the Mexican National, at Chirimoya Hill, near Jaral

A Trip Over the Railway Lines of Mexico

Construction and Operation Under Difficulties. Private Trains to Secure Better Service

By P. Harvey Middleton
Executive Assistant, Railway Business Association

PART II.* PRIVATE LINES AND PROPOSED EXTENSIONS

THE TENACITY, enterprise and foresight of Harriman resulted in the construction a few years ago of the Southern Pacific of Mexico, which owns approximately 1,000 miles of line in some of the most beautiful country on this continent. This line is the result of the consolidation into a single system in Mexico of the lines controlled by the Southern Pacific system of the United States. The Mexican concession dates from 1905, and carried a subvention of $10,058 U. S. currency per mile. This company has virtually absorbed what was hitherto called the Cananea, Yaqui River & Pacific, which had constructed lines from Nogales and Naco on the Pacific-Arizona border to Cananea, a copper-producing center in the state of Sonora, and down the west coast of Mexico on the Gulf of California from the port of Guaymas to Mazatlan, continuing to Tepic, from which point it is eventually to go to Guadalajara and Mexico City.

The company suffered considerably between 1910 and 1913, the traffic loss for this period being estimated at $3,000,000, and the cost of maintaining the property during the same period was $510,000 in excess of the revenue collected. The road in its progress southward crosses the wealthy regions of the Mayo and Yaqui rivers, which produce the best garbanza (chick peas) in the world. It passes Navajoa, the center for this product, and then touches San Blas, in the state of Sinaloa, where it connects with the Kansas City, Mexico and Orient. At Manzanillo it connects with the National Railways of Mexico.

The Southern Pacific of Mexico runs triweekly trains from Nogales to Naco via Cananea, 120 miles, but the property of the railroad in this section has greatly deteriorated, owing to the fact that it has been compelled on several occasions to withdraw all trains and practically abandon the roadbed. All the bridges have been destroyed, and all rolling stock, roadbed, terminals and buildings will have to be renewed at an early date. At one point on this line, between San Blas and Culiacan, H. J. Temple, the general superintendent, rebuilt a bridge nine times. Every time the bandits destroyed it, Temple rebuilt it. A pile driver outfit was maintained at the bridge all the time, and in one month the bridge was rebuilt five times. As will be seen in the photographs reproduced in this article, the Southern Pacific of Mexico is compelled to operate armored cars on all trains.

A glance at the map published in the *Railway Age* of May 30 will show the small portion of the route between Tepic and Guadalajara which is still to be completed. The intervening distance is only a few miles, but it is in the difficult Sierra Madre country, requiring a number of tunnels—one of them nearly three miles in length—and much heavy grading. Representatives of the Southern Pacific are now in the field arranging for the early completion of the line. When this is done the Southern Pacific will have a direct connection between its great system in the United States and the entire west coast of Mexico—a region immensely wealthy in agricultural and mineral products.

Difficulties of Construction

The difficulties which will have to be overcome by the American engineers in completing this short stretch between Tepic and Guadalajara are graphically illustrated by the description of the survey made under exactly similar circumstances of the Cañon de Tamasopo on the Mexican Central by Max E. Schmidt, an American engineer. This cañon is 18 miles long, with perpendicular cliffs many hundred feet high on both sides.

When the first surveys were made, the cañon was devoid of roads or trails. The sun hardly ever penetrated the rockbed where the engineers

*The first article will be found in the *Railway Age* for May 30, page 1297.

camped, and where a sudden rain in a few hours might create a torrent that would fill the bottom of the cañon from side to side many feet deep, and carry away every vestige of the camp outfit and survey. At night, the noise of the rocks becoming detached from the cliffs above and falling into the cañon made sleep a succession of nightmares. When the actual location was made it was found that, in order to obtain proper grades, the road would have to intersect the cliffs at about half their heights. Difficulties then began in earnest. On many days not over 100 feet could be staked. All camp comforts had to be abandoned, and night would find the engineers camping on the cliffs, near the last stake, swinging their hammocks over rocks and precipices and securing what little rest they could. The roadbed as now finished is nearly all carved out of the solid rock. The total track curvature is 12,248 degrees, and in the aggregate only about one-fifth of the distance is on tangents.

Another American Line

A gigantic monument to the pluck and resourcefulness of American engineers is the Kansas City, Mexico & Orient, running from Kansas City to the Bay of Topolobampo on the Pacific Coast of Mexico, a total of 1,451 miles. It was promoted by Arthur E. Stilwell, who carried large parties of prospective stockholders from the western states, and in this way sold enough stock to carry on the construction work. The company was incorporated in 1900 under the laws of Kansas. Two sections are still under construction—one between Alpine, Texas, and the Rio Grande, 81 miles, and the other



A Gun Made in the Railway Machine Shop at Monclova, Mexico

between Sanchez, in the state of Chihuahua, and Los Hornillos, in Sinaloa, 198 miles.

This line also taps large agricultural and mining districts, it being estimated that there are about 500 mines and prospects on the line, as well as important haciendas producing, sugar, cattle, grain, timber and fruit. Owing to bandit activities, service is at present irregular on the stretch of line from the Rio Grande to Sanchez, 287 miles.

The construction of this line is all first class, rails of 75 lb. weight, ties of California redwood, tarred, bridges well piled and provided with safe approaches and abutments. On the first hundred kilometers of the line, starting from the Pacific terminus at Topolobampo, there is but one bridge of any importance, namely, that crossing the Fuerte river, comprising three truss spans, each measuring 300 ft. in length. Several smaller bridges are from 15 to 50 ft. in length. On the second division, from Chihuahua east, however, when the Sierra is reached, the country becomes difficult to negotiate, In this long section tunnelling has been both expensive and difficult, the longest of the excavations being 1,520 ft., while there are two others which measure 810 ft. East of Chihuahua there is a bridge across the Chuviscar river near Aldama consisting of 10 spans of 50 ft. deck girders on concrete piers and abutments. Further on, crossing the Conchos river, there is a steel girder bridge which is comprised of 17 spans of 50 ft. deck girders.

The length of the main line in Mexico, from the Rio Grande to Topolobampo, is 633 miles, which distance includes a portion of the Chihuahua & Pacific Railway, from Tabalaopa to Minaca, 120 miles, operated under lease. The terminus of the line at the bay of Topolobampo is a magnificent port, completely mountain-locked, measuring about seven square miles in area, with a depth over the bar at the entrance at low tide of about 22 ft.

Privately Operated Trains

A large part of the freight in northern Mexico is today handled in privately operated trains, of which there are about 30 in service. American mining companies have agreed to



The Southern Pacific of Mexico Protects Its Trains With a Gondola Car Cut With Slits for Rifles

rebuild a part of the destroyed cars on condition that such cars are to be used exclusively by them for a period of two years, after which they revert to the regular equipment of the service. From the American border to San Luis Potosi, 475 miles, on the government railways, shippers are dependent on private trains for quick service, freight being delivered in about ten days, at rates 50 per cent higher than the regular government rate. As freight is not received on private trains in less than carload lots, shippers of smaller quantities who require regular quick service must ship by express or pay



One of the Locomotives Left on the San Jorges Bay & Eastern After the Rebels Had Stripped That Road

insurance. There are special express trains leaving Nuevo Laredo on the Rio Grande for Mexican points twice a week.

An effort is being made at the present time to bring about an agreement with the United States Railroad Administration for the through billing of freight from points in the United States and Mexico, and for the regular interchange of cars. Through billing has been discontinued since 1915. American owned freight cars are, however, going across the border into Mexico under bond furnished by the shipper, and bond is released as soon as the car is returned to the United States. There are at present about 500 American owned freight cars in shops and in service in Mexico.

Extension of Lines

When I left Mexico City on May 7 the extra session of the Mexican Congress had completed its organization, and was starting to work on the big questions which it is now compelled to deal with. One of the most important of these is the extension of the railroads of the country, as recommended by President Carranza, and the purchase by the government of all or a majority of the stock of the United Railways of Yucatan. This company was incorporated under the laws of Mexico in 1902, and is a system formed through the consolidation of lines formerly independent and then owned by henequen (hemp) planters of the peninsula of Yucatan.



A Big Fill on the Mexican National Railway

There are four divisions—the Northern, between Merida, the capital of Yucatan, and Progreso, its seaport, and between Merida and Izamal, all standard gage; the Eastern, between Merida and Valladolid, with two branches, all narrow gage; the Western, connecting Merida with Campeche, capital of the state of the same name, and two branches, all narrow gage; and the Southern, between Merida and Peto, with one branch, narrow gage.

Since 1914 the Yucatan railways have been operated by the local government of the state of Yucatan. The share capital is 23,000,000 pesos ($16,500,000), in addition to which there



The Other Extreme of Transportation in Mexico

is an issue of $4,125,000 first mortgage 5 per cent redeemable gold bonds issued in London. At the time of my visit to Yucatan on May 12 there were 500 miles of railway operating on schedule time. Track was in good condition, but rolling stock was badly in need of repair.

Three new lines are proposed for Yucatan. The first would link the Yucatan system with the territory of Quintana Roo, running through Peto, Yucatan, Bacalar and Santa Cruz. Surveys for this line were made under the rule of Porfirio Diaz. The second extension, also proposed by Diaz, would connect Santa Lucrecia, in Vera Cruz, to Campeche, connecting with the National Railway of Tehuantepec across the isthmus. The third proposed line will run from some point on the Southern Pacific, between Magdalena and Hermosillo, to Ensenada, the capital of Lower California. The completion of these lines will enable troops to be transported by rail from any part of the country to Lower California without entering the United States.

The American Smelting & Refining Company is also planning the construction of a new line to be operated in connection with its extensive mines and smelters in the states of Chihuahua and Durango, and will expend some $5,000,000.

Smaller American Lines

Another American owned line is the Mexican Northern, with offices at 82 Beaver Street, New York, which has a total track of 78 miles and runs from Escalon, in Chihuahua, to Sierra Mojada, connecting that region with the Mexican Central. This line is now under the control of the Mexican government. The Mexico Northwestern Railway, incorporated in 1909 under the laws of Canada, with offices at 115 Broadway, New York, was formed for the purpose of providing northern Mexico with railroad facilities. It has 476 miles, and is still privately operated. It owns the following lines: The Chihuahua & Pacific (incorporated in 1897 in



Bridge Across Rio Grande Between Pedras Negras and Eagle Pass

New Jersey), the Sierra Madre & Pacific, a lumber line, and the Rio Grande Sierra Madre & Pacific, which owned several lines in Sonora and Chihuahua—all rich in agricultural, mineral and forestry resources.

The Parral & Durango Railway was incorporated in Colorado in 1898, and runs from Minas Nuevas Chihuahua, to Paraje Seco, Durango, 59 miles, with a short branch line to Parral. The head offices of this line are at Pittsburgh. The Potosi & Rio Verde, narrow gage, is another American enterprise, with offices at 82 Beaver Street, New York. This runs from San Luis Potosi to Ahuacatal, 38 miles, and is at present under the control of the Mexican government.

Building a Tropical Railroad

It was a Kansas City man, Dennis W. Hedrick, who built the bridges on a line which crosses more rivers and streams than any other railway on the North American continent. This was the Vera Cruz & Pacific line, completed in 1903, and now part of the Mexican government railways, extending from Vera Cruz to Santa Lucrecia, a station on the National Tehuantepec, midway between the Gulf of Mexico and the Pacific. The distance was only 242 miles, but the road crosses six large rivers and numerous streams, which necessi-

tated the building of 300 steel bridges. The largest of these crosses the Papaloapan river at El Hule, the superstructure consisting of five spans, each 170 ft. in length, a draw span of 225 ft. and two steel approaches of 245 ft. each, making a total length of nearly one-third of a mile, and consuming 1,250 tons of steel.

Curiosities of Mexican Railroading

There are a number of reasons, other than those relating to natural obstacles, which make railroad building in Mexico expensive. The peculiarities of the Mexican peon is one of these. During the construction of a line in the south thousands of wheelbarrows which were imported for grading purposes had to be thrown away because the peons would not use them unless permitted to take the wheels off and carry the bodies on their backs.

Government requirements for the construction of new railways have also in the past caused large unnecessary expenditures. When I was traveling on the Mexican Railway from Mexico City to Vera Cruz on May 8 I was informed that the cost of the road had averaged $136,000 per mile—probably the most expensive railroad in the world—and that while only 264 miles long it had taken 20 years to build the road. A



Bridge Across Balsas River, Mexico

little inquiry soon cleared up the mystery. The government in granting the concession had insisted that the railroad be constructed from both terminals simultaneously. Notwithstanding the vehement protests of the English contractors, they were compelled to transport rails, parts of locomotives and other machinery on mule-back or carts over 250 miles inland, over rugged mountains, some of them over 8,000 ft. high, and then the track had to be laid backwards to meet the section which was working up from the coast.

Some Statistics

That the freight and passenger traffic of Mexico is growing, despite bandit and rebel activities, is evidenced by the statistics of transportation of commodities on the railways under government control—representing only about 8,000 miles—for the year ended June 30, 1918. Here are the figures, in metric tons: Forestry products, 393,968 tons; agricultural products, 1,236,719 tons; animals and animal products, 216,443 tons; inorganic products, such as lime, cement, asphalt, coal and coke, oil, minerals, etc., 1,935,105 tons; general merchandise, 372,475 tons. For a country containing a population of only 14,000,000, of which about 10,000,000 are Indians and half-breeds living under the most extreme primitive conditions, a country which, moreover, has been torn up by nine years of revolutions, these figures are remarkable.

Engineering Council Committee on Compensation for Engineers

The railroad section of Engineering Council's committee on classification and compensation of engineers has submitted a preliminary report of its activities from which the following abstract will be found of interest to engineers employed by railroads. This section of the committee is composed of Francis Lee Stuart, consulting engineer, New York City, chairman; Frank H. Clark, consulting engineer, New York City and Bion J. Arnold, consulting engineer, Chicago. The work of this committee to date has consisted essentially of the preparation of a questionnaire to be submitted to the chief engineers of railroads, to gather information on compensation being paid to engineers in railway service and opinions on the adequacy of such compensation. It was proposed to have this transmitted through the agency of the Railroad Administration, but Director General Hines did not concur to this view and in consequence the questionnaire has been sent only to members of the "founder societies."

The work of the committee has been divided as follows:

A. Determining the classes of engineering positions.

B. Collecting data in regard to compensation now paid for each class.

C. Determining an equitable rate of compensation for each class.

The committee has adopted a simple general classification containing eight groups which it is believed will be generally applicable to all organizations of engineers.

1. Chief administrative officer having full charge of organization, including determination of policy.
2. Head of major subdivision in responsible charge of large unit.
3. Head of intermediate subdivisior in responsible charge.
4. Head of minor subdivision.
5. On general duty under direction but requiring special education and special training and the use of initiative and originality.
6. On subordinate duty requiring special education or training, but not requiring special originality.
7. On subordinate duty not requiring special education, training nor originality.
8. On special duty of responsible character requiring particular qualifications and initiative.

In supplementary remarks issued by the entire committee on classification of Engineering Council considerable information is submitted showing the decreased purchasing power of the dollar and the embarrassing position of the salaried man when compared with wage workers whose compensation has been largely increased by collective bargaining. This statement is concluded by the following:

"The committee believes, therefore, that in adopting standards for the compensation of workers in all technical fields due consideration must be given to the great increase in the cost of living which has taken place. The dollar of salary must be considered with regard to what it will purchase today and is likely to purchase next year, and not with regard to the value of the dollar 10 or 15 years ago. This increase in compensation is necessary not merely as a matter of justice to the engineer, but in order that engineering work may be maintained on the plane that it must be to secure economical and efficient work. Not only the leaders but the rank and file of technical workers often have it in their power largely to affect the cost of the work in their charge by the quality of the effort they exert. There is no economy in paying such men at rates inadequate for their support, for this leaves their minds burdened with anxieties, when they should be free to give their best efforts to the work in hand. Moreover, such a rate automatically tends to drive the abler men into other occupations and to leave in charge of the work only those of less ability, who are unable to make a change."

Corporate Accounting During Federal Control*

Responsibility Rests on the Corporation Accounting Officers to See that Proper Accounting Is Had With the Administration

By Frank Nay
Vice President and Comptroller, Chicago, Rock Island & Pacific

The United States Government took possession of the railroads of the United States under proclamation of President Woodrow Wilson, at 12 o'clock noon, on December 28, 1917, but for the purposes of accounting, the possession dated from 12 o'clock midnight on December 31, 1917.

Under general orders Nos. 1 and 2, the railroad accounting officers handled both corporate and federal accounts; in fact, at that time they had no knowledge as to the difference between a corporate account and a federal account. They continued, for several months, to perform their duties exactly as prior to federal control. January 1 being the beginning of the calendar year and of the fiscal year established by the Interstate Commerce Commission, was the most propitious day on which to inaugurate the period of federal control. Naturally the accounts for the year 1917 separated themselves from the accounts for the year 1918, barring certain over-lapping items which will be considered later.

Corporate and Federal Accounts

For some months there was indecision as to whether or not it was necessary to make a complete separation of the accounts, such as has since been decided upon. The undersigned was asked by an official of the United States Railroad Administration if he could fairly and impartially keep the accounts of the road which he represented, for the corporation and for the director general, and give a square deal to both. The answer was in the affirmative, and reference was made to the many joint agencies of various kinds existing all over the United States, filled by men who have for years been serving two or more railroad companies, and have been giving each railroad company served, a square deal. However, further consideration of the matter led the Administration officials to the conclusion that it was desirable and necessary to have not only a complete separation of the accounts between the corporate accounts and those of the Administration, but that they should be administered by separate accounting forces, in charge of separate accounting officers; or, to put it another way, the Administration desired to have their accounts kept by men who were 100 per cent Administration, and who had no official connection with the corporations. With this in mind, General Order No. 17 was issued, under date of April 3, 1918. This order provided for a complete separation of the accounts of the corporation from those of the director general, and required that they be written in separate sets of books. This was done, and when the work was completed, the corporate books were turned over to the corporation, and it was then necessary for the corporation to have an accounting officer who would take charge of the corporate books, as the accounting officers of the Administration were prohibited from keeping them further without special permission from the Administration.

Corporate Accounting Departments Organized

About July 1, 1918, the separation of the sheep from the goats began. At that time federal managers were appointed for the various railroads, complete federal organizations were established and the federal officers were required to sever all connections with the railroad corporations, as officers, directors, or otherwise. That action obliged the corporations to create organizations entirely separate and distinct from the federal organizations. One of the first essentials of the separate corporations was adequate provision for corporate accounting, because it was extremely important that the accounts of the corporation should be given proper attention. As illustrating how the corporate executives felt, I quote the following from a letter dated October 26, 1918, from Mr. Samuel Rea, president of the Pennsylvania, addressed to a number of presidents of other large railroad companies, in connection with the proposed formation of a corporate railway accounting officers' association:

"You will appreciate that the contract is in large part an accounting matter. It lays down the general basis and principles of the relation with the government, but the details for carrying it out will devolve largely upon the accounting officers."

I imagine very few corporate accounting officers at first had any grasp upon the conditions and situations which confronted them. I confess to you that when I was appointed corporate accounting officer, or rather, retained in that position, because no change was made in my title and no change in my duties, except the separation of accounts relieved me from the detail of the operating accounts,—I said to my assistant, something like the following: "Joe, I believe you and I can handle the corporate accounts for the Rock Island; there will not be very many journal vouchers, and we may have to get a clerk or two to work on the subsidiary accounts and check the lap-overs, but you and I can do the general work without any difficulty at all; in fact, I rather welcome the idea of getting a chance to make some entries on the books again; it has been so many years since I actually took my pen in hand to make entries on ledgers."

Today I have in my corporate accounting office for the Rock Island, 34 clerks; they are all kept busy and many of them are working overtime. By actual count we record just as many journal vouchers on our books as prior to federal control. Up to this time I have not personally made any entries on the books and it looks as if I would not be able to do so during federal control; in fact, I give you my word that I have never worked harder in my life than during the last year, and I may add, I have never had less to show for hard work.

In taking up this corporate accounting work, we had an entirely new proposition. None of us had had experience with a similar accounting situation, and we had to blaze the trail. We were also confronted with the difficulty of obtaining adequate and competent help. The very cream of the young railroad men of our country had eagerly offered the supreme sacrifice to help win the war, and there was a great shortage in railroad accountants.

Compilation of Standard Return

One of the first things to which the attention of the corporate accounting officer was applied, was the compilation of data to demonstrate prior to the signing of the contract covering federal control, whether or not the average net railway operating income as reported to the Interstate Commerce Commission for the three years ended June 30, 1917, was the true income for that period. It is assumed that when the

*From an address before the Association of Railway Accounting Officers, New York, June 11, 1919.

President issued his proclamation and when Congress passed the Act of March 21, 1918, fixing as the compensation for the use of the railways, the average annual net railway operating income for the three years ended June 30, 1917, the actual net income as nearly as might be ascertained without completely re-working all of the detailed figures, was intended. In the case of carriers where that net figure was over-stated, due to the omission of some charge or to an excessive credit, which would be adjusted in a subsequent period, unless adjustments are made, such carriers would receive a rental in excess of the amount intended by the President and by Congress. In the case of a carrier whose net income as stated to the Interstate Commerce Commission for the period named, was less than the actual figure, due to items similar to those hereinbefore mentioned, such a carrier would be underpaid unless proper adjustment was made. As the Interstate Commerce Commission was required to certify to the President, the average net railway operating income for the three years ended June 30, 1917, it would seem natural that the Interstate Commerce Commission would make an effort to locate the relatively important items which should be adjusted and thus produce a net figure which would more nearly repreesnt the actual net railway operating income than the one which was reported to the commission.

It should be said right here that when the statement is made that the net operating income reported to the commission, is not the actual, the impression must not be created that any intentional omissions or errors were made or that the net figure that was stated was intentionally greater or less than the actual, but owing to the large volume of items entering into the net operating income of the carrier during the year, or during the three year period, and the complications in connection therewith, it is a practical impossibility to state the net income of the carrier on an actual basis within the time prescribed for rendering the reports.

Along in the summer of 1918, the Interstate Commerce Commission became aware that certain carriers had included in their accounts, subsequent to June 30, 1917, certain Adamson law payments, which accrued prior to June 30, 1917, and should have been charged against the expenses of the three year period ended June 30, 1917. Further, they were aware of the fact that under the income or war tax law of October, 1917, the carriers could not possibly have included the taxes under that law which accrued during the first six months of the year 1917, in the accounts for that period. The very fact that the law was not enacted until more than three months after the close of the period, precludes the possibility of including the figures within the period. Therefore, the Interstate Commerce Commission sent out a communication to the chief accounting officers of the various carriers, requesting them to modify their previous reports of the net railway operating income for the three years ended June 30, 1917, by deducting therefrom such omitted Adamson law payments as had accrued within that period, and also by deducting therefrom one-half of the war taxes under the Act of October, 1917, for the year 1917. This action was commendable and in harmony with the spirit to determine a figure for the net railway operating income for the three years ended June 30, 1917, which should be as nearly as practicable the actual figure for that period. The carriers responded with the corrections requested, and then later, certain carriers called to the attention of the Interstate Commerce Commission items which were erroneously included as a charge against the net income of the test period, and to revenue which was erroneously omitted from that of the test period; the adjustments requested would have the effect of increasing the net railway operating income for the test period. However, the Interstate Commerce Commission declined to make any further adjustments unless it could be shown that the accounting rules of the Interstate Commerce Commission had been violated. The Interstate Commerce Commission initiated the move to decrease the net railway operating income by deducting therefrom the two items mentioned, the omitted Adamson law payments and the one-half of the 1917 war taxes, neither of which constituted a violation of the accounting rules of the Interstate Commerce Commission, but the commission has so far declined to make adjustment of similar items subsequently brought to their attention.

Lap Overs

Under General Order No. 17, certain items affecting the income accounts of the corporations prior to midnight of December 31, 1917, were classed as lap-overs. On the expense side, these lap-overs were very clearly defined by General Order No. 17, and accounting bulletins and circulars. They referred to all payments by the director general for expenses which were incurred prior to January 1, 1918, which if they had been paid prior to federal control, would have been charged to operating expenses or income account of the corporation prior to such control. In other words, the lap-over expense items were allocated according to the date on which the service was performed or the liability incurred.

The general orders and circulars of the Administration provided that such lap-overs would be paid by the Administration, and charged against the railroad corporations, and that the railroad corporations would simultaneously credit the Administration on the corporate books. This was an entirely equitable method of handling these lap-overs as the Administration had taken over the cash on hand January 1, 1918, and had collected all operating funds accruing to the corporations on and after that date; in fact, the Administration collected all moneys, whether operating or corporate, that accrued to the corporations for several months after the beginning of federal control, and naturally, it was incumbent upon the Administration to pay the liabilities of the corporations.

On the revenue side, however, the lap-overs have not been clearly and equitably defined. In General Order No. 17 it was provided that the Administration would continue to revenue the freight, passenger and other traffic in the same manner that the corporation had accounted for such revenue, taking into the Administration treasury, the revenue that would have accrued to the corporation in the months during federal control. As to passenger service, the revenue on which is accrued largely on a forwarded basis the corporations are credited with more than their proper proportion of the revenue on lap-over passenger traffic. The average journey per passenger is shown in the reports of the Interstate Commerce Commission to be anywhere from 20 miles to 100 miles in the different sections of the United States, and therefore, on the average, because of the short journeys and because passengers do not become congested at terminal points, like freight, the method of determining passenger lap-overs as prescribed in General Order No. 17 does not miss the mark very far, but as heretofore stated, it is not exact, and is on more or less of a hit-or-miss basis. However, neither the revenues of the corporations nor the revenues of the Administration would be seriously affected by the application of General Order No. 17 to the passenger business, assuming that exactly the same method of ticketing passengers and of accounting for passenger revenue will prevail at the end of federal control as at the beginning of federal control.

As to the freight traffic, the method proposed in General Order No. 17 of revenuing freight at the beginning, during and at the end of Federal control, in accordance with the practices of the carrier prior to federal control would cause certain carriers or corporations to suffer heavy losses in their revenues, and the U. S. Railroad Administration to have the advantage of similar gains. At the time that the railroads were taken over by the Administration, freight was interrupted en route and congested at many terminal points. This was due to the increased movement of traffic on account of trans-

portation for the War and Navy departments and by orders given to expedite the movement of certain classes of traffic, which resulted in the delay and congestion of other classes of traffic. In fact, at December 31, 1917, there was an unusual congestion and freight was delayed en route to a much greater extent than in the ordinary course of business, and the accrued earnings on such freight delayed en route, amounted to many millions of dollars. In the case of the few railroads which accrue their freight revenues on the "forwarded" basis, that is to say, those which put into their revenue and income account the earnings when the freight starts on its journey, these congestions would have no effect, but the large majority of roads which accrue their revenue on a "received" basis, that is to say, those which credit their revenue or income account when the freight arrives at destination and the transportation service is complete and the contract fulfilled, would suffer a very large loss of revenue under the provisions of General Order No. 17. Of course, the losses to the corporations would be minimized if the congestion at the close of federal control should be as great as at the beginning of federal control,—a condition which is scarcely possible because at the close of federal control, under peace conditions, there will not be the enormous volume of traffic and priority orders that caused the congestion and delay which existed at the beginning of federal control. However, as to lap-overs, that order was framed on an unsound accounting basis, and provided a hit-or-miss division of the freight revenue between prior or corporation account, and the accounts of the federal Administration. This condition was later modified by the contract, see Section 4, paragraph (b), and by accounting circular No. 53 of December 2, 1918.

The accounting circular No. 53 is still on a hit-or-miss basis, although it does provide for an adjustment of certain delayed carload shipments on which the service was completed prior to federal control but the accounting delayed until during federal control. However, accounting circular No. 53 does not take care of the large number of shipments,—carload and less than carload,—that were delayed in transit on which the service had not been completed at December 31, 1917. Take for example a carload shipment moving from Chicago to Baltimore, which reached Pittsburgh in December, 1917, and lay there until, say January 10, 1918, when it moved out to destination, the settlement being made on the "received" basis. The lines west of Pittsburgh included in their operating expenses, the cost of transporting that shipment from Chicago to Pittsburgh, but never have, and according to the present attitude of the Railroad Administration, never will receive a dollar for such transportation. An offset will result at the end of federal control if a similar car is en route from Chicago to Baltimore, reaches Pitsburgh just prior to the end of federal control and lays there until after the end of federal control, and then moves to destination after federal control, the revenue being taken into the accounts of the corporation after federal control. If a sufficient number of such cars move just prior to the end of federal control, to produce the same lap-over revenue as that produced by delayed cars which moved just prior to the beginning of federal control, there would be an offset, but considering the congestion that existed at the time the railroads were taken over, and that probably there will be no congestion at the end of federal control, it is inconceivable that there will be anything like the number of such cars en route at the end of federal control as at the beginning of federal control. It has been urged that to make a separation of the accounts between the carriers, would require additional clerical expense, and of course, it is true that to prepare an account accurately requires more clerical work than to guess at it. It is my judgment that the railroads as a whole will lose millions of dollars because of the failure to separate the freight revenues at the beginning and at the end of federal control on the basis of the service performed; that is to say, take the case of the shipment Chicago to Baltimore, hereinbefore referred to; the revenue from Chicago to Pittsburgh should have been credited to the corporation because the expense of that haul was charged to the corporation, and only the revenue from Pittsburgh to Baltimore should have been credited to the federal Administration because the Administration paid the expense of that haul. The increase of 25 per cent in freight rates would require that 80 per cent of the freight that was delayed en route at December 31, 1917, should be delayed en route at the end of federal control; that is to say, where there were 100,000 lap-over cars from certain points to certain points delayed in transit at certain points at December 31, 1917, there should be 80,000 lap-over cars from the same points to the same points, delayed in transit at the same points, at the end of federal control in order to give the corporation an erroneous credit which would offset the erroneous credit given the Railroad Administration at the beginning of federal control. If there should be less than 80 per cent of such cars delayed in transit at the end of federal control, the corporation loses revenue; if there should be more, it will gain revenue, but such methods are unbusinesslike and are not good accounting methods. I daresay that the accounting between the U. S. Railroad Administration and the War department, Navy department, or any other department of the same government, is not conducted on a basis as loose as that.

Of course, as to the less than carload shipments, the average haul is shorter, the amount of money involved is smaller, and the expense of separation is greater. The majority of the less than carload shipments of freight are handled on the "received" basis, while the passenger business is handled on the "forwarded" basis. The less than carload business might be ignored and any loss to the corporation thereon be considered as an offset against the gain in the passenger business. In those two cases, the amount of revenue involved would be comparatively small, and although it is unbusinesslike not to make any attempt at a separation on the basis of service performed, yet accountants must be practical, and where the expense is liable to be more than the amount involved in a separation of accounts between the railroad and the government during the time of war, there would be no serious objection to waiving the strict accounting practices in such cases. However, the expense of apportioning the revenue on carload shipments substantially in accordance with the service performed, would not be seriously burdensome and where millions of dollars are involved, good accounting and businesslike methods should not be sacrificed.

Another question regarding these lap-overs relates to the proper accounts to be charged and credited by the corporation after the amounts have been determined. A bulletin was put out by the Committee on General Accounts of this association, stating that Alexander Wylie, chief examiner of accounts, of the Interstate Commerce Commission, had ruled that these lap-over expenses and lap-over revenues should be charged and credited to the income accounts of the carriers, while a large number of railroad accounting officers maintain that they should be charged and credited to the profit and loss accounts of the carriers. The theory on which the instructions to charge and credit the income account is that *if* the corporation had been operating the properties, these items would have been taken into the income account under the head of operating expenses, operating revenues, etc. In other words, the decision is based on an "if" statement, but the "if" goes the wrong way. The corporations are not operating their properties and have not operating expenses, operating revenues, etc., in which to include those items. Furthermore, the corporation's income account is based on the average net railway operating income for the test period, which theoretically is complete and represents the

complete income for those three years including the lap-overs from the beginning of the period and excluding the lap-overs at the end of the period. An average of three complete years makes the complete income account so far as the operating accounts included in the standard return are concerned. Hence, any lap-overs added to the income account or deducted therefrom, cause a mis-statement of the income of the corporation.

Another reason for requiring such items to be debited and credited to the income account of the corporation, was to offset the corresponding debit or credit to the income account of the Administration, so that when the two accounts were put together, these lap-over debits to expenses and credits to revenues would disappear in the consolidated account, offsetting each other. However, I have learned recently that it is the intention of the Administration, and I want to express my commendation of their proposed practice, not to charge and credit these items to the Administration income account, but to set up reserve accounts which will take care of similar items that will be charged and credited to the Administration after federal control. It is evident, of course, that at the end of federal control there will be lap-overs in expenses which must be charged back to the federal Administration, and lap-overs in revenues which must be credited back to the Administration. If these items are put into the income account of the Administration currently, it will be necessary for the lap-overs to be put into the income account of the Administration a long time after the close of federal control, which might prove very embarrassing to the Administration because they will run into millions of dollars. It seems to me to be very wise, good business and sound accounting for the Administration to charge and credit these lap-over items to a reserve account against which they will charge and credit similar items after the end of federal control.

Corporate Transactions

Certain debits and credits are made to the corporations by the United States Railroad Administration under the head of "Corporate Transactions." These debits and credits represent payments or receipts by the federal officers which are chargeable or creditable to accounts outside of these comprised in the standard return. Such debits and credits should be carefully examined by the accounting officers to determine whether or not they are properly chargeable or creditable to the corporations, and the principle to govern is whether or not the item is properly chargeable or creditable to an account which is not embraced in the standard return.

Verification of Accounts

One of the principal duties in connection with corporate accounting is to check the debits and credits made against the corporation by the U. S. Railroad Administration, to determine the accuracy of the lap-overs, the charges for additions and betterments, the charges against corporate transactions, and in fact, all debits and credits made against or in favor of the corporation, in order to see that the corporation's revenues and income are properly protected so far as its accounts with the Administration are concerned. Of course, this does not mean that the corporate accounting officer is to neglect in any way whatever his usual functions with regard to strictly corporate transactions which are not handled by the Administration, but this section of the paper is to lay emphasis on the necessity of checking the accounts with the federal administration. Not only should the items which are charged and credited to the corporation be thoroughly audited and their accuracy completely determined, but the accounts of the federal books should be examined with a view of determining whether or not omissions have occurred, which would affect the accounts with the U. S. Railroad Administration.

As to the lap-over items, the principal work will be in the freight and passenger departments, and that work diminishes as time goes on, because naturally there would be more lap-overs in January, 1918, than in any subsequent month, and so on until the present time, the lap-over items are very small. However, as most of the railroad corporations did not get their corporate accounting departments on a working basis until the latter part of 1918, it is probable that the work of checking the lap-over debits and credits and the accounts to determine whether omissions have occurred, has not been completed to date by very many carriers. For this purpose, first-class accountants should be employees. Any lack of ability on the part of the accountants checking the accounts with the government may result in heavy losses in revenues to the corporation. It is much better to defer the work to some later day than to employ inferior accountants for that kind of work.

Co-operation of Corporate and Federal Accounting Officers

Throughout this paper, reference has been made to the protection of the revenues of the corporation. This has been done for the reason that the subject assigned to me was "Corporate Accounting during Federal control." The accounts between the U. S. Railroad Administration and the corporations involve hundreds of millions of dollars resulting from transactions which must be recorded on the federal books. Hence, the federal accounting officer is interested in protecting the revenues of the corporations to the extent of seeing that all his accounts with the corporation are recorded with the greatest degree of accuracy. From my personal knowledge of the honesty and fair dealing of the railroad accounting officers of the United States, both federal and corporate, I know that during federal control the federal accounting officers have been diligent and faithful in their efforts to record all transactions with the corporations, with the greatest degree of accuracy and thus to render substantial assistance in protecting the revenues of the corporation. If any federal accounting officer has intentionally deprived the corporation of revenues to which he believed it was justly entitled, whether through erroneous debits or through omission of proper credits, then such accounting officer is unworthy of his profession and is unworthy of membership in this great association, but I will not believe that such an one exists.

Director of Accounts—U. S. Railroad Administration

While in this paper I have criticised a few of the accounting provisions of the Administration, it is not intended to create the impression that I think the Administration has a weak accounting department. On the contrary, I think it has a strong accounting department, administered in its details by men of recognized accounting ability. It would be a miracle if all of the accounting provisions of the Administration were beyond criticism. I also want to pay a tribute to Director C. A. Prouty at the head of the Division of Accounts of the U. S. Railroad Administration, in his administration of that department. The magnitude of his duties prevents him from giving attention to details, but the policy of his administration has been broad and fair-minded.

Conclusion

Many other things could be said with reference to corporate accounting during federal control; this paper has attempted to touch simply a few of the high spots as they appeared to the writer. It would be an insult to the intelligence of the many experienced accounting officers if I should attempt to go into the details and try to touch upon every phase of this subject during federal control. If my paper has resulted in suggesting chains of thought which may be of benefit to the corporations and to the U. S. Railroad Administration, the effort has been amply repaid.

Doings of the United States Railroad Administration

With a Reduced Appropriation the Administration Is Making Every Effort to Hold Down Expenses and Increase Traffic

WASHINGTON, D. C.

DIRECTOR GENERAL HINES returned to his office on Monday after a speaking and inspection trip to Boston, Denver, Chicago, Omaha, St. Louis and Birmingham. He will also speak before the Philadelphia Chamber of Commerce on Friday and before the New England Bankers' Association at Boston on Saturday. Mr. Hines has stated that he is exceedingly anxious to come into contact with the people of the country as far as it is in his power to do so and to get them to understand the policies which he and his associates are trying to carry out in the Railroad Administration, as well as to seek every practical opportunity to get the point of view of the people as to what the Railroad Administration should do. He is also presenting his views and suggestions as to a permanent solution of the railroad problem and in his speeches takes occasion to explain why he is not yet prepared to decide on a rate increase. In one recent address he said he had had the rather unique experience of having various shippers come to him urging that rates ought to be increased. This he attributed to the fact that "there has been such a striking object lesson that railroad prices have increased to a much greater proportion than the rates have been increased, and therefore that the railroad operations are not likely to be self-sustaining in business with no increase in rates."

Appropriation Is Reduced

The principal effect of the reduction of the Railroad Administration appropriation from $1,200,000,000 to $750,000,000 apparently will be in the direction of making it necessary for the Railroad Administration to continue, although to a less extent, the policy forced upon it during the time it has been waiting for an appropriation, of postponing some of its disbursements as long as possible. The estimate of its requirements did not represent contingencies but amounts already expended, contracted for, or to which it stood committed and practically none of the items can be reduced. As soon as the money is made available it will be possible to pay off the certificates of indebtedness, of which $234,000,000 were outstanding on May 31, and to make additional deferred payments on rental and equipment which were not represented by certificates. Meanwhile its working capital will be somewhat increased and a considerable part of the payments on equipment will not become due until later, by which time it is hoped that they will be financed by an equipment trust, and also pressure will be brought to bear on the corporations to pay what they owe to the government for additions and betterments. The financial situation of the Railroad Administration will then depend largely on the amount of any additional operating deficits and on how fast the corporations are able to finance their indebtedness. The administration officers feel some relief because of the suggestion held out by the House committee that an additional appropriation may be had later and presumably it will follow familiar methods of adjusting its disbursements to its cash on hand until it becomes necessary to ask for more.

From June 2 to July 1, according to an estimate prepared some time ago, the requirements of the railroad companies amount to $190,850,271. Of this $113,000,000 was for corporate requirements, $51,000,000 for maturities, $23,000,000 for capital expenditures and $2,962,000 for equipment other than standard.

Contracts Executed

The Railroad Administration has executed a compensation contract with the Illinois Central providing for an annual payment of $16,540,717 and one with the Yazoo & Mississippi Valley for $3,862,317; also one with the Bennettsville & Cheraw for $29,077. Short line co-operative contracts have been executed with the Boyne City, Gaylord & Alpena; Virginia & Truckee; Tennessee, Alabama & Georgia; Wilmington, Brunswick & Southern and the Loranger, Louisiana & North Eastern.

The War Finance Corporation has made a loan to the Wabash of $68,000 and to the Seaboard Air Line of $110,000 on the security of certificates of indebtedness issued by the director general of railroads.

Improvement in Traffic Noted

In the Central Western Region there was an increase in the loading of grain, for the week ended June 9, amounting to 64 per cent over the same week of last year; live stock loadings increased 34 per cent in the same region. Grain loadings in the Northwestern region showed an increase of 100 per cent over last year, while grain products, livestock and miscellaneous freight also showed increases. Passenger travel is on the increase in nearly all the regions and indications are that it will continue to improve.

Reports from the Southwestern region continue to show increases, both in freight loadings and earnings, the increases amounting to 11.1 per cent for the past week. Both the local loading and the cars received from connections show increases. Cotton is moving more freely in this region and with promises of additional steamers for Gulf ports, an increased shipment is expected in an effort to reduce the large surplus on hand.

A summary follows:

Eastern Region.—Reports from nearly all sections still show the general movement of freight and coal traffic to be sub-normal. The blast furnace situation remains about the same, and while the ore movement on the lake is increasing, it is not up to last year's figures. Passenger traffic continues good, and the travel on Decoration Day was extremely heavy, some stations showing largest receipts in history of their companies.

Allegheny Region.—Heavy orders for refrigerator cars have been received through Chicago and Potomac Yards, and special attention is being given to the handling of this equipment. Some slight improvement is noted in the blast furnace situation in Pittsburgh district. The demand for box cars continues heavy, and we are just able to meet requirements.

Pocahontas Region.—Coal dumped at tidewater for the week showed an increase of 50 per cent over the preceding week, although still showing considerable decrease under last year's dumping.

Southern Region.—The cotton movement seems to be increasing throughout the region. The recent fall in prices handicapped planters to the extent that their activities were embarrassed and their purchasing power reduced to the minimum. The recent sharp advance in price, however, has enabled them to recoup their losses, dispose of much of their cotton which they have been holding, and consequently they are in better financial condition, and have again become an element of large purchasing power in the Southern region.

Northwestern Region.—Reports a gradual improvement in the general movement of traffic, particularly merchandise and eastbound tonnage. The loading for the week, how-

ever, showed a decrease of 8,468 cars, consisting principally of coal, coke, lumber and ore. There is a continued improvement in the Pacific Coast Lumber situation. The oil traffic from Wyoming fields continues to show an abnormal increase and the facilities for handling same were taxed to the utmost. The movement of ore for the week shows a decrease of about 15 per cent under corresponding week of last year, but the output of the independent companies is improving and the indications are that the production of ore will be normal in a short time. The movement of freight eastbound is about the same as last year, but the westbound movement is lighter, due chiefly to absence of shipbuilding material and munitions, which moved in large quantities last year, also lighter exports through Puget Sound ports. Passenger business continues to show an increase over last year, particularly pleasure travel. The recent warm weather has greatly stimulated resort and vacation travel, and many requests are being received for reservations.

Central Western Region.—During the week 93,914 cars of all freight were loaded in this region, which was 4 per cent less than the same week of last year. Passenger travel in general continues to be heavier than last year, particularly to Colorado and locally within the state, on account of the inauguration of summary tourist rates. There is also an especially heavy movement at the present time between Kansas City and the new Texas oil fields. Notwithstanding the heavy outbound travel from Southern California, it is reported that the number of people there seems as great as ever, and that hotels and apartment houses are still crowded and unable to accommodate all applicants. Indications are that as soon as means of transportation are available, a large number of foreigners will leave Southern California for their native countries.

Southwestern Region.—Crops in general are in need of warm weather and sunshine, as the rainfall throughout the Southwestern region, especially during the last two weeks of May, caused considerable damage to cotton, wheat, corn and alfalfa hay. Regular passenger travel, both local and through, continues above normal with adequate equipment provided to handle same. The movement of farm hands to harvest fields during the present month will be an item of considerable importance.

Railroad Administration Paying Little Extra Compensation

Up to June 1 claims for extra compensation had been allowed amounting to $3,709,887 and an estimate of $1,500,000 has been used, in figuring the total standard return at $940,000,000, as a reserve to take care of additions to compensation which may yet be allowed, although the claims pending amounted to $26,285,000. The total claims filed amounted to about $69,000,000. The federal control law of March 21, 1918, provides in section 1 that "If the President shall find that the condition of any carrier was during all or a substantial portion of the period of three years ended June 30, 1917, because of non-operation, receivership, or where recent expenditures for additions or improvements or equipment were not fully reflected in the operating railway income of said three years or a substantial portion thereof, or because of any undeveloped or abnormal conditions, so exceptional as to make the basis of earning hereinabove provided for plainly inequitable as a fair measure of just compensation, then the President may make with the carrier such agreement for such amount as just compensation as under the circumstances of the particular case he shall find just."

It is also provided that claims not adjusted may be submitted to boards of referees appointed by the Interstate Commerce Commission. Following is a statement of the disposition of the various claims for extra compensation up to June 1:

STATEMENT SHOWING NAMES OF RAILROAD COMPANIES WHICH HAVE FILED CLAIMS FOR COMPENSATION IN ADDITION TO STANDARD RETURN AND DISPOSITION THEREOF

Recapitulation of claims allowed to June 1, 1919, in excess of standard return:

Baltimore & Ohio	*$2,136,932.00
Chicago, Milwaukee & St. Paul	440,082.39
Carolina, Clinchfield & Ohio	173,798.41
Northwestern Pacific	172,479.50
Missouri & North Arkansas	161,230.00
Kansas City, Mexico & Orient	140,926.61

*Baltimore & Ohio allowance includes $1,724,800 allowed for Toledo & Cincinnati Division, which had no separate standard return, for the reason that during the test period it formed a part of the lines of the Cincinnati, Hamilton & Dayton and made no separate report to the Interstate Commerce Commission.

Georgia & Florida R. R. (including Augusta Southern)	116,000.00
Western Pacific	86,229.76
St. Louis Southwestern	67,303.78
Cumberland & Pennsylvania	19,885.50
New York, Susquehanna & Western	19,807.00
Wrightsville & Tennille	16,531.21
Salina Northern	15,000.00
Van Buren Bridge Co.	11,126.47
Louisville & Wadley	2,819.57
Trinity & Brazos Valley (lump sum)	100,000.00
Gulf, Texas & Western (lump sum)	29,734.80
Total	$3,709,887.09

Claims denied to June 1, 1919:

New York Central	$5,339,941.20
Chicago, Rock Island & Pacific	5,193,045.34
St. Louis-San Francisco	4,971,520.70
Missouri Pacific	4,383,736.12
Wabash	2,731,368.00
New York, New Haven & Hartford	2,000,000.00
Great Northern	1,426,320.00
Erie Railroad	1,397,577.91
Minneapolis & St. Louis	1,073,680.75
Lehigh Valley	900,273.98
Boston & Maine	809,624.34
St. Louis Terminal Association Lines	696,593.66
Delaware & Hudson	693,861.87
Evansville & Indianapolis	622,504.69
Union Pacific	595,079.00
Cincinnati, Indianapolis & Western	529,699.00
Illinois Central	524,736.84
Detroit, Toledo & Ironton	512,791.00
Norfolk Southern	476,595.43
Chicago, Indianapolis & Louisville	470,808.12
Northern Pacific	437,579.28
Chicago, Terre Haute & Southeastern	392,856.95
Louisville & Nashville	341,776.40
Norfolk & Western	189,700.09
Pullman Co.	160,000.00
New Orleans Great Northern	155,192.21
Philadelphia & Reading	128,059.50
Gulf & Ship Island	124,908.00
Waterloo, Cedar Falls & Northern	123,410.94
Louisiana & Arkansas	120,695.30
Toledo, Peoria & Western	120,260.23
Ann Arbor	109,721.01
Bangor & Aroostook	107,170.24
Hudson & Manhattan	89,224.00
Minneapolis, St. Paul & Sault Ste. Marie	86,084.99
Port Townsend & Puget Sound	74,863.06
Ulster & Delaware	71,722.32
Lehigh & New England	57,520.45
Kansas City Southern	57,447.11
Toledo Terminal	47,000.57
Port Reading	42,288.86
Galveston Wharf Co.	32,479.41
Detroit, Bay City & Western	18,000.00
Wildwood & Delaware Bay	15,562.75
Galveston, Houston & Henderson	9,458.00
Catasauqua & Fogelsville	8,107.52
Piedmont & Northern	2,605.23
Atlantic City Railroad	642.81
Total	$38,474,095.21

Claims withdrawn to June 1, 1919:

Chicago Great Western	$171,513.49
Elgin, Joliet & Eastern	115,756.01
Nashville, Chattanooga & St. Louis	78,230.47
Farmers Grain & Shipping Co.	53,647.33
Atlantic Coast Line	44,361.84
Ocean Steamship Co.	43,818.97
Central of Georgia	39,468.09
Total	$546,796.10

Claims pending June 1, 1919:†

†Amount not stated in claims of Toledo, St. Louis & Western, Gulf, Mobile & Northern, Lake Superior & Ishpeming Ry. Co., Old Dominion Steamship Co., Old Dominion Terminal Co., and Virginia Navigation Co.

Missouri, Kansas & Texas System (3 claims)	$5,559,539.61
Southern	4,771,398.97
Wheeling & Lake Erie	2,828,314.63
New York, Chicago & St. Louis	2,732,941.09
Seaboard Air Line	2,538,726.00
Western Maryland	1,883,478.94
Gulf Coast Lines	1,487,722.75
New York Connecting	1,469,758.80
Chicago & Alton	926,685.08
Florida East Coast	672,804.71
Chicago & Eastern Illinois	414,159.12
Missouri, Oklahoma & Gulf (approximate)	211,480.00
Fort Dodge, Des Moines & Southern	154,164.39
Atlanta, Birmingham & Atlantic	134,823.16
International & Great Northern	129,259.18

Houston & Brazos Valley	102,733.00
Pittsburgh & Shawmut	157,302.81
Escanaba & Lake Superior	46,311.99
Pacific Coast	35,222.28
Vicksburg, Shreveport & Pacific	28,780.00
Total	$26,285,606.51
Claims denied and now pending before the Interstate Commerce Commission board of referees:	
Boston, New York & Cape Cod Canal	$495,644.04
San Antonio, Uvalde & Gulf	216,054.32
Midland Valley	87,145.13
Total	$798,843.49

Director General Appeals for Efficiency and Economy

Walker D. Hines, director general of railroads, has sent the following letter to all officers and employees of railroads under federal control:

"The increased payroll cost, due to improved wages and working conditions, and the increased cost of material and supplies, are now resulting, in connection with the falling off in business, in the United States Railroad Administration incurring heavy deficits in railroad operations.

"For the first four months of this year, these deficits, after deducting the rental due the railroad company, were about $250,000,000 or at the rate of $62,500,000 per month. This critical condition makes it imperative not only that costs shall not increase but also that every effort be made to help the government through every reasonable effort to economize and realize greater efficiency.

"These deficits, so far as they cannot be eliminated through greater economies and through increased business, will eventually have to be offset by increased transportation rates which all should endeavor to avoid.

" I ask every officer and every employee to redouble his efforts to do efficient work, to economize in the use of railroad materials, fuel and other supplies, and to use great care not to injure equipment, tools, office furniture or injure property being transported by the railroad and for which payment must be made if injury occurs, and further than this, to try to encourage others to do the same. Please remember that if you should fail in any of these respects to do what you reasonably could and ought to do you would impose unnecessary cost upon the government. This is true because it is the government which has to bear the loss if there is one or which will receive the profit if any is earned.

"Do not wait for the other fellow to begin this improvement, but begin yourself. Do not decline to help because some other fellow is not helping; turn in and help, and keep on setting the other fellow a good example. You are interested in the great movement for the improvement of the condition of the individual worker. You can aid in that great movement, through efficiency and saving in reducing the cost of railroad operation, because thereby you help to keep down transportation rates, and thereby you help to keep down the cost of living. An increase in rates will give occasion for an increase in prices of what the public consumes and that will mean a new cycle of increasing still further the cost of living. It is to the interest of every man, woman and child in this country that this shall be avoided just as far as possible.

"The government, during federal operation of the railroads, as a result of its nation-wide control, has been able to do much to promote justice to railroad employees through making proper increases in their wages and proper improvement in their working conditions. In the nature of things the result cannot be equally satisfactory to all, involving 2,000,000 employees, because it is not possible in this vast undertaking to satisfy equally every one or even every class of these employees. If any employee feels he has a ground for such dissatisfaction he ought to remember the remarkable strides that have been taken by the government in the last 12 months in the recognition of the just rights of railroad employees, and compare the situation today with what it was in December, 1917, before federal control began. It has been a source of satisfaction to me to aid in this great work. Will you not, in turn, do justice to the government and help sustain my work, as director general, and also justify what has been done for you, by doing all that you can reasonably do to save the government money and to increase the efficiency of your work?

"I sincerely want your assistance in demonstrating that the railroads may be operated successfully even though the wages of its employees have been materially increased."

Report on Fort Washington Collision

The Interstate Commerce Commission has issued a report, dated April 10, signed W. P. Borland, chief of the Bureau of Safety, on the rear collision on the Philadelphia & Reading near Fort Washington, Pa., January 13, 1919, which resulted in the death of 14 persons and in the injury of 22.

This collision was reported in the *Railway Age* of January 17, page 212, the accident having happened in the same week with that at South Byron, N. Y.; also in the monthly record printed in the *Railway Age* of February 28, page 510.

While the principal cause was the failure of the engineman of train 319 to observe the adverse indication of a distant automatic block signal, the report brings out other elements. The signals are enclosed disks, and the distant signal is not controlled by the position of the home signal; it is controlled directly by the track circuits of the two block sections in advance. The engine had two cabs, the engineman's cab being located ahead of the firebox and about the center of the locomotive. The colliding train, No. 319, was running at moderate speed, but the engine, weighing 98 tons, penetrated the wooden passenger car at the rear of the standing train about 45 feet. None of the cars in either train were derailed.

A test of the brakes on train 319 developed that the engine had no brakes on the engine truck, and that the piston travel on the tender was too great, so that the brake apparatus of the engine and tender, as a whole, was weak.

The flagman went back only about 1,500 ft. and there stood from 3 to 5 minutes before the approach of the following train; by going a short distance farther he would have made his signal visible beyond the abutment of an overhead bridge.

The report recounts very careful inspection of the signal apparatus, leading to the conclusion that the possibility of any abnormal condition existing in the distant signal, which would be necessary to justify the engineman's claim that he saw a clear signal, is exceedingly remote. The engineman declared that about six weeks prior to this collision he had found this distant signal clear when the next succeeding home signal was at stop; but from testimony of the signal maintainer it appears that the distant signal, in indicating clear, was in proper position, and that the wrong position of the home signal was due to local circuit trouble in the clearing relay. Though the home signal indicated stop, the section was in fact clear.

The engineman at fault is 39 years old; was employed as fireman in 1907 and promoted to engineman in 1913. In February, 1918, on account of unsatisfactory service he was put back to firing; and was restored to the position of engineman twelve days later. Since then two other adverse items appear on his discipline record. The flagman is 35 years old, and had been in the service 13 years; was a freight train conductor for one year.

Fifty miles in 26 minutes, 23.2 seconds is the latest speed record reported in an automobile race. This record was made at Sheepshead Bay, New York City, on June 14, by Ralph De Palma. It is equal to **113.7 miles an hour.**

Convention of the Telegraph Superintendents

Mailgram Service, Wire Crossings and Pole Line Construction Among Important Subjects Considered

The Telegraph and Telephone division of "Section 1—Operating," of the American Railroad Association, held its first annual meeting at the La Salle Hotel, Chicago, June 11, 12 and 13. This division of the A. R. A. was formerly the Association of Railway Telegraph Superintendents and this was the thirty-seventh meeting of the former association. M. H. Clapp, manager of the Telegraph section of the United States Railroad Administration and chairman of the division, presided, and the total registration was about 180. The chairman said that although the reorganization was intended to be only for the duration of the Railroad Administration he felt that it was for the best interests of the members that the amalgamation be permanent. He said that reports presented were to be divided into two groups consisting of those ready for final adoption and those of a preliminary nature. He made a plea for co-operation in and between different departments, railroad companies and commercial companies.

R. H. Aishton, regional director the Northwestern region, United States Railroad Administration, made a short address Thursday morning. He referred to the wonderful progress that had been made by the association in the past. In 1908 the only telephone circuit for train despatching in use was one 45 miles long on the Chicago, Burlington & Quincy, while at the present time there are 13,440 miles of such circuits. He was a great believer in association work and favored amalgamation with the American Railroad Association; the railroads will of necessity have to look to somebody to keep them from being foolish after their return to private operation. No railroad would be foolish enough to go against recommendations of such a body as the American Railroad Association. What is accomplished by the association will in the course of the next four or five years come very close to being railroad law. If the roads go back to private operation at the end of the year it will be under changed and better conditions and greater progress will be made during the next few years than ever before.

A banquet was given for the members of the association on Thursday evening at the La Salle Hotel under the auspices of the Railroad Telegraph and Telephone Appliance Association. The speakers were E. E. Nash (C. & N. W.); C. Selden (B. & O.); G. A. Cellar (Pennsylvania Lines West), and H. Hulatt (Grand Trunk).

Committee Reports

Sub-Committee A.—Maintenance and Construction of Pole Lines of committee No. 1—Construction and Maintenance, Outside Plant, presented a preliminary draft of pole line specifications including 15 of the proposed 16 sections but in general without the official drawings and without certain appendices yet to be decided upon. A plan for pole line specifications involving complete independence of any other organization or company was presented at the meeting held in Chicago last December. It was decided, however, to develop through joint action if possible uniform specifications satisfactory to both railroad and telegraph interests and this report was made upon this basis. The specifications provide for three grades of line according to the character of circuits carried, viz., special trunk lines, trunk lines, and non-trunk lines. Trunk lines are described as all pole lines carrying trunk and other important circuits; special trunk lines are defined as special pole lines connecting important centers. Non-trunk lines are all other pole lines. The specifications also divide the country into four pole-line districts determined by the severity of the climatic conditions which are designated as extra heavy, heavy, medium and light, respectively. The various grades of the lines to be built under these specifications are to be fitted to climatic conditions. The committee asked approval of the plans submitted and for further instructions.

E. C. Keenan, general superintendent telegraph, New York Central, pointed out the advisability of the committee establishing a set of specifications based on engineering principles and offered an amendment to the original motion to the effect that the committee should continue along lines consistent with principles heretofore adopted by the Association of Railway Telegraph Superintendents. He proposed changes in certain tables.

William Bennett (C. & N. W.) felt that it was unnecessary for the committee to follow engineering principles in pole line construction as strictly as for other items of railroad construction; railroads could operate temporarily notwithstanding failure of pole lines.

E. A. Chenery, general superintendent telegraph Southwestern region, United States Railroad Administration, stated that under the present specification a mile of 41 Class B 22-ft. chestnut poles carrying 40 wires would cost $1,355 which is considered a pretty good pole line, compared to practice 10 or 20 years ago when 30 to 35 poles per mile was common practice. Comparing these figures with the proposed specifications for pole lines in extra heavy districts, the cost would be $1,327 to $2,419, the lower figure being for non-trunk lines. A mile of pole line in extra heavy districts would cost from $1,951 to $2,419 or from 41 to 80 per cent more than the same line built under present specifications. Every railroad has some mileage so unimportant that a 50 per cent increase in the cost of construction is not justified. The report was accepted by the association as a progress report.

Wire Crossings

The report of sub-committee B,—Wire Crossings, Committee No. 1 Construction and Maintenance, Outside Plant, contained recommendations covering wire lines crossing over railways. Dr. M. G. Lloyd of the Bureau of Standards requested the association to criticise the Bureau of Standards' proposed revision covering such crossings. This revision was considered at committee meetings and the subcommittee conferred with Edwin B. Katte, representing the Committee on Electric Working of the A. R. A. and the Committee on Electricity of the American Railway Engineering Association, who concurred in the recommendations of the sub-committee as presented here. In the proposed revision the Bureau of Standards wished to have the rules governing signal line crossings over railways based upon engineering principles with proper assumed loading so as to be consistent with other sections of the Safety Code. While the proposed revision as shown by the first draft is generally based upon scientific principles it contains some articles which in the opinion of the committee were not consistent with good railroad engineering practice and changes were proposed. After the Bureau of Standards finally issues its revision it is the purpose of the sub-committee to get up detailed specifications for wire crossings over railroads as well as parallels or conflicts between signel lines and power lines. The association instructed the committee to proceed

along the lines on which it was working with the understanding that it follow the engineering practice of the Bureau of Standards.

Underground Construction and Transpositions

Sub Committee C,—Underground Construction, Committee No. 1, Construction and maintenance, Outside Plant, reported on a revision of the draft of the specifications which appeared in the proceedings of the meeting held in Chicago last December. The specifications presented at this meeting prescribed the general requirements for underground conduit construction for telegraph, telephone and other low voltage signal cables on railroad right-of-way. The specifications covered conduit construction, general specifications, high and low tension ducts in the same trench, location and clearances, manholes and handholes, and material. The report was adopted as recommended practice.

Sub-Committee D. Transportations, Committee No. 1, Construction and Maintenance, Outside Plant, submitted complete specifications for locating and installing transpositions in telephone circuits. The specifications were accompanied by numerous transposition diagrams for standard auxiliary and unit sections showing non-phantom, horizontal phantom and vertical phantom transpositions. The specifications cover the creating of both physical and phantom telephone circuits and provide a method for transposing these circuits so as to reduce inductive disturbances from neighboring circuits. These specifications follow those of the American Telephone & Telegraph Company and the Western Union Telegraph Company. It is the intention of the sub-committee during the coming year to prepare specifications for the line materials which are referred to in these specifications.

The question was asked whether the telegraph wires should be placed above or below telephone circuits and as to where the ticker circuits and signal circuits should be placed on the pole line. In answer the chairman of the sub-committee said there was no preferred position as regards the telegraph and telephone circuit but that the ticker circuit should be on an end pin on the top cross arm in order to be as far removed from inductive disturbances as possible. When signal circuits were carried on the same pole line with the telephone and telegraph circuits the signal circuits should be on the lower cross arm.

Report on Office Wiring and Equipment

Committee No. 2, Construction and Maintenance, Inside Plant, submitted a preliminary draft of specifications for the installation of telegraph and telephone equipment in railroad offices. The report was accepted as a progress report.

Reports on Electrolysis and Lighting Protection

Committee No. 3—Protection Against Electrolysis, presented a report which consisted of a general discussion of electrolysis as affecting telegraph and telephone conductor cables, its nature, causes and remedies with descriptions of instruments for making electrolytic tests and instructions concerning the use of such instruments. Certain specific maintenance instructions were also given. The report was accepted as recommended practice.

Committee No. 4 submitted a report on Protection Against Lightning and Against Electric Light and Power Circuits in the form of a preliminary draft of specifications for such protection. The committee felt that it was necessary to differentiate between wires owned by railroad companies and those not owned. During the discussion some members felt that the railroad companies should specify the protection to be used on all lines entering railroad company buildings irrespective of whether they were owned by the company or not. Others felt that specifications should not be carried that far as the larger telegraph and telephone companies have their own specifications which may be presumed to be safe. Some felt that hazard to life had been given secondary consideration and property hazard first. The report was accepted as showing work accomplished to date.

Committee No. 5—Telegraph and Telephone Development, presented a report upon a number of recent improvements which was accepted as information.

Messages and Mailgrams

Committee No. 6—Message Traffic, reported in part as follows: "Assuming that many communications have been offered for transmission by wire which would have served their purpose equally well if handled by mail, we are confronted with the proposition of establishing a dividing line between message traffic and mail traffic."

The committee recommended that the railroads generally be asked to instruct all persons originating telegrams and correspondence to offer for transmission by wire only communications which require attention prior to the time such attention would be given if forwarded by mail or where the transmission by wire will mean a considerable money saving. A mailgram service could be established to advantage on practically all railroads. "Mailgrams" should be placed in a pouch in the telegraph office and, immediately before the departure of train, a special messenger should be sent to the train with the pouch, delivering it to the train baggageman. At destination a telegraph office messenger meets the train and takes the pouch to the telegraph office, from which point the messages are delivered the same as telegrams. On some railroads special forms of envelopes, or envelopes specially stamped, are kept open in the telegraph office until immediately before the departure of a train on which such telegrams can be carried as mail.

The rest of the report discussed censoring, filing time, adequate address, use of symbols and codes. These items were referred back to the committee for further consideration.

Regulations Governing Telegraph and Telephone Division

The regulations as drawn up by the Committee of Direction for the Telegraph and Telephone division Section 1, Operating, were presented to the meeting and they were adopted. The regulations provide:

1. Representatives of members shall be those actively connected in official or supervisory capacities with railroad telegraph or telephone service, who have general charge of such service over an entire railroad or grand division of a railroad consisting of two or more transportation divisions. A reasonable number of such other employees in supervisory capacities as may, from time to time be presented by the railroads for reasons special to themselves, or as may be called by the Telegraph and Telephone division for special duties may be designated as temporary representatives of members.

2. The Committee of Direction consists of eleven representatives of members within the division, including the chairman and the first and second vice-chairman of the division, the two past chairmen of the division last holding office, and six representatives of members; and a committee on Nominations of five members to be elected annually by the division.

The Committee of Direction shall conduct the business of the division and fix the number of and appoint the members of committees. For the present there shall be the following:

Committee No. 1—Construction and Maintenance—Outside Plant.
Committee No. 2—Construction and Maintenance—Inside Plant.
Committee No. 3—Protection Against Electrolysis.
Committee No. 4—Protection Against Lightning or Electric Light and Power Circuits.
Committee No. 5—Telegraph and Telephone Development.
Committee No. 6—Message Traffic.
Committee No. 7—Editing.

3. Regular meetings of the Committee of Direction shall

be held quarterly, and regular meetings of the division in March and September. The September meeting shall be the annual session. Special meetings may be held at the call of the Committee of Direction.

4. The Committee of Direction shall offer the names of ten representatives of members, not officers of the division, as candidates for the committee on nominations.

5. Defines duties of the Committee on Nominations.

6. Officers shall be elected at the annual meeting. The chairman, the first and second vice-chairman and members of the Committee of Direction and the Committee on Nominations shall be elected by printed ballot each year, the candidates receiving the majority of the votes cast shall be declared elected and shall hold office for one year or until their successors shall be elected.

7. The right to hold office, vote and attend executive sessions shall be vested in representatives of members only.

Election of Officers

Martin H. Clapp, manager Telegraph section United States Railroad Administration, was elected chairman; J. F. Caskey, superintendent telegraphs, Lehigh Valley, first vice-chairman; H. Hulatt, manager of telegraphs, Grand Trunk Railway System, second vice-chairman. The secretary of the telegraph section is J. E. Fairbanks, 75 Church street, New York. The members elected on the Committee of Direction were: G. A. Cellar, superintendent telegraph, Pennsylvania Lines West; E. A. Chenery, general superintendent telegraph on Southwestern region, United States Railroad Administration; W. H. Hall, superintendent of telegraph, Missouri, Kansas & Texas Lines of Texas; C. S. Rhoads, superintendent telegraph, Cleveland, Cincinnati, Chicago & St. Louis; L. S. Wells, superintendent of telegraph and electricity, Long Island Railroad, and F. T. Wilber, superintendent of telegraph, Illinois Central. In addition E. C. Keenan, general superintendent of telegraph and telephone, Eastern region, United States Railroad Administration, and William Bennett, superintendent of telegraph, Chicago & Northwestern.

The Appliance Association Elects Officers

The Railway Telegraph and Telephone Appliance Association at its annual meeting at Chicago on June 12, re-elected the following officers: A. D. Walters, New York Telephone Company, New York, chairman; G. A. Graber, Kerite Insulated Wire & Cable Company, Chicago, vice-chairman; G. A. Nelson, Waterbury Battery Company, New York, secretary-treasurer. The executive committee of the association also remains unchanged.

Orders of Regional Directors

FREIGHT CAR DISTRIBUTION.—The regional director, Eastern Region, by a circular, dated June 12, issues revised instructions for sending freight cars towards home. System cars will be confined to local loading to the fullest extent practicable and will not be furnished for off-line loading if other suitable equipment is available. In filling orders for off-line loading, special effort should be made to furnish equipment for loading to or in the direction of: (a) the car owner; (b) the Regional territory in which car is home; (c) to an intermediate connection in the direction of car owner or Regional territory in which car is home; (d) locally in the direction of car owner or Regional territory in which car is home. In furnishing empty cars on Inter-Regional or Regional orders, care will be exercised to furnish to fullest extent possible cars owned by: (a) the receiving road or roads; (b) the receiving Regional territory in which car is home.

Superheaters.—A. T. Hardin, regional director, Eastern Region, by circular 500-1-97A728A promulgates for the information of federal managers the order of the director of the Division of Capital Expenditures relative to the application of superheaters to locomotives. The order says: "Consideration by the Mechanical Section of the Division of Operation develops that these superheaters will not pay for the cost of application, irrespective of the cost of the material, if the engine is not actually in service by October 1, 1919. It is of course expected that business judgment will be exercised in installing the superheater even after that date, but unless the corporations are willing to stand the operating charge as well as the capital charge for applying superheaters after October 1, 1919, the program should cease as of that date."

New Locomotives Moved Free.—The regional director, Eastern Region, by circular 500-1-106-A783, advises that no freight charges are to be assessed on any class of new locomotives moving from the works of the builders to the purchasing roads, whether under their own steam or dead in trains.

Label Holders for Express Cars.—The regional director, Eastern Region, by circular 500-104A784, recommends that all cars used in express service be fitted with two holders, one on each side, for the labels used by the express company. A standard label, six inches by nine inches has been adopted, and the circular shows a drawing of a metal holder suitable for this size label. It can be made of sheet metal or of cast iron. The holder should be near enough to the door to permit of being reached by a person standing inside, and with the center of the holder about six feet above the rail.

Per Diem Settlement.—Supplement 4 to Circular 78 of the Northwestern regional director amplifies instructions contained in Supplement 3 to Circular 78 (*Railway Age*, page 1202, May 16) regarding per diem settlements with non-federal controlled roads. A similar order has also been issued by the Southwestern regional director.

Shipments of Nut and Bean Oil.—Order 212 of the Southwestern regional director states that shipments of nut and bean oils are being made in barrels and other wooden containers which are not of sufficient strength to prevent leakage and instructs all concerned to apply rules making it permissible to decline freight unless shipped in containers of sufficient strength to afford reasonable protection.

Movement of Oil and Tank Cars.—Order 211 of the Southwestern regional director amends Circular 72 issued on April 9, 1918, by Regional Director R. H. Aishton to all western railroads in that roads in the Southwestern Region may symbol, report and handle as trainload 20 or more cars of oil for one destination instead of the 25 cars stipulated as the minimum for the movement of oil in train lots in the original order. All trains may be filled out with other traffic when practicable and where it can be done without unreasonable delay. In any case where the engine rating is less than the tonnage of 20 cars of oil, then the full engine rating of oil tonnage will be considered a trainload of oil.

Routing Instructions for Eastbound Carload Freight.—Routing Circular 103A-Chicago, superseding Routing Circulars 101, 102, 103 and 104, issued by J. E. Weller, resident traffic assistant, Allegheny Region, Chicago, outlines routing instructions for eastbound carload freight including fresh meat, live-stock, perishables, grain, grain products and dead freight originating in Chicago districts and west, when destined to the Allegheny or neutral territory. These routing instructions are not to apply when in conflict with current embargoes.

Atlantic City Convention.—Hale Holden, regional director of the Central Western Region, in a letter dated June 6, to federal and general managers of Central Western railroads, issues similar instructions to those contained in Circu-

lar 131-75A731A of the Eastern regional director (*Railway Age,* June 13, page 1438).

Notifying Consignee of Arrival of Freight.—Supplement 1 to Circular 74 of the Northwestern regional director states that freight waybills do not ordinarily show the street address of consignee and that notice of freight arrivals, where street address is not shown, should be given by sealed letters rather than by postal cards in cities where mail is delivered by carriers because of the fact that postal card notices which do not show street addresses are not delivered, whereas sealed letters without street addresses are delivered when the city directory shows the location of person addressed.

Forage Consigned to Army Camps.—The Northwestern regional director, file 73-1-83, amends orders issued in a circular dated February 14, (*Railway Age,* February 21, page 444), relative to the weighing of shipments of forage consigned to army camps. The Southwestern regional director issues similar amendments in Supplement 1 to Order 165.

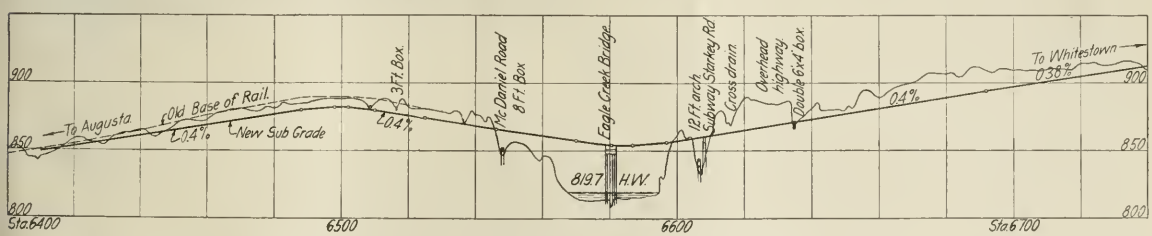
Cotton Shipments to Southern Points.—Circular 221 of the Southwestern regional director outlines instructions issued by the regional director of the Southern Region relative to the shipment of cotton originating at points west of Chattanooga, Tenn., Birmingham and Montgomery, Ala., and Pensacola, Fla., and destined to Jacksonville, Fla., Brunswick, Ga., Savannah, Ga., Charleston, S. C., Wilmington, N. C., proper or for export through these points unless shipments are covered by transportation orders issued by the Inland Traffic Service or by permits issued by the Southern Export Committee, Atlanta, Ga., and requests that cotton restricted by this circular be refused for shipment unless covered by the proper authority.

Flexible Staybolts.—Northwestern Regional Purchasing Committee Bulletin 146 states that the American Locomotive Company has completed the installation of equipment necessary for the manufacture of flexible staybolts and will prepare to furnish them upon order.

Big Four Increases Capacity At Congested Points

Builds 87 Miles of Second Track and Reduces Grades to Handle More Traffic During War Period

An increase in traffic density on the Cleveland, Cincinnati, Chicago & St. Louis during the war period made it necessary to provide additional facilities, particularly second main tracks. As a consequence the construction of 87 miles of second track was undertaken during 1917 and 1918, nearly all of which is now in service. The largest part of this is on the Cleveland-St. Louis line, the backbone on the Big Four system. Later, work was also undertaken on the Chicago-Cincinnati line and on a short stretch at Columbus, Ohio, in connection with terminal improvements at that place. Considerable improvement in grade was undertaken in connection with the second track work, but, as explained later, the conditions did not warrant a complete change in ruling gradients on any of the engine districts. In only one case was it found necessary to make a deviation from the existing alinement.



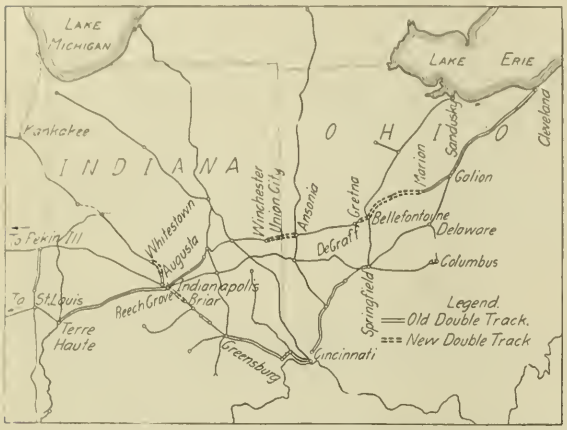
Profile of the Zionsville Cut-Off North of Indianapolis

The Cleveland-Indianapolis Line

All of the improvement work on the Cleveland-St. Louis line is east of Indianapolis. This is the busiest section of the road. The traffic amounts to about six passenger and seven scheduled freight trains each way daily, in addition to extras. During 1916 the gross tonnage handled amounted to 8,782,000 ton miles per mile of road while the train movements aggregated 6,800 freight and 5,700 passenger train miles per mile of road. Previous to the inception of the present project double track had been in operation on this line between Indianapolis and Taft 32.9 miles, and from Marion, Ohio to Cleveland 101.5 miles. Of this last stretch the 21 miles between Marion and Galion consists of the parallel, singe-track lines of the Big Four and the Erie which are operated as joint double track. The 284 miles of line between Cleveland and Indianapolis is operated as two engine districts; one of 141 miles from Cleveland to Bellefontaine and one of 143 miles from Bellefontaine to Indianapolis. The ruling grade in both districts is 0.8 per cent in both directions. The present improvements include 18.6 miles of second track between Ansonia, Ohio and Winchester, Indiana, and 44.6 miles between Gretna, Ohio and Marion, work on which has been in progress since the latter part of 1917.

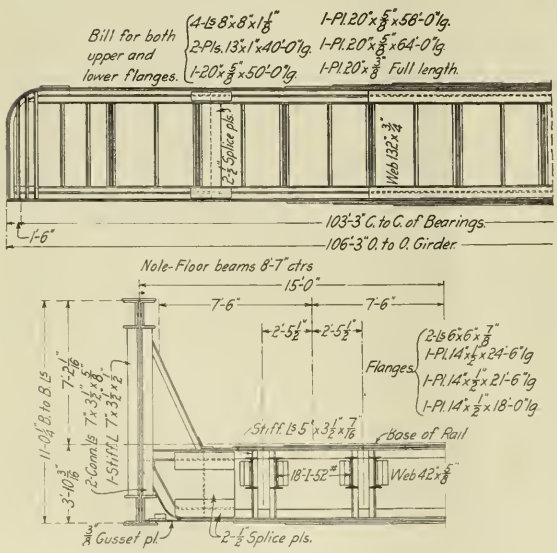
All of this work is being conducted in conformity with a program for reducing the ruling grade in both directions to 0.3 per cent, with the exception of that portion of the line crossing a summit about four miles east of Bellefontaine where the track reaches an elevation of about 1350 ft. above sea level, one of the highest points in the state of Ohio. The two approaches to this summit cover practically the entire distance of 25 miles from DeGraff, at elevation 1000, to Ridgeway, at elevation 1060, and entails the use of 0.8 per cent grades which could not be eliminated on the present location, without an objectionable increase in distance. It would be possible to build a line several miles to the north of the present location which would largely avoid this summit, but such a line would miss the city of Bellefontaine and involve the abandonment of the engine and freight ter-

minal facilities at that place to which the railway company has been committed. This solution also would not have afforded the immediate relief to the congested line which it was possible to obtain by second tracking on the existing location, since this plan adopted afforded opportunities to



Map of a Part of the Big Four Showing Location of New Double Track

throw sections of the new track into operation as fast as completed. As a consequence it was concluded to double track the 21 miles from Ridgeway to Gretna without change of grade, except that the 2½ miles of 0.8 per cent grade east from the Bellefontaine yard to the top of the hill was reduced to 0.5 per cent against eastbound traffic. As a result of this arrangement the Bellefontaine hill still imposes a 0.5 per cent grade against eastbound traffic and an 0.8 per



Details of Heavy Girder Span Used at Columbus

cent grade against westbound traffic in the engine district between Bellefontaine and Cleveland, and it imposes an 0.8 per cent grade against eastbound traffic between Indianapolis and Bellefontaine.

In addition to second track work and grade changes the improvements in this section included the construction of a new eastward yard and the extension of the existing "B N" yard east of Bellefontaine, each of which comprises a simple grid of tracks having car capacities of 86 to 102 each.

The work between Marion and Gretna was relatively light, consisting in the main of the widening of existing embankments and cuts. The cuts were taken out with teams and the lighter fills were made with material from the cuts and from borrow pits. The heavier fills were made with material handled by train from steam shovel cuts. One of these was in the eastward yard which required 195,600 cu. yd. of excavation, 33,000 cu. yd. of which was used for filling in the yard and the rest in the completion of main line embankments. After the completion of the excavation in the yard this shovel was moved to a borrow pit near Mt. Victory for the completion of the embankments between Marion and Ridgeway. In laying out the second track work, existing passing tracks were incorporated where this was possible, but new 100-car passing tracks were installed at intervals of about 10 miles. The work between Gretna



Progress View on Bridge Construction at Columbus

and Ridgeway was finished in November, 1918, except for the extension of the "B N" yard, while the work from Marion to Ridgeway was started in July, 1918, and is now practically completed.

From Winchester to Ansonia the double-track work consisted partially in the widening of the existing embankments and cuts and partially in raising the grade through sags to reduce the gradient. Of this work which amounted to 500,000 cu. yd. in embankment, the heavier portion is between Union City and Ansonia. The improvement also includes the construction of a small enginehouse, coal dock, cinder pit and water tank at Ansonia to take the place of existing facilities at Union City.

The largest single feature of the earth work on this section is an embankment 10,000 ft. long containing 190,000 cu. yd. with a maximum raise above the old track of 17 ft. To build this it was necessary to place the operated track in a temporary position a maximum of 24 ft. to one side of the old center line at the old grade on a new shoulder which eventually formed a part of the higher embankment. With this temporary track in operation, the embankment was completed to the new grade line on the opposite side for as great a width as was possible without interfering with the

operated track. After this had been done, a track was laid and put in service on the new embankment which was then widened to the standard width. The shoulder for the temporary track and the first portion of the high embankment were made with teams from borrow pits along side having a maximum depth of 15 ft. A steam shovel was also used



Contractors Plant at the Eagle Creek Bridge

in this pit to supply material for completing this embankment after the track had been installed on the top and for widening embankments at other points in the section. All filling handled by the shovel was hauled in standard-gage equipment over the operated track. The bridge work on this section was of minor importance, the only structure of any size being an existing undercrossing used by an electric line. This had to be largely reconstructed to provide for the second track and a raise of seven feet in the grade line. Aside from the extension of the abutments and the raising of the grade, the single-track, deck girder span was replaced by a reinforced concrete slab.

One of the points of chief interest attached to this section of the work arose from difficulties encountered with sink holes. At several places east of Union City, the bottoms



The Embankment in the Eagle Creek Bottoms

of depressions traversed by the railroad are underlaid with a stratum of peaty loam of varying thicknesses. In three locations this was so thick that the weight of the newly imposed embankment squeezed it out along each side and pronounced and protracted settlements occurred, accompanied by extensive upheavals of the adjacent ground surface. As a consequence large quantities of material were placed in the filling without effecting much progress in the completion of the work. This difficulty was finally overcome by discontinuing the use of a heavy clay filling in favor of cinders, which, being much lighter and not being subject to the flowing which took place in the clay, did not disturb the equilibrium of the subsurface materials to any great extent. A more complete account of the experience with these sink holes was published in the *Railway Age* of January 17, 1919, page 217. All of the grading on the Cleveland divi-



Building a Drainage Diversion Ditch Alongside the Eagle Creek Embankment

sion was done by the Walsh Construction Company, Davenport, Iowa.

Heavy Work Near Indianapolis

By far the heaviest and most interesting feature of all the improvement work undertaken by the Big Four is the double track work between Augusta and Whitestown, a short distance north of Indianapolis. This improvement covers 10.2 miles of which 4.5 miles is on a new location known as the Zionsville cut-off. This constitutes an extension of second track on the Indianapolis-Chicago line which had previously extended from Indianapolis to Augusta, a distance of 10.8 miles. It also affords a considerable improvement in grade and alinement. The old line has grades of 0.78 per cent southbound and 0.67 per cent northbound, whereas the new line has maximum grades of 0.4 per cent in each direction conforming to the adopted ruling grade between

Indianapolis and Kankakee, Ill. The maximum rate of curvature on the old line is 2 deg. 37 min. with a total central angle of 75 deg. 56 min. whereas the new line now has a maximum rate of curvature of 0 deg. 30 min. with a total central angle of 34 deg. 50 min. The saving in distance on the new line is important, amounting to 2,500 ft. or nearly one-half mile. A total of 586,000 cu. yd. of earth work in excavation is involved.

On the basis of its physical features this project is naturally divided into four sections. At the south end is 3.2 miles of second-track work on the old alinement, the most important feature of which is an 11,530 ft. grade reduction involving a depression below the existing grade to a depth of 8 ft. and requiring the removal of 189,000 cu. yd. of material This total includes a 2,000-ft. continuation of this cut on to the south end of the cut-off. The cut-off embraces two essential features, an embankment a mile long and 40 ft. high across the Eagle Creek valley containing 478,000 cu. yd. and a cut 2½ miles long containing 397,000 cu. yd. The remainder of the work including 2,300 ft. of the cut-off in the north cut moving without interference entails a carefully planned and extensive track layout as indicated by the use of 7 miles of temporary track in the 4½ miles of cut-off.

One noteworthy feature of this work is the special pains taken to obtain adequate drainage as well as freedom from washing of the cut and embankment slopes. Cuts were given a sub-grade width of 10 ft. from the center line of track plus a minimum of 5 ft. for a ditch, this ditch being increased 0.1 ft. in width for each 100-ft. of distance in the direction of drainage. The contractor was required to finish the cut in perfect slope while surface ditches of adequate proportions were provided wherever conditions demanded. In the long cut, the first 2,500 ft. from the lower end is drained by side ditches carried to a catch basin 500 ft. from the lower end where a depression in the ground line made it possible to install a line of 24-in. pipe leading down a transverse gully. At a point 2,600 ft. from the lower end of the cut the ground surface comes practically to grade for a distance of 150 ft. where a double 6-ft. by 4-ft. box culvert



Steam Shovel in the Big Cut Near Zionsville

and the north section of second track work consists of light fills with only two slight changes of grade in the second-track portion.

The lowering of the grade south of Eagle Creek is being accomplished by making a preliminary cut along the east side to the final grade without disturbing the existing track. This could be done readily for a considerable portion of the distance without any excavation beyond the finished cut line because the cut had to be made of sufficient width to accommodate a passing track on the east side. After turning trains over a temporary track at grade in this portion of the cut, the old track will be abandoned and the rest of the cut taken out.

This cut and the long cut north of Eagle Creek are being taken out with 70-C Bucyrus shovels, the material being handled by standard-gage equipment into the Eagle Creek embankment and some minor fills by dumping from trestles. Two shovels are being operated in the north cut and one in the south cut, each being served by two trains of 12-yd. Western air dump cars. The complete equipment includes seven six-wheel switch engines and 100 cars. To keep the four trains

was installed to carry the drainage of a creek that crosses the line. By depressing the bed of this creek for a distance of 200-ft. downstream, it was possible to use it as the outfall for water draining into the cut north of this point, as well as for a surface ditch extending for nearly the entire length of the cut along the east side and a channel diversion ditch one half mile long on the west side. These surface ditches were made with teams before the cut proper was started, the material being wasted on the site of the cut so that it could be picked up by the shovels in taking out the cut.

The structures formed an important feature of this project, chief among them being the Eagle Creek bridge which is located about centrally in the long embankment. This is a reinforced concrete arch structure of the filled-spandrel type consisting of five semicircular arches—three central openings of 45 ft. with one at each end of 39 ft. The total length of the bridge is 273 ft. with a maximum height of 62½ ft. from base of rail to bottom of footing. It requires the placing of 6,200 cu. yd. of concrete and 112,000 lb. of reinforcing steel. Pile foundations were used.

Railway Developments in Foreign Countries

Authority Asked for the Construction of 1500 Miles of New Railroad in Mexico; Other Notes

American Railway Manufacturers May Be Under Handicap in China

(From our Special Correspondent in China)

While there is considerable feeling of disappointment that America has not been able to "put over" a reorganization of affairs in the Far East, Chinese are not disposed to blame either America or Mr. Wilson. But they do point out that unless something very pointed is done, American interests are completely in eclipse. The peace settlement clearly recognizes the "sphere of influence" in China. It intensifies the competition between British and Japanese, with the French-Belgian interests holding a position of balance of power. Under these conditions, since there is no American "sphere of influence" or room in which one can be set up, American manufacturers are relegated to a position of permanent handicap. For a year or two, until Europe gets back to a peace basis, there is likely to be a small market for materials which are urgently needed, in which Americans may bid with some hope of success. But after that, the "home" dealer, it is thought to be beyond question, will always have the preference.

* * *

The Peking Hankow has ordered 10 Prairie Type locomotives from the Baldwin shops and 10 more from the Lima works. Tientsin Pukow tenders are delayed pending a discovery of means of payment.

* * *

The Ministry of Communications has received advices concerning the arbitration of the Shanghai-Nanking Railway net profits case, to the effect that one of its contentions has been sustained, one decided adversely, and one reserved for further taking of evidence. Due principally to the favorable rates of exchange for interest payments, this line found itself with a surplus for the year in 1916. The ministry contended, however, that deficits from previous years should be met before profits could be divided with bondholders. This is the contention which is sustained. It also contended that interest upon land purchases, although in excess of the amount provided in the contract, should be deducted as expenses, before a declaration of profit. This has been denied. Its third contention was that its regular depreciation charges are a proper charge to expense before declaration of profit, and this point is still under consideration. The immediate result of this decision, so far as it goes, is to release $1,250,000 held in the treasury pending the award. This line is sorely in need of locomotives. Because of overwork, its expense for locomotive repairs increased in 1918 over 50 per cent above 1917, and loaded wagons were constantly being left standing for want of power. Whether the necessities of the government for ready money will permit the use of this sum now in the treasury for the purchase of the needed power remains to be seen.

* * *

The Lung-Hai management has cancelled certain inquiries for bridge steel entered with an American firm just prior to the armistice. The explanation is that the line is now required to make such purchases "at home" (Belgium).

* * *

The nearest official admission of approaching bankruptcy which any organ of the government has made was contained in the recent report of a conference between a representative of the Ministry of Communications and representatives of the stockholders of the late Chekiang and Kiangsu Provincial railways. The Chekiang and the Kiangsu Provincial railways represent two of the many attempts made about ten years ago to build Chinese railways with local capital. The officials and gentry of these two provinces undertook to build a line from Shanghai to Ningpo. This route was already under contract to the British and Chinese Corporation, but yielding to this local pressure the Manchu government secured a release from the British. Some six or seven years of painful progress, quarrels among stockholders, and exhaustion of funds brought a realization that a foreign loan and foreign management was necessary. The government, now the Republic, therefore took over the line, agreeing to refund the shares with its own bonds and cash. The two lines have now been consolidated, practically rebuilt, and are operated by the Shanghai Nanking administration. But the shareholders object to receiving their interest in depreciated bank notes, and demand certain cash payments which were promised in installments. The latter the ministry representative professed to be impossible at the present and soundly scolded the provincials for expecting anything besides depreciated bank notes "when the ministry had millions of them which it can not dispose of."

* * *

The Tientsin Pukow has now given notice of refusal to accept payment of freights or fares in anything but silver or its equivalent. This line has as managing director a brother of Hsu Shih Chang, president of the Republic. The other Chinese managed lines are still accepting the notes for payment of fares.

* * *

The situation is very tense over reports from the Peace Conference in Paris. It has been rendered more so perhaps by the very evident tampering with telegraphs and cables along the China coast. For two weeks Peking has been practically out of communication with the outside world, except over the Japanese wireless. At the same time reports in the Japanese papers seemed to be baiting Chinese into some act of violence. At the same time that assurances were extended that Japan had succeeded to everything it claimed in Shantung, a Japanese paper published in Chinese in Peking contained a circumstantial account of the assassination of President Wilson. The result was that on the following day students of government schools formed a procession and marched to the legation quarter with banners expressing disappointment and anger with Chinese officials, who are held responsible in the public mind for "selling China." The delegation was peaceable until upon arriving at the home of Tsao Ju-lin, Minister of Communications, it found gates barred and the minister refusing to appear. The procession was immediately transformed into a mob, which broke down the gates, rushed the guards, and made a search of the house, breaking everything in its way. The minister made his escape, but his father was badly beaten in the hope of provoking Tsao to appear from his supposed hiding place. Chang Chung-hsiang, minister to Japan, who signed with Tsao many of the treaties and agreements which are objected to, was found in the house in conference with a Japanese. The latter was quickly passed outside without violence, but Chang was beaten and kicked into insensibility, and is now in the Japanese hospital. Tsao and Lu Cheng Yu, who also has

been implicated in the recent railway deals, took refuge in the Japanese Legation.

Carranza's Railroad Program
Calls for 1,500 Miles of New Line

It is an ambitious program of government railroad building which President Venustiano Carranza has mapped out. In his recommendations to Congress authority is asked for the construction of more than 1,500 miles of new railway. It is expected that the recommendations will be favorably acted upon by Congress. It is significant that all of the proposed new lines cover practically the same routes that were designated in concessions that were held by American and British interests at the time their plans were upset by the beginning of the revolutionary period nearly nine years ago. The most important perhaps of the proposed new roads is that which is to run from a connection with the United Railways of Yucatan at Campeche, about 450 miles. The concession for the construction of this proposed line was owned by a syndicate of British investors at the time President Porfirio Diaz was forced to vacate the chair of chief executive. The route is through a remote part of Mexico that is said to be capable of wonderful agricultural development. The region is also rich in mahoghany and other valuable timber. President Carranza's plan also embraces the construction of a railroad from Peto, state of Yucatan, to Chan Santa Cruz, in the territory of Quintana Roo, a distance of about 300 miles, including proposed branch lines. This proposed road would penetrate what was formerly the heart of the hostile Maya Indian country. The line would be of important military value, it is asserted. Another new line, the construction of which is recommended by President Carranza, has for its purpose the connecting of Ensenada, on the Pacific side of Lower California, with the Nogales-Guaymas branch of the Southern Pacific of Mexico, at a point a short distance north of Hermosillo. The building of branch lines is also contemplated. This proposed road would closely parallel the international border between Mexico and the United States and traverse a part of the rich Imperial Valley. It would also serve as a valuable factor in the movement of troops in time of troubles along that part of the border.

It is not questioned that the Mexican government may be able to assemble men and materials sufficient to carry out these railroad construction projects, but it is not understood where the equipment for operating the proposed lines is coming from. It is well known that the present railroad systems of the country are so short of equipment that traffic is far below normal. The new road which the government has constructed between Durange and a point on the old Mexican Central near Zacatecas is not being operated to any appreciable extent because of the lack of cars and engines. The same is true of the new line which the government recently finished between Cuatro Cienegas and Sierra Mojado.

At this time a large force of men are employed on the construction of the railroad which the government is building between Durango and the Pacific port of Mazatlan. From an engineering standpoint this is one of the most difficult pieces of railroad ever attempted in Mexico. It involves the crossing of the Sierra Madres at an altitude of nearly 8,000 ft. and an almost precipitous descent to the sea-level of the coastal region. The late Collis P. Huntington, who built the old Mexican International from Eagle Pass, Texas, to Durango, had corps of engineers in the field constantly for several years endeavoring to find a feasible route over the mountains for the proposed extension to Mazatlan and none was found.

According to the report of engineers who have made an investigation of the physical condition of the National Tehuantepec, the expenditure of not less than $15,000,000 gold will be required to place that line in shape to properly handle trans-isthmian traffic. This road was operated for many years by the British contracting firm, S. Weetman Pearson & Son, Ltd., of which the present Lord Cowdray is the head. The firm had the road leased for a period of 51 years from the National government, but on account of pressure that the Carranza administration brought against the lessees, the lease was given up and the line turned back to the government some months ago.

The Pan-American which runs from Piacho, on the National Tehauntepec line, to Suchiate, 284 miles, is also bad off physically. This line was constructed by David Thompson, former American ambassador to Mexico, and associates. They disposed of the property to the Mexican government during the latter days of the Diaz administration at a profit of many millions of dollars, according to report current at the time. The Pan-American was to have been a link in a through trunk railroad that was to have continued on down through the countries of Central and South America. Just across the river from Suiache is Ayutla, Guatemala. The original plan was to extend the railroad system of Guatemala to a connection with the Pan-American, but this has not as yet been done. The coastal region traversed by the Pan-American is capable of producing big yields of various kinds of crops. Large areas of land in the territory along both the National Tehuantepec and the Pan-American are owned by Americans but on account of disturbed conditions that have prevailed for several years most of these properties have long been abandoned.

The Mexican Southern Railroad occupies an unique position in the government affairs of Mexico. Although the line is owned by the government it has been in control of the revolutionists under General Felix Diaz for several years. Little is known here as to its physical condition. It is said to be giving very good passenger and freight service between points on its line in the state of Oaxaca.

The government recently ordered that construction of the branch line that is to run from Allende, situated on the Eagle Pass-Torreon division of the National Railways of Mexico, to Las Vacas, 75 miles, be resumed. From an international standpoint this is a very important piece of work for the reason that Las Vacas is situated just opposite Del Rio, Texas, and it is purposed to connect there with the branch line of the Kansas City, Mexico & Orient that is to be constructed south from San Angelo. The National Railways of Mexico and the Kansas City, Mexico & Orient entered into a contract several years ago to jointly build a bridge across the Rio Grande at Las Vacas-Del Rio. The accomplishment of this project will mean the opening of a new international railroad gateway between the two countries.

American Rivalry in Steel
Discussed in British Parliament

In the British Parliament on May 26 Lieutenant Colonel Sir F. Hall asked Sir Auckland Geddes, minister of national service and reconstruction, whether America was now able to import steel into Great Britain at a price which enabled manufacturers in the United States to undersell British manufactured steel by £4 10s a ton and upwards, after allowing for freight and all other costs; and, if so, what practical steps had been taken by the government to meet the position thus arising. In reply Mr. Geddes said: "I understand that American steel manufacturers are quoting prices for delivery in the United Kingdom lower than those quoted by British manufacturers (though, not so far as I am aware, to the extent suggested). As regards the second part of the question, his Majesty's government is) not prepared at present to impose any restrictions upon the importation of iron and steel, in view of the demand in the country."

Sir F. Hall interposed: "Is the right honorable gentleman aware that the difference of price is upward of £9 10s and that the government has undertaken to protect the interests of this country? Are they going to do anything or are they not?"

"Under the provisional trade policy that is being followed," Sir A. Geddes replied, "the interests of this country are being protected to the best ability of the government, and the matter is not so simple as the honorable gentleman appears to imagine. There is a very great demand for iron and steel in this country, which at present the producers of this country are unable to meet."

"Is not iron being produced at places which are much nearer the United States, and does it seem reasonable that Americans should be able to send this produce to this country at £9 13/4s per ton lower to the detriment of the manufacturers in this country?" asked Sir F. Hall.

"I do not know whether it is reasonable or not, but it is a fact that they are producing iron and steel at the present moment cheaper," was the answer, "and it is also a fact that our export still demands a large amount of iron and steel to be worked up in things to be exported."

President-Elect of Brazil to Visit United States

Dr. Epitacio Pessoa, who was elected president of Brazil on April 13 while he was in Paris serving as president of the Brazilian delegation to the Peace Conference, is to visit the United States on his way back to his country and is expected in New York on June 20. Dr. Pessoa is one of the first presidents of Brazil to be elected from a northern state, the presidents as a rule having hitherto been of the more populous and further developed southern regions. He is a comparatively young man. After taking his degree with honors in one of the leading law schools of Brazil, he became public prosecutor in the state of Pernambuco, where he revealed striking legal and oratorical abilities. He came rapidly to the front with the proclamation of the republic in 1889 and his reputation as a jurist won for him the position of professor of law in the faculty of the University of Pernambuco. At only 26 years of age, he was elected deputy to Congress and became one of its leading figures.

Before he was 33 years of age, President Campos Salles invited him to be minister of justice and public instruction in his cabinet, where he rendered brilliant service. Later, he occupied the position of attorney general for the republic and became a judge of the highest judicial body of Brazil, where, in the execution of his duties, he was noted for his firmness and impartiality. At the time he was appointed president of the Brazilian Mission to the Peace Conference, he was serving as senator from the state of Parahyba.

Train Connection with Southeastern Europe

Mr. Chaveille, the French minister of public works, presided recently over a meeting of diplomatic and technical representatives of Great Britain, Belgium, Switzerland, Italy, Serbia, Roumania, and Greece, called to consider under what conditions a train service could be established with the southeast of Europe to replace the former Orient express, writes Trade Commissioner Eliot G. Mears at Athens.

The proposed line will pass through the Simplon Tunnel, Milan, Venice, Trieste, Agram, and Belgrade. Ultimately the line will be prolonged to Bucharest and Constantinople, where a connection will be established with the Bagdad railway. A branch will go to Odessa. The project of building a suspension bridge to connect the two shores of the Bosphorus was also considered. This bridge would serve as a line of communication with Asia.

Train service with the Balkans will probably be established very soon, although no definite date has been set. According to a plan announced in London, two trains will meet at Milan, one from Calais and one from Bordeaux. From there a single train will proceed to Brod, where a second division will be made with one part of the train going direct to Constantinople through Bucharest, while the other part will run direct to Odessa.

Exports of Railway Track Material in April

Exports of rails amounting to 60,463 tons valued at $3,416,590 showed an increase over March but did not reach as high totals as in January or February. Exports during April of railroad spikes amounting to $413,292 and of switches, frogs, etc., amounting to $1,063,437 were, on the other hand, considerably greater than for any of the preceding months of the year. The figures in detail as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce were as follows:

Countries	Railroad spikes		Rails of steel		Switches, frogs, splice bars, etc.
	Pounds	Dollars	Tons	Dollars	Dollars
Belgium	.....	.....	3,802	197,098	21,116
Denmark	.....	.....	200	13,163	1,007
France	4,746,100	267,761	15,153	859,483	645,152
Italy	.....	.....	.....	.....	33,750
Norway	3,254	183	40	2,598	203
Portugal	.....	.....	.....	.....	725
Spain	.....	.....	646	32,755	19,734
Sweden	405	54	.....	.....	.....
England	.....	.....	1,581	90,530	5,404
British Honduras	1,600	52	.....	.....	28
Canada	118,387	3,908	10,717	429,015	61,700
Costa Rica	100	10	.....	.....	375
Guatemala	10,000	500	.....	.....	1,797
Honduras	16,760	805	121	8,275	.....
Salvador	16,200	892	2	188	34
Mexico	200,537	8,525	152	8,559	2,683
Newfoundland and Labrador	22,400	1,142	.....	.....	.....
Barbados	.....	.....	.....	.....	402
Jamaica	20,000	1,000	.....	.....	1,308
Trinidad and Tobago	.....	.....	179	12,555	1,008
Other British West Indies	.....	.....	.....	.....	486
Cuba	147,711	7,261	7,133	382,287	97,139
Dutch West Indies	5,852	448	.....	.....	.....
French West Indies	600	32	2	204	2,606
Haiti	28,000	1,170	.....	.....	11,350
Dominican Republic	2,000	123	.....	.....	765
Argentina	12,184	785	.....	.....	338
Brazil	270,000	14,820	631	47,700	6,359
Chile	172,656	10,173	5,404	337,441	48,082
Colombia	21,110	994	158	11,174	7,806
Ecuador	2,000	92	.....	.....	220
British Guiana	44,600	2,277	209	10,290	7,414
Peru	29,030	1,619	192	15,040	7,456
Uruguay	.....	.....	.....	.....	225
Venezuela	20,000	965	.....	.....	637
China	285,000	11,458	901	59,664	.....
Japanese China	.....	.....	2,581	193,964	17,550
British India	.....	.....	516	36,231	4,554
Dutch East Indies	326,448	31,574	1,219	59,779	31,374
Hongkong	1,028	49	44	2,989	269
Japan	522,188	19,429	6,375	462,708	16,104
Russia in Asia	732,800	23,687	1,225	59,441	7,625
New Zealand	4,480	260	139	8,925	487
Philippine Islands	.....	.....	777	54,822	3,157
British West Africa	16,800	1,244	.....	.....	.....
British South Africa	.....	.....	100	6,417	.....
Egypt	.....	.....	264	13,295	1,008
Total	7,799,630	413,292	60,463	3,416,590	1,063,437

Exports of Locomotives in April

The exports of locomotives from the United States in April, totaling 55 and having a value of $2,193,168 were more than double those of March but not as great as in January or February.

The detailed figures as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce are as follows:

Countries	Steam locomotives	
	Number	Dollars
France	8	379,600
Italy	10	575,000
Canada	5	49,100
Cuba	12	364,889
Brazil	1	10,950
Colombia	3	85,085
China	5	260,000
Japanese China	8	457,980
Japan	3	10,564
Total	55	2,193,168

Tokyo Considering Building a Subway

The city of Tokyo, Japan, is considering the building of a subway to help relieve its serious transportation problem. But in the meantime, and in order to receive immediate relief, the mayor of the city has recommended to the city council the purchase of 200 additional street cars.

Railroad Affairs in Congress

CONGRESSIONAL CONSIDERATION of the general railroad problem has been somewhat delayed by the precedence given by the Senate and House committees to other matters in an effort to clear the decks, but Chairman Esch of the House committee now hopes to begin hearings either next week or the following week, depending on the time required by the water power bill, which will probably continue for about two months, and at which the director general and the Interstate Commerce Commission will probably be given the first opportunity to testify. The passage of the deficiency appropriation bill for the Railroad Administration has not been responsible for any delay because it was handled by the appropriations committees and not by the interstate commerce committees, but both the House and Senate committees have given some time to the problem of getting the wire systems returned, while the House committee has been concerned with the farmers' demands for the repeal of the daylight saving law and the Senate committee desired to do a little tinkering with the railroad laws before tackling the big question. Senator Cummins, who is in charge of general railroad matters, was ambitious to get through his bill to restore the Interstate Commerce Commission's power to suspend rates and other Senators took advantage of the opportunity to dispose of another question that has been disturbing them by tacking on an amendment requiring the director general to pay out of the railroad rental judgments based on claims that accrued before federal control. Many of such claims had been held up because it was not considered the duty of the government to pay them and many railroads were unable to pay them or took advantage of the fact that their property could not be attached while under federal control.

Some of the Senate committee members are also sympathetic toward the bills to amend the fourth section to require a strict enforcement of the long and short haul rule and hearings were held before the committee last week on Senator Poindexter's bill. Some of the Senators who had got their views on the question principally from the representatives of the inter-mountain country who have been most in evidence during the previous discussions on this subject, had their eyes opened when the first testimony was presented at this hearing by prominent representatives of a large number of shippers who vigorously opposed the bill and showed that its passage would not only not accomplish the desired object but would disrupt the rate structure in practically all parts of the country.

The Cummins bill, if it becomes a law, would leave the director general no more power to put rates into effect than that formerly possessed by the railroads. He may continue to initiate rates, but must file a fifteenth section application with the commission for permission to file a tariff increasing a rate, until January 1, 1920, when this provision of the law expires, and the commission may suspend his rates if it sees fit. Heretofore the Railroad Administration, while it has frequently consulted the commission, has merely filed its rates and set the effective rate, regardless of the former statutory 30 days' notice in many cases. The commission could review them later on complaint, and it has made several minor changes without any attempt to disturb the general 25 per cent advance, but meanwhile the rates were in effect. As to intrastate rates, the director general is still supreme, on the theory, as stated by Senator Cummins, that it would be intolerable to have the federal administrator subject to the interference of 40 states. Efforts were made by several Senators to restore the former authority of the states, but it was recognized in the debate that the purpose was to give them an opportunity to reduce the rates increased by the Railroad Administration and that even if they did not do so affirmatively the state statutory rates might be put into effect. Senators Sheppard of Texas and McKellar of Tennessee introduced amendments to restore the state authority but were voted down after Senator Cummins had stated that it might be possible for the states, if given the authority, to reduce the federal income by $200,000,000. Senator Trammell of Florida, however, secured the adoption of an amendment providing that no intrastate rate shall be increased until at least 30 days' notice has been given to the shippers of the state and a hearing granted. Another amendment provides that in computing the time allowed for presenting claims or bringing suit for reparation or loss or damage, the period of federal control prior to the passage of this bill shall be excluded.

The principal provision of the bill is as follows:

> That during the period of federal control the right to initiate or change rates, fares, charges, classifications, regulations and practices exercised by the carriers now under federal control, prior to the 29th day of December, 1917, shall hereafter be exercised by the President, or by the director general of railroads, but such right as to interstate commerce shall be exercised under all the limitations and conditions which were imposed upon said right by the act to regulate commerce, approved February 4, 1887, as amended; and the Interstate Commerce Commission shall have as full and complete authority and jurisdiction to set aside, change, modify, suspend or otherwise review all such rates, fares, charges, classifications and regulations directly affecting interstate commerce as though the government had not assumed the possession and control of said transportation systems. To that end the said act to regulate commerce, as amended, is hereby declared to be in full force and effect with respect to rates, fares, charges, classifications, practices and regulations, anything in the act approved March 21, 1918, to the contrary notwithstanding. The procedure before the Interstate Commerce Commission shall be the same as formerly, except that the President or the director general of railroads shall stand in the stead of the carriers, and all notices theretofore required to be given to or served upon carriers shall be given to or served on said director general. All orders or findings of the commission shall bind the director general to the same extent as they formerly bound the carriers.

While this would make it slightly more difficult to put into effect a general advance in rates there is a belief that it offers a sharing of responsibility between the director general and the Interstate Commerce Commission that might not be unwelcome to both parties.

Senator Pomerene especially took occasion during the debate to criticize many of the rate and other orders issued by the director general. He said in effect that as a railroad man Mr. McAdoo was a wonderful secretary of the treasury. He also pointed out that whereas Mr. McAdoo had claimed a saving of $6,000,000 last year on the salaries of executives, an examination of the director general's payroll indicated that there had not been much saving in the long run. He said that 72 men on the staff of the director general receive salaries aggregating $1,398,100, or an average of $19,418, which he compared with the $15,000 received by the chief justice of the United States.

Several Senators said they were more interested in getting the railroads back to their owners than in the bill before them and expressed an opinion that the question of rate jurisdiction could well wait to be considered in connection with the proposed general legislation, but they were willing to support the bill. In reply to a question as to when such legislation could be expected, Senator Cummins expressed confidence that it could be worked out before the end of the year.

H. C. Barlow, representing the Chicago Association of Commerce, the National Industrial Traffic League, the Illinois Manufacturers' Association and the Illinois Traffic League, in testifying on the Poindexter bill said that those for whom he appeared are opposed to a rigid application of the long and short haul rule and that the act as it now reads is conducive to the greatest good to the greatest number. The commission should continue to have the broadest discretionary power because each case presents a different aspect. He said that if the railroads were prohibited from meeting the

water rates the intermediate points would not get the benefit anyway and he pointed out that the rates on sugar from San Francisco to Chicago are less than those to Kansas City because the western sugar industry could not reach the Chicago market in competition with Cuba by New York and New Orleans if the rates were higher. In such a case, he said, Chicago would be dependent on one source of sugar supply.

J. C. Lincoln, representing the Merchants' Association of New York and the National League of Commission Merchants, said the question involved is that of the railroads competing with water carriers and that the possibility of an all-water service from New York to the Pacific coast causes keen competition which the railroads have to meet if they wish to participate in the traffic. If not allowed to participate their ability to conduct their other business would be impaired and he thought the eastern shippers were entitled to the benefit of both rail and water facilities.

W. H. Chandler, who appeared for the Boston Chamber of Commerce and several New England industrial organizations, pointed out that a rigid long and short haul rule would encourage an increase in the water rates and would require the rail carriers to increase their non-competitive rates to make up for the loss of the other business. He also said that enforcement of a rigid long and short haul rule would mean either a very material advance in rates in the southeastern territory or a reduction of all rates to the level of the Memphis and Mobile rates and that such a change would put New England out of market.

Senators Poindexter, Cummins and Pomerene kept referring to the argument that the present adjustment penalizes the intermediate points for the benefit of those enjoying water competition, while the witnesses asserted that their only penalty was by comparison with localities better situated.

J. A. Morgan, representing Texas shippers, and E. J. Rich, representing New England shippers, also opposed the bill.

E. E. Clark of the Interstate Commerce Commission testified on June 17, opposing the bill. He said he could not see how any public good could result from it while it would uproot rate structures representing years of development. He said the commission had done its best in applying the law but had felt it necessary to prevent undue disturbance of business relationships and had narrowed its policy in regard to meeting water competition from one of recognizing potential competition to recognizing only actual and active water competition as a justification for fourth section relief. He thought the commission should have power to establish minimum rates and to have control over the rates of water carriers and that possibly it would be well to lay down some rule to govern the commission in its application of the fourth section.

The representatives of the intermountain section were to be given their innings on Thursday.

New York Commission on the Collision Problem

Mechanical Automatic Stop Discussed and the Inventors Give Full Descriptions of Their Devices

The New York Public Service Commission, Second District, held a hearing on the collision problem in New York City on Wednesday, June 18. The hearing was conducted by the full commission, Charles B. Hill (chairman), Frank Irvine, John A. Barhite, Thomas F. Fennell and J. A. Kellogg; with C. R. Vanneman, chief of the Division of Steam Railroads. Among those attending the hearing, many of them invited by the Commission, were F. P. Patenall, signal engineer of the Baltimore & Ohio; Frank Rhea, engineer, New York City; W. Y. Scott, signal engineer of the Boston & Maine; J. D. Bourne, superintendent, Boston & Maine; J. E. Sague, former member of the Public Service Commission; Frank J. Sprague, of the Sprague Safety Control and Signal Corporation, New York; D. H. Schweyer of the Schweyer Electric & Mfg. Co., Easton, Pa.; J. F. Webb, Jr., International Signal Company, New York; C. E. Doyle, "M-V All Weather" train control system; C. G. Riddick, locomotive engineman; Thomas E. Ryan, representing locomotive firemen; and other enginemen.

Messrs. Sprague, Schweyer and Webb spoke in advocacy of their respective systems and the locomotive men outlined the necessary elements of safety as viewed from their standpoint; while Messrs. Sague and Rhea appeared as independents, not favoring any railroad, any device or inventor or anything but the public interest.

The first speaker was Mr. Patenall. He suggested a closer alliance between the railroads and the inventors and said this was being done at present through the Automatic Train Control Committee of the Railroad Administration. He briefly outlined some of the systems of train control that have been tested. It has taken approximately 30 years to develop the present system of automatic visual block signals and it will be necessary to have patience in the development of train control apparatus.

Mr. Scott told of the practice with automatic block signals on the Boston & Maine where each signal goes to the stop position before it is reached by the train which sets it; that is to say, the signal is set 200 ft. beyond the entrance to the block section; and the engineman, seeing it move, knows that it is in working order and will indicate stop behind his train.

Mr. Bourne told of his experience with surprise tests. He said that the Boston & Maine conducted large numbers of these tests which, he felt, were instrumental in securing proper observance of signal indications; personally he felt that an automatic train control would be a desirable adjunct.

Mr. Sague believed that safety of operation could be improved by using a full block overlap which would make it necessary for an engineman to run by two stop signals before colliding with a train ahead. At the time the full block overlap was discussed by the commission, some years ago, the members were divided on this question, as some felt it would have a tendency to make the engineman less vigilant in the observance of signals. He suggested the physical examination of enginemen who had reached a certain age; the further development of the present signal systems, and the use of surprise tests to improve discipline. It was a question in his mind whether generally speaking, a man of 60 odd years should be allowed to run high speed trains. Mr. Patenall raised an objection to the use of a full block overlap; it does not tell the engineman the truth as to actual conditions ahead. Mr. Sague favored automatic speed recorders on locomotives. He spoke of the high record for safety made by English railroads, where the flagman and the perplexities of the flagging rule, as experienced in this country, are unknown, and suggested that American roads ought to heed this lesson from British practice.

Mr. Webb described his mechanical automatic stop as it was tested over a period of two years on the New York, New Haven & Hartford. This apparatus was described in the *Railway Age Gazette* of April 13, 1917, page

789, and copies of this description were handed to the commissioners. Referring to electrical devices, with no mechanical contact, Mr. Webb said that there should be no unseemly rivalry; there would be room for several companies in this field; no one manufacturer can supply all the requirements of all the railroads. He claimed the advantage, for the mechanical device, that no further demonstration was needed. His two years' test had demonstrated the integrity of his apparatus. It had functioned properly in all weathers, through two winters, with never a failure; not even failures on the safe side (which cause unnecessary stops). His is the only machine that has been tested which operates at every signaling point, both when the road is clear and when it is not. The air valve is opened directly by the vertical member, when it comes in contact with the ramp on the roadway, requiring no intermediate apparatus. In addition to the apparatus that was tested, Mr. Webb has also a mechanical speed control device depending upon centrifugal force and the force of gravity.

He estimated the cost of equipping one engine and one signaling point at $500 and was sure that he could provide satisfactory apparatus at a lower price than Mr. Schweyer, while Mr. Schweyer had named figures lower than those quoted by Mr. Sprague. The apparatus can be maintained by an ordinary mechanic; no special talent required; and repairs and renewals are not costly.

Asked about the results of his tests as throwing light on the effect of an automatic stop on the mind of the engineman, Mr. Webb believed that it was good rather than bad; the experience with automatic stops on the Interborough lines in New York City and on the Chicago & Eastern Illinois has shown that the enginemen are more vigilant, not less so. His company has already invested money mounting into six figures, but the conservative attitude of the railroads and the delays incident to the war have halted progress.

Mr. Schweyer described his induction apparatus which is now being tried on the Colebrookdale branch of the Philadelphia & Reading extending from Pottstown, Pa., to Barco. This apparatus was tried last year and was described in the *Railway Age* and, with illustrations, in the Railway Signal Engineer, but a new and more extensive installation is now being made for the inspection of the Committee of the United States Railroad Administration.

The induction apparatus is the only practicable automatic stop, because of the difficulty with clearances if mechanical devices are used. Induction is the only means of meeting climatic conditions. The air mechanism, as well as the electric circuits, must be normally closed so that a leak in the main reservoir will cause an application of the brakes. Audible indications may or may not be given in the cab. Audible signals at the roadside are not practicable in the present state of the art, as they must be designed on the open circuit principle. The air brake mechanism must be such that by merely turning a valve the application may be made either service, or emergency, and the service application must be of a predetermined amount, to be decided by the railroad company.

The public should demand that a start be made, even if money has to be spent lavishly in making tests. Millions of dollars have been spent on experiments in this field by private parties, and if a definite policy is not soon decided upon there will be little encouragement for further activities by inventors.

After the government committee has made its inspection (about July 7), Mr. Schweyer invites everybody else to come to Pottstown and see his apparatus. This can be observed in the baggage car; visitors need not ride on the engine. Mr. Sprague told of the experiments which he has been making during the past five years, and outlined what he held to be the wise policy to be pursued by the state and the railroads. His device, which has met successfully the criticisms of the most conservative signal engineers, is still in the laboratory stage, but the United States Railroad Administration has asked him to prepare for an installation as soon as he is ready to do so.

Thomas E. Ryan, speaking in behalf of the Brotherhood of Firemen and Enginemen of New York State, called for the abolition of surprise tests, which he declared to be grossly unfair. He said that he expected the Director General of Railroads to issue an order forbidding such tests. Mr. Ryan answered numerous questions put to him by the commissioners. He and other spokesmen for the locomotive men protested against relaxation or suspension of the flagging rule (which had been suggested by another speaker). The firemen and enginemen want the flagging made more thorough and complete, both within and without yard limits.

Mr. Rhea gave in condensed form his views of the whole collision problem. He said, in substance: "There is a decided public sentiment in favor of requiring installation of devices for prevention of rear and butting collisions. This opinion is held by many representative business men, who doubtless have but vague ideas of the probable large cost of installation, the heavy continuing expense for maintenance and operation and the probable restriction of traffic capacity of the railroad; but the time has arrived for determining the real possibilities and limitations of automatic train control. The development of automatic train control can be properly done only by completely equipping given railroads of considerable length and operating automatic train control under actual service conditions. On account of the probable great cost the expense can best be borne and probably can only be provided as a matter of public expense instead of being borne directly by the railroads equipped. There must be entire unity of action by all interested parties, particularly by the regulating Public Service authorities.

"Methods of train direction can be divided into two generic classes: (1) Manual direction, including ordinary telegraph despatching, central controlled staff operation for single lines and lock and block for multiple track lines; (2) automatic direction, in which I include the so-called audible and cab signal systems as well as the usual automatic visual fixed signals.

"All classes of train direction and automatic train control must be considered as between single track lines with traffic in both directions and multiple track lines with traffic in one direction only on assigned tracks. To permit of the most desirable arrangement of single track automatic train control it is highly desirable, if not actually necessary, for the train control to be both 'cautionary' and 'stop.' For multiple track lines with traffic in one direction only on assigned tracks, while 'cautionary' control might be desirable, this is not a necessity particularly, as full protection can be provided by a complete overlap, although this arrangement may substantially restrict the traffic capacity of the line.

"There are at least two and probably three or four typical arrangements of automatic train control which can be installed as workable systems. The best ultimate system of automatic train control would be obtained by appropriating the best features of several suggested arrangements and combining these. The more simple problem of multiple track installation should first be attempted, to get the benefit of this experience for the more difficult problem of single track train control. It is highly desirable that all parts of all systems be standardized as far as practicable. If the best results are to be obtained, it is absolutely necessary that there be entire unity of requisites for the same classes of roads by all public regulating authorities. It is highly desirable that there shall be only one set of standards and requisites for the entire United States.

"To attain the best results the situation warrants tem-

porarily commandeering the best qualified men in the United States to carry out test installations; the number of thoroughly qualified men at present is limited. If overlapping of patents prevents the adoption of the best system the good of the public service warrants the commandeering of such patents as may be necesary for carrying out the best composite installations. Some railways are better adapted for trials than others and the situation warrants the commandeering of such railways, if necessary.

"With approval rather than criticism of past policy I feel warranted in making the statement that the installation of improved systems of train direction in the past has been equally a matter of expediting the movement of traffic as well as the safeguarding of the traffic. In fact the installations in many instances has been made on the basis of expediting the movement of traffic as one of the best means of safeguarding it. In all probability installations of automatic train control will somewhat restrict the traffic capacity of the railroads so equipped.

"The cost of installation and expense of maintenance and operation no doubt will be very considerable, especially when taken into consideration with the possible restriction of traffic capacity, but in my opinion no definite conclusion can be arrived at until actual working results of automatic train control are available. Therefore, I believe unity of action by all Public Service regulating authorities is necessary and that the cost of installation and the extra expense of maintenance, operation and indirect expense, if any, of restriction of traffic, is properly a charge which should be borne by government appropriation."

Canadian Railway Progress During 1917-1918

Forty-Four Per Cent. of the Mileage of the Dominion Is Now in the Hands of the Government

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THE RAILWAYS OF CANADA had gross earnings of $332,777,937 for the fiscal year ended June 30, 1918, which was in the nature of a high level record. This total was $19,284,988 better than that of the preceding year, and, to make such an encouraging feature more striking, it was $89,694,398 above the showing for 1914—the year prior to the outbreak of war. The latter increment alone was greater than the aggregate of gross earnings no farther back than 1902. In fact, everything on the side of receipts was most satisfactory. Per mile of line, they reached $8,493, which represented a gain of $442 over 1917. Freight traffic swelled in volume and yielded a higher average per ton and per ton per mile. While the number of passengers carried showed a slight decrease, passenger train revenue and the average receipts per passenger per mile were above the results for the year before. All the conditions on the inflow side suggested growth and prosperity.

It would be very agreeable to stop there and ignore the other side of the account. The facts growing out of the positive side of railway finances in 1918 would make a gratifying and inspiring story, and it is always pleasant to be the bearer of good tidings; but the truth must be told. Despite the buoyancy of business and the expansion of revenues, the railways of the Dominion had rather a hard year. Operating expenses not only ate up the extra income, but made serious inroads on normal net earnings. Since all the operations of railroading find a focus in the running of trains, the results for 1918 may be summarized quite conveniently and illuminatingly in this vital statement. That whereas earnings per train mile increased for the year by 12.1 per cent, operating expenses per train mile increased by 29.5 per cent. In other words, while receipts grew by $19,284,988, operating expenses grew by $51,233,446. The railways were practically poorer by that difference. Net operating revenue fell from $87,880,842 in 1917 to $56,264,714 in 1918. Thus, while receipts gave encouragement, outgo brought despair.

The situation in Canada in 1918 will be better understood on further analysis. Out of 68 reporting units, 30 did not make one hand wash the other as between gross earnings and operating cost. Three more fell below superficial solvency when taxes had been paid. After deducting further fixed charges there were only 24 survivors, and of these six were able to declare dividends. The aggregate of dividends was $37,403,499, and of that the Canadian Pacific paid $36,278,672. These facts put the whole case in a nutshell.

The railways, of course, saw the finish coming. It would perhaps be more in accordance with actual experience to say they felt it coming. They applied for relief in the only way relief was practicable—by being allowed to charge higher tolls. Resistance at once came from all quarters. Some of it was broad and general, in the sense that it was contended all passenger and freight rates were as high as they should be allowed to go; but the chief pressure was against the prosperous Canadian Pacific being permitted to better its earning power. The Railway Commission answered to the logic of stern and indubitable facts by granting increases equal to about 40 per cent all round, but, sheared the Canadian Pacific of any direct share therein by providing that all net earnings of that road created by the new rates should go into the Dominion treasury. The higher tolls went into effect in August, 1918, and will be reflected in the operating results for 1919

In what particulars did operating expenses increase in 1918? On the surface, it would appear that all accounts were affected; but on further examination it is made clear that the chief difference between 1918 and 1917 was in the cost of labor and materials. The railways actually employed about 3,000 fewer persons, and yet the salaries and wages bill for the year was higher by $22,648,766. Cost of materials made up in large measure the balance of the increase in operating expenses. If the figures attaching to the eight divisions of accounts be put side by side they practically tell their own story:

	1917	1918
Way and structures	$41,154,193.11	$51,614,857.71
Equipment	46,371,178.39	57,304,234.84
Traffic	6,236,810.91	6,342,393.99
Transportation—rail line	114,327,343.71	145,107,396.15
Transportation—water line	3,271,892.62	1,552,958.83
Miscellaneous operations	3,962,543.94	4,443,665.75
General expenses	7,584,881.55	7,597,985.10
Transportation for investment—Cr.	18,207.15	8,056.58
Total	$222,890,637.08	$273,955,435.79

I have not taken up the space to show the percentage of each division in its relationship to the total; but the figures in that regard are surprisingly alike for the two years. That

is to say, the cost of maintenance of way and structures in 1917, for example, was 18.46 per cent of total operating expenses, and in 1918 it was 18.84. Maintenance of equipment showed 20.80 as against 20.92. To keep up those percentages, owing to the higher cost of labor and materials, meant a larger outlay in 1918, as compared with 1917, by $21,393,-721. This condition ran down through the whole list, and it very clearly and emphatically shows that the railways had to meet the higher cost of living created by the war in precisely the same degree as had individuals. If food, clothing and so on, cost railway employees more money, that additional cost had to be provided by the employers; and it was reflected quite directly in operating expenses.

It may be worth while to pause right here and interject a thought or two about this cost of living, which we see very clearly concerns the railways in a vital way. During the American civil war, and until 1866, the prices of all commodities went steadily upward to a very high level—in some respects almost as high as at present. Then they receded. The whole duration of rise and fall was not above twelve years. In fact, by 1870 the recession was very marked. The upward flight began with abnormal conditions, among which the low ratio of specie to total currency was an outstanding fact. The rise of prices from which we are now suffering began in 1896, and ran concurrently with a remarkable period of trade expansion and prosperity world-wide in scope. It was first demonstrated in the higher cost of food, and this led, quite naturally, to demands for better wages. In 1865 there was scarcely a trace of organization on the part of labor; in 1896 there was a vast change in that regard. The fattening of the pay envelope increased the power to bear the rising burden of food cost, which, we must see, was not attacking the problem at its base, but at its apex. Had a courageous and determined effort then been maade to check the upward movement of food prices we should probably have a different situation today; for we must definitely recognize the basic character of food prices in relation to all prices. Higher wages to meet the higher cost of living was a process so much to the taste of the food profiteers, whose vast and powerful organizations had full control of supply, that from that time onward they persistently took advantage of it.

Higher wages quite logically and unavoidably meant the higher cost of all products into which labor entered. Thus was begun, with steadily increasing momentum, that process of reciprocal leverage by which the cost of one thing raised the cost of another. It has brought us to our present distressing position. The conditions being fundamentally different, there is scarcely any ground for the hope that the experience of 1862-1870 will be repeated. In my humble judgment, after most painstaking study of the whole problem, not only will prices be maintained, but they may be further advanced. The law of supply and demand cannot possibly be identified as the controlling factor in what has occurred, particularly during the past three years. What we have seen has been the easy triumph of organization over unorganization—the strong in that respect winning against the weak. On one hand, tremendous forces have been behind the exploitation of the world's needs for food, without regard to the adequacy of supply; on the other, consumers have not made the slightest attempt at co-operation and therefore have not offered resistance. In short, no matter from what angle our bitter experiences may be viewed, the whole trouble may be quite clearly traced to this lack of resistance. Hence, if a remedy for high prices is to be found it must have its foundation in some effective form of opposition. Market prices are made by human beings and not by the force of automatic and inexorable laws.

Can this resistance be asserted? To reply in the negative is to admit the loss of the war by the Allies. If the struggle was in behalf of democracy, and victory has come to those who fought for that lofty principle, then the judgment of the majority must prevail. The winners are sane and sagacious. They can do anything for the common good if they are agreed about it and in earnest. Since food prices are clearly recognizable as forming the basis of all prices, then the course of action suggested is to proceed in a firm and comprehensive way to stabilize them. This should be done on the just ground of cost plus a fair profit. The cost of producing a pound of butter or a dozen of eggs can be ascertained with greater accuracy than can the cost of moving freight by a railway. We have seen freight rates fixed by law for a generation past, without any reference to the alleged law of supply and demand, and the producer of transportation is not in any essentially different position from the producer of food. What has been deemed just for one surely cannot be unjust for the other. If this is not done, then we must be prepared to see the operating expenses of railways rise with the upward movement of everything else.

The whole process by which the cost of food is first crystallized into the cost of labor, and then by reaction into the cost of everything which labor needs—moving upward at one end and then at the other in response to changing gravity —can only be arrested by taking control of the fundamental factor. That factor is food. It is now yielding what many regard as a high and more or less unearned profit to producers; yet prices will unquestionably continue to ascend unless steps are taken to interpose the thing now lacking—resistance.

From this digression, if it can be so regarded at a time like this when the responsiveness of railways to general conditions should be clearly recognized, we must get back to the presentation of further statistical facts regarding the year 1918. It has been said that traffic was buoyant. It was actually the best in the history of Canadian railway operations. Tons of freight rose from 121,916,272 to 127,543,-687. For this higher volume of business the average receipts per ton per mile amounted to .736 cent, as compared with .690 in 1917 and of $1.789 per ton, as against $1.765 for the year preceding. The average trainload was raised from 436 to 457 tons, and in this betterment lies one of the brightest features in the story of 1918. It was by such means the strain of financial conditions was in some degree met. Tonnage per mile of road expanded from 3,159 to 3,281.

It must be borne in mind that Canada still has a considerable mileage of undeveloped line. The total operating mileage in 1918 was 38,879, which was 247 miles ahead of 1917. Since the outbreak of war in 1914 the addition to mileage has been 8,084. This would seem to indicate considerable activity in construction; but, as a matter of fact, it merely represents the completion of mileage which was under way when Germany invaded Belgium. Not a single new project has been undertaken since 1914, and at this juncture it does not seem probable that much railway building will be done in the near future. There are two difficulties in the way—high cost, and the uncertainty of subsidy aid by government. Practically all railways in Canada, with the exception of some of those which are owned in the United States, have been given substantial subventions. This policy of stimulating the increase of transportation facilities, in which the people heartily concurred, is alleged to have carried the Dominion beyond its immediate capacity to assimilate; but, apart from that consideration, the burden of debt arising out of Canada's conspicuous part in the war may call for rigid economy during the next decade at least.

Leaving aside all further references to merely statistical data, this brief sketch in relation to the year 1918 would not be complete without some allusion to the altered conditions under which 1919 was begun. On July 1, 1918, government assumed full possession of the Canadian Northern

System, thereby adding 9,479 miles to the 4,334 operated by the state at that time. Since then the Grand Trunk Pacific, with 1,794 miles of line, has passed into the hands of a receiver, and the Minister of Railways holds the assignment. To this might be added 1,000 miles owned by the Grand Trunk Pacific Branch Lines Company; so that, actually and prospectively, it might be assumed that government ownership has been applied to a system aggregating nearly 17,000 miles, or approximately 44 per cent of the total mileage of the Dominion.

This will appear on the surface like a very sweeping and significant change, and so it is; but due regard must be had to the facts of the case if a misunderstanding is to be avoided. This has come about wholly because of financial conditions. The Canadian Northern had fallen into difficulties just before the war, and with the outbreak of hostilities was unable to carry on its financing. Government was the guarantor of about 75 per cent of its total obligations, and because of that important fact deemed it expedient to take over the road. Although a decision has not been reached with regard to the Grand Trunk Pacific, the situation as respects guarantees is practically the same. The acting Prime Minister, speaking recently in Parliament on the railway situation, implied that it might also be necessary to absorb the Grand Trunk. In that event more than half of all the mileage in Canada would be brought under government ownership. Up to a few years ago the Dominion merely operated the two lines of railway, representing about 1,800 miles, which had been built as an integral part of the bargain of confederation.

It is no part of my purpose to write a single syllable either for or against the principle of government ownership. It is solely my intention to present in the briefest possible form, without comment, the facts of the case for the information of American readers. Let it therefore be clearly understood that the present situation in Canada was brought about by circumstances of a purely monetary character. Government might be regarded as having no choice in the matter. Be that as it may, the point to keep definitely in view is that the far-reaching changes of 1918 and the current year came about without a direct decision being reached by either government or the people on the underlying principle. Nobody may say at this moment that the judgment of either the Administration or the voters of Canada has been declared in favor of or against state ownership of railways as distinct from corporate ownership. Whatever may happen in that regard in the future, scarcely a single aspect of the whole matter has been presented as a clear-cut issue. Certainly neither what has been done or may be done has as yet come before the people at large as a question of public versus private control of railways.



Photo from Central News

Breaking-Up Shells at a German Manufacturing Plant

The Military Railway*

RAPID TRANSPORTATION to the front, both of food and munitions, was made largely over narrow-gage military railways, thousands of miles of which were furnished by this company for use in France by the French Government from the beginning of hostilities, and also by the United States Government for the American Expeditionary Forces after our entrance into the war.

The French track was ordered mostly in sections 5 metres long, or approximately 16 ft. 4 in. and in 60 centimetre gage, which is slightly less than 2 ft. The weight of the French rail was approximately 20 lb. to the yard of single rail and the American 25 lb. to the yd. Eight pressed steel ties were riveted to the 5-metre lengths of French track, while American practice bolted the ties to the rail so that it could be packed knocked down to save shipping space. Although most of the track was in 5-metre lengths, many longer and shorter sections were used, all, however, in multiples of 2½ metre, accurately sawed so as to insure absolute fit of intermediate sections when shell fire necessitated replacement. Vast quantities of curved track were also specified as well as innumerable switches and turnouts. After the track was unloaded at the French port it was shipped over standard gage railroads to points close to the war zone. Here it was either stacked up according to length of sections to await requisitions from the Engineer Corps, or sent at once to the front. The necessary splice bars and bolts accompanied the track, so that the Engineer Corps were able to lay it quickly ready for use.

The "Stars and Stripes," the official newspaper of the American Expeditionary Forces, published in France, in a recent issue devotes much space pertaining to the contests which were held by the engineers in laying narrow gage track which had been shipped overseas unassembled to save shipping space. Remarkable results in distance of track laid per day were obtained by these contests, always friendly. Teams were composed of 12 men each, working in pairs. Six men bolted the ties to the rails, while the other six men, acting as helpers, supplied the necessary ties, splice bars, clips and bolts as fast as needed.

One contest started by two rival teams began at 7 o'clock in the morning and ran all day without let-up, in spite of raw winds and drizzling rains. One of the teams had not tasted defeat in track laying since it arrived in France 15 months earlier. But it had a strong rival this day.

"With the first defeat seemingly inevitable they became desperate. As the time for the finish grew shorter the two teams were neck and neck, but at the close they were the winners in a grandstand finish that equalled any uphill fight ever staged on the Polo Grounds in New York in ante-bellum days."

They had laid 280 sections, or about 4,572 feet of track, while their rivals were a close second with 279 sections, losing out by just one section, or approximately 161.3 feet. Officers had promised a feast for the winners, but the race was so close both teams were invited to the celebration that night in the mess hall.

* Reproduced from "The Road to Peace," recently issued by the Lakewood Engineering Company, Cleveland, Ohio.

General News Department

The Artesian Belt Railroad, connecting Macedonia and Christine, Tex., a distance of 42¼ miles, was sold at auction on June 3, for $150,000, to Harry Landa and associates, who will continue operation. They plan to make improvements in the near future.

Seven employees of the Kanawha & Michigan at Hobson, Ohio, have been arrested by railroad detectives, following the investigation of thefts of thousands of dollars worth of merchandise from freight cars in the yards at Hobson. The reports say that one of the men has signed a confession implicating the other six.

The shopmen of the Norfolk & Western of whom, according to the newspapers, a large number have been on a short strike, agreed with officers of the United States Railroad Administration on June 13 to go back to work this week Monday. Their chief grievance was the alleged unfair discharge of certain men. In the negotiations the shopmen were represented by officers of the American Federation of Labor.

Three hundred shop employees of the Southern Railways at Alexandria, Va., went out on strike on June 17 by way of protest against what they term the delay in passing on the proposed uniform rules and working conditions and also the general demand of the shop employees for an advance in wages which have both been before the Board of Wages and Working Conditions for some time. The strike was unauthorized and the men were persuaded to return to work later in the day.

Governor Frank O. Lowden of Illinois, and State Director of Finance Omar Wright have been exonerated of charges made by W. H. Malone, a member of the State Board of Equalization, of tampering with the State Board of Equalization over its assessment of the Pullman Car Company, in the original draft of the report of the legislative committee appointed to investigate the charges. Mr. Malone charged that the governor and Mr. Wright threatened to abolish the board if the Pullman company assessement was not reduced.

The Voluntary Relief Department of the Pennsylvania Lines West of Pittsburgh for the 18 months ending December 31, 1918, reports total receipts of $1,942,551 and total disbursements $1,834,449. During this 18 months there has been paid $252,866 for expenses of the relief department out of the railroad treasury. The number of death and disablement benefits paid during the 18 months was 32,444, of which 182 were deaths due to accidents and 12,928 disablements due to accidents. The total membership of the Department on December 31, 1918, was 52,780.

The use of heavy guns on railroad cars is engaging the attention of officers of the War department at Washington in connection with their studies of the defenses of the Chesapeake bay district. Coast artillery officers are now conferring with railroad officers regarding the practicability of constructing permanent spurs from the main lines to the coast around Chesapeake bay. The vicinity of Roanoke, Va., is also being studied in connection with its importance to the defense of the National Capital. Several heavy howitzers and rifles mounted on cars already are available, other units are under construction and still others will be brought back from France.

Fines aggregating $8,000 were recently imposed upon three railroad companies, namely, the Michigan Central, the Grand Trunk and the Wabash, by Judge Arthur J. Tuttle, in the federal court at Detroit, Mich. The Michigan Central was fined $6,700 for violation of the law requiring that cattle be taken from cars seasonably for watering and feeding. This fine covered violations from 1911 to about 1914 and the amount represented part of a large number of suits, approximately 475, commenced at Detroit and also at Buffalo, N. Y. The Grand Trunk was fined for not having air brakes properly repaired and for not having sufficient grab irons on cars; and the Wabash company was fined for the same offense.

The triennial convention of the Brotherhood of Locomotive Firemen & Enginemen opened at Denver, Colo., on June 9 with approximately 900 delegates present and will continue in session for approximately a month, during which the average attendance is expected to be approximately 2,500. Among the questions which it is understood will be discussed by delegates to the convention are those of federal control of the railroads, the attitude of the Brotherhood toward a solution of the railway problem, and the matter of wages of railroad firemen and engineers. Among the first resolutions adopted by the Brotherhood were ones endorsing the League of Nations and requesting the release from prison of Eugene V. Debs and Thomas J. Mooney.

Safety-first campaigns will be begun in both the Central Western and the North Western regions on June 22, and will continue through June 28—seven days. The government operated railroads in these two regions aggregate about 104,000 miles of line, or about two-fifths of the mileage of the country. The campaigns will be under the direction of H. A. Adams, in the Central, and H. J. Bell in the North Western region. The two campaigns will concern approximately 550,000 railroad men. The men in these regions operate roughly 700,000 freight cars, 21,000 locomotives and 17,000 passenger cars, or 30 per cent of the total railway equipment of the United States. So far as practicable personal appeals will be made to every employee to equal or better the records made in similar campaigns in other regions.

Eight Miles of Belting

The B. F. Goodrich Rubber Company, Akron, Ohio, recently shipped to the Pennsylvania Railroad, 44,254 ft. of rubber belting for use in its new grain elevator at Camden (Baltimore). This shipment included 32-in. and 38-in. widths for belting, and 36-in., 42-in. and 48-in for use in conveyors. The capacity of one of the 48-in. horizontal carriers is 35,000 bushels an hour. It is expected that at this elevator 2,000,000 bushels of grain can be loaded daily.

The Trouble Begins

Today (June 20) is the last day for shipping whisky by railroad, according to a Cincinnati paper, which says that a notice to that effect has been sent to distillers and wholesalers by the United States Railroad Administration. It is said that more than a third of outbound shipments from Louisville are whisky; for the last week freight houses have been packed with liquor. "All whisky going out now must have freight prepaid so that railroads will not be the loser if the goods arrive at their destination after the curtain falls, July 1."

The International Fuel Association

The report of discussion of F. H. Hammill's paper on fuel economy appearing in the article on the Eleventh Annual Convention of the International Railway Fuel Association as given on page 1254 of the *Railway Age* of May 23 referred to a statement by A. D'Heur of the Southern Pacific. This is incorrect as the speaker was Thomas Ahern, division superintendent of the Coast division, Southern Pacific. The division fuel oil meetings there referred to are attended by em-

ployees from all departments, as they can be spared. Engineers and firemen attending these meetings are selected because they have the best fuel records, as shown by performance sheets.

Spruce Forest Railroads to Be Sold

The Spruce Production Corporation announces at Portland, Ore., that the extensive forests bought by the government last year with a view to supplying lumber for airplanes, together with the railroads built to get at this lumber, will be soon advertised for sale. The timber area amounts to hundreds of square miles, and the length of completed railroad is more than 75 miles. About half of this railroad is on the Olympic peninsula in Clallam county, Washington, and grading has been done on many miles of short spurs. There are also long pieces of railroad in Oregon.

Winnipeg Strike

With the arrest of 10 of Winnipeg's general strike leaders on June 17 on charges of making seditious statements, the situation at Winnipeg is less tense, and it is expected that the difficulties between employees and metal trade workers, in whose support the general strike was called, will soon be adjusted. The "labor temple," from which the strike has been conducted, was raided by the police and considerable literature confiscated.

Members of the Winnipeg lodges of the firemen's and brakemen's brotherhoods have voted to join in a sympathetic strike unless certain demands of the local unions are met. The executive officers of both brotherhoods immediately declared that the action of the Winnipeg locals was unauthorized and that union men would be used to replace the "illegal strikers." The railroad brotherhoods acting as mediators did not accomplish any definite results. Train service in and out of Winnipeg has been maintained, and with the exception of a few suburban trains the service has not been curtailed in any manner during the strike.

James Peak Tunnel Proposed

Mayor Dewey C. Bailey, Denver, Colo., has recently made a proposal to the Denver Civic & Commercial Association to create a six million dollar corporation to complete the tunnel under James Peak for the Denver & Salt Lake independent of state aid. In making his proposal Mayor Bailey promised city aid in promoting the new company and proposed to ask the citizens of Denver to vote bonds to build the tunnel.

The Colorado legislature at its last session authorized the appointment of a special commission to prepare plans for submission to the voters of a bond issue to complete the tunnel. Mayor Bailey's proposal was based on the supposition that the southern part of the state would not support a plan to vote bonds by the state to build this tunnel for the Moffat road, whereas Denver is directly interested in this project because of the great business which otherwise would be diverted to Wyoming, Omaha, Neb., and Salt Lake, Utah. President W. D. Hodges of the Denver Civic & Commercial Association, promised to back the campaign, which will probably start about September 1.

The Franco-American Tongue

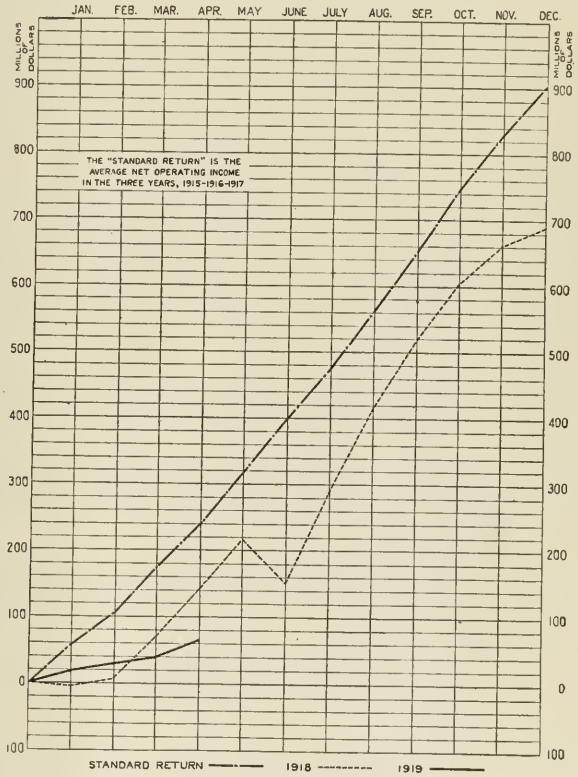
A correspondent in France sends us the following extract from an Anglicized report, received from a French superintendent, replying to correspondence about carelessness or neglect on the part of a certain engineman. Superintendents and others who do not feel themselves 100 per cent proficient in correspondence may perhaps learn a point or two from this translator. The incident referred to was the derailment of a tender, the engineman of Engine 1242, coupled to the rear of Engine 1579, putting on steam at the wrong moment and derailing the tender of 1579, as they were entering a side track.

"In reference to the correspondence exchanged—your note No. 580 DM.—concerning the derailing of the machine USA 1242, on the heart of switch 328 . . . according to the investigation to which we proceeded, it follows that the engineman of the machine 1242, which was joined to machine 1579, had opened his regulator just as he was about to engage the center of the crossing. This operation, causing pressure of the first machine, uplifted slightly the front axle of the machine 1242 and enabled it, thanks to a curve of 280 mm. (eleven inches!) diameter to take the tangent and to engage itself in the groove preceding the frog.

"As we have no regulation whatever, in case of a double draw-gear, forbidding the engineman of the second engine to open his regulator, when the operation is necessary, the responsibility of the engineman, at machine 1242, cannot be looked for. . . ."

Net Operating Income

The chart made by the Bureau of Railway Economics shows the net operating income of the Class I Roads in 1919, compared with the average in the test period (1915-1916-17)



Net Operating Income, Cumulated by Months, 1918 and 1919 Compared with Standard Return, Class I Railways of United States

on which government rental is based. The table gives the figures on which the chart is based.

Month	Average net operating income (standard return) in 3-year test period: By months	Cumulative	Net operating income earned in 1919: By months	Cumulative	Deficit in 1919: By months	Cumulative
Jan...	$56,613,000	$56,613,000	$18,783,702	.....	$37,830,000	.....
Feb...	47,934,000	104,547,000	10,106,268	$28,889,970	37,828,000	$75,658,000
March.	68,251,000	172,798,000	10,842,608	39,660,778	57,409,000	133,067,000
April..	67,289,000	240,087,000	26,115,214	65,916,807	41,174,000	174,241,000
May...	77,385,000	317,472,000	.....	.....	.....	.....
June..	82,550,000	400,022,000	.....	.....	.....	.....
July...	75,341,000	475,363,000	.....	.....	.....	.....
August	86,860,000	562,223,000	.....	.....	.....	.....
Sept...	91,273,000	653,496,000	.....	.....	.....	.....
Oct...	94,333,000	747,829,000	.....	.....	.....	.....
Nov...	83,536,000	831,365,000	.....	.....	.....	.....
Dec...	73,282,000	904,647,000	.....	.....	.....	.....

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL, 1919—CONTINUED FROM LAST WEEK

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	In crease (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Houston, East & West Texas	190	$130,620	$38,046	$178,401	$33,319	$22,771	$1,018	$92,944	$4,556	$154,610	86.66	$23,791	$6,158	$17,34[illegible]	—$23,[illegible]
Illinois Central	4,787	5,579,872	1,796,937	8,015,774	1,490,374	2,268,997	90,351	3,944,502	233,265	8,098,130	101.02	—82,357	396,000	—48[illegible]947	—2,369,494
Indiana Harbor Belt	116	.....	.....	453,335	93,150	115,867	2,029	304,394	18,653	534,094	117.81	—80,759	9,954	—9[illegible]716	—81,466
International & Great Northern	1,159	793,013	220,975	1,092,233	282,400	339,480	13,241	617,175	42,961	1,302,247	119.22	—210,014	30,000	—240,[illegible]105	—459,554
Kanawha & Michigan	176	266,931	69,242	351,595	33,991	98,738	2,666	113,662	12,363	261,419	74.35	90,175	17,885	72,[illegible]290	—33,333
Kansas City, Mex. & Orient	272	95,705	22,317	123,633	38,180	34,859	986	54,070	7,865	135,963	109.97	—12,330	6,250	—[illegible]8,58[illegible]	1,683
Kansas City, Mexico & Orient of Texas	465	64,370	12,185	81,986	32,610	36,636	1,041	60,147	7,658	138,092	168.43	—56,105	4,920	[illegible]1,026	—48,[illegible]72
Kansas City Southern	774	890,971	171,766	1,147,678	217,193	239,832	21,505	478,097	45,163	997,519	86.91	150,160	61,750	88,[illegible]32	—341,988
Kansas City Terminal	27	.....	.....	101,355	14,294	24,959	.....	46,914	1,630	89,016	87.82	12,340	20,150	—7,[illegible]811	—9,309
Lake Erie & Western	902	614,056	59,046	706,788	116,446	238,337	12,006	339,008	24,116	729,594	103.23	—22,806	28,500	51,541	—217,285
Lake Superior & Ishpeming	34	3,804	250	5,017	20,927	20,291	192	9,948	2,598	53,956	1,075.46	—48,939	2,560	—51,499	—28,844
Lehigh & Hudson River	96	168,740	4,015	181,098	22,674	37,422	1,556	77,236	6,291	145,179	80.16	35,419	4,500	31,404	—5,884
Lehigh & New England	229	273,210	1,716	286,881	40,657	61,728	3,012	88,940	8,397	202,734	70.66	84,147	8,610	75,537	19,694
Lehigh Valley	1,435	3,932,346	700,789	5,105,030	751,293	1,257,081	51,639	2,452,065	105,757	4,633,828	90.76	471,203	146,725	324,[illegible]42	—14,448
Long Island R. R.	398	507,319	1,269,604	1,985,635	262,299	276,476	12,751	925,014	47,193	1,537,314	77.42	448,322	85,804	361,484	—56,784
Los Angeles & Salt Lake	1,168	1,085,274	335,495	1,507,113	295,246	269,178	16,422	461,334	29,506	1,107,122	73.45	399,991	67,235	322,770	100,351
Louisiana Ry. & Navigation	349	231,462	32,380	280,051	91,966	43,637	3,485	138,630	7,136	284,852	101.71	—4,801	14,000	—18,835	—89,112
Louisiana & Arkansas	302	133,921	32,261	172,234	32,694	36,343	3,153	72,122	5,670	149,982	87.08	22,241	11,571	10,671	—33,682
Louisiana Western	207	201,511	99,980	318,815	37,954	61,714	3,734	81,505	10,538	197,433	61.92	121,382	9,070	112,254	—64,999
Louisville & Nash	5,013	6,271,861	1,852,179	8,600,945	1,383,851	2,250,497	116,309	3,397,120	200,984	7,347,530	85.41	1,753,411	246,776	1,006,585	—634,141
Louisville, Henderson & St. L.	199	157,602	58,655	228,213	63,566	37,877	6,331	95,692	6,995	210,460	92.22	17,753	4,000	13,649	—41,705
Maine Central	1,216	888,896	378,592	1,385,944	284,247	332,652	10,449	777,075	33,517	1,438,919	103.82	—52,975	75,623	—128,609	—284,548
Maryland, Delaware & Va.	82	70,590	30,312	103,994	8,244	22,943	505	73,719	1,954	107,365	103.24	—3,371	1,733	—5,104	5,129
Michigan Central	1,861	3,613,573	1,567,869	5,757,070	807,852	1,173,180	70,040	2,224,104	111,453	4,449,519	77.28	1,307,551	160,000	1,146,820	—612,130
Midland Valley	388	218,922	80,520	307,301	70,441	58,927	3,414	115,365	12,294	260,442	84.75	46,860	6,286	39,953	63,540
Mineral Range	101	69,326	494	72,274	8,867	23,016	772	37,796	1,643	71,526	98.96	748	3,300	—2,552	—8,414
Minneapolis & St. Louis	1,646	748,631	200,413	1,007,539	227,999	298,666	10,272	474,320	28,674	1,038,790	103.10	—31,251	51,373	—83,487	—92,988
Minneap., St. Paul & Sault Ste. Marie	4,243	2,302,716	591,125	3,131,747	531,173	754,096	25,829	1,316,335	74,689	2,710,967	86.56	420,780	187,703	233,049	9,239
Minn. & International	194	68,560	23,599	96,010	23,644	14,747	4,691	46,523	7,293	88,668	92.35	7,342	4,800	2,538	—201
Mississippi Central	164	44,901	25,839	75,354	18,066	28,269	1,072	40,761	5,529	94,097	124.87	—18,744	3,325	—22,069	—58,644
Missouri & North Arkansas	365	73,436	38,168	117,919	58,321	33,618	2,967	66,852	6,493	168,175	142.61	—50,256	6,242	—56,[illegible]98	—67,089
Missouri, Kansas & Texas	1,713	1,815,265	586,042	2,565,830	477,197	752,914	30,535	946,354	73,453	2,286,129	89.09	279,701	90,359	189,237	—352,058
Missouri, Oklahoma & Gulf	332	76,791	15,704	101,505	48,094	50,551	1,974	69,539	7,209	177,607	174.97	76,101	8,500	84,601	—57,362
Missouri Pacific	7,108	4,898,545	1,465,834	6,868,821	1,310,912	1,597,576	101,110	2,878,980	208,252	6,125,978	89.18	742,843	266,393	473,989	1,793,507
Missouri, Kansas & Texas Ry. of Texas	1,796	1,214,893	587,012	1,944,486	385,679	347,451	20,444	962,955	69,847	1,801,737	92.65	142,749	47,828	94,[illegible]21	42,334
Montour R. R.	54	104,760	1,566	111,367	22,877	63,912	1,028	25,732	6,467	120,020	107.76	—8,653	2,286	—10,939	—10,230
Mobile & Ohio	997	972,117	174,260	1,214,250	234,728	442,970	27,001	571,671	40,142	1,316,739	108.44	102,488	—55,174	—157,681	—397,865
Monongahela Ry.	108	197,082	18,728	278,920	70,402	33,127	1,028	79,143	6,003	189,704	68.01	89,216	5,000	84,216	—61,986
Monongahela Connecting	6	.....	.....	99,350	15,474	38,545	510	48,831	6,464	109,825	110.54	—10,475	2,566	—13,042	—62,156
Morgan's Louisiana & Texas R. R.	400	346,365	159,541	546,760	98,757	124,988	7,205	282,114	22,348	537,262	98.26	9,497	31,034	—21,638	—323,940
Nashville, Chatt. & St. L.	1,247	1,062,541	426,952	1,599,324	281,472	369,138	32,244	621,933	44,278	1,358,015	84.91	241,309	50,000	191,168	—187,776
Nevada Northern	168	97,535	8,695	110,529	17,377	23,800	1,246	34,450	4,541	81,544	73.77	—28,986	18,323	10,662	—74,171
New Orleans & N. E.	409	347,832	103,335	517,101	101,839	112,344	9,575	255,646	12,213	495,159	95.75	21,942	28,357	—6,563	—171,626
New Orleans Great Northern	284	142,139	41,115	190,609	40,856	46,446	2,291	74,698	8,776	173,481	91.01	17,128	9,100	7,988	—38,017
New Orleans, Texas & Mex.	191	108,171	34,561	151,570	46,519	35,956	2,899	48,176	6,631	141,761	93.52	9,810	10,000	—190	—87,068
New York Central	6,075	13,339,550	6,347,564	22,701,274	2,977,648	5,353,397	222,661	10,505,262	599,354	20,058,134	88.35	2,643,141	1,281,216	1,361,430	—3,235,380
New York, Chicago & St. L.	574	1,700,255	214,649	1,960,898	232,603	384,514	25,571	768,001	47,692	1,462,416	74.57	498,481	55,000	443,481	—48,129
New York, N. H. & Hart.	1,965	3,442,938	3,641,285	8,118,784	1,106,843	1,571,505	43,999	4,086,149	245,941	7,176,786	88.39	941,997	268,000	672,711	—551,386
New York, Ont. & Western	569	465,114	115,300	725,653	119,913	211,041	8,629	371,858	20,260	731,700	100.83	—6,047	24,700	—30,751	—135,887
New York, Phila. & Norfolk	121	465,464	130,729	639,208	53,221	140,860	9,073	300,711	11,127	533,306	83.43	105,903	17,646	88,257	283
New York, Susq. & Western	135	212,411	51,618	314,571	33,957	49,181	1,977	220,359	9,066	314,514	99.98	59	37,111	—37,078	—78,315
Newburgh & South Shore	7	.....	.....	151,304	21,499	27,565	.....	64,620	3,671	117,355	77.56	33,949	8,145	25,804	23,857
Norfolk Southern	907	337,823	136,623	511,270	119,087	122,103	7,451	246,901	21,297	517,515	101.22	—6,245	19,990	26,264	—106,483
Norfolk & Western	2,088	4,979,175	865,206	6,189,619	792,970	1,904,737	53,101	2,184,662	110,040	5,048,683	81.56	1,140,936	260,000	880,648	—732,333
Northern Alabama	112	66,565	11,946	80,692	27,056	8,970	1,343	40,547	1,670	79,459	98.47	1,233	3,400	—2,167	—29,434
Northern Pacific	6,568	5,756,736	1,435,019	7,747,573	1,580,761	1,355,259	54,901	2,803,646	192,464	6,304,384	81.37	1,713,189	647,124	1,064,275	—460,104
Northwestern Pacific	507	224,367	175,670	454,440	79,985	70,433	4,335	197,591	13,097	367,818	80.93	86,621	22,000	64,454	—50,302
Oregon Short Line	2,347	2,099,979	518,414	2,823,799	726,504	441,798	15,332	836,751	95,704	2,168,260	76.78	655,540	177,964	477,491	—441,651
Oregon-Wash. R. R. & Nav.	2,069	1,388,998	473,459	2,049,454	441,134	257,796	25,127	803,056	92,461	1,745,788	85.18	303,665	113,614	189,802	—343,681
Panhandle & Santa Fe	772	299,553	90,458	413,999	145,318	158,663	3,663	227,192	14,769	545,695	131.81	131,696	15,604	147,417	288,425
Pennsylvania R. R. Western Lines	1,754	5,809,623	1,658,455	8,068,487	1,052,530	2,248,852	80,577	3,402,779	183,601	7,026,055	87.08	1,042,432	307,737	734,549	—72,518
Pennsylvania R. R., East	5,360	18,278,793	7,743,288	28,413,269	3,962,189	7,975,466	290,274	12,513,981	723,245	25,994,230	91.48	2,419,030	920,335	1,498,266	—1,911,193
Perkiomen	41	81,194	8,810	92,978	7,156	3	13	28,713	280	36,199	38.93	56,779	1,880	54,079	36,002
Peoria & Pekin Union	19	30,578	4,564	94,190	15,992	38,564	849	67,642	5,413	128,459	136.38	—34,269	9,500	43,769	50,767
Pere Marquette	2,232	2,060,931	424,236	2,690,532	369,233	575,284	28,910	1,225,916	72,169	2,280,141	85.08	401,391	49,834	351,489	—224,444
Phila. & Reading	1,127	4,203,280	959,524	5,471,390	764,416	1,407,948	37,225	2,788,860	132,994	5,149,674	94.12	321,716	143,228	178,488	—1,419,937
Pitts. & Lake Erie	224	1,600,238	201,922	1,963,786	555,839	614,864	13,408	720,506	42,400	1,948,118	99.20	15,669	75,500	—59,835	—1,051,322
Pitts. & W. Va.	63	77,716	9,140	100,236	82,865	39,152	1,673	45,959	5,015	184,236	183.80	—84,000	11,446	—95,446	—120,385
Phila., Bethlehem & N. England	71	.....	.....	52,598	4,487	12,499	373	36,625	950	54,934	104.44	2,336	1,050	—3,386	—17,039
Pitts. & Shawmut	103	79,568	3,951	84,474	31,590	41,926	2,094	38,197	3,102	115,238	136.41	—30,764	979	—31,742	—25,224

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL, 1919—CONCLUDED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of—									
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.				
Pitts., Cin., Chic. & St. Louis	2,383	$5,618,320	$1,494,746	$7,813,282	$913,107	$2,286,229	$82,516	$3,280,645	$176,009	$6,802,023	87.05	$1,011,259	$243,016	$767,934	—$226,520
Pitts., Shawmut & Northern	204	78,102	6,027	86,771	19,886	49,162	1,170	35,786	5,551	111,560	128.56	—24,787	1,832	—26,620	8,464
Port Reading	21	106,557	.....	233,938	23,120	9,195	18	80,767	306	113,406	48.47	120,532	9,000	111,532	—24,450
Quincy, Omaha & Kansas City	255	61,325	23,481	91,261	44,747	24,802	173	42,882	1,680	113,860	124.76	—22,600	2,910	—25,538	—27,942
Rich., Fred. & Pot.	77	224,185	291,248	564,882	97,873	94,936	4,943	219,426	10,101	443,877	78.57	121,005	—11,810	109,192	—36,517
Rutland R. R.	415	231,466	104,074	402,152	64,091	95,581	5,806	200,578	11,148	377,185	93.79	24,967	19,059	5,906	—67,082
St. Joseph & Grand Island	258	147,110	44,226	205,945	50,654	75,677	2,078	122,077	12,319	324,227	108.87	—18,282	8,811	—27,093	—23,870
St. Louis, Brownsville & Mex.	548	263,471	118,226	411,372	60,668	71,393	4,441	133,781	16,231	286,513	69.64	124,860	10,000	114,854	37,595
St. Louis Merchants Bridge Terminal	9	.....	696	206,100	60,081	43,356	733	175,921	6,308	286,397	138.95	—80,297	8,000	—88,297	—126,746
St. Louis-San Fran.	4,761	3,981,301	1,568,125	5,855,857	1,043,731	1,134,393	45,631	2,148,324	196,591	4,515,603	77.11	1,340,255	279,332	1,059 034	38,187
St. Louis, San Fran. & Texas	134	100,656	4,718	113,290	21,042	23,257	2,213	65,593	10,477	122,582	108.20	—9,293	1,629	—10,939	—69,201
St. L. Southwestern	939	781,187	163,436	989,182	160,087	214,242	15,191	277,324	35,962	706,001	71.37	283,181	44,829	238,378	—327,950
St. Louis Southwestern Ry. of Texas	814	295,673	97,609	429,322	107,161	165,930	8,919	243,498	23,845	548,518	127.76	—119,196	21,000	—140,199	—109,241
San Anto & Aransas Pass	732	189,738	78,231	295,758	88,577	116,719	5,454	200,162	16,114	426,937	144.35	—131,179	15,000	—146,956	—164,391
Seaboard Air Line	3,563	2,059,722	995,555	3,359,085	516,387	726,525	68,050	1,582,031	109,427	3,031,712	90.25	327,372	135,000	191,770	—418,464
St. Louis Transfer	6	.....	.....	70,824	11,350	10,381	186	34,930	2,019	58,867	83.11	11,956	100	11,856	—3,443
South Buffalo	11	27,538	.....	62,444	—15,763	9,141	305	42,776	1,968	38,427	61.53	24,017	2,550	21,467	—55,377
Southern Ry.	6,983	6,363,120	2,926,169	10,110,424	1,921,192	2,526,282	123,244	4,329,576	277,923	9,272,254	91.71	838,170	322,263	510.213	—2,776,540
Southern Ry. in Mississippi	278	81,168	40,706	131,637	41,439	24,121	2,543	83,111	4,202	155,415	118.06	23,778	9,000	—32,911	—36,714
Southern Pacific	7.049	8.057.021	3,355,272	12,469,791	2,258,650	2,830,823	107,365	5.137,840	282,754	10,830,550	86.85	1,639,241	631,133	1,005,410	—1,628,467
Spokane International Ry.	156	56,595	16,421	74,964	20,343	7,897	1,602	28,519	4,031	61,909	82.58	13,054	7,932	5,121	—26,983
Southern Pacific Steamship Lines	...	813,664	51.746	914,643	10,733	250,817	11,320	652,087	23,886	948,844	103.74	—34,201	10,850	—45,051	—221,848
Spokane, Portland & Seattle	554	393,497	123,588	557,583	102,533	104,924	7,010	180,059	18,798	415,674	74.54	141,909	59,200	82,674	—124,713
Staten Island Rapid Transit	23	93,021	71,495	188,371	26,967	29,769	888	103,095	9,486	170,206	90.35	18,166	9,020	9,147	—10,383
Tennessee Central	293	172,448	42,391	228,578	97,901	45,796	2,004	93,718	6,924	247,032	108.07	—18,455	5,135	—23,596	—81,078
Terminal R. R. Assn. of St. L.	36	.....	2,852	290,914	54,005	52,117	748	154,054	5,688	269,947	92.79	20,966	28,250	—7,284	—64,051
Texarkana & Ft. Smith	87	95,602	15,591	121,408	23,215	24,103	376	73,779	3,166	124,569	102.60	—3,161	7,768	—10,951	—42,518
Texas & New Orleans	469	439,174	167,212	663,933	116,933	167,435	5,595	222,381	13,108	550,770	82.95	112,648	21,086	91,270	—92,290
Texas & Pacific	1.946	1,836,554	710,592	2,708,204	391,643	548,190	22,825	1,284,536	71,876	2,338,657	86.35	369,547	84,971	284,379	—156,619
Toledo & Ohio Central	435	499,651	61,218	591,209	123,350	201,740	5,215	263,667	16,922	613,058	103.70	—21,850	31,056	—52,908	—90,018
Toledo, Peoria & Western	247	87,331	44,809	140,272	32,181	45,440	2,438	67,343	5,912	153,315	109.29	—13,043	8,500	—21.543	—13,004
Toledo, St. L. & Western	454	561,106	29,280	618,992	104,160	123,369	4,944	245,482	11,547	489,503	79.08	129,488	26,000	103,488	—121,463
Trinity & Brazos Valley	368	70,161	20,145	95,343	34,490	38,007	1,731	55,012	7,380	136,619	143.29	—41,276	5,715	—46,991	—54,890
Ulster & Delaware	128	71,450	6,282	98,452	4,116	20,298	1,317	94,223	4,723	125,224	127.19	—26,772	5,400	—32,172	—35,078
Union R. R.	35	.....	.....	612,679	61,258	200,910	234	327,955	7,762	598,120	97.62	14,560	6,428	8,132	—49,635
Union Pacific	3,614	5,738,998	1,747,423	8,171,586	1,498,704	1,527,937	53,886	2,244,303	220.505	5,735,856	70.19	2,435,731	275,316	2,159,476	—184,329
Utah Ry.	98	62,254	438	64,380	3,482	13,213	205	14,658	1,867	33,425	51.91	30,955	4,088	26,867	—20,967
Vicksburg, Shreveport & Pacific	171	153,197	667,705	239,840	37,644	54,271	3,712	92,934	7,870	198,341	82.69	41,499	9,417	31,946	—21,957
Virginian Ry.	499	558,367	51,911	680,346	115,407	201,038	3,656	258,808	14,276	596,047	87.60	84,300	35,700	48,597	—177,618
Wabash	2,519	2,903,816	772,310	3,880,977	529,468	676,851	56,912	1,953,966	113,060	3,350,317	86.32	530,660	108.887	421,670	—326,110
Washington Southern	35	93,455	182,059	309,100	44,905	43,620	1,931	121,650	5,957	225,441	72.93	83,659	6,870	76,777	—36,761
West Jersey & Seashore	361	271,600	501,892	832,378	161,882	191,873	8,916	479,148	21,079	868,785	104.37	—36,407	51,605	—88,012	35,609
Wichita Falls & N. W.	328	106,229	34,927	150,179	50,862	32,329	1,863	109,159	8,731	262,923	175.07	—52,744	9,256	—62,000	—24,787
Western Maryland	707	956,671	73,878	1,124,869	188,663	387,456	16,610	460,340	41,878	1,107,101	98.42	17,768	43,200	—25,432	—66,445
Western Pacific	1,011	632.818	155,069	830.826	254,925	178,188	9,846	312,491	25,999	795,947	95.80	34,879	48,231	—13,595	—270,242
Western Ry. of Alabama	133	139,510	82,598	235,874	25,607	47,504	2,956	77,152	6,072	163,049	69.12	72,824	7,500	65,324	—4,109
Wheeling & Lake Erie	511	816,361	58,293	962,184	219,311	204,805	5,896	376,984	23,911	833,230	86.59	128,954	54,200	74,155	37,465
Yazoo & Miss.	1,381	1,310,272	391,461	1,798,195	339,689	427,891	18,180	802,114	47,699	1,633,478	90.83	164,717	68,066	96,543	—344,403
FOUR MONTHS OF CALENDAR YEAR, 1919															
Alabama & Vicksburg	141	601,293	235,514	892,232	146,242	228,992	6,900	395,411	34,161	816,085	91.56	75,247	42,540	32,616	—116,482
Ala. Great Southern	312	2,335,875	670,332	3,188,632	379,008	883,796	50,623	1,388,063	69,924	2,784,617	87.32	404,015	98,244	305,698	—350,832
Ann Arbor	301	997,673	206,779	1,270,538	274,262	223,989	14,261	600,676	47,776	1,161,130	91.38	109,408	59,600	49,586	18,236
Arizona Eastern	377	972,408	190,848	1,248,133	328,990	194,208	6,413	410,234	27,490	983,993	78.83	264,141	65,128	198,940	—366,467
Atch., Topeka & Santa Fe	8,635	34,946,341	13,475,138	50,910,056	7,550,223	12,176,918	563,359	19,682,115	1,036,435	40,874,865	80.29	10,035,191	2,210,064	7,813,916	—4,673,472
Atlanta & W. Point	93	448,472	366,837	901,414	108,620	165,538	11,627	528,543	25,092	644,741	71.52	256,673	34,000	222,638	22,249
Atlanta, Birm. & At.	639	1,182,815	280,675	1,559,145	480,631	543,154	26,236	946,713	50,132	2,047,247	131.31	—488,102	64,000	—552,971	539,311
Atlantic City	177	489,025	505,295	1,072,418	170,743	164,872	3,785	649,613	3,295	992,682	92.56	79,735	48,000	31,735	36,461
Atlantic Coast Line	4,875	14,408,011	7,166,952	22,960,934	3,152,429	4,581,470	239,252	9,800,061	433,865	18,346,552	79.91	4,614,382	820,000	3,788,733	—1,385,822
Balto. & Ohio Chic. Terminal	91	.....	12	472,126	135,676	183,539	4,268	489,661	43,748	875,750	185.49	—403,624	116,837	—520,496	—136,511
Balto. & Ohio	5,145	36,341,078	9,958,455	50,199,190	8,509,882	17,914,779	617,291	25,225,641	1,605,539	54,253,895	108.07	—4,054,705	1,454,992	—5,514,091	3,417,855
Balto., Ches. & Atl.	87	267,673	118,464	399,071	44,499	75,827	3,729	259,255	13,655	396,966	99.47	2,105	12,640	—10,534	—34,471
Bangor & Aroostook	632	1,437,711	294,569	1,810,366	366,884	431,548	15,609	714,410	53,554	1,602,738	88.53	207,629	84,000	123,289	—90,045
Beaumont, Sour Lake & Western	118	326,573	90,280	436,971	95,359	77,674	6,803	191,114	20,904	391,853	89.85	44,218	10,800	33,378	—204,900
Belt Ry. Co. of Chicago	31	.....	.....	961,095	83,378	200,317	1,197	694,391	31,885	1,011,168	105.20	—50,073	62,536	—112,609	—88,955
Bessemer & Lake Erie	217	2,620,628	133,481	2,866,924	315,163	1,212,683	44,182	1,199,990	80,540	2,805,738	97.86	61,186	58,000	3,119	83,078
Bingham & Garfield	37	411,858	10,122	442,076	129,121	159,021	6,023	126,823	19,011	445,717	100.82	3,642	24,927	—28,569	—452,288
Birmingham Southern	29	163,325	.....	227,319	14,766	29,657	2,754	95,860	13,194	156,231	68.72	71,089	11,404	58,972	43,955
Boston & Maine	2,258	11.669,584	6,390,692	20,320,399	2,684,889	4,456,449	151,140	12,041,711	676,386	20,123,487	99.03	196,912	693,776	—497,119	—512,070
Buff. & Susq. R. R. Corp.	296	620,932	29,391	666,808	157,204	328,533	7,226	247,624	29,221	769,808	115.44	—102,999	13,000	—115,999	—188,740

REVENUES AND EXPENSES OF RAILWAYS

FOUR MONTHS OF CALENDAR YEAR, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Buff., Roch. & Pitts.	589	$3,822,803	$478,765	$4,449,185	$671,643	$1,570,018	$57,335	$2,285,740	$131,873	$4,724,247	106.18	—$275,061	$108,000	—$383,503	—$465,047
Canadian Pacific Lines in Maine	233	991,537	267,115	1,310,816	135,155	315,872	10,521	868,941	15,650	1,346,138	102.69	—35,322	44,000	—79,322	77,386
Carolina, Clinchfield & O.	282	1,643,765	119,177	1,796,088	328,208	454,434	17,755	614,353	53,807	1,468,206	81.74	327,881	65,200	262,669	—101,678
Central New England	391	1,683,138	97,023	1,879,660	416,411	456,016	9,734	1,066,973	50,431	2,004,754	106.66	—125,094	64,000	—189,270	—435,929
Central of Georgia	1,918	4,070,320	1,934,299	6,717,673	1,361,441	1,530,434	13,618	2,963,167	233,408	6,212,832	92.48	504,841	219,362	284,437	—1,586,439
Central R. R. of New Jersey	684	9,738,745	2,341,699	13,174,502	1,561,214	3,618,225	82,395	6,597,160	327,714	12,251,076	92.98	923,426	629,899	293,371	—444,907
Central Vermont	411	1,183,062	317,025	1,645,304	214,850	460,580	24,110	1,111,544	72,056	1,884,392	114.53	—239,089	69,600	—308,808	—150,061
Charleston & Western Carolina	342	776,278	224,084	1,042,996	179,245	192,178	16,903	476,898	23,096	888,321	85.17	154,675	34,000	120,675	—95,522
Chesapeake & Ohio	2,496	15,834,641	4,541,871	21,538,164	3,536,677	5,054,214	150,037	8,780,255	455,512	18,104,538	84.05	3,433,627	682,841	2,747,754	—746,124
Chicago & Alton	1,050	5,431,498	1,865,362	7,736,255	1,263,415	2,097,821	99,363	3,481,433	201,221	7,134,032	92.21	602,223	226,706	374,939	—105,985
Chicago & Eastern Ill.	1,131	5,381,592	1,521,195	7,455,375	1,217,809	2,996,019	91,204	3,499,656	193,068	8,018,552	107.55	—563,177	318,092	—882,917	—972,058
Chicago & Erie	269	2,661,513	325,534	3,241,785	363,441	630,772	41,487	1,774,428	112,666	2,935,335	90.54	306,450	128,573	177,803	495,121
Chicago & Northwestern	8,090	25,434,777	10,067,678	38,734,267	5,305,197	8,836,527	294,194	19,823,100	976,725	35,547,271	91.77	3,186,995	1,900,000	1,283,355	—26,475
Chicago, Burl. & Quincy	9,372	31,606,007	9,830,701	44,566,855	6,569,635	9,186,047	350,373	18,390,884	1,267,257	36,180,878	81.18	8,385,977	1,732,705	6,635,927	—1,154,654
Chicago Great Western	1,496	4,176,206	1,798,547	6,429,860	978,038	1,625,146	105,117	3,036,752	178,133	5,972,451	92.88	457,409	232,948	224,327	—358,423
Chicago, Ind. & Lou.	657	2,408,859	814,447	3,529,240	428,680	865,794	49,747	1,470,446	99,849	2,947,425	83.51	581,815	128,166	453,481	204,143
Chicago Junction	12	.....	.....	1,063,736	330,483	206,001	440	921,147	31,294	1,489,364	140.01	—425,628	9,974	—435,602	—355,130
Chicago, Milwaukee & St. Paul	10,647	31,424,021	8,964,195	44,149,525	5,008,150	13,785,219	350,189	21,728,994	1,244,196	42,254,252	95.71	1,895,273	2,121,187	—235,780	—869,388
Chicago, Peoria & St. L.	247	374,109	93,065	496,282	150,584	250,153	10,525	318,718	37,760	767,733	154.69	—271,451	29,566	—301,031	—216,954
Chicago, Rock Island & Gulf	474	1,066,299	330,263	1,463,459	264,327	289,102	25,626	677,065	46,246	1,305,360	89.19	158,099	52,619	105,210	—334,169
Chicago, Rock Island & Pacific	7,592	21,211,055	8,762,698	31,882,242	5,595,747	8,114,391	386,060	14,632,074	795,370	29,653,568	93.01	2,228,874	1,393,258	833,318	—2,992,043
Chicago, St. Paul, Minn. & Omaha	1,749	5,457,066	2,232,213	8,295,824	841,848	1,596,157	83,359	4,093,344	233,465	6,912,974	83.38	1,382,851	413,947	967,076	213,032
Chicago, Terre Haute & Southeastern	374	1,144,388	85,539	1,257,462	211,480	609,644	14,399	486,448	32,536	1,361,714	108.29	—104,253	58,000	—162,254	119,597
Cincin., Lebanon & Nor.	76	225,208	26,664	304,453	61,666	72,788	5,095	205,908	3,465	348,923	114.60	—44,470	17,002	—61,472	20,290
Cincinnati, Ind. & Western	321	609,271	188,720	886,064	168,788	273,480	16,658	505,948	49,441	1,016,080	114.67	—130,016	40,972	—170,988	—292,510
Cincinnati, New Orleans & Texas Pacific	337	4,054,317	1,236,561	5,572,445	626,957	1,754,847	93,452	1,956,697	130,254	4,598,570	82.52	973,876	155,999	816,547	209,044
Cincinnati Northern	251	830,112	67,170	919,266	166,637	218,905	9,532	313,195	18,944	727,213	79.90	192,054	33,000	158,974	94,216
Cleveland, Cincinnati, Chicago & St. Paul	2,395	14,346,643	4,759,627	20,725,110	2,911,416	4,551,504	312,631	8,653,513	422,294	17,003,068	82.04	3,722,043	740,000	2,978,409	—427,064
Colorado & Southern	1,100	3,299,099	642,764	4,150,462	520,701	970,275	33,570	1,573,008	146,630	3,266,934	78.71	883,527	188,000	693,782	—266,394
Colorado & Wyoming	41	98,670	4,676	379,511	33,806	70,510	309	180,780	15,467	300,872	79.27	78,639	16,000	62,639	—13,703
Cumberland Valley	163	1,336,579	253,597	1,707,608	350,903	386,448	26,017	759,849	46,416	1,572,125	92.07	135,482	37,370	97,873	—336,796
Delaware & Hudson	868	8,776,462	856,484	10,193,225	1,436,152	3,109,078	71,354	4,895,167	428,808	10,081,480	98.90	111,745	240,000	—133,946	1,372,715
Delaware, Lack. & Western	955	15,882,093	3,645,482	21,810,350	1,917,344	4,679,532	159,346	9,996,771	446,268	17,416,980	79.85	4,393,371	1,220,440	3,170,270	—430,332
Denver & Rio Grande	2,629	6,976,229	1,668,886	9,140,272	1,232,302	2,844,342	71,863	3,408,178	270,231	7,958,976	87.08	1,181,302	400,000	779,446	—1,143,205
Denver & Salt Lake	255	547,649	88,665	662,555	217,249	355,868	3,931	462,642	20,137	1,059,847	159.96	—397,292	36,000	—433,330	—128,855
Detroit & Mackinac	381	317,536	112,523	452,983	75,634	147,244	17,069	263,837	61,318	565,103	124.75	—112,118	25,320	—137,439	—132,251
Detroit & Toledo Shore Line	61	714,542	.....	735,293	53,487	57,395	1,563	208,618	10,177	330,652	44.96	404,641	44,746	359,888	94,738
Detroit, Toledo & Ironton	457	1,065,866	45,536	1,199,332	321,036	440,598	11,145	587,356	50,575	1,410,711	117.62	—211,379	34,432	—245,826	88,208
Duluth & Iron Range	292	724,005	94,012	893,401	201,896	314,661	1,934	538,125	55,213	1,111,817	124.44	—218,416	46,235	—265,037	338,870
Duluth, Missabe & Northern	410	1,462,041	167,701	1,728,324	444,371	511,278	9,114	703,357	68,561	1,742,005	100.79	—13,681	92,925	—106,606	940,210
Duluth, South Shore & Atlantic	599	901,980	321,960	1,298,457	222,955	270,055	23,606	745,257	39,305	1,317,908	101.49	—19,452	76,003	—95,489	—19,109
Duluth, Winnipeg & Pacific	178	564,371	99,972	691,267	86,121	132,061	9,759	321,371	33,344	588,223	85.09	103,044	34,926	68,116	43,335
East St. L. Connecting	3	.....	.....	361,239	51,123	137,634	1,214	241,570	12,759	444,299	122.99	—83,060	11,111	—94,171	47,919
El Paso & S. W.	1,027	3,281,287	690,894	4,180,822	509,076	784,740	38,767	1,138,987	100,184	2,599,007	62.16	1,581,814	235,991	1,345,450	—753,499
Elgin, Joliet & Eastern	824	6,170,262	25	7,269,486	610,438	1,725,569	26,734	2,736,342	103,711	5,202,440	71.56	2,067,046	211,397	1,855,649	1,275,282
Erie	1,987	20,059,018	3,928,476	26,531,362	3,195,759	9,666,744	238,454	14,642,496	808,359	28,723,370	108.26	—2,192,008	973,197	—3,172,047	—790,833
Florida East Coast	764	2,000,965	1,414,683	3,800,107	625,812	692,109	34,032	1,804,960	74,534	3,277,978	86.26	522,129	144,206	377,737	—1,211,834
Fonda, Johnstown & Gloversville	88	102,152	247,537	363,691	38,197	35,116	2,060	151,496	19,257	246,125	67.67	117,566	19,600	97,966	—15,680
Fort Smith & Western	253	339,996	95,450	468,505	92,109	111,916	14,471	184,743	24,869	429,044	91.57	39,461	20,000	18,910	—11,610
Fort Worth & Denver City	454	2,252,093	858,742	3,262,740	367,474	664,897	18,352	1,260,415	104,283	2,425,465	74.34	837,276	77,000	759,999	173,241
Fort Worth & Rio Grande	235	214,333	179,841	423,654	124,453	106,086	2,431	277,870	26,753	537,593	126.97	—113,939	12,520	—126,782	—152,807
Galveston, Harrisburgh & San Ant.	1,382	4,495,883	1,738,954	6,567,384	1,028,472	1,434,522	73,604	2,649,590	209,303	5,451,047	83.00	1,116,337	208,822	905,355	—1,105,053
Galveston Wharf	13	.....	.....	264,199	63,235	2,729	97	104,295	3,665	205,415	77.75	58,783	47,500	11,284	—76,856
Georgia R. R.	328	1,306,851	638,239	2,093,615	224,484	325,193	28,346	952,844	66,607	1,598,164	76.33	495,451	24,800	470,633	—72,917
Georgia Southern & Fla.	402	939,779	429,416	1,496,428	256,078	354,822	24,255	676,082	38,176	1,350,615	90.26	145,813	54,400	91,239	—78,081
Georgia & Florida	348	242,026	72,821	334,278	108,154	70,368	8,272	198,242	22,043	407,080	121.77	—72,802	16,818	—90,347	—91,319
Grand Rapids & Ind.	569	1,523,569	523,575	2,239,364	396,559	546,008	40,084	1,208,171	91,763	2,287,434	102.15	—48,070	102,651	—150,737	—224,717
Grand Trunk Western Lines	1,002	4,895,828	974,890	6,392,656	779,514	1,297,181	50,214	3,255,982	172,367	5,574,856	87.20	817,800	200,602	613,876	1,197,793
Great Northern	8,254	21,835,769	5,347,467	29,866,891	5,643,454	6,466,831	213,125	13,792,377	615,721	27,107,152	90.75	2,759,738	1,680,091	1,077,558	1,612,821
Gulf & Ship Island	307	497,237	160,008	721,685	224,068	169,665	14,227	303,024	33,798	746,225	103.40	—24,540	39,895	—64,484	—238,036
Gulf, Colorado & Santa Fe	1,932	3,963,917	1,497,837	5,778,537	1,230,312	977,977	50,828	2,535,643	183,420	4,966,337	85.94	812,199	284,670	524,462	—1,068,228
Grand Trunk Lines in New England	172	1,115,447	130,752	1,530,971	363,312	185,373	11,128	938,849	51,646	1,808,582	118.13	—277,611	46,000	—323,611	—66,281
Gulf, Mobile & Northern	434	567,669	156,423	768,432	164,835	227,707	19,996	395,881	39,282	847,739	110.32	—79,307	42,646	—122,012	—254,699
Hocking Valley	350	1,724,735	350,054	2,216,569	411,811	1,086,642	24,355	976,842	83,528	2,581,754	116.47	—365,185	228,267	—597,616	—543,029
Houston & Texas Central	847	1,738,288	723,122	2,612,536	533,751	519,857	31,082	1,130,108	76,211	2,339,606	89.55	272,931	136,095	135,575	—541,658
Houston, East and West Texas	190	535,302	159,255	728,103	131,576	95,993	3,391	338,003	17,070	586,223	80.62	141,880	24,633	116,831	—57,950
Illinois Central	4,787	22,921,328	7,531,668	32,772,806	6,029,025	9,114,988	297,867	14,688,103	923,884	31,189,595	95.16	1,583,211	1,631,003	—54,854	—4,763,291
Indiana Harbor Belt	116	.....	.....	1,973,116	347,479	481,495	7,060	1,268,715	66,361	2,171,110	110.03	—197,994	40,116	—238,113	43,824
International & Great Northern	1,159	3,033,864	940,597	4,260,564	1,110,086	1,235,685	51,052	2,290,727	152,680	4,862,607	114.13	—602,043	120,000	—722,567	—1,615,671
Kanawha & Michigan	176	813,151	235,524	1,096,714	177,830	466,223	9,714	477,556	50,053	1,181,377	107.71	—84,663	71,540	—156,203	—328,414
Kansas City, Mex. & Orient	272	271,843	61,199	350,051	141,150	162,273	4,694	220,404	29,147	557,668	159.31	—207,617	25,031	—232,668	—114,253

REVENUES AND EXPENSES OF RAILWAYS

FOUR MONTHS OF CALENDAR YEAR, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.)	Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.			
Kansas City, Mexico & Orient of Texas.	465	$254,684	$45,184	$319,909	$129,952	$169,145	$4,763	$246,482	$28,715	$578,997	181.10	—$259,287	$19,906	—$279,195	—$242,063
Kansas City Southern	774	3,586,517	724,191	4,658,411	871,125	1,087,358	72,945	1,957,863	175,263	4,150,153	89.08	508,258	272,779	233,031	—1,217,238
Kansas City Terminal	25	.....	.....	410,657	50,302	107,560	.....	214,190	5,354	382,685	93.18	27,972	80,600	—52,633	—46,039
Lake Erie & Western	902	2,580,094	232,470	2,939,754	473,979	960,722	46,491	1,357,588	94,864	2,929,256	99.64	10,498	105,500	—95,478	—398,466
Lake Superior & Ishpeming	34	22,056	1,099	26,877	65,390	76,457	794	38,133	10,021	190,795	709.88	—163,918	10,283	—174,201	—31,740
Lehigh & Hudson River	96	713,709	15,769	759,317	85,444	200,389	6,355	354,911	23,115	670,214	88.26	89,103	19,500	69,585	—11,178
Lehigh & New England	226	858,049	6,696	938,433	163,026	234,733	9,671	383,531	30,310	827,032	88.12	111,402	34,441	76,962	—29,872
Lehigh Valley	1,435	14,801,710	1,890,166	18,548,829	2,437,359	5,383,356	157,725	9,331,185	411,425	17,782,914	95.87	765,915	586,900	178,840	556,793
Long Island R. R.	398	1,684,317	4,183,210	6,560,633	1,055,946	1,114,303	42,672	3,673,489	185,006	6,130,593	93.45	430,040	360,464	67,587	—443,366
Los Angeles & Salt Lake	1,168	3,935,532	1,317,821	5,544,089	959,901	1,122,032	63,763	1,808,022	117,802	4,200,301	75.77	1,343,288	262,286	1,080,547	356,447
Louisiana Ry. & Navigation	349	939,750	144,278	1,135,917	299,604	210,543	15,276	645,325	30,127	1,200,874	105.72	—64,957	56,000	—121,072	—346,406
Louisiana & Arkansas	302	520,376	140,110	688,085	161,860	152,561	13,435	318,529	24,644	671,029	97.52	17,056	45,620	—28,591	—181,713
Louisiana Western	207	741,496	438,835	1,229,232	148,562	231,997	15,634	355,023	43,789	803,061	65.33	426,171	37,865	388,184	—240,482
Louisville & Nash	5,013	23,745,706	8,080,330	33,606,503	5,491,990	8,521,637	426,135	13,908,565	752,092	29,195,716	86.87	4,410,786	1,001,052	3,406,118	—2,362,042
Louisville Henderson & St. L.	199	651,697	228,564	914,397	212,243	126,401	28,319	366,582	29,355	762,899	83.43	151,497	16,000	135,136	—59,267
Maine Central	1,216	3,663,135	1,378,639	5,412,745	875,570	1,352,196	41,205	3,373,955	149,695	5,794,443	107.05	—381,698	302,493	—684,217	—299,627
Maryland, Delaware & Va.	82	236,949	102,180	348,334	32,941	65,226	1,856	254,881	8,146	363,050	104.22	—14,716	6,932	—21,648	—26,021
Michigan Central	1,861	15,239,374	5,443,772	22,521,264	3,310,677	4,655,079	266,643	9,022,852	420,461	17,947,960	79.69	4,573,304	640,000	3,931,336	476,704
Midland Valley	387	875,196	305,915	1,235,612	253,721	229,146	9,388	471,149	50,608	1,013,411	82.02	222,201	28,027	193,724	—98,383
Mineral Range	101	313,339	1,987	323,570	37,461	89,286	1,740	173,957	4,015	305,498	94.41	17,072	13,200	3,872	10,477
Minnesota & Int.	641	249,667	94,866	361,175	69,663	60,956	2,100	201,013	14,253	347,984	96.34	13,191	17,935	—4,756	—47,997
Minneapolis & St. Louis	1,646	2,780,354	843,698	3,810,740	782,949	1,070,390	40,747	2,092,114	118,116	4,095,234	107.47	—284,494	208,945	—495,193	—812,127
Minneap., St. Paul & Sault Ste. Marie.	4,243	9,129,885	2,265,380	12,131,330	1,668,124	2,934,904	93,055	5,558,872	282,736	10,582,110	87.22	1,549,220	750,783	797,990	433,436
Mississippi Central	164	197,449	99,341	309,674	73,833	119,452	5,167	138,313	22,157	358,923	115.90	—49,249	13,300	—62,556	—164,936
Missouri & North Arkansas	365	309,912	140,690	481,187	276,082	160,738	7,475	241,182	29,784	714,598	148.50	—233,410	25,903	—259,678	—273,433
Missouri, Kansas & Texas R. R.	1,714	7,092,416	2,476,331	10,103,488	2,184,120	3,030,570	89,765	3,758,356	307,247	9,398,633	93.02	704,855	361,424	343,079	—906,138
Missouri, Oklahoma & Gulf	332	305,819	68,106	399,050	185,947	179,596	6,700	264,700	27,064	664,817	166.59	—265,768	34,007	—300,192	—226,837
Missouri Pacific	7,108	19,388,842	6,187,240	27,471,548	5,737,865	6,751,093	315,327	12,382,744	804,264	26,107,740	95.04	1,363,808	1,065,572	289,129	—5,539,778
Missouri, Kansas & Texas Ry. of Texas	1,796	4,383,908	2,321,128	7,257,425	1,488,626	1,406,551	68,849	3,910,978	286,665	7,222,712	99.52	34,713	194,897	—162,174	—383,575
Montour R. R.	54	294,141	6,756	321,653	87,045	202,764	4,997	101,182	25,133	422,552	131.36	—100,899	9,172	—110,072	—46,149
Mobile & Ohio	995	3,756,037	714,900	4,735,675	828,215	1,742,729	92,862	2,291,702	153,685	5,115,095	108.00	—379,420	212,673	—592,566	—854,869
Monongahela Ry.	108	923,252	79,796	1,023,397	255,751	139,491	3,691	352,426	25,614	776,974	75.92	246,424	20,000	226,404	51,054
Monongahela Connecting	6	.....	.....	661,132	105,828	241,364	2,051	361,858	27,528	738,630	111.72	—77,498	9,577	—87,075	—160,226
Morgan's Louisiana & Texas R. R.	400	1,512,085	681,068	2,328,904	353,264	534,684	30,604	1,094,443	80,497	2,101,498	90.23	227,407	123,258	103,277	—867,686
Nashville, Chatt. & St. L.	1,247	3,848,963	1,723,181	6,016,176	1,264,727	1,624,604	128,320	2,795,762	178,624	6,038,645	100.38	—22,469	200,000	—223,044	—1,351,954
Nevada Northern	168	468,995	43,699	535,235	66,928	91,847	3,998	161,553	17,960	342,836	64.05	192,400	73,292	119,107	—248,530
New Orleans & N. E.	398	1,332,767	432,780	1,995,532	289,080	515,923	51,743	1,041,684	55,224	1,955,708	98.00	39,825	113,428	—73,809	—560,486
New Orleans Great Northern	284	525,400	157,766	717,766	155,432	160,713	9,288	321,960	31,418	660,421	92.00	57,345	41,330	15,676	—140,229
New Orleans, Texas & Mex.	191	387,546	123,653	558,753	141,907	148,885	9,414	195,569	23,538	527,177	94.34	31,576	40,000	—8,458	—302,031
New York Central	6,075	56,831,161	24,249,439	91,467,179	12,263,412	20,597,980	806,072	42,616,976	2,433,618	80,184,413	87.66	11,282,766	4,325,206	6,953,737	—1,227,959
New York, Chicago & St. L.	573	7,210,575	652,554	8,075,660	990,511	1,530,194	102,072	3,196,820	209,209	6,040,828	74.80	2,034,832	220,000	1,814,467	1,313,308
New York, N. H. & Hart.	1,965	13,309,646	13,284,056	30,062,654	4,021,895	6,898,810	160,345	16,367,127	1,074,366	29,117,533	95.07	945,021	1,072,000	—134,188	—2,814,115
New York, Ont. & Western	569	1,797,784	411,716	2,712,267	426,757	887,988	33,152	1,465,336	95,980	2,909,214	107.26	—196,947	98,800	—295,714	—517,375
New York, Phila. & Norfolk	121	1,782,504	491,576	2,453,860	213,596	505,758	34,249	1,158,659	45,056	2,027,469	82.62	426,392	68,720	357,671	284,505
New York, Susq. & Western	135	809,002	209,264	1,189,621	131,585	198,646	6,940	815,784	32,626	1,185,796	99.67	3,825	103,410	—99,657	—118,317
Newburgh & South Shore	7	.....	.....	553,449	71,008	108,856	.....	255,445	14,261	449,571	81.23	103,877	30,862	73,016	124,417
Norfolk Southern	907	1,354,879	519,252	2,018,237	443,495	465,186	29,331	1,008,347	81,016	2,029,017	100.53	—10,780	79,872	—90,764	—361,128
Norfolk & Western	2,087	19,469,923	3,316,040	23,966,345	3,181,411	7,031,358	136,950	8,897,261	403,267	19,731,917	82.33	4,234,428	1,040,000	3,193,831	—722,285
Northern Alabama	112	343,489	50,711	405,880	104,050	25,486	5,120	265,882	7,112	407,523	100.40	—1,642	13,600	—15,242	—114,045
Northern Pacific	6,565	22,255,901	5,692,605	29,949,640	4,620,726	5,486,257	246,983	11,681,225	752,596	23,077,585	77.05	6,782,055	2,200,535	4,666,796	—766,738
Northwestern Pacific	507	834,327	585,295	1,583,350	409,286	265,958	19,111	800,641	49,700	1,551,996	98.01	31,354	88,248	—57,208	—369,678
Oregon Short Line	2,347	8,324,156	2,002,144	11,077,218	2,375,665	1,911,345	60,679	3,523,932	345,849	8,431,309	76.11	2,645,909	711,855	1,933,507	—1,043,941
Oregon-Wash. R. R. & Nav.	2,069	5,569,160	1,978,623	8,307,165	1,745,575	1,387,493	106,411	3,465,284	373,202	7,213,958	86.82	1,094,107	456,290	636,980	—502,747
Panhandle & Santa Fe	772	1,161,146	310,591	1,555,635	489,064	579,929	15,069	909,108	62,068	2,046,807	131.57	—491,171	63,955	—555,577	—1,012,458
Pennsylvania R. R. Western Lines	1,754	20,627,090	6,103,727	29,497,422	4,239,240	8,740,959	277,134	14,395,055	735,335	28,577,148	96.88	920,273	1,173,257	—254,175	—1,416,174
Pennsylvania R. R. East	5,360	72,020,478	30,228,640	112,453,769	15,136,303	31,371,349	987,038	53,913,516	2,929,094	106,430,232	94.64	6,023,537	3,494,692	2,525,336	3,470,643
Perkiomen	41	285,654	26,791	326,770	19,991	16,422	42	137,212	1,231	174,986	53.55	151,784	7,200	144,584	80,032
Peoria & Pekin Union	19	130,285	18,541	387,190	66,328	127,234	2,971	295,284	21,576	513,393	132.59	—126,203	38,000	—164,203	—140,598
Pere Marquette	2,232	7,704,019	1,552,516	9,982,717	1,411,904	2,089,222	97,534	4,549,818	278,813	8,455,081	84.69	1,527,636	197,587	1,329,240	554,163
Phila. & Reading	1,127	15,824,700	3,400,781	20,656,424	2,423,682	6,274,349	139,545	12,170,133	528,934	21,603,827	104.58	—947,403	572,912	—1,520,262	—3,995,828
Pitt. & Lake Erie	224	7,926,661	788,913	9,545,589	2,010,521	2,632,807	59,469	3,394,340	168,332	8,270,985	86.64	1,274,604	302,000	972,600	—1,058,990
Pitts. & W. Va.	63	333,505	38,410	421,172	247,489	151,425	4,879	195,675	20,652	652,976	155.03	—231,803	47,868	—279,671	—290,589
Phila., Bethlehem & N. England	71	.....	.....	299,932	34,380	45,959	1,123	178,096	5,201	264,760	88.27	35,172	6,333	28,839	—35,364
Pitts. & Shawmut	103	321,106	18,100	343,090	126,608	153,516	6,695	143,847	12,223	441,219	128.60	—98,128	3,893	—102,021	—125,349
Pitts., Shawmut & Northern	204	292,285	26,137	329,640	81,637	176,597	321,415	13,678,867	672,812	27,151,065	94.42	1,602,979	941,481	660,304	—160,775
Pitts., Cin., Chicago & St. Louis	2,383	19,285,911	6,330,232	28,754,045	3,495,399	8,722,662	3,960	144,945	26,636	433,791	131.59	—10,415	7,362	—111,531	15,838
Port Reading	21	464,053	.....	823,313	71,498	75,449	56	395,355	3,231	545,588	66.26	277,726	36,000	241,726	173,983
Quincy, Omaha & Kansas City	255	222,040	97 051	336,859	112,750	57,175	958	171,657	5,753	347,668	103.21	—10,809	11,919	—22,793	—2,916
Rich., Fred. & Pot.	77	1,266,829	1,167,470	2,616,254	265,613	336,446	17,737	874,216	49,833	1,582,626	60.49	1,033,628	52,045	981,531	449,856
Rutland R. R.	415	771,336	389,679	1,387,493	263,679	385,377	30,743	710,512	43,581	1,433,872	103.34	—46,379	74,755	—121,169	155,587
St. Joseph & Grand Island	258	657,456	155,270	861,291	207,327	117,663	7,410	554,353	48,970	940,694	109.21	—79,403	35,243	—114,709	—209,990

Atlantic Crossed in 16 Hours, 12 Minutes

The flight across the Atlantic, by way of the Azores by the United States Navy biplane in command of Lieut Commander A. C Read on May 26 and 27, was followed on June 14 and 15 by a flight from St. John's, Newfoundland, to Clifden, Ireland, 1,960 miles, in 16 hours, 12 minutes, without a stop This flight was made by Captain John Alcock, and Lieutenant Arthur W. Brown of the British Royal Air Force, flying in a Vickers-Vimy biplane. They left the Newfoundland coast about noon on Saturday, and arrived at Clifden, near Galway, at 8:40 a. m., Greenwich time, on Sunday. This flight wins a prize of $50,000 offered by the London Daily Mail several years ago.

Safety First in Southwestern Region

The campaign to reduce accidents to employees in the Southwestern region during the month of May, 1919, reduced the number of these accidents 56 per cent from the records for the same month last year. During the month of the campaign there was a total of 646 accidents to employees as compared with 1,475 during the corresponding period last year. During the three months' period January to March, 1919, inclusive, an average of one employee per month was killed to every 9,715 in service, while during the month of May the number was reduced to one employee killed to every 24,983 in service. During the same three months' period one employee out of every 153 was injured, while during the month of May one employee was injured to every 273 in service.

To Eliminate the Noise Nuisance

Among the rules prescribed by American railroads for the guidance of enginemen, and other trainmen, in performing their work with the least practicable offense to adjacent residents, that of the Pittsburgh division of the Pennsylvania Railroad is one of the most comprehensive. It is embraced in Sections 464 and 468 of the working time-table and is reprinted below. The italics are the editor's; a brief comment on the rule will be found in the editorial columns.

PENNSYLVANIA RAILROAD, PITTSBURGH DIVISION

"464. Enginemen will use the whistle *judiciously* where required by rule or law, but all *unnecessary* long and loud blasts must be eliminated in order to minimize the annoyance to and complaints from the residents along our right-of-way.

"When handling trains in or about borough limits, except in approaching grade crossings, the bell must be rung when proper to have it serve the purpose instead of using the whistle.

"Boroughs have very generally passed ordinances prohibiting all unnecessary noises and smoke, a violation of which involves a fine and imprisonment of person at fault.

"468. In order to avoid complaint of *what may be considered* unnecessary noise in connection with the movement of trains and shifting of cars, it is desired that *all employees* give this matter special attention. The engine whistle must not be used except as provided by rule or special instruction, or when necessary to prevent an accident, and when so used it *must not* be *sounded any louder than actually necessary*. Engines should not be permitted to blow off steam except when testing safety valves. When shifting cars at stations and elsewhere, care must be exercised to eliminate all unnecessary and avoidable noise."

New York Electrical Society

Edwin B. Katte, chief engineer of electric traction of the New York Central, has been elected president of the New York Electrical Society. Mr. Katte is a graduate of Sibley College, Cornell University, with the degree of M.E. in 1893, and with the degree of M.M.E. in 1894. He began railroad work on the New York Central & Hudson River in 1896. In 1903 he was appointed electrical engineer, which carries with it the secretaryship of the electric traction commission. In 1906 he was appointed chief engineer of electric traction of the New York Central & Hudson River. He is a past vice-president of the American Society of Mechanical Engineers.

Traffic News

Edward L. Hamilton has been appointed general agent for the American Railway Express Company at Chicago to succeed William Gourlay, who has been appointed manager of the London, Eng., branch of the American Express Company.

Representatives of the railroads and electric lines centering in Toledo, Ohio, expect to transport 60,000 or 75,000 persons on the occasion of the Willard-Dempsey fight at Toledo on July 4. Parking space for approximately 600 sleeping cars has been provided.

Traffic through the canals at Sault Ste. Marie, Michigan and Ontario for the month of May, 1919, shows a substantial decrease eastbound; a total of 7,895,542 tons of freight as compared with 9,200,843 tons in May of last year. The total tonnage westbound was 2,670,784 tons; last year it was 2,203,-202 tons.

The record of overseas traffic for the week ended June 11, showed 10,146,408 bushels of grain in the elevators at North Atlantic Ports, the excess for the week of deliveries over receipts being 1,459,809 bushels. South Atlantic and Gulf Ports report on June 7, 4,788,751 bushels of grain in elevators distributed as follows: New Orleans, 2,511,880 bushels; Galveston, 2,276,871 bushels; Port Arthur, empty; Texas City, empty.

A comparison of freight car loadings on the lines of the Northwestern region for the month of May, 1919, with the corresponding period last year shows a decrease of 53,962 cars, 640,698 cars being loaded during 1919 as compared with 694,660 in 1918. A comparison of grain loading for the same period shows an increase in 1919 of 12,755 cars, while bituminous coal loaded at mines during the same period show a decrease of 13,078 cars.

R. D. Williams has been appointed traffic manager of the California Fruit Exchange, Sacramento, Cal., to succeed Henry Cole, who becomes traffic manager of the California Fruit Growers' Exchange at Los Angeles, Cal. Mr. Williams was formerly connected with the traffic department of the Erie railroad at San Francisco, Cal. In April, 1918, he organized the traffic department for the housing division of the Shipping Board, completing that work in May of this year.

The agricultural departments of the railroads of the Southeastern States are praised warmly by J. J. Brown, Commissioner of Agriculture of Georgia, in his annual report. Their extension work is carried on by "some of the ablest and best informed men of Georgia," who give their entire time to the furtherance of agriculture. These men, being thoroughly conversant with up-to-date agricultural methods and the most modern means of marketing and transportation, are rendering valuable service. The commissioner also commends the hearty co-operation of the railroads with his department in moving promptly all shipments of products directed through the State's market bureau division.

Howard H. Hays, manager of the Bureau of Service National Parks and Monuments, a sub-committee working under the direction of the Western Passenger Traffic Committee for the advertisement of America's national parks and monuments, has bought the Yellowstone Park Camping Company and assumed the position of general manager of that company with office at Livingston, Mont. Mr. Hays was formerly manager with the Union Pacific-Chicago & North Western department of tours and was the organizer as well as the manager of the Bureau of Service National Parks and Monuments. Prior to his connection with the railroads he was general tourist agent of the "Wylie Way," the pioneer Yellowstone Park camping company.

Equipment and Supplies

Locomotive Deliveries, Week Ended May 31

Locomotives were shipped to railroads under federal control during the week ended May 31 as follows:

Works	Road	Number	Type
American	A. C. L.	2	USRA Pacific
	P. L. W.	3	USRA Santa Fe
	C. C. C. & St. L.	3	USRA 8-w. Sw.
		8	
Baldwin	A. T. & S. F.	2	Pacific
	I. H. B.	6	USRA 8-w. Sw.
	Southern	3	USRA Mount.
	B. & O.	4	USRA 6-w. Sw.
	S. P.	6	Santa Fe
	A. T. & S. F.	1	Mountain
	C. B. & Q.	2	Santa Fe
	C. B. & Q.	1	Mikado
	U. P.	1	Santa Fe
	N. & W.	1	Mallet
	G. N.	2	8-w. Sw.
	T. & P.	1	Santa Fe
	T. & P.	2	Pacific
	P. & R.	1	Mallet
		33	
	Total	41	

Locomotive Deliveries Week Ended June 6

The following locomotives were shipped to roads under Federal control during the week ended June 6:

Works	Road	Number	Type
American	N. & W.	20	USRA Mallet
	P. L. W.	2	USRA 6-w. Sw.
	Wash. Ter.	3	USRA 6-w. Sw.
		25	
Baldwin	C. C. & O.	1	Mallet
	Sou. Pac.	5	Santa Fe
	T. & P.	3	Santa Fe
	C. B. & Q.	1	Santa Fe
	U. P.	1	Santa Fe
	I. H. B.	6	USRA 8-w. Sw.
	N. & W.	1	Mallet
	Southern	1	USRA Mount.
		19	
	Total	44	

Freight Cars

The Pennsylvania Equipment Company, Philadelphia, Pa., is in the market for 100 second-hand all steel tank cars, 8,000-gal. capacity, without heater coils; also 100 of 10,000-gal. capacity.

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, is in the market for several second-hand steel self-clearing hopper bottom coal cars; one 40-ft. box car with automobile end doors, and one gondola car with drop ends.

The Canadian National, Toronto, Ont., has sent inquiries to Canadian car builders for the construction of 20 steel postal cars and 20 steel first-class coaches. The postal cars are to comply with the latest Canadian Railway Mail Service department specifications and also those of the United States Railway Mail Service and will be 73 ft. 6 in. in length. George E. Smart, general master car builder, is receiving the bids.

Iron and Steel

The Belgian Government has ordered 8,000 tons of rails from the Algoma Steel Corporation.

The Canadian Government has ordered 10,000 tons of rails from the Algoma Steel Corporation.

Signaling

The New York Central has ordered from the Federal Signal Company, Albany, N. Y., a 68-lever style "A" mechanical interlocking for Port Byron, N. Y.

Supply Trade News

The Judson Freight Forwarding Company, Chicago, Ill., will open its new office, 202 Wells Fargo building, 204 Camp street, New Orleans, La., with **O. E. Duggan,** general agent, in charge.

The Niles-Bement-Pond Company, Pittsburgh, Pa., has removed its office from the Frick building to 425 Seventh avenue. This company will keep a stock of Pratt & Whitney small tools at the new office and store.

Major John L. Wood, formerly connected with the Buckeye Steel Castings Company, Chicago, and interested in several railway supply companies including Edwin S. Woods & Co., Chicago, died on June 13, at Pasadena, California, after a protracted illness.

The Railway Audit & Inspection Company of Philadelphia, Pa., has opened an office in Boston, Mass., for the purpose of having representation in the New England territory. **H. G. Hathaway** has been appointed office manager and **C. J. Logan** will continue a special representative in this territory as heretofore.

Edwin T. Jackman, formerly of **E. S. Jackman & Co.,** Chicago, has returned from Sheffield, England, where he has been investigating methods in connection with tool and alloy steels. On July 1 he will become manager of the Boston, Mass., office of the Firth-Sterling Steel Company, McKeesport, Pa.

The Betson Plastic Fire Brick Company has been incorporated under the name of the **Betson Plastic Fire Brick Company, Inc.,** with headquarters at Rome, N. Y. **Frank J. Jewell** is president and secretary, and **Nelson Adams,** vice-president and treasurer. The company manufactures plastic fire brick for boiler furnace linings and baffle walls and "Hi-Heat" cement for use in boiler rooms.

A company, known as the **Cummins-Blair Company,** a subsidiary organization which will be affiliated with the C. R. Cummins Company has recently been formed. This company will specialize in reinforced concrete and brick building construction and reinforced concrete bridges and arch culverts. **N. F. Blair** is president, **C. R. Cummins,** vice-president and **W. A. Beaumont,** treasurer. The headquarters will be at Cleveland, Ohio.

Colonel R. T. Lamont, president of the American Steel Foundries, Chicago, has been awarded the distinguished service medal for "exceptionally meritorious service as assistant to the chief of the procurement division, later as chief of the procurement division and as a member of the claims board of the ordnance department," and for "rendering material assistance to the nation's industry in adjusting equitably outstanding contracts in full justice to employers and employees alike."

The Central Steel Company, Massillon, Ohio, has opened new offices in Detroit, in the Book Building, 35-37 Washington boulevard, rooms 948-9-50. **Arthur Schaeffer,** former assistant director of sales at the home office, Massillon, has been appointed district manager of sales, with **Frank Gibbons** as his assistant. **Mr. Gibbons,** who has just joined the organization, has been associated with the Carbon Steel Company for five or six years. He spent a great part of this time in the Carbon Company's Pittsburgh plant, and for the last several months he has been district sales manager of its Detroit office.

The Carter Bloxonend Flooring Company, Kansas City, Mo., has been formed to take over the manufacturing and selling interests in Bloxonend Flooring formerly held by the C. J. Carter Lumber Company, Kansas City, Mo., the Doniphan Lumber Company, Kensett, Ark., and the Marsh & Truman Lumber Company, Chicago, Ill. The Kansas City

office will be under the direction of **C. J. Carter**, president, and **Mabry Mellier**, vice-president, will have charge of sales. The sales office in the McCormick Bldg., Chicago, will be in charge of **M. G. Truman** as vice-president, who will also have charge of the railroad sales to those roads with principal operating offices east of the Mississippi river. The Builders' Material Supply Company, New York, will continue as sales agents for the new company in the New York district for all other than railroad business. The manufacturing plant of the company will be located at Kensett, Ark.

J. M. Woodruff, manager of the advertising and paving departments of the Standard Asphalt & Refining Company, Chicago, a subsidiary of the Cities Service Company, New York, has resigned to become general manager of the **Southern Asphalt Association**, with headquarters at Atlanta, Ga. In this capacity he will have charge of the publicity of this association which was organized for the purpose of supplying information to public officers and taxpayers concerning the advantages of asphalt for paving roads and streets. From 1909 to 1913, Mr. Woodruff was manager of the paving department and in charge of advertising for the Standard Asphalt & Rubber Company, and the following four years he was southern representative of the Warren Brothers Company, Boston, Mass., bitulithic paving contractors, with headquarters at Richmond, Va.

The S. F. Bowser Company, Ltd., Toronto, Ont., which has for a number of years been manufacturing and selling Bowser gasoline and oil pumps, tanks and storage systems under the control of the parent company, S. F. Bowser & Co., Inc., Fort Wayne, Ind., has been re-organized under the Canadian laws to operate as a strictly Canadian firm. **H. C. Christie**, who has been for some time past connected with the Canadian factory of the F. S. Bowser Company, recently as sales manager, has been elected manager, with **E. E. Cummings** as factory manager. For a number of years, nearly the entire Canadian trade of the S. F. Bowser Company has been supplied from the Toronto factory, but this company has been under the direction of the home office at Fort Wayne. Through the present re-organization, the Canadian factory is to be operated and controlled as a separate institution. The officers are S. F. Bowser, president; S. V. Bechtel, vice-president; H. J. Grosvenor, secretary, and W. G. Zahrt, treasurer.

Railway & Industrial Engineers, Inc.

The Railway & Industrial Engineers, Incorporated, with offices at 25 Broad street, New York, recently organized by **J. E. Muhlfeld** and **V. Z. Caracristi**, as announced in the *Railway Age* of May 23, page 1288, announces that it has associated with it an experienced, competent and reliable staff of experts thoroughly familiar with domestic and foreign methods and practices, and offers to bankers, corporations and others its services in a representative, advisory, consulting or administrative capacity as follows:



J. E. Muhlfeld

Organization, management and operation of railroad, public utility, industrial and manufacturing enterprises.

Examination of proposed capital and consequential expenditures for facilities or equipment to ascertain whether they are justified and will improve conditions, increase revenues or reduce costs of operation and maintenance.

Assistance in connection with plans for financing projected improvements and extensions.

Review or preparation of plans, specifications and estimates of costs of contemplated new construction work, or enlargements of existing facilities.

Rehabilitation and modernization of unprofitable undertakings, including, if desired, their temporary management and operation until satisfactory results are obtained.

Advisory or consulting engineers to insure that expenditures are made in a manner that will produce maximum economic results and reflect the greatest return to the properties, and provide the best security to the owners

Advisors and conferees in labor problems and in the preparation of rules and regulations governing compensation and working conditions.

Preparing, passing upon or approving inventories, valuations and appraisals of properties and equipment.

Consulting engineers for exporters and importers and their foreign representatives, to co-ordinate specifications, prices and purchases for the best interest of each.

Reporting on inventions, new methods and processes, and assistance in the development of those having practical merit and commercial value.

J. E. Muhlfeld, who has been in transportation work for about 25 years, has, during the past ten years, been engaged in the habilitation of roadway, terminals, shops and equipment on various railways, and more particularly in the design and development of the Mallet and other types of large steam locomotives in combination with the utilization of low-grade fuels for the purpose of increasing the average train load and reducing the costs of operation and maintenance on railroads in the United States, Canada and Brazil. He was born at Peru, Ind., on September 18, 1872, and studied mechanical engineering at Purdue University; he served as machinist, and then as locomotive fireman and engineer on the Wabash Railroad and later successively as enginehouse foreman and general foreman on the same road; master mechanic at Port Huron and Montreal, on the Grand Trunk; superintendent of machinery and rolling stock on the Canadian Government Railways; superintendent of motive power on the Baltimore & Ohio, and vice-president and general manager of the Kansas City Southern. During the past five years he has been located in New York and has specialized in railway and other valuation and improvement work and in the development of methods and appliances for the modernization of locomotives and central power stations for the purpose of reducing investment and fuel costs, utilizing waste heat, eliminating arduous labor, and increasing capacity.

V. Z. Caracristi has been engaged in railway and industrial work for the past 20 years, having specialized in locomotive, car and shop design and construction. He served as shop engineer and maintenance supervisor for the Richmond plant of the American Locomotive Company, and in the inauguration and installation of a uniform system of maintenance and shop betterment he was general maintenance supervisor for all of the plants of the same company. He associated on the design and construction of the Washington, D. C., terminal and station, and later served as assistant to general superintendent of motive power of the Baltimore & Ohio, in charge of shop additions, construction and equipment, and general betterment of the design and construction of locomotives and cars, which included the design and construction of the first Mallet type locomotive. He was then engaged in carrying out improvements of the Brewster shops of the Wheeling & Lake Erie, and the Watervliet shops, and Carbondale mechanical terminal of the



V. Z. Caracristi

Delaware & Hudson Company; in charge of the layout, design and equipment of extensions to the Lima Locomotive Works, and various additions to plants and power houses of the American Locomotive Company. For the past six years he has been engaged in consulting work for various bankers on financial reports and suggesting improvements in industrial operating methods for controlled corporations. During this time he was engaged in development and commercial work on means and methods of burning coal in suspension, which work he will continue.

American Brake Shoe & Foundry Changes

William G. Pearce has retired as president of the **American Brake Shoe & Foundry Company** to become chairman of the executive committee, and **Joseph B. Terbell**, vice-president, has been elected president to succeed Mr. Pearce, effective July 1. **Randolph Ortman**, who has been president for one of the company's subsidiaries, has been elected a director, succeeding the late **Joseph D. Gallagher. Col. James B. Curtis**, of Baldwin & Curtis, has been elected general counsel of the American Brake Shoe & Foundry Company also, succeeding Mr. Gallagher.



W. G. Pearce

William G. Pearce, chairman of the executive committee of the American Brake Shoe & Foundry Company, was born at Marietta, Ohio, on June 11, 1859. He entered railway service in August, 1877, as a clerk in the office of the controller of the Missouri, Kansas & Texas, at Sedalia, Mo. He was later promoted to bookkeeper and chief clerk in the same office, and in August, 1879, left that road to take a clerical position in the auditing department of the Northern Pacific. He was successively promoted to assistant express auditor, assistant auditor of disbursements and auditor of disbursements in the same department, and in February, 1890, was appointed general purchasing agent. From May, 1892, to September, 1896, he was assistant general manager of the same road, and when the Northern Pacific was re-organized on the latter date, he was transferred to Tacoma, Wash., as assistant general superintendent. From August, 1900, to July 1, 1901, he was assistant to the president of the Northern Pacific, the Seattle & International, and the Washington & Columbia River, at the same time being general manager of the Seattle & International. From July, 1901, to March, 1902, he was general manager of the Northern Pacific, leaving railway service at the end of that time to become second vice-president of the Griffin Wheel Company. On June 5, 1905, he was also made general manager of this company, with headquarters at Chicago. He left the Griffin Wheel Company on November 22, 1910, to become vice-president of the American Brake Shoe & Foundry Company, and in May, 1916, was elected president, with headquarters at New York.



J. B. Terbell

J. B. Terbell, the new president, was born at Corning, N. Y., in February, 1863, and was educated at Hamilton College, graduating in the class of 1884 with the degree of A. B. After leaving college he served with the Fall Brook Railway, now the Pennsylvania division of the New York Central, with headquarters at Corning, N. Y., and later was vice-president of the Corning Iron Works. In 1897, he became president of the Corning Brake Shoe Company, and in 1902, was elected vice-president of the American Brake Shoe & Foundry Company, with headquarters at Chicago, in charge of the company's western business. In 1915, Mr. Terbell came to the New York office in connection with munition contracts for the British Government, and on July 1, succeeds Mr. Pearce as president.

Trade Publications

SPECIFICATIONS FOR MANGANESE CROSSINGS.—The Balkwill Manganese Crossing Company, Cleveland, Ohio, has just issued specifications for its articulated cast manganese crossings accompanied by standard detailed drawings for crossings at various angles, for heavy and medium duty and for three-hole and two-hole drilling.

CEMENT GUN WORK.—The Cement Gun Construction Company, Chicago, has issued Gunnite Book No. 6, containing 24 pages illustrative of the structures which have been treated with the Cement Gun process for the application of a coating of gunite to produce wall, roof and floor surfaces or to protect structural steel against corrosion.

EYE SHIELDS.—The Chicago Eye Shield Company, Chicago, has issued a new catalogue describing various types of goggles, respirators and protective shields for chippers and foundry workers. Interesting data are included on the spectrum of the welding arc and the absorption of ultra-violet rays by the special Essentialite lenses which this company uses in welders' goggles.

Financial and Construction

Railway Financial News

ARTESIAN BELT.—This road was sold at auction on June 3 for $150,000 to Harry Landa, J. E. Jarrett and W. R. Wiseman, officers of the Commonwealth Bank and Trust Company of San Antonio, and their associates, who were the only bidders for the property. The Artesian Belt has a length of line of 46 miles and has been in the hands of receivers since April 25, 1917.

Railway Construction

PENNSYLVANIA LINES WEST OF PITTSBURGH.—This road will build a group of repair shops at Stark, Ohio, consisting of a locomotive erecting shop, heavy and light machine shops, tank shop, flue shop, wheel and pipe shop, blacksmith shop, firing-up shed, storehouse, office building, rest house and shed for the storage of miscellaneous material. A portion of these buildings are already under contract, and bids have been requested or will be requested in the near future on the remainder. The buildings, with the exception of the rest house, office building and storehouse, which are of brick and timber construction, and the firing-up shed, which is of reinforced concrete construction, will be of steel frame and brick exterior wall construction and carried on concrete foundations.

ANNUAL REPORTS

The New York Central Railroad Company—Annual Report

To the Stockholders of

THE NEW YORK CENTRAL RAILROAD COMPANY:

The Board of Directors herewith submits its report for the year ended December 31, 1918, with statements showing the income account for the year and the financial condition of the company.

The operation and maintenance of the company's road were conducted under Federal control during the year 1918. The mileage covered is as follows:

	Miles
Main line and branches owned	3,699.14
Leased lines	1,920.40
Lines operated under trackage rights	456.25
Total road operated	6,075.79

The construction of a joint terminal of the Putnam Branch at Sedgwick Avenue, New York, in accordance with an agreement with the Interborough Rapid Transit Company, whereby the Putnam bridge over the Harlem River was surrendered for use in connection with the extension of the elevated system up Jerome Avenue, decreased the length of the Putnam Division by 23/100ths of a mile.

The Cardiff Branch, Reddick to Cardiff, Illinois, 3.49 miles, was abandoned.

To correct an error in the 1917 report, 11/100ths of a mile has been added to the main line mileage in the State of Illinois.

These changes produce a net decrease in operated mileage of 3.61 miles.

There was no change in the capital stock of the company during the year.

Since the date of the annual meeting on January 23, 1918, the number of stockholders has grown 1,591, the total number at the end of the year being 28,693, of whom 28,395 are in the United States, and 298 abroad. The par value held by those here is $247,543,855, and by those abroad $2,053,500, the average holdings being 87 and 69 shares respectively. In 1915 the numbers reported were 22,270 here, and 2,772 abroad, the general average holding being, approximately, 100 shares, while now it is 87 shares.

The changes in the funded debt of the company are shown in the following statement:

Amount as reported on December 31, 1917, was		$711,883,086.19
Included therein were the following securities which had been reacquired or held pending their sale, and (with the exception of certain of them with a par value of $730,000) had been pledged for the company's notes:		
N. Y. C. & H. R. R. R. Co. refunding and improvement mortgage 4½% bonds	$20,000,000.00	
N. Y. C. R. R. Equipment Trust certificates of 1917	1,218,000.00	
N. Y. C. & H. R. R. R. Co.—Lake Shore collateral gold bonds	10,000.00	
R. W. & O. R. R. Co. 1st consolidation bonds	2,000.00	
		21,230,000.00
leaving the total funded debt actually outstanding at the beginning of 1918		$690,653,086.19
Retired during the year:		
R. W. & O. Terminal 1st mortgage 5% bonds matured and paid	$375,000.00	
Payments falling due during the year on the company's liability for certificates issued under equipment trust agreement as follows:		
N. Y. C. Lines Trust of 1907, installment due November, 1918	1,492,884.74	
Boston & Albany Trust of 1912, installment due October, 1918	500,000.00	
a total decrease of		2,367,884.74
leaving the funded debt actually outstanding December 31, 1918		$688,285,201.45

New York Central Railroad Equipment Trust certificates of 1917 to an aggregate amount of $6,648,000 were issued during 1918, but as all of them were concurrently acquired by the company, there is no change in the funded debt in this connection.

As was pointed out in the last annual report, the President of the United States took possession and assumed control of the railroad property of your company on December 28, 1917. By the terms of the President's proclamation the possession, control, operation, and utilization of the transportation systems were vested in a Director General; and it was stated that, until the Director General should otherwise determine, his powers would be exercised through the boards of directors, officers, and employees of the systems taken over. The Director General appointed Regional Directors under whom the railroads of the several districts were unified as to control and operation. Subsequently, Federal Managers and other federal officers were appointed and required to report through the Federal Managers to the Regional Directors and the Director General.

As of December 27, 1918, the company, jointly with The Toledo and Ohio Central Railway Company, The Zanesville and Western Railway Company, The Kanawha and Michigan Railway Company and the Kanawha and West Virginia Railroad Company, executed an agreement with the Director General of Railroads providing for the operation, during Federal control, of the roads of the parties to the agreement by the Director General of Railroads for an annual total standard compensation of $58,122,084.92, divided as follows:

The New York Central Railroad Company	$55,802,630.50
The Toledo and Ohio Central Railway Company	1,086,650.87
The Zanesville and Western Railway Company (deficit)	*107,598.45*
The Kanawha and Michigan Railway Company	1,295,141.37
Kanawha and West Virginia Railroad Company	45,260.63
	$58,122,084.92

Under the agreement, all salaries and expenditures incurred by the company, during federal control, for purposes which relate to the existence and maintenance of the corporation, are required to be borne by the corporation, out of its compensation and other income.

Immediately upon his taking office, the Director General of Railroads appointed as Regional Director in charge of the Eastern District Mr. A. H. Smith, then President of The New York Central Railroad Company. This district, at that time included practically all the railroad lines north of the Ohio and Potomac rivers and east of the Indiana-Illinois state line. Mr. Smith assumed the duties of the Regional Director's office, which involved dealing with a complicated traffic situation and the co-ordinating of the lines for war purposes, as an addition to his obligations as President of the company.

Early in 1918, the Director General decided that officers in charge of Federal operation should not continue their positions with the corporation, except in special cases and where permission was given. Thereupon, Mr. Smith resigned his office as President, effective May 31st, and Mr. William K. Vanderbilt, Jr., was elected in his stead. Later in the year the following general executive officers also resigned in order that they might continue in the service of the United States Railroad Administration:

Mr. A. T. Hardin, Vice-President; Mr. C. F. Daly, Vice-President; Mr. P. E. Crowley, Vice-President, and Mr. H. M. Biscoe, Vice-President.

A separate corporate organization has been formed to conduct the affairs of the company under instructions from the President and the Board of Directors, and to take all appropriate and necessary corporate action to carry out the obligations assumed by it under the agreement. Through this organization, the personnel of which is shown on the first page of this report, expenditures for additions and betterments to the property, and for the maintenance of road and equipment under federal management, are investigated and verified and supervision is exercised for the protection of the company's interests, both as to the property transferred under the Federal Control Act, and that remaining with the corporation.

SUMMARY OF FINANCIAL OPERATIONS AFFECTING INCOME

		Year ended December 31, 1918
COMPENSATION ACCRUED FOR THE POSSESSION, USE AND CONTROL OF THE PROPERTY OF THIS COMPANY AND ITS LEASED LINES		$55,802,630.50
MISCELLANEOUS OPERATIONS		
Revenues	$1,963.59	
Expenses	4,925.78	
NET DEFICIT		2,962.19
OTHER CORPORATE INCOME		
Income from lease of road	$106,424.88	
Miscellaneous rent income	904,841.70	
Miscellaneous non-operating physical property	632,283.40	
Separately operated properties—profit	1,147,244.01	
Dividend income	6,379,728.57	
From funded securities	500,845.06	
From unfunded securities and accounts	3,745,610.50	
Miscellaneous income	54,274.23	
TOTAL OTHER CORPORATE INCOME		13,471,252.35
GROSS INCOME		$69,270,920.66
DEDUCTIONS FROM GROSS INCOME		
Miscellaneous rents	$689,074.60	
Miscellaneous tax accruals	300,045.83	
Rent for leased roads	9,314,910.15	
Interest on funded debt	29,432,623.35	
Interest on unfunded debt	2,004,364.10	
Amortization of discount on funded debt	556,975.56	
Miscellaneous income charges	138,783.96	
Separately operated properties—loss	62,628.25	
War taxes	2,017,501.92	
Corporate general expenses	288,667.84	
DEDUCTIONS FROM GROSS INCOME		44,805,575.56
		$24,465,345.10
Less revenues and expenses applicable to the period prior to January 1, 1918, settled for account of the corporation by the United States Railroad Administration		6,548,223.55
NET CORPORATE INCOME		$17,917,121.55
DISPOSITION OF NET INCOME		
Dividends declared—5 per cent	$12,479,610.00	
To sinking funds	115,563.46	
TOTAL APPROPRIATIONS		12,595,173.46
SURPLUS FOR THE YEAR CARRIED TO PROFIT AND LOSS		$5,321,948.09

Profit and Loss Account

BALANCE TO CREDIT OF PROFIT AND LOSS DECEMBER 31, 1917		$75,245,201.74
ADDITIONS:		
Surplus for the year 1918	$5,321,948.09	
Sundry deferred credits and adjustments	802,435.98	
Profit on road and equipment sold	27,766.74	
		6,152,150.81
		$81,397,352.55
DEDUCTIONS:		
Loss on retired road and equipment	$31,054.16	
Loss on sale of capital stock of the Pennsylvania Coal and Coke Company	281,250.00	
Charging off various uncollectible accounts	29,850.40	
Readjustment of operating results of the Detroit Terminal Railroad prior to November 1, 1912	42,645.66	
Sundry deferred debits and adjustments	69,254.43	
		454,054.65
BALANCE TO CREDIT OF PROFIT AND LOSS DECEMBER 31, 1918		$80,943,297.90

The amount of standard compensation, $55,802,630.50, accrued under federal control for the possession and use of the company's property, and its leased and operated lines, was based upon the average annual railway operating income for the three years ended June 30, 1917.

As required by the Federal Control Act, this amount was certified by the Interstate Commerce Commission as agreeing with the income reported to it, subject, however, to such changes and corrections as the Commission might hereafter determine and certify to be requisite.

There were delivered in 1918, 1 electric locomotive, 139 steam locomotives, 20 steel baggage and mail cars, 71 steel passenger coaches, 2 steel dining cars, and 105 steel baggage cars, which were provided for under the New

York Central Railroad Equipment Trust of 1917 as authorized by the Board of Directors on October 19, 1916. On account of the prevailing unsatisfactory market conditions for the sale of the equipment trust certificates, and in order to procure the equipment as needed, the company has purchased at par and accrued interest $6,648,000 of the certificates, of which $4,187,000 were pledged as security for short-term loans and $2,461,000 carried in the treasury of the company.

The Director General of Railroads allotted to the company 4,500 freight cars, estimated to cost $13,201,000, and 120 locomotives, estimated to cost $6,192,955; a total of approximately $19,393,955. Of this equipment, 2,556 freight cars and 114 locomotives were delivered during the year.

The Director General also allotted to the company, as Lessee of the Boston and Albany Railroad, 10 locomotives, estimated to cost $622,770, for use on that road.

These allotments were accepted by the company and the equipment is being constructed under contracts between the Director General and the builders, and the financing of the cost thereof is being arranged between the Director General and the company.

The changes in the property investment account for the year were as follows:

Additions and betterments—Road		
Expenditures by the Federal Manager	$11,432,818.09	
Expenditures by the corporation	126,860.84	
	$11,559,678.93	
Less sale of land by corporation and miscellaneous credits	63,522.96	
		$11,496,155.97
Additions and betterments—Equipment		
Expenditures by the Federal Manager, less equipment retired and transferred	$2,933,531.70	
Equipment assigned to the N. Y. C. R. R. by the United States Railroad Administration	13,002,056.00	
Expenditures by the corporation	8,511,006.80	
		24,446,594.50
Total addition to road and equipment accounts		$35,942,750.47
Improvements on leased railway property		
Expenditures by the Federal Manager	$4,783,284.40	
Less miscellaneous credits by the corporation	11,911.68	
		4,771,372.72
Improvements on miscellaneous physical property		
Expenditures by the Federal Manager	$18,541.61	
Expenditures by the corporation	52,293.74	
	$70,835.35	
Less credits by the corporation	50,000.00	
		20,835.35
The net increase in property investment accounts during the year being		$40,734,958.54

Pending the execution of the agreement with the Director General of Railroads and the settlement of accounts thereunder, the company borrowed from him $20,000,000 for which it gave its 6 per cent demand notes. Of the notes so given $13,500,000 were secured by collateral, the balance, $6,500,000, being unsecured.

In the operation of the Pension Department, 107 employees were retired and placed upon the pension roll. Of these retirements, 43 were authorized because of the attainment of seventy years of age, and 64 because of total and permanent physical disability; 165 pensioners died during 1918, and at the close of the year 1,469 retired employees were carried upon the pension rolls. The average monthly pension allowance of these is $26.34, and the total amount paid in pension allowances during the year was $471,075.11, which was paid by and charged to the operating expenses of the United States Railroad Administration, as provided in the agreement with the Director General of Railroads.

The following changes took place in the Board of Directors during the year:

Resigned:	March 13, 1918	Robert S. Lovett
	April 10, 1918	Marvin Hughitt
	May 31, 1918	Alfred H. Smith
	Sept. 18, 1918	Frank J. Jerome
	Sept. 18, 1918	Leonard J. Hackney
Elected:	Sept. 18, 1918	Charles T. Lewis
	Sept. 18, 1918	Charles B. Seger
	Sept. 18, 1918	Edward S. Harkness
	Nov. 13, 1918	Samuel Mather
Re-elected:	Dec. 11, 1918	Frank J. Jerome

The Board records, with regret, the death on August 10, 1918, of Mr. William H. Newman, a Director of this Company, and who was President of The New York Central and Hudson River Railroad Company from June 3, 1901, to February 1, 1909.

The Board also records, with regret, the death of two other of its members, Mr. Charles T. Lewis, on September 29th, and Mr. Horace B. Andrews, on December 1st, 1918.

Appreciative acknowledgement is made to all officers and employees of their loyal and efficient co-operation and service.

For the Board of Directors.

WILLIAM K. VANDERBILT, JR.,
President.

APPENDIX

INCLUDED FOR INFORMATION FROM REPORTS SUPPLIED BY THE FEDERAL AUDITORS

REPORT OF OPERATIONS OF THE NEW YORK CENTRAL RAILROAD (EXCLUDING BOSTON AND ALBANY RAILROAD) BY THE UNITED STATES RAILROAD ADMINISTRATION FOR THE YEAR 1918

INCOME ACCOUNT	1918 5,681.82 *miles operated*	1917* 5,685.43 *miles operated*	Increase or Decrease 3.61 *miles operated*
OPERATING INCOME			
Railway operating revenues	$269,270,956.51	$216,267,517.22	$53,003,439.29
Railway operating expenses	210,637,848.99	153,597,905.35	57,039,943.64
NET REVENUE FROM RAILWAY OPERATIONS	$58,633,107.52	$62,669,611.87	—$4,036,504.35

CONDENSED GENERAL BALANCE SHEET, DECEMBER 31, 1918

ASSETS

INVESTMENTS		
Investment in road	$472,010,405.09	
Investment in equipment		
Trust	$116,733,517.07	
Other	141,642,599.21	
	$258,376,116.28	
		$730,386,521.37
Improvements on leased railway property		96,903,574.44
Miscellaneous physical property		8,701,439.17
Investments in affiliated companies		
Stocks	$133,447,346.64	
Bonds	9,735,838.38	
Notes	43,500,926.84	
Advances	14,968,985.60	
		201,653,097.46
Other investments		
Stocks	$31,140,024.32	
Bonds	3,858,079.67	
Notes	11,780,026.03	
Advances	712,514.11	
Miscellaneous	12,765.00	
		47,503,409.13
Total investments		$1,085,148,041.57
CURRENT ASSETS		
Cash	$8,993,280.27	
Special deposits	981,245.14	
Loans and bills receivable	59,108.99	
Traffic and car-service balances receivable	41,509.59	
Miscellaneous accounts receivable	6,815,012.76	
Interest and dividends receivable	4,354,563.58	
Rents receivable		
Compensation due from United States Government	27,672,084.92	
		48,916,805.25
DEFERRED ASSETS		
Working fund advances	$124,392.30	
Insurance and other funds	908,611.38	
United States Government		
Cash taken over	$13,407,045.26	
Agents and conductors balances	9,616,893.84	
Materials and supplies	34,239,829.70	
Assets December 31, 1917, collected	6,919,234.06	
Other items	5,163,370.15	
	$69,346,373.01	
Other deferred assets	4,097,745.84	
		74,477,122.53
UNADJUSTED DEBITS		
Discount on funded debt unamortized	$6,321,634.59	
Securities acquired from lessor companies (per contra)	457,851.00	
Other unadjusted debits	2,214,851.31	
		8,994,336.90
Securities issued or assumed—unpledged	($3,443,005.00)	
Securities issued or assumed—pledged	($24,687,000.00)	
Total		$1,217,536,306.25

LIABILITIES

STOCK		
Capital stock		$249,597,355.00
LONG TERM DEBT		
Funded debt unmatured		
Equipment obligations	$41,591,201.45	
Mortgage bonds	526,194,000.00	
Debentures	105,500,000.00	
Notes	15,000,000.00	
		688,285,201.45
CURRENT LIABILITIES		
Loans and bills payable	$41,963,000.00	
Traffic and car-service balances payable	2,239,089.84	
Audited accounts and wages payable	4,380,970.65	
Miscellaneous accounts payable	5,921,122.51	
Interest matured unpaid	3,955,549.15	
Dividend declared, payable February 1, 1919	3,119,902.50	
Dividends matured unclaimed	170,630.42	
Funded debt matured unpaid	4,790.00	
Unmatured interest accrued	6,241,945.73	
Unmatured rents accrued	748,207.37	
Other current liabilities	4,596,902.90	
		73,342,111.07
DEFERRED LIABILITIES		
Liability to lessor companies for equipment	$14,715,322.52	
United States Government		
Additions and betterments	$16,650,703.63	
Liabilities December 31, 1917, paid	21,512,363.92	
Corporate transactions	8,214,989.85	
Revenue and expenses prior to January 1, 1918	6,906,821.83	
Other items	5,734,017.03	
	$59,018,896.26	
Other deferred liabilities	192,861.20	
		73,927,079.98
UNADJUSTED CREDITS		
Tax liability	$2,553,255.51	
Insurance and casualty reserves	565,079.82	
Operating reserves	350,029.88	
Accrued depreciation of equipment	32,806,683.77	
Liability to lessor companies for securities acquired (per contra)	457,851.00	
Other unadjusted credits	13,970,888.63	
		50,703,788.61
CORPORATE SURPLUS		
Additions to property through income and surplus	$93,924.85	
Sinking fund reserves	643,547.39	
Total appropriated surplus	$737,472.24	
Profit and loss—balance	80,943,297.90	
		$1,680,770.14
Total		$1,217,536,306.25

Percentage of expenses to revenues	(78.23)	(71.02)	(7.21)
Railway taxes accrued	$11,273,155.71	$10,594,035.62	$679,120.09
Uncollectible railway revenues	17,594.44	19,395.51	—1,801.07
RAILWAY OPERATING INCOME	$47,342,357.31	$52,056,180.74	—$4,713,823.43
OTHER INCOME			
Joint facility rent income	$3,262,788.23	$3,148,788.33	$113,999.90
Income from interest on bank balances	59,331.16	284,520.60	—225,189.44
Revenues and expenses prior to 1918	6,194,711.69	.....	6,194,711.69
TOTAL OTHER INCOME	$9,516,831.08	$3,433,308.93	$6,083,522.15
GROSS INCOME	$56,859,188.45	$55,489,489.67	$1,369,698.78
DEDUCTIONS FROM GROSS INCOME			
Hire of equipment, debit balance	$3,411,326.39	$3,219,768.18	$191,558.21
Joint facility rents	1,154,583.18	1,178,790.89	—24,207.71
Miscellaneous rents	62,737.99†	.....	62,737.99
Interest on unfunded debt	133.21	.....	133.21
TOTAL DEDUCTIONS FROM GROSS INCOME	$4,628,780.77	$4,398,559.07	$230,221.70
NET INCOME	$52,230,407.68	$51,090,930.60	$1,139,477.08

*Figures for 1917 revised to agree with basis in 1918.
†Represents increase in rental of properties over amounts paid prior to January 1, 1918.

The Cleveland, Cincinnati, Chicago and St. Louis Railway Company—Thirtieth Annual Report

To the Stockholders of

THE CLEVELAND, CINCINNATI, CHICAGO AND ST. LOUIS RAILWAY COMPANY:

The Board of Directors herewith submits its report for the year ended December 31, 1918, with statements showing the results for the year and the financial condition of the company.

The operation and maintenance of the company's road were conducted under federal control during the year 1918. The mileage embraced in the operation of the road is as follows:

Main line and branches owned	1,693.03
Proprietary lines	126.09
Leased lines	204.43
Operated under contract	201.37
Trackage rights	170.85
Total road operated (as shown in detail on another page)	2,395.77

As compared with mileage operated in 1917, there was an increase in mileage of leased lines of 2.01 miles account of the Mt. Gilead Short Line Railroad, which heretofore had been reported as separately operated, and an increase of trackage rights of 6.85 miles over the Toledo Terminal Railroad between Stanley and Gould, Ohio, making an increase of 8.86 in mileage operated during 1918.

There was no change in capital stock during the year, the amounts authorized and issued to December 31, 1918, being as follows:

Preferred stock authorized		$10,000,000.00
Common stock authorized		50,000,000.00
Total stock authorized		$60,000,000.00
Preferred stock issued	$10,000,000.00	
Common stock issued	47,056,300.00	
		57,056,300.00
Balance common stock authorized but not issued December 31, 1918		$2,943,700.00

The funded debt unmatured outstanding December 31, 1917, was $99,231,284.62

It has been decreased during the year as follows:

Big Four Railway equipment trust certificates payable June 1, 1918	$373,000.00	
Big Four Railway equipment trust certificates payable July 1, 1918	115,000.00	
Pro rata New York Central Lines equipment trust certificates payable November 1, 1918	246,689.81	
C. I. St. L. & C. Ry. Co. general first mortgage bonds retired	76,000.00	
C. I. St. L. & C. Ry. Co. first consolidated mortgage bonds retired	11,000.00	
Central Grain Elevator Co. bonds retired	26,000.00	
C. C. C. & St. L. Ry. Co. (St. Louis Division) first collateral trust mortgage bonds purchased for sinking fund	22,000.00	
		869,689.81

Total funded debt outstanding December 31, 1918 ... $98,361,594.81

The Big Four Railway Equipment Trust of 1917, established by agreement dated June 1, 1917, provides for a total issue of $2,370,000 equipment trust certificates. The original agreement provided for an interest rate of 5 per cent per annum, but under date of December 31, 1918, by supplemental agreement, the interest rate was increased to 6 per cent per annum. Under the provisions of the Trust 20 locomotives and 30 passenger cars were delivered during the year.

The Big Four Railway Equipment Trust certificates issued during the year amounted to $465,000. On account of the prevailing unsatisfactory market conditions for the sale of equipment trust certificates, and in order to procure equipment as needed, the company, through the medium of short-term loans, purchased at par and accrued interest these certificates, using $317,000 of them as collateral, pending more favorable conditions for their sale. There is therefore no change in the funded debt in this connection.

As was pointed out in the last annual report, the President of the United States took possession and assumed control of the railroad property of your company on December 28, 1917. By the terms of the President's proclamation the possession, control, operation, and utilization of the transportation systems were vested in a Director General; and it was stated that, until the Director General should otherwise determine, his powers would be exercised through the boards of directors, officers, and employees of the systems taken over. The Director General appointed regional directors under whom the railroads of the several districts were unified as to control and operation. Subsequently, Federal Managers and other Federal officers were appointed and required to report through the Federal Managers to the Regional Director and the Director General.

As of December 27, 1918, the company, jointly with The Muncie Belt Railway Company, executed an agreement with the Director General of Railroads providing for the operation, during federal control, of the roads of the parties to the agreement by the Director General of Railroads for an annual total standard compensation of $9,945,738.41, divided as follows:

The Cleveland, Cincinnati, Chicago and St. Louis Ry. Co.	$9,938,597.23
The Muncie Belt Railway Company	7,141.18
Total	$9,945,738.41

Under the agreement, all salaries and expenditures incurred by the company, during federal control, for purposes which relate to the existence and maintenance of the corporation, are required to be borne by the corporation out of its compensation and other income.

Immediately upon his taking office, the Director General of Railroads appointed as Regional Director in charge of the Eastern District, Mr. Alfred H. Smith, then President of this company. This District at that time included practically all the railroad lines in the district north of the Ohio and Potomac Rivers and east of the Indiana-Illinois state line. Mr. Smith assumed the duties of the Regional Director's office, which involved dealing with a complicated traffic situation and the co-ordinating of the lines for war purposes, as an addition to his obligations as President of this company.

Early in 1918, the Director General decided that officers in charge of federal operation should not continue their positions with the corporation, except in special cases and where permission was given. Thereupon, Mr. Smith resigned his office as President, effective May 31st, and Mr. William K. Vanderbilt, Jr., was elected in his stead. Later in the year Mr. Abraham T. Hardin, Vice-President, and Mr. Harry A. Worcester, Vice-President and General Manager also resigned in order that they might continue in the service of the United States Railroad Administration.

A separate corporate organization has been formed to conduct the affairs of the company under instructions from the President and the Board of Directors, and to take all appropriate and necessary corporate action to carry out the obligations assumed by it under the agreement. Through this organization, the personnel of which is shown on the first page of this report, expenditures for additions and betterments to the property, and for the maintenance of road and equipment under federal management, are investigated and verified and supervision is exercised for the protection of the company's interests, both as to the property transferred under the Federal Control Act, and that remaining with the corporation.

Pending the execution of the agreement with the Director General of Railroads and the settlement of accounts thereunder, the company borrowed $5,300,000, of which $4,300,000 were obtained from the Director General of Railroads and the Secretary of the Treasury, for which the company gave $2,500,000 of 6 per cent demand notes secured by collateral and $1,800,000 unsecured. For the balance of $1,000,000, an unsecured 6 per cent demand note was given by the company to The New York Central Railroad Company, endorsed by that company and sold by it to the Director General of Railroads.

SUMMARY OF FINANCIAL OPERATIONS AFFECTING INCOME

		Year ended December 31, 1918
Compensation accrued for the possession, use and control of the property of this company and its leased lines		$9,938,597.23
REVENUES FROM MISCELLANEOUS OPERATIONS		
Revenues	$18,842.68	
Expenses and taxes	16,867.55	
MISCELLANEOUS OPERATING INCOME		1,975.13
OTHER CORPORATE INCOME		
Miscellaneous rent income	$195,016.70	
Miscellaneous non-operating physical property	81,107.27	
Separately operated properties—profit	2,797.20	
Dividend income	74,705.89	
From funded securities	238,218.40	
From unfunded securities and accounts	234,546.14	
Release of premium on funded debt	1,885.80	
Miscellaneous income	3,427.88	
TOTAL OTHER CORPORATE INCOME		831,705.28
GROSS INCOME		$10,772,277.64
DEDUCTIONS FROM GROSS INCOME		
Miscellaneous rents	$141,315.15	
Miscellaneous tax accruals	469.86	
Separately operated properties—loss	64,290.97	
Rent for leased roads	561,280.09	
Interest on funded debt	4,580,303.37	
Interest on unfunded debt	505,581.75	
Amortization of discount on funded debt	9,026.69	
Miscellaneous income charges	56,392.50	
War tax accrued	74,825.62	
Corporate general expenses	42,085.45	
DEDUCTIONS FROM GROSS INCOME		6,035,571.45
		$4,736,706.19
Less revenues and expenses applicable to the period prior to January 1, 1918, settled for account of the corporation by United States Railroad Administration		1,616,343.07
NET CORPORATE INCOME		$3,120,363.12
DISPOSITION OF NET INCOME		
Dividends declared—5 per cent preferred stock	$499,925.00	
Sinking funds	31,894.10	
Investment in physical property	95,530.40	
TOTAL APPROPRIATIONS OF INCOME		627,349.50
SURPLUS FOR THE YEAR CARRIED TO PROFIT AND LOSS		$2,493,013.62
Profit and loss account		
Amount to credit of profit and loss, December 31, 1917		$9,661,133.72
ADD:		
Surplus for year 1918	$2,493,013.62	
Unrefundable overcharges	13,360.31	
Reacquirement of securities below par	15,357.60	
Unclaimed wages and pensions 1912	6,524.94	
		2,528,256.47
		$10,772,277.64

DEDUCT.		
Interest to December 31, 1917, on advances by New York Central Railroad Co. for purchase of coal lands in the State of Illinois	$546,267.60	
Unaccrued depreciation prior to July 1, 1907, on equipment retired during 1918	123,983.21	
Operations of Peoria and Eastern Railway included in income account for 1918 and credited to that company	107,341.11	
Refund of freight overcharges previously written off	24,199.66	
Surplus appropriated for investment in physical property	3,438.97	
Adjustment of sundry accounts (net)	58,550.48	
		863,781.03
BALANCE TO CREDIT OF PROFIT AND LOSS DECEMBER 31, 1918		$11,325,609.16

The amount of standard compensation, $9,938,597.23, accrued under federal control for the possession and use of the company's property, and its leased and operated lines, was based upon the average annual railroad operating income for the three years ended June 30, 1917. As required by the Federal Control Act, this amount was certified by the Interstate Commerce Commission as agreeing with the income reported to it, subject, however, to such changes and corrections as the Commission might hereafter determine and certify to be requisite.

The Director General of Railroads allotted to the company 2,000 freight cars, estimated to cost $5,736,000, and 35 locomotives, estimated to cost $1,780,000, a total of approximately $7,516,000. Of this equipment 1,246 freight cars and 25 locomotives were delivered during the year. These allotments were accepted by the company and the equipment is being constructed under contracts between the Director General and the builders and the financing of the cost thereof is being arranged between the Director General and the company.

The changes in the road and equipment accounts for the year were as follows:

Additions and betterments—Road		
Expenditures by the Federal Manager	$4,088,370.76	
Expenditures by the corporation	52,283.58	
		$4,140,654.34
Additions and betterments—Equipment		
Equipment assigned to the C. C. C. & St. L. Ry. by the United States Railroad Administration	$4,875,074.00	
Expenditures by the Federal Manager less equipment retired and transferred	78,483.15	
Expenditures by the corporation	1,344,469.35	
		6,298,026.50
Improvements on leased railway property		
Expenditures by the Federal Manager	$229,458.28	
Expenditures by the corporation	1,774.85	
		231,233.13
Total (as shown in detail on other pages)		$10,669,913.97

In the operation of the Pension Department 32 employees were retired and placed upon the pension roll; of these retirements 18 were authorized because of the attainment of seventy years of age, and 14 because of total and permanent physical disability; 39 pensioners died during 1918, and at the close of the year 313 retired employees were carried upon the pension rolls. The average monthly pension allowance of these is $23.06, and the total amount paid in pension allowances during the year was $86,471.77, which was paid by and charged to the operating expenses of the United States Railroad Administration as provided in the agreement with the Director General of Railroads.

The following change took place in the Board of Directors during the year:

Resigned:	March 13, 1918	Robert S. Lovett
	May 31, 1918	Alfred H. Smith
	May 31, 1918	Harry A. Worcester
	September 18, 1918	Frank J. Jerome
	September 18, 1918	Leonard J. Hackney
Elected:	September 18, 1918	Charles T. Lewis
	September 18, 1918	Charles B. Seger
	September 18, 1918	Edward S. Harkness
	September 18, 1918	Horace E. Andrews
	October 30, 1918	Samuel Mather
Re-elected:	December 11, 1918	Leonard J. Hackney

The Board records, with regret, the death on August 10, 1918, of Mr. William H. Newman, a Director of the Company, and who was President of the Company from January 31, 1905, to February 1, 1909.

The Board also records, with regret, the deaths of two other of its members, Mr. Charles T. Lewis, on September 29th, and Mr. Horace E. Andrews, on December 1st, 1918.

Appreciative acknowledgement is made to all officers and employees of their loyal and efficient co-operation and service.

For the Board of Directors,
WILLIAM K. VANDERBILT, JR., President.

APPENDIX

INCLUDED AS INFORMATION FROM REPORTS SUPPLIED BY THE FEDERAL AUDITOR

RESULTS OF OPERATIONS OF THE CLEVELAND, CINCINNATI, CHICAGO AND ST. LOUIS RAILROAD BY THE UNITED STATES RAILROAD ADMINISTRATION FOR THE YEAR 1918 AS REPORTED TO THE INTERSTATE COMMERCE COMMISSION

INCOME ACCOUNT	1918	1917	INCREASE OR DECREASE
Railway operating revenues	$71,403,970.21	$52,650,920.24	$18,753,049.97
Railway operating expenses	51,895,288.69	38,059,421.05	13,835,867.64
NET REVENUE FROM RAILWAY OPERATIONS	$19,508,681.52	$14,591,499.19	$4,917,182.33
Percentage of expenses to revenues	(72.68)	(72.29)	(.39)
Railway tax accruals	$3,538,917.93	$2,144,867.99*	$1,394,049.94

CONDENSED GENERAL BALANCE SHEET, DECEMBER 31, 1918

ASSETS

INVESTMENTS		
Investment in road and equipment	$172,342,676.82	
Improvements on leased railway property	705,103.21	
Sinking funds	652.42	
Miscellaneous physical property	2,341,825.32	
Investments in affiliated companies		
Stocks	$6,798,534.16	
Bonds	5,285,402.00	
Notes	5,000.00	
Advances	1,177,167.61	
	$13,266,103.77	
Other investments		
Stocks	$36.00	
Bonds	1,115,166.45	
Notes	30,775.15	
Advances	81,000.00	
Miscellaneous	1,330.00	
	$1,228,307.60	
		$189,884,669.14
CURRENT ASSETS		
Cash	$1,277,803.60	
Special deposits	623,631.41	
Loans and bills receivable	650.00	
Traffic and car-service balances receivable	29,583.58	
Miscellaneous accounts receivable	646,335.78	
Interest and dividends receivable	26,220.50	
Rents receivable		
Compensation due from United States Government	$7,295,738.41	
Miscellaneous	17,411.34	
	$7,313,149.75	
Other current assets	812.75	
		9,918,187.37
DEFERRED ASSETS		
Working fund advances	$8,881.99	
Other deferred assets	261,883.69	
United States Government		
Cash taken over	$1,655,048.11	
Agents and conductors balances	3,235,259.67	
Materials and supplies	5,381,116.19	
Assets, December 31, 1917, collected	5,133,017.72	
Equipment retired	505,090.47	
Miscellaneous	337,907.73	
	$16,247,439.89	16,518,205.57
UNADJUSTED DEBITS		
Rents and insurance paid in advance	$111.41	
Discount on funded debt	52,960.22	
Other unadjusted debits	2,181,268.66	
		2,234,340.29
Securities issued or assumed—unpledged	($163,330.00)	
Securities issued or assumed—pledged	($6,963,000.00)	
Total		$218,555,402.37

LIABILITIES

STOCK		
Capital stock		$57,027,200.00
LONG TERM DEBT		
Funded debt unmatured		
Equipment obligations	$10,358,488.87	
Mortgage bonds	59,146,500.00	
Collateral trust bonds	9,194,000.00	
Miscellaneous obligations	19,662,605.94	
	$98,361,594.81	
Non-negotiable debt to affiliated companies	6,025,927.00	
		104,387,521.81
CURRENT LIABILITIES		
Loans and bills payable	$8,327,650.00	
Audited accounts and wages payable	212,549.90	
Miscellaneous accounts payable	38,466.23	
Interest matured unpaid	1,079,218.19	
Dividends matured unpaid	7,898.77	
Unmatured dividends declared	124,981.25	
Unmatured interest accrued	739,273.46	
Unmatured rents accrued	103,103.40	
Other current liabilities	5,514,948.18	
		16,148,089.38
DEFERRED LIABILITIES		
Other deferred liabilities	$2,344,478.72	
United States Government		
Additions and betterments	$5,186,803.64	
Liabilities, December 31, 1917, paid	7,360,837.55	
Corporate transactions	4,607,356.41	
Expenses prior to January 1, 1918	1,574,242.46	
Miscellaneous	153,389.66	
	$18,882,629.72	21,227,108.44
UNADJUSTED CREDITS		
Tax liability	$213,925.12	
Premium on funded debt	9,272.44	
Accrued depreciation—equipment	5,505,568.14	
Other unadjusted credits	1,338,044.64	
		7,066,810.34
CORPORATE SURPLUS		
Additions to property through income and surplus	$845,735.71	
Sinking fund reserves	527,327.53	
Total appropriated surplus	$1,373,063.24	
Profit and loss—balance	11,325,609.16	
		12,698,672.40
Total		$218,555,402.37

Railway operating income	$13,96 ,010.89	$12,436,999.07	$3,525,011.82
Income items			
Equipment rents—net debt	$944,058.60	$1,804,641 57	$860,582.97
Joint facility rents—net debt	339,013.86	05,881.57	233,131 29
Net railway operating income	$14,688,938.43	$10,536,474.93	$4,152,463.50
Other income items	1,678,716.63	.....	.....
Uncollectible railway revenues	7,752.20	9,632.13	1,879.43
Net income	$16,367,655.06	..	.....
Average number of miles of road operated	2,395.77	2,386 91	8.86

*Adjusted for comparative purposes by eliminating the federal income and excess profits taxes accrued in 1917 which compare with the taxes which the corporation is required to pay for 1918.

The Michigan Central Railroad Company—Seventy-Third Annual Report

To the Stockholders of

THE MICHIGAN CENTRAL RAILROAD COMPANY:

The Board of Directors herewith submits its report for the year ended December 31, 1918, with statements showing the results for the year and the financial condition of the company.

The operation and maintenance of the company's road were conducted under federal control during the year 1918, the mileage covered being as follows:

	Miles
Main line and branches owned	1,182.84
Line jointly owned	
Leased lines	.71
Lines operated under trackage rights	578.16
	100.06
Total road operated (as shown in detail on another page)	1,861.77

There was no change in capital stock during the year, the amount authorized being $18,738,000 and actually outstanding $18,736,400.

The funded debt outstanding on December 31, 1917, was $52,738,843.79

It has been decreased during the year by payment of pro-rata of installments on account of equipment trust certificates as follows:

Trust of 1907, due November, 1918 (N. Y. C. Lines)	$260,425.45
Trust of 1915, due October, 1918 (M. C. R. R.)	300,000.00
Total funded debt outstanding December 31, 1918	560,425.45
	$52,178,418.34

Of the $8,000,000 refunding and improvement mortgage bonds authorized in 1917 there were issued during the year $6,171,000, but as all of them, pending their sale, are held by the company and pledged as collateral for short term loans there was no change in the funded debt in this connection.

Michigan Central Railroad Equipment Trust certificates of 1917 issued during the year amounted to $3,848,000. On account of the prevailing unsatisfactory market conditions for the sale of equipment trust certificates, and in order to procure equipment as needed, the company, through the medium of short-term loans, purchased at par and accrued interest these certificates, pledging $3,658,000 of them as collateral, pending more favorable conditions for their sale. There is therefore no change in the funded debt in this connection.

SUMMARY OF FINANCIAL OPERATIONS AFFECTING INCOME

	Year ended December 31, 1918	
Compensation accrued for the possession, use and control of the property of this company and its leased lines		$8,052,127.48
Other corporate income:		
Income from lease of road	$123.43	
Miscellaneous rent income	2,883.56	
Miscellaneous non-operating physical property	2,881.23	
Dividend income	487,540.00	
From funded securities	48,579.78	
From unfunded securities and accounts	359,257.06	
Miscellaneous income	1,714.81	
Total other corporate income		902,979.87
Gross income		$8,955,107.35
Deductions from gross income:		
Miscellaneous rents	$3,208.88	
Miscellaneous tax accruals	5,379.92	
Rent for leased roads	2,774,022.11	
Interest on funded debt	2,077,363.38	
Interest on unfunded debt	1,282,387.40	
Amortization of discount on funded debt	22,482.24	
Miscellaneous income charges	8,645.02	
Separately operated properties—loss	58,883.36	
War taxes accrued	81,566.38	
Corporate general expenses	71,605.54	
Deductions from gross income		6,385,544.23
		$2,569,563.12
Less revenue and expenses applicable to the period prior to January 1, 1918, settled for account of the corporation by United States Railroad Administration		2,021,705.41
Net corporate income		$547,857.71
Disposition of net income:		
Dividends declared—4 per cent		749,456.00
Deficit for the year carried to profit and loss		$201,598.29
Amount to credit of profit and loss, December 31, 1917		$18,589,136.74
Add:		
Profit from sale of land at Detroit	$96,960.00	
Readjustment of advances and interest to December 31, 1917, account Detroit Terminal Railroad Company	211,469.88	
Profit in connection with sale of rail leased to Eastman Lumber Company	12,643.17	
Proceeds from sale of grain at Elevator B, Detroit	6,762.32	
Adjustment of sundry accounts (net)	63,963.80	391,799.17
		$18,980,935.91
Deduct:		
Deficit for year 1918	$201,598.29	
Depreciation unaccrued prior to July 1, 1907, on equipment retired during 1918	311,910.04	
Adjustment of overaccrual prior to December 31, 1917, of mail revenue	18,672.17	532,180.50
Balance to credit of profit and loss, December 31, 1918		$18,448,755.41

As was pointed out in the last annual report, the President of the United States took possession and assumed control of the railroad property of your company on December 28, 1917. By the terms of the President's proclamation the possession, control, operation, and utilization of the transportation systems were vested in a Director General; and it was stated that, until the Director General should otherwise determine, his powers would be exercised through the boards of directors, officers, and employes of the systems taken over. The Director General appointed regional directors under whom the railroads of the several districts were unified as to control and operation.

Subsequently, Federal Managers and other Federal Officers were appointed and required to report through the Federal Managers to the Regional Director and the Director General.

As of December 27, 1918, the company, jointly with the Chicago, Kalamazoo & Saginaw Railway Company, executed an agreement with the Director General of Railroads providing for the operation, during federal control, of the roads of the parties to the agreement by the Director General of Railroads for an annual total standard compensation of $8,105,727.04, divided as follows:

The Michigan Central Railroad Company	$8,052,127.48
Chicago, Kalamazoo & Saginaw Railway Company	53,599.56
	$8,105,727.04

Under the agreement, all salaries and expenditures incurred by the company, during federal control, for purposes which relate to the existence and maintenance of the corporation, are required to be borne by the corporation out of its compensation and other income.

Immediately upon his taking office, the Director General of Railroads appointed as Regional Director in charge of the Eastern District, Mr. Alfred H. Smith, then President of this Company. This District at that time included practically all the railroad lines in the district north of the Ohio and Potomac Rivers and east of the Indiana-Illinois State Line. Mr. Smith assumed the duties of the Regional Director's office, which involved dealing with a complicated traffic situation and the co-ordinating of the lines for war purposes, as an addition to his obligations as President of this company.

Early in 1918, the Director General decided that officers in charge of federal operations should not continue their positions with the corporation, except in special cases and where permission was given. Thereupon, Mr. Smith resigned his office as President, effective May 31st, and Mr. William K. Vanderbilt, Jr., was elected in his stead. Later in the year the following general executive officers also resigned in order that they might continue in the service of the United States Railroad Administration: Mr. Abraham T. Hardin, Vice-President; Mr. Charles F. Daly, Vice-President, and Mr. Edmond D. Bronner, Vice-President and General Manager.

A separate corporate organization has been formed to conduct the affairs of the company under instructions from the President and the Board of Directors, and to take all appropriate and necessary corporate action to carry out the obligations assumed by it under the agreement. Through this organization, the personnel of which is shown on the first page of this report, expenditures for additions and betterments to the property, and for the maintenance of road and equipment under federal management, are investigated and verified and supervision is exercised for the protection of the company's interests, both as to the property transferred under the Federal Control Act, and that remaining with the corporation.

The amount of standard compensation, $8,052,127.48, accrued under federal control for the possession and use of the company's property and its leased and operated lines, was based upon the average annual railroad operating income for the three years ended June 30, 1917. As required by the Federal Control Act, this amount was certified by the Interstate Commerce Commission as agreeing with the income reported to it, subject, however, to such changes and corrections as the Commission might hereafter determine and certify to be requisite.

Pending the execution of the agreement with the Director General of Railroads and the settlement of accounts thereunder, the company borrowed $7,050,000, of which $4,000,000 were obtained from the Director General of Railroads and the Secretary of the Treasury on 6% demand notes secured by collateral, and $3,050,000 from The New York Central Railroad Company on unsecured notes, endorsed by that company and sold by it to the Director General of Railroads.

The Michigan Central Railroad Equipment Trust of 1917, established by agreement dated March 1, 1917, provides for a total issue of $9,000,000 equipment trust certificates. The original agreement provided for an interest rate of 4½% per annum. Under date of December 31, 1918, by supplemental agreement, the interest rate was increased to 6% per annum. Under the provisions of the trust 3,470 freight train cars were delivered in 1918.

The Director General of Railroads allotted to the company 2,000 freight cars, estimated to cost $5,747,000, and 30 locomotives, estimated to cost $1,512,000, a total of approximately $7,259,000. These allotments were accepted by the company and of this equipment 827 freight train cars and 20 locomotives were delivered during the year.

This equipment is being constructed under contracts between the Director General and the builders and the financing of the cost thereof is being arranged between the Director General and the company.

The changes in the road and equipment accounts for the year were as follows:

Additions and betterments—Road		
Expenditures by the Federal Manager	$2,066,319.88	
Expenditures by the corporation	1,533.80	$2,067,853.68
Additions and betterments—Equipment		
Equipment assigned to the M. C. R. R. by the U. S. R. R Administration	$3,302,419.00	
Expenditures by the Federal Manager less equipment retired and transferred	118,830.12	
Expenditures by the corporation	5,119,481.66	8,540,730.78

Improvements on leased railroad property		
Expenditures by the Federal Manager	$162,187.13	
Less miscellaneous credits by the corporation	725.87	161,461.26
Total (as shown in detail on other pages)		$10,770,045.72

In the operation of the Pension Department, 24 employees were retired and placed upon the pension roll; of these retirements 5 were authorized because of the attainment of seventy years of age, and 19 because of total and permanent physical disability. 29 pensioners died during 1918, and at the close of the year 288 retired employes were carried upon the pension rolls. The average monthly pension allowance of these is $23.82, and the total amount paid in pension allowances during the year was $82,635.68, which was paid by and charged to the operating expenses of the United States Railroad Administration as provided in the agreement with the Director General of Railroads.

The following changes took place in the Board of Directors during the year:

Resigned:	April	10, 1918	Robert S. Lovett
	April	10, 1918	Marvin Hughitt
	May	31, 1918	Alfred H. Smith
Elected:	September	18, 1918	Charles B. Seger
	September	18, 1918	Edward S. Harkness
	October	16, 1918	Samuel Mather
	October	16, 1918	Henry Russell

The Board records with regret, the death on August 10, 1918, of Mr. William H. Newman, a Director of the company and who was President of the company from January 31, 1905, to February 1, 1909.

The Board also records, with regret, the death on December 1, 1918, of Mr. Horace E. Andrews, a Director of the company.

Appreciative acknowledgment is made to all officers and employes of their loyal and efficient co-operation and services.

For the Board of Directors,
WILLIAM K. VANDERBILT, Jr.,
President.

APPENDIX

INCLUDED AS INFORMATION FROM REPORTS SUPPLIED BY FEDERAL AUDITOR REPORT OF OPERATIONS OF THE MICHIGAN CENTRAL RAILROAD BY UNITED STATES RAILROAD ADMINISTRATION FOR YEAR 1918 AS REPORTED TO THE INTERSTATE COMMERCE COMMISSION

INCOME ACCOUNT	1918 1,861.77 *miles operated*	1917 1,861.77 *miles operated*	Increase or decrease
OPERATING INCOME			
Railway operating revenues	$68,520,087.06	$52,879,434.29	$15,640,652.77
Railway operating expenses	51,070,072.12	38,289,136.32	12,780,935.80
NET REVENUE FROM RAILWAY OPERATIONS	$17,450,014.94	$14,590,297.97	$2,859,716.97
Percentage of expenses to revenues	(74.53)	(72.41)	(2.12)
Railway tax accruals	$1,899,790.41	$1,762,795.37*	$136,995.04
Uncollectible railway revenues	7,463.31	13,405.98	—$5,942.67
RAILWAY OPERATING INCOME	$15,542,761.22	$12,814,096.62	$2,728,664.60
NON-OPERATING INCOME			
Rent from locomotives	$42,835.11	$45,476.76	—$2,641.65
Rent from passenger-train cars	105,080.27	140,865.51	—35,785.24
Rent from work equipment	38,819.56	18,318.41	20,501.15
Joint facilty rent income	229,268.70	225,778.53	3,490.17
Income from unfunded securities and accounts	85,769.80	†	85,769.80
Miscellaneous income	2,019,705.41	†	2,019,705.41
TOTAL NON-OPERATING INCOME	$2,521,478.85	$430,439.21	72,091,039.64
GROSS INCOME	$18,064,240.07	$13,244,545.83	$4,819,704.24
DEDUCTIONS FROM GROSS INCOME			
Hire of freight cars—debit balance	$1,507,426.72	$3,358,129.26	—$1,850,702.54
Rent for locomotives	51,994.54	68,147.03	—16,152.49
Rent for passenger-train cars	177,099.62	320,613.93	—143,514.31
Rent for work equipment	31,889.78	5,121.45	26,768.33
Joint facility rents	583,874.57	606,137.80	—22,263.23
Interest on unfunded debt	12.53	†	12.53
TOTAL DEDUCTIONS FROM GROSS INCOME	$2,352,297.76	$4,358,149.47	—$2,005,851.71
NET INCOME	$15,711,942.31	$8,886,386.36	$6,825,555.95

*Revised for comparative purposes.
†Figures for 1917 not comparable.

CONDENSED GENERAL BALANCE SHEET, DECEMBER 31, 1918

ASSETS

INVESTMENTS		
Investment in road and equipment		
Road and equipment to June 30, 1907	$35,213,257.09	
Road and equipment since June 30, 1907		
Road	31,238,429.62	
Equipment—trust	37,182,261.35	
Equipment—owned	1,718,831.86	
	$70,139,522.83	
Total investment in road and equipment		$105,352,779.92
Deposits in lieu of mortgaged property sold		13,279.70
Improvements on leased rail property		
To June 30, 1907	$823,773.76	
Since June 30, 1907	1,867,447.92	2,691,221.68
Miscellaneous physical property		669,399.15
Investments in affiliated companies		
Stocks	$8,808,194.50	
Bonds	807,200.00	
Notes	1,014,468.63	
Advances	660,026.35	11,289,889.48
Other investments		
Stocks	$15,004.00	
Bonds	220,360.62	
Miscellaneous	25,001.00	260,365.62
Total investments		$120,276,935.55
CURRENT ASSETS		
Cash	$1,397,745.44	
Special deposits	74,893.81	
Loans and bills receivable	22,000.00	
Miscellaneous accounts receivable	420,552.61	
Interest and dividends receivable	264,127.72	
Rents receivable		
Compensation due from United States Government	5,055,727.04	7,235,046.62
DEFERRED ASSETS		
Working fund advances	$29,508.10	
United States Government		
Cash taken over	$2,713,163.02	
Agents and conductors balances	5,487,939.17	
Material and supplies	8,070,073.80	
Assets December 31, 1917, collected	4,045,116.89	
Equipment retired	1,032,643.09	
Other items	298,962.42	
Cash transferred subsequent to December 31, 1917	411,350.73	
	$22,059,249.12	
Other deferred assets	3,297.33	22,092,054.55
UNADJUSTED DEBITS		
Rents and insurance premiums paid in advance	$47.06	
Discount on funded debt	779,702.26	
Other unadjusted debits	313,790.92	
Securities issued or assumed—unpledged	421,600.00	
Securities issued or assumed—pledged	14,042,000.00	1,093,540.24
TOTAL		$150,697,576.96

LIABILITIES

STOCK		
Capital stock		
Book liability at date	$18,738,000.00	
Held by or for carrier at date	1,600.00	
Actually outstanding at date		$18,736,400.00
LONG TERM DEBT		
Funded debt unmatured		
Equipment obligations	$11,388,418.34	
Mortgage bonds	33,156,000.00	
Miscellaneous obligations		
Gold debentures of 1909	7,634,000.00	52,178,418.34
CURRENT LIABILITIES		
Loans and bills payable	$22,885,228.00	
Audited accounts and wages unpaid	787,153.35	
Miscellaneous accounts payable	109,232.75	
Interest matured unpaid	78,435.00	
Dividends matured unpaid	4,646.00	
Funded debt matured unpaid	2,000.00	
Unmatured dividends declared	374,728.00	
Unmatured interest accrued	596,326.90	
Unmatured rents accrued	457,272.26	25,295,022.26
DEFERRED LIABILITIES		
United States Government		
Additions and betterments	$4,361,668.39	
Revenue prior to January 1, 1918	103,289.60	
Corporate transactions	2,942,793.10	
Liabilities December 31, 1917, paid	10,365,439.22	
Expenses prior to January 1, 1918	1,812,711.30	
Other items	53,405.14	
	$19,639,306.75	
Other deferred liabilities	338,068.72	19,977,375.47
UNADJUSTED CREDITS		
Tax liability	$81,566.38	
Operating reserves	69,460.34	
Accrued depreciation—road and equipment	5,842,971.10	
Accrued depreciation—miscellaneous physical property	6,949.38	
Other unadjusted credits	3,604,773.64	9,605,720.84
CORPORATE SURPLUS		
Additions to property through income and surplus	$6,455,884.64	
Profit and loss—balance	18,448,755.41	24,904,640.05
TOTAL		$150,697,576.96

[ADV.]

Railway Officers

Railroad Administration

Operating

O. J. Nelson, trainmaster on the Chicago, Burlington & Quincy, with headquarters at Alliance, Neb., has been promoted to assistant superintendent with headquarters at Greybull, Wyo., to succeed **C. C. Holtorf**, who has been transferred to the Wymore (Neb.) division.

Newman Kline, division superintendent on the Northern Pacific, with headquarters at Minneapolis, Minn., has been promoted to general superintendent with headquarters at St. Paul, Minn., to succeed **C. L. Nichols**, whose promotion to assistant general manager was noticed in the *Railway Age* of June 6 (page 1450).

Traffic

R. N. Golden, general agent of the Chicago, Milwaukee & St. Paul, at Cincinnati, Ohio, has resigned to become general agent of the Shippers & Manufacturers Export Corporation, Marquette, Bldg., Chicago.

D. G. Gray, freight traffic manager of the Baltimore & Ohio, Eastern lines, and assistant freight traffic manager of the Western Maryland, with headquarters at Baltimore, Md., has been appointed assistant traffic manager of the Baltimore & Ohio, Western lines, with headquarters at Chicago, Ill.

Engineering and Rolling Stock

Herman F. Noyes, traveling engineer of the Maine Central, has been appointed superintendent of fuel economy of that road and the Portland Terminal, with office at Portland, Maine.

Albert M. Traugott, whose appointment as acting chief engineer of the Virginian Railroad, with headquarters at Norfolk, Va., was announced in the *Railway Age* of May 9 (page 1184) was born on July 31, 1882, at Rochester, N. Y. He was educated at Purdue University and during his summer vacations worked as a chainman with the Buffalo, Rochester & Pittsburgh, and later as a rodman on the Delaware, Lackawanna & Western. In February, 1903, he entered the service of the Virginian Railroad and has served successively as rodman, draftsman, instrumentman, resident engineer on construction work and later as locating engineer on preliminary surveys. In February, 1913, he was appointed resident engineer of the Norfolk division, and one year later became division engineer of the third and Deepwater divisions, which position he held until his recent appointment as acting chief engineer, as above noted.



A. M. Traugott

Charles J. Scudder has been appointed superintendent of shops of the Delaware, Lackawanna & Western, with headquarters at Scranton, Pa., vice **Joseph Grieser**, assigned to other duties.

H. G. Clark, who was chief engineer of the Chicago, Rock Island & Pacific prior to the return of C. A. Morse, as noted in the *Railway Age* of June 13, page 1450, has been appointed assistant to the federal manager, succeeding **H. M. Sloane**, who has resigned to become assistant to the president of the Chicago, Milwaukee & St. Paul.

Purchasing

R. R. Jackson has been appointed division storekeeper of the Pittsburgh division of the Baltimore & Ohio, Eastern Lines, with headquarters at Glenwood, Pa., vice T. C. Hopkins, assigned to other duties.

Corporate

Executive, Financial, Legal and Accounting

A. H. Barnes, auditor of the Kansas City Southern has been appointed in addition assistant secretary succeeding **J. M. Souby**, solicitor and assistant secretary. Mr. Souby retains his position as solicitor.

Traffic

R. W. Long, division freight agent on the Grand Trunk, with office at Hamilton, Ont., has been transferred to Toronto, vice **L. Macdonald**, promoted; **R. J. S. Weatherston**, division freight agent at Ottowa, has been transferred to Hamilton, vice Mr. Long, and **E. J. Hilliard**, commercial agent at Buffalo, N. Y., has been appointed division freight agent, with office at Ottawa, Ont., vice Mr. Weatherston, transferred.

Obituary

Carl Remington, assistant secretary of the Chesapeake & Ohio Railway Company and the Hocking Valley Railway Company, with office at New York, died in that city on June 6. Up to January, 1918, Mr. Remington was secretary of these roads, and for about a year he had been out of active service on account of ill health.

Joseph C. Thompson, formerly district passenger agent of the Northern Pacific with headquarters at Chicago and recently connected with the Chicago Consolidated Ticket Offices, died at Chicago on June 10. Mr. Thompson was also president of the Tri-State Passenger Agents' Association prior to government control and was a brother of E. Thompson, secretary of the Western Passenger Traffic Committee.

The new shops of the Canadian National at Leaside, near Toronto, were opened for business this week. Construction work is practically completed. The plant consists of a roundhouse, powerhouse, administration building, locomotive repair shop and car repair shop.



British Officers and Bluejackets at Soroka—on the Murmansk-Archangel Railway

Railway Age

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WE GUARANTEE that of this issue, 17,100 copies were printed; that of these 17,100 copies, 15,406 were mailed to regular paid subscribers to the Railway Age and the Railway Mechanical Engineer; 119 were mailed to advertisers, 300 were provided for counter and news companies' sales, new subscriptions, bound volumes, copies lost in the mail and office use; and 1,275 copies for distribution at Atlantic City.

THE RAILWAY AGE is a member of the Audit Bureau of Circulations (A. B. C.) and the Associated Business Papers. (A. B. P.)

The Wheel Committee's Report

It is a remarkable fact that even though the Wheel Committee has been reporting for many years, hardly a convention passes without some concrete suggestion for securing increased service from car wheels. In 1917 the re-design of the 675-lb. wheel practically eliminated the cracking of the plate, which had proved so troublesome with the older design. This year the strength of the tread seems to have received special attention, as the committee is considering a change in the location of the limit of wear groove on wrought-steel wheels, and recommends the adoption of a gage to fix the allowable limit of wear for wheels with hollow treads. Undoubtedly a definite condemning limit should be fixed and the gage proposed should meet all requirements. As a measure of protection against arbitrary scrapping, it should prove valuable, and will no doubt be adopted by the association. The suggestion contained in the committee's report that the 625-lb. and 725-lb. wheels may be re-designed is an indication of the excellent service secured from the arch plate design. It has been reported that of forty thousand 700-lb. arch plate wheels in service, only two have been found with cracks in the plates. Probably the most serious trouble experienced with the present standards is the breakage of 625-lb. wheels under refrigerator cars. The high brake shoe pressures and high speeds combine to make the service conditions unusually severe. While it must be admitted that the merits of the 1917 design cannot be definitely determined as yet, the performance which has been secured thus far is very gratifying. In view of the apparent resistance to breakage under temperature stresses exhibited by the arch plate wheel, the next problem to which the committee should give attention is the re-design of the 625-lb. wheel, with special regard for the requirements of refrigerator car service.

The Acoustic Properties of Convention Hall

It is unfortunate that with the fine attendance at the sessions of the convention this year, probably not half of those in the room are able to follow closely the reading of papers and the discussion following. The acoustic properties of the hall are exceedingly poor, a fact which the large attendance, necessitating the use of the entire floor space, accentuates. It is noticeable that most of the discussion comes from those well toward the front. Is this due to the fact that those deeply interested in the affairs of the section are grouped in a comparatively small section of the hall, or is it because those farther away are unable to follow the course of the proceedings sufficiently closely to take part intelligently? In either case, the result is the same and is detrimental to sustained interest in the meetings. Many of the younger members and attendants receive an unfortunate impression of the value of attendance at the conventions, due to this situation. It would seem to be highly desirable that some experiments be made to determine whether it is not possible and practicable to improve acoustic conditions.

The Grain Car Situation

On March 1 the aggregate surplus of freight cars in the United States and Canada amounted to 473,080, a greater surplus than has ever before been recorded. During March and April the surplus was reduced and now, little more than three months later, the roads are facing a severe shortage of one class of equipment at least, namely, box cars. The representatives of the car departments of the Western roads who are attending the convention have expressed great concern over the problem of furnishing cars to care for the wheat crop this season. The yield will unquestionably be greater than ever before, and the demand for cars will be augmented by the present circumstances. There is little incentive to hold the grain for an advance in price. Consequently the farmers will attempt to dispose of it as quickly as possible. Furthermore, the elevator capacity is not adequate to take care of the crop, and it will be necessary to market a large percentage of it to prevent deterioration. The abnormal demand for cars comes at a time when the roads are not well prepared to meet it. The percentage of equipment in suitable condition for grain service is unusually low, due in part to the small amount of new equipment purchased in the last two years. Less than one-half of the Administration's order of 100,000 cars has been built to date. About 5,000 box cars are stored at the car builders' plants awaiting disposition, but even if these cars are used they will care for but a very small portion of the crop and it will be necessary for the roads to make every effort to repair the maximum number of cars in time to transport the grain traffic.

Comparative Draft Gear Data

The report of the Committee on Draft Gear, which was presented at Thursday's session, calls attention to the drop gear investigations which are being conducted by the Inspection and Test Section of the Railroad Administration. Reference has already been made to these investigations in an article in the May 2, issue of the *Railway Age*, describing these methods of testing the gears under practically service conditions, which have been developed by the Inspection and Test Section and are being applied at the draft gear test plant of the T. H. Symington Company at Rochester, N. Y. The subject of draft gears, is one of importance and one involving many considerations.

The committee brings out clearly in its report limitations of the various methods of testing. It is evident that no one of the methods provides data on which a definite conclusion may be reached as to the relative value of different gears in service. The ideal draft gear, from the standpoint of its characteristics, new, is not necessarily the best gear when considered from the standpoint of the service to be obtained from it over a period of years. The question of life, the change of characteristics during the life and the cost of maintaining the gear in a reasonably perfect condition are factors which are of equal weight with the characteristics of the new gear. It is evident that the only reasonable basis of comparison, considering these factors, involves the accummulation of a large amount of service data which can only be accomplished after the lapse of years of service. The work of the Inspection and Test Section will be of great value in arriving at conclusions on one phase of the subject and it is fortunate that through the co-operation of the committee of the mechanical section, the data will be available to that committee. The committee, however, will still have much work to do in the accumulation of service data involving the question of life and repairs.

The Automatic Train Line Connector

The Mechanical Section has taken up the automatic train pipe connector as a subject for consideration. The question was brought up during Thursday's session and referred to the general committee by vote of the members in attendance, with the result that a special committee will probably be appointed to take it up, or it will be referred to one of the standing committees.

The automatic train pipe connector is not a new device. The first connectors were placed in service about eighteen years ago and many different devices have received trials since then. While not all of these have proved successful, the eighteen years' development has demonstrated the desirability of continuing the development so that the manifest disadvantages of the manual couplings may be eliminated. There are several connectors at the present time which seem to be working successfully and the outstanding facts in connection with the service of all of these devices are the increased life of hose and the reduction in train line leakage. The advantages from the standpoint of safety are self-evident.

There seems no insurmountable difficulty in developing devices of this kind to meet the essential mechanical requirements.

The greatest difficulty in the universal use of connectors is the question of interchange. This problem for the connector is practically the same as that which had to be solved in the development of the automatic coupler to the present universal interchangeable standard. To secure the benefits of more than local or isolated installations on special service equipment which is not offered in interchange, all automatic train pipe connectors must operate interchangeably. To expect the immediate or hasty development of a standard type to meet this requirement is unreasonable, as the form of a perfected mechanical device can only be arrived at by first allowing designers the widest latitude in the development of their various ideas. It would be unfortunate, however, if this fact were used as an argument against the widest possible application of the various devices which are now or may be developed, because it is only through such development that the advantages of safety and economy offered by a universally interchangeable automatic connector may ultimately be obtained.

When the investigation of the connector problem has become sufficiently extensive so that well-supported opinions may take form as to the essential requirements of such a device the problem of interchangeability may be considered. Until that time has arrived lack of interchangeability should not be a deterrent on the development of connector devices. In its present stage the question is one of a fair field and may the best man win.

Opportunity of the American Railroad Association

In their addresses before the mechanical convention yesterday, Mr. Aishton, Mr. Tyler and others touched upon the part the new American Railroad Association can play in bringing about unity of action by the railroads after Government control has ceased, and the Railroad Administration has gone out of existence.

This is a point of the utmost importance. Many of the serious troubles of the railways before Government control was adopted, were due to their failure to work together. In fact, they did not in all things work together as they should have even when the Railroad War Board was in charge of their operation, and this was one of the things which made Government control practically unavoidable.

While, on the whole, Government operation has not been a success, it has brought about some important improvements in operation which could not have been effected without centralized control, and which cannot be perpetuated without some form of centralized control provided by the railroads themselves.

The new American Railroad Association affords the best, and indeed, the only agency in sight, for effecting the co-ordinated working under private control which will be necessary if the best results are to be obtained.

Fortunately, the difficulties in the way of co-operation between the railroads regarding operation will be much less formidable in the future than they have been in the past, since it appears certain that the Sherman anti-trust law and the anti-pooling law, as they apply to railways, will be repealed at the present session of Congress. These laws in the past rendered it very difficult for the railways to adopt and enforce among themselves the measures necessary to secure the co-operation and co-ordination of operation which all recognized as desirable.

The new American Railroad Association is fortunate that it is going to begin its career with R. H. Aishton as its president. No railway manager in the country unites in himself better than Mr. Aishton does the qualities of energy, courage, tact, thorough knowledge of the "railroad game," which are needed in order to give the association a good start in the right direction. Upon the way the new American Railroad Association performs its enlarged functions will largely depend the future of the railways of the United States.

Program For To-day

9.30 A. M. TO 1.30 P. M.

Discussion of Reports on:	
Safety Appliances	9.30 A. M. to 9.45 A. M.
Loading Rules	9.45 A. M. to 10.15 A. M.
Car Construction	10.15 A. M. to 10.45 A. M.
Car Trucks	10.45 A. M. to 11.30 A. M.
Train Lighting and Equipment	11.30 A. M. to 12.00 M.
Tank Cars	12.00 M. to 12.30 P. M.
Questions Proposed by Members	12.30 P. M. to 1.30 P. M.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert at Entrance Hall, Million Dollar Pier. Fry Philharmonic Orchestra.

3.30 P. M.—Band Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier. Royal Scotch Highlanders' Band. Tea will be served at 4.30 P. M. in Entrance Hall.

9.30 P. M.—Grand Ball, Ball Room, Million Dollar Pier. Royal Scotch Highlanders' Band.

Badges Must Be Worn!

THE DOOR COMMITTEE of the Entertainment Committee again wishes to emphasize the importance of the wearing of badges at all times. The Door Committee is an important unit; it has difficult problems to solve and rather hard situations to adjust. It should be given real, not half-hearted, help.

Daily Distribution

FOR MANY YEARS it has been the policy to put the *Daily Railway Age* in the hands of those attending the convention as early as possible. In most of the hotels the *Daily* will be found on a table at the entrance to the dining rooms, while at others they will be found on the hotel registration desk.

Big Guns in Action

IN CONNECTION with the program to be given on the pier on Sunday evening, at 8.15, there will be shown a series of motion pictures illustrating large naval guns in action in France. These pictures will be exhibited by the United States Navy and a naval officer will be present to explain them.

Carnival Night

It was carnival night at the Million Dollar Pier last night. The three thousand convention people who attended the entertainment voted unanimously that it was "some big night to-night" and it was.

Those who went were fortunate and by the same token those who failed to attend now regret it.

The fun commenced in the ball room at about 9 o'clock when the Royal Scotch Highlanders started a program of sixteen dances. During the dances members of the Entertainment Committee distributed vari-colored paper hats and caps, confetti, ticklers and so forth.

The management of the evening's entertainment was in the hands of the following: W. K. Krepps, general chairman; R. J. Himmelright, chairman; Ellsworth Haring, L. O. Cameron, H. E. Passmore, G. A. Nicol, R. H. Gwaltney and J. E. C. Holding.

Air Brake Meeting

The Executive Committees of the Air Brake Association and the Air Brake Appliance Association will hold a joint meeting at 10 o'clock Friday morning at the Marlborough-Blenheim.

Chairman Chambers Appoints Committees

CHAIRMAN CHAMBERS has appointed the following Committee on Subjects for the American Railway Association, Section III, Mechanical; M. K. Barnum, C. E. Fuller, D. R. MacBain, T. H. Goodnow and J. C. Fritts.

Messrs. W. E. Dunham, B. P. Flory and R. L. Kleine have been appointed on the Committee on Resolutions and Correspondence.

Committee on Obituaries

CHAIRMAN CHAMBERS named the following Committee on Obituaries at the Wednesday afternoon session: On J. L. Greatsinger, F. W. Brazier; on Henry Hardie, C. F. Giles; on C. D. Porter, A. W. Gibbs; on R. E. Smith, Willard Kells; on C. W. VanBuren, W. H. Winterrowd; on R. A. Billingham, F. W. Gaines; on D. M. Perrine, J. T. Wallis; on Dr. Angus Sinclair, C. E. Chambers; and on J. W. Heintzelman, Geo. McCormick.

Lost and Found

FOUND—Badge No. 2290. Call at the office of the *Daily Railway Age*.

LOST—By Miss E. D. Knapp, Iroquois, Hotel, Atlantic City, R. S. M. A. badge; also bar pin and silk handkerchief (colored).

LOST—Dark brown sable scarf during the informal dance Wednesday evening. It was left on one of the chairs immediately in front of the Galena Signal Oil Company exhibit. Please return to Mrs. C. F. Massey, care *Railway Age* office, at the entrance of the pier.

Railway Club Secretaries

THE SOCIETY of Railway Club Secretaries held a brief meeting yesterday morning, Mr. A. J. Merrill, of Atlanta, chairman, presiding, and adjourned to meet again at 10 o'clock this morning in room 192 of the Blenheim.

Later, with several invited guests, the members had a "round table" luncheon at the Blenheim. This is an innovation in the society's work. It proved of so much pleasure and profit to all concerned that it will be a permanent feature of the annual meetings.

The Man Who Saw

The "old timer's" emotion was only exceeded by his admiration as he surveyed the latest greyhound of the rails, the monster Mallet locomotive in the exhibit of the Pennsylvania Railroad, near the Atlantic City station. The Man, observing his interest, came nearer and ventured to ask him what he thought of it.

"It is wonderful, sonny," said Andrew Chambers. "I have watched them grow for 50 years. In 1868 I started running for the Pennsylvania Railroad, and held the job without an accident for 44 years. Since 1873 I have had the honor of pulling seven different presidents of the Pennsylvania Railroad and three Presidents of the United States. I have never missed a mechanical convention, and this is the finest one I ever saw. I handled one engine—the 937—from 1873 to 1912. Yes, it is wonderful. I am through now; let the younger boys have a chance."

Running Orders for the Boss

"What I would like to know is, who's supposed to be running this job here, anyway?"

The irate, sputtering master car builder bounced out of his office and bumped into The Man who waited patiently outside for an "interview" and nearly knocked him down.

"Last night I told the worst stenographer I ever saw that she wouldn't do, and I was sorry to be compelled to seek another in her place.

"Why, she even leaves the "i" out of railroad. Deprive her of her trusty eraser and she would cease to function altogether!

"Now comes an important person who calls herself the Secretary of the Amalgamated Association of Secretaries to inform me that she has reviewed the case and finds that Miss Smith has done nothing whatever to merit dismissal.

"She furthermore stated that she has decided to recommend that Miss Smith remain on the job. If Miss Smith goes, she says the whole works goes."

Now, what do you think of that?

U. S. Presidents and Machine Tools

"Do you realize," said a mechanical engineer, "the quality of some of the talent employed on this floor?"

The "talent" referred to, scattered here and there among the exhibits in the machine tool section, was surrounded by interested groups from 48 States, watching this year's innovations in drilling, boring, planing, grinding and other operations. The turning of wheels everywhere evidenced the machine tool builders' ingenious perfection of devices that meant "more miles for less money."

"Do you see that fellow with the gray suit and glasses?"

"Yes," said The Man. "Who is he?"

"Well, he is the publicity manager for the tool concern in whose booth he is standing. A few years ago, right on this same pier, this unassuming fellow, who was the personal press representative for a presidential candidate, closed a campaign that helped to elect a President of the United States. The man standing on his right is the 'daddy' of motion on the pier. He was the first man to exhibit a tool doing business at the convention, and he put up a sign which read, 'Look what's coming off here!' That was 13 years ago—to-day they are all moving."

"That is talent," said The Man, in appreciation of the press agent; and "that was initiative," said the mechanical engineer, as a tribute to the pioneer exhibitor of operating tools.

The Shipper Speaks

The Shipper and the Labor Delegate had casually noted each other's presence in the lobby and The Man had been watching them both. Feeling that each other had something to "get off of his chest," The Man timidly approached the Delegate to get some "views."

"Wages won't come down; if they change, they'll go up. Attempts at 'slave driving' will be promptly squelched."

The Shipper, anxious to hear any discussion participated in by the well-known Delegate, moved nearer to the conversation. For the benefit of the Shipper, the Delegate repeated his threat, whose intended effect brought this immediate response:

"Gentlemen, pardon me. I could not help overhearing your conversation. Evidently you men represent the interests of the workman. I am a shipper of a thousand tons of merchandise a month. I acknowledge our obligation to the men whom you represent. As proof of my sincerity you are invited to visit my plant. Come and talk to my men. You will find that our workmen have all they demand—and a little more. But I want to tell you that the forty-five men who are soldiering on the thirty-man job at the P. & X. shops right in this town, have something to do with the rate that I pay to send my stuff to you.

"You both use my product. You are paying more for my goods than you would pay if you were more concerned over an honest analysis of the condition that I mentioned, than in the indulgence of defiant generalities. Think it over!"

The Man looked at the Delegate as the Shipper withdrew. "Well, what do you say?" said The Man. "To hell with him," said the Delegate.

The Crepe Hanger

"Oh, I've tried that darn thing—put it on three locomotives—we didn't get anywhere with it."

In hanging this little bit of crepe on the door of the supplyman, the visitor complimented his own alleged abilities in his remark. He seemed to have stamped himself as a duly qualified member of an ever-present minority of weak sisters who usually only half-heartedly encourage the development of new devices to which the transportation world to-day owes its very existence.

"I wonder," thought The Man, eyeing the retreating crepe hanger with suspicion, "if that fellow *really* tried it to get the results. I wonder if he thought of the supplyman's contribution of confidence, courage and money in the gradual perfection of the device which was already commencing to exceed its promises on other lines?"

The Man's thoughts took him back to the early days of the superheater and brick arch. He remembered the army of "conscientious" objectors, the coldness of whose feet was only exceeded by the chilliness of their reception of those who persisted day and night in their efforts to save coal and increase the train load. And hope for the ultimate salvation of the crepe hanger lies in the supplyman's refusal to attend the funeral.

A. R. A. Executive Committee at the Convention

R. H. Aishton Elected President of the Big Organization and W. T. Tyler, First Vice-President

THE FIRST MEETING of the Executive Committee of the reorganized American Railroad Association, which was held in Atlantic City yesterday, proved to be one of the most interesting and important events that have ever been associated with the mechanical conventions. All the members of the Executive Committee were present except Charles A. Prouty, director of the Division of Accounting of the Railroad Administration; E. E. Calvin, federal manager of the Union Pacific, and H. G. Kelley, president of the Grand Trunk Railway. The most important work done at the meeting was the election of officers, which resulted as follows:

President, R. H. Aishton, regional director, North Western Region.

First vice-president, W. T. Tyler, director of the Division of Operation, United States Railroad Administration.

Second vice-president, E. H. Coapman, federal manager of the Southern Railroad.

General secretary and treasurer, J. E. Fairbanks, who was re-elected.

Assistant general secretary and assistant treasurer, H. J. Foster.

It was decided to hold the first annual meeting of the reorganized association in Chicago, on the third Wednesday in January. C. W. Crawford was elected chairman of the General Committee on Transportation, which will constitute Section 5.

After the meeting of the committee adjourned all of its members proceeded in a body to the Million Dollar Pier, where the Mechanical Section of the association was in session. C. E. Chambers, president of the Mechanical Section of the association, who was presiding, invited the visitors to the platform and introduced the new president of the association, Mr. Aishton, who delivered a short address, which was received with much enthusiasm. In the course of his remarks, Mr. Aishton said:

Mr. Aishton's Remarks

"I was just elected president of the American Railroad Association. I do not know why, or did not know until I got on this magnificent pier, and some fellow told me they elected me president so that I could make a speech for them at your convention. That is not much of a reason why a man should be elected as president of such an important institution as the American Railroad Association, and, furthermore, I could hardly qualify on those grounds, because I am not a very great success as a speech maker.

"I have been connected with the American Railway Association—now the American Railroad Association—for a great many years, and I have been on the Executive Committee for a long while, and I want to tell you gentlemen that a visit to your convention here has certainly broadened us out, because I know all the history of the American Railroad Association, and we never had a meeting in a Greek temple on the Million Dollar Pier, and at no place where we went did we ever get a badge that entitled us to the many things that this badge of your association entitles us to. (Laughter and applause.)

"It goes without saying that the Executive Committee is glad to be with you. Government control of railroads, as you know, is almost universally condemned by the public, but if the public could be here with us today, and could see what a magnificent meeting you folks are having, I think they would say that government control, at least, has given you the largest and I think one of the most enthusiastic meetings you have ever had in your associations. (Applause.) You also have here a wonderful exhibit of railway equipment and devices for which the manufacturers deserve unstinted credit and praise.

"We have been going through strenuous times. We have been through the greatest war in history. It is true that we only went in in 1917, but previous to that, for two or three years, we had given all the assistance we could to the Allies in an indirect way through our transportation machine, and I think it is the general verdict of everybody in Washington, at least of the real people in the United States, that if there was one class of men in the United States who met successfully the burden that was put upon them, it was the railroad men.

"We are going through strange times, times when all our past precedents and ways of doing things are in the discard. No man can tell what the future has in store for us or where we are going. The President of the United States has announced very definitely that the roads are going back to their owners on January 1st next. I do not think there is a dissenting voice on that proposition, either from Congress, the people of the United States, from the Administration or from the railroad men.

"But we are going to be up against one of the greatest constructive periods we have ever gone through. I am one of those who do not believe that in the future the selfish conditions which have prevailed in the past are going to prevail in the railroad business or any other business of this country in future. I believe the time has come when all men must work together, and I firmly believe that the welding together of all these railroad interests, the welding together of your Master Car Builders' Association, and your American Railway Master Mechanics' Association, and all these various associations, into one big force, is going to be to the advantage of all of us.

"What has held the railroads together during the last 18 months? It has been the Railroad Administration—it has been the central authority that said what ought to be done, and how to do it, that has held us together. We have made mistakes in the Railroad Administration, lots of them—who has not?—they made mistakes in all the Allied countries—they are free to admit that they made many mistakes in the conduct of the war—but, on the whole, if it had not been for the centralized control of the Railroad Administration, I doubt if we could have gotten through the job as well as we did. In fact, I know we could not have done so.

"What is going to happen? The Administration is going to let go control the first of January, and we will be placed upon our own resources—that is what they say, and most of us hope that it is true.

"In my opinion, the action you people have taken in joining hands in one great big functioning machine is what is going to hold us together, and the people will look to your organization to co-ordinate this whole railroad system into one great big system, in so far as methods of doing things are concerned, and I firmly be-

lieve that the day has come when individual idiosyncrasies, and all that kind of thing, which in the end cost considerable money when applied to railroads, and which in the end the public has got to pay for, will disappear, and I believe that the American Railroad Association, with you gentlemen as the directing force of that Association, putting it up to the Association to make effective your recommendations regarding the things that you as a collective body believe to be right, is going to be the main thing that is going to tie this railroad system together, and make a smooth working machine of it, when the central direction, as represented in the Railroad Administration lets go.

"Now, for the members of the Executive Committee—they are all very modest, and I am afraid they will not speak for themselves, and they want me to speak for them. All I have to say is that the Executive Committee of the American Railroad Association will stand with you on any reasonable proposition. If you have something bothering you, and you want to have it straightened out, call on us and we will send some one down here to take it up with you, or I will come myself, if I can, as I spend most of my time traveling about the country, and, if possible, I would be glad to come.

"You are here to work out the practical problems connected with the operation of the railroads. Who knows the mechanical end of the railroads, if you gentlemen do not? I have been a railroad president for three or four years and all of these gentlemen on the platform are railroad presidents, and pass as 'wise guys,' but when it comes down to finding out something you know who they go to.

"I want you to know that we are all traveling together, and that we must work out this problem together. There is no one man who is going to do it, but it is the hundreds and thousands of men who are thinking about these things that are being brought up in your Association, and who finally crystallize them into something definite that finally produce something that is of inestimable value, in the line of progress, who are going to bring about the results which are so much to be desired.

"I would like to state to your entire convention that, from the sample I have seen so far of it, it is very fine. I have had two free rides in a rolling chair on the Boardwalk because I have this badge, something that never happened to me before in Atlantic City (laughter), and all I can say, in conclusion, is that if there is anything that the Executive Committee of the American Railroad Association can do to assist you, call upon us and we will be glad to help you." (Applause.)

Remarks of Mr. Tyler

The chairman then introduced W. T. Tyler, who in turn presented to the convention J. E. Fairbanks, general secretary of the American Railroad Association; Mr. Bush, Regional Director of the Southwestern Region; Mr. Powell, Director of the Division of Capital Expenditures; Mr. Jackson, Federal Manager of the Chicago & Eastern Illinois, and G. L. Peck, Federal Manager of the Pennsylvania Lines West of Pittsburgh.

Mr. Tyler said in part:

"I cannot add anything to what Mr. Aishton has said, except to say if these two rides which he has had are the first two free rides he has ever had, he has one still coming to him. (Laughter.)

"I do want to say that I think while the work of the Railroad Administration and the work of the railroads under the Administration has been most remarkable in a great many ways, one of the most remarkable results has been in the matter of organization. When the railroads were taken over in January, 1918, the Railroad Administration was entirely without any landmarks, without any precedents, without any light at all on the matter of procedure. The Director General had to reach out largely in the dark, and gather together an organization. I presume that he had advice on the subject, although most of the additions that were made to the organization after I became connected with it, which was in the second week of its life, seemed to be almost entirely without suggestion. The Director General might call his staff together, but, as a rule, either he or some member of his staff recommended a man and it went through.

"There was gathered together at Washington an organization that worked in absolute and complete harmony, and is doing so up to this time. There has never been, so far as I know, a discordant note in that central organization. I think that thing itself is most remarkable. Now, that condition prevailed naturally, you might say, during the period of the war as the result of the patriotism of the members, but it continued after the signing of the armistice in just exactly the same degree as it did before, and it continues and goes along, even when the minds of the individual members very naturally are largely turning to the return of the railroads.

"That organization, as I have said, is functioning today perfectly, and in this meeting here we see the same signs of perfect success in working out a complete organization of the railroads of the United States, to take the place of the U. S. Railroad Administration when it shall cease to exist by act of the President. So that I think, not only from what the railroads did toward winning the war—and when I say the railroads I mean, of course, railroad men—but from what is now being done by the rank and file of these various organizations to promote an organization that will go on and keep up what has already been accomplished, we are going to get results that could not have been accomplished in any other way, and results well worthy of all that we have all done in the past eighteen months, for first, the Government, and second, the railroads.

"I am hopeful that before the roads are finally turned back there will be, as Mr. Aishton has said, a complete organization of all the functions of the operation of these railroads in one smooth, working body."

Mr. Markham Speaks

In introducing C. H. Markham, the Chairman, Mr. Chambers, said: "While there were no doubt many difficulties attending the work under the Railroad Administration, I presume almost everyone found some pleasure in the work—I know that was true in my case—for if it had not been for the creation of the U. S. Railroad Administration, I might have lived my lifetime and never been associated with one man, to know whom it has been a great pleasure to me, and I will ask Mr. Markham, Regional Director of the Allegheny Region, to say something."

"I am very glad," said Mr. Markham, "to have had the opportunity of appearing before the organization that in its work is doing as much for the railroads of the country as any that I know of. I am particularly glad of the opportunity that is given me to testify to my own appreciation of having had the privilege of being associated in the work of the Regional organization of the Allegheny Region, with your esteemed Chairman, Mr. Chambers. To be associated with Mr. Chambers is not only a privilege but a great pleasure."

Remarks by Mr. Powell

Mr Powell, when called upon, said: "I am in a most unfortunate position, because while I have the title of Director of the Division of Capital Expenditures, my

constant effort is to keep down expenditures. We had hoped that Congress would be willing and liberal enough to give us the money that we required for the operation of the railroads, but they became cautious and cut down the appropriation bills, including the Army and Navy appropriation bills, and when they came to the appropriation for the Railroad Administration, they landed on us with both feet, and cut off a greater proportion of our appropriation than in any other bill, and because of this you will see that I really have not much to say."

Regional Director Winchell Introduced

Mr. Winchell, the southern regional director, said in part:

"I want to comment a little upon what Mr. Tyler said about the Director General reaching out in the dark, and not knowing what he was doing. That is not quite so in my case, because he did not send for me until he knew what he wanted, and that was the first of June. (Laughter.) This thing of being a Regional Director may be more or less hard for you to understand, because it was hard for us to understand. I think it was Samuel Butler, who said a great many years ago, that life is a good deal like playing a violin solo in public without knowing anything about the violin, but learning the instrument as you went along. That is very much like what the position of being Regional Director has been, but it has been the most interesting work that I have ever done in my life, and I am sure it has been so to a great many others.

"We have had broad opportunities, doubtless many opportunities we have not risen to, but anything we did accomplish could not have been done without the splendid support that has been given us by everybody, and no support has been more valuable than that which came from the members of your organization. Before I sit down I want to testify to the accuracy of the remarks which were being made by a very talented speaker as we came into the room, on the subject of cleaning air brakes. I want to tell you there is no discriminatory practice in that matter, for I started out from Atlanta not long ago with bright new lettering, stating the date I had beencleaned up, the day before, and I got to Louisville with the brake acting badly, and found it was dry and full of sand." (Laughter.)

Regional Director Maher Speaks

Mr. Maher, regional director of the Pocahontas Region, said:

"I am reminded at this meeting that when I was on a railroad once I heard a man say that an engine was the only thing that earned money on a railroad. This section of the American Railroad Association I regard as a vital section. I think your work is probably as important, if not more important, than that of the other sections; unless we have the locomotives and cars in good shape, the railroad cannot be operated. I am very much in sympathy with the statement of Mr. Aishton and Mr. Tyler that the amalgamation of this association with the American Railroad Association is going to be one of the greatest helps to the whole railroad situation that we have in this country."

Mr. Stone, Federal Manager of the Erie; Mr. Gorman, Federal Manager of the Rock Island, and others also spoke briefly. Mr. Gorman paid a high compliment to Mr. Tollerton, mechanical superintendent of his lines.

The members of the Executive Committee of the American Railroad Association constitutes the largest body of the higher operating officials of the railways who have ever attended the mechanical conventions in one group. They had been expected at the convention hall some time before they arrived, and the hall was crowded and many persons were standing. In proceeding to the hall, the distinguished visitors passed through parts of the pier containing a large part of the exhibits. Most of them had never seen a mechanical exhibit at Atlantic City before, and they expressed great astonishment and satisfaction because of its magnitude and completeness.

A few of the executives left for their homes yesterday, but most of them remained over for the purpose of taking advantage of the opportunity of making a more thorough inspection of the exhibit.

Some Facts About the Members of the Committee

Some details regarding the personnel of the Executive Committee of the American Railroad Association may be of interest.

Mr. Aishton, the new president of the association, is regional director of the North Western Region, and was formerly president of the Chicago & Northwestern Railroad. When the Railroad Administration was originally organized, all the railroads west of the Mississippi River were comprised in the Western Region, of which Mr. Aishton was director. Some years ago he was first vice-president of the American Railway Association, and was in line to be elected president but declined the office because at that time W. A. Gardner, then president of the North Western, was in bad health, and Mr. Aishton, who was then vice-president of the road, felt that his railroad required his undivided attention. He is one of the biggest, ablest and most public spirited railroad men in the United States, and withal a man with a personality so attractive that he is one of the most popular railroad men in the country.

William T. Tyler, the director of operations of the Railroad Administration, and the new first vice-president of the American Railroad Association, is a thoroughly experienced railroad operating man, who has served on various railroads, including the Great Northern, the St. Louis & Iron Mountain, the St. Louis-San Francisco, the St. Louis-Southwestern and the Northern Pacific. He was general manager of the Frisco, vice-president of the Cotton Belt, and assistant to the vice-president of the Northern Pacific. He was occupying the last-named position when the Railroad Administration was organized and C. R. Gray was appointed director of operation. Mr. Gray immediately wired, asking Mr. Tyler, who had served under him on the Frisco, to become his senior assistant. Mr. Tyler served as senior assistant director of the Division of Operations until Mr. Gray retired, late in 1918, when Mr. Tyler was appointed to succeed him. No railroad man in the country has worked harder than Mr. Tyler during the last year and a half. The strain imposed by the long hours he has had to keep in his office in Washington has been tremendous, but his rugged constitution has enabled him to stand up under it. Personally, Mr. Tyler is one of the most congenial and approachable of men, and all of his friends know that promotion to his present position as the head of the operating department of the railroads of the United States, while it has made him busier, has made him no less democratic and approachable than he always has been.

T. C. Powell, director of the Division of Capital Expenditures, was connected with the Southern Railway System for many years, having become vice-president of this road in 1905. Mr. Powell did much important work for the Government in important positions in Washington during the war. He succeeded Judge R. S. Lovett as head of the Division of Capital Expenditures, when Judge Lovett retired after the signing of the armistice.

A. T. Hardin, regional director of the Eastern Region, was formerly vice-president in charge of operation of the New York Central. He was made assistant regional director of the Eastern Region and succeeded A. H. Smith as regional director when the latter retired a short time ago.

C. H. Markham was president of the Illinois Central when Government control of railroads was adopted. He was first appointed regional director of the Southern Region, and later was appointed regional director of the Allegheny Region when the latter region was created.

N. D. Maher, regional director of the Pocahontas Region, was president of the Norfolk & Western when Government control was adopted and served as federal manager of that road until the Pocahontas Region was created.

B. F. Bush, regional director of the Southwestern Region, was president of the Missouri Pacific before Government coltrol was adopted and later was federal manager of that road.

Hale Holden, regional director of the Central Western Region, was formerly president of the Chicago, Burlington & Quincy. He was chairman of the Railroad Presidents' Conference which, in 1916, carried on the negotiations with President Wilson in the eight-hour controversy with the train service employees. He was a member of the Railroads' War Board, which supervised the operation of the railroads for the railway companies in 1917.

B. L. Winchell, regional director of the Southern Region, was formerly president of the Rock Island, and later the Frisco. He was traffic director of the Union Pacific when he was appointed regional director of the South.

W. J. Jackson, federal manager of the Chicago & Eastern Illinois, was formerly president and later receiver of that road. He was long chairman of the Committee on Relations of Railway Operation to Legislation.

E. H. Coapman, federal manager of the Southern, was vice-president in charge of operation of that road when Government control was adopted.

H. E. Byram, federal manager of the Chicago, Milwaukee & St. Paul, was federal manager of that road, and J. M. Hannaford, federal manager of the Northern Pacific, was president of that road, before they were appointed federal managers. G. L. Peck, federal manager of the Pennsylvania Lines West, was vice-president in charge of operation of those properties. J. E. Gorman was president of the Rock Island Lines before he was appointed their federal manager. A. J. Stone, federal manager of the Erie, was vice-president in charge of operation of that road.

Mr. Fairbanks, general secretary of the American Railroad Association, stated yesterday that its headquarters in Chicago will be as large as those in New York. They will be located in the Manhattan Building. The activities of the mechanical, engineering, traffic and transportation sections will be carried on from Chicago, and the general secretary will have an office there. The general secretary will also have an office in New York. The treasurer will be located there, and the activities of the operating, telegraph and telephone, signal and transportation and purchase and stores section will be carried on from New York.

The Cure of the Model Hater

"How do you do, Mr. X. What do you think of the convention this year?" The Man who saw turned his head to hear the reply.

"Why, hello, Dick. It's the best I ever saw. I'll take off my hat to the far-sighted crowd who brought these splendid exhibits here. And, Dick, I'm going to make a confession. For years, as you know, I have declined to look at the models you have so patiently dragged around for my benefit—and other fellows like me. Models, to me, have always been a bore, but now I am cured. I have spent four straight hours looking at models and nothing else, and I'll say frankly, that I wish I had more time."

The Man thought of unconverted others of his type who, safely fortified in their private offices, politely declined to give the "once over" to carefully constructed models which were made for their sole education and brought to their very doors. Truly, the "greatest convention" is a converter as well as an educator.



Erie Yards and Roundhouse at Susquehanna, Pa.



Delaware, Lackawanna & Western Car Shops at Kingsland, N. J.

American Railway Association, Section III, Mechanical

Report of the Proceedings of the Wednesday Afternoon and the Thursday Sessions

The Wednesday afternoon session was called to order by Chairman Chambers at 3:15 o'clock.

The Report of the Arbitration Committee



J. J. Hennessey
Chairman

DURING THE YEAR, Cases Nos. 1148 to 1155 have been decided and copies sent to the members. A vote of concurrence in the decisions is respectfully asked by the committee. With the approval of the General Committee, this committee has continued the rendering of interpretations of such questions as have been asked by the members regarding the rules.

The committee recommends, as the Master Car Builders' Association has become a part of Section III —Mechanical, of the American Railroad Association, that all reference hereafter to the Rules of Interchange, Loading Rules, Specifications, etc., and all printed forms issued in connection with the interchange, repairing, billing, defect carding, etc., be changed to conform therewith, i. e., be designated as "A. R. A." instead of "M. C. B."

Changes in the Rules of Interchange Recommended by the Committee

Rule 9

The committee recommends the following addition to Rule 9:

Journal Boxes: Periodical repacking, per Rule 66. { "Length of journal. Date previously repacked or 'No date.'"

This information will be required if the recommendation for repacking journal boxes under Rule 66 is approved.

Rule 12

The committee recommends that the fourth paragraph of this rule be amended to read as follows: "Joint evidence must be obtained within 90 days after first receipt of car home and said joint evidence shall not be valid unless used within 16 months from date of issue."

We feel there should be a time limit within which joint evidence must be used. As there is a twelve-month limit upon the rendering of bills, there should be some additional time allowed the car owner to make use of joint evidence.

Rule 17

The committee recommends the following interpretation of Section B of this rule, to be included in the revised rules: "Q.—Are special steels, or alloy steels, considered to be the equivalent of and permissible in substitution for malleable or gray iron A. R. A. standards A.—Yes."

The committee recommends that the following interpretation of paragraph (e), as shown on page 31 of the 1916 Rules of Interchange, be reinstated and shown in the Rules when revised for 1919. "Q.—When substitution of different makes of M. C. B. metal brake beams necessitates changes in brake hangers or connections, is the company making the repairs liable to the car owner for wrong repairs on account of these hangers, etc., being different from that standard to the car? A.—The association has no standard method of hanging beams, and until such a method is adopted the standard to the car must be maintained." The committee feels that this interpretation is necessary to properly protect the car owner.

Rule 32

The committee recommends that Rule 32 be rewritten as follows: (Delivering Company Responsible.)—"Dome covers or safety valves missing from tank cars. Material missing from cars due to handling on unloading machines. Removing or cutting out parts of car to facilitate loading or unloading. Known theft of parts of car occurring on handling line.

"Damage to any car (including cars on ferries or floats) if caused by: (a) Derailment. (b) Cornering. (c) Sideswiping. (d) Collision or impact other than that occurring in regular switching. (e) Handling of cars with broken or missing couplers, or couplers out of place. (f) Colliding with or shoving over bumping post or other fixed obstruction. (g) Shifting of

loads from other cars. (h) Overloading. (i) Explosion. (j) Collapsing buildings or other structures on right-of-way. (k) Unconcealed fire damage. (l) Flood. (m) Storm where car is derailed or destroyed. (n) Failure to close hopper or drop doors before moving car."

These changes are intended to better cover those causes of damage which should be considered as unfair usage and more clearly outline such causes and the loss of certain parts of cars which it is felt are properly a handling line responsibility, and to eliminate the indefinite term "wreck."

Rule 33

The committee recommends that the first paragraph of this rule be rewritten to read as follows: "Owners will be responsible for the expense of repairs to safety appliances where not involved with other delivering line damage, except damage to running boards on tank cars when sideswiped or cornered."

Rule 58

The committee recommends that Rule 58 be reinstated to read as follows: "Delivering company responsible when cars are offered in interchange with missing brake cylinders, reservoirs, triple valves, pressure-retaining valves, cut-out cocks, angle cocks or air hose, each or all complete." Also that reference to Rule 58 be added to Rule 43 as an exception.

Rule 66

The committee recommends that Rule 23, as printed in Circular No. 25, issued January 1, 1919, be incorporated in the Rules of Interchange as Rule 66, and amended to read as follows: "Owners responsible.)—Periodical repacking of journal boxes, regardless of the responsibility of delivering company for change of wheels, journal boxes or journal bearings. No charge shall be made for repacking unless all boxes are repacked. No charge shall be made if the repacking is done within nine months from date stenciled on car. If car bears no stenciling, showing date of previous repacking, all journal boxes may be repacked, if necessary, and charged for.

"(a) All journal boxes shall be repacked with properly prepared packing (new or renovated) at least once every twelve months, at which time all packing will be removed from the boxes and the boxes cleaned; dust guards to be renewed when wheels are changed.

"(b) The date and place (railroad and station) where the work is done must be stenciled on the car body near the body bolster at diagonal corners in 1-in. figures and letters, using the same station initial that is used for air-brake stencil.

"(c) This work to be done as far as possible when cars are on repair track undergoing heavy repairs. When on repair track for heavy repairs, cars which have not had boxes repacked within nine months will have all boxes repacked and the record stenciled on the car as above.

"(d) This does not contemplate any change in the intermediate packing of boxes when it is necessary to do so. No change should be made in the stenciling unless all boxes are repacked."

Rule 88

The committee recommends that Rule 88 be rewritten to read as follows: "In order that repairs of owners' defects may be expedited as fully as possible, foreign or private line cars may be repaired by the handling line by using material from their own stock instead of ordering material from car owner, as prescribed by Rule 122, in which event the repairing line must issue its defect card for the labor only of correcting such improper repairs, and defect card should be so marked.

"In case of delivering line defects, defect card shall be issued for both labor and material for correcting the improper repairs."

Rule 90

The committee recommends the elimination of the last exception in this rule, reading "except in cases covered by Rule 88."

Rule 94

The committee recommends that the third paragraph of this rule be changed to read as follows: "If the owner elects to dismantle the body or trucks, or both, charge may be made for such material as would have been required for the repairs covered by the defect card, but such charges to be confined to the actual material stated on card and items of labor for straightening or repairing material returned to store stock. No other labor shall be charged in such cases except in so far as labor is already included in the A. R. A. prices for material."

Rule 95

In reference to a recommendation that this rule be changed to include missing brake beams and other brake details, as formerly covered, the committee recommends the rule remain as at present for the reason that in case of bills for defective or missing brake beams, the average credits allowed under Rule 101 are high enough to offset the value of occasional missing beams, and the billing is thereby greatly simplified. Furthermore, the condition of the missing beam cannot be ascertained and is no doubt frequently defective.

Rule 101

The committee recommends that the following items be inserted in Rule 101 to provide for the charge for the periodical repacking of journal boxes as per Rule 66: "Journal Boxes, periodical repacking of, per car, net:

149-a.	For journals 7 in. long and over, but not 8 in	$1.75
149-b.	For journals 8 in. long and over, but not 9 in	2.10
149-c.	For journals 9 in. long and over, but not 10 in	2.35
149-d.	For journals 10 in. long and over, but not 11 in	2.50
149-e.	For journals 11 in. long and over	2.80"

Rule 108

The committee recommends that Rule 108 be rewritten to read as follows: "No labor to be charged for the inspection of cars, testing or adjusting brakes, adjusting angle cocks, tightening unions or spreading cotters; sill steps, ladder treads or handholds, tightening or straightening on car.

"No material or labor to be charged for the following items of repairs: 1. Air-hose gaskets, applied, except with hose complete, applied. 2. Brake pins or key bolts, applied. 3. Brake ratchet wheel keys, applied. 4. Brake-shaft rings, applied. 5. Brake-shoe keys, applied. 6. Carrier iron, Bettendorf type, when turned over, no charge for adjustment. 7. Coupler release clevises, clevis links or chains, clevis pins or bolts, applied. 8. Lag screws, applied, except when used to complete other items of repairs not herein listed. 9. Nuts or lag screws, tightened. 10. Nuts, ¾ in. or less, applied, except when used in renewal of bolts. 11. Nut locks, or lock nuts, applied. 12. Release-valve rods, repaired or applied. 13. Straightening brake shafts and uncoupling levers when not removed from car. 14. Spring cotters and split keys, applied. 15. Staples, applied. 16. Wood screws, applied, except when used in renewal of running board. 17. Washers, applied, except when used in renewal of bolts.

"No charge to be made for the material or labor of lubrication, except as provided in Rule 66."

Rule 120

The committee recommends that the fifth item under Paragraph "B," "Repair Limits for Labor," be corrected to read as follows: "All steel and steel underframe cars, excepting steel or steel underframe flat cars."

The report is signed by J. J. Hennessey (Chairman), Chicago, Milwaukee & St. Paul; P. F. Smith, Pennsylvania Lines; James Coleman, Grand Trunk; F. W. Brazier, New York Central; T. H. Goodnow, Chicago & North Western; J. J. Tatum, United States Railroad Administration, and George Laughlin, Armour Car Line.

Discussion

After the reading of the report, the Secretary made the following statement: At a meeting of the Arbitration Committeee, held last night, the committee decided to recommend the following changes in Rule 36:

"To be permitted only on cars loaded with perishable or fragile freight and on tank cars containing dangerous articles as per I. C. C. regulations."

Also, that the following be added to the last paragraph of the same section:

"Commodity cards required on tank cars may be pasted, glued, or otherwise secured."

Also, that the second sentence in second paragraph of Section 3 of this rule, be changed to read as follows:

"Placards and certificates on empty cars, except inflammable and commodity placards on tank cars, must be removed."

Reason: Apparent conflict between above M. C. B. rule and paragraph 1712 of I. C. C. regulations relative to use of commodity cards on tank cars containing dangerous articles.

On motion the report was accepted as read.

Report on Prices for Labor and Material



P. F. Smith, Jr.
Chairman

The committee after the 1915 M. C. B. convention took up the work of analyzing the prices for labor and material (as outlined by the Committee on Compensation for Freight Car Repairs in their report to the 1915 convention) as instructed by the association. For the 1916 convention the report presented gave a general outline of the method being followed in carrying on the work, and included a list of items for Rules 101, 107, 108, 111, 116 and Passenger Car Rules to be added and changed. This report was adopted and the revised 1916 M. C. B. rules included the changes in items and prices as suggested.

For the 1917 convention the report presented covered all items for labor and material for freight and passenger car repairs, and specified that during the coming year the studies of the committee would include the direct and overhead charge for yard repair work as compared with shop track work; center, intermediate and side sill renewals; tank car repair studies; items per Rule 111; also giving further consideration to material prices and making recommendations for alterations in such prices as might be found necessary. This report was adopted, subject to the modifications which the Price Committee had in mind and that were reported upon at the meeting held in Chicago, but the items for labor and material as reported on were not introduced in the M. C. B. Rules of Interchange, and the proceedings do not give any reasons therefor; further, the Price Committee was not informed or given any instructions how to proceed in the future.

For the 1918 meeting the report presented, due to abnormal conditions existing at that time, was to the effect that the items for labor and materials, as printed in the 1917 revised M. C. B. rules, should stand, but the percentage to be added should be increased to 50 per cent. On this report apparently no action was taken, as the proceedings make no mention of such a report, further; price details were taken care of by the Arbitration Committee.

In view of the above, the committee asks for further instructions. If it is decided to continue this committee, we suggest that the work left unfinished in our 1917 report be continued, and the entire price schedule be revised to date and submitted to the 1920 convention. We further recommend in the revision of time allowances that time basis be used and the hours divided on the decimal plan in multiples of tenths.

The report is signed by P. F. Smith, Jr. (Chairman), Pennsylvania Lines; G. E. Carson, New York Central; J. E. Mehan, Chicago, Milwaukee & St. Paul; Ira Everett, Lehigh Valley; Willard Kells, Atlantic Coast Line; E. S. Way, General American Tank Car Corporation; H. L. Osman, Morris & Co.; G. F. Laughlin, Armour Car Lines, and A. E. Smith, Union Tank Line.

Discussion

In the last year and a half the prices of both labor and material were continually shifting, but your committee has considerable data on time studies that were made for the various items in the rules, so that we can now go ahead if the Association so desires.

A motion to accept the report was carried.

Report on Depreciation for Freight Cars

In order that the committee's conclusions might be based on representative factors as to average life and residue values, Circular No. 35 was issued requesting data on equipment dismantled during a period of three years ending December 31, 1917. This period was taken because it represented normal conditions more nearly than those existing during 1918. This information was requested by classes in three groups—wooden cars, wooden cars with steel underframes and cars of all-steel construction.

Replies were received from 55 railroads and 7 private lines, representing the ownership of 2,023,783 cars and covering 106,010 cars dismantled during the three-year period, a summary of which is shown below:

Cars Worn Out and Dismantled.

(Cars retired in connection with rebuilding are not included.)

All Wood Cars.

Class of Cars.	No. of Cars.	Average Life of Cars in Years.	Scrap Value.
Box	47,672	22.3	12.2
Stock	5,201	20.1	12.1
Flat	6,800	22.3	17.1
Gondola	24,630	18.0	14.7
Hopper	16,082	20.3	14.4
Refrigerator	4,591	21.7	12.3
Tank	81	24.6	31.5
Weighted Average	105,057	20.9	13.5

All Steel Cars.

Class of Cars.	No. of Cars.	Average Life of Cars in Years.	Scrap Value.
Gondola	817	13	11.7
Hopper	136	14.7	17.2
Weighted Average	953	13.1	12

The information furnished regarding wood cars with steel underframes was very limited and not representative of average conditions, and the committee did not feel justified in using it.

The average life of railroad owned wooden refrigerator cars dismantled was 17.1 years and of private line wooden refrigerator cars dismantld 21.9 years, making the average life for all wooden refrigerator cars dismantled 19.4 years. However, the average life of railroad owned wooden refrigerator cars is very largely affected by two lines reporting the dismantling of a large number of cars of an average life of only 15 years, which is much lower than the general average for all railroad owned wooden refrigerator cars, and by excluding these two lots of cars the results are as follows:

Railroad owned wooden refrigerator cars dismantled...21.3 years
Private line owned wooden refrigerator cars dismantled.21.9 years
Average life for wooden refrigerator cars dismantled...21.7 years

which your committee feels should be taken as the average life of wooden refrigerator cars and which has been shown in the table.

In order that the information would be obtained on a uniform basis, the committee asked that the scrap value be expressed in the percent of the M. C. B. price of the car, as shown in Rule No. 112 in the 1918 M. C. B. Rules, using the 1918 price for scrap.

From the information secured we obtained a weighted average percentage of scrap of the M. C. B. value new, on all wooden cars, of 13.5 per cent. It is the opinion of the committee that ¾ cent per pound is more nearly representative of the average current market price for scrap than ½ cent per pound as quoted in the present M. C. B. Rules, which would increase the weighted average percentage from 13.5 per cent to 20.25 per cent.

In settling for destroyed cars, recognition should be given of the fact that the car has a value to the owner above that of the actual value of the scrap to the line destroying the car, and further, that there is considerable serviceable material on which the line destroying the car can obtain the secondhand instead of the scrap value. If 20.25 per cent represents the value of the scrap to the line destroying the car, the committee does not feel justified, in the absence of any other figures, in recommending any change in the provision of Rule No. 112 which provides that in no case shall the depreciation exceed 60 per cent of the value new.

The weighted average life of all classes of wooden cars was found to be 20.9 years, as indicated in the above table. We have no information as to the average life of cars of steel underframe or all-steel construction, in the absence of which we would suggest, that on such cars, other than gondola or hopper cars, the same rate of depreciation be used as on wooden cars, until such time as experience may warrant a different rate.

The weighted average life of all classes of open top steel cars was found to be 13.1 years, but on account of the committee having knowledge that the cars reported as being dismantled during the period did not represent the present standard for this type of car we are inclined to believe that the information does not represent the average life of this class of equipment and, pending the time when experience will warrant a revision, the committee recommends considering 17½ years as the average life for open top steel cars. Based on the average life as indicated in the above table for wooden gondola cars, the committee suggests that wooden and steel underframe gondolas and hopper cars, for the purpose of depreciation, be included with similar cars of all-steel construction.

Opinions were requested as to whether depreciation should be applied on air brake values at the same rate as for car bodies and, on a car-owned basis, the majority of the replies favored depreciating both 8-in. and 10-in. air brakes at the same rate as the car body, which is recommended by the committee. The majority of replies to the question about depreciation of trucks, considered on a car-owned basis, favored having the trucks carry their own rate of depreciation and having that rate less for all-metal trucks than for composite trucks. However, the committee finds that the rate of depreciation of car bodies should be reduced to 3 per cent and 3½ per cent, according to construction, and we do not feel that a rate less than 3 per cent for trucks is justified; therefore we recommend that the trucks be depreciated at the same rate as the car body to which they belong.

In view of the information at hand, the committee submits the following recommendations for the depreciation of freight cars:

Straight Depreciation Basis.

Items.	1918 Rules of Interchange. Per Cent.	Proposed Rate. Per Cent.
Wooden car bodies, except gondolas and hoppers.	5.5	3
Wooden car bodies, gondolas and hoppers	5.5	3.5
Wooden car bodies with steel underframes, except gondolas and hoppers with steel underframes	4.5	3
Wooden car bodies, gondolas and hoppers	4.5	3.5
Steel underframe flat cars	5	3
All-steel car bodies or those with steel underframes and steel superstructure frames, except gondolas and hoppers	4	3
All-steel car bodies or those with steel underframes and steel superstructure frames, gondolas or hoppers	4	3.5
Tanks for non-corrosive material	4	3
Tanks for corrosive material	5	3.5
Air brakes	None	Same rate as car body.
Trucks	Same rate as car body.	Same rate as car body.

The age of the car body shall govern in figuring depreciation on air brakes and trucks.

The depreciation rate for the class of car shall govern in figuring depreciation on such betterments as are listed in Rule 112 and shall be figured from date of application.

In its study of the subject of depreciation your committee was confronted with the question of rebuilt cars, and believes that this should be referred to a committee for consideration, and suggests this committee, if appointed, be requested to take up the part of Rule 112 which provides that in no case shall the depreciation exceed 60 per cent of the value now.

The report is signed by M. K. Barnum (Chairman), Baltimore & Ohio Railroad; J. Hainen, Southern; L. K. Sillcox, Chicago, Milwaukee & St. Paul; A. E. Calkins, New York Central, and H. L. Osman, Morris & Co.

Discussion

C. E. Fuller (U. P.): I think this committee should be either continued or another committee appointed to take up the question of rebuilt cars. That subject is very pertinent and one we ought to have settled. There is quite a diversity of opinion as to the value of a rebuilt car, especially the refrigerator cars, and now, with steel underframes and the betterments and improvements on the car, they place that car in a class by itself. I think the subject should be thoroughly considered and a report given on it by this committee.

Chairman: If there is no objection, that will be included in the motion—that the report be accepted and the committee requested to continue the investigation in accordance with the recommendation of Mr. Fuller.

F. F. Gaines (U. S. R. A.): I would like to hear from some member of the committee as to what ground they justify the limitation of 60 per cent and that the scrap value lies between 12 and 13.5 per cent. If you leave 40 per cent there which you cannot get back, you are penalizing somebody; the owner of the car, in other words, can only get 60 per cent value of the car up to its 20 year life. I do not understand why the figure of 60 per cent is the dividing line, and have never understood it.

R. L. Kleine(Penna. Lines): I think the average life of 20 years for wooden cars seems to be right, and what would be expected, although during the early portion of this life, wooden cars were not subjected to the severe strains of being hauled with steel cars and in heavier trains.

No steel or steel underframe cars have been retired on the Pennsylvania Railroad on account of being worn out, and the first of these cars was built in 1898. The life of a steel or steel underframe car will naturally be longer than that of a wooden car, since during the first ten years of the life of such a car the total cost of repairs, aside from running repairs, would be about $100. After the tenth year, and until it is 25 years old, the car will require normally, barring accidents, in turn a new floor, possibly new side sheets, and another floor, which may carry the car until it is 32 years old. Around that time the cost of maintenance per year will be much higher, as it will not have the initial ten years' low maintenance cost of a new car, and then it becomes a question of whether to maintain such a car or build a new one. This would be decided by taking into consideration the yearly costs of maintaining the old car and the cost of building a new car, including the interest on investment and the depreciation.

With the value of scrap in a car representing the per cent of the original cost of a new car, the limit of depreciation in per cent should be the difference between 100 per cent and the per cent representing the value of the scrap, both figured in normal times, and if the price of either scrap or new car should materially change, the percentage could be adjusted accordingly, although they generally run hand in hand. That is, if the cost of the car new is materially increased, the value of scrap generally increases correspondingly. Under all conditions the total value of the car (100 per cent) should be made up of the limit of depreciation in per cent, plus the value of scrap in per cent. The value of scrap recovered from destroyed and badly damaged cars is not worth more than the scrap rate net to the handling line, as there is a very small percentage of this material that can be used in repairs.

Since January 1, 1918, the Pennsylvania Railroad Company reclaimed, at the request of the regional director, all serviceable parts from destroyed foreign cars, recorded and tabulated them, and submitted lists to the car owners for instructions as to what items they desired shipped home. Very few items were desired, and these were mainly truck sides and truck bolsters of the latest design, and the majority offered no more than scrap rates, plus the expenses of handling.

The conclusions are: 1. The yearly rate of depreciation for badly damaged cars or maximum allowable depreciation should be such that neither the owner nor the handling line would make money in settlement for destroyed cars.

2. On account of the different retirement programs and rates of depreciation used by various roads, a definite life should be established for wooden, steel underframe, and all-steel and tank cars, or at least a definite time at which depreciation should cease as a basis for settlement of cars destroyed: 20 years for wooden cars and 27 years for steel cars.

3. The limit of depreciation should be a percentage based on the value of new cars (normal times) to the value of scrap

(normal times) obtained from the car at time of destruction: 20 per cent scrap value, and 80 per cent limit of depreciation.

4. The rate of depreciation should be the number of years established for the life of the car divided into the limit of depreciation: 4 per cent for wooden cars, and 3 per cent for steel cars.

5. Provision should be made for return of trucks at the option of the destroying line.

6. Rate of depreciation should be the same for trucks and air brakes as for body of car.

7. The M. C. B. values now have been increased 55 per cent in the last two years, and the arbitrary values of betterments were increased 100 per cent without any of the depreciation rates being changed and the long standing practice of depreciating betterments from the original date the car was built was superseded by depreciating from the date applied, which makes it difficult for the handling line to estimate depreciated values of such cars. Unless arbitrary values are reduced, the maximum allowable depreciation should be increased, in order that the remaining depreciation may represent only the value of the scrap in the car.

8. If the low yearly depreciation rates, as recommended, be adopted, it would prohibit roads from settling for many damaged foreign cars, on account of the high settlement price, would result in more old wooden equipment being maintained instead of getting this weak equipment retired and might result in additional building of wooden equipment. There are thousands of old wooden cars, especially of low capacity, which will not stand up under ordinary service, and are a danger to themselves, to other equipment, to the roadbed and to life, and when such cars fail to the point of destruction, they generally cause considerable expense to the handling line by damaging other cars and the roadbed.

Furthermore, the corporations set up a yearly depreciation for the cars, and the depreciation which the Association set ought to more nearly approximate what the corporation has already in its accounts.

Mr. Gaines: I think that this convention will take a big step backward to put in that old method of depreciation on equipment. The only way you can get at it rationally is to take 100 per cent, minus your scrap and divide by the life of the car for your yearly depreciation, and I think if we adopt this report as a whole, we are taking a step backward.

Chairman: I have had some experience with these items, and I never did agree to it in my own mind. The depreciation has never been right, and there is no reason at all for the wide gap between the Rule 120 basis and 112, and I favor a little more latitude than 120, so that there will not be any incentive for a man to destroy a good car if he happens to damage it, and finds he can pay for it more cheaply than for the repairing; but there should be a basis so that at the time when a car was dismantled there would be an established figure that can be represented in dollars and cents. I think we could and should establish it before we drop this subject, or recommend rather some basis that seems sensible and will bear argument.

Mr. Giles: It appears to me that some further consideration should be given to establishing a different basis for figuring the depreciation of trucks, especially steel trucks under modern equipment, than that which is used in arriving at the depreciated value of the body of the car. The trucks do not depreciate as rapidly as the body of the car does, either in steel or wood, and I have always been in favor of establishing a different basis for the trucks.

Mr. Goodnow: It is not brought out in this report at all just what consideration was given the present value of cars. The Arbitration Committee is accepting as the basis of settlement the book value of the car purchased since 1914. Prior to that time the cars go on the arbitrary values as established in the M. C. B. rules. That took care of the war conditions which prevailed, but in the settlement for cars built in the years just prior to 1914 and cars which may have been contracted for and delivered in 1914, and for the cars that have been bought under the present prices, there is no difference, as an earning unit to your company. There were cars built in 1912, 1913, and 1914 that will go along for years and be just as good as a car built since 1914. They represent only about one-third of the value of the car that has been built since that time; so that if this is to be analyzed right, there must be some basis of settlement or of cost set up to take care of the depreciated value. I don't know if the committtee gave any consideration to that in their recommendations.

Mr. Calkins: The committee had that subject in mind, but according to the instructions it had, it did not consider it was to go into anything other than the rate of depreciation.

Mr. Goodnow: You mentioned just prior to that that you depreciated on the M. C. B. prices.

Mr. Calkins: That was in determining the value of scrap, as compared to the value of the car. We did not get any of those new values because all the cars dismantled were of the type that came under the old arbitrary value established by the Association.

Mr. Goodnow: I don't think the rate of depreciation is half as important as setting up proper values, because what we would actually lose, whether it is three or five per cent, in depreciation, does not represent the value of cars to your company today under present prices, although they may have been bought just prior to 1914. This matter of reconciling the M. C. B. depreciation and that set up by the various companies on their books was attempted about two years ago, and at that time the depreciation as carried by the companies varied so much that it was impossible to reconcile it at all. It ran from one-half of one per cent up to 3 per cent or more, so that at that time there was no common depreciation, as between the companies, on the equipment.

Mr. Kleine: It would be a simple matter to cover Mr. Goodnow's point in regard to the various prices paid for cars during recent years. You could establish a basis for normal times, and as the cars increased in price in following years, you could use that as a base and add a percentage. But the rate of depreciation, and the total depreciation of the car, is the thing that should be established as a fixed basis. We have had enough experience with the wooden cars to know what that is, and I think the committee brought that out very nicely. It is about 20 years; that is our experience also, but I think the committee is wrong in stating 60 per cent. If 80 per cent were used to represent the depreciated value of the car and the 20 per cent remaining in the car the scrap value, it would be approximately correct.

Mr. Calkins: We did not set the 60 per cent limit. We had this 20 and 80 per cent figure in our mind, too, but we thought the thing ought to be carried over, as we suggest there, to the committee, who will go on with this work another year. The last paragraph says: "And suggests this committee, if appointed, be requested to take up the part of Rule 112 which provides that in no case shall the depreciation exceed 60 per cent of the value new." We did not change the present practice.

Mr. Tatum: I was wondering how these figures are arrived at. We place the average life of wooden cars at 22 and 23 years. The average life of a wooden gondola is 18 years; steel is placed at 13 years. In considering the repairs to steel cars when repairs or rebuilding is necessary, you are required to renew the floor sheets and the side hopper sheets possibly. The side sheets of the car are fairly good, yet 50 per cent of the life is gone. In repairing a wooden gondola car, if you are required to renew the floor and side hopper planks, the planks may all be there and intact, and for the reason that they do not depreciate by deterioration they are worth as much in the rebuilding of that car as if they were new. It is well seasoned, hardened and in good condition, and as the car is rebuilt with the new floor and side planks, as it may be, or end sills, these old side planks applied to the rebuilt wooden gondola car are just as good as if new. It would not be so with the steel car, because if you apply a new steel floor to the steel car, or perhaps new sills, the side plates of that steel car have depreciated 50 per cent or probably 75 per cent, and maybe it would not justify the rebuilding of that car, or scrapping it, and building a new body, as it would the wooden car. By that method you are able to increase the life of the wooden car, if you don't consider the rebuilding along with the scrapping of the car, while with the steel car you shorten the life. If we take a steel car and compare the cost of rebuilding it or repairing it, you might find it just as cheap to build an entire new steel body, as it would be to repair the old steel body. There have been some test cases made where there was only $50 difference between the building of a new steel body and the repairing of an old steel body. It is very expensive to get the car down so that you can apply new parts and build it up, while you can use the oxy-acetylene or other methods, and cut the steel down, put it in the scrap and use the money you save in cutting out the rivets to

apply to the new body, and practically get an entire new body for what you pay for the repair or rebuilding of the old body. Has the committee considered the cars having had new bodies built, and the old bodies scrapped? If you continue the trucks, draft gears and air brakes, and simply build a new body, you can add considerable life to a steel car, just as much as you can to a wooden car by renewing the defective parts.

Mr. Hennessey: The committee is up against a very hard proposition when it attempts to get the average depreciation of a wooden car or a steel car. You may build a wooden car, and use material in that car that will depreciate to a very small per cent, I may build from the same drawings a car practically out of sap. It will depreciate twice as fast as a car that is built out of good material. I have inspected some 100,000 gondola cars that in 8 years are practically fit for the scrap heap; I have inspected other cars that have the same cubical capacity, but instead of having been built 38,000 lb. in weight when new, a good car was built about 45,000 lb. That car had the great factor of safety, and depreciation was very small in per cent, as compared to the car that was practically a tin pan. The same is true with the wooden cars.

Mr. McBain: The committee should consider an arbitrary point of depreciation at some point above the actual scrap values. It should take into consideration the maintenance of that car in the service, depending on the maintenance policy of the owner. Any car that is maintained in serviceable condition, so as to pass interchange and carry the load to destination, certainly must have a value somewhere in excess of the actual scrap in the car. I urge that the committee consider that point before it reaches a final conclusion.

Mr. Gaines: I would like to amend the motion that is now before the house to this extent: That the report of the committee be accepted, but in publishing this report we substitute for the method of depreciation, the plan of using 100 per cent, minus the scrap value divided by the life of the yearly depreciation.

Mr. Kleine: I second that amendment.

Mr. Calkins: I don't quite get that point. Do I understand then if you have a $1000 car, and it runs 5 years, and is destroyed, and is worth $200, that you have got to account for $800 in depreciation in the five-year period? What is to be the life of it that you use for that divisor?

Mr. Gaines: The estimated life is 15 or 20 years, whatever you adopt.

Mr. Kleine: That simply substitutes the depreciated rate, or to establish the depreciated rate, we take 100 per cent, subtract the scrap value, divide the life into that and get the rate of depreciation, whereas in my suggestion I had set a definite life.

Mr. Tatum: I understand Mr. Gaines' motion is that the committee or the Association fix the life of the car. For example, say that they have established a life of 20 years or 30 years, or whatever it may be, if a car costs $1000 and the scrap value is $200, and they divide the $800 remaining above the scrap value into the age of the car, that would be its depreciated value per annum.

Mr. Gaines: I would say it is my intention that we take for the present, until we get different figures, the estimated life given in this report and use that as the basis to work on.

Mr. Calkins: When a car reaches the estimated life, it is worth nothing but scrap value, according to the process of reasoning used. There is always some value in a car above its scrap value, if it is used as a unit of equipment, and is in condition to be so used. At the end of 17.5 years a steel car is worth $200 as scrap value, according to this report. I still believe there is more value in the car than its scrap value at that time.

Mr. Tatum: Is it Mr. Gaines' intention to accept the figures of 13 years as the life of the steel car?

Mr. Gaines: I had in mind 17.5 years. We should accept these figures as the best we have obtainable at the present time, with the understanding that the committee will give further attention to the subject and report at a later time. You can extend the life of a car, or cut it down, but you must make an arbitrary life, and my suggestion is that we accept the committee's report this year as to the life.

Mr. Goodnow: I understand the motion which was first made was to receive the report of this committee, and that the committee should be continued, to give further study to the subject, particularly with reference to rebuilt cars. Representing a company which owns and operates cars, I am not ready, without a chance to give further study to this subject, to vote one way or the other on such a motion, and I think, without establishing some rule as to how your scrap values and similar matters are to be arrived at, we never would settle for a car. I do not think this convention is in any shape to act on a motion now, and I think we had better go along for another year with what we have at the present time.

Mr. Gaines: The committee has worked out the scrap value and it has given averages. The proposed amendment is superior to the old methods of the 60 per cent limit, and has some rational basis at the bottom of it, which the other has not, and we must adopt some rule for handling the business this year.

Mr. Goodnow: If you can arrive at some standard of value for cars, you are right, but in the absence of that, I believe a car built in 1913 will earn as much money as one built in 1915, and there is a wide line of settlement on the original values of these cars.

Mr. Fuller: Do you mean you would accept 14 years as the life of a steel car?

Mr. Gaines: That part of the report does not agree with my experience, but I am willing to ride with that part of the report.

Mr. Fuller: It does not seem right to put the period of life of a steel car, gondola or hopper, at 14 years, when the figures show that the life is 17 years as an average. Every one knows that if the steel car is taken care of it has many more years of life than 14 or 17 years.

Mr. Tatum: Some of the railroad companies are tearing down and settling for a car which was in bad condition, rather than to rebuild a car.

Suppose the car is 17 years old, and it has been maintained in fairly good, serviceable condition. It goes on a road and it is damaged, and the managers of the road say—"We will settle for this car, we will not repair it. There is $200 worth of scrap in it, it will cost us $300 to repair it. By settling for it we will save $100, and we will settle for it." I do not think that is good and I am sure that is what will happen if Mr. Gaines' motion prevails.

Mr. Goodnow: Under Mr. Gaines's motion the scrap value is the only thing to be considered, and it reflects back to the value of the car as it is established under an arbitrary figure, and as it is represented in value on the books of the company.

R. L. Kleine: The present rates of depreciation are too high. Mr. Gaines wants to extend the life of the car to a longer period—instead of 60 per cent of the value of the car he wants to extend it to 80 per cent, or 100 per cent less the scrap value. That means anywhere between 15 and 20 per cent. The committee has found that the life of the average wooden car, torn down as worn out, is about 20 years. We have data on wooden cars, but in connection with the steel cars, we have not any such data. We have steel cars build in 1898, which are now 20 years old, but we have not torn down a single one of these cars on account of being worn out.

If we establish 20 years as the life for the wooden car, as recommended by the committee, and run the depreciation to 80 per cent of the value of the car, that will give 4 per cent a year depreciation. In the case of the steel car, we do not know what it is, and no matter how much investigation is made, we have to wait until the end of the normal life of the car to determine it. We will have to estimate it for the present.

J. H. Milton (Rock Island): Suppose a car has been running 15 years. Do I understand that we will depreciate that car on a 20-year basis, notwithstanding the fact that we may have practically rebuilt the car, and spent $700 or $800 on the car, reinforced it in every way, and added years of life to it? It seems to me when that amount of money is spent on a car we change the life of the car and in my opinion it should be considered as a new piece of equipment.

L. K. Sillcox (C. M. & St. P.): I want to point out one of the conditions prevailing today. We settle on a car basis, according to the cheapest method, we either fix the car up to stand the pull, or settle with the owner, and our experience has been that we have a vast majority of steel cars on our hands for which we have settled. The committee has reported a less rate of depreciation than that which was formerly used, and I think it is on the right track. We had to use figures based on information which was furnished.

The evidence which has been submitted with respect to the steel cars does not cover a long enough experience, and shows cars taken out of the service which have a short life naturally.

There are cars running in the Illinois territory which have eight years of service, and that is the normal condition in the coal traffic in that section, whereas if you take the same cars out in Colorado, where the conditions are not so severe, the same type of car might run 15 years, and yet be in good shape. The point I want to make is this—that we are settling for cars today which are in good shape, because it is the cheapest way to do it. A lot of these cars could be continued in service if there was a less rate of depreciation prevailing.

E. S. Way (Gen. American Tank Car Corp'n): I do not think it is wise to take any hasty action on the amended motion before us. I wish to offer another amendment, that the subject be referred back to the committee for further consideration, and that the committee give weight to the value of a tank car, as well as the scrap value, and allow for the maintenance of the car.

Mr. Calkins: Under the present rate of depreciation, which I think is too high, a car at the rate of 5.5 per cent depreciation reaches the 40 per cent limit in 10¾ year; at the 4.5 per cent rate of depreciation, it reaches the 40 per cent limit in 13.3 years; at the 5 per cent rate of depreciation, it reaches the 40 per cent limit in 12 years, and at the 4 per cent rate of depreciation, it reaches the 40 per cent limit in 15 years. I believe the work of the committee should go further, and take up the question and determine the facts regarding the rebuilt car.

Mr. Milton: Take a steel car that costs $1500 when you bought it, and it is depreciated down to $500. We repair it and use $1000 worth of good material with $500 of partly worn-out material; it has only 3 or 4 years more life. Is it policy to do this? It would appear to be better to tear it down and build a new one.

Mr. Way: Perhaps it will clear up the situation if an amendment is made to the effect that, instead of accepting the rate of depreciation as worked out by the committee based on the data compiled, to let the present rate of depreciation stand, and refer the matter back to the committee for continued consideration as to the actual point of depreciation. I make that as an amendment to the motion.

The Chairman: It is not within our province to settle the rate of the value of the car under the present operation. The corporate interests value the car, and any rate change, one way or the other, can only be done with their consent. I would suggest that you keep that in mind when we undertake to make any change this year, and I want to say, that as chairman, that it is not my intention to allow any of these motions to be passed, if it is in my power to have them withdrawn.

In the first place, this matter will have to be referred to letter ballot to change any method of value of a scrapped car. We have always had two methods of depreciation, and the reason we have had these two methods, is because one covered a worn-out car, and the other covered a destroyed car, and we had the two methods to prevent the very thing Mr. Sillcox told us about—that many cars have been destroyed because they could be paid for more cheapely than they could be repaired.

I hope that some one will make a motion to take the place of these amendments, so that a proper vote can be taken with regard to the matter. We had better go on, in my opinion, as we are, for another year, and let the committee put further study to the subject.

It is wrong to think of limiting the life of a steel car to 17 years. I would say that 25 years is the life of a steel car, on the average. I think that 20 or 22 years is the life of a wooden car. Thirteen years is not anywhere nearly long enough for the life of a steel car, unless it has been abused and practically thrown away. I do not want to see anything passed that is wrong, and we had better accept what we have until we get something better, rather than adopt something we have not the authority to do.

Mr. Fuller: I approve of everything you have said, Mr. Chairman. I cannot afford, and I do not think there is anybody in this room who can afford, to vote on the period of 15 or 17 years as the life for a steel car. If Mr. Hennessey is the man who made this motion, I will ask him to withdraw it.

Mr. Hennessey: My only motion was to receive the report of the committee and open it for discussion. I have no motion before the house. Mr. Gaines has a motion pending.

Mr. Gaines: I will withdraw my motion.

Mr. Goodnow: As I seconded Mr. Way's amendment, I do not understand that it has anything in view except to change the rate of depreciation which is arbitrarily established by the M. C. B. rules. It does not change the time allowed for depreciation, but simply changes the rate from 5.3 to 4.3 per cent. That is perfectly safe. The only reason the question of the value of cars was brought up here was on account of the change attempted to be made in the rate, and if you make that change you must take into consideration the value of the cars. Mr. Way's amendment does not take into consideration the value of the cars at all, but simply takes into consideration the rate of depreciation.

Mr Gaines: I move that the report of the committee be received, and that the committee be continued for another year to take up all these questions which we have discussed; that we maintain the old rule which we have for the ensuing year, pending another report from the committee at next year's convention.

C. E. Spoor (B. & S.): I want to say that for the past month or two I have been making an inspection of the equipment on our roads, and I found that we could repair the cars at our home shops at less than $200 in two instances, and from these facts I do not believe the steel car equipment should be put below 20 years. I think it should be extended longer. I believe the committee should be continued.

F. W. Brazier (N. Y. C. Lines): We have had some steel cars on our lines that have gone to pieces in less than 12 years. It makes a big difference what service the cars are in. I ask Mr. Kleine what service the cars are in that have been on his road for 20 years—in coal service?

Mr. Kleine: Yes, the cars go to tidewrater daily.

Mr. Brazier: I believe the best car ever built, with steel underframe, will not survive the coal business.

Mr. Sillcox: One of the difficulties the committee was confronted with, and one of the matters which made it so confusing for the committee to arrive at a conclusion, was the fact that we labored with the question of depreciation without giving due consideration to the question of rebuilding. You cannot consider one without the other, because one takes in the question of repairs and of maintenance, and I think now that the opportunity has been given to give consideration to the rebuilding feature that the committee can work with a great deal more freedom. The fact remains that there has not been enough experienc had with the steel car to date in order to arrive at definite conclusions. It is a question of type of construction employed, whether of wood or steel, which enters into this question, and we must solve that feature before we can solve the general question.

There are classes of steel cars in service today not as good as wooden cars. There were a lot of general service cars built in 1912 to sell and not to give long service.

Chairman: The first steel cars operated on the Central Railroad of New Jersey were bought in 1901. These cars are still in service, with the original sides, most of them; new bottoms and hoppers in most cases, and they are good for eight or ten years more.

Mr Fuller: I would like to make a motion that the committee's report be received, so far as the 3 per cent. depreciation is concerned, and that the report then be returned to the committee for further consideration.

Prof. W. F. M. Goss: Before the question is put, I would like to say that we all fully understand that the depreciation which is discussed by the committee is really a depreciation of investment, not of a car, and I make that distinction because there are other uses of depreciation which we sometimes wish to employ, which would lead us to a different result from that which is reached by the committee. You are trying to determine the diminished value of your investment, of your car, and hence you credit your scrap values, but suppose I wish to determine the rate at which new cars are to be built, because of the losses through depreciation, then there is no scrap value that I can take into account, and I must work upon the basis of cars put out of service from depreciation, that is, through the using up of their life tenure.

The point I wish to make is, that in fixing the value for depreciation, as the committee has recommended, and as is contemplated by this motion, we are depreciating investment, and not cars.

The motion, that the committee's report be received so far as the 3 per cent depreciation is concerned, and that the report be returned to the committee for further consideration, was put to vote and unanimously carried.

Revision of Passenger Car Rules of Interchange



H. H. Harvey
Chairman

THE COMMITTEE on the Revision of Passenger Car Rules submits the following changes for consideration:

Sections A, B and C should be changed to conform with whatever changes the Arbitration Committee makes in Article 11 of the freight car rules.

Add a Section "D" to read as follows: "It will no longer be necessary to apportion among interested carriers the expense of heating, lighting, cleaning, etc., of passenger train equipment employed in through service over railroads under Federal control. A fair proportion of the expense should be charged against any non-Federal road which participates in the through service."

"NOTE.—Under Section 'D,' items per Rules 6 'C' and 'D,' 9 and 10, also other expenses chargeable to I. C. C. Account 402—Train Supplies and Expenses, shall not be billed for as between roads under Federal control, nor shall owners be billed for items mentioned in Rule 7 'C' when such items are chargeable to Account 402.

"Any Federal controlled road incurring any expense as above in connection with through service in which a non-Federal controlled road participates will bill direct against the latter for its fair proportion of expense. Any non-Federal controlled road incurring expense in connection with items mentioned in Rule 7 'C' will bill direct against car owner."

RULE 7. If the Wheel Committee makes provision for a change in Item 4, paragraph F (tread worn hollow), this rule should be changed to comply with their report.

RULE 8. If Freight Car Rule 32 is changed by the Arbitration Committee, paragraph "A" should be changed to correspond.

Add a paragraph at the end of Section "F" to read as follows: "The above provisions shall govern any loss or increase of service metal on account of the mate wheel, even if same is not defective, if both wheels are turned off to correspond."

RULE 9. Make the third line of paragraph "C" read "Mantles, tips, burners, domes, globes." Add a paragraph "E" to read as follows: "Illuminating oils, water and ice are not a line expense. Coal, wood and charcoal are not a line expense unless used as specified in paragraph 'B' for cars in line service. (See note below.)" Make paragraph (4) read as follows: "Coal, wood, charcoal, water and ice. (Such items furnished private or business cars shall be charged against the car owner.)"

RULE 13. The labor rate referred to in answer to the question in the interpretation should be changed to 68 cents, instead of 58 cents.

RULE 17. Omit the words "Not in line service" in the first line.

RULE 19. Add a sentence immediately after the third line to read as follows: "Original record of repairs and billing information shall be prepared as required in the freight car rules."

RULE 20. If the percentages in the freight car rules are changed, those mentioned in this rule should be changed to correspond.

RULE 21. Labor on repairs (Item 20) should be changed from 58 cents to 68 cents per hour.

RULE 22. Make a third note on page 204 to read as follows: "Material not listed above, but listed in Rule 101 of the freight car rules (if same as that used on freight cars), shall be charged at prices shown in Rule 101. All other material to be charged at net store department cost, except material ordered from car owner, which shall be handled in accordance with Rule 122 of the freight car rules."

The report is signed by H. H. Harvey (Chairman), Chicago, Burlington & Quincy; C. J. Nelson, Chicago & Northwestern; W. R. McMunn, New York Central; J. E. Mehan, Chicago, Milwaukee & St. Paul; T. J. Boring, Pennsylvania, and C. J. Forrester, Grand Trunk.

Discussion

A motion that the report be adopted was carried. The meeting then adjourned to 9.30 o'clock Thursday morning.

The Thursday Morning Session

The Thursday morning session was called to order at 9.40 by Chairman Chambers. It immediately proceeded to a consideration of committee reports.

Report of Committee on Car Wheels



W. C. A. Henry
Chairman

CERTAIN RECOMMENDATIONS have been made by manufacturers of wrought-steel wheels and referred to this committee. Among them is one, that the 38-in. diameter wrought-steel wheel be eliminated from our standards, it being stated that the number of wheels of this diameter manufactured is small and that in many cases the 36-in. wheel could be used. The committee does not have sufficient information to justify making definite recommendations at this time, but arrangements will be made to obtain this information, meanwhile the use of the 38-in. wheel should be discouraged.

It has been recommended that the limit of wear groove for wrought-steel wheels be located ½ in. from the inside of the rim of the wheel instead of ¾ in. as at present, it being that the thickness of metal would be sufficient to afford the necessary strength. Other questions than the strength of the wheel are involved, namely, maintenance of draw bar height, truck clearance, and effectiveness of brakes with increased range in diameter of wheels. The committee, therefore, requests that the members give this subject consideration in order to reply to a circular of inquiry that will be sent out.

The question has been raised as to whether the standard wheel circumference measure, sheet M. C. B.-16B, should have the points indicating the normal circumference of the 33-in. and 36-in. wheels located on the tape when laid out flat, or whether a correction should be made for the tape thickness; there being a difference of 2/10 in., or more than one tape size, depending upon which way the tape is laid off. In playing out the wheel circumference measure, due correction should be made for the tape thickness and in order that absolute uniformity may be obtained the Executive Committee has decided that the association obtain standard rings of 33-in. and 36-in. diameter; these rings to be certified by the Bureau of Standards and used in cases of dispute to check wheel tapes. The committee was instructed to prepare a design and mounting for these rings and they are submitted herewith (exhibit *A*).

The specifications for wrought-steel wheels permit a variation of five tape sizes under and nine tape sizes over the size called for. It is felt desirable to provide for these additional tape

sizes for 33-in., 36-in. and 38-in. wheels by adding to the spaces now provided for taping cast-iron wheels. The continuous markings on the upper side of the tape would then be used for mating worn wheels. Exhibit *B* shows the recommendations of the committee as to how this could be carried out.

The following note should be inserted on sheet M. C. B.-16B: The linear dimensions shown represent measurements of the actual circumference of the wheel and not the straight length of the tape. Graduations are to be spaced 1/8 in. apart with the tape laid flat, and the space between lines 157 and 158 on the upper side of the tape is to coincide with the space representing tape size No. 3 for the 33-in. diameter cast-iron wheels.

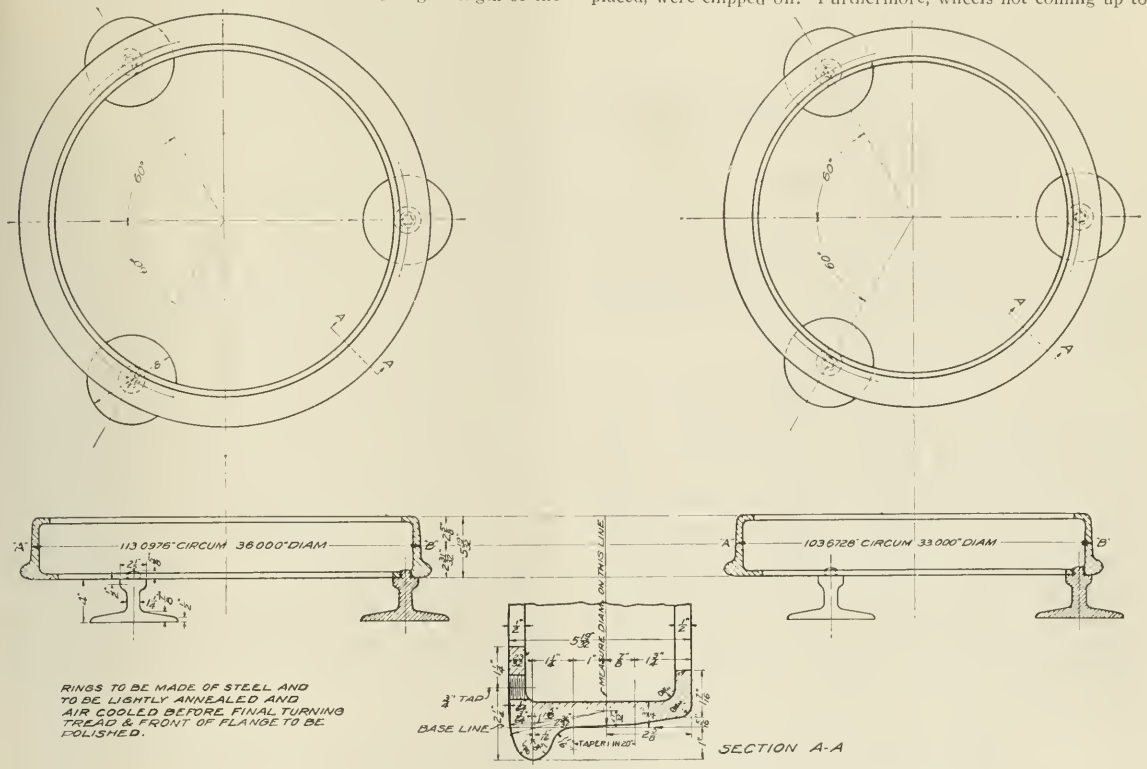


Exhibit A.—Wheel Circumference Measure Test Rings for 33-in. and 36-in. Wheels

Rule 76 of the Rules of Interchange reads as follows: "Tread worn hollow; if the tread is worn sufficiently hollow to render the flange or rim liable to breakage." It is the opinion of the committee that the meaning of this rule is not clear and subject to wide variation in actual application; it having been found that many wheels are being withdrawn on account of tread wear without the wear being sufficient to injure the wheel. The committee recommends that a gage, as shown in exhibit *C*, be used in determining whether or not a wheel should be condemned on account of tread worn hollow; a wheel not to be condemned on this account unless the projection on the underside of the gage does not come in contact with the tread of the wheel.

It has been recommended that a clause be inserted in our specifications, requiring that in case of cast-iron wheels failing to pass the M. C. B. test the first letter of the initials of the purchasing road be chipped off with the idea of stopping the practice claimed to exist to a certain extent of roads purchasing rejected wheels. It is felt that action of this sort is desirable, but that the letter *C* in the legend *M. C. B.* be chipped off for the reason that, being located on the outside of the wheel it can be more readily seen than if a letter on the inside, where the purchaser's name is placed, were chipped off. Furthermore, wheels not coming up to M. C. B. requirements cannot be considered M. C. B. wheels. The committee, therefore, recommends that the following clause be added to the specifications for cast-iron wheels under the heading "Rejection," paragraph 16: (d) In all cases where wheels are rejected the letter *C* must be chipped out of the legend *M. C. B.* on the outside face of each wheel. It is further recommended by the committee that a rule be inserted in the Rules of Interchange prohibiting acceptance, in interchange of a car, any of the wheels of which have the letter *C* chipped out of the legend *M. C. B.*

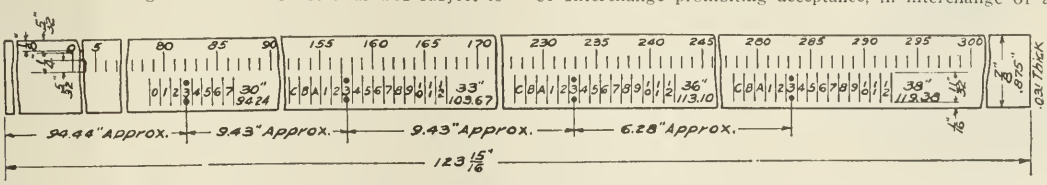


Exhibit B.—Additional Spaces to be Added to Standard Wheel Circumference Measure Tape for Taping Wrought Steel Wheels

The Association of Manufacturers of Chilled Car Wheels advises that all information thus far available indicates the superiority of the arch design of plate adopted in 1917, for the 700 and 850 lb. wheels over what has been considered our standard design of plate. It is our feeling, however, that another year should be allowed to elapse in order to accumulate more information before considering the re-design of the 625 and 725 lb. wheels.

The report is signed by W. C. A. Henry (Chairman), Pennsylvania Lines; E. J. Brennan, Chicago, Milwaukee & St. Paul; W. H. Winterrowd, Canadian Pacific; J. A. Pilcher, Norfolk

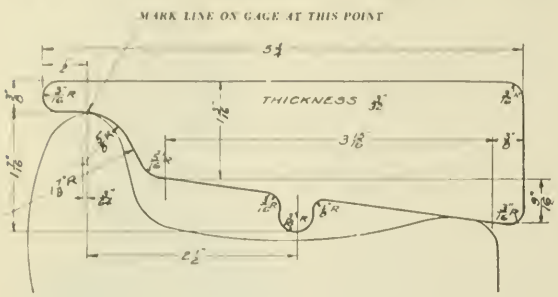


Exhibit C.—Wheel Tread Worn Hollow Gage

& Western; O. C. Cromwell, Baltimore & Ohio; J. M. Shackford, Delaware, Lackawanna & Western; H. E. Smith, United States Railroad Administration; C. T. Ripley, Atchison, Topeka & Santa Fe, and R. E. Jackson, Virginian.

Discussion

At the conclusion of the report, Mr. Henry said: The committee would like to supplement its report by recommending that we submit to letter ballot the following items:

1. The standard rings referred to in our report as exhibit A; 2, the modified wheel circumference measure referred to in our report as exhibit B; 3, the gage for determining tread wear referred to in our report as exhibit C; 4, the modification of the wheel specifications to require the letter *C* to be chipped from condemned wheels; 5, provide in the Rules of Interchange to prohibit accepting cars, any wheel of which has had the letter *C* chipped off.

A motion that the report be accepted and opened for discussion, and the questions suggested submitted to letter ballot was carried.

Mr. Gaines: Referring to the recommendation of the committee, relative to chipping off the letter "C." While I believe that is a good thing to do, I wonder if you won't throw a lot of work on our interchange inspectors to examine every wheel and see whether they have the "C" on them or not. I would like to hear from the committee whether they think they can carry that out or not. The principle is good.

Mr. Henry: It was not thought that that will place very much of a burden on the inspector. The wheels are supposed to be carefully looked after in interchange, and the fact that these letters are large and on the outside plate, should not place any appreciable amount of work on the inspectors.

Mr. Brazier: The idea is all right, but I would like to know how the inspector, with four or five inches of snow or ice on the wheels, will be able to see it. The inspector condemning the wheels having the "C" cut out is all right, but there may be some unprincipled people that will buy them and use them over again, and the idea of the committee is to overcome this by having the inspectors reject them. I can see how that would work in the summer, but it will be rather difficult in the winter, with snow and ice on the wheels.

Mr. Tollerton: I would like to ask the chairman of the committee, if he has any guarantee that the inspector will chip the "C" off the wheel. I think they will have car repairers do it, so that might involve the question of expense.

Mr. Henry: It was the idea that the letter "C" would be chipped from the wheels at the place of manufacture. Some roads now require one of the initials of their legend to be chipped off wheels which are manufactured for them, and which fail to pass the test. The removal of that letter should be done at the point of manufacture of the wheel and nowhere else.

Mr. Goodnow: I have just one question about the two items that go to letter ballot. Will that not be too late to get in the Rules of Interchange? The results of letter ballots are not generally known at the time the rules are printed in interchange. The items that go in the rules are usually passed by the vote of the floor here, rather than by letter ballot, so as to get them in in time.

Chairman: The Secretary informs me that they will be in all right, that our letter ballot goes out earlier than formerly. It will be included. If there are no other questions, we will declare the subject closed.

Standard Blocking for Cradles of Car Dumping Machines



J. McMullen
Chairman

The committee appointed to make recommendations covering standard blocking for cradles of car dumping machines has found by observation of the operation of the machines equipped with the present M. C. B. blocking that cars receive more or less damage while passing through the machines. The railroad mechanical department, with the co-operation of the heads of various industries in the coal and ore district, after experimenting with several types of blocking, developed what we consider the most suitable blocking for protecting the various types of cars now being handled on the car dumper.

This blocking consists of vertical posts covered with horizontal planking. This arrangement furnishes the greatest possible bearing surface for the side of the car, which is one of the most important requirements. The proposed blocking can be renewed at less expense than the old style, as it is only necessary to renew the planking at the places where it wears out, while with the present M. C. B. blocking it is necessary, in some cases, to renew the heavy vertical posts when they become worn.

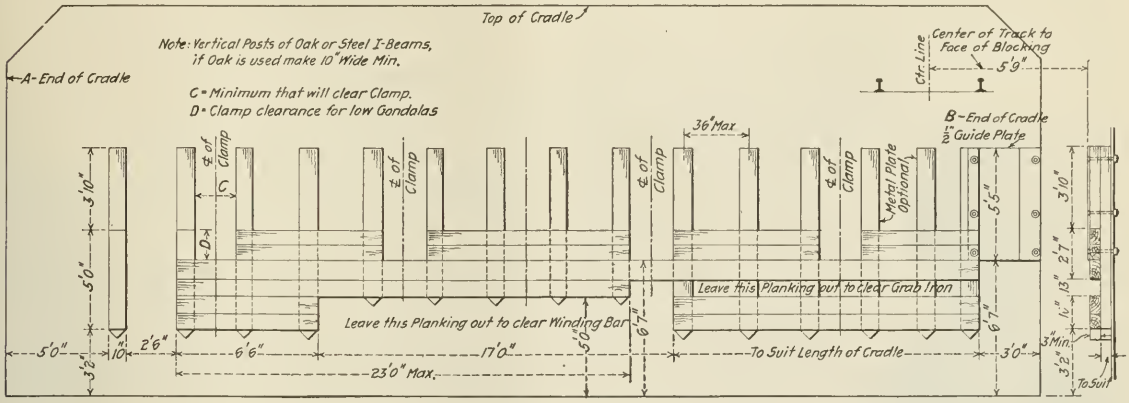
Provision is made to take care of projecting grabirons, ladders and the ends of winding bars by omitting a part of the 3-in. planking at the *B* end and near the center of the cradle wall. The planking is also omitted between the first and second posts at the *A* end of the machine so that short cars may be handled nearer the center of the cradle, this to be accomplished by spotting the car with the side ladder between the two posts. The long cars are to be spotted with the ladder outside of the end post. This post is to be faced with 3-in. timber to make the face flush with the planking. Railroads operating cars having the top side angle projecting beyond the face of the car side may cut a horizontal recess 6 in. wide and 3 in. deep in the face of the blocking at the point of contact with the angle.

The matter of applying a metal plate to the face of the posts above the planking to prevent wear of the facing on the posts is left optional with the company operating the machine. All fastenings, such as bolts, lags, spikes, etc., shall have heads flush or below the face of the blocking. The distance from the center of the track to the face of the planking should be made 5 ft. 9 in. (where possible) when the cradle is in the normal position. A guide plate should be located as shown on the drawing at the *B* end of the cradle to prevent damage to the blocking by cars having sides bulged too wide to clear.

The planking directly under the clamps should not extend more than 6 ft. 7 in. above the top of the rail in order that the clamp may drop low enough to engage the top of low side cars. The spacing of the vertical posts will have to be governed to some extent by the construction of the cradle, but they should not be spaced further apart than 3 ft. centers where possible, with the exception of the first two at the *A* end, which should be spaced not less than 2 ft. 6 in. between the posts, as shown on the drawing. The bottom ends of the posts should be tapered

to prevent material falling onto the cradle from lodging against them when the cradle is overturned. Oak lumber is recommended for the planking on the face of the posts.

The report is signed by Jas. McMullen (Chairman), Erie; J. W. Senger, New York Central; J. J. Tatum, United States Railroad Administration; George Durham, Wheeling & Lake Erie; T. W. Demarest, Pennsylvania Lines; J. E. Davis, Hocking Valley; G. M. Gray, Bessemer & Lake Erie, and J. A. Pilcher, Norfolk & Western.



Blocking Suggested for Protecting Cars on Car Dumping Machines

Discussion

F. W. Brazier: This committee has gone to a great deal of trouble in compiling this report, and it seems that some of the men who handle the machines ought to make some statement concerning them. Our road does not handle them, but I think when a committee has worked as hard as this committee, and has presented such a report, that some one should say whether the report is right or wrong, and in that way encourage the committee.

George W. Rink (C. R. of N. J.): I would like to have an interpretation of what is meant by the "A" end of the cradle and the "B" end of the cradle; does "A" end signify the approaching end, that is, the end in which the car is delivered, because the lay-out of the blocking has a bearing on which end you are going to work from?

James McMullen: The "B" end of the cradle is the approaching end. In the case of the "A" end of the cradle, you will note the first post is five feet from the end of the cradle. This is so arranged in order to clear the ladder from the end of the coupler to the inside of the ladder, and for that purpose we leave that five feet, and consider that will take care of long cars.

Many of the people operating these machines do not like to have all of the cars dumped, long and short cars, at one end of the machine, they said they wanted to get the short cars nearer to the center, and therefore we leave a space of 2 ft. 6 in. between the first and second posts, so that the short cars could be located nearer the center, and allow the ladder to drop into this recess between the first and second posts.

F. F. Gaines (U. S. R. A.): Is it the intention of the committee that the report shall be submitted as recommended practice, or shall be adopted as a standard? I think we should have a definite recommendation from the committee as to what is to be done with the report.

James McMullen: We have submitted this report in the form of a statement of general information on the subject, and placed it before the association. The report may be adopted as recommended practice, and tried out for a while, although the methods which are described in the paper have been in service for some time in the Youngstown district.

Mr. Tatum: I would suggest that this report be made recommended practice, because there is constant changing in the design of equipment in the way of capacity. In the Pennsylvania cars which are on exhibition here there is some difference in the lay-out, and it may be necessary to make other changes. If the report is approved and adopted as recommended practice it would be better than to adopt it as a standard.

T. W. Demarest (Pennsylvania Lines): The question of proper blocking on coal-dumping machines is a more serious and important proposition than you may realize. The railroads operating along the lakes and throughout the steel territories come in contact with coal and ore-dumping machines. Cars are run on the cradle, the cradle is lifted and clamps thrown over the cars, and the cars turned upside down. In the operation of dumping the car lies on its side, and unless the side of the car is properly supported at the time it is being dumped there is a great deal of damage done to it. That includes not only the side of the equipment, but perhaps safety appliances and other attachments on the sides of the car.

Some four or five years ago the Erie, the Baltimore & Ohio, and the Pennsylvania tried to get together with a view of having the dumping machines at the mills and the docks blocked in a standard manner. The blocking used on machines was all different, and the result was that while one machine was properly blocked, others were so blocked that cars were being badly damaged.

The basis for the recommendations made by this committee is the blocking which was worked out experimentally and has been in service on some of the machines for over three years. This method has been so arranged as to avoid, as far as possible, damaging the car, and in severe cases it will almost straighten up the side of the car.

The association ought to receive this report, and the matter should be submitted to letter ballot with a view to adopting it as recommended practice. It is a very important item.

Samuel Lynn (P. & L. E.): I concur in what Mr. Demarest said. For several years we have had more or less trouble in the Pittsburgh district, on account of the dumping machines. The committee has worked up a very good report and a method to protect our cars when they are going over the machines.

J. J. Ewing (C. & O.): I would like to ask an explanation of this guide plate. I don't quite understand the construction of it.

Mr. McMullen: The guide plate is to be applied at the "B" end of the machine, bevelled off to guide wide cars into the machine, so that they won't damage the end of the planking when entering. Perhaps it would have been well if we had shown a detailed sketch of this guide plate. However, we can arrange to have that shown so that it will appear in the proceedings.

Mr. Rink: We happen to be unfortunate, I presume, in just getting two McMyler machines in operation, to find that the blocking does not check with this proposition. They have installed a square section of blocking, and I am wondering whether it could be changed to this type without any great expense, if we should find that the square type arrangement will not prove satisfactory.

Mr. McMullen: I believe it can be changed to come pretty

close to this layout. It will wear out in a short time, so that you will have to renew it anyhow.

Mr. Rink: The present installation is a large square block, setting lengthwise, with a heavy angle iron frame, and we would have to make some changes to the frame before we could apply two thicknesses of material.

Mr. McMullen: I think that perhaps your blocking is heavy enough there, so that you could reduce the posts sufficiently to compensate for the horizontal planking that would be applied on the face of the posts.

A motion that the report be submitted to letter ballot for recommended practice was carried.

Specifications and Tests for Materials (M. C. B.)



F. M. Waring
Chairman

THE COMMITTEE SUBMITS its report covering the subjects which were reviewed during the past year and recommends that changes be made in the several specifications, as shown under the respective exhibits. All references to page numbers relate to the 1918 Proceedings.

Exhibit A

1. The following revision to supercede the present Specifications for Galvanized Sheets for Passenger and Freight Equipment Cars, page 1042, as Standard.

Specifications for Galvanized Sheets for Passenger and Freight Equipment Cars.

(Standard)

1. **Scope.**—These specifications cover galvanized steel and iron sheets for use on passenger and freight equipment cars.

I. MANUFACTURE.

2. **Process.**—(a) The sheet material may be either open-hearth mild steel, or puddled iron made wholly from pig iron.

(b) All sheets shall be thoroughly cleaned and then galvanized with a coating of not less than 1.5 oz. of zinc per square foot.

II. PHYSICAL PROPERTIES AND TESTS.

3. **Bend Tests.**—(a) A test specimen shall stand bending double on itself around a mandrel, the diameter of which is equal to twice the thickness of the specimen, and straighten, without cracking or flaking of the coating on either side of the specimen.

(b) A test specimen shall bend twice in the same direction, first around a mandrel the diameter of which is equal to fifteen times the thickness of the specimen, and straighten, and then bend flat on itself and straighten, without cracking of the base material.

(c) Sheets of Gage No. 26 and less in thickness shall double-lock seam without cracking of the sheet or coating.

4. **Test Specimens.**—Specimens eight inches in length by two inches in width shall be cut from the center of a sheet selected at random from each lot of 1,000 sheets or fraction thereof, for test purposes.

III. PERMISSIBLE VARIATIONS IN WEIGHT.

5. **Permissible Variations.**—The weight of the finished sheets shall not vary more than 2½ per cent either way from that shown in Table 1.

TABLE 1.
WEIGHT OF GALVANIZED SHEETS.

United States Standard Gage Number.	Weight Per Square Foot, Oz.
16	42.5
17	38.5
18	34.5
19	30.5
20	26.5
21	24.5
22	22.5
23	20.5
24	18.5
25	16.5
26	14.5
27	13.5
28	12.5
29	11.5
30	10.5

IV. WORKMANSHIP AND FINISH.

6. **Workmanship.**—The sheets shall conform to the gage and size ordered.

7. **Finish.**—The finished sheets shall be properly galvanized, be free from blackened and acid spots and surface defects.

V. MARKING.

8. **Marking.**—The finished sheets shall, when ready for shipment, be properly marked with the name or brand of the manufacturer and a lot number for identification.

VI. INSPECTION AND REJECTION.

9. **Inspection.**—(Same as paragraph 7 of 1918 specifications.)

10. **Rejection.**—(a) Sheets represented by samples which fail to conform to the requirements of these specifications will be rejected.

(b) Sheets which, subsequent to tests and inspection at the mills or elsewhere and their acceptance, show black spots, inferior galvanizing, improper trimming or other defects will be rejected and shall be replaced by the manufacturer.

11. **Rehearing.**—Samples tested in accordance with Section 9 (b), which represent rejected material, shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with results of tests, the manufacturer may make claim for a rehearing within that time.

Exhibit B.

2. The following revision to supersede the present Specifications for Miscellaneous Steel Castings for Passenger and Freight Equipment Cars (Recommended Practice), Specifications for Cast-Steel Truck Sides (Recommended Practice) and Specifications for Cast-Steel Bolsters (Recommended Practice), pages 1029, 499 and 502, respectively.

Specifications for Annealed Carbon Steel Castings for Passenger and Freight Equipment Cars.

(Recommended Practice)

1. **Scope.**—These specifications cover all steel castings for passenger and freight equipment cars, including couplers, truck bolsters, truck side frames, yokes and miscellaneous castings.

I. MANUFACTURE.

2. **Process.**—The steel may be made by the open-hearth, crucible or electric process.

3. **Heat Treatment.**—Castings shall be allowed to become cold They shall then be uniformly reheated to the proper temperature to refine the grain and allowed to cool uniformly and slowly. If, in the opinion of the purchaser or his representative, a casting is not properly annealed, he may at his option require the casting to be re-annealed.

II. CHEMICAL PROPERTIES AND TESTS.

4. **Chemical Composition.**—The steel shall conform to the following requirements as to chemical composition:

Carbon	0.20–0.37 per cent.
Manganese	not over 0.75 per cent.
Phosphorus	not over 0.05 per cent.
Sulphur	not over 0.05 per cent.

5. **Ladle Analyses.**—An analysis of each melt of steel shall be made by the manufacturer to deter mine the percentage of carbon, manganese, phosphorus and sulphur. This analysis shall be made from drillings taken at least ¼ in. beneath the surface of a test ingot obtained during the pouring of the melt. The chemical composition thus determined shall be reported to the purchaser or his representative, and shall conform to the requirements specified in Section 4.

6. **Check Analyses.**—A check analysis may be made by the purchaser from the broken tension test specimen or from a

finished casting representing each melt. The chemical composition thus determined shall conform to the requirements specified in Section 4. Drillings for analysis shall be taken not less than ¼ in. beneath the surface of the casting.

III. Physical Properties and Tests.

7. **Tension Tests.**—(a) The steel shall conform to the following minimum requirements as to tensile properties:

Tensile strength, lb. per sq. in.	65,000
Elastic limit, lb. per sq. in.	0.4 Tensile Strength
Yield point, lb. per sq. in.	0.45 Tensile Strength
Elongation in 2 in., per cent.	1,600,000 / Tensile Strength
Reduction of area, per cent.	Not under 22 per cent.

(b) Either the elastic limit or the yield point, but not both, shall be determined. The elastic limit shall be determined by an extensometer and the yield point by the drop of the beam of the testing machine.

(c) The yield point, or the elastic limit, shall be determined at a cross-head speed not to exceed ⅛ in. per minute, and tensile strength at a speed not exceeding 1½ in. per minute.

8. **Alternative Tests to Destruction.**—In the case of orders including only castings not exceedings 150 lb. in weight, a test to destruction on one casting for each 100 castings or smaller lot may be substituted for the tension tests. This test shall show the material to be ductile, free from injurious defects, and suitable for the purpose intended.

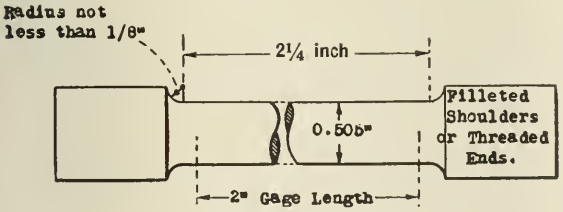


Fig. 1.—Exhibit B, Paragraph 8

9. **Test Specimens.**—(a) Tension test specimens shall conform to the dimensions shown in Fig 1. The ends shall be not less than ⅞ in. in diameter and of a length and form to fit the holders of the test machine in such a manner that the load will be axial.

(b) An adequate number of test coupons shall be cast with and attached to castings, weighing over 150 lb., from each melt when presented for inspection. If the design of the casting is such that the test coupons cannot be attached, the test bars shall be cast in runners outside of the casting, but attached to it to represent each melt. The location of the test coupons or bars, as well as the method of casting such coupons or bars, shall be subject to mutual agreement by the inspector and manufacturer. In the case of any orders for castings weighing under 150 lb., the physical properties as required in Section 7 may be determined from an extra or spare test bar cast with and attached to some other casting from the same melt.

(c) When sufficient coupons have not been cast, a test specimen may be cut from a finished casting at a location mutually agreed upon by the inspector and manufacturer.

10. **Annealing Lugs.**—For the purpose of determining the quality of annealing, at least two and not more than four annealing lugs shall be cast on all castings 150 lb. and over, and on such castings less than 150 lb. as required by the purchaser. The location of the annealing lugs shall be agreed on by the inspector and the manufacturer. The standard annealing lug shall be 1 in. in height and 1 in. in width by ⅝ in. in thickness where it joins the casting. The inspector may remove one-half and the manufacturer one-half of the number of annealing lugs.

11. **Grouping Melts.**—(a) After 15 consecutive melts, which may contain any or all classes of castings covered by these specifications on one or more orders, have been tested and accepted, the manufacturer may group the succeeding melts in lots of five melts each, but each lot not to exceed 40 tons; the entire group to be accepted if the test specimen selected from the lot fulfills the chemical and physical requirements herein specified. If this test fails, a rehearing will be granted on the melt that the failed bar represents, and the other four melts of the group shall be tested individually.

(b) In case of small orders for bolsters, truck sides, draft arms, yokes or castings weighing over 150 lb., where the size of order and the available pattern and foundry equipment are such that not more than five castings can be cast in any one melt, the physical properties as required in Section 7 may be determined from an extra or spare test coupon cast with and attached to some other casting from the same melt.

(c) If there is a period of more than six months between shipments of the class of castings covered by these specifications, then each melt shall be tested individually until 15 consecutive melts have been accepted, after which the melts may again be grouped as in paragraph (a).

(d) If one or more melts are rejected each succeeding melt shall be tested individually until 15 consecutive melts have been accepted, after which melts may again be grouped as in paragraph (a).

12. **Number of Tests.**—(a) One tension test shall be made from each melt, except as provided in Section 11 (a).

(b) If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

(c) If the percentage of elongation of any tension test specimen is less than that specified in Section 7 (a) and any part of the fracture is more than ¾ in. from the center of the gage length, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

IV. Permissible Variations.

13. **Dimensions.**—The dimensions shall conform to the permissible variations shown on the drawings.

14. **Weight.**—The normal weight of the castings of any one design shall be determined from the actual weight of at least 50 castings weighed at one time. The weight of individual castings shall not vary more than 5 per cent over or 3 per cent under the normal average weight so obtained. The gross weight of the entire order of castings to be not more than 2½ per cent over the normal average weight multiplied by the number of castings in the order. The gross weight as specified herein shall apply only on large orders of castings from machine patterns.

V. Workmanship and Finish.

15. **Workmanship.**—All castings shall substantially conform to the size and shape shown on standard drawings, and shall be made in a workmanlike manner.

16. **Patterns.**—When patterns are furnished by the purchaser, the manufacturer shall make sure that the allowance for shrinkage in these patterns agrees with his own practice, and castings shall be rejected which do not conform closely to dimensions on prints, or if distorted by improperly matched flasks, undue rapping or any other defect caused by molding. Special attention should be given to properly rounding all fillets and corners shown on drawings. Where surfaces are to be machined, the castings shall have the proper allowance for finish. Under no circumstances shall manufacturer change purchaser's patterns, without written permission from the purchaser.

17. **Finish.**—(a) The castings shall be free from all injurious defects. Castings shall not be painted before inspection. Castings rusted to any extent, or covered with any material to hide defects, shall be rejected.

(b) Any casting found with blow holes, cracks, low spots or thin sections filled with cement or like material will be rejected and shall not be further considered. Welding will not be permitted unless authorized by the inspector and then only when the defects are cleaned to solid metal and only at locations where the defects will not in any way be detrimental to the strength of the casting.

VI. Marking.

18. **Marking.**—The manufacturer's name or identification mark and the specified pattern number shall be cast on all castings. In addition, the month and year when made shall be cast on all bolsters, truck sides and similar castings. The location and size of numbers shall be agreed upon by the manufacturer and the inspector. In accordance with the standard practice of the individual foundry, to identify individual castings, a serial number may be cast or the melt number may

be stamped on bolsters, truck sides and similar castings as agreed upon by the manufacturer and the inspector.

VII. Inspection and Rejection.

19. **Inspection.**—The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of castings ordered. The manufacturer shall afford the inspector, free of cost, all reasonable facilities to satisfy him that the castings are being furnished in accordance with these specifications. All tests (except check analyses) and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified.

20. **Rejection.**—(a) Unless otherwise specified, any rejection based on tests made in accordance with Section 6 shall be reported within five working days from the receipt of samples.

(b) Castings which show injurious defects subsequent to their acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

21. **Rehearing.**—Samples tested in accordance with Section 6, which represent rejected castings, shall be preserved for two weeks from the date of test report. In case of dissatisfaction with the results of the tests, the manufacturer may make claim for a rehearing within that time.

Exhibit C.

3. The following revision to supersede the present Specifications for Rivet Steel and Rivets for Passenger and Freight Equipment Cars (Standard), page 1038:

Specifications for Rivet Steel and Rivets for Passenger and Freight Equipment Cars.

(Standard.)

1. **Scope.**—These specifications cover steel bars for the manufacture of rivets and finished steel rivets for passenger and freight equipment cars.

I. Manufacture.

2. **Process.**—The steel sall be made by the open-hearth process.

II. Chemical Properties and Tests.

3. **Chemical Composition.**—The steel shall conform to the following requirements as to cheimcal composition:

Carbon	perceneage optional.
Manganese	percentage optional.
Phosphorus	not over 0.04 per cent.
Sulphur	not over 0.05 per cent.

4. **Ladle Analyses.**—An analysis of each melt of steel shall be made by the manufacturer to determine the percentages of carbon, manganese, phosphorus and sulphur. This analysis shall be made from a test ingot taken during the pouring of the melt. The chemical composition thus determined shall be reported to the purchaser or his representative, and shall conform to the requirements specified in Section 3.

5. **Check Analyses.**—An analysis may be made by the purchaser from finished bars or rivets representing each melt. The chemical composition thus determined shall conform to the requirements specified in Section 3.

III. Physical Properties and Tests.

A.—Requirements for Bars.

6. **Tension Tests.**—The bars shall conform to the following requirements as to tensile properties:

Tensile strength, lb. per sq. in.	45,000—60,000
Elongation in 8 in., min. per cent.	1,500,000
	Tensile Strength
	but need not exceed 30 per cent.

7. **Bend Tests.**—The test specimen shall bend cold through 180 degrees flat on itself without cracking on the outside of the bent portion.

B.—Requirements for Rivets.

8. **Bend Tests.**—The rivet shank shall bend cold through 180 degrees flat on itself, as shown in Fig. 1, without cracking on the outside of the bent portion.

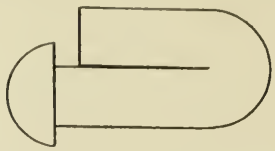


Fig. 1.—Rivet Shank Bent Cold

9. **Flattening Tests.**—Rivet heads shall be flattened sideways, when cold, to a thickness of one-third, and when at a driving heat to a thickness of one-fourth the original diameter of the shank without splitting.

10. **Test Specimens.**—(a) Bars.—Tension and bent test specimens shall be of the full section of bars as rolled.

(b) **Rivets.**—Bend and flattening test specimens shall be of the full section of rivets as manufactured.

((c) When accurate account of the material has been kept and the melts can be identified, only one set of specimens for each diameter in each melt shall be taken from either the bars or the finished rivets.

11. **Number of Tests.**—(a) Bars.—One tension and one bend test shall be made from each lot of 200 bars, or from each diameter in any one melt, each of which shall conform to the requirements specified.

(b) **Rivets.**—One bend and one flattening test shall be made from each lot of 100 kegs of each diameter or from each diameter in any one melt, each of which shall conform to the requirements specified.

(c) If any test specimen from the bar or rivets originally selected to represent a lot of bars or rivets contain surface defects not visible before testing, but visible after testing, or if a tension test specimen breaks outside the middle third of the gage length, one retest shall be allowed.

IV. Permissible Variations in Gage.

12. **Permissible Variations.**—The bars shall conform to the M. C. B. standard limit gages.

13. **Dimensions of Rivet Heads.**—(Same as paragraph 19 of 1918 specifications.

V. Workmanship and Finish.

14. **Workmanship.**—The finished base shall be circular within 0.01 in., and the rivets shall be concentric, true to form and shall be made in a workmanlike manner.

15. **Finish.**—The finished bars and rivets shall be free from injurious defects and shall have a workmanlike finish.

VI. Marking.

16. **Marking.**—(a) Bars.—Rivet bars shall, when ready for shipment, be properly separated and marked with the name or brand of the manufacturer and the melt or lot number for identification.

(b) Rivets.—Kegs of finished rivets shall, when ready for shipment, be properly marked with the name or brand of the manufacturer, diameter of rivets and the melt or lot number for identification.

(c) Samples.—The melt or lot number shall be legibly stamped on each test specimen representing a lot of bars. Samples representing a lot of rivets shall be marked in a manner that will not impair their value for test purposes.

VII. Inspection and Rejection.

17. **Inspection.**—The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the bars or rivets ordered. The manufacturer shall afford the inspector, free of cost, all reasonable facilities to satisfy him that the bars or rivets are being furnished in accordance with these specifications. All tests (except check analyses) and inspection shall be made at the place of manufacture prior to shipment, unless otherwise

specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

18. **Rejection.**—(a) Unless otherwise specified, any rejection based on tests made in accordance with Section 5 shall be reported within five working days from the receipt of samples.

(b) Bars or rivets which show injurious defects subsequent to their acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

19. **Rehearing.**—Samples tested in accordance with Section 5, which represent rejected bars or rivets, shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with the results of the tests, the manufacturer may make claim for a rehearing within that time.

Exhibit D.

4. The following revision to supersede Specifications for Black Paint (Recommended Practice), page 1058:

Specifications for Black Paint.

(Recommended Practice.)

1. **Scope.**—These specifications cover carbon black semi-paste to be used as a protective paint for M. C. B. equipment cars.

I. Chemical Properties and Tests.

2. **Chemical Composition.**—(a) Paste.—The paste shall conform to the following requirements:

Pigment	43 to 47 per cent by weight.
Linseed oil	53 to 57 per cent by weight.

(b) Pigment.—The pigment shall conform to the following requirements:

* Lampblack or carbon black	not less than 30 per cent.
Red lead	not less than 8 per cent.
China clay or other approved inert pigment	not more than 62 per cent.
Oxide of iron, if present	not over 15 per cent., and may be substituted for an equal amount of lampblack.

* The lampblack shall be of a good quality and of such a character as to produce the standard shade. Ground coal, etc., will not be considered.

(The last paragraph under (b) together with paragraph (c) and article 3 to remain the same as in the 1918 specification.)

II. Physical Properties and Tests.

4. **Shade.**—(Same as in 1918 specifications.)

5. **Fineness.**—The pigment shall be ground so fine that it will not show any appreciable settling in the barrel, and, when a sample of the paste is washed on a 350-mesh sieve with a suitable solvent, at least 97 per cent of the pigment shall pass through the sieve. There shall be no visibly coarse particles in the residue on the 350-mesh sieve and shall pass through a 200-mesh sieve.

6. **Sampling.**—A sample of the paste shall be taken at random from any barrel, can or package in each shipment, at destination.

7. **Place of Making Tests.**—The purchaser may make the tests to govern the acceptance or rejection of the material in his own laboratory or elsewhere. Such tests shall be made at the expense of the purchaser.

III. Permissable Variations.

8. **Weight.**—As quotations are made by the pound on the basis of the paint weighing not over 10.5 lb. per gallon, all paint received which weighs more than 10.5 lb. per gallon, but not over 11.5 lb. per gallon, will be accepted at the weight of 10.5 lb. per gallon, the excess weight being at the expense of the manufacturer.

(Sections IV., and V., remain the same as in the 1918 specications.)

Exhibit E.

5. The following revision to supersede Specifications for Malleable Castings for Passenger and Freight Equipment Cars (Recommended Practice), page 1027:

Specifications for Malleable Iron Castings.

(Recommended Practice.)

1. **Scope.**—These specifications cover all malleable iron castings for freight and passenger equipment cars.

I. Manufacture.

2. **Process.**—The castings shall be made by either the air furnace, open-hearth, or electric furnace process.

II. Physical Properties and Tests.

3. **Tension Tests.**—The tension test specimens shall conform to the following minimum requirements as to tensile properties:

Tensile strength, lb. per sq. in.	45,000
Elongation in 2 in., per cent.	7.5

4. **Annealing Tests.**—(a) All castings, if of sufficient size, shall have cast thereon test lugs of a size proportional to the thickness of the casting, but not exceeding ⅝ in. by ¾ in. cross-section. On castings which are 24 in. or over in length, a test lug shall be cast near each end. These test lugs shall be attached to the casting at such a point that they will not interfere with the assembling of the castings, and may be broken off by the inspector.

(b) If the purchaser or his representative so desires, a casting may be tested to destruction. Such a casting shall show good, tough malleable iron.

5. **Test Specimens.**—(a) Tension test specimens shall be of the form and dimensions shown in Fig. 1. Specimens in which the mean diameter at the smallest section is less than $1^{9}/_{32}$ in. will not be accepted for test.

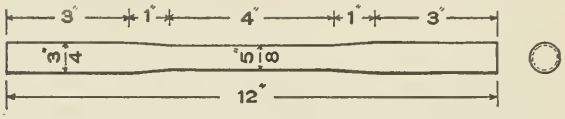


Fig. 1.—Exhibit E, Paragraph 5

(b) A set of three tension test specimens shall be cast from each melt, without chills, using heavy risers of sufficient height to secure sound bars. The specimens shall be suitably marked for identification with the melt. Each set of specimens so cast shall be placed in an oven containing castings to be annealed.

6. **Number of Tests.**—(a) After annealing, three tension test specimens shall be selected by the inspector as representing castings in the oven from which these specimens are taken.

(b) If the first specimen conforms to the specified requirements, or if, in case of failure of the first specimen, the second and third specimens conform to the requirements, the castings in that oven shall be accepted, except that castings will not be accepted if the test lugs show that they have not been properly annealed. If either the second or third specimens fail to conform to the requirements, the entire contents of that oven shall be rejected.

7. **Re-Annealing.**—Any castings that have shown insufficient annealing may be re-annealed, but not more than once. If the remaining test lugs, or castings broken as specimens, show the castings to be thoroughly annealed, they shall be accepted; if not, they shall be finally rejected.

III. Workmanship and Finish.

8. **Workmanship.**—The castings shall conform substantially to the patterns or drawings furnished by the purchaser, and also to gages which may be specified in any individual cases. The castings shall be made in a workmanlike manner. A variation of ⅛ in. per ft. will be permitted.

9. **Finish.**—The castings shall be free from injurious defects.

IV. Marking.

10. **Marking.**—The manufacturer's identification mark and the pattern numbers assigned by the purchaser shall be cast on all castings of sufficient size. Markings shall be applied at such a point that they will not interfere with the service of the castings.

(Section V., remains the same as in the 1918 specifications.)

The report is signed by F. M. Waring (Chairman), Pennsylvania; J. R. Onderdonk, Baltimore & Ohio; J. J. Burch, Norfolk & Western; I. S. Downing, Cleveland, Cincinnati, Chicago & St. Louis; Frank Zeleny, Chicago, Burlington & Quincy; A. H. Fetters, Union Pacific; H. B. MacFarland, Atchison, Topeka & Santa Fe; H. G. Burnham, Northern Pacific; H. E. Smith, United States Railroad Adminstration, and J. C. Ramage, Southern.

Discussion

After presenting the report Mr. Waring said: In addition the committee wishes to offer an amendment to the report,

which is not covered in the printed circular; this amendment to cover a modification of the specifications for steel axles, standard, page 483 of the 1918 Proceedings, Section 7; from the tests omit the letter "a" at the beginning of first paragraph and omit the entire paragraph "B." Paragraph "B" covers the selection of the test sample for chemical analysis and requires that a six-in. piece shall be cut off the axle and the test analysis be taken from this six in. piece. The majority of the purchasers seem to be making their inspection and tests, by drilling directly from the end of the axle, instead of cutting off a six-in. test piece.

The committee felt it would be well to substitute that method of taking the chemical analysis sample. The chemical analysis clause would then read as follows: "An analysis shall be made by the purchaser from one axle representing each melt. The chemical composition thus determined shall conform to the requirements specified in Section 2. The drilling for this analysis shall be taken, with a five-in. drill, from one end of the test axle at any point midway between the center and surface."

A motion to amend the report by including the modification to the Specifications for Steel Axles was carried, and Mr. Waring then read exhibit "B" of the printed report.

Mr. Waring: This recommendation was made as a result of a meeting of the committee held in Chicago in April, at which time it was decided that the advance that had been made in the art of making steel castings was sufficient to justify us in recommending to the association a complete revision of the steel castings specifications, raising the physical properties from a test strength of 60,000 to 65,000 lb. per sq. in., and making a complete revision of the remainder of the specifications to cover certain details of inspections and tests.

Chairman: Mr. Waring, may I ask you if in each instance where you have made these changes that you give for the benefit of the members the reason that brought about the changes.

Mr. Waring: Our specifications for steel castings are rather old, and they are in accordance with what has been used for a great number of years. They do not recognize the fact that a great improvement has been made in the quality of steel castings, and we found that the castings we were actually getting showed physical properties greatly in excess of those required by the specifications. At the same time it was recognized that the grade of steel called for by the specifications might be entirely satisfactory in certain miscellaneous castings, which were not subjected to any great stress, or did not form part of any important structure, but in considering castings, such as truck sides and bolsters, many felt that since the design of these parts were required to stand stresses as high as 12,500 lb. per sq. in., and in some cases greater, that it would be well to provide designs with specifications covering material which would be amply safe for such stresses. I have to make some explanation as I go along, because the committee's action was not unanimous, and we will get down to something a little bit different at the end.

Subsequent to a meeting, at which nine members were present, and all of them voting in favor of the specifications, there was apparently a change of opinion among certain members, thinking that this recommendation for a complete revision of the specifications and increase in physical properties was perhaps a little bit too radical to present to the convention at this time. As a result of conversation among some of the members of the committee, it was suggested that the committee's report on steel castings specifications be offered at this time simply as a part of the report, and not to go to letter ballot. On that proposition the committee was divided, two being opposed, desiring that the specifications should be submitted as they stand, or withdrawn completely, and the remainder of the committee in favor of sending them as information only. I do not have any unanimous recommendation from my committee in regard to the specifications. It seems to me there are two things we can do: one of them taking the majority vote of the committee to present these specifications as information only as part of the report, but not to go to letter ballot for recommended practice; and the other that the specifications be withdrawn and referred back to the committee for further action. I would move that the revised specifications for steel castings, as presented in exhibit B of this report, be included in the report of the committee as information only.

H. G. MacFarland (A. T. & S. F.): I voted against that proposition of having it for information only. I really could not see what is to be gained by the presentation of the specifications after deliberation on the part of the committee for two years for information only. We have prepared a specification that meets very satisfactorily the requirements furnished by the steel companies except for a small percentage of rejections, and we think they will be very satisfactory, showing a tensile strength of 65,000 lb., a reduction of area of 35 per cent and a minimum ductility of 22 per cent. Those most essential requirements can easily be met and will provide a steel exceptionally satisfactory. I would much prefer that this go to letter ballot and be determined by the association, rather than left for information only, or if the association feels that it does not want a letter ballot, return it to the committee until we have a unanimous opinion. We did have a unanimous opinion at one time and I do not see any good reason why we should not continue with the same unanimity that we had expressed at one meeting.

Mr. Gaines: I would like to ask the chairman of the committee, what is the attitude of the steel makers themselves in regard to the question.

Mr. Waring: We have heard from six steel makers, and from the chairman of the sub-committee representing them, and they have stated to us that they would agree to the tensile strength of 65,000 lb. per sq. in. as the least limit of tensile strength, but they felt that the ductility requirements as expressed in these specifications, were very difficult for them to meet; they thought they were too high and that it would result in the rejection of from 8 to 10 per cent of their product. That is the main feature of the statement. Three members of the committee seemed to think that there might be a great deal in what the steel makers had to say, and for that reason they wished to change their views a little.

Mr. Kiesel: I fully agree with what Mr. McFarland says. I am speaking now from the design standpoint. We allow a stress of 16,000 lb. per sq. in. in side frames and bolsters. Steel that is made in accordance with the old specifications, under the lower limit, is not to stand that stress; therefore, we ought to have better steel, or we will have to increase the weight of the bolsters and side frames at least 25 and maybe 50 per cent. We absolutely have to have better steel. We get better steel now, and there is no reason why we should not make a specification in conformity with the steel we now get, and eliminate any that comes down near the lower limit, which would not be safe to use in bolsters and side frames, and possibly also couplers.

Mr. Tatum: I agree with Mr. Kiesel. We are having frequent failures all over this country with our cast steel bolsters and cast steel side frames. Our trains are delayed; we are not able to get the traffic over the country because we haven't steel in our cast steel bolsters and side frames that will meet the requirements. I don't think that we should add metal over what is reasonable for a cast steel side frame, or a bolster, in order to get the bolster or side frame to hold up under load. I believe that this matter should be referred to the railroads, and that they be given an opportunity to vote their opinion by letter ballot, and not offer it only to the convention or to the railroads at large as information. I think it would be well for the committee to know the sentiment of the railroads throughout the country. They have men in their employment who have studied the necessity of steel and its requirements, and they should be given opportunity to express their views to the committee.

Mr. Cromwell (B. & O.): I am quite sure that it would be no hardship upon the steel manufacturers if these specifications were adopted. The railroad with which I am connected has no trouble whatever in obtaining steel castings to meet these requirements. It is absolutely essential to have a better grade of steel in cast steel side frames and cast steel bolsters. As Mr. Kiesel remarked, we will have to make the castings heavier if we hold to our present specifications. The failure of cast steel side frames and bolsters is quite a serious matter, and the matter relative to the welding of these parts has been before this committee a number of times. If we had had a steel of higher quality in those frames, those parts would not be annoying you

at this time. I hope the convention here will submit the specifications to letter ballot.

Mr. Fuller: I think it would be a mistake to ignore this committee's report and simply accept it as information. Everything that has been said here so far tends to the opinion that the specifications are not unduly high. To relieve the embarrassment of the chairman of this committee, as he evidently made that motion under more or less compulsion, I would like to ask him if he will withdraw his motion so that we can put a motion before the house without wasting a lot of time, and accept the report and submit it to letter ballot.

A. W. Gibbs (Penna. Lines): I would like to ask the chairman of the committee what is the practice on which these figures are based—are these figures the upper limits of the possibilities of the steel casting, or have you allowed a good margin even as it is over the common ones?

Mr. Waring: According to the results of a large number of tests in possession of the members of the committee, these minimum figures given in the specifications are quite low, and could be easily met. Of a series of 3,000 tests, there was only one which would have been rejected under this specification.

Mr. Fuller: I do not think there is any reason why this specification cannot be met by the steel makers, and it is up to this Association to get out a specification that will meet our requirements, and if we put that specification through, I doubt if we will have any trouble in obtaining a steel that will meet it. As I understand it, there is not very much opposition to it. The tensile strength is a little high, but not enough to interfere with the general acceptance of the specification, and I would like to see the Association go on record as accepting the report.

Chairman: Mr. Waring, have you made up your mind to withdraw the motion?

Mr. Waring: As that motion represented the latest majority vote of the members of the committee, I think we ought to let it go through to a vote, and either sustain it or vote it down. I do not feel justified in withdrawing it.

The motion that this report be referred to the association as information only was then put and lost by unanimous vote.

F. F. Gaines: I move that the report be received and submitted to letter ballot in its entirety.

B. B. Milner (N. Y. C. Lines): There is one question I would like to ask. This specification covers miscellaneous castings, side frames and bolsters. We are quite concerned about the material going into the side frames and bolsters, but I am wondering what the committee would say on the question of having a separate specification for miscellaneous casting.

Mr. Waring: We thought it would be better to have one specification covering all grades of casting, since the properties specified were not particularly high, and are being met in the case of the miscellaneous castings, practically in all cases.

Mr. Milner: The committee considered that carefully, and decided unanimously that all steel castings should be covered under one specification?

Mr. Waring: Yes.

Mr. Tatum: It is not only the side frame and bolster which put the cars on the shop track, but it is the center plate and the side bearing as well, so let us have a good casting properly made for all our parts.

The motion that the report be received and submitted to letter ballot in its entirety was then put to vote and carried.

Welding Truck Side Frames, Bolsters and Arch Bars



W. O. Thompson
Chairman

THE COMMITTEE MADE A REPORT to the 1918 convention; however, it was omitted from the proceedings and the committee was requested to continue its researches and report again this year.

The Committee on Standards also referred to this committee the following from I. S. Downing, general master car builder, C. C. C. & St. L., which was received in reply to the Circular of Inquiry from the Committee on Standards: "It is our opinion that a limit should be placed on the welding and reclaiming of various parts, such as couplers, side frames, etc., inasmuch as at the present time there is nothing definite as to what extent broken or cracked couples, side frames, and the like, can be welded and placed back in service. This practice would eliminate any possibility of relying on the judgment of one man as to whether or not the part in question would be serviceable after being repaired."

Prior to the 1918 Convention the committee conducted static tests at the Bettendorf Company's plant, Bettendorf, Iowa, and at the American Steel Foundries' plant, Alliance, Ohio, on cast steel truck side frames and cast steel bolsters, some of which had been autogenously welded, whereas others were tested with cracks not welded. The results were variable; some of the frames and bolsters which had been welded failed at a point other than where the weld was located and in other cases the failure was through the weld. It also developed that some of the welds proved to be of inferior quality upon examination of the fracture.

The fact that so many cast steel side frames and cast steel bolsters are failing in the tension members is conclusive evidence of weakness in design and the welding of the fractures will not add to the strength but is likely to introduce a condition of further weakness by improper workmanship and change in the structure of the metal. It is, therefore, necessary to confine autogenous welding within specified limits on structures subject to alternating stresses and prescribe definite instructions to govern such welding.

The necessity for a greater factor of safety in the design of cast steel truck side frames and steel bolsters has been recognized by the association in the adoption of specifications including chemical properties, of load tests and limiting weights for cast steel truck side frames, as well as specifications including definite designs, limiting weights, chemical analysis and physical tests of the steel for both pressed steel and cast steel bolsters; and the United States Railroad Administration adopted definite designs of cast steel truck frames and bolsters based on those specifications and also prescribed that when renewals are necessary on existing cars side frames and bolsters in accordance with these standards be used.

It is, therefore, desirable from the standpoint of economy and safety to retire cast steel truck sides and bolsters not conforming to these specifications, as rapidly as they show signs of failure; however, it is realized that this would entail a large expenditure of money and, therefore, the committee believes that as an expedient autogenous welding should be permitted on these members within well defined limits and regulations.

Other metal car parts subject to compression only or to compression and low tension stresses may be welded. Worn surfaces of any nature and on any parts may be built up, provided that the material remaining in parts subject to high tension, such as hangers, etc., before welding, is equal to at least 80 per cent of the original section area, and in parts such as bolster guides, column castings, center plate rings, etc., the material remaining must be equal to 60 per cent of the original section area.

Broken coupler bodies, knuckles, locks, lifters and throwers should not be welded for the reason that reinforcing of the fractures cannot be permitted on account of interfering with the proper operation of the parts. Worn coupler bodies, knuckles, locks and throwers may be built up to the original sections, dressed and checked with proper gages to insure interchangeability and proper operation.

In order to determine what results would be obtained with blacksmith welding of wrought iron arch bars, four full sized pieces of 5 in. by 1¼ in. arch bar material were welded by com-

petent blacksmiths and these were tested (pull test) full size in comparison with four other bars which had not been welded. The following results were obtained:

	Lb. Per Sq. In. Ultimate Strength	Elongation Per Cent in Eight Inches
Welded bar	34,170	5
Welded bar	29,580	3
Welded bar	37,200	7
Welded bar	35,140	9
Unwelded bar	46,270	33
Unwelded bar	45,250	33
Unwelded bar	46,360	36
Unwelded bar	46,260	31

The average tensile strength shown by the unwelded bars was 46,000 lb. and the strength of the welded bars varies from 64 per cent to 81 per cent of this average, with very low elongation in eight inches. The general average of the strength of the welded bars gives 74 per cent of the average of the unwelded material. No attempt was made by the smith shop to produce a special weld but the material was handled as would be done for any ordinary welding of this character and the figures

A SHOULD BE SLIGHTLY GREATER THAN DIAMETER OF PENCIL

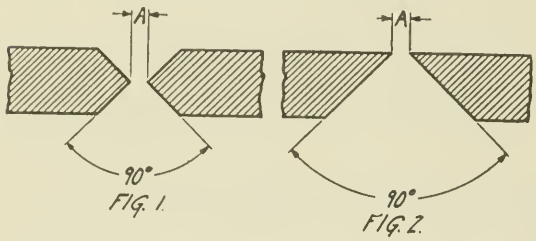


FIG. 1. FIG. 2.

WHEN PIECE IS SUBJECT TO HIGH TENSION B MUST BE MORE THAN 1½ T

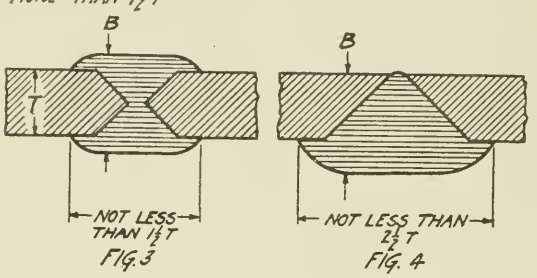


FIG. 3 FIG. 4

probably represent what may be expected under ordinary conditions.

It is a simple process to form and drill arch bars and as the failure of this important member of truck construction is a serious matter, the committee is not justified in approving any process of welding which will decrease the strength of the original bar.

The committee, therefore, recommends the following:

Autogenous Welding, Limits and Regulations

I. General.—In welding, either by the use of gas or electricity, care and good judgment on the part of the operator are of prime importance. The operator's ability as to the desired proficiency should be certified by the mechanical officers in charge or by an instructor qualified by experience in general railroad welding with the method involved.

The metal added is liable to be porous and relatively brittle. The heat at the surfaces welded affects other sections near the weld, tending to reduce strength and toughness.

The following general rules must, therefore, be carefully observed:

II. Welding cracks or fractures will not be permitted on the following: Axles, arch bars, car wheels or tires, track equalizers, spring or bolster hangers, brake staffs, brake wheels, coupler bodies, knuckles, knuckle pins, locks, lifters and throwers.

Parts made of alloy steel or heat treated carbon steel. Top chord angles of open top all steel cars if the fracture is located at a point between bolsters more than five feet from the center of either body bolster.

III. Building up worn surfaces will be permissible on the following:

Parts subject to compression only.

*Spring or bolster hangers, holes in levers.

†Center plates, truck sides, bolsters and column castings.

Journal boxes, coupler bodies, knuckles, locks, lifters and throwers. After building up to the original section, the same must be dressed and then checked with proper gages to insure interchangeability and proper operation.

Flat spots on rolled steel wheels and tires if thickness of tread is 1 in. or more above limit of wear groove.

* Provided that the material remaining in the part is equal to at least 80 per cent of the original section.

† Provided that the material remaining in the part is equal to 60 per cent of the original section.

IV. Welding cracks or fractures will be permitted on the following:

Parts subject to compression only and general car parts not subject to high tension strains except as otherwise prohibited.

Car and roof sheets.

*Cast steel truck sides.

*Pressed and structural steel truck sides, bolsters and transoms.

*Cast steel bolsters.

Draft castings.

*Brake beams.

*Case steel coupler yokes.

Car sills, posts, braces, stakes, carlines, side plates and end plates.

* Welding is permitted only when the area of the crack is less than 2-5, or 40 per cent, of the total area through the section at the point of fracture, but it is not permissible to weld any crack located within 6 in. of an old weld.

Regulations for Welding

V. (a) All parts marked (*) in Section IV, except truck transoms, must not be welded unless removed from the car or truck. Truck transoms may be welded in place by removing the truck from under the car body.

(b) The edges of pieces for welding must be prepared as shown in Figs. 1 and 2. If both sides of the fractured member can be worked upon, the fracture should be prepared as per Fig. 1, and where only one side of the fractured member is accessible, Fig. 2 should be followed. The entire crack should be burned or chipped out far enough back so that there will be no portion of the crack in the metal. Failure to do this permits the check or crack to work its way across the metal to the farther side, due to the constant vibration, even after the weld has been made. A hole may be drilled at the end of the crack or check and chipped or burned towards the hole. The surfaces where new material is to me deposited must be clean and bright and reasonably smooth and, therefore, if the surfaces are prepared by the burning process the surfaces must be finished by chipping before welding.

(c) The portion of the part adjacent to the fracture should be heated before the welding is begun. In welding, the operator should begin to weld at the point farthest away from the outside edge and work the weld towards the edge. All efforts must be made to prevent oxidization, and to accomplish this the work should be placed at an angle that will allow the blowing out of all slag or impurities in the fused metal. Giving the torch a rotary movement will assist in their removal.

(d) The new material must be deposited to the form shown in Figs. 3 or 4 in order to properly reinforce the weld, and *B* should be somewhat greater than *T*. For the important items marked (*) and (†) in Section IV, as well as for car sills, posts, braces, stakes, carlines, side plates and end plates, *B* must be at least 1½ times *T*.

(e) The parts marked (*) in Sections III and IV, with the exception of truck transoms welded in place, must be carefully annealed by uniformly heating to approximately 1,400 or 1,500 degrees F. and allowed to cool slowly in the atmosphere.

(f) Worn surfaces permitted to be built up to the original section by depositing of new metal thereon must first be made clean,

bright and fairly smooth, and after the metal is deposited must be dressed to the required dimensions and gaged where necessary.

(g) When truck side frames and bolsters are welded the weld must be made smooth and the following record legibly stamped on the weld by at least ⅜-in. steel stencils, in the following form:

(Mo.—Day—Yr.) o——oo——oo	(Railroad) A. B. C.
XY (Shop Abbreviation Mark)	X (Welder's Identification Number or Mark)

VI. It is also recommended that reference be made in the Rules of Interchange to the effect that autogenous welding, by either gas or electric process, when performed must be strictly in accordance with these limits and regulations. The present price in the Rules of Interchange, Rule 107, Item 432, will not properly compensate the party performing the welding according to these regulations, and should be revised. A penalty should also be prescribed in the Rules of Interchange providing for the erection of any car on which a truck side frame or truck bolster is welded, after the adoption of these regulations, when not conforming to same.

The report is signed by W. O. Thompson (Chairman), New York Central; G. W. Rink, Central Railroad of New Jersey; J. T. Walls, Pennsylvania; J. J. Hennessey, Chicago, Milwaukee & St. Paul; A. M. McGill, Lehigh Valley; R. W. Schulze, St. Louis-San Francisco; Willard Kells, Atlantic Coast Line; J. R. Gould, Chesapeake & Ohio; E. H. Sweeley, Long Island and C. F. Giles, Louisville & Nashville.

During the reading of the report Mr. Thompson said: Your committee would like to have the paragraph in the middle of page 4, reading: "Flat spots on rolled steel wheels and tires, if thickness of tread is 1 in. or more above limit of wear groove," eliminated from the report, because after giving the matter further consideration we do not believe it is good practice to have that inserted.

Discussion

At the conclusion of the report Mr. Thompson said: There was a part of the report which was not printed, and that is that the thanks of this Association are due to The Bettendorf Company, The American Steel Foundries, and the Pennsylvania Railroad for placing all of their appliances at our disposal and for the considerable time and amount of money that was spent in the long extended experiments made with regard to welding.

Mr. Fuller: The committee's report has one recommendation that is all right, but I think you all ought to understand it. The last paragraph of the report reads as follows:

"A penalty should also be prescribed in the Rules of Interchange providing for the rejection of any car on which a truck side frame or truck bolster is welded, after the adoption of these regulations, when not conforming to same."

That should be carefully considered, as I presume there are hundreds and thousands of cars with the truck side frame or truck bolster welded, that have been welded for years, and are in use, and this paragraph may be the means of rejecting quite a number of cars.

Mr. Gaines: Mr. Fuller is right in this matter, and rather than make that penalty operative immediately, it would be better to set a future date, when the matter will become effective, so that we can gradually eliminate these cars. I would like to ask why the committee desires to cut out the recommendation relative to flat spots on rolled steel wheels and tires, if thickness of tread is 1 in. or more above limit of wear groove.

Mr. Thompson: They do not stick and you have a flat wheel, which is a great deal worse than what you had before.

A. W. Gibbs: I would like to ask, in connection with Section IV, on page 4, why it is stated "Welding cracks or fractures will be permitted on the following: 'Parts subject to compression only and general car parts not subject to high tension strains except as otherwise prohibited."

Why is the welding of bolsters and truck frames confined to the compression members only?

Mr. Thompson: It is hard to define what the tension and compression is in truck sides and bolsters. There are times when they are in tension and other times when they are in compression. It would be hard for anyone to say what are the tension members and what are the compression members in these two parts.

W. J. Tullerton (Rock Island): In welding these flat spots on rolled steel wheels and tires, did you use the electric process as well, and did you have the same difficulty with the welds giving out when you used the electric weld? It is a well-known fact, that you cannot use the acetylene process for this purpose, as well as the electric process, for the reason that the acetylene calls for pre-heating, which the electric process does not. I think it is a mistake to condemn the welding up of flat spots on rolled steel wheels and steel tired wheels, until we know the reasons.

Mr. Thompson: Both processes were tried, and we could see no difference between the two in the result.

John A. Pilcher (N. & W.): I wish to point out in Paragraph 4, the first statement, as follows:

"The fact that so many cast steel side frames and cast steel bolsters are failing in the tension members is conclusive evidence of weakness in design, and the welding of the fractures will not add to the strength, but is likely to introduce a condition of further weakness by improper workmanship and change in the structure of the metal."

There are exceptions to that, because the stresses in the side frames can be very much increased by improper spring capacity; that is, any roughness in the track transmitted to the spring causes stresses to be set up which are indefinite, so there is a possibility of improper spring design affecting the breakage of the side frames, irrespective of the weakness of the casting I want to take exception to that particular paragraph, because the spring must be properly designed to take care of the load, to avoid the breakage of the side frames.

There is another thing to which I desire to call attention. Under heading III—"Building up worn surfaces will be permissible on the following:" I notice they do not mention the building up of collars on axles. This is a source of great saving, and where the collars are built up simply to prevent their excessive lateral movement, it will not materially affect the strength of the axle, because the stresses are immaterial at that point. I wonder if that feature cannot be introduced—the building up of collars on axles.

Mr. Thompson: The committee did not consider the question of the building up of axles, but it is a question if that would not be in the same category as the steel-tired wheels would be. That is something, as I said before, that we did not look into.

The fact that so many cast steel side frames and cast steel bolsters are failing in tension members is conclusive evidence of weakness of design. When you consider the way the side frames are breaking down and the results we are experiencing from their breaking down, I do not believe that you could arrive at any other conclusion. Conditions have changed greatly since these truck side frames and bolsters were designed. The roads are carrying heavier loads and the service is more severe, all tending to the conclusion that the side frames were not designed for the service they are giving at the present time.

Mr. Gaines: I hope before the report of the committee is printed they will include the building up of collars on axles, as it will save many axles that now have to be thrown out. As to the building up of tires, I believe if you used the electric arc and the weld is made properly, that it can be done, and before we turn that proposition down finally it should be tested out further, because you can save money by welding up spots in the wheels by that process.

John McMullen (Erie): We have had a good deal of experience in electric welding flat spots on wheels. We have welded cast steel wheels and rolled steel wheels, and used them under our passenger cars, where we could see them and follow them up, and the results obtained have been very satisfactory. If the flat spot is properly cleaned off and cut in around the edges, and the weld is then made, rather than to apply it right on top, I do not think we will have any trouble with the electric welding process.

We have built up the collars and reclaimed a great many axles. The price of axles to-day is such that I think we are justified in building up these collars. We have reclaimed many

couplers, and I think if there is a slight crack down the back wall of the coupler it can be satisfactorily welded and reclaimed.

Mr. Tatum: Referring to paragraph four on page two, I am inclined to agree with the statement of the report. There are a number of side frames used on the trucks of various railroads in which the design is not proper, causing a number of them to fail. Another cause for the failure of truck frames is that they are not made of proper metal. As Mr. Pilcher says, because of weak springs the frames do get punishment. The truck frame receives more punishment than if you had a spring doing good work, but that makes no difference, in view of the committee's report that we had in service truck frames which show evidence of weakness in design.

The idea of building up the collar of the journal is very desirable. A great number of axles have been reclaimed by building up the collar of the axle, and I believe the committee should give that very thorough consideration.

Slid flat steel wheels and steel tired wheels have been successfully reclaimed when the work of building up the flat spot has been properly done.

I cannot agree with the reclaiming of the couplers.

J. G. Dickson (Oregon Elec. Ry.): Were the side frames tested, as mentioned in paragraph three, annealed for the welding, or were they welded without annealing them?

Mr. Thompson: They were experimented on, annealed and not annealed. We tried out every scheme we could think of.

Mr. Dickson: The Oregon Electric Railroad has been successful in welding flat spots by the electric process. We found the best material to use in filling in was cuttings from steel tired wheels. We had difficulty when we used other metal, but when using that metal we had good success, and I would not like to see this Association go on record against welding flat spots.

Mr. Thompson: The opposition to the recommendation of the committee, with regard to the matter of not welding the flat spots, has only been on the part of men who are operating suburban service, or electric railway service, which is a comparatively light and easy, but let us hear from some of the members who are running 120,000 lb. or 140,000 lb. capacity coal cars, and heavy trains.

C. E. Fuller (U. P.): We have been and are welding flat spots on steel wheels, and steel tires, with successful results. We would not think of removing a pair of wheels, or removing a tire, from service today because of a flat spot. We would use the electric weld, and if the work is properly done there is no question about its being a success. We have never welded any flat spots on wheels with the oxy-acetylene process.

We are reclaiming axles with worn collars. It would be a waste of material to throw axles away because the collars are worn ⅛ or 3/16, or even ¼ in. This committee should embody these items in its report, and should change the last paragraph on page 7 regarding the penalty, so that it will not compel us to take out of service side frames that have been welded and are giving good service.

The trouble is that some of it has been done in an improper manner. We have had lots of trouble from bad welding, but we have got to a point where we feel that we can weld safely, and I know of truck frames today that have been in service five or six years, and they are giving good service. I do not believe that anybody would ask to take them out of service because they had been welded.

The welding of some of the side frames has been done without regard to the service the truck frame is to perform—there have been too many tension members of improper design and bad steel that have been welded, and they have caused lots of trouble.

F. W. Brazier: The way I understand the recommendation of the committee is that in the future, any welding that is done must conform to the methods prescribed after a certain date. The date must also be attached, showing when the welding is done. If you get a car in the future with this date on it, and the welding is not done in conformity with the recommendations prescribed by the committee, you have the right to reject the car and that is the important point.

Frank McManamy (U. S. R. A.): The committee has rendered an excellent report, and while there may be some points not fully covered, there is so much good in the report that the committee should be congratulated on it. In the paragraph Mr. Fuller refers to, I believe his interpretation may be due to a comma, which is misplaced. The clause reads: "A penalty should also be prescribed in the Rules of Interchange providing for the rejection of any car on which a truck side frame or truck bolster is welded, after the adoption of these regulations, when not conforming to same." The trouble comes with the comma after the word "welded."

The object was to provide a penalty in the case of welding that is done after the adoption of these regulations, taken in connection with the date at the bottom of page six, and then I believe that the report of the committee will not be subject to the objection raised by Mr. Fuller. Autogeneous welding is one of the most useful processes we have now in railroad work, but it has come near being discredited, due to the inefficiency of the operator.

We have been attempting to do things by means of autogeneous welding which we ought not to do, and I think in the interest of safety as well as economy, that considerable of that work might be reduced, and the rest of it more carefully supervised, particularly with respect to the efficiency of the operator.

Mr. Fuller: I am glad to have had pointed out my misinterpretation or misunderstanding of the paragraph referred to. I have no objection to the rule if it applies to welding after the date set.

(At this point, Mr. Tatum called attention to errors regarding truck equaliizers and top short angle, which should be top chord angle.)

Mr. Fuller: I would like to make a motion that the report of the committee be adopted, leaving in the building up of flat spots on wheels. I would like to see the word "electric" used in connection with welding, and also request the committee to put into the report a section relating to the building up of collars on axles.

H. C. Oviatt (New Haven): I would like to get straightened out on the question whether the committee experienced any trouble in building up flat spots where the thickness of tread was more than one in. above the limit of wear groove.

Mr. Thompson: The allowable limit of running the tire would be about one in. It was not considered good practice to try to weld a truck member, when it is weak, if it is under one in. thick.

H. C. Oviatt: As I read this, it says this is permissible when the thickness of the tread is one in. or more above the limit of wear groove.

Mr. Thompson: We considered anything below one in. was not worth it anyway.

H. C. Oviatt: Was there any experiment made with tires more than one in.?

Mr. Thompson: A great many, both by the electric and acetylene processes.

H. C. Oviatt: They were satisfactory?

Mr. Thompson: No, they were not satisfactory; that's the reason we backed up on it.

Mr. Kleine: This committee has been continued from year to year, and it has finally presented a report which I think we can all go along with. There are requests for certain additions to the report, but rather than adopt them on the floor or read them into the report of the committee, it would be better to continue the committee for another year, and let it look into the proposition of welding collars on axles, welding flat spots on wheels, and also the welding of couplers. I amend Mr. Fuller's motion that the report of the committee be accepted as read by the chairman and referred to letter ballot, and the committee continued to report on the items which were brought out in the discussion.

Mr. Gaines: Before that motion is put I would like to have the vote on Mr. Fuller's original motion. The building up of flat spots is not an experiment; it has been going on for years. It is common practice and good practice, and as long as we can reclaim a whole lot of material, let those that want to do it do so.

Mr. Kleine: This would in no way stop any road from continiug its present practice, but I don't believe that the Association should recognize it as an accepted practice until the committee has had an opportunity to go into it further. I would refer the members to the report of Mr. Miller on Autogenous

Welding, that appears in the 1918 *American Engineer*, which absolutely condemns the practice. That was a very carefully considered report, and, therefore, I don't think we should take any precipitate action.

Mr. Gibbs: I would like to ask the chairman of this committee, referring to paragraph four of page four, would it be a very difficult job to introduce into this report drawings of typical side frames and bolsters, and indicate the parts that should not be welded. I think that would clear up the ambiguity. You have a pretty clear idea of the parts that should not be welded; would it be much trouble to do that?

Mr. Thompson: That is a very good suggestion, Mr. Gibbs. It would not be much trouble at all.

Mr. Fuller: Do I understand that the amendment carries with it the two suggestions that I made? My motion was to reinstate the paragraph covering the welding up of flat spots and also adding to the report the building up of collars on axles. Does your motion include those, or not?

Mr. Kleine: My motion eliminates those two items, and simply defers them for further investigation for the committee to report upon next year.

Mr. Sillcox: One thing to consider is the number of cars which are going to be tied up in this country on roads which are isolated and have to move equipment, where you have to weld the arch bars and the truck side frames. Some roads weld these frames and paint them. We had a train wrecked the other day that was one of the worst disasters we faced this year, and the train had passed four inspection points. The truck frame had been welded and thoroughly painted and the best inspector in the world could never have detected that condition. We can't get arch bars to points way out in the mountains on a 12,000 mile railroad, unless we tie the car up for two or three weeks. The question of whether we would render a bill for a welded arch bar should be brought up, or some explanation should be given how this would be included in the rules and applied. If the committee is to carry on its work it should be prepared next year to tell us how that would be controlled.

Mr. Tatum: I don't quite understand Mr. Sillcox. I would like to ask him if he thinks we should continue welding side frames and arch bars, or whether we should discontinue it.

Mr. Sillcox: I don't say that the universal practice is good, but there are cases where you have to weld the arch bar. If you have the car in a big shop, where you can put a new arch bar in, that is the thing to do; but if you have a car 200 or 300 miles away from a point where can you obtain the proper arch bar? You have to keep the car moving somehow, and you are going to tie up a world of cars this way if you have to tie up to put in new arch bars.

Mr. Tatum: It would be far better to tie up a car than to allow it to go out on the railroad and tie up many more cars and destroy the property of the railroad, and tie up the traffic.

Mr. Gaines: I would like to ask Mr. Thompson if the committee's report bars the welding of arch bars in a blacksmith fire. We are talking of two things, the welding by autogenous process is one, but it does not say the arch bar must not be welded in an open blacksmith fire in the old way.

Mr. Thompson: Perhaps we don't say that, but that is what we meant; it should not be welded at all.

Mr. Fuller: This Association should go on record as absolutely prohibiting the welding of an arch bar, either in a blacksmith shop or any other place.

The Chairman: Any further remarks? If not, the amendment is before you. Will you please state your amendment again, Mr. Kleine?

Mr. Kleine: That the report of the committee, as read by the chairman, be adopted, and submitted to letter ballot for adoption as recommended practice, and the committee continue to consider the question of welding of collars on axles, the welding of flat spots on wheels, and the welding of couplers.

Mr. Tatum: Do I understand that motion to intend to stop the building up of solid flat wheels during the period that this investigation is going to be made?

Chairman: No.

Mr. Kleine: You can use your own option about that in the meantime; simply not recognizing it as recommended practice.

Mr. Fuller: Evidently there is some confusion here. I asked Mr. Kleine, who seconded my motion, whether or not that left out, as the chairman read, on page 4, the paragraph "Flat spots on rolled steel wheels and tires, if thickness of tread is 1 in. or more above limit of wear groove." Now, Mr. Kleine says: "The report as it stands." To make this clear, I think the members should have both motions, and my motion was to reinstate this item and also add into the report the building up of collars on axles.

The amendment was put to vote and carried.

The Report of the Committee on Couplers



R. L. Kleine
Chairman

WITH THE ADOPTION, last year, of the details, such as contour line, design of 6 in. by 8 in. shank, etc., for the M. C. B. Standard *D* coupler, the duty assigned to the committee to present to the association a one standard coupler has been completed. To realize the benefits of this work it is essential that the coupler be placed into general use as soon as practicable. The design has passed the experimental stage and the coupler manufacturers are in a position to furnish the coupler in any quantities desired.

To accomplish the universal use of the standard coupler, the committee recommends the following program: (A) Make it mandatory that all new cars built after a certain date be equipped with the M. C. B. Standard *D* coupler with 6 in. by 8 in. shank. (B) Make it mandatory that after the present stock of 5 in. by 7 in. couplers is used all future renewals will be made with the M. C. B. Standard coupler with 5 in. by 7 in. shank.

NOTE.—On existing cars equipped with 5 in. by 5 in. shank couplers, the present type of coupler should be maintained except where cars are changed in the draft arrangement when provision should be made for applying either the 5 in. by 7 in. or the 6 in. by 8 in. shank M. C. B. Standard *D* Coupler. It is impracticable to apply the standard type *D* coupler to the 5 in. by 5 in. shank.

In order to carry out this program the committee recommends the following changes in the M. C. B. Rules of Interchange for Freight Cars: (A) Add the following paragraphs to Rule No. 3:

I. Cars built after June 1, 1920, will not be accepted in interchange unless equipped with 6 in. by 8 in. shank M. C. B. Standard *D* couplers.

II. Existing cars, equipped with 5 in. by 7 in. shank couplers of the present types, when requiring coupler renewals, shall have 5 in. by 7 in. shank M. C. B. Standard *D* couplers applied. This rule to be effective when present stock of new and second-hand 5 in. by 7 in. shank couplers has become exhausted.

III. Existing cars equipped with 5 in. by 7 in. shank couplers shall have the existing type of couplers maintained in repairs. Where changes are made in the design of the draft arrangement, provision should be made for the application of either the 5 in. by 7 in. or 6 in. by 8 in. shank M. C. B. Standard coupler.

Uncoupling Attachments—Revision of Standard

The General Committee instructed the Coupler Committee under date of February 25, 1919, to consider revising the standards for the uncoupling arrangements shown in the Master Car Builders' Association Standards, Sheet 19-B, with a view of providing a standard in accordance with Paragraph (m) of Rule 3 of the 1918 Code of Interchange Rules and with the United States Railroad Adminstration's standard.

Rule 3 (m) reads as follows: Cars built after January 1,

1919, must be equipped with coupler operating lever connected direct with coupler lock or lockhft without the use of links, clevises or chains. The United States Railroad Administration Standard reads: Coupler operating device to be of the top operating type without the use of clevises, links and pins; that is, to be direct connected to the locking-block. Apparatus to be in accordance with condition drawings. United States Railroad Administration, Division of Operation, Mechanical Department Circular No. 8 reads: Coupler operating device to be of type directly connected to coupler knuckle lock without use of clevis, link, chain or pin and to be interchangeable with operating device on United States standard cars where possible. United States Safety Appliance Standards provide for uncoupling levers to be either single or double, and of any efficient design with prescribed dimensions for various types of uncoupling levers including those which employ clevises and link, and provide penalties for uncoupling levers not conforming to the detailed specifications.

The M. C. B. Standard *D* coupler makes provision for both top and bottom operation, the latter being necessary for cars with low height of floors from rail and where it is desirable to keep all portions of the uncoupling arrangement below floor line.

The object of changing the standard is to provide an uncoupling lever that is entirely connected to the locking-block or locking-block lifter and avoid the defects existing in levers which employ clevises, chains, pins and cotters. On account of the United States Safety Appliance Standards providing certain specifications for the various types of uncoupling levers used, it is necessary to retain these specifications in the standards. It is also desirable to retain the bottom connection for certain cars that require it. The types of uncoupling levers directly connected to the locking-block or locking-block lifter are covered by letters patent which, under the rules, prevent adoption of any specific design. It is, therefore, the suggestion of your committee to provide for the uncoupling rigging directly connected to the locking-block or locking-block lifter by making the following changes in the standards: 12. (A) Plate M. C. B. 23-A. Eliminate the uncoupling attachments (links, clevises, pins and cotters) shown on this plate. (B) Plate M. C. B. 19-B. Add a heading over the cuts, reading: "For Existing Cars Only." Add the following to the right of the cuts: "For New Cars and Application of New Design Uncoupling Levers to Existing Cars." Coupler operating device must be of a type directly connected to the coupler knuckle locking-block or locking-block lifter without the use of clevises, links, chain or pin and must conform to the detailed specifications prescribed in the United States Safety Appliance Standards. (C) M. C. B. Proceedings, 1918, Page 607, Heading: Change Recommended Practice to Standard.

On Page 607, eliminate the paragraph at the bottom of the page relating to chain conection. Page 608, eliminate the last sentence in the first paragraph reading: Details of uncoupling rod chain are shown on sheet M. C. B. 23-A. Page 608, add a new paragraph after the second paragraph at the top of the page, reading: In 1919 the standard for uncoupling levers for new freight cars and application of new design uncoupling levers to existing freight cars specified that the coupler operating device must be of a type directly connected to the coupler knuckle locking-block or locking-block lifter without the use of clevises, links, chain or pin and must conform to the detail specifications prescribed in the United States Safety Appliance Standards.

(D) 1918 Proceedings, Page 553. Add a paragraph after the second paragraph at the top of the page, reading: In 1919 the Standard for Uncoupling Levers for new freight cars and the application of the new design uncoupling levers to existing freight cars specified that the couple roperating device must be of a type directly connected to the coupler knuckle locking-block or locking-block lifter without the use of clevises, links, chain or pin.

(E) M. C. B. Proceedings 1918, Plate B, Safety Appliance Standards for uncoupling levers, following Page 574: Add the same notes as provided for Plate M. C. B. 19-B and covered in foregoing paragraph (B).

In conclusion the committee recommends submitting to letter ballot the following: Coupler operating device for new freight cars and the application of new design coupler operating device to existing freight cars must be of a type directly connected to the coupler knuckle locking-block or locking-block lifter without the use of clevises, links, chain or pin and must conform to the detailed specifications prescribed in the United States Safety Appliance Standards.

The report is signed by R. L. Kleine (Chairman), Pennsylvania; F. W. Brazier, New York Central; F. H. Stark, Montour; E. J. Brennan, Chicago, Milwaukee & St. Paul; J. W. Small, Atlantic Coast Line, and J. A. Pilcher, Norfolk & Western.

Mr. Kleine: You will note that we don't specify any given date, for the reason we desire to give the railroads an opportunity to use up their present stock of couplers, either new or second-hand. I have an inquiry from one of the members in regard to the specification for uncoupling levers. It is understood that the recommendation for uncoupling levers simply relates to the connection of the uncoupling lever to the locking block, or locking block lifter, and does not take in any other part of the uncoupling lever.

(Mr. Tollerton occupies the Chair, during absence of Mr. Chambers.)

Mr. Tatum: Mr. Chairman, I note the recommendation at the conclusion, "your committee recommends submitting to letter ballot the following: 'coupler operating device for new freight cars and application of new design coupler operating device to existing freight cars must be of type directly connected to coupler knuckle block or locking block lifter without use of clevises, etc.'" I thought that if the committee gave consideration to requiring that the standard that it has recommended be adopted on cars receiving a change in the device, why not extend it a little further, and say, "when new operating devices on the existing cars are manufactured, that they be made to conform with the new standard." Why should we perpetuate the old device.

Mr. Kleine: This is a matter of interchange, interchange could not control the manufacture, but they can control the application.

Mr. Tatum: The idea that I want to bring out is that a number of the railroads are manufacturing the old device, perpetuating the old existing trouble. In manufacturing the old device the railroads manufacturing it are making themselves liable to frequent penalties because the device is not always found operating, and I believe the sooner we understand the conditions and get away from the old device and put in a device that will prevent these violations of the safety appliance law, the better off our railroads will be, and the more our men will be protected.

Mr. Brazier: It would seem to me after all the arguments that have been made in years gone by and with the reports of the Interstate Commerce Commission inspectors showing violations—there have been more penalties attached to the system of the old method of chain clevises, and if you keep acmount of it very carefully, you will find you are spending thousands of dollars a month in maintenance. The average road that is spending money on equipment today should put in the new uncoupling device in the reclamation work as well as in the new care.

Mr. Gaines: I agree with all that has been said about incorporating something of that kind, but I don't think you can put it in that paragraph because this is an interchange.

Mr. Kleine: I may explain that the report covers two devices; one, the interchange, and the other the recommended practice. In the recommended practice, your recommended practice would read this way: "Coupler operating device for new freight cars and application of new design coupler operating device to existing freight cars." It is covered right there.

Mr. Gaines: There are two distinct things we have here: one is a recommendation of letter ballot relative to the couplers; then, if I understand it, the committee also makes a number of recommendations for recommended practice in addition to that. I move that the matter be accepted and referred to letter ballot, both questions.

Mr. Tatum: I don't quite understand how this is going to be referred to letter ballot. Is it going to be referred by letter ballot for the roads to vote whether or not the manufacture of new uncoupling operating devices for old cars in existence is to be in accordance with the new recommended practice?

Mr. Kleine: Inasmuch as this is a change in the standards, it should first be approved by letter ballot, and then the change made in the Interchange Rules.

The motion was then put to vote and carried.

The Report of the Committee on Draft Gears

Subsequent to the 1916 M. C. B. convention, the committee addressed a circular of inquiry to the railroads with a view of ascertaining the kind and capacity of draft gears in service, travel, performance, sustained capacity in service and repairs, also sill spacing, coupler attachments, riveted versus key connection between coupler and attachments, draft lug spacing, overall length of gears, coupler horn, clearance, etc. Replies to this circular were received covering a total of 1,678,000 cars owned. The data received gives a very fair idea of the gears in service, forms of attachments used, spacing of sills, etc., but the information is very meager, generally, as to the efficiency of the gears in service, cost of maintenance, practicability of repairs and capacity of repaired gears, although valuable data are included on tests of two types of draft gears taken from service before repairs were made, as well as tests of these gears after repairs.

It was felt essential that gears should be thoroughly tested out, not only when new, but after they had seen service, as well as after repairs had been made to gears taken from service, also that such tests should be made approximating as closely as possible actual service conditions, eliminating variables as far as possible. The static machine gives a certain comparison as determined by its diagram and absorption of work but does not measure the capacity of the gear as a shock absorber. The 9000-lb. drop test machine will measure the height of drop at which various gears will close, and, therefore, can be considered a relative measure of shock-absorbing capacity in different gears; however, the weight used is so much less than in actual service that the question arises whether the weight and height of drop of the test machine is comparable to the weight and speed of a loaded car in service, and if a gear so tested in a 9000-lb. drop test machine will have the same relative efficiency in service under the heavier weight car and slower speed. The 15,000-lb. single pendulum machine in conjunction with the 30,000-lb. car on level track, as used by the Union Draft Gear Company, is another form of drop testing and is comparable with the drop weight. The Symington test plant for testing draft gears in full-sized freight cars. (See *Railway Age*, issue of May 2, 1919, page 1097.) This testing arrangement represents more nearly actual service conditions than any of the tests previously referred to. It, however, necessarily includes a number of variables, but is no doubt valuable for check testing and action under service conditions.

In order to reduce to a minimum all variables and for the purpose of accurately measuring impact blows, recoil, etc., the Pennsylvania designed a pendulum draft gear testing apparatus (Exhibit *A*), consisting of two weights of 200,000 lb. each,

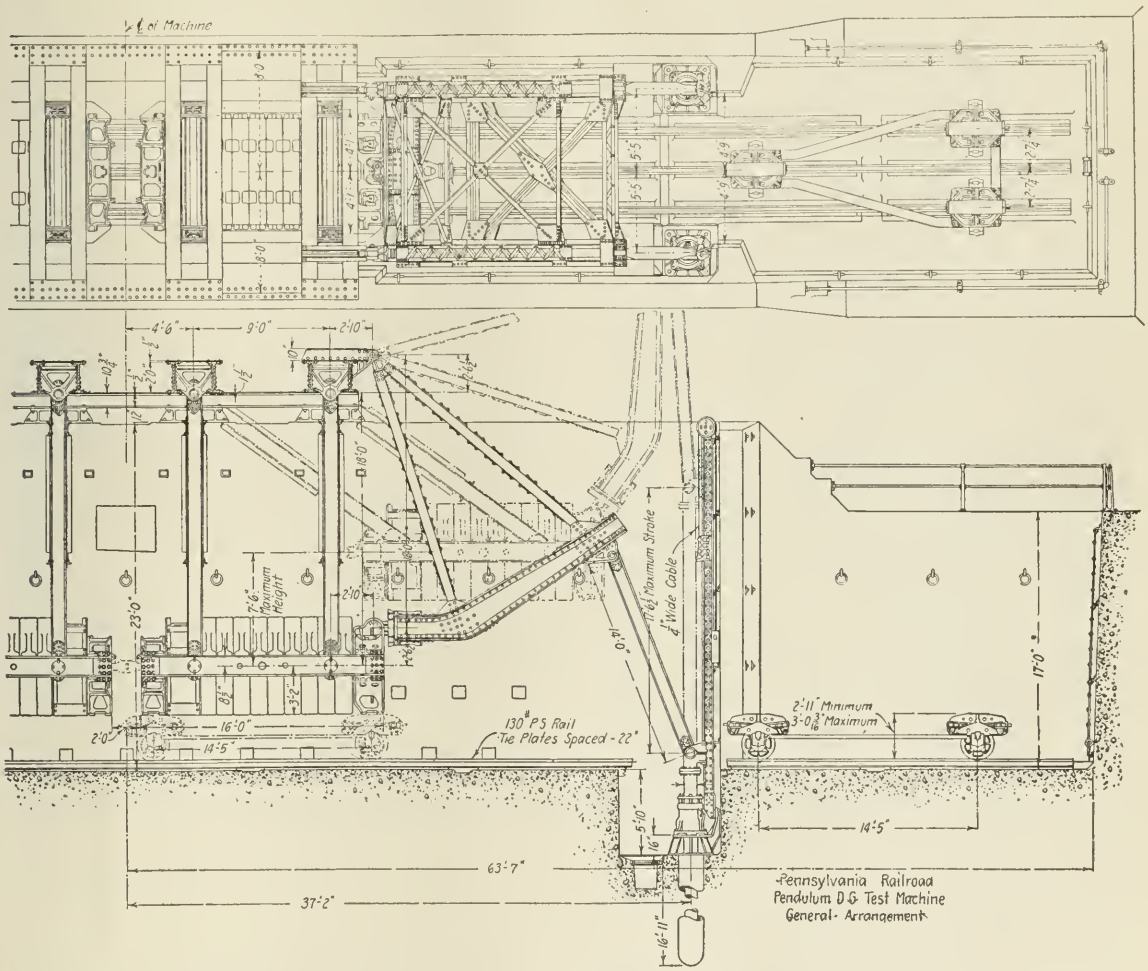


Exhibit A.—General Arrangement of Pennsylvania Draft Gear Testing Machine

suspended from a suitable framework with provision for applying different draft gears. The weights may be varied up to 100,000 lb. as found desirable. It was the purpose of the Draft Gear Committee to use this machine in tests conducted by it, but on account of the war, the machine has not been built.

On June 7, 1918, C. B. Young, Manager, Inspection and Test Section, Division of Operation, United States Railroad Administration, advised it is the desire and intention of that section to make an extensive test of draft gears to determine what a draft gear should be, and also the value of the draft gears now on the market measured by the ideal standard, and invited suggestions and recommendations of the Draft Gear Committee, draft gear manufacturers and railroad officers. The committee acted upon this invitation and placed at the disposal of the government all the data and tests that had been collected, as well as their views in connection with the tests to be conducted. After outlining their plan of procedure, the Inspection and Test Section of the United States Railroad Administration conducted tests of draft gears on the static and drop test machines, for the purpose of calibrating the gears used in the cars at the Symington testing plant, which were started April 10, 1919, and to which the committee has been invited.

In order to avoid duplication of work and entailed expense, this committee has suspended making any tests of draft gears, but will work in close harmony with the United States Railroad Administration, Inspection and Test Section, and thus have available the results of these tests.

The report was signed by R. L. Kleine (Chairman), Pennsylvania; Prof. L. E. Endsley, University of Pittsburgh; W. E. Dunham, Chicago & North Western; J. R. Onderdonk, Baltimore & Ohio; A. R. Kipp, Minneapolis, St. Paul & Sault Ste. Marie; G. W. Rink, Central of New Jersey; J. C. Fritts, Delaware, Lackawanna & Western; R. D. Smith, Boston & Albany; A. M. Darlow, Buffalo & Susquehanna, and H. C. May, Chicago, Indianapolis & Louisville.

Discussion

Mr. Kleine: I may say, subsequent to describing the testing machine at the Rochester plant, that this description is prior to the time that the U. S. R. Assn. test section took up the work. It has added considerable to the machine which brings it up to date. Mr. Kadel, who is the engineer in charge of the tests at Rochester, is here, and I believe we should hear from him on the progress of these tests.

A motion to accept the report was carried.

Mr. Kadel: In taking up the work of testing draft gears for the Railroad Administration, we have given consideration to all of the methods of testing that are in vogue, and in assembling cars for testing, we put them through all of the recognized tests that might show any results, and in our tests, at this time, we have 16 different types of draft gears. These will, undoubtedly, be added to as there are several more being considered, and I think the total would be about 20 when we complete the program. The gears were first assembled at Baltimore, and were given their static tests, a 9,000 lb. drop test on solid anvils. On Mr. Onderdonk's gear-testing machine the gears have been carefully calibrated to see just what results they show there, and we have made destruction tests in testing the gear under the 9,000 lb. drop test. We know just what it takes now to first start destruction of any gear under that test. The gears were then taken to Rochester and are now being carried through tests in the Rochester plant of the Symington Company, and at that plant we are recording the exact striking velocity, the exact impact velocity, and when I say exact velocity it means the velocity at the instant of impact, which is somewhat different from the average velocity over a long length of track.

We get the exact amount that the draft gear closes. We are taking each type of gear, first running two tests with one of each type on each of the two cars that are there; then we take the gear out of the striking car, and put in a solid buffer of 24 sq. in. area, and we run a test with another gear in the struck car. In the standing car we get some additional new action on the draft gears, whether there be one or two gears. We get the exact amount that these draft gears close at different speeds, and we get a different measure of cushioning value. When we say cushioning value, we do not mean absorption, because a spring draft gear, whatever its capacity, has just as much a cushioning action as a friction gear that may absorb all of the shock. They are two entirely different things. But we are also getting the absorption, because the absorption is a very important feature. The absorption spells absence or presence of what we call recoil, your kick-back in cars, and we are getting the cushioning value and the effect of recoil also in impact tests. We are able to tell you just what the gears do as they close, and how long it takes them to close, how far the cars travel while they are closed, how long it takes them to open—that is, what period of time, and how far the cars travel while they are opening. We tell you how much the striking car was decreased in speed by the closing of the gear and how much it was decreased by the opening of the gear. We tell you on the struck car how much its speed was affected by the closing and how much by the following release of the gear. There is one class of tests that properly should precede all of these that we have not been able to even begin, and that is the tests on pulling, the tests that are really road tests of draft gears, and should properly precede all other tests in the determination of an ideal draft gear. Draft gears, first of all, must hold cars together, they must enable us to handle cars in trains, and then, after they do that, we must get just as much cushion value and absorption value as we can get to keep destructive loads off the sills.

Briefly, that is the work going on at Rochester. The Draft Gear Committee is taking an active part in that work and have a representative there at all of the tests. Mr. Slaughter of the Pennsylvania Railroad has been named by the committee to attend all of these tests, and is in constant attendance there. The Symington Co.'s plant has always been a valuable testing plant for draft gears. The original plant of the Symington Company had means for measuring a draft gear closure, the distance the cars traveled, and a seismograph on each gear. There has been added to that a double drum, alongside of the track, setting on a base on the ground. That track is stationary with respect to the ground. The struck car is, what we term the B car, ordinarily the standing car, and it has means by which a pencil on the car draws a line on the drum. The other car drops down an incline, and as it approaches the first of these two drums it picks up a pencil there and draws a line on that drum, at the same time that the B car is drawing its line on the other drum. The two drums are running on a common shaft at exactly the same speed, and we have a very simple and very accurate means for marking the cars, so that we can time them together, both lengthways to the drum. When this pencil is used we can time them exactly around the drum, so that we know at any point around the drum just exactly where the two pencils stood, and from the two drums working on the same shaft at the same speed, we know exactly what each car was doing at any instant. We can trace the whole path and the whole action of the two cars all during that impact. There is only one way to really measure the path of the travel of any body. If it is a resilient body we would have to take the record from the center of the mass and we would have to apply the force to the center of the mass, but unfortunately we cannot do that. We could approach it, but we can never obtain it absolutely. So we are always going to have some resilience, some elastic yield in the car body, and that makes trouble for us, but we get mighty good records in spite of that.

We found that if you take a draft gear and test it under the 9,000 lb. drop, for example, we get practically an unyielding testing device. We have a base that we take for granted is unyielding, and then we have a weight that is pretty nearly unyielding also, and we drop it on there. If a gear has any tendency to chatter as it goes in you would not hear the chattering, and would not see it. The weight will prevent your discovering the chatter, but if you have the yielding car the little yield of the car striking is just enough to leave a chatter as it goes in. It is a little different thing from what any of us in the work there anticipated because we did not appreciate that that little yield alone might allow the chatter that the solid weight won't decrease and won't detect. I think that gives a description of the test plant.

G. H. Wood (A. T. & S. F.): I understand the report of this committee is merely a report of its investigations. There is no recommendation or anything of that sort in it, and the committee is to continue their investigations along the lines of

draft gear. It is a standing committee. The gentleman said there have been no tests made to determine the pulling strength on couplers, and as that is where we have the greater part of our coupler failures, or draft gear failures I would like to suggest that if it is possible to make any tests that will determine the pulling strength in the draft gear and the draw bars that the committee try and determine the relative strength between the coupler, draft gear and knuckle parts, so that any failure that may occur will occur throughout the knuckle, knuckle pins, or those parts that can be reapplied readily, because if the knuckle and draw bar is made strong enough, and it seems to be the general opinion that it ought to be made stronger, we are simply going to pull the draft gear out of the car. We are never going to stop breaking couplers and draft gears, and things of that kind, but the committee is trying to evolve some means of reducing the failures and the shocks due to slack action. In doing this they might evolve a draw bar and knuckle parts that will give us knuckle failures instead of draft gear and draw bar failures.

Mr. Kleine: The present M. C. B. standard "D" coupler is designed to fail through the knuckle hub. It is recognized that that is the portion of the coupler which is most easily renewed. Following that up, the draft attachment should, of course, be stronger than the knuckle hub. The test for the knuckle hub now is 175,000 lb.—within the elastic limit of the cast steel—therefore, your attachment should be stronger than that, and, so far as the attachment of the draft stops to the sills are concerned, it is rather a simple matter. So far as the draft gear itself is concerned, there isn't so much trouble on the road from the failure of the draft gear as it is from the failure of the draft gear that results from the failure to properly function, and Mr. Cadel's explanation in making these road tests was simply to ascertain how a draft gear should function in order to ascertain how a draft gear should function in order to take care of the proper starting and stopping of trains.

Mr. Gaines: I was present at some of these preliminary tests at Rochester, and have seen the apparatus, and understand it to a certain extent. I think they have apparatus up there that is going to give us very definite and very fine information on draft gears when they get the whole series completed.

A motion that the report of the committee be accepted and the committee continue its work was carried.

Registration, American Railway Association, Sec. III, Mechanical

Aishton, R. H., Reg. Dir. Northwest Reg., U. S. R. A.
Akans, E. L., M. M., Osborne.
Akans, Geo., M. M., Southern, Schlitz.
Aldcorn, Thomas, Chicago Pneumatic Tool Co., Shelburne.
Allen, C. E., Gen. M. M., No. Pac., Ambassador.
Amend, D. H., Keystone Coal & Coke Co.
Anderson, J. J., M. M., Chattahoochee Valley, Osborne.
Andrews, S. B., M. E., S. A. L., Chelsea.
Aloquist, Peter, M. C. B., Pere Marquette, Ambassador.
Appler, A. B., M. E., D. & H., Marlborough.
Arden, D. D., M. M., Sav. & Statesboro, Lexington.
Armstrong, S. T., S. M. P., I. & A. N., Traymore.

Babcock, W. J., M. C. B., D. & H., Osborne.
Barker, N. M., Copper Range, Strand.
Barons, J., Asst. Gen. Car. Fore., K. & I., Osborne.
Barry, F. J., M. M., N. Y. O. & W., Chalfonte.
Bartlett, Henry, G. S. M. P., B. & M., Chelsea.
Basford, G. M., Loco. Feed Water Heater Co., Marlborough.
Bawden, Wm. M. M., Wiggins Ferry Co., Strand.
Beaumont, H. A., G. F. C. S., B. & O., Osborne.
Berg, Karl, M. E., P. & L. E., Pennhurst.
Bilty, Chas. H., M. E., U. S. R. Y. Adm. N. W. Reg., Ambassador.
Bishop, G. C., S. M. P., Long Island, Chelsea.
Blair, H. A., Supv. C. R., Allegheny Region U. S. R. R. A., Dennis.
Bohan, W. J., M. E., N. P., Ambassodor.
Boutet, H., C. J. I., Chalfonte.
Bowerson, C., M. M., Tol. & Ohio Cent., Chalfonte.
Brandt, C. A., Loco. Superheater Co., Marlborough.
Bray, B. H., S. M. P., N. O. M. & C., Osborne.
Brennan, E. J., Supt. M. P., C. M. & St. P., Marlborough.
Breyer, J. S., M. M., Southern, Dennis
Brown, E. L., C. I., Iowa Transfer Ry.
Burch, J. J., G. F. C. D., N. & W.
Burroughs, C. R., S. P., Monticello.
Burton, Thos. L., C. A. B. E., N. Y. C., Marlborough.
Bush, B. F., Reg. Dir. Southwest Reg., U. S. R. R. A.
Butler, W. S., M. M., C. & O., Marlborough.
Buzzzell, O. D., G. F. C. D., A. T. & S. F., Craig Hall.
Byram, N. E., Federal Mgr., C. M. & St. P.

Calkins, A. E., Eng. R. S., N. Y. C. Lines & Rutland, Traymore.
Caracristi, V. Z., Traymore.
Carmer, J. R., G. F., P. B. & W., Haddon Hall.
Case, S. T., M. C. B., N. Y. C., Pennhurst.
Caton, S. W., C. C. I., Western Maryland, Monticello.
Charlton, Geo. J., G. C. F., D. L. & W., Pennhurst.
Clark, F. D., Supt., Cambria & Indiana, Alamac.
Clark, F. H., Consulting Engineer, Marlborough.
Coapman, E. H., Federal Mgr., Southern
Coddington, H. W., Eng. Tests., N. & W., Shelburne.
Colgate, Thos., Litchfield & Madison, New Holland.
Combs, W. B., M. M., M. D. & S., Arlington.
Connolly, J. J., S. M. P., D. S. S. & A., Chelsea.
Coulter, J. W., M. M., Alton & So., Grand Atlantic.
Courson, J. F., G. F., Pa., Seaside.
Coutant, G. E., G. I., L. & C. D. Wabash, Alamac.
Cowgill, L., M. C. B., A. T. & S. F., Shelburne.
Cross, D. W., M. M., T. St. L. & W., Traymore.
Cunningham, J. L., S. M. P., Penn., Dennis.
Curry, H. M., S. M. P., N. P., Marlborough.

Daley, J. H., M. M., N. Y., N. H. & H., Dennis.
Davis, J. H., El. Eng., B. & O., Shelburne.
Davis, M. J., A. E. M. P., Pa., Chalfonte.
Dawson, E., M. M., Ariz. & New Mex., St. Francis.
Demarest, T. W., S. M. P., Penna., Brighton.
Deverell, A. C., S. M. P., G. N., Traymore.
De Vilbiss, E. B., A. E. M. P., Penna., Marlborough.
DeWolff, F. A., A. L. S., Cuban Central Rys. Ltd., Corinthan.
Dickinson, F. W., M. C. B., B. & L. E., Monticello.
Dinan, Arthur, M. M., A. F. & S. F., Wellington.
Ditmore, George W., M. C. B., D. & H., Osborne.
Donehue, Thos., D. G. C. F., N. Y. C., Planters.
Doring, T. J., G. F. M. C. B., Penna., Craig Hall.
Dougherty, W. Q., M. M., M. & O., Deville.
Downing, I. S., G. M. C. B., C. C. C. & St. L., Traymore.
Dunham, W. E., C. S. M. P., C. & N. W., Marlborough.
Dunkle, S. K., S. M. P., Benwood Wheel. Con. Rys., Wiltshire.
Dunlop, P. T., G. S. M. P., St. L. & S. F., Traymore.
Dyer, R. H., U. S. R. R. A., Arlington.

Edwards, H. P., G. M., A. & W., Bouvier.
Eich, H. C., G. S. M., C. G. W., Chalfonte.
Elliott, B. F., M. C. B., United Rys. of Havana, Strand.
Ettinger, R. L., C. M. E., Southern, Dennis.
Ewald, Wm., Asst. M. M., Cumb. & Pa., Monticello.
Ewing, J. J., M. E., C. & O., St. Charles.

Farr, B. J., C. M. P., G. T., Traymore.
Fisher, W. J., Midland Valley, Seville.
Fitzmorris, James, M. M., C. Junc., Lexington.
Flynn, W. H., S. M. P., M. C., Marlborough.
Foque, T. A., S. M. P., M. St. P. & S. S. M., Ambassador.
Fowler, Geo. L., C. E., Dennis.
Fox, H. K., M. E., C. M. & St. P., Ambassador.
Freeman, J. F., G. F. C. D., Sunset Cent., Strand.
Fritts, J. C., M. C. B., D. L. & W., Kentucky.
Fry, Lawford H., Standard Steel Works, Brighton.
Fryer, C. V., G. F. C. D., N. Y. O. & W., Chalfonte.
Fuller, C. E., S. M. P., U. P., Marlborough.

Gaines, F. F., Vice Chrn., U. S. R. R. A., Marlborough.
Gallagher, F. S., A. E. B. S., N. Y. C., Haddon Hall.
Garstang, William, life member, Traymore.
Gemlo, William, S. M. P. & R. S., M. & St. L., Shelburne.
Goodnow, T. H., S. C. D., C. & N. W., Marlborough.
Goodwin, George S., M. E., C. R. I. & O., Chalfonte.
Gorman, J. E., Federal Mgr., C. R. & P.
Goss, W. F. M., Pres., Railway Car. Mfg. Assn., Chelsea.
Gould, Jos. E., M. M., C. H. & N., Dennis.
Gray, G. M., S. M., B. & L. E., Shelburne.
Griffith, W. C., M. M., Pere Marq., Ambassador.

Halbert, M. W., Ch. Interchange Insp., East, St. Louis, Princess.
Hall, C. C., M. C. B., Cuba R. R., Francis.

Hall, W. H., C. C. I., C. R. R. of N. J., Arlington.
Hammett, Philip M., S. M. P., Maine Central, Shelburne.
Hampton, J. N., F. C. D., A. C. L., Osborne.
Hannaford, J. M., Federal Mgr., N. P.
Hardin, V. L., Reg. Dir. East Reg., U. S. R. R. A.
Harding, F. N., G. M. L., I. C., Alamac.
Harris, V. V., M. S., N. Y., N. H. & H. Marlborough.
Harvey, H. H., G. C. F., C. B. & Q., Chelsea.
Hatch, M. C. M., Pulverized Fuel Equip. Corp., Traymore.
Haynes, A. C., F. G. C., N. Y. C., Pennhurst.
Haynes, J. F., Montour, Chalfonte.
Hennessey, J. J., M. C. B., C. M. & St. P., Traymore.
Henry, W. C. V., S. M. P., P. Lines West, Chelsea.
Hicks, I. C., M. S., A. T. & S. F., Holmeshurst.
Hildreth, Fred F., M. E., Vandalia, Craig Hall.
Hogarth, Wm., Cudahy Refr. & Tank Lines, Haddon Hall.
Holden, Hale, Reg. Dir. West. Reg., U. S. R. R. A.
Horrigan, John, S. M. P., E. J. & E., Traymore.

Jackson, W. J., Federal Mgr., C. & E. I.
Jackson, O. S., S. M. P., C. T. H. & S. E., Strand.
Jansen, E. W., Elec. Eng., I. C., Ambassador.
Jaynes, R. T., M. M., L. & H., Chalfonte.
Johnson, J. O., Southern, Fredonia.
Jones, C. H., M. M., Hunt. & B. T. Mountain, Marlborough.
Jones, E. F., M. M., C. & W. I., Strand.
Justus, I. J., G. C. I., N. Y. C., Pennhurst.

Kantmann, A. G., G. M. M., V. S. & P., Chalfonte.
Keiser, C. B., S. M. P., Penna., Haddon Hall.
Kelley, H. G., President, G. T.
Kells, Williard, G. S. M. P., Atlantic Coast Line, Dennis.
Kelly, John P., Inspr. Safety Appl., I. C. C., Blackstone.
Kent, F. S., G. C. I., Penna., Marlborough.
Kinney, W. H., Dearbon Chemical Co., Strand.
Kinter, D. H., G. F. C. D., Monongahela, Watkins.
Kipp, A., G. C. I., N. Y. O. & W., Chalfonte.
Kleine, R. L., G. C. I., Penna., Dennis.
Kucher, T. N., M. M., T. P. & W., Ambasador.
La Mar, A., M. M., Penna., Dennis.
Laughlin, Geo. F., S. C. D., Armour Car Lines, Marlborough.
Leman, W. W., S. M. P., D. & R. G., Pennhurst.
Linstrom, C. A., C. Eng., P. A. & Mck. R., Shelburne.
Lynn, W. K., S. M. P., G. & S. I., De Ville.
Lynn, Samuel, M. C. B., P. & L. E., Pennhurst.

McBride, B., M. M., Southern, Shelburne.
McKinsey, Capt. C. R., M. M., Wash. Term. Co., Runnymede.
McMullen, John, M. S., Erie, Shelburne.
McNanamy, Frank, Asst. Dir., U. S. R. R. A., Marlborough.
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McQuillen, J. E., M. S., G. C. & S. F., St. Charles.
McRae, J. A., M. E., M. & St. L., Chalfonte.
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Maher, N. H., Reg. Dir. Pocahontas Reg., U. S. R. R. A.
Manchester, H. C., S. M. P., D. L. & W., Traymore.
Marden, J. E., G. F. M. P., Portland Terminal., Alamac.
Markham, C. H., Reg. Dir. East. Reg., U. S. R. R. A.
Martin T. O., Foreman, Ill. Cent.
Mehan, J. E., A. M. C. B., C. M. & St., Traymore.
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Meloy, H. C., Supt. Elec. Appl., N. U. C.
Michael, J. B., M. M., Southern, Osborne.
Miller, E. B., Super. Car Repairs, U. S. R. A., Lexington.
Miller, W. J., S. M. P., St. L. S. W., Traymore.
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Murray, E. A., M. M., C. & O., Marlborough.
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Nash, J. H., S. M. P., Ill. Cent., Chalfonte.
Naylor, F., M. M., Miss. Cent. R. R., Osborne.
New, W. E., M. M., K. C. Term. Ry., Monticello.
Nordberg, A., M. M., P. & S., Arlington.

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O'Brien, M. S., M. P., Traymore.
O'Brien, W. J., M. M., K. & M. Ry., Haddon Hall.
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O'Donnell, T. J., Arbitrator, Niagara Frontier Car Insp. Assn., Pennhurst.
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Power, J. A., A. G. M., S. P., Ambassador.
Powers, M. J., S. M. P. & C. D., C. C. & C. S., Ambassador.

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Ramage, J. C., Supt. Tests., Southern, Southland.
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Reese, O. P., S. M. P., Penna., Chelsea.
Reid, W. L., V. P., Lima Loco. Works, Traymore.
Richardson, Louis A., M. S., C. R. I. & P., Breakers.
Ridgeway, H. W., S. M. P., Colo. & So., De Ville.
Riley, S. B., M. M., Cumb. Valley R. R., Chalfonte.
Rmk, George W., M. E., C. R. R. of N. J., Traymore.
Robertson, E. J., S. C. D., M. St. P. & S. S. M., Ambassador.
Rosing, W. H. V., Globe Seamless Steel Tubes Co., Marlborough.
Russum, T. H., S. P. C. Dept., B. & O., Dennis.

Sage, R. V., Cambria Steel Co., Marlborough.
Sandman, A. G., M. E., B. & O., Marlborough.
Schrader, J. R., C. F., N. Y. C., Osborne.
Schultheiss, Rupert, M. P. Dept., S. P., Sacramento Shop, Lexington.
Schultz, F. C., C. I. I., Grand Central Sta., Marlborough.
Schulze, R. W., S. C. D., St. L. & S. F., Traymore.
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Seddon, C. W., S. M. P., D. M. & N., Traymore.
Sedgewick, E. V., M. M. Ret., Inter Oceanic, Shelburne.
Seiders, I. A. S. M. P. & R. E., P. & R., Dennis.
Seley, C. A., Chalfonte.
Shackford, J. M., C. D., D. L. & W., Marlborough.
Sheafe, J. S., Shaefe Eng. Co., Dennis.
Sheahan, J. F., S. M. P., A. B. & A., Chalfonte.
Shearman, C. S., M. C. B., Chicago Jct., St. Charles.
Shoemaker, H., M. S., B. & A., Haddon Hall.
Shull, G. F., M. M., C. C. & O., St. Charles.
Sicardi, E., V. P., Union Tank Line, Traymore.
Sillcox, L. K., M. C. B., Tacoma Eastern, Traymore.
Simpson, C. S., Foreman Car Dept., Cape Girardean & Northern.
Sloan, J. R., E. E. C. L., Penna., Haddon Hall.
Smith, E. W., S. M. P., P. R. R., Chalfonte.
Smith, Henry J., G. C. I., D., L. & W., Kentucky.
Smith, Jno. L., Jr., E. C. F., P. & L. E., Osborne.
Smith, A. E., M. C. B., Union Tank Line, Traymore.
Smith, Jno. L., S. M. P., Pitts. Shawmut & Nor., Osborne.
Smith, P. F. Jr., S. M. P., P. Lines, Brighton.
Smith, W. A., Traymore.
Spoor, C. E., M. C. B., B. & S., Haddon Hall.
Sprowl, N. E., S. M. P., Atl. Coast Line, Chalfonte.
Stone, A. J., Federal Mgr., Erie.
Storey, J. W., C. D., C. of G., Arlington.
Streeter, L. P., A. B. E., I. C., Ambassador.
Stubbs, G. W., M. M., Kentwood & East., Arlington.
Summer, Eliot, C. M. P., Penna., Chalfonte.
Swanson, Chas. N., Supt. Car. Shops, A. T. & S. F., Holmhurst.
Sweeley, E. H., G. F. L. R., Long Island, Chalfonte.

Tatum, J. J., Gen. Supv. Car Repairs, U. S. R. R. A., Chelsea.
Terrell, C. H., A. S. M. P., C. & O., Haddon Hall.
Thomas, H. T., M. M., Detroit & Mackinaw.
Thomas, J. J. Jr., S. N. P., Southern, Chalfonte.
Thompson, A. W., Acting Pres., Am. R. R. Asso.
Thompson, Geo., Oxweld R. R. Serv. Co., Shelburne.
Thompson, W. O., S. R. S., N. Y. C., Marlborough.
Thorn, W. H., M. C. B., C. St. P. M. & O., Pennhurst.
Tollerton, W. J., C. M. S., C. R. I. & P, Marlborough.
Trapnell, F. W., C. I. I., Kansas City Car Interchange Bureau, Chalfonte.
Tyler, W. T., Dir. Div. of Operation, U. S. R. R. A.

Wagoner, J. V., M. M., G. F. & A., Arlington.
Walter, P. S., C. C. I., P. C. C. & St. L., Craig Hall.
Waring, E. T., Penna.
Warnock, H. R., G. S. M. P., C. M. & St. P., Traymore.
Westervelt, Jos., M. C. B., N. Y. C., Winniefield.
Wilder, R. E., Car. Eng., Cambria Steel Co., Marlborough.
Wood, G. H., C. A. B. L., Santa Fe., Osborne.

Vittum, J. E., Chf. Joint Insp., Colwyn.

Yercy, J. P., Genl. Fore., Penna.
Young, C. B., Mgr. Insp. & Test Sec., U. S. R. R. A., Strand.
Young, J. P., G. I. P. C. E., Mo. Pac, Ambassador.

Zercher, F. B., M. C. B., G. T. W., Marlborough.

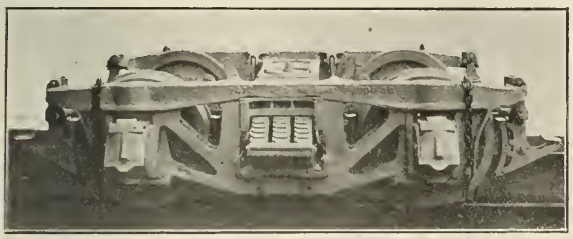


Pennsylvania General Utility Express and Baggage Car

P. R. R. General Utility Express and Baggage Car

Capacity of 70,000 lb. Obtained in Design Meeting Requirements of Universal Passenger Service.

FROM AN ECONOMIC STANDPOINT one of the most interesting track exhibits this year is the Pennsylvania class B-50 general utility express and baggage car, which will be found on the Georgia Avenue tracks near the boardwalk. This car was designed primarily to handle the traffic now generally moved on the Pennsylvania in 50-ton express box cars of the X-25 class.



Semi-Passenger Truck for the General Utility Express Car

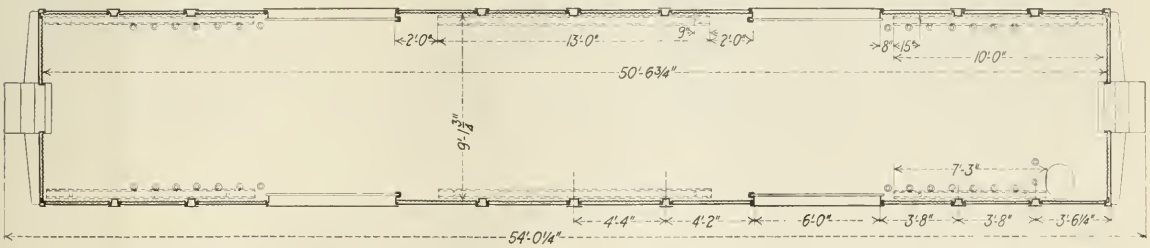
The design has been modified, however, to make it available for baggage, mail storage and parcels post service, as well as for some classes of perishable shipments. But while it may be pooled with other passenger equipment and moved freely in passenger service, it is much lighter, can be built for considerably less money, and has a much greater load capacity than standard passenger equipment. Furthermore, with the addition of running boards and ladders it will meet the requirements of the Interstate Commerce Commission for freight service.

While retaining a weight and first cost which are in keeping with the character of the traffic it is primarily intended to handle, the greater range of usefulness has been effected by providing two doors of suitable width of opening on each side, end doors of standard width for



End View of the Truck

communicating between cars in passenger service, steam heat and electric lights, and a suitable ventilating system which may be operated from the outside when the car is moving under seal. A modified design of freight truck has been used in order to make the riding qualities of the car suitable for high speed passenger service and the car is equipped with the Westinghouse UC brakes generally used on Pennsylvania Railroad passenger equipment.



Floor Plan of the Pennsylvania General Utility Express and Baggage Car

The car has a length over buffing faces of 54 ft. ¼ in., is 9 ft. 4⅛ in. wide over the eaves and has a maximum height above the rail of 13 ft. 4⅝ in. Inside, the car is



The Interior of the Car

50 ft. 6¾ in. long, 9 ft. 1¾ in. wide and 10 ft. high at the center of the car. The trucks are 36 ft. from center to center and have a wheel base of 5 ft. 10 in. The car has a weight (estimated) of 72,000 lb., which gives it a lading capacity of about 70,000 lb., limited by the requirement that the maximum for the total load be about 140,000 lb., or 35,000 lb. per axle.

Underframe

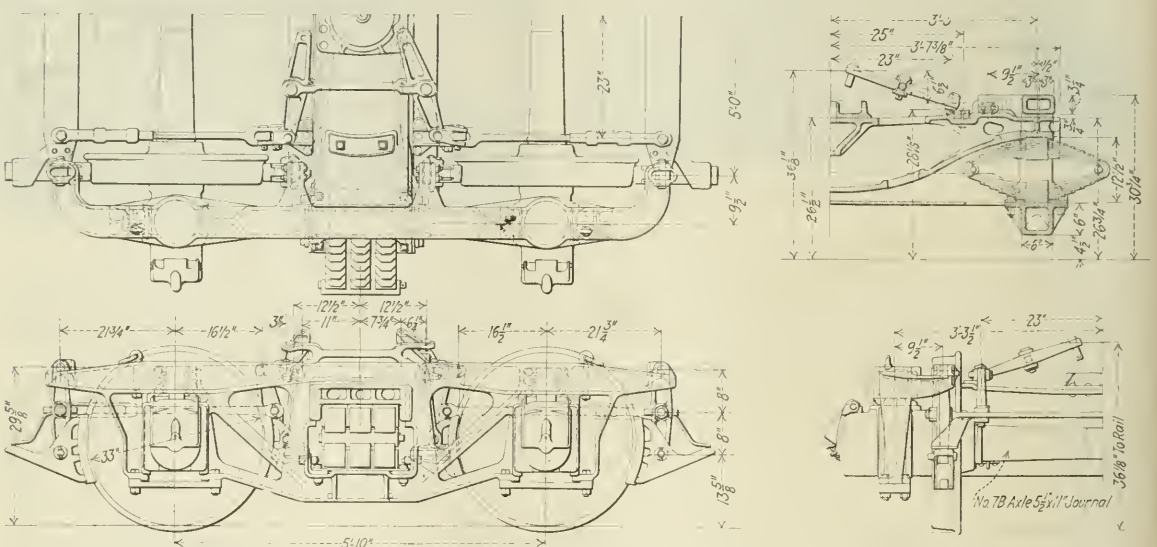
The car is built on the Pennsylvania standard steel passenger car underframe, which is of the center construction type with center sills of uniform section, in which the load is transferred to the center construction at the ends of the car and at two intermediate points between the truck centers. The center sills are 15-in., 40-lb. channels and the side sills 6-in. by 4-in. by ¼-in. angles.

The Body Construction

The frame of the car body consists of corner posts of 3½-in. by 3½-in. by ½-in. angle section, end and side door posts of 4-in., 7.25-lb. channels and pressed steel intermediate side posts of U-section, flanged and riveted to the inside of the ⅛-in. side sheets. The channel openings on the outside of the posts are closed by butt strips eight inches wide and the edges of adjoining side sheets are riveted between the butt strips and the post flanges. The top member of the side frame is a 4-in., 10.3-lb., Z-bar, the outside flange of which extends down over the top of the side sheet. A belt rail of 2½-in. by 2-in. by ¼-in. angles is fitted between the side posts and riveted to the side sheets on a line 4 ft. 3⅜-in. above the floor.

The car is fitted with the A. R. A. steel box car roof, which is carried on U-section carlines and is attached at the sides to the vertical flange of the Z-bar side plates and at the ends to a pressed steel connection angle flanged over the top of the end sheet, the contour of the vertical flange of which is shaped to suit the slope of the roof.

The car has a double floor, the lower course of which is of 1¾-in. yellow pine laid transversely and secured to the top of the side sills and the top center sill cover plate by ⅜-in. carriage bolts with countersunk heads and riveted ends. The sub-floor is surfaced with ¾-in. maple flooring laid longitudinally. Drain troughs of 3/16-in. steel are let into the floor along the sides of the car, except at the door openings. Two drains open through the floor of the car from each of these troughs.



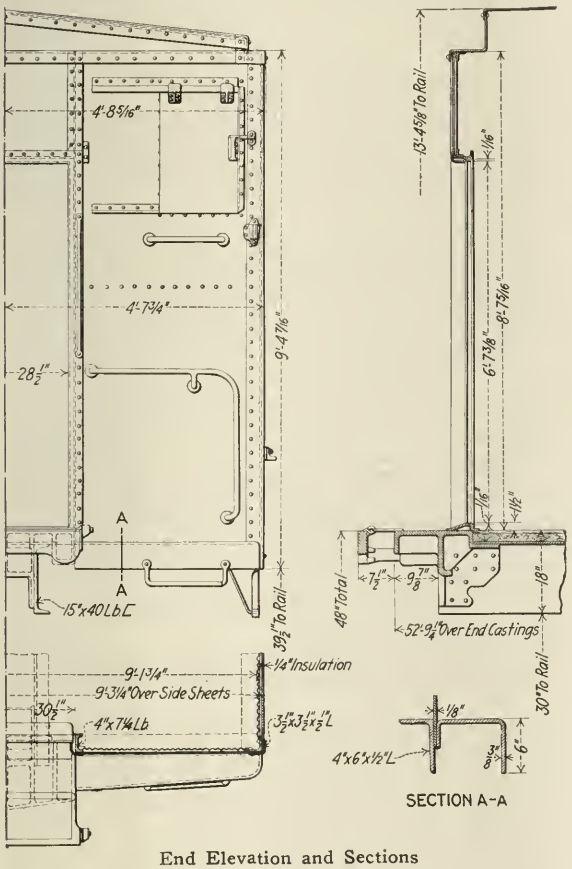
General Arrangement of the Truck

The sides, ends and roof of the car are insulated. The side and end insulation is composed of eight layers of asbestos paper, covered on each side with burlap and applied to the inside of the sheets with freight car color in a semi-paste form. Corrugated iron lining is applied inside the insulation and is held in place at the top by 2½-in. by 2½-in. by ¼-in. angles riveted to the web of the side plates, 1½-in. by 1½-in. by 3/16-in. angles fast-

ened to the floor with No. 12 wood screws and a special double angle of pressed steel fitted over and rivited to the horizontal flange of the belt rail. The roof is insulated with ground cork applied to the sheets with paint.

There are two doors on each side of the car and the center of each door opening is 13 ft. 9⅜ in. from the end of the car. The door openings are 6 ft. 0 in. wide, which is the same as for doors on standard baggage cars. The end door openings are 2 ft. 5½ in. wide. To meet the requirements of express service all doors are fitted with locks on the outside, and to suit the requirements of baggage service, are also provided with auxiliary locks which cannot be operated from the outside. In order to facilitate cleaning, the side door guards are made of one-inch wrought iron pipe.

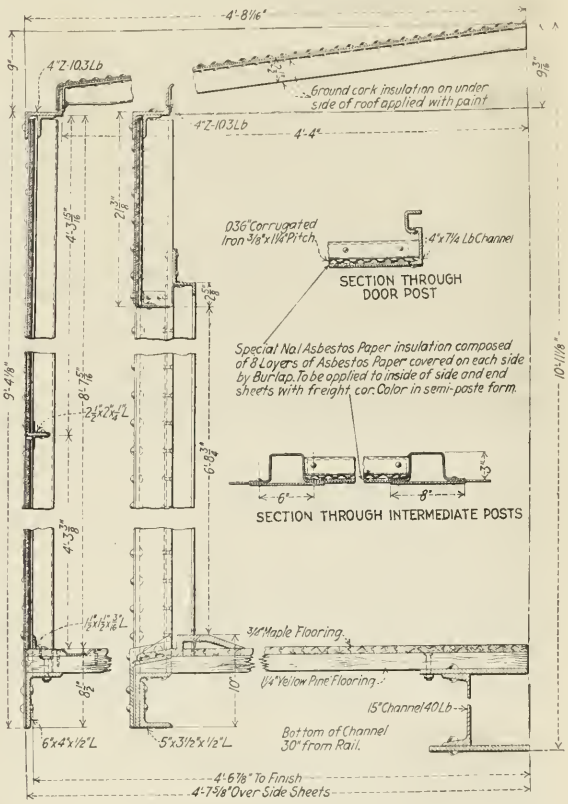
Ventilator openings are placed in the car body, one in each end and two in each side, near the corners. These openings are 15 in. wide by 27 in. high and are framed by 2-in. by 2-in. by 3/16-in. angles, riveted to the inside of the sheets, to which the ventilator frame is attached. The ventilator itself is made up of horizontal slats placed one inch apart and inclined downward and outward. A



End Elevation and Sections

heavy galvanized wire screen is placed outside of the ventilator slats and welded to the frame at the top and sides, with a ⅜-in. opening at the bottom for draining. The ventilators are closed by sliding steel doors placed on the outside of the car.

The trucks are basicly of freight car design, differing principally from freight car practice in the use of pedestals, and provision for the insertion of coiled springs between the truck side frames and the top of the journal boxes. The truck side frames are unit steel castings, the members of which are disposed in truss form. The top or compression members and the bottom members under the spring seats are of box section with coil spring pockets above the journal boxes. The two frames are connected by a flat spring plank secured to each frame by four bolts, and the load is delivered to the side frames by a cast steel bolster resting on three-unit, full elliptic springs. The wheels are 33 in. in diameter, mounted on



Details of the Car Body Construction

passenger car axles with 5½-in. by 11-in. journals, running in passenger car journal boxes. The trucks are equipped with clasp brakes and have a weight complete of 12,000 lb. each.

Five electric lights, supplied from an axle generator and storage batteries, are located along the center line of the roof of the car close to the ceilinng, in order that they may be out of the way when the car is used in express or mail storage service. The car is fitted with standard steam heat equipment, with radiators along the side of the car protected by screens and a dry hopper is provided for messenger or crew service.

This car, in point of lading capacity, comes approximately half-way between a 50-ton freight car and a standard steel baggage car, a gain of approximately 30,000 lb. in capacity being obtained over that possible in the latter. In point of cost the car also comes approximately in the middle of the range between a steel box car and the standard baggage car. A wide range of usefulness is thus provided at a cost representing a substantial saving over the amount which would be required to produce standard passenger equipment.

Special Guests

Adan, John C., Superv. of Equipment, U. S. R. R. AD., Grand Atlantic.
Agnew, S. H., M. M., River Terminal, St. Charles.
Alexander, Verne M., Purch. Agt., C. & Alton, Ambassador.
Anderson, A. W., Gen. Supt., C. & W. C. & Ga., Alamac.
Anderson, F. C., Asst. Mech. Eng., C. B. & A., Breakers.
Andrews, Henry, Asst. Gen. For., N. Y. C., Ambassador.
Arden, Morgan, M. M., Sav. & Statesboro, Lexington.
Armstrong, A. G., S. S., A. T. & S. Fe, Ambassador.
Atkinson, E. M., Agt., Penn.
Averill, E. A., Traymore.

Baker, G. T., Genl. Car Insp., P. R. R., Worthington.
Balkoff, Peter S., Asst. Chief of Russ. Miss. of Ways of Comm., Grand Atlantic.
Barstown, W. A., Pres., Union Tank Line Co., Traymore.
Barrow, Claude M., U. S. Rep., N. S. W. Gov. Rys., Traymore.
Barthlemy, R. P., A. G. C. F., G. N., Regent.
Batchelder, E. H., Jr., Secy. to Reg. Direc., U. S. R. R. A., Dennis.
Bateman, Frank, Director, A. C. R. R.
Beahm, P., F. P., Matley Tran.
Beaghen, Thomas, Jr., The Texas Co., Traymore.
Beaumont, Clifton, U. S. R. A., Traymore.
Bennett, G. R., Insp. of Locos., I. C. C., Blackstone.
Bernhardt, C. F. M., Gen. For. Car Dept., Geo., Haddon Hall.
Bettes, J. J., G. F., Georgia Central, Marlborough.
Bingham, P. R. R., Genl. Fore., Penna., Shelburne.
Boltwood, Harvey, Supt. of Equip., U. S. R. R. Assn., Haddon Hall.
Booth, C. W., M. M., N. Y., N. H. & H., Seaside.
Borland, W. P., C. Bureau Safety, I. C. C., Blackstone.
Bradshaw, J. H., Supt. Car Dept., Amer. Cotton Oil Co., Haddon Hall.
Brady, J. Frank, Asst. Super. of Equipment, U. S. R. R. A., Regent.
Brewster, E. J., G. F., C. & N. W.
Briggs, W. G., Reporter, Craig Hall.
Briggs, C. A., Asso. Phys. Bur. of Sts., P. R. R., B. & O., P. & R., Craig Hall.
Bromley, Joseph, Insp., Inter. Com. Com., Monticello.
Brown, C. W., Supt., L. & N. E.
Brown, B. S., Asst. Engr., P. R. R., Morton.
Bunn, D. M., Asst. Supt., A. C. & R. R.
Burt, A. M., Ast. Direc. of Oper., U .S. R. A., U. S. R. R., Car No. 2.
Bustch, H M., Insp. Bureau Safety, I. C. C., Blackstone.
Byrne, F., Rd. For. of Eng., Chicago Junction, Lexington.

Cair, M., Round House For., Chicago Junction, Lexington.
Callison, W. A., S. M. P., C. I. & L., Traymore.
Campbell, E. R., Chief Joint Car Insp., C. St. P. M. & O., Arlington.
Carey, J. J., Gen. Fore., L. V.
Carlton, E. T., Chief Car Insp., L. I., Strand.
Carlton, H. C., L. I., Strand.
Cartmill, L. E., Supt. Car Dept., P. F. E., Chelsea.
Case, T. G., Asst. Gen. For., N. Y. C., Pennhurst.
Caton, Frank, West Md., Monticello.
Chambers, James A., U. S. R. R. A., Dennis.
Chandler, R. L., Div. M. C., N. Y. C., Marlborough.
Cheadle, T. S., Ch. Joint Insp.,R. F. & P. R. T.
Clark, F. D., Jr., Alamac.
Clark, J. P., Sup. of Signals, Atlantic City R. R.
Clark, Milton, Storekeeper, Penn.
Coffey, J. E., Fore. Car Dept., C. R. R. of N. J., Tracy.
Coldsmith, A. C., G. F., P., B. & W.
Coombs, A. C., Asst. to Gen. Mgr., T. H. & B., 121 New Jersey Ave.
Coopman, E. H., Fed. Mgr., S., Ambassador.
Cooper, J. N., Sup. of Equip., U. S. R. R. A., St. Charles.
Cooper, J. W., Secy. to Reg. Dir., U. S. R. R. A., Dennis.
Corner, W. S., Power Supt., N. S. W. Rys. & Tran., Traymore.
Coyle, C. H., Asst. to Pres., Cenl. American Tank Car Co., Haddon Hall.
Crampton, John B., Eng., L. I., Strathaven.
Creel, Charles L., M. M., W. Va. North.
Creswell, R. A., Steel Expert, N. S. W. Gov. Rys., Traymore.
Crissinger, S. C., Ch. Ck., Railway Mail Service, Stevenson.
Crooks, W. B., Trav. Insp., S.
Cross, Bob, M. M., T., St. L. & W., Traymore.
Crossman, T. E., Reporter, Craig Hall.
Cunningham, W. J., Asst. Direc. of Oper., U. S. R. R. A., U. S. R. R., Car No. 2.
Daley, J. H., Gen. For., Cent. Tenn., Osborne.
Dally, F. M., G. F. L. D., C. R. R. of N. J., Lexington.
Daniels, George F., Penna., 926 Atlantic Avenue
Daniels, O. V., Asst. Genl. Store, Penna., 926 Atlantic Ave.
Davis, James P.,Gen. Frt. Agt., McKeesport Connect., Galen Hall.
Davis, W. H., Office Eng., Ins. & Test. U. S. R. R. A., Shelburne.
Deal, Alonzo W., Sr., Air Brake & Mchy. Exam., P. & R., Aston.
Delcher, H. C., Insp. Test. Dept., B. & O., Martinique.
Dempster, C. M. M., Southern, De Ville.
Dewart, H. M., P. A., C. V., Arlington.
De Wolff, Frank A., Asst. Loco. Supt., Cuban Central Rwys. Lim, Corinthian.
Dick, M. M., Gen. Car Fore, C. T. H. & S. E., St. Elmo.
Dinan, Wilfred T., A. T. & S. Fe, Brighton.
Dobson, W. E., C. & I., Alamac.
Donoghue, C. H., Asst. Dir. Gen. Car For., N. Y. C., Pennhurst.
Donovan, Henry, Spec. Eng. Pur. Dept., U. P., Traymore.
Dow, A. M., Gen. Fore. Frt. Repairs, El Paso & Southwestern, Monticello.
Downes, J. H., Asst. Road Fore. of Eng., P. R. R. East Lines, Lakewood.
Drake, W. A. Asst. Mgr., Penn Tank Line, Traymore.
Dunn, George T., G. F. C. D., N. C. & St. L., Fredonia.
Dunn, Percy A., Insp. of Locos., I. C. C., Blackstone.
Durham, F. F., Genl. Insp. Car Dept., M. K. & T., Arlington.
Dwyer, Ed., Priv. Secy., Dir. of Oper., U. S. R. R. A., Marlborough.
Dyson, Admiral C. W., Bur. of Steam Eng., U. S. Navy, Craig Hall.

Edwards, James M., Secy. to Gen. Mgr., Bouvier.
Ehrich, Thomas J., Reporter, Canfield.
Elliott, B. F., M. C. B., Unit. Rys of Havana, Strand.
Epperson, J. E., Sec. to Staff Offi. Mech., Southern, Craig Hall.
Epright, A. W., Scale Insp., P., Craig Hall.
Estrud, H. H., Gen. Car Fore., C. & E. T., Arlington.
Evans, Capt. Geo. H., Southern.

Fairhead, J. E., Gen. Supt., P. & W. V., Ambassador.
Field, W. E., M. C. B., Cent. of Geo. Arlington.
Fineron, F. W., Fmn. M. P. Dept., St. Elmo.
Fisher, H. B., Asst. Pur. Agt., P. A. & M. Ck., Traymore.
Fitzgerald, L. C., C. S., Erie, Shelbourne.
Fitzgerald, M. E., M. C. B., C. & E. I., Arlington.
Flowers, S. R., F. C. D., A. C. Line, Terminal.
Ford, J. H., G. C. F., L. & N. E.
Fuller, W. W., Safety Supt., Seaboard Air Line, Dennis.

Gainey, J. J., Gen. For. Rep., Southern, Chalfonte.
Gallagher, P. F., Foreman B. M., State Island R. T., Williams.
Garman, Delbert, Insp. Bureau Safety, I. C. C., Blackstone.
Gearhart, J. H., Secy. to Reg. Dir., U. S. R. R. A., Marlborough.
Gee, H. E., For. Mech. Eng. Office, Penn., Morton.
Geisking, Charles, Gen. Fore., P.
Gemlo, Wm., S. M. P. & R., S. M. St. L., Shelburne.
Gilbert, J. B., Jr., Asst. Eng. House For., W. J. & S. S.
Gilbert, J. B., Sr., W. J. & S. S.
Gimpel, Julius H., S. C. R., U. S. R. R. A., Strand.
Goff, C. G., M. M., Ga., So. & Ha.
Good, Harold, M. C., Shelburne.
Gorbounoff, Simon T., M. E., Communications, Grand Atlantic.
Griffith, H. C., Insp. Office of Mech. Engr., P. Eastern Lines, Borton.

Hadley, E. A., Eng. Asst. to Reg. Dir., So. West. Reg.
Hair, John, Special Eng., B. & O., Clarendon.
Hale, O. R., M. P. Supt., Western & Cuban Central, Marlborough.
Hammond, F. S., Gen. Strkpr., Pgh. Shawmut & Nor., Osborne.
Hankey, Elmer B., Chf. Clk., P., Craig Hall.
Harbert, W. F., C. C. & M. C. B., Indiana Harbor Belt, Orborne.
Harlow, E. H., M. M., A. T. & S. F., Arlington.
Harper, F. J., Gen. Car Insptr., Frisco, Strand.
Harper, E. L., M. C. B. Acct., Northwest Pac., Grand Atlantic.
Harris, R. C., Genl. Store, P. Lines West, Traymore.
Hardie, J. S., Genl. Fore. Car Dept., K. C. M. & O., Belfort.
Hay, J., M. M., G. T. R., Wiltshire.
Hayes, C. J., Asst. Eng., N. Y. C., Dennis.
Helwig, P. W., M. C. B., C. & A.
Hengstler, D., Fore., P., 143 S. Illinois Ave.
Herrold, A. E., M. C. B., Monongahela Connctg., Philip House.
Herring, W. M., Ch. Ck., So., Arlington.

Heslin, H. W., M. M., N. O. Ct. No., De Villa.
Hickok, W. H., Ch. Insp. Car Dept., D. & H., Osborne.
Hill, F. J., Chief Elec., M. C., Traymore.
Hill, A. T., Gen. Frt. Agy., Lake Term., Galen Hall.
Hitch, C. M., M. C. B., B. & O., Osborne.
Holzemer, J. F., P. A., T. & O. C., Traymore.
Hood, J. M., Supt., Akron Canton & Youngstown, Kenderton.
Hoover, G. W., M. C. B., Texas So. EastM., Osborne.
Hope, P., Gen. For., C. V., Osborne.
Howell, H. T., M. S., C. V., Arlington.
Hubbell, C. C., P. A., D., L. & W., Traymore.
Hughen, J. M., M. C. B., P. Tank Lines, Traymore.
Hummel, Herman H., C. C. to Gen. S. M. P., S. P., Shelburne.

Ingersoll, Howard L., Mech., Asst. to Reginal Dir., N. Y. C. Lines, Traymore.
Irving, H. R., Sup. Test Dept., B. & O, Martinique
Irwin, J. E., M. M., Sand Springs, Continental.

Jackson, W. J., Frd. Mgr., C. & E. I., Ambassador.
Jackson, John R., M. E., U. S. R. R. A.
Jellison, B. T., Pur. Agent, C. & O., Marlborough.
Jett, Emery E., M. C. B., Morris & Co.
Johnson, B. P., M. M., Nor. Pac., Ambassador.
Jones, James E., Insp. of Safety, I. C. C., Blackstone.
Jones, W. H., Supr. R. R. Repairs, Chalfonte.

Kadell, B. W., Asst. Eng. Insp. Test., U. S. R. R. A., Monticello.
Kane, John P., Supr. of Equip., U. S. R. R. A., Regent.
Kapp, J. B., M. M., P., Grand Atlantic.
Kauffman, G. B., Inst. Pass. Train Employees, P. & R.
Keiber, Henry, Asst. For., P. & R., Elberon.
Kells, Paul, A. C. L., Dennis.
Kendall, W. C., Mgr. Car Service Dept., U. S. R. A.
King, John H., C. C. M. of W., N. Y. & W., Philip House.
Kirk, J. W., U. S. R. A., Lexington.
Kleinhaus, F. J., Car. Acc., Interstate Tank Car Corp., Chelsea.
Koeneke, Thos. B., Supt. Equip., Indianoma Refining Co., Strand.

Laughlin, Geo. C., Amour Car Line, Marlborough.
Lambeth, G. L., M. M., M. & Q., Alamac.
Langzettel, W. S., Mech. Eng., The Central, Alamac.
Leflot, C. H., Rep. Engineer, Paris-Orleans Ry., French High Comm., Pennhurst.
Leslie, B. J., Draftsman, Penn.
Levan, Frank J., M. P. Clerk, L. I., Alamac.
Lewis, Herbert, Loco. Inspr. Bur., I. C. C., Blackstone.
Lower, M. J., Asst. Genl. Mgr., O. R., Traymore.
Lumley, Charles, Estimate Engineer, C. St. M. & O., Pennhurst.

McAlpine, J. D., Acc., N. Y. C., Pennhurst.
McBrian, Jas., Dist. Car Insp., C. R. T. & Pac., Lexington
McClennan, W. J. Asst. Eng. R. S., N. Y C., Dennis.
McGinty, Geo. F., Secy. Inter-Com. Com., Blackstone.
McLaughlin, M. C., Loco. Insp., B. & M., Seaside.
McMillan, A., Supt. Car Service, Morris & Co., Traymore.
McNamara, James F., Secy. to Reg. Dir., U. S. R. R. A.
McNicoll, Chas., D. F. A., Pencoyd & Phila., Galen Hall.
Mallard, J. T., M. M., Norfolk So., Monticello.
Mallory, C. E., Supt. & Traf. Mgr., Kingan Refrig. Line, Traymore.
Manley, W. J., Car Service Section, U. S. R. A., Pennhurst.
Martin, Livingston, Ch. M. C. B., B. & O., Wiltshire.
Marriott, Geo. A., Corp. M. Mech., C. & O., Grand Atlantic.
Mase, C. F., Super. Car Repair, U. S. R. R., Adm., Avon.
Mathews, Woodrow, A. C. L., Revere.
Mattingley, E. H., Gen. Car For., B. & O., Osborne.
Maurer, W. R., Engr. of Equip., N. Y. N. H. & H., Haddon Hall.
Mayer, Frank A., Gen. M. B. M., Southern, Arlington.
Mendenhall, D. H., Gen. For., Wheeling Term., Castro.
Merrill, A. J., Sec., So. & So. West., Arlington.
Michael, H. C., Secy. to Eng. of Tests, B. & O.
Mills, A. N., Insp. Test Dept., B. & O., Arlington.
Miller, Robert N., Asst. Eng., Penn., Morton.
Miller, R. E., U. S. R. R. A., Lexington.
Mitchell, A. G., Supt., P. R. R. & W. J. & S. R. R.
Mitchell, E. B., Div. Frt. Agt., Penn.
Mitchell, P. H., Car Fore., M. D. & G., Osborne.
Moir, George B., Asst. Supt. Equip., U. S. R. R., Haddon Hall.
Moncure, A. H., Gen. Fore., Car Shops, R. F. & Pot.
Moody, F. C., Sup. S. R. Car Reps., U. S. R. R. A., Chelsea.
Morrison, William, Storekeeper, L. I., Regent.
Morris, J. C., Fore. Car Shop, Cumb. Valley, Chalfonte.
Morris, R. L., Gen. Store., C. & O., Craig Hall.
Morris, R. T., Jr., C. & O., Craig Hall.
Moses, E. P., Genl. Car Insp., N. Y. C., Dennis.
Mueller, J. R., Pur. Agt., Hocking Valley, Chalfonte.
Munay, G. E., Mech. & Ele. Eng., G. T., Marlborough.
Murrian, W. S., Ry. Board of Adj., Lexington.

Nicholas, R. H., Asst. M. M., C. R. R. of N. J., Lyric.
Nordberg, C. R., Spec. Apr., Pen., Arlington.
North, L. A., Shop Supt., I. C., Sterling.

Ogilrie, James, Mch. Expert, G. T., De Ville.
Oliver, C. E., Genl. Car. For., Santa Fe, Osborne.
Otto, Alfred, Clerk, N. Y. C., Marlborough.
Owen, W. F., Genl. Mgr., A. M. & West., Osborne.

Pack, A. G., Chief Insp., Bur. Loco. Insp., Inter. Com. Com., Blackstone.
Parrish, J. B., Genl. Mgr., C. & O., Breakers.
Patram, B. F., Gen. For. Car Repairs, So., Elberon.
Patterson, F. M., Of. of Dis. Dir., U. S. R. R. A., Haddon Hall.
Perry, M. R., Chief M. C. B. Insp., B. & O., Bouvier.
Pfeiffer, I. F., Spec. Eng., Penn.
Phelps, W. C., Pur. Agt., P. Western Lines, Traymore.
Pole, Thos. C., Engineer, D. R. & W.
Porter, C. A., Supt. Transp., Indian Refining Co., Traymore.
Porth, H. W. L., M. C. B., Swith Ref. Trans. Co., Blackstone.
Pournall, W. A., M. E., Wabash, Alamac.
Prettyman, A. J., F. C. D., N. Y. C., Craig Hall.
Priest, Harry M., Insp. of S. A., I. C. C., Blackstone.

Quinn, M. H., Gen. Fore., Erie, Pennhurst.

Reid, W. G., M. M., Ariz. East, Strand.
Ramage, Master Cowan, Southland.
Ranck, Capt. J. M., U. S. Army, Runnymede.
Reed, W. M., Secy. to Frt. Agt., Atlantic City & Pleasantville, Pleasantville, N. J.
Reed, H. A., Yardmaster, B. & W. C., Wiltshire.
Reed, M. R., Supt. of Car Reps., Penn., Craig Hall.
Reice, John, Insp. Tools & Mach., N. Y., N. H. & H.
Rice, N. W., Engineer, S. P. & S., Ambassador.
Richardson, Louis A., Jr., C. R. I. & P., Breakers.
Rivett, R., Supt. Car Repr., U. S. R. R. A., Chelsea.
Roberts, Mord, Retired, Kansas City So., St. Charles.
Robertson, H. M., S. S., N. P., Ambassador.
Robinson, T. M., Ch. Draft., Hocking Valley, Chelsea.
Rogers, A. D., Insp. Buy. of Loco., I. C. C., Blackstone.
Romanach, Juan A., S. of L., Cuba Cane Sugar Corp., Dennis.
Rommel, C. T., G. M. P. I., B. & O., 125 S. Illinois Ave.
Ross, B. B., Gen. For. Car Dept., L. I., Regent.
Ryan, J. W., G. C. I., C. St. P M, Pennhurst.

Sale, C. S., Asst. to Pres., Railway Car Mfg. Assn. ,Chelsea.
Samuels, W. H., Gen. For. Car. Dept., Frisco, Strand.
Sandhas, H. L., Gen. Insp., C. R. R. of N. J., Schlitz.
Scheifele, John, R. F. of E., P. & B., Ariel.
Schjerning, E., Insp. Eng., Danish Sate Railways, Marlborough.
Schlatter, L. H., Asst. Fore., P.
Schneider, Louis, Asst. Ch. Clk. to S. M. P., G. N., Grand Atlantic.
Scofield, W. C., For. Blacksmith, I. C., Sterling.
Scott, J. R., M. I., Frisco, Osborne.
Shank, A. B., G. F., M. K. & T., Belmont.
Shaw, O. E., M. C. B., Wilson Car Lines, Monticello.
Sheehan, J. J., Tool Fore., N. & W., Louella.
Sheen, John, M. C. B., Atla. & West Point, Osborne.
Shirley, John A., Ass. Ch. Insp. of Loco., I. C. C., Blackstone.
Simms, H. A., M. S. C. E., Am. R. Ex. Co., Chalfonte.
Sipes, W. C., C. & I., Alamac.
Skilling, John K., Acc., U. S. R. R. A., Monticello
Slutzker, Joseph, M. M., P. Lines East.
Smith, J. C., Supv., A. C. & S.
Smith, J. H.
Smith, Montgomery, A. P. A., P.
Smith, R, M. M., Union, Neville.
Snyder, Joseph, M. M., Monongahela, Osborne.
Sowman, Commander Roy S., U. S. Navy, Shelburne.
Stapleton, J. F., Pur. Agt., H. I. D., Strand.
Stevens, F. J., M. M., A. & C. & S.
Stewart, A. B., Ry. Tr. For., C. R. I. & P.
Stone, Walter C., Supr. Car. Repairs, U. S. R. R. A, Chalfonte
Storke, C. H., Supr. of Loco. Maint., U. S. R. R. A., Traymore.
Sutherland, T. M., Gen. Car For., Santa Fe, Los Ang., Holmhurst.
Summers, E. P., Gen. Fore., S. P. R., Grand Atlantic.
Sweeny, U. S., Asst. Ch. Ck., Supt. M. P., Wash. Southern.
Sweringen, F. H., The Streets Co,. Alamac.

Tapman, W. H., Gen. Mech. Insp. Test D., B. & O., Arlington.
Titus, F., Asst. Eng. M. P., Penn. W. L., Dennis.
Thomas, William, III Albion Place, Atlantic City, N. J.
Thompson, E. B., Asst. Eng., C. N. & W., De Ville.
Thorn, Willis W., C. St. P. M. & O., Pennhurst.
Thorne, Clifford, Rep. Tank Car Owners, Traymore.
Thornley, F. W., Reg. Supv. of Stores, Allegheny Reg.
Tierney, James F., M. M., L. & A., Sterling.
Tiley, Geo. F., Supt. Tank Car Equip., Crescent Tank Line, Lexington.
Tollerton, Robert W., C. R. I. & P., Marlborough.
Tolley, Geo. H., Insp. Locos., I. C. C., Blackstone.
Trottnow, E. H., Assr. Gen. For., N. Y. C., Ambassador
Turner, J. A., P. A., Mobile & Ohio, Brighton.
Tutt, T. L., Mgr., P. Tank Lines, Traymore.
Tyler, U. T., Dir. Div. of Oper., U. S. R. R. Ad., Marlborough.

Villard, George, Mgr., Amer. R. R. of Porto Rico, Traymore.
Voigt, Jake, Pur. Dept., P.
Vollmer, W. G., Asst. Reg. Dir., U. S. R. R. A.
Vought, Harry D., Secy., N. Y. R. R. Club & Central R. R. Club, Marlborough.
Vyne, A. G., For. Eng. House, W. J. & S. S., Worthing.

Waddy, G. N., Gen. Car Fore. Lines, West, Eric.
Wagar, Walter F., Bureau of Safety, I. C. C., Blackstone.
Walker, J. N., Carman, C. R. I. & P.
Walker, J. W., A. B. & S. H. Insp., Penn.
Walker, J. J., Secy. to Reg. Dir., U. S. R. A., South. Reg., Ambassador.
Walsh, C. E., Asst. Pur. Agt., Penn. L. W., Traymore.
Warne, C. C., Asst. Pur. Agt., N. Y. C., Marlborough.
Warner, W. W., S. S., Erie.
Welsh, John, Dist. Insp. of Loco., U. S. R. R. A., Blackstone.
Whaley, T. H., Boilermaker, W. J. & S. S.
White, E. E., Gen. Car Insp., P. R. R., Craig Hall.
Wightman, F. A., Reg. Supt. of Safety, U. S. R. R. A., Blackstone.
Wilbur, R. H., Gen. Mgr., L. & N. E.
Williamson, C. H., For. Of. Gen. Sm. P., P. R. R., Morton.
Williamson, G. B., M. C. B. Insp., Bouvier.
Wilson, C. A., Asst. M. M., W. J. & S. S.
Wilson, H. A., Secy. & Mec. Asst., U. S. R. R. A., Dennis.
Wilson, H. A., A. R. M. Allegheny Reg., U. S. R. R. A.
Wilson, O. A., For. Car Insp., Keystone Coal & Coke, Traymore.
Winchell, B. L., Reg. Dir., Southern, Ambassador.
Withall, Arthur, Asst. Eng. Car Const., A. T. & S. F., Alamac.
Wood, D., Asst. M. E., S. P., Shelburne.
Wood, C. W., Supvr. P. C. W. K., M. C., Shelburne.
Woods, G. D., Supt. Car Plant, Santa Fe, Osborne.
Woods, J. G., Pur. Agt., M. C. & St. L.
Woodward, C. N., Gen. Supt., N. Y., N. H. & H., Dennis.
Woodworth, E. A., U. S. R. R. Adm., Arlington.

Yeager, J. R., Genl. Fore., West Maryland, Monticello.
Yergy, H. J., Gen. Car Inspr., P., Northwest, Craig Hall.
Yong, James, Pur. Dept., P.
Young, F. W., Genl. Boiler Insp., C. N. & St. P., Schlitz.

Zane, W. H., A. B. I., W. J. & S. S.
Zartman, S. B. Supt. of Safety, P. & R.

Monel metal is an alloy of 60 per cent nickel, 38 per cent copper and a small amount of manganese or aluminum. It is tough and ductile and can readily be machined, cast, forged, annealed, rolled, soldered, brazed and welded. Monel metal is sold in rods, sheets, tubes or in cast form. It is used for parts requiring great strength, hardness and incorrodibility, such as pump liners, valve seats, bolts, studs, shaft nuts and caps, nails, screws, chains, etc.—*Machinery*.

Beehive Ovens.—The continued existence of the wasteful beehive coke oven, said Secretary of Commerce Redfield recently, ought to be an offense against accepted business standards, just as higher business standards will some day think it an economic offense to allow black smoke to escape from a chimney for lack of careful firing.

Conventionalities

Mrs. Michael Quinn and sister, Miss Carroll, of Port Jervis, N. Y., are attending the convention with Mr. Quinn, who is general foreman car repairs of the lines East, Erie Railroad.



Juan Etenderson, General Locomotive Inspector, United Railways of Havana, and Juan Romañach, Superintendent of Locomotives and Cars, Cuba Cane Sugar Corporation, Havana, Cuba

Did you ever see a broader grin than that on the face of Walter Johnson? There must be a reason and—we have it! Walter has been made assistant manager of the pneumatic tool sales of the Ingersoll-Rand Company.

F. W. Sargent, chief engineer of the American Brake Shoe & Foundry Company, was in action early. He has been in the ring at these conventions for more years than he will tell, but he still has the punch and the smile.



H. S. Irving and H. C. Delcher, Inspectors, Test Department Baltimore & Ohio Railroad

Ben Elliott, master car builder of the United Railways of Havana, Havana, Cuba, arrived Thursday with Mrs.

Elliott. They are registered at the Strand. Neither can vouch for Hale, reported overdue in yesterday's *Daily*.

George Musgrave is introducing his son, Howard G. Musgrave, who has recently been released from the Naval Aviation Corps. Mr. Howard Musgrave is joining his father in the service of the Star Brass Manufacturing Company.

E. E. Griest, formerly master mechanic of the Pennsylvania Lines at Fort Wayne, Indiana, and now assistant general superintendent of the Chicago Railway Equipment Company, is attending the conventions. He is quartered at the Traymore.

Frank Morrison, of the Mason Regulator Company, who has been prominent in past years in R. S. M. A. Committee work, has brought with him this year his daughter, Miss Lavinia. This is Miss Morrison's first visit to these meetings.

Frank De Wolff, assistant locomotive superintendent, Cuban Central Railway at Sagua La Grandé, Cuba, who is stopping with friends here, wishes to deny the fact that Sagua is not on a railroad. He states that it is on a good railroad and that the custom of the country is his —"my house is at your disposal."

Thomas L. Mount, who, for seventeen years, has attended these meetings as a representative of the Consolidated Railway Electric Lighting & Equipment Company, has, since May, been attached to the Electric Storage Battery Company, of Phildaelphia. Mr. Mount is one of the pioners in electric lighting for railway coaches.

Twenty-four hours late but still smiling, Colonel Savage, vice-president of the Pulverized Fuel Equipment Corporation, and party "blew in" to the Traymore Wednesday evening. It is whispered that "Old Maude," the Colonel's 'benzine buggy" balked somewhere up the road when she found she was to travel all the way from New York to Atlantic City on pulverized fuel.

J. Snowden Bell, who has been a regular attendant at the conventions for many years, will be unable to attend this year. Several weeks ago he fell on the postoffice steps in Pittsburgh, Pa., breaking his leg near the hip. He is still confined to the Western Pennsylvania Hospital in Pittsburgh, but is getting along very well and expects to be moved to his home within a short time

Burton Mudge, president of Mudge & Company, was an early arrival at the convention. Mrs. Mudge accompanied him but Burton, Jr., who has also been a consistent "conventioner," was forced to stay home to ponder



C. C. Hall, Master Car Builder, Cuba Railroad, Camaguey, Cuba

over college examinations. He expects, however, to arrive later in the week. Father and son Mudge are becoming a formidable golf team, and while no challenges have been issued, accompanying golf bags show preparedness to defend a good golfing reputation.

Compelled to remain at home on account of the illness of his wife, William O. Duntley, president of the Duntley-Dayton Company, regrets his inability to attend the conventions this year. He had made all arrange-



Left to right—Mrs. W. W. Lemen and Miss Catherine Lemen, wife and daughter of W. W. Lemen, Superintendent of Motive Power, of the Denver & Rio Grande. Dan Cunningham, Assistant Superintendent of Motive Power, D. & R. G., and R. H. Dyer, Supervisor of Car Repairs, U. S. R. A., Washington, D. C.

ments to be here. Vice-president Crawford A. Duntley, a son, will arrive Saturday. George Bardon, manager of the Philadelphia territory, is here, but this year Mrs. Bardon could not attend.

L. W. Schnitzer, of the Ingersoll-Rand Company, is attending the convention in a new capacity this year. He has just been made manager of the pneumatic tool department of that company at Chicago.

Chas. W. Allen, formerly with the motive power department of the Philadelphia and Reading and who later entered the supply field with L. J. Bordo, died at Reading, Pa., June 11th. Mr. Allen was the son of Geo. S. Allen, retired, who was master mechanic of the Philadelphia & Reading at Tamaqua, Pa.

Karl J. Eklund, who has attended all the conventions since 1910, is here this year with Mudge & Company, of which company he is general manager. He was formerly



R. S. Mounce, General Foreman Car Repairs, Erie, and J. T. Munroe, Shop Superintendent, Erie

associated with the Pilliod Company and is still representing its interests. Mudge & Company being western representatives for the Pilliod Company.

J. H. Gimpel, a supervisor of car repairs for the railroad Administration, with headquarters at Denver, Col., is accompanied by his wife and his oldest daughter, Bertha. It is hard to believe that Mrs. Gimpel is the mother of nine daughters. Mr. Gimpel reports that the crop conditions in the West are splendid and that the roads are rapidly getting their car equipment into shape to take care of the heavy traffic which will soon be upon them.

J. H. Killius, of the Baker R. & I. Company, gave a splendid account of himself on the Million Dollar Pier last week. When the congestion of express and parcel-post packages became acute he generously offered the use of his general utility industrial truck and delivered a large volume of material to the booths each day.

Frank T. Hyndman, who is now living at Cleveland, and who was associated with the Procurement Division of the War Department during the war, motored to Atlantic City with Mrs. Hyndman. He expects to remain here over Saturday and will then return to Cleveland, going back by a northern route which will carry him through New York and northern Ohio.

Fred S. Wilcoxen, a long-time convention attender, will be missed this year by his many friends. He is unable to attend this convention on account of his duties with the Fuel Conservation Section of the Northwestern Regional Director's Office. He has attended each year since 1910, having been connected with the Service Department of the Pilliod Company in the Western territory.

The Chicago, Milwaukee & St. Paul delegation this year includes two eastern railroad men who since the last convention have followed Horace Greeley's advice. They are H. R. Warnock and E. J. Brennan, who left the Western Maryland and the Baltimore & Ohio about two years ago. Contrary to the general belief Mr. Warnock and Mr. Brennan say they are not worrying about a surplus of locomotives and cars on the Milwaukee after July 1.

Nothing but an extremely important appointment could keep Robert F. Carr, president of the Deerborn Chemical Company away from the conventions. Unfortunately, the date of the convention this year conflicts with the commencement exercises at the University of Illinois. Mr. Carr is president of the board of trustees of that university which this year, will graduate more than 600 students. His duties in this connection make it absolutely necessary for him to be in Champaign.



P. Balkoff, Assistant Chief, and (Right) S. Gourbonoff, Chief Inspector, Russian Mission of Ways and Communications

Mr. and Mrs. D. C. Noble are again at the Marlborough-Blenheim. Mr. Noble, who is president of the Pittsburgh Spring and Steel Company, has been attending these conventions for upwards of thirty years. It is only natural that he takes considerable pleasure in the

ever-growing success of the meetings, since for many years he was very active in the management, having at one period been treasurer of the Railway Supply Manufacturers' Association.

J. E. Mechling, superintendent of motive power of the St. Louis system of the Pennsylvania Lines West ,with headquarters at Indianapolis, Ind., brings the regrets of W. C. Arp, former superintendent of motive power of the same lines, for his inability to attend the convention for the first time in years. Mr. Arp's host of friends will be sorry to learn of his indisposition and inability to be here this year. Mr. Mechling is accompanied by Mrs. Mechling and Miss Lois, their daughter.

It is good to see J. C. Currie on the pier. His railroad friends have missed him during recent months because of the fact that he retired from the Nathan Manufacturing Company sometime ago. The pull of the conventions, however, was too strong for him to resist, and he is attending as a guest of the Nathan Company. Mr. Currie has always taken an extremely active part in the affairs of the Railway Supply Manufacturers' Association and



Sam Andrews, Mechanical Engineer, Seaboard Air Line

was chairman of the Finance Committee of that organization at the 1916 convention.

William Owens, representative of the New York Air Brake Company at Buffalo, is at the Chalfonte. Mr. and Mrs. Owens have been attendants at these conventions for years and their many friends will learn with regret of Mrs. Owens' death about two months ago. Mr. Owens holds the distinction of being one of the engineers who took the Black Diamond over her maiden trip in May, 1897, his run being from Sayre to Buffalo. He has been with the New York Air Brake Company continuosly since January, 1900, except for two years (1910-1912), when he was general air brake fuel inspector on the Lehigh Valley. He is also one of the charter members of the Traveling Engineers' Association and has attended its convention for twenty-five years.

Frank W. Furry, president of the Ohio Injector Company, who had been attending the conventions for years, died at his home in Chicago recently. It had been Mr. Furry's custom for a long time to come to Atlantic City on the Special from Chicago, and he followed the pleasant practice of providing himself with some fine California cherries which he passed around on the train.

William S. Furry, his son, who was asosciated with him in business and who has now succeeded him as presi-



Andrew Chambers, Veteran Engineer, Pennsylvania Railroad

dent of the company, continued his father's custom on this year's Special, and the crowd received its cherries as usual. The elder Mr. Furry had many friends among those who attended the conventions, who have greatly regretted to hear of his death.

Mr. and Mrs. W. T. Tyler, accompanied by their nieces, Misses Lucile and Veronica Ermatinger, arrived Wednesday evening, and are at the Marlborough-Blenheim. Mr. Tyler is director of operations of the Railroad Administration. The Misses Ermatinger are daughters of George A. Ermatinger, brother of Mrs. Tyler, who is connected with the mechanical department of the Railroad Administration, and who already was here at the convention. Mr. and Mrs. Tyler and their party paid their first visit to the exhibit on Wednesday evening, and were interested spectators. They probably will remain at least until Saturday, as Mr. Tyler is very anxious to give the exhibit a thorough inspection. The Tylers' only son, Harold, entered the United States Navy as a lieutenant when this country became involved in the war, and is now on the ship Mongolia, which is said to have made more trips carrying American troops and to have brought more troops home than any other ship. Mr. Tyler was greatly impressed by the attendance at the convention and by the magnitude and importance of the exhibit, and he is a good judge of anything pertaining to railroads, as he has been in the business ever since his youth, and rose from the ranks through all the grades of the operating department.

New Devices Among the Exhibits

Red Devil Pneumatic Rivet Cutter

THE RED DEVIL RIVET CUTTER shown by the Duntley-Dayton Company is a pneumatic tool designed solely to cut and back out rivets. The principle is simple—that of a plunger in a long barrel, driven by compressed air, striking a blow on the chisel head. It



The "Red Devil" at Work

will cut cold 1¼-in. rivets in an average of ten seconds, and 1-in. rivets are cut in from three to five blows.

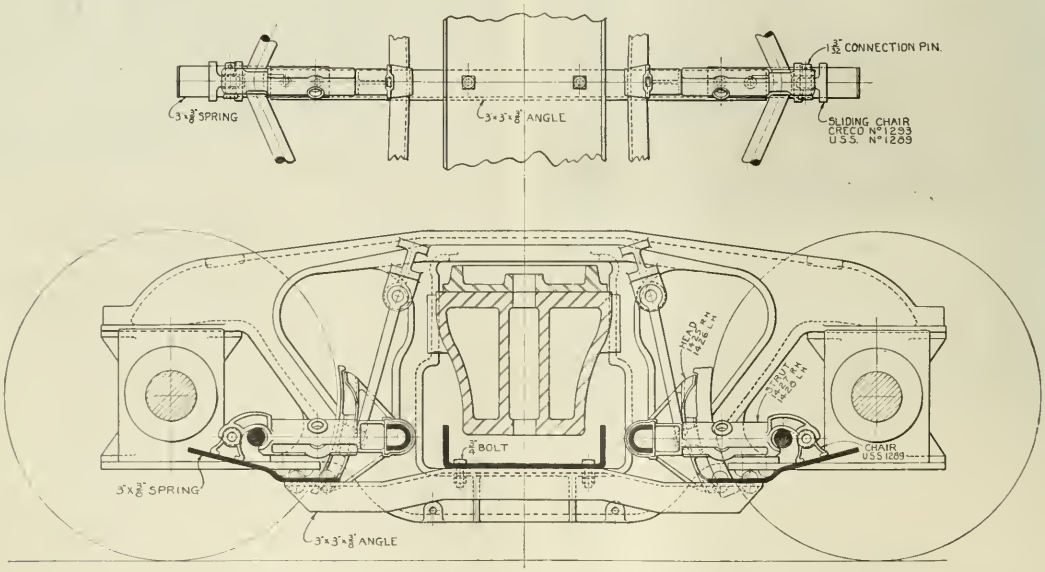
The operation of the cutter is simple and requires no special skill. Three men are necessary to operate the tool. The operator takes the left side handle with his left hand and rocks the valve handle with his right. Another man holds the right side handle, while the third man holds the chisel on the rivet. Turning the valve handle up opens the air port, which instantly permits the full force of the air to act on the plunger, driving it down the barrel and striking the chisel head. The valve handle is then thrown down to exhaust, and the plunger returns to the head of the tool ready for the next blow.

The force of the blow is entirely under control of the operator, and when the rivet is nearly off a light blow can be struck so that the rivets will not be thrown about with possible injury to persons nearby.

The valve head and nose piece are attached to the barrel by being forced on under 50,000-lb. pressure. With its 11-lb. chisel the Red Devil rivet cutter weighs 65 lb. It will give fairly good results with air pressure as low as 40 lb., and it will cut from 12 to 15 times as many rivets as can be cut in the same time by hand. The Duntley-Dayton Company, 1416 Michigan Avenue, Chicago, are sole distributors for the Rice Manufacturing Company, of Indianapolis, who manufacture the tool.

A Recent Development in Brake Beam Supports

THE CHICAGO RAILWAY EQUIPMENT COMPANY, CHICAGO, is exhibiting at the convention a recent modification of the Creco brake beam support, which was applied to all the tenders on the Railroad Administration standard locomotves. The flexible spring in this design is used only under the chair at the end of the strut. This flexible element furnishes an adjustable support and is riveted to the end of a 3-in. by 3-in. by ⅜-in. angle extending under the spring plank, which provides the maximum of safety in case the brake beam drops. This arrangement retains all the features of the former designs of the Creco third and fourth point supports, and is particularly applicable where a combination of long wheel base and heavy brake beam service is found.



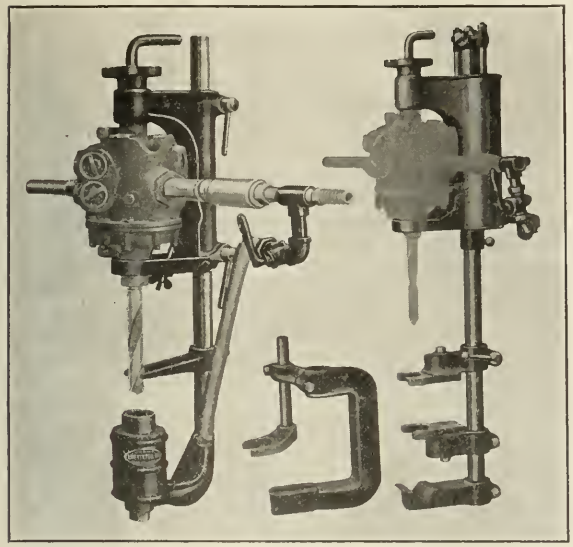
Latest Design of Creco Brake Beam Support

Labor Saving Shop Tools

The Liberty Tool Company, Baltimore, Md., is showing a number of new devices designed to effect time and labor saving in shop work.

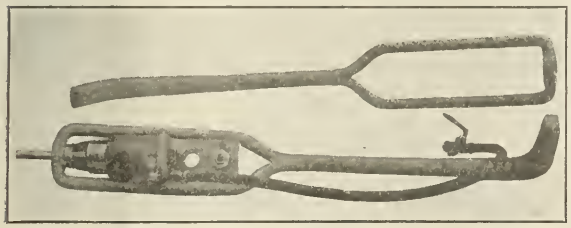
Portable Drill Presses

A portable drill press, designed to fit any make or shape of air drill having a vertical motor, is especially adapted for drilling and countersinking flange and plate



Portable Drill Presses with Crowfoot (center) for Double Cylinder Press (right)

work, such as firedoors, flue sheets and door sheets. This device has a 2¾-in. pneumatic feed end and is equipped with a sliding head taking any work from ½ in. to 14 in.



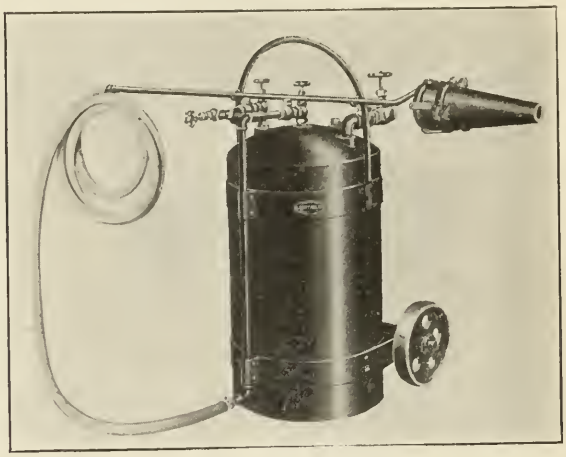
Holding-on or "Dolly" Bar

thick. It will drill holes from ½ to 1 5/16 in. and countersink up to 2 in. in diameter.

A double cylinder portable drill press with a crowfoot attachment is designed for any class of work and fits any of the pneumatic drills commonly used. It is equipped with a sliding head and a sliding table, has an 8 in. pneumatic feed and will drill holes up to 1 5/16 in. and countersink to 2 in. in diameter. It can be used as a radial drill press up to 18 in. in diameter of hole circle and the sliding head can be adjusted to take work up to 14 in. in thickness.

Rivet Heating Furnace

A portable rivet heating furnace using oil as fuel is designed so that the point of the rivet may be heated to any desired temperature, while the head is heated only to a cherry red or sufficient to readily conform to the work in the riveting operation. The top of this furnace is pierced with holes, through which the rivets are inserted, so that the point of the rivet is in the flame, while



Portable Heating Torch

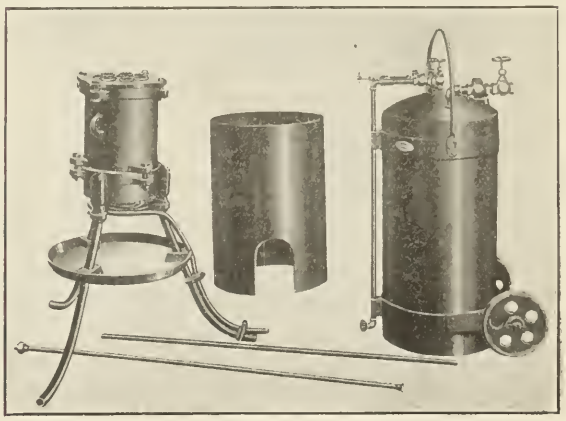
the rivet head rests on the outside or top of the furnace. The intensity and uniformity of heat may be regulated by means of a control valve.

Portable Heating Torch

This apparatus consists of a feul tank, a hose and a burner. The torch has one line of hose leading from the tank to the burner, which makes it convenient to handle in close places. This torch will heat to any desired temperature and may be used in the open air with excellent results.

Holding-On Bar

This holding-on or dolly bar has a pneumatic clamping device secured in a rectangular frame which is part of the bar itself. The bar can be placed in position quickly and the recessed end tightly clamped over the rivet. It may be readily applied in close quarters and is especially designed for use in locomotive flue sheet riveting and

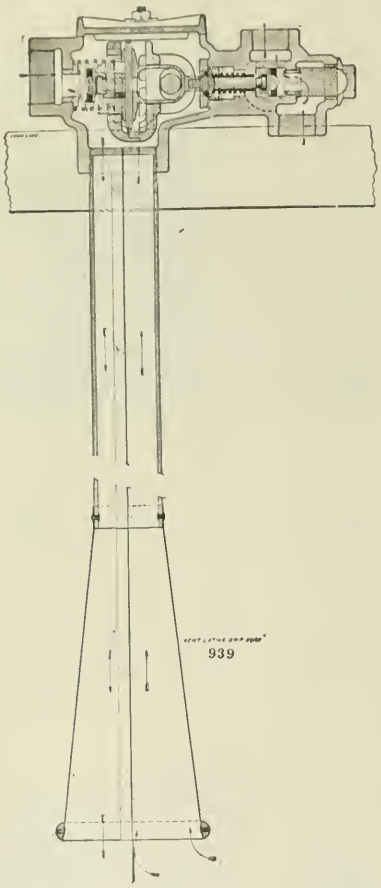


Rivet Heating Furnace

repair work. This company is showing a heading attachment for a riveting hammer, designed to rivet stay bolts and stay rods or countersink rivets and also a portable drill press for a close corner motor.

Combination Pressure and Vapor Valve

Previous to the introduction of the vapor systems most of the car heating arrangements were of the direct or pressure type, the radiation of which was sufficient for severe winter weather. Many roads have increased the piping in older cars from time to time in order to provide sufficient radiation for vapor heat. This was an expensive proposition, but by the introduction of the combination pressure and vapor valve shown in the illustration, to cars already equipped with the pressure system, the advantages of the vapor system are obtained without additional radiation, and in addition the pressure system is available for the severest conditions. By the use of this valve, vapor can be used entirely on a car or pressure can be used entirely, or pressure can be used on the cold windy side of the car and vapor on the other.



Sectional View of Combination Pressure and Vapor Valve

It is stated that in the heating of cold trains in terminals pressure can be turned into the system, and the cars can be heated in much less time than with vapor, after which the vapor can be used. The installation of this valve on old equipment is said to be inexpensive and on new equipment the cost of its installation is claimed to be materially reduced because less radiation is required. This combination valve is said to weigh less than the ordinary vapor valve and the weight of the pipe and necessary fittings used in conjunction with it is claimed to be one-third to one-half less than that required by the ordinary vapor system. The complete valve is of packless design, non-adjustable and so constructed that by the operation of the lever handle, either pressure or vapor is obtained in the system.

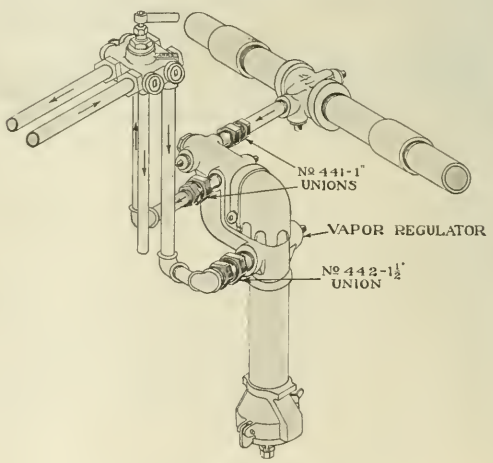
This system comprises a combination of vapor valve and steam trap arrangement for application inside of the car away from the danger of freezing. The diaphragm is located in the cradle, which is moved forward by a cam when the handle is set for vapor. In this position the expansion of the diaphragm is forward and the valve operates as a vapor valve. When the handle is set for pressure the cradle containing the diaphragm is moved backward. In this position the expansion of the diaphragm is to the rear, or in the reverse direction to that when set for vapor; therefore, the vapor operating mechanism is held stationary in the open position and the valve operates as a steam trap.

This valve, which is the product of the Gold Car Heating and Lighting Company, New York, is known as its No. 1170, and embraces the use of a diaphragm that is identical with the one used in its vapor valve No. 1112, and its steam trap No. 1165. It is constructed in two separate and distinct sections or diaphragms joined together as a unit, each section separately containing a volatile liquid. This construction increases the flexibility and power of the diaphragm and also doubles its life. Should one section fail, the remaining section will operate the valve until replacement can be made, thus avoiding shutting off the steam from that side of the car.

The disk holders both on the vapor valve and the trap end are of the quick removable type, the rear portion being slotted. In case of necessary removal they can be slipped off their respective spindles and be readily replaced. The two plugs, one on either side of the vapor chamber, give access to one disk holder and the cover of the diaphragm chamber gives access to the other.

Special Metal Union Connection

The Vapor Car Heating Company, Inc., of Chicago, is showing a Vapor regulator with a special metal joint type of union used in order easily to make repairs and renewal of parts of Vapor regulators. The 1-in. size is used in the feed and delivery pipes near the top of the regulator, and is so made that there is ample clearance for the union nuts when both are used on the



Regulator Connected with the Special Unions

same side of the regulator. The 1½-in. size is used for the bottom or return connections. The male end of the union (made of wrought iron) screws in the regulator casting, and the female end (made of brass) is used on the end of the pipe.

When a regulator is removed the male end of the union remains in the regulator and the female end of the union remains on the pipes, so that a duplicate regulator equipped with the male end of the union can be applied in place of a defective regulator very quickly and conveniently. This avoids the inconvenient and slow method of making repairs or renewal of parts to a Vapor regulator when it is attached to the pipes underneath the car.

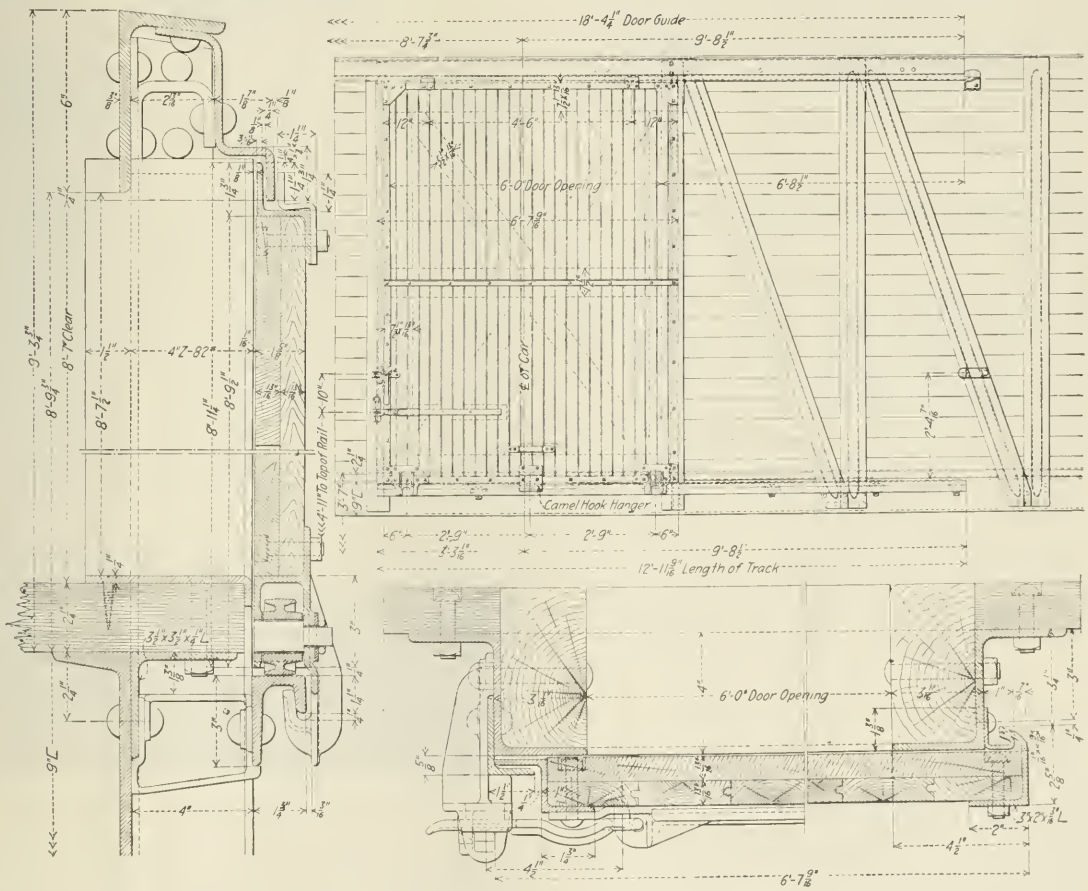
Bottom Supported Car Door

A BOX CAR DOOR OF NEW DESIGN which has been applied to cars built for the Railroad Administration is being exhibited by the Camel Company, Chicago. This door, which is known as the No. 50, is applicable to either single or double sheathed cars. The ilustration shows the arrangement of the door as applied to the single sheathed standard cars. It has a steel frame made of angles and two bars braced by gusset sheets at the four corners. The door guide, which is of ¼-in. pressed steel reinforced the side plate and fits between the Z-bars at the top of the frame. The rollers are mounted at the bottom and run on a continuous track of specially designed section. The hangers are of the double supported type, permitting of replacement of the wearing parts. A hook hanger between the rollers keeps the bottom end of the door from moving outward.

The door is made spark and weather-tight at the front door post by extending the flange of the Z-bar on the frame between the Z-bar and angle on the post, and at the rear post by a post strip which overlaps the angle on the frame when the door is closed. A burglar proof locking arrangement is used and a door starter of the eccentric type is located above the hasp. The design of the No. 50 door as applied to double sheathed cars is generally similar to the one illustrated, but there are numerous changes in the details.

Spring Journal Box Packing

THE UNIVERSAL PACKING & SERVICE COMPANY, CHICAGO, is exhibiting in the booth of the Anchor Packing Company a journal box which has been in service for ten months under a locomotive tender, without any new material being added or the waste in the box picked up. The packing used in this box is of a new type known as Spring Journal Box Packing. It is composed of thread stock cotton waste, with mechanically inserted coiled wire springs, to give it resilience.



Camel No. 50. Door Applied to Single Sheathed Standard Cars

Plain cotton waste is a good conveyor of oil, because of its high capillary properties, but lacks resilience. Wool waste has more resilience than cotton waste, but lacks the capillary properties of the cotton. In Spring Journal Box Packing cotton waste, with its high capillary qualities, is given a resilience much greater than that of plain wool by means of the inserted springs. The packing is made with either brass or steel springs, as may be specified. The springs are made of No. 18 gage wire, with a lineal pitch of ⅝ in., 2 in. long and 1 in. in diameter.

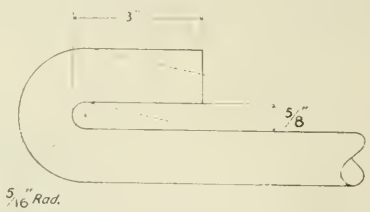
During the past twelve months a series of tests has been conducted which, it is claimed, has demonstrated that spring packing will produce entirely successful lubrication, requiring 20 per cent less weight of dry packing in the initial packing of the boxes, as compared with the amount necessary if packing without springs is used. This packing does not have to be picked up in the journal box with a packing iron at frequent intervals, nor is it necessary to add to the original amount of waste. Due to its looseness, or openness of structure, spring packing does not glaze over the surface which is in contact with the journal.

The springs are of an open pitch, so that when laid on the side they will have a spring action as well as when on end. The boxes should be packed in the same manner as with ordinary waste, except that it is unnecessary to pack them as tight, due to the fact that the springs will keep this packing against the journal, whereas in the case of plain waste there must be tight packing in order to get this result. Spring packing can be reclaimed by the same methods used with the ordinary packing when it has become dirty.

Detachable Drop Forged Brake Rod Jaw

The Schaefer Equipment Company, Pittsburgh, Pa., which manufactures the Schaefer truck lever connection, has developed and is showing at its booth, a drop-forged detachable type of brake rod jaw of improved design and increased strength as compared to the common welded-on type of jaw.

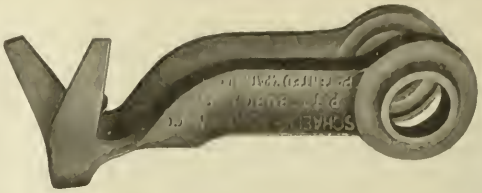
This jaw is made from open hearth low-carbon bar steel, and is so constructed that it is very easily attached



Proportions of the Bend in the Brake Rod

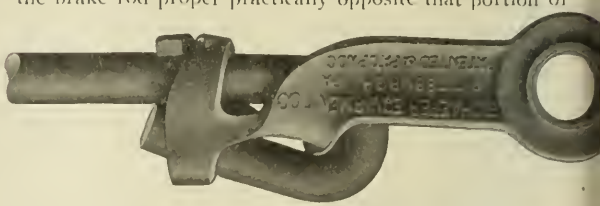
and is securely held to the rod by means of double locking prongs. In the event of a change in the length of brake rods, these prongs may easily be folded back and reattached without danger of damage to the brake jaw. It is of the same relatively light construction that characterizes the Schaefer design of brake lever connectors and is so proportioned that it will develop the full strength of any given size rod. At the booth may be seen several samples applicable to freight car equipment, which have been pulled to various loads, one of these having been subjected to a tension load of 32,200 lb., at which load the ⅞-in. diameter steel rod broke, the fracture occurring at a considerable distance from the point of attachment.

The advantages of the mechanical structure, as embodied in the design displayed, over other types of jaws



The Jaw with Locking Prongs Open

are that the bent over portion of the rod engages a solid portion of the jaw structure; the rod entering the jaw in a straight line with the hole, the locking prongs engaging the brake rod proper practically opposite that portion of



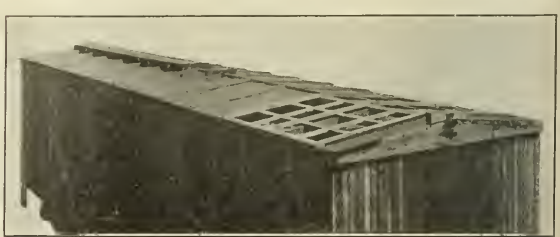
The Jaw Attached to the Brake Rod

the rod which locks the front end; and the jaws has been designed so that it can be produced in a drop forging operation with corresponding increase in strength and decrease in weight.

A Flexible Car Roof for Repairs

A new development in the repairing of car roofs is the application of a new all-steel flexible roof to the old carlines. This method has been developed by the Hutchins Car Roofing Company, Detroit, Mich.

In the past it has been necessary to use a special steel carline when applying a new steel flexible roof and the old carlines were usually scrapped; this waste of material is now eliminated and the labor cost of applying a new roof is reduced to a minimum. When applying a flexible roof in this manner the old roofing boards are removed, leaving the old carlines of wood or steel in place and the new all-steel flexible roof is applied direct to the old



The Flexible Roof Applied to the Old Carlines

carlines. These steel flexible roofs are made of 16, 18 or 20 gage sheet steel. This thickness is about three times that of the ordinary outside or inside metal roof, and because of the thickness of the weatherproofing steel sheets, together with the fact that no roofing boards are required, this method of repairing car roofs offers great possibilities in facility in repairing and economy in cost of material and labor.

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THE RAILWAY AGE is a member of the Audit Bureau of Circulations (A. B. C.) and the Associated Business Papers. (A. B. P.)

Discussing the Reports

The prediction has been made that the discussion of the reports at the convention will gradually grow less and less because under the better methods of organization which are being planned for the making up and working of the various committees, the reports will be so thorough and complete that there will be little need of very much general discussion. It is extremely doubtful whether this prediction will prove correct or that it would be desirable. It is true that there is a great deal of useless discussion that can be eliminated if the members generally study their reports carefully in advance. The great value of the conventions, however, is in having a large number of capable men from all sections of the country to criticise any statements that may be made or to suggest improvements or modifications in the findings of different committees. It may even be desirable for the General Committee deliberately to plan to insure having several of the best posted men in the country on each particular subject present to discuss each report. Some of the general engineering societies and two or three of the railroad clubs have got excellent results by specifically inviting different men well in advance of the time of meeting to discuss certain points in the reports which these men are particularly well fitted to talk on. The more thorough and complete the reports are, the greater the importance and value of having such expert discussion. This means that special and intelligent effort must be made to develop it.

The Coupler Exhibit

No action taken by the Master Car Builders' Association in recent years is so far-reaching in its effects as the adoption of the type *D* coupler. The development work was a matter with which the committee was principally concerned, but the maintenance of the coupler is of interest to all car men. For that reason it is to be hoped that every one attending the conventions will avail himself of the opportunity to visit the exhibit prepared by the Coupler Committee in co-operation with the coupler manufacturers. The exhibit of gages to insure interchangeability of parts is an indication of the care that is taken by the makers to secure satisfactory operation. The railroads must do their part to obviate trouble, and one of the best ways of attaining this end is to see that the construction and operation of the coupler is thoroughly understood. The descriptive circular distributed at the convention has been prepared with great care and merits the widest possible distribution.

A Businesslike Convention

Several of the railway supply manufacturers have stated that this is the most businesslike convention that has ever been held, and they hope that the high standard which has been set will be maintained and even raised still higher in the years to come. Various reasons are given for this change in spirit, such as its being part of the after-effect of the war, which is noticed generally, or the fact that there has been no convention for three years. Still others say it is because of the larger and more general attendance of railroad men, a very large number of whom come from long distances and who are at the meetings for the first time. Then, too, there are those who say that the most important factor is the suggestion that was made to the regional directors that the various representatives from each road be asked to report back to their managements in writing on the important and practical things that were drawn to their attention at the convention. Whether any one of these factors is more important than the other it is, of course, impossible to say. One thing is certain, the railroad men generally are making the most of their opportunity to get practical suggestions and the railway supply manufacturers feel that they have been mighty well repaid for the effort that they have made to bring their exhibits to Atlantic City. It may not be amiss to suggest that it is not too soon for the heads of the railway and railway supply associations to get together and, after analyzing the situation thoroughly, to start to prepare for the next convention along such lines as will insure continuing and further developing the businesslike spirit which has so thoroughly entered into the convention this year.

Increase Facilities for Car Repairs

THE SHORTAGE OF CAR REPAIR FACILITIES on American railroads was very strikingly brought out by the unusual conditions which existed during the war. The heavy traffic which the railroads were compelled to handle taxed the capacity of the rolling stock to the utmost and made it necessary to use every car which could turn a wheel. This resulted in serious deterioration of rolling stock, which bad order reports did not reflect. Figures compiled by the Mechanical Section of the Railroad Administration during the latter part of 1918, while they

showed a very good percentage of bad order cars and also indicated that the daily accumulation of bad orders was about balanced by the daily output of repairs, showed a much higher ratio of bad order cars shopped for heavy repairs than the ratio of the output of heavy repairs to the total number of cars repaired. Of course, this was in a measure due to conditions other than a lack of shop facilities, such for instance, as shortage of labor and the necessity for an early return of the cars to service; in the main, however, it could have been prevented had the railroads been provided with adequate car shop facilities.

Steel cars have now been in service for about twenty years and the extent of their use has been growing continually during that time. Adequate facilities to make heavy repairs to these cars, however, have not been provided and the time has now come when large numbers of them have reached the age where these facilities are badly needed. Many of the eastern roads and some of those in the southeast have provided shops equipped especially for handling steel car work. The western roads, however, have not anticipated their requirements and are seriously short of steel car repair facilities. With the lessons taught by the war fresh before them, it should be the duty of mechanical department officers carefully to consider and formulate plans for shop facilities which will be adequate to meet their requirements. The present situation with respect to capital expenditures will not continue indefinitely and it is well for the roads to have their programs laid out, ready to put into action when conditions change so that capital may be provided.

Limiting Loads for Freight Cars

THE COMPREHENSIVE STUDY of the factors affecting the permissible capacity of freight cars is a piece of work for which the Committee on Car Trucks deserves to be commended. While the proposed methods of marking cars are a radical departure from the former practice, they are more logical, and the change should be welcomed by both shippers and railroad employees. The last paragraph of Interchange Rule 3-d, which was to be effective October 1, 1920, would have made it necessary to reduce the allowable loads for cars having axles of less capacity than required by the sum of the light weight and the marked capacity. If the committee's recommendations are adopted the maximum axle capacity will be made the basis for increases as well as decreases in the permissible loads.

The capacity of some of the equipment now in service will be appreciably changed by the new rules. The allowable load on cars of 60,000 lb. capacity will in general be decreased, while on the heavier equipment and notably on the 80,000 lb. capacity cars there will be an increase (assuming that the car bodies are considered strong enough to carry the extra weight). The load limits established for cars with non-M. C. B. standard axles should result in such axles being retired rapidily. Statistics regarding the number of cars that will be affected were furnished by only one road, but this probably represents a large proportion of the total equipment. Whatever the results, the committee's action seems fully justified considering the time that has elapsed since the adoption of the M. C. B. standard axles.

The new method of determining the allowable load may have an appreciable effect on the design of cars. In the past the desire to reduce the deadweight carried has been the only incentive for designing light cars. The proposed rules will give light cars a double advantage: not only will the deadweight be less, but the maximum load will be increased as well. Of course, the stresses in the car will increase as the load increases and no very great reduction in weight will be feasible. The problem is to balance the saving in transportation expense against the cost of repairs. If the proportion of paying load can be increased by lighter construction, such design may prove economical, even though it results in higher maintenance costs for the equipment.

Important Effect of A. R. A. Meeting Here

ONE OF THE ILLUSIONS which many railway executives and operating officers have cherished for years has been that the mechanical conventions were largely junkets. Few of them have appreciated the large amount of important work done at the conventions and the great educational value of the exhibit of equipment and supplies made in connection with them.

Because this misunderstanding has prevailed so widely, the visit of the executive committee of the American Railroad Association to the pier on Thursday was of very great importance. By the reorganization of the American Railroad Association the mechanical associations have lost their independence and in consequence, to a large extent, the future of the conventions and of the exhibit depends upon the attitude that would be assumed in future by the operating executives.

The comments made by members of the executive committee who were here—comments made both in public and in private—make certain that most or all of them have gone away from Atlantic City with a realization of the fact that the conventions and the exhibit constitute a great educational institution, which contributes more than can be estimated to broadening the vision and increasing the efficiency of the officers of the mechanical departments of the railways. It is a fact that in years long past there was conduct at the conventions which would not have borne close scrutiny. The conventions have suffered ever since from a taint acquired at that time. But for many years there have been no cleaner and more wholesome gatherings than the mechanical conventions.

There never was a doubt that the mechanical conventions would be continued to be held, but there has been talk at times of taking them some place where the exhibit could not be held. This would have been a serious mistake, since from an educational point of view the exhibit is fully as valuable as the convention sessions. The visit of the members of the executive committee to the pier this week cannot fail to have the effect of making the operating executives, generally, regard in a very favorable way the sessions which are hold here and the exhibit which is made, and the more operating executives that attend the conventions, the more favorable their impression of the value of the sessions and the exhibit will become.

Since the mechanical associations have been merged into a section of the American Railroad Association it would seem that there is good reason why the executive committee of the A. R. A. should in future meet once a year where the mechanical convention is held and look over the exhibit. The enterprise of the railway supply manufacturers deserves this recognition, and it would be very beneficial to the railways for the higher operating officers to keep in touch with the progress being constantly made by the supply companies in the design and manufacture of equipment and supplies.

Program for Today and Tomorrow

Saturday, June 21, 1919

9.30 A. M. TO 12.00 M.

Discussion of Report on Train Lighting and Equipment 9.30 A. M. to 10.00 A. M.
Consideration of Rules of Order..
Election of Officers, General Committee and Nominating Committee—Presentation of Badges to retiring Officers, Etc. ..... 10.00 A. M. to 12.00 M.

ENTERTAINMENT

10.30 A. M.—Band Concert at Entrance Hall, Million Dollar Pier. Royal Scotch Highlanders' Band.

8.30 P. M.—A special program has been prepared in appreciation of the railway and railway supply men who went into the service during the war. The speakers will be Franklin D. Roosevelt, Assistant Secretary of the Navy; Brigadier-General W. W. Atterbury, Col. Henry W. Hodge, and Senator Walter E. Edge, New Jersey's war governor.

Sunday, June 22, 1919

3.30 P. M.—Sacred Concert. Music Rooms of Marlborough-Blenheim. Fry Philharmonic Orchestra.

Pictures from the Front

ON SUNDAY EVENING, at 8.15, an entertainment will be given on the pier. The program includes the presentation of an interesting series of motion pictures, representing large naval guns in action in France. These pictures will be exhibited by the United States Navy, and a naval officer will be present to explain them.

Lost and Found

LOST—Badge No. 2425, issued to W. S. Clock. If found, please leave at the *Railway Age* booth.

LOST—Lady's badge No. 4334, lost last night on pier. Mrs. H. E. Graham, Room 1306, Hotel Traymore.

LOST—On dance floor, Thursday night, badge No. 4209. Mrs. J. E. Gierney, L. & A. Railway, Room 35, Hotel Sterling.

LOST—R. S. M. A. badge No. 2425 by Mr. Clock, Joyce-Cridland Company, Strand Hotel.

LOST—Bar pin, gold, three inches long, with square blue stone. E. D. Knapp, Iroquois Hotel.

LOST—R. S. M. A. badge No. 3226. Please return to the office of the Enrollment Committee or any member.

LOST—R. S. M. A. badge No. 5349. Return to Enrollment Committee.

Railway Artillery

THE CONVENTION ATTENDANTS have a real treat before them in a special feature which was arranged for too late to go on the official program but which will precede the informal dance on Monday evening. Major E. D. Campbell, of the Railway and Seacoast Section, Artillery Division, Ordnance Department, United States Navy, has been assigned by the Navy Department to deliver an illustrated lecture on Railway Artillery. Readers of the *Railway Age* have followed with much interest the development and use of railway artillery during the war and will undoubtedly appreciate the importance of this announcement. The lecture will be given in the Hippodrome at 9.00 P. M. Following it a representative of the Navy Department will show pictures illustrating the effect of the 14-in. guns on the other side.

Traveling Engineers' Meeting

THE EXECUTIVE COMMITTEE of the Traveling Engineers' Supply Men's Association will hold a meeting in the Green Room of the Marlborough-Blenheim at one o'clock Saturday.

The Grand Ball

IT IS GENERALLY CONCEDED that the social events of the week have been delightful affairs, but it must be admitted that last night's event on the Million Dollar Steel Pier eclipsed all previous social functions. It was the convention grand ball. Fully three thousand conventionites were in attendance.

At 10 o'clock the grand march was started. It was headed by the officers and members of the executive committee of Mechanical Section III, American Railroad Association, and their ladies. The ball room of the pier certainly never presented a more beautiful sight. At the conclusion of the march the Royal Scotch Highlanders' band began a twenty-dance program. The pleasure was continued until long after midnight.

William M. Wilson, Chairman, was ably assisted in the management of the evening's entertainment by the following: G. A. Nichol, R. J. Himmelright, J. C. C. Holding, J. L. Paxton, L. O. Cameron, N. C. Naylor, Ellsworth Haring and H. E. Passmore.

R. S. M. A. Annual Meetings

THE DISTRICT MEETINGS of the Railway Supply Manufacturers' Association will be held from 9 A. M. to 10.30 A. M. this morning in the Executive Committee Room, which is next to the Enrollment Booth. It will be necessary for the third district (Pennsylvania) to elect two men to the Executive Committee for three years; for the fifth district (Illinois, Wisconsin, Iowa and Minnesota) to elect one member for three years, and for the sixth district (Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Kentucky and Tennessee) to elect one member for three years. A special election is also necessary for the fourth district (Ohio, Indiana and Michigan) to elect a member to serve one year to fill the unexpired term of J. F. Schurch, who has moved out of the district.

The annual meeting of the Railway Supply Manufacturers' Association, itself, will be held at 11 o'clock this morning in the Hippodrome. It will be necessary to elect a president and a vice-president. The nominating committee on Wednesday nominated W. S. Bartholomew as president and J. F. Schurch as vice-president. Mr. Bartholomew found that it would impossible for him to accept the nomination. Following the receipt of a letter to this effect, it was necessary to hurriedly circulate a petition in order that another nomination be posted, in accordance with the requirements of the Constitution and By-Laws, before six o'clock last night. George R. Carr, who is a member of the Executive Committee representing the Fifth District and who is a vice-president of the Dearborn Chemical Company, was nominated.

Just before six o'clock last evening a petition placing George Hull Porter, of the Western Electric Company, in nomination for the office of vice-president of the Railway Supply Manufacturers' Association, was posted

on the bulletin board on the Million Dollar Pier. Mr. Porter will therefore be Mr. Schurch's opponent for the office of vice president at the election to-day.

Important Special Program for This Evening

COMPLETE DETAILS concerning the special program this evening were not available when the official program was published. The nature of the meeting is so important that the Railway Supply Manufacturers' Association, which has the program in charge, is desirous of giving the information concerning the program as widespread publicity as possible. A great many of the railway men and railway supply men were called into the service during the war; many of them in uniform and many to help in looking after the necessary work behind the lines on this side. It is quite appropriate, therefore, that recognition of this service should take the form of a patriotic program in appreciation of the work done by these men.

The committee in charge has been fortunate in securing as speakers Franklin D. Roosevelt, Assistant Secretary of the Navy, who will speak for the administration on behalf of the War and Navy Departments; Colonel Henry W. Hodge, who was Assistant Chief Engineer of the American Expeditionary Forces and who will tell of the achievements of the railway men in France, and Senator Walter E. Edge, who was Governor of New Jersey during the war. It is expected that Brig. General W. W. Atterbury, who did such splendid work as Director General of Transportation of the American Expeditionary Forces under General Pershing, will deliver an address.

R. H. Aishton Praises the Exhibit

THE MOST ENTHUSIASTIC man on the pier yesterday regarding the exhibit of equipment and supplies made by the railway supply manufacturers this year was R. H. Aishton, regional director of the Northwestern region and new president of the American Railroad Association. Mr. Aishton, accompanied by General Secretary Fairbanks, of the A. R. A., arrived on the pier early yesterday morning and was shown through the exhibit by E. H. Walker, president of the Railway Supply Manufacturers' Association. He and Mr. Fairbanks saw the entire exhibit as thoroughly as could be done in a half day. After he had finished his tour of inspection Mr. Aishton said:

"I confess that before coming here I had no adequate idea of the magnitude, completeness and importance of this exhibit. The railway supply manufacturers of the United States deserve the greatest credit for having made such an exhibit, especially under present conditions and in view of the fact that for two years they have had nowhere near a normal business. It is a fine expression of their optimism as well as their enterprise.

"The railway executives of the country have not appreciated the value and importance of the exhibit in past years because most of them have not seen it. Its educational value, especially to mechanical officers, could hardly be exaggerated. I cannot imagine anything which would do more to increase the railway mechanical officers' efficiency than to come and spend six or seven days thoroughly studying the equipment and devices being shown, their uses and methods of operations. Furthermore, it would be of great value to the railways to have their purchasing agents come here and thoroughly inspect the exhibit. I am extremely glad to have had opportunity to see this one and I hope to see more of them in the future."

Mr. Aishton was accompanied to Atlantic City by Mrs. Aishton and they stayed until yesterday afternoon, when they started on their return homeward to Chicago.

Railway Club Secretaries Meet

ONLY TWO ORGANIZATIONS enrolled in the Society of Railway Club Secretaries were not represented at the adjourned annual meeting of the society Friday morning, at the Blenheim. The session lasted several hours with A. J. Merrill, of Atlanta, presiding. While much of the time was taken up with an interchange of experiences as to practices and methods in handling club work, several subjects of special interest to executive officers and club members were discussed.

It was agreed that in view of the suspension of activities during the war period and the condition of the treasury it would not be necessary to ask the clubs to contribute the usual assessment this year. In addition to economizing in running expenses the society invested in a Third Liberty Loan bond and hopes to be able to hold it in reserve until its payment becomes due.

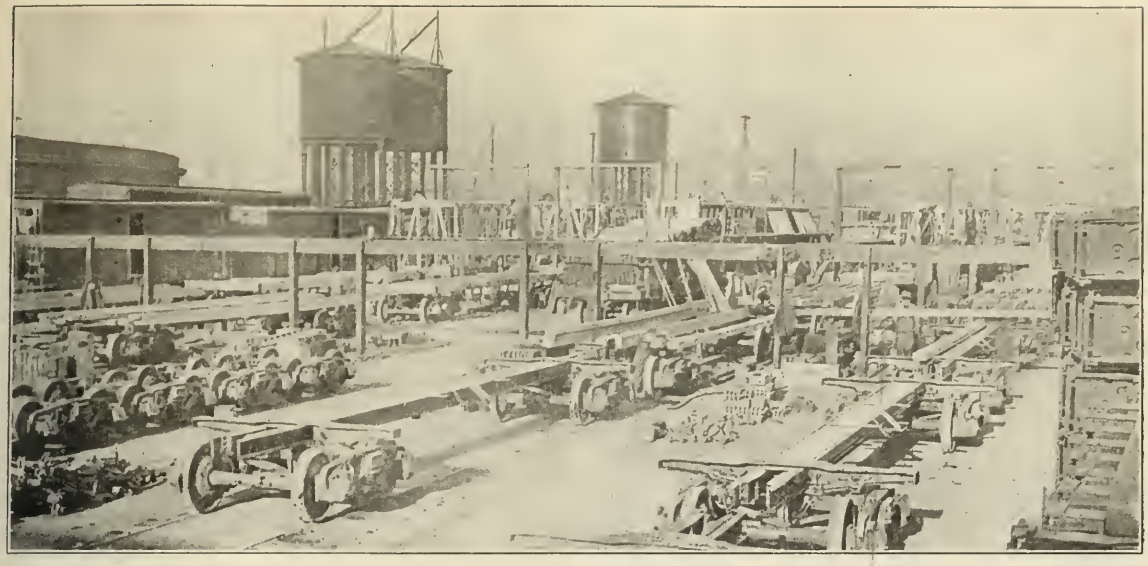
Vice-President Wood, of the Pacific Railway Club, after conferring with the secretaries, and having attended their luncheon, stated that he was much impressed by the earnestness and activity shown, and on his return home would recommend that his club become a member of the society.

The possibility of the western club resuming its membership was the subject of an encouraging report. It was decided that future annual meetings in connection with the Mechanical Section of the American Railroad Association shall be held on the first Saturday of the convention period, preceded on the previous Friday by a "Round Table Luncheon," each secretary to arrange for the attendance as a guest of the society of the highest ranking officer of his club present at the convention.

In connection with a referred subject from the New York and Central Clubs, an adverse decision was reached as to whether it would be advantageous for railroad clubs to identify themselves with the activities of the National Engineering Council organized in Chicago. The reason was that as railroad clubs have not a large representation of the engineering profession in their membership and the various engineering societies being actively identified with the work contemplated by the promoters of the council, it would be an undesirable duplication of membership for the railroad clubs to unite with it.

In considering conditions incident for two years to the attitude and policy of the postoffice department with respect to the postal privileges of the clubs in mailing Official Proceedings, it was agreed to recommend to the executive committees that as the clubs have a combined membership of 8,000 or more, they should unite in petitioning the Postmaster-General to reopen the matter, and give it his personal consideration. It is believed that if this can be accomplished, the question can be presented in a manner calculated to secure more favorable consideration. After electing the following officers for the ensuing year, the society adjourned subject to call:

Chairman, A. J. Merrill, Atlanta, Ga.; Vice-Chairman, W. E. Cade, Jr., Boston; Secretary-Treasurer, Harry D. Wright, New York City.



Building Freight Cars at Los Angeles on the Southern Pacific. Copyright by International Film Service.

American Railroad Association, Section III, Mechanical

Report of Proceedings for Friday; Convention Hall Crowded; Lively Discussion

THE FRIDAY MORNING session of the American Railroad Association, Section III, Mechanical, was called to order by Chairman Chambers at 9.40 o'clock.

The chairman stated that the Committee on Safety Appliances had submitted a written report, because it was not possible to have it printed in time for the convention.

Report of the Standing Committee on Safety Appliances

NO REPORT WAS PRINTED by the Committee on Safety Appliances, because it was not possible to get the information together to draft such a report. The information, however, reached the chairman on June 16 and the attached report has been compiled for your consideration. It will be noted that this includes the total number of cars owned in each region, the total number equipped with safety appliances, those remaining to be equipped, and the percentage remaining to be equipped as per cars owned. The totals of all regions are also shown, from which it will be noted that there are still 89,645 cars to be equipped, or 3.8 per cent of the equipment owned. This should receive vigorous action from all roads until such cars are so equipped.

EXHIBIT A

STATEMENT OF FREIGHT CARS EQUIPPED AND REMAINING TO BE EQUIPPED WITH SAFETY APPLIANCES AS OF MARCH 31, 1919

Regions	Total Freight Cars Owned	Equipped with Safety Appliances	Remaining to be Equipped	Per cent of Cars Owned Remaining to be Equipped
Eastern	604,622	580,425	24,197	4.0
Allegheny	467,099	448,004	19,095	4.1
Pocohontas	107,857	105,214	2,643	2.5
Southern	299,166	290,497	8,669	2.9
Central Western	334,791	325,462	9,329	2.8
Southwestern	168,284	158,621	9,663	5.7
Northwestern	390,949	374,900	16,049	4.1
TOTAL	2,372,768	2,283,123	89,645	3.8

EXHIBIT B

EASTERN REGION

STATEMENT OF FREIGHT CARS EQUIPPED AND REMAINING TO BE EQUIPPED WITH SAFETY APPLIANCES AS OF MARCH 31, 1919

Railroads	Total Freight Cars Owned	Equipped with Safety Appliances	Remaining to be Equipped	Per cent of Cars Owned Remaining to be Equipped
Ann Arbor	1,960	1,243	717	36.6
Bangor & Aroostook	5,034	4,353	681	13.5
Boston & Albany	7,612	7,603	9	.12
Boston & Maine	21,039	20,993	46	.2
Buffalo, Roch. & Pittsburgh	17,697	15,438	2,259	12.7
Central Vermont	2,816	2,656	160	5.68
Chicago, Ind. & Louisville	6,201	5,978	223	3.6
Cinn., Ind. & Western	2,440	2,013	427	17.5
Cincinnati Northern	1,596	1,468	128	8.0
Clev., Cin., Chic. & St. Louis	33,210	32,131	1,079	3.2
Delaware & Hudson	18,705	18,522	183	.98
Del., Lack. & Western	28,439	28,422	17	.05
Detroit & Mackinac	1,487	1,407	80	5.3
Det., Toledo & Ironton	3,092	2,951	141	4.5
Det., Toledo Shore Line	201	201	0	.0
Erie	59,266	56,689	2,577	4.57
Grand Trunk Western	6,002	5,028	974	16.2
Hocking Valley	14,446	14,203	243	1.6
Kanawha & Michigan (including K. & W. Va.)	6,406	5,920	486	7.29
Lake Erie & Western (including Northern Ohio)	3,374	3,227	147	4.4
Lehigh & Hudson River	531	531	0	.0
Lehigh & New England	3,529	3,529	0	.0
Lehigh Valley	42,601	42,535	66	.16
Maine Central	8,585	8,476	109	1.26
Michigan Central	34,651	33,482	1,169	3.27
New York Central	136,350	128,630	7,720	5.21
New York, Chi. & St. Louis	11,626	10,535	1,091	9.0
New York, New Hav. & Hartford	38,437	37,395	1,042	2.79
New York, Ontario & Western	5,422	4,996	426	7.57

Railroads	Total Freight Cars Owned	Equipped with Safety Appliances	Remaining to be Equipped	Per cent of Cars Owned Remaining to be Equipped
Pere Marquette	15,920	15,845	75	.47
Pittsburgh & Lake Erie	33,506	33,051	455	1.3
Pittsburgh & Shawmut	2,373	2,360	13	.54
Pittsburgh & W. Va	3,246	3,246	0	.0
Rutland	2,464	2,433	31	1.2
Toledo & Ohio Central	9,480	9,245	235	2.37
Toledo, St Louis & W	2,682	2,512	170	6.4
Ulster & Delaware	170	170	0	.0
Wheeling & Lake Erie	7,809	6,984	825	10.42
New York, Susq. & W	2,638	2,572	66	2.5
Detroit Bay City & W	112	101	11	9.8
Central Indiana	157	124	33	21.0
Susquehanna & N. Y	176	105	71	40.3
Central New England	1,134	1,122	12	1.1
Total	604,622	580,425	24,197	4.0

Statement of Freight Cars Equipped and Remaining to be Equipped with Safety Appliances as of March 31, 1919
Allegheny Region

Railroads	Total Freight Cars Owned	Equipped with Safety Appliances	Remaining to be Equipped	Per cent of Cars Owned Remaining to be Equipped
Balt. & Ohio (Entire)	97,197	88,463	8,734	8.8
Bessemer & Lake Erie	15,708	15,305	403	2.6
Buffalo & Susquehanna	3,236	3,169	67	2.1
Central R. R. of N. J	27,182	25,679	1,503	5.5
Cumberland Valley	596	520	76	10.6
Grand Rapids & Indiana	2,969	2,755	214	7.0
Long Island	1,214	1,168	46	3.0
Pennsylvania Lines East	168,387	165,341	3,046	1.8
Pennsylvania Lines West	95,006	91,012	3,994	4.2
Philadelphia & Reading	42,144	41,321	823	1.9
Staten Is. Rapid Transit	.....	.....	.....	0.0
Western Maryland	13,460	13,271	189	1.4
Total	467,099	448,004	19,095	4.1

Statement of Freight Cars Equipped and Remaining to be Equipped with Safety Appliances as of March 31, 1919
Pocohontas Region

Railroads	Total Freight Cars Owned	Equipped with Safety Appliances	Remaining to be Equipped	Per cent of Cars Owned Remaining to be Equipped
Chesapeake & Ohio	48,162	45,576	2,586	5.3
Norfolk & Western	50,648	50,614	34	0.07
Virginian	8,897	8,897	.....	0.0
Ashland Coal & Iron	150	127	23	15.3
Total	107,857	105,214	2,643	2.5

Statement of Freight Cars Equipped and Remaining to be Equipped with Safety Appliances as of March 31, 1919
Southern Region

Railroads	Total Freight Cars Owned	Equipped with Safety Appliances	Remaining to be Equipped	Per cent of Cars Owned Remaining to be Equipped
Alabama & Vicksburg	1,058	1,058	0	0.0
Atlanta, Bir. & Atl	2,921	2,815	106	3.0
Atlantic Coast Line	29,502	27,811	1,691	5.0
Atlanta & West Point	1,548	1,439	109	7.0
Carolina, Clinch. & Ohio	6,708	6,544	164	2.7
Central of Georgia	9,567	9,136	431	4.3
Charleston & W. Car	938	899	39	3.0
Florida East Coast	1,964	1,963	1	0.5
Georgia	1,860	1,739	121	6.0
Georgia Southern & Fla.	2,340	1,985	355	15.0
Gulf, Mobile & Northern	1,755	1,717	38	2.0
Gulf & Ship Island	1,446	1,446	0	0.0
Illinois Central	67,847	66,240	1,607	2.0
Louisville & Nashville	54,749	53,717	1,032	1.8
Louisville & Il. & St. L.	492	492	0	0.0
Mobile & Ohio	12,014	11,807	207	1.7
Nashville, C. & St. L.	10,287	9,502	785	7.0
New Orleans Gt. North.	1,453	1,245	208	14.3
Norfolk Southern	3,602	3,102	500	13.4
Richmond, Fred. & Pot.	936	893	43	4.6
Seaboard Air Line	17,187	16,908	279	1.6
Southern Railway	68,113	67,280	833	1.2
Tennessee Central	388	296	92	18.0
Georgia & Florida	491	463	28	5.0
Total	299,166	290,497	8,669	2.9

Statement of Freight Cars Equipped and Remaining to be Equipped with Safety Appliances as of March 31, 1919
Central Western Region

Railroads	Total Freight Cars Owned	Equipped with Safety Appliances	Remaining to be Equipped	Per cent of Cars Owned Remaining to be Equipped
Arizona Eastern	171	161	10	6.0
Atchison, Top. & Santa Fe	69,424	67,224	2,200	3.6
Chicago & Alton	13,070	12,606	464	3.4
Chi., Burlington & Quincy	70,242	70,116	124	1.6
Chi. & Eastern Illinois	24,385	22,404	1,981	8.1
Chi., Peoria & St. Louis	1,691	1,541	150	7.9
Chi., Rock Island & Pac.	45,246	44,087	1,159	2.4
Chi., Terra Haute & S. E.	6,892	6,642	250	3.6
Colorado Southern	6,896	6,639	257	3.4
Denver & Rio Grande	17,193	16,716	477	2.6
Denver & Salt Lake	1,121	996	125	9.7
El Paso Southwestern	4,258	4,235	23	0.5
Los Angeles & Salt Lake	5,273	5,257	16	0.3
Northwestern Pacific	1,304	1,304	0	0.0
Oregon Short Line	13,915	13,779	136	1.0
Toledo, Peoria & Western	1,799	1,725	74	4.1
Union Pacific	23,436	22,932	504	2.0
Wabash	17,862	17,373	489	2.6
Western Pacific	5,293	5,061	232	4.3
Ft. Worth & Denver City	3,951	3,528	423	10.5
Gilmor & Pittsburgh	207	48	159	66.0
Peoria Ry. Terminal	49	48	1	22.2
P. & P. U.	227	218	9	3.9
St. J. & G. I.	512	502	10	1.8
Wichita Valley	140	84	56	40.6
D. R. I. & N.	122	122	0	0.0
Des Moines Union	18	18	0	0.0
Illinois Terminal	84	84	0	0.0
Rapid City, Black Hills & Western	10	10	0	0.0
Total	334,791	325,462	9,329	2.8

Statement of Freight Cars Equipped and Remaining to be Equipped with Safety Appliances as of March 31, 1919
Southwestern Region

Railroads	Total Freight Cars Owned	Equipped with Safety Appliances	Remaining to be Equipped	Per cent of Cars Owned Remaining to be Equipped
Fort Worth & Rio Grande	0	0	0	0.0
Gulf Colorado & Santa Fe	762	757	5	0.7
Gulf Coast Lines	3 670	3,308	362	9.9
Internl. & Great Northern	5.484	5.162	322	5 9
Kansas City Southern	5.091	4.688	403	7 9
Kan. City, Mex. & Orient.	1,638	1,501	137	8.4
Louisiana & Arkansas	1,161	1,161	0	0.0
Midland Valley	1,720	1,665	55	3.2
Missouri, Kansas & Texas	21,889	20,020	1,869	8.5
Missouri & N. Arksansas	715	637	78	10.9
Missouri Pacific	45,443	45,313	130	0.3
San Antonio & Ark. Pass	2,587	2,340	247	9.5
Missouri, Okl. & Gulf	1,304	854	450	34.5
Southern Pacific	16,975	16,053	922	5.4
St. Louis, San Francisco	30,912	28,422	2,490	8.1
St. Louis, Southwestern	13,900	13,304	596	4.3
Texas & Pacific	10,255	9,811	444	4.3
Vicksburg, Shreveport & Pacific	946	860	86	9.1
Arkansas Central	34	34	0	0.0
Memphis, Dallas & Gulf	118	103	15	12 7
St. Louis, San Fran. & Texas	73	68	5	6.8
Kansas City, Clinton & Sprinfield	43	38	5	11.6
Quanah, Acme & Pacific	60	52	8	13.3
Galveston, Houston & Henderson	55	53	2	3.6
Houston & Brazos Valley	20	2	18	90.0
Weatherford, Mineral Wells & N. W.	11	11	0	0.0
Gulf, Texas & Western	88	79	9	10.2
Texas, Midland	206	206	0	0.0
San Antonio, Uvalde & Gulf	128	56	72	56 3
Trinity & Brazos Valley	1,482	872	610	41.2
Terminal R. R. Asso. of St. L.	113	113	0	0.0
St. Louis Merch. Bridge Term.	16	16	0	0.0
East St. Louis Connecting	12	12	0	0.0
St. Louis Transfer	9	9	0	0.0
Alton & Southern	311	168	143	46.0
Litchfield & Madison	1,053	873	180	17.1
Total	168,284	158,821	9,663	5.7

Statement of Freight Cars Equipped and Remaining to be Equipped with Safety Appliances as of March 31, 1919
Northwestern Region

Railroads	Total Freight Cars Owned	Equipped with Safety Appliances	Remaining to be Equipped	Per cent of Cars Owned Remaining to be Equipped
Chi. Great Western	10,360	9,642	718	7.8
Chi., Mil. & St. Paul	64,361	55,597	8,764	13.6
Chi. & Northwestern	73,940	73,340	600	0.8
Chi., St. Paul, Minn. & Omaha	13,419	13,016	403	3.0
Duluth & Iron Range	7,151	7,151	0	0.0
Duluth, Miss. & Northern	9,350	9,323	27	0.3
Duluth, S. S. & Atl.	2,875	2,760	115	4.0

Railroads	Total Freight Cars Owned	Equipped with Safety Appliances	Cars Remaining to be Equipped	Per cent of Cars Owned Remaining to be Equipped
Elgin, Joliet & Eastern..	11,284	11,084	200	1.8
Great Northern	58,452	57,992	460	0.8
Mineral Range	1,024	995	29	2.8
Minn. & St. Louis.....	8,990	7,595	1,395	15.5
Minn., St. Paul & S. S. Marie	25,088	25,052	38	0.14
Northern Pacific	53,400	51,799	1,601	2.9
Oregon, Washington R. R. & Nav. Co.....	7,677	7,495	182	2.4
Southern Pacific	35,486	34,645	841	2.3
Spokane, Portl'd & Seattle	819	819	0	0.0
Ontonagon	90	2	88	97.0
Escanaba & Lake Sup...	417	417	0	0.0
Bolt	278	278	0	0.0
Chi. & Western Indiana.	648	648	0	0.0
Chicago Junction	284	284	0	0.0
Chi., Milwaukee & Gary.	269	195	74	27.5
Ft. Dodge, DesMoines & Southern	2,427	2,080	347	14.3
Green Bay & Western..	1,250	1,172	78	6.2
Indiana Harbor Belt....	41	31	10	24.0
Manistique & Lake Sup.	203	188	15	7.3
Copper Range	626	626	0	0.0
Chicago River & Indiana.	51	5	46	90.0
Fairchild & Northeastern.	20	20	0	0.0
Pacific Coast	518	518	0	0.0
St. Paul Bridge & Terminal	8	8	0	0.0
Waterloo, Cedar Falls & Northern	143	143	0	0.0
TOTAL	390,949	374,900	16,049	4.1

The report is signed by C. E. Chambers (Chairman), U. S. R. A.; D. R. MacBain, New York Central; C. E. Fuller, Union Pacific; C. B. Young, U. S. R. A.; H. Bartlett, Boston & Maine; E. A. Sweeley, Seaboard Air Line; H. T. Bently, Chicago & North Western.

Discussion

Mr. Brazier: It is very clear that the law defines that after September 1, 1919, no cars shall be received in interchange unless so equipped. You have had plenty of notice, and I would like to give you a few facts on the road which I represent. I thought that under government control all cars were home wherever they were, and I have treated them as such, but I find this is not a fact. The New York Central has equipped, in the last two years, between 500 and 600 foreign cars with safety appliances, and less than 10 cars of the New York Central have been equipped on the foreign lines. Our cars are somewhere in this country, and we would be pleased to have you put safety appliances on them so we can live up to the law. Under Federal control no cars are to be received after September 1, 1919, unless they are equipped with safety appliances. That means you must hold the cars on your lines and equip them before they are offered in interchange.

Mr. Tollerton: What Mr. Brazier has said is true. However, it seems from this report that the number of cars still unequipped with safety appliances is very small. We have all had a vast number of foreign cars on our lines during the past year and a half. There is an effort now being made to get the cars home. Our line has provided special material for equipping cars with safety appliances and I think many of the other railroads have provided the same thing. If the rule is provided that before September 1st these cars on foreign lines must be equipped with safety appliances, it will leave the individual lines with a lot of material they cannot use.

As the number of cars still uneqipped is so small, I believe it will put an unnecessary burden on the railroads to insist on the observance of September 1st as the date when cars shall be refused in interchange if they are not equippd with the safety appliances.

The time should be extended, to give time for these cars to get home, so that the individual lines can equip them with the material they have on hand. I offer a resolution at this convention, that we go on record as asking the Interstate Commerce Commission to extend the time for the application of the safety appliances until January 1, 1921, instead of September 1st of this year.

Chairman: I will put the original motion made by Mr. Fuller to accept this report before we take further action.

The motion was put to vote and carried.

Mr. Brazier: I will second the resolution made by Mr. Tollerton. The material Mr. Tollerton speaks of is standard, and the roads are equipping the cars with this standard material. We do not care about the safety appliances put on our equipment as long as they comply with the Federal laws.

I think it is in the hands of the government to say whether they will extend the time, or insist on our having the equipment provided with the safety appliances by September 1, 1919. I would like to see all the cars equipped. The equipment is standard to our cars and will be in the nature of repair work in the future.

C. E. Fuller (U. P.): If we could get the cars home we would do the work. There never was a time so opportune, nor a power so strong, as exists today that can get the cars home. I would like to see something go on the record to the effect that the movement of foreign cars to the home line shall be put into operation immediately. We received some cars recently that had not been on our line in 12 years. They were not equipped with safety appliances, or very much of anything else when they got home. I think that if this Association would go on record as asking the director general of railroads to make some rule—although there is a rule now in force to that effect—to have the cars returned home, and have this made absolutely effective, this question can be handled very easily and expeditiously.

T. H. Goodnow (C. & N. W.): In connecion with the motion made by Mr. Tollerton, I was going to say that all railroads have undertaken to equip a great many cars in the last 18 months, which it was never anticipated would be equipped. We had a retiring schedule lined up, with several thousand cars on that schedule, which, had it not been for the conditions caused by the war, would have been retired by this time. They were old, light capacity cars, but instead of retiring them we withdrew the schedule and have been repairing the cars, so that in a way accounts for a number of cars in the country at the present time that remain unequipped.

So that there will be as little interference as possible in the interchange of cars when the law becomes effective, it will be necessary to see that th intrchange inspectors are educated. While the United States standards are alike, their manner of application has not been the same on account of the construction of cars, and if inspectors are not educated, undoubtedly there will be cars rejected or refused that should be accepted, and others accepted that possibly should not be.

Mr. Gaines: I think this a very opportune time to request the Railroad Administration to make it imperative to send them home. While there is a rule out to send foreign cars home as rapidly as possible, it could be made imperative to send such cars home as are not equipped with safety appliances, and I think if that were done the majority of roads can get the cars home in time to put the safety appliances on in the near future. I don't know whether they could do it all by September 1 or not, but they could do a great many of them.

Mr. McManamy: So that we won't misunderstand the attitude of the Railroad Administration, I will say that rules are in existence for sending foreign cars home as needed for general repairs, or for betterments. I don't think there is anyone in this convention that would seriously ask the Railroad Administration to send empty cars long distances home to have ladders, handholds, hand brakes, or standard running boards, put on them. We have to consider the empty car mileage in that connection, and if we send cars four or five hundred or a thousand miles, for the application of such minor appliances, the actual cost of movement of the empty car will be several times the cost of the repairs. The Railroad Administration is trying to use judgment in the matter of sending cars home for repairs of any kind, realizing all the time that as a general proposition, heavy repairs or the application of betterments, can be better and more satisfactorily performed on the home line.

That is the principle that the Railroad Administration is fol-

lowing. But I am quite sure that this convention would not want to go on record as asking for cars to be sent home for the application, for instance, of the additional sill steps required by the law, or for the application of additional ladders or for the standardization of hand brakes. Where the safety appliances required mean practically the rebuilding of the car, every road has it in its own hands to have a car sent home by applying for it. If a request from any road is made to the Railroad Administration that such cars be sent home for extensive repairs or the application of betterments, orders are issued through the Car Service Section to send the car home, and you get them as fast as may be necessary—as fast as you can handle them.

We have had to regulate the sending of cars home because some roads were being buried in bad order cars, which other roads were sending home without request. Those things have to be handled in a broad way. We have at present, if I recall correctly, about 89,000 cars that are not yet equipped with U. S. safety appliance standards. During the last year we have equipped about 11,000. The time is not long, and in many instances the work is not very heavy, but there is not a railroad shop in the country that cannot put the standard safety appliances on any car just about as cheaply as they can be applied at home, with the exception of changing the superstructure of the car to give necessary end ladder clearance. The other things can be standardized much more quickly, and just as satisfactorily by any line and at any shop, as they can at home, and we will save a great deal of extra empty car mileage in that way.

It may be possible that it will be found desirable to ask the Interstate Commerce Commission for an extension of time, but we must remember that the Commission has been frequently asked for extensions of time on this matter, and I think we will all agree that it has been very fair and even liberal in the granting of such extensions when the need for them could be shown. I think this convention should take some action which would expedite the application of Federal safety appliance standards wherever the car happens to be.

I think we will find this: A large proportion of these 89,000 cars that remain yet to be equipped are special service cars, outfit cars, and other cars that are not largely used in interstate traffic, and if we take those away from the total, it will reduce the number to be equipped at foreign shops very materially. I simply want to lay before the convention the situation as we see it at Washington. We are sending home cars on request, not otherwise, except where cars are offered to the owning line at interchange point, when all empty cars must be accepted.

But I don't believe the convention wants to go on record as asking for excessive empty car mileage to get these cars home, when most of them can be just as well equipped at any other shop.

Chairman: I am thoroughly in accord with what Mr. McManamy has said. It would cost five times as much to get some cars home as it would cost to equip them. One thing I think is really important: Each mechanical department man on a railroad knows the attitude of his corporate interests as to what cars are to be maintained. I know that quite a number of cars remain on foreign lines today that are not equipped because they are of the oldest type, and in all probability they don't expect to maintain the cars. I favor a resolution from this convention that each road, so far as possible, learn the location of such cars and notify that road that it is not intending to maintain them. In that way, they would prevent any further money being spent. I would like to see an extension asked, for the end ladder clearance. They are cars that will be maintained for many years, and you might be able to get some extension to that particular portion of the requirements.

Mr. Fuller: I want to correct a misunderstanding. It was not my thought to move cars light, but to load them to home line. I full appreciate the fact that there are a lot of cars in this country that will not be equipped, and also appreciate that there are a lot of outfit cars in this list. If the real list of the cars that are to be maintained was under consideration, or given, it would reduce that number considerably. I don't see any reason why the Central Railroad of New Jersey, if it has a modern car belonging to a Western road, could not just as well load that car to the West as to load some other car.

Chairman: I think that all roads are so instructed at the present time, and should make it a point to load a foreign car. But most of these cars are cars that cannot be loaded until something is done to them.

Mr. McManamy: I think W. P. Borland, the Chief of the Bureau of Safety, is in the audience somewhere, and I suggest that he be asked to explain to the convention just what the provisions are with respect to reconstructing cars to give them the desired end ladder clearance. I think that provision is covered in the Federal orders as they now stand, but he is more familiar with that than I am.

W. P. Borland: The motion made by Mr. Tollerton is one that the Commission will not look on very favorably. The Commission has already extended the time for the equipment of these cars on four different occasions, and I am sure they will not favor any further extension of time.

It seems to me that a great proportion of these cars that are still to be equipped are cars that naturally would be retired from service, and as to those that are still to remain in service, I cannot see any reason why they should not be equipped wherever they are found just as easily as sending them home.

I noticed in the list which was read two roads which in 1915 reported they had no cars to equip. One of them has reported here that they have 3.1 per cent and the other one another percentage which I cannot recall. When some of the roads were asking the Commission for further extension of time, those two roads stated that they wanted no further extension of time, because they were fully equipped.

I cannot see any particular reason—with the Railroad Administration able to get these cars fixed wherever they may be found—for another extension of time. The material is standard and can be used at any time and anywhere, and I cannot see that there is any hardship placed on the roads.

Chairman: There is some special provision in regard to the end ladder clearance, is there not?

Mr. Borland: Yes, but I cannot recall that. I cannot state it specifically without the order before me.

H. W. Watkins (So. P.): I favor Mr. Tollerton's motion for an extension of time, because I think it is necessary. It has been stated here that only 11,000 cars were done during the past year. How are we expected to do 89,000 cars in two months? Let us have the time that is asked for, and I believe by that time the railroads will be in a better position, and will have the job completed.

J. J. Tatum (U. S. R. A.): The safety appliance parts that we have in stock on the various railroads of this country to apply to cars belonging to the individual roads are United States standard Safety dimensions and meet the requirements of the law. If they did not meet these requirements, you would not apply them to the cars. For that reason they are suitable to apply to the cars of any railroad, and will meet the requirements of the law if properly applied. I see no reason why we should send a good order car home to have safety appliances applied to it. If you have safety appliances on your railroad, apply them to your own cars, apply them to your neighbors' cars, let your neighbors apply their safety appliances to your cars and we will get the safety appliances applied promptly.

As to the number of cars being equipped with safety appliances during the Federal control, we must all bear in mind that the men of our individual railroads were beyond the sea, applying safety appliances to the Germans. They did it well, and now that a great many of them are back with us and more coming, we can apply safety appliances to our cars very quickly.

Mr. McManamy said that we had equipped 11,000 cars during Federal control. Probably this figure slipped him in some way or another, but as a matter of fact, we applied 29,788—almost three times that number.

F. F. Gaines (U. S. R. R. A.): It would seem from what has been said here this morning, that it is a very easy matter to apply safety appliances anywhere at any time. It may be on some roads, and on some cars, but my experience as far as the end ladder clearance goes, it is not anything of the kind. On a great many of the cars it means new draft timbers, new end sills, and a lot of other things. It can not be done cheaply. If the end ladder clearance was excepted from all the other things, we could get busy with it without any trouble—we could put on the grab irons, and ladders, and all the other things that are required, but it will be a very difficult matter to apply the end ladder clearance, as far as the coupler is concerned, on old cars cheaply.

Mr. Tatum: I do not think we can tear down the cars and rebuild them to get the end ladder clearance to meet the requirements of the law as promptly as we would like to do, but by changing the coupler and using the long head coupler, we can put in the end ladder clearance almost in the same time that we are applying the ladders and grab irons. I do not believe we can do all this work by September 1, but we can facilitate the application of the appliances and get a greater number of cars equipped in a shorter time than we have been able to do in the past.

Mr. McManamy: I want to thank Mr. Tatum for correcting my figures. Roughly speaking, the provision for end ladder clearance in the requirements of the law, is that where cars have 10 in. or more clearance, they may be operated during the life of the car. Where they have less than that, they are supposed to be in a dangerous condition and the repairs should be made.

Mr. Tatum is correct when he says that in practically all cases, or in many cases, that the end ladder clearance is given by applying a coupler with a special head, so that with the provision which is now contained in the law, making exceptions of cars with more than 10 inches end ladder clearance. I do not believe that phase of the question is as serious as it appears.

Mr. Borland: I am quite sure that Mr. McManamy is correct on that. I will have the order in a few minutes and will let you know exactly how it reads.

I. S. Downing (C., C., C. & St. L.): Our great difficulty has been in getting the cars to the repair tracks. We had equipped a large number of foreign cars with safety appliances. The trouble is that at the large terminals, where you can equip them, the car comes to you loaded. It is loaded to an intermediate point, when it is unloaded, and reloaded again, so that the inspectors do not get at them and they go on through.

To get them to the repair tracks, I believe some kind of a general car could be used, to the effect that if the car is found without the safety appliance, and is loaded, it should be shipped, when it is unloaded, to the nearest shop in order that the appliances may be applied.

The ladders and end holds are near the proper location on a great many of the cars, so that unless the inspectors stop to measure them, they do not know that they do not comply with the law, and they are pased along. In order to get these cars to the shop, when they are received loaded, and the safety appliances must be applied to the car, we must indicate on the car in some manner that when it is unloaded it must go to the nearest shop for having the appliances applied, regardless of the road it is on.

We get long lists from other roads, telling us that certain classes of cars are not equipped. The inspectors have so much to look after and so many reports to make that they pay but little attention to these lists of numbers. About two weeks ago, I thought I would put some special men in our large terminals for a test, and I put these men at Indianapolis, Cincinnati, St. Louis and Cleveland, and we did not find a Big Four car in any of these yards not equipped. We found several foreign cars not equipped, but they were loaded cars, loaded off our line. We had no right to pull them to some other shop, but I do believe that a very simple card could be gotten up that we could apply to the car, to the effect when the car is not equipped with the safety appliances that when it is unloaded it should be sent to the nearest shop to have the safety appliances applied.

Mr. Gaines: The main objection to the present status of the proposition is the end ladder clearance, and I feel that we could very justly ask the Interstate Commerce Commission to give us an extension of time on that one item. I would, therefore, move that this convention make that request to the Interstate Commerce Commission as an amendment to the motion now pending before the house.

J. S. Naery (C. I. & L.): Most of the cars we have to-day running over the country are cars that only need the replacement of the coupler. If we had the material to make this change, we could equip the cars. I have no doubt there are many other roads in the same condition. We started out to equip our wooden cars with the long draft arms, but you all know that previous to the war everybody wanted this material and it could not be furnished. We use the long shank couplers, but could not get them, and when the extension came along, it gave us the privilege of running the cars. Today we cannot get the long shank couplers, and that is one condition which should be looked into in regard to the end ladder clearance. I put the appliances on individual cars, including the coupler, and if there is anything that can be done to help the situation in regard to this end ladder clearance it should be done.

E. T. Millar (B. & M.): I was very much impressed by what Mr. Brazier said regarding the number of cars that his road had equipped. Some two years ago I appointed myself a committee of one to do what I could to accomplish the end in view and get all our cars equipped. I presume the figures read, as far as the Boston & Maine is concerned, were correct—one-tenth of one per cent. Before coming to the convention I cleaned up all the matter I had on my desk, and I found that we had a total of 28 cars to equip, four of which would come under Form RE 2.

In the last month we equipped 64 foregin cars on the Boston & Maine, and I have so reported to the mechanical head. I also advised him that a proper billing statement would be sent through the Accounting Department, and sent a copy of that to our Accounting Department. I have had a number of inquiries from different mechanical men regarding their cars, and to the best of my ability I have run them down, and shopped them. In many instances I have found that their cars were equipped, and that, through some error in reporting, they had not been checked off on their books. I found that is true also as far as the Boston & Maine cars are concerned. I next checked up our own cars. I found there had been errors made and cars were not reported, or the reports had been lost, as all the reports were handled through the U. S. R. R. mail.

I agree with Mr. Fuller in regard to loading cars in the direction of the home road. I thoroughly believe in that. I sent out three tracing letters on a car which was passing over our lines. The car was owned away down in the South. It was loaded in the Middle West, and destined to a point about as far East as cars run. I know positively that where that car is to be unloaded it is utterly impossible for those people to equip it.

Motion Withdrawn

At this point the original motion was withdrawn by Mr. Tollerton in favor of the amendment which covered only a request for an extension on the end ladder clearance. This motion was put to a vote and unanimously carried.

Mr. Borland: If you will permit me to proceed a little out of order now. I was unable to quote this exactly, and I did not want to say anything until I was sure I was exactly right. With respect to the steel and steel underframe cars, the roads have a definite extension, in which to provide for any change in these end ladders on these cars until the safety appliances are renewed. I suppose you all understand that.

Now, with respect to paragraph D, the carriers are not required to make a change to secure additional end ladder clearance on a car, that has more than 10 in. end ladder clearance within 30 in. of side of car, until the car is shopped for work amounting to practically rebuilding body of car, at which time they must be made to comply with the standards prescribed in the order. That cuts you down to paragraph E, which refers to cars which have less than 10 in. end ladder clearance. Those are the only ones that you need bother about to any great extent. Paragraph E refers to cars with less than 10 in. end ladder clearance, which must be changed at once. The original order gives five years, and as you know, there has been four different extensions on that, or three since the original order was passed, and as I said before, I don't believe the Commission will look very favorably upon any request for further extension of time, and it don't seem to me it is required.

Mr. Harvey: I would like to ask whether the 10 in. clearance refers to all cars, or simply the cars built prior to July 1, 1911? My understanding was that on cars built after July 1, 1911, it was necessary to have the 12 in. clearance.

Mr. Borland: That is true. It refers to cars built prior to July 1, 1911.

Mr. Harvey: When that law went into effect there was a great many cars under contract. Some of the cars were delivered, say, June 30th, and the 10 in. clearance was permissible. Cars delivered July 1, have to be changed, according to my understanding. That accounts for about half of our cars that are not equipped.

Report of the Standing Committee on Loading Rules



J. J. Eurch
Chairman

The Committee Received some correspondence from C. R. Gray, director, Division of Operation, United States Railroad Administration, instructing that the Code of Loading Rules be rearranged so that all instructions relating to each class of lading would be fully covered under the specific heading referring to such lading, thereby eliminating as far as practicable all cross references. The rearranging of the Code of Loading Rules will now meet these requirements. The general rules comes first in the code and are intended as a guide to the shipper in securing lading on the car, which is not specifically or definitely covered. Following this appear in their order the specific rules covering the manner of securing on cars the more common class of lading. The rules covering any specific lading referred to in the code, may, if desired, be obtained from the secretary, in pamphlet form, thereby eliminating in many cases the unnecessary expense of buying the complete Code of Loading Rules.

In addition to rearranging the rules, the committee reproduced all cuts to a larger scale and made the lettering and figures uniform in size and more legible. After the loading rules were put in their final shape, they were submitted to and approved by the Assistant Director of Operation, United States Railroad Administration, and the Executive Committee of the M. C. B. Association.

The committee has received a number of recommendations and suggestions from the Regional Directors, the Car Service Section of United States Railroad Administration, and others, relative to new rules to cover lading not taken care of in the present Code of Loading Rules and changes in the present rules. The suggestions in the main have reference to the conservation of the car supply by increasing the load carried per car and revising the present rules to bring them up to approved practices.

On account of the apparent necessity that immediate action be taken, the committee prepared several new rules and revised others, sending them to the Executive Committee for approval. The new rules, and the rules which have been revised and issued as supplements to the 1917 Code of Loading Rules by the Executive Committee, are as follows: Supplement Circular No. 6, issued July 15, 1918, includes a modification of Rules 17, 56, 57 and 59 and the following new rules: Rule 88, Manner of Loading Metal Plates in Gondola Cars; Rule 112C, Manner of Loading Wrought-Iron Pipe 12 in. or Less, on Flat Cars; Rule 117B, Manner of Securing Concrete Culvert Pipe Loaded on Flat Cars, and Rule 135, Manner of Loading Metal Sheets in Box Cars.

Supplement Circular No. 11 issued July 25, 1918, contains a modification of Rule 121-B, 1917 Loading Rules, Loading of Gasoline Tractor Engines.

These modifications and additions were incorporated in the rules as revised for 1918.

Proposed Changes in the Loading Rules.

The committee recommends the following changes in and additions to the present (1918) Code of Loading Rules:

Wide Plates Loaded Diagonally on Gondola Cars

Page 89, Paragraph 513.—Change marginal note to "Plates loaded diagonally on gondola cars having wooden side boards."

Page 89, Paragraph 513.—Change second sentence to read "The plates must be placed on the car so that the center of gravity of the load (center line of plates) will be in the longitudinal center line of the car, if necessary filler pieces may be placed between post and side boards to accomplish this."

Page 89, Paragraph 513.—Change sentence beginning "When used, the size of bearing-pieces is optional," to read "When used, the size of bearing-pieces is optional, but they must be located opposite each post and longitudinal shifting of the plates prevented by either stop blocks spiked to side and floor of the car or by horizontal tie rods across car."

Round Plates, Flat or Flanged

Page 90, Paragraph 513.—Change the last sentence "blocks securely spiked each edge of the plates" to read "To prevent longitudinal shifting, stop blocks 6 in. by 8 in. must be either bolted to the floor of the car or secured by cleats spiked to the sides and floor of the car."

Page 90, Paragraph 514.—Revise as follows: "Gondola cars loaded with plates or other material on the floor of the car may have plates that are too wide for the car, loaded on top of the car sides when the height of the sides does not exceed three feet (See Fig. 38-D.) Such superimposed plates must be supported by posts, one set of posts for each length of lading with a minimum of three sets of posts for each tier of plates. Side motion to be prevented by not less than two clamps consisting of a clamping-piece secured through the side boards of the car by an angle rod, the vertical leg passing through the clamping-piece and the horizontal leg through the side board of the car. Longitudinal motion to be prevented by struts against the end of the lading and spiked or bolted to the side of the car."

Page 102, Paragraph 527.—Revise to read "When bearing-pieces are on the car floor they must be over the car bolster or between bolsters. When one or both bearing-pieces are located on top of the car sides, they may be placed within twelve inches of either side of the center line of the car bolsters.

Page 120, Paragraph 555.—Revise to read as follows: "Material loaded on gondola cars with drop ends or on flat cars, as shown in Figs. 55 and 56, must have one hardwood bearing-piece not less than 10 in. by 10 in. for loads up to 65,000 lb. per bearing-piece and not less than 12 in. by 12 in. for loads exceeding 65,000 lb. per bearing-piece (see paragraph 507 for light loads), secured to the floor of each car with ⅞ in. bolts."

Paragraph 555-A.—When the lading consists of I-beams or similar material lying flat, and the load is 40,000 lb. or more per bearing-piece, or where there is danger of the flanges cutting into the bearing-piece, the webs must be supported by web-pieces or the lading must be placed on pivoted bolsters. (See Fig. 42.)

Paragraph 555-B. In placing lading on cars the following general requirements should be followed. (a) Make the width of the load as great as possible consistent with side clearance; (b) the longest pieces must be placed at the bottom of the load and, when possible, near the center of the pile; (c) When the lading consists of different kinds of material such as I-beams and angles, spacing blocks not less than 2 in. by 8 in. in section placed over and in line with the bearing-pieces may be used between the various kinds of material to properly align and stabilize the load. (See Fig. 42); (d) All structural material should be interlaced as far as practicable to prevent independent side motion; (e) The various tiers of the lading must be moved close together. Where space is left between tiers it must be filled up with upright spacers located at the bearing-pieces and binders so as to make a compact load when the binders are drawn tight. These spacing pieces must be secured at the top against falling out; (f) Height of the load is to be measured from the top of the bearing-piece to the top of the load; (g) Loads are limited to six feet in height and 180,000 lb. on the two bearing-pieces.

Paragraph 555-C. A clamp consisting of a hardwood top clamping-piece 6 in. by 8 in. in section and two vertical rods 1¼ in. in diameter placed close to the load and passing through the clamping-piece, the bearing-piece and the floor of the car shall be applied at each bearing-piece as shown in

Fig. 42. Each end of the clamping-piece shall have a ½ in. bolt with a suitable washed under the head and a nut to prevent the clamping-piece from splitting. If the load is 24 in. in height or over, braces 4 in. by 6 in. for loads up to 5 ft. in height and 6 in. by 8 in. for loads 5 ft. and not over 6 ft. in height must be added as shown in Fig. 46. The batter of the brace should be as great as possible. The clamping-piece at the top of the load should just clear the load when braces are used.

Paragraph 555-D. Binders consisting of two vertical hardwood pieces of timber 6 in. by 8 in. in section with ½ in. bolts and a suitable washer under the head and a nut in each end to prevent splitting, drawn together by means of two 1¼ in. rods, one on top and one below the load, shall be applied to all loads as follows: Loads up to 4 ft. in height, one binder located midway between bearing pieces. Loads 4 ft. and up to 5 ft. in height, two binders, one adjacent to each bearing-piece (either side) and 6 in. from it. Loads 5 ft. and not over 6 ft. in height, three binders, one adjacent to each bearing-piece and one midway between bearing-pieces.

Page 120, Paragraph 556.—The following notes should be added.

Note 1.—The side clearance given in paragraph 556 for a triple load relates to a load on three cars with the bearing-pieces located on the first and third cars and the center car acting as an idler.

Note 2.—A twin load supported on bearing-pieces on the first and second cars with the overhanging load over the third car, either with or without sliding-pieces on the third car, should be treated as a twin load for side clearance. The overhang governs the width of the load according to the tables under paragraph 554. The clearance required on each side of the overhang is one-half the difference between the width given in the table and ten feet.

Paragraph 558.—Change the reference to Fig. 47 in the second line of this rule to read: *Fig. 48.*

Bearing-pieces to be Provided with Vertical Rods and Clamping-pieces

Paragraph 559. Revised to read: "The bearing-pieces only are to be provided with vertical rods and clamping-pieces. When the bearing-piece is located on top sides of gondola cars it must be secured by cross braces and diagonal struts, as shown in Figs. 49, 50 and 54, to prevent breaking down of the sides of the car when going around curves. When the load, measured from top of bearing-piece to top of load, exceeds 24 in. in height the bracing for the clamping-piece on top of the load must be as shown in Fig. 46."

Center-posts and Bearing-piece Cross Braces may be Omitted

Paragraph 560. Revised to read: "For twin load of plates, structural bars and shapes carried on two bearing-pieces not less than 8 in. by 10 in. in section (with or without sliding-pieces) located on top sides of car, the center post and bearing-piece cross braces may be omitted if the total weight of lading does not exceed 20,000 lb. or 10,000 lb. per bearing-piece.

Rule Governing Loading of Automobiles, Trucks and Trailers on Freight Cars

1300. Cars must be carefully examined, all defects remedied, and must be properly cambered.

1301. Cars should be in such condition that the trucks can curve freely. The maximum side-bearing clearance for loaded cars must not be more than 5/16 in. per side-bearing for loads less than 10 ft. high from top of rail, and must not exceed 3/16 in. per side-bearing for loads 10 ft. high or over from top of rail.

1302. All single cars must be so loaded that one hand brake is accessible and operative. There must be a clearance of at least six inches between the brake wheel and the lading, this clearance to extend the width of the car.

1303. The lading must be so placed on the car that there will not be more weight on one side of the car than on the other.

1304. The height and width of lading must be governed by the clearance limits of the roads over which the lading is to pass.

1305. All clamping-pieces, bearing-pieces, braces and blocks must be sound, straight-grained lumber (hardwood preferred) and free from knots that materially impair their strength, or may be rolled or built up steel sections of equal strength. Decking or staging may be of lumber or steel construction.

1306. All trucks measuring more than 14 ft. over all should be loaded on open top railway freight cars, wherever

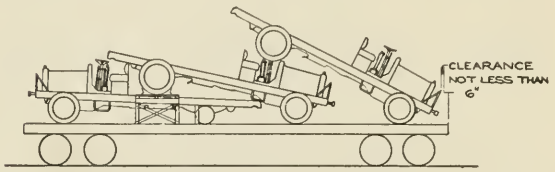


Fig. 99.—Tilting Method of Loading Three or More Automobile Trucks on Open Top Freight Cars

possible. Load freight cars as nearly as possible to capacity, using such of the methods given in the following specifications as will obtain the most economical results.

1307. Never load one vehicle, only, on a frieght car, when it is possible to avoid it. Two trucks each 22 ft. long can be

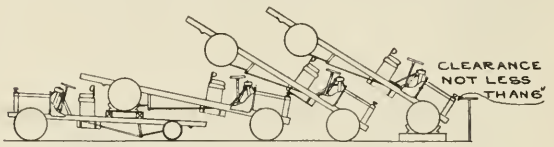


Fig. 99a.—Tilting Method of Loading Four or Five Automobile Trucks on Open Top Freight Car

loaded on 35 ft. freight car by tilting one of the trucks. Three trucks each 22 ft. long can be loaded on 40 ft. car by tilting two trucks. Four trucks each 22 ft. long can be loaded on a 45 ft. car by tilting three trucks. See Figs. 99, 99-A and 99-B. (When tilting, the wheels of either end of the vehicle may rest on the floor of the car, the other end raised.)

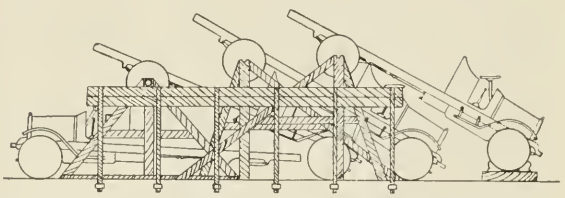


Fig. 99b.—Tilting Method of Loading Four or Five Automobile Trucks on Open Top Freight Car

1308. Where three trucks are to be loaded on a freight car which is long enough to hold two on the floor, back to back, the third truck can be loaded on top of the other two. This is done by fastening cross beams on the frames of each of the other two lower trucks with J- or U-bolts. Upon these

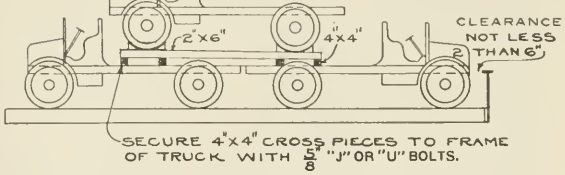


Fig. 99c.—Manner of Loading One Auto Truck on the Frames of the Two Trucks Loaded on the Floor of the Car

beams is mounted a board which will support the wheels of the third truck and the blocks that hold it. See Fig. 99-C.

1309. Where the over-all length of trucks being loaded is slightly greater than the length of the freight car, safe loading can be made by removing the front or rear wheels of

one of the trucks and slightly raising the rear of another truck so that it overlaps the end of the first truck. This is to prevent the truck from projecting beyond the end of the freight car.

1310. In the case of automobiles or light trucks having a wheel base not over 125 in. from four to five can be loaded on a freight car by tilting all but one. See Figs. 99-A and 99-B.

Methods of Loading

1311. There are three methods of loading and staying automobiles, trucks and trailers on freight cars. (a) blocking

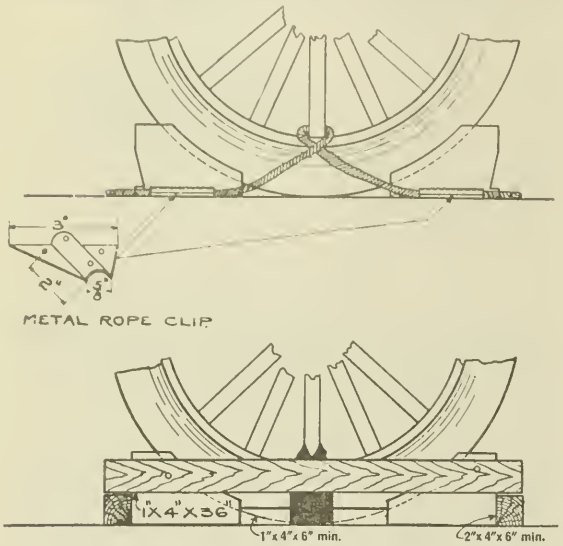


Fig. 100.—Manner of Securing Wheels to the Floor

or chocking on the floor of the car; (b) tilting (one end of the vehicle resting on the floor of the car, the other end raised; (c) double decking. These three methods are treated separately.

Blocking

1312. Lumber used in the construction of wheel blocks, side strips and heel blocks, must be sound (free from decay and dote) and no knot shall be permitted that interfers with the nailing.

1313. The principal woods used in blocking automobiles, trucks and trailers are, for the purpose of these specifications, divided into four groups as follows:

	Group No. 1.	
Virginia and Carolina Pine	Yellow Poplar	Buckeye
Cypress	Balsam Fir	White Fir
White Pine	Chestnut	Cedar
Norway Pine	Sugar Pine	Redwood
Aspen	Basswood	Butternut
Spruce	Willow	Cucumber
Western Yellow Pine	Magnolia	Apine Fir
Cottonwood	Noble Fir	Lodgepole Pine
	Group No. 2.	
Southern Yellow Pine	Douglas Fir	Larch (Tamarack)
	Group No. 3.	
White Elm	Pumpkin Ash	Tupelo
Red Gum	Black Ash	Maple, sofe or silver
Sycamore	Black Gum	
	Group No. 4.	
Hard Maple	Hackberry	White Ash
Beech	Birch	
Oak	Rock Elm	

Wherever wheel blocks are made from Group 1, side strips not less than 1 in. by 4 in. and heel blocks not less than 2 in. by 4 in. by 6 in. must be used as an additional reinforcement, regardless of the weight of the vehicle loaded.

1314. Side strips must be used on all plain faced blocks and grooved blocks that do not have incut or extended heels. Heel blocks must be used with all solid blocks that do not have incut or extended heel. (See Fig. 10.)

1315. Groups 2 and 3 will not require side strips as does Group 1.

1316. Wherever Group 4 is used for making wheel blocks, the heels and sides of the blocks must be bored to receive the nails.

1317. Wherever blocks in Group 1 are used in combination with blocks in other groups, these blocks shall be re-

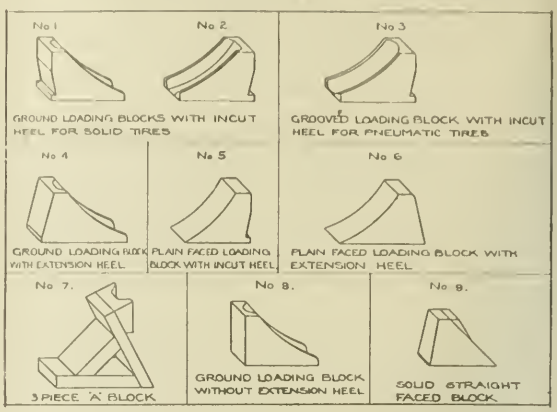
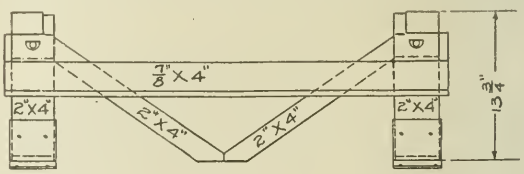


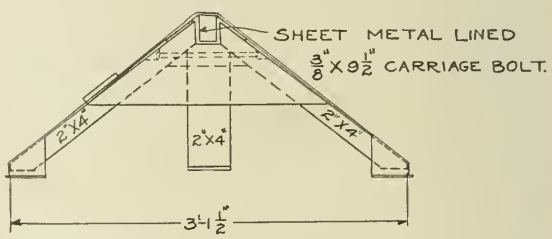
Fig. 100a.—Types of Heel Blocks

inforced with side strips and heel blocks as specified in paragraph 1313 on each wheel in which the combination occurs.

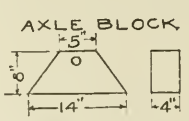
Wheel and Axle Blocks

1318. Any of the following blocks may be used: Curved grooved block with incut heel. Curved grooved block without incut heel. Curved plain faced block with incut heel. Curved





HORSE OR TRUSS BLOCKING FOR FLOOR LOADING.



THESE ARE MINIMUM DIMENSIONS. THE BASE MUST BE INCREASED IN PROPOTION TO THE INCREASE. IN HEIGHT.

Fig. 1001

plain faced block without incut heel. Solid plain faced block with or without incut heel. Three-piece A-block. (See Fig. 100-A for cuts of foregoing blocks.)

Axle Blocks (see Fig. 100-L).

V-block (see Fig. 100-M, for detail construction).

1319. (a) Where wheel blocks are used without incut heel, the back of the block must be extended so as to form an extended heel not less than 2 in. from a vertical line drawn from the back edge of the top of the block, or the block must be backed up with 2 in. by 4 in. blocks securely nailed to the floor of the car. (b) When solid axle blocks are used, they must be made from wood shown in Groups 2, 3 or 4 of paragraph 1313. (C) When the horse or truss method is used for floor loading the wood for construction must conform to paragraphs 1330, 1331 or 1332.

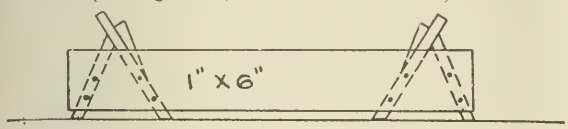
1320. Blocks must be one inch wider than the tire. Curved grooved blocks must be made so as to conform to the contour of the tire. For five ton trucks or heavier, increase the width of the block one inch and use one additional nail.

SIZE OF BLOCKS WITH INCUT OR EXTENDED HEELS

For tires to 30 in. in diameter	6 in. high by 10 in. long
For tires to 32 in. in dimaeter	7 in. high by 11 in. long
For tires to 34 in. in diameter	8 in. high by 12 in. long
For tires to 36 in. in diameter	9 in. high by 13 in. long
For tires to 40 in. in diameter	10 in. high by 14 in. long

Where wheel blocks are used without incut or extended heel, add 2 in. to the above lengths.

1321. For tires seven inches wide or wider, use plain curved blocks. (See Fig. 100-A, Blocks No. 5 and No. 6.)



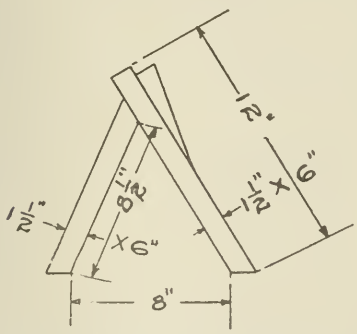


Fig 100m.—These are Minimum Dimensions. The Spread of the Block Must Not Exceed 90 deg.

1322. (a) When using the three-piece A-block or a straight faced solid block, a grooved or triangular shaped block should be fastened to the top so as to bring the resistance to the highest point of the block. (See Fig. 100-A, Blocks No. 7 and No. 9.) (B) In lieu of the foregoing, blocks as per Fig. 100-N may be used.

Loading Instructions for Automobiles, Trucks and Trailers

1323. (a) In raising vehicles for tilting or double-decking, the tackle should be secured by means of a hook or loop fastened to the side or end posts of the car. The tackle should not be fastened to the ridge pole or carlines.

(b) When a vehicle is loaded on the floor, chock all four wheels, using two wheel blocks to each tread, or solid axle blocks, or secure the front axle by two horses or truss blocks and tie the rear wheels securely to the floor, as per paragraphs 1324, 1325 or 1326.

(c) If a solid axle block is used, a 2 in. by 4 in., 24 in. long must be securely nailed to the block and to the floor of the car with not less than six 20-penny nails (cement-coated preferred). This 2 in. by 4 in. may be omitted in connection with the front axle blocks. A solid block 8 in. high must have a 14 in. base, and for higher blocks the base must be in proportion to the increase in height.

(d) If the horse or truss method is used, paragraph 1349 governs the manner of securing it to the floor of the car.

(e) If a solid block is employed, use not less than three 20-penny nails (cement-coated preferred) at the back and one 10-penny nail (cement-coated preferred) on the outer side. If side strips are used, the 10-penny nail on the outside may be omitted.

(f) If a three-piece A-block is employed, use not less than three 20-penny nails (cement-coated preferrd) at back and two on the end next to the tire, one on each side.

(g) With all solid grooved blocks having incut or extended heel made from Groups 2, 3 or 4 and when loading vehicles weighing 3,000 lb. or less, side strips are unnecessary.

(h) A-type blocks must be constructed so that the bottom board projects sufficiently far to the rear to act as a heel block.

(i) When loading, emergency brakes should be set.

(j) The distance between any two vehicles at the nearest points loaded on a freight car must not be less than 2 in. horizontally and 4 in. vertically.

1324. Each wheel must be tied to the floor with a strap and

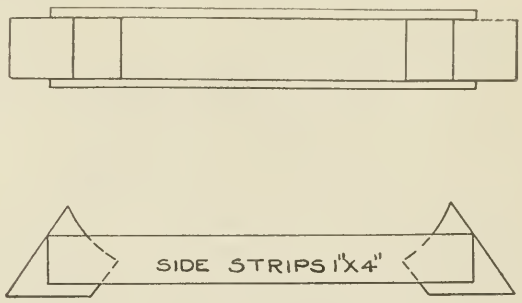


Fig. 100n

each strap must have an ultimate tensile strength equal to one-fourth the weight of the vehicle, for which purpose rope is recommended. (See Fig. 100.) The following table may be used for estimating the size of manilla or hemp rope to be used.

½ in. diameter	2,450 lb. ultimate tensile strength
⅝ in. diameter	4,000 lb. ultimate tensile strength
¾ in. diameter	4,900 lb. ultimate tensile strength
⅞ in. diameter	5,900 lb. ultimate tensile strength
⅞ in. diameter	7,000 lb. ultimate tensile strength
1 in. diameter	8,200 lb. ultimate tensile strength

(Sisal rope possesses 25 per cent less strength than manila or hemp rope.)

1325. If rope is used for tying down vehicles which have a varnish finish, the rope should be wrapped with burlap or cotton cloth around that portion coming in contact with the spoke and felloe.

1326. (a) A metal clip or wood block should be used to fasten the ends of the rope to the car floor. The metal clip should be stamped to fit the rope and should be so made that two nails pass through the clip and rope, and two nails through the wings of the clip. The wood blocks should be not less than 2 in. by 4 in. by 6 in. grooved to fit over and pinch the rope. Clips or wood blocks should be spiked down over each end of the

rope as close to the wheel as practical. (See Fig. 100 for cut of metal rope clip.)

(b) To apply the rope to the wheel. If a spoke wheel—nail one end to the floor with one 10-penny nail (cement-coated preferred), then secure the chp or block to this end of the rope close to the wheel, cross the rope around the spoke, stretch the other end out and secure it with a 10-penny nail (cement-coated preferred) at the extreme end, after which apply a block or clip to the rope, drawing it down and making it taut. If a wire

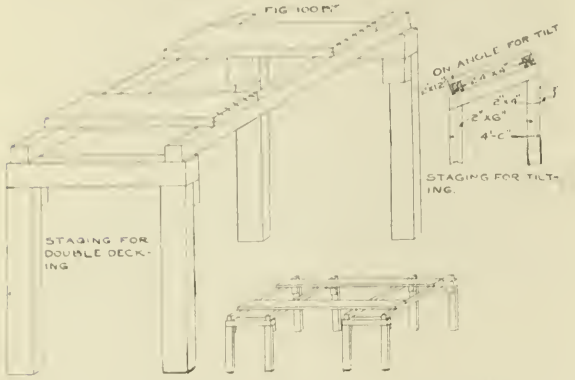


Fig. 100b.—Staging for Double Decking and Tilting

wheel—pass the rope over the felloe and fasten on the inside and outside as above. If a solid wheel—the rope may be passed over the hub. (c) If canvas or burlap straps are used, they must be fastened to the floor with blocks of not less than 1 in. by 4 in. lumber, not less than 6 in. long. The strap must be given one turn around each block and the blocks nailed to the floor with not less than 12-penny nails (cement-coated preferred). A metal stamping, not less than one 1/32 in. in thickness with 1/4 in. radius, may be used in lieu of a wooden block in securing the burlap to the floor of the car.

Nails

1327. Nails (cement coated preferred) must be as follows: Not less than 20-penny nails for wheel blocks (except the side nail in a solid block which should be a 10-penny nail). 20-penny nails in the heel blocks and 10-penny nails in the side strips and through the rope and rope clips. Where wood blocks are used for tying down the rope 20-penny nails (cement-coated preferred) must be used.

Tilting and Double-Decking

1328. Lumber to be used in construction of horses must be sound (free from decay and dote) and uniform in thickness

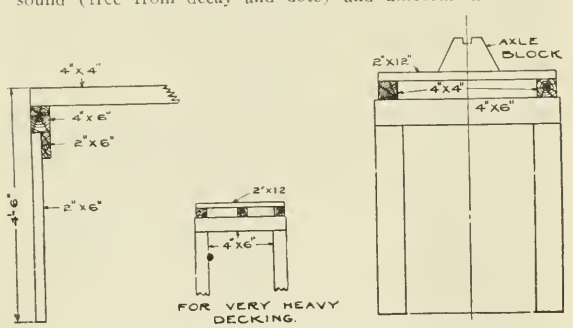


Fig. 100c.—Staging for Double Decking

and width. The supporting braces must be free from knots greater than one-fourth the width of the face of the board, and cross bracing must be free from knots greater than one-third of the width of the boards. No knots shall be permitted that interfere wieh the nailing.

1329. Lumber to be used for beams in staging shall be of high class structural material free from rot, loose or rotten knots and dote. When the beams are cut to size the aggregate diameter of knots in the center half of any side shall not exceed one quarter the width of that side. No knot on the vertical sides shall be within one-quarter of the width of that side from the upper and lower edges.

1330. The principal woods used for double-decking and tilting devices and for cross bracing are grouped as follows:

Group No. 1

White Pine	Chestnut	Noble Fir
Norway Pine	Butternut	Magnolia
Aspen	Redwood	Buckeye
Spruce	Cucumber	White Fir
Western Yellow Pine	Sugar Pine	Cedar
Cottonwood	Cypress	Alpine Fir
Yellow Poplar	Basswood	Lodgepole Pine
Balsam Fir	Willow	

Group No. 2

Ash	Oak	Southern Yellow Pine
Hemlock	Maple	Hackberry
Elm	Beech	Douglas Fir
Red Gum	Virginia and North Carolina Pine	Black Gum
Sycamore		Birch
Larch	Tupelo	

1331. Group No. 2 should be used for all supporting members and either Groups No. 1 or 2 may be used for cross bracing.

1332. If Group No. 1 is used for support members, the lumber should be cut 1/2 in. thicker than when using Group No. 2.

1333. There are two methods employed in "double-decking." (a) Staging. (b) Truss or horse.

1334. Staging consists of uprights, supporting cross pieces, which in turn support a floor upon which rest the axles or wheels of the vehicle. The whole must be securely fastened to the freight car and strongly braced both horizontally and obliquely. (See Figs. 100-B and 100-C.)

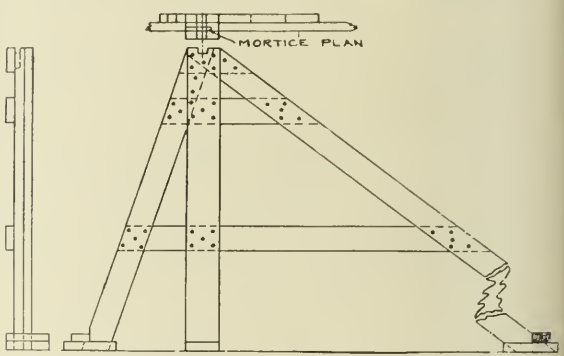


Fig. 100d.—Double Decking Horse with Mortise Head

1335. When two or more vehicles are tilted on the same freight car, the horses used for tilting are exactly the same as the horses for double-decking. Where only one vehicle is tilted, the horse has to take the strain alone, both forward and backward, and the construction differs accordingly.

1336. The outside legs of this horse are each of equal length and are braced at the bottom by a piece of 2 in. by 4 in. material spanning the entire length of the horse, properly beveled to fit the inward slope and nailed securely to the foot before the horse is placed in position. This foot brace is then nailed to the floor of the freight car. The horse is otherwise braced the same as the double-decking. (See Fig. 100-D.)

1337. The truss or horse method is the one recommended. It is adaptable to any size or kind of vehicle. The horse required for vehicles up to 3,000 lb. in weight, consists of two legs to the floor and an arm to the wall of the freight car. Four horses are required for double-decking and two for tilting vehicles, one for each wheel or axle raised. (See paragraph 1305 which governs.)

1338. The horse required for vehicles over 3,000 lb. weight, consists of three legs to the floor and an arm to the wall. In the lighter horse the lumber used for the legs consists of 2 in. by 6 in. material. Where three legs are used, this size is sufficient for weights up to 5,000 lb. For increased weights increase the size of the lumber; for instance, a truck weighing 10,000 lb. would have a central leg not less than 4 in. by 8 in. (See Figs. 100-H and 100-I.) (See paragraph 1305 which governs.)

1339. The horses for automobiles and light trucks are made approximately 6 ft. high, one leg 6½ ft. long and the other

10 ft. long. For larger vehicles, the legs are proportionately longer. The long legs of the front and rear horses on each side overlap each other and are nailed together after being put in place. It is unnecessary to remove the wheel where the hub caps are strong enough to take the weight of the vehicle. The horses must be reinforced by cross pieces of 2 in. by 6 in. material at the top and 1 in. by 6 in. material in the middle. (See paragraph 1305 which governs.)

1340. Another style of horse which may be used for vehicles weighing not more than 2,600 lb. net, consists of one leg to the floor 4 in. by 4 in. and three arms 2 in. by 6 in. by 36 in. to the

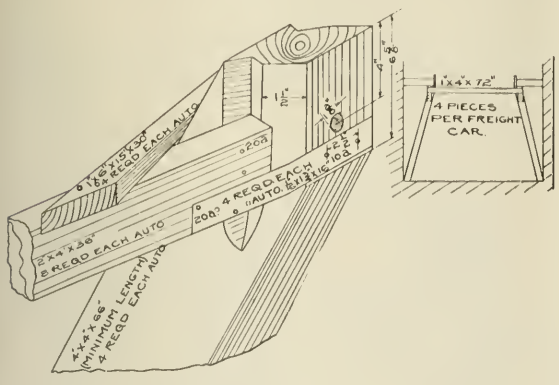


Fig. 100g.

wall. If the leg to the floor is made of 4 in. by 6 in. and the leg and arms are secured by steel straps or stampings, vehicles not exceeding 3,200 lb. net, may be loaded by this method. (See paragraph 1305 which governs.)

1341. The arms support the upright leg horizontally and are fastened to the car wall at the belt rail. One end of each arm rests in a notch or offset which has been made in the head of the upright and is fastened with 20-penny nails

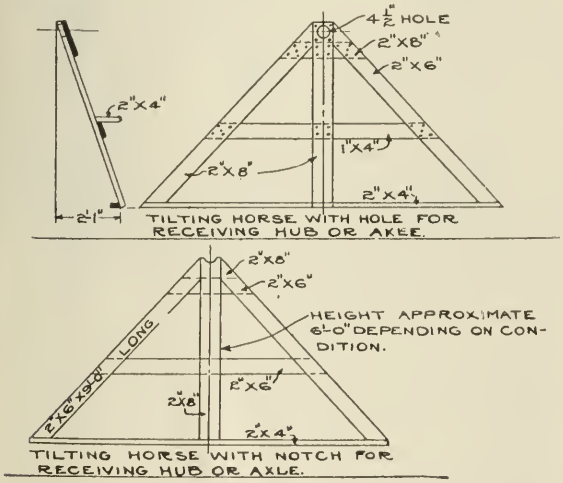


Fig. 100e.

(cement-coated preferred.) If the arm comes above or below the belt rail a runner of 2 in. by 6 in. lumber must be nailed along the side of the box car and the arms nailed to this runner. (See paragraph 1305 which governs.)

1342. At the end of each arm resting against the freight car wall must be placed a heel block not less than 2 in. by 6 in. by 8 in. (See paragraph 1305 which governs.)

1343. The third arm should be placed from the head of the upright upwards and outward to the car wall and fastened in place with a heel block, secured so as to prevent any upward movement of the horse. This arm is not necessary if a steel strap or stamping 8 in. long and the width of the upright member is used to fasten the upright leg to the car floor. See paragraph 1305 which governs.)

1344. The two rear horses and the two front horses, respectively, are fastened together laterally, with a timber 1 in. by 4 in. by 72 in. (See paragraph 1305 which governs.)

1345. The foot of each upright must be braced fore and aft with blocks 2 in. by 4 in. by 6 in. (See paragraph 1305 which governs.)

1346. The horizontal arms are further braced by steel strapping and by nailing to them a board of 2 in. by 6 in. back of the upright support. (See paragraph 1305 which governs.)

1347. Another adaption of the same system for automobiles not over 2,600 lb., is as follows: An upright support 4 in. by 4 in. by 66 in. (minimum length) mortised to take a specially constructed head (see Fig. 100-G). This head receives the end of two arms which take the longitudinal strains and one arm which takes the lateral strains. The arms are all made from material 2 in. by 4 in. and are reinforced on the car wall with heel blocks and at the head with steel strapping. (See paragraph 1305 which governs.)

1348. A further reinforcemtn consist of a brace of 2 in. by 4 in. lumber from a block fastened to the upright immediately below the head to the floor, at an angle of about 45 deg. This brace is reinforced at the floor with a heel block not less than 2 in. by 4 in. by 6 in. (See paragraph 1305 which governs.)

1349. It is best to fasten the legs of the horses to the car

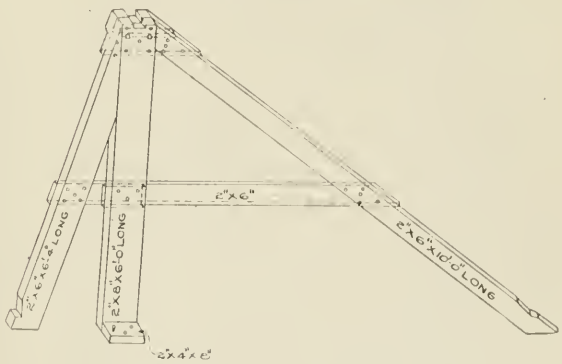


Fig. 100i.—Double Decking Horse With 3 Leg Eutting

floor by using an angular metal stamping 8 in. long and the width of the supporting members, but if these are found difficult to obtain a wooden foot lock may be used consisting of two pieces of 2 in. by 4 in. material nailed one on each side of the foot with a third piece across fitting into a notch made in the foot to receive it. (See Fig. 100-D.) (See paragraph 1305 which governs.)

1350. The 2 in. by 4 in. blocks on both sides of the foot should be beveled to accommodate themselves to the slant of the horse so as to make a snug fit. The inside block should be nailed to the foot before it is placed in the freight car. (See paragraph 1305 which governs.)

1351. There are several methods of construction which have been approved and which may be used in accordance with the necessities or requirements made by the special construction of individual vehicles, as follows:

Horse Head Construction

The quickest and cheapest method of construction is to form the head of the horse by bringing together the two pieces forming the legs so that they abut. This head should be notched to receive the hub or axle, and cross braces nailed and bolted on with ⅜ in. bolts through the top brace and legs. Where the vehicle is loaded on its hubs the top of the head should be twice the width of the hub. (See Fig. 100-E.) (See paragraph 1305 which governs.)

1352. The heavier vehicles require the addition of a third leg to the horse. The horse may then be constructed in any one of three ways, depending upon the weight or construction of the vehicle to be loaded.

(a) A center leg with two side legs abutting, cross braces nailed and bolted with two ⅜ in. bolts through the top braces and side legs. (See Fig. 100-I.)

(b) Side legs abutting at the top. The center leg fastened to the head thus formed, the whole cross braced, nailed and bolted

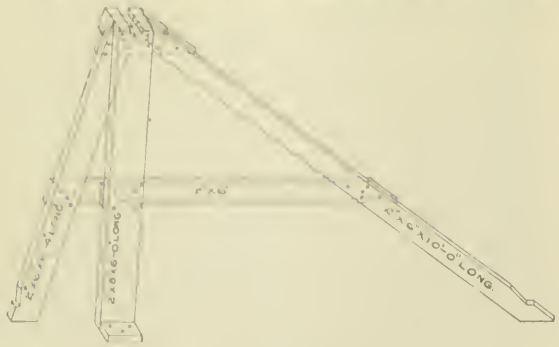


Fig. 100h.—Double Decking Horse With Side Leg Butting

with two ⅝ in. bolts through the top brace, side legs and center leg. (See Fig. 100-H.)

(c) Side legs mortised at the top, the center leg fastened to the

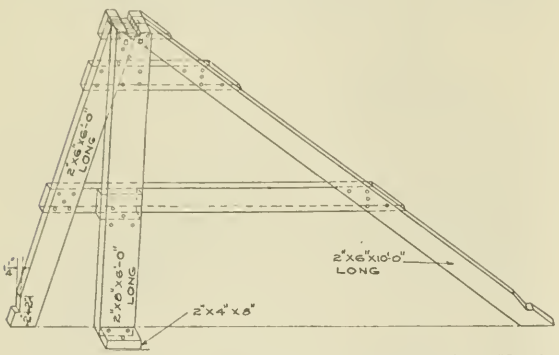


Fig. 100f.—Double Decking Horse With Morticed Head

head thus formed. The whole cross braced, nailed and bolted with two ⅜ in. bolts through the top brace, side legs and center leg. (See Fig. 100-F.)

1353. Another form of head construction may be used

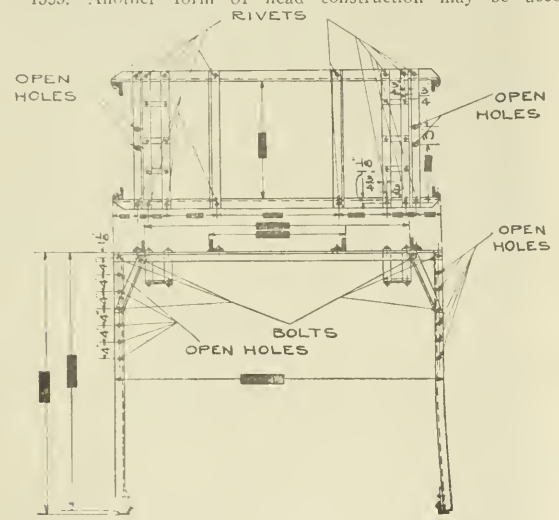


Fig. 100j.—Steel Decking for Use in Tilting or Double Decking Automobiles and Trucks

wherever desired; namely: A higher horse with "all-around head" having an opening to receive the hub or axle as shown in Fig. 100-E. (See paragraph 1305 which governs.)

1354. The lateral strains are taken on an arm made of not less than 2 in. by 4 in. material fastened horizontally between the horse and the wall of the freight car. (See Fig. 100-E.) The arm is supported at each end on a block 2 in. by 4 in. by 6 in. and fastened down with steel strapping. To hold the vehicle securely to the horse and to prevent any bounce or upward movement, steel straps are passed over the hubs or axles, crossed and nailed securely to the horse. A piece of two-ply 10-oz. burlap is placed under the strap to prevent chafing. (See paragraph 1305 which governs.)

1355. When steel decking, as shown in Figs. 100-J and 100-K, is used, the following precautions should be taken: (a) Lock nuts should be used on all bolts. (b) Axles of automobiles, trucks or trailers should be fastened securely so the fastening will not come off if the tires deflate. (c) Angle *A* should be kept wrapped to avoid tire chafing. (d) All floor angles should be nailed through all holes and at the front and rear end of the

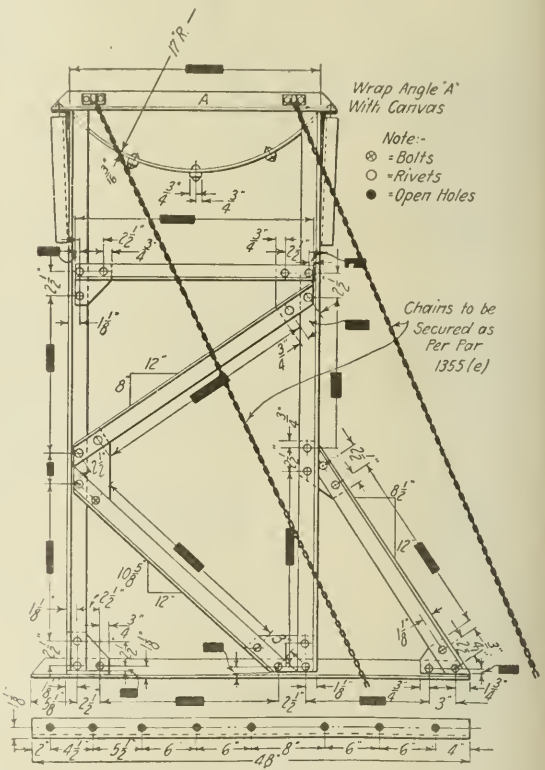


Fig. 100k.—End View of 100j

angle with not less than 20-penny nails, the top ½ in. of the nail to be bent over. (e) Two chains with plates securely attached in direction as shown should be used to tie each leg of the deck with a downward tendency and be securely fastened to the bracing of the car side which must be heavier than 2 in. by 4 in. and the anchor must not be more than 2½ ft. from the car floor. These chains should not be fastened to the car floor except in exceptional circumstances and then should be reinforced with 18 in. pieces of 2 in. by 6 in. securely nailed to the car floor over the plates. On flat cars fasten chains to side sills. (See Fig. 100-K.)

(f) The toes of the deck should be set toward the center of the vehicle supported. This applies to half decks or tilted loads as well. The chains for decks of tilted loads should preferably be used one in each direction.

1356. In lieu of the above methods of loading, automobiles may be loaded on their side as per Fig. 100-O.

Patents

1357. Of the methods of double-decking or superimposing automobiles, trucks and trailers, the staging system described

in paragraph 1334 is the only system not covered by patents and, therefore, the other systems specified cannot be used without purchase or proper authority from the patentee or his agent. The incut heel block shown in Fig. 100-A is also patented and subject to the same conditions. (See paragraph 1305 which permits the use of other constructions of equal strength.)

The committee recommends that, in view of the increased cost of the Loading Rules, these proposed changes and additions, if approved, be printed in the form of a supplement to the

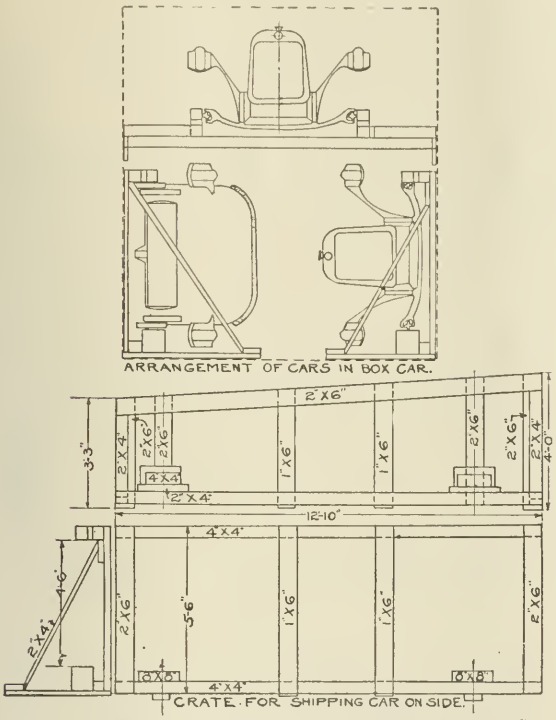


Fig. 100o.—Manner of Securing Automobiles in Box Cars When Loaded on the Sides

rules rather than revising the entire code, and that when the present stock of complete Loading Rules is exhausted the secretary be authorized to incorporate this supplement in any reprint made.

The report is signed by J. J. Burch (Chairman), Norfolk & Western; A. B. Corinth, Atlantic Coast Line; R. L. Kleine, Pennsylvania; H. H. Harvey, Chicago, Burlington & Quincy; C. N. Swanson, Atchison, Topeka & Santa Fe; E. J. Robertson, Minneapolis, St. Paul & Sault Ste. Marie; J. E. Mehan, Chicago, Milwaukee & St. Paul, and Samuel Lynn, Pittsburgh & Lake Erie.

Before presenting the report of the Committee on Loading Rules, Mr. Burch said:

Since the printing of the Loading Rules, your committee has found it desirable to make some slight changes and additions in the report which they would like to have included in the report.

Discussion

Mr. Burch: The first sentence of paragraph 1306 will be cut out. The committee thinks it advisable to add a note to paragraph 1324, as follows:

Note: Any mechanical device for holding down the wheels equally efficient to that specified will be accepted as an alternative arrangement.

Mr. Gaines: May I interrupt one moment? Inasmuch as this report has been distributed, I think it is unnecessary to read all these details. I think it would be much better to call attention to what changes have been made, and answer any questions that may be asked from the floor on the subject. We are taking up a long time on this detail work.

Mr. Burch: I was reading that on account of the change, which reads as follows: The committee has decided to change paragraph 1340, the third line "2 x 6." to read "2 x 4 x 36," and the fourth line——

Mr. Milner: Can the speaker try to make himself heard back here, please?

Mr. Barnes: I would like to amend the motion, and in view of the fact we have all had the paper, and ample chance to read it, I move that the paper as prepared be accepted, and referred to letter ballot.

Mr. Burch: You haven't heard the paper as prepared. There are some slight changes which have been made in the report since the printed copy went out. Paragraph 1340, the third line, should read: "4 in. and 3 arms 2 x 4 in.," instead or "2 x 6 in.," and the fourth line, after the word "and," "the arms 2 in. x 6 in. x 26 in. and." That is to clarify the paragraph.

Paragraph 1341, at the end of the sentence, line 4, add "See Fig. 100G."

Paragraph 1346, line 2, change "2 x 6" to read "1 x 6 x 15 x 30 in." That is to make the paragraph conform to the cut.

Because of an accident which we had on the Pennsylvania with some steel loading we would like to ask that paragraphs 555, 555A, 555B, 555C and 555D be approved by the convention, so that the rules can be made effective at once. I think that is very necessary because these rules are now followed by some other steel shippers. I overlooked stating that I would like to add a sentence to the paragraph referring to spacing blocks, making the composite spacing blocks an alternative method, and the committee will prepare cuts showing the block to be used and will follow up the subject of blocks during the coming year and make a report at the next convention.

C. M. Swanson (A. T. & S. F.): Being a member of the Loading Rules Committee, I know of the untiring effort of our chairman for the last two years in changing the rules into sections, for different commodities. We have had meetings all over the country with manufacturers of steel, tubes, automobiles, concrete pipe, and lumber dealers, and I do not believe that at any time there has been such hearty co-operation between the carriers and the manufacturers as there is at the present time. I feel that the work that the chairman and the committee have done has been the means of bringing together in closer co-operation the interests of the carrier and the manufacturer. The great majority of the suggestions are made by the manufacturers owing to their large experience in handling their special commodity. I also find that the manufacturers are not supplied sufficiently with the loading rules. The Loading Rules are not distributed to the men who actualy shoud have them.

Mr. Gaines: The committee on Loading Rules has done a very fine job in segregating these rules. About a year ago I was delegated by the Director of the Southern Region to go down on the west coast of Florida and settle a three-cornered fight between the Emergency Fleet Corporation, a timber contractor and some of the railroads, regarding loading piles for Hog Island. I thought I knew something about the Loading Rules, but when I came to go into the details of it I found that I did not know anywhere near as much as I thought; then I stepped down and tried to study them out. I found that Rule 101 tells you to look at Rule 3, and when you look at Rule 3 that tells you to look at Rule 48, and then I wondered what a car inspector out on the job ever could tell about it. I think this report will go a great way toward simplifying the work for the people doing the loading, and the man loading piles, or loading concrete pipe, or any other commodity, can look at the rules covering that commodity instead of referring back from one rule to another rule, dealing with something else.

A motion that the recommendation of the committee, in regard to the special circular being issued, be adopted, was carried.

Mr. Snyder: I want to add one suggestion: The rule calling for the spacing block is given in the front of the book, but is not repeated in the steel loading rules. It should be added to that pamphlet when that is prepared.

Secretary: That has been done. It is in every pamphlet.

Mr. Fuller: Mr. Chairman, I move you that the Rules be received and submitted to letter ballot, with the exception of that part that has already been passed on.

The Chairman: What about the spacing block suggestion?

Mr. Fuller: I think that is all right. I think it should be included in all the rules.

The Chairman: They want to go back to the composite spacing block.

Mr. Fuller. I haven't anything to say about that.

Mr. Lynn. I move that the use of the composite block, as recommended, be continued for another year, so that the committee can get sufficient data to determine just what it should do next year. I would make that as an amendment to Mr. Fuller's motion.

The amendment was put to vote and carried, and then the original motion was voted on and carried.

Report of Committee on Car Construction



W. F. Keisel, Jr.
Chairman

In the past year, the subjects referred to the Committee on Car Construction were: First: The revision of Rule 22 of the 1917 Code of Rules of Interchange; and, second: Suggested provision for side door openings 10 ft. wide in all box cars, the side door proper to be 6 ft. wide, with a removable door post, and an auxiliary door 4 ft. wide.

M. C. B. Circular of Inquiry, No. 19, was sent out to all members, asking for suggestions and recommendations for changes in Rule 22 of the Code of Interchange, and the replies thereto were carefully considered by the committee, based on which the following rule has been formulated, and is offered herewith as a substitute for present Rule 22.

For Cars Having Wooden Sills

Rule 22: Draft timbers must not be spliced. Longitudinal sills must not be spliced between or over cross-bearers. Longitudinal sills (intermediate or side sills) may be spliced at both ends, on either side of the body bolster. The nearest part of the splice must not be less than 12 inches from the edge of the body bolster. Intermediate sills, spliced between the the body bolster and cross-bearer, must be reinforced as per Figs. 11 or 11-A. Intermediate sills, spliced between the bolster and the end of the car, and side sills, spliced on either side of the bolster, must be in accordance with Figs. 10 or 10-A.

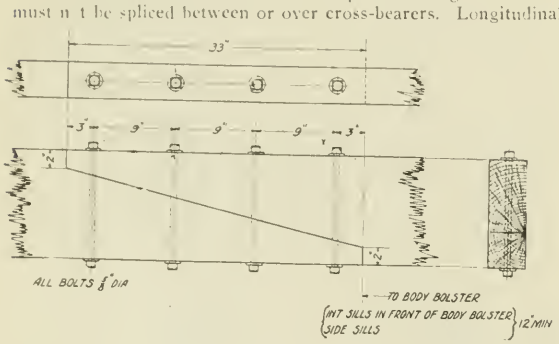


Fig. 10

When splicing or renewing any longitudinal sill, the reinforcement shall be applied to all existing non-reinforced splices, in all sills except side sills. If the old splice is a four-bolt splice, it shall be reinforced in accordance with Figs. 11 or 11-A. If the old splice is a three-bolt splice, the reinforcement shall be applied in accordance with Fig. 15.

Center sills shall be spliced only between the body bolster and cross-tie timber. The nearest part of the splice must not be less than 24 in. from the edge of the body bolster. Center sill splices shall be in accordance with Fig. 11. The diameter of horizontal or vertical splice bolts shall be ⅝ in.

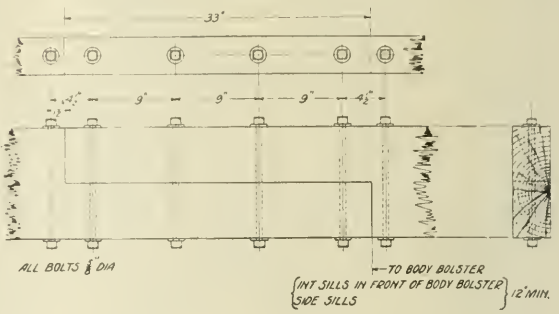


Fig. 10a

For Cars Having Steel Center Sill Splices Located at Least Seven Inches from the Face of the Bolster

Adjacent sills may be spliced. All splices shall be of the butt-joint type, reinforced on both sides by plates not over 24 in. in length, and not less than twice the length of the protruding end when the projection is less than 12 in. The reinforcing plates shall be at least as thick as the web of the sill. The splice plate on the flange side of the sill shall be U-shaped, to include flanges, while the plate on the opposite side shall cover the web only. Rivets to be placed as shown in Figs. 12 and 12-A. Where autogenous welding is available, the sills may be welded after rivet-

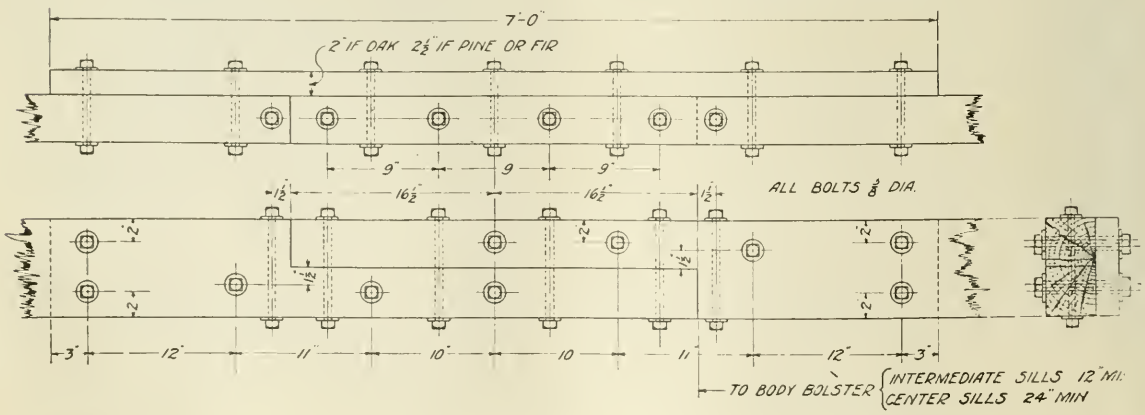


Fig. 11

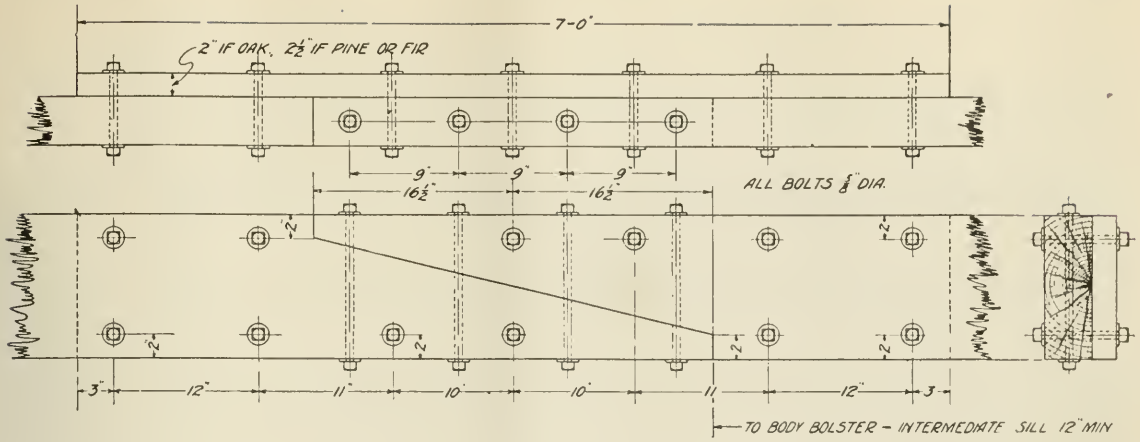


Fig. 11a

ing the U-shaped plate on the flange side, omitting the flat plate on the web side.

For Cars Having Steel Center Sill Splices Located Between the Body Bolster and End Sill, and Less Than Eight Inches from the Face of the Bolster

All splices shall be of the butt-joint type, with the addition of a cover plate. The splice plates shall be at least as thick as the web of the sill. They may be located on either side of the sill, extending forward and back of the center line of the bolster 30 in., as shown in Figs. 13 or 13-A. The rivets shall be spaced as shown.

Side Sill Splices

All splices must be of the butt-joint type, reinforced on both sides by plates 14 in. long. The reinforcing plates shall be at least as thick as the web of the sill. The splice plate on the flange side of the sill shall cover the web only, while the plate on the opposite side shall be flanged over the bottom leg of the side sill, and riveted to it, as shown in Fig. 14. The splice may

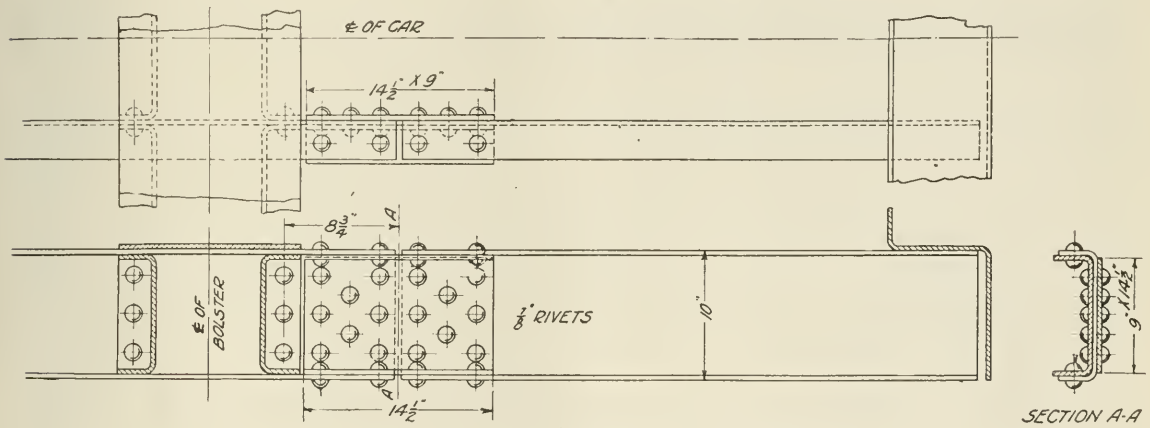


Fig. 12.—Steel Center Sill Splice in Front of Bolster

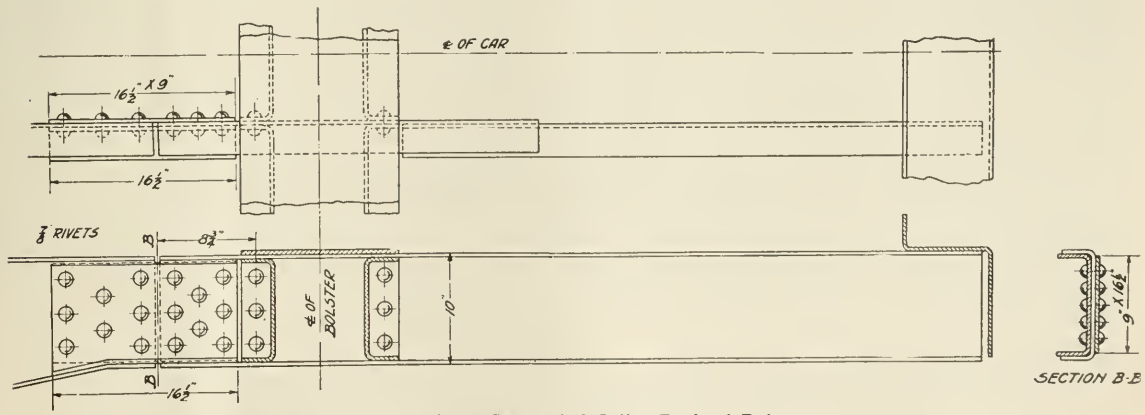


Fig. 12a.—Steel Center Sill Splice Back of Bolster

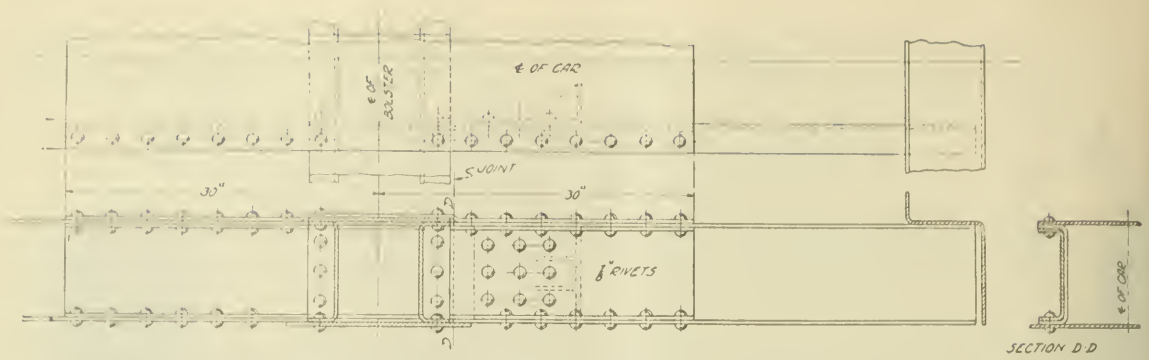


Fig. 13.—Steel Center Sill Splice (Outside), Less Than 8 Inches From Face of Body Bolster

be located on either side of the body bolster. The rivets shall be spaced as shown.

Side sills may also be welded by the autogenous process, making the thickness of the metal through the weld one and one-half times the thickness of the metal in the sill, in which case the reinforcing plates and rivets shown in Fig. 14 may be omitted.

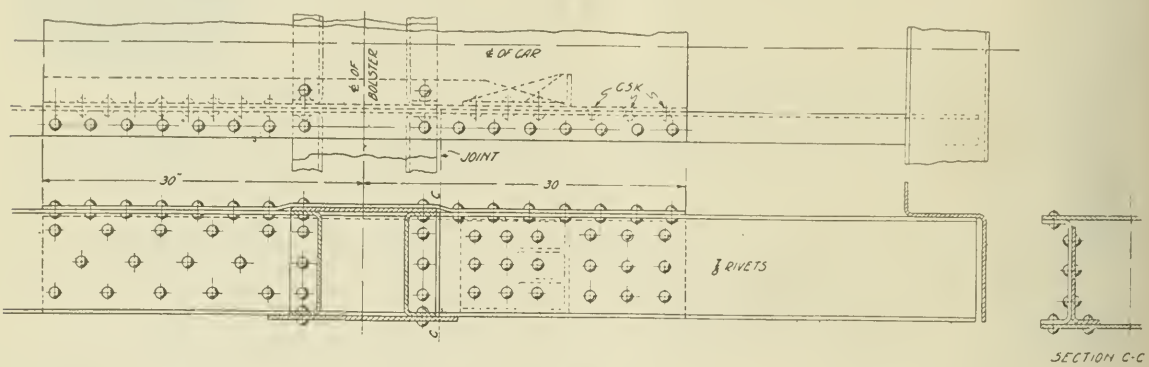


Fig. 13a.—Steel Center Sill Splice (Inside), Less Than 8 Inches From Face of Body Bolster

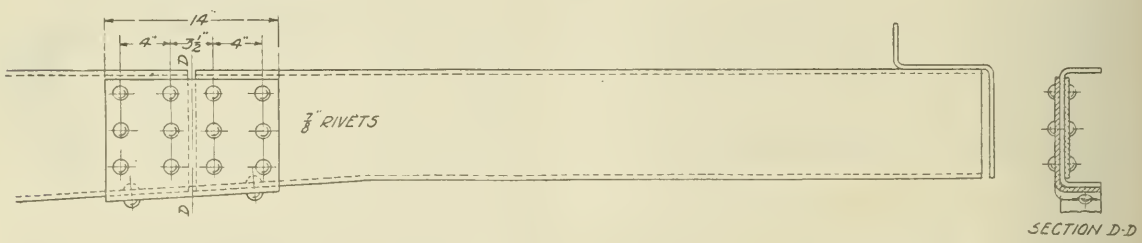


Fig. 14.—Side Sill Splice

The traffic manager of the General Motors Corporation suggests the following for box car side doors: "It has long been my contention that a 6-ft. wide side door, with a movable post, and a 4-ft. extension beyond, is the proper kind of a door to be used on either 36-ft., 40-ft. or 50-ft. cars. This kind of a door enables everyone to use a box car. In other words, with only

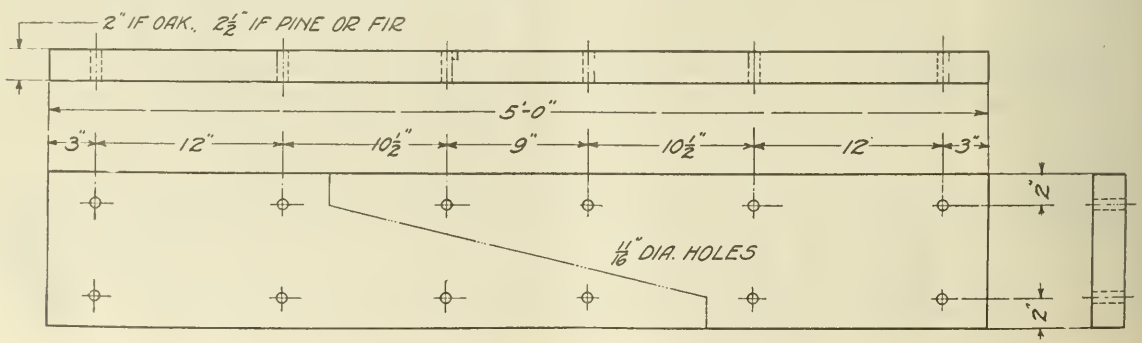


Fig. 15.—Center and Intermediate Sill Three-Bolt Splice Reinforcement

a 6-ft. door it confines the use of this box car to certain commodities, and certain other commodities, such as light and bulky articles, are excluded from the use of these cars, as it is impossible to get a light and bulky commodity in anything less than an 8 ft. wide side door—10 ft. wide preferred. If all box cars in future were equipped with the kind of a door above described, it would mean that on a car coming into our factory, loaded with any kind of commodity, when this car was unloaded we could immediately use this car for loading automobiles or trucks, by removing the post and taking advantage of the 4-ft. additional extension. This, you will note, gives a load to the car in both directions, and means that there will be practically no empty movement of a box car in any direction, as it could be used for all classes and kinds of commodities from merchandise to grain."

The point raised in the above is a matter of policy, for adoption or rejection by the management of the railroads. It, however, raises the question of providing a satisfactory design of door openings, wider than 6 ft., as a basis of construction. Special automobile cars with side door openings varying in width from 8 to 12 ft., and some with end doors 8 ft. and more in width, are in existence. If so directed, the committee will take up the task of providing such side door ensign.

The report is signed by W. F. Kiesel, Jr. (Chairman), Pennsylvania; A. A. Ayers, New York, Chicago & St. Louis; C. E. Fuller, Union Pacific; E. G. Chenoweth, Chicago, Rock Island & Pacific; I. C. Fritts, Delaware, Lackawanna & Western; C. L. Meister, Atlantic Coast Line, and H. T. Bentley, Chicago & North Western.

After presenting the report Mr. Kiesel read the following communication from the committee.

To the Members:

Under date of June 9, 1919, your secretary, V. R. Hawthorne, sent us the following copy of communication from F. C. Ferry, master mechanic, L. H. & St. L., dated April 5, 1919:

"I am in receipt of your Circular No. S-111-No. 2, requesting suggestions as to subjects for committee investigation during the year from June, 1919, to June, 1920, reports to be submitted to the 1920 annual convention.

"Question: 'Why is it that refrigerator cars cannot be so arranged as to prevent salt water dripping on the rails, etc.; lack of such an arrangement causes untold thousands of dollars of damage every year.'

"Rule 3, Paragraph F, Rules of Interchange, Master Car Builders' Association, provides that cars lacking such an arrangement mentioned in above question, shall not be accepted in interchange after October 1, 1920. This rule has been promulgated from year to year, but has been rendered null and void and of no effect by reason of postponement of the effective date. Why not put an end to this evil and have done with it?"

The Secretary stated that he was instructed to refer this matter to the Committee on Car Construction, to investigate and report at the convention in connection with their regular report; also to consider and advise as to observations of the use of open tanks.

Your committee has made an investigation of the status of the question of salt water drippings from refrigerator cars to date.

In 1898 a committee consisting of Messrs. S. Higgins and A. M. Waitt made a report on "Rust From Salt Water Drippings." This committee presented two methods of equipping refrigerator cars without much expense, and submitted two drawings, the object being to lead the salt water to the center of the track, instead of permitting it to drop at or near the rails.

In 1910 the following rules were adopted:

1. All salt water drippings should be retained in the ice tanks and drained off only at icing stations.

2. The total capacity of drain openings should not exceed the capacity of traps, and the capacity of both drains and traps should be sufficient to release all drippings within the time limit of icing the train.

3. The mechanism adopted for handling drain valves should be simple and positive, and so designed as to insure closing the valves before hatch plugs can be returned to their places.

4. Salt water drippings should be conducted from ice tanks through the drain valves above described and thence to the outside of cars through the regular traps and drain pipes.

In the interchange rules, Rule 3, paragraph F, reads as follows: "After October 1, 1920, no car carrying products which require for their refrigeration the use of salt with ice, and which are equipped with brine tanks will be accepted in interchange, unless provided with suitable device for retaining brine between icing stations."

We also find records that some of the members of this association have made independent investigations.

In January, 1905, C. A. Schroyer, superintendent car department, C. & N. W., wrote to important railroads operating dressed beef refrigerators, in order to ascertain the results of following the M. C. B. Recommended Practice of 1898. To the best of our knowledge he did not receive any very encouraging replies, and the consensus of opinion seemed to be that it is not feasible or desirable to consider the application of tanks for the retention of the brine. This referred only to such cars as were equipped with so-called "ice baskets," for we find that some milk cars and also some meat cars have been equipped with brine tanks, somewhat of the nature of those recommended by the M. B. C. Committee in 1910. An arrangement of this kind is shown on plate *A*, attached hereto. The brine tanks there shown have a pipe arrangement so installed that the upper part of the tanks can be emptied at terminals by opening certain valves, and when these valves are closed the pipe openings are at a sufficiently higher level to retain all of the brine plus the water from the ice meltage; should, however, there be too much water collect, there is a possibility for this water to overflow.

There has not been sufficient time to ascertain from all railroads how many cars they have equipped with brine tanks, but our perliminary investigation indicates that there are very few cars so equipped, and that the bulk of the refrigerator cars are equipped with so-called ice baskets, in which the ice is loaded, and all of the drippings pass out through traps to the track. On some cars there is a trough leading these drippings toward the center of the track and on other cars the traps are directly under the car side, where the drippings escape the rail. When meat is loaded in these cars it is the custom to add salt to the ice.

Although the question of guarding against damage from brine has been raised periodically, there has been little specific evidence produced to show the seriousness of the effect therefrom.

We should first determine whether this is sufficiently serious to justify making radical changes in present practice.

Explicit detail information should be obtained from the Maintenance of Way Section concerning the extent of damage, traceable to brine from refrigerator cars, that has been done to bridges, tracks and other maintenance of way structures; also whether any attempt has been made to protect these structures and with what success.

While this information is being collected, your committee will get in touch with Mr. Ferry in order to ascertain the details of damage to permanent structures on which he based his observations.

Respectfully submitted,

COMMITTEE ON CAR CONSTRUCTION.

Discussion

Mr. Gaines: Referring to the diagonal splice shown on page 3. There is an alternate splice on the next page, and if I am not mistaken, the committee made a report to this association several years ago, showing tests made on the two forms of splice. There was no question whatever at that time that the splice shown on page four was much the stronger form of splice, and it is much the cheaper to put in a car when you are splicing sills. As it stands, I think that we ought to discard that old diagonal ship splice that you have on the first page.

Mr. Lentz: I recall the tests made in the shops at that time, and the results were as stated by Mr. Gaines.

Mr. Gaines: In addition, I am going to make a motion that in publishing this report we do away with that diagonal splice. It is expensive, is hard to make, and is not strong. I move that we eliminate it.

Mr. Goodnow: At the time that investigation was made the splice shown on page 4, as a bucking proposition, was the best, but the other splice, the ship splice, as Mr. Gaines referred to as a load carrying proposition for inner sills, was considered at that time to be a better splice than the buck splice.

Mr. Gaines: If you had that splice made accurately, possibly that might be true; but the average carpenter is not matching a diagonal ship splice, and I doubt that as a load carrying proposition, as a bulling proposition, as a pulling proposition, or in any other respect, it is as strong as the straight splice.

Mr. Keisel. We do not have this splice, shown in Fig. 10, for center sills, which take buffing action. They are used in intermediate sills, where they are under bending action, and that type of sill makes a stronger sill with that type of splice than the butt splice for bending. The report says: "Intermediate sills spliced between bolster and end of car, and side sill, spliced on either side of bolster, must be in accordance with Figs. 10 or 10-A." Therefore, it is not a buffing resistance that we get, but a bending resistance.

Mr. Gaines: I am willing to admit that, theoretically, for loading, the diagonal ship splice may be the stronger, but under practical conditions, in the car yard, you are not getting anything like what you think you are getting in theory, and you can get a straight butt splice which will be as strong, and stronger, practically, than the other. I am in favor of eliminating the diagonal splice.

Mr. Keisel: You can have either one. It reads "must be in accordance with Figs. 10 or 10-A." You can make it either diagonal or butt.

I. S. Downing (C. C. C. & St. L.): Some years ago two splice tests were made on the C. B. & Q. at Peoria, Ill., and Mr. Young had charge of the tests. That test showed that in no manner was the ship splice as strong as the butt, in any of the tests which we made.

John McMullen (Erie): I wonder if Mr. Gaines took into consideration that if we splice a 14 in. side sill and cut it in the center, making the butt splice, if we are going to have as good a sill, to carry the load as we would have with the ship lap splice. I think it would be a mistake to make the butt splice on all sills, because in the 14 in. sill you have 2 in. on the bottom, and that would leave 12 inches of sill, otherwise you will cut it in two and ony have 7 inches.

Mr. Gaines: In the ship lap splice you have only 50 per cent when you cut it down, and I think Mr. Young answered the question as to the strength. I do not believe that one car repairer out of ten can make a perfect ship lap splice.

H. H. Harvey (C. B. & Q.): I am very much in favor of the butt splice, but this committee's recommendation is on Rules of Interchange, and you have both forms of splice. You will have to leave the report as it is and mention both kinds.

H. M. Curry (N. P.): Mr. Harvey brought out a question which came to my mind: If the recommendations formerly made were in favor of the butt splice, why was the other adopted? Some of the real old-time car men might give us some advice on that subject.

J. J. Hennessey (C., M. & St. P.): When the butt splice was first adopted it was altogether, as stated by Mr. Young, on the center sill, and leaving it optional to use either splice on the side or intermediate sill. That was the first report we made to the association, and I believe the report of the committee to-day, to leave it optional, is a correct report.

I would not advocate the use of ship lap splices in center sill construction, but there are conditions and times when it is easier to apply a ship lap splice, especially between the body bolster and end sills on intermediate and side sills, than it is to apply the butt lap splice.

F. W. Brazier (N. Y. C. Lines): I agree with what Mr. Hennessey says. On the other hand, it is optional, and you can use either one you like. When the first ship lap splices were put into the rules it was because we had car men who were mechanics, and to-day we have not got them, and we put something easy in the rules, so that the mechanics can work it out. You can use it if you want to. The ship lap splice, as the report leaves it, is optional.

Mr. Gaines: It has been determined by actual test that the ship lap splice is not as good nor as strong as the butt splice, and to make it requires a better grade of mechanics than we have to-day. In view of the present state of the art, we should eliminate the ship lap splice from our rules, and take the one that can be made.

Chairman: How would you cover that in interchange?

Mr. Gaines: I would not bar that out in interchange.

Chairman: How do you know when it is made? A man might make a splice tomorrow and you would not know whether it was made a year ago, or six months ago.

Mr. Gaines: I would put in the straight butt splice as recommended practice to get rid of the ship lap splice. I have seen ship lap splices that did not meet within an inch.

Mr. Hennessey: If you put the butt splice in, and it does not meet within an inch, you do not know what you have then. The report leaves the matter as optional, and you must be careful not to get things into the interchange rules which will cause a turmoil for years to come. It will be impossible for an inspector in the yard to say when the sill was spliced, if you pass it along on your own road, and leave it there for years.

Mr. Gaines: As my motion was not seconded, I will withdraw that, and make another motion. The recommendation of the committee on page two says "must be in accordance with Figs. 10 or 10-A," and I now make the motion that that portion of the report be amended to read "must be in accordance with Figs. 1 0or 10-A, but the latter preferred."

This motion was put to vote, and carried.

A motion that the report be accepted and go to letter ballot, and that the committee be continued to investigate the question of salt tanks was then made and carried.

The Report of the Committee on Car Trucks



J. T. Wallis
Chairman

UNDER DATE OF FEBRUARY 10, 1919, the secretary of the M. C. B. Association, at the request of the Car Service Section of the United States Railroad Administration, referred to the Committee on Car Trucks correspondence on the subject of marking freight equipment cars to show the load limit and requested the committee to make a report to be submitted to the Car Service Section.

This correspondence covered two points, viz.: First: Failure of axle in service due to being overloaded in accordance with the marked capacity on the cars, particularly the 60,000 lb. capacity cars. Second: Difficulty and confusion in determining the allowable lading that may be placed on the car from the weight markings stenciled on the cars as well as from the provisions of the M. C. B. Rules of Interchange governing the amount of load that may be carried.

The axle complication dates back to 1896, when it was found that the axles used at that time were too light to carry the load and axles of proper dimensions were designed. These axles, as subsequently modified and adopted as a standard of the association, have given satisfactory service without failure when purchased in accordance with the specifications. However, the condemning limits of the lighter design of axles, of 40,000 and 60,000 lb. capacity, were carried along in the interchange rules and in only the more recent years condemning limits were added for the M. C. B. standard axle. No penalty in repairs was provided for substituting a Non-M. C. B. standard for an M. C. B. standard axle until recently and the failure to have in stock M. C. B. standard axles resulted in axles of the same journal diameters, but different diameters at the wheel seats and the center of the axles, being under the same car. After the Rules of Interchange provided condemning limits at the wheel seat for both M. C. B. and Non-M. C. B. standard axles of the same capacity, some roads resorted to the practice of turning down the wheel seats of M. C. B. standard axles below the minimum limit and used such axles as Non-M. C. B. standard, thus prolonging the life of Non-M. C. B. standard axles and defeating the object

of having all cars in service equipped with standard M. C. B. axles. In some cases these axles with M. C. B. standard journal and center dimensions, but wheel seats below the minimum limit, were improperly applied in repairs to cars equipped with standard M. C. B. axles, causing justified complaints from the car owners. Furthermore, odd sized axles were introduced and applied to cars marked 50,000 and 70,000 lb. capacity.

Cars have been marked with varying capacities as follows: 40,000, 45,000, 50,000, 60,000, 65,000, 70,000, 80,000, 85,000, 90,000, 100,000, 105,000, 110,000, 115,000, 130,000 and 140,000 lb. capacity, notwithstanding that we have but five M. C. B. standard sizes of axles as follows:

M. C. B. Standard Axle	Journal Size	Nominal Capacity (Load)	Total Weight (Car and Load on Rail)
A	3¼ in. by 7 in.	40,000 lb.	66,000 lb.
B	2¼ in. by 8 in.	60,000 lb.	95,000 lb.
C	5 in. by 9 in.	80,000 lb.	132,000 lb.
D	5½ in. by 10 in.	100,000 lb.	161,000 lb.
E	6 in. by 11 in.	140,000 lb.	210,000 lb.

Note.—The above table is based on four-wheel truck cars (four axles per car). The loads for six-wheel truck cars (six axles per car) would be 50 per cent greater than given in the table.

The various markings can be attributed to the following: (A) Heavy light weight of body (as in the case of refrigerator cars) plus nominal capacity, including 10 per cent excess lading, exceeding the nominal car capacity for the axles used. (B) Low light weight of body (as in the case of flat and open top cars) plus nominal capacity, including 10 per cent excess lading, being less than the safe load the axles will carry. (C) Some cars being marked with capacity markings disregarding the safe load the axles will carry. (D) Other cars marked with "Load Limit" weight in order to obtain the maximum paying load on the car based upon the safe load for which the axle was designed.

This has caused general confusion and it, therefore, seems evident that some standard method of marking cars with weight markings should be adopted, which from a safety standpoint must be based on the safe allowable load on the axle used under the car and should be stenciled on the car, indicating the total weight of the car and lading as resting on the rails. This would indicate to scale agents, when cars are weighed, whether the car is overloaded or not without making any calculations; however, it would be necessary for them to record the light weights as at present in order to obtain the weight of the lading for billing purposes, which makes necessary the stenciling of the light weight on the car. The maximum load weight, difference between total weight and light weight, should also be shown as the maximum limit weight of lading which shippers can load on the car. These markings should, in the opinion of the committee, be:

MAX LOAD ..... 000 000 Lb.
LIGHT WT ..... 00 000 Lb. New 3—19

TOTAL WT ..... 000 000 Lb.

Max Load to include lading, as well as ice, brine or packing or blocking material used in connection with transporting the load shipped on the car. It is the difference between the total weight given in M. C. B. Interchange Rule 86 and the light weight of the car. This is the absolute maximum that can be placed on the car and no percentage for overload is allowed.

Light Wt to be the weight of the empty car resting on the rails.

Total Wt to be the sum of the Max Load that can be placed on the car and the Light Wt of the empty car. This total weight is shown for each size of M. C. B. standard axle under M. C. B. Interchange Rule 86.

Note.—The toal weight given in the M. C. B. Rule of Interchange 86 is based on the safe load for four axles, of the respective capacities, shown on M. C. B. Standard Sheet 15, plus the weight of the wheels and axles.

These markings involve a safe predetermined value for all axles now used under the cars and the committee has placed safe load limits on the Non-M. C. B. standard axles, figured on the same basis as the M. C. B. standard axles as shown in Exhibit *A*.

It will be noted that the carrying load for the Non-M. C. B. standard axles of the lighter capacity cars, 60,000 lb. capacity and less, are considerably reduced over the nominal capacity plus the usual 10 per cent. This mainly affects the house cars, as there are few open top cars of these low capacities and house cars very rarely carry loads up to their nominal capacity. On the other hand, it permits cars of 80,000 lb. capacity and over, which comprise the modern equipment, to carry loads up to the axle limit, which will increase the paying loads handled in these cars.

In the past, objections have been raised to permitting certain cars to be loaded to their axle carrying capacity on account of the truck or body details or both not having been designed with a factor of safety sufficient to permit them to be loaded beyond their nominal capacity. To provide for this contingency, the committee suggests that the owner of such cars be permitted, on authority of the Car Construction Committee, to mark down the Total Wt of the particular series of cars to the proper figure and place after such figure the size of axle with which the car is equipped, for example: A 100,000 lb. capacity

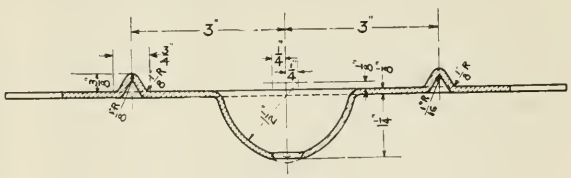


Exhibit B, M. C. B. Sheet 31

coal car can only safely carry 110,000 lb. of lading. The light weight of the car is 38,000 lb. The car should be marked as follows:

MAX LOAD ..... 110 000 Lb.
LIGHT WT..... 38 000 Lb. New 3—19

TOTAL WT..... 148 000 Lb. 5½ in. by 10 in. M.C.B. Std. Axle.

The only time the axle stenciling will be placed after the Total Wt is when the total weight is less than the prescribed allowable axle load.

With the proposed markings it is understood that when the light weight of the car is changed for any reason the maximum lading in pounds will also be changed. The total weight only changes when the type of Non-M. C. B. standard axle is changed to M. C. B. standard. The proposed markings involve changes in the M. C. B. Rules of Interchange and the committee will formulate these changes for submission to the Arbitration Committee when the plan is agreed upon.

With the adoption of the Max Load and Total Wt markings the nominal capacity marking is unnecessary. The new markings will require three lines for stenciling under the initials and number of the car and, as the distance from the center of the coupler to the bottom of the numerals in the number is fixed within certain limits, it leaves no space in which to stencil the cubical capacity of the car. The committee is of the opinion that the cubical capacity should be placed among the other dimension markings of the car, preferably under the inside dimensions. The committee was not unmindful of the fact that the Transportation, Traffic and Car Service Sections are vitally interested in any changes in the markings of weights, cubical capacity, etc., on freight cars and, therefore, the secretary arranged for a joint conference between this committee and the committees representing these sections. The representatives fully concurred in the report of this committee and considered the proposd mark-

Exhibit A

Total Weight Limits Based on Safe Allowable Load on Axles (Four Axles per Car).

Normal Capacity of Car Lb.	M. C. B. or Standard Non-standard.	Permissible Weight of Car and Lading on Rail	Journal Diameter. Worn New.	Journal Diameter. Worn Limit.	Wheel Seat Diameter. Worn New.	Wheel Seat Diameter. Worn Limit.	Center Diameter. New.	Center Diameter. Limit.
140,000	M. C. B.	210,000	6	5½	7⅝	7⅜	6⅞	6⅞*
100,000	M. C. B.	161,000	5½	5	7	6¾	5⅞	5⅞*
80,000	M. C. B.	132,000	5	4½	6½	6¼	5⅜	5⅜*
70,000	Non-standard	105,000	...	4	...	5⅝	...	4⅞
60,000	M. C. B.	95,000	4¼	3¾	5¾	5½	4¾	4¾†
	Non-standard	78,000	...	3¾	...	5	...	4⅜
50,000	Non-standard	66,000	...	3½	...	4¾	...	4⅛
40,000	M. C. B.	66,000	3¾	3¼	5⅛	7⅞	4¼	4¼†
	Non-standard	56,000	...	3¼	...	4⅝	...	3⅞

Note.—The Rules of Interchange provide that M. C. B. standard axles of 80,000 lb. capacity and over (marked *) may have a limit at the center of the axles 1/8 in. lower than the standard axle when new, and that the 60,000 and 40,000 lb. capacity M. C. B. standard axles (marked †) may have a limit at the center of the axles 1/8 in. lower than the standard when new. The committee is of the opinion that all new axles should be strictly in accordance with the standards, and the allowances now provided in the rules should only apply to existing axles under the equipment.

ings essential and adequate. It was pointed out that the adoption of these markings will necessitate revisions in the tariffs.

Norfolk & Western Special Axle 5¼ in. by 9 in.

The Norfolk & Western desired to have its special 5¼ in. by 9 in. journal axle included in the table with Non-M. C. B. standard axles, claiming that this axle is good for a total weight of 152,000 lb., the dimensions of the axle now being as follows: Journal, 5¼ in. by 9 in., dust guard seat, 6¾ in. diameter, wheel seat, 6½ in. diameter, center of axle, 5⅝ in. diameter, with 6 ft. 4 in. center to center of journals. Inasmuch as the wheel seat on this axle is the same as on the 5 in. by 9 in. axle, although other dimensions are greater, the committee cannot assign a greater load to this axle than the standard 5 in. by 9 in. axle.

Remuneration for Light Weighing Cars

The question has been raised whether the present remuneration as given in the Rules of Interchange for light weighing cars is sufficient to reimburse the road performing the work. The committee has carefully checked this matter and finds that the present prices in the Rule of Interchange are adequate.

Spring Plates—M. C. B. Sheets 31 and 31-A

C. B. Young, Manager, Inspection and Test Section of the United States Railroad Administration, calls attention to the height of the boss on the spring plate shown on M. C. B. Sheet 31 not being clearly defined, as well as differing from the height of the boss shown on M. C. B. Sheet 31-A. The committee concurs in the suggestion that the drawings should be clarified and recommends that the height of the boss be made ⅜ in. in the clear, the dimensions in the detailed views changed to accord with this dimension, and an enlarged view added to the section showing the recess for the bolt heads in the spring caps, showing the detail of the boss as per Exhibit *B*. In addition to the above the committee recommends that a note be added that the bolt must be riveted over the nut.

Five Inch by Nine Inch Passenger Journal Box—Dust Guard Well

The secretary referred correspondence originating with the T. H. Symington Company to this committee, advising that the dust guard well on the 5 in. by 9 in. passenger journal box differs in dimensions from the dust guard well for the 5 in. by 9 in. freight journal box, and that this difference interferes with the interchanging of pattern parts. In 1916 changes in the dust guard well for the 5 in. by 9 in. freight journal box were adopted by letter ballot, but corresponding changes were not made in the 5 in. by 9 in. passenger journal box, and they should be the same.

Recommendations

The committee recommends: That the following be submitted to letter ballot for adoption as Standard:

1. Marking cars with Max Load, Light Wt and Total Wt as per paragraph 7 of this report.

2. Marking the cubical capacity under the inside dimensions as per paragraph 13 of this report.

That the secretary be instructed to make the necessary changes:

3. In the spring plates shown on M. C. B. Sheets 31 and 31-A to accord with Exhibit *B* of this report and that a note be added reading "Rivet bolt over nut."

4. In the dust guard well of the 5 in. by 9 in. passenger journal box shown on M. C. B. Sheet 8-A to conform to the dust guard well for the 5 in. by 9 in. freight journal box shown on M. C. B. Sheet 8.

The report is signed by J. T. Wallis (Chairman), Pennsylvania; E. W. Pratt, Chicago & North Western; James Coleman, Grand Trunk; J. J. Tatum, United States Railroad Administration; Major E. C. Schmidt, New York District Ordnance Office; W. J. Robider, Canadian Pacific; J. McMullen, Erie; A. R. Ayers, New York, Chicago & St. Louis; E. G. Chenoweth, Chicago, Rock Island & Pacific; J. J. Maginn, Cincinnati Northern, and B. B. Milner, New York Central.

Discussion

H. H. Harvey (C. B. & Q.): In page four, paragraph 10, sixth line, where it refers to the question of marking down the present cars, I would like to ask the committee what they have in mind with regard to the owner of the car applying to the Committee on Car Construction for permission to do so.

Mr. Ayres: That is only as a general check, as there is a standing committee on car construction.

Mr. Harvey: It seems to me, especially as the roads will probably go back to private management, that the owner will be the party who is the better judge as to whether the car is strong enough to carry the marked capacity than anyone else. He knows the equipment, the time it was constructed, and knows how it has been kept up. I approve the report as a whole, but do not see the necessity for that particular recommendation.

Mr. Gaines: I have heard a great deal of criticism in the last two or three years of a lot of old equipment to the effect that the present condition of the car is not strong enough to carry the loading that would be given under this new maximum loading rule. There should be a clearing house of this association to determine whether such cars are justified in carrying the loads as marked before they are checked up by some committee. It is proper for some association like this to see whether they are strong enough to carry the loads, instead of allowing them to go around the country because the owners would like to have them do so.

Mr. Harvey: It is not a question of the trucks; it is largely a question of body construction. A 100,000-lb. capacity car will carry 92,000 lb. of freight in certain commodities, but if you load it with bulk grain it may not carry it safely. The body of the car is not heavy enough to carry it. The new cars will carry 86,000 lb., and you ask the older cars to carry 6,000 lb. more than the new cars. For this reason the owner ought to have the right to mark down his car, if he so wishes, without referring the matter to the Committee on Car Construction.

T. J. Burns (M. C.): There is a matter which is more important than that, and has to do with the first recommendation on page seven. You are providing a remedy that will not be operative for years to come. We know how long it took us to get the safety appliances on the cars, and we have an idea how long it will take us to have the cars properly stenciled, and in the meantime, while the stencils are being put on the cars, they are going around overloaded. We have a great deal of trouble with 60,000-lb. capacity cars, and few roads are observing Rule 86 as it was intended it should be observed.

Since I came to the convention, I received a letter from our federal manager and chief operating officer, which, in part, reads:

"I am surprised at the general application of this order (Rule 86). No two railroads in the country appear to be applying the instructions alike. This is a confusing operating arrangement and also has a strong tendency to bring about discord among various shippers." Further on, he recommends that the matter be brought before this convention, to see if the members of the association have any suggestion to make to straighten out the matter. I do not know exactly how the committee can handle it, but there should be some court that will have the necessary authority to make the people observe this rule in the true spirit.

J. J. Hennessey (C. M. & St. P.): Without attempting to criticize the report of the committee, there is one thing I want to call to the attention of the association. You equip a car with a 60,000-lb. or 80,000-lb. standard M. C. B. axle, and so mark it. I receive that car in a short time, after you have so stenciled it, with the proper size axle under the car to carry the load according to the stencil, but I apply a non-M. C. B. 60,000-lb. axle, that is turned down in the wheel seat. Will you hold that car up in interchange? You cannot get anything into the rules and make it binding, unless you run the danger of holding up cars interchange, and I do not believe you want to do that. This subject should be handled very carefully indeed, because these interchanges of axles will be made.

J. A. Pilcher (N. & W.): The report of the committee, paragraph 15, refers to the application of the Norfolk & Western, in regard to an additional non-standard axle, in which the committee refuses to accede to the request to put this additional non-M. C. B. axle in their list, and I wish to bring before the Association the full significance of this ruling to the railway company.

The axles in question have been in service since 1899, so far as size of the journal is concerned. At that time the wheel

seat, which is the critical point referred to by the committee, was 6⅜ in. Several years later the wheel seat for this axle was increased to 6½ in.

In paragraph 15, the committee brings out the point that the 6½-in. wheel seat is the standard diameter of the 5 in. by 9 in. axle. That is true, but the rules of interchange and the table in Exhibit A, allow the wheel seat of a 5 in. by 9 in. axle to be made as low as 6¼ in.

In paragraph one, on page one, they speak of the failures being due to overloading. The question of failure from overloading is largely a question of experience, in so far that all of our stresses in shapes or structures, have been determined upon someone's experience. In all the twenty years' service of these axles, there has never been a single report of an axle breaking in the wheel seat, even though a large number of them were originally 6⅜ in.

I wish to ask that this additional non-standard M. C. B. axle be put in this list, in accordance with the letter to the committee, with one modification. We stated in the letter that we desire 152,000 lb. as the load. We would like to modify that and use 148,000 lb., as that will take care of the real carrying capacity of the cars—110,000 lb. in most cases—and allow, at the same time, throwing the axle stresses well within the limits as established in the standard M. C. B. axles.

I wish to illustrate that by referring to the variations of weight and comparing this axle with the standard M. C. B. 5-in. by 9-in. axle and the standard M. C. B. 5½-in. by 10-in. axle. I will make the first comparison with the 5½-in. by 10-in. axle. The decrease in weight is 8 per cent of the decrease in the strength of the axle at the wheel seat is 10.7 per cent. That looks as if it was below the standard axle, but you have further to take into consideration that the distance from the center of the bar to the center of the rail, measured in a horizontal line, is reduced one-half inch, which is equivalent to a 5.5 per cent reduction; so if we add the 5½ per cent to the 8 per cent, we have practically 13 per cent reduction in stresses and 10.7 per cent in reduction of the strength of the axle at that point. It is, therefore, well within the limit at the wheel seat.

Comparing it again with the 5¼-in. by 9-in. axle, using the 148,000 lb. and 132,000 lb., the lengths there are identical. The increase in lading is 12.1 per cent. The increase in the strength of the axle at the wheel seat is 12.5 per cent. As a matter of safety and strength, it meets all the requirements of the M. C. B. axle.

I therefore move that this non-standard M C.. B. axle be placed in the iist with the others.

As to the operation of the rule, it is significant to the company that they have now in service, so far as we know, something over 14,000 open-top coal cars, so constructed. None of these cars have been built since 1909, so that you will see we started to be good 10 years ago. By cutting down the capacity of these cars on an average of 10 tons, that would be equivalent to a destruction of 2,800 50,000-lb. cars, the value of which, if you put it on a liberal basis, would be something like $7,000,000. If we should estimate the carrying capacity of the cars on the basis of mileage of the cars during the year 1916, of which we have a record, and allowing only half the mileage to be the loaded mileage, it would reduce the capacity something over 1,000,000,000 ton-miles.

R. L. Kleine (Penna. Lines): The present chaotic condition of the markings of cars and the amount of loaded carrying capacity has brought about a recommendation on the part of the U. S. R. R. A. Car Service Section to get a uniform marking, in order to obtain the maximum loaded carrying capacity on the cars, and as well to overcome the trouble that has been experienced with broken axles in service. The matter was referred to the Car Truck Committee to solve the proposition.

We well know that the M. C. B. standard axle has been abused in that it has been turned down below the safe limits set for the particular axle, and I do not think we can justify Mr. Hennessey's statement that, due to expediency, we have disregarded the safe loading on the axle and turned it down below the safe limits, and ask to continue such practice.

The committee has taken all of these details into consideration, and formulated the safe loads on the standard axles, as well as figuring the non-standard axles by the same formula as the standard axle was figured, and in cars now in service, we do not think that the standard axle will have to be marked down to the figures presented by the committee.

The committee has had a joint conference with the Car Service Section, and also with the Traffic Section, and they have unanimously agreed to the markings as recommended by the committee.

In regard to submitting to the car construction committee such questions as marking down the cars below the carrying capacity, the thought, there, was that the controversies might arise where a car has been marked in accordance with the standard axle under the car, and the car shows weakness in service. When such occasion arises there will be a controversy between the road on which the car failed and the car owner, and it was thought best that such controversies should be submitted to the car construction committee.

In regard to the Norfolk & Western axle, the committee carefully considered the subject. This is a special axle of the same length as the 5-in. by 9-in. axle. They have larger diameters as to journal, also center of axle, but their wheel seat is exactly the same dimensions as the M. C. B. 5-in. by 9-in. axle—in other words, 6½ in. Mr. Pilcher did not allow for any turning down of the wheel seat in service, where they changed the wheels under any such cars. The figures given by Mr. Pilcher are entirely correct, in accordance with the formula, that if the axle has a wheel seat of 6½ in. it is good for a load of 148,000 lb., but if the wheel seat is turned down to 6⅜ in., it is good for a load of 140,000 lb, and if turned down to 6¼ in., which is the minimum limit for the 5-in. by 9-in. axle, it is good for 132,000 lb. Axles, under the N. & W. cars referred to, have wheel seats turned down to 6⅜ in. and 6¼ in., and therefore, the committee could not consistently accept the recommendation of Mr. Pilcher.

For many years we have talked about the overloading of our refrigerator cars, considering the size of the journal that was under the car and the capacity marking on the car. Now, we all agree that the refrigerator marking was not correct considering the diameter of the axle under the car. After a while we found a lot of our cars weak and we began to apply steel underframes, steel centers and steel ends, and other improvements and added to their weight. Finally we found that our box cars had the journals overloaded with the marked capacity they were supposed to carry, considering the 10 per cent added.

Mr. Pilcher brings out the dimensions of his axle. He says it is strong. The 5½ in. by 10 in. axle was established because its dimensions were found necessary in order to carry the load that the car was supposed to carry, that it was placed under. He has not made any mention as to what the load would represent on the journal, or the journal bearing, that would increase the heating of his 5 in. by 9 in. journal over the 5½ in. by 10 in. journal. He probably didn't break the axle at the wheel seat, but probably broke the journal off because it was frequently hot.

Chairman: I would like to ask Mr. Pilcher whether any record has ever been kept of loose wheels.

Mr. Pilcher: We have loose wheels, but I am sure there are no more loose wheels in connection with this construction than any other construction we have. The loose wheel construction is not a question of the particular size of that axle fit. It is a very serious matter to cut out such a large hauling capacity in the country at this time, and the cost of replacement is so very great.

I would like, therefore, if I could get a second to my motion, so that the matter could come up for a vote, if nothing else, to see if we cannot stave off this enormous expense .

Mr. Kleine brought out the point of the turning down of the axles. Penalize us when you find them turned down, and don't penalize those that are not turned down.

There has been no indication whatever of any unexpected or any unusual heating that would bring about the breaking of these axles in the journal. We have had broken axles, due to hot boxes, but I cannot say that any one of them was this particular axle.

Mr. Gaines: I would like to ask the Secretary when the 5½ by 10 axle was first made the standard of the Association.

Secretary: That was in 1899, Mr. Gaines. In 1901 the diameter of the wheel seat was changed from 6⅞ to 7 in.

H. W. Coddington (N. & W.): It is my duty to make a report on all of these failures wherever they occur, and it is our experience that we have more broken journals in the boxes in

the journal bearing on the 5½-in. by 10-in. journals than we have in the 5¼-in. by 9-in. It is very seldom that we ever have a 5¼-in by 9-in. axle failing in the journal bearing section.

Mr. Tatum: I would like to know if there is any comparative records kept or is this simply surmise? Have we a comparative record of the number of hot boxes we have on a 5-in. by 9-in. journal carrying 100,000 lb. capacity load, with other cars equipped with the 5½-in. by 10-in. journal, to measure up the difference existing on that railroad? If you have one I would like to know what it is.

Mr. Coddington: I was speaking about journal failures, not hot boxes. I understood Mr. Tatum took the point that way. I have a record of that. The motion to permit the use of the 5¼-in. by 9-in. journal was put and lost.

A motion that the report of the committee be received and the recommendations referred to ballot was carried.

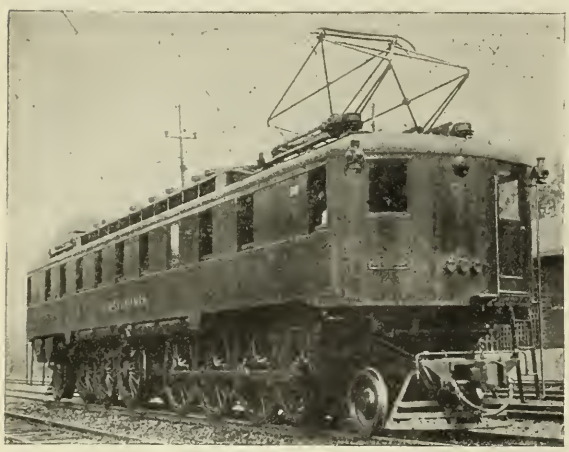
Mr. Ayers: I don't know that this requires any action by the convention, but it is a matter to which Mr. Barnes refers, and I would like to speak a little on it. It will possibly involve other and similar questions. That is, the matter of getting this rule about the maximum load followed out. It will not be taken care of at all by changing our Rules of Interchange, because the trouble goes a good deal farther back than the inspector. The trouble originates with the shipper, and I don't know just how the question can be handled. It is probably one for the Executive Committee, but the matter will have to be controlled before it gets to the Mechanical Section people, it seems to me.

Report of Committee on Tank Cars

The report of the Committee on Tank Cars was presented by Mr. Gibbs, and a lengthy discussion ensued. This dissussion will be published in the next issue of the Daily, next Monday morning.

Moving Tonnage in Large Units

THE ABILITY TO INCREASE TRACK CAPACITY for the rapid expedition of heavy freight trains is fast becoming a difficult problem, owing to the tremendous increase in train tonnages to be moved as a unit. In other words, the problem before many steam railroad operators is how to increase the physical capacity of a



Pennsylvania FF1 250-Ton Electric Locomotive

certain heavy tonnage division without prohibitive expense. At the same time, after such an expenditure in correcting alignment, grade reductions and other operating difficulties, there still remains the problem of operation, namely hauling without delay the tonnage offered for transit.

With the introduction of the large FF1 250-ton locomotive of the Pennsylvania Railroad, on exhibit at the Pennsylvania Electric Station, Tennessee Ave., there dawns a new era in the possibility of moving heavy tonnage in large units over steep grades. The locomotive has a maximum accelerating horsepower of 7600, with a sustained horsepower capacity of 4800 for one hour. With two of these engines a 6300 ton train can be handled up long grades at constant speed; for instance on a 25-mile 1 per cent grade, such a train could be moved at 20.6 miles an hour.

The Pennsylvania FF1 locomotive was built within existing operating limits, including the maximum starting draw-bar pull which average freight cars will permit; the maximum tractive effort consistent with the wheel arrangement used; the maximum weight on drivers; the maximum horsepower per unit weight, and the maximum speed considered desirable for contemplated operation.

Registration, American Railway Association, Sec. III, Mechanical

Eimer, Wm., S. M. P., Penna. B. & A. V. Div., Marlborough.
Gray, C. B., Penn.
Hellman, Chas., Pitts. & Shaumont.
Hess, Geo. F., S. M., K. C. Southern, Traymore.
James, Chas., M. S., Erie.
Kimmett, M. A., G. F. C. D., C. R. R. of N. J., Arondale.
Lee, F. H., A. S., F. C. D. of the B. & O.
Long, B. O., So. Pac.
McMunn, W. R., A. S. R. S., N. Y. C., Shelburne.
Pratt, E. W., A. S. M. P. ,C. & N. W., Marlborough.
Robbins, F. S., A. G. F., Penn., Haddon Hall.
Shepard, L. A., Brighton.
Vaughan, H. H., Dominion Bridge Co., Marlborough.
Wintersteen, J., M. M., Cornwall R. R., Arlington.

Special Guests

Anderson, H. A., Asst. P. A., Pa.
Baker, C. N., M. M., Tennessee, St. Charles.
Barton, Wm. R., Chief Draft., N. Y. N. H. & H., Osborne.
Borup, Mrs. O. V., Draftsman, B. & O., Pennhurst.
McCampbell, Jas., M. M., Ft. Smith & Western, New Strath Haven.
Clark, Edward, Gen. Mech. Fore., Cornwall, Arlington.
Clifton, W. H., Asst. P. A., B. & O., Breakers.
Corbett, A. B., Shop Supt., M. K. & T., Osborne.
Cornwell, Wm. H. R., H. D. F., P. East Lines, Strathhaven.
DeGuire, G. N., Gen. Supr. of Equip., U. S. R. R. A., Marlborough.
Dynan, T. J., Secy. to Mech. Asst., East Reg. U. S. R. R. A., Breakers.
Dugdale, Geo., U. S. R. R. A., Marlborough.
Dunn., Col. B. W., Ch. Insp. Bur. of Expl., U. S. R. R. A., Breakers.
Enwright, J. T., Insp. Wgts. & Meas., Bur. of U. S. R. R. A., Strand.
Ford, J. F., Fore. Frt. Dept., B. & O.
Grams, S. C., For. Passenger Shop, B. & O.
Grant, W. M., Boiler Shop For., Penna. E. L., Strathhaven.
Grant, J. E., Insp., A. R. A., Sterling.
Hall, C. B., Asst. P. A., Pa.
Hammond, R., M. M., N. Y. N. H. & H.
Henry, H. B., Asst. Dir. of Pur., S. P., Traymore.
Hill, J. P., Storekeeper, W. J. & S. S.
Hodges, A. H., M. M., B. & O., Normandie.
Ingersoll, Howard L., Mech. Asst. to Reg. Dir., East. Dist., Traymore.
Kapinas, G. H., G. F., B. & O.
Kimmett, M. A., G. F. D., C. R. R. of N. J., Avondale.
Lawson, A. B., Draughtsman, B. & O., Arlington.
Lehr, N. W., Gen. Foreman, P.
Madden, T. P., Gen. Boiler Insp., M. O. P.
G. N. Norman, Pa.
Parker, W. T., Machinist, W. J. & S. S.

Pinkerton, N. W., Asst. Eng., N. Y. Cen.
Poley, G. M., Architect, A. C. L., Strand.
Price, Towson, 3rd Asst. Exam., U. S. Patent Office, Kingston.
Roberts, Geo. S., Shop Insp., Penn.
Rogers, N., Asst. Sec. to Dir. Div. of Operation.
Rhul, Andre, M. E., Branch P. L. M., Chelsea.
Shank, H. T., P. A., L. & N. & L. N. & St. L., Chelsea.
Driscoll, F. E., Asst. Pur. Agt., Erie, Traymore.
Whitsitt, W. B., Chief Draft, B.& O., Arlington.
Williams, M. A., Blackstone.
Wheeler, H. B., Fore. Mill & Cab. Shop, B. & O.
Van Moss, J. H., Sales Rep. P. Tank Line, Traymore.
Weigle, John, Ret. Foreman, Penn., Elwood.

Important A. R. A. Committee to Meet Here

The Committee on Grade Crossings, Protection and Trespassing of the American Railroad Association will hold a meeting at the Marlborough-Blenheim Hotel on Monday. The committee is composed of the following railroad officers: Col. A. J. McCrea, chairman; C. L. Bardo, general manager, New York, New Haven & Hartford; J. Q. Van Winkle, general superintendent, Central Indiana Railroad; D. H. Beatty, superintendent of safety, Southern Railroad; W. J. Towne, assistant general manager, Chicago & Northwestern; J. H. Dyer, general manager, Southern Pacific Company; T. S. Stevens, signal engineer, Atchison, Topeka & Santa Fe; F. L. Thompson, chief engineer, Illinois Central, and C. H. Tillett, acting signal engineer, Grand Trunk.

"Look Me Up"

"I want to register a kick," said the tired car inspector, buttonholing The Man Who Saw.

"I got here at 10.00 A. M. this morning. At 10.02½ A. M. Dan Gitem, of the Fit-em-all Equipment Company, had my pedigree and a promise to bring my wife, and lunch with him at noon.

"'Look me up,' he says.

"Where are you at?" says I.

"'Booth 4076.'"

"'All right, Dan, we'll be there with our hair in a braid.'

"Well, it's nearly one o'clock now and me and Mary here have been trudging all over the place to find booth 4076. We went through 2,000 of them and got tired—can you take us there direct?"

The Man, having qualified as a puzzle expert in the postoffice department, felt that he had acquired a sufficient knowledge of the intricate lay out of booths on the Pier to guide them safely to Dan Gitem's lair, and they started off.

"Why," said the Inspector, "doesn't somebody hand out a map so a fellow can find his way around? It might be a good idea to divide the whole exhibit floor into sections A, B, C, etc., and list the numbers as A1, B1, etc.,—anybody who could read could get there then."

"Perhaps," suggested The Man, "there may be 'method in their madness.' The object of the arrangements here is to assure the spectator that he won't miss anything. For this reason the exhibit spaces are laid out in such a manner that no matter what booth he starts out for, he is automatically sidetracked along by-paths which contain things he really shouldn't miss. From there, it is but a willing step farther to the next—and although he gradually gets away from his objective, in the long run he wins. He wins a liberal education."

"Well, well," said the Inspector, "I had a hunch that there was a purpose behind it—let's hurry, I'm hungry."

Conventionalities

James E. Tierney, master mechanic of the Louisiana & Arkansas at Stamps, Ark., is here with Mrs. Tierney and the future master mechanic of the L. & A., Master Stanley Tierney.

Mr. and Mrs. Burton W. Mudge are attending the conventions as usual. Their son, Burton, Jr., was unable to come with them, as he is taking some important examinations in school, but he expects to come later.

B. L. Winchell, regional director of the Southern region, was accompanied to Atlantic City by Mrs. Winchell. They stayed here until yesterday and then went to New York to visit Mr. Winchell's mother, who is now 83 years old.



D. H. Kinter, General Foreman Car Department, Monongahela Railroad; Mrs. Kinter and Miss Grace Kinter

D. J. Champion, President of the Champion Rivet Co., is here as usual. We say "as usual" because while Mr. Champion can not lay claim to the "long distance" record, that having almost been conceded to Frank Edmunds, he has been coming a long time.



Left to Right—R. J. Leslie, Draftsman, Car Department, P. R. R.; C. Geisking, General Foreman P. R. R., and G. T. Baker, General Car Inspector, P. R. R.

W. H. Keller, president and general manager of the Keller Pneumatic Tool Company, Grand Haven, Mich., arrived Thursday from New York, bringing with him export orders for Keller tools approximating a quarter million dollars. Mr. Keller reports business brick with his company. An enlargement of the Keller factory to nearly double its present capacity is planned for the near future.

E. G. Jackson, president and general manager of the International Equipment Company, Montreal, representing in his territory the American Steel Foundries, Keyoke Railway Equipment Company, National Malleable Castings Company and Edwin S. Woods & Company, is at the Traymore.

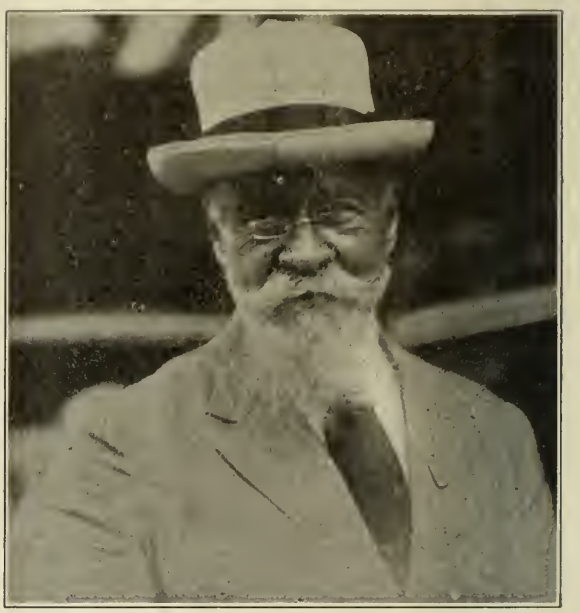


G. Villard, Manager American Railroad of Porto Rico, San Juan, P. R.

Mr. and Mrs. E. W. Pratt, who have been attending the conventions for years, arrived on Thursday, a little later than usual. Some months ago Mr. Pratt, who is assistant general superintendent of motive power of the Chicago & Northwestern, secured leave of absence for six months and has since been enjoying himself. He took leave of absence merely to get a good rest and we expect to see him back on the job in the railway business one of these days.

So far as we are able to ascertain, the only Canadian railway officer at the convention is W. A. Booth, of Montreal, successor to James Powell as chief draftsman of the Grand Trunk and also as secretary of the Canadian Railway Club. Labor conditions have prevented our Canadian friends from coming to Atlantic City this year.

F. J. Foley came to the conventions this year as general sales agent of the Railway Steel Spring Company, having been appointed to that position recently, following the



M. N. Groten, First Assistant Engineer, Russian Commission on Ways and Communication

death of S. T. Fulton, vice-president in charge of sales. Mr. Foley is a sales agent who thoroughly knows the products he is selling, as he was until his recent promotion general superintendent of the plants of the company. He was accompanied to Atlantic City by C. K. Shreve, assistant secretary of the company.



Executive Committee, American Railroad Association

Left to Right—B. F. Bush, Regional Director, Southwestern Region; Hale Holden, Regional Director, Central Western Region; B. L. Winchell, Regional Director, Southern Region; W. T. Tyler, Director of Division of Operation, U. S. Railroad Administration; J. E. Fairbanks, General Secretary, American Railroad Association; R. H. Aishton, Regional Director, Northwestern Region and President, American Railroad Association; C. H. Markham, Regional Director, Allegheny Region; G. L. Peck, Federal Manager, Pennsylvania Lines West; N. D. Maher, Regional Director, Pocahontas Region; T. C. Powell, Director of Division of Capital Expenditures; A. J. Stone, Federal Manager, Erie; H. E. Byram, Federal Manager, Chicago, Milwaukee & St. Paul; J. M. Hannaford, Federal Manager, Northern Pacific; E. H. Coapman, Federal Manager, Southern Railway; A. T. Hardin, Regional Director, Eastern Region; J. E. Gorman, Federal Manager, Rock Island; W. J. Jackson, Federal Manager, Chicago & Eastern Illinois.

A lapse of three years defines sharply how much these meetings partake of the spirit of family reunions. Men and women are here to whom the convention has been a definite part of their lives annually. The Ashton family represents this type in a high degree. Mrs. Emma C. Ashton, the wife of Henry G. Ashton, has attended these



W. G. Phelps, Purchasing Agent, Pennsylvania Lines West

meetings for more than forty years. Her son, A. C Ashton, who has married since the last convention, brings his wife.

E. S. Wortham plays a good game of golf. He is a member of the Glen View Club, Chicago. When we were in Atlantic City in 1916 he played in the M. C. B. and M. M. golf tournament. He made a fine score, but failed to win a prize. The reason was that the handicap committee, knowing that Mr. Wortham was suffering with a case of poison ivy, made him a "scratch" man. Mr. Wortham, Frank L. Norton and George L. L. Davis, all of the Scullin Steel Company, are guests of the Marlborough-Blenheim.

The name of James M. Hopkins should be added to the list of "farmers" we mentioned in the daily the other day. And, by the way, he is no longer president of the Camel Company, Percy M. Elliott having succeeded him. "Farmer" Jim motors occasionally from his country estate near Libertyville, Ill., to Chicago, where he assumes his duties of chairman of the board of the Camel Company. After a fine record of attendance at the conventions Mr. Hopkins remains at home this year.

How children are trained up in the way they should go finds an example in the Bullard Machine Tool Company. Edward C. Bullard, grandson of the founder, is assisting demonstrators at the pier exhibit. He is a graduate of Sheffield School at Yale, and enlisted in the army and was assigned to the Ordnance Department, where he did active duty. On being released from the government service he began the routine shop education in the Bullard plants. This means a three-year term of apprenticeship, which includes work in all departments.

J. E. Erwin, a 20-year member of the A. R. M. M. A., probably has the unique distinction of representing a railroad at the convention owned by an orphans' home and so far as known, the only one in the world. Mr. Erwin is master mechanic of the Sand Springs Railway and hails from Sand Springs, Okla. This railroad has a history. Charles Page went to Oklahoma about 12 years ago a poor man. His youth had been beset with hardships and deprivation because of the necessity of providing for a mother with a large family, and he firmly resolved that if the time ever came he would in some way lighten the burden of widowed mothers and orphans. In a short time he acquired undeveloped "Indiana country" and struck it rich in oil. He built the railroad with no prospect of immediate, paying business and then built the business on the railroad. It is today both steam and electrically operated and is the smallest, large railroad in the mid-west, both from a passenger and freight earning basis. He subsequently built the Sand Springs Home, a widows' and orphans' colony, where widows are given an opportunity to help themselves and where orphans are given the advantages of a home and a good education. This home provides for nearly 600 children and 70 widows, and includes a cannery, greenhouses, dairy, hospital, cold storage and ice plant, manual training school and other educational institutions. The Home owns the railroad and other business concerns established by Mr. Page and all are dividend payers.



Left to Right—George C. Weight, General Car Insector, P. R. R.; F. S. Kent, General Car Inspector, P. R. R.; Captain C. R. McKinsey, Captain Engineers (ex-Master Mechanic, Washington Terminal); Captain J. M. Rank, Staff of Director General, Military Railways; Charles E. Boyer, General Car Inspector, P. R. R., and Frank E. Taylor, General Car Insector, P. R. R.

Those who have met W. E. Dunham, assistant to the general superintendent of motive power and car department of the Chicago & North Western, only during working hours and know only his serious characteristics will not suspect that there is a recognized humorist in the Dunham family. His friends at the convention, however, will not be surprised to learn that Mr. Dunham's son, who is a sophomore at Cornell University, has been elected to the staff of *The Widow*, the humorous periodical published by the undergraduates.

C. H. Hogan, assistant superintendent of motive power of the New York Central at Albany, N. Y., was given badge No. 999 when he registered on Friday. This was not intentional but it is quite significant because of the reputation which he made as an engineer on the New York Central's Empire State express on the famous engine numbered "999."

To the old guard at the convention the Crane Company's booth without Frank Fenn looks almost as strange as a performance of "Hamlet" without the Prince of Denmark. For many years he has been a regular attendant at the Atlantic City conventions, but at present he is taking a much needed rest on his farm at Chillicothe, Illinois.

Major John R. Jackson, since his discharge from the army Ordnance Corps, has joined the staff of the chief mechanical engineer, Division of Operation of the Railroad Administration, and is attending the convention as a special guest this week. Major Jackson was formerly assistant engineer of tests of the Santa Fe, leaving that position in the fall of 1917 to enter the Ordnance Department of the army. Out of a total of 18 months in the service he was with the A. E. F. in France for a year. During his service abroad he was liaison officer on the Anglo-American Tank Commission, which was formed to design and construct heavy battle tanks for the joint use of the British and American armies. After five months' service in this position he went with the Engineering Division in the office of the chief ordnance officer, investigating the performance of tanks with the First Army in the Argonne offensive, during the month of October, 1918. This was one of the real fighting jobs of the Ordnance Department and involved the reclamation in the field of tanks put out of service in action. At the signing of the armistice he was with the Second Army at Toul in connection with the motorization of artillery. Mr. Jackson says that it is some job to get back to this country even after assignment for return has been made. In his case it took six months.

Col. John T. Dickinson, widely known as secretary of the World's Columbian Commission at Chicago and who nineteen years ago pioneered the introduction of the axle light system of electric car lighting which is now in universal use on all first-class passenger and Pullman cars, is registered at Haddon Hall with Mrs. Dickinson.



C. E. Slayton, Master Mechanic, Union Pacific, Marysville, Kansas, and Mrs. Slayton

He is now living in Washington, D. C. and is attending the conventions after a lapse of six years.

"Dave Pye," who has been coming to these conventions for many years, was introduced last night to a young lady who is attending this convention for the first time. After being introduced she said, "I don't like nicknames, what is your real name?" Somehow that reminds us of "Jack High." Pye and High are business cronies and occasionally find themselves resting in the same hotel lobby. On such an occasion recently at the Waldorf, a boy with a falsetto voice came up the hall paging "Mr. High," and closely followed by another boy equipped with a basso-profunda voice paging "Mr. Pye." And so they went up and down the hallways and lobby—"High, Pye, Pye, High," much to the amusement of the guests. Our relator doesn't tell whether either Pye or High answered the call.



W. P. Borland, Chief of the Bureau of Safety, Interstate Commerce Commission and a Group of His Inspectors

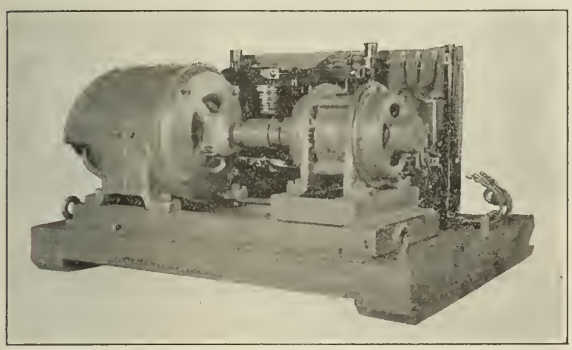
Left to Right—I. P. Kelley, W. F. Wagar, H. M. Burtch, J. E. Jones, W. P. Borland, Joseph Bromley, D. Garman and H. M. Priest

New Devices Among the Exhibits

Welding Sets

THE TYPE WD-9 WELDING EQUIPMENT made by the General Electric Company includes a constant energy self-excited generator to be driven by belt, electric motor, or engine. When belt driven by engines the speed should be 1200 r. p. m. or 1500 r. p. m.

The constant-energy self-excited generator is designed to embody all the characteristics demanded by arc welding service. There is no external ballast resistance or



Self Exciting Welding Generator Direct-Connected to an Alternating Current Motor

separate excitation from any external source. Neither a separate circuit nor direct-connected exciter is used. Since the machine provides its own excitation, the voltage characteristics are such that throughout the proper working range of the arc the energy delivered is practically constant. The voltage and current follow the momentary variation in the arc conditions practically instantaneously, and consequently the lag between change in arc conditions and resulting corrective change in electrical conditions is reduced to a minimum. This lag is a possible source of trouble in welding with self-regulating welding equipments when the automatic feature is embodied in the revolving apparatus or mounted on the control panel.

The generator is so wound as to give a no load or striking voltage of 60 volts which, when the arc is struck, automatically decreases to the voltage required by the arc. This is from 18 volts to 20 volts for the average operator and general work. A long arc is generally considered undesirable. Skilled operators are able to hold a very short arc with a voltage as low as 16 volts, but 20 volts is the average rating of the generator. By adjusting the dial switch on the panel, the current may be varied from a maximum of 200 amperes to a minimum of 75 amperes in 25 ampere steps.

The standard motor generator sets are assembled complete with the panel on a htructural steel base so the entire equipment may be picked up by a crane and handled as a unit, or if desired can be mounted on truck.

The connections are simple, the motor leads being brought out at one end and welding leads at the other. Mounted on the control panel are the motor starter and the generator field rheostat, voltmeter, and series field dial switch.

Belt driven generators are mounted on standard sliding bases, and the control panel is arranged for separate mounting.

Balancer Set

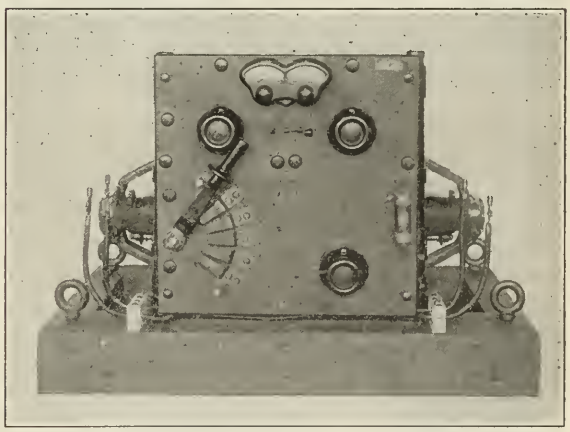
The constant energy arc welding set of the balancer type is a novel type of arc welding equipment which combines electrical characteristics for the arc with high efficiency and light weight. The charactesistics have been determined by a series of practical tests under commercial operating conditions and by oscillograph curves.

This set is built for operation on 110 to 125 volt direct-current supply circuits. The two armatures are mounted on one shaft and connected in series across the 125 volt circuit. One terminal of the welding circuit is taken from the connection between the two armatures and the other from the positive line. By this means each of the machines supplies part of the welding current, and consequently the size and weight of the machines are minimized. The design of the fields and their connections is such that the set delivers the voltage required directly to the arc without the use of resistors.

The welding control panel for the balancer set consists of a slate base 24 inches square, which is mounted on 24-inch pipe supports for portable work and on 64-inch pipe supports for stationary work.

The equipment consists of: a meter and voltmeter inclosed in a common case, dial switch, motor and generator field rheostats, starting equipment, and reactor. The ammeter indicates current in the welding circuit and the voltmeter is so connected, that by means of a double-throw switch, either the line of voltage or the welding voltage can be read.

The dial switch is connected to taps in the series field of the generator, the field being connected to oppose the main field. This feature provides the current control by



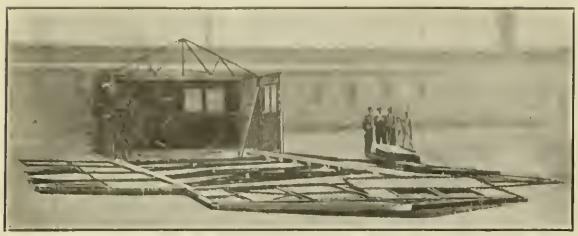
Balancer Type Welding Outfit

which six approximately equal steps are obtained between 50 amperes and 150 amperes. If intermediate current values are required, they can be obtained by means of the generator field rheostat. A small reactor is used to steady the arc and current, both on starting and during the period of welding.

Arc welding is always done on metal which is grounded. Since successful operation requires that the positive terminal be connected to the work the supply circuit should be arranged so that it can be safely grounded on the positive side.

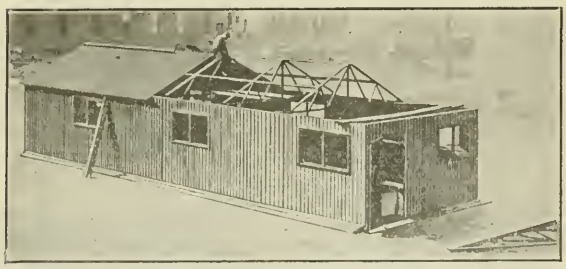
An Easily Erected Steel Building

In the application of the fabricated idea to the erection of buildings, startling strides have been made during the past year because of the necessity in many industries for strong and durable fireproof buildings which could be erected without the inconvenience of



Starting Erection of Stefco Standardized Sectional Steel Building

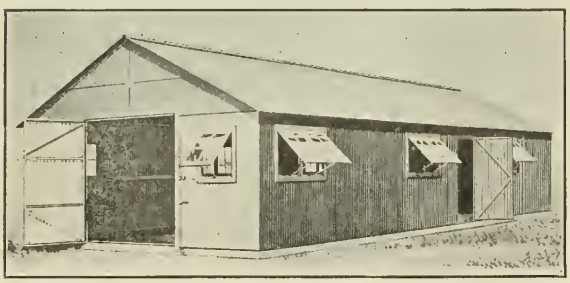
delays and disappointments incidental to the activities of architects, contractors, and skilled labor. A recent development in this type of standardized steel units for building purposes is shown in the photographs. In designing this type of building the engineers had in mind the fact that some of the early constructions along these lines had limitations because of lack of strength. The



Erection of Sectional Steel Building Nearing Completion

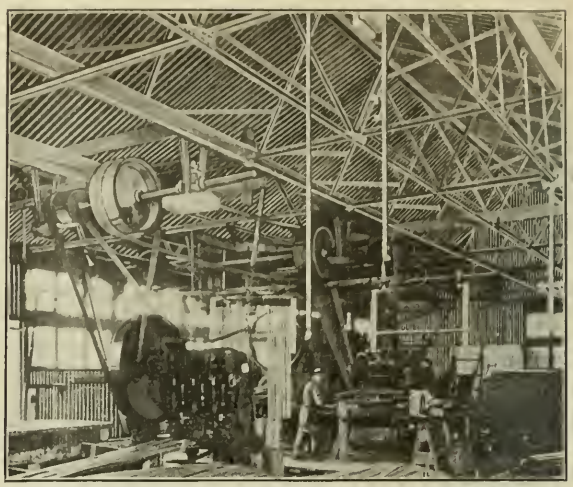
design illustrated is said to be strong enough to stand any of the strains to which an industrial building can be put, and it is further stated that these buildings are strong enough to carry a line of shafting on the trusses without any pillars, trusses or supports.

Practically any combination of window lighting effects can be obtained so that they can be adapted to a varied



Building Completed

line of purposes for manufacturing or for storage. It is claimed that these buildings are so simple to erect that common labor without any supervision, except that of a man who can read simple directions can erect them in a comparatively short time. They can be supplied in any length or width, it being related that one installation has been furnished which was only 80 ft. short of a mile.



These Buildings Are Designed For Heavy Service

The construction described is known as the Stefco structural steel building, manufactured by the Liberty Steel Products Company, New York, who are exhibiting sev- types of them at the convention.

Trunnion Type Coupler and Yoke Connection

A new trunnion type of coupler and yoke connection which eliminates the tail pin, the functions of which are performed by trunnions cast integrally with the coupler, is exhibited by The McConway & Torley Company, Pittsburgh, Pa. The trunnions are of generous proportions and provide, in addition to great strength, an extra large bearing surface for pulling. The yoke contains a single bearing block which, while readily moved, is normally held securely in place. This feature, in combination with the design of the coupler shank, provides for the application or for the removal of the coupler from the car independently of the yoke.

This trunnion type of connection is also shown in modified form, the coupler and yoke being cast separately but interlocking, in a manner requiring no tail pin, blocks or other details to form the connection, the device consisting simply of a coupler and a yoke.

Collapsible Stake Pockets

The Damascus Brake Beam Company, Cleveland, Ohio, is showing for the first time a novel form of collapsible stake pocket for application to the inside of gondola cars. It consists of three links of wrought iron chain of the proper dimensions to hold standard sized stakes. When the stake is removed, the chain hangs slack and will not become damaged or distorted, as is often the case with rigid stake pockets on gondola cars. Another new type of stake pocket exhibited by this company is designed for application to flat cars. It has corrugations which prevent vibration and shocks from loosening the wooden stake, thereby preventing the stake from working out and insuring against loss or damage to the lading.

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WE GUARANTEE that of this issue, 17,100 copies were printed; that of these 17,100 copies, 15,406 were mailed to regular paid subscribers to the Railway Age and the Railway Mechanical Engineer; 119 were mailed to advertisers, 300 were provided for counter and news companies' sales, new subscriptions, bound volumes, copies lost in the mail and office use; and 1,275 copies for distribution at Atlantic City.

THE RAILWAY AGE is a member of the Audit Bureau of Circulations (A. B. C.) and the Associated Business Papers. (A. B. P.)

To preside over a large convention meeting is not an easy task even under the most favorable circumstances. At the sessions held last week, the difficulty was increased by the poor acoustic properties of the auditorium, and the retiring chairman is to be congratulated on the way in which he handled the situation. Chairman Chambers demonstrated that he possesses in a marked degree the qualities that go to make up a good presiding officer. He showed his familiarity with parliamentary law and, regardless of the complexity of the situation resulting from motions, amendments and protracted discussion, never became confused. He was impartial in his attitude and encouraged full and free discussion, but held the meetings in hand at all times and was decisive, though never arbitrary, when decisions were required. Among the factors that contributed to the success of the meetings, Mr. Chambers' work as presiding officer deserves recognition.

An Executive in the Chair

"Post Graduate Courses" for Officers

IN HIS ADDRESS before the Mechanical Section yesterday, W. T. Tyler referred to the annual convention and exhibit as a "post-graduate course in railroading" for those attending. This is a very good description of the purpose which the convention and exhibit serve. The time never comes when any professional man can safely consider his education in his special line finished. The moment he begins to consider it finished and to act accordingly, he begins to retrograde, for in every line of professional activity new discoveries and developments constantly are occurring, and no man can keep up with them who does not make unflagging efforts to do so. All this applies without qualification to the technical men of railroads. The important developments in their field do not all take place in the railroads. Many of the most important of them occur in the laboratories, the manufacturing plants and the offices of railway supply concerns. From them proceed a very large part of all the improvements in railway equipment and devices. No railway man can visit the laboratories and factories of all the equipment and supply concerns. On the other hand, every railway man, by participating in the annual meetings of the Mechanical Section, and carefully inspecting the exhibits made in connection with them, can do a great deal toward keeping abreast of all the important developments in his field, both those which originate on the railroads and those which originate with the equipment and supply companies. It would be an excellent thing if Mr. Tyler's suggestion that the spring meeting of the American Railroad Association be held at a time and place when and where the operating executives of the railroads could visit the exhibit should be adopted. The operating executives need "post-graduate courses" as well as the mechanical officers.

An Innovation in Locomotive Design

ABOUT TWO AND A HALF YEARS ago the Pennsylvania Railroad built a Decapod locomotive, in the design of which the principle of the short maximum cut-off was first incorporated in a simple locomotive. The design was a development from the class L1s Mikado type, which was exhibited at the 1914 conventions, the boiler being essentially the same so far as proportions and capacity are concerned, with the notable exception that the working pressure was raised from 205 lb. to 250 lb.

By increasing the size of the cylinders and increasing the steam lap of the valve, the maximum possible cut-off was reduced from about 85 per cent to 50 per cent, thereby materially reducing the steam consumption of the engine when working at slow speeds. Advantage of the decreased steam consumption was taken to increase the tractive effort, which was increased about 40 per cent over that of the Mikado. The simple Mallet locomotive is the next step in the application of this principle.

A comparison of the characteristics of the compound with the simple locomotive show a decided advantage in the speed to which the maximum tractive effort may be maintained before the capacity of the boiler is exceeded. This is, obviously, due to the expansive working of the steam. The simple engine with short maximum cut-off possesses essentially the same characteristics in this respect as the compound locomotive, and it is this fact which gives promise of providing sufficient boiler capacity to take care of two sets of simple cylinders. The compound engine differs, however, from the short cut-off simple engine in that the full expansion takes place in a single cylinder with the disadvantage of smaller temperature differences in the cylinder walls. But with superheated steam this advantage is largely discounted.

This design, however, involves another feature which is decidedly to the disadvantage of the simple engine. This is the stresses to which the running gear is subjected. With a cut-off between 85 and 90 per cent of the full stroke the maximum pressure at any point in the stroke is comparative uniform and is very little higher than the mean effective pressure, on which the tractive effort depends. With the short cut-off, however, the maximum pressure is much higher. On a rough estimate, the maximum pressure with the long cut-off is about 17 per cent higher than the mean effective pressure, while with 50 per cent cut-off it will

probably be more than 60 per cent higher. There is no difficulty in designing the parts to provide adequate strength, but increased difficulties of maintenance may be expected. The driving box, with its crown type of bearing, is not well adapted to take heavy thrusts, a fact which already has resulted in increased maintenance of main boxes on large power. The added thrusts which must be resisted with the 50 per cent cut-off will increase the difficulties of keeping these boxes in good condition. There is no inherent objection to the short cut-off from the strength standpoint, but to provide ample strength the weight of frames, rods and pins must be increased.

There is nothing on which to base a prediction as to the ultimate success of the idea; it must rest upon a careful weighing of the advantage as demonstrated in service with the above-mentioned disadvantages. Applied to the Mallet locomotive, however, as a substitute for compounding, it does not possess the advantages which might be expected when compared with the usual type of simple locomotive.

The Tank Car Situation

The remarks of Col. B. W. Dunn during Friday's session on the seriousness of the danger and economic loss in connection with the transportation of gasoline in tank cars, placed before the Mechanical Section a matter which should receive the very serious thought of the members. The bottom discharge valve is the greatest source of trouble and is most in need of attention. The solution of this safety value and dome cap questions offer less difficulty. The inadequacy and unsatisfactory nature of the type of valve generally used at present was clearly indicated in the report of the Tank Car Committee and in the individual discussion of the bottom outlet valve by Chairman Gibbs. The principal point of difference between the committee and Colonel Dunn seems to be in their respective attitudes toward the proper methods of improving the situation. Mr. Gibbs' remarks, tacitly at least, recognize the bottom outlet valve as a necessary adjunct of these cars, but strongly recommends its improvement. Colonel Dunn points out that, since 20 years have elapsed without the development of a satisfactory device, it is unreasonable to expect any better results from future attempts at improvement.

For cars handling volatile liquids exclusively there seems to be no good reason why the bottom outlet should not be eliminated, as these liquids can very readily and satisfactorily be unloaded through the dome by several methods and the equipment required for top unloading is not of such a nature that its installation can be considered burdensome when the advantages of the elimination of the bottom valve in decreased danger and loss of lading is considered. There may be some difficulty in top unloading of some of the viscous products commonly handled in tank cars, which would make the elimination of the bottom valve burdensome to those having to do with such products. The matter, however, is one which must be determined on the broad grounds of country wide economy and safety and it will probably be impossible to arrive at a final solution which adequately considers the matter of safety and freedom from loss of volatile products, that will be entirely satisfactory to shippers of other products. It would be better to provide special equipment to meet the requirements of such cases than to perpetuate present conditions as they effect the vastly greater volume of traffic in highly inflammable volatile products. Such a solution of the problem is not impracticable when it is considered that the greater part of the tank car equipment of the country is privately owned and built for use in one class of traffic and that the volume of traffic in products which cannot readily be handled in a car designed for volatile products are comparatively of very small volume.

Training for Car Department Men

In the course of his address at Saturday's meeting, F. W. Brazier gave some interesting data concerning the relative expenditures for labor and material in the car department. He quoted statistics which showed that wages formed approximately 60 per cent of the total expenditure for the maintenance of cars. This fact is of peculiar significance, coming, as it does, at the end of a four days' session devoted to discussions of the problems of the car department. During these meetings committee reports were presented dealing with questions involving various phases of operation, design, the technical aspect of equipment maintenance and the efficiency of materials and devices. During the entire session not a single report was presented which dealt in any way with labor matters; in other words, the attention of the committee has been devoted entirely to methods of saving a part of the 40 per cent spent for material, while the 60 per cent spent for labor has been ignored.

The natural inference that would be drawn from this fact is that labor conditions are entirely satisfactory and there is no opportunity for improvement. Such an idea would be promptly dispelled by reading the discussion of the report of the Committee on Car Construction. In the course of this discussion there were repeated references to the inability to secure good workmanship from the present day car repairers and the butt splice for car sills was adopted in preference to the ship lap splice, partly at least because the butt splice is easier to make.

Is it not time for the members of the mechanical associations to abandon their attitude of indifference toward the problems connected with the efficiency of labor? The by-laws of the Master Car Builders' Association prohibited the discussion of rates of wages or hours of labor. Even granting that the consideration of these particular questions by the Mechanical Section might be unwise, it is, nevertheless, a fact that the training of men to increase their efficiency is a subject which demands attention and to which no valid objection could be offered. The need for systematic training is proved when the master car builders agree that formerly the car department employees were competent mechanics, but now it is necessary to "put something easy in the rules so that the mechanics can work it out."

It is doubtful whether there is a road in this country that has a system of training car men that is satisfactory under present conditions. A consistent quality of developing the personnel of the car department is needed to reduce the labor turnover, to train skilled mechanics and to provide capable executives in the future. At the present time some roads are preparing comprehensive instructions for the guidance of car repairers. Such a policy, in conjunction with an apprentice course, should bring about a marked betterment in labor conditions.

The results of the methods developed to improve the labor situation might well be considered in a topical discussion at next year's convention. There is some question whether the Mechanical Section will confine itself to technical problems or whether it will broaden its activities to embrace all matters concerning the mechanical department. The decision which the officers and members come to will be watched with interest.

Program For Today

9.30 A. M. TO 1.30 P. M.

Address of Vice-Chairman	9.30 A. M. to 10.30 A. M.
Action of Minutes of 1918 Annual Meeting (M. M.)	10.30 A. M. to 10.35 A. M.
Reports of Secretary and Treasurer (M. M.)	10.35 A. M. to 10.50 A. M.
Discussion of Reports on: Standards Recommended Practice (M. M.)	10.50 A. M. to 11.20 A. M.
Mechanical Stokers	11.20 A. M. to 11.50 A. M.
Individual Paper on "Standardization," by Mr. Frank McManamy	11.50 A. M. to 12.30 P. M.
Questions Proposed by Members	12.30 P. M. to 1.30 P. M.

10.30 A. M.—Band Concert. Entrance Hall, Million Dollar Pier. Royal Scotch Highlanders' Band.

3.30 P. M.—Orchestral Concert and Impromptu Dancing. Entrance Hall, Million Dollar Pier. Fry Philharmonic Orchestra. Tea will be served at 4.30 P. M., in Entrance Hall.

9.00 P. M.—Major E. D. Campbell, Railway and Seacoast Section, Artillery Division, Ordnance Department, United States Navy, will make an address in the Hippodrome on "Railway Artillery." There will be an Informal Dance in the Ball Room, Million Dollar Pier. Royal Scotch Highlanders' Band.

W. T. Tyler to Speak Monday

W. T. TYLER, DIRECTOR OF OPERATION of the Railroad Administration, will deliver another brief address before the Convention on Monday morning.

Meeting of General Committee

THERE WILL BE a meeting of the new General Committee of Section III—Mechanical, American Railroad Association, at 4.00 P. M. on Monday, at the Marlborough-Blenheim. Members of the retiring Executive Committee are also invited to attend.

The Lecture Tonight

THE LECTURE ON RAILWAY ARTILLERY, which is to be delivered in the Hippodrome at 8.30 tonight by Major E. D. Campbell, Railway and Seacoast Section, Artillery Division, Ordnance Department, United States Army, should provide interesting entertainment from the popular as well as the engineering standpoint. Major Campbell was with the Ordnance Department throughout the war, following the development and progress of railway artillery from the very beginning, and is therefore specially well fitted to speak on this subject. The lecture will be accompanied by descriptive moving pictures and lantern slides.

Don't Fail to See the Big Guns

THE EXHIBIT of the Baldwin Locomotive Works, which is located on Georgia Avenue, three blocks below the pier, is of unusual interest. Through the courtesy of the United States Navy, two gun mounts are exhibited—one a railway mount carrying a 14-inch gun and the other a caterpillar mount carrying a 7-inch gun. The big gun is manipulated at 11.00 A. M. and 3 P. M. The 14-inch mount represents an improvement over a number which were built during the war, and were used in action in France. The mounts were constructed by the Baldwin Locomotive Works and the guns by the Midvale Steel and Ordnance Company.

Lost and Found

LOST—Lady's badge No. 5105. If found, please return to the *Railway Age* booth.

LOST—Plain gold lingerie pin, between Hotel Traymore and Dixon booth on pier. Finder will kindly return to F. W. Cohen, Metal and Thermit Corporation.

LOST—Gold mesh purse by Miss Louise Guldman. If found, please return to Royal Palace.

LOST—Badge No. 2591. If found, please return to *Railway Age* booth.

LOST—A diamond and platinum bar pin on Saturday evening by Miss Raster, at the enrollment booth.

LOST—Two return tickets to Baltimore by A. F. Jenkins, Ambassador Hotel, Room 926.

LOST—Railroad badge No. 238. Please return to J. H. Milton, of the Chicago, Rock Island & Pacific.

FOUND—Five-point star and circle enameled pin. Apply to Secretary Conway, Million Dollar Pier.

LOST—R. S. M. A. badge No. 3165. Return to enrollment booth.

FOUND—Lady's blue stone pin, set in filagree silver. Apply to Secretary Conway.

LOST—Badge No. 2747. If found, please call at the *Railway Age* booth.

McBarmma Golf Tournament and Dinner

THE ANNUAL TOURNAMENT AND DINNER of the McBarmma Golf Club were held at the Seaview Club on Saturday. N. M. Garland won the championship medal with low gross of 84. He also won the Sargent Luck cup with a selected score of 77. C. F. Street won the club handicap cup with a net score of 82. Other winners in the tournament were:

Class A, first, A. H. Sisson; second, C. L. Bardo and H. A. Gillis tied.

Class B, first, F. H. Clark, George Bishop and C. F. Street tied, and Mr. Street won in the play-off; second, W. O. Wood.

Class C, first, J. T. Carroll; second, D. R. MacBain.

Guest prizes, first, H. C. Manchester; second, Alfred Calkins.

The following officers were elected: President, C. L. Bardo; vice president, E. W. Van Houten; secretary-treasurer, C. F. Street; directors, B. F. Flory and W. L. Conwell.

The following new members were elected: J. H. Young, E. H. Walker, H. C. Manchester and Samuel O. Dunn.

Election of Mechanical Section Officers

THE ELECTION OF OFFICERS for the American Railroad Association, Section III, Mechanical, was held on Saturday morning.

W. J. Tollerton, general mechanical superintendent, Chicago, Rock Island & Pacific, was elected chairman, and James Coleman, superintendent car department, Grand Trunk Railway, vice-chairman. These officers will serve for the next two years.

For members of the General Committee, term expiring June, 1921: C. F. Giles, Louisville & Nashville; T. H. Goodnow, Chicago & Northwestern; J. T. Wallis, Pennsylvania Lines; W. H. Winterrowd, Canadian Pacific; term expiring June, 1920: C. E. Fuller, Union Pacific; John R. Gould, Chesapeake & Ohio; John S. Lentz, Lehigh Valley; Samuel Lynn, Pittsburgh & Lake Erie, A. P. Prendergast, Texas & Pacific, St. Louis, Southwestern, International & Great Northern; J. W. Small, mechanical assistant to the regional director, Atlanta, Ga.; H. R. Warnock, Chicago, Milwaukee & St. Paul.

For members of the Committee on Nominations: F. W. Brazier, New York Central Lines; H. T. Bentley, Chicago & Northwestern; J. T. Willis, Pennsylvania Lines; D. R. MacBain, New York Central Lines, and J. J. Hennessey, Chicago, Milwaukee & St. Paul.

Industrial Car Manufacturers' Institute

The Industrial Car Manufacturers' Institute had its regular monthly meeting on last Friday at the Marlborough-Blenheim. The Institute is a new organization of manufacturers of the lighter type cars used for industrial purposes. While the organization is a comparatively new one, it is quite progressive. At the present time there are 22 manufacturers in its membership. The objects of the Institute are to bring about co-operation of business methods and the standardization of equipment; special attention is also being given to welfare work and to the improvement of labor conditions.

Colonel James Milliken of the Corps of Engineers, was elected president of the Institute and assumed charge on May 1. It will be recalled that Colonel Milliken, who has been a member of both the M. C. B. and the M. M. Associations for a number of years, was, prior to the taking up of war duties at Washington, superintendent of motive power of the Pennsylvania Railroad at Wilmington, Del. Soon after the outbreak of the war he was called to Washington as mechanical aide to the director general of military railways, where he had charge of the design, purchase and production of the mechanical appliances for use by the American Expeditionary Forces. In the summer of 1918 he was commissioned a Colonel of Engineers and placed in direct charge of the design, purchase and production of all railway equipment, appliances and supplies. This position he occupied until he received his discharge the latter part of April, 1919.

Frank McManamy Honored

As a tribute to Frank McManamy, assistant director, Division of Operation, his associates gave him a banquet in the Forest Room of the Marlborough-Blenheim on Saturday night. He was presented with one of only fifty-six Webb C. Ball watches, which passed the test of the United States Government Bureau of Standards. Inscribed in the back of the case are these words: "Presented to Frank McManamy, assistant director, Division of Operation, U. S. R. R. A., by his associates, in memory of his services rendered in connection with the winning of the world war. June 21, 1919."

The guests included Mr. and Mrs. Frank McManamy, W. T. Tyler, director of operation, and Mrs. Tyler; George N. DeGuire, general supervisor of equipment; Fred P. Pfahler, chief mechanical engineer, and Mrs. Pfahler; J. J. Tatum, general supervisor car repairs, and the Misses Lucille and Veronica Ermatinger, nieces of Mrs. Tyler, as well as the following supervisors and assistant supervisors of equipment, several of whom were accompanied by their wives: J. G. Adair, Harvey Boltwood, J. Frank Brady, Mr. and Mrs. R. Campbell, Mr. and Mrs. J. H. Cooper, G. E. Dougherty, Mr. and Mrs. George Dugdale, George Ermatinger, Mr. and Mrs. Hiram K. Green, Mr. and Mrs. John Kane, Mr. and Mrs. William Martin, G. B. Moir, Mr. and Mrs. C. R. Woods and Mr. and Mrs. C. Woodworth and daughter.

R. S. M. A. Annual Meeting

A larger number of members than usual attended the annual meeting of the Railway Supply Manufacturers' Association in the Hippodrome on the Million Dollar Pier Saturday morning at 11 o'clock. All attendance records are nowadays being broken and it was therefore not surprising that the gathering Saturday morning was a large one.

President E. H. Walker occupied the chair. Although he reported verbally for the Executive Committee his statement of the activities of the association since the last convention in 1916 was very complete, and was listened to with interest and approval. The present convention and exhibit was, he said, by far the best and largest ever held. Keen interest was aroused when he told of the visit of seventeen of a total of twenty members of the Executive Committee of the American Railroad Association to the meeting of Section III, Mechanical A. R. A., on the pier Friday and of the interest of these men in the splendid exhibit of railway appliances. Mr. Walker did not use the word, but he plainly conveyed the idea of a great "awakening" among the railroad executives of the entire country in connection with the Atlantic City activities this year.

In the way of routine business the association passed a resolution increasing the amount to be retained in the association treasury from $5,000 to $10,000. It was also resolved that hereafter the fifth association district be composed of the State of Illinois alone and that the other States heretofore included in the fifth district be added to the seventh district.

District elections for the Executive Committee were reported as follows:

Third—W. H. S. Bateman, Champion Rivet Company, Philadelphia, Pa. (Mr. Bateman also represents the Parkersburg Iron Company), and John M. Gillespie, Lockhart Iron and Steel Company, Pittsburgh, Pa.

Fourth—Charles D. Jenks, Damascus Brake Beam Company, Cleveland, Ohio.

Fifth—L. S. Wright, National Malleable Castings Company, Chicago.

Sixth—Col. George L. Morton, Galena-Signal Oil Company, Atlanta, Ga.

The duties of the new members of the executive committee become effective September 1, 1919.

The election of officers for the coming year resulted as follows:

President, George R. Carr, vice-president of the Dearborn Chemical Company, Chicago.

Vice-President, J. F. Schurch, vice-president T. H. Symington Company, Chicago.

Mr. Carr, the newly-elected president, was compelled to leave on an important business trip to San Francisco just after the meeting.

W. T. Tyler Addresses Mechanical Convention

Director of Operation of Railroad Adminstration Praises Sessions and Exhibit as "Post Graduate Railroad Course"

W. T. Tyler, Director of Operation of the United States Railroad Administration, attended the session of the Mechanical Convention on the Pier, Saturday morning and delivered a brief, but interesting address. In the course of his remarks he referred to the achievements of the railroads in helping win the war; praised the work done by the mechanical officers and paid high tribute to the educational value of the exhibit on the Pier. He declared he would use his influence to get the American Railroad Association to hold its spring meeting in Atlantic City next year to enable the operating executives attending it to see the exhibit.

Mr. Tyler was introduced by C. E. Chambers, Chairman of the Mechanical section. He said in part:

I am here this morning as director of the Division of Operation of the Railroad Administration. The other day I called as a member of the Executive Committee of the Railway Association. I am not here with a speech or an address.

I presume a great many were too busy to keep up with all of the war activities of the railroads, and it may be of interest to you to know how many times the railroads actually won the war. That was, at times, a daily occurrence, and other times it did not occur more than two or three times a week; but whenever any fellow had anything he wanted done by the railroads, the outcome of the war depended on the railroads being able to do that one thing. Seriously, I am of the opinion that the railroads of this country did as much to win the war as any other agency. The war produced three or four millions of soldiers in this country in an incredibly short time. That same thing applies to railroad soldiers. It was necessary for almost every man in the service, especially the officers, to entirely change his methods and readjust himself to an entirely new situation.

There were many misgivings about the mechanical preparedness of the railroads to meet the demands of the war. Unfortunately, the railroads did come into the thing in bad condition, because they were laboring under the disadvantage of inadequate rates for several years, and matters had reached a point where many of the railroads were practically bankrupt. There was unpreparedness in the number and condition of locomotives and cars. There had been the most remarkable increase of business during the year 1916 and the first half of 1917, and locomotives and cars were run to their utmost. There was not the time, the labor, nor the facilities, and there was not the money with which to repair them.

Many predicted that it would not be possible for the railroads to meet the burden that would be thrown upon them. But the situation did straighten itself out, and the only way in which it could have happened was through the soldierly qualities of the members of the mechanical organizations. They simply got together and met that situation.

War Achievements of the Railroads

C. R. Gray, in an address at St. Louis recently, touched briefly on one of the special features of our work that stands out in my mind. On February 8, 1918, three Cabinet officers, supported by Mr. Hoover, Dr. Garfield and Mr. Hurley, walked into Mr. Gray's office and laid on his desk a cablegram to the President of the United States, signed by the Premiers of England, France and Italy, serving notice upon him that unless the United States immediately brought its food program for the Allied armies up to par and kept it there, the Allied armies would have to discontinue fighting and withdraw from the field.

It was a notice, putting upon this country the whole burden, the whole responsibility for winning the war, and characteristic of the great American game called "passing the buck," it was brought over to the Railroad Administration with a brief speech from each of the gentlemen present, each one assuring Mr. Gray that his department of the government was ready to meet the situation and it was up to the Railroad Administration to bring the foodstuffs down to tidewater and they would take it across.

Drastic measures were taken immediately to meet the situation. Mr. Hoover said "it is out there"—he said it covered the country—but he could not say just where it was.

Dr. Garfield assured us that the coal was already mined, and the miners were waiting to put it into the cars if we furnished the cars.

Mr. Hurley assured us that the ships were all on the ocean, and that they would be in port whenever we had food there.

An order was issued taking equipment away from the Eastern section of the country, regardless of the freight offering for movement. Cars were taken out of the industries empty, when the shippers had the freight piled up on their platforms ready to put into the cars. In about two weeks Mr. Gray was able to send a letter to the French High Commission, and to Sir Cunnifs Guthrie, the British representative in charge of the purchases for the Allies, and to each of the gentlemen who had visited him that morning, that the principal ports of commerce were at that time practically blocked with food supplies in cars waiting for ships, and while he would very much regret to do so, unless relief were offered at once, he would find it necessary to issue an embargo. From that moment on the shoe was on the other foot all the time. The movement of food supplies into the ports had to be regulated to meet the arrival of ships which could transport the food overseas.

Right along, almost every few days, we had some delegation come to see us who stated that their industry would perish if not supplied with cars. I recall that a great many cars had to be taken out of the Southeast, where the big bulk of fertilizer is manufactured. We had a call in a few days from members of the Association of Manufacturers of Fertilizer, with a representative from the Department of Agriculture. They assured Mr. Gray unless cars were furnished immediately, and in preference, for the movement of fertilizers, that there would be no crops in this country in the Fall of 1918, that a great majority of the farmers of the country depended upon fertilizer for their crops, and that at that time they were so far behind in its movement that it would be almost impossible to catch up and meet the situation, but that if we would turn over to the fertilizer industry the exclusive use of the cars and railroad facilities for the period of about thirty days, they might possibly save the situation.

Then came Mr. Hoover again to say that about 90 per cent of the total corn crop of the United States for the previous season was still unmoved—it was largely

on the farms—that about 80 per cent of that total was soft corn, and that it would germinate in the month of March and be a total loss. It was not cured, and unless it could be moved in the drying elevators and cured, and gotten out of the way, it would be a total loss, and we would starve to death, because all of our wheat had to go to the armies abroad. That situation did, in fact, exist, but it was met. By that time the overseas food situation had been met, and we were able then to turn the cars into the movement of corn.

In about six weeks there was more corn moved to primary markets, dried and moved out to its ultimate destination than had ever been moved in six months in the United States before. I do not know how it was accomplished—it was accomplished by the men on the job, that's all; they were told what was necessary to be done, and did it.

Following that came the men who built silos. They explained that for about two years they had not been able to carry on the work of building and distributing silos throughout the country, and that there had been a tremendous loss the year before in foodstuffs as the result of not having silos to take care of the corn crop, which was destroyed in the field, and there was greater danger last year than ever before of that happening again, and unless they could be furnished with cars we would all starve to death.

Then came the tin can manufacturers. They said even if we were at that time to give them absolute preference to the use of the railroad facilities of this country, in the movement of tin to their plants, and the movement of the manufactured product out to the distributing centers, they would not be able to meet the situation. They said they were so many hundreds of millions of cans behind, it was impossible to meet the situation, and a great deal of food would go to waste because of their not having cans in which to preserve it, and we would starve to death. That thing followed right along. Every fellow came in with his particular product and proved to us, unless he was given preference, the whole thing would go to smash.

Now, you men out on the job, met that situation, and as I say, you saved the country every time you did it. Each and every situation that I have mentioned, and many more which the railroads had to meet, they did meet. In doing so, I feel that we produced as good soldiers in the railroad operation as were produced in the Army. Speaking once again for the mechanical organization, as I saw it from Washington, while the Army produced wonderful soldiers, and the Navy produced wonderful sailors, our organization was absolutely amphibious—we worked above or below water, and it did not make any difference.

Praise for the Convention and Exhibit

Now, just a word about the Convention, and our experience here this time. I do not know of any department of the service that has labored under greater disadvantages than the mechanical men. The building of a roundhouse comes only after you have supplied the wants of all of the other departments on a railroad. You are expected to get along out-of-doors; you are expected to get along in any kind of weather, and if you do not do it, you are simply inefficient, that's all. This is my first experience at one of these mechanical exhibits, and I want to say here and now, and say it for publication, that I regard the mechanical exhibit here as a post-graduate course for mechanical officers that is not available in any other way. The doctor, for instance, takes his post-graduate course every year or two, in order to keep up with the times. You gentlemen have great need for the same post-graduate course, frequently, and nowhere else is it available as it is right here on this Pier, and I am going to use my personal effort as a member of the Executive Committee of the American Railroad Association, to bring the spring meeting of that Association here to Atlantic City while you are in session. (Applause.) I think it will be just as helpful to the Executive officers of the railroads of this country, as it will be to you, and it will give them an entirely new conception of what you accomplish here, and of the opportunities that are put into your hands for, as I say, getting a post-graduate course in mechanics.

I think it will be helpful to you, in that it will enable you to demonstrate to the executives and the chief operating officials of the road what you can do if you are given up-to-date machinery and up-to-date tools; in fact, as you all know, there is a great difference between going on with what you have been able to utilize in order to keep your machinery in operation, and in going on with what is up to date and what really meets your need in handling the heavier power, and heavier cars, and heavier traffic which moves over the road.

I think a great deal of good will come from the visit of the Regional Directors and members of the Executive Committee of the American Railroad Association to this convention and the exhibit. If I had realized the importance of it a little earlier, I would have endeavored to have had the spring meeting at this time to cover two or three days, so as to have had them all here for several days; but some of them had important engagements and they hurried away after finishing the work in one day. Two or three of the gentlemen have remained over, and every one has voiced himself as anxious to come back, and as having an entirely new conception of these meetings and of this railway supply exhibit.

Now, I want to say in that connection, that as the result of the variety of interests of the different railroads and of business competition, it has been difficult in the past for you gentlemen to get over some of the things that you have recommended, to secure approval of many of the standards that you have recommended, and that you have seen the need of. The life of the United States Railroad Administration, we are told, is limited now to the close of this year, and I want to ask, therefore, that while the opportunity is ripe, you bring as many of these things to the attention of the Railroad Administration as you can, through Mr. McManamy, and let us work them out at this time, and get them into effect, and perhaps they will last after the roads go back to the individual owners. I pledge you my own personal assistance in this matter, and I want you to think seriously of taking advantage of the opportunity that we have. We can perhaps accomplish some things now that you gentlemen have had in your minds for a long time, but could not get all of the interests together on. Now, while we have that opportunity, let us go along with it. I will help you.

Plans for 1920 Air Brake Convention

The Air Brake Association and the Air Brake Appliance Association held a joint meeting in the Marlborough-Blenheim on Friday, F. J. Barry presiding. Plans were formulated for the exhibits in connection with the next convention, which has been set for May 5, 6 and 7, 1920. Chicago was chosen as the place of meeting. Twenty-two new applications for membership in the Appliance Association were acted on and arrangements were made for the assignment of exhibit space.



Chicago & Alton Engine Terminal at Bloomington, Ill.

American Railroad Association, Section III, Mechanical

Proceedings for Saturday Morning, Including the Tank Car Report which was Presented Friday.

THE SATURDAY MORNING SESSION of the American Railroad Association, Section III, Mechanical, was called to order at 9.40, Chairman Chambers presiding. The session on Saturday was an innovation, as compared to previous conventions, but there was a large attendance and the arrangement proved satisfactory. The report of the Committee on Tank Cars, which was presented on Friday, was not published in Saturday morning's *Daily* and follows herewith:

Report of the Committee on Tank Cars

WITH THE WAR CAME the necessity for the transportation of various products, among them toxic liquids for filling shells, not previously handled in tank cars. The Class III car was adapted to this service by the modification of certain details, such as omitting all openings in the shell, making the dome capacity about one per cent, special arrangement for closing the dome opening, etc. Another demand was for tank cars for carrying compressed liquefied gases, notably chlorine. The specification for Class V car, with welded tanks, adopted by the association in 1917, with some modifications of details, met the situation very well.

Some difficulties were experienced in welding anchorages to the tanks. This was remedied by avoiding the use of anchorages having great length of welded contact with the shell.

The seams of these tanks were hammer welded throughout, using water gas as the heating medium. With steel of a proper quality there seems to be no difficulty in securing throughly sound welds and containers which are bottle tight. The American Society for Testing Materials has prepared a specification for "Plates for Forge Welding," which meets the views of those engaged in producing welded containers. If this specification is adopted by the A. S. T. M. this year, the committee recommends that it be substituted for the specification of the A. S. T. M. for Boiler Plate Steel, Fire Box Quality, now prescribed by the Tank Car Specifications for tanks of Class V cars. To insure getting satisfactory material under this latter specification it has been necessary for the users to make certain restrictions within its limits.

Suspensions of Requirements.—As stated in the committee's report last year, the necessity of keeping in service every car capable of safely handling liquid products made it advisable to suspend until July 1, 1919, the requirements of flange quality steel for Class III tanks, and until January 1, 1920, the hydraulic retests of tanks of Classes I, II, III, IV and V cars. As the conditions which led to these suspensions have passed, your committee has recommended to the Executive Committee that no further extensions of these requirements be granted and that circulars be issued to inform all interested accordingly.

The Notes of Section 2 (a), Material, Class III Specification, and Section 23, Tests of Tanks, Classes I, II, III, IV and V Specifications, covering these suspensions should be omitted.

The notes to Section 2 (a), Material, Class III Specification, portant matters, the committee has been able to make but little progress during the past year with the experimental work in connection with the safety valve. For use in connection with these tests better springs than are ordinarily used in these valves have been purchased but even these do not entirely comply with the specifications.

It is very evident that for certain products it will be necessary to provide a safety valve in which corrosion is guarded against by the use of non-corrosive material in both the housing seat and the bearing face of the valve proper.

The committee has made some experiments in electrically welding the non-corrosive metal to the iron parts, but the results so far have not been satisfactory. Further work will be done in this direction.

It is not certain that an absolutely tight valve can be secured which will at the same time retain the valuable feature of the present design, viz., very free discharge in case of necessity. A considerable amount of information has been accumulated concerning the behavoir of safety valves under pressure, and the committee hopes to be able to push the work to a conclusion during the coming year.

Safety Valve Collar, Fig. 10-A.—Complaint has been made that with the rivet circle of 5⅛-in. radius the hub of the collar interferes with the rivet set. The size of this collar is limited by its location on the dome head, and the committee does not believe that there will be any question of safe construction if the radius of the rivet circle and the radius of the outside of the collar are left to the car builder, and therefore recommends that these dimensions be omitted from Fig. 10-A.

Bottom Discharge Valve.—Complaints continue to be re-

ceived, notably from the Bureau of Explosives, concerning the unsatisfactoriness of the bottom discharge valves now used. The question was discussed in the committees' report for 1917 and it is to be regretted that little or no progress has been made in the improvement of this feature. Reliance against leakage seems to be really placed on the cap of the discharge pipe instead of on the valve and although the regulations prescribed by the Interstate Commerce Commission require that cars shall be loaded with the caps off, it is apparently the general practice for loading to be done with the caps on, primarily for the reason that the valves are not tight, and the only way to prevent leakage during the process of loading is to rely upon the cap. The breaking of the cap in derailments and from other causes frequently results in the partial or entire loss of the contents of the tank, and too often in fires.

The committee does not feel that it would be proper for it to undertake the design of this part and then recommend it as a standard, and trusts that a design may be developed by the tank car builders or users which will be enough better than the present ones to warrant its adoption. The committee believes that the present conditions of the tank car traffic require some form of bottom outlet.

Riveting.—Criticisms have been received that tanks with 5/8-in. rivets, particularly those tanks having 7/16-in bottom plates, 5/16-in. shell plates, and 1/2-in. heads, have given trouble from leakage because of the small size of the rivet head. While the committee believes that such cases are due rather to bad workmanship than to any mistake in the size and spacing of the rivets, it has made a canvass of the car builders and finds that a number of them, considering the fact that the circumferential seams have a surplus of strength, prefer the use of the 3/4-in rivet with sheets 5/16-in. thick and over, and show that with a spacing of 2 3/4 in. they can still maintain the required 70 per cent strength of seam. In the head seams it is undesirable to use different sizes and spacing of rivet holes where the different thicknesses of bottom and shell sheets are joined to the head.

The committee recommends that for Classes III and IV cars the use of 3/4-in. rivets with 2 3/4-in. spacing be permitted with 5/16-in. plates. The committee is not prepared to recommend a wider spacing.

Section 3 (b). Riveting, amended in this respect, would read:

Thickness of Plate.	Diameter of Rivet.	Longitudinal Pitch.	Back Pitch.
5/16 in.	{ 5/8 in. { *3/4 in.	2 1/2 to 2 3/4 in. See Note.	1 1/2 to 1 3/4 in.

* Note.—For longitudinal seams with 3/4-in. rivets, 2 3/4-in. longitudinal pitch is necessary to insure 70 per cent strength of seam.

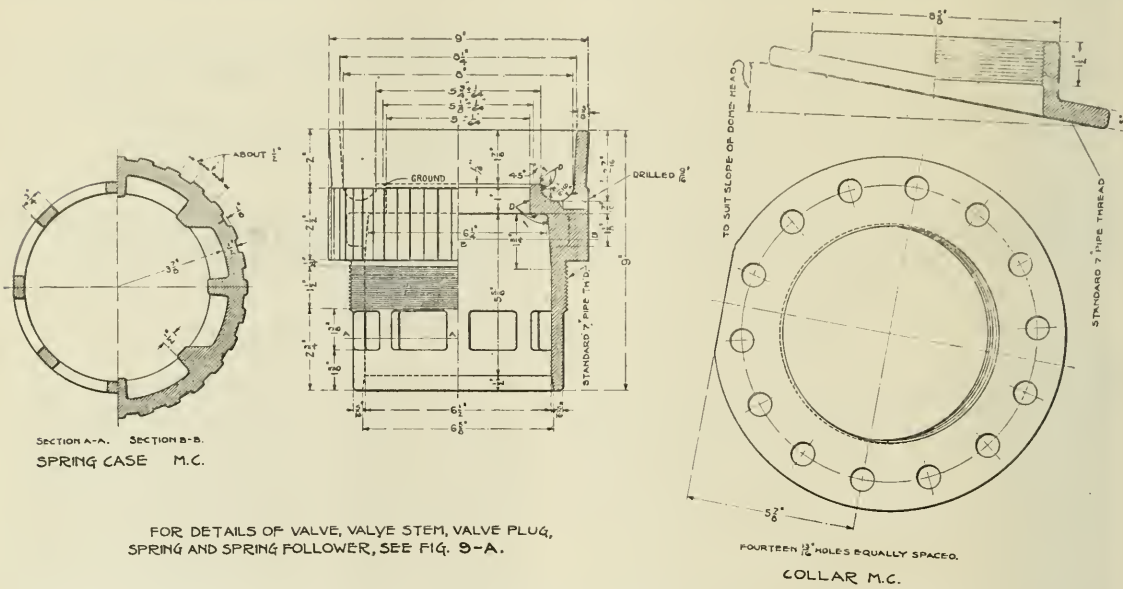
Calking.—Attention has been called to the injury of the shell of the tank by the use of chisel-pointed calking tools, and the committee recommends that a new sentence be added at the end of Section 4, Calking, Specifications for Classes III and IV Cars, reading,

"Split calking shall not be permitted."

Application of Running-Board Brackes on Tanks Covered with Jackets.—It is recommended that in paragraph "Manner of Application of Safety Appliances" the sentence, "The running-board brackets must be attached preferably to the underframe, or to metal pads attached to the shell proper," be changed to read: "Running-board brackets must be attached to the underframe."

Application of Dome Platform Brackets to Tank Cars Covered with Jackets.—It is recommended that in the paragraph "Manner of Application of Safety Appliances," the words "on the outside of the jacket" be omitted from the third sentence, so that it will read, "Dome platform brackets must be attached to suitable bands."

Inspection.—Section 25 of Specifications for Classes I and II cars has a note which seems to conflict with Interchange Rule 3 (e) and the committee now recommends that it be omitted from the two specifications.



Revised 1918: Spring seat and opening for valve to be dressed. Tolerance limits fixed for certain dimensions of valve seat. Thickness of bottom of spring case changed from 3/8 in. to 5-16 in. Form of inside ribs of spring case changed.

Fig. 10a.—Details of 5-in. Standard Safety Valve, Applied to Dome

Boards for Attaching Placards Prescribed by the Interstate Commerce Commission.—It is recommended that a new section be inserted in the Specifications for Classes III, IV and V Cars, reading: "18-A. Cars shall be equipped with suitable boards for attaching placards prescribed by the Interstate Commerce Commission. These boards shall be of sufficient size to permit placards to be applied with the opposite points of the diamond in vertical and horizontal positions respectively."

Some minor corrections which were overlooked in the 1918 Revision should be made as follows:

Method of Testing Safety Valve in Place on Car.—In the Table of Scale Readings, 25-lb. setting the minimum scale reading sould be 430 and the maximum 550, the same as shown in Fig. 13. The reference to tolerance sould be changed to agree with the 3-lb. tolerance for the 25-lb. setting, as follows: "The minimum and maximum scale readings are the limits within which the valve must open when being tested to come within the tolerance of 1 lb. for the 12-lb. setting and 3 lb. for the 25-lb. setting, above or below the normal pressure per square inch at which the valve is supposed to open."

United States Railroad Administration Tank Cars.—Under date of February 7, 1919, the secretary, by direction of the

Executive Committee, referred to the Tank Car Committee the suggestion that they go over the plans and specifications for the United States Railroad Administration Tank Cars (Oil Cars, 7000, 8000, and 10,000 gal. capacity, and Acid Cars of same capacities), and consider the advisability of adopting them as standards of the Master Car Builders' Association, report to be made at the coming convention.

This involves two questions: 1. As to the wisdom of adopting any particular tank car designs as M. C. B. Standards. 2. Whether from all standpoints the government tank car designs meet the requirements of the tank car traffic better than others now being followed. In deciding these questions the interests of the railroads, the tank car owners, and the car builders must be considered..

The committee believes that as long as the requirements of the Master Car Builders' Standard Specifications covering the essential features of tank car construction are complied with it would be unwise to restrict the builders and users to certain standard designs, as the many commodities of widely different characteristics, weights and values transported in such cars require for their safe and economic handling various modifications in detail design.

The Railroad Administration designs were prepared to meet the M. C. B. Specifications, and this committee passed them in conference with the Railroad Administration. The tank car equipment of the country, in which the railroad ownership is comparatively small, must also be assumed to comply with the M. C. B. requirements, as it is moving in interchange. Specifications and prints have been furnished by the Railroad Administration for its cars, but the time available is entirely too short to permit the proper comparison and consideration of them and of the plans and the specifications for other designs of cars which must be gone over to answer the second question. The committee will be glad to have further instructions in this matter.

The report is signed by: A. W. Gibbs (Chairman), Pennsylvania; C. E. Chambers, United States Railroad Administration; Wm. Schlafge, Erie; Samuel Lynn, Pittsburgh & Lake Erie; John Purcell, Atchison, Topeka & Santa Fe; O. J. Parks, General American Tank Car Corporation and A. E. Smith, Union Tank Line.

Discussion

Mr. Gibbs: On page seven recommendations are made to suspend the requirements, and among those you will remember that during the course of the war we recommended the allowance to use tank steel instead of the specification boiler steel. A great many cars have been built according to those specifications, and a number of railroads and some builders have material to build cars which are on order. I would like to withdraw that part of the specification to suspend entirely until July 1, 1919, the requirement of flange quality of steel for Class III tanks, but have left it to the Executive Committee to fix a date after our committee can get all the facts.

There is a paragraph on bottom discharge valves, which I need not read, because I have a separate paper, and Colonel Dunn will also speak on that subject.

In regard to riveting, your committee is in doubt as to how much of this is based on poor workmanship, and how much is real necessity. We recommend that it be permissible to increase the size of rivets from 5/8 in. to 3/4 in.

At the time the report on Hand Brake Power was written the Executive Committee had not adopted rules for any practice on tank cars. Since this was written they have done so, and the Committee on Train Brakes has issued a diagram and circular. We recommend that this be made part of the report.

The Bottom Outlet Valve on Tank Cars

Individual Discussion by A. W. Gibbs

THE following discussion is to be undertsood as an expression of personal views, and does not of necessity express those of the members of the Tank Car Committee.

The bottom discharge valve on tank cars antedates the formation of the committee in 1903. Its use was due to its manifest convenience in discharging the contents of such cars without the aid of any auxiliary machinery. In detail, it consists in nearly every care of a miter valve, fitting into a conical seat. The valve is guided by either a pin passing through a hole in a bridge below the seat, or wings fitting a cylindrical hole forming the discharge passage below the seat. The material may be either steel or cast or malleable iron, the seat usually being cast or malleable iron. In practically all cases the valve discharges into a vertical cast iron pipe having a flange riveted to the shell of the tank. The seat for the valve is machined in this pipe casting. At its bottom end the pipe is ordinarily closed by a screw cap with internal threads corresponding to those of the union of the pipe leading to the storage tank.

The valve is as a rule operated by a certical rod socketed and pinned to the valve and extending up into the dome where it is guided by a suitable bracket. This bracket also serves as a support for a lifting cam or some form of nut engaging a threaded portion of the rod. Where the lifting cam is used a spring below the bracket engages a collar on the rod and is supposed to keep the valve firmly on its seat. Other variants of this arrangement have been used, such as a yoke and nut immediately above the yoke, but not, so far as we are advised, combined with the yoke and spring. While this arrangement has possible advantages, it has also the disadvantage that the whole assembly is submerged and very inaccessible in the event that anything goes wrong.

There has been a great deal of complaint of the whole bottom discharge arrangement, and it is probably the main source of leakage of tank cars. The Tank Car Committee is in receipt of numerous complaints from the Bureau of Explosives, relating to cases where tank cars have lost all or a part of their contents by leakage at the bottom discharge valve. The indication is that shippers rely mainly on the bottom cap to prevent leakage. Complaints from other sources have supplemented those from the bureau. A number of bad cases have been due to water leaking past the valve into the discharge pipe and subsequently freezing and bursting the discharge pipe and unseating the valve. Still others have resulted from the exposed end of the discharge pipe being struck and broken, unseating the valve at the same time. The modern anchorages almost insure against the cases where the discharge pipe is broken by the tank shifting.

The question naturally arises, why should there be any difficulty in securing a thoroughly tight valve where the pressure is so very low—usually only that due to the static height of the liquid? At first thought it seems to be the simplest kind of a mechanical problem. This may be the reason why no serious attention appears to have been given to making a radical improvement. It is difficult to see where there has been any betterment in this feature of the car during the life of the Tank Car Committee.

In seeking for the causes of leakage we suggest the following possibilities: 1. Corrosion of the valve or seat. 2. Lodgment of dirt or trash on the valve seat. 3. Cocking of the valve from insufficient guide or from improper fitting of the lifting socket. 4. Displacement of the valve from surging action of the liquid contents of the tank. 5. Change of shape of the tank due to the weight of the lading causing lateral spreading with resulting decrease of vertical height.

The first of these sources of leakage is easily remedid by the use of non-corrosive material in the valve and its seat. As the seat is usually formed in the top end of the discharge pipe it will be desirable to roll or pean a ring of non-corrosive material into a proper seating in an undercut groove in the pipe, so as to reduce to a minimum the amount of stealable material. The same care would have to be taken in pre-

paring the valve itself. In this connection it should be mentioned that the seats must be adapted to the nature of the products handled

It may be desirable to so arrange the valve and its guide and the valve seat that the whole assembly can be readily removed from below. This will insure better workmanship in refitting, as the work can be done under very much more satisfactory conditions than with the present arrangement where the men have to go into the tanks. In the case of cars carrying inflammables the tanks have to be steamed out before the men can enter. Such an arrangement would probably require a larger discharge pipe, which does not seem to be particularly objectionable.

The lodgment of dirt or trash on the valve seat probably occurs during the drainage of the last portion of the contents of the tank. The only practical remedy that we can suggest is care at the loading rack, passing the contents through a proper screen.

I believe there is a great chance of improvement by the use of some form of rotating valve in which the valve and seat are always in contact, the liquid contents discharging through ports which register when in the open position. The main disadvantage of this arrangement is the size of the opening required to provide the necessary area of discharge ports. I believe that the rate of discharge, especially during the latter stages, can be much increased by the use of proper overhead shields which will prevent the access of air through eddy action of the outflowing liquid.

Cocking of the valve is believed to be a potent cause of leakage. It should be borne in mind that a conical seated valve fits its seat only when the axes coincide; any but right sections of such a valve are ellipses. Spherical seats are free from this objection, but are so much more difficult to maintain that they are not to be recommended. The causes of cocking are many, such as rigidly pinning the valve to the operating rod, poor workmanship in providing proper guides above or below. I believe that an overhead cylindrical guide, such as that of the cup-shaped valve used in the old-time crosshead feed pump, has great possibilities.

The displacement of the operating rod by the surging of the liquid contents of the tank is offered as a possible source of valve leakage. With some of the large tanks having much less than the required percentage of dome capacity, which in consequence must not be loaded shell full, the rod is continually subject to this action, especially with viscid liquids. Enclosure of the rod in a protecting pipe would guard against this action.

Deformation of the tank from the weight of the contents is known to occur. We have some data concerning the flattening which occurs at the loading rack, but none as to that which occurs in transit due to uneven track. Where the valve is cam operated with spring take up it is not quite clear that this action should cause the valve to chatter on its seat.

Finally, there is the failure to properly close the existing valves, for which we have no remedy to suggest other than to make the open and closed postion of the openating handle so plain as to be reasonably foolproof.

The Chief Inspector of the Bureau of Explosives has suggested that the Tank Car Committee design a proper outlet valve arrangement, but we have felt that it is not advisable for the committee to devise such an arrangement and then push its adoption. We believe that there is ample talent among the engineers of the car building and car operating companies to provide adequate devices if they will give this feature the same attention that has been given to the improvement of the general construction of the tank car.

Discussion

Mr. Gibbs: Our committee has been in constant receipt of complaints from the Bureau of Explosives of loss due to continued leaking at the bottom discharge valve. The designers have made little or no progress over a long period of time, and this report is written with the hope that those who are designing cars will submit designs which give some promise of being tight.

Colonel Dunn is present and I would suggest that he be given the privilege of the floor, to tell us just how bad the trouble is.

Chairman: I will be very glad for the convention to have Colonel Dunn address us.

Colonel Dunn Speaks

I am very glad for an opportunity to talk to you gentlemen on the subject of tank cars. You all know that the Interstate Commerce Commission has issued regulations intended to safeguard the transportation of explosives and other dangerous articles; that a part of those regulations has been to prescribe the specifications governing the manufacture or shipping and the containers for dangerous articles. A single exception to that practice was made in the case of tank cars. When these regulations were promulgated, this Association through its tank car committee had charge of prescribing specifications for tank cars, and it was thought best to leave the matter in the hands of that committee.

There are three things about the tank car which are weak. They are the bottom discharge valve, the safety valve and the dome cover. The people who are responsible for designing and constructing the tank car, to make it an efficient shipping container, have borne for about 20 years a responsibility of getting these parts of the tank car right.

The most destructive article, from the railway standpoint, that we have to transport to-day, is gasoline. Some years ago, when the Bureau of Explosives was organized, every one thought it was dynamite and similar explosives. Let me read you a few figures that come from our reports.

In the period of 1910 to 1917 the number of people killed on the railroads in the transportation of dangerous articles of all kinds, not including explosives, was 97—78 of those people, or over 80 per cent, were killed by gasoline; 901 people were injured; 607 of them, or 67 per cent, were injured by gasoline. Only four people were killed by explosives, gasoline being nineteen times as dangerous from that standpoint. Thirty-four people were injured, gasoline being eighteen times as dangerous as explosives. The property loss in those eight years was $3,500,000. Gasoline caused $1,600,000, or 46 per cent. The property loss from explosives, omitting the Black Tom explosion, which was a war outrage and not a transportation accident, was $135,000; to $1,600,000 for gasoline, or gasoline was twelve times as destructive from the standpoint of money as explosives of all kinds.

During 1918 the tank car carrying inflammable liquids, acids and corrosive materials, killed 22 people, injured 56, and caused a money loss of $977,000, or about 1-23 of all the freight losses on the railroad.

The tank car accidents in 1918 summarize as follows: 49 were due to derailment, which killed 12, injured 13, and caused a money loss of $651,000; 37 collisions, killing 2, injuring 9 and causing a loss of $199,000. There were 59 leakages not caused by derailment or collisions, which killed 8, injured 34 and caused a loss of $126,000.

In 1918, if our tank cars had not had bottom valves, we would have saved the lives of 3 people, the injuries of 11 and money loss of $245,000. That does not include very large losses as a result of evaporation from both the bottom valve and the safety valve.

F. J. T. Stewart, Superintendent of the Bureau of Surveys, New York Board of Fire Underwriters, and President of the National Fire Protection Association, in answer to my questions, says: "I first familiarized myself with the present provisions for emptying such car tanks. I am impressed with the objectionable features of the outlet valve, located at the bottom of the tank and having a discharge pipe extending some distance below. This arrangement is a serious violation of a fundamental safeguard which the National Board of Fire Underwriters have stood for for many years. I refer to the prohibition against gravity pressure upon such a valve, which experience has shown is exceedingly difficult to keep tight. On the tank car the danger of derangement of this valve is infinitely greater than in the case of a fixed storage system. The valve being located in the bottom of the tank is affected by the slightest amount of sediment. Water, due to condensation, is also likely to accumulate at this point and freeze in cold weather. The projection of the outlet pipe below the valve offers an additional opportunity for derangement of the valve by being struck in case the car leaves the track. Serious fires have resulted

from this bottom valve, causing losses not only to the tank cars and their contents, but also to adjacent properties."

An extract from a report of one of the inspectors of the Bureau of Explosives indicates the general impression produced upon the mind of a disinterested man who has spent all his life traveling over railroad lines, where very large numbers of tank cars move.

"Aside from the fact that this tank car should not have been in transportation service, because of being in bad order and not complying with the M. C. B. Rules, and the various violations committed by the agent in waybilling the shipment, the contents would not have been lost if the tank had not been equipped with an outlet pipe at the bottom, which broke off when the tank shifted on the frame. The outlet pipe on tank cars is responsible for 95 per cent of the leakage of contents of tank cars, due to the fact that the outlet valve and the fittings on the outlet pipe cannot be made leak proof. In the winter, water will get in the outlet pipe and cause it to freeze and burst and the ice in the pipe will unseat the outlet valve. The only reason that I can see for having tank cars equipped with outlet valves and outlet pipes is for convenience in unloading and that can as well be done from the dome and a five-in. tapered plug can be substituted for the outlet valve."

Similar reports show that that is the general opinion of representatives of the Bureau of Explosives.

In England they do not allow bottom valves in any tank wagon which carries an inflammable liquid. They do not allow the most dangerous inflammable liquids to go into tank wagons at all, and gasoline is one of them.

Another extract from a report of one of our inspectors assigned to tank car work, who has just returned from a trip through the oil region in Oklahoma and Texas, follows:

Of leaky outlet valves, he says:

"This condition was observed on May 9th at Forth Worth, 14th at Burkburnett, 27th at Sapulpa, 28th at Kieffer, and the 29th at Shamrock. Tanks involved were owned by Anderson and Gustafson, General American Tank Car Corporation, Inland Refining Co., M. R. Travis Co., Oklahoma Petroleum Co., Keith Tank Line and Pelican Oil Refining Co.

In addition there must be many which do not show valve trouble because of the practice of using lime in the outlet valve caps. While this has proved to be the best method of insuring against leakage from the cap, it is depended upon too much by those who do not leave the cap off while loading. On several cars on which I saw the caps removed, leakage came from the outlet valves in streams, showing that the cars had been loaded with the caps on and the responsibility of the valve transferred to the cap by the use of lime. Efforts to reduce the leakage by manipulation of the valve rod failed and transfer was necessary.

At isolated tracks, where there is difficulty in securing empty cars, the temptation is strong to try to hold the load with the valve cap if another car is not available.

At Sapulpa, on May 28th, I saw a car loaded with gasoline and bearing on each side a label,

DO NOT REMOVE
BOTTOM OUTLET VALVE
We will not be responsible for
any loss entailed in unloading
from the bottom.
UNLOAD FROM DOME

I think our 20 years' experience in waiting for a satisfactory bottom discharge valve, is about as much time as we ought to wait. My remedy is to do away with it entirely. This suggestion is radical from the standpoint of the owners of these tank cars, and for the shippers who use them. I am not making it with the idea that it will be adopted at once, or that all of these sacrifices that it would entail would be brought at once upon the owners of tank cars. I have asked a number of the larger shippers to give me some data as to what it will mean to them if this bottom valve is taken off, but I have not yet received their replies.

I believe that most large shippers are prepared at their large plants to unload through the dome. If a shipper is large enough to get gasoline in tank car lots, he ought to be large enough to get an equipment to unload through the dome.

The safety valve is second in importance to the bottom discharge valve. It was put on, as you know, to avoid the danger of a rupture of the tank in case of accidents involving fire. I will read what Inspector Grant found in regard to safety valves down in the oil region:

"In the usual trouble from blowing safety valves it was noticed that the temperature raised and interior pressure developed from exposure of the tanks to the sun. I went up on a number of cars where the leakage of gas from valves was heavy and the hissing noise could be heard from the ground at a considerable distance. There were a number with a quiet escape of gas evident only from a wavy appearance in the air about the valves and a very strong odor.

"At Sand Srings, in the shop of the General American Tank Car Corporation, on May 30th, I had Superintendent Eakins conduct some tests with new safety valves of Trumbull make as well as their own. No amount of adjustment or regrinding could make them tight, and they blew under test at practically all pressures up to the popping point.

"At Argentine, May 31st, at the works of Thomas Track Appliance Company, I found that they were machining a wider valve seat than called for in M. C. B. specifications. I arranged to have two complete valves machine to exact dimensions for testing at the shop of the Sinclair Refinery on June 3rd. These tests were conducted in the presence of Master Car Builder Beasley, Shop Superintendent Osborn and Inspector J. M. Scott. It was found impossible to get the valve tight, and the trouble showed itself due to a side lift. I do not believe that the present type of valve will ever prove satisfactory.

"The bottom outlet is not necessary in transportation, and without the development of a type to reduce or prevent the rapidly increasing cases of leakage it seems to me that it would be best to eliminate bottom valves."

He found that they could not make a new valve work in accordance with the specifications. We haven't yet had any big disaster in the storage yards in the oil region, but I am living in trepidation that from day to day I am going to hear from one. What does it mean to shippers to have that constant escape from this loose safety valve? A great many of them get to destination with shortage of contents. The railroads are asked to pay for a great deal of it, and the shippers themselves have to pay the major portion.

It is by no means uncommon to hear of a tank car losing 10 per cent of its products while en route. That is a tremendous tax upon the resources of the country and is due in a large measure to the fact that safety valves on tank cars do not hold; they leak almost from zero pressure.

Most of the dome covers are secured by a screw thread. It is a very large and heavy piece. Many of the men who should secure it after loading a car do not secure it properly, and many of them injured the thread. They are not vapor tight or even water tight. In attempting to screw them down, the gaskets underneath have been punched and inured; the holes that have been drilled to prevent opening the domes under pressure have taken up part of the thread, and the result is that wherever you get a high vapor tension product in a tank car today, you are liable to have the vapor, escaping from under the dome cover.

The design, assembled from the interior, which was submitted by the Union Tank Line sometime ago, and I understand approved by your committee, is a very much better one than the screw design that we are using. A large number of accidents have occurred as a result of men attempting to unscrew the dome cover, when there was interior pressure in the car. The usual result is for them to unscrew it until only one or two threads remain, and then the pressure in the car does the rest of it, blowing up the dome cover and a column of liquid with it. The hinged bolts, or the design assembled from the inside, would make it impossible for that accident to occur.

I hope that the owners of tank cars, those who construct them, those who are responsible for their use, will give serious consideration to the troubles that I have detailed and that they will meet us in the right spirit and devise some reasonable way to at least better the condition.

Mr. Gibbs: Before Colonel Dunn leaves the stand, will he tell us whether that great loss through the valves, particularly safety valves, is on cars which are jacketed? We prescribe a special car for handling these casing head gasolines, and my observation is that they are comparatively small in number.

Colonel Dunn: This is from the ordinary tank car. The regulations permitted shipment in an ordinary tank car of casing head gasolines, when they reduce the vapor tension down to 10 lb. All of these shippers claim that they do reduce the vapor tension down to that point; but experience shows that when the sun beats down on one of these tank cars long enough, you will get a vapor pressure that is sufficient to give this trouble, even where it is not a prohibited article. I have heard of very little trouble from those insulated tank cars.

Mr. Harding: I represent a private ownership. We have a number of tank cars that carry explosive products. Colonel Dunn's remarks are very interesting and instructive. I wish he could be a little more helpful in reference to that discharge nozzle. We have followed very carefully the Tank Car Committee's recommendations in past years. In addition to a discharge nozzle there are also two pipes entering into all our tank cars; for instance, through the bottom, for coils. It is necessary to take care of crystallized products, as they must also be removed. Our greatest losses are through the heating coils. The pipes extend from the bottom down each side of the discharge nozzle, and a man swinging himself under the car, grasping that pipe to help himself through, has, at times, broken off the pipe. It is necessary to have a valve on that, and at times that valve has been opened, causing loss.

We find that there are very few people receiving our commodities that are equipped to blow out or syphon or pump out our products. Our dome covers are of cast steel; they are hinged, and are held in place with swining bolts. We ship the highest grade ammonia, and I cannot recall an instance in the past 19 years that we have had losses from leaking dome covers. I don't believe that this convention should put it up to the builders of tank cars, or the operators of tank cars, to find out the best means. I believe it remains for the Tank Car Committee to tell tank car users what to use, just the same as you are telling all other people what to do, and properly so.

Chairman: Evidently you don't think we would have any controversy if the Tank Car Committee did all of these things.

Mr. Harding: Yes, but the controversy would have the authority back of it at any time.

Chairman: It would have to be approved by the Tank Car Committee. I am sure we are very thankful to Colonel Dunn for his talk to us. He is always helpful, no matter where or when.

Now, the Report of the Committee is before you gentlemen. It has really only one specific request, and that is that the paragraph about the time limit of the use of flanged steel, whether it should be left to the Executive Committee for action after further investigation and developments.

A motion that the report be accepted and that matter be referred to the Executive Committee for action was carried

The convention then adjourned until 9:30 o'clock Saturday morning.

Saturday Morning Session

The Saturday morning session was called to order by Chairman Chambers at 9.40. The Secretary read the proposed Rules of Order for the Mechanical Section and then said:

Rules of Order

The Rules of Order as read corresponded with those printed in the *Railway Age* of March 7, 1919, page 535, with the exception of the paragraphs printed below.—Editor.

(c) Any person having such knowledge of science or practical experience in matters pertaining to the construction of motive power or rolling stock as would be of special value to the section may be admitted by the General Committee as an affiliated member on being recommended by three representative members. Affiliated members shall be entitled to all the privileges of representative members excepting that of voting on matters submitted to written or printed ballots and being elected to office in the section and may serve on committees on appointment by the General Committee, in addition to the regularly elected members of such committee.

Such membership shall continue until written resignation is received by the secretary or the membership is terminated by the General Committee or by the members becoming engaged in business which, in the judgment of the General Committee, would impair his usefulness to the section or discriminate against others similarly engaged. Affiliated members shall not be subject to dues or assessments.

(d) Representative members who have been in good standing twenty years, or members who have served as President of the Master Car Builders' or American Railway Master Mechanics' Associations or chairman of the section become life members.

(e) Those persons, active or representative members, who have been in good standing in either the Master Car Builders' Association or the American Railway Master Mechanics' Association for twenty years, or members who have served as president of either association or as chairman of the section become life members. Those now carried by the Master Car Builders' Association as life members or by the American Railway Master Mechanics' Association as honorary members will be continued as life members of Section Three—Mechanical.

8. (b) In all ballots for chairman, vice-chairman, members of General Committee and Committee on Nominations at the meetings of the section, the following form of voting shall be adhered to: An envelope shall be provided on which there shall be a blank space for the name of the railroad, and the name of the official voting; smaller envelopes shall be provided on which shall be printed the words "For Officers," "For Members General Committee," "For Members Committee on Nominations," and otherwise unmarked. In these envelopes the ballots shall be placed by those voting them and they shall then be placed within the larger envelope and presented to the general tellers. When a ballot is to be taken the chairman will announce the names of all required tellers. Three general tellers shall have charge of receiving and recording the ballots cast. When all ballots have been cast these tellers will announce that the polls are closed. They shall then remove the smaller envelopes, count and announce the vote for officers and shall deliver the envelopes marked "For General Committee" to two tellers, who shall count and announce to the general tellers the vote for General Committee and those marked "For Committee on Nominations" to two tellers who shall count and announce to the general tellers the vote for the Committee on Nominations.

(d) When a ballot for officers or membership on committees shall be announced as having eventuated in a tie vote, or be otherwise undecided, upon such announcement the final result shall be determined by the majority of the members present.

9. (a) Unless otherwise provided herein, a vote in the session of the section may be taken *viva voce*, by arising, or by written or printed ballot. In a vote taken by written or printed ballot only representative members and representatives of the United States Railroad Administration shall participate. Letter ballots may be ordered to be taken in such manner and under such conditions as the section may by resolution from time to time or the General Committee may direct.

(b) Votes on letter ballot on all measures affecting the interests of the railroads represented, which a majority of the Association decide, shall be determined on the basis of cars and locomotives owned, or which are in use or process of purchase by the railroad. Votes on car standards shall be on the basis of one vote for each 1,000 cars and on locomotive standards on basis of one vote for each 100 locomotives. The ballot shall be cast by the representative member in the section designated by the federal manager or executive officer of the member of the Association.

(c) Printed ballots for use in the election of officers, members of the General Committee and the Committee on Nominations, to be of the form as prepared by the Committee on Nominations.

(d) Printed ballots for use in letter ballots to be of the form as prepared by the General Committee.

A motion that the Rules of Order, as read by the Secretary, be received and adopted, was put to vote and carried.

Report on Train Lighting and Equipment



J. R. Sloan
Chairman

THE COMMITTEE HAS CONFINED its efforts this year to developing a proposed standard basis for the rating of car lighting axle generators and a method of testing to determine this rating. Some consideration was given to the subject of a proposed general specification for axle generator car lighting equipment, but it was found impracticable to give sufficient study to the subject to submit a report.

There is not, at the present time, any method of rating axle generators, or of testing them to ascertain their rating, that has been accepted by any society or association. The various manufacturers have their own basis of rating and some few of the railroads cover the subject in their specifications, but there is no generally accepted method. In order that when quotations are received from axle generator manufacturers the purchaser may compare them on an equal footing, it appears essential that there be an officially recognized method of rating and of testing to determine the rating.

The current carrying capacity of any electrical apparatus, including axle generators, is dependent upon the ultimate temperature attained by the insulation. The materials used as insulators have been divided by the American Institute of Electrical Engineers into three classes: Class A, Class B and Class C. Class *A* insulation consists of cotton, silk, paper and similar materials, when so treated or impregnated as to increase the thermal limit, or when permanently immersed in oil; also enameled wire. Class *B* insulation consists of mica, asbestos and other materials capable of resisting high temperatures, in which any Class "A" material or binder is used for structural purposes only and may be destroyed without impairing the insulating or mechanical qualities of the insulation. Class *C* insulation consists of fireproof and refractory materials, such as pure mica, porcelain, quartz, etc.

The maximum temperatures to which these various types of insulation may be continuously subjected have been determined by the A. I. E. E. to be as follows:

Class of Material.	Maximum Temperature to Which the Material May Be Subjected.	Maximum Temperature Rise.
*Class A	105 Deg. C.	65 Deg. C.
Class B	125 Deg. C.	85 Deg. C.
Class C	No limits specified.	.....

* For cotton, silk, paper and similar materials, when neither impregnated nor immersed in oil, the highest temperature and temperature rises shall be 10 deg. C. below the limits fixed for Class "A" insulation.

It is further provided that the above temperatures are based on a standard ambient temperature of 40 deg. C., and that when the temperatures are determined by thermometer readings, 15 deg. C. shall be added to the highest temperature observed. This correction shall apply to insulated windings, but no correction is required for commutators, while the correction for bare copper solenoids, etc., is 5 deg. C. Class *A* insulation is now generally used in axle generators, except on commutators where Class *B* is used.

The test to determine the rating will necessarily be made in the shop, where the conditions of operation are quite different from what they will be in actual service.

With a constant field current, the e. m. f. of any generator is directly proportional (within limits) to the speed, and with constant speed it is directly proportional (also within limits) to the field current. As satisfactory illumination and lamp life are dependent on an approximately constant voltage, it is obvious that the generator voltage should be maintained between as narrow limits as the range of charging voltage of the battery will permit. Also to maintain the voltage within these limits, it is apparent that the field strength must vary approximately inversely as the train speed, and therefore the maximum field current will be at the minimum train speed.

As the heating of the generator is due principally to the energy dissipated in the fields and armature, the maximum heating must occur at a speed of the armature that will generate sufficient voltage to make the generator carry the current, and as the maximum temperature is limited, the object of a capacity test or heat run is to ascertain the maximum current that can be carried without exceeding this temperature limit, and this heat run must necessarily be made at the minimum r. p. m. that will generate the rated voltage and current.

In service, the following conditions occur, all of which tend to affect the temperature, as compared with operation on the stand: 1. The commutator's hand-hole covers must be in place, tending to increase the temperature, as the heated air enclosed in the generator cannot escape, while on the stand test they are customarily removed. 2. Due to the movement of the train, the axle generator is subjected to a very effective air wash, tending to decrease the temperature. 3. The intermittent character of the load, due to the train speed falling below the "cutting-in" speed on account of slowdowns and stops will tend to decrease the temperature. 4. The ambient temperature will rarely attain a value of 40 deg. C., and when it does, only for a comparatively short time. 5 The time at which the load on the axle generator is likely to be greatest during the day is the time at which the ambient



Generator with Thermometers Applied to Bearings

temperature is likely to be least, and vice versa. What the railroad car lighting engineer desires to know is what the capacity of the axle generator will be in service and not what it may give on a stand test.

A Series of Tests

The committee has, therefore, conducted a series of tests with a view of determining: 1. The rating of an axle generator. 2. A method of testing to determine this rating. 3. If possible, the relation between the capacity as found on the stand test as compared to the capacity in actual service.

These tests are as follows: 1. Stand test for five hours to attain maximum temperature. 2. Stand test for five hours at manufacturer's rated full load. 3. Road test with generators forced to carry manufacturer's rated full load. 4. Road test operating normally. 5. Stand test under same conditions as No. 3. 6. Stand test under same conditions as No. 4.

The apparatus used in making these tests was as follows: A standard make of body-suspended axle generator, rated at 40 volts and 41 amperes net output. A standard make of car lighting battery, rated at 150 ampere hours' capacity, having a normal charging rate of 30 amperes. The number of cells

was varied as conditions of load and temperature rendered necessary. Weston portable ammeters and voltmeters. Esterline recording ammeters and voltmeters. Resistance and mercury thermometers. The instruments were calibrated by comparison with laboratory standards and actual readings obtained were corrected accordingly. The axle generator equipment with the thermometers in place is shown in the photograph.

To make the road tests the generators and battery were applied to Pennsylvania steel coach 1893, and the car was placed in service on train No. 12, operated between Pittsburgh and Philadelphia. The results obtained on this run did not prove satisfactory, on account of the cooling due to the frequent stops of train No. 12 between Pittsburgh and Harrisburg, while between Harrisburg and Philadelphia the run was covered at high speed with few stops, with the result that the temperature of the generator was still rising at the end of the run.

The car was, therefore, transferred to train No. 44, operating between Pittsburgh and New York, and on this run a number of tests were made. Train No. 44 has a faster schedule and less stops than train No. 12, and it was noted that the temperatures attained on the run made on train No. 44 were higher than the temperatures attained on train No. 12. This indicated that the intermittent load obtained on No. 12, due to the frequent stops, more than compensated for the increase in field current at the lower speed.

Considerable difficulty was encountered in obtaining concordant data on these runs, due to the fact that in some of them the control was hand operated and also to other factors over which we had no control. The results obtained from runs Nos. 12, 13, 15 and 16 were selected as being the most representative of the conditions and as conforming most nearly to the normal schedule of the train. On these tests, temperature readings were taken at 30-minute intervals and immediately before and after stops.

Following these road tests, the entire equipment was removed from the car and set up for operation in the shop, where road tests Nos. 12, 13, 15 and 16 were duplicated as closely as possible with regard to load, number and duration of stops and average speed. It should be noted that the speed in the shop tests was not the actual speed as obtained on the road, but the average speed obtained by calculation on the basis of distance and running time between stops.

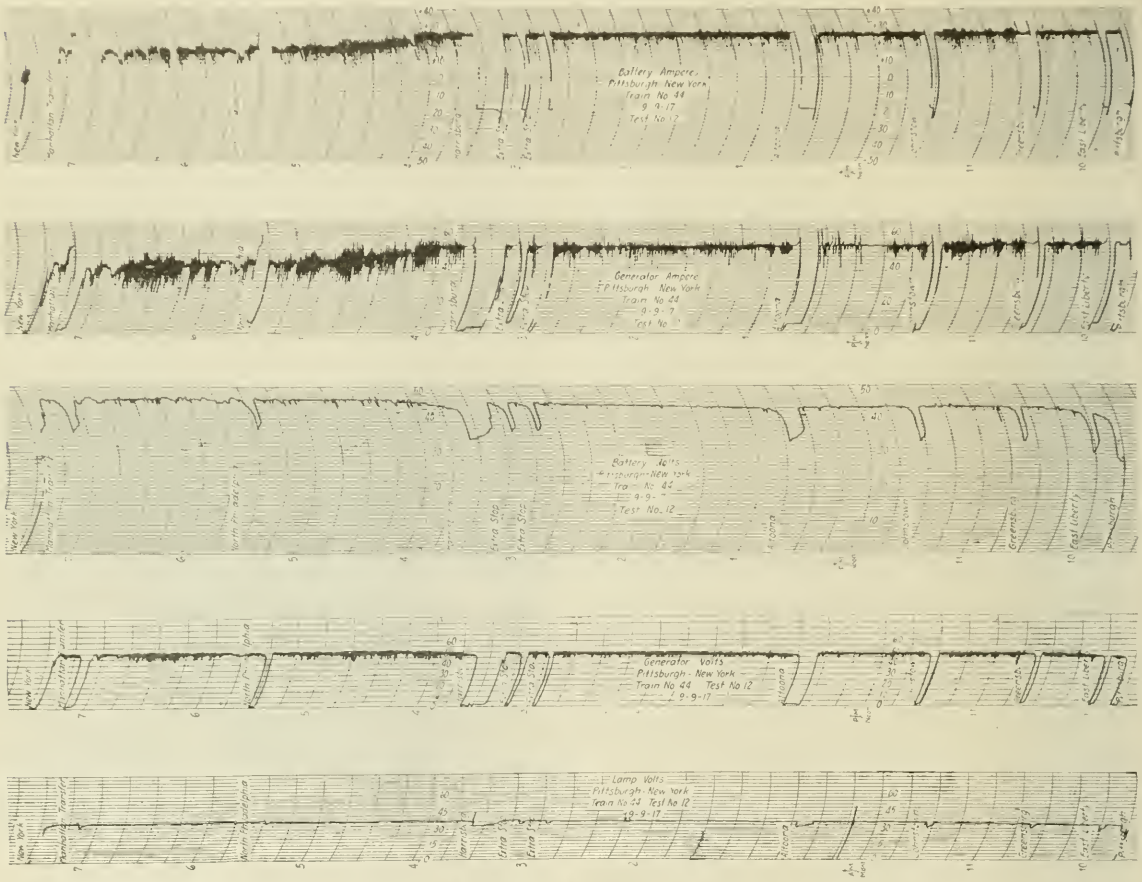


Plate No. 5.—Test No. 12.—Electrical Values—Normal Operation—45 "Load Side" Volts. Train No. 14.

The data accumulated on these tests are shown on the following plates:

PLATE.	TEST.	DATA.	DESCRIPTION.
1	S-1	Electrical Values....	Run five hours at 43.5 load side volts and constant current value to attain maximum allowable temperature.
2	S-1	Temperatures	
3	SS-1	Electrical Values....	Run five hours at manufacturer's rating 43.5 load side volts, 41 net amperes constant load.
4	SS-1	Temperatures	
5	12	Electrical Values....	Road test, normal operation, 45 load side volts.
6	12	Temperatures	
7	12-A	Electrical Values....	Duplicate of test No. 12 on Stand.
8	12-A	Temperatures	
9	13	Electrical Values....	Road test, constant load 41 amperes net, 45 load side volts.
10	13	Temperatures	
11	13-B	Electrical Values....	Duplicate of test No. 13 on Stand.
12	13-B	Temperatures	
*13	15	Electrical Values....	Road test, constant load 41 amperes net, 43.5 load side volts.
14	15	Temperatures	

PLATE	TEST	DATA	DESCRIPTION
*15	15-A	Electrical Values....	Duplicate of test No. 15 on Stand.
16	15-A	Temperatures	
17	16	Electrical Values....	Road test, normal operation 43.5 load side volts.
18	16	Temperatures	
19	16-A	Electrical Values....	Duplicate of No. 16 on Stand.
20	16-A	Temperatures	
21	S-1 SS, 12 12-A, 16 16-A	Temperatures	Comparison.
22	S-1 SS, 13 13-B, 15 15-A	Temperatures	Comparison.

* NOTE.—The electrical data for tests 15 and 15-A were lost and cannot, therefore, be submitted.

[Due to lack of space the charts accompanying the report are not all reproduced.—EDITOR.]

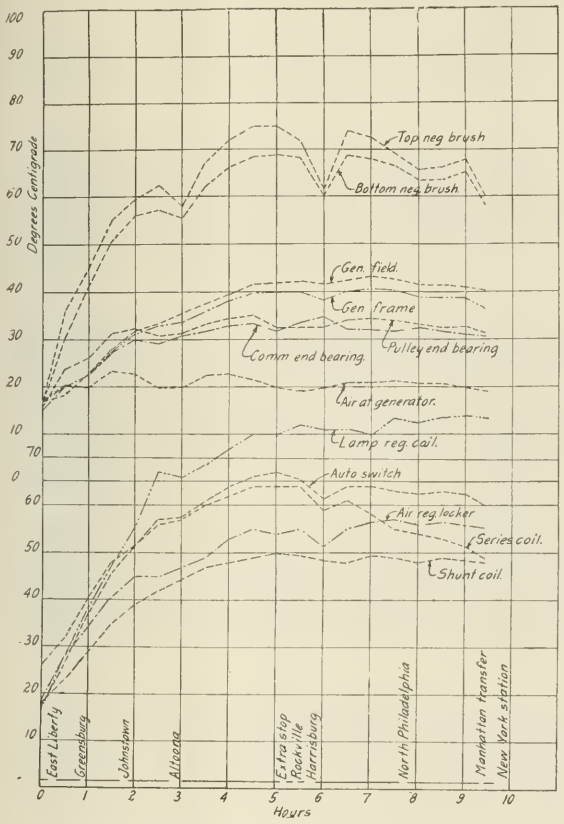


Plate No. 6.—Test No. 12. Temperatures—Normal Operation, 45 "Load Side" Volts. Train No. 44

On Plate No. 21, considering the curves for tests 12 and 12-A after the sixth hour, when the temperature of the fields had attained practically constant values, it will be noted that the rise in temperature (generator operating in normal manner at 45 load side volts) is 21.3 and 30.7 degrees, respectively, the difference in rise being 9.4 deg. C. Considering the curves for tests 16 and 16-A, also after the sixth hour, the rise in temperature of the fields (generator operating in normal manner at 43.5 load side volts) is 22.85 and 30.46 degrees, respectively, the difference in rise being 7.6 deg. C.

On Plate No. 22, considering the curves for tests 13 and 13-B after the sixth hour, when the temperature of the fields had attained practically constant values, it will be noted that the rise in temperature (generator operating at a forced output of 41 net amperes at 45 load side volts) is 23.6 and 33.2 degrees Centigrade, the difference in rise being 9.8 degrees C. Considering the curves for tests 15 and 15-A, also after the sixth hour, the rise in temperature of the fields (generator operating at a forced output of 41 net amperes at 43.5 load side volts) is 26.1 and 29.9 degrees Centigrade, respectively, the difference in rise being 3.8 degrees.

The difference in rise in the above tests, which, so far as electrical values were concerned, were as near identical as possible, is accounted for by the different conditions of heat radiation on stand and road. The rise in temperature of the field, as shown in curves for stand test SS-1, is 25.5 deg. C. at the end of five hours. This rise is greater than the rise under road conditions as found in tests 12, 16 and 13, and only slightly less than was found in test 15. Also the difference in rise between corresponding stand and road tests is 7.6 deg. for normal operation and 3.8 deg. for forced load operation.

When it is considered that in making what is called the normal operating tests the tests were intentionally started on a battery that was only about one-quarter charged, and that the output of the generator was, therefore, greater than it usually would be in regular service, and also taking into account that the tests were run in very warm summer weather, it is believed that 5 deg. C. can easily be allowed for the difference in operating conditions on road and stand.

The generator was rated by the manufacturer at 41 amperes

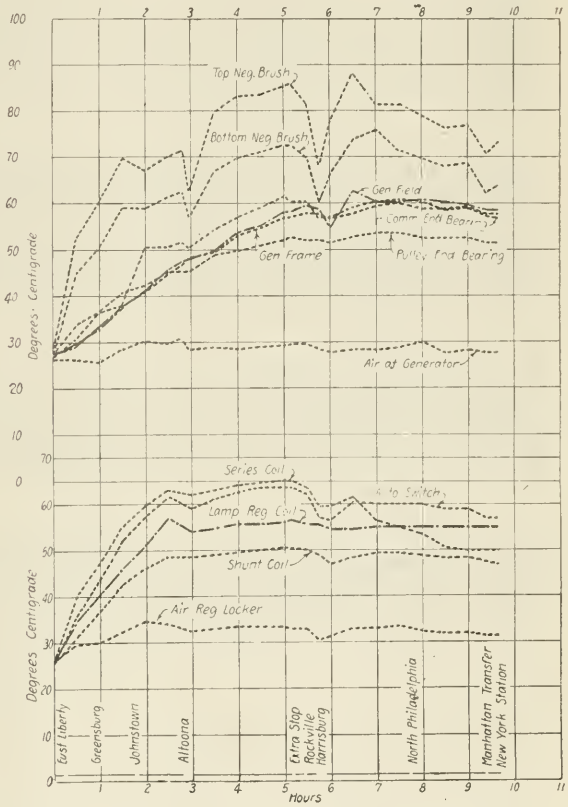


Plate No. 8.—Test No. 12-A. Bench Test Duplicating Test No. 12 on Train No. 44. Temperatures—Normal Operation—45 "Load Side" Volts

net output, so tests were run to determine its actual output. It was inconvenient to obtain the temperature of the field, but it will be noted in the other tests that the field and armature temperatures very closely approximate each other. From these tests, test S-1 was selected as being nearest the condition desired, *i. e.*, a rise of temperature of 65 deg. C. This test was run at 58 net amperes and the actual rise in temperature of the armature, the hottest part of the generator, was 67.5 deg. C.

The ambient temperature of an axle generator in actual service is rarely over 90 deg. F. or 32 deg. C., except in cer-

tain limited sections of country where it may attain a temperature of 100 deg. F. or 38 deg. C.

The committee would, therefore, recommend the following:

1. That the method of testing to determine the rating of an axle generator be as follows: (a) That the generator, together with the generator and lamp regulator, if used, shall be connected in a normal manner to dead load resistance in the battery and lamp circuit, and (b) Shall be operated continuously for five hours, with commutator hand-hole covers removed, at the minimum r. p. m. that will generate rated volts at the load side of the generator regulator and carry the current, and that (c) The net current output shall be the armature current less all current consumed in the generator fields, generator regulator, and lamp regulator, if used.

2. That the rating of an axle generator be based upon the following: (a) The rating of an axle generator, when connected and operated as above, shall be the maximum net current that the generator will carry without exceeding the following values:

	Maximum Observable Temperature.	Maximum Observable Rise in Temperature.
Any part of generator or regulators, except commutator, brushes, brush rigging and bare copper solenoids	110 Deg. C.	70 Deg. C.
Commutator, brushes, brush rigging and bare copper solenoids	130 Deg. C.	90 Deg. C.

3. That the rating test shall be made at or above 15 deg. C. ambient temperature.

4. That a badge plate be securely attached to each axle generator which shall show the following: (a) Manufacturer's name (b) Type number. (c) Nominal voltage of generator (40 volts for 30-volt system and 80 volts for a 60-volt system). (d) Rating in amperes as above determined. (e) Minimum speed in r. p. m. at which generator will deliver rated volts and amperes.

5. That the above recommendation be submitted to letter ballot as Recommended Practice.

The final meeting of the committee was attended by representatives of all the axle generator manufacturers in this country but one, and the above recommendations were unanimously approved by the representatives attending.

A method of rating axle generators is one of the essential portions of an exle generator specification. The committee, while it realizes that it is impossible to draw a complete detailed specification that would be applicable to all types of axle generator equipment as now commercially manufactured, nevertheless believes that there are a number of essential characteristics that are common to all types of axle generators and which would be included in complete specifications. The committee, therefore, recommends that it be instructed to investigate this matter with a view to drawing up a partial specification which will include the features common to all axle generator equipment.

The report is signed by J. R. Sloane (Chairman), Pennsylvania; C. H. Quinn, Norfolk & Western; D. J. Cartwright, Lehigh Valley; E. W. Jansen, Illinois Central; E. Wanamaker, Chicago, Rock Island & Pacific; A. McGary, New York Central, and L. S. Billau, Baltimore & Ohio.

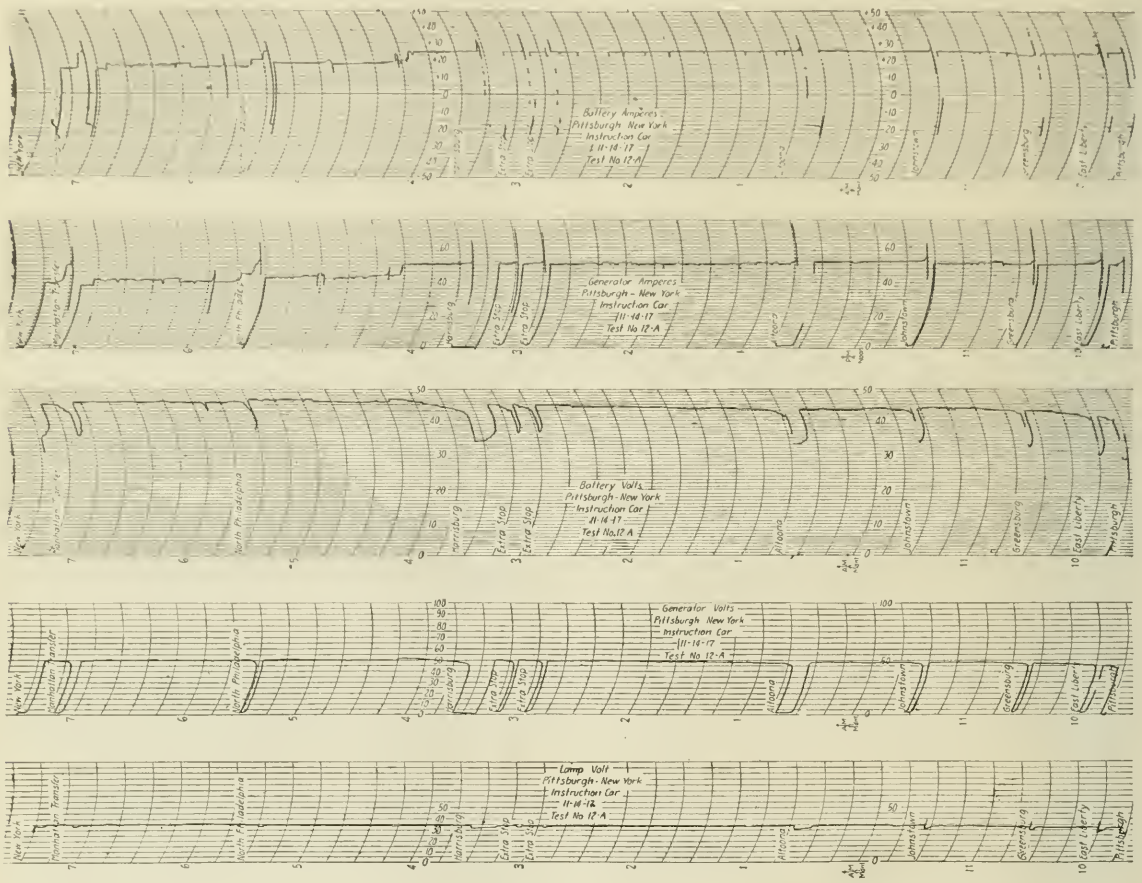


Plate No. 7.—Test No. 12-A.—Bench Test Duplicating Test No. 12 on Train No. 44. Electrical Values—Normal Operation—45 "Load Side" Volts.

Discussion

Mr. Sloane: Referring to paragraph three on page five, my attention is called to the fact that for trains using a slipping belt, the field strength does not vary inversely with the train's

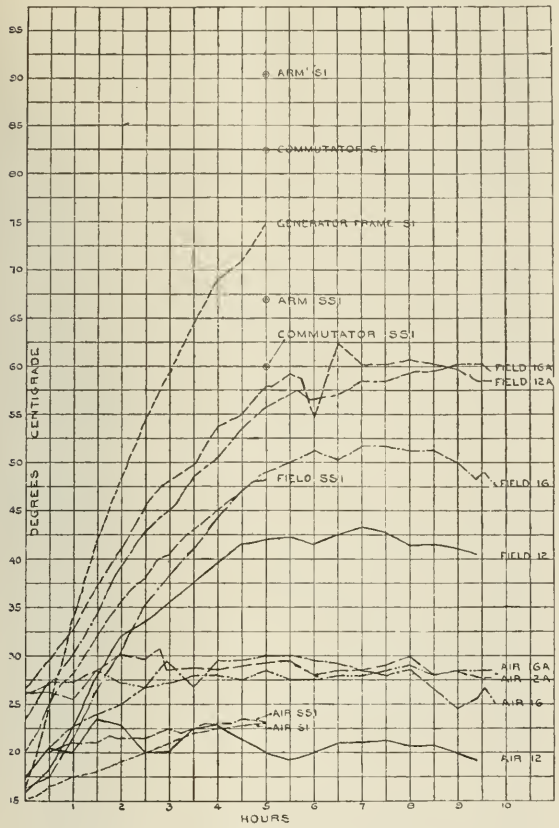


Plate No. 21. Comparison of Temperatures for Tests S-1, SS-1, 12, 12-A, 16 and 16-A

speed. But if you substitute here the words "armiture speed" for the words "train speed" it is practically correct. In the table on page 12, paragraph 2-A, there should be inserted after the words "copper solenoids" the words "resistance units and carbon piles," so it will read "any part of generator or regulator except commutator, brushes, brush rigging, bare copper solenoids, esistance units and carbon piles," shall have a maximum observable temperature, etc."

Mr. Gaines: I move the report be received and the recommendation of the committee be referred to letter ballot, and that the recommendation of the committee relative to further investigation be carried out.

J. H. Davis (B. & O.): The only criticism that I had of the report was in paragraph 3, page 5, to which Mr. Sloane referred in reading the paper.

B. B. Milner (N. Y. C. Line): This report is a very commendable piece of work on the part of the committee. The method of basing the rating of the generators and the method of testing to determine that rating, as reported by the committee, represents pioneer work. As the committee states in its report, it has never been passed on by any society or association.

The N. Y. C. Lines have in operation some 2,800 axle light equipments which were purchased under, and meet, a specification somewhat more severe than that suggested by the committee in its recommendations on page 12. The temperature rise suggested by the committee as shown on that page is 90 deg. C. As applied to commutators, brushes, brush rigging and bare copper solenoids, the maximum temperature rise prescribed in these specification is 75 deg. C. The maximum allowable increase in bearing temperature is 50 deg. C.

Current output, according to paragraph (c), at the top of page 12, is "the armature current less all current consumed in the generator fields, generator regulator and lamp regulator, if used." The rating of current which the N. Y. C. Lines has been using is the serviceable current, that is the current measured at a point nearest the lamps and the batteries. The paragraph referred to might be made to cover that by including some additional relays or automatic switch solenoids which might be a part of the testing equipment. The service test prescribed is paragraph (b) on this same page is for some five hours under regular conditions of load and speed. Under the specifications referred to the

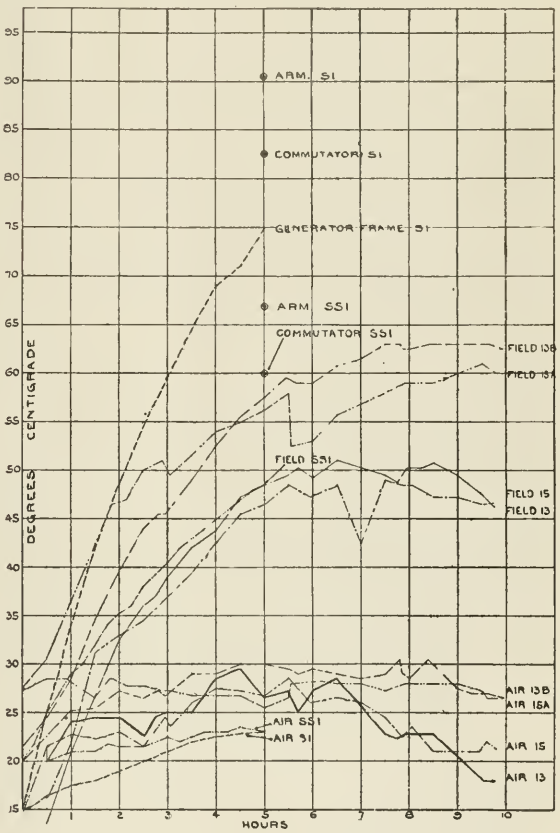


Plate No. 22.—Comparison of Temperatures for Tests S-1, SS-1, 13, 13-B, 15 and 15-A

fifth hour of that period of testing is replaced by 15-minute tests with increase in speed and load set up to cover unusual conditions under which the generators may be called to operate.

Mr. Sloane: In regard to Mr. Milner's remarks about 1-C, the net current is specified as the armature current less all current consumed in the generator field, generator regulator, and lamp regulator, if used. That means that what current is put down as net current is what is available for use. We had a fully attended meeting of the committee and representatives of the axle generator companies, and this question of the N. Y. C. specifications was brought up. The committee decided that it could be omitted; that it did not consider that the service which an axle generator underwent was so severe that it had to put an additional test on it. I have received the following communication:

"In the replies from New York Central Lines roads to M. C.

B. Circular No. 29, dated January 1, 1919. Circular of Inquiry of the Committee on Standards and Recommended Practice is included the following from I. S. Downing, G. M. C. B., C. C. C. & St. L., Indianapolis, Ind.:

"There are different ideas and systems of applying generator pulleys to axles of passenger equipment cars. Some roads use

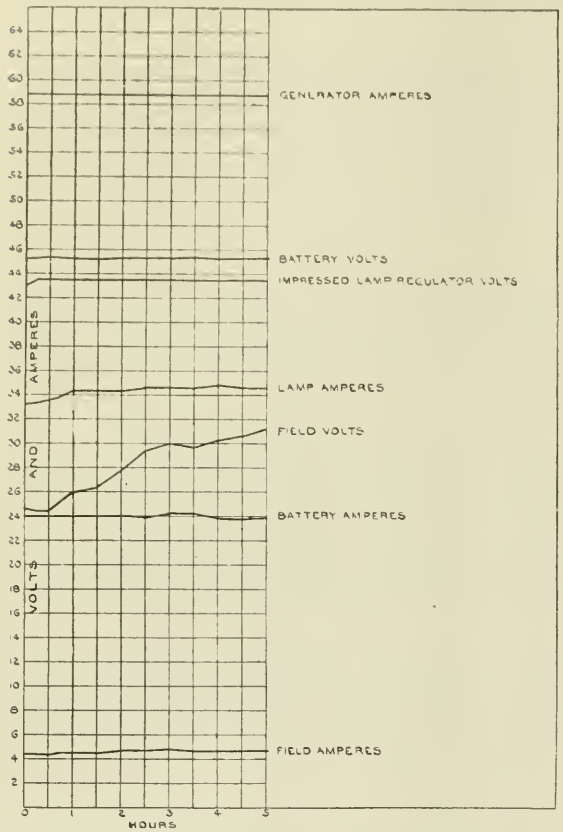


Plate No. 1. Test S-1.—Heat Run: Electrical Values—Load: Dead Resistance, 43.5 "Load Side Volts," 58 Net Amperes; Speed 16 M. P. H., 333 R. P. M. of Armature

special axles for the generator pulley, and it would be our recommendation that such pulleys be designed to conform to standard M. C. B. axles and avoid having special designed axles to accommodate the axle pulley."

(b) "Extract from Minutes of Meeting of the Committee on Standards and Recommended Practice, held in office of the Secretary at Chicago, Tuesday, March 18, 1919.

"It was decided that the subject of generator pulleys for axles of passenger equipment cars, mentioned in letter dated February 13, 1919, from E. Chamberlin, Secretary of Equipment Clearing House, New York City, be referred to the Committee on Train Lighting and Equipment."

I answered that letter to the Secretary of the Committee on Standards. I will quote in part:

"The Committee on Train Lighting and Equipment covered this subject as fully as it could be done, considering conditions as they exist, when they submitted the following recommendations in their report to the 1917 Convention.

"6. Axle Pulleys and Bushing.

"(a) A straight pulley seat shall be provided for the axle pulley.

"(b) If a bushing be used, it shall preferably be secured to the axle independently of the pulley, and shall have an external diameter throughout its length of 7½ in., and be not less than 8½ in. long.

"(c) The hub of the axle pulley shall have a uniform internal diameter of 7½ in., the length of the hub shall be 6½ in.

"(d) The face of the axle pulley shall be not less than 9 in. if flangeless, and not less than 8 in. if flanged.

"(e) The diameter of the axle pulley shall be as large as the construction of the car will permit, preferably 21 in. or 17 in.

"The recommendations were No. 88 in the letter ballot and were adopted, 1817 voting 'yes'; 154 voting 'no' and 'necessary to choice', 1314.

"These recommendations specify that a 'straight' seat shall be provided for the axle pulley but do not say by what means this end shall be attained. They do intimate that a special bushing is preferred, and this implies that a standard M. C. B. axle is used, as, if a special axle were used, the bushing would be unnecessary. They specify how the pulley bushing will be secured, its essential dimensions and also the essential dimensions of the pulley itself. It did not seem possible to prepare a 'standard' in the shape of a dimensioned drawing.

"If you feel that our committee can go further in the matter, please outline clearly what you would propose."

The stand of the committee is that the action desired has already been taken, and is recommended practice of the Association.

W. E. Dunham, (C. & N. W.): It would have more force with the members of the Association if the opinion of the Committee on Train Lighting was expressed a little more dis-

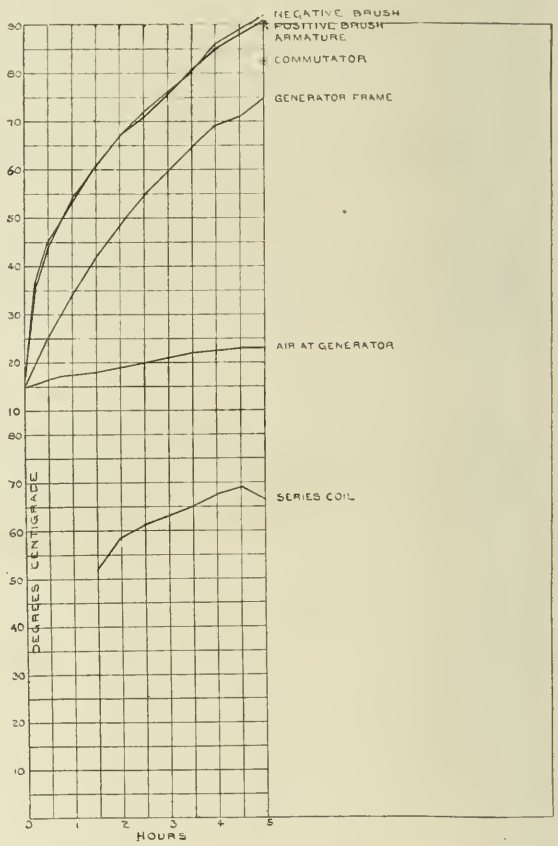


Plate No. 2.—Tests S-1.—Heat Run: Temperatures—Load: Dead Resistance, 43.5 "Load Side" Volts, 58 Net Amperes; Speed 16 M. P. H., 333 R. P. M. of Armature.

tinctly in recommended practices and standards. An axle shown in the recommended practices has a straight seat, and it is the appearance of that axle in the proceedings which leads a great many to continue to use it. I would like to see the action of

the Convention such that the straight sided axle will be eliminated entirely from the records.

Mr. Milner: I support the elimination of the special axle, or what appears to be a special axle, from the records of the Association. The N. Y. C. lines, are eliminating its use, and using only M. C. B. standard axles to which bushings are applied. If paragraph C, at the top of page 12, were amended in accordance with Mr. Sloane's remarks, it would be entirely clear.

Mr. Gaines: If we want to eliminate the special axle and adopt the standard axle in connection with car lighting, that is a subject of recommended practice and letter ballot. I would, therefore, add to the motion that the question of eliminating the special axle, and the adoption of the standard M. C. B. axle in connection with car lighting, be referred to letter ballot.

Mr. Sloane: We did not have a special axle. We say if you use it, make it thus and so, so that when you get your pulley bushing on it will conform to the same bushing as the M. C. B. axle, and be interchangeable.

Mr. Davis: I was chairman of the Train Lighting and Equipment Committee in 1917, and we made a special effort to steer clear of special axles, and I don't think you will find a thing in any of the reports of the committee which requires a special axle. If the Committee on Standards should see fit to eliminate the special axle shown, there certainly will be no objection on the part of the Car Lighting Committee.

B. B. Milner (N. Y. C. Lines): I believe that the interests of the Association and the interests of the railroads are somewhat broader than as stated by Mr. Sloane, and it seemed to me that some action should be taken in connection with the elimination of the special axle. As a matter of information, I would like to ask Mr. Sloane how many cars are carrying these special axles.

Mr. Sloane: The committee cannot state how many roads or how many cars are using special axles. We considered that the axle was out of our province, and what we considered our duty was to report on the conditions whereby we could make the pulleys interchangeable.

C. B. Keisel (Penna. Lines): It seems to me that the axle has nothing to do with this. The committee stated that it made the pulleys interchangeable so that you could use either the standard axles or the special axles, as you pleased.

Mr. Gaines' motion, with the addition, regarding the special axle and adoption of the M. C. B. axle was then put to vote and carried.

Election and Other Business

F. F. Gaines: While the Secretary is busy with the tellers, I want to offer him a bouquet as I think it is due him. I do not think we have ever had a convention where things have been so conveniently arranged. Every morning we get the papers in a nice envelope, and everything we are to have for the day is right before us.

The Chairman: A great many improvements could be made in this room. We changed the arrangement this morning because of the bad conditions of the speaker's rostrum when it was at the other side of the room. If anyone talked from the back of the hall his voice struck the big girder and died at that point. The arrangement this morning was the old arrangement before the extension was built. I think we have a right to request at least, of the pier owners, that during the sessions some of this noise be eliminated. They started to rebuild out there the other day about the time we started our prayer, and there is no necessity for it at all. We have a right to stop these things, and I think by requesting it we will get that improvement. This Convention has grown with great rapidity in the last fourteen years, and these things need revision.

Mr. Cromwell: I don't think cutting windows on the side is quite the thing. The first day of the Convention I sat near the window there and there was a little too much ventilation. I had to move toward the center where I found it too hot. I think what we need is a passenger car deck above here to let this hot air out.

Here the Secretary read the report of the election which resulted in the election of W. J. Tollerton as Chairman of Section III, Mechanical, and of other officers. The results are given in full on another page of this issue:

Chairman: You have heard the result of the election and with that goes the immediate placing of the new officers. I take great pleasure in introducing to you Mr. Tollerton, the Chairman of Section III, Mechanical, for the next two years.

Mr. Tollerton: Mr. Chairman, and members of Section III, Mechanical: I want to say how much I appreciate your selecting me to preside over this section for the next two years, and I shall endeavor in every way possible to handle the work as successfully as it has been handled by my predecessors.

Mr. Tollerton then took the chair and requested Mr. Brazier, of the New York Central Lines, to make a few remarks on the history of the M. C. B. Association, which after over 50 years of existence, is now merged with the consolidated association.

Mr. Brazier Speaks of M. C. B. Assn.

I have prepared a paper touching on the history of the Master Car Builders' Association, but, after listening to the very able and masterly address of Mr. Chambers, who covered the ground so accurately, there was little more I could say. It is a great privilege for me, one of the oldest members in the Association, to be called on to read this paper:

The Master Car Builders' Association has been in existence as an organization for fifty-two years. The Association had its origin in informal meetings which were held by car men of the New York Central Railroad for three years prior to the formation of the Association. It is a privilege briefly to call attention to the long list of honored members of the Master Car Builders' Association, to the efficient work it has done, to its rules of interchange which have made possible the operation and interchange of equipment and to its standard and recommended practices which have been generally adopted by the railroads of the country. The decisions of its Arbitration Committee have been binding on its members, with a force equal to the decisions of our courts.

In years gone by when most railroads had their Master Car Builders, the Car Department was considered to be an important one. Looking back over the history of the Association and the foundation on which it was built and realizing that in the past few years there has been a tendency on the part of some railroads to consolidate the departments, it is regrettable to note that the prominence of the Master Car Builder has disappeared. Those in charge of the equipment departments, in many cases, are known under a different title.

Our government practically adopted its standards for safety appliances, which, to my mind, was a great compliment to our association. There has been altogether too little attention paid to this important department in recent years. You will find, if the car department is properly managed, and the equipment maintained and improved to the proper standard for present day operating conditions, that the expenditures for labor and material of the car department will be in excess of those of the motive power department.

It might be interesting for you to know the total of payrolls and material disbursed for the year 1918 in both the car and locomotive departments of the New York Central Railroad, Lines East:—

	Labor	Material	Total
Car Department	$12,861,877.44	$9,787,350.90	$22,649,228.34
Locomotive Department	12,109,132.74	5,778,196.30	17,887,329.04
Total	$24,971,010.18	$15,565,547.20	$40,536,557.38

In the last two years and particularly since we have been under Federal control, investigations have shown the importance of the car department in connection with the upkeep of equipment. I believe there is a brighter future for competent car men than there was prior to the period of Federal control.

Like the Constitution of the United States of America, adopted by the forefathers of our country, you can add to it by amendments, but the foundation stands forever. So with the Constitution of the M. C. B. Association; it can be added to or called by any other name, yet the principles stand forever.

There have been twenty-nine presidents of our Association of whom twelve have gone to their reward, nine have retired from railroad service and only eight are in active service to-day. In the list of officers and members of this association there are at the present time but five in active railroad service who have been members for twenty-five years or more: W. K. Carr, chief car inspector, Norfolk & Western; Past President J. J.

Hennessey, master car builder, C. M. & St. P., and E. J. Doyle, master car builder, M. K. & T.

Next on our list is a man whom we all honor and respect He has been a member of this association for forty years; has served one railroad of this country for over half a century; has filled with honor the position of president of our association, I refer to the dean of the association, our treasurer, J. S. Lentz, master car builder of the Lehigh Valley, and your humble servant completes the number of five.

Badge Presented to Mr. Chambers

Mr. Brazier: Mr. Chambers, I have been selected by the officers and members of the Master Car Builders' Association to present you with the Past President's badge of that association. I trust, sir, you will wear this with pride and when you look back over the work which our association has accomplished in the interest of the railroads of the country that it may bring pleasant recollections to your mind as to the part which you have taken in the work. You have filled the chair and administered the duties of the President of our Association with honor and credit to yourself and to the Association, and when you look upon this badge it will reflect the esteem and confidence of your associates.

I also have the pleasure, Mr. Chambers, of presenting you with the Past Chairman's badge of the A. R. A. You were elected as President of the Master Car Builders' Association in 1917 and in the changes made in our standing, which now places us under the American Railroad Association, you have had the distinction and honor of being our first chairman—in fact, you will be, without doubt, referred to as our war chairman, as you have carried us through this period. This badge is presented to you by the officers and members of the Mechanical Section and I trust, sir, that it may serve to convey to you the appreciation of your associates for the creditable manner in which you have conducted the affairs of the Mechanical Section.

Mr. Chambers' Response

No event in my life will carry with it a more beautiful recollection of the past than the favors conferred upon me as being the last president, or any president for that matter, of the Master Car Builders' Association, and Chairman of Section III, Mechanical. Three years ago, when I was elected to this office, I took it not unmindful of my predecessors; also realizing to the fullest extent my inability to fill the office as it had been filled in the past. However, with your most hearty cooperation, I have done the best I could, and I trust that I have in a measure given satisfaction. I can only say in retiring that I want to offer my heartfelt thanks, not only to the members of the association, but to the secretary, and to the members of the General Committee and Executive Committee, who have unstintingly and without a dissenting vote, favored everything that I wished to put through or get before you. I could not ask in my future ever to have any better support than I have had in the past. Thank you, gentlemen.

Mr. Hennessey: I move that there be a vote of thanks extended to the retiring Chairman, Mr. Chambers, for the courtesies that all the members have received during his three years as President of the Master Car Builders' Association, and one year as Chairman of Section III, Mechanical.

This motion was seconded and unanimously carried.

The meeting then adjourned.

Special Guests

Anderson, Allan R., M. K. & T., New England.
Anderson, J. B., C. C. to Asst. A. M., Penn., Runnymede.
Ashe, W. O., Ch. Dftmn., N. Y. C., Traymore.
Baldwin, T. W., Asst. Reg. Dir., Alleg. Reg., Marlborough.
Bamberger, Julian E., Pres., Bamberger Elec., Breakers.
Barry, Rich. J., Gen. Insp., N. & W., Louella.
Barton, T. F., M. M., D. L. & W., Traymore.
Beum, H. W., Oper. Statistician, Reg. Dir. Office, U. S. R. A.
Billings, Ambrose, C. R. R. of N. J., Lexington.
Blackburn, H. E., Ins. of Appr., Erie, Y. M. C. A.
Brown, R. M., Asst. E. M. P., N. Y. C.
Brown, Jno. I. Examiner Div. 41, U. S. Patent Office, Wiltshire.
Burkhard, A. A., Genl. For., N. Y. C., New Belmont.
Butts, H. M., Master Painter, N. Y. C.
Clapp, D. A., Trainmaster, Penn.
Collins, Col. L. R., Representative, South African Govt. Rys., Marlborough.
Collins, W. R., Pur. Agt., Erie, Seaview Golf Club.
Connery, P. J., Shop For., B. & O.
Curren, W. C., Spec. Agt., Staff Reg. Dir., N. Y., St. Charles
Daily, Carl, C. R. R. of N. J., Lexington.
Davis, James, Foreman Timer, S. I. R. T.
Dobson, J. D., Genl. Supt., B. & O., Bouvier.
Dooley, W. H., S. M. P., C. N. O & T. P., Dennis
Dougherty, Geo. E., Supt. of Equip., U. S. R. R. A., Haddon Hall.
Edwards, Chas., For. Ft. Hps., L. I.
Englebright, E. W., Acting Constg. Eng., U. P., Traymore
Ennes, S., Gen. Mgr., B. & O., St. Charles.
Faga, H. L., Ch. Clk. Supt., L. & N. E., Pennhurst.
Feather, E. H., Mech. Dept., R. F. & Prt., New Hygeia.
Fisher, C. D., For., W. J. & S. S, Rafters
Fitzgerald, Wm, Asst. Pur. Agt., Marlborough.
Fletcher, J., Gen. For., Seaboard Air Line, Princess.
Forde, T. J., Mech. Supt., H. I. & D. Marlborough
Freeman, E. H., Gen. Clk., B. & O., Miller Cottage.
Fritchey, F. W., M. M., B. & O., Marlborough
Fryberger, G L., Machine Operator, Penn, Elberon.
Gaffney, J. F., Yd. Condtr., W. J. & S. S., 604 N. Indiana Ave.
Geis, Wm. F., Secy. to Corporate Mech. Eng, B. & O., Bouvier.
Gordon, C. E., R. F. & P., Terminal.
Greene, H. E., Asst. Ch. Pass. Clerk, U. S. R. R. A., Miller
Griffin, J. F., Div. Gen. Car For., N. Y., New Belmont. Cottage.
Hackenburg, J. H., P. A., P. A. & M. C. K., Alamac.
Hall, C. W., For. Loco. Rprs, Penn L W, Traymore
Hall, M. K., Asst. Mgr. of Str. Sec., U. S. R. R A.
Hamilton, R. H., Genl. Mgr, H. I. & D.
Harrison, W. R., M. M., Santa Fe, Breakers.
Harter, Chas., Mech. Eng., Mis. Pac., Ambassador.
Hazel, F. J., Supt., Det. & Tol. Shore Line, Schlitz.
Heckman, A. A., Ch. Clk. M. R. D., Norfolk & Western, Elwood
Heiser, Chas. E., Drafts'm, P. & R., Chester Inn.
Himmelberger, Chas. M., Asst. Trainmaster, C. R. R. of N. J. Worthington.
Hitz, C. D., Spl. Agt., Penn.
de Hoidenstam, R., Capt., American Gas Accumulator Co., Traymore.
Holmes, H., P. & R.
Holmes, J., Dir., N. W.
Hosack, W. K., Gen. For., Westn. Md., Monticello.
Hughes, M. L., Penn., Schlitz.
Hughes, P. E., President Material Agent, Penn., Schlitz.
Johnson, E. Y., Loco. Insp., B. & O., Clarendon
Jones, L. M., Pur. Agt., N. So., Breakers.
Jones, W. N., Gen. Strkpr., Chalfonte.
Joy, C. U., M. M., N. Y., N. H. & H., Osborne.
Julien, T. St., Penn.
Keeber, W. G., Mch. Shop For., C. R. R. of N. J., Lyric.
Kilborn, Jas. E., Pur. Agt., Rutland, Marlborough.
Bressling, E. W., Foreman, W. J. & S. S., Marlborough.
Landis, John D., Jur. Agt., P. & R.
Lepper, C J., Machinist, Penna., Schlitz.
Lipetz, A. I., Chief Russian Ry. Mission, Russian State Rys., Marlborough.
Lohman, C., Shop For., C. R. R. of N. J., Lyric.
Long, M .A., Asst. Ch. Eng., B. & O., Chelsea.
McCann, J. L., Supt. Recl. Plant, Zanesville, B. & O., Miller.
McCawley, H. B., Atty., I. C. C., Blackstone
McConnell, W T., Gen For. Retired, Penn.
McGinnis, T. A., Insp. M. P. Dept, N. & W., Alamac.
McKernan, E. J., Supervisor, Santa Fe, Strand.
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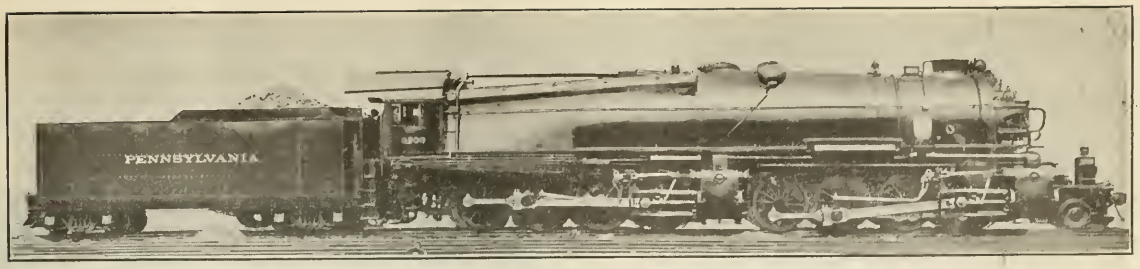
Maze Edward J. Asst. Shop For., L. I., 12 Ohio Ave., Atlantic City.
Mitchell, J., Gen. For., C. R. R. of N. J., Pennhurst.
Murphy, W. J., M. B. M., Penn., Traymore
Nelson, W. C., Jr., Reg. Clerk, Penn.
Nohun, J. L., Asst. to Cons. Engr., U. P., Traymore.
Northan, B. L., Gen. Asst. Pur. Dept., N. Y., N. H. & H., St. Charles.
North, J. H., Ch. Clk. to Gen. Mgr., L. & N. E., Pennhurst.
Nichols, Capt. Ralph G., Army Insp Ordnance, Strand.
Oswald, Geo., For. Water Service, L. I.
Palmer, L. W., M. M., E. B. T. R. R & Coal Co



Simple Mallet Locomotive with Short Maximum Cut-off

Pennsylvania Engine Has Unusual Boiler Design; Longest Port Opening Is 50 Per Cent of Stroke

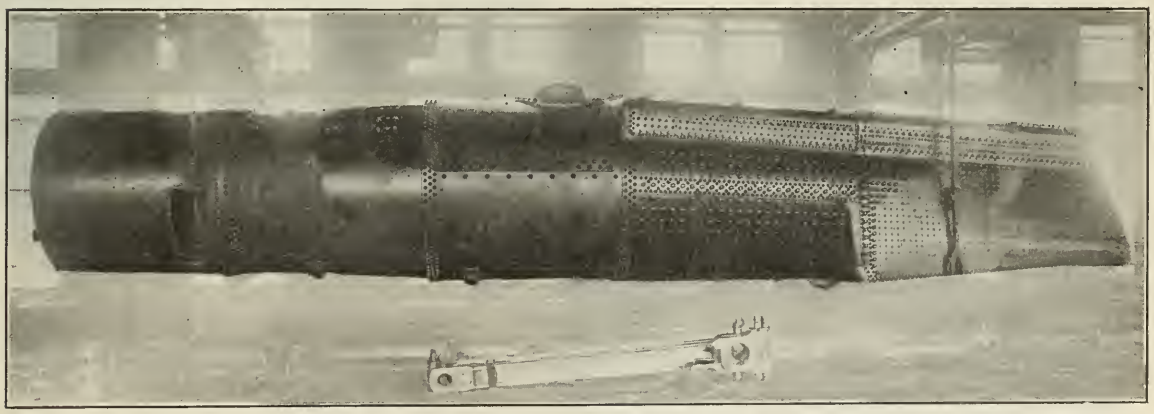
ONE OF THE MOST INTERESTING FEATURES of the track exhibit this year is the simple Mallet type locomotive, Class HC1s, which has just been completed at its Juniata shops by the Pennsylvania Railroad. This locomotive, together with the Pennsylvania Class I1s Decapod and the Class FF1 electric locomotive, is on exhibition at the Pennsylvania Station, at Tennessee Avenue, just off of Atlantic Avenue.

Many unique features are incorporated in the design of this locomotive. Like the Pennsylvania Decapods of the 11s class, the first of which was built in December, 1916, and one of which is also included in the track exhibit, the Mallet locomotive has cylinders designed to produce the maximum tractive effort at a cut-off of 50 per cent. The boiler, with a total equivalent heating surface of 11,360 sq. ft., a grate area of 112 sq. ft., and a barrel combustion chamber 11 ft. 7¾ in. long, is, as a whole, of unusual proportions and incorporates a number of details of construction the fabrication of which involved a high degree of skill and ingenuity.

The locomotive is designed on the basis of driving axle loads of 65,000 lb. to 68,000 lb. at the rail, the eight pairs of drivers thus giving a total adhesive weight of 520,000 lb. to 544,000 lb. The weight of the locomotive in working order is 555,000 lb. to 580,000 lb., while in working order the engine and tender have a total weight of 774,000 lb. to 800,000 lb. In all cases the weights are estimated. With two sets of simple cylinders, each 30½ in. in diameter by 32 in. stroke and limited to a maximum cut-off of 50 per cent, driving wheels 62 in. in diameter and a boiler pressure of 205 lb., it is estimated that the maximum tractive effort, based on driver weight, will be about 135,000 lb.

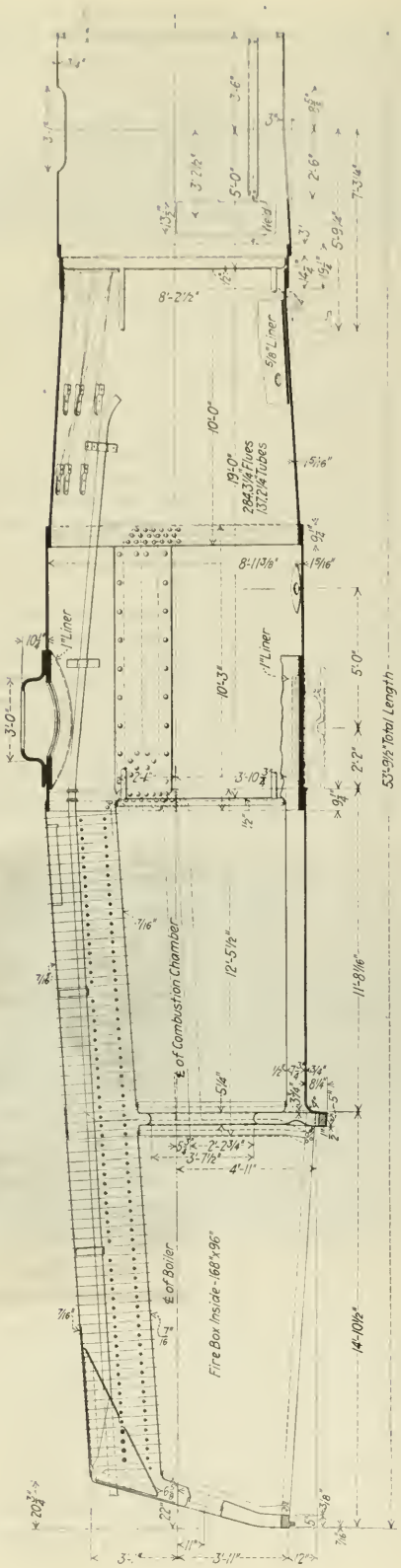
The Boiler

The boiler is of unusual interest both from the standpoint of design and of the methods employed in the construction of some of its details. It may be considered as in three parts, each involving a different type of construction: the two barrel courses, the combustion chamber course and the firebox. The barrel courses are formed of 1 5/16 in. plate. The first course is conical, with a minimum outside diameter at the front end of 96 in. The second course is straight, with an outside diameter of 110 in. This course contains the shoulders for the Belpaire roof connection and, as shown in one of the illustrations, is rolled in one piece, the corners being formed in one operation on the flanging press after the sheet is rolled. The combustion chamber course is made up of four parts: a tapering throat sheet of ¾-in. material, two side connection sheets of the same thickness and a Belpaire roof sheet 7/16-in. thick.



The Boiler

Two of the illustrations show how the throat sheet is formed. After it has been rolled the rear end is heated locally and then broken down to form the mudring connection; the Juniata boiler shop is equipped with a 700-



Longitudinal Section of the Boiler for the Pennsylvania Class HC. 1s Locomotive

ton flanging press for carrying out work of this character.

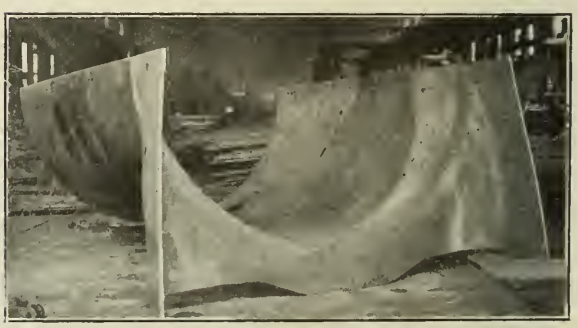
The firebox and combustion chamber have a total length of 25 ft. 9 in. from the door sheet to the rear tube sheet and some special provision was considered necessary for taking care of expansion. This has been



The Throat Sheet before Flanging

made by the insertion of a folded throat sheet connection between the firebox and combustion chamber. The form of this sheet is shown in detail in the boiler drawings, and one of the photographs shows it in place in the firebox. The sheet is formed in two parts, which join and are welded together on the transverse center line of the combustion chamber.

The top half is a comparatively simple flanged channel



The Throat Sheet—Flanged in One Operation under a 700-Ton Press

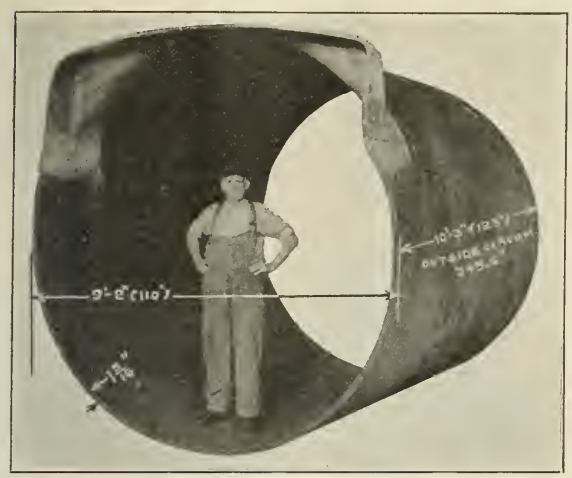
section and is formed under the press in one operation. The fold in the lower part forms in effect a bridge wall between the firebox and the combustion chamber, and here the contour of the inverted U-section makes exceptionally difficult the securing of a satisfactory flow of the metal during the flanging operation. To avoid excessive puckering and drawing of the metal it was necessary to form this sheet in three operations. In the first operation the combustion chamber flange and the contour of the bridge wall were formed by breaking the sheet over a die, the throat and combustion chamber sides of which were separated by an angle of 32 deg. This operation resulted in some upsetting and thickening of the metal in the bend and the throat sheet corners pulled up about three inches. In the second operation the partially finished sheet was placed on a die with the combustion chamber side vertical and the throat sheet side pressed down through an angle of 32 deg. parallel to the combustion chamber side. The corrugation just below

the combustion chamber flange was formed in a third operation.

When completed, the two sides of the channel, which extend completely around the mouth of the combustion chamber, are 4¼ in. apart; the channel has a depth of 5 in. at the top and 14 in. on the bottom center line.

The firebox is built up of separate crown and side sheets, and the combustion chamber of a crown and a half barrel sheet. The adjoining edges of these sheets are butted and electric welded after the firebox is assembled.

The firebox has a length of 14 ft. and the combustion



The Second Barrel Course; Beloaire Shoulders Pressed in One Operation

chamber extends forward into the boiler 11 ft. 7 11/16 in. from the throat sheet. The tubes and flues are 19 ft. long. There are 137 2¼-in. tubes and 284 3¼-in. flues, the latter containing the elements of the type E superheater with which the engine is equipped.

The type E superheater has three vertical headers, one central saturated steam header and two superheater steam headers, one on either side of the smokebox. Each header connection serves a cluster of from two to five units, depending upon the arrangement of the flues. Each unit consists of two loops, each of which occupies one of the 3¼-in. flues.

The boiler is fitted with three 5-in. Coale safety valves and is fed by two non-lifting injectors, one a No. 16 7/10 Sellers, and the other a No. 17 Nathan Simplex. It is also provided with a Sentinel low water alarm. The engine is fired by a Duplex stoker and is also fitted with a Franklin power grate shaker.

The extreme length of the crown sheet makes the question of water level variations due to changes in grade one of great importance. This is particularly true on ascending grades, where the upward slope towards the front of the crown sheet augments the effect of the inclination of the locomotive. Under these conditions the water level at the backhead, as registered in the ordinary gage glass, is no criterion of the condition at the front end of the combustion chamber; in fact, the water level at the backhead may be above the top of the gage glass. Provision has been made in two ways for determining directly the water level at the front of the crown sheet.

Instead of being connected directly into the backhead of the boiler the gage cocks are each connected to a ⅜-in. copper pipe, and the three pipes lead into the boiler through the wrapper sheet near the front end of the combustion chamber, terminating at points respectively 4 in., 7½ in., and 11 in. above the front end of the crown sheet. These pipes are carried back over the top of the boiler to a point just inside the cab in a 3½-in. extra strong wrought iron pipe, opening into the boiler through a special flanged connection and closed at the rear end by a ground joint cap, on the face of which is located the gage cock fixture. Steam for cab auxiliaries is taken from a turret casting let into the wrought iron pipe just outside the cab.

A further check on the water level is obtained by an ingenious device which gives a visible indication of the level of the water at the center of oscillation of the water in the boiler; that is, at the point where the height of the water with relation to the crown sheet does not change with variations in the slope of the locomotive. This point is located about 16 in. ahead of the rear tube sheet.

The operating element of this device consists of a longitudinal arm pivoted in a bracket attached to the shell of the boiler, one end of which carries a float and the other a counterweight balanced so that in water at a temperature corresponding to 205 lb. pressure the float is one-half submerged. The float arm has a downward projecting lever which is conected to the indicator on the backhead by a rod of watertight steel tubing, the weight of which is practically equal to the weight of the water displaced. The indicator consists of two flat springs on the end of this rod, the ends of which bear lightly on the inside of heavy glass windows in a horizontal casing opening into the backhead of the boiler. A disk valve carried near the end of the rod and seating against the inside face of the indicator casing closes automatically in case of failure of either of the indicator glasses. The casing is provided with steam and drain pipes, the former for the purpose of breaking the seal of the disk valve and starting the device after the



The Firebox and Combustion Chamber Connection Sheet

valve has for any reason been closed. The range of this indicator is the same as that of the gage cocks.

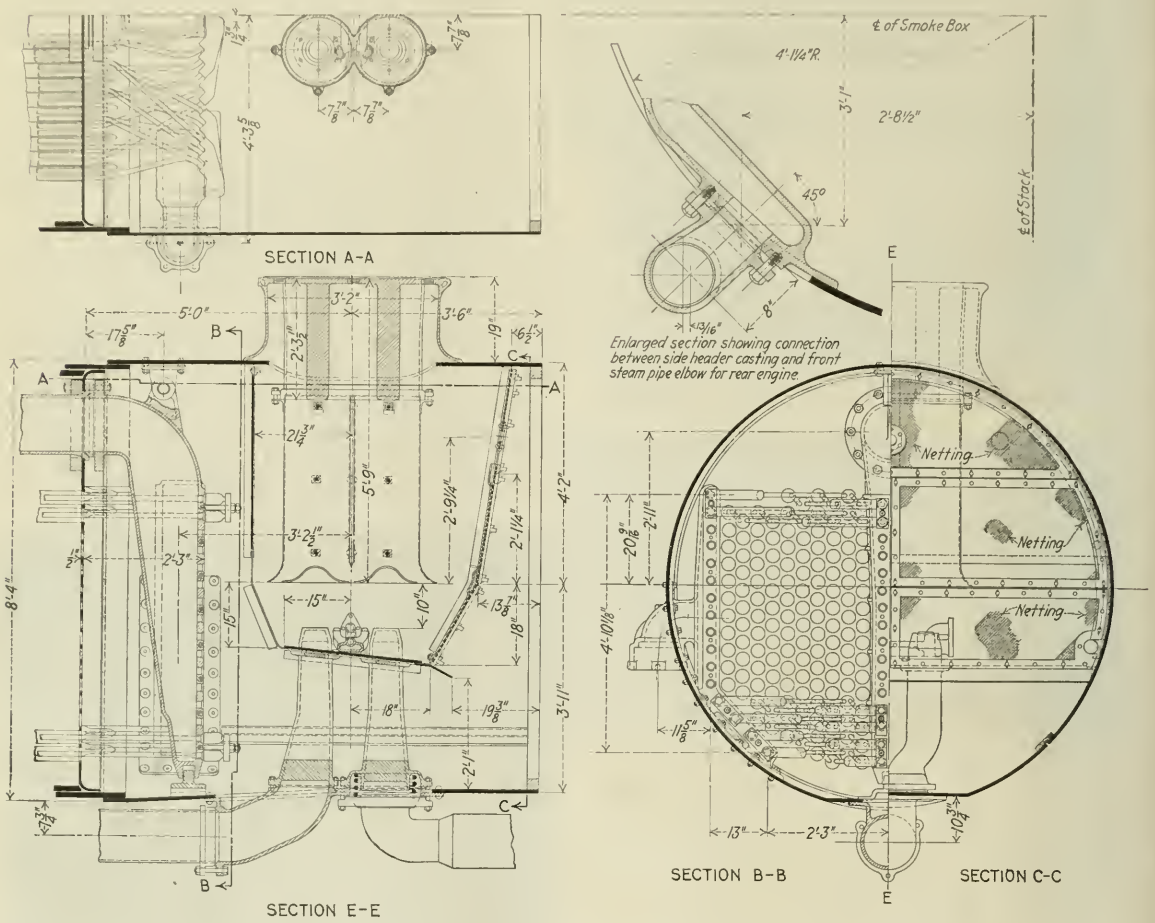
Steam Distribution

Contrary to the usual practice in Mallet locomotive design, this engine is driven by two sets of simple cylinders, a relation between boiler capacity and cylinder power roughly equivalent to that obtaining in compound locomotives being obtained by the use of a 50 per cent

maximum cut-off. This scheme, first tried on the 11s Class Decapod locomotives, was developed in order to eliminate the range of cut-offs in simple cylinders within which the water rate is excessive. As experience has demonstrated that little advantage is obtained by reducing cut-offs below about 25 per cent, it will be evident that at the range of speeds from starting to that corresponding to 25 per cent cut-off, this locomotive works in the most economical range of cut-offs and has a decided advantage in point of steam consumption over a simple locomotive, on which the cut-off varies from 90 to 25 per cent.

With the exception of the 2-in. steam lap employed to limit the maximum cut-off to 50 per cent, the arrangement of the valve gear does not differ essentially from the usual Pennsylvania practice.. The long steam lap necessitates, however, the use of some auxiliary method of admitting steam to the cylinders when the locomotive is standing, in order that it may be started from any position of the crank pins. This condition is met by the use of an auxiliary port opening ⅛ in. wide by 1½ in. long, cut through the valve chamber bushing and opening into a recess cored in the inside edges of each valve chamber steam port. The auxiliary ports are so placed that their steam lap is ¼ in., and they serve merely to permit steam pressure to accumulate in the cylinders sufficiently to move the engine and open the main port. Under running conditions the relation of their size to the main ports and the time element is so small that they have no appreciable effect upon the steam distribution.

The arrangement of the steam pipes is shown in one of the drawings. Two connections lead through the smokebox from each of the superheater steam headers. The lower of these openings terminates in an elbow, a pipe from which leads directly back along the shell of the boiler to an elbow connection with the rear unit steam chest, where a slip joint is provided. The upper connection terminates in a ball joint, from which a short vertical pipe leads down to a ball joint elbow casing; from this casing a pipe leads forward to the front unit valve chamber connection, which is also a ball joint.

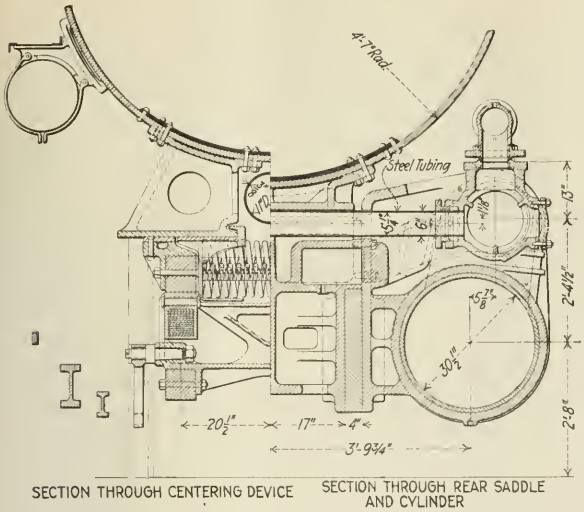


Front End Arrangement of the Pennsylvania Simple Mallet Locomotive

The steam pipes are 6 in. in diameter, and in order to fully utilize the combined opening of the pipes and the superheater elements on both sides of the locomotive, the valve chambers of each unit are connected by a cross pipe 5¼ in. in diameter.

The exhaust pipes for the two units teminate in separate exhaust stands, each of which in turn terminates in a double nozzle. This arrangement is clearly shown on the front end drawing. The openings of the tips are

4½ in. in diameter and the center lines are located at the corners of a square measuring 15½ in. on a side.



The Front Unit Centering Device and a Cross Section Through the Rear Cylinders

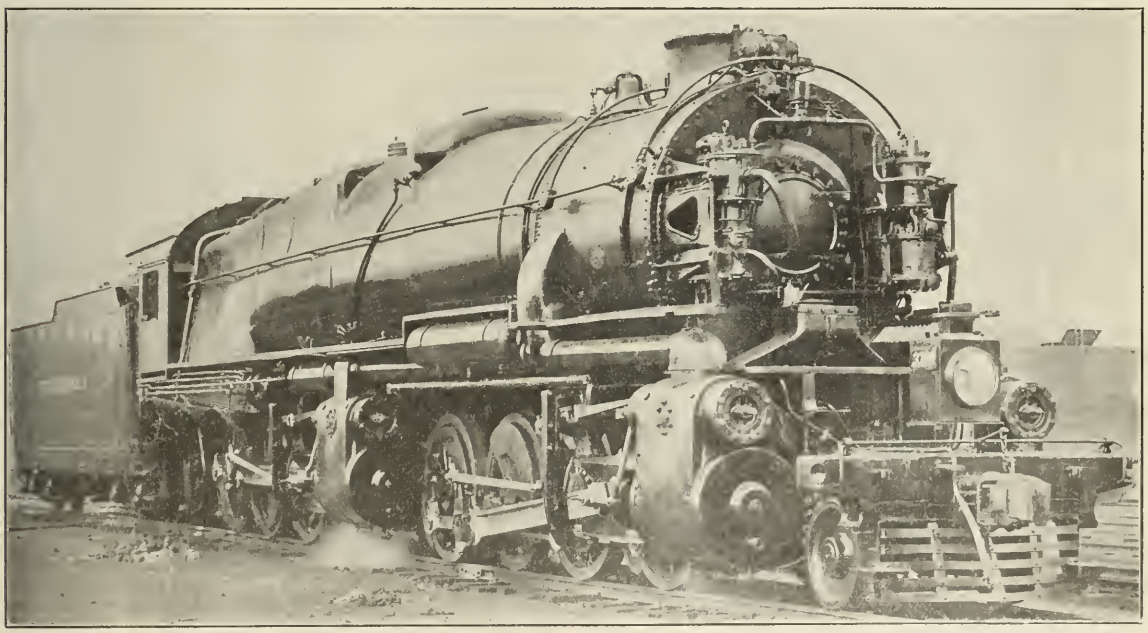
Each tip discharges into a separate stack passage having a minimum diameter of 15 in. The four stacks are cast integral and are contained in a circular shell 3 ft. 2 in. in diameter conforming to usual lines so far as appearance is concerned. The inside stack extends down to the center line of the boiler, 10 in. above the nozzle tips.

Owing to the area of stack passage required for the four simple cylinders, no opportunity was afforded for obtaining a satisfactory ratio of stack diameter to length, with one stack passage. The arrangement described was therefore adopted in order that a more satisfactory ratio of length to diameter might be obtained.

Another interesting feature of this locomotive is the power reverse gear. This is a hydro-pneumatic device, the cylinder of which is made up of two sections, one 16 in., and the other 12 in. in diameter. The cylinder contains a piston of the differential type, the full area of the 16-in. face of which is subjected to liquid pressure. The differential area between the 16-in. and the 12-in. head of the piston is always open to air pressure drawn from the brake system. The outside face of the 12-in. head is not under pressure.

The operation is controlled entirely on the hydraulic side by the admission of liquid to the operating cylinder to move the piston forward and by the release of air pressure from the surface of the liquid supply, carried in a reservoir in the cab, to move the piston backward. The backward movement is caused by the air pressure on the differential area of the piston, which forces the liquid from the cylinder back into the reservoir through a check valve in the control valve. The function of the control valve is to perform these operations only, and it occupies its central, or lap, position at all times except while the piston is actually moving. The position of the gear is shown by a sliding indicator at the side of the control valve. The gear is fitted with a steam connection for use when air is not available.

The purpose in the design of this device was to eliminate the constant tendency of the piston to move against the air cushion in pneumatic gears not provided with a mechanical lock, hence the substitution of an inelastic operating medium for steam or air.



Front End View of the Pennsylvania Simple Mallet Locomotive

The Cylinders and Frames

The cylinders are cast separate from the saddles, and are all interchangeable. Between the cylinders and each

of the saddle connections passes a slab section front frame rail 28-in. deep and 4 in. wide. The front cylinders are lubricated by a two-feed Locomotive Lubricating Company's force feed lubricator and the rear cylinders by a hydrostatic lubricator in the cab.

The articulating joint tongue is cast integral with the rear engine cylinder saddle, and fits between the jaws of the articulating casting bolted between the rear ends of the front engine frames. These jaws are spaced to allow one inch vertical clearance. The tongue is 10-in. deep, bored out to a diameter of 13½ in. to receive the ball joint articulating pin connection.

The centering device for the front engine is shown in one of the illustrations. This consists of a group of three triple coil springs placed between follower castings which seat against the inside faces of the top frame rails. These are cast with flanges which engage the inside of the saddle castings, so that the springs are compressed by the movement of one or the other of the followers as the engine swings out of alignment with the boiler.

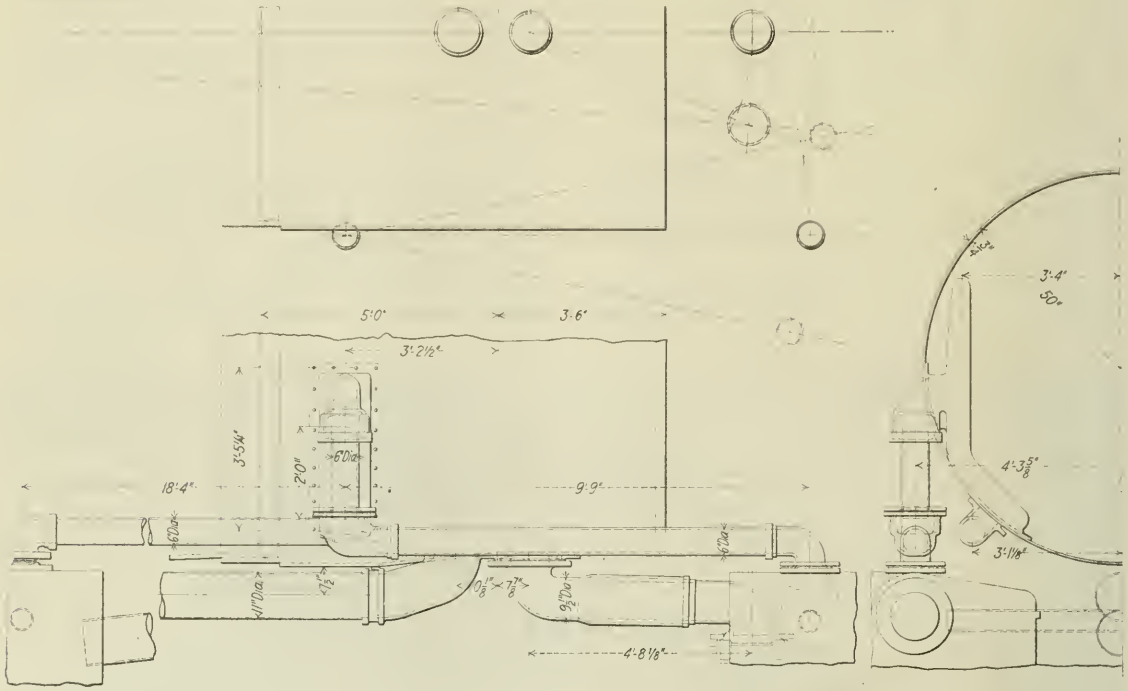
The frames, in detail, are similar in design to those used on the class IIs Decapod locomotives. The top rails are 7½-in. deep and 7 in. wide, the section being thickened on the inside over the pedestals to a width of 9½-in. The lower rails are 6¼-in. thick over the binders and 7-in. thick where the brake hanger brackets and frame braces are attached.

The driving boxes are of straightforward design and are the same as those used on the Decapod locomotives. One point in connection with the design is especially worthy of note. In order to secure a bearing 16-in. long the box has been extended inside the frames so that its center line is one inch inside of the center line of the frames and spring rigging. The eccentricity of journal loading thus effected has shown no undesirable concentration of wear at the outside ends of the boxes or axles on the IIs class, on which it was first tried, and the first of these engines has been in operation, either on the test plant or in road service for more than two years.

The Running Gear

The design of the running gear details is characterized by a high degree of refinement in the distribution of metal to secure the lightest possible weight for allowable maximum stresses. Hollow sections are employed for the axles, crank pins and piston rods, a practice which has become well established on the Pennsylvania, and the main and side rods are of deep I-section with thin webs.

The locomotive is designed to traverse curves with a minimum radius of 400 ft. and has actually been moved around a curve of 395 ft. radius. The tires on two pairs of drivers on each engine are flangeless. On the rear engine these are placed on the second and third pairs. On the front engine they are placed on the second and fourth pairs, thus relieving the tendency to cramp the rear wheels of the front unit and the front wheels of the rear unit in traversing curves.



The Outside Steam Pipe Arrangement

The equalization of the two engines has been arranged to produce in effect a three-point suspension of the locomotive as a whole. On the front unit the equalization of all four drivers is continuous on each side and the two sides are cross-equalized with the engine trucks. The load on the frames of this unit is thus free to distribute itself over three fixed points of support, *i. e.*, the engine truck equalizer, fulcrum under the cylinder saddle and the rear spring hanger connection on each frame. The drivers on each side of the rear unit are also equalized continuously, but are not cross equalized, and so from two separate system, equivalent to two points of support of the locomotive as a whole, while the third point is provided by the front unit.

The Brake Rigging

Instead of dividing the brake rigging into separate systems on each side of the two units with an operating cylinder for each, the wheel base of each unit has been divided transversely into two systems of two pairs of wheels each. The space between the frames is too small to permit the location of the two cylinders side by side, and this arrangement of the brake rigging facilitates placing them at different points on the center line of the engine. On the front engine the cylinders are attached respectively to the frame braces back of the first and third pairs of driving wheels, which gives them practically identical positions in relation to their foundation gears.

On the rear engine the fact that the firebox extends forward over the third pair of drivers made it necessary to place the cylinder for the third and fourth pairs of wheels on the cross brace back of the second drivers. This required the placing of the brake lever fulcrum shaft for the rear half of the engine in front of the second pedestal jaws, from which the pull rods are carried back over the second brake bearer, above which they are broken in a horizontal pin joint and supported by a swing link hanger from the brake hanger bracket.

Two pull rod connections are provided on each cylinder lever fulcrum shaft, which are attached to equalizers, one end of each of which is attached to the forward brake beam and the other to a cross equalizer. From the center of the cross equalizer a pull rod leads to the center of the rear brake beam.

The brakes are operated by the Westinghouse E-T equipment and four 16-in. by 12-in. cylinders. Air is supplied by two 8½-in. cross compound pumps carried on the front end of the smokebox. The location and method of attachment are clearly shown in one of the photographs.

The principal dimensions and data are as follows:

General Data

Gage	4 ft. 8½ in.
Service	Freight
Fuel	Bituminous coal
Tractive effort (estimated)	135,000 lb.
Weight in working order (estimated)	575,000 lb.
Weight on drivers (estimated)	540,000 lb.
Weight on leading truck (estimated)	35,000 lb.
Weight of engine and tender in working order (estimated)	794,000 lb.
Wheel base, driving	17 ft. 1½ in.
Wheel base, total	54 ft. 8½ in.
Wheel base, engine and tender	97 ft. 3¼ in.

Ratios

Weight on drivers ÷ tractive effort	4.0
Total weight ÷ tractive effort	4.3
Tractive effort × diam. drivers ÷ equivalent heating surface*	736.81
Equivalent heating surface* ÷ grate area	101.41
Firebox heating surface ÷ equivalent heating surface,* per cent	4 7
Weight on drivers ÷ equivalent heating surface*	47.5
Total weight ÷ equivalent heating surface*	50.6
Volume equivalent cylinders with 90 per cent maximum cut-off	43.6 cu ft.
Equivalent heating surface* ÷ vol. cylinders	260 0
Grate area ÷ vol. cylinders	2.6

Cylinders

Kind	Simple (two sets)
Diameter and stroke	30½ in.by 32 in.

Valves

Kind	Piston
Diameter	12 in.
Greatest travel	6 in.
Outside lap	2 in.
Inside lap	¼ in.
Maximum cut-off	50 per cent

Wheels

Driving, diameter over tires	62 in.
Driving journals, main, diameter and length	12 in. by 16 in.
Driving journals, others, diameter and length	11 in. by 16 in.
Engine truck wheels, diameter	33 in.
Engine truck, journals	6½ in. by 12 in.

Boiler

Style	Belpaire
Working pressure	205 lb. per sq. in.
Outside diameter of first ring	96 in.
Firebox, length and width	168 in. by 96 in.
Firebox plates, thickness tube and combustion chamber connection, ½ in.; door, ⅜ in.; others, ⅜ in.	
Firebox, water space	5 in.
Tubes, number and outside diameter	137—2¼ in.
Flues, number and outside diameter	284—3¼ in.
Tubes and flues, length	19 ft.
Heating surface, tubes and flues	6,125 sq. ft.
Heating surface, firebox	531 sq. ft.
Heating surface, total	6,656 sq. ft.
Superheater heating surface	3,136 sq. ft.
Equivalent heating surface*	11,360 sq. ft.
Grate area	112 sq. ft.

Tender

Frame	Rolled and cast steel
Weight	219,000 lb.
Wheels, diameter	33 in.
Journals, diameter and length	6½ in. by 12 in.
Water capacity	13,000 gal.
Coal capacity	14 tons

* Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

Registration, American Railroad Association, Sec. III, Mechanical

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Barr, L. S., S. C. D., Live Poultry Transit Co., Strand.
Billau, L. S., Asst. Elec. Eng., B. & O.
Brady, C., E. C. C., Canadian Pacific, Fredonia.
Brangs, P. H., Dennis.
Burel, W. C., D. M. M., B. & O., Monticello.
Byers, R. F., Duffington.

Carson, G. E., D. M. C. B., N. Y. C., Dennis.
Clark, J. H., Supt. Float Equip., B. & O., Traymore.
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Diehr, C. P., M. M., N. Y. C., Fredonia.
Haddon Hall.
Dillon, S. J., M. M., Penn.
Dobson, F. L., M. M., Penn. Haddon Hall.
Doty, D. M., Inspr. Ord. U. S. N., American Road Machine Co., Strand.

Ennis, J. B., V. P., American Loco. Co., Traymore.

Gordan, H. D., Marlborough.
Graff, F. M., S. A. M. D., Erie, Shelburne.
Graham, Chas., Jr., Pennhurst.

Hainen, J., Staff Officer Mech., Southern, Dennis.
Hankins, F. W., M. M., Penn. E. L., Cheltenham.
Harris, H. Y., M. M., Tampa Northern, Westminster.
Hice, Geo. T., M. M., Morgantown & Kingwood, Monticello.
Hogan, C. H., A. S. H. P., N. Y. C. & H. R., Marlborough.

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Kight, H. R., M. M., Western Maryland, Monticello.

Lovell, Alfred, Traymore.

McDonough, John, M M., Santa Fe, Francis.
MacBrain, D. R., S. M. P., N. Y. C., Marlborough.
Marriott, F. I., C. D., C. & O., Alamac.
Maxfield, H. H., Works Mgr., Penn., Chalfonte.
Mellin, C. J., American Locomotive Co., Traymore.
Murray, F. H., Insp. Mech. Maint., Erie, Alamac.
Muchnic, C. M., American Locomotive Co.

Nanney, T. H., M. M., B. & S., Chalfonte.
Nelson, C. J., Genl. Car Insp., C. & N. W., Chalfonte.

Page, Charles N., M. M., Lehigh, Arlington.
Pidock, C. W., Pres., Georgia Northern, Chalfonte.
Porcher, Samuel, P. A., Penn.
Purcell, John, Asst. to V. P., Santa Fe, Shelburne.

Ream, A. H., M. M., Pitts. & Shawmut.
Redding, D. J., M. P. & L. E., Traymore.
Rhuark, F. W., M. M., B. & O., Pennhurst.
Riegel, S. S., M. E., D. L. & W, Runnymede

Schlafge, Wm., C. M. S., Erie, Shelburne.
Schmoll, G. A., S. M. P., B. & O., Marlborough
Smith, J. A., Middletown & Unionville.
Strauss, M. H., M. M., N. Y. C., Holmhurst.
Sweeley, E. A., M. C. B., Ry. Bd. of Adjustment, Lexington.

Trumbull, A. G., Asst. to C. M. S., Erie, Traymore.

Vaughan, H. H., Dominion Bridge Co., Marlborough.

Zeleny, Frank, Engr. Tests, C. B. & Q., Traymore.

Addresses by Distinguished Convention Visitors

Assistant Secretary of Navy Roosevelt, Senator Edge and Col. Hodge Tell of American Achievements in War

Addresses by Assistant Secretary of the Navy, Franklin D. Roosevelt, United States Senator W. E. Edge, of New Jersey, and Col. Henry W. Hodge, of the American Expeditionary Forces, were delivered to a large crowd of interested convention visitors on the Pier on Saturday night.

Secretary of the Navy Daniels had promised to come, but was prevented by important duties, and Assistant Secretary Roosevelt consented to come in his place. Senator Edge, who was governing New Jersey during most of the time the country was at war, lives in Atlantic City. Colonel Hodge was connected with the engineering work of the American army in France, and for a time was in the transportation department under General Atterbury.

Arrangements for the meeting were made by the Entertainment Committee of the Railway Supply Manufacturers' Association, and E. H. Walker, president of the association, presided and introduced the speakers.

In opening the meeting, Chairman Walker said: It is three years since we have met in convention, and during that time we have seen a world remade. We have seen nations regenerated into serious, glorious manhood. We have seen this nation changed from indifference into passionate devotion. We have seen cynicism changed to patriotism; luxurious self-indulgence transformed into a fine abnegation; individual character exalted by a common cause.

When this nation decided that it could no longer be neutral between right and wrong, and there was a call to arms, two hundred thousand men went from the railroad ranks into the uniformed ranks, and as many more from the railway supply manufacturers' mills, foundries and desks.

To these men we meet to do honor; but not only to them, but you also, who served in civilian clothes, and in dungarees back of the lines, because this war was not won alone by burnt powder and shot and shell.

Address of Hon. Franklin D. Roosevelt

Secretary Roosevelt said, in part:

Unfortunately, from the point of view of a good many people in the naval service, the primary purpose for which a navy had been thought to be created, of going out and fighting an enemy, was defeated because no enemy would come out to fight us. And so our task fell to fighting an invisible enemy. Our task fell along the same lines as your tasks fell—to throw ourselves heart and soul into the great game of winning the war where the enemy was; that is to say, on the soil of Belgium and France and Italy.

We, with you, were merely one link in that great chain that brought about the ultimate victory, because that chain started in the factory town in this country. It started on the farm, and the first link in the chain of transportation was composed partly of the material which existed, of the steel rails, the locomotives and the cars; but it existed far more in the personnel that made possible the operation of those material things. It was through the co-operation of the individual, not so much of a few people at the top in the railroads, in the Navy, and over in France, but in the individuals who made up the great mass of the servants of the Nation; who made the locomotives run, and the car wheels go round; who made the ships cross the ocean, and who protected them across the ocean; who took the supplies and the troops off in France, and then another railroad organization took them up to the fighting front. That was the chain that made it possible for the men in the trenches to do their part.

I think it is fair to say that in handling the work of the supply department of the Navy we earned the good will of the men that we did business with, because we met them, or at least tried to meet them, on the level. The first principle which I presented two months before the outbreak of the war was this: We were going to increase the purchases for the Navy Department many hundredfold, and I saw signs at that time of other branches of the government trying to go out and do something new with new tools. And I said "No." In the purchase of our spplies, I believed it to be the right principle that we should take the men who know about supplies to assist us, and go to them first. In other words, we did not try to ask watchmakers to give us 14-inch shells; neither did we ask people who turn out armor plate to make chronometers for us.

So far as possible, the Navy tried to develop existing plants. That system proved its wisdom, and the result is that, so far as I know, the Navy happens to be one of the few departments of the government that is not under serious investigation at the present time I think the country, as time goes on, will begin to recognize the magnificent spirit of service of the quarter million of men who went into the uniform from the railroads, and probably an equal number of men who went into the uniform from the railway supply organizations all over the country—a total of probably half a million men, who were trained in the work that you have been trained in. That half million men, plus the Navy, were responsible for getting the munitions and supplies to the troops from away back home, up, yes, to the Rhine. We appreciate it in Washington. I do not need to tell you that.

Address of Senator Walter E. Edge

Senator Edge said in part: I think it is a magnificent tribute for you men and women to come to this hall tonight and spend an hour in consideration of those who have been associated with you in business, who offered their services to their country in the time of war. We could not all go abroad. We should not have all gone abroad. There were many responsibilities here, and it was a wonderful inspiration to see the way the men and women of New Jersey—and that simply typifies the sentiment of every State in the Union—met the obligation, and the way they were ready and determined to do their full part as members of the home army.

We must appreciate right now that we are facing the greatest problems this country has ever faced; problems that must be solved by sound, careful and mature judgment, and without sensation or too much visionary thought, and adherence to too many ideals in trying to reach the solution of these problems. I do not propose to discuss any of these problems, particularly the position of our country in the League of Nations. I do not want America to evade any responsibility. As we all know, she was a very potent factor in winning the war, but at the same time we must not evade any responsibilities in endeavoring to maintain the position she so dearly bought.

But with all that, I feel that this country can be stronger and better able to meet this great new and broadened responsibility, now that we occupy practically a position at the head of the council table of all the nations of the world. Under these circumstances, we can be stronger and better equipped to meet and help solve these problems by maintaining, at least, the sovereignty that has made us great, and although I want to see this country do its full part in any League of Nations or any other combination of nations, which will help to maintain peace, yet I do not want to see her as a minority stockholder in any international corporation.

We must forget everything but the duty we owe to protect the Flag, and back up the four million boys who went into the service, and now that we are trying to solve the problems before us, I propose to stand for the principles which actuated us in our part in the war, in order that the sacrifices we have made will not be in vain.

We have decided in the Commerce Committee, of which I am a member, that we will spend $25,000,000, in



Senator Walter E. Edge

order that we may build a merchant marine, and some of us are trying to decide what we are going to do with it after it is built. I want to see a splendid merchant marine, carrying the American flag on all the seven seas. I want to see the men now employed in shipyards continue in that industry, and do not want to scrap the terribly costly equipment put in during war times on the Atlantic Coast.

But I want to go a little further, and find out if we are to be paid by the European countries for the manufactured products, the engines and tenders and machinery which we sent to France, and also to other countries. We can get the merchant marine readily, and we can get orders by the thousands, but we cannot get paid for them under present conditions. I want this country to prepare now, in times of peace, as in times of war, so that we can finance our credits and buy securities abroad, and bring them back here, and use their credit against our credit, so that they can pay us for the commodities and products that we send abroad. We desire that the government will co-operate and back your business with the credit of the country in a way that will enable you to push your business ahead, with the understanding that the government will back you in securing your payment for the business which you secure abroad.

There is a great difference between the government running your business and the government giving you the moral and financial backing—and with the backing



Colonel Henry W. Hodge

of the American government, with its almost inexhaustible resources, we can go ahead and expand our business in all parts of the world, and that is the basis on which some of us are working.

Address of Colonel Henry W. Hodge

[Chairman Walker, in introducing Colonel Hodge, said: The transportation department of the American Expeditionary Force achieved marvels. Many things which the French and British war chiefs claimed were impossible were accomplished sometimes so easily as to intimate magic. Colonel Hodge was in France even before General Atterbury, and was with the General after he arrived. He was then made the Manager of Roads, and finally Assistant Chief Engineer of the American Expeditionary Force in France; he traveled over 28,000 miles in his automobile, back and forth, from Dunkirk to the border of Switzerland, and up and down the Coast, with all of what that means to the observant man, with the trained eye. He is going to tell up some of the things our boys did over there, and some of the things he helped do himself.]

I do not think that we have a true perspective of what has been going on in France—we do not know the size of the job. We all know we had two million men in France, and we thought that the most of these two million men were in the front line trenches. They were not. There were never more than 435,000 men at the front, out of two million men, and that is about the usual percentage in any army; in other words, in the Army you have four men back of the lines supporting every man in the line. But do not think that the rest of them, the one million six hundred thousand, were not fighting—they

were fighting, by doing work that the men in the front lines could not do.

At one time we had over 100,000 men doing engineering work, building railroads, docks, telegraph and telephone systems, building the biggest storage yard the world has ever known, building locomotive roundhouses, automobiles, refrigerator plants—the latter, the biggest on the face of the earth—and all these things being provided for the maintenance of our two million men whom we had in France, and we did the work pretty well.

We had the greatest transportation problem the world has ever faced. Our Allies did not have any problem such as we had. The British occupied the ports of Havre and Calais, and the average haul from England to their front lines was about 75 miles. The French had their supplies immediately behind the lines all the time; they had their shops and all their equipment behind their lines, and their haul was not more than 35 or 40 miles. We had to haul our stuff half way across the United States and 3,000 miles across the sea, and land it in France; and perhaps you think when it was landed in France all our fellows had to do was to fall on it and eat it. No, it was not as easy as that. We then had 600 miles to transport it, and we did transport it that distance.

When we got in France, we Americans were as green as green could be about the transportation problem. We did not know how much material we had to transport. They sent several of us up to the British and French headquarters to find out what heir transportation problem was, and we discovered that the British were hauling 50 lb. per man per day and the French were hauling 47 lb. per man per day. That means everything, food, munitions, equipment, fodder, and everything else that is required by an army. That does not seem much to you, perhaps, but when the Armistice was signed we were handling 53,000 tons of freight every day from our own ships. We were unloading every day 20 ocean steamships—literally every day, weekdays, Saturdays, Sundays and holidays.

Our great problem when we arived in France was to find out how we were going to do that. When we got there the British were occupying the two main ports on the Channel. They really had possession of all the available ports, and when we asked the French and British if there were any of the ports that we could use, they did not seem to be able to give us any reliable information.

Building a Port

The first thing we did was in August, 1917, when there was no American Army in France. That was to select a site for our first port. We picked out the port at Bassens, near Bordeaux, and when I was there for the first time, in August, 1917, it was a slimy mud bank, with a large swamp behind it. We took it as the best place where we could build a port because we had deep water up to the very front of the location, a good piling bottom. We found we had nothing to start with, and we asked General Pershing if we could borrow material from the French, and he said: 'We came to help the French, and not have the French help us. You must get your materials elsewhere." We cabled to the United States, and we got big lumber from Oregon and Florida, and we got pile drivers and cranes from the United States, and we got generators to generate electricity to run the trains, and American operators to operate the trains and we started in with about 13,000 men. Inside of 10 months we turned a swamp into docks for 10 ocean-going ships, and handled 25 tons of freight per day every day.

Then we started on other ports, and after we got these ports, we had to take care of the stuff that came in. You may think we had a supply of common labor in France. I went across on a ship with two engineering regiments, and on the way over these 5,000 men were constantly talking about the men who were to do the labor on the job they were going to be the brains for. One of the officers said: "Is there much labor in France?" My reply was: "Not that I know of, but there are 5,000 good laborers aboard this ship." He replied, "We are not expected to do the labor, we are the brains of this organization, and someone else is going to do the labor."

The first job I was assigned to was at Bassenes. As I came across the swamp I saw the Colonel of the regiment, and the 2,500 men stretched out in a line, hip deep in mud, shoveling up the mud on to the bank; he waved his hand to the long, hard-working set of men and said—"behold the fate of a college graduate." As we got further down the line he stopped opposite a nice-looking boy, perhaps 20 or 24 years old. He said, "You see that boy with the long handled shovel—his father is one of the richest men in San Francisco. He wanted a commission and could have had it, but he did not wait for it, and joined as a private." He then said to the boy, "Walter, how is it?" The boy wiped the perspiration off from his forehead and said, "Colonel, I passed three examinations to get this job."

Building Yards the Next Step

That was the class of laboring people our railroads had there. After we got through the building of the railroads, we went to build yards. We had freight coming in at the rate of 50,000 tons a day, and we had to build yards to accommodate that freight. We laid out our first yard in the center of France, 8 miles long and 4 miles wide, and we had 125 miles of ladder tracks, and between the ladder tracks we had warehouses. The General came to me in August, 1918, and said, "Hodge, can you write a cablegram to be sent to the United States, describing the character of storehouses that you will require?"

I then wrote the following: "We want storehouses fifty feet wide, 11 feet high, at the eaves, built of wood or iron frame. Length immediate required 25 miles." That was the cablegram for the first order of warehouses, and we got it. That is the style we went into. We did it on grand scales.

When we first took that yard drawing up to the Army headquarters, they said, "We never would think of using a yard like that. We don't need it. We are here to fight a war, not build warehouses." But before the armistice was signed, we had six yards like that.

After we got the yards built, we had to commence building roads, to get stuff up to the front. Perhaps you might think we could take our stuff up to the front on railroads. We could not. We took it up to within about 15 or 16 miles of the front, then we took it the rest of the way by motor trucks, and the War Department says we had 16,000 trucks. Perhaps that is so. We did, but we didn't think so, we never saw them. They were great roads, not roads like the ordinary country roads. They were 80 feet wide and had rock on them three or four feet deep, because we had to get a good bottom in that muddy country; and we re-surfaced them all the time, the motor trucks wearing about 3½ in. of rock off every month. We had to employ about 36,000 men in keeping those roads in order, but that was not enough, we could not keep the roads up.

Well, our road work commenced in the Chateau Thierry drive. We were told this drive was coming and were told to carry rock, a total of 40 or 50 thousand tons, to build roads. That doesn't seem much to you because you could go to the telephone any day in our big

cities and call up a few quarries and they would furnish you all you wanted, but you must remember that in France we had nobody to telephone to, and if we needed the rock we had to dig it out and crush it and carry it ourselves.

So we opened 42 quarries, one up on top of a hill up on the Marne. It was 240 feet above where the trench was; it had never been opened. "It was good stone," the French said, "but rather expensive to get it down." And they did not think we could do it; they stood in open-eyed wonder when we hauled two big 45-ton Marion steam shovels up the hill, for we hauled them with beef, man-power, and block and tackles. Then we did not have any ordinary drills, we had only 8 in. well drills, so we drilled holes and loaded them with TNT and ordered the men off into the next county until we fired, and what did not land in the next county we picked up. There was six or eight thousand tons after we fired those shots. Then we tumbled it into the crushers on top of the hill and brought it down to our cars at the bottom of the hill, and within five days after we started that work we were getting five or six hundreds tons a day, and there wasn't another quarry in France getting fifty tons out.

The Bridge Work

Just one thing as to the bridge work we did. The bridges were generally very simple, but most of the work in the Argonne fight was pontoon work, and we didn't have an American pontoon over there.

We Americans did wonders. You people at home did wonders. You sent us all the ammunition and clothing and many other things, but you don't want to ever accept as true the statement that an eminent late statesmen used to make that a million men could rise to arms over night. A million men could rise to arms, but they are not an army, they are not equipped with lots of the things we need, but could not make in time for use in this war.

To begin with, we did not have any artillery in France. I was taken up by one of the Army officers in that statement. He sent me a list of 57 guns we had. Well, what is 57 guns? We did not have any aeroplanes to speak of. We had a lot being assembled but they were not on the front. The gas masks and helmets we fought with were almost entirely British, and so also were a lot of supplies. We had to get hem from our Allies, and they furnished them to us.

Among other things we did not have any pontoon boats; we had to cross the rivers, and the Chief Engineer said: "Now, you are in charge of the bridges. It is up to you to know where things are and to get them." And I did get them, because I found out the Germans had come to the Marne with the greatest pontoon equipment the world has ever seen. They had come with 183 boats, better than the U. S. Army had ever seen.

Somebody said, how do you know they had 183 boats. I know it, because after they had been shelled for three weeks, they had the experience and we had the boats and we needed them. We took a gang of men up along the Marne and pulled those boats out of the bottom of the Marne mostly, filled with dead Boche and holes. We did not care about the dead Boche, but we did worry about the holes. And we had some trouble patching up those holes and making timber structures, but we got them fixed up, made them sound, and used them to chase the Germans in their own boats. And when we got one of the bridges up I saw some of the boys were very busy at a certain spot, near the end of the bridge. I went and looked to see what they were doing, and found they were placing a sign, and it said: "Made in Germany but erected by the U. S. Engineers."

If anybody asks you who won the war, and there is any question about it, it was not General Pershing; it was not the general staff; and not the officers; it was nobody in the world but those same dead boys in olive drab that won the war. And it was a job well done. But we don't want to give way to the feeling that we did it all. We want to be a little bit careful not to give way to the American feeling that we are the whole thing.

When we look carefully at the war, we, the Americans, only fought two campaigns. We fought the Chateau Thierry campaign from Soissons to Rheims, which is a distance of 27 miles, and took us two months. Then we moved to Argonne and we fought from Verdun to Vincennes, a distance of 50 miles, and it took us two months. Therefore, we were fighting on a front of eighty miles, for a total of four months, and our total losses were about 80,000 killed, and total casualties 300,000 men. That is a lot of good American boys, and we are sorry they are lost, but when we compare that with our allies, who fought 4½ years, on a front of 450 miles, and had total casualties of nearly 7 million men—then you can't look them square in the eye and say we did it all.

The meeting was preceded by a dinner given by President Walker, of the Supply Manufacturers' Association, at the Shelburne, in honor of the visitors. Those present were Mr. Walker, Assistant Secretary Roosevelt, Ralph Coburn, who was a college classmate of Mr. Roosevelt; Senator Edge, Colonel Hodge, C. E. Chambers, W. J. Tollerton, E. Hoover, E. H. Bankard, J. E. Fairbanks and Samuel O. Dunn.

The Army Ordnance Exhibit

THROUGH THE COURTESY OF THE ORDNANCE DEPARTMENT of the United States Army, the American Car & Foundry Company has a group of three ordnance exhibits, one of which is on the pier and the others outside. The outside exhibit consists of four heavy artillery pieces on railway mounts and an ammunition car, which are on the Mississippi Avenue tracks, and an exhibit of field artillery trucks and artillery repair trucks, which are parked near the Boardwalk, just north of the Marlborough-Blenheim. An exhibit of shells is located on the pier.

The four heavy artillery pieces in the track exhibit are a 14-in. rifle, a 7-in. rifle, a 12-in. mortar and an 8-in. rifle. The 14-in. rifle is mounted on a heavy built-up frame of deep girder section, which is carried on two eight-wheel trucks. This rifle can be elevated to any angle up to 45 deg., and has a full traverse of 360 degs., with a range of 20 miles. The mount, ready for service with the gun in position, has a total weight of 436,700 lb. The eight-wheel trucks are completely equalized on each side with semi-elliptic springs over each journal box. The axles have 6-in. by 11-in. M. C. B. journals. The truck frames extend out beyond the ends of the gun mount, and are of such a height that the coupler and draft gear are mounted on the ends of the frames.

This mount is essentially for coast defense work, although its mobility makes it available for use in the field. The gun is not traversed when on the trucks. A base ring with a conical roller path is carried on a separate car, and is set on a foundation in the ground when the gun it to be put into action. The car is run over this ring with the center of the car over the center of the ring. The mount is then jacked up, the trucks removed, and the mount let down on the base ring. The gun may also be fired from the trucks, but at a reduced elevation of 22 deg. This mount is the only one of its type which has so far been built.

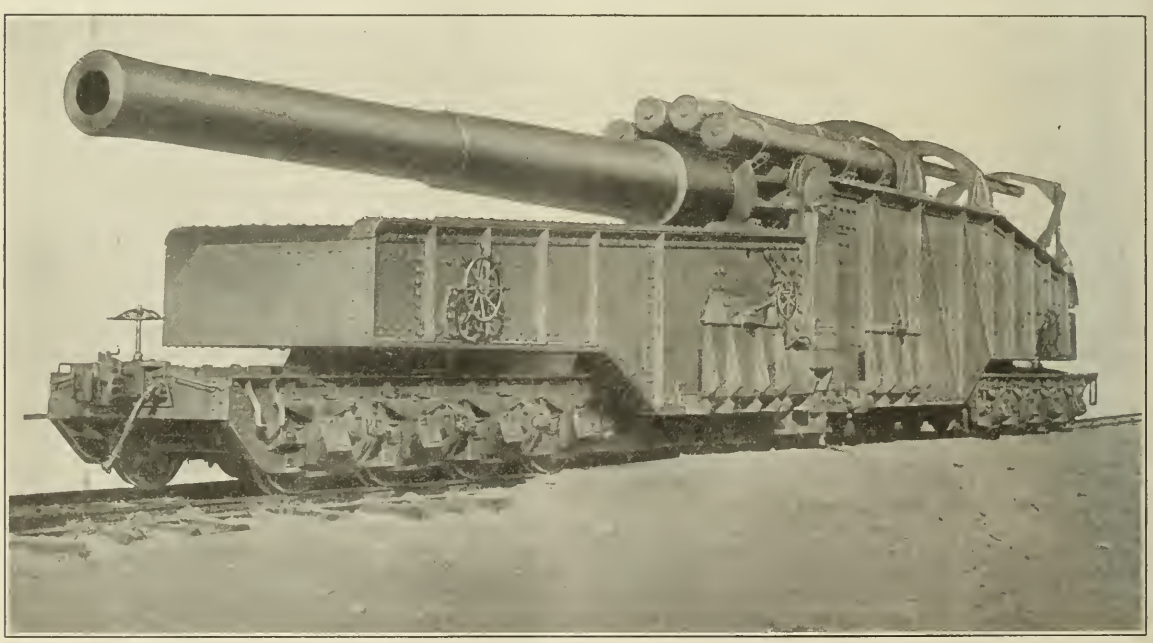
The seven and eight-inch rifles and the 12-in. mortar are all carried on mounts of the well type, and the two rifle cars are carried on trucks of standard railway type. The rifles are both mounted on barbette carriages, having a full circular traverse. The 7-in. rifle has a range of elevations from minus five to plus fifteen degrees, and the unit complete weighs 160,000 lb. at the rail. It is carried on standard 50-ton trucks. These outfits were designed for coast defense purposes and were used as protection against submarines. The 8-in. rifle has a range of elevations from horizontal to 42 deg. and weighs 174,000 lb. on the truck. The trucks of the 8-in. rifle are the standard 70-ton truck.

In one of the illustrations is shown the method of bracing the car when the gun is in service. To place the piece in action the mount is freed from the trucks by means of jacks which form an integral part of the car body, are are lowered by means of these jacks to rest on crossties placed on the rails. Outriggers, pivoted to the car body and carried against the side of the car when not in use, are swung and braced against suitable foundations, arranged as the angle of traverse requires. It is said that a trained crew can place these pieces in action in about 20 minutes.

The 12-in. mortar mounts are carried on six-wheel trucks, fully equalized, the frames of which are of



Railway Mount with 7 Inch Army Rifle



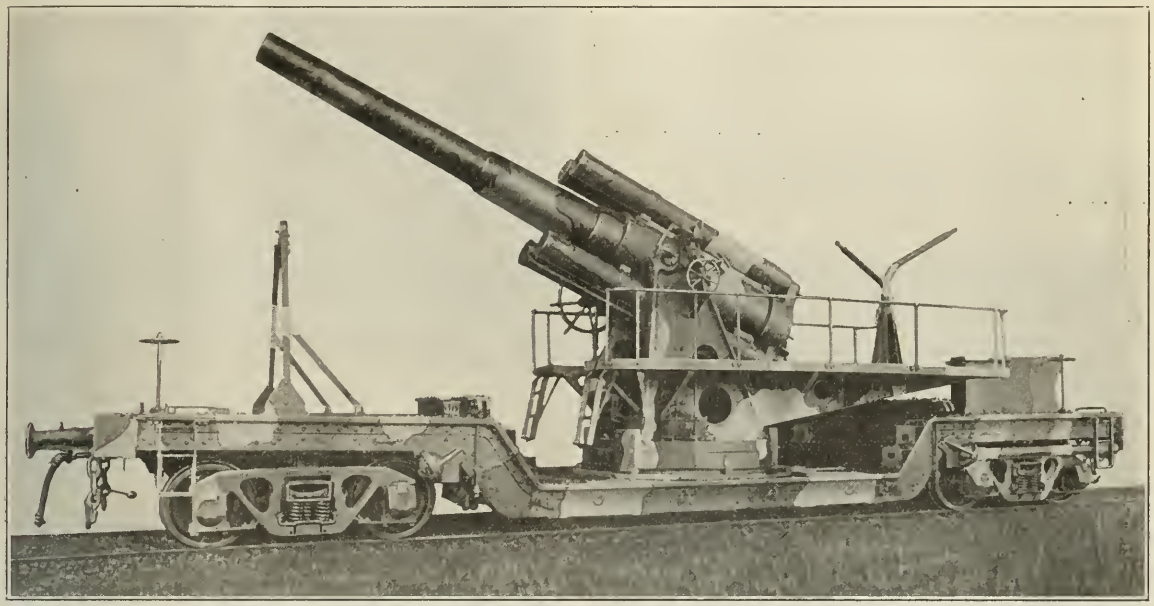
Railway Mount with 14 Inch Army Rifle for Seacoast Defense

special built-up construction. The mortars have a complete circular traverse and a maximum elevation of 65 deg. The mount with the gun ready for service has a total weight of 180,000 lb. This is essentially a field piece and is intended principally for destroying deep underground fortifications.

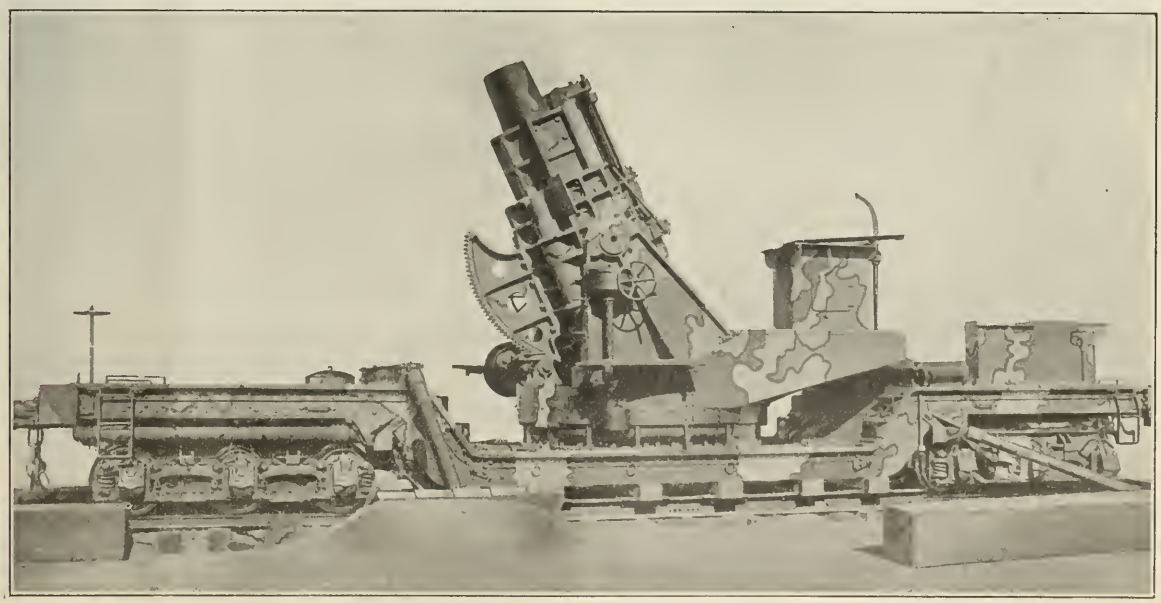
The 8-in. rifle and the 12-in. mortar mounts are equipped with the French type of screw coupling and buffers.

The armored ammunition car is designed for railway artillery equipment and has a capacity of 66,000 lb. In the design of the body and the underframe structure, this car follows closely the box cars built by the American Car & Foundry Company for the French Government. The interior is equipped with ammunition racks and a longitudinal trolley hoist. Doors in the end of the car permit the hoist beams to be extended outside the car for the purpose of serving ammunition to the gun.

The field artillery exhibit includes a caisson limber and carriage limber for a 77-mm. field piece, a powder and store wagon, forge and store limbers, a 4.7-in. gun and gun caisson, and a 75-mm. field gun and tractor. A number of artillery repair trucks are also included in the exhibit. With the exception of the 75-mm. field gun and tractor, these units were all built by the American Car & Foundry Company.



Railway Mount with 8 Inch Army Rifle in Position Ready for Firing



Railway Mount with 12 Inch Seacoast Type Mortar

Conventionalities

J. R. Sloan, chairman of the committee on train lighting and equipment, says that Altoona, Pa., is no place for white serge.

Among the workers in the supply ranks the belief is growing that E. A. Le Beau, of "Creco," is very properly named Earnest.

R. J. Fisher, traveling salesman for the Bass Foundry & Machine Company, received the congratulations of his friends Friday upon the seventieth anniversary of his birth.

Many will know what we mean when we say that it is understood that Clark Moore, vice-president of the Safety Car Heating & Lighting Company, is writing several volumes, entitled "Life on the Pacific Coast."

Friends of W. A. Hall will be interested to learn that he left Yale & Towne to enter the navy in March, 1917. He was only recently released from service and has joined the Cleveland Tractor Company's organization as manager of industrial sales, at Cleveland, Ohio.



H. S. Fentress, Gen. Car Insp., Norfolk & Southern.

W. M. Lalor, president of the W. M. Lalor Company, Chicago, is attending the conventions this year as railway sales representative of the Zapon Leather Cloth Company. This is Mr. Lalor's sixteenth convention, he having been connected with the electric car lighting interests for a number of years.

The Editor found this memorandum on his desk a few minutes after the dailies were delivered on Saturday morning: "My name is Harry D. Vought and not Harry D. Wright, as reported in the account of the Railway Club Secretary's meeting in Saturday's *Age*. Bang that proofreader!"

To the list of members and guests who have taken trips in aeroplanes over Atlantic City during the conventions may be added the names of Mr. and Mrs. Harry Vissering and James A. MacLean. Latest report says that President Jackson, of the Chicago Pneumatic Tool Company, is to take, or has already taken, a "flyer" in the latest sport.

Many railroad and supply men are expressing their feeling in the loss by death of Secretary Joseph W. Taylor, of the M. C. B. and M. M. Associations. The passing away of Mr. Taylor, suddenly and unexpectedly, in the midst of his activities meant a loss which time will hardly repay.



L. C. Fitzgerald, Shop Supt., Erie; G. N. Waddy, General Car Foreman, Erie Lines West

E. R. Viberg, mechanical engineer of the Canadian Car & Foundry Company, Montreal, missed the 916 convention because of being sent to France in connection with war supplies. He was at one time located at Camp Audrie, to assist in the erection of Belgian cars, and while there heard the incessant booming of artillery.



J. P. Yergy, General Foreman, West Philadelphia Shops, P. R. R.; H .J. Yergy, General Car Inspector, Northwest System, P. R. R., and Mrs. J. P. Yergy.

Never before have there been so many new faces seen at the convention. T. A. Foque, mechanical superintendent of the Minneapolis, St. Paul & Sault Ste. Marie, is attending his first convention. When one looks back at the remarkable work that he did as secretary and later as president of the old Northwest Railway Club, it is hard to believe that he could have kept away from the Atlantic City conventions as long as he did.

The limit of space on the pier worked severe hardship upon one firm which shipped a carload of material here but were unable to get space. The Computing-Tabulating-Recording Company, of New York, would have made a most interesting display of machines used by the accounting departments and illus-

trative of the advantages their use may give in tabulating details in the mechanical department records. Harry S. Evans is representing the company here.

Captain R. de Heidenstam, of the Gas Accumulator Company, Stockholm, Sweden, has recently arrived in this country and is attending the convention. His company represents the Dalen patents, covering gas lighting of railway signals, grade crossings, buoys, etc., and he is in this country studying American conditions. Captain de Heidenstam expects to remain another two months and is making his headquarters at the offices of the American Gas Accumulator Company, Elizabeth, N. J. The captain expects that a very large portion of supplies of all kinds bought from Germany or through German export houses prior to the war, will in the future be ordered from the United States and England.



J. T. Mallard, Master Mechanic, Norfolk Southern.

Frank W. Edmunds, of the Schroeder Headlight family, had to return home last Friday to function as president of the School Board at West Nyack, N. Y., at the graduating exercises. Mr. Edmunds has taken a personal interest in educational matters in his neighborhood and has been responsible for many school improvements. During his absence, his co-workers have hung his "convention service" flag in the Schroeder booth, on which are thirty-seven stars and the following words: "The old war horse, 'Pop' Edmunds. Convention service flag record—a star for each year, count them—still going strong." Mr. Edmonds returned yesterday.

Alas and alack! There will be no golf tournament this year. Many will be disappointed. Have you heard

THE GOLFER'S PRAYER

O Lord, I pray Thee for a drive
Of such a length that I,
In telling of it afterward,
Shall have no cause to lie.

And this will amuse some of us:

There was an old duffer who stood
For a slice, as he aimed at a wood;
But by some twist or crook
He came through with a hook,
And the little pill left him for good.



Left to Right: George Thomson, Master Car Builder, N. Y. C.; I. W. Senger, Master Car Builder; N. Y. C.; E. H. Trottnow, Assistant General Foreman, N. Y. C.

The Fuel Conservation Section of the Railroad Administration is represented at the convention by three regional fuel supervisors, all of whom have been presidents of the Traveling Engineers' Association or the International Railway Fuel Association. They are: F. P. Roesch, of the Northwestern region; L. R. Pyle, of the Central Western region, and B. J. Feney, of the Southern region.



Left to Right: H. F. Grewe, Master Mechanic, P. W. & B.; C. B. Keiser, S. M. P., P. R. R.; O. S. Jackson, S. M. P., C. T. H. & S. E.; C. Bowerson, M. M., Toledo & Ohio Central; F. K. Moses, M. M., B. & O. Chicago Terminal; C. M. Hitch, M. C. B., B. & O.; E. H. Mattingley, General Car Foreman, B. & O.; J. S. Naery, M. C. B., C. I. & L.; J. F. Holzemer, Purchasing Agent, Toledo & Ohio Central

New Devices Among the Exhibits

New Machine Tools and Shop Devices

COMPARATIVELY FEW NEW TOOLS or shop devices for railroad use were placed on the market during the war. The builders were kept busy making their standard machines or in devising equipment for the manufacture of war supplies and munitions. That the designers were not unmindful of the demands after the war is evidenced by the number of new designs which have been placed on the market during the past few months. A large proportion of the new tools and shop equipment suitable for use by railways was fully described in the June number of the Railway Mechanical Engineer, subscribers to which are receiving copies of the *Daily*. We shall therefore in this article attempt only to briefly call attention to the new machine tools and shop equipment devices that are exhibited on the Pier and which were described in the special Shop Equipment Number of the Railway Mechanical Engineer in June.

High Power Multiple Spindle Drill

An interesting example of drills of this type is being exhibited by the Defiance Machine Works Company of Defiance, Ohio. A description of it will be found on page 358 of the June Railway Mechanical Engineer. It is a heavy service production tool, especially intended for use in locomotive and railroad shops and will be found useful whether the work involves heavy gang drilling or heavy jig drilling. On jig work the compactness of the machine enables one operator to keep a number of spindles—either singly or in groups—in operation, and as a result, the operator is kept constantly reloading the jigs. One of these drills is in the exhibit of Manning, Maxwell & Moore.

The Ohio Tilted Rotary Milling Machine

That there is apparently no limit to which the designer will go in the search for the practical application of every possible principle which will influence the efficiency of machine tool production is strikingly illustrated in the tilted rotary milling machine which is on display in the booth of the Osterlein Machine Company, Cincinnati, Ohio. As implied by its name, the table on this machine revolves, carrying the work to the cutting position; during the cutting operation the finished work is removed on the opposite side of the table, and the new work is set up. The cutter may be held in a fixed position and the table rotated continuously by automatic feed for continuous milling, or the cutter may be reciprocated radially in combination with an intermittent motion of the table, controlled by an indexing mechanism which provides for from two to 72 divisions. The table revolves rapidly between divisions in order to reduce the idle time, and by feeding the cutter radially over the surface of the work the loss of time between milling surfaces is avoided on such jobs as cannot be compactly spaced. Other advantages in the design of this machine include the avoidance of non-productive time of cutter approach. The cutter travels the shortest possible distance. Two or more simple fixtures may be used instead of one large fixture, and the machine is practical when applied to small quantity lots. This machine was described in the June Railway Mechanical Engineer, page 360.

The Mult-Au-Matic

Friends of the quantity producer, the Bullard Mult-au-matic, manufactured by the Bullard Machine Tool Company, Bridgeport, Conn., will be interested in noting the refinements and changes which have been made in the 1919 model of this machine. The new model is shown in operation on the pier. A detail description of it will be found on page 394 of the June issue of the Railway Mechanical Engineer.

Internal Grinders for the Locomotive Shop

In repairing valve motion levers, parallel rods, and various similar parts where the holes in the rods or in the bushings are worn oblong or rough, or the holes in the levers have become distorted, the use of the internal grinder commends itself. Those who have benefitted by their recognition of the cylindrical grinders' place in the locomotive shop will be interested in the machine displayed by the Heald Machine Company of Worcester, Mass. It was described on page 362 of the June issue of the *Railway Mechanical Engineer*. It combines several noteworthy features, among which may be mentioned a large crosswise adjustment for the work, large vertical adjustment of the knee, multiple speeds for the rotation of the head, quick change gear boxes for speeds and feeds, and micrometer readings throughout.

Belt Type Finishing and Buffing Machines

These machines embody the principle of a two-belt system employing an abrasive cloth belt running at high speed over a heavy corrugated leather cushion belt. Without memchanical holding devices or power feed attachment the work is held by hand, and produces a finished product of a superior nature. Equipped with a holding device and the power feed attachment, the machine is automatic in its operation, and thus production is limited only by the ability of the operator to handle the work. They are being exhibited by the Blevney Machine Company, Greenfield, Mass., and were described on page 345 of the June Railway Mechanical Engineer.

Automatic Screw Cutting Die Head

The thread chasers on the new Landis automatic screw cutting die head may be easily and quickly removed for grinding or changing, as they are supported on the face of the head. The head is opened automaticall by retarding the forward motion of the carriage, is closed by hand, and is locked by the operating handle which contains a latch having a tongue milled on the lower end. This tongue is milled off center, which permits roughing and finishing cuts; to adjust the head for either merely requires a half-inch turn of the latch to a suitable graduation. It will be found among the other products in the exhibit of the Landis Machine Company of Waynesboro, Pa. It was described in the June Railway Mechanical Engineer, page 372.

Constant Speed Motor Drive for Shaper

A "selective type" gear box, with steel case-hardened gears, which may be used with a constant speed motor drive or a single pulley belt drive giving the same changes of speed as are ordinarily obtained with the

cone pulley drive, has been designed by Gould & Eberhardt, Newark, N. J., and is being exhibited mounted on one of their 28-in. Invincible shapers. By the use of this device it is unnecessary to stop the machine in changing speed except when changing from single gear to back gear, or vice-versa. The application of this device was recently described in the Railway Mechanical Engineer for June.

Combination Punch and Shear

The combination punch and shear exhibited by the Beatty Machine & Manufacturing Company, Hammond, Ind., is especially designed for steel car repair work, and combines some interesting features, noteworthy among which is the provision for three different sizes of punches which can set up simultaneously and be operated independently of each other. One end of the machine is built as a guillotine frame of semi-steel and supports and operates three different types of shears:: one for flat work, one for different sizes of round bars, and another for angle irons. The extreme right end of the machine contains a set of coping tools. Seven sets of tools, each set ready for instant use, constitutes the working range of this interesting combination. The machine was described in the June Railway Mechanical Engineer, page 396.

Motor Driven Double Holder Drill Grinder

Those who seek "more holes for less money" should be interested in the motor driven double holder drill grinders which have been brought to the convention by the Grand Rapids Machine Company, Grand Rapids, Mich. One of its style C-6-A grinders, which was described in the June Railway Mechanical Engineer, is on display with several models of other types. The C-6-A grinders combines a small min'mum capacity convenient in handling small drills with the necessary capacity for large drills. The small holder will accommodate drills from No. 52 to ¾-in., while the larger one will handle drills up to 4 in. or more. The larger holders grind the large drills wet and use a coarse wheel. The small drills are ground dry on a fine grain wheel. The rotation of the wheel of this machine is downward from the point of the drill, which not only obviates a tendency for the drill to lift from the holder, but throws all grit downward, resulting in safety for the operator's eyes.

A Valveless Air Drill and New Shipping Hammer

Because of the elimination of the delicate valve mechanism, the valveless air drill which is being exhibited by the Keller Pneumatic Tool Company of Grand Haven, Mich., is exceptionally light and compact. Economical air consumption is claimed for it, and it is stated that it will stand up under severe service. These machines are built in the non-reversible or reversible types, including a reversible wood boring machine and a reversible grinder.

The company is also exhibiting the new type of pneumatic chipping hammer, which it calls the Sure-Lox, a name derived from the manner of locking the handle to the cylinder, which eliminates the old-style clamp bolt. The new handle of the Sure-Lox hammer is locked directly to the cylinder in a rigid manner by means of a key which is inserted in the cylinder and engages one of a series of slots in the handle. The key is securely held in place and the entire lock arrangement is covered by a neat spring clip. An extra long striking end is provided on the piston and these hammers are furnished with either open or closed handle styles in 10 sizes, ranging from 1¼ to a 41in. stroke. These devices were fully described in the June Railway Mechanical Engineer, page 363.

Jacks for Unwheeling Coaches

A contribution to the efficiency and cleanliness of the coach repair track is made in the production of the new Whiting coach jacks which were described on page 392 of the June Railway Mechanical Engineer, and which are shown in actual operation at the convention by the Whiting Foundry & Equipment Company, Harvey, Ill. The upright members of the jacks are spaced a fixed distance apart laterally. One pair of jacks mounted upon trucks which provide for adjusting the spacing longitudinally for different lengths of cars. Heavy steps or knees on the jacks travel between the jaws of the cast steel columns or posts and are controlled by a revolving screw. Provision is made for raising each step to the sill of the car independently; then all four jacks can, by throwing a clutch, be controlled as a unit.

Carbide Lamp and Welding Torches

New 5,000 candle power carbide lamps, with 12 hours capacity on 8 lbs. of carbide—a cost of approximately 3 cents an hour—are being exhibited by the Alexander Milburn Company of Baltimore, Md. One of the interesting features of this new lamp is the carbide container, which being made up as a series of pockets will accommodate the safe loading of carbide and no more. This construction also facilitates disposition of the residue. The cotainer is simply withdrawn and the edge tapped lightly to dump the contents.

The same company is exhibiting its new oxy-acetylene torches. One is the "Cut Weld" combination torch, which is an all-purpose torch with interchangeable tips that can be used for cutting or welding as the case requires. Its type J or "quick-weld" is an equal pressure oxy-acetylene torch for welding. In this torch the gases are mixed in the tip. The torch head and tips have a flat seat which insures a perfect fit at all times, a new tip fitting the old torch without difficulty. It is stated that the equal pressure feature holds the oxygen and acetylene at equal pressure, making a softer flame, preventing flash-back and danger of oxidation of the metal. These devices were described in the June Railway Mechanical Engineer.

Davidsonized Cast Tool Steel

Seekers for the ultimate in production for machine tools who have tested and tried all makes of tool steels will doubtless be interested in Oscar F. Ostby & Company's line of cast tool steel which is being shown on the pier. A comprehensive review of the history of the production of this rather remarkable product was published on page 371 of the June Railway Mechanical Engineer. In the exhibit mentioned are samples of reamers, various types of milling cutters, counter-sinks, etc., which were cast in an electric furnace so nearly finished and ready for work that all that is required is hardening and grinding the cutting edges. The cutting possibilities of this steel are no less remarkable than the process of its manufacture.

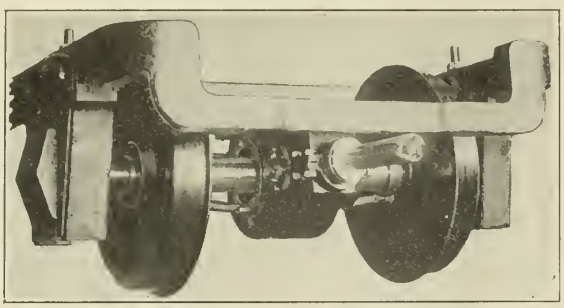
High Speed Ball Bearing Screw Jacks

Three sizes of the 75-ton jack and three sizes of the 50-ton capacity are described on page 343 of the Railway Mechanical Engineer for June. These jacks, manufactured by the Duff Manufacturing Company of Pittsburgh, Pa., are on exhibition and are specially recommended for handling all railway equipment. The load is raised with the use of a solid steel bar in the lever socket, using it like a pump handle. The load being

raised on each downward stroke. A positive clutch holds the load for the return stroke of the handle. Regardless of the speed with which the jack may be descending, the lowering handle may be stopped with absolute safety to within a thousandth part of an inch of any desired point. It is stated that so little effort is required to lower the load that the 75-ton jack can be operated by a boy with ease.

Spring Drive for Electric Axle Generators

The Safety Car Heating and Lighting Co., New York, is showing a new method of drive for car lighting generators, using a principle entirely new and unique in its application. Power is transmitted from the revolving car axle through springs connected to gear mechanism mounted on the truck, but free from the axle. Two split collars are bolted to the axle between the wheels, one at each end. Attached to each of these collars are three coil springs paralleling the axle and connected to the split drum. This drum surrounds the axle about midway between the wheels, but is of such internal diamenter as to give several inches clearance between the axle and the drum. A flexible shaft running at right angles to the axle is geared at one end to the drum and



Spring Gear Driving Mechanism Mounted on Axle

at the other end to the armature shaft of the generator, the generator being mounted on the car body. The drum and gears are mounted in a two-part housing, split horizontally and bolted together; the upper part is securely fastened to the truck frame.

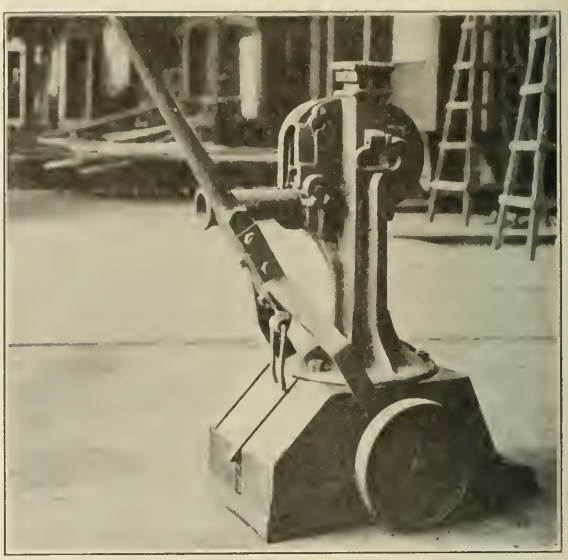
The generator being mounted in a fixed position on the car and connected to the axle drive by a shaft, necessitates providing for the variable relations between the car body and the axle when the car is traveling on a curved track. Compensation must also be made for side thrust through the truck equalizer springs and the variable pressure on the bolster springs. This is accomplished through the springs connecting the car axle with the geared drum. These springs not only give great flexibility in operation, but also provide wide latitude in assembling at the shops or on the road.

In case of flat wheels or other defects to wheels or axle, provision is made for quickly changing wheels and axle without changing any parts of the generator drive, thereby avoiding the necessity of carrying extra parts with each new axle. The same equipment can be applied to either straight or tapered axle without change, which is, of course, a great advantage.

The device is simple and compact and devoid of those intricacies which the operator and inspector usually condemn.

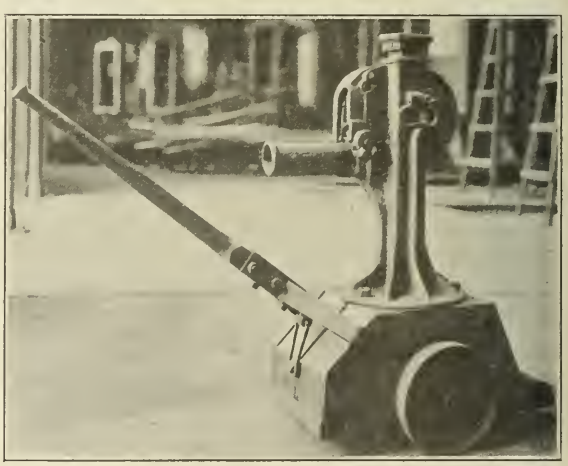
A Truck for Car Jacks

A convenient means of supporting and moving car jacks about the shop or yard is being exhibited by the Union Connector Company, St. Louis, Mo. The device consists of a heavy block, on top of which the jack is mounted and to which is attached a lever handle



The Union Jack Truck

and a pair of wheels, as shown in the illustrations. When not used, the handle of the jack is raised and the block rests directly on the ground. When the jack is to be moved the handle is lowered, carrying the wheels down



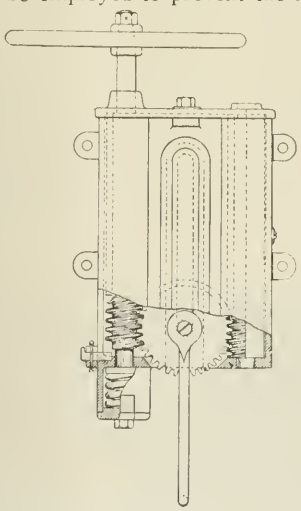
The Truck Ready to Move

with it and raising the block off the ground. The handle is locked in the moving position by a link, which engages a lug on the front of the block. When the jack is in use the block forms a solid foundation for the jack.

Worm Driven Hand Brake

THE DRAWING SHOWS A HAND BRAKE which has just been developed and is being exhibited by the Atlantic Hand Brake Corporation, Buffalo, N. Y. The brake is worm driven and connects directly to the end of the push rod without the interposition of levers. The device consists of a short shaft, at the top of which the handwheel is placed. On this shaft is a long worm, which meshes with a gear and the gear in turn meshes with a stationary worm segment placed parallel to and on the opposite side of the casing from the driving shaft. The movement of the driving shaft causes the gear to climb the worm rack, carrying with it a clevis link, to which the brake chain is fastened.

As the leverage at the handwheel is high, special means must be employed to prevent the application of



The Atlantic Worm-Driven Hand Brake

excessive force to the brake chain. The lower end of the shaft rests on a plate, which in turn rests upon a coil spring in a pocket below the body of the device. This spring is designed to close under 12,000 lb. As the brake is applied, the shaft gradually compresses the spring, until it goes solid. This brings the end of the worm into engagement with a lug inserted in the casing, which prevents further movement.

No ratchet or other locking device is required, as the geer will not back off. However, it is only necessary to give the handwheel a spin to release it. In applying, a spin of the wheel quickly takes up the slack and the full force may be applied with one hand.

The leverage of the worm is such that the brake chain is connected directly to the end of the push rod without the interposition of intermediate leverage.

Supplementary Exhibit List

Broschart Threadless Pipe Coupling Company, Trenton, Mo.,—Train line coupling for temporary repairs. Represented by J. L. Broschart. Space H.

Cleveland Osborn Manufacturing Company, Cleveland, Ohio.—The Edlund railroad and mill broom. Represented by Jos. L. Sullivan, T. A. Unsworth and William P. Carroll. Space H.

General Welding & Equipment Company, Boston, Mass.—Oxy-acetylene welding and cutting equipments. Represented by Thomas F. Stoddard. Space 537-538.

Southern Economy Device Company, Shreveport, La.—International adjustable lateral plate and International removable driving box. Represented by H. McDougal. Space 38.

A New Use for Fabrikoid

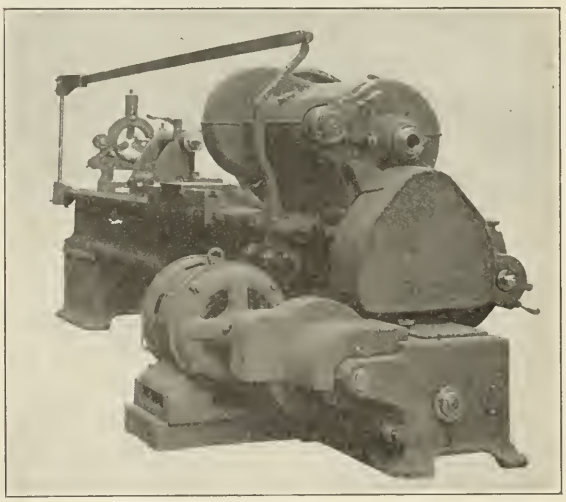
ONE OF THE EXHIBITS of the DuPont Fabrikoid Company, Wilmington, Del., is a Cadillac automobile, the body of which is completely finished with Fabrikoid in place of the usual enamel finish. This is the first trial which has been made in the use of Fabrikoid as an exterior finish where it is exposed to the weather. The body of the automobile was prepared for the Fabrikoid by the application of a coat of shellac. The Fabrikoid is then applied with cement. The entire exterior of the car body is covered in this way, including the top and the fenders.

The automobile on exhibit is the first one to which Fabrikoid has been applied and it has now been driven 15,000 miles, with the finish showing every evidence of a high degree of durability. So far as the test has been conducted the material has been unaffected by weather conditions or by the heat of the radiator and engine hood. A number of other automobiles have since been and are being finished with this material.

A Lathe with a Low Motor Mounting

A DISTINCT AND NOVEL ADVANCE in lathes of the type illustrated is characterized by the low mounting of the motor on a standard motor frame, upon which a large or a small motor may be placed to suit the nature of the work on any given size machine. A pulley may be applied and the motor disconnected so that independent or group driving is at the option of the user.

The use of the silent chain in the head effects a smoothness of operation which makes the drive practically noise-



Twenty-Four-Inch Motor Driven Bradford Lathe

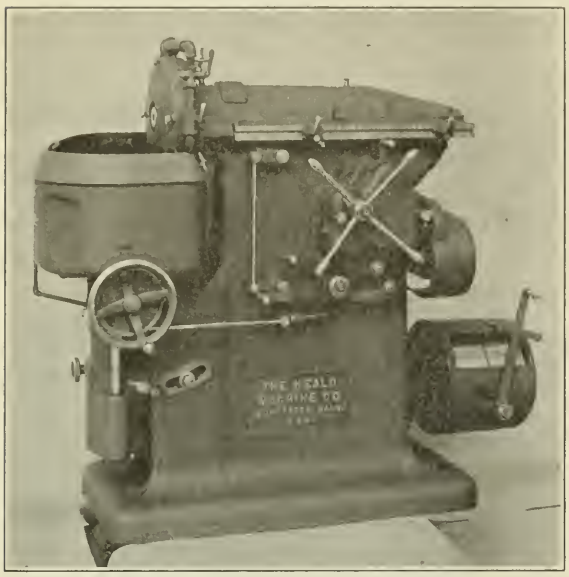
less and the spindle chatterless. Gear shifts in the selective driving gears in the speed box can only be effected after momentarily changing the drive through the shifter pole. In this gear shift no abuse of the mating gears is possible and speed changes are instantly made without noise or conflict. The back gear lever on the head not only engages the direct and back gear drives, but it is so arranged that in its central or disengaged position it effects a quick stoppage of the spindle by automatically applying through a direct friction brake. It is possible

to pull the work around by hand to inspect it with the friction brake applied.

The motor is used for driving purposes only and provision is made through simple mechanical means in the lathe itself for starting, stopping, reversing, speed changing and brake stopping. A 24-in. lathe of the type herein described, manufactured by the Bradford Machine Tool Company, Cincinnati, Ohio, is being displayed by the Swind Machinery Company, Philadelphia.

Rotary Surface Grinding Machine

THE ROTARY SURFACE GRINDING MACHINE shown in the illustration is built in two sizes, 8 in. and 12 in. regular equipment for both of which includes magnetic chucks. Prominent features incorporated in its design include the wheel slide which is a massive casting having a flat and "V" way which assures alinement. The wheel spindle is large and is mounted in a plain adjust-



Front View of 12-in. Rotary Surface Grinding Machine

able bronze bearing in the rear; it is lubricated through a large sight feed oiler. Automatic and hand feed for the wheel slide has been provided for by an automatic box and a pilot wheel which may be disengaged whenever the automatic feed is being used.

The main speed box which is situated on the rear of the machine furnishes power to the wheel slide by a three-stop cone and three speeds to the chuck through a bank of gears. The speeds of wheel slide and chuck are independent of each other allowing for a large latitude as regards speeds and feeds. The speeds to the chuck are controlled by a pull rod on the front of the machine.

The chuck spindle is driven by spiral gears, one of which is mounted directly on the spindle. The chuck bracket is adjustable to allow for the grinding of concave and convex surfaces up to an angle of 10 deg. The chuck feed is controlled by a hand wheel and vertical screw through a nut on the spindle sleeve. The chuck spindle is mounted on the ball bearings, while the vertical screw has a ball thrust bearing allowing vertical adjustment of the chuck. These machines are also equipped with an automatic vertical adjustment to the chuck which will feed from 0.0005 in. to 0.003 in. at each end of the wheel traverse.

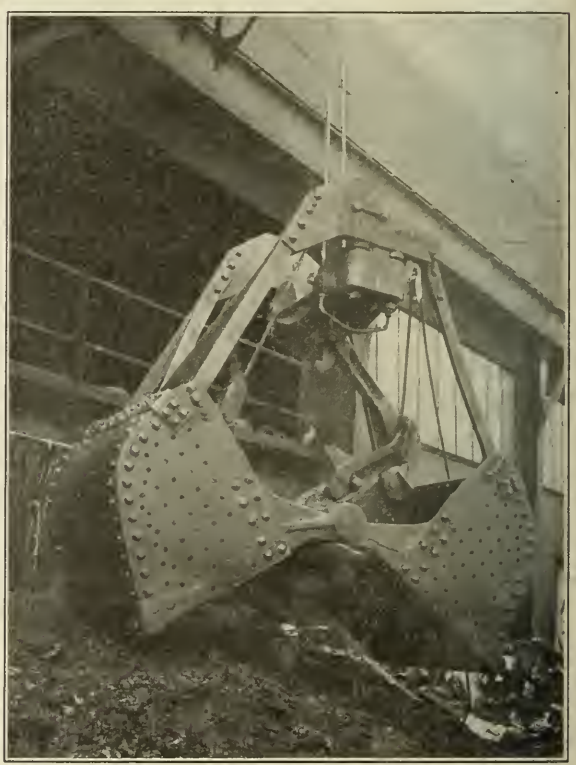
The water equipment includes a pump, tank, waterguard and connections, while a swivel joint in the distributing nozzle enables the operator to direct the flow of the water to any desired point.

The machine is self-contained, requiring but a single belt from the main line shaft or motor. Motor driven machines can be furnished if desired, the motor being placed where it is most convenient.

One of these rotary surface grinding machines is upon exhibition in the booth of its manufacturers, the Heald Machine Company, Worcester, Mass., who are also exhibiting a line of other types of grinding machines, one of which the Heald internal grinder, was illustrated and described in the June issue of the Railway Mechanical Engineer.

Single Hoist Grab Buckets

THE AUTOMATIC SINGLE HOIST GRAB BUCKET illustrated is recommended for use in the cinder pit; it will be noted that it is built without projecting parts which might catch on the sides of the pit. This bucket requires only a single drum hoist to handle it and is much faster in its operation than a two-line bucket because the operator has only one controller to handle. This grab bucket is automatic in operation, dumping at a fixed height controlled by a tripping hanger permanently attached to the hoist of the crane.



Brosius Automatic Single Hoist Grab Bucket

A special design of this particular type of bucket for use in ash pit service has been put out by Edgar E. Brosius, Pittsburgh, Pa., a specialist in the manufacture of grab buckets for ash handling plants; it has a capacity of 1½ cubic yards and is 3 ft. ½ in. wide, allowing a clearance between the walls of 4 ft. pit.

Railway Age

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WE GUARANTEE that of this issue, 17,000 copies were printed; that of these 17,000 copies, 15,406 were mailed to regular paid subscribers to the Railway Age and the Railway Mechanical Engineer; 119 were mailed to advertisers, 300 were provided for counter and news companies' sales, new subscriptions, bound volumes, copies lost in the mail and office use, and 1,175 copies for distribution at Atlantic City.

THE RAILWAY AGE is a member of the Audit Bureau of Circulations (A. B. C.) and the Associated Business Papers. (A. B. P.)

A great deal of time is lost in the convention meetings by the reading of the reports in detail. This is, of course, necessary where the reports are sent out late and do not reach the members until just as they are leaving for Atlantic City. This year, however, the most of the reports were sent out several weeks in advance of the meetings and the members should have had plenty of time to read and digest those in which they were particularly interested. Indeed, many of the reports are so carefully prepared and go into such technical detail that it is hardly safe to attempt to discuss them unless they have been studied carefully in advance. While it may not be advisable to take such a radical step this year, some measure should be adopted to insure that the reports will be read only in abstract at the conventions next year. Secretary Hawthorne made a remarkable record this year in getting the reports out early and his staff is now so organized that it is safe to predict that even better results will be obtained next year. If this prediction is correct there is no reason why time should be wasted next year in reading the reports in full. It is an extremely difficult matter to get committee chairmen or the authors of individual papers to realize the importance or necessity of taking only a few minutes to place their reports before the convention. To check against this, the chairman should prepare their abstracts in advance and submit them to the General Committee to pass upon; or it might be advisable to have Secretary Hawthorne's office prepare such abstracts and submit them to the committee chairmen for approval. In this way prompt transaction of business would be insured and there would be more time available for discussion—and discussion from a practical and educational standpoint is one of the most important parts of the convention.

Stop Reading the Reports!

Too often committee work is more or less of a joke. Members of a committee are likely to place the entire responsibility of doing the work on the chairman, and sometimes the chairman finds it easier to rely upon his own organization to do the greater part of the work in compiling and preparing the report because of the difficulty of arranging for meetings of the committee. Secretary Hawthorne is helping to overcome the latter difficulty by arranging through his office for the meetings of the committees at the convenience of the chairmen, but taking the details of calling the members together off their hands. It is understood that a Committee on Committees has been appointed whose duty it will be carefully to study the make-up of each committee and see that it is composed of the kind of men who are specially well fitted to work on it. An example of how a committee should do its work is afforded by the present Train Brake and Signal Equipment Committee. Its meetings are noted for the fact that ordinarily 100 per cent of its members are present. All of the men on the committee are experts on the subject, and it is not unusual for them to sit in conference for more than a day; indeed, one conference laster several days, and all of the members worked hard and heartily during that time. With committees managed and made up in this way there is still another factor to be desired, and that is that the individual roads back up their representatives on committees and express a real pride in having them give the best that is in them to the committee work. The Pennsylvania Railroad has always insisted that its representatives on a committee make good, regardless of whether they were chairmen or members. More than this, it has placed its resources behind these men in the way of making special investigations or tests for the benefit of the committee. Other roads should adopt the same policy.

An Ideal Committee

Mr. Tyler's Tribute to the Railway Supply Men

MR. TYLER PAID A DESERVED TRIBUTE to railway supply men in his address to the Mechanical Section yesterday, which is published elsewhere in this issue. He said the fact that more progress has been made in the United States than in any other country in the development of railroad equipment is due largely to the railway equipment and supply manufacturers.

We believe it is not generally known that the railway equipment and supply manufacturers occupy a much more important place in the transportation industry of the United States than of any other country. In most other leading countries a large part, or even most, of the equipment and materials used by the railways is made in their own shops. For example, the British railways built most of their own locomotives and cars. There are big builders of locomotives and cars in Great Britain, but they get 90 per cent of their business from foreign countries. In this country, on the other hand, the railways buy almost all of their equipment and supplies from manufacturers.

The technical officers of the railways have invented many of the most important specialties and materials used. They have suggested improvements in many of those which have originated with the supply companies. They have designed a large part of the locomotives and cars which have been built. On the other side, the supply companies have bought and put on the market

many of the things which railway officers have invented and have co-operated with the railway officers in perfecting their designs, while, of course, they have made most of the devices and equipment which the railway officers have designed.

It has been chiefly this co-operation between the officers of the railways on the one side and the supply concerns on the other that has promoted the technical development of our railroads and enabled them to haul a ton of freight one mile cheaper than any other railways, while paying the highest wages paid by any railways.

While there has been this co-operation between the officers of the railways on the one side and the equipment and supply companies on the other, they have always had the relationship of buyer and seller. They, in consequence, have regarded themselves as being engaged in separate industries. As a matter of fact, however, in a broad way, the railroad business and the railway supply business are one big industry. It is not always even true that the railroad is the buyer and the supply company the seller since the supply companies are large shippers and in the relationship of carrier and shipper it is the railroad that is the seller and the supply company the buyer.

To say just how much the technical development of the railroads has been due to railway officers and how much to railway supply men would be impossible. But in view of the superior efficiency with which our railroads are operated, it may be safely said that the railway and railway supply men of the United States have both done their work better than those engaged in similar lines of work in any other country.

Locomotive Standardization

IN HIS ADDRESS at Monday's session Frank McManamy very ably presented the arguments for standardization. The great strides which have been made in industrial developments in this country have been made in an atmosphere of individual initiative which is the expression of the principle of freedom on which all our national institutions are founded. According to this principle, organizations as well as individuals should have the fullest possible latitude in the development of their own policies and ideas, only being restrained where it can be proved that the national interest demands the imposition of restraint.

The burden of proof, therefore, must lie with the exponents of general standardization. This has been done in the case of cars, which are universally offered in interchange, the question of standards therefore becoming a matter of general concern. On the other hand, while in special cases they may be used on foreign lines, locomotives are essentially a fixed part of the transportation machine, functioning to the greatest advantage when retained within the limits of the owning road, and to even better advantage when they are used exclusively on the home division. The fact that the extradorinary transportation conditions which were brought about by the war have made it expedient to transfer locomotives from one railroad to another does not alter this principle. Even the building up of permanent joint terminals in which locomotives of several roads are handled and dispatched by a common organization does not materially affect the situation, because these are largely turning points and the greater part of the actual repair work is cared for at terminals on the home road.

Standardization of locomotives has been adopted quite generally by individual railroads and where sufficient latitude is allowed in the working out and application of improvements, this is a highly desirable policy. But it is not safe to draw general conclusions from the facts in particular cases, and standardization should not be regarded as a principle, but as an expedient for the attainment of certain ends. These ends are uniformity of shop practice and tools, the reduction of the variety of repair parts and hence the number which must be carried in stock, and the reduction of first cost.

As it has been adopted by individual railroad systems, the first two of these ends have in a measure been attained. To apply a single set of standards to the nation, however, will add nothing to the benefits which are being derived from the standardization programs of individual roads.

These programs make possible uniformity in shops practically under normal conditions and reduce the material carrying charges as far as they can practically be reduced.

In fact, general standardization would be a backward step, so far as the attainment of these benefits is concerned, for a period of 15 or 20 years. The standard locomotives already built have added to the number of classes and non-interchangeable details, now too large in many cases, which the more progressive railroads are endeavoring to reduce. To offset the disadvantage of this long transition period there must be assurance of large benefits in the end in addition to those now already assured from the measure of standardization which has developed naturally under private ownership and operation.

Of the advantages claimed for standardization the only one which offers reasonable hope of fulfillment is that of reduced first cost, which may be secured through economies in construction made possible by quantity production. This, however, is not large, owing to the comparatively small number of engines to be built of a single standard type and is a question of minor importance as compared with the question of the preservation of individual initiative and incentive in the development and improvement of motive power. It is not difficult to form an opinion of the effect on the state of motive power development 20 years hence, if the actual application and working out of new ideas and improvements must pass through the hands of a central organization for approval or rejection by a comparison of the motive power of 20 years ago with that of today. And yet 15 or 20 years must elapse before a general standardization program will have become effective.

The statement that standardization does not mean stagnation is true within certain limits where it has naturally developed and has taken a form expressive of the ideas of close knit organizations. In few cases have standards been so rigidly maintained that improvements were not very readily incorporated, not only in new designs, but in the old power. The attempt to maintain universal standards of necessity must greatly increase the difficulty of securing the adoption of improvements to prevent a rapid growth of local changes which would soon destroy the standards. The inflexibility and unwieldiness of such a central organization will effectively kill the incentive to continue the rapid pace which developments of the past twenty years have taken.

There is still much to be done before the locomotive is sufficiently perfected to attempt to maintain fixed designs. Take the question of fuel economy which is only just beginning to receive serious attention in this country. It involves the consideration of many problems of boiler and firebox design. The present high cost of fuel and the necessity for conserving the nation's fuel resources demand the utmost freedom in the development of improvements and in themselves are a sufficient reason for not adopting a program of national standardization.

Program For To-day

9.30 A. M. TO 1.30 P. M.

Discussion of Reports on: Fuel Economy and Smoke Prevention	9.30 A. M. to 10.00 A.M.
Specifications and Tests Materials (M. M.)	10.00 A. M. to 10.30 A. M.
Design and Maintenance of Locomotive Boilers	10.30 A. M. to 11.00 A. M.
Locomotive Headlights	11.00 A. M. to 11.30 A. M.
Superheater Locomotives	11.30 A. M. to 12.00 A. M.
Individual Paper on Carbonization in Valve Chambers and Cylinders of Superheated Steam Locomotives; Its Cause, Effect on Lubrication and Maintenance, and Proper Measures to Overcome Same, by F. P. Roesch	12.00 A. M. to 12.30 P. M.
Amalgamation of other Mechanical Associations with Section III—Mechanical of the American Railroad Association	12.30 P. M. to 1.00 P. M.
Questions Proposed by Members	1.00 P. M. to 1.30 P. M.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert. Entrance Hall, Million Dollar Pier. Fry Philharmonic Orchestra.

3.30 P. M.—Band Concert and Impromptu Dancing. Entrance Hall, Million Dollar Pier. Royal Scotch Highlanders' Band. Tea will be served at 4.30 P. M. in Entrance Hall.

9.30 P. M.—Mardi Gras Dance. Ball Room, Million Dollar Pier. Royal Scotch Highlanders' Band.

The Mardi Gras To-night

THE BALL ROOM on the Million Dollar Pier will be the scene to-night of a merry affair. It will be termed a Mardi Gras dance and will be in its nature somewhat similar to the carnival dance of last Thursday night. The Highlanders' band will furnish the music for a twenty dance program and during the intermission the members of the Entertainment Committee will distribute paper caps, streamers, horns, squakers, confetti, etc. Fun will then reign supreme till long after midnight.

Lost and Found

LOST—Badge No. 4187 by Mrs. S. F. Armstrong and Badge No. 184 by George Akans. If found, please return to *Railway Age* booth.

LOST—R. S. M. A. Badge No. 2312 by J. N. Gallagher of the O'Malley-Beare Valve Company. Finder please leave at the *Railway Age* booth.

FOUND—Badge No. 5349. Apply to Secretary Conway's office.

LOST—Parasol, blue with Roman border, tan stick with fork handle. Return to E. W. Winchester, Logan Hotel, or Secretary Conway's office.

FOUND—Small fur neckpiece. Call at Secretary Conway's office.

Yesterday's Entertainment

THE ENTERTAINMENT FEATURES of yesterday and last night were greatly enjoyed. In the morning a band concert was given in the ball room of the Pier, and in the afternoon an orchestral concert received a generous attendance. The afternoon affair was followed by an informal dance during which tea was served.

In the evening the announced informal ball was thoroughly enjoyed, and there was a large attendance, although many convention people attended an added attraction in the Hippodrome. Sixteen dances composed the evening's program. The committee in charge consisted of Langley Ingraham, Chairman, assisted by J. L. Paxton, H. E. Passmore, J. C. C. Holding, Ellsworth Haring, F. T. Connor and R. J. Himmelright.

A Big Convention

REGISTRATION BOOK NO. 4, which will be issued to-day, will show some astonishing attendance figures. We have talked about the year 1911 as a record-breaker. It was and has continued to hold this distinction until this year. Book No. 4 will show a total attendance of 5,771. It is safe to say this morning that over 6,000 people have attended the conventions up to this time. The comparative figures between 1916 (up to Sunday evening) and 1919 (up to Monday noon) are as follows:

	1916	1919
Members	628	630
Special guests	511	1,795
Railroad ladies	417	600
Supply ladies	30	450
Supply men	1,453	2,246
Foreign guests	....	50
Total	3,315	5,771

The figure for the "members" needs some explanation. In former years many members registered for both the M. M. and the M. C. B. conventions and were counted twice. This, of course, is not being done this year.

American Society for Testing Materials

THE TWENTY-SECOND ANNUAL MEETING of the American Society for Testing Materials will be held at the Hotel Traymore, beginning today and closing Friday, June 27. The program for today's sessions is as follows:

FIRST SESSION, 10 A. M.

Minutes of twenty-first annual meeting.
Annual report of Executive Committee.
Report of Committee E-6, on Papers and Publications.
Report of Committee D-3, on Method of Sampling and Analysis of Coal.
Report of Committee E-4, on Magnification Scales for Micrographs.
Announcement of election of officers.
Miscellaneous business.
M. O. Leighton, chairman of the National Service Committee of the Engineering Council, will address the meeting on the activities of that committee.

SECOND SESSION, 3 P. M. ON PRESERVATIVE COATINGS, LUBRICANTS AND CONTAINERS.

Report of Committee D-1, on Preservative Coatings for Structural Materials.
Paint, a Plastic Material and Not a Viscous Liquid.
Report of Committe D-2, on Lubricants.
A Viscosimeter for Gasolene.
Report of Committee D-10, on Shipping Containers. Motion pictures will be presented showing certain activities of the United States Forest Products Laboratory, Madison, Wis.

THIRD SESSION, 8 P. M., PRESIDENTIAL ADDRESS AND MEMORIAL SESSION.

Annual address by the President, Guilliam H. Clamer, on the subject of Standardization.
Memorial session in honor of Dr. Edgar Marburg, late secreary-treasurer of the society.

President Walker, of the R. S. M. A., has extended the full privileges of the Million Dollar Pier to the members of the American Society for Testing Materials during the remainder of the convention of the American Railroad Association, Section III, Mechanical. The badges of the members of the Testing Material Society will admit them to the Pier at any time.

Train Line Connector to be Investigated by Mechanical Section

During last Thursday's session the subject of automatic train pipe connectors was brought up, under the head of Questions Proposed by the Members, by C. E. Fuller, superintendent motive power and machinery, Union Pacific. The discussion, which follows, was referred to in an editorial which appeared in the June 20 issue of the *Daily Railway Age:*

Mr. Fuller: Sooner or later we may be confronted with automatic steam and air hose couplings. I have noticed one on the pier. I do not remember whose it is, but it looked pretty good to me, and I think this association ought to study the subject, because I am sure we are going to be confronted with an automatic coupler sooner or later and we ought to anticipate it.

Wm. H. Mussey (Long Island): We have had a good many years' experience with automatic connectors and I think we ought to consider very carefully before we go into it. We have come to the conclusion that the straight automatic connector has so many difficulties involved in it that it involves the coupler question.

F. W. Brazier (New York Central): We have a train on one of our divisions running between Highbridge and Yonkers, a short distance, which has been equipped for about eighteen years with automatic connectors, but train has been kept going on the run back and forth without being broken up and they have been very successful. We are using one manufactured by the Westinghouse Company. This question was very much debated by this association a few years ago. We had committee reports on the subject, but the movement has died down. There is a movement on foot now to make tests, and go into it deeper, and it would be a good idea if this matter were referred to the Train Brake and Signal Equipment Committee. There are a number of different designs, and on the Lines West, Mr. Thompson can tell you they are testing out some on his trains.

W. O. Thompson (N. Y. Central Lines): We are trying out some of these connections on the lines West of Buffalo, but we are not in a position now to give any definite information, for the reason that we have put the equipment on our suburban trains and there is no cutting apart and switching or anything of that kind with those trains. We have now changed the couplers on some branch line trains that will be cut apart and switched around and perhaps that will give us a chance to give you a little more information later.

J. J. Tatum (U. S. R. A.): We have been working with connectors. All of us have realized for a number of years that the connector is going to come into use some day, and I believe we ought to get into position by having a committee follow up the development of the connectors so we will know more about them when they are developed than we know about the draft gear. You would be surprised to know how little we know about draft gears. It would be a good move by the association to have a committee follow up the development of the connector so that when it is complete and ready for use, they will be able to tell us something about it that we can bank on.

J. McMullen (Erie): We have a suburban train equipped with an automatic connector. I happened to be at Jersey City a few days ago when I was coming down here and I noticed this train come in on the platform while I was there and it seemed to be working very nicely. There was a car connected on the end of this train that was not equipped. This was done by the use of a dummy which they have in connection with the connector that we are using, and gives satisfaction.

Mr. Mussey: I didn't want to be understood as saying that the automatic connector did not have a lot of very good features, but the difficulty on one of the points Mr. McMullen has just brought out is the question of coupling other cars, and the attachment of the coupling is so closely allied to the couplers that it is really almost a part of the coupler, or should be, and the subject might be sent to a sub-committee of the Coupler Committee.

Mr. Fuller: We have been using automatic connectors for a long time. I had an experience in 1902 and 1903 on the Alton, with varied results. There is no question but that we have got to come to it and this association should be in touch with anything that is being done.

The Chairman: These men who have remarked that they have some in service on their trains that are never broken up must realize that there is absolutely no advantage in an automatic coupler if that is the service you are going to put it in. The argument has always been that the absolute need for them, if there is one, is for use in suburban trains, where you are breaking your trains up and slamming them together. I suggest if anybody is going to use automatic connectors that they put them in service where the trains are broken up and not where the benefits of the automatic coupler cannot be fully realized. The real test is in the suburban service, where you have a great deal of crossover conditions and conditions which are severe, but actual working conditions, as a rule.

On motion, the subject was referred to the General Committee, to be assigned to a new committee or to one of the standing committees.

Message From General Atterbury

It was expected that General Atterbury would be present to take part in the "Recognition Program" last Saturday evening. President Walker of the R. S. M. A. received the following telegram from him on Saturday morning:

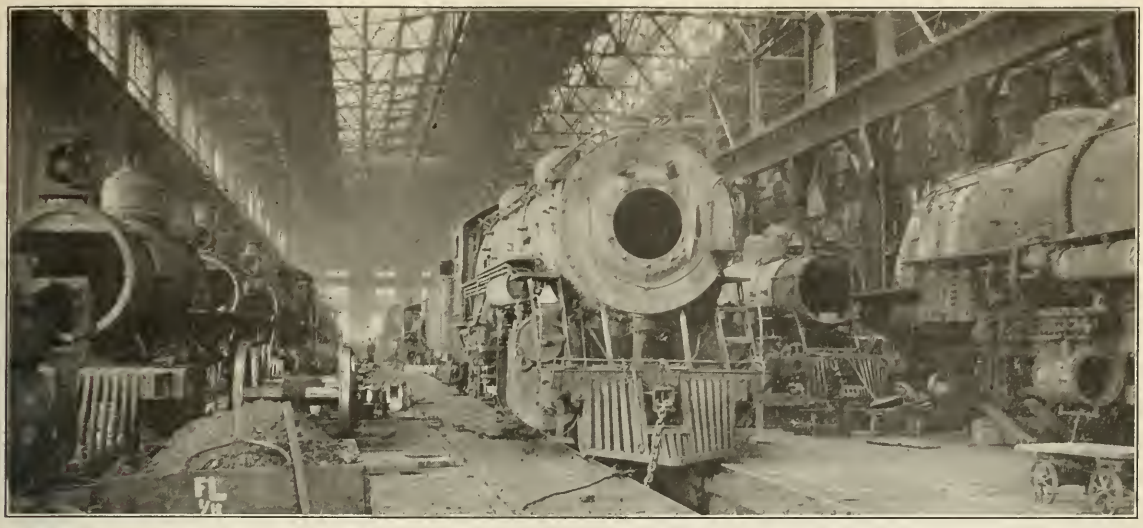
"I am deeply grateful for the cordial invitation extended to me verbally by yourself and also in the telegram of Mr. Chambers and Mr. Tollerton to be present at the session of the American Railroad Association, Mechanical Section.

"It would be a great privilege and pleasure to me to participate in the affair of this evening were it not that other arrangements previously made preclude my being in Atlantic City for the occasion.

"I note that you call it a night of recognition and appreciation of the service rendered by A. R. A. members during the war.

"So far as this concerns the railroad men who served in France, I can speak with authority regarding their accomplishments, and my message to you is that you can go the limit in commending them. I rank their work with the most distinguished performed in France

"A large percentage of the railroad men who went to France were well beyond the age at which military service might reasonably have been expected, many gave up very rumunerative positions, home ties and all those comforts and conveniences that are so foreign to army life, all to answer the call of their country and to serve in such capacity as they could be used with benefit to the cause. I think that if the facts were analyzed it would be found that of all agencies that contributed over and above what might be termed the reasonable call of duty the railroad profession stands out pre-eminently. I am proud not only of the sum total of achievement of the railroad men in France, but also of every man who had the opportunity of serving there." W. W. Atterbury.



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American Railroad Association, Section III, Mechanical

Proceedings Include Addresses by W. T. Tyler, Chairman Tollerton and Frank McManamy

THE FIFTH DAY of the first annual convention of the American Railroad Association, Section III, Mechanical, began with a morning session on Monday, June 23, 1919. The meeting was called to order at 9.45 o'clock by Mr. Tollerton, the newly elected chairman, who asked that the past presidents in the audience and also Mr. McManamy, assistant director, mechanical department of the U. S. R. A., take seats on the platform.

Address of Vice-Chairman, W. J. Tollerton

I HAVE LISTENED to so many excellent addresses since the opening of the convention and the ease with which they were delivered and it would seem that any one should be able to make a public address merely by close observation as to how it was done. However, I am inclined to think that making addresses in public is like the great game of golf, you may be one of a gallery that is following a professional golfer and watching the ease and accuracy with which each shot is made, it seems not to be difficult at all, but when we try it ourselves we generally dub our shots. Therefore, I trust that if my drives are short and I am occasionally in the bunkers the convention will bear with me for I assure you if given strokes enough I will get over the course somehow.

The American Railway Master Mechanics Association is just closing its 51st year and as I had the honor of serving you as President until its consolidation into Mechanical Section No. III. I will therefore address you as Past President of your association.

In addressing you today as President of the American Railway Master Mechanics' Association, I thoroughly appreciate the honor conferred upon me and the privilege of appearing before you in a capacity which has in the past been so ably filled. It is therefore with an especial pleasure that I extend to the members and distinguished guests, a sincere welcome with the hope that this meeting shall be truly beneficial. I am certain that none of us will leave this beautiful city and its charming hospitality with other than the most pleasant recollections.

During these eventful years of change and progress, we have witnessed the growth of a co-operative spirit among nations and national institutions, the far-reaching effects of which, will not be fully appreciated for some time to come. In the railroad field some of these tendencies are already evident. The amalgamation of various organizations is in line with the general trend and will lead undoubtedly to a broader opportunity for useful effort, and a more complete development of the inherent possibilities, than could be expected from the organizations acting independently.

Most of us will view with considerable regret the passing of our old association. In fact had it not been for this sentiment in favor of retaining the identity of the American Railway Master Mechanics' Association, it is probable that a combination of the different organizations would have been effected a number of years ago. While at that time the advantages of a more complete co-operation were realized, there was no urgent incentive to the formation of an amalgamated association. Today, however, we are confronted with problems, the solution of which will indeed necessitate our combined efforts, and in the wise consideration of these matters, we will have increased opportunities together with a graver responsibility than has been ours during the preceding years.

It is only necessary to glance through the published proceedings of the Master Mechanics' Association to realize that there has been a consistent growth right from the beginning, and also that in the various lines of investigation under way, there still remain great possibilities for future endeavor. It would require altogether too much time to attempt anything in the nature of a complete review of the work accomplished by this association during the past fifty-one years. I feel, however, that on this occasion it will not be entirely out of place to mention briefly some of the more important results secured. This is the only true measure of our success and consequently a summary of these results seem to be a logical topic for incorporation in my address as last president of your association.

History of the Master Mechanics' Association

It may appear to some of the members, that a synopsis of this association's efforts is not entirely necessary inasmuch as the modern American locomotive of today might be considered

in itself as a complete embodiment of our work and efforts during the past years. The difference between this machine just prior to the organization of the Railway Master Mechanics' Association and as it stands today, constitutes a vivid fact, infinitely more impressive than any written account. This is the concrete evidence of our labors as members of the old association and in the progress of its development during years to come, the locomotive will still remain as a true representation of our work in the amalgamated organization. It may be of interest, however, to outline a brief historical record of the Master Mechanics' Association, with an indication of some of the results accomplished.

The American Railway Master Mechanics' Association is today just closing its fifty-first year of existence. On June 10, 1868, six railroad master mechanics met at Dayton, Ohio, to plan this great organization. Another meeting was held at Cleveland just fifty-one years ago tomorrow, and was attended by twenty master mechanics, who issued invitations to the first annual meeting held at Cleveland, September 30th and October 1 of the same year. This time there was a more general attendance and the work of the association was formally started.

It was the purpose of these earnest men that annual meetings be held and appropriate committees be appointed to gather from all parts of the country ideas, practices, and the experience of manufacturers and mechanics, then after digesting them thoroughly, to present full and complete reports to the association. In this manner a valuable fund of information has been accumulated for the professional guidance and benefit of railway officials. During the first annual conventions reports on such subjects as Boilers and Boiler Material, Steel Tires, Wheels and Axles, Cylinder and Stuffing Box Packing, Boiler Incrustations, Safety Valves, Material for Flues and Standard Nuts, were presented and discussed.

Development of Standards

Of the greatest value has been the work of the association committees in preparing and recommending various standards and practices, which have been adopted by action of the association assembled in convention, or by a letter ballot of all the members. The first recommended standard was for screw threads, and was adopted at the convention of 1870. Some of the more important standards that have been adopted are for axles, wheels, safety appliances, screw threads, bolts and bolt heads, tires, wheel mounting pressures, formulæ for main and side rods, specifications for axles, boiler and fire box steel castings, cast-iron wheels, cast-iron cylinders and cylinder parts, steel forgings, packing rings, safety valves, steam chests, superheater castings, superheater pipes, boiler and arch tubes, solid and forged steel wheels and valve bushings.

In addition to the above association Standards, the following are some of the more important Recommended Practices that have been adopted:—Rules for the testing and inspection of locomotive boilers; rules for the inspection and testing of locomotives and tenders, air brake and train air signal instructions, photometering of headlights; rules for determining stresses in locomotive boilers; rules for boiler washing; fastenings for tires of steel wheels; standardization of tinware, various gauges and specifications for lumber, wrought iron bars, bronze bearings, steel forgings and castings, cast-iron wheels, engine bolt iron, air brake hose, journal bearings, lap welded and seamless boiler tubes, rivet steel and rivets, staybolt iron and welded pipe.

The above constitutes a brief synopsis of the most important work carried on by this association since its organization. It does not, however, give any indication of the tremendous amount of labor and investigation necessary on the part of the various committee members before the recommended standards, practices and specifications, were finally adopted. Eminent railway mechanics held diverse opinions regarding important details of locomotive construction, regarding the proper proportion of various parts; the strongest and simplest method of building and bracing locomotive boilers to insure them against explosion; the most efficient form and construction of fire boxes to develop the value of the different kinds and qualities of fuel; the relative value of iron and steel plate for boilers, and especially of copper, iron and steel for fire boxes and flues; the relative safety and economy of iron and steel axles, crank pins and truck wheels; the cause and prevention of boiler explosions; and a multitude of kindred topics, embracing a wide range.

In view of the various conflicting opinions held by the members upon these important subjects, a careful and systematic investigation by the different committees has been necessary in order to harmonize and develop a set of Standards and Recommended Practices that would represent the best composite opinion of the entire organization. These discussions and investigations have also had the very excellent effect of awakening and directing attention to the subjects under consideration. It is doubtful if any railroad man can listen to discussions upon matters of vital bearing upon his daily occupation, without having his attention quickened and awakened. He may not always take part in these discussions, nevertheless when he goes home he will see and look for things he never saw or thought of before.

At the convention of 1891, it was decided to incorporate under the laws of the State of New York, as owing to its steady increase in membership and influence, it was felt that the association should be in a position to exercise a legal control over its finances and to make and execute contracts and do all other acts that an association of this kind may do to maintain and perpetuate its existence. Incorporation was effected July 23, 1891.

Association Establishes Scholarships

At the fifth annual convention, held in Boston during the year 1872, there was a surplus of three thousand dollars. By an unanimous vote of the subscribers (merchants and manufacturers of Boston) this money was turned over to the association to be placed in the hands of three trustees, chosen by the association, to be used for the benefit of the association in such manner as the trustees might direct. There were many discussions as to the proper use for this fund, among which was the project of erecting a building for the association. However, the fund was finally invested in government bonds until the year 1891, when with accrued interest it amounted to $6,898.13. A committee was then appointed to find a suitable use for this money and recommended that $5,000.00 of the amount be invested in four scholarships at Stevens Institute of Technology.

In 1903, Jos. T. Ryerson & Son of Chicago provided a scholarship in any institution and assigned the filling of this scholarship to the association. This scholarship provided for $500.00 a year. In 1915 this was changed to two scholarships of $300.00 per year each. These scholarships have been filled every year since first established. They are available to the sons of members and under certain conditions as provided by the constitution to the sons of other railroad employes. Successful candidates are required to take the mechanical engineering course. No more worthy use of money than this can be conceived and it is to be earnestly hoped that there may soon be many more such scholarships under the supervision of the association.

In 1904 the constitution was amended to provide for representative membership on the basis of locomotives owned and operated. Since that date relations between railroad corporations and the association have been very close. Prior to 1904 the membership was entirely voluntary, the members all paying their own dues, but of late years the railroads have manifested great interest in the association, appointing representative members and paying their dues, no doubt feeling that the expenditure was fully justified by the results achieved.

As we look over the activities of the American Railway Master Mechanics' Association during the past 50 years, we cannot fail to be impressed by the work which it has accomplished. Its entire history is a record of splendid achievements in the improvement of the steam locomotive on American railroads. It is the duty of the members of this association to see that the work which has been so ably carried on under its direction is prosecuted just as earnestly under the new organization which has been formed.

Benefits to be Derived from Amalgamation

I am convinced that the amalgamation of the American Railway Master Mechanics' Association with the American Railroad Association offers even better opportunities than formerly existed for carrying on this work, and that it comes at a time that is very opportune to permit us to secure the greatest measure of co-operation. The period of stress through which we have just past demonstrated conclusively the necessity for efficient motive power and adequate facilities for maintaining it to a high standard while in service. Much of our work in

the past has been hampered by lack of funds to carry on improvements. When the re-adjustment of the transportation situation now under way is accomplished there is reason to hope that the financial return which the roads receive will be more nearly adequate and will permit of making improvements in motive power which have long been recognized as necessary to the economical operation of the roads.

The cost of fuel and to some extent, the cost of wages per ton mile are largely determined by the type of motive power and the condition in which it is maintained. These items form such a large proportion of the total cost of conducting transportation, that in the last analysis the extension of our railroad systems depends upon the ingenuity of mechanical men in devising means for reducing the cost of transportation. There are still fertile sections of this country remaining undeveloped owing to the lack of railroad facilities. As the population increases we shall need the additional production obtainable from this territory. The present tendency, however, is toward a decrease in railroad mileage. In fact during the past two years the mileage of railroads abandoned has exceeded the mileage built. Nothing will be more effective in overcoming this tendency toward a reduction in railroad mileage than the general development of improved facilities for the economical handling of light traffic.

Many Engineering Problems Requiring Solution

There is great need for the continued study of motive power from an engineering standpoint. Further investigation is required to determine the best proportions for locomotive boilers and draft appliances. There are many devices now on the market and no doubt many others will later become available, with the object of bringing about a reduction in the cost of locomotive operation. These should be studied and every assistance given toward their further development. The design of machinery for large locomotives is a problem well worthy of our most careful attention. It is also of importance to determine possible economies by the addition of improvements to existing motive power and the advisability of such alterations based on the type and service life of the equipment.

The development of roundhouses has not kept pace with the increase in size and weight of locomotives. The length of time locomotives are held out of service is in many cases unreasonably long. There is a splendid opportunity for increasing the service secured from locomotives, by improving terminal facilities and mechanical men should give the matter careful study.

Many of the technical problems pressing for solution cannot be properly investigated without a complete equipment of testing and laboratory apparatus. Few roads are able to undertake the expense of such work alone and as the benefits are shared by all, the establishment of a joint laboratory for test and research work seems a logical method for furthering such investigations. I believe this association should go on record as recommending a central testing bureau and that an earnest effort should be made to bring such an institution into existence at the earliest possible date.

As we examine the progressive steps whereby the locomotive has advanced from the early crude conception to its present state of comparative perfection, it becomes very evident that in this marvellous growth the locomotive builders have exerted a most decided influence. In fact it would be difficult to exaggerate the importance of what has been accomplished by their engineering ability, not only in the development of locomotive appliances, the perfection of design and proportioning of parts, but also in the adaption of locomotive construction to a great variety of severe operating conditions and the working out of original ideas, frequently at heavy expense. In this connection it is only fitting to say a few words in behalf of the manufacturers of railroad supplies, who by their initiative and energy in the development of new devices have contributed so much to the progress of railroads in this country.

To the Railway Supply Men's Association we owe a debt of gratitude. They have brought together for our inspection what is beyond doubt the most complete display of railway appliances ever exhibited. I desire to urge upon all of you to devote your spare time to the examination of these exhibits, and to bear in mind that the use of more efficient labor saving machinery is probably the only means at our disposal to bring about a reduction in operating costs. The increased wages which employes are now receiving has changed the economic aspect of the shop situation. In view of these altered conditions it has become more vitally important than ever to see that our men are provided with modern tools and facilities. There are no doubt a considerable number of the members, having under their jurisdiction shops filled with machine tools built sometime during the nineteenth century. Practically all of this machinery is operated at a loss and in numerous cases at a very great loss. Many of us have realized for years the necessity for replacing and adding to our equipment of shop machinery, but owing to the ever-increasing burden of expense and financial difficulties under which the roads struggle, it became almost impossible to secure a sufficient appropriation to put the shops on a truly efficient basis. It seems to me that these matters are worthy of our consideration and as members of the combined organization we should have a better opportunity than ever to formulate a definite policy of shop improvement.

In closing I wish to express an appreciation of the work done by the committee members and officers during the preceding year. I am sure that the new organization will receive the benefit of your continued activity together with that loyalty and earnest endeavor which has accomplished so much throughout the life of the Master Mechanics' Association. It is my sincere desire that the members and their families shall secure from this meeting the greatest possible instruction and pleasure with a safe and enjoyable trip home.

Minutes Approved

A motion to approve the minutes of the 1918 meeting as published and transmitted to members was put to vote and unanimously carried.

Mr. McManamy Speaks on Stanardization

Among the changes which the war brought about in the industrial life of the nation there are perhaps none that are more far-reaching in their effect than the general movement towards standardization, not only in railroad equipment, but in all branches of industry.

Because of the necessity of placing each plant engaged in producing articles which were necessary to the successful conduct of the war upon a basis which would insure maximum output, standardization was made compulsory in many lines, and the War Industries Board, through its numerous sections, standardized literally thousands of articles. In so far as some of these were concerned, as for example hardware, hand tools, pneumatic tools, electrical apparatus, etc., the process of standardization was in effect a process of elimination, and because of the comparatively short life of many of these articles in use, some of them may not leave very much impression on our industrial life.

Among the changes in railroad methods that which has perhaps been most commented upon and probably least understood is the standardization of equipment, which was started by Director General McAdoo very early in the life of the United States Railroad Administration, and its relation to production, maintenance and operation of equipment.

In the standardization of rolling stock, where each unit has a prospective life of twenty-five years or more, this standardization could not be accomplished by elimination and required, therefore, the preparation of plans and specifications, with the single object of building locomotives and cars which would have, so far as possible, those parts subject to frequent renewals because of wear, interchangeable on as many classes as possible.

By some, standardization has apparently been construed to mean the preparation of a standard design for equipment which must meet the demands of all classes of service in every section of the country, which of course would be impracticable because it would hamper improvement and retard development.

As a matter of fact, however, nothing of this kind was even remotely considered in connection with the program of standardization of equipment. The fact that the standardization program was entrusted to a committee composed of some of the ablest superintendents of motive power and mechanical engineers in the railroad business, who for years have been active

in the work of this association, together with the engineers and designers from the locomotive builders, should have been a sufficient guarantee that nothing radical or impracticable could come from the deliberations of such a committee.

An effective transportation machine is just as vital to the welfare of the nation in time of peace as it is in time of war. Quantity production, standard parts and efficient performance are just as necessary to efficient industrial progress now as they were one or two years ago.

An attempt to agree on a single standard for locomotives or cars, without regard to the character of the service performed, would of course be impracticable and such a plan must of necessity be a failure. Standardization of certain dimensions and appliances common to all locomotives and the preparation of designs for a number of standard types of locomotives using appliances common to all and which are as far as practicable interchangeable, is an entirely different proposition and is intended to bring about a condition which has been striven for by railroad men during the century of locomotive development which has just passed.

While it has been generally agreed that cars may be standardized, it has been frequently pointed out that the differences in operating conditions, such as grades, character of fuel used, and nature of traffic would make a single standard design of locomotive impracticable. This is entirely true and such a thing was not attempted, but it is equally true that a locomotive that is designed to haul a certain train at a pre-determined speed on a 2 per cent grade will perform that service equally well whether the grade be in the Alleghenies or in the Rockies, and while standardizing the design of locomotives does in a measure prevent some of the various designers from giving undue preference to their individual ideas, experience with the standardized designs has indicated that so far we have lost little or nothing of value thereby.

This, and other associations of railroad mechanical men have been built up almost entirely on the principle of standardization. It will be interesting perhaps to those who have not closely followed the work of this association in its early days to refer to the proceedings of a meeting of this association, held at Adrian, Mich., September 19, 1866, under the name of "Car Masters" at which time the following resolution was adopted:

"Whereas, It is very desirable, in view of our extensive interchange of cars of our various compromise lines that we adopt some uniform plan of building for future use, and

"Whereas, It is found impossible to agree as to a uniform truck, some preferring wood, and some iron, therefore

"Resolved, That we recommend to the Red and White Lines, that they, through the Presidents and Superintendents of the different roads, authorize N. H. Marsh, of the Cleveland, Plainsville & Ashtabula Railroad, and Joseph Jones of the New York Central Railroad, to each build a sample car of such style as in their judgment they may think best, and after such cars are built, and approved by the Presidents and Superintendents of our connecting lines, we recommend that such cars be our pattern cars, and that all roads running in connection conform in all the details to the pattern cars, thereby saving all our companies expense and delay in running and repairs. We would also recommend that in the building of the different styles that the axles and brasses and other parts that it is possible to make so, be precisely uniform, also that Mr. Marsh and Mr. Jones each furnish to each road, patterns for the use of each road, at the expense of the road that receives them.

"We also would recommend that, in view of the constant increase of the cars in the various lines in connection with us, that the Presidents and Superintendents have this matter acted upon immediately in order to meet the wants of roads now building cars. Adopted."

It will be noted in this resolution that they had the same disagreements relative to the use of wood or metal for the different parts of the car that we have today. It will also be noted that the purpose of standardization, as pointed out in this resolution was to save "All our companies much expense and delay in running and repairs."

It will be noted that "Pattern Cars" were to be built which corresponds largely with the method of the Administration in having sample cars built by each of the builders and inspected before they were allowed to proceed with their regular orders and that patterns for the use of each road was to be furnished at the expense of the road which receives them, which corresponds in a great measure with the plan followed by the Administration in furnishing drawings of the U. S. Standardized cars and locomotives.

As a matter of fact, however, the real foundation for standard cars was laid long before the date of this meeting in the adoption of a standard gage of track to avoid expense and delay incident to the transfer of lading from one car to another at the terminus of each railroad, because of the difference in gage of track which prevented cars from being sent through to the destination of the shipment.

Although the standardization of gage of track was pretty well established it remained for the emergency created by the Civil War to bring about the practice of sending cars through to the destination of their lading regardless of ownership.

If the practice of standardization needed any justification the illustration provided by the larger railroad systems, such as the New York Central or the Harriman lines, in immediately proceeding to standardize the equipment of their entire line and extending its standards as their lines are extended, either by construction or purchase, would surely be sufficient, and it has always been difficult to explain why parallel lines operating through the same section of the country over approximately the same grades and handling the same kind of traffic should each have their different designs of equipment.

Changes in operating conditions are constantly emphasizing the need for standardization both in locomotives and cars. Freight cars have for many years been interchanged under the rules of the Master Car Builders' Association, and we are all familiar with the delay to equipment and the added expense of making repairs, including the necessity of carrying numberless parts in stock to provide material for repairs to other line cars which is made necessary by the different types of construction which are now in general use.

It is unlikely that locomotives will ever be as freely interchanged as cars, but at the present time locomotives are rendering an increased amount of service on the railroads of other than owning lines, and the indications now are that during the coming fall and winter this will be further increased, therefore the need for standardization of locomotives is becoming almost as great as for freight cars.

On March 1, 1918, 33 railroads were using 522 domestic locomotives belonging to other lines, and in addition 135 locomotives originally constructed for the use of our army in France, popularly known as Pershing locomotives, were in service on railroads under Federal control. Although the Pershing locomotives have long since been converted back to French standards and shipped overseas, there are at the present time 422 other line locomotives on 51 railroads under Federal control and in addition 200 locomotives originally constructed for the Russian Government, which have been modified for use on American railroads.

Another need for standardization of equipment which has been created by the Railroad Administration is the work which has been done in the way of consolidation of terminals and locomotive dispatching and car repair facilities. The consolidation of locomotive dispatching stations alone has effected the elimination of 820 engine houses end engine house organizations; therefore, many locomotives which were formerly cared for in the engine houses operated by the owning lines are now being handled at a joint terminal.

Nationalization of Railroad Shops

What has been termed the "Nationalization of Railroad Shops" has resulted in 3,493 locomotives receiving repairs in other line shops during the period from January 1, 1918, to June 1, 1919. The handling of these locomotives, both in engine houses and at shops, has necessitated additional material for the particular locomotive, and has frequently caused extended and expensive delays because the material was not in stock at the point where it was needed.

An illustration of this is a case where a Mallet locomotive leased to another line was held out of service for repairs until rental amounting to $4,800 had accumulated, while waiting for a repair part which cost less than $30 to manufacture. In another instance, a leased locomotive was held out of service while rental amounting to $1,680 accumulated while waiting for tires and another while $1,375 accrued while waiting for a piston and rod. Numerous other illustrations of this kind can be given

which amply justify a greater degree of standardization than has formerly existed.

The illustrations given, of delay and expenditure caused by waiting for parts for repairs, are not intended as a criticism of operating methods but rather as a criticism of any failure to use standard parts where they may reasonably be used.

Standard Locomotives and Production

Considering standardization from the standpoint of production it is only necessary to refer to what the builders have done with standard designs as compared with individual designs to see how very much production can be increased.

In this connection, it is interesting to note that one of the large locomotive companies were able to produce 163 locomotives of standardized design in a five weeks' period, while they were able to complete but 104 locomotives of individual design during a similar period, and this experience is typical.

The experience of another locomotive builder during a year's trial proved conclusively that they could produce at least 30 per cent more tonnage of standardized locomotives than miscellaneous locomotives of similar weights requiring separate specifications and a separate set of standards and gages.

Standardization means, therefore, tremendous economies not alone to the builder, but to the purchaser, and for this reason if for no other, the efforts of this association to standardize equipment should be encouraged.

In computing the cost of a locomotive it is of course necessary to include the cost of the design and the making of drawings, patterns, dies and formers. Therefore it will be clearly seen that this expense is multiplied by the number of different designs which are built. Because of this, and the reduced work in the drawing room and in the preparation of bills of material, as well as the reduction in other overhead expenses the cost of standardized locomotives is reduced.

Standards and Maintenance

Standard locomotives and standard cars will reflect superior maintenance and will show a reduction in time at terminals, also a reduction in the time in shop. Parts standard to such equipment can be manufactured in quantity well in advance of the shopping. Men engaged in repairing equipment, because of their familiarity with them, will achieve greater speed than where each vehicle presents new problems in each part.

Striking illustration of this is found in the cases where locomotives were sent to other line shops for repairs, and hundreds of instances have occurred where the time lost by the locomotive due to sending to the owning lines for some minor part or making patterns and manufacturing it has cost more than the entire repair bill.

The Committee on Standardization of locomotives working jointly with representatives of the manufacturers brought about standardization of the dimensions of numerous specialties. These specialties need not be of the same type or purchased from the same manufacturer; in fact they may be of widely different design yet their dimensions were standardized so as to be perfectly interchangeable. This is true of injectors, lubricators, safety valves, power reverse gears and many other highly specialized productions.

The point has been raised that locomotives built to standardized designs will not be uniform with the present standards, therefore, will increase the number of spare parts necessary to be carried in stock. This in some cases will no doubt be true, but as a matter of fact there is no more difference between the locomotives built to standard design, the working parts of which are largely interchangeable with other locomotives, than there is difference between two road classes of locomotives on the same railroad. For instance, there are 66 different items, or 10 per cent, of the total which are standard for all of the 12 standard types of locomotives. There are 110 different items, or 16 per cent of the total which are standard to 9 or more of the 12 standard types of locomotives and there are 165 different items which is 25 per cent of the total number that are standard to 6 or more of the standard types of locomotives.

The importance of this will be more fully realized when we consider the fact that few roads will probably ever require locomotives of all of the 12 standard types. A comparison of the cost of locomotive repairs on various railroads will indicate conclusively that railroads which have developed and which maintain definite well selected standards are experiencing decreasing maintenance cost.

1297 Items Standardized

The work of standardization covered a total of 1297 items, therefore, I shall not attempt to outline all of them but on the locomotives the following are some that will be recognized as facilitating maintenance without in any way decreasing operating efficiency.

All boilers and boiler seams are of the same general design, and in nine classes boilers are of the conical extended wagon top type.

Superheaters of similar arrangement are applied to all, the top header type being used, although the number and length of units varies with the type of locomotive.

Flues and tubes were so worked out that four flue lengths, viz: 15 ft. 0 in., 19 ft. 0 in., 20 ft. 6 in. and 24 ft. 0 in, filled all requirements. All superheater flues are 5½ in. diameter and all fire tubes on road locomotives 2¼ in., and on all switching locomotives 2 in.

The standardization of firebox dimensions permits the interchange of boiler and ash pan details. Without any sacrifice of grate area it has been easily possible to make the firebox lengths the same on five and three classes respectively, and to care for all classes with widths of 66¼ in., 84¼ in. and 96¼ in. Similarly it was found possible to make the grate surface and grate arrangements uniform on three classes with an area of 76.3 sq. ft. each, and two classes with an area of 66.7 sq. ft. each.

Innumerable details are susceptible to standardization. Thus, the dome caps, safety valve fittings, injector check and pipe support, hand rail posts, longitudinal and radial staying, tube and flue end styles, smoke box and other details are interchangeable on all classes of locomotives. Mud ring corners, staying in throat sheet, superheater damper arrangement and smoke stacks are interchangeable for all road classes.

Cylinders are of similar, general design with only differences in dimensions and proportions imposed by the work to be developed. Fourteen inch piston valves are used on all road classes, except the light Mallet. All steam chest and cylinder glands are of similar design.

The diameter of drivers are worked out to give the best proportions for each type within the limitation of the design. Wheel centers and tires are largely interchangeable and three classes of road engines are each provided with 57 in. and 63 in. diameter driving wheels.

In main journals only four sizes were found necessary, viz: 9 in. by 12 in., 10 in. by 12 in., 11 in. by 13 in and 12 in. by 13 in., and for driving wheels other than main, 9 in. by 12 in., 10 in. by 13 in. and 11 in. by 13 in. journals only are necessary. In addition, other than main axles on some heavy classes are used for main axles on other classes. The same is true of driving boxes and their parts, crown brasses, cellars, etc.

Trailing trucks are interchangeable on all road locomotives except the heavy Mallet and the tires, wheel centers, axles, journal brasses and details are similarly interchangeable.

All leading truck wheels and axles are interchangeable as are brasses, boxes and cellars.

One crosshead pattern serves eight classes of locomotives and other details, shoes, piston rods, etc., are used on two or more classes.

In the design there was borne in mind the entry of better or improved parts at some future time. To illustrate this I desire to point out that the frames of all locomotives have been slotted so that automatic driving box wedges may be applied in the future without the necessity for any machine work on the frames. Three designs of tenders with water capacity of 8,000, 10,000 and 12,000 gallons respectively, satisfactorily meet the requirements of all classes of service.

On the cars, it was possible to standardize numerous items; for example, three trucks with capacities of 40,000 lb., 50 000 lb., and 70,000 lb., respectively, may be used for a total of seventeen classes of cars, so that three patterns each of bolsters and truck side frames, and three lots each of brake levers and brake connections only are required.

Roofs are interchangeable. The dimensions of draft gear pockets are uniform and couplers, coupler yokes, uncoupling mechanism and many details are interchangeable on all classes of cars.

In the design and construction of the cars built on Administra-

tion order the standards of the M. C. B. Association were found of incalculable help, and they were closely adhered to. For example M. C. B. sizes of lumber were used throughout the cars, and wherever possible other items which the M. C. B. Association has made standard were used.

The winter of 1917 and 1918 exploded the theory that in order to render efficient service locomotives must be specially designed for the road on which they were to be operated. When it was necessary to bring western locomotives east, which was done to the extent of several hundred, it was found that these locomotives rendered excellent service and the only interference was due to the difficulty in getting repair parts and getting employes familiar with their repair and operation, all of which would have been avoided by even a moderate degree of standardization.

Standardization of locomotives and cars will reduce the time at terminals and in shops by reducing delays caused by manufacturing material for repairs, because of not having suitable materials in stock. It will provide locomotives that will be familiar to enginemen and repairmen so that no loss of efficiency will result in transferring locomotives from one division or from one railroad to another as traffic conditions require.

It will reduce the quantity and consequently the cost of material necessary to be carried in stock at various terminals in addition to the reduction in delay. The reduction in expenses will be found to be substantial and this is confirmed by the cost figures of those railroads which have to the greatest degree standardized their designs and practices.

In the item of material alone, there would be an estimated saving of 50 per cent in the cost of the spare parts necessary to carry in stock and this saving can still further increased. The cost of carrying $100 worth of material is not less than $5 per annum for carrying charges only, but the carrying charges only, but the carrying charges are really only a small part of the total cost. In addition to the cost of carrying material, there must be included the expense due to deterioration and obsolescence. I have been furnished the figures of a well-officered road covering a period of ten years, which shows that these total figures are almost 18 per cent.

It should also be borne in mind that the interest on the investment, as well as the annual charges to depreciation, must be charged to operation, and this figure on an average railroad, assumes important proportions. Thus, an increase of $5,000 in the cost of a locomotive means an annual charge to interest and depreciation of approximately $450, or say $1.25 per day, and this amount accrues irrespective of the service rendered or the productivity of the investment.

Standardization does not mean stagnation. This is evidenced not alone by the railroads which have extensively adopted this principle on their own line, but by companies which manufacture specialties used in railroad work. No one will accuse the air brake companies of having failed to keep abreast of the times, and yet their product is standardized to a very high degree. The same is true of a great many other specialty manufacturers, which, by the establishment of, and a strict adherence to definite, well selected standards, have built up businesses which are more than nation wide.

Surely no one will say that the adoption of standard dimensions for axles, journal boxes and contained parts, couplers or safety appliances as referred to in the annual address of the President of this Association has had the effect of reducing the carrying capacity or the types of cars which may be built.

As the need for axles with increased carrying capacity became apparent, the need has been met. The American eight-wheel locomotive gave way to the Atlantic type and the ten-wheel passenger locomotive to the Pacific, and when train weights continued, the natural development was the Mountain, so with standards, as the need for additional ones arise, it can be met, without destroying the principle of standardization.

In this connection it is interesting to note the instructions issued by the Direction General of Railroads, when the original committees on the standardization of locomotives and cars were assembled. The instructions which were issued to the Locomotive Committee were to work up specifications for 12 types of locomotives with particular consideration given to creating standards of parts subject to wear and frequent replacement, so that these may, as far as economy and efficiency would permit, be made standard for as many types as possible, and permit the entry of better and improved parts in the future.

Similar instructions were issued to the committee having in charge the preparation of the designs for freight cars. They were charged that plans and specifications should comprise the most improved and modern designs of cars, not only as to structural strength, but having in mind the important questions of:

(a) Original cost.

(b) Maintenance cost for road service, and to be such as to permit the entry of improved or better designs than those described in the plans and specifications.

They were also instructed to provide for the interchangeability of parts, such as standard truck, applicable to various classes of cars, with the same weight carrying capacity, with a view to reducing the material stocks necessary to be carried at repair points throughout the country.

All of these things have been accomplished. It has been shown that it is possible to build locomotives covering practically the entire range, in weight, size, type and service, using to a very great extent standardized parts and dimensions without the introduction of any designs or parts whose reliability had not been demonstrated by extensive service As a result, 12 classes of locomotives have been designed and built, with a great many parts standard to all of the classes of locomotives and with details interchangeable not only with locomotives of the same class, but with other classes.

The same thing has been true of the cars. Seventeen different classes of cars, including box, stock, gondola, hopper, refrigerator and tank cars have been designed of varying sizes, capacity and kind of construction, and yet it has been possible to not only build these cars so that three kinds of trucks only were necessary, but also to realize a very high standard of car construction. Where standards are adopted under suitable safeguards, and where those not only engaged in the production, but also those who are responsible for the maintenance and operation, have their wishes considered, superior results may be expected.

The success of a transportation company is not reflected by the number of patterns they own, by the sheets of tracings they possess, nor by the number of types of locomotives and cars on their equipment list, but rather by the service they obtain from their facilities and the promptness with which they are able to move the business offered.

The measures of operation is the use which may be had from a locomotive or car. If, by reason of reduction in time at terminals or time at shop, we can add 1 per cent to the time available for service, we have in effect added one locomotive or car to each 100. An addition of this kind adds nothing to capital, costs nothing for repairs and carries no charges for depreciation.

In carrying out this policy of standardization the Railroad Administration has simply followed not only the policy, but the practices which have long been advocated by this Association, the difference being that the Railroad Administration has a greater measure of authority to make its rules effective and it is a notable fact that most of the objections to the standards established comes from those roads which have shown the greatest disregard of M. C. B. standards.

This Association has originated most of the standards now in general use on American railroads, but has frequently required assistance in making them effective. No better organization exists to continue on behalf of the railroads the work of standardization in the future and if assistance is needed to make the rules of this Association effective it is to be hoped that in the final settlement of the railroad problem such means will be provided.

It would be a serious loss to the railroads of the country if the co-ordination of the work of standardization and the spirit of co-operation in the application of such standards which has been fostered during the period of Federal control should be permitted to decrease in any degree and it will be a distinct loss to the railroads, particularly to the mechanical departments, if in the final arrangement some way is not provided to hold all that we have gained and to continue the work of standardization for the promotion of both safety and efficiency in a co-operative way between the Federal government and the railroads as represented by this Association.

In this huge constructive work some mistakes were made, but the sum total constitutes the greatest step in standardization that has ever been taken by the railroads of America, and the standardization committee is to be congratulated on its work.

Critics may magnify minor but irritating defects, and may

minimize the vast benefits to be derived from a reasonable program of standardization intelligently carried out, but in spite of all this, I venture the prediction that among the many progressive methods initiated or fostered by the United States Railroad Administration which will be perpetuated and improved upon, none will last longer, be of more benefit, or give more satisfaction to the railroad men of the country than the program of standardization of rolling stock.

Report of Standards and Recommended Practice (A. R. M. M.)



W. E. Dunham
Chairman

After consideration of the present Standards and Recommended Practice of the American Railway Master Mechanics' Association, together with replies received to the Circular of Inquiry, sent to all members, the committee submits the following report:

Specifications for Solid Wrought Carbon Steel Wheels (Standard, Pages 239-242, Sheet M. M. 24).

Attention is called to the fact that the specifications for solid wrought carbon steel engine truck wheels in Section II, Paragraph 7-(1), limit the inner hub projection to $3^9/_{16}$ in. as a maximum from the line *AB*, thus making the actual projection from the rim face $1^{19}/_{32}$ in., and that sheet M. M. 24 shows these figures also. Information is submitted which indicates that by far the larger proportion of the railroads specify this projection as $1^1/_{16}$ in. and greater, while some few railroads specify it smaller. It is suggested that the wording of this paragraph be changed to read "shall not be less than $3^9/_{16}$ in." instead of "shall not exceed $3^9/_{16}$ in." The committee concurs in the suggestion.

Pipe Unions (Standard, Pages 332, Sheet M. M. 19).

The standardization of pipe unions, both flat and ball joint types, as concerns the contour and interchangeability of parts, which was a matter of special investigation with the A. S. M. E. and M. C. B. Associations, in accord with the action of the 1916 convention, and which was dormant during the war period, has again been taken up with those associations. Progress only, at this time, is reported.

The report is signed by W. E. Dunham (Chairman), Chicago & North Western; M. H. Haig, Atchison, Topeka & Santa Fe; A. G. Trumbull, Erie; A. R. Ayres, New York, Chicago & St. Louis; G. S. Goodwin, Chicago, Rock Island & Pacific; R. L. Ettenger, Southern, and B. B. Milner, New York Central.

Discussion

Mr. Dunham: I move that the first item, "Specifications for Solid Wrought Carbon Steel Wheels" be referred to letter ballet for a change in the standard.

Mr. Gaines: I second the motion.

The motion was carried.

Report of Committee on Mechanical Stokers

The Committee on Mechanical Stokers has been reporting to this association since the convention of 1913. It has now become extremely difficult to compile any additional data that might be received with interest and appreciation by the members of the association. During the last two years, the railroads have done very little research or experimental work. Consequently, there has been practically no information established relative to the performance of locomotive stokers in service such as is obtained from specially conducted tests.

This two-year's war period, from a manufacturer's standpoint, however, has been extremely active, and there have been a large number of stokers applied. Inquiry was made of the different stoker manufacturers as to the number of stokers they had actually applied which were in service as of January 1, 1919. The following table indicates the number of different representative stokers then in service and the type of engins to which they have been applied:

Kind of Stoker	Mallet	Mikado	Santa Fe	Centipede	12-Wheel	Decapod	Consolidation	Mt. Type and Mohawk	Pacific	Total
Street	424	638	380	4	14	...	22	3	37	1,522
Duplex	240	804	195	...	...	53	1	1	...	1,294
Standard	120	338	36	...	33	...	21	162	21	731
Hanna	70	6	73	...	16	...	...	4	...	169
Elvin	...	...	1	...	...	...	...	...	...	1
Total	854	1,786	685	4	63	53	44	170	58	3,717

There was a total of 3,717 stokers of the above types in service January 1, 1919. The stoker report of 1917 shows a total of 1,611 stokers (exclusive of Crawford) in service as of April 1, 1917. There have been placed in service 2,106 stokers between April 1, 1917, and January 1, 1919, which indicates the rapid rate at which locomotive stokers are being applied. The types of locomotives to which the stokers are largely being applied are the Mallet, Mikado and Santa Fe, which represent the locomotives of large capacity. The question as to the size of locomotives upon which stoker installations are justifiable is one that is frequently referred to and is yet unsettled. It is the opinion of the committee that the conditions surrounding individual conditions are so variable that no fixed rule can be recommended for guidance in this connection.

Suggestions have been made involving certain limits in the weight and tractive effort of locomotives, the character of fuel used and the rate at which it must be fired. Limitations on the basis of weight and tractive effort of locomotives may be feasible where the locomotives operate under uniformly heavy conditions, but even then there are certain local and physical conditions to be considered that prevent any general recommendation being laid down even on such a basis as this. Locomotives operating in districts where the demand for maximum power is intermittent and for short duration could not be considered on the same basis as locomotives of the same weight and capacity operating where the maximum power is demanded for extended periods. The character of fuel available for firing may also be considered one of the controlling factors in consideration of the application of locomotive stokers to comparatively small engines. In view of these governing factors, the committee does not feel justified in attempting to suggest a ruling which might be followed in the consideration of this phase of the subject, as it is believed that this question will have to be settled based upon the surrounding conditions under which the locomotive is required to operate.

There were some questions of general interest in connection with stoker operations concerning which it was thought well to secure an expression from the roads using mechanical stokers. These questions were sent out to such roads and replies to this inquiry have been received from thirty-two roads; these thirty-two roads represent a total of 1,777 of the stokers now in service. Inquiry was made relative to the kind and character of fuel used, and it is noticed that on all of the roads bituminous fuel is used; the fuel reported varies in heat units from 9,212 B.t.u. to 14,520 B.t.u.

In answer to the inquiry as to whether the same size exhaust nozzles are used on stoker-fired locomotives as employed on hand-fired locomotives, it seems that the general practice is to use the same size exhaust nozzle, although a few roads vary from this general practice. Three roads report smaller nozzles on the stoker-fired locomotives, ranging from $^1/_8$ in. to $^1/_4$ in.

smaller in diameter. Two roads report that they are using nozzles from ⅛ in. to ¼ in. larger in diameter than are employed on their hand-fired locomotives.

The consensus of opinion is that the stoker-fired locomotives burn more fuel than the hand-fired. Where percentages of difference have been expressed they range from 10 to 41 per cent in favor of hand-firing. This difference, however, is expressed in terms of coal as fired and does not recognize the advantages that have been gained by improvement in the performance of the locomotive resulting in uniform steam pressure and more active and uniform performance over the division. These increases in fuel consumption may, in some instances, be considered as the price of firing locomotives of capacity beyond the range of successful hand-firing.

In referring to the continuous performance of stokers over a division, the record indicates that in the majority of cases the stokers are doing about 100 per cent of the firing of the locomotive.

The failures occurring on the stoker equipment are the same old offenders and are classified as "failure of stoker parts," "foreign matter in fuel" and "wet coal." The record tabulated from the information received as to the percentage of failures that may be classified under these three headings is quite interesting in the variety it presented. On some roads the highest percentage of failures is due to broken stoker parts; on others, foreign matter in the fuel seems to be the chief offender, while on others the question of wet coal is apparently causing the most concern and delays to stoker-fired locomotives.

An effort was made to obtain information relative to the cost of stoker maintenance upon a thousand-mile basis. Very few roads keep such a record, and those that have reported on this item, when grouped together, show a very wide range of costs. One road with 92 stokers in service reports a cost of $1.77 per thousand miles, while another road with 54 stokers in service shows a cost of $40.00 per thousand miles. These are the maximum and minimum cost figures presented and indicate the extent of the variation in cost, and if closely analyzed it would no doubt be found that local conditions were possibly largely responsible for the variation.

In the circular of inquiry sent to the users of mechanical stokers, suggestions relating to features of mechanical stokers to which attention should be directed by the manufacturers were solicited, and it might be well to incorporate some of these suggestions in this record. A simpler and more accessible lubricating system has been suggested by several roads. Provision for the better handling of wet coal comes as a suggestion from roads that are experiencing trouble in this respect. Recommendations for more accessible conveyor screws are presented, which might be considered in conjunction with one road which suggests that the stoker be constructed so that it will be less susceptible to failure when foreign material gets into the stoker mechanism with the coal. Provision for overcoming the loss of fuel from the conveyor system may well be considered by the manufacturers as this feature has been suggested as a stoker deficiency. Improvement in the arrangement for the positive adjustments of conveyor adjusting plates is recommended, and it has also been suggested that consideration be given to the design of a system of conveyance of the fuel from the tender to the fire box that will provide against pulverizing the fuel in conveyance. Better protection from dust for the bearings and gears of the stokers is referred to as desirable.

In the report of 1917, additional reference was made to the Elvin stoker then undergoing development on the Erie. This stoker has passed through its experimental stage and it is understood that it is now in condition to be presented as a commercial proposition. The committee has learned that the Elvin stoker now in operation on the Erie is giving very satisfactory service, and that it embodies several individual features which may mean greater economy in mechanical firing. The opinion has been expressed by disinterested parties who have come in contact with this type of stoker and have seen it in operation that, while it may not have reached its final stage of development, there are, nevertheless, marked possibilities in a stoker of this type.

The committee wishes to recognize the unceasing efforts and activity of the stoker manufacturers in the development of their respective devices, and is of the opinion that with continued effort in the light of service experience, a more perfect stoker may be developed in which objectionable features, such as those outlined in this report, will have been eliminated.

The report is signed by A. Kearney (Chairman), Norfolk & Western; M. A. Kinney, Hocking Valley; J. R. Gould, Chesapeake & Ohio; J. T. Carroll, Baltimore & Ohio; J. W. Cyr, Chicago, Burlington & Quincy; A. J. Fries, New York Central, and L. B. Jones, Pennsylvania.

Discussion

Mr. Gaines: When we were working out the administration engines, we heard a great deal of discussion on the stoker, and the thing that struck me most forcibly in that discussion was the question of its lack of economy over hand firing. The discussion seemed to hinge on the point that the stoker, while necessary on heavy power to get the maximum results, was not as economical as hand firing. I have seen the exhibit that is here this year of a stoker that approximates hand firing in principle, and I think it is a very valuable principle and new. Should we have a coal crusher on our engines and carry that unnecessary weight around, or should some method be procured for curing the fuel before we put it on the tank? Carrying this crusher around on our engines is an unnecessary burden, and I think we should go into the feature of purchasing the fuel before it is put on the tank.

Mr. Dunham: The preparation of the coal has always been a very serious detail in the successful operation of mechanical stokers. I believe that the committee can do no better in the coming year than to gather information concerning the cost of preparing coal off the engine as compared to the cost of preparing it on the engine, taking into account the necessary equipment both off and on the engine, and the results obtained in the fire. *I, therefore, move that that be considered very seriously, and if necessary, referred to the general committee for action.*

Mr. McBain: I second the motion.

J. A. Pilcher: In the preparation of coal on my road, which has a large number of stoker engines, they provided, in their new types of coaling plants, a method by which the coal is separated as it passes into the storage bin. It goes over the screen in such a manner that coal suitable for the stokers is stored in one part of the plant, and that suitable for hand firing in another, with the further arrangement that in case there is an over supply of the lump coal for hand firing, that can be passed back through the crusher and into the bins for the stoker firing. That seems to be a very simple solution, although it makes quite an elaborate plant. It would appear to be the best method to have one breaker at the terminal instead of a large number on the tenders.

H. T. Bentley (C. & N. W.): We have just been considering a rather heavy locomotive to be fired with either oil or lignite, and I had a meeting with the locomotive builders yesterday to see how they could handle this particular type of engine. No one seemed to have had any experience with burning lignite coal with a stoker. Are there any members who have successfully burned lignite coal such as Wyoming lignite, and, if so, what kind of stoker was used for that purpose? It is a very serious situation with us. We have large fields of lignite in sight and we would like to get some kind of stoker that would handle it as satisfactory as it does the bituminous coal.

Mr. Fuller: We are handling Wyoming lignite or semi-lignite coal with a stoker; the fuel is prepared for and put on the tender, and with another class we have the crusher on the engine. We have two grades of lignite coal or semi-lignite. The Hanna coal is best, not crushed too fine but about the size of a walnut. It does deteriorate and it does interfere with the stoker operation, in wet weather, when very fine coal becomes thoroughly saturated with water, but I don't think, Mr. Bentley, you will have any trouble either with the Street or Duplex stokers. I presume other stokers are just as good for burning a semi-lignite coal or any Wyoming coal if the stoker is properly handled. We have been very successful with both makes of stokers. We have had some trouble at the start with the Hanna. It was felt that Hanna coal could not properly be prepared at the mine, but we prepare all our coal at the mines with the exception of that for engines that are equipped with a crusher.

Mr. Chambers: I note one item in this report speaking of percentage, increased percentage of consumption of coal with stoker as compared with hand firing. That was no surprise. A new device never starts out with its best effort. There is

much to be learned in the manipulation of a stoker, and the easy part of the job would incline a fireman to waste coal. While I have never had any direct supervision of a stoker engine in operation, I think that a man who would practically starve his fire at all times would have you a lot of coal, because you are taking no chance whatever if you get a little behind. It is very easy to increase the operation and your fire is covered all over at one time. It is not like the hand firing which might develop holes and make your engine go back materially in steam. I am not in favor of the system of automatically sifting your coal out as it goes into the bins. To get proper results you have got to prepare the coal either at one bin or in as many bins as necessary for the system and deliver it to the engines and to the bins in a prepared state.

Mr. Gaines: I think that the committee ought to develop whether or not it is feasible to have the coal producers run the coal over a screen and give you such portion of the screenings as you need for firing. I think that is going to be one answer. If the committee will take it up with the producers, they will find in many parts of this country that the producers would be very glad indeed to take out the lump that is too big to go into the stoker and prepare the fuel without any cost whatever.

Mr. Barnum (B. & O.): To derive any benefit of the figures on increased cost for fuel we should have, to go with that, the increase in the work done. One of the principal advantages realized by the roads using stokers is the increased tonnage hauled by the steam locomotive as compared with the tonnage that can be hauled by that locomotive when hand fired. One of the omst important things for this committee during the next year is to give us something definite in the way of increased work performed with the stoker as compared with the hand-fired engine.

Mr. Fuller: There is no doubt but that a large percentage of the locomotives that were equipped with crushers were equipped because of the inability to use these engines in any territory on their railroad due to lack of having crushers at their coaling stations and their inability to get the coal crushed at the mines. After the crusher becomes a universal equipment there is no doubt but what the engines can run without a crusher on them. Mr. Gaines spoke about having the mines prepare the coal. We have our own mines and we prepare our own coal. Some years ago slack was a drug on the market and they threw it away, but when we got stokers there was more demand for slack than anything else. If you depend on the mines to crush your coal, those of us who have to store coal would want to store crushed coal. The loss in deterioration would be so great that I don't believe you would want to do it; and if you did store lump coal and did not have a crusher you could not crush your coal. I believe from our experience that we have to put crushers in our coaling stations and crush coal when we want. If you don't have a crusher on the engine, then you will be up against it.

Mr. Gaines: Perhaps I did not make clear the preparation of fuel. At the mines in Alabama they are very glad to screen the coal, run it over a three-inch mesh screen and give you the screenings and take the lumps out, and when that has been done it is all ready for the stokers. The next thing to be considered is storing the screened coal. It is surprising how little that deteriorates. I have had experience for four or five years with storing the nut coal to take us through the winter season. About Christmas time it is almost impossible to get fuel for your locomotives unless you store it in the summer, the demand for domestic fuel is so great and the depreciation is certainly very, very small. I would say that it is less than 5 per cent from tests we have made.

W. J. Bohan (N. P.): The question of whether we should store coal in prepared form for delivery to the locomotive or whether we should load reasonably prepared coal on the engine and there crush it for the firebox is one that should be approached with extreme care. The subject is very apt to be looked at from the viewpoint of local conditions instead of looking at it as a machine that would have to be used to take care of coal over a very wide area. We are approaching a period when lignite coal will necessarily be used on locomotives and we should creep before we walk. We are too prone to take broad jumps without making preparation. We can't afford at present to equip the coaling stations necessary. We have lots of territory west of the Mississippi river where a highly developed coaling station would be a failure. We lose sight of the fact that there are thousands of miles of outlying territory and very few miles of the territory where the operation is intense, and where, perhaps, specially prepared coal would solve the problem. All we need at the coaling station is a clean, dry coal. We have to burn the coal, both lump and slack and poor and good, and the thing we should do at the present time is to develop the stoker that we have started out with to its highest possibilities, before attempting to install highly developed and expensively operated coaling stations.

Mr. Kinney (Hocking Valley): This committee does not desire to convey the impression that the stoker is not an economical machine on the locomotive. We have attempted to make it plain that in all cases where the stoker is applied it is where the range of successful hand firing has passed and you are applying the stoker for the benefits that will come from it, and these benefits are derived in other directions. We would very much decry any thought that this meeting would have, or individuals here that are considering or are operating stokers, that the stoker is not an economical proposition. As to the preparation of fuel. The stokers come on your line perhaps one one or two engines. You are not prepared to put in an expensive plant. These devices and methods that have been placed in use on the locomotives are in their infancy, and possibly, as time will tell, a makeshift in the development of the stoker. This committee will be very glad to have the co-operation of all users of stokers.

F. P. Roesch: In regard to the preparation of coal for the use of stokers, you will recall, the original stoker that was put out used prepared coal, and there are more of this type of stoker in use at the present time than of any other type. We met with considerable difficulty, due to the fact that all locomotives on all railroads using this stoker were not equipped with the stoker. The result was that it was necessary to carry two kinds of coal, having a two-compartment shute. The coal for the Street stoker is prepared at the mines, either by means of crushing or screening. I have known of instances of railroads equipped with this type of stoker where the coal is prepared at the mines and a mistake was made in the billing of the coal, the result being that the division using the hand fired locomotives received the prepared stoker coal and the divisions having the stoker fired engines had the lump coal. You may say that such a mistake as that is inexcusable, but such mistakes do occur. We know that this fine screened coal is not the best coal for hand firing. We also know from tests made at the University of Illinois and on various railroads ha lump coal, screened lump coal, is not the best coal for firing. We will get the better results through the use of a mine-run coal, in view of the fact that it is not probable that any railroad will be operated with all stoker fired engines; it would be well to give the matter of taking the crusher off the engines very serious considerations before any recomendations are made in that direction. It costs a little more to crush coal; there is a great loss of crushed coal in transit, there is a great loss at the chutes, and it will not store due to the fact that it is more liable to spontaneous combustion.

I do not know whether the Alabama coal that Mr. Gaines speaks of fires in that way. All of these things must be taken into consideration before we make any recommendation toward the elimination of the crusher on the engine.

In the handling of lignite, the quality of the coal makes absolutely no difference; it is simply a question of capacity, and the stoker as now developed is of a sufficient capacity to successfully fire the largest locomotives that we have.

So far as the economy of the stoker is concerned, when compared with hand firing, if we take into consideration the fact that the stoker in itself has never burned a pound of coal, we can see that the lack of economy is not due to the soker as a machine, bu to the man who is operating it. If we educate the man to handle the stoker in the way we have educated them to handle the scoop, we will get exactly the same results, or possibly better results, from the stoker in pounds of coal per thousand gross ton miles that we get from the scoop.

Mr. William Schlafge (Erie): We have, on the Erie, approximately about one hundred and fifty stoker-equipped locomotives. It would be expecting rather too much if you did not have trouble with the stokers as they are not entirely out of the experimental stage. We usually experience trouble with any new device that is put on a locomotive. We have had troubles with air pumps and the injectors and without an exception you will have trouble where a new device is put on a locomotive. Such troubles the designer cannot foresee and service conditions

only can produce them. The stoker makers have worked out an efficient stoker, so far as the delivery of the coal to the firebox is concerned. They, undoubtedly, will work out the problem of an economical stoker and in my opinion it will be just as economical as intelligent hand firing.

We have our coal prepared at the mines. We did have some trouble, but that was due to the conditions of the period that we went through. We can now get our coal prepared in any way we may specify. While there is no data, I am very much of the opinion that there is no economy in making a coal breaker of every locomotive equipped with a stoker.

The committee recommended that in breakdowns there should be a weak link provided somewhere in a convenient location and I think this is a good recommendation. Our troubles today are the breakdowns mostly due to foreign matter getting in the machinery. We have one engine equipped with the Elvin stoker, which is very satisfactory. When foreign matter gets into the machinery the engine stops, but it is only a small matter to remove the obstruction and start the engine.

We ran a test sometime ago, as I remember it about two years ago, on the Kent division, and later on ran a test on the Meadville division. We are conducting further tests now. I believe we will be in a position to give the committee some valuable information for its next report.

Mr. Gaines: I believe that a scheme can be worked out at large coaling plants whereby you could screen the coal as it goes over the chutes into the tenders, taking the lump coal out for hand firing the engines, and using the slack for the stoker. The committee should look into that, and see if something of that kind could not be worked out at the coaling plants to properly prepare the coal for the stoker and also the lump coal for hand firing.

Chairman: The motion before the house is that the report be received and the committee continue with special instructions to investigate the preparation of coal.

(*The motion was put to vote and duly carried*).

Automatic Coal Weighing Devices

Mr. Barnum: I made some inquiries about the automatic coal-weighing devices for locomotive tenders and started with the locomotive builders, but was unable to find that any of the principal locomotive builders had built any tenders with any coal-weighing devices. The only record that I was able to find of such devices being tested was a case on the D. L. & W.

H. C. Manchester (D. L. & W.): We did test out for about a year a coal-weighing device which was invented by L. A. Watres, the same gentleman that invented, the National graphite lubricator. It consisted of a separate coal container, built so as to fit inside of the coal space in the tank. It was set on a scale arranged underneath the coal container, and supported by the tank frame; a gage which was located upon the left leg of the tank in view of the engineer and fireman, showed in actual pounds, how many pounds of coal were in the container at all times. The experiment was very much handicapped at first in getting the proper gage, but after a time that was quite satisfactorily taken care of. There was some difficulty with the dust and particles of coal getting around the device and the mechanism of the device underneath, and we were never able to quite satisfactorily solve that difficulty so as to get satisfactory results from the apparatus. Therefore, we abandoned the test after a number of months, and have done nothing further with it. That is about all I can say, and that is about as far as we have gone with it.

Snow Fighting Equipment

C. E. Fuller (U. P.): I really know very little about snow fighting equipment. Of course, we have to fight snow in our line. Our experience is that it requires different kinds of plows to some extent to successfully fight snow. The trouble with the rotary plows is that there have been too many people who have attempted to buck snow with the rotary plow, which you cannot do. If you endeavor to do it, the rotary plow will soon be put out of commission, because it will not handle snow in a snow bank, unless you have sufficient power behind it to keep the plow fed up with the snow. The capacity of the plow is controlled by the wheel.

In the winter 1916-17—I think it was in that year—we fought snow for about five months constantly over the Rocky Mountains, and it was a fight day and night. The snow would blow from the up mountain and collect on our tracks just as fast as we could take it out. We got up a plow built new from the ground up. It is a bucking plow, a plow that it is necessary to get a speed up of twenty-five or thirty miles an hour, with three or four engines, depending upon their size, to shove it through the drifts. After we had worked with the rotaries and fought the battle until pretty nearly everybody was down and out, the home manufactured plow was put into commission and kept the road open the balance of the winter. The plow was christened the Fuller plow, I don't know why, but we built the plow and we had a great many of them. Our transportation people can't speak high enough of them, after they learned that they would stay on the track, and there wasn't any danger in operating them. They are scattered all over our railroad now. There is just one feature of this plow that has made it a success, and that is the nose of the plow. It digs down in place of digging up. Most of the plows, the push plows, will mount the rail in hard snow or other conditions. The greater the load, the more this plow hangs to the rail.

Mr Bentley: Dan Cunningham, of the Denver & Rio Grande, suggested to me that a paper on snow-fighting apparatus would be entirely proper, and I think it is a very good subject, if the Committee on Subjects will permit of that being given consideration. I think there are a number of us who would like to get some information about snow fighting. We are fighting all the time during the winter months and sometimes we have derailments that are caused, the superintendents say, by the type of plow we use and the type of car we use behind the plow. It is a real live subject, for the Northern roads particularly, and I move you, that we have a paper on snow-fighting apparatus.

Mr. Fuller: Last April, I believe it was April, we had a tremendous storm in Kansas, wet snow *and very heavy*. We had one of these plows going over a part of the Kansas division. Telegraph poles were all on the track, wires and everything else, and there was a passanger train stalled on the main line. They opened the switches at each end so that if anything was coming which they did not know about, they would be protected. The snow plow came along. It saw nothing, it found the telegraph poles, and finally it landed into a box car and cut it to pieces and went through another one; while it damaged the plow, nobody was hurt and the plow was not off the track. We have only had one derailment of this snow plow, and that was on a branch line due fo the ball of the rail being broken for about two feet; the plow went off the track and did a iot of damage, with two engines behind it. Two men were killed and two were injured. But it is our opinion that if the rail had been sound the plow would have gone through this drift as it had been going for several days under the same conditions, without any trouble.

Dan Cunningham: One of the reasons that I suggested this subject is that the snow-fighting equipment receives so little attention that it is something like the Arkansas Traveler—"When it is raining we can't fix the roof, and when it isn't raining we don't need it." Recently I was connected with a road that had to fight snow for eight or nine months a year. It was in an elevation of about 11,600 feet and had 28 miles of 4 per cent grade, so we really know what the snow game is. Some snow is better handled with flangers of different kinds, and others with the appliance that Mr. Fuller has just mentioned, and others with the rotaries. The rotary game is somewhat complicated, because there are so many things about a rotary plow that will give out.

Mr. Gaines: Mr. Chairman, I am going to suggest that the Secretary get in touch with Mr. Fuller and procure the drawings of his plow that he has described this morning and attach them as part of the minutes of this meeting.

Mr. Fuller: This plow is not patented. It is one of our own design and everybody is welcome to it.

Mr. Barnum: I second Mr. Bentley's motion.

(*The motion on being put to vote was carried.*)

The Chairman: There seems to be another motion before us—the incorporation of the drawings of the Union Pacific plow with this report, if that motion has a second.

Mr. Bentley: I second that motion.

(*The motion was put to vote and carried.*)

A Remarkable Exhibit of Railway Artillery

Conventionites Accorded a Rare Privilege Through Courtesy of the Government and the Manufacturers.

THERE ARE TWO EXHIBITS of railway artillery at the conventions this year. One of these, The American Car & Foundry exhibit, which is made possible through the courtesy of the Ordnance Department of the United States Army, was described and illustrated in the *Daily Railway Age* of June 23d, page 1685. The other one, that of the Baldwin Locomotive Works, which consists of a 7-in. caterpillar gun mount and a 14-in. railway gun mount, built for the United States Navy, was described in the *Daily Railway Age* of June 19th, page 1494. The first of the 14-in. naval guns that were placed on railway mounts which were built by the Baldwin Locomotive Works, are familiar to the readers of the *Railway Age,* descriptions having been published in the *Railway Age* of November 1, 1918, page 767; November 15, 1918, page 875; and November 29, 1918, page 967.

In connection with the American Car & Foundry Company's War Activities Exhibits and through the courtesy of the Ordnance Department of the United States Army, Major E. D. Campbell, Railway and Seacoast Section, Artillery Division, Ordnance Department, United States Army, gave an illustrated lecture last evening on "Railway Artillery." The *Railway Age* owes an apology to Major Campbell for having announced in an earlier issue that he was connected with the Navy Department. Extracts from Major Campbell's address follow:

Major Campbell's Address

The popular idea of railway artillery is that it is a development of the recent war. As a matter of fact, it is almost as old as the railroads. It is important to remember that, so far as we can find any record, it had its beginning as early as the Civil War and was used by both the Confederate and Union forces at that time. Thus, railway artillery is doubtless an American invention. The development since the beginning of the world war has been so rapid as to make previous efforts seem of small consequence.

During the campaign against Richmond the Union forces used a piece of artillery which created great havoc among the Confederate gunners. This was a 13-in. mortar weighing 17,000 lb., mounted on a reinforced flat car having eight wheels. During the period from 1863 to 1912, while the idea of mounting guns on trucks had not been discarded, only crude railway mounts of an experimental nature were produced. France and Germany, according to record, appear to be the only countries actually working with railway artillery during these years. In 1912 the Schneider Company, a French manufacturer, produced a 200 mm. 8 in. howitzer railway mount, which was quite a step forward in the design of railway artillery. This mount possessed some of the features which were used in the design of railway artillery during the late war.

America manufactured some railway mounts during the year 1912 for use in the Panama Canal Zone. The cannon mounted on the cars were small, being 4.7 in. howitzers. During this period the main idea for the development of railway aritillery in the minds of the designers was its obvious use for coast defense work. However, during the present war, the use of this artillery has been confined to field operations entirely, necessity of its use for coast defense not having developed.

Design Problems

Transportation Problems.—Transportation of railway mounts involves a problem of design that requires the closest consideration of weight, clearances, and the type of track used. You will appreciate that in handling mounts weighing 600,000 lb. and upward, a system of trucks must be utilized that combines perfect equalization and flexibility. Trucks have been designed which have 4, 6, 8, 10 and 12 wheels each. Conditions of road beds in France have limited all axle leads to 17 metric tons each, and this limitation has been followed in the design of equipment intended for foreign service. Trucks to meet these requirements have units, with short wheel-base, connected by span bolsters.

Railway clearances present limitations to the design of all heavy railway artillery that are ever present to handicap the engineer. It is absolutely necessary to give careful consideration to this point in order to transport your mount over any line that an emergency calls for. To keep within this clearance, it is necessary to swing the larger guns out of balance in order to keep the trunnions sufficiently low and at the same time get proper elevation of the gun. In fact, on some mounts where this is not done, an excavation between the rails is required in order to take care of the recoil of the gun at high elevations. These conditions impose extra work and complications which, you will appreciate, enter into the production of railway mounts, but which, none the less, must be met and overcome.

The Ordnance Department has made an extensive study of railway clearances covering both European and American railroads. A map has also been prepared of the coastal lines, the main transcontinental lines and a few central, north and south lines.

Regardless of the care and patience exercised by the Ordnance Department, in designing railway mounts, that could safely be transported over American and French railroads, most of the roads seem to have the opinion that these features have been entirely overlooked in the design. Some peculiar incidents have occurred in the shipment of railway artillery, as, for instance, one prominent Eastern railroad held up a railway mount on its way to the Coast with the information that it would not meet their clearances. Yet two other mounts of exactly the same type had been shipped over the same road without a murmur.

Carriage Problems.—In designing a railway gun carriage one of the big problems involved is to transmit the force due to firing to the earth with the least number and complication of parts. Many different methods of accomplishing this result have been developed, of which the American railway mounts, to be described, are typical examples.

The main features entering into a railway mount design are the recoil system, traversing mechanism, elevating mechanism, and the means of securing stability when firing. These four elements are common to both field and railway artillery, but certain limitations are imposed in railway mounts which bother the designer. The type of railway carriage to be designed fixes, to a large extent, the four features just mentioned. Likewise the converse is true, namely, that these features govern the type of carriage to be designed. Many other elements enter into the design, but once the above are fixed, a

definite type of carriage necessarily follows this decision. Consequently, in designing railway artillery, as is the case of any high-class machinery design, definite uses or special work to which the railway artillery unit is to be used must be given first consideration.

American Types

The two desirable features in the design of railway artillery, namely, that of having an artillery piece which can be quickly emplaced in a battery and that of having a piece so designed as to permit the gun to elevate to any angle up to 42 degrees and to be traversed around the entire azimuth, have been met with in the 8-in. mount in a highly satisfactory and efficient manner. This mount is the only one of its kind in existence, and perhaps represents the highest type of railway artillery. When in firing position this railway mount is supported by a firing platform consisting of four 8-in. H beams, on top of which are placed six cross-ties. The H beams are simply laid on the railroad ties with no spiking, neither do the oak cross-ties require any fastening to the H beams. This emplacement can be laid in position in 15 minutes by a common crew and of course can be removed in less time. When firing at right angles to the track, the side outriggers of the mount are used. When firing railway mounts the trucks are relieved from the shock of recoil.

The gun carriage, known as the 8-inch Barbette Carriage Model of 1918, is mounted on a base ring which is bolted to the car underframe. Traverse is secured by means of a racer which rolls on a roller path formed by machining the top surface of the base ring. The rollers, of which there are 24, are forged steel, 4 inches in diameter, spaced equi-distant by means of a distance ring. Motion is imparted to the carriage by means of a hand wheel which moves a pinion whose teeth mesh into a circular rack secured to the base ring. A system of gears transmit the hand power at the wheel so that one man is able to traverse the carriage with ease. The gun can be elevated from zero degree to 42 degrees by means of an elevating rack secured to the cradle and turned by worm which is rotated by means of gears and hand wheel.

The car part of this railway mount consists of a structural steel drop type of under frame supported by two 4-wheel 70-ton trucks of the Pennsylvania standard 70-ton type. The underframe of the car is a daring departure from accepted car practice in that the center portion drops abruptly. It is recognized that this weakens the car in its resistance to buffing shocks, but in railway artillery this does not present a serious disadvantage. The car is 40 feet 6 inches between end sills, which are 15-inch channels. Both the center and side sills are the box girder type of construction continuous between end sills. Each has top and bottom cover plates and a ½-inch plate covers the entire under frame. Seven cross-ties are interposed between the body bolsters. The body bolsters are of single web construction, having top and bottom cover plates. The underframe is of structural steel construction throughout except the special transoms which take the side outriggers and special transoms for the jacking mechanism.

As an auxiliary feature it is possible to transport this car on 60 cm. gage track by means of special narrow gage trucks, which take the place of the four-wheel standard gauge trucks. It is necessary, however, to remove the gun from the cradle in order to bring the center of gravity sufficiently low to prevent overturning. This railway mount weighs approximately 180,000 lb., which load is carried on two 4-wheel standard gage trucks or four 6-wheel narrow gage trucks. The gun used in this mount is known as the 8-inch Seacoast Gun Model 1888, considerable numbers of which were withdrawn from the seacoast fortifications for use as railway artillery. It has a maximum elevation of 42 deg., with a corresponding range of 21,000 yards. For field use it fires a 200-lb. projectile with 65 lb. of powder.

7-Inch Gun Railway Mounts

Some 7-inch 45-caliber guns were secured from the navy and mounted on the same type of car for operation along our coast as protection against submarine attacks. This car embodies the same outrigger and float idea for securing stability, but is somewhat different in the underframe construction, the main difference being the installation of hydraulic jacks in place of the screw jacks used on the 8-inch railway mount. This mount does not use any emplacement or firing platform, but is simply lowered so that the cross ties rest on the rails. It weighs 171,000 lb. The trucks are 4-wheel Pennsylvania standard, two of which weigh 21,000 lb. The gun is 45 calibers in length, the range is 17,000 yards, with 15 deg. elevation. The projectile weighs 165 lb., using a powder charge of 58 lb.

12-Inch Mortar Railway Mount

This same type of car is also used for mounting 12-inch mortars except that six-wheel standard trucks are used in place of the 4-wheel standard 70-ton trucks. The carriage for the 12-inch mortar has all the advantages of the 8-inch barbette carriages, but is substantially different in design. This difference is in the recoil system, which utilizes a hydraulic cylinder using piston buffer for recoil with an air pressure arrangement for counter recoil. The air is compressed by the recoil of the piece, thus utilizing a portion of the energy of recoil. Six-wheel trucks are used under the 12-inch mortar railway mount in place of 4-wheel standard gage trucks. These 6-wheel trucks are unique in their design since the wheel base and center plate heights are the same as the 4-wheel trucks. As a matter of fact the 6-wheel trucks can be interchanged with the 4-wheel trucks.

14-Inch, Model E, Railway Mount

During the year 1915 a design was started for a railway mount of sufficient capacity to mount the 14-inch Army gun, which would have all around fire, and which could be adapted for seacoast defense. For seacoast work all guns must have at least 180 deg. traverse, and must be easily operated, since the objective is always a moving target. This mount was designed for seacoast work primarily and requires a special emplacement, consisting of a base ring carried on a flat car accompanying the mount. This base ring is inserted in the track and is provided with a roller path on its top surface on which the gun carriage is traversed after the trucks are withdrawn. The method of maneuvering this mount is to first emplace the base ring on any part of the track desired, then running the mount over this emplacement. When it is in the exact position the entire car body is jacked and the trucks withdrawn. It is then lowered in position on the base ring, the rear end resting on an annular support. The trucks used under this mount are of 8 wheels whose diameter is 31 in. The journals are M. C. B. 6 inches by 11 inches. The trucks are the rigid side frame type, with cast steel bolster and transoms. The weight of this mount is 436,700 lb. The two trucks weigh 56,000 lb.

The gun is a 14-inch Army gun, 40 calibers in length. It has a range of 32,000 yards at 30 deg. elevation. The projectile weighs 1200 lb. and utilizes a powder charge of 360 lb.

The railway artillery which I have just described is on exhibition during this week. The mounts are so designed that they can be used either in the field or for seacoast work.

American 12-Inch Sliding Railway Mount

The American 12-inch sliding railway mount weighs 600,000 lb., mounting a 12-inch 50-caliber gun. It is similar to the French A'Glissement or sliding type, in that it has no recoil mechanism or traversing mechanism. The entire mount is 105 ft. long. Each truck weighs approximately 20,000 lb. This load is distributed over 32 wheels, giving approximately 18 tons per axle. The mount can negotiate curves as sharp as 16 degrees and has been moved at the rate of 45 miles per hour. The gun on this particular mount is one of the most powerful in existence, being 12 inches in caliber, 50 calibers in length, and having a muzzle velocity of 3200 foot seconds. The range of this gun is approximately 45,000 yards. The projectile weighs 700 lb. and uses a powder charge of 305 lb.

16-Inch Howitzer

In the case of the 7-in. and 8-in. guns and 12-in. Mortar, the firing platform is so simple that only a few minutes are required to put it in position. By actual test one of these mounts has been brought up to position, firing platform and outriggers placed, five rounds fired, platform and outriggers replaced on car, and the mount gotten under way, in 37 minutes.

In the case of the large guns and howitzers considerable time and labor are required to prepare the mounts for emplacement. This is a serious matter in the case of large mounts when used in the field for various reasons; one being, that the enemy is likely to observe the work of preparing the emplacement by means of aeroplane observers after which it would only be a question of a few hours until the enemy could drop a large shell which would obliterate that part of the landscape. Another reason is that in case of sudden advancement of the enemy, sufficient time is not allowed for withdrawal of the railway mount, due to the fact that so much time is consumed in preparing it for transportation, thus inviting its destruction or capture by the enemy. Hence, any railway mount which can be brought into battery and withdrawn in the course of a few minutes, has a distinct advantage over the other types.

The 16-in. howitzer overcomes the above disadvantages and is perhaps the very latest type of railway artillery. This mount carries the huge 16-in. howitzer, which is probably the most powerful howitzer mounted on a railway mount. This howitzer can be fired directly from the trucks on standard gage track. The shock of recoil is taken care of through the recoil mechanism and in moving the car backward along the track on its own trucks. Two 12-wheel trucks with specially designed truck frames and spring arrangement are used so that the recoil shock is comfortably transmitted through a system of equalizer springs to the rails. Ordinary rock-ballasted track of 80-pound standard rail is used, and after repeated firings, the test track shows absolutely no distortion.

The spring arrangement on these trucks is worthy of interest, inasmuch as both semi-elliptic and volute springs are used. The semi-elliptic springs are of sufficient strength to withstand the firing load. The volute springs, which are interposed between the semi-elliptic springs and equalizer beams, are designed to take the carrying load only. Thus on firing the gun the volute springs go solid and the shock of recoil is transmitted to the semi-elliptic springs. The truck is the locomotive type using inside journals with 6½-in. x 12-in. journals. An immense combination bolster and transom casting connects the locomotive type of side frames so that the load at the center is uniformly distributed along the side frames. These trucks are equipped with both hand and airbrakes, which, of course, are of special design.

Other Railway Mounts

The Ordnance Department has four other types of railway mounts in existence. These include a French type, known as the 305 millimeter Schneider Railway Mount, which is very similar to the American 12-inch Sliding Railway Mount, and is operated from a curved track or epi. The 12-inch French Batignolles railway mount is another French type using the Army 12-inch gun. It is equipped with the hydro-pneumatic system of recoil. The mount is fired from a firing platform which is carried on a ground platform car. The other two railway mounts in existence are the 12-inch Howitzer and the 16-inch Howitzer Model E. Both are adaptable for seacoast defense since they have all around fire.

It is perhaps wondered how it is possible to negotiate curves with some of the railway mounts having 8, 10 and 12-wheel trucks. Contrary to what might be expected, every truck and mount is subjected to a test requiring that it negotiate a 17-degree curve. The ability to round curves is secured by means of extra pedestal clearance on the inner sets of wheels and the changes in wheel gages on the same set of wheels. It is only necessary to do this on trucks with more than eight wheels each. It has been found in practice that these two methods give all the flexibility required.

It is necessary in the design of railway artillery to so detail the construction that both the French State standard screw couplers and buffers and the American M. C. B. couplers and draft gears could be applied in the field. All the mounts sent abroad, of course, were equipped with the French standard. When these mounts were returned, the French couplers were taken off and the M. C. B. equipment installed. Although the French do not use any airbrakes on their railroad artillery, the Ordnance Department received instructions from General Pershing to equip all railway artillery with both hand and air brakes. The application of air and hand brakes to the trucks is an exceedingly difficult task. No standard locomotive or car brake arrangement could be utilized. The loads of course are static loads and after considerable experimental and development a brake power of 40 per cent was adopted. In most all cases this entailed the use of two airbrake arrangements utilizing two cylinders with other auxiliary equipment. On all trucks except four and six-wheel trucks, all the air brake apparatus is contained in the trucks. It was exceedingly difficult to so design the trucks and air brake arrangement to secure this feature, of having the brake arrangement self contained in the trucks.

It was early found out that the secret of safe running of heavy artillery was keeping the axle loads down to 17 metric tons. This necessitated the use of many wheels and axles on the extraordinarily heavy mounts and the question of clearance and negotiating railway curves immediately came up.

Armament Train

The organization of railway artillery is made up of regiments, battalions and batteries. A battery consists of four pieces of railway artillery, together with armament train cars. A battalion consists of three batteries and a regiment of two battalions. The armament train cars include ammunition, supply, spare parts, fire control and repair cars. The ammunition car is a steel car

with a wood lining equipped with ammunition racks for storing ammunition. A trolley hoist arrangement is also provided in this ammunition car for transporting the ammunition to the platform of the gun car. This trolley I beam hoist can be projected through the end door of car so that ammunition has a continuous run on to the gun car platform. The construction of the ammunition car is somewhat similar to the 30-ton box cars supplied for use in France by the Director-General of Military Railways. This car has a steel roof, very similar to the construction of passenger car roofs and built up plate and angle carline sufficiently strong to support 16-inch shells weighing 2400 lb. The underframe of the car as well as the entire construction meets the M. C. B. requirements and the Interstate Commerce Commission rulings.

A fire control car is somewhat similar to an ammunition car except it has wooden roof and wooden sheathing. The supply car is a low gondola car with no distinctive features.

The repair car is of exactly the same construction as the fire control car with the interior equipped with machine shop, carpenter shop and blacksmith shop. Great care was exercised in procuring the equipment for this repair car, so that a complete outfit of tools sufficient for all repairs in the field, except those occasioned by direct hit, could be made. The machine shop part of this car has a lathe, shaper, radial drill, grinder, work bench and complete outfit of tools, gages, micrometers, etc. The machine tools are motor driven, current for which is furnished by 5 k. w. gas electric set.

Camouflage

All railway mounts for use abroad were camouflaged by the Ordnance Department with the Ordnance five-color contrast system of camouflage. To the uninitiated it will appear that no preconceived arrangement of colors is used in painting this railway artillery. As a matter of fact, the colors and their arrangement on the mount is scientific, and will effectually conceal the piece from aeroplane observation. Shadows cast by any object on the ground are very distinct from a height, and it is necessary to conceal the outline of the shadows as well as the outline of the mount itself. For this reason railway artillery units are hidden under camouflage screens or canopies which are so constructed that no distinct shadows are apparent.

It is interesting to note here that the invention and use of microphones locate the position of heavy artillery by sound. At the time of the signing of the armistice the Americans had enormous quantities of these planted on the western front. I am told that 400 German guns were located and put out of commission by this system. It is doubtful, however, if the use of the microphones will do away with camouflage. The use of the microphone is only possible after sounds have been produced. Unless the artillery is camouflaged it could be located and destroyed before a shot was fired.

Future Types of Artillery

A forecast of the future types of railway and field artillery is worthy of our attention in the light of all the experience gained during the war. In spite of the popular appeal to the imagination, and the widespread conception of long range artillery as an instrument of war, it is the shorter range artillery which wins battles. I have only to call your attention to the effectiveness of the French 75's at Verdun to illustrate the vital necessity of having armies equipped with a plenty of mobile field artillery. By field artillery we of course mean the 3 in., 4.7 in., 5 in. and 6 in. 155 mm. guns and the smaller caliber howitzers.

Long range artillery has certain tactical uses in the field, but is very rarely used to fire on men. These tactical uses prepare the way for an offensive operation by destroying railway centers, ammunition dumps, observation towers, bridges and fortified works. It may also be desirable to destroy and interrupt traffic on the lines of communication. A few well-placed shots will accomplish any one of the above objects and then that day's work is done. But the field artillery never ceases to operate in all kinds of fighting. This war has proven the great advantage of having all artillery mobile and capable of being moved swiftly over any kind of road or terrain where there are no roads.

The Ordnance Department early recognized this necessity and produced field pieces on caterpillar mounts. The light ones are capable of moving 15 miles per hour over any road or field, while the heavier howitzers can travel at the rate of 3 miles per hour.

Our forecast, then, of the field artillery of the future will include the light field artillery all mounted on caterpillar mounts or drawn by tractors, and the heavy howitzers and guns on railway mounts.

For seacoast defense, which is an entirely different problem, we have the navy as our first line of defense. It is obvious that no enemy can reach us from the sea unless they first defeat or elude the navy. Granting this accomplished, the next move of any enemy would be to capture our seaports or effect a landing on some suitable point along our coast. Our seacoast fortifications are admittedly the finest in the world. The great extent of our coast line, however, makes it physically impossible to fortify every vulnerable point. Our railway mounts will constitute a mobile seacoast defense, supplementing our permanent fortifications. It is desirable that the entire cost line be divided into zones and batteries of railway artillery assigned to each zone, so that sufficient units could be concentrated at any point attacked. Railroads running parallel to the coast should be extended so that their tracks will cover any strategic points and all places where an enemy might land an expedition.

Closing Remarks

At this point a most dramatic scene was enacted. Major Campbell removed his coat and spoke as follows:

I have received my discharge as an officer in the United States Army, and so remove my coat prepartory to making a few remarks tributary to an officer of exceptional merit serving in the regular army. I am now talking to you as a civilian. Do you know that only 38 per cent of the officers of the regular establishment got to France during the war? Only those men who were associated with these officers know the bitter disappointment these regular army men felt in being forcibly detained in this country. It is hoped that these officers received just recognition for their invaluable work on this side. These men were held here for the simple reason that they were practically the only ones in this country competent to handle the designs and problems of supplying the troops with the necessary equipment. Some of them have received the Distinguished Service Medal. One of the recipients of this decoration was a former chief of the engineering division of the Ordnance Department. This officer, to my personal knowledge, worked day and night, Sundays and holidays, and was a constant source of inspiration to all who worked for him, not only on account of his tireless energy, but for his exceptional ability as an engineer, executive and organizer. I refer to Colonel Jas. B. Dillard. Too much praise cannot be given Colonel Dillard for the

stimulus he inspired in the manufacturers of ordnance material, which resulted in their noble and patriotic response.

I wish also to pay tribute to the manufacturers who so willingly co-operated with the Ordnance Department in all branches of its work. Among these is the American Car and Foundry Company. This concern absolutely placed its entire resources at the disposal of the Ordnance Department. Why, at the inception, in April, 1917, of the first project of railway artillery, the 8-inch mount, one of which is now on exhibition, this company submitted a bid which was 50 per cent below their competitors, with a promised delivery in one-third lass time. In spite of this, the first mount was shipped in half the time promised.

In artillery vehicles such as you have seen on exhibition here they reached at their peak of production a total of 277 vehicles per day, with spare parts aggregating the equivalent of 32 vehicles; thus their production can be stated to have reached 309 complete artillery vehicles per day. Previous to this the best output accomplished in the same kind of equipment was one vehicle per day.

We all know that one of the principal causes of Germany's request for an armistice was the splendid production of war materials in America. This production was only reached by the untiring work and co-operation of manufacturers, railroads, War Department and laborer. As one of the American generals remarked, had the war lasted three months longer the infantry would have to be put on horseback to keep up with the railway artillery.

"Railroad Break-Down" Not Due to Railroad Men

"Too Much Government Interference Caused It," Says W. T. Tyler—Praise for Enterprise of Railway Supply Concerns

W. T. Tyler, director of the Division of Operation of the Railroad Administration, delivered a very interesting address at the Convention yesterday. In the course of his remarks, Mr. Tyler said:

Public Interest in the Railroad Problem

I presume we have all attended the circus "just to take the children," so that I am glad your chairman has explained my reason for staying over in Atlantic City—it has not at all been a hardship, in fact, I tried to have him defer this talk until Wednesday, but he insisted on my coming over this morning. (Laughter).

I presume that the interest of the public to-day is about equally divided between the League of Nations and the railroad problem. I do not know but that we hear the railroad problem discussed among active business men more than we do the League of Nations. They do not expect to have much voice in settling the question of the League of Nations, but they do hope eventually to have a part in on the settlement of the railroad problem, and its settlement touches us all more nearly and the need for it is more immediately pressing, so I believe we can consider the railroad problem in this country at the moment the most important subject of thought and discussion. I believe we can rest assured that the President will carry out his expressed intention to return the roads to their owners at the close of this calendar year. A great deal of concern has been expressed, and is being expressed from day to day, lest this does not afford time for Congress to prepare and pass the necessary enabling legislation. My own opinion is that six months will serve every purpose that would be served by five years. We are not getting from the present method of operation any helpful experience, unless it be the lesson of what not to do. Public operation of privately owned railroads will not work, it is not practicable, and I think practically everyone who is interested and has given the matter study, is satisfied of that fact. I believe the situation is best expressed by the apt remarks of a member of the Senate Committee on Interstate Commerce that it is like trying to teach a man to play the violin by having him practice on the piano. If Congress was given five years in which to take action, very naturally it would defer action until the last six months, because the situation is constantly changing, and it would be a miracle if at any time Congress could enact a law that would serve indefinitely and that would not require changes and modifications as experience taught the need of them, so that one time is as good as another. And the immediate solution is to pass at this time the best legislation Congress can, and then as we operate under it change it as experience shows the need of changing. My own opinion is that the Congress cannot do better than to face about and look to the first year of the war for its guidance as to what should be done for the railroads, and to meet the needs of transportation of this country.

How the Railroads "Broke Down"

We hear a great deal about the railroads, especially of the East, breaking down at that time. I want to say to the railroad men all over this country that the railroads owe no apology for their breakdown or for their failure absolutely and completely to meet the transportation requirements during the first year of the war and before government control was adopted. They broke down in the same sense that the cathedrals of France broke down under artillery fire. With German guns playing on them for days at a time they did break down. The railroads broke down, especially in the Eastern section, where the war activities were greatest because of the multitude of government agencies exercising priority authority, each demanding that the freight for its particular department be moved in preference, and even to the extent of passing out to the railroads the individual car numbers of thousands of cars to be picked out of this great mass of blockaded traffic and brought in.

It was absolutely impossible to meet such a situation. For a long time the railroads had suffered from inadequate rates, and from all manner of hampering regulation. These things together constitute the reason why the railroads were not able to meet transportaion needs during the first year of the war. Under government operation they were able to do it because the government agency placed in charge of the railroads was able to exercise absolute control regardless of all the other government agencies that hammered away day after day for their little part in control of the railroads.

What the Railroad Administration Did

The first thing that the Railroad Administration did was to lock the door on these various governmental agencies and say to the War Department "you tell us

what you want moved and we will move it in our own way. You will get what you ask for and you will get it promptly." Really the very first thing that the Railroad Administration did, however, was to set aside and disregard all the restrictive laws and regulations that had been enacted by both the State and the Federal Government. It was early recognized as impossible to meet the transportation needs of the Government and at the same time follow its regulations, and the regulations of the States fortunately the man placed in charge, Mr. McAdoo, being himself familiar with the government methods and at the same time a man of extraordinary strength, wholly fearless and utterly disregardful of criticism, did apply the strong hand and defeat every effort at interference. He said to not only the central organization at Washington, but passed the word out to the railroads, "you know the transportation game, you know what you ought to do, go ahead and do it and I will stand behind you." That was all that was needed. The only thing needed was to have someone between us and outside interference and the railroads resumed their functions.

Now, it would have been impossible for any central organization or any number of men, no matter how well selected, to have themselves operated all the railroads, brought method and order out of chaos, without this cessation of interference by so many governmental agencies. So I say I think that Congress can do no better than to look back upon the first year of the war and the first four months of Government control to find the solution. If what was done during the first four months of Government control was necessary to enable the railroads to function, similar treatment is necessary now to enable them to go on and meet the requirements of transportation in this country in time of peace and to meet the expansion in business that we are sure to have and that we see coming at this time I should say that the first need is responsible centralized control. That is something that we have never had until we had Government operation. We have had scattered control, but never responsible control; we have had centralized control, but never responsible control. The Interstate Commerce Commission has been much abused, but I do not feel that the criticism is entirely deserved, because the Commission has never been charged with the responsibility for results. It has named a maximum rate after long investigation, and after several roads had become bankrupt, but it never was responsible for the effect of that rate upon earnings. If the railroads went bankrupt under it, the operating officers were considered responsible, and not the officers of the Government who named the rate. So when I say responsible central control, I mean a central body that will have absolute control of the rates and will also be responsible for those rates furnishing adequate returns to enable the railroads not only to meet the transportation needs of the moment, but to improve and build up their properties so as to be prepared at all times to meet just exactly what we met during the war, the maximum of requirements in the way of transportation service.

There should be at the same time a repeal of a great many of the restrictive laws, and the enactment of others in their place, because I think it would be entirely wrong and a most serious mistake for the railroads to be handed back to their owners without regulation of their operation. It is needed, and there will be no satisfactory solution without it.

If I were asked to name the most important benefit accruing from Federal control, I would say that away up at the top of the list stands the methods that have been worked out for dealing with labor. I think it would be a most serious mistake if the corporations in taking back their properties should not work out of the existing boards and agencies for handling labor matters a permanent method, something along the same line, for adjusting labor disputes.

Dealing With the Labor Problem

I have no very clearly defined idea as to just what form the plan should take, but I do want to say that a most serious mistake will be made unless this is provided for, and some definite plan worked out. I think it highly desirable that the officers represented in this meeting give the matter serious thought and consideration. There has been, of course, much complaint about interference of the central administration with discipline, but I believe any one who will stop to consider what the situation would have been if each railroad had been obliged to deal with its labor problems in its own way, will agree that the methods adopted, regardless of whether they are as complete and as perfect as they should be or not, were necessary and did absolutely save the day.

Now, I want to speak just a moment about the convention and its relation to the exhibits. I said on Saturday to the Master Carbuilders that I regarded this supply exhibit as offering to the railroad mechanical officers a postgraduate course in their profession not available in any other way ,and I want to repeat that to you gentlemen now, and to say to you that you will not at all have justified this meeting and your trip here if you do not see every exhibit on the Pier.

Praise for Railway Supply Concerns

The railroad supply man, to my mind, is entitled to a very large measure of credit, for the progres of railroading that has been made in this country, and I want to say furthermore he has accomplished that progress largely against opposition. He has not been met halfway, he has not had the encouragement he should have had, nor the help. I think it is the duty of every railroad officer here to go through the exhibits and not only listen attentively to the demonstrator but to give him your suggestions. He is entitled to that, and out of all that he gets unquestionably some will be valuable to him. I do not think there is any question that we have made greater progress in this country in the development of the art of railroad transportation than has been made in any other country on the face of the globe, and as I say, it is largely due to the supply man. It has not been a work of philanthropy, at all, it has been a business proposition, but it has been the result of foresight.

I know of a number of railroads in this country that encourage initiative and inventive genius, but a great many of them tie a string to it. If you produce something of value, the fact that you are on the payroll of that company gives it the right to use it without paying you for it. I think this policy is wrong. I think it has proceeded from an entirely wrong viewpoint, and if it were not for the supply man who stands ready to take whatever the inventor can work out and pay him for it, we would not have had this progress. The supply man may recognize that the appliance is not perfect and is even of doubtful value, but he always realizes that no other action will stimulate the interest, not only of that man, but of others in the same line of work, to use the inventive genius they have and to go along improving, and the supply man has prospered, not at all beyond his due, because he, after all, has carried the financial burden, and he realizes that a very large number of the appliances that he invests his money in must fail, but he keeps right along, trying again, buying something today,

perfecting it and discarding it to-morrow when he sees something that is a little better. For these reasons they are entitled to all you and I can do to help them along in that direction, to justify what they are trying to do, and so I say to you my own idea about the convention is that even if you find it necessary to stay here and transact your business after the exhibit closes, such a course would be preferable to neglecting one single booth on this pier.

I was introduced here to-day as the Director of the Division of Operation. When you meet next year there will perhaps not be a director of the Division of Operation. I hope at that time I may be asked to come down here again simply as one of yourselves to meet with you, listen to your discussions and avail myself, as I have on this occasion and as I propose to do during the next couple of days, of what there is to learn from the railroad supply exhibits.

Meeting of Railway Electrical Engineers

THE SEMI-ANNUAL CONVENTION of the Association of Railway Electrical Engineers was held at the Hotel Dennis on Monday, June 23. The opening session was called to order at 10 A. M. by President J. E. Gardner, of the Chicago, Burlington & Quincy.

Jos. A. Andreuceti, secretary and treasurer of the association, presented a brief report in which the excellent financial condition of the association was shown. Mr. Andreuceti explained that it had not been the thought to provide an extensive program for this meeting, but that it was intended to provoke discussion to assist the members of the several committees in presenting more comprehensive reports at the annual convention in the fall.

Although the meeting was held ostensibly for the purpose of hearing the progress reports of the committees, one report was presented in completed form. At the annual convention last October the Committee on Electric Headlights was instructed to make a more extensive study of this subject and present its findings at the June meeting. The subject is a particularly live one at this time and the report was presented to a large and appreciative audience.

In substance the report is based upon facts brought out by a questionnaire sent to a number of roads sometime ago to obtain information as to their practices. Although there is apparently a decided lack of uniformity in the headlight practice on the different roads there was sufficient information gathered from the questionnaire to enable the committee to prepare an interesting and instructive report. All phases of the headlight question were considered, including the conduit runs, wiring, switches, lamps, receptacles, etc. The committee was highly complimented on the excellent report it had prepared, although it was very evident from the lengthy discussion which followed that the time has not yet arrived when electric headlight equipment can be permanently standardized. The practice has changed so rapidly in headlight equipment that it has been exceedingly difficult to fix upon definite and permanent standards. There is every reason to believe that many other developments will take place before all of the different parts of this apparatus can be permanently standardized. In fact, it is exceedingly doubtful if it would be possible to standardize all equipment so that all roads would use the same standards. Nevertheless, the report of the committee is full of important recommendations which will serve as an excellent basis for present practice, and as such, it was accepted by the association. It was, however, referred back to the committee again for its further consideration in order that any new developments might be included when the report will be again presented at the annual meeting of the association in October.

In view of the fact that the report embodies an excellent resumé of electric headlight practice at the present time it has been accepted as such by the Mechanical Section of the American Railroad Association and will be presented in its entirety at the meeting of this association on June 24.

The first report presented at the afternoon session was the progress report of the Electric Headlight Handbook Committee. It is the thought of this committee to prepare a handbook similar in all respects to the Car Lighting Handbook which was compiled last year and which so satisfactorily filled the requirements in the maintenance of car lighting apparatus. Special emphasis was placed upon the importance of preparing the headlight handbook, so as to include complete information concerning the theoretical operation of the various equipments.

The work of the Committee on Illumination was assigned to three sub-committees, namely, Sub-committee "A," car illumination; Sub-committee "B," on shop illumination, and lighting, etc. ,and Sub-committee "C," on lamp specifications. In answer to the question as to what might be expected in the way of increased efficiency of lamps, L. S. Billau, of the B. & O., seemed to be of the opinion that there was little to be expected in the way of reducing current consumption by increased efficiency of lighting units ,as the tendency at the present is toward increased use of lamps with a corresponding increase of current.

E. Lunn, of the Pullman Company t,hought that some attention should be given to the artistic design of the lighting fixtures and that this question was at present under consideration by the Pullman Company.

In the matter of lamps for use on extension cords in shops, the practice of using carbon filament lamps, while desirable in view of its more rugged construction, will probably be eventually supplanted by tungsten lamps, due to the difficulty of securing a good grade of carbon lamps. It was suggested by J. L. Minick, of the Pennsylvania Railroad, that auto transformers might be used on 110-volt circuits, and by this means reduce the voltage on the lamps to 32 volts . Tungsten lamps of much larger filament can be used with the corresponding rugged construction. The more general opinion of the members, however, was that the matter should be taken up with the lamp manufacturers, with the idea of getting them to develop a tungsten lamp that would be sufficiently rugged to withstand use on extension cords.

The Committee on Electric Arc Welding in its progress report expressed the intention of going into the matter of arc welding in a most thorough manner, insofar as the matter is applicable to the repair of locomotive parts and in the numerous other fields on the railroad where welding can be carried on to advantage.

E. Wanamaker, of the Rock Island Lines, read the report of the Committee on Electrification. The committee expressed its desire to secure from as many of the members as possible all the information on this subject that is available. There is undoubtedly an increasing interest being taken by railroad managements in electrification projects, and it is information along this line that the committee wishes to be in a position to supply those roads that are logically interested in electric traction.

L. S. Billau read the report of the Committee on Train Lighting Equipment and Practice. This report covered

a number of temperature rating specifications with reference to axle generators. These specifications represent the first steps in the standardizing of the ratings of axle generator equipment ,and it is hoped that future specifications may be extended to include all parts of axle generator apparatus which may be properly assigned specified ratings.

The Committee on Compiling Costs for maintenance of Head Light Equipment expressed its intention o fseeking the assistance of the various roads as to their present methods of keeping cost records for maintenance.

Registration, American Railroad Association, Sec. III, Mechanical

Allstrand, H. P., M. M., C. N. W., Marlborough.
Andrewcetti, Jos. A., A. E. E., C. & N. W., Dennis.
Band, R. W., S. S., B & M., Monticello.
Barclay, F. P., S. M. P., I. C., Ambassador.
Bardo, C. L., Gen. Mgr., N. Y., N. H. & H.
Barton, T. F., M. M., D., L. & W., Traymore.
Beatty, D. H., Supt. of Safety, Southern.
Bennett, W. H., M. M., Pa., Traymore.
Bickford, S. A., M. M., N. Y. C., Chelsea
Bingaman, C. A., M. E., P. & R, Wiltshire.
Black, W. C., M. M., N. Y. C. & St. L., Ambassador.
Blunt, James G., Gen. D. R., American Loco. Co., Marlborough.
Booth, J. K., M. M., B. & L. E., Ambassador.
Borell, E. A., P. & R., Wiltshire.
Brodman, R. W., Gen. Fore. Elec. Equip., L. I., Dennis.
Burns, Jno., M. M., C. P., Haddon Hall.
Gallaway, A. K., M. M., B. & O., Haddon Hall.
Cherry, W. Y., M. M., G. R & I.
Chilley, Jos., S. M. P., N. Y. C., Marlborough.
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Cole, Thos. J., M. M., Erie, Arlington.
Daley, W. W., M. M., New York, Ont. & West., Chalfonte.
Davey, Thos. S., Erie, Arlington.
Davis, J. E., M. M., Hocking Valley, Haddon Hall.
Depue, G. T., S. S., Erie, Haddon Hall.
Drury, M. J., Sup. Shops, A. T. & S. F., Traymore.
Duga, G. A., M. M., P. & R., Haddon Hall.
Edmondson, W. G., Eng M. P., P. & R., Galen Hall.
Edmonds, Geo. S., S. S., D. & H., Ambassador.
Ennis, J. F., A. E. R. S., N. Y. C., Galen Hall.
Flanagan, M., M. M., C. & O., Bothwell.
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Gardner, G. Clinton, G. F. M. P., Penn, Chalfonte.
Gardner, Henry, S. A. & S. A., B. & O., Chalfonte.
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Hoke, H. A., Acting Asst. Mech. Eng., Penn., Morton.
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Karibo, J. J., M. M., C. C. C. & St. L., Alamac.
Keenan, C. E., Midvale Steel & Ordnance Co., Marlborough.
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Kinnear, C. W., Asst. Gen. Store., Pa.
Kuhn, B. F., A. M. M., N. Y. C., Arlington.
Laux, J. P., M. M., L. V.
Lawes, T. A., M. E., N. Y. C. & St. L., De Ville.
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Leyonmark, J. H., M. E., C. & A., Brighton.
Ligon, J. F., M. M., Ashland Coal & Iron Ry.
Lipetz, A. I., Russian Rys., Marlborough.
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Martin, A. W., Supt. Shops, C. C. C. & St. L., Alamac.
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Parker, H. H., Norfolk & Portsmouth Belt, Sterling.
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Tillett, C. H., Asst. Sig. Eng., G. T.
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Turner, J. S., Honorary Man, Marlborough.
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Wagstaff, Geo., American Arch Co., Chalfonte.
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Woodbridge, H. C., Supr. Fuel Cons., U. S. R. R. A., Strand.
Wray, R. W., M. M., Penn.
Wyman, Geo. A., M. M., B. & M., Monticello.

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Anderson, J. B., C. C. to Asst. A. M., P. R. R., Runnymede.
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Boorzhinsky, Eng. of M. E., Russian Mis. of Ways.
Boucher, E. F., Gen. For., Wash. Term., Whittle.
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Coffman, B. J., Atg. Mech. Eng., R. F. & P.
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Cooper, F. E., Supt. Shops, B. & O., Osborne.
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Dickerson, T. B., Supt. Lo. Shops, C. R. R. of N. J.
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Edge, Senator Walter E., U. S. Senator.
Edwards, J. B., M. M., Newberry & Laurens, Continental.
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Farrington, T. B., M. M., P., Ambassador.
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Forbes, H. W., For., Erie, Blackstone.
Fravel, George B., M. M., Penna. L. W., Dennis.
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Funnell, Walter, Mach. Shop Fore., N. Y. C. & W., Netherland.
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Good, Harold, M. C., Shelburne.
Graef, C. S., Supr. Elec. Weld., B. & O., Alamac.
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Hedeman, W. R., Leading Dfmn., B. & O., Arlington.
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Houser, W. M., Penn., Pennhurst.
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Learner, M. F., Asst. to Chief of Ry. Dept., Russian Gov. Rys., Blackstone.
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Leonard, W. W., Super. Car Lighting, B. & O., Hayden.
Levin, V. Z., Chief Loco. & Car Inspt., Russian Gov. R. R., Blackstone.
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Newman, W. A., M. E., C. P. R., Marlborough.
Norton, A. M., Equipment Pilot Eng., B. & O., Arlington.
Norton, C. H., M. M., Erie, Arlington.
Orghidan, Constantine C., Roumanian Gov. Com., Traymore.
Oviatt, Harold E., Chalfonte.
Owens, W. H., M. E., Southern, Borton.
Page, A. N., L. V., Arlington.
Page, Earl, L. V., Arlington.
Patterson, D., M. M., N. So., Osborne.
Pearce, E. S., M. E., C. C. C. & St. L., Alamac.
Peddle, C. R., Asst. Pur. Agt., Penn., Traymore.
Pie, E. F., M. Draft., Penn.
Pohlman, Wm., Gen. Fore. Loco. Dept., N. Y., O. & W., Netherland.
Pribble, B. S., C. C. to S. M. P., R. F. & P. R. R., Wiltshire.
Pugh, A. R., Gen. Air Brake Insp., S. A. L., Osborne.
Ramsdell, F. H., M. M., Maine Cent.
Randolph, V. C., As. Sup. Fuel Cons., U. S. R. R. A., Schlitz.
Rhodes, Robert S., Ch. Draft. Elec. Dept., N. Y. C., Runnymede.
Rice, Frank J., Chf. Lo. Insp., U. S. R.R. A.
Richardson, W. P., Sen. M. E., I. C. C., Pennhurst.
Richardson, Laurence, Asst. Supvr. of Equip., U. S. R. R. A., Haddon Hall.
Riegler, Fred, Wheeling & Lake Erie, St Charles.
Robb, E. H., C. D., Long Island, Homestead.
Roberts, R. D., Leading Mech., Florida East Coast.
Robey, A. A., Asst. Ch. Clerk to Staff, S. I., Arlington.
Robsnson,, J. J., M. M., So. Ry., Osborne.
Roosevelt, Franklin D., Asst. Secy. of Navy, U. S. Navy.
Rosenberg, Chas. R., C. C. to Div. Pass. Ogt., Penn.
Russell, Harry B., For. Eng. House, P. & R., Haddon Hall.
Russell, Walter L., Genl. For., Reading, Speidles.
Starke, Aubrey H., Supr. of Loco. Rpr., U. S. R. R. A., Chalfonte.
Sands, Edwin A., Div. Acc., B. & O., Bouvier.
Siebert, Frank T., Fed. Insp., Inter. Com. Com.
Sdigletch, W. L., Safety Super., Mech., Southern, Osborne.
Siegfried, M. A., Trav. Fire., Central R. R. of N. J.
Singleton, A., Gen. Store., Hocking Valley, Haddon Hall.
Simons, V. M., Road Fore. of Eng., P. S. & N., Reading Ter.

Conventionalities

H. J. Small, well-known railroad man, now a resident of San Francisco, could not attend the convention this year on account of illness.

J. E. O'Hearne, formerly with the mechanical department of the Chicago & Alton, was recently seriously injured in a street car accident in Denver, Colo.

It is a matter of regret to many that W. L. Kellogg, formerly of the Pere Marquette, is ill and will not be here this year. Mr. Kellogg lives in Denver, Colo.

M. Kokawi, resident inspector of the Imperial Government Railways of Japan, with headquarters in New York, arrived Saturday and expressed his amazement at the first convention he has ever attended.

F. I. Marriott, chief draftsman of the Chesapeake & Ohio is known as the human calculator. It is said that he can "figger" the number of tubes in a boiler from the width of the running board.

The many friends of Mrs. Stanley Midgley will note her presence this year after an absence of some six years. Prior to that time her record of ten consecutive conventions is a good one.

Many friends of Mr. and Mrs. J. F. Dunn will be pleased to hear of them. They are in California with their daughter, Miss Edna Dunn, and are visiting another daughter, Marganeret, whose husband is in army service in San Francisco.

Probably the oldest guest at the conventions is the mother of F. B. Ward, of the Elwell-Parker Electric Company. Mrs. Ward has recently celebrated the ninetieth anniversary of her birth. She is enjoying the conventions each day on the pier.

"Big Dan," Assistant Superintendent of Motive Power of the Denver & Rio Grande, in introducing his little brother, Frank Cunningham, of the Standard Stoker Company, says, "We're triplets. He's one of them; I'm the other two."

Alfred B. Carhart, vice-president of the Crosby Steam Gage and Valve Company, of Boston, came here to drown his sorrows in the Atlantic and incidentally to look over the convention. Mr. Carhart's disconsolate frame of mind was caused by the outcome of the Yale-Princeton baseball game which he attended yesterday. Princeton "blew up" in the fifth inning.



W. T. Tyler, Director of Operation, U. S. R. A., and Mrs. Tyler

Miss Irene M. Dunne, who was the soloist of the sacred concert given in the Exchange of the Marlborough-Blenheim Sunday afternoon, is a young soprano of remarkable promise. She completed her last year at the Chicago Musical College just before coming here. She sang with the Marlborough-Blenheim Orchestra Sunday afternoon, and everybody enjoyed her singing greatly. Miss Dunne's home is at Madison, Ind. She is a friend of Mr. and Mrs. L. E. Jones and Fritz Ernest, of the American Steel Foundries, and has been visiting them while in Atlantic City.



Enrollment Committee

Top Row, Left to Right: Harry Jacques, F. H. Smith, William S. Edgar. Second Row: F. V. McGinness, J. A. Stevens. Bottom Row: S. Inglis Leslie, George A. Barden, L. D. Mitchell, G. H. Gayetty (Chairman), S. H. Campbell, Joseph E. Brown, George W. Denyven, Gilbert E. Ryder.

Donald R. MacBain, of the New York Central Lines West comes to the convention this year as assistant general manager instead of superintendent of motive power, having been promoted a short time ago. Mr. MacBain had been superintendent of motive power nine years.

Mr. and Mrs. E. P. Welles are accompanied this year by their son, Edward, who paid the convention the compliment of preferring to come here from Yale, where he is a student, to going to the boat races. Mr. Welles is president of C. H. Besly & Company, of Chicago.



Center, Mrs. W. T. Tyler, wife of the Director of Operation, U. S. R. A., and her two nieces, Misses Veronica and Lucile Ermatinger

William K. Krepps, of the Crucible Steel Company of America, who was chairman of the Entertainment Committee one year and a member of this commitee for six conventions, received a telegram yesterday from President-elect Carr, of the R. S. M. A., appointing him chairman of the Entertainment Committee for the 1920 conventions.

J. F. Graham, superintendent of motive power of the Southern Pacific, could not be present on account of illness. Mr. Graham has had an attack of influenza, but is recovering. Mr. and Mrs. Graham, well known to conventionites, are residents of Portland, Oregon.

Mention was made in Mondal's issue of the *Railway Age*, regarding the celebration of "Bob" Fisher's seventieth birthday." This statement was somewhat incorrect. Mr. Fisher is celebrating, but not his birthday. He will be 74 years old this fall and will then retire from service with the Bass Foundry & Machine Company, after 55 years' service.

Nelson B. Gatch, of the Chicago Pneumatic Tool Company, received a promotion during the convention. He was yesterday named as manager of sales of the New York district. Mr. Gatch was a captain in the air service and, upon receiving his discharge in February, joined the forces of the Chicago Pneumatic Tool Company as district manager in the Minneapolis territory. He later on held the same position in Chicago.

J. H. Young, senior assistant director of operations of the Railroad Administration, accompanied by Mrs. Young and their daughter, Miss Jeannette, are visitors at the convention. Before the adoption of Government control Mr. Young was president of the Norfolk Southern. He became federal manager of the Norfolk Southern and later also of the Virginian, which position he held before he was promoted to his present office.

When Major Leonard J. Hibbard appeared this year on the Pier he received as cordial a welcome as any man could possibly be given. And well he might. Enlisting in the French aviation service early in 1916 he flew during five months of that year. In 1917 he joined the American forces and was assigned to the first division as first lieutenant. In may of 1918 he was promoted to the captaincy of Company C, First Regular Engineers. While brigaded with the British forces in November of 1918 he was wounded, and again received wounds at Cantiguy, at St. Mihiel and in the Argonne. Major Hibbard's wounds consisted of two broken legs, a machine gun bullet through the wrist and minor injuries. For nine years Major Hibbard served on the Entertainment Committee of these conventions.



Entertainment Committee

Top Row, Left to Right: W. W. Melcher, W. H. Oliver, Langley Ingraham, Worcester Sargent, Ellsworth Haring, W. M. Wilson and L. O. Cameron. Second Row, Left to Right: J. M. Brown, A. C. Moore, George A. Nicol and J. L. Paxton. Bottom Row, Left to Right: W. K. Krepps, N. C. Naylor, L. B. Sherman, E. H. Bankard, Jr., J. E. Slimp, H. E. Passmore and R. J. Himmelright.

The Man Who Saw

The Efficient Switchman

The air brake man had just returned from a tour of the perturbed realm of Don Venustiano Carranza.

"You know," said he to The Man Who Saw, and the supply man who said he was sitting up nights studying Spanish, "I learned how the Mexicans uncouple air brake hose down there. They pull out a knife and cut the hose in two—its quicker, and they don't understand the hose coupler anyway."

"They do that here," said the M. C. B. from Kansas. "The only difference is that we don't use a knife."

A Tribute From Darktown

Superintendent of motive power, master mechanics, other locomotive men and the convention attendants in general are not the only ones who have visited and paid tribute to the Pennsylvania Railroad's latest masterpiece—the monster simple Mallet locomotive illustrated and described in the *Daily Railway Age* for Monday, the 23rd.

A delegation from Darktown was in attendance the other day and the Man Who Saw heard this little compliment from one of the colored admirers, "My, my, dat sho' am some injun. Hook her on to Atlantic City and she'll pull her right on up to Philadelphia."

One Millionth of an Inch

It may be new to many to learn that seasoning—air seasoning from two to five years—is necessary before steel is in a fit condition to be used in the construction of certain machines and tools. To prove the truth of his statement to The Man Who Saw, the fine tool manufacturer produced a Hoke precision gage and explained that it is the most precise instrument ever produced by the hand of man. It is accurate to one millionth of an inch—count 'em. And he said one millionth is just as easy to measure as one thousandth. All you have to do is to catch a sunbeam and measure your work by it to prove it.

That is how it came about that seasoned steel—the time and air seasoned article that is steady and settled in its ways—must be used in the construction of certain instruments.

Signs of the Times

One of his friends who has cultivated Cuban, Mexican and South American railroad men to a considerable extent, called The Man's attention to the significance of the fact that among the visitors here this year are two well known Cuban locomotive men, one of whom is in charge of 110 locomotives; two master car builders of Cuban railroads; two locomotive superintendents of important Cuban lines; a native general manager of Porto Rico's railroad system, and a distinguished Mexican who represents in the United States the purchasing interests of the National Railways of Mexico.

"Two of the Cubans," said the friend, "were amazed at what they saw at this, their first convention. They said that they took a chance on coming here in spite of the report that it would cost them $40 a day. "Why," added the friend, "doesn't somebody start something that will induce a representative showing here from Latin America every year? Why not arrange for their reception?"

The Man remembered a large recent purchase made by a man on this list and learned that after the order was concluded, two vertical turret lathes were added as a result of the visitor's attendance at the convention.

"Yes, why not?" said The Man.

It seemed that the arrival of the Latin Americans shadowed events which might be worth encouraging.

The New Mail Car

Rumors in Poseyville had it that the Poseyville & Northwestern Railroad had ordered a mail car. As a consequence the usual daily committee of prominent citizens who considered it their sacred duty to see that the wheezy little train arrived safely, was considerably increased.

Finally she arrived and was given a reception and a write-up in the Daily Taddle-Tale.

"Well," said the well-known motive power accountant, who was telling the story to The Man Who Saw, "Everything seemed clear about the new car except the strange hook across one of the doors.

"What is that hook for?" inquired the druggist.

"It's to keep the door shut," ventured the grocer.

"You're both wrong," asserted the editor of the Taddle-Tale, "that's the mail hook. It grabs the mail as the train rushes past a station."

"Well, Andy," said the grocer, "don't you send any more eggs by parcel post."

The Builder of Men

The mechanical engineer from the southwest turned the pages of a railway mechanical engineering paper with unconcealed affection.

"I have a fine drafting room," said he. "Whenever I hire a new man for my department my instructions to him include the following:

"'We are buying your time which is eight hours a day. In return therefore, we give you eight dollars—a dollar an hour. The money we pay is real money; its value doesn't fluctuate. It is never discounted and represents full value. In return for this money we expect eight dollars worth of your time, which is eight hours a day of conscientious concentration on our work. We no more expect you to discount the value of these hours than you would have us deduct from your pay check.

"'When the work slackens, instead of killing your own time at a dollar an hour and perhaps the time of another high-priced man as well, I want you to go to the book shelf and get a bound volume of a railway mechanical engineering paper and dig something out of it, which, from your observations around here, you think would benefit us by its adoption. I don't care what it is, just so its worth having or doing. If you have the time I would appreciate your writing it up, setting it forth as a recommendation or an argument for our consideration.'"

"How does your system work? Has it increased the interest—tell me about your results," asked The Man Who Saw that his informent was a psychologist as well as an engineer.

"Well," said the thinker, "it worked well for my showing and it helped the boys. Two of them recently left me to do really big things on their own hook. The P. & Q. is after another one and I am afraid I shall lose him, as I can't very well see how he can turn it down."

New Devices Among the Exhibits

Pyrometer for Locomotive Service

The Locomotive Superheater Company, New York, is showing its model 496 pyrometer equipment which is of the electrical type. This instrument makes use of the thermo-couple principle, by means of which an electric current proportionate to the difference in temperature between the hot and cold junctures of the couple is generated.

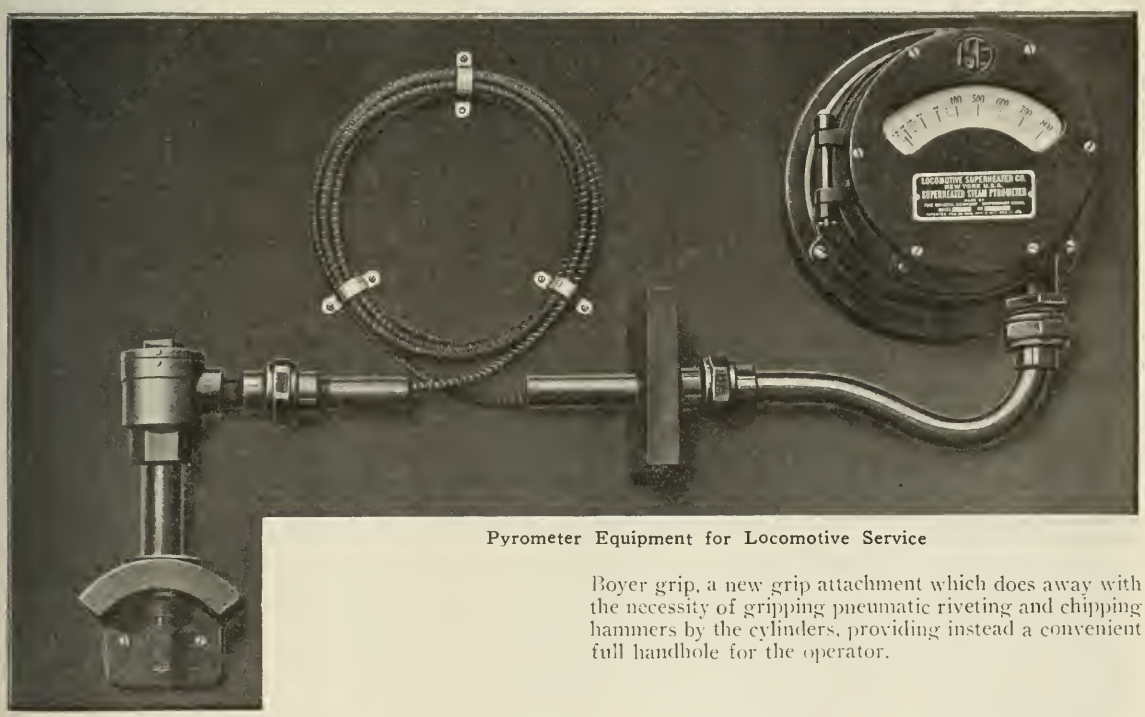
The indicator itself contains a millivolt-meter actuated by the current generated at the thermo-couple and moves a pointer on the dial indicating the actual temperature of the steam. The pyrometer equipment for each locomotive consists of three parts; a steam fixture (containing the hot junction of the thermo-couple), which screws into the steam pipe or steam chest of the engine; an indicator, which is placed in the cab, and a cable connecting the fixture to the indicator. The cold junction of the variations in the atmospheric temperature are automatically compensated for. The hot junction of the thermo-couple is directly exposed to the flow of superheated steam and the slightest variation in the steam temperature immediately affects the current generated, showing this change instantaneously upon the dial in the cab.

The entire equipment has been completely adapted to locomotive conditions and has been found valuable in checking operating and maintenance conditions, as well as proving a substantial aid in making adjustments and drafting locomotives.

This apparatus provides a constant check on the performance of the engine. If the water is too high in the boiler or the fire is not properly kept, or if any other condition affecting the steaming qualities of locomotives should arise, it is at once indicated by the pyrometer.

Advances in Air Drill Design

The Little Giant air drills displayed this year by the Chicago Pneumatic Tool Company, Chicago, contain several new features of interest to users of pneumatic tools. One of the important recent developments is a new form of toggle and piston construction, including a replaceable crank-pin bearing and a one-piece connecting rod by means of which all joints, eye holes and toggle nuts are eliminated. The company is also displaying a new corner drill made in both reversible and non-reversible types. Another innovation is the Boyer grip, a new grip attachment which does away with the necessity of gripping pneumatic riveting and chipping hammers by the cylinders, providing instead a convenient full handhole for the operator.



Pyrometer Equipment for Locomotive Service

Universal Air Hose Coupling

The Independent Pneumatic Tool Co., Chicago, is exhibiting an improved universal hose coupling. The coupling ends are absolutely interchangeable; consequently all confusion in ordering is eliminated and only the size required need be specified. Once connected the coupling cannot open when not intended, yet it can be uncoupled instantly by a pull on the sliding sleeves. The gasket cannot blow out, as it is protected from the flow of air by a protruding seat and the tapered back holds it securely in place.

The Clark Tructractor

One of the latest developments in industrial tractors is the Clark Tructractor, exhibited by the Liberty Steel Products Company of Chicago, who are the exclusive representatives for the railroad trade. The general design of this vehicle indicates a powerful and, at the same time, a flexible machine. It is constructed in a most substantial manner with a steel frame



Clark Tructractor with Dump Body

carried on two driving and one trailing wheel. The load carrying body is of sheet steel substantially braced with angle iron. The engine is mounted on the rear end of the frame. It is a four-cylinder 25 horsepower automobile type, with a differential gear acting on the forward axle, and will furnish sufficient power to propel the vehicle over rough roads or floors with a maximum tractive effort and enables it to haul heavy loads easily. The driver's seat is located directly over the engine hood.

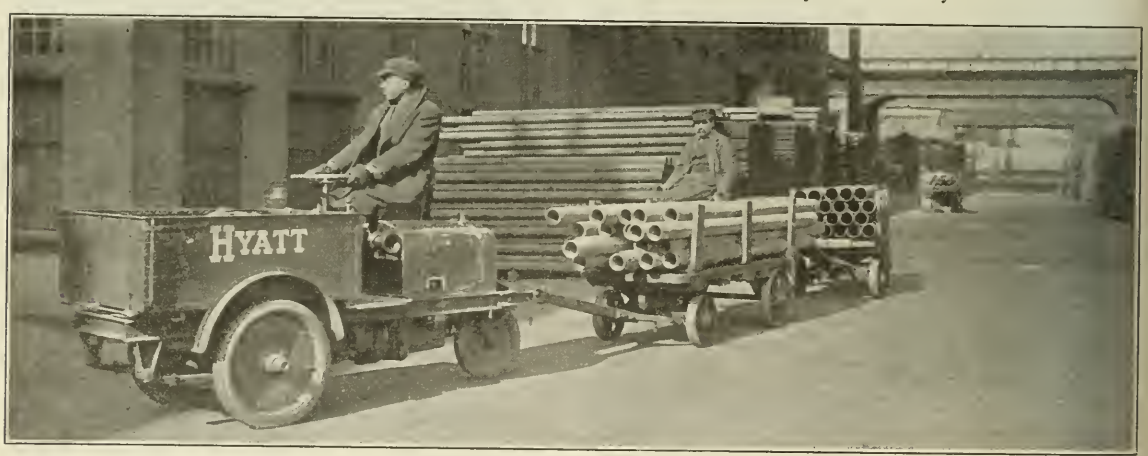
Its carrying capacity is 1½ tons and with the dump body and its ability to make sharp turns, due to the wheel arrangement, it has proved very useful in congested places, such as foundry yards or shops, for the carrying in of sand or other material and the removal from the foundry of castings or refuse. The Tructractor is furnished either with the plain load carrier body without any dumping facilities, or with the dump body.

A clevis is provided at the rear end of the frame so that other trucks may be attached and the tractor used in a hauling capacity. The over-all dimensions of this machine, with a one-yard dump body, are 125 in. by 46 in., and the truck wheel base is 84 in. The tractor will develop a speed ranging from one-quarter mile an hour to 15 miles an hour. In a recent test this machine was driven a distance of 143 miles over country roads in a single day and it has given remarkable service in shifting loaded freight cars without any injury to its structure. The clearance above floor level is 9½ in., which enables it to move over rough foundry floors, factory yards or bad roads, and because of its low center of gravity it can be successfully used under almost any conditions.

The steering gear acting on the single trailing wheel and the driving mechanism are substantially that of the automobile. The axles are equipped with frictionless bearings and the wheels with rubber tires. The load carrying end is supported on semi-elliptic springs, which enable the machine to travel over rough roads with no undue strain on the body or machinery.



The Dump Body in Operation

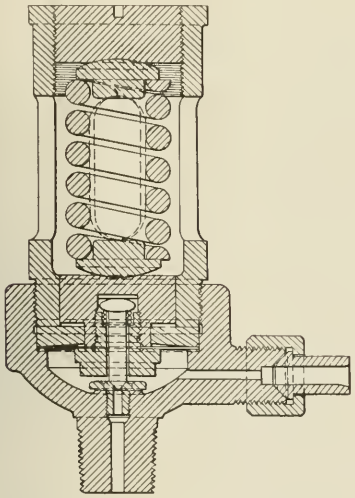


The Tructractor Used for Hauling

The steering gear acting on the single turning wheel sumption of three gallons of gasoline a day, and because of its unusually strong construction it should prove a most efficient and economical tractor for industrial purposes. The Tructractor is demonstrated each day, on the pier beside Convention Hall, between the hours of one and three o'clock.

Lubrication of Valves and Cylinders

In 1911, the Evolution of the force feed lubricator for cylinders and valves of locomotives had progressed so little beyond the experimental stage that the Master Mechanics' Association's committee, which had been appointed to report on the comparative progress of lubrication of locomotive cylinders, summed up its findings in favor of the hydrostatic libricator as against the early



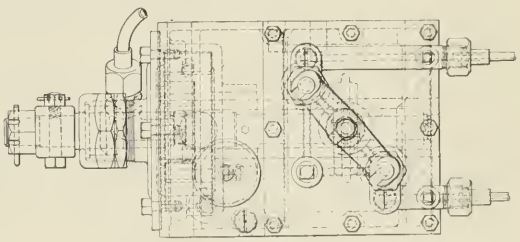
Diaphragm Terminal Check Valve

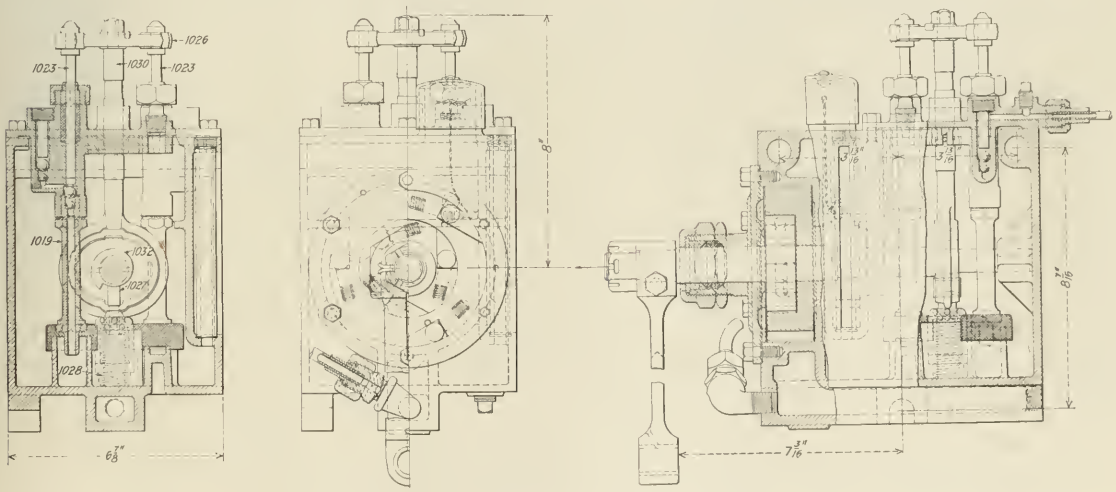
systems of mechanically forcing the oil to the valves and cylinders. The committee made the statement that "the accurate regulation of the amount of oil delivered to the valves and cylinders under the varying conditions of service performance by the locomotive at different speeds and points of cut-off" was only achieved by the hydrostatic lubricator.

Interesting evidence of what has been accomplished in eight years in the development of force feed lubrication, which successfully overcomes the objection cited above is afforded in the following description of the Schlack's system which is used in the force feed lubricator made by the Locomotive Lubricator Company, Chicago. The lubricator is mounted on a vertical flat plate, which is bolted to the head of the valve chest. The mounting of the apparatus is illustrated in one of the drawings; it will be seen that the mechanism is well out of harm's way, is easily accessible for filling and attention, and the installation as a whole presents an impression of compactness. The secret of the pump's efficiency lies in the variable control of its drive.

The pumping arm is driven from an extension on the combination lever of the valve gear. The distance between the radius rod connection and the center of the pump drive connection equals the distance between the valve stem connection and the radius rod connection, which insures a movement of the lubricator lever at all different cut-offs equal to the valve travel. The length of the lubricator lever, together with the valve travel, determines the amount of oil that is delivered into the steam at every revolution of the drivers. The formula by which the length of the lubricator lever is determined includes the valve travel at the normal running cut-off, multiplied by a constant of 2,500, divided by the diameter of the cylinder times the length of the piston stroke. This results in the injection of oil into the steam in proportion to the area of the cylinder walls to be lubricated.

In the 1919 model oil is delivered into the steam at every revolution of the drivers through the action of one pump in each oil pipe line, details of which are shown in one of the drawings. The wedge cam No. 1032 presses the stroke shaft 1030 and its bearing 1027 downward until it passes the lowest point on the cam, after which the spring 1028 carries the stroke shaft 1030 up quickly. The two plungers, 1023, one for each oil pipe





1919 Model, Locomotive Force Feed Lubricator

line, are connected to the stroke shaft 1030 by means of the cross head 1026 and on the quick upward stroke of the plunger, oil from the reservoir is sucked through pipe 1019 into the plunger chamber and forced out into the oil pipe by the successive downward movement of the pump plungers.

The lower end of the suction pipe is considerably below the top of the oil well and is covered by a very fine screen, which laps the upper part of the well about hanf an inch. Any light foreign matter in the oil will float on top; that which is heavier sinks to the bottom. The clean oil goes directly through the small meshed, so-called umbrella; should the screened umbrella be stopped up, it will pass between the larger diameter of the umbrella and the well, the combination of which makes extremely rare the chances of any foreign matter entering and affecting the pumping system.

The cam 1032 is revolved by means of a lever connecting through a friction ratchet. The pump mechanism is so designed that it delivers practically the same amount of oil at 140 degrees of temperature that it does at 265 degrees. Steam is delivered to the lubricator through a copper pipe tapped from the fountain and running under the lagging and against the boiler. The drain from the lubricator can be passed either directly into the exhaust channel in the locomotive saddle or to the air pump exhaust pipe.

When the locomotive is standing in the roundhouse, with very little radiation affecting the temperature of the lubricator, the steam in the lubricator heating chamber is under less than 2 pound pressure, keeping the oil at a temperature of less than 200 degrees. When the engine is running and the radiation of the lubricator reservoir is increased, the back pressure in the cylinder exhaust channel increases the pressure of the steam in the lubricator heating chamber, thus automatically increasing the temperature of the heating medium when required. The diaphram terminal check valve indicated by 1084 in the drawing of the front view of the application is connected with the steam pipe and maintains a constant oil pipe pressure, irrespective of the fluctuating steam pipe pressure, so that for every drop that the pump injects into the steam pipe, an equal size drop is simultaneously injected into the steam.

Trap Door Plate

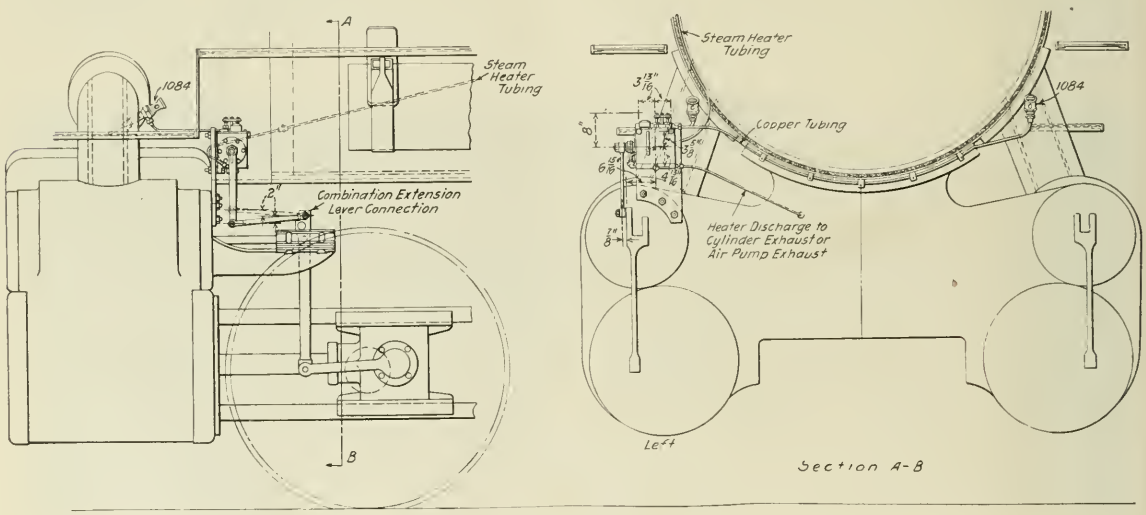
A TRAP DOOR PLATE which combines features of unusual interest is being shown in space C on the porch at the left of the main entrance to the pier. It is a new idea, which dispenses with much of the weight of older types of trap doors and is said to overcome the sticking tendencies of the latter.

The trap door plate is made of one-piece steel, No. 10 gage, with reinforcing ribs pressed in it on the under side, and turned over the edges, providing maximum strength and rigidity with minimum weight. Its weight is claimed to be approximately two-thirds that of other designs for the same area and rigidity.

The threshold is of one-piece steel beaded tread, securely riveted to the outside edge of the trap door plate and sufficiently strong to preclude possibility of buckling, through the pinching action of the buffer wings on the train when rounding curves.

The construction of the trap door plate makes it ideally adapted for the application of composition to replace rubber matting. Expanded metal is welded to the plate to provide the proper bond. Rib depressions permit material to work in under expanded metal, increasing the bonding action.

The lifting device proper consists of a specially designed spring and adjusting plug and worm. The spring is ¼ in. by 1 in. cross section high carbon spring steel, carefully tempered, wound helically, with coils approximately ¼ in. apart. This provides a winding action, also a very low fibre stress, and, therefore, long life, with the least possibility of breaking in service, and upon release of the trap door insures its rising with a slow, smooth action, thus eliminating customary banging. For a spring of this type a very fine adjustment is required. This is obtained by means of an adjusting plug and worm arrangement. The spring is anchored in a slot in the plug, which has gear teeth hobbed in it, and which meshes with the adjusting worm seated in the bracket. By turning the worm and thereby the plug a fine initial tension is placed upon the spring, this tension depending upon the size and weight of the trap door. With this arrangement any required adjustment, no matter how fine, is obtainable. Permanent adjustment is secured by means of a



Typical Application of the Schlack's System of Locomotive Force Feed Lubrication

locking washer which fits over the square shank of the worm and is locked on by means of a cotter pin. The lifting device is encased in a pressed steel housing of No. 13 gage material and consists of few parts of simple construction. The entire device is fitted directly to the trap door plate itself, thus facilitating repairs, whenever necessary.

This trap door is exhibited by the Tuco Products Corporation, New York.

Automatic Drifting Valve

The Lewis Valve Company, New York City, is exhibiting a mechanically operated automatic drifting valve. This valve is connected to the valve gear as shown in Fig. 1. In its operation when the locomotive is running, link *3*, Fig. 1, swings lever *4* to alternately open the compressed air governor valves *1* and *2*, Fig. 2. When valve *1* is open compressed aid is supplied from the air reservoir through pipe *6* to the compressed

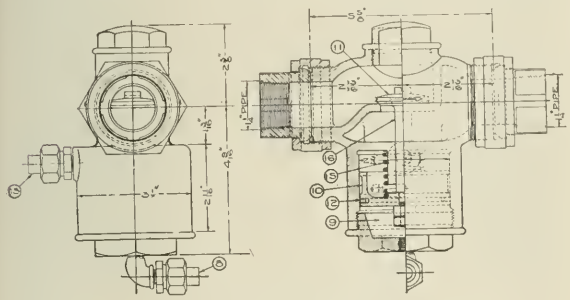


Fig. 3—Steam Governor

air governor chamber *7*, Fig. 2. When valve *1* closes, valve *2* opens, and the compressed air in chamber *7* expands into pipe *8* leading to the steam governor. When the locomotive is running above a predetermined speed compressed air will be intermittently supplied in sufficient volume to the steam governor cylinder *9*, Fig. 3, to raise piston *10* and valve *11* and retain valve *11* open

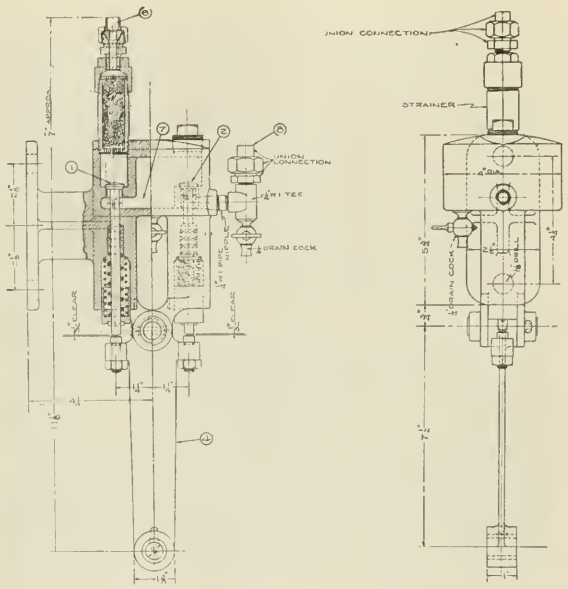


Fig. 2—Compressed Air Governor

for the passage of steam from the boiler through pipe *14*, Fig. 1, to the locomotive cylinders.

When coming to a stop valves *1* and *2* will not open rapidly enough to supply compressed air in sufficient volume to retain valve *11* open and the compressed air in pipe *8* and cylinder *9* will escape through the steam governor packing ring *12* and pipe *13* to the atmosphere. Valve *11* will be seated by spring *15* together with the

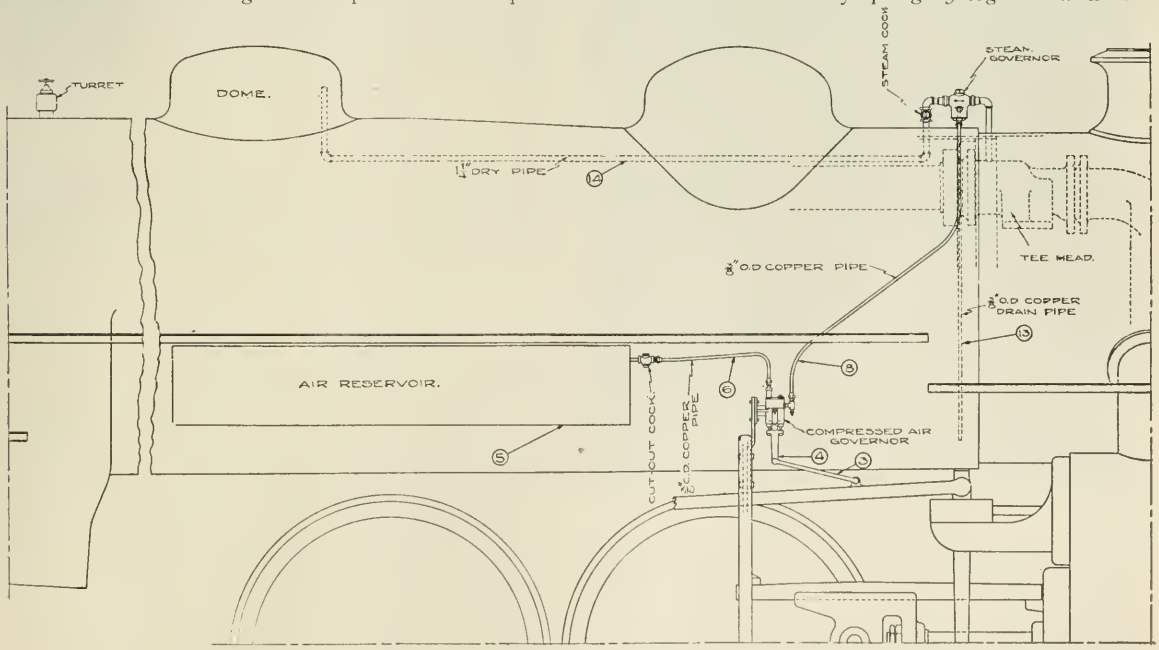


Fig. 1—Application of the Lewis Automatic Drifting Valve

action of the steam on the upper end of the valve stem 10 and the supply of steam to the locomotive cylinders will be cut off a short interval before the locomotive comes to a stop, and the locomotive will stop with no steam remaining in its cylinders.

The packing used on the valve stems of the compressed air governor contains a permanent lubricant and oil holes are also provided on lever 4, Fig. 2. No other lubrication is necessary.

Locomotives equipped with this drifting valve are in service between Richmond, Va., and Washington, D. C., on the Richmond-Washington Line, the Richmond, Fredericksburg & Potomac and the Washington Southern Railroad.

Turbine Headlight Set for Steam Locomotives

To meet the requirements of steam locomotive headlight service, the General Electric Company, Schenectady, N. Y., has placed on the market a turbine generator set known as type CY-32B, especially designed to supply power for the headlight and cab lights. This set consists of a single stage Curtis turbine direct-connected to a compound wound generator governed on the steam end by a self-contained pressure regulating valve, and controlled electrically by a stationary magnetic brake coil and rotating copper disk which maintains practically constant voltage under different loads.

The machine is made in two sizes, 175 watt, 6½ volt, and 500 watt, 33 volt, for operation on boiler pressures varying between 125 and 225 lb. per sq. in. It is composed essentially of one metal casting equipped with three substantial feet. This casting embodies the generator frame, regulating brake coil chamber and turbine casting. The generator shield carries one of the ball bearings and the brush holders, and the exhaust head carries the other ball bearing.



Turbine and Generator Complete Ready for Mounting

The rotating part is composed of a shaft upon which is mounted the armature and bucket wheel, and to the bucket wheel is riveted a copper disk by means of which the load regulation is obtained. Cast integral with the main frame is a steam separator upon which is mounted the pressure reducing valve and pop relief valve.

The steam pressure at the turbine is maintained constant by the action of a hollow valve, steam working against the pressure of a spring, the section of the stem immediately below the ports being tapered. The tension of the spring is adjusted by the addition of thin washers, so that when the boiler pressure does not exceed 125 lb. the stem remains in its lowest position and no throttling of the steam takes place. When the boiler pressure exceeds 125 lbs. the stem is forced up and the tapered portion throttles the steam flowing out. The upward movement of this stem at all boiler pressures above 125 lb. is just sufficient to maintain constant steam pressure at the ports in the valve bushing.

The magnetic brake has no moving parts except the copper disk which is riveted to the bucket wheel and rotates in the air gap around the pole faces. The brake winding consists of a series and a shunt coil so proportioned that at full load the series coil neutralizes the magnetic effect of the shunt coil. Consequently no drag is produced on the rotating copper disk. When either the headlight or cab lamps are turned off, thereby reducing the current through the series winding, the field set up by the shunt winding is not entirely neutralized by the series field and produces eddy currents in the copper disk which results in a sufficient drag to hold down the speed of the rotor, thereby preventing over-voltage. The machine will run at its highest speed, 3,600 r. p. m., at full load, and any other condition produces a lower speed, unless an open circuit occurs between the brushes and brake windings. In this case, of course, no voltage is generated and the speed increases to approximately 5,000 r. p. m., a speed which the machine is made to withstand, however. This braking effect prevents burnt-out generator coils, for if an overload or short circuit occurs, the flux from the series coil overbalances the flux of the shunt coil, thereby producing a drag on the copper disk which is proportional to the amount of the overload. While the full-speed current of the machine is 15.2 amperes, and the speed 3,600 r. p. m., the short circuit current is about 12.8 amperes and the short circuit speed approximately 800 r. p. m. This form of governing is, therefore, not only simple, but it is also of value as a protection against burned-out windings. There are no moving regulator parts to become worn.

Railroad standards have been followed in the mechanical design. Only two sizes of cap screws and one size of nut are used, both sizes of cap screws being hexagon headed and slotted, so that if necessary the machine may be completely disassembled with the aid of an ordinary wrench and screw driver.

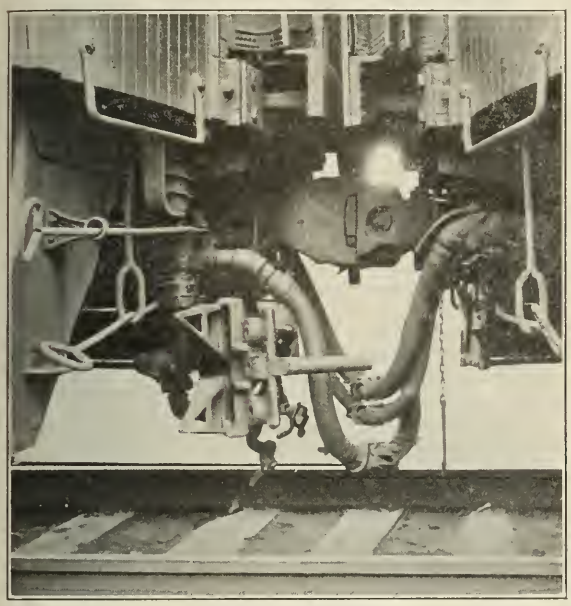
Storage Battery Cars

Storage battery cars constructed according to M. C. B. standards and having the car body and its appliances of steel with the exception of doors and inside fittings, are exhibited and demonstrated by the Railway Storage Battery Car Company, New York. Motive power is supplied to the wheels through gears by four 250-volt direct current motors, and current is supplied by these motors by Edison storage batteries. These cars were described in detail in the April 19, 1919, issue of the *Railway Age*. One of these cars is making exhibition runs between Atlantic City and Ocean City, leaving Virginia avenue and the boardwalk at 10.00 A. M. and 3.00 P. M. The running time is 50 minutes for the round trip.

The Union Automatic Train Line Connector

An automatic connector for steam, signal and air brake train lines has been developed by the Union Connector Company, St. Louis, Mo., and is on exhibition. This connector is of the side port type, the gaskets registering in a plane making an angle of about one in seven with the center line of the car.

The connector is attached to any standard drawbar without welding or removing the couplers, by the use of attachments designed to meet the requirements of each application. Where the conditions permit, however, a lug may be welded to the drawbar to carry the connector. When new couplers are to be fitted with the equipment the lugs may be cast integral with the couplers. No

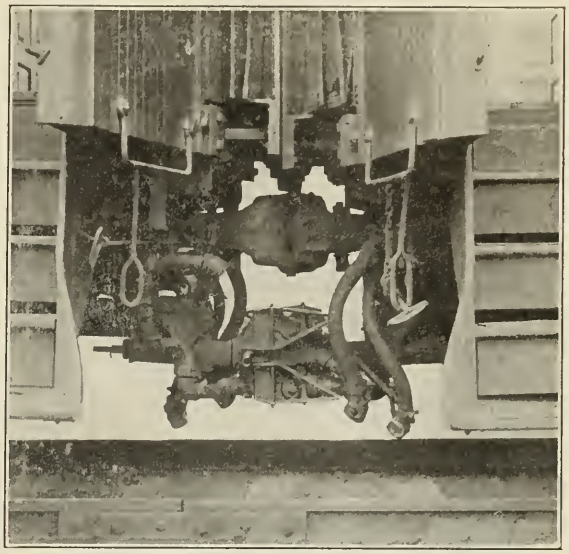


The Coupler Disconnected and Swung Aside for Interchange with Unequipped Cars

change in the air or signal hose need be made, as hose of standard length are attached to the connector by means of the standard hose couplings. This takes care of the interchange feature without the use of special dummy couplings, as it is only necessary to uncouple the hose from the connector to prepare for interchange with unequipped cars. The steam hose is ordinarily replaced with a flexible pipe connection leading to the connector. This pipe is screwed into a specially designed three-way end valve with two outlets, in one of which the standard steam hose may be screwed for interchanging with unequipped cars.

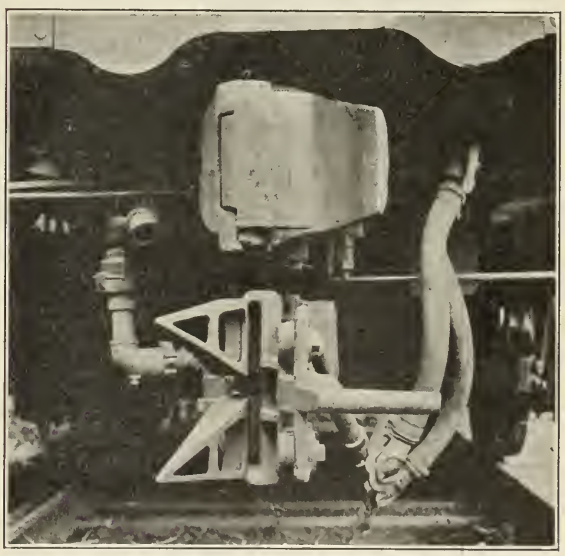
The connector has a gathering range of 11 in., both horizontally and vertically, which is about two inches more than the range of the car couplers. In registering horizontally the vertical tongue is gathered inside the points of the horns on the opposite head. Vertically, any variation in height is taken care of by the horizontally protruding pin, which is gathered between the upper and lower horns.

The connector is located with the center line of the brake pipe port about 17½ in. below the coupler, with the center of the gasket extending 2½ in. out from the inside face of the coupler knuckle. As two connectors come together the gaskets are registered and the connector springs compressed 2½ in. each, thus holding the heads locked together. Before coupling, the springs are designed to hold the connectors in a fairly rigid posi-



Union Automatic Train Line Connectors Coupled

tion, but when coupled the two connectors as a unit have universal freedom of movement, unhampered by the spring pressure. The side registering feature permits the use of light springs, the coupled compression of which amounts to only 250 lb. When interchanged with



End View of the Coupler

unequipped cars the connector is swung to one side, as shown in one of the illustrations, and locked.

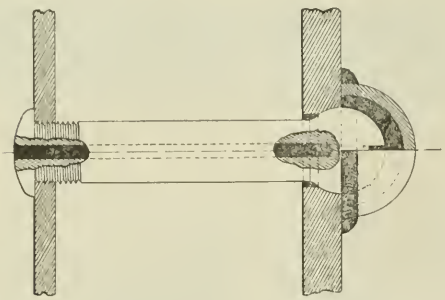
When coupled, the steam gaskets do not come in contact with each other, but remain loose in the heads. When steam pressure is admitted to the train line the steam forces the gaskets to close tightly against each

other. They are said to remain steam tight until condensation accumulates in the coupling, when it drains automatically without the escape of steam. The slight angle at which the gaskets register is designed to prevent any tendency for the gaskets to shear.

This connector has been developed as the result of a long period of service trials under a variety of conditions in which special attention has been given to the design of a device which will meet in a practical manner the requirements of interchange during the period when such connectors must frequently be used with unequipped cars.

New Designs of Flexible Staybolts

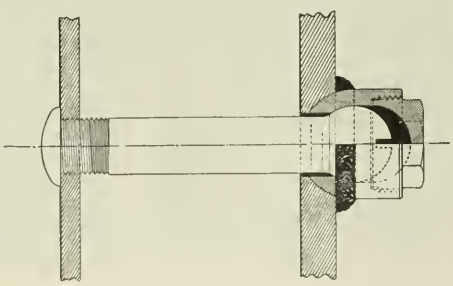
Several new designs of flexible staybolts, made feasible by the development of autogenous welding, are being exhibited by the Flannery Bolt Company, Pittsburgh, Pa. Electric welding is used to secure the caps and sleeves of flexible staybolts to the outer sheet for the purpose of doing away with the threaded sleeves and the tapping of the outer sheet, and in order to overcome



Hollow Flexible Bolt with Solid Cap

occasional troubles resulting from the leakage of sleeve threads. It also eliminates the uncertainties of the tooling operation in tapping the outer sheet to obtain perfectly tight installations of the sleeves in all instances.

The F. B. C. universal type of flexible staybolt contains a universal sleeves with inserted plug and gasket, that rests on a counterbored seat made in the outer plate at an angle corresponding with that of the staybolt. The round head Tate bolt has its bearing inside the sleeve,



Application of Universal Staybolt Sleeve

with sufficient clearance between the cap and the bolt head to obtain the necessary longitudinal movement under firebox expansion. The universal sleeve, when located on its counterbored seat on the plate surface, is held up tightly to the plate, and is then electric welded to the outer plate surface. Welding seals the connection tightly, thus providing a reinforcement that adds strength to the plate section where the sleeve is applied. The bolt is then inserted through the sleeve and screwed into the firebox sheet until the round head takes its bearing in the sleeve. It is then riveted up and the plug and gasket are inserted in the sleeve.

The F. B. C. plain type of flexible staybolt is made in two designs. One design provides for seating the round head Tate bolt directly on the outer surface of the wrapper sheet, in a counterbored bearing. A one-piece cap is placed over the bolt head with ample clearance to allow for bolt movement, and is then welded to the outer plate. The closed cap used in this design necessarily demands a hollow staybolt and a drilled hollow Tate bolt is provided with a telltale hole extending from the riveted end of the staybolt to a point just beyond the round head, so that if a fracture should occur at any portion of the bolt beyond the round head it could be detected, provided it reached the telltale hole. The holes are cleaned out before inspections and tests. This design is very simple and no doubt will be found useful in certain types of firebox boilers. For locomotive boilers at the present time there is no ruling for inspection and test for a flexible bolt of this kind.

The other design provides for the use of a cylindrical housing with plug and gasket, welded onto the outer plate surface, covering the Tate staybolt, which is applied to the plate in the same manner as for the one-piece closed cap, thus allowing for the use of a solid bolt, and the removal of the plug in the housing for the periodical inspection and test of the staybolt.

At the Flannery Bolt Company's exhibit several models of the F. B. C. flexible staybolts are exhibited, showing the welded sections and separate parts, as well as the drilled Tate bolts, which can be used in the regular Tate flexible staybolt assemblages whenever it is thought advantageous.

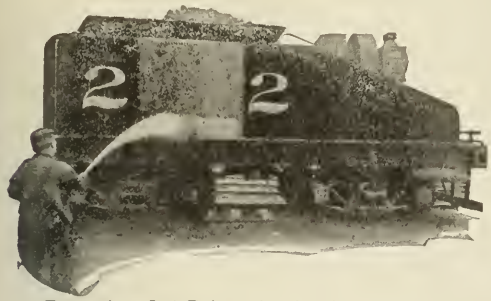
Hvid Oil Burning Engine

The Hvid type oil burning engine is being exhibited by Manning, Maxwell & Moore, Inc., New York. This engine operates with any liquid fuel and the fuel is not compressed before being fed to the engine. The small engines of this type are said to develop about 12 brake hp. hours per gallon of fuel oil and the larger engines 16 brake hp. hours per gallon. The small engines are started by cranking, while the larger ones are equipped with auxiliary air or engine starters. The fuel oil is completely burned so that there is no trouble with a carbon deposit; the exhaust is clean because of the high temperature in the cylinder at the time of combustion.

Briefly, the operation of the engine is as follows: During the suction stroke of the piston air is admitted to the cylinder through an intake valve. Simultaneously liquid fuel for one charge is admitted into the fuel cup by gravity flow. A small amount of air also enters the fuel cup, which is always open into the cylinder through small holes in the fuel cup. On the compression stroke of the piston the air in the cylinder is compressed to such a degree that it is heated to the point of ignition of the fuel, which is thus vaporized and ignited, creating a partial explosion in the fuel cup. The fuel is thus heated and then atomized through holes in the fuel cup into the cylinder, where it is completely burned. The pressure generated forces the piston through a power stroke. On the following exhaust stroke the piston expels the burned gases through the exhaust valve and the cycle is repeated.

Removing Old Paint

REMOVING THE OLD PAINT from steel passenger and freight cars, locomotive tanks, structural steel, trucks, underframes, locomotive jackets, etc., is often as much of a problem as the repainting job itself; while methods of quick applications of new coats of paint have been brought to a high point of efficiency, the



Removing Old Paint with Solvit Compound

various procedures incident to the removal of old paint have offered room for improvement.

A new paint dissolving solution called Solvit has been recently brought out by Mudge & Co., Chicago. It is said to be non-inflammable, easily applied to flat surfaces and being of the proper consistency, will adhere easily to any vertical surface. One of the greatest difficulties



Before Applying Solvit Compound

met with in the use of many paint removers is the tendency of the remover to dry within a short time after it has been applied; it is necessary constantly to spray such removers with water. This of course means additional time, labor and expense. Solvit will remain moist for from 10 to 24 hours, and when once applied further attention is unnecessary until the paint is in condition so that it can readily be scraped or washed off. After being applied it is allowed to remain from one-half to six or



Immediately After Applying Solvit Compound

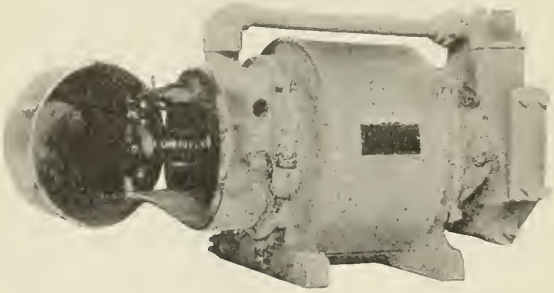
seven hours, depending entirely on the thickness of the paint to be removed. After it has thoroughly penetrated the paint, the latter may be easily removed by using hose and water or a scraper knife, leaving a clean surface for refinishing.

This compound is recommended for use on metal objects only, with the exception of brass and aluminum. It is not recommended for the removal of paint and varnish from wooden surfaces. The liquid can also be used for cleaning and renovating interior walls, hoppers, dining car kitchens, etc.

The photographs show one of the methods of the application of Solvit in removing the paint from a switch engine tender. The liquid may be applied with a brush, but for the purpose of speed and economy the method shown in the second illustration is recommended.

Alternating Current Headlight Generator

THE GOULD COUPLER COMPANY, New York, is placing on the market a new 500-watt, 32-volt turbo-generator for locomotive headlights. The generator is designed on an entirely different principle from any of the headlight equipments that have heretofore been marketed. It is an alternating current device and combines a number of advantages that are inherent with this tipe



The Open Cover Shows the Absence of Brushes and Commutator

of machine. There are no rotating wires, no commutator, no brush holders or brushes. The rotating element revolves in ball bearings.

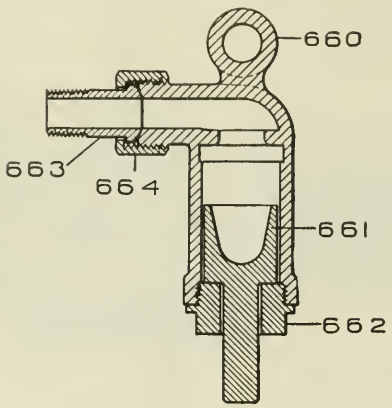
More electric headlight trouble and headlight failures can be attributed to commutator and brush trouble than to any other source, and in view of the fact that there are a great number of locomotives which must soon be equipped with electric headlights, the generator should receive most critical attention.

Pivoted Type D Passenger Coupler

THE MCCONWAY AND TORLEY COMPANY, Pittsburgh, Pa., is showing an adaptation of the new standard D coupler with pivoted head for use on passenger cars. The coupler head and shank are separate members and are connected in pivotal fashion by means of a 2¾ inch pin. In the shank are mounted devices, simple, compact and readily accessible, for centering the shank on the car and for holding the coupler head normally in alignment with the shank. The coupler head and all contained parts are "standard D," the rear portion of the head being designed properly to co-operate with the shank and centering device, the whole forming an equipment having the flexibility recognized as being so essential for passenger car service and providing for the use of standard D parts.

Sellers Injector Indicator

THE USUAL FORM of "tell-tale" for non-lifting injectors warns the engineer by discharging a jet of steam into the cab when the injector blows back. The indicator illustrated herewith, and which is exhibited by William Sellers & Co., Inc., not only performs the function of tell tale without discharge of steam into the cab, but, in addition, advises the engineer if the injector is wasting water at the overflow and enables the operator to adjust the feed valve to the actual maximum or minimum capacities of the injectors. Its action depends upon the well-known principle that when feeding without waste there is always a partial vacuum within the overflow chamber of an injector of the gravity overflow type. This vacuum is utilized to raise the loosely fitting piston to its upper seat, causing the projecting plug to disappear from view. If, for any cause, the injector starts to waste, the vacuum within the overflow chamber is broken, the piston drops to the lower end of its stroke and exposes the projecting plug. The operator is thus warned and will partially close the lazy cock, stopping the waste.



Injector Indicator

If there is an interruption of the water or steam supply, and the injector "flies off," the piston will instantly drop to its lower seat, preventing outflow of steam; the engineer will be again warned of the danger.

A further advantage of this form of indicator is that it enables the engineer or fireman to obtain the actual minimum capacity and adjust the feed to the varying needs of the boiler. Most operators do not regulate the water supply closely, fearing that the injector may break off without warning, or waste at the overflow. The indicator is so sensitive to conditions in the overflow chamber that the exact minimum can be obtained by regulating the lazy cock until the end of the piston appears, due to the loss of the vacuum in the overflow chamber; a very slight opening of the lazy cock will cause the piston to rise and the exact minimum is obtained, with resulting economy of fuel.

Further, the application of the indicator will reduce the tendency of the engineer to close the heater valve, which prevents the injector from restarting automatically, so that this form of indicator materially increases the safety of the boiler feeding system. The Sellers indicator makes the non-lifting injector as safe and certain to operate by night or day as an open overflow lifting injector.

It is said to be applicable to the Sellers, Nathan WF, Nathan Simplex, Chicago, and other forms of non-lifting injectors using an overflow chamber containing the combining tube and closed against the atmosphere by a gravity overflow valve.

Chrobaltic High Speed Cutters

MILLING MACHINE CUTTERS cast from high speed steel are one of the new products developed to meet war-time demands, which are being exhibited at the convention. The demand for high speed steel for munitions work taxed the available supply of tungsten, and to meet the emergency the Chrobaltic Tool Company, Chicago, developed a high speed alloy steel made without tungsten, known as Chrobaltic alloy. This new product not only makes the use of tungsten unnecessary, but also saves material and high priced labor, as it can be cast into the most intricate shapes.

Chrobaltic alloy has been used in the manufacture of milling cutters, blanking, drawing and forming dies and hot and cold trimmers. It offers remarkable resistence to abrasion and is therefore particularly adapted for gages and similar instruments. The cutter or tool is cast to practically the finished form, leaving from 1/16 in. to 1/8 in. for finish, and the tools are machined to within a narrow tolerance before heat treating. Final finish, however, is attained by grinding as in the case of regular high speed steel cutters. These new high speed steel castings have the appearance of good smooth forgings. They are practically non-rusting and acid-resisting, and their grain is uniform and dense. The heat resisting qualities of the new alloy are high and it does not scale in the fire, thus adapting it to milling cutters having very thin cutting edges. The cast tools are furnished in the finished state ready for use, or they are supplied in annealed form to the customer who machines them to accurate dimensions and hardens them for use. They may be hardened in oil or air, and the process of annealing and rehardening may be repeated many times without losing any of the properties of the steel.

Annealing is effected by heating to 1,832 deg. F. in closed muffle furnaces and allowing the part to cool slowly. However, very rapid annealing may be effected by heating slowly to 1,202 deg. F. in a muffle furnace or in a blacksmith's fire, allowing the temperature to fall there to a black heat, and afterward cooling naturally in still air or quenching in boiling water. After annealing, the casting should show about 38 scleroscope hardness. It can then be machined at the rate of 25 to 30 lineal ft. per minute.

To harden Chrobaltic cutters, they should be heated slowly in a hardening muffle furnace to 1,832 deg. F. to 1,877 deg. F. and held at this heat until the tools are thoroughly soaked. The heat is then allowed to drop about 20 to 50 deg., at which heat the cutter is withdrawn and quenched in oil. Good results may also be obtained by allowing the cutter to cool in still air until the red disappears and is invisible in the shade, then quenching in oil. The slight drop in temperature while the tool is still in the hardening furnace is important. On very large milling cutters, a blast or air current may be used to accelerate cooling before quenched in oil.

In comparing the cutting and wearing qualities of Chrobaltic alloy with those of tungsten high speed steel, there is practically no difference where the ordinary temperatures in service are involved, but in abrasive service, as in the machining of phosphor bronze, white metals, etc., as much as ten times the wear is obtainable from Chrobaltic cast cutters.

Type E Locomotive Feedwater Heater

Although the type *E* heater of the Locomotive Feed Water Heater Company, New York, has been in service over two years it has never before been seen at the convention. A half-size model is being shown embodying the corrugated agitator feature that is responsible for results beyond what was even hoped for.

This type is a development of the double tube or corrugated film type that was shown at the last convention. It was found that a higher heat transfer could be obtained by agitation of the water in the tubes. Metal agitator strips were therefore introduced in 5/8-in. brass tubes. The tubes are four feet or more in length between tube sheets and are arranged in groups so that the water makes the passage of four different lengths of tubes in going through the heater, giving it a travel of over 16 feet in the tubes.

Within each tube is a spirally corrugated agitator made of this brass stripping. These agitators have stops at one end which overlap and interlock and prevent the agitator from turning in the tube. The water in passing through the tube and around the agitator is constantly impinging against the inner surface of the tube. This results not only in the high transfer of heat for a given area, but also scours the inside of the tube and keeps it clean.

Heavy cast iron headers are bolted to the tube plates and are arranged with partitions which cause the water to flow through the four passages in succession. These headers are easily removable for inspection. One of the



Sectional View of the Type E Heater

tube plates is larger than the other and is arranged to be secured to the end of the cast iron body which encloses the whole nest of tubes. The smaller tube sheet is allowed to move freely in a longitudinal direction within the body and thus provides for the difference between the expansion of the brass tubes and the cast iron shell. This end of the shell is enclosed by a casing to prevent the escape of the exhaust steam around the floating header.

Feet for securing the heater to the locomotive frames are formed on the body and elbows are provided for connection with the pipes leading from the exhaust passages in the cylinder. A drain is provided at the bottom of the shell for clearing away the condensed steam. It will be noticed that there is a baffle plate at the top of the nest of tubes to prevent the impinging of the steam directly on the tubes, and a tube nest guard is placed at the bottom to prevent damage to the tubes when the nest may be removed for any purpose.

Inlet and outlet water connections are provided at one end of the heater, the arrangement being for a flanged pipe connection to allow the removal of the header without disturbing the pipe lines. A thick coating of asbestos lagging is placed around the body of the heater and this is covered with a sheet steel jacket.

A point of special interest in this heater is the form of joint used for the connection of the tubes and the tube sheets. This joint includes a groove in the tube sheet about midway between the two faces, and as the brass tube is rolled the metal is forced into this groove. Experience has shown that by employing this construction a leaky tube at its connection with the tube sheet is practically unknown.

A drain is provided at the inlet end of the heater which, when opened, will remove the water, not only from the heater but also from the pipe leading to the pump and the connection as far as the check valve at the boiler. Thus by opening the drain on the end of the heater all of the line between the pump and the boiler check valve is easily drained.

Connections are provided to receive the exhaust steam pipe from the boiler feed pump and also from the air pumps at the back of the elbows on the top of the heater body.

This design of heater has been developed after three years' practical experience in locomotive service and is the result of a most careful study of roundhouse and shop conditions as well as regular road service.

A boiler feed pump designed especially for this work, has been developed by the assistance of the Westinghouse Air Brake Company. This pump has operated under the most difficult conditions with a slip of not over four per cent and a steam consumption of not over 70 lb. per water horsepower at any point of the range of capacity. The pump will consume less than two per cent of the capacity of the boiler and the amount to be deducted from the theoretical saving of the feedwater heater is less than two per cent.

Between 65,000 and 70,000 lb., or from 7,800 to 8,400 gallons of water an hour can be handled by this pump at its maximum rate. A normal continued rate of 50,000 lb. or 6,000 gallons an hour is maintained with quiet action.

The steam end is essentially the standard 9½-in. locomotive air compressor of the Westinghouse Air Brake Company. All standard 9½-in. air pump parts for the steam end are used in the water pump. On the water end the effort made was to develop a rugged construction with every part easily accessible for inspection and of the simplest and strongest design.

Valve chambers containing the suction and discharge valves are located on either side of the water cylinder in order to get ample volume for the free passage of the water and at the same time keep the pump within clearance limits for attachment to the side of the locomotive. The valves are located in groups of five, each side containing two sets, one for suction valves and one for discharge valves. Each set of five valves is arranged in a separate removable deck which is held in place by a center bolt. The stops for the suction valves are part of the upper or discharge deck and the stops for the discharge valves are attached to the valve chamber cover.

By using this large number of valves in each deck it is possible to get the desired area of opening with a very small lift of the valve, which gives high efficiency and also results in greatly reduced maintenance cost. With the low lift the valves do not pound themselves and their seats, or start leaking nearly as soon as would valves of larger size. Bronze valves and valve seats are used

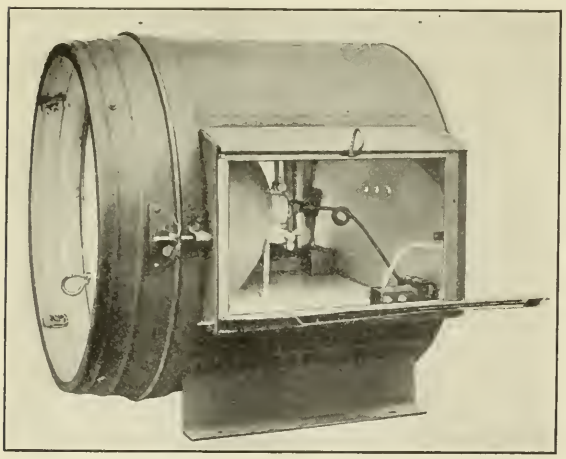
and over each is a light bronze spring insuring quick and positive action to each valve.

An accepted standard water packing is used on the water piston and the construction at this point is extremely simple. It incorporates a follower plate which carries an adjusting screw in the center for following down the packing, if necessary. Experience has shown that very little attention is required at this point. The packing should need renewing only at the shopping of the engine.

This pump has a fire hose connection at the bottom of the air chamber. Suitable provision is made for a careful draining of all parts of the pump in case the locomotive is to be laid up dead in cold weather.

Electric Headlight and Generator

The Schroeder Headlight and Generator Company, Evansville, Ind., has improved its equipment by the addition of several devices. Automatic disconnecting switches have been applied to the headlight so that the reflector and other internal parts in the headlight case may be removed without the necessity of disconnecting any wires. Another improvement in the headlight makes the interior of the headlight easily removable and at the same time holds it firmly in position under all conditions of vibration to which headlights are subjected.



Headlight with Side Open, Showing Disconnecting Switches

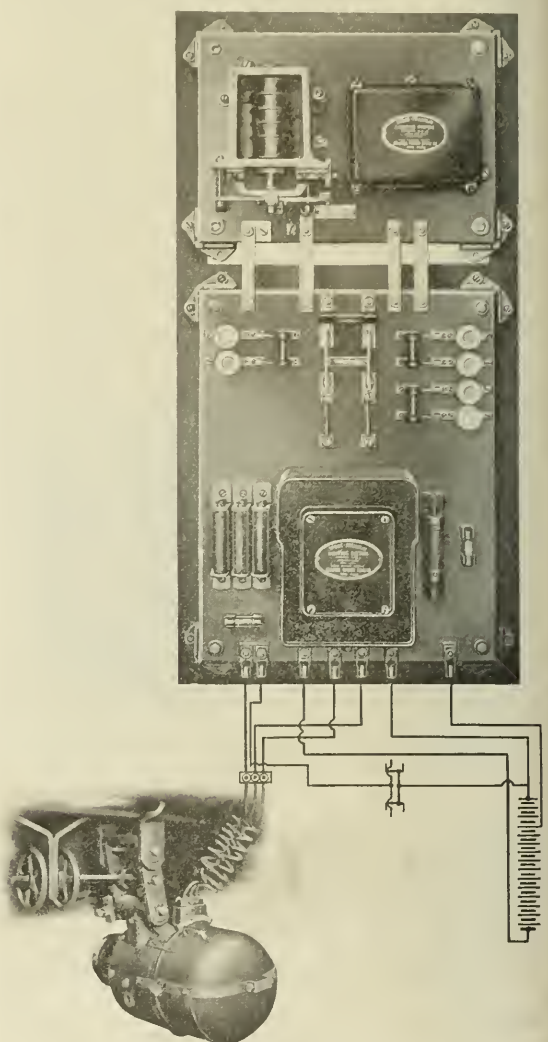
A piston valve, operated by the governor which controls the flow of steam and the speed of the turbine, has been added. The makers claim that this valve has done away entirely with the sticking of the valve caused by deposits of lime or other foreign substances common to localities where the water is bad.

Car Lighting Equipment

The Stone Franklin Company, New York, has introduced a single battery system of car lighting, the operation of which is based on principles never before applied to car lighting equipment. It has been discovered that with constant output from the generator there is a certain relation between voltage and current delivered to the battery when gassing commences. When the charge reaches the gassing point the rate of charge is automatically reduced. In this way excessive gassing is prevented and the amount of flushing required is greatly reduced.

Lamp voltage regulation is obtained in the same manner as with the two battery system, except that the regulating voltage is obtained from the one battery.

Four devices control the operation of the equipment. These are the constant watt generator output by speed control, the auto triplex switch, the reducer switch and a relay. The sequence of operations is quite simple. When the speed of the train is sufficient to bring the generator voltage up to the proper value the auto triplex switch connects the generator with the battery. Five contact fingers on this switch, without any adjustable springs, interpose properly proportioned lamp resistance for any supply voltage, and finally connect to the positive lighting circuit, a battery potential equal to the lamp voltage potential which is used for lamp voltage regulation.



Panel, Generator and Connections

As the battery approaches the gassing point the voltage rises and the current falls off. When gassing commences the relative values of voltage and current are such as to cause the reducer switch to operate. This switch shunts

out a part of the generator current through a resistance thereby reducing the rate of charge of the battery. It also prepares the relay to operate at a predetermined battery voltage. After reduced the charge rate has been continued for a period of time, the relay disconnects the generator by opening the triplex switch when the battery voltage has increased to a certain predetermined value.

A change of adjustment of the reducer switch makes it possible to use either lead-acid or alkaline batteries with the same equipment. If two batteries are wanted for dining car or private car service they may be taken care of by the addition of a change-over switch.

Babcock Water Gage Protector

The Johnson Bronze Company, New Castle, Pa., is exhibiting an improved design of the Babcock water gage protector, which is intended to improve materially the visibility of the water gage glass for observation with either natural or artificial light. The protector possesses all of the features formerly incorporated in the design, which include the heavy cast bronze body, the double observation glasses, each of 3/16-in. glass plate, and the outlet for steam, hot water and broken glass in the event of a broken gage glass.

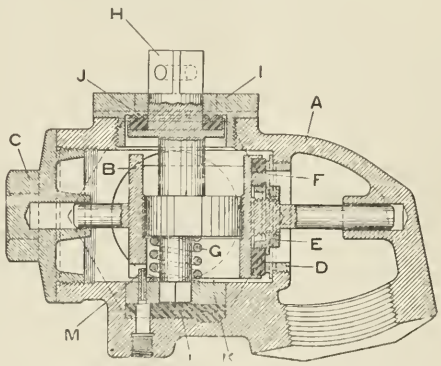


Babcock Water Gage Protector with a Slot in the Casing to Illuminate the Interior

The new feature consists of a narrow slot in the front of the protector, which, by admitting the light, either natural or artificial as the case may be, illuminates the gage glass in such a way as to clearly show the water level to the engineer and fireman on opposite sides of the cab. The photograph shows the front of the protector with the slot for admitting light in the casting behind the front window.

Packless Steam Heat End Valve

In relieving the condensation at the rear end of passenger train heating lines, the general practice has been to open the end valve slightly. This, however, has not proved satisfactory, and many different devices have been designed to take care of this drip automatically All of these have been arranged to drain through the hose and have frequently caused freezing and decay of the hose. The Gold Car Heating & Lighting Company, New ,York, has recently developed a new end valve known as No. 1126, in which the drip is automatically relieved through the valve itself, thus eliminating the continual dripping through the hose. The valve is also of a packless design and will not leak around the stem.



Section Through the Center of Valve

In the sectional view of the valve it will be seen that it is of the piston type, similar to existing Gold end valves. A composition disk *F*, insuring a tight valve when it is closed, is mounted on the face of the piston. A composition disk *L* is located in the base of the valve and is held stationary in its position. The seat *K* is of metal and rotates against the composition disk *L*. The metal seat *K* also has a sliding motion on the base of spindle *H*, so that the pressure from spring *G* will force it to a positive contact with the composition disk *L*, thus insuring a positive seat. A hole in the seat *K* and the disk *L* is so located that when the valve is closed (Piston *B* being forced to the right by the cam on spindle *H*) the seat *K* will rotate to a position so that the holes are in line, thus allowing condensation to drip out. The spring *G* presses the spindle *H* upward firmly against the bonnet . With the disk *J* at this point a leak is practically impossible, thus doing away with the packing at this point.

A quarter turn fully opens or closes the valve, and it cannot be jarred from its set position by the vibration of the train, or be unseated by the steam pressure. The valve is substantially built, the body being of iron and the cam and spindle of brass cast in one piece. The spindle is short and of large diameter and should keep in perfect alinement for a long period. The distance from center of the train pipe to the top of the spindle is 2¾ in., and it will clear any adjacent apparatus.

The area of the passage in the valve is so large that it offers less resistance to the flow of steam than the train line itself. The seats of the valve are renewable and can be replaced without disconnecting any piping. In addi-

tion to relieving the hose of the effects of the continual drip incident to the condensation passing through the hose coupling, it is also a protection to the trainmen when uncoupling the hose, as the opening between the train line and the hose is tightly closed when the valve is shut.

Valve Gear for Standard Locomotives

In spite of the army of conscientious objectors to the so-called "monkey motion"—a term once sarcastically applied to all types of outside valve gears—and strong predictions from some "old timers" that "they would scrape it off on the corners of box cars as they pass," eccentrics and links seemed to disappear almost over night. In their places appeared the comparatively simple, accessible and more trustworthy steam distributing mechanism, deriving its motion from the crank pin and the crosshead. Evidence of continued thought and consideration for the betterment of the Baker valve gear in contending with the regularly increasing demands made upon it, is contained in the announcement by its manufacturers, the Pilliod Company, New York, of recent changes in its construction to comply with the requirements of the United States Government standard locomotives. For passenger engines, cast steel frames, vanadium cast steel bell cranks and drop forged reverse yokes, radius bars, connecting rods and other minor parts will henceforth be standard. On freight and switch engines all frames will be of cast steel. All principal gear parts will be of vanadium steel except the radius bar, which will be drop forged.

More than 800 of the Railroad Administration standard locomotives have been equipped with this valve gear.

Four-Wheel Drive Auto Truck

Through the courtesy of the War Department the Four-Wheel Drive Auto Company, Clintonville, Wis., is exhibiting a three-ton, four-wheel driven truck, which is one of over 17,000 of these trucks used by the Allies and the United States Army during the war.



Four-Wheel Drive Ammunition Truck

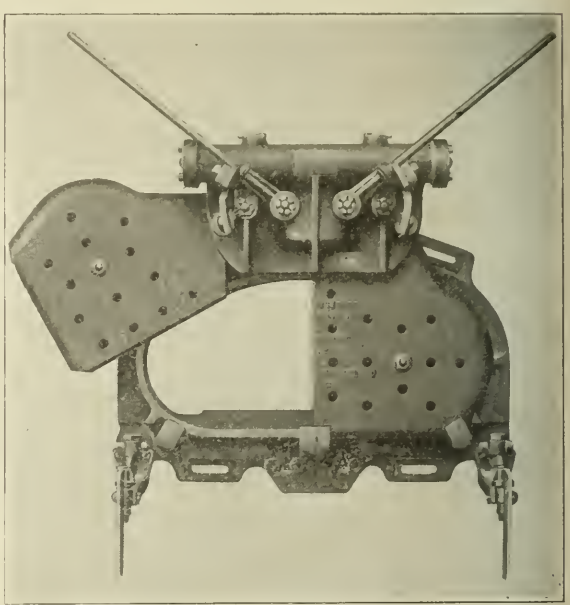
The artillery repair trucks which are included in the exhibit of U. S. Army ordnance, are also of the same type.

The feature of this truck is its high tractive power, made possible by the utilization of all four wheels for driving the truck. To effect uniform traction on all wheels the weight of the truck is also equally distributed and the same size tires are used all around. This truck is readily adapted to run on railway track by the substitution of flanged steel tires for the solid rubber tires ordinarily used. No change in gage is necessary in making this conversion.

Such an application has already been made on the Northwestern Pacific, where one of these trucks is handling two 40,000-lb. dump cars and two 60,000-lb. flat cars on a 1.2 per cent grade. This installation indicates the adaptability of the truck to railway contractors' work.

Double Butterfly Firedoor

A double door that provides for the independent operation of each firedoor has been developed by the Franklin Railway Supply Company, New York, and is known as the Franklin double No. 6 type. This door is used on openings from 20 in. to 36 in.; the latter is the widest so far made. Its use cuts down by one-half the amount of air entering the firebox opening, as it is used only when the opening of one side will admit a coal scoop.



Double Butterfly Door for Wide Fire Door Openings

The single operating cylinder contains two pistons that work in opposite directions, each operating one door by means of a link connection. The construction of the pistons and port valves and foot levers is the same as in the single operating Franklin No .8 door, one for the right hand and the other for left hand operation. This does away with the use of the gear in automatic operation. While this type of door still retains a gear, it is for hand operation only. The door is also arranged so that it can be opened by hand so as to uncover the entire opening to permit passing grate bars through the door frame. This arrangement of door is now being applied in place of the horizontal or vertical double doors to engines having a wide fire box and a large fire door opening.

Railway Age

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WE GUARANTEE that of this issue, 16,825 copies were printed; that of these 16,825 copies, 15,406 were mailed to regular paid subscribers to the Railway Age and the Railway Mechanical Engineer; 119 were mailed to advertisers, 300 were provided for counter and news companies' sales, new subscriptions, bound volumes, copies lost in the mail and office use, and 1,000 copies for distribution at Atlantic City.

THE RAILWAY AGE is a member of the Audit Bureau of Circulations (A. B. C.) and the Associated Business Papers. (A. B. P.)

The Most Successful Convention

The convention which will close to-day will be unanimously voted the most successful mechanical convention ever held. It may have a great influence upon the efficiency of American railroads in future. Railroad expenses at present are extremely high chiefly owing to increases in the wages of labor and the prices of fuel and materials. If greater economy of operation is to be secured, it must be done chiefly by using less labor, fuel and materials to move a given amount of traffic. Greater efficiency in the use of labor, fuel and materials can be obtained only by the employment of better operating methods and better machinery and equipment. The better methods of operation must be worked out principally by railway officers.

The better machinery and equipment must be provided by the railways and the railway supply companies jointly. Never was so much equipment and machinery adapted to saving labor and materials on railways shown at one time and in one place as has been shown on the Pier at Atlantic City within the last two weeks; and never was such equipment and machinery examined by so many railway operating and mechanical officers in so short a time. Equipment and machinery to save labor cannot be provided by the railways in sufficient quantities to accomplish the maximum practicable results unless they have available the money which must be spent in order to buy it; and they cannot get enough money unless their rates are made reasonable and their earnings adequate. There are strong indications, however, that after the carriers are returned to private operation they will be regulated in a more liberal and intelligent manner than they have been in the past; and if they are, railway officers, realizing better than they ever did before, both the imperative need for better methods and machinery, and the fact that better machinery is available if they can only buy it, will introduce an era of increasing efficiency in operation that will surpass any known in the past. The interest, the optimism and the enthusiasm shown by both railway men and railway supply men or this convention is a good omen as to the future of both the railway and the railway supply industries.

The Electric Headlight Situation

THE REPORT OF THE COMMITTEE on electric headlights of the Association of Railway Electrical Engineers which was presented before the semiannual convention of the association on Monday, and which was again read before the meeting of the Mechanical Section of the American Railroad Association on Tuesday deals with a subject which is a particularly live one at the present time because of the large number of locomotives that are being equipped with headlights. The first presentation of the report provoked a great deal of discussion and brought out many and diverse opinions as to just what should be considered as standard practices in the various parts of the equipment. While the work of the committee indicates that it obtained information from a large number of roads as to the practices that are being used, it is plainly evident that the time is not yet ripe to bring about a complete standardization of locomotive elective headlights, is not probable or advisable. There will eventually be standard practices adopted in some of the roads will all agree on the same methods of installing the wiring, conduit, switches, turbo-generators, etc. Unquestionably the several roads will retain their own practices to a large extent. Although methods of installation cannot be generally agreed upon there are certain parts of the electric headlight which can be made standard, such as the capacity of the generators, voltage of the lamps, kind of wire to be used, as well as lamp fixtures. These parts can readily be made standard on all roads and have already been made so to a large extent. The actual necessity for standardization of methods of installation is not a paramount issue, however, since locomotives are seldom used on any other than their own lines and the equipment adopted by any one line will not conflict in any way with the practices of the other lines.

The report as submitted by the committee should not be considered as a final attempt at standardization, but rather as an outline which represents the main features of present practice on a number of the largest roads and something which may be changed from time to time as necessity seems to dictate.

Economics of Stoker-Fired Locomotives

THE REPORT OF THE COMMITTEE on Locomotive Stokers showed that while great progress has been made in applying stokers to locomotives, little or no work has been done during the past two years with a view to determining the results secured or the net effect of stokers on the cost of conducting transportation. The report contained several suggestions regarding matters in connection with mechanical stokers which required further study. The cost of stoker maintenance as reported by the roads using them, showed wide variations. In view of the difficulty experienced in operating stokers with certain kinds of coal it might be well to keep a separate record of the cost of maintaining the crusher in order to

determine whether the cost of maintenance could be reduced by eliminating this feature and preparing the coal at the chutes. The method of operating stokers to secure the maximum fuel economy was mentioned in the course of the discussion, and while it is not certain that it has any marked influence some consideration should be given to the matter.

The committee stated that the size of a locomotive is not the controlling factor in determining the advisability of applying a stoker. Any data that could be furnished to enable the roads to judge the advisability of equipping a given type of locomotive with a stoker would prove extremely valuable and it is to be hoped that the committee will carry on investigations with this object in view.

The economics of the operation of stoker-fired locomotives are so important that tests should be arranged to determine the most economical methods under various conditions. Stoker-fired locomotives can be worked at higher rates of combustion than hand-fired engines and as a rule the increased evaporation secured is utilized to haul heavier tonnage, although it might be used to increase the speed of the train. As the rate of combustion increases the efficiency decreases, but the heavier tonnage hauled reduces the cost of wages on the ton-mile basis an amount which is generally assumed to more than compensate for the increase in the cost of fuel. The maximum economy of operation cannot be secured unless it is definitely known whether the combined cost of fuel and wages per ton-mile decreases constantly with the increase in tonnage up to the point where the locomotive is loaded to the limit of the available tractive effort. It is to be hoped that the next report of the committee will include cost data bearing on this question.

Pyrometers for Superheater Locomotives

In discussing the report of the Committee on Superheater Locomotives one of the speakers urged the use of pyrometers to check the temperature of the steam and characterized the device as quite as necessary as the steam gage. There is no doubt that an increase in the efficiency of locomotives could be secured by the use of pyrometers and the fact is realized by motive power officers. It remains to be seen whether the device will be genrally adopted or whether a long campaign of education will be required before it is recognized as a necessary adjunct to the superheater. The railroads are generally slow to adopt anything that adds to the cost of maintenance even though the increase is justified by the results obtained. It goes without saying that the pyrometers will require some attention, although the instrument now being offered for this purpose is very rugged and specially adapted for the purpose.

In considering the advisability of equipping superheater locomotives with pyrometers one important advantage secured by their use should not be overlooked. The pyrometer serves as a check on the operation of the locomotive and discloses conditions that could otherwise be determined only by very careful inspection. Mechanical department officers realize that due to hidden defects or improper operation the full benefit of the superheater is often not secured. The expense of examining locomotives every trip to determine whether draft appliances are in good condition, superheater flues clean and superheater unit joints tight would be prohibitive. The pyrometer will immediately show up any of these defects which reduce the degree of superheat. Furthermore, the improper methods of operation would be brought to the attention of the enginemen by the decrease in the degree of superheat and they would be enabled to correct such practices. In short, th pyrometer would lighten the work of the inspectors and locomotive supervisors and would be of great value in insuring proper maintenance and operation. The railroads spend large amounts in order that they may occasionally check the condition of the equipment. It should certainly prove advantageous to maintain such a device as the superheater pyrometer, which would disclose many important defects affecting the efficiency of the locomotive as soon as they occur.

Constructive Suggestions for the Mechanical Section

In the address of W. J. Tollerton, printed in yesterday's issue, numerous subjects were mentioned to which the Mechanical Section might well devote its attention. Among the most important of these are two which have been touched on before, but should be taken up with renewed interest because under the present organization there is a better opportunity for dealing with them than has existed before. One of these is the question of engine terminals; the other the establishment of a co-operative research bureau.

It is 15 years since the Master Mechanics' Association had a comprehensive report or paper dealing with the design or operation of round houses. The conditions have changed greatly since then, and as stated by Mr. Tollerton the development of the locomotive has outstripped the improvements in the terminals. The need for improved facilities was very evident during the winters of 1917 and 1918, when great difficulty was experienced in caring for power at the terminals Since the introduction of the report prepared by the Operating Statistics Section showing the distribution of locomotive time it has become apparent that even under normal conditions motive power is delayed unreasonably long at many roundhouses. By comparison with the cost of locomotives the investment in terminals is small and efficient roundhouses, cinder pits and coal chutes will bring large returns in the increased efficiency of the motive power. Under the circumstances the question of terminal design and management should be an excellent subject for a committee report and since engineering as well as mechanical problems are involved the engineering Section of the American Railroad Association might be invited to co-operate in the preparation of a paper on these subjects.

Mr. Tollerton advocated the establishment of a co-operative research bureau, and the applause which greeted his remarks showed that the members were in sympathy with the project. Some of the investigations that should be undertaken by such a bureau were outlined in the chairman's address. The need is apparent, and if a practical working plan can be drawn up the American Railroad Association could probably be induced to provide the funds for carrying on the work. There is no reason why this should not be started without delay, as some of the universities having facilities for such work have in the past expressed their willingness to conduct investigations in co-operation with the railroads. The failure to establish a co-operative laboratory has been largely due to a lack of funds, but if the financial assistance of the parent association can be secured, the Mechanical Section will have an opportunity for carrying on research that should point the way to improved practices that will effect marked economies in operation.

Program For Today

9.00 A. M. TO 1.30 P. M.

Discussing of Reports on:	
Design, Maintenance and Operation of Electric Rolling Stock	9.30 A. M. to 10.00 A. M.
Individual Paper on "The Use of Bronze for Valve Snap Rings and Piston Surfaces, and Bull Rings in Large Cylinders, to Prevent Rapid Wear and Cutting of Cylinders and Valve Bushings"	10.00 A. M. to 10.30 A. M.
By Mr. C. E. Fuller.	
Discussion of Reports on:	
Train Resistance and Tonnage Rating	10.30 A. M. to 10.45 A. M.
Subjects	10.45 A. M. to 11.15 A. M.
Powdered Fuel	11.15 A. M. to 11.25 A. M.
Resolutions, Correspondence, Etc.	11.25 A. M. to 11.35 A. M.
Auditing	11.35 A. M. to 11.40 A. M.
Unfinished Business	11.40 A. M. to 11.45 A. M.
Questions Proposed by Members	11.45 A. M. to 12.30 P. M.
Closing Exercises	12.30 P. M. to 1.00 P. M.

Transportation Committee—Attention!

MEMBERS OF THE TRANSPOTATION COMMITTEE are requested to meet in front of Mr. Young's house on the Pier at 12 o'clock to-day to have a group photograph taken.

Section V, Transportation, Meeting

IN THE PARK AVENUE ROOM of the Marlborough-Blenheim Hotel this morning at 10 o'clock, there will be held a meeting of Section V, Transportation, American Railroad Association.

President of A. R. A. Congratulates Chairman Tollerton

W. J. TOLLERTON on Monday received the following telegram from R. H. Aishton, the newly elected president of the American Railroad Association: "My sincere congratulations on your election as chairman of the Mechanical Section of the American Railroad Association."

Presentation of Badge to E. H. Walker

AT THE MEETING of the Railway Supply Manufacturers' Association on Saturday, the presentation of the past president's badge to E. H. Walker was overlooked. The general committee of Section III, Mechanical, has extended an invitation to the Supply Manufacturers' Association to attend the Wednesday session near the close of the convention and the presentation ceremony will take place at that meeting.

Lost and Found

FOUND—R. S. M. A. badge, number 2775. Apply at Enrollment Committee office.

LOST—Badge No. 4026. Return to *Railway Age* booth.

LOST—A gold watch this morning on pier. Return to J. D. Conway's office if found.

LOST—Lace filet collar on pier this morning by Mrs. W. F. Robinson, Room 553, Dennis. Return to J. D. Conway.

LOST—Following badges in Secretary's office: 2775, 3679, 3922, 4209, 4334.

H. S. Wall, mechanical superintendent of the Santa Fe Coast Lines, lost a five-eighth carat diamond on the Pier. Finder will please return to *Railway Age* booth.

E. H. Bankard, Jr., on the Executive Committee

E. H. BANKARD, JR., who has made such an excellent record this year as chairman of the Entertainment Committee, was elected yesterday a member of the Executive Committee of the Railway Supply Manufacturers' Association. The vacancy which he was elected to fill occurred because George R. Carr, on being elected president of the association, had to resign his membership on the Executive Committee.

Push Repair Work on Cars

FRANK MCMANAMY, the assistant director of the Division of Operation, on June 20, sent the following letter to the regional directors:

"Confirming the understanding reached at our conference yesterday, arrangements should be made at once to condition freight cars to handle prospective traffic:

"1. Car repair forces should be put on full time at all points where a reduction in hours has been made.

"2. Car repairers who have been furloughed should be returned to service in all cases where they can be used to advantage. Such increases should be made at principle shops and at points where the work can be most economically performed.

"3. Where additional work is needed and penalty overtime can be saved thereby a second shift may be organized at shops where the facilities are such that it can be profitably employed.

"4. Special attention should be given to grain cars, coal cars and refrigerators cars in the sectons where such cars are most needed, so that the possibility of a shortage may be averted."

A Remarkable Miniature Car

THERE IS ONE CONVENTION EXHIBIT which is attracting a great deal of attention which is not designed as an advertisement for any manufactured product. Through the courtesy of the American Railway Express Company there is exhibited in booth 18 a model of a 50-ft. standard refrigerator express car built to one-eighth scale. The model was constructed by the American Car & Foundry Company. The underframe is of steel girder construction, the rivet heads in the model being hardly larger than the head of a tack. The body is of wood and is equipped with siphon ice bunkers with operative hatch covers and plugs. The inside is fitted with floor racks and the walls are insulated. The doors are fitted with a cam operated locking device and a miniature seal pin. The United States safety appliances have been applied to the car. Space will not permit of a description of all the details included in the model. It has all-metal trucks, hand brakes and brake rigging, air brake, signal and steam heat lines, couplers and safety chains and even a card holder on the side. The model will well repay inspection on account of its educational value and also as an example of high grade workmanship.

Secretary Hawthorne

IN THESE DAYS OF PERSONAL ACHIEVEMENT, when individual accomplishment cannot be hidden by a modest personality, the work of Secretary Hawthorne, of Section III, Mechanical, American Railroad Association, shines in no reflected light; and it is both the privilege and the pleasure of the *Daily* to call attention to his record of efficiency both before and during the convention.

Under the direction of Mr. Hawthorne the work of the secretary's office has been thoroughly reorganized in order to meet the new conditions involved in becoming a part of the American Railroad Association. This has been done with energy and tact and with a vision of the future possibilities of a larger mechanical association.

Mr. Hawthorne was born November 27, 1886, at Oleona, Pa. He received a common school and high school education and graduated from the Elmira Free Academy, Elmira, N. Y., June, 1905. He entered the service of the Pennsylvania Railroad at the Elmira shop as painter, in June, 1905, and was transferred to Baltimore as a car builder in the passenger car shop, November, 1905. While at Baltimore shop he was assigned to work in M. C. B. billing department. He was transferred to the M. C. B. clearing house, Williamsport, Pa., in June, 1910, and was transferred to the Pennsylvania Railroad M. C. B. clearing house at Altoona, Pa., June, 1914. While at Altoona he served on the M. C. B. shop Committee of the Pennsylvania Railroad and also the special investigating committee of the American Railroad Association. He was serving on this latter committee at the time of the death of Secretary Joseph W. Taylor.

The New Chairman

WHEN A MAN STARTS WORK as a machinist apprentice, rises to the position of master mechanic at the age of 26 and is made general mechanical superintendent of a road of 8,000 miles at 42 it is safe to say that he possesses unusual qualifications for railroad work. This in brief is the story of the career of W. J. Tollerton, who was elected chairman of the Mechanical Section of the American Railroad Association on Saturday. Mr. Tollerton might well be chosen as a typical representative of the higher officers of the railroads of this country. A tireless worker, he has risen to the position he now occupies by his ability and the force of his personality:

Mr. Tollerton was born in 1870 at St. Paul, Minn., and was educated in the public and high schools. He entered railroad service as a machinist apprentice with the St. Paul & Duluth, now part of the Northern Pacific, and subsequently became a fireman on the Chicago, St. Paul, Minneapolis & Omaha, since which he has been consecutively from 1890 to 1896 foremen and afterwards general foreman of the Union Pacific; from 1896 to 1903 master mechanic of the Utah Division, Oregon Short Line; from 1903 to July, 1906, master mechanic of the Idaho, Utah and Montana Divisions of the same road, with headquarters at Pocatello, Idaho; from July, 1906, to April, 1907, superintendent of motive power of the Chicago, Rock Island & Pacific in charge of lines west of the Mississipi river at Topeka, Kan.; from April, 1907, to May, 1912, assistant general superintendent of motive power of the Rock Island Lines at Chicago, Ill.; May, 1912, to January 1, 1913, mechancal superintendent, and from January 1, 1913, to date, general mechanical superintendent of the same lines.

The high esteem in which Mr. Tollerton is held was evidenced by the statement of J. E. Gorman, federal manager of the Rock Island, before the convention a few days ago, that he replied implicitly on Mr. Tollerton. It is characteristic of the new chairman to devote his energy without stint to whatever he undertakes and those who know him feel assured that under his direction the Mechanical Section will live up to the best traditions of the old associations.

The American Society for Testing Materials

THE PROGRAM for the first day's sessions of the American Society for Testing Materials was published in yesterday's issue of the *Daily Railway Age*. The program for the remaining sessions is as follows:

FOURTH SESSION, WEDNESDAY, JUNE 25, 10 A. M., ON STEEL AND WROUGHT IRON

Report of Committee A-1, on Steel.
Report of Committee A-2, on Wrought Iron.
Deep Etching of Rails and Forgings.
Modern High Speed Steel.
Some Fatigue Tests of Nickel Steel and Chrome-Nickel Steel.

WEDNESDAY AFTERNOON, JUNE 25

Committee Meetings

FIFTH SESSION, WEDNESDAY, JUNE 25, 8 P. M., ON CORROSION AND MAGNETIC ANALYSIS

Report of Committee A-5, on Corrosion of Iron and Steel.
The Influence of Very Low Percentages of Copper in Retarding the Corrosion of Steel.
Topical Discussion on "Magnetic Analysis."
This discussion will be formally introduced by several speakers under a number of titles.

SIXTH SESSION, THURSDAY, JUNE 26, 10 A. M., ON TESTING AND APPARATUS; RUBBER PRODUCTS AND TEXTILES

Report of Committee E-1, on Methods of Testing.
A Wire Testing Extensometer.
A Machine for Measuring Hardness of Thin Metal Sheets.
A Fatigue Testing Machine.
The Single Blow Notched Bar Impact Test as used in the American Industry.
Report of Committee D-11, on Rubber Products.
Steam Hose for Car Heating.
Report of Committee D-13, on Textile Material.

THURSDAY AFTERNOON, JUNE 26

Golf Tournament

SEVENTH SESSION, THURSDAY, JUNE 26, 8 P. M., ON MALLEABLE IRON AND NON-FERROUS METALS

Report of Committee A-7, on Malleable Castings.
Some Physical Constants of Malleable Cast Iron.
Report of Committee B-1, on Copper Wire.
Report of Committee B-2, on Non-Ferrous Metals and Alloys.
The Behavior of Wrought Manganese Bronze Exposed to Corrosion while under Tensile Stress.
Some Tests of Light Aluminium Casting Alloys: The Effect of Heat Treatment.

EIGHTH SESSION, FRIDAY, JUNE 27, 10 A. M., ON CERAMICS, LIME AND ROAD MATERIALS

Report of Committee C-3, on Brick.
Report of Committee C-6, on Drain Tile.
Report of Committee C-8, on Refractories.
Preventable Defects in Refractory Brick.
Report of Committee C-7, on Lime.
Report of Committee I-4, on Road Materials.
An Apparatus for Determination of the Breaking Point of Pitches.

NINTH SESSION, FRIDAY, JUNE 27, 3 P. M., ON CONCRETE AND GYPSUM

Report of Committee C-2, on Reinforced Concrete.
Report of Committee C-4, on Clay and Cement Sewer Pipe.
Report of Committee C-11, on Gypsum.
Proportioning of Pit-Run Gravel for Concrete.
Theoretical Studies of the Surface Area Method of Proportioning as Applied to Concrete.
Modulus of Elasticity of Concrete.
Relation between the Methods of Curing Standard Concrete Specimens and their Compressive Strength at 28 Days.

TENTH SESSION, FRIDAY, JUNE 27, 8 P.M., JOINT SESSION WITH AMERICAN CONCRETE INSTITUTE ON CEMENT AND CONCRETE

Report of A.S.T.M. Committee C-1, on Cement.
Report of A.S.T.M. Committee C-9, on Concrete and Concrete Aggregates.
Report of A.C.I. Committee on Fireproofing.
A.C.I. Paper: Later Fire Tests of Concrete Columns.
A.C.I. Paper: The Strainagraph and its Application to Concrete Sbips.
A.S.T.M. Paper: Effect of Fineness of Cement.
A.S.T.M. Paper: Cements Producing Quick-Hardening Concrete.
MISCELLANEOUS BUSINESS.

President Walker, of the R. S. M. A., has extended the privileges of the Million Dollar Pier to the members of the American Society for Testing Materials, whose badges will admit them to the exhibits until the close of the Mechanical Section Convention, at one o'clock this afternoon.



American Railroad Association, Section III, Mechanical

Fuel Economy, Maintenance of Boilers and Superheating Among Subjects Considered Tuesday

The convention was called to order by Chairman Tollerton on Tuesday morning, June 24, at 9.45 o'clock, and immediately took up the reports of committees, the first being that on Fuel Economy and Smoke Prevention.

Report on Fuel Economy and Smoke Prevention



W. Schlafge
Chairman

THE COMMITTEE HAS heretofore aimed to deal with the methods of firing and the means to be adopted for developing the required supervision, rather than with the details in design and maintenance which are subjects that more properly fall within the scope of other committee assignments. The situation immediately preceding the report of 1918 was so extraordinary and the need for economy so pressing, that a departure was made from the earlier policy and some consideration given the more general features attending the purchase, transportation and use of railroad fuel. This situation has been practically relieved so that now the importance of the subject arises from its influence upon operating expenses which have reached a point where they are absorbing the gross rail revenues for many roads.

There has been a steady increase in the total fuel cost to the railroads, chiefly caused by two factors—increased cost of production and increased consumption due to the natural expansion of traffic. The accompanying curve No. 1 exhibits the trend of total cost for the past nineteen years for which there are available figures. Comparison with curve No. 2 shows that while the trend of prices at the mines has been steadily upward, the increased total cost is chiefly due to increased consumption.

The increase was reasonably uniform for the ten year period ending with 1909 and subsequently it was more gradual. On a basis of the general trend of increase for the previous few years, a reasonable estimate of cost would have placed the total for the year 1917 at about $265,000,000, but the total actually amounted to $401,297,300.00, an increase of 55.9 per cent over the preceding year.

The official statistics for 1918 will undoubtedly disclose a total even greater, although there will be a substantial decrease in 1919 due to the greatly reduced tonnage handld and to the influence of a generally organized effort to promote economies in every possible manner. But the total will still be a vast sum, and since it represents approximately 14 per cent of the total operating expense it has assumed a greater importance than ever.

In view of the situation this committee is of the opinion that its report for this year may be profitably devoted to some consideration of the application of its previous recommendations and to methods for economy in the use of fuel for other than locomotive purposes.

In one of its earlier reports your committee provoked some criticism because of its suggestion that railroad fuel should be purchased to specification, but the past few years have furnished convincing evidence that this procedure is highly important if reasonable economies are to be effected. The advantage lies not so much in the purchase of fuel having the higher B. t. u. values as in the opportunity for selecting coal that can be economically burned under the peculiar conditions prevailing in locomotive service. A specification which limits the percentage of easily removable non-combustible produces economies in fuel, labor and transportation and involves no economic losses.

Action should be taken at no distant date to determine the most favorable conditions under which economical combustion may be obtained with various grades of fuel so that plant design and equipment may be made to utilize available supplies to the best advantage. Such an investigation would naturally include the difficult and varied circumstances attending locomotive service.

In the opinion of the commmittee public interest will ultimately require the exercise of reasonable efficiency in the use of fuel, which prompts a brief consideration of the conditions of purchase. Specifications should include the characteristics of the available supply with particular reference to the percentage of

ash present, to its clinker forming qualities, and to its liability to spontaneous combustion. The size demanded for best results is also important and should be specified by the road supervision which should be familiar with requirements for the most satisfactory combustion conditions. It should be observed also that where these conditions cannot be obtained with one grade of coal, analysis will frequently develop that a suitable mixture may be secured with another grade. The character of the ash content exercises a great influence upon the combustion conditions since, under certain circumstances, the free burning of the combustible material is prevented and clinker formed over the grate surface, thus interfering with combustion by cutting off the air supply and not infrequently preventing proper operation of the grates to keep the fuel bed open.

There is also a common source of waste through clinkering coal. The ash constituents producing these conditions are not only visible and mechanically separable, but may be intimately mixed with the combustible elements and, therefore, disclosed only by chemical analysis.

Reference has been made to the importance of properly grading the sizes of coal to insure the greatest efficiency. It is generally understood that existing locomotive operating conditions prohibit the use of slack, but not that different grades of lump coal have different evaporation values. This has recently been demonstrated at the University of Illinois in a series of tests with a modern Mikado type locomotive, the results of which are indicated below.

It should be said concerning these results that they are probably not generally applicable since they were made with Illinois coal from a single mine with one locomotive. It is not impossible that other coals with a locomotive having different stoker, grate, fire box or front end conditions might develop a different ratio, but the figures are useful in demonstrating the importance of the subject and emphasizing the necessity for ascertaining the conditions applicable to the different coals on each railroad.

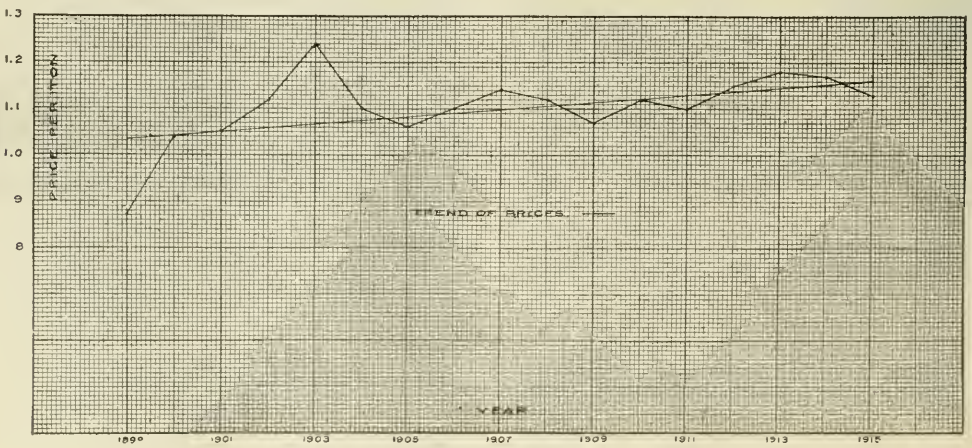
The foregoing observations are made for the purpose of emphasizing recommendations of your committee made in earlier reports concerning the desirability of creating an organized fuel department which should embrace the services of a chemist and an inspection corps whose attention could be devoted to those problems involving research and experiment and whose co-operation with the purchasing department would insure selection of those coals promising the greatest service value. Where the purchases are relatively small, a joint arrangement might be effected whereby the cost of this work could be distributed among several consumers. It is believed that the fuel Administration and Fuel Conservation Section have fully demonstrated the advantages of



Curve No. 1.—Total Locomotive Fuel Cost

Equivalent Evaporation per Lb. Dry Coal

Size of Coal	Medium Rate Tests	High Rate Tests
3-in. by 6-in. egg	10.21	9.09
Mine run	10.12	8.66
2-in. lump	9.95	8.32
2-in. by 3-in. nut	9.90	9.11
2-in. screenings	9.25	7.43
1¼-in. screenings	8.47	7.06



Curve No. 2.—Price of Coal at the Mines

systematic inspection and analysis and a reasonable exercise of control over the supply. The benefits which have thus been received should be made permanent.

It may be well to describe a system in effect for some time on a large railroad, which has proven satisfactory and which has resulted in co-ordinating the various agencies responsible for the purchase and use of fuel. A chart of the organization appears in Fig. 1, and its functions are briefly described as follows:

The chemist and coal inspectors report to a staff officer of the Mechanical Department who is responsible for co-ordinating the laboratory and inspection work with that of the road supervision and the purchasing department. In this manner a proper anlysis of the varying conditions is insured and a check maintained upon shop maintenance and upon fuel distribution by the operating department.

Whenever purchase from a new mine is proposed analysis is made of a representative mine sample. From this analysis the general availability of the coal is determined and, if satisfactory, road tests are conducted to determine the service characteristics. As a rule the chemical analysis and physical inspection at the mine are sufficient to justify conclusions, but final acceptance requires favorable report by the road supervision. For the following regular shipments, samples from cars at destination are taken from time to time. These analyses are then compared with that of the original mine sample in order to determine whether the quality remains uniform. The inspector taking these samples effects contact between the road supervision and headquarters, interviews the road supervisors, investigates engine failures caused by poor coal to insure obesrvance of the schedule provisions and to see that the quality of the shipments is up to the standard; he checks manifests to insure proper distribution and the coal dock records to see that the right grade of fuel is used for the specified service. The other field inspectors are assigned to specific territories and live at a point central to them.

The duties of the field inspection force comprises not only the preparation and sizing at the mines, but should include all features affecting efficiency, cost of transportation and handling, such as inspection of the empty cars for foreign matter, particularly sandstone, cinders, gravel and similar materials likely to be mixed with the coal and dumped into the pockets. Experience has demonstrated that a quarter of a ton of such refuse is frequently found in empty cars consigned to the mines. The inspection should also cover defects in equipment and all conditions affecting the loading, unloading or loss of lading in transit frequently overlooked in routine car inspection.

Another feature of importance is the distribution of equipment to suit unloading conditions. The cost of unloading is now a large item and it constitutes a part of the total fuel charge. The field inspection force should be required to maintain a check upon these details and upon the scale and manifest weights to detect discrepancies, and to insure loading of equipment to the prescribed limit.

If the information collected by the inspection force is to be of value it must be promptly transmitted to headquarters, consequently, a daily report should be required covering all the features of inspection so that prompt steps may be taken in connection with any conditions requiring correction. One of the inspectors, designated as the chief, is held responsible for the work of the others and is expected to be informed on the technical features of the work so that the department will be assured of information concerning developments in the entire field of investigation concerning fuels, combustion and other related subjects.

Such an organization requires a high order of ability, but the cost involved is readily justified in view of the possibilities for economy presented. While varying circumstances will affect the number of men required in such a force, it is believed that, in general, a thoroughly satisfactory inspection service for a large railroad should involve an expense not exceeding one-tenth of one per cent of the fuel cost.

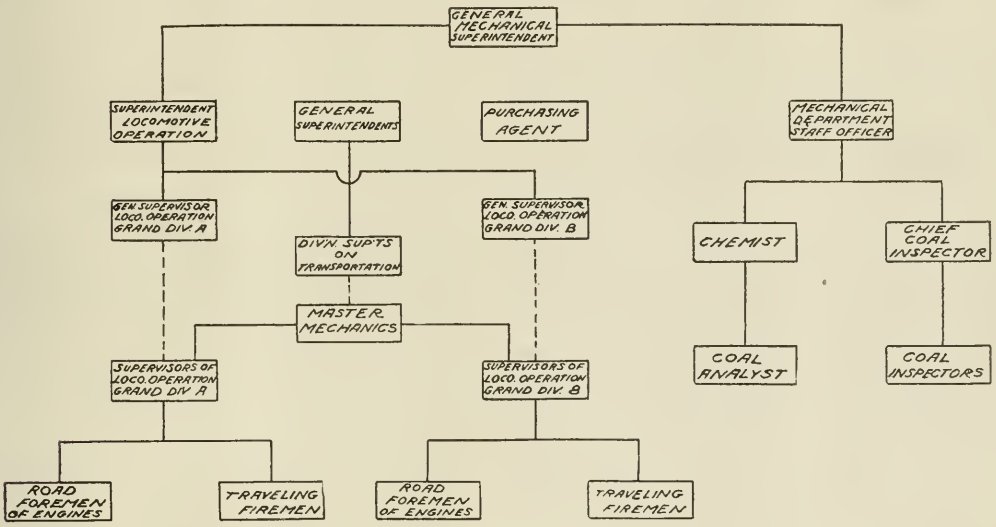


Fig. 1.—Fuel Department Organiz ation for a Trunk Line Railroad

The problem involved in the inspection, distribution and utilization of. fuel is one in which each division of the operating department has some responsibility, and it is, therefore, advisable that the chief operating official should be fully informed as to the requirements, procedures and accomplishments of this branch of the organization. In the opinion of some, the head of the fuel department should report directly to the chief operating official, but, in view of the wide divergence of opinion on the subject, the committee is not yet prepared to make such a recommendation because it is thought that co-operation between the various operating branches will produce the required results, especially since fuel is now the second largest item of operating expense and, therefore, of prime importance to the transportation department.

The limitations upon a report of this kind do not permit further discussion of the features of inspection and we will now consider the locomotive and the influence of maintenance upon fuel consumption.

Since a knowledge of the nature of heat losses in locomotive service is essential to a proper appreciation of the possibilities for economy, it is desirable that brief reference be made to the

avenues through which heat is wastefully dissipated, which are as follows: 1. Steam leaks in fire box, superheater, front end or to the atmosphere. 2. Grate, cinder pit and stack losses. 3. Escaping steam through safety valves, unnecessary operation of auxiliaries, such as headlight generator, air pump, etc. 4. Unconsumed volatile matter usually denoted by excessive smoke. 5. Heat losses in escaping gases. 6. Radiation. These items are largely influenced by factors independent of operation and maintenance, but it is with the latter that we are now chiefly concerned and to which attention is directed.

Recent observation indicates that steam leaks are not receiving the attention demanded by the extent of losses involved. One remedy for this situation lies in o proper inspection of locomotives while under steam in advance of each boiler washing, this inspection to be followed by a check inspection after the locomotive is ready for service. This practice would insure reasonable freedom from leaks because excessive leakage rarely develops in the intervals between two boiler washing periods.

Large losses are sustained through faulty superheater maintenance. Pressure tests should be regularly applied to superheater units and steam pipe joints in order that defects may be located and corrected. Recent inspection on one railroad developed that out of 15 locomotives in service 11 had leaking superheater joints. This condition can virtually be eliminated through the observance of standard methods for the maintenance of units. This should include proper assembly with the required bands and supports in the tubes. Observation on several railroads shows that this feature is being neglected with the result that vibration opens the header joints, causing bad leaks in the smoke box and, frequently, costly damage to adjacent parts.

Faulty combustion, represented by unconsumed hydrocarbons and high combustible in the ash, is most frequently occasioned by improper air supply. For a given furnace and fuel, the excess air is fixed within comparatively small limits. An increase in the air supply reduces efficiency because of the loss in heating the excess, while on the other hand a decrease below the required percentage produces less complete combustion. Coals having low percentages of volatile matter require less excess air for nearly complete combustion than those having higher percentages of volatile. This not infrequently accounts for better results with one grade of fuel than with another.

In locomotive service the air supply is controlled by front end, flue, grate and ash pan conditions, which often do not receive proper attention from the designers. Many modern locomotives have grates with insufficient air-inlet openings, or with openings that readily become clogged, thus increasing the resistance to air flow. Attempts are frequently made to overcome this condition by adjusting front ends or reducing the diameter of the exhaust nozzle.

Many of the older engines are still equipped with ash pans having insufficient air openings, a defect readily detected with a U-tube draft gage. There should be no indication of vacuum in the ash pan.

It is highly important that the flues and tubes be free from obstructions which not only interfere with the air supply to the fire box, but reduce tube evaporating efficiency and superheater economy. The Fuel Conservation Section has recently pointed out that the fuel loss through drop in superheat with half the tubes stopped up may reach 24 per cent. In order that thorough and efficient cleaning may be assured, standard apparatus and methods should be established and suitable records maintained. The maximum interval in mileage or time between cleanings consistent with the requirements for different classes of power and service should be determined and flues thoroughly cleaned within these limits. Periodical checks by the supervising officers are required to insure proper work and continuous records.

Radiation losses have heretofore received little attention from writers on locomotive fuel economy and even less from those responsible for locomotive design and maintenance, as a casual inspection of any locomotive will disclose. It is estimated that the radiation from each square foot of surface carrying 200-lb. perature wastes 1000 lb. of coal per year. This loss increases rapidly with decreasing temperatures, certain weather conditions and rapid circulation produced by moving locomotives. The average locomotive has approximately 100 sq. ft. of such exposed boiler and pipe surface, easily representing an annual loss of $150 to $200. This can be substantially reduced if cylinder heads, steam pipes and fire box surfaces are properly insulated. For this purpose it is recommended that magnesia-asbestos or hair felt be used and that it be not less than 1½ in. in thickness except for small pipes where ¾ in. is sufficient.

Fire boxes may be covered by removable sections where access to staybolts is required. These practices, once somewhat general, have been neglected because of the maintenance problems introduced with modern power.

A common source of loss of power and combustion efficiency arises from frequent unnecessary changes in the dimensions or adjustment of front end appliances. Standards suited to local conditions for each class of locomotive should be determined and maintained, and periodically checked by the inspection force. The common practice with respect to a poor steaming locomotive, for which the cause is not readily discernible, is to alter some of the front end details, whereas, proper investigation usually discloses a leak in some of the joints, frequently between the front and the ring or around the outside steam pipe joints. As an overdrafted locomotive produces air, spark and back pressure losses, the importance of maintaining standard front end details may be understood.

In its last report the committee briefly covered those features of maintenance that contribute largely to power and fuel losses, but the work of the Fuel Conservation Section has demonstrated that two other appliances are exerting an appreciable influence upon locomotive fuel losses, the power reverse gear and the pneumatic sander. There are some power reverse gears in use that, not being positive, permit "creeping" while the locomotive is in operation, thus increasing the cut-off and decreasing efficiency. It is recommended that all such gears be modified so as to permanently correct this defect and that particular attention be paid to the maintenance of valves and packing to insure proper operating conditions.

The losses occasioned by poor sand and defective or inoperative sanding appliances are greater than commonly supposed and arise chiefly through failure at critical points, necessitating stopping, taking slack and doubling hills. The committee recommends the adoption of suitable specifications governing the purchase of locomotive sand which, by establishing reasonable limits for silicon content, will insure a suitable quality. To make the material effective, the sand pipes should be firmly held over the rail by substantial clamps not less than ½ in. by 2 in. in section, attached to the extreme lower end of the pipes. With the adoption of these provisions the prescribed daily or trip inspections should insure the desired sanding efficiency.

Previous discussion has been confined to the influence of the locomotive and its details of construction, maintenance and operation upon fuel consumption, but it may be well to mention the fact that car equipment also exerts a large influence upon the problem. While any defect contributing to increased resistance produces a corresponding increase in the fuel required, perhaps the most general features are defective brakes and air leakage caused by defective hose and gaskets. The leakage limits for freight trains established by many railroads should be generally adopted and consistently maintained. The committee recommends that they be given official recognition and incorporated in the air brake rules now the standard practice of the section.

While the opportunity for the greatest savings occurs on the road, there is an aggregate annual loss now amounting to millions arising from locomotive fuel consumption that is occasioned through the limitations imposed by service conditions. The fact is that irregular demands upon the locomotive render side track and terminal economies of the highest importance.

A large part of the terminal losses arises from maintaining locomotives under steam when not required for early service and from unnecessary cleaning or removal of fires. Where locomotives are not likely to be required for service within twenty hours, as frequently occurs on Sundays or holidays, or under special conditions arising from variations in operation incident to reduced business, fires should be drawn. Under all circumstances grates and stacks should be covered to prevent the cooling effect of air circulation through the fire box and flues. This suggests the frequent waste observed through faulty methods of firing up, resulting in the loss of green coal through the grates either because they are defective or the openings are large enough to permit the green coal to fall through. Observation of recently prevailing methods discloses that enough coal is fre-

quently wasted in this manner to haul 1000 tons one mile on the average railroad. Grates should be covered with shavings or wood before coal is applied, which will not only minimize the loss mentioned, but reduce the quantity of coal otherwise required in kindling fires.

Side track losses arise from excessive draft which should be regulated by means of the fire door. Another factor in this connection is the influence of the superheater damper which is frequently tied open, a practice that should be discouraged because of its influence upon maintenance as well as upon fuel consumption.

Cinder pit operation offers much greater opportunity for fuel economy than is generally recognized. Recent investigation developed that the combustible content of locomotive cinders at certain terminals averaged 35 per cent by weight. In other words, every car of cinders contained more than a third of a car of coal. It is at present impossible to avoid large losses here, but they may be mimimized through the co-operation of engineers, firemen, hostlers and ash-pit foremen by careful firing before engines reach the pit avoiding the application of green coal immediately before fires are cleaned.

This suggests the service that competent supervision may render on the ash pit in cleaning fires promptly, moving locomotives as soon as ready, in careful cleaning of fires to properly remove ash and clinker without waste of fuel, in preventing the excessive use of the air pump and steam blower and in maintaining co-operation with the roundhouse in order that no fire shall be dumped unnecessarily and no fire cleaned that will require subsequent dumping. The ash pit foreman should be provided with a copy of the monthly boiler list and see that fires are dumped as the engines pass over the pit.

The coal pocket foreman should be furnished with a schedule of coal required by locomotives in each class of service and should be charged with the responsibility for observance of the schedule. The Fuel Conservation Section estimates that at least 100,000 tons of coal, unnecessarily carried on engine tenders, is being transported 100 miles every day at a total expense for fuel alone equivalent to 1000 tons per day. The schedule should also indicate the kind of coal required for different classes of locomotives and assignments so that the better grades may be employed in the heaviest service.

The extent of the possible terminal losses suggests the desirability of an accounting system that will distinguish between the fuel consumption of locomotives in the hands of the mechanical and the transportation departments. Such records would readily disclose uneconomical practices and permit their prompt correction. The road performance should be compared with predetermined figures based on an estimate and trial under average conditions.

While the responsibility for fuel conservation rests in a large measure upon the mechanical department, there are features of operation affecting the problem that are under the immediate control of associated departments whose interest is essential to many economies that are possible only through improved efficiency in daily routine. This includes prompt dispatching of locomotives and trains, proper adjustment of tonnage, proper make-up of trains, prompt completion of station work and the elimination of delays in the movement of ash pit and coal cars.

Maintenance of way and signal department officers can also render effective service in the cause of fuel economy by eliminating, as fas as possible, the necessity for stopping or reducing the speed of trains because of prolonged slow orders, the unnecessarily prolonged display of caution flags or inoperative signals. This department is also directly responsible for lighting and pumping-plant operation and should eliminate fuel losses through radiation from exposed surfaces and the steam leaks that are frequently characteristic of these isolated plants.

Locomotive fuel constitutes about 88 per cent of the total railroad consumption, and, therefore, offers the greatest opportunity for conservation and economy, but the remaining 12 per cent represents the very substantial sum of $45,000,000 on the 1918 basis, an amount approximating half the total fuel cost for locomotives ten years ago. Of this total the largest percentage is represented by power plant consumption to which the remainder of the paper will be devoted.

Questions of relative economy in the purchase of power or its generation in privately owned plants are important, but do not fall within the scope of a paper which deals with the problems of operation rather than design, and consideration will, therefore, be given to those details susceptible of correction in existing plants.

The inefficiency in the ordinary railroad stationary boiler plant arises from equipment, maintenance and operation. Large losses are frequently encountered because of insufficient or inefficient equipment. Investigation has developed frequent instances of low rates of evaporation in very inefficient plants caused by an attempt to force boilers above their normal capacity. This is a frequent accompaniment of the discarded locomotive boiler which is always uneconomical for stationary purposes. In one instance of recent occurrence, a locomotive boiler in stationary service, consuming seven tons of coal per day, was replaced by a return tubular boiler which effected a saving of three tons per day under the same service conditions.

Many stationary boilers are not provided with dampers in the uptake, and yet draft regulation should be obtained with dampers and the draft should be varied to suit the rate of combustion, which is proportional to the load. Maximum efficiency is attained when the proper draft for given rates of combustion under given condition is established by suitable tests. The influence of proper draft regulation is plainly indicated by the curve marked Exhibit *A* from which it will be observed that under the conditions represented, damper regulation effected an average saving of 9½ per cent.

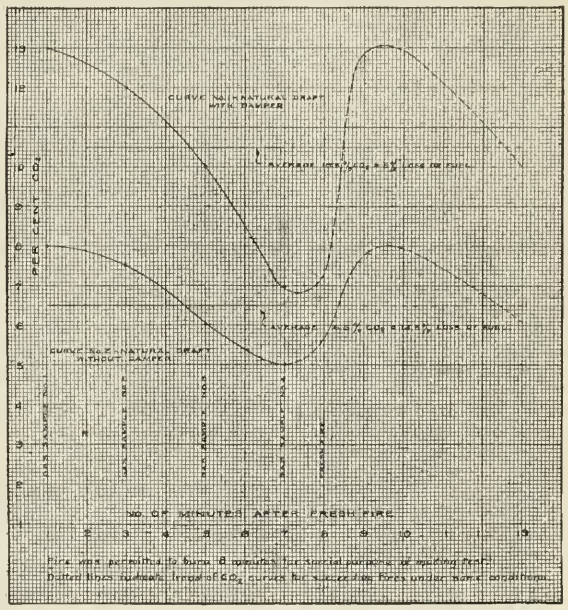


Exhibit A.—Variation of Percentage of CO_2 in Flue Gas Stationary Plant

Feed water heaters are not economically employed and yet the conditions prevailing in practically all railroad power plants will permit their use for eight months in the year. When it is considered that under average conditions an increase of 11 degrees F. in the temperature of feed water effects a saving of about one per cent in fuel consumption, the loss from free exhaust stam is plainly evident. There is no more immediate and effective means of economy than through feed-water heating.

One other prime factor in power-plant economy lies in the disposition of exhaust steam other than for feed-water heating purposes. This feature would not be lost to view if the engine portion of the plant were considered, the auxiliary and mechanical power a by-product. Under average conditions the heat consumption of stationary engines does not exceed 15 per cent of the total heat generated, the difference being represented by the heat of the exhaust. In practically all railroad shops, therefore, the heating requirements should be satisfied with exhaust steam, and in large plants the condensate should be returned through a suitable vacuum system. The outside purchase of

power and the use of high pressure steam for heating purposes is an unwarranted extravagance.

Experience has convinced the committee that the largest losses usually encountered in the operation of stationary boilers on railroads are included under the following headings, which are enumerated in the order of frequency and importance. 1. Leaky settings and stack connections. 2. Poor firing. 3. Radiation from uncovered surfaces. 4. Dirty flues.

Leaky settings produce excess air in the combustion space, although this may arise from other causes. The importance of this common source of inefficiency will be understood from the fact that boiler efficiency falls off in almost direct proportion to the percentage of excess air, and this not infrequently produces a loss of 40 per cent. Brickwork settings are sure to develop cracks in addition to which the porous character of the brick permits air infiltration. All exposed brick settings should at least receive a coat of a good plaster sealing compound; a ½-in. covering of magnesia-asbestos cement, followed by the sealing compound, is even better. Frequent leaks are found around stack connections, plates, dampers and doors, all of which influence the draft and reduce boiler efficiency. These parts require occasional inspection to insure a high order of maintenance.

Poor firing includes too thick or too thin a fuel bed, accumulation of clinkers, too frequent shaking, uneven distribution, permitting holes to develop, improper manipulation or neglect of dampers and carelessness in fire cleaning. Correction of these faults is a matter of analysis, education and supervision. It should be observed, however, that the economies of the best equipment may be lost in poor boiler room practice.

Radiation losses are usually considerable and nearly always neglected. At 100-lb. steam pressure and 70 degrees F. atmospheric temperature, the loss in radiation amounts to 718 lb. of coal per sq. ft. of uninsulated surface per year. It is, unfortunately, common practice to burden railroad shop boiler plants with a multitude of accessories usually involving large heating loads. It is certainly economy to centralize steam production, but economical steam distribution is a matter too frequently left to the division plumber or the shop pipe foreman, who may be masters of the technique of thei rtrade, but to whom lost B. t. u.'s are of no particular interest. The surest evidence of this statement lies in the appearance of bare ground in winter over the average buried steam pipe. Plain, unprotected, asbestos covering on an underground steam pipe may be expected to become a surface condenser of large capacity. The committee recommends the adoption of specifications for pipe coverings suitable for superheated and saturated steam and hot water, and also for water-proof underground coverings for low pressure lines.

Clean flues and boilers are a matter of standard practice and organization. In plants having no engineer, the responsibility for cleaning flues and washing boilers at the prescribed intervals should be placed upon one of the firemen, and he should be followed up by the general supervision.

Auxiliaries are frequently neglected, especially in the smaller and older plants. Blowing rod packing, excessive water-pump slippage and leaking steam-pipe joints are all too commonly in evidence where it is unnecessary to maintain a suitable relation between input and output. The losses outside the plant are also much greater than usually supposed, particularly in compressed air lines. It is estimated that the cost of air, compressed in a modern plant, approximates 10 cents for each 1000 cubic feet of free air used, and yet the waste in many plants is enormous. Reasonable economy requires that a periodical inspection of air losses shall be conducted and leaks in pipe lines, valves and hose promptly repaired. Once each week is not too frequent for inspection in the average shop.

Preparation of systematic records is essential to every well operated plant. The possibilities should be developed through suitable experiments, and standards once established should be checked with the daily operation. Such records should be made to correspond with the available equipment, and, for smaller plants, may be very simple. The results for a general division of a railroad may be tabulated and a rating established which will stimulate competition. For this purpose plants having the same general facilities should be grouped by classes in order that the ratings may be comparable. The attached forms, *A* and *B*, are offered as a simple basis for rating plant maintenance.

Stationary power-plant operation may be reduced to a reasonably exact basis and the best results are attained when the equipment is planned for the required service. Results may then be obtained upon a basis corresponding with reasonable exactness to a predetermined production cost, but the variables in the operation must be worked out to produce maximum economy for various rates of output. These are problems requiring skill and experience, and should be intrusted only to qualified engineers. The committee repeats its recommendations of last year that mechanical stationary power plants be placed under the responsible supervision of one man, whose time on the larger systems can profitably be devoted to the problems and economies in steam generation and utilization.

In conclusion, the committee recognizes that without any attempt at research or experiment, it has been necessary to sacrifice originality of subject matter. But if many of the things mentioned have long been familiar to mechanical department officers, perhaps their present existence is the best of reasons for their consideration at this time. It is reasonable to assume that neither the cost of mine production nor that of transportation will be appreciably lower in the immediate future, so that economy in consumption assumes an importance relatively greater than ever before. But, it may be asked, what shall be done to realize the economies admittedly so necessary. The answer is that the first requisite is full knowledge as to the extent to which wasteful practices prevail, which should be determined by careful survey. Remedial measures will frequently involve mechanical equipment requiring appropriations, but the chief problem is one of efficient operation and effective supervision. The results depend upon maintaining an enthusiastic interest on the part of those responsible for the use of fuel and the

"FORM A"

RANK OF POWER PLANTS

Rank determined from the standpoint of Fuel Economy. Size of plants not considered.

Rank based upon consideration of the following:

1. Combustion efficiency.
2. Condition of plant, including air-tight boiler settings; dampers and damper operators; grates; scale; soot; engine-room equipment; steam and air leaks and pipe insulation throughout shop facilities.
3. Interest of local forces in plant and effort to follow recommendations for operation and improvement.
4. General appearance (with due consideration of conditions).
5. Need of general overhauling.
6. Quality of fuel furnished.
7. Efficiency of firemen.

(Master Mechanics will report by mail improvements made from time to time which will affect standing of plants they supervise.)

KEY TO RANK

A—Excellent	91 per cent	to	100 per cent.
B—Good	71 per cent	to	90 per cent.
C—Medium	51 per cent	to	70 per cent.
D—Fair	26 per cent	to	50 per cent.
E—Poor	0 per cent	to	25 per cent.

Rank A	Rank B	Rank C	Rank D	Rank E
None	A 88 prct F 80 prct	K 67 prct P 54 prct	T 30 prct	None
	B 82 prct G 78 prct	L 65 prct Q 51 prct		
	C 81 prct H 76 prct	M 63 prct R 51 prct		
	D 81 prct I 74 prct	N 61 prct S 51 prct		
	E 81 prct J 73 prct	O 54 prct		

Carbon copy to Gen. Officers Asst. Gen. Mgrs., Mech. Supt., Eng. M. of W., Supvr. Fuel Econ., Supt., M. M., Power Plant Mgr.

Form B.

WORKING CHART. Key to numbers appears on FORM A.

Location of Plant.	No. 1.	No. 2. Plastic Cement.	Cracks.	Fire Doors.	Dampers.	Damper Operators.	Grates.	Steam and Air Leaks.	Scale.	Soot.	Leaks in Engines and Pumps.	Pipe Insulation Entire Plant.	Baffles.	No. 3.	No. 4.	No. 7.	Total Score.
Potential %	0	2	6	3	15	10	2	3	7	5	2	8	5	5	2	25	100
Boston....	good	2	6	3	15	10	1	2	5	4	2	0	none 5	0	1	20	76
Los Angeles	fair	0	6	3	15	0	stoker 2	3	6	5	2	8	with 3	5	2	15	75

elimination of wasteful practices. And the interest and enthusiasm must begin at the top and permeate the entire operating organization if the maximum efficiency is to be attained. The great difficulty, on a railroad, lies in the tendency to relaxed effort, besause of the routine involved, but this is a subject demanding sustained and interested support from the chief operating officer to the fireman and the roundhouse man.

The report is signed by Wm. Schlafge (Chairman), Erie; W. H. Flynn, Michigan Central; Robert Quayle, Chicago & North Western; D. J. Redding, Pittsburgh & Lake Erie, and W. J. Tollerton, Chicago, Rock Island & Pacific.

Discussion.

Mr. Schlafe: We have received, too late to be embodied in the report, a suggestion made by a member of the Fuel Conservation Board, and we desire to offer the following:

"Since the advance copies of the report have been distributed, it has been suggested to the committee that there may be possibilities for fuel economy, in stoker-fired locomotives, through screening out a portion of the slack.

"There can be little doubt that the rate of evaporation would be improved if this was done, but the net efficiency would obviously depend upon the mine cost of the fuel so prepared. The committee suggests that the subject is sufficiently promising to justify investigation by the railroads having stoker equipment, in order that immediate advantage be taken of any economies that can be realized in this manner.

"Attention is directed to a typographical error appearing in Curve No. 1 of the report, the ordinates of which should be expressed in millions instead of thousands."

Mr. Woodbridge (Supt. Fuel Conservation, U. S. R. R. A.): I feel that the members of this association should take home the lesson that Mr. Tyler gave us yesterday, relative particularly to new devices. I was very sorry that the subject of weighing the coal on a tender was passed over so hurriedly. There is no question whatever but that accurate records of the consumption on individual engines will result in greater fuel conservation than any other one thing. Everyone knows that the experiments that have been performed in the last few months of counting scoops of coal, or estimating the coal placed on tenders, unsatisfactory as they are, have produced a rivalry among engine crews that has resulted in a tremendous economy in fuel. I sat in this convention in 1906 and 1907 when H. H. Vaughan pleaded with you to put superheaters on your locomotives, and most of the things he said fell on barren ground. Five years after that Russia had six per cent of her locomotives equipped with superheating apparatus, and you had six-tenths of one per cent equipped. A proper weighing device on the tender to tell what coal was being used would result in fully as great a reduction in the fuel consumption as the superheater, and I commend that thought to your very serious consideration.

I want to read a paragraph in this paper here, and to commend it to you: "The greatly increasing coal consumption and the present growing importance of conserving this indispensable factor in our economic life prompts your committee to say that in its opinion action should be taken at no distant date to determine the most favorable conditions under which economical combustion may be obtained with various grades of fuel so that plant design and equipment may be made to utilize available supplies to the best advantage." And just following this, "In the opinion of the committee public interests will ultimately require the exercise of reasonable efficiency in the use of fuel, which prompts a brief consideration of the conditions of purchase."

It seems to me there is a slight inconsistency in two paragraphs, and it is a mighty important matter. I also want to read these two paragraphs: "The problem involved in the inspection, distribution and utilization of fuel is one in which each division of the operating department has some responsibility, and it is, therefore, advisable that the chief operating official should be fully informed as to the requirements, procedures, and accomplishments of this branch of the organization. In the opinion of some recognized authorities, notably the chief of the Fuel Conservation Section, the head of the fuel department should report directly to the chief operating official, but in view of the wide divergence of opinion on the subbject, your committee is not yet prepared to make such a recommendation, because it is thought that co-operation between the various operating branches will produce the required results.

There is no question about that, but you can't get that co-operation unless you have, as is stated in the report, the results dependent on maintaining an enthusiastic interest on the part of those responsible for the use of fuel and the elimination of wasteful practices. The transportation department can waste more coal than all the firemen in this country can save, and you must have co-operation. The interest and enthusiasm must begin at the top. You cannot get the co-operation that you must have unless you have at the head of the organization some one connected with the chief operating officer who is willing to assist you in checking the other fellows—maintenace of way men, for example, slow orders and so on.

Mr. Bentley: Some question was raised about the sandpipes not being in line with the rails. One of our men squared the ends of the sandpipe and put a square clamp on so that it is impossible for the pipe to turn. The covering of the outside steampipe is something that has given us a lot of concern, but I believe we have finally arrived at a solution of the difficulty. We are putting a shoulder on the casting that goes into the smokebox, putting a collar around the steam pipe about eight inches below that and covering the intermediate space with a sheet iron covering, which apparently is an air-tight proposition.

D. J. Redding, (P. & L. E.): One item in the report which perhaps does not receive enough consideration is the matter of sanding equipment. I know of some tests conducted some time ago to find out what sanding locomotives meant, and all of the standard makes of sanders were tested. We found as much as 500 per cent. difference in the amount of air required, as between one sander and another, to put sand on the rails.

We also found that no one was paying particular attention to sanding and its cost, and the cost of the operating mechanism to handle the sand. The sand, at least on that railroad, cost more than the oil for locomotives, and the oil was given a lot of expert attention.

W. J. Bohan (N. P.): Approximately one-third of the coal consumption of the country is credited to the railroads. We are apt to confine our coal conservation too much to our locomotives, and do little or nothing towards coal conservation in our stationary plants. Probably one of the most wasteful things we have is the ordinary round-house plants, with condenser systems, consisting of the blower outfits used in roundhouses and inefficient transmissions for operation of our shop tools. Little or no attention is given to what might be done in purchasing power from outside concerns.

Railroad people might well give consideration to the acquiring of accurate data on their power plants, to determine at what rates they could afford to buy current. Some recent investigations showed that from 30 to 50 per cent. can be saved in some instances, in the purchase of current at proper power rates. The public utility man has not recognized the possibility of securing this business to a very great extent, and it is time that we started an educational programme with him so that he will.

I would like to ask if the committee has considered that one part of its work is to look into this very important matter of the purchase of power and the shutting down of the local steam plant.

B. J. Feeny, (Supv. Fuel Conservation Sec. U. S. R. A.): Some reference was made to the difference in opinion as to who was to handle the coal on the railroads. If you have any difference of opinion as to who will be responsible for it, you do not understand how big a problem it is. If the fuel used on the railroads in this country in 1918, was put in fifty-ton cars and moved at the rate of sixty miles an hour, it would require twenty days and twenty nights for that amount of fuel to pass you, and when put in the storage yard, it would be necessary to have a yard one hundred miles long with two hundred and eighty-eight tracks and this coal is costing the railroads approximately $1,500,000 a day.

There should not be much difference of opinion as to who should handle the fuel problem. Some one should be responsible for the handling of fuel on the railroads, because we know that there is a great waste of fuel.

You would get more results out of the use of weighing apparatus, if there is such a thing, than you do out of the use of superheaters. It is, maybe, we are not getting the full results from the super-heater, but this is due to neglect.

Faulty workmanship on locomotives is responsible for a large amount of waste. If you will go home and took down ten in-

dividual smokestacks you will see what faulty work is being done in the shops of the railroads.

On some stacks I have seen table plates that you could put your hand through, and these locomotives were inspected every day. We inspect the netting for fire protection, but that is as far as we go unless there is a loose nut or bolt that can be plainly seen.

The Russian locomotive came to us and there was a diversity of opinion as to the front ends. These locomotives had as many changes made in them as the number of railroads they were put on. One railroad changed the grates of these locomotives, put on a standard nozzle and made the best records in fuel consumption of any engines on that division.

We have learned from the Russian locomotive front ends that when the gasses reach the end of the flue they are not restricted, but pass right through the stack. On a great many of our older locomotives in this country we have the draft sheet set so close to the flue sheet that the gasses and cinders strike this plate so hard as to cause them to rebound and pass back through other flues. This is responsible for the hot fire doors we have heard so much about.

There is too great a variation in the grates on the different locomotives. One railroad will operate its locomotives with 25 per cent of air opening grates, and another railroad in the same vicinity using the same coal will use a grate with 50 per cent opening.

On a great many of the locomotives there is fifty lineal feet of exposed steam heat pipe from the source in the cab to the rear end of the tender and we run this equipment through zero weather and wonder why the train-line freezes up. If we will give the same attention to the fuel on locomotive tenders that we give to the lubricating oil on locomotives we will make progress.

On one railroad in the southern region a man was put on for the purpose of saving fuel and in looking over the record. I find that that road saved $116,000 the first three months of 1919 as compared with the first three months of 1918.

L. P. Streeter (I. C.): Reference is made to the importance of reducing the permissible air leakage limits for freight trains. That matter was recognized by the Fuel Administration last year, and it requested the Air Brake Association to write rules that would eliminate or reduce that leakage. A committee was appointed, of which I was chairman, and the result was the issuance of Fuel Conservation Circular No. 13, over the signature of Eugene McAuliffe, and a marked improvement followed. I have noticed, however, a lapse in the efforts made on the part of the men since the armistice was signed. Possibly they thought that it was not so important to continue the strict observance of these rules as it was during the war.

It is important that every one of us should make the effort to keep that circular before all concerned.

Leslie R. Pyle (Supervisor of Fuel Conservation): You gentlemen think probably that the Fuel Conservation Section is doing a lot of talking, but I want to say a few things, and they are things connected with the mechanical equipment, either in the locomotive or stationary plant.

In the last year I have had hundreds of meetings in the Central and Western regions, and I have made a number of inspections. I see things that lead me to believe that there is no real heart interest in fuel economy. The railroad companies in the last five months of 1918 and the first six months of this year saved nearly $10,000,000 in fuel, a saving on practically all railroads, but we cannot stop with what we have done.

All of the work you gentlemen have done with the assistance of your force, and the transportation people as well, show the new conditions that exist today. A master mechanic said to me a few days ago: "Mr. Pyle, after you have seen what we have done, you might give us some credit for it." It is not the credit we are looking for, but to save the dollars and cents of the railroad company, and when we are wasting fuel to-day to the extent of hundreds of dollars' worth around our terminals, there is no use in talking of what we have done. What is needed today in order to continue savings, and increase them, is for the people who are responsible for these conditions to take the proper interest in them and see that the saving is made. When I can go to a terminal and casually discover eight or ten places where steam is being wasted, and fuel wasted, it shows that the conditions are not what they should be.

I can go to any number of roundhouses and find leaky steam lines with the blowers covered with burlap to cover up the leaks. I can find air compressors that are compressing no air, but are running, and some one around the shop will see this, but nothing is done about it.

I have read the minutes of fuel meetings where the road foreman will get up and say there is nothing left to do at a terminal to save fuel, and the superintendent will say that he could not save ten dollars worth a month on his division. What he says indicates that in his mind there is no necessity for further effort to conserve fuel.

Every one should feel that it is his duty to save fuel. When you go back into the roundhouse see if there are not a number of these things that require attention. Sometimes when I talk to the foremen about steam and air leaks they say they cannot get the men to fix them. You cannot expect any man working for you to do any more than you do, and if you see burlap tied around a steam pipe to prevent a leak, or to lessen a leak, and you do nothing to have that difficulty remedied, you cannot expect the men to take any interest in it.

You can bring about fuel economy and get your men to take the proper interest in that subject, by setting them the example and seeing that these things are properly card for.

The last two pages of the report contain diagrams giving the results of rating of power plants, showing the attempts made to bring about the efficient operation of stationary plants. This association recommends standard practices, and while this report does not recommend the standardizing of this practice of rating power plants, yet I would like to recommend that this rating be standardized on all railroads, because this system has worked a wonderful change in the power plants on the railroad on which it was developed. Before this system went into effect, due to the apparent lack of interest on the part of the company, one of the power plants was rated at 68 per cent, the best mechanical plant on the railroad. In the last report that plant is rated at 91 per cent. It would not have been 91 per cent had it not been for this report going out to the superintendent, showing that there was room for improvement in the operation of a plant. If it had not been for this system of rating the terminal probably would still be 68 per cent. When you point out an evil to a man who is responsible for it, he will give his attention to overcoming it. All that we need is to have a regular inspection, and not simply say that the fuel is being wasted, but do something to prevent that waste.

C. A. Bingeman (P. & R.): We have given the matter of fuel conservation some careful consideration on the Philadelphia & Reading, both from the standpoint of the locomotives and of the stationary power plants. It is not only a matter of seeing the things that require attention and co-operation on the part of all parties concerned, but it is a matter of a certain amount of money investment, in many cases, in order to achieve fuel conservation in these plants. Many of the old plants have grown up from year to year under the old practice of using locomotive boilers for stationary service at roundhouses, which practice everybody knows is wasteful in fuel. They do not have the proper size of chimneys, in many cases, no proper regulators, in some cases no damper provisions whatever and no gages so that the firemen ma yknow just what his combustion conditions are at any time. We have found cases where grates were not properly proportioned. All of this can be cured with little expense, after the conditions are determined by making tests with suitable appliances.

A great amount of fuel can be saved at all of these plants if the management will give co-operation, from a financial standpoint, to the motive power department which has charge of these various plants and will give attention to its recommendations.

T. A. Barton (D. L. & W.): I have had a great deal of experience in sanding locomotives, and I find that, in a great many cases, there is not enough attention paid to the quality of the sand put on the locomotives. In many cases you will find the sand pipes, sand traps and sanding apparatus all hammered to pieces, and it is due to no other cause than the material put in the sandbox.

Robert Collett (Fuel Cons. Sec., U. S. R. R. A.): This very valuable report marks a very decided step in fuel conservation generally. It is a big thing for the motive power men and the mechanical organization represented by this association, which is the mouthpiece of the people who use the fuel. After all, it is

the mechanical department that uses the fuel, and the thing which is a big text is the paragraph "that the chief problem is one of efficient operation and effective supervision, and the results depend upon maintaining enthusiastic interest." It is not so much a question of who has the organization. Obviously the department that has the organization takes with it the responsibility, and I have never found any lack of willingness to assume that responsibility. If such attention be given to these recommendations, as they are picked out as applying to the individual road, results will surely follow that will be gratifying to any managing officer. In fact, they are now obtaining those results. It is only a comparatively short time since they have, on a great many roads, specialized on fuel to a large extent. Service, of course, has had to be first all the time. You must be careful about what suggestions you make, because the average operating officer is going to at least give some consideration to the things you say. I just recall an engine that I rode two days ago, it was a regular engine, and it looked like a jewelry ship in the interior, and the substance of what I said to the crew when I got off was that you are doing a good job operating this engine, it is a pleasure to ride with you and I want you to tell your master mechanic or your road foreman of engines that I said so, if you want to." Incidentally I told his federal manager the first time I saw him.

Sometimes we ride engines that are not so good. I rode an engine the other day on one of the most important trains in the Eastern region, and it does the railroad no injustice to call attention to it and say that we found a condition that was not quite so good as they should have it. The next day we had a meeting and there were about fifty or sixty men there. I did not call the meeting; I was invited to it, and I said to the chief fuel supervisor, "I want to tell you that this railroad has provided a very thorough organization that has the full support of the general operating officer as well as the chief mechanical officer and every other officer on the road." I told him what the performance had been the day before when I rode the engine for forty-five minutes, and I asked what fuel they burned. They told me, and it checked very closely with my estimate.

I wanted to tell you this little story, as this was a regular engine, manned by a regular crew. We checked the work back, the mechanical officer and myself, for fifteen days at both ends of the road, and there was not a thing recorded on that engine by the engineer to show that it was wasting fuel until the night I went in, and then he said it was burning too much coal and that "the reverse gear creeps."

What the men that come here and talk on this paper want, what the chief operating officers of the railroads want is to get their money out of the things that they put on. We can get money to put all these things on the engines, but what is the use of putting all of them on if he was going to have a seventy-five per cent waste just because the man was not doing the job properly, and the man he had to supervise him was not supervising him.

J. Dickson (S. P. & S. Ry.): We have derived as much benefit from the monthly fuel meeting of each division as from any other thing that we have tried. Our fuel meeting is held on the first Tuesday or the first Monday, depending upon the division. The assistant general manager is the chairman of the fuel meeting. The superintendent of the division, the yardmaster, the chief dispatcher and all the other officers who are in charge of departments are at that meeting. We also encourage engineers, firemen, conductors, yardmen and any one we can interest in the meeting to come. We discuss the different complaints we have against each other. Instead of talking about the transportation department among ourselves, we air it at the meetings, and I have found the transportation department always ready to make improvements that help in fuel conservation. I believe that that monthly meeting is one of the best things that any railroad can institute. We have unearthed a number of things which cause fuel leaks that I don't believe we could have gotten to the bottom of otherwise.

A motion that the committee be continued and that it should broaden its investigation to cover stationary plants was carried.

Report on Specifications and Tests for Materials (A. R. M. M.)

THE COMMITTEE SUBMITS its report covering the different subjects which were reviewed during the past year and recommends that changes be made in several specifications, as shown under the respective exhibits. All references to page numbers relate to the 1916 proceedings.

Exhibit A. Specifications for Lap-welded and Seamless Steel Boiler Tubes for Locomotives

(RECOMMENDED PRACTICE, PAGE 552)

1. *Scope.*—These specifications cover lap-welded and seamless steel boiler tubes, boiler flues, superheated pipes, safe ends and arch tubes.

I. MANUFACTURE

2. *Process.*—The steel shall be made by the open-hearth process.

II. CHEMICAL PROPERTIES AND TESTS

3. *Chemical Composition.*—The steel shall conform to the following requirements as to chemical composition:

Carbon	0.08—0.18	per cent.
Manganese	0.30—0.60	per cent.
Phosphorus	not over 0.04	per cent.
Sulphur	not over 0.045	per cent.

4. *Check Analyses.*—(a) Analyses of two tubes in each lot of 250 or less, and of 2,000 ft. or less of safe-end material may be made by the purchaser. The chemical composition thus determined shall conform to the requirements specified in Section 3. Drillings for analyses shall be taken from several points around each tube. (b) If the analysis of only one tube does not conform to the requirements specified, analyses of two additional tubes from the same lot shall be made, each of which shall conform to the requirements specified in Section 3.

III. PHYSICAL PROPERTIES AND TESTS

5. *Flange Tests.*—(a) For all tubes 6 in. or under in diameter and having a thickness less than 9 per cent of the outside diameter, a test specimen shall have a flange turned over at right angles to the body of the tube without showing cracks or flaws. This flange, as measured from the outside diameter of the tube, shall not be less than 15 per cent of the outside diameter, but the flange shall in no case exceed ½ in. in width. (b) In making the flange test, it is recommended that the flaring tool and die block shown in Fig. 1 be used.

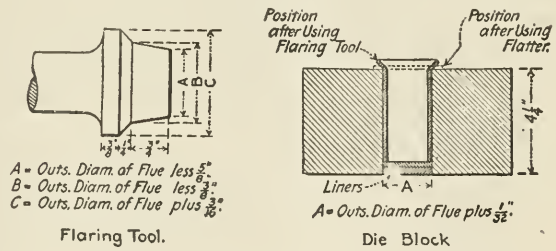


Fig. 1.—Flaring Tool and Die Block for Flange Tests

6. *Flattening Test.*—(a) For all tubes, except small tubes and superheater pipes, on which the flange test is not required, a test specimen 3 in. in length shall stand flattening between parallel plates until the distance between the plates is not over three times the wall thickness, without showing cracks or flaws. For lap-welded tubes, care shall be taken that the weld is not located at the point of maximum bend. (b) For small tubes and superheater pipes on which the flange test is not required, a test specimen 3 in. in length shall stand flattening between parallel plates until the distance between the plates is not over four times the wall thickness, without showing cracks or flaws.

7. *Crush Tests.*—(a) For all tubes except superheater pipes, a test specimen 2½ in. in length shall stand crushing longitudinally until the outside folds are in contact, without showing cracks or flaws. (b) For superheater pipes, a test specimen 2½ in. in length shall stand crushing longitudinally to 1¼ in., without showing cracks or flaws.

8. *Hydrostatic Test.*—Tubes under 5 in. in diameter shall stand an internal hydrostatic pressure of 1000 lb. per sq. in., and tubes 5 in. or over in diameter shall stand an internal hydrostatic pressure of 800 lb. per sq. in.; provided that the fiber stress does not exceed 16,000 lb. per sq. in., in which case the test pressure shall be determined by the following formula:

$$P = \frac{32{,}000\ t}{D}$$

in which P = the pressure in pounds per square inch, t = the thickness of wall in inches, and D = the inside diameter of tube in inches. Lap-welded tubes shall be struck near both ends, while under the test pressure, with a 2-lb. steel hand hammer or the equivalent.

9. *Test Specimens.* (a) Test specimens shall consist of sections cut from tubes, selected by the inspector representing the purchaser, from the lot offered for shipment. They shall be smooth on the ends and free from burrs. (b) All specimens shall be tested cold.

10. *Number of Tests.*—One of each of the physical tests specified shall be made from each of two tubes in each lot of 250 or less, or each 2000 ft. or less of safe-end material. Each tube shall be subjected to the hydrostatic test.

11. *Retests.*—If the results of the physical tests of only one tube from any lot do not conform to the requirements specified in Sections 5, 6 or 7, retests of two additional tubes from the same lot shall be made, each of which shall conform to the requirements specified.

IV. Standard Weights

12. *Standard Weights.*—The standard weights for tubes of various outside diameters and thicknesses are as indicated in Table 1.

13. *Permissible Variations.*—The weight of the tubes shall not vary more than five per cent from that specified in Table 1.

V. Workmanship and Finish

14. *Workmanship.*—(a) The finished tubes shall be circular within 0.02 in., and the mean outside diameter shall not vary more than 0.015 in. from the size ordered. (b) The thickness at any point shall not vary more than one gage above or below that specified. In the case of boiler tubes which are expanded and swaged, the thickness of the expanded end may be 1½ gages lighter, and of the swaged end two gages heavier than the thickness specified. (c) The length shall not be less, but may be 0.125 in. more than that ordered.

15. *Finish.*—The finished tubes shall be free from injurious defects and distortion, and shall have a workmanlike finish.

VI. Marking

16. *Marking.*—The name or brand of the manufacturer, the material from which it is made ,and the pressure in pounds at which it was tested, shall be legibly stenciled on each tube.

VII. Inspection and Rejection

17. *Rejection.*—(a) Unless otherwise specified, any rejection based on tests made in accordance with Section 4 shall be reported within five working days from the receipt of samples. (b) Tubes when inserted in the boiler shall stand expanding and beading without showing cracks and flaws, or opening at the weld. Superheater pipes when properly manipulated shall stand all forging, welding and bending operations necessary for application without developing defects. Tubes or superheater pipes which fail in any of the above operations will be rejected and the manufacturer shall be notified.

Exhibit B. Specifications for Lap-welded Charcoal-iron Boiler Tubes for Locomotives

(Recommended Practice, Page 552)

1. *Scope.*—These specifications cover lap-welded charcoal-iron boiler tubes, boiler flues, safe ends and arch tubes for locomotives.

I. Manufacture

2. *Process.*—The tube shall be made from knobbled, hammered charcoal iron.

II. Physical Properties and Tests

3. *Bend Tests.* (a) *Quench-bend.*—Strips ½ in. in width by 6 in. in length, planed lengthwise from tubes, when heated to a cherry red and quenched at once in water the temperature of which is 80 degrees F., shall bend in opposite directions at each end, as shown in Fig. 1, without showing cracks or flaws. (b) *Nick-bend.*—Strips ½ in. in width by 6 in. in length, planed lengthwise from tubes, when nicked and broken by light blows, shall show a wholly fibrous fracture.

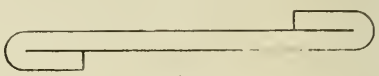


Fig. 1

4. *Expansion Test.*—A test specimen 12 in. in length shall be heated for a length of 5 in. to a bright cherry red (1200 to 1400 degrees F.), placed in a vertical position, and a smooth tapered steel pin at blue heat (600 to 800 degrees F.), forced into the end of the tube by pressure or by light blows of a 10-lb. hammer. Under this test the tube shall expand to 1⅛ times its original diameter without splitting or cracking. The pin shall be of tool steel and shall have a taper of 1½ in. per ft. of length.

TABLE 1—STANDARD WEIGHTS

Lap-welded and Seamless Steel Boiler Tubes for Locomotives
(Including Safe Ends, Arch Tubes and Large Boiler Tubes.)

Thickness, Birmingham Wire Gage.		Weight, lb. per ft. of Length. Outside Diameter, In.													
No.	In.	1¾	1⅞	2	2¼	2½	3	3½	4	4½	5	5¼	5⅜	5½	6
13	0.095	1.679	1.806	1.932	2.186	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
12	0.109	1.910	2 055	2.201	2.492	2.783	3.365	.....	.....	.....	.....	.....	.....	.....	.....
11	0.120	2.089	2.249	2.409	2.729	3.050	3.691	4.331	.....	.....	.....	.....	.....	.....	.....
10	0.134	2.312	2 491	2.670	3.028	3.386	4.101	4.817	5 532	.....	.....	.....	.....	.....	.....
9	0.148	2 532	2.729	2.927	3.322	3.717	4.508	5.298	6.088	6.879	7.669	8.064	8.262	8.459	9.250
8	0.165	.....	.....	.....	.....	4.114	4.995	5.877	6.758	7.639	8.520	8.960	9.181	9.401	10.282
7	0 180	.....	.....	.....	.....	4.460	5.421	6.382	7.343	8.304	9.266	9.746	9.987	10.227	11.188

Small Superheater Pipes
(Seamless Only)

Thickness, Birmingham Wire Gage.		Weight, lb. per ft. of Length. Outside Diameter, In.										
No.	In.	⅝	⅞	¾	⅞	⅞	1⅛	1	1¼	1⅜	1⅝	1½	1⅝
13	0.095	0 537	0.601	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
12	0.109	.....	.....	0.746	0.818	.....	.....	.....	.....	.....	.....	.....	.....
11	0.120	.....	.....	.....	.....	0.967	1.047	1 127	.....	.....	.....	.....	.....
10	0.134	.....	.....	.....	.....	.....	.....	.....	1.597	1.776	1.865	1.954	2.133
9	0.148	.....	.....	.....	.....	.....	.....	.....	1.741	1 939	2.038	2.137	2.334

5. *Crush Test.*—A test specimen 2½ in. in length shall stand crushing longitudinally to a height of 1⅛ in. without splitting in either direction and without cracking or opening at the weld.

6. *Hydrostatic Test.*—Tubes under 5 in. in diameter shall stand an internal hydrostatic pressure of 1000 lb. per sq. in., and tubes 5 in. or over in diameter shall stand an internal hydrostatic pressure of 800 lb. per sq. in., provided that the fiber stress does not exceed 16,000 lb. per sq. in., in which case the test pressure shall be determined by the following formula:

$$P = \frac{32{,}000\ t}{D}$$

in which P = the pressure in pounds per square inch, t = the thickness of wall in inches, and D = the inside diameter of the tube in inches. Lap-welded tubes shall be struck near both ends, while under the pressure, with a 2-lb. steel hand hammer, or the equivalent.

7. *Etch Test.*—In case of doubt as to the quality of material, the following test shall be made to detect the presence of steel. A cross-section of tube shall be turned or ground to a perfectly true surface, polished free from dirt or cracks, and etched until the soft parts are sufficiently dissolved for the iron tube to show a decided ridged surface, with the weld very distinct, while a steel tube would show a homogeneous surface.

8. *Test Specimens.*—(a) Test specimens shall consist of sections cut from tubes, selected by the inspector representing the purchaser, from the lot offered for shipment. They shall be smooth on the ends and free from burrs. (b) All specimens, except as specified in Section 4, shall be tested cold.

9. *Number of Tests.*—One of each of the physical tests specified shall be made from each of two tubes in each lot of 250 or less. Each tube shall be subjected to the hydrostatic test.

10. *Retests.*—If the results of the physical tests of only one tube from any lot do not conform to the requirements specified in Sections 3, 4 or 5, retests of two additional tubes from the same lot shall be made, each of which shall conform to the requirements specified.

III. Standard Weights

11. *Standard Weights.*—The standard weights for tubes of various outside diameters and thicknesses are as indicated in Table 1.

IV. Workmanship and Finish

12. *Workmanship.*—(a) Finished tubes 3½ in. or under in outside diameter shall be circular within 0.02 in. and the mean outside diameter shall not vary more than 0.015 in. from the size ordered. For tubes over 3½ in. in diameter, these variations shall not exceed 0.5 per cent of the outside diameter. (b) The thickness at any point shall not vary more than one gage above or one gage below that specified. In the case of boiler tubes which are expanded and swaged, the thickness of the expanded end may be 1½ gages lighter and of the swaged end two gages heavier than the thickness specified. (c) The length shall not be less, but may be 0.125 in. more than that ordered.

13. *Finish.*—The finished tubes shall be free from injurious defects and distortion, and shall have a workmanlike finish.

V. Marking

14. *Marking.*—The name or brand of the manufacturer, the words "knobbled charcoal," and the pressure in pounds at which it was tested, shall be legibly stenciled on each tube.

VI. Inspection and Rejection

15. *Rejection.*—Tubes when inserted in the boiler shall stand expanding and beading without splitting or breaking. Tubes which fail in this manner shall be rejected and the manufacturer shall be notified.

Exhibit C. Specifications for Air-brake Hose Gaskets

(Recommended Practice, Page 591)

(This specification is the same as that adopted by the M. C. B. Association and revised in 1918. See *Railway Age* for June 21, 1918, page 1490.)

Exhibit D. Specifications for Tank and Underframe Rivet Steel and Rivets

(Recommended Practice, Page 604)

(Same as Specifications for Rivet Steel and Rivets for Passenger and Freight Equipment Cars. See report of Committee on Specifications and Tests for Materials, M. C. B.)

Exhibit E. Specifications for Locomotive Rivet Steel and Rivets

(Recommended Practice, Page 609)

1. *Scope.*—These specifications cover steel bars for the manufacture of rivets and finished steel rivets for locomotive boilers.

I. Manufacture

2. *Process.*—The steel shall be made by the open-hearth process.

II. Chemical Properties and Tests

3. *Chemical Composition.*—The steel shall conform to the following requirements as to chemical composition:

Manganese	0.30 to 0.50 per cent.
Phosphorus	not over 0.04 per cent.
Sulphur	not over 0.045 per cent.

4. *Ladle Analyses.*—An analysis of each melt of steel shall be made by the manufacturer to determine the percentage of carbon, manganese, phosphorus and sulphur. This analysis shall be made from a test ingot taken during the pouring of the melt. The chemical composition thus determined shall be reported to the purchaser or his representative, and shall conform to the requirements specified in Section 3.

5. *Check Analyses.*—An analysis may be made by the purchaser from finished bars or rivets representing each melt. The chemical composition thus determined shall conform to the requirements specified in Section 3.

III. Physical Properties and Tests

A.—Requirements for Bars

6. *Tension Tests.*—(a) The bars shall conform to the following requirements as to tensile properties:

Tensile strength, lb. per sq. in.	45,000-55,000
Yield point, min. lb. per sq. in.	0.5 tens. str.
Elongation in 8 in. min. per cent.	$\left\{\frac{1{,}500{,}000}{\text{Tens. str.}}\right\}$ but need not exceed 30 per cent.

TABLE 1—STANDARD WEIGHTS

Lap-Welded Charcoal-Iron Boiler Tubes for Locomotives
(Including Boiler Flues, Arch Tubes and Safe Ends)

Thickness Birmingham Wire Gage.		Weight, lb. per Ft. of Length. Outside Diameter, In.											
No.	In.	1¾	2	2¼	2½	3	3½	4	4½	5	5¼	5⅜	5½	6
13	0.095	1.65	1.90	2.14	2.39	....	....	....	....	....	....	....	....	....
12	0.109	1.87	2.16	2.44	2.73	3.30	....	....	....	....	....	....	....	....
11	0.120	2.05	2.36	2.68	2.99	3.62	4.25	....	....	....	....	....	....	....
10	0.134	2.27	2.62	2.97	3.32	4.02	4.72	5.42	....	....	....	....	....	....
9	0.148	2.48	2.87	3.25	3.64	4.42	5.19	5.97	6.74	7.51	7.91	8.10	8.29	9.06
8	0.165	....	....	....	4.03	4.90	5.76	6.62	7.48	8.35	8.78	9.00	9.21	10.07
7	0.180	....	....	....	4.37	5.31	6.25	7.20	8.14	9.08	9.55	9.79	10.02	10.96

(b) The yield point shall be determined by the drop of the beam of the testing machine.

7. *Bend Tests.*—(a) *Cold-bend.*—The test specimen shall bend cold through 180 deg. flat on itself without cracking on the outside of the bent portion. (b) Quench-bend.—The test specimen when heated to a light cherry red as seen in the dark (not less than 1200 degrees F.), and quenched at once in water, the temperature of which is between 80 degrees and 90 degrees F., shall bend through 180 deg. flat on itself without cracking on the outside of the bent portion.

B.—Requirements for Rivets

8. *Tension Tests.*—The rivets, when tested, shall conform to

the requirements as to tensile properties specified in Section 6 (a), except that the elongation shall be measured on a gage length not less than four times the diameter of the rivet.

9. *Bend Tests.*—(a) *Cold-bend.*—The rivet shank shall bend cold through 180 deg. flat on itself, as shown in Fig. 1, without cracking on the outside of the bent portion. (b) *Quench-bend.*—The rivet shank, when heated to a light cherry red as seen in the dark (not less than 1200 degrees F.), and quenched at once in water, the temperature of which is between 80 degrees and 90 degrees F., shall bend through 180 deg. flat on itself without cracking on the outside of the bent portion.

10. *Flattening Test.*—Rivet heads shall be flattened sideways, when cold, to a thickness of one-third and when at a driving heat to a thickness of one fourth the original thickness of the shank, without splitting.

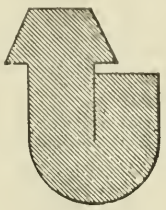


Fig. 1

11. *Test Specimens.*—(a) *Bars.*—Tension and bend test specimens shall be of the full section of bars as rolled. (b) *Rivets.*—Tension, bend and flattening test specimens shall be of the full section of rivets as manufactured. (c) When accurate account of the material has been kept and the melts can be identified, only one set of specimens for each diameter in each melt shall be taken from either the bars or the finished rivets. (d) If rivet bars or rivets have been cold-worked, the test specimens shall be heated to a drawing heat and allowed to cool in air before testing.

12. *Number of Tests.*—(a) *Bars.*—Two tension, two cold-bend and two quench-bend tests shall be made from each lot of 200 bars, or from each diameter in any one melt, each of which shall conform to the requirements specified. (b) *Rivets.*—One tension test (when specified), one cold-bend, one quench-bend and one flattening test shall be made from each lot of 50 kegs of each diameter or from each diameter in any one melt, each of which shall conform to the requirements specified. (c) If any test specimen from the bar or rivets originally selected to represent a lot of bars or rivets contains surface defects not visible before testing, but visible after testing, or if the percentage of elongation of any tension test specimen is less than that specified in Section 6 (a), and any part of the fracture is outside the middle third of the gage length, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

IV. Permissible Variations in Gage

13. *Permissible Variations.*—The gage of each bar shall not vary more than 0.01 in. from that specified.

V. Workmanship and Finish

14. *Workmanship.*—The finished bars shall be circular within 0.01 in., and the rivets shall be concentric, true to form and shall be made in a workmanlike manner.

15. *Finish.*—The finished bars and rivets shall be free from injurious defects and shall have a workmanlike finish.

VI. Marking

16. *Marking.*—(a) *Bars.*—Rivet bars shall, when ready for shipment, be properly separated and marked with the name or brand of the manufacturer and the melt or lot number for identification. (b) *Rivets.*—Kegs of finished rivets shall, when ready for shipment, be properly marked with the name or brand of the manufacturer, diameter of rivets and the melt or lot number for identification. (c) *Samples.*—The melt or lot number shall be legibly stamped on each test specimen representing a lot of bars. Samples representing a lot of rivets shall be marked in a manner that will not impair their value for test purposes.

VII. Inspection and Rejection

17. *Rejection.*—(a) Unless otherwise specified, any rejection based on tests made in accordance with Section 5 shall be reported within five working days from the receipt of samples. (b) Bars or rivets which show injurious defects subsequent to their acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

Exhibit F. Specifications for Steel Blooms, Billets and Slabs for Carbon Steel Forgings

(Recommended Practice, Page 562)

6. That the determination of segregation, as specified in Section 8 (b), shall be omitted for "Class C" material, and the letter *C* removed from the last sentence in the paragraph.

Exhibit G. Specifications for Solid Wrought Carbon Steel Wheels

(Recommended Practice, Page 543.)

7. Sec. 8.—Add to this paragraph, following the title "Branding," the letter *a* and add as paragraph (b), the following: "(b) When so specified, the purchaser's name and serial number shall be obliterated from all rejected wheels, in the presence of the inspector."

Exhibit H. Specifications for Annealed Carbon Steel Castings for Locomotives

(Recommended Practice, Page 569.)

1. *Scope.*—These specifications cover all steel castings for locomotives and tenders, including tender truck bolsters, truck side frames, locomotive frames and driving wheel centers, as well as miscellaneous castings, classified as follows: Class A—Steel for locomotive frame. Class B.—Steel for all other castings, except as otherwise specified on individual orders.

I. Manufacture

2. *Process.*—The steel may be made by the open hearth, crucible or electric process.

3. *Heat Treatment.*—Castings shall be allowed to become cold. They shall then be uniformly reheated to the proper temperature to refine the grain and allowed to cool uniformly and slowly. If, in the opinion of the purchaser or his representative, casting is not properly annealed, he may at his option require the casting to be re-annealed.

II. Chemical Properties and Tests

4. *Chemical Composition.*—The steel shall conform to the following requirements as to chemical composition:

	Class A.	Class B.
Carbon	0.25—0.45	0 20—0.37
Marganese not over	0 75	0.75
Phosphorus not over	0.05	0.05
Sulphur not over	0.05	0.05

5. *Ladle Analyses.*—An analysis of each melt of steel shall be made by the manufacturer to determine the percentage of carbon, manganese, phosphorus and sulphur. This analysis shall be made from drillings taken at least ¼ in. beneath the surface of a test ingot obtained during the pouring of the melt. The chemical composition thus determined shall be reported to the purchaser or his representatives and shall conform to the requirements specified in Section 4.

6. *Check Analyses.*—An analysis may be made by the purchaser from the broken tension test specimen or from a finished casting representing each melt. The chemical composition thus determined shall conform to the requirements specified in Section 4. Drillings for analysis shall be taken not less than ¼ in. beneath the surface of the casting.

II. Physical Properties and Tests

7. *Tension Tests.*—(a) The steel shall conform to the following minimum requirements as to tensile properties:

	Class A.	Class B.
Tensile strength, lb. per sq. in.	75,000	65,000
Elastic limit, lb. per sq. in.	0.4 Tens Str.	0.4 Tens. Str.
Yield point, lb. per sq. in.	0.45 Tens Str.	0.45 Tens. Str.
Elongation in 2 in. per cent.	1.600 000 Not under Tens. Str. 18 per cent.	1.600.000 Not under Tens.Str. 22 per cent.
Reduction of area, per cent.	30	35

(b) Either the elastic limit or the yield point, but not both, shall be determined. The elastic limit shall be determined by an extensometer and the yield point by the drop of the beam of the test machine.

(c) The yield point, or the elastic limit, shall be determined at a cross-head speed not to exceed ⅛ in. per minute, and tensile strength at a speed not to exceed 1½ in. per minute.

8. *Alternative Tests to Destruction.*—In the case of orders including only castings not exceeding 150 lb. in weight, the test to destruction of one casting from each 100 castings or smaller lot may be substituted for the tension tests. This test shall show the material to be ductile, free from injurious defects, and suitable for the purpose intended.

9. *Test Specimens.*—(a) Tension test specimens shall conform to dimensions shown in Fig. 1, the ends shall not be less than ⅞ in. in diameter and of a length and form to fit the holders of the test machine in such a manner that the load will be axial.

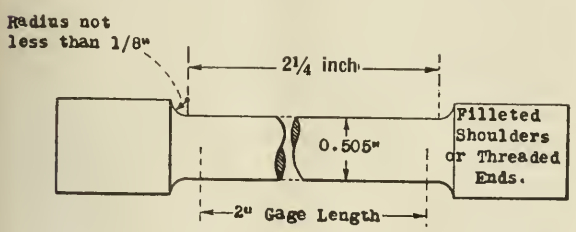


Fig. 1.—Test Specimen

(b) If the test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

(c) A sufficient number of test coupons, from which the required test specimen may be prepared, shall be cast attached to each end of each locomotive frame, to each locomotive cylinder, to each wheel center and to miscellaneous castings weighing over 150 lb. These test coupons shall remain attached to the castings throughout the annealing and until the castings are presented for inspection. If the design of the casting is such that the test coupons cannot be attached, they shall be cast in runners outside of the casting, but attached to it, to represent each melt. The location of the test coupons, as well as the method of casting such coupons, shall be subject to mutual agreement by the inspector and the manufacturer. In the case of any orders for casting weighing under 150 lbs., the physical properties as required in Section 7, may be determined by an extra or spare test bar cast with and attached to some other casting from the same melt.

(d) When sufficient coupons have not been cast, a test specimen may be cut from a finished casting at a location mutually agreed upon by the inspector and the manufacturer.

10. *Annealing Lugs.*—For the purpose of determining the quality of annealing at least two and not more than four annealing lugs shall be cast on all castings 150 lb. and over and on such castings less than 150 lb. as required by the purchaser. The location of the annealing lugs shall be agreed upon by the inspector and the manufacturer. The standard annealing lug shall be 1 in. in height and 1 in. in width and ⅝ in. in thickness where it joins the casting. The inspector may remove one-half and the manufacturer one-half of the number of annealing lugs.

11. *Number of Tests.*—(a) General Requirements. (1) One tensile test shall be made from each end of each locomotove frame and both tests shall meet the requirements of the specifications. One tensile test may be made from each wheel center and each locomotive cylinder casting, but at least one of each kind of such castings in each melt shall be tested. For miscellaneous castings from melts which do not include frames, wheel centers or cylinders, one tensile test shall be made from each melt. (2) If the percentage of elongation of any tension test specimen is less than that specified in Section 7 and any part of the fracture is more than ¾ in. from the center of the gage length, as indicated by scribe scratches marked on the specimen before casting, a retest shall be allowed. (3) If the results of the physical test of any test lot do not conform to the requirements specified, the manufacturer may re-anneal such lots, but not more than twice, and re-test shall be made as specified in Section 7. (4) No part of this specification shall operate to cause any one tensile test to apply to more than 40 tons of castings as offered for inspection.

(b) Special Requirements for Miscellaneous Castings.—(1) After 15 consecutive melts, which may contain any or all classes of castings (except frames, wheel centers and cylinders) covered by these specifications on one or more orders, have been tested and accepted in accordance with the above requirements, the manufacturer may group the succeeding melts in lots of five melts each; the entire group to be accepted if the test specimen selected from the lot fulfills the chemical and physical requirements herein specified. If this test fails, a rehearing will be granted on the melt that the failed bar represents, and the other four melts of the group shall be tested individually. (2) If there is a period of more than six months between shipments of the class of castings covered by these specifications, then each melt shall be tested individually until 15 consecutive melts have been accepted, after which the melts may again be grouped as in paragraph (a). (3) If one or more melts are rejected, each succeeding melt shall be tested individually until 15 consecutive melts have been accepted, after which melts may again be grouped as in paragraph (a). (4) In case of small orders for bolsters, truck sides, draft arms, yokes or castings weighing over 150 lb. where the size of the order and the available pattern and foundry equipment are such that not more than five castings can be cast in any one melt, the physical properties, as required in Section 7, will be determined from an extra or spare test coupon cast with and attached to some other casting of the same melt.

(The sections on Permissible Variations, Workmanship and Finish, Marking and Inspection and Rejection follow the wording of the corresponding sections in the M. C. B. Specifications for Annealed Carbon Steel Castings for Passenger and Freight Equipment Cars. See Report of M. C. B. Committee on Specifications and Tests for Materials.)

The report is signed by F. M. Waring (Chairman), Pennsylvania; J. C. Ramage, Southern; J. R. Onderdonk, Baltimore & Ohio; A. H. Fetters, Union Pacific; Frank Zeleny, Chicago, Burlington & Quincy; H. B. MacFarland, Atchison, Topeka & Santa Fe; Prof. L. S. Randolph, Virginia Polytechnic Institute; H. E. Smith, Chief Materials Inspector, United States Railroad Administrator.

Discussion

Mr. Waring: In addition, the committee wishes to make the addition of an Exhibit I to modify specifications for steel axles for locomotive tenders, standard page 229 of the 1917-18 proceedings. In Section 8 omit the letter A at the beginning of first paragraph. Omit the entire paragraph B. Change Section 5, check analysis, to read as follows: "An analysis shall be made by the purchaser from one axle representing each melt. The chemical composition thus determined shall conform to the requirements specified in Section 2. The drillings for this analysis shall be taken with a ⅝ in. drill from one end of the test axle at any point midway between the center and the surface." The reason for that is that the present specifications require that a 6 in. piece shall be cut off the test axle, and the most general method of drilling for check analysis is to take the drillings directly from the end of test axle. The committee saw no objection to making that substitution in the specification. *I would move that the report of the committee be accepted and go to letter ballot.*

T. L. Burton (N. Y. C.): I would like to call attention to the detail of nominal and tolerance dimensions for air-brake hose gaskets. The dimensions as here shown do not coincide throughout with the sections in recommended practice gage for hose coupling gaskets. This gage was voted a few days ago and submitted to letter ballot for advancement to standard. There seems also to have been some division of responsibilities of the committees on specifications and tests for materials and the train brake and signal committee in reference to this matter of gaskets, hose-coupling gages and so forth. In view of this the last mentioned committee submitted the matter to the General Committee to know whether the train committee was going to handle the question of dimensions for the parts mentioned, as they had done heretofore, or whether they were to be handled by the committee on specifications and tests materials. The decision was that the question of air-brake hose couplings, gaskets for air-brake hose couplings and gages for the two were to be treated as air-brake details, and all dimensions pertaining thereto were to be handled by the air-brake committee. The committee on specifications and tests of materials would deal only with the physical and chemical properties of those parts. As a result of that lack of understanding in the past you have had certain standard dimensions adopted on the recommendations of the committee on specifications for test materials for gaskets and certain dimensions for a gasket gage which

you also adopted on the recommendation of another committee, and the two did not coincide. I call this to your attention because of your having adopted conflicting recommendations in the past.

W. E. Dunham: Under the circumstances as explained by Mr. Burton, I move that the dimensions both original and limiting of the gage and of the gasket as recommended by the train-brake and signal committee be substituted in these specifications.

Mr. Burton: If you will carry out the recommendation that you adopted in connection with the train brake and signal committee's report, it will automatically do what has been suggested. The committee recommended that the matter of tolerance dimensions for the hose coupling packing rings be provided for in the gage rather than in the gasket the thought being that if you put a minimum and maximum gage, and specify that a ring should enter one side of the gage and should not enter the other, it would automatically take care of the tolerance dimensions. The committee also recommended that the specifications for the gasket include a drawing for the gage and instructions on its use. That being the case, it seems to me the matter might be cleared up by simply eliminating the tolerance dimensions in this report of the gaskets and substituting the one for the gage.

Mr. Waring: The reason these specifications do contain tolerances was that the members of the Specification Committee found that the actual gaskets that we were getting could not be checked with the gage which the Train Brake Committee had recommended. We made a thorough investigation of this gasket question, and came to the conclusion that since these tolerances were not satisfactory that it was up to us to make a set of tolerances, and that it would be desirable to have them in the specifications. That was done about a year ago. Since then I understand that the Train Brake Committee has made some changes in that gage and the tolerances. I think it would be desirable to have a joint action between these two committees, so that we could have the same understanding of the subject. In order to clear up this situation, perhaps Mr. Burton's motion to the effect that the tolerances should be removed from this specification is the one that should prevail.

The Chairman: Do you make that as an amendment, Mr. Waring? There is a motion before the convention.

Mr. Burton: I don't think the motion that was made conflicts at all with anything that was said. The motion, as I understood it, was that the gage and these dimensions be substituted for the dimensions shown in this report for the packing ring itself.

The Chairman: That is in accordance with your understanding?

Mr. Dunham: Yes, sir.

(The motion was put to a vote and carried.)

Design and Maintenance of Locomotive Boilers

Under date of February 8, 1919, the committee issued Circular *L*, containing six questions. Up to March 20 only 19 roads responded, and from their reports we derive the following general conclusions:

None of the 19 roads reports introducing any new or special designs of locomotive boilers during the last two years.

Nine roads out the 19 use electric welding in fire boxes for patches, partial side sheets, cracks and fire door patches.

Eight report no electric welding at all, and two report the use of oxy-acetylene. Only three roads report making a common practice of using electric welding as a substitute for riveted seams in the firebox and only to a limited extent in repair work. One road uses riveted seams strengthened by electric welding. In some cases seams between the crown sheet and side sheets are welded the full length without rivets, and also fire door hole flanges, without giving any further trouble. One road reports that all cross seams, and, to some extent, the fire door sheets, are either electric or acetylene welded. Mud ring corners are being successfully repaired by cutting off 18 in. each way and welding in a new corner, but the report does not specify whether this operation is done by the electric or acetylene process.

One road reports what it claims to be a successful method of reclaiming enlarged staybolt holes, by tapping out from 2 in. to 3 in diameter and screwing in plugs the same thickness as the sheet, with both the plug and the sheet chamfered off ⅛ in. and the electric weld built up in the gutter thus formed, with a slight mound for strength. Cracks between staybolt holes are repaired by cutting out the crack to a 45 degree bevel on each side 3/16 in. apart, and building in the electric weld.

One road furnishes a sketch of a sectional flue expander with the parts which, in the standard expander, would have a bearing against the bead of the flue ground off. This is to be used on flues which are electric welded in the back sheet when they show leakage, the idea being to knock the scale off on the water side next to the sheet and prevent overheating and cracking, and at the same time avoid crowding the bead of the flue against the weld and breaking it. Grinding the expander off in this way does not impair its efficiency for roundhouse work on flues which have not been welded. Some large superheater flue expanders have been changed also, and the road claims that up to date this seems to be the most efficient tool for keeping scale away from the ferrule on the water side. This road finds it necessary to work the flues which have been welded in the sheet about every 60 days, and in bad water districts oftener. A discussion of this process of removing scale and its effect upon welded flues is invited.

One road reports electric welding smoke box studs, the inference being that the studs are butt welded to the ring to save drilling and tapping. Another road electric welds arch brick studs in a similar manner.

The most approved methods of performing the various welding operations were included in last year's report and need not be repeated here. It may also be remembered that among the roads reporting last year, 25 per cent used electric welding for entire new fire boxes, which does not agree perfectly nor conflict radically with the fact that none of the roads reporting this year mention such a practice, although one road uses oxy-acetylene welding in place of riveted seams, except in the mud ring, for all new fireboxes.

Of the 19 roads responding to Circular *L*, only 10 have had experience with combustion chambers, and all that have had them any length of time report favorably on account of improved combustion and less trouble with leaky flues. If there has been any notable change in locomotive boiler practice during the past year, it has been the re-introduction of the combustion chamber. These range all the way from the D-shaped tube sheet up to a combustion chamber reported on the new Pennsylvania Mallet as 10 ft. in length.

One member advises his view of the combustion chamber is that its main function is not so much to increase the firebox surface as it is to shorten the tubes and give increased length of flameway, to allow combustion to be more nearly completed before it is extinguished by admission to the tubes. Combustion once completed, it is immaterial whether the heat be absorbed by the firebox or by the tubes, and the more heat extracted by the firebox, the less will be the evaporation of the tubes.

The introduction of large combustion chambers naturally brings up the question of bridge walls between the combustion chamber and the firebox proper; possibly also the desirability of some form of discharge for the bank of sparks carried over the bridge. While the committee has received no data on bridge walls, we have no doubt that a discussion will develop this feature.

A member has suggested as worthy of consideration the best method of determining the water level in the extremely long boilers of to-day. This refers particularly to the long boilers on Mallet engines, which operate over heavy humps and dips.

In reply to Question 5, 11 roads have experienced trouble from cracks in boilers where the guide and waist sheet angle is fastened to the boiler shell. To overcome this, six roads have removed the rivets or studs, leaving a loose bearing. One road uses two small waist sheets instead of the one-piece design, which they find permits greater flexibility, and one road is experimenting with flexible braces between the guide yoke

and the boiler, but these have not been on the road long enough to produce results. One important road continues to rivet the angle or tee to the boiler with a ¾-in. liner inside of the boiler, which distributes the strain over a greater area with successful results. Another important road uses studs in some engines and rivets in others, but finds that the counterbalance has some effect in causing cracks at that point.

In reply to the sixth question, 13 of the 19 roads have no government engines, while the remaining six have nothing to say except one reference to the two water glasses and water column, which is believed by some to be superfluous.

Referring again to innovations in locomotive design—the attention of the committee has been directed to detail descriptions and reports of the performance of a locomotive equipped with a new type of firebox on the Chicago, Milwaukee & St. Paul, known as the "Nicholson Thermic Syphon." (See *Railway Age*, issue of January 10, 1919, page 151.) According to published test data, the engine equipped with these syphons appears to have produced some very economical results.

The report is signed by C. E. Fuller (Chairman), Union Pacific; A. W. Gibbs, Pennsylvania; D. R. MacBain, New York Central; M. K. Barnum, Baltimore & Ohio Railroad; C. B. Young, Inspection and Test Section, United States Railroad Administration, and J. Snowden Bell.

Discussion

Mr. Fuller: Since this report was made one or two members have suggested the advisability of a committee being appointed to go into the combustion chamber feature and its application.

Mr. Gaines: The combustion chamber question is one worthy of a committee. I have been making a study of that one particular feature of engine construction for a number of years. We have had little, if any, authentic data brought before the association. I have prepared, but I am not going to inflict it on the association at this time, a little data, and with your kind permission I am going to leave it with the secretary and let him include it in the proceedings.

(Mr. Gaines' paper will appear in to-morrow's *Daily*.)

Mr. Bentley: Is the welding of two-in. flues in Locomotives operating in bad water districts a good proposition? At one time we welded the flues in a large number of boilers and the flue sheets cracked and we had all sorts of trouble. Our people used to say that in good water there is no necessity for any flue welding because the flues do not leak, but in bad water you get in other complications because the flues leak and the flue sheets crack.

The Chairman: We are welding the small tubes in about 40 to 50 locomotives a month—that is about one-half of what we turn out of our shops. The only reason we don't weld more is because we haven't enough welders. We would weld them all if we had machines enough. We are rapidly getting in the machines. We have been welding flues—small flues I am talking about now—because for years we have welded all our superheaters, and we have any number of cases on record where a locomotive leaves the shop and returns after performing from 55,000 to 70,000 miles without having a boilermaker in the firebox, and if you can keep the boilermakers out of the firebox you keen down your flue troubles. I don't want to get into a discussion of how flues should be welded, but there is only one method of properly welding tubes. Tubes should be prepared the same as you did when you handled them by a boilermaker, namely, the copper gasket. The electric welding arc is the only thing that you can properly weld a small tube with and not preheat it. With the aid of the copper gasket, if any difficulty should be experienced with the flue while in service, you can go to it with your prosser expander, just the same as you could before.

Mr. Pickard (D., L. & W.): *I move you that the report be received and the committee continued, and the subject of combustion chambers be referred to the same committee.*

(*The motion was seconded and upon being put to vote was carried.*)

Report of Committee on Locomotive Headlights



H. T. Bentley
Chairman

HERETOFORE, REPORTS of the Headlight Committee have been in the nature of results obtained by tests of electric headlights and at the time they were made and conclusions reached, most railroad men, especially in thickly congested territory, and where high-powered lights had not been tried, were satisfied that such a device was a menace to the safe operation of a busy railroad and should not be used. Now that the electric headlight is with us to stay, it may be in order to refresh our memories, to give a brief history of its evolution, and after that, see what is still further needed to make the apparatus as reliable as any other part of the locomotive.

The first arc light was operated in the early eighties by an oscillating engine, which later was changed into a turbine for furnishing the power and this method, with modifications and improvements, is still in use. Objections to the arc light were many, among them being the necessity for continually changing carbons, the tremendous heat generated, the unreliability and variety in the intensity and direction of illumination and the burning out of carbon holders and other parts of the apparatus. There was no way of dimming or softening the light, and on account of its brilliancy it was very objectionable at stations or when passing trains on double track, etc. As an advertising medium and on single-track roads, particularly in the West, it was fairly successful except for failures, some of which are mentioned above.

After much experimentation it was decided in 1915 to substitute the incandescent carbon filament lamp for the arc light and a remarkable improvement in cost and operation was shown, the light being steady, uniform and more reliable. It was also possible to have a smaller lamp in the same headlight casing, so that by use of a switch it could be used when the larger lamp was objectionable at stations or on double track. On account of the lack of efficiency in the carbon lamp it was necessary to use a comparatively large generator with an accompanying high steam consumption and trouble was still experienced with the governor, and bearings had to be frequently lubricated or the machine was out of commission.

Improvements in electric lamp construction gave us the tungsten filament with its increased efficiency, so that for the same amount of current, very much greater illumination was furnished, but the frailty of this filament caused considerable trouble and failures. The lamp manufacturers later furnished a type of lamp with a short, stiff filament that was very rugged and thus the annoyance of failures from this cause was overcome. The greater efficiency of the lamps enabled a very much smaller unit, with decreased steam consumption to be used, and at about this time the lubricating devices were improved so that instead of having to oil the bearings about every eight hours they would run for several months without attention.

A dimming device was later designed, so that instead of using two lamps, one of which had to be out of focus, the 250-watt lamp in focus could be used for road work or through the medium of a resistance of 3.12 ohms could be reduced by the movement of a switch so that it was not objectionable to an engineman opposing it. The difficulty of properly focusing the lamp was taken care of by a device which enabled this to be done quickly and properly.

In the earlier recommendations of the A. R. M. M. Association committee, a 6-volt system was suggested, but on account of train-lighting systems being 32 volts, this voltage is now generally used for headlighting equipment and on

several roads, suburban coaches are lighted from the headlight equipment. To take care of this work a 2½ or 3 k. w. machine is used.

Towards the end of 1915 experiments were made with storage batteries to furnish current for the headlight. This equipment gave good results except for lamp trouble, which difficulty was later overcome, but its first cost was so high and the length of time consumed charging batteries so great, where facilities were provided for that purpose, that its use was abandoned.

The headlight reflector, silver plated, give considerable trouble with tarnishing, and a glass reflector that can be readily kept clean is very desirable. Several makers have put such reflectors on the market.

Acetylene gas was tried for headlights on a number of roads, some using a generator apparatus on the engine while others used acetylene stored in tanks. With the former practice serious accidents occurred, due to men with open torches cleaning out the spent carbide before all of the gas had been dissipated, while the storage tanks required considerable work to replace them when discharged. The light furnished was of good quality, but due to breakage of piping, clogging of burners, and the troubles mentioned above, the use of acetylene for headlight purposes was discontinued.

The amount of light necessary on a swith engine must be considered not only from the engineer's requirements but also from the switchman's stafety standpoint. Complaints are continually being made by the former that the light is not bright enough and from the latter that it is too strong, but by using a 40-watt lamp in a clean reflector, ample light is furnished to comply with the 300-ft. requirement of the law and not be objectionable to the switchmen.

There appears to be a demand in some quarters for an enclosed type of switch of more rugged construction and conveniently located within reach of the engineer, as complaints are made that the single-pole double-throw switch as generally used is not very satisfactory.

Failures frequently occur from broken steam pipes, broken field lead, excessive voltage, ground brush holders, loose connections, worn bearings and excessive valve travel, but the manufacturers and repair men are making much progress in the correction of these difficulties and we soon will have the headlight equipment as free from troubles as any properly designed machine.

Through the courtesy of the Association of Railway Electrical Engineers, the committee has been furnished with their report on this subject, and with their permission it is presented by us. We believe it gives a great deal of technical information from men well qualified to handle the subject, so that by a thorough discussion of this we will be in very much better position to know what is the best practice and be governed accordingly.

The report is signed by H. T. Bentley (Chairman), Chicago & North Western; D. F. Crawford, Locomotive Stoker Co.; C. H. Rae, Louisville & Nashville; F. A. Torrey, Chicago, Burlington & Quincy; M. K. Barnum, Baltimore & Ohio Railroad; Henry Bartlett, Boston & Maine; W. H. Flynn, Michigan Central; W. O. Moody, Illinois Central, and A. R. Ayers, New York, Chicago & St. Louis.

Exhibit A

Report of Committee on Electric Headlights A. R. E. E.

The committee, in submitting the following recommendations for standard practice for conduiting and wiring locomotive headlight equipment, has in mind the necessity of installing a conduit system that will insure good service and one that can readily be removed and applied with a minimum amount of labor, recognizing the fact that the installation is not permanent, as the engine may have to be stripped at any time to allow for repairs to the boiler, cab or other parts of the locomotive. It has, therefore, been the object of the committee to arrange the conduit plan so that the conduits could be removed with the wiring intact and placed in suitable racks ready to be reapplied to the engine when the engine repairs have been completed. Inasmuch as the installation of the conduit on the engine is usually the last thing to be done, the factor of time is an important element to be considered. The more simple the system of wiring and less complicated the conduit plan, the more readily can the men who maintain and install it do their work. The item of expense is one that enters largely in the re-application of the conduit and wiring as well as the first cost of installation, and the committee has tried to keep in mind the practicability of the installation from the maintainers' point of view.

Equipment

It is recommended that an incandescent electric headlight be adopted with a 500-watt turbo generator, capable of developing 32 volts with full load on at a steam pressure of 125 pounds, the governor to regulate the speed of the turbine properly between steam ranges of 125 to 200 pounds.

It is recommended that manufacturers of electric headlight equipment adopt a universal standard sie of ball bearing which will be interchangeable and can be purchased on the open market. (No. 305 recommended.)

Owing to the transfer of motive power to foreign territory, the method of mounting the turbo generator should be standardized to facilitate interchanging of equipment. It is recommened that the spacing of bolt holes for mounting the turbo generators be the same on all makes of equipment, and that the thickness of the legs of the turbo generator be standard so that a standard size stud bolt can be used.

Installation of Turbo Generator—Location of Turbo Generator

The turbo generator shall be located on the top of the boiler as near the cab as practicable, with the dynamo end toward the side of the boiler equipped with the conduit system (preferably the left or fireman's side of the locomotive). Where locomotive conditions will not permit the location of the generator set at this point, it is recommended that the turbo generator be located on the left side and longitudinally with the boiler, the turbine end toward the locomotive cab and in a position not to obstruct the vision of the fireman. Under no condition should the exhaust pipe of the turbine be attached in any way to the cab. Where it is necessary to place the equipment forward of the center or at the front end of the locomotive, a ¾-in. extra heavy pipe should be run under the lagging next to the boiler for the steam supply (this to prevent steam condensation or freezing of this pipe in severe weather). It is recommended that the turbo generator be secured to the boiler with ⅞-in. stud bolts.

Piping for Steam Connections, Etc.

The steam connection shall be not less than ½-in. extra heavy pipe carried from the fountain in the cab to the turbine in such a manner that the line will drain from the throttle valve to the turbine. Where the pipe can not be drained direct to the turbine, the low point in the line should be inside the cab and a drain pipe placed with a suitable valve conveniently located so that the engineer can open and drain the steam line when the turbine is not running (this to prevent the pipe freezing). Where the steam line is brought through the cab, a clearance of at least ½ in. should be maintained around the pipe so that any movement of the cab will not break the pipe connections. Where the pipe passes through the cab, the hole shall be closed with a weather-proof cover that will allow for a free movement of the pipe.

It is recommended that two valves be used in the steam supply pipe, the one at the manifold or source of steam supply and the other to be within easy reach of the engineer. Where this valve can not be so placed, an extension handle should be used—removed from the hot steam pipe so there will be no danger of the engineer burning himself in turning the valve on or off.

Conduit and Wiring

Locomotive Wiring.—The conduit system and wiring for the electric headlight equipment on the locomotive boiler shall utilize the hand rail where possible. The wires from the turbo generator set shall run to the cab and to the front end of the locomotive in the hand-rail conduit (preferably on the left or fireman's side). This hand rail shall be of standard galvanized electric-conduit of not less than 1 in. inside diameter.

The conduit shall be supported and secured to the boiler by special hand-rail columns, provided with a detachable part

or cap to facilitate the removal of the hand-rail conduit as a unit intact. This conduit shall in no case be less than 4 in. above the engine jacket and shall have at least 2½ in. clearance over all pipes on the engine boiler. A suitable weather-proof box with a terminal block or disconnecting device should be located on the front of the cab where the wire enters, so that the wires may be readily disconnected. The connection between the hand-rail conduit and the junction box shall be a non-rigid connection (¾-in. flexible steel conduit with suitable fittings recommended). A suitable weather-proof fitting or terminal box shall be placed at the end of the hand-rail conduit with non-rigid connections between the classification lamps and the headlight case. This flexible connection shall be of sufficient length to permit the opening of the door on the front of the boiler without necessitating the removal of the headlight case. All conduits should be supported in a manner that will give at least 2 in. clearance above the boiler and in no case shall the flexible conduit rest on the smoke box. (This being unprotected with lagging, is the hottest place on the locomotive boiler.) The connection between the terminal box and the classification lamp should be so arranged that it can be easily disconnected either at the terminal box or at the lamp.

Cab Conduit.—The wiring in the cab shall preferably be installed in ½-in. rigid steel conduit so applied that it may be removed intact (approved electrical fittings to be used throughout), and where conditions permit of such location, the conduit fittings for drop cords to gage lights should be placed on the ceiling of the cab in front of and not directly over the boiler in order that they may be readily accessible. A detachable fitting should be provided for the water glass, lubricator, air and steam gage lights, to facilitate the renewal or repairs to drop cords in case of trouble; (it is advisable to fuse each of these individual drops; armored cord or flexible steel conduit has not been satisfactory and is not recommended). No. 16 or No. 18 cotton-covered lamp cord drawn through a ⅜-in. flexible asbestos tubing has proven the best for this service. Where this tubing is used the gage lamps and conduit fitting should be provided with a cover bushing or fitting having a ½-in. opening with a cupped recess, that will allow the tubing to pass through and form a knot so that the strain is taken on the tubing and not on the wire. This is formed in the tubing by turning in the ends on the cord.

Where the gage lights do not come directly under the fittings, some provision should be made to loop back and secure the drop cord so that it does not come in contact with hot steam pipes or the head of the boiler.

The conduit system in the cab should not be rigidly attached to the distributing center, neither should the conduit placed on the ceiling of the cab be rigidly connected to the conduit placed on the sides of the cab (the motion of the cab having a tendency to break the fittings or loosen the conduit). The distribution center shall consist of a single pole, double-throw switch, a common wire terminal, resistance unit and Edison plug cut-out, all mounted on the same base, and placed on the side of the cab within easy reach of the engineer. The wires from the terminal box at the front of the cab to the distribution center may be run in flexible conduit, loom, or can be taped and cleated, but in no case shall it be a fixed part of the conduit system for the cab light circuits.

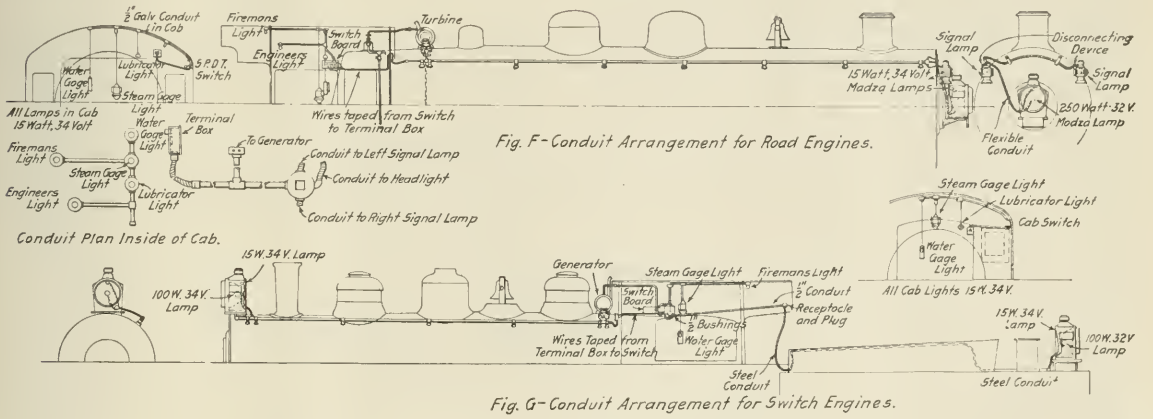
Open wiring for the cab lights (properly installed) is acceptable. See proposed conduit plans, Fig. *F*—Road Engines, Fig. *G*—Switch Engines.

Switch Board Panels

Road Engines.—The switchboard for road engines shall consist of a single-pole, double-throw switch, one resistance unit, a common wire terminal and one single branch, two-plug Edison cut-out, all mounted on the same base. The cab switch should be so connected that when the blade of the switch is in the forward position full voltage is impressed on the headlight lamp and when in the opposite position the dimming resistance is cut in the headlight circuit. (See wiring diagram Fig. *F2*.) One side of the classification and cab light circuits should be fused with 10-ampere Edison fuse plugs. Fusing of the main headlight circuit is not recommended.

Switch Engines.—The switch board for engines in switching or back-up service having front and rear headlights, shall consist of a special single-pole, double-throw switch, common wire terminal and single-branch, two-plug Edison cut-out, mounted on the same base. (A four-position switch is recommended, wired as follows): Off Position—Blade at center. First Position—Forward, front headlight full voltage. Second Position—Forward, both headlights full voltage. First Position—Reverse or back, rear headlight full voltage. Second Position—Reverse or back, both headlight full voltage.

Where desired to dim headlights, the standard resistance unit can be cut in series with the center contact at the switch blade, with a separate 10-ampere snap switch (or preferably a toggle switch) to short circuit and cut out this unit when not used. When desired to dim one or both of the headlights, this switch should be open or off and to impress full voltage on the lamps the switch should be in the normal position, which is on or closed, the headlight circuit not to be fused. (See wiring diagram, Fig. *G 2*.) The 100-watt headlamps should be placed forward of the focal position in the reflector, so as to spread and not to throw a beam of light. It is recommended that a dimming resistance which will reduce the voltage of the headlight lamp approximately one-half be used. (A standard 3.12-ohm resistance unit 8-ampere capacity be used with 250-watt, 32-volt headlight lamp to comply with the Interstate Commerce Commission ruling in this connection.) Wiring for signal lamps on engines in switching service is not recommended.



Conduit Arrangements for Road and Switch Engines

Connection Between Engine and Tender.—Where a headlight is placed on the engine tender, a detachable, approved locking type of connector with flexible steel conduit connection should be made between the engine tender and the cab. (It is recommended that this connection be made between the roof of the cab and the top of the tender, leaving slack in the flexible conduit to allow for the swing of the tender. This conduit to be carried back far enough to keep clear of the gangway. The location of the connector and conduit under the step of the cab is not recommended on account of steam and water conditions.)

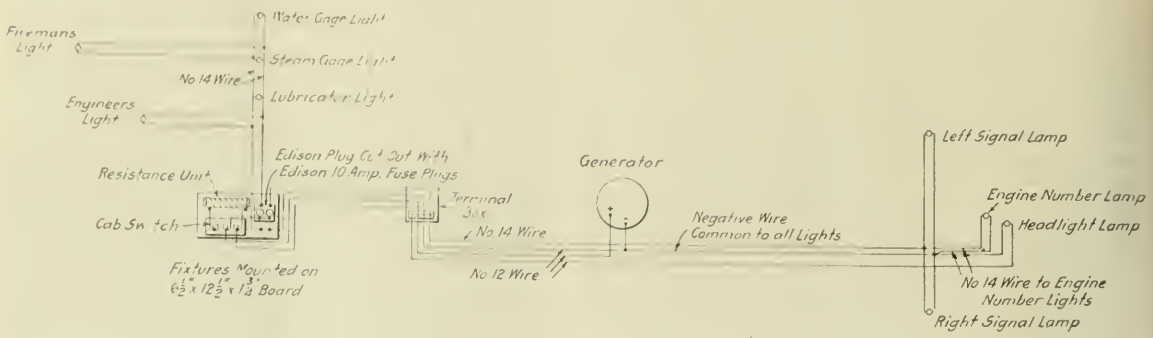


Fig. F 2.—Wiring Diagram for Road Engines

Control of Classification Lamps.—A key socket should be used in each classification lamp to require the enginemen to go to the lamp to light it, thus insuring that the lamps are burning. A switch in the cab for controlling these lamps is not recommended. The connections to the classification lamps should be made at the conduit junction box or at the lamp, which will readily permit of their removal, the connection to be weather-proof and not a part of the lamp supporting bracket.

Type of Wire

The wire from the generator to the cab switch and to the headlight lamp should be No. 12 AWG. The wire for cab lights, classification lamp or engine-number lights may be No. 14 AWG. The use of standard rubber covered and slow-burning weather-proof wire has not proven satisfactory for resisting heat, moisture, oil and mechanical strains under conditions existing in locomotive service. A wire, therefore, with insulation that will not deteriorate nor adhere to the conduit at a temperature of less than 225 degrees F., and which will not be affected by oil, water or mechanical strains, peculiar to locomotive service conditions within a period of five years, is recommended. Where stranded wire is used, lug terminals should be provided or the ends of wires soldered.

Lamps

It is recommended that a 15-watt S-17-34 volt special cab lamp be used in cabs, signal or engine number lights, and all other outlets other than the headlight lamp. It is recommended that a 250-watt G-30-32 volt concentrated filament lamp be used for headlights on road engines. It is recommended that a 100-watt G-25-32 volt concentrated filament lamp be used on switch or back-up service engines.

Discussion

Mr. Bentley: I would like to ask that the privilege of the floor be given to E. W. Jansen, electrical engineer of the Illinois Central, chairman of the headlight committee, but before we call on him I would like to make a few remarks. The report says: "The turbo generator shall be located on top of the boiler as near the cab as practicable, with the dynamo end towards the side of the boiler equipped with the conduit system (preferably the left or fireman's side of the locomotive)." We had a large number of locomotives equipped with the generator located just ahead of the cab, and during the cold weather the condensation from the exhaust pipe was so bad that it frosted the windows, and we designed an exhaust head which took care of that condensation and made it generally satisfactory. I don't see why the manufacturers could not get up a very simple exhaust head and attach it to their electric generators so that everybody could have the benefit of that device, when the generator is located just ahead of the cab. Where it is located on the smokebox, as you will notice it on some of them, I don't think the necessity for such an exhaust head is quite as apparent.

Referring to the piping for the steam connections, we have had quite a number of cases where the steampipe connections to the turbo-generator have broken off and a suggestion has been made that a flexible connection be made at that point so as to overcome that difficulty.

Under the heading of "Switch Engines," it is suggested that

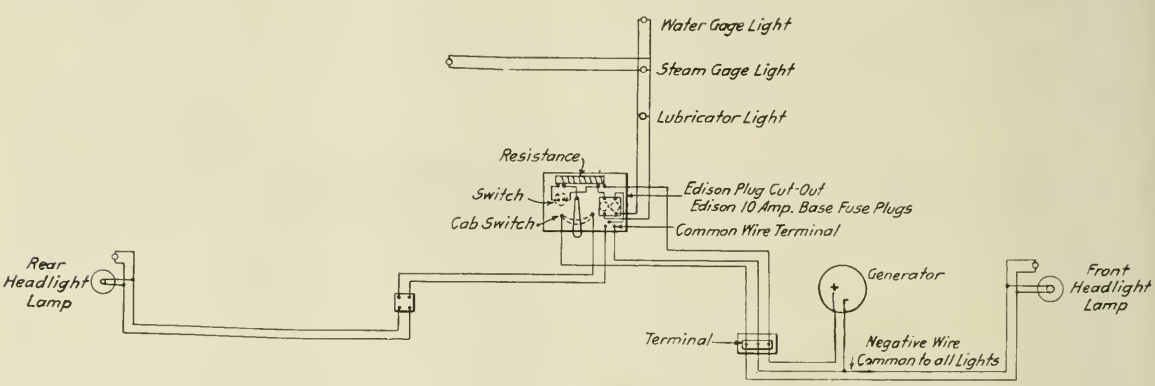


Fig. G 2.—Wiring Diagram for Switch Engines

the 100-watt headlight lamp should be placed forward of the focal position in the reflector, so as to spread and not to throw a beam of light. As I understand it, the recommendation is that instead of having a 25-watt lamp, as this committee recommends, in focus, the A. R. E. E. committee recommended a 100-watt lamp out of focus, so that instead of having a beam of light, the light is diffused, making it less objectionable for the switchman. I don't believe that we ought to use a resistance on a switch engine with the 25-watt lamp, and without a resistance there is absolutely no difficulty in complying with the requirements of the law, perfectly satisfactory to the engineer and also safe for the switchman to operate.

Under "control of classification lamps," the Electric Committee recommended that a key socket should be used in each classification lamp to require the engineman to go to the lamp to light it, thus insuring that the lamps are burning. The original installation on most railroads was to have a switch in the cab by which the blizzard lamps could be operated. The light could be turned on and off at will, but with the very large engines, the blizzard lamps being located directly in front of the smokebox, some objection has been raised that the engineer cannot tell whether his classification markers are burning or not, and therefore, for the purpose of knowing that the lights are burning, it is recommended that the key socket be used. I don't know that there is any objection to that. It is certainly very desirable to know that when you turn a switch your lamps are burning, and if you can't see it from the back of the engine, I presume the next best thing is to go up ahead and have a key socket and know that the lamp is there and burning. One case was brought to my attention where the man turned the switch on and started out, and did not have any light because somebody had taken the lamp out of his classification markers.

Discussing the question of lamps, it is stated that a 100-watt concentrated filament lamp should be used on switch or back-up service engines. I have been talking to a member of the electrical associations, and he says that "backing-up" engines means switch engines, that is, yard engines. Where an engine is in back-up service in road service, of course, a 250-watt lamp would have to be used, just the same as it would have to be used at the head end.

In closing, I want to say that the headlight lamp manufacturers and headlight manufacturers themselves are deserving of a tremendous lot of credit for the co-operation and assistance they have given the railroads in working out a hundred and one difficulties that we had to contend with.

The Chairman: You have heard the report of the committee. *A motion that it be received and opened for discussion will be in order.*

(The motion was made and carried.)

E. W. Jansen ((I. C.): In regard to the location of turbo-generators and, in fact, a good many of the recommendations of the committee, the Electrical Engineers' Association sent a questionnaire to twenty-one of the leading roads which we knew had had electric headlights in service for a great many years. A great deal of our report is from a tabulation of the majority replies of those different roads as to what they thought the best practice or the practice they were using. The installation of the turbo-generator on the left-hand side was voted by a majority of the roads as being the best place on heavy power. Where the turbo-generator is located at the front end of the engine it entails considerable steam piping and quite a loss, and located near the cab on the left-hand side it was away from the water pumps on the right-hand side. On the larger engine you cannot locate it just on top of the boiler in front of the cab for the reason that there is no space at that point, so it was located on the left-hand side, where the fireman could maintain both the steam and electric ends in case of trouble. By having the conduit on the left-hand side, on locomotives with the headlight on the smokebox, particularly with the door opening on the left-hand side, it did not necessitate cables and flexible connections going across the front of the boiler.

As regards the 100-watt lamp, that type lamp was recommended mostly on account of the government requirements specifying 250-watt lamps being used for road engines and 100 for switch engines. On some tests that were made with the 100-watt lamp it was found easy to see a man on the track on a dark night with dark clothes a distance of 300 ft., but with the 50 and 25-watt lamps you could not see anything under operating conditions as we find them, especially with the reflector all clouded up and out of condition and dirty.

We don't think the 100-watt lamp is altogether satisfactory; in fact, the average switchman complains of the 25-watt lamp, and I think the special effort of the manufacturers should be to develop reflectors that will prevent the strong light and glare of the 100-watt lamp, or the stronger sizes, and to have the rays so arranged that they will be reflected down on the step particularly. Most switchmen complain that they look at the light and then can't see the step. By having a small deflector in front of the lamp and a proper reflector you could do away with that glare and throw the light down where it is needed. But I doubt, with the 25-watt lamp, with poor headlights where the mirror is not clean and smoke in the yard, if you will be able to see anywhere near 300 ft.

As regads the wiring of cabs, there was a great deal of discussion as to whether to place the wiring in a conduit or to use open wiring, but a great many complaints are received on the last government engines. One road says that after the first six months or year they had to re-wire the cabs. But I think that is a matter of application. If the conduit is properly applied in the cab, placed where it is accessible, and the conduit leading down the side of the cab is not originally carelessly placed, and the conduit on the roof, I don't think there will be any trouble with conduit cab wiring.

The question also came up of having steel flexible covered drop cord. There are probably some makes of this cord with proper fittings that can be made up without any trouble, but the roads have tried this out and had lots of trouble. They are using ordinary lamp cord drawn through asbestos tubing, wiring the ends together. This tubing takes the strains off the connectors both on the rosette on the wall of the cab and in the socket at the lamp. We have recommended that a rosette or the fitting at the ceiling where this cord and gage light is attached to the conduit system be such that if we had to change a length, or that the cord broke or became grounded or any trouble developed, the lubricator feed lights would go out and we could just take that one cord and put in another and take the cord to the shop and repair it.

The question came up also about fusing circuits, but we did not believe in fusing the main headlight circuit, but we do know that the other lights are liable to be put out by their circuit, and for that reason we placed no fuse on the headlight circuit, because you can keep running with the use of lanterns; the main thing is to keep your headlight going and not have an engine collision.

A. G. Trumbull (Erie): There are two paragraphs of the report that have been somewhat interesting to me. One is the suggestion that the brackets for the application of the units be standardized. The application of electric headlight equipment is proceeding with considerable rapidity and in the natural order of events as prescribed by the Association's standard can only be adopted after 1921. It seems to me that this is of sufficient importance to receive consideration and be available for adoption by the railroads at an earlier date, and I suggest that that possibly might be accomplished through the medium of the General Committee.

It is also proposed, and of course, applies to the electrical association, but I observe the committee recommends that a book of instruction on the maintenance of electric headlight equipment be compiled for guidance in headlight maintenance. I have always believed that the Master Mechanics' Association or the Mechanical Section of the A. R. A., as it now is, should take the lead in adopting standard practices of maintenance. That is a very important thing, and it seems to me that the association should take such steps as are necessary to bring that formally before the convention next year in order tha twe may have a standard practice with respect to locomotive headlight equipment.

Mr. Jansen: I will say that the Association of Electrical Engineers has practically concluded a book for standard maintenance and installation. We intend to print it and give it to all our members, and we also intend to furnish the chairman of the Headlight Committee of the A. R. A. with a copy of it. It goes into the question from both the maintenance and the installation standpoint. In regard to classification lights going to the front, we felt it very important that the fireman or en-

gineer go right to the lamp and open it to know his light is burning.

On the Illinois Central we have had a key socket in these classification lamps. We use our standard classification lamp, cutting a 5/8 in. slot in the side about 1 in. deep, and make up an angle brass fitting to which we attach a 3/8 in. socket with the key up and make a groove for that and run the loop right up through that, with the proper fitting, and merely open up the top a little and drop the angle fitting in the slot. If the light should fail or the whole equipment fail, we just open the top and lift this out, let it hang and light the oil. I think that there should either be a key socket on the classification light or else a switch such as the Pennsylvania is using in the headlight, so that the man has to go to the front end and know the lights are burning. I also want to say there is a lot of room for developing of heavier fittings. The standard fittings are not heavy enough.

D. G. Redding (P. & L. E.): I would like to ask if the committee has done anything or whether it feels it is within its province, to put out rules for the operation of lights along the road. We made some observations recently and could not find there were any fixed rules that seemed to be consistent for all roads as to the dimming of lamps, methods of operating them when meeting approaching trains and similar matters.

Mr. Jansen: I think you will find the A. R. A. rules cover that very specifically. We had that up on our road and found, I believe, that you had to blanket the light. In regard to lights on switching engines, I think you will have to have a 100-watt lamp, at least, or something larger than the 25-watt lamp, to reach the 300-ft. ruling, and if you have that you almost have to have a dimmer. It doesn't cost much more, and yiu will need it in the event you should let that switch engine go out on the road. That is the reason we put that in. It is there for use in emergency if ever required.

Mr. Barnum: The chairman of the committee calls attention to the importance of going to the glass reflector. The probable reason for this is the rapid deterioration of the silvered copper reflector. The value of the new silvered reflector of the standard 18-in. dimension is somewhere around three to four times the average. The reader of the paper called attntion to the manufacturers endeavoring to manufacture an 18-in. glass reflector. I don't consider that the 18-in. reflector law is one of the Medes and Persians. I think the first thing we should do is to find out what glass reflector will comply with the law.

Tests that I have recently had the opportunity of making indicate that a 16-in. glass reflector of proper design will fulfill the requirements. The glass reflector, of course, has a constant reflecting value; it also has other values due to the refraction of glass and dispersion values, and the more shallow the lens the better headlight you get. The lens errors creep into the lighting of your right-of-way, and I would suggest that the committee's work include, during the coming year, carefully looking into the proper size of a glass reflector headlight, not only the contour and specifications for the glass, but the mounting of the glass and the best ventilation of the cage.

I think there are possibilities of doing a great deal toward ventilating a glass reflector to reduce breakage due to heat and using the high candle power lamp to a minimum. There is also a great deal that can be done in the more careful selection of metal in the construction of headlights, because we know that since we have eliminated the oil lamp from the headlight and gotten away from the use of kerosene corrosion is very rapid. I believe that on some of the loocomotives we have been reciving latly deterioration has already set in so rapidly that probably cages will have to be renewed within a year. Cast iron affords a remedy for this trouble. I believe that a cast-iron headlight can be made that will last almost indefinitely, and that the headlight can be made dust-proof to such an extent that the reflecting values will be almost constant. I would like to recommend that that be considered in the next year's action of the committee.

I would also like to call attention to the remark made in connection with classification lamps. There is a little bit to be said in connection with the engineer going out to see whether his classification lamps are burning and a little to be said against it, on the basis of safety. Perhaps the classification lamps could be so located that they would be visible from the cab and could be turned on by a snap switch and not necessitate the engineer going out front.

Mr. Woodbridge: I would liqe to suggest, too, if some of these committees have not already done so, that they recommend the most suitable location for the generator on the boiler. Placing it out on the smoke box requires an additional 30 or 40 ft. of pipe which should be insulated. I also would like to recommend that the members of this association consider very carefully the location of the gages and also the eliminating of the lighting in cabs. It is a very general practice to keep the dynamos running all the time, and that is very wasteful.

W. J. Bohan (N. P.): Mr. Chairmann, in regard to classification lamps, it seems to me the trouble could be overcome by putting the two lamps in series with the third lamp in the cab, so that the engineer would have a warning in case the classification lamps were not burning.

E. W. Jansen (I. C.): For such a scheme, you must have two lights in series, using 15-volt lamps. This would require you to carry a special lamp, which is not advisable, as in renewing lamps you are liable to place a 15-volt lamp in some other part of the engine, causing it to burn out, or a 32-volt lamp would burn only dimly if used in the series socket.

Another thing should be considered—all road engines should have a white light at the top of the center of the tank, to be used when taking the engine through the yard. We should consider wiring the tender the same as for switch engines, put a lamp at the top of it at the back, and instead of using a ladder, making it an ordinary fixture, with a standard white lens, set with a slot to throw light down on the track on the engineer's side, so that he can know if the light is burning. We cannot get the light high enough to see over the coal pile without interfering with the water spout, or having it broken off. Only two sizes of lamps should be carried on an engine: a 25-watt lamp for main headlight and a 15-watt lamp for all other locations.

B. P. Flory (N. Y. O & W.): We are using a separate conduit for the wiring, using standard electrical fittings, and so far have had no trouble. The illustration of road engines shows the location of the headlight on the door of the smokebox, and on switch engines on the top of the smokebox. I have noticed that a number of roads have the headlight casting on top of the smokebox, some on the door, and some above the door of the smoke-box. The question has been brought up on our road that the use of a flexible conduit should be done away with, as far as possible, and it is a question whether the headlights should be located on top of the smokebox or just above the door.

H. T. Bentley (C. & N. W.): The cast-iron headlight is practically indestructible, but due to some difficulties in the foundry, we have not been successful in the manufacture of it. We hope that some manufacturer will make a cast-iron headlight which can be produced in a satisfactory manner.

In regard to Mr. Trumbull's question about the standard spacing, I think you will find that the manufacturers are getting to a common basis for a standard bolt spacing for the headlight generator, and if any man desires to apply a new headlight he will have to conform to the standards agreed upon by the manufacturers of headlihts for the standard locomotives.

W. J. Bohan (N. P.): We have used the cast iron headlight on our switching engines, and we have had no trouble in obtaining them.

H. M. Curry (N. P.): I agree with what Mr. Bentley sasy, about a fireman coming to the front end to turn on the lights, to a limited degree only. We have used electric headlights on the Northern Pacific a great many years, and to my knowledge there has been no such instance as that which he reports that has ever occurred on our line. We have used them many years. If an engineer gets an order to carry a signal, perhaps in the winter time, it is a real job for the engineer or fireman to get up on to the front end of the locomotive and turn on these lights. Our men have not been subjected to that necessity. I mention this because we are endeavoring to adopt labor saving devices. I believe that this is a necessary move, and in the right direction.

A motion that the committee be continued and enlarge the scope of the investigations which they are to carry on.

The motion was put to vote and carried.

Report of Committee on Superheater Locomotives

THE COMMITTEE SUBMITS the following report on superheated locomotives:

Superheating Existing Locomotives

The superheat schedule was somewhat delayed during the past few years, due to the shortage of labor and material caused by the war. Of the railroads reporting, practically all are going to the piston valve when superheating, either by changing to piston valve cylinders or applying a piston valve steam chest. One railroad, in superheating cross-compound locomotives, retained the slide valve on the low pressure side, using a double ported slide valve. Those reporting as retaining slide valves used bronze valves. In applying new cylinders new modern valve gears were applied to the locomotives. Considerable trouble was experienced in using the piston valve steam chest due to leaks and rapid wear. These defects have been overcome in the later designs. When superheat valve stem packing is used the life of the packing is about the same as that of a saturated locomotive.

Lubrication of Superheated Locomotives

On the railroads using slide valves no change was made in the oiling or lubricating devices when bronze valves were used, but where the original cast-iron valves were used some trouble with cutting the seats was experienced. The application of an additional system of graphite lubrication stopped the trouble.

The hydrostatic lubricator is still the standard for all locomotives and results from its use are satisfactory in most cases. A number of the railroads have taken up force feed lubrication, using a plunger type of lubricator. As this practice of lubrication is very recent and data as to the performance limited, the committee does not feel justified in making any recommendation, but it is the opinion of the railroads using them that the force feed lubricator when in good condition will distribute the oil more economically, positively and regularly than the hydrostatic lubricator. It has the advantage of being outside the cab and requiring no special attention of the engineman, as the feeds are set and the lubricator stops feeding when the locomotive stops. Sufficient information is not at hand to judge as to the life of packing rings and bushings; it is the opinion of the committee that the life will be increased, but is unable to say to what extent.

Cylinder feeds are not extensively used and the committee is of the opinion that they are unnecessary and should be discontinued, as it is doubtful if any benefits are derived from their use.

The use of superheat valve oil is recommended by the majority of railroads reporting, but a large prcentage use the ordinary valve oil and claim satisfactory results. Carbonization is caused by the manner of operation.

Considerable trouble has been experienced with cylinder and valve packing. Much of this trouble has been overcome by changing the design of the rings, which, in most cases, consisted of going from a ring, with a square cross-section, to a narrow-faced ring, by using a better grade of material, and by admitting steam to the cylinders while drifting. It is the opinion of the committee that two cylinder packing rings are ample for good service.

The majority of railroads report satisfactory results from a 50 per cent lead, 50 per cent copper mixture for piston rod packing. Very good results have been obtained from 74 per cent lead, 20 per cent copper and 6 per cent nickel, and 80 per cent lead and 20 per cent antimony, especially when equipped with a hard grease piston rod lubricator, which adds greatly to the life of the softer packing. Some railroads are using tandem piston rod packing, but it is the opinion of the committee that single packing will give satisfactory results.

When automatic or manually operated drifting valves, or drifting throttles are not used, instructions have been issued to enginemen to drift with what is called a cracked throttle. It is essential that steam be supplied to the cylinders while drifting. Drifting valves are not essential, but desirable, especially in a mountainous country, as the steam can be supplied by cracking the throttle. Automatic drifting valves of a good design are valuable as they eliminate the human element in furnishing steam for drifting.

A number of roads are using a manually operated drifting throtte, others are using and experimenting with automatic valves of different makes. Fifty per cent of the roads reporting do not use steam chest relief valves, and 50 per cent do when engines are not equipped with drifting valves or vacuum breakers. It is the opinion of the committee that relief valves should be used on large power if not equipped with drifting valves or vacuum breakers. It is the opinion of the committee that a properly designed drifting valve will eliminate carbon deposit, aid in lubrication, and increase the life of packing.

Maintenance

The superheater units have failed mostly at the rear return bend, the welded type giving the most trouble. The application of cast steel return bends has reduced this trouble. Some failures have occurred at the front end under the ball joint. This failure is due mainly to cinder wear, as the unit lies in the path of the cinders drawn through the tubes at a high velocity. To protest against this wear, a shield of thin steel is spot welded to the unit. Failures at this point are repaired by cutting off the worn part and welding on a new piece. No particular difference has been noted in the cinder wear of a stoker fired and hand fired locomotive. The abrasive effect of the cinders varies greatly with different coals.

The tools used to repair and maintain the units are those recommended by the Locomotive Superheater Company. When units are removed, the joints should be reground and individually tested before being replaced, and collectively after being replaced. A periodical test might be desirable, but the committee feels that it is not essential.

The majority of railroads purchase the header bolts. One uses .988 per cent carbon steel heated to between 1,400 and 1,500 degrees F. and plunged into an oil bath, then reheated and allowed to cool naturally. Another specifies that the material shall have a tensile strength of 90,000 lb. per sq. in., elastic limit not less than 65,000 per sq. in., and an elongation in 2 in. not less than 18 per cent. The metal should have the following chemical properties: carbon, .45 to .60 per cent, manganese, not over .70 per cent, sulphur not over .05 per cent, phosphorus not over .05 per cent. Some use a high grade iron without any heat treatment.

The investigation shows that in most cases a limit percentage of weight for the scrapping of superheater flues has not been established. Some give the limit percentage as from 10 per cent to 25 per cent reduction. Some give flues the hammer test. Superheater flues are reclaimed by welding up pits and holes worn in by steam leaks. It is a good practice to weld the large superheater flues to the back flue sheet. Good results have been obtained from it, and the committee recommends this practice.

All boiler tubes should be blown out each time the fire is drawn and, at least, at each washout period all tubes should be cleaned thoroughly from end to end, and all accumulations removed; special attention should be given to the superheater flues. The flues should be blown with a ¼ in. or ⅜ in. pipe and 100 lb. of air.

The method employed in testing the packing for leaks around the outside steam pipes where they enter the smoke box is by applying a lighted torch to all surface joints while the blower is on. Much trouble is experienced in keeping these joints tight. Different kinds of packings have been used with varied results. Cement and ground magnesia have been used with some success. A mixture of ground magnesia and asphaltum applied while hot gives promise of better results; this is due to the heat keeping the mixture in a semi-plastic state. The design as used on the United States standard locomotives gives promise of a high efficiency.

Most railroads have issued through bulletins or personally by the road foreman, instructions not to carry over two gages of water; this, of course, depends on the water conditions of the locality in which the locomotive is operating. The use of a pyrometer will show the men the low temperature of the steam resulting from carrying high water; it will also show the effect the position of the throttle and reverse lever has on the superheat obtained. The majority of the roads prefer a wide open

throttle with as short a cut off as possible under the operating conditions. Some roads claim better results by using a longer cut-off and a lighter throttle, claiming better superheat.

Light, frequent and regular firing proves to be the best practice, and produces the best degree of superheat, but it is essential that at all times the flues be kept clean. The method of firing depends on the quality of fuel used.

The report is signed by W. J. Tollerton (Chairman) Chicago, Rock Island & Pacific; H. W. Coddington, Norfolk & Western; C. H. Hogan, New York Central; R. W. Bell, Illinois Central; W. C. A. Henry, Pennsylvania Lines; T. Roope, Chicago, Burlington & Quincy; E. W. Pratt, Chicago & Northwestern, and G. M. Basford.

Discussion

F. F. Gaines (U. S. R. A.): The question of whether it is advisable to apply superheaters to new engines or existing engines is no longer pertinent. The question of whether a locomotive under consideration for the application of a superheater is to be kept in service a sufficient length of time to realize a saving over the cost of installing the superheater, is one that must be given some consideration. Further, consideration should be given, in the selection of classes of locomotive to receive the superheater equipment, as to which class performs the more important service and will pay the largest return on the investment.

Considering the superheater as a standard part of the locomotive, the superheater committee would be a great service to the organization and to the railroads as a whole if it would devote its efforts to the development of standard methods of operation, maintenance and repairs. In making recommendations along these lines careful canvass should be made in a way to bring out practices in force on a majority of the railroads.

The information available indicates that the present report, which makes recommendations for the benefit of approximately 250 railroads is compiled in the returns received from thirty railroads.

To comment specifically on a few items in the report, your attention is first called to the following paragraph:

"On the railroads using slide valves a change was made in the oiling or lubricating devices when bronze valves were used, but where the original cast iron valve was used some trouble was experienced with cutting the seats and the application of an additional system of graphite lubrication stopped the trouble."

The inference to be drawn from this statements is that the operation of slide valve locomotives is a general practice and successfully accomplished without difficulty where bronze valves are used, and where cast iron valves are used the difficulty in lubricating slide valve locomotives is easily overcome by the introduction of an additional system of graphite lubrication. Out of the 35,000 locomotives operating with superheaters on the North American continent an estimate of ten would be ample to cover the number of these locomotives that are using superheated steam with slide valves. With this fact in mind, it is difficult to understand why the committee makes a statement which can be construed to recommend the use of superheated steam with slide valve locomotives. The use of superheated steam with slide valves is a dead subject in view of the facilities at hand for applying piston valves. Where benefits are to be obtained in the way of increased tractive power by increasing cylinder diameter, it is economical to apply new cylinders with piston valves, and where no advantages are to be obtained from this sourse piston valve chests are available in order to obtain piston valves which unquestionably give satisfactory results with superheated steam.

"The hydrostatic lubricator is still the standard for all locomotives and the results are satisfactory in most cases."

The above statement is rather broad, and it is to be believed that some railroads that are obtaining satisfactory results with forced feed lubricators will have difficulty in qualifying under the standard of hydrostatic lubricators for all locomotives.

"Cylinder feeds are not extensively used and your committee is of the opinion that they are unnecessary and should be discontinued, as it is doubtful if any benefits are derived from their use."

This recommendation is substantiated by the statement that out of 30 reports received, 17 report cylinder feeds as not essential, 11 as essential and 2 gave no report.

There is of course diversity of opinion as to the benefit resulting from the admission of oil to the cylinders. However, the majority just cited was so small and the percentage of the total roads represented in the report is so small that the direct recommendations that cylinder feeds be discontinued should meet with considerable objection. On the assumption that cylinder feeds are of doubtful benefit, it would seem preferable for the committee to give the safest practice the benefit of the doubt. Certainly, the admission of oil to the cylinders cannot in any way detract from better lubricating conditions, or destroy lubrication; consequently the use of cylinder feeds cannot be of negative value as far as the lubrication of the surfaces in contact is concerned, and, therefore, the uncertainty must be in favor of the cylinder feeds rather than against them. Further, there are many railroads in the country that have found the use of cylinder feeds beneficial in overcoming lubrication troubles.

"The use of superheat valve oil is recommended by the majority of railroads reporting, but a large percentage use the ordinary valve oil and claim satisfactory results from same."

This is a mere statement of facts and does not make any definite recommendation. However, the situation with reference to valve oil is similar to that which applies to the use of cylinder feed, and here, as in the case of cylinder feeds, the committee should give the favored practice the benefit of the doubt. By recommending the best that is obtainable the committee obviates the responsibility for failure. If an inferior quality of oil is used, the user assumes the responsibility and cannot use the reports of the Superheater Committee as a support for trouble that may follow the use of an inferior grade of oil.

"When units are removed the joints should be reground and individually tested before being replaced and collectively after being replaced. A periodical test might be desirable, but the committee feels that it is not essential."

If periodical tests will pay for themselves in reduction in engine failures due to leaky superheater units, they are certainly to be desired and to almost be considered essential.

"The majority of railroads purchased the header bolts. One used .998 per cent carbon steel heated to between 1400 deg. and 1500 deg. and plunged into an oil bath, then reheated and allowed to cool naturally. Another specifies that the material shall have a tensile strength of 90,000 lb. per sq. in., elastic limit not less than 65,000 lb. per sq. in. and elongation in two inches not less than 18 per cent. The metal should have the following chemical properties: Carbon .45 to .60 per cent, manganese not over 0.70 per cent, sulphur not over 0.05 per cent, phosphorus not over 0.05 per cent. Some use a high grade iron without any heat treatment."

A stronger recommendation for bolts would be that based on the elastic limits and ultimate strength rather than to attempt to cover the bolt material by a detailed chemical analysis and definite temperatures for heat treating. It is almost impossible to obtain various lots of steel which will run absolutely uniform to chemical analysis, and varying chemical analyses require different heat treatment limits in order to obtain the desired elastic limits and ultimate strength. The above recipe for heat treatment is not complete even for the chemical analysis of the material shown, inasmuch as the temperature of the reheat is not given, nor is the process of cooling after the reheat covered.

The subject of maintenance is only just touched upon in the committee's report. It might be thought by some that the information given covers the subject completely. Much benefit would be derived from a complete study and report on this subject.

There are mmany other comments which could be made in connection with the report of the Superheater Committee, but the above covers a few points which are of most importance.

Prof. L. E. Endsley (University of Pittsburgh): It is seventeen years since we started testing, at Purdue, on superheating locomotives, and there are a good many representatives of roads here today that did not have the superheater at that time.

There is one thing in this paper that I want to say a word about, and that is the pyrometer for use on superheated locomotives. I think that is the greatest forward step made by the superheater people in the last decade on superheater locomotives, and you men who have been interested in superheater locomotives, and have studied the problem, are much interested in

that subject. If the pyrometer is the success which I understand it is, it will be the greatest thing to show the efficiency of your engines that you can put on them. I have always wanted to see just such a thing—it is almost as necessary, in my opinion, as the gage on the engine itself.

I had a great deal of trouble in attempting to measure the temperature of superheated steam by thermometers, and it is a job which, even after you get it done, you do not know whether you have it right, but I believe the pyrometer is the thing to-day to be installed on the engine to give the engineman an idea of what his superheater is doing. He will get a much better efficiency out of the engine by the use of that instrument.

I am sorry to see also that some men are still adhering to a common grade of lubricating oil. We tested that matter out at Purdue, and I know, without a doubt, you will get better results if you use a better grade of oil. Those who are using the better grade of oil will not want to go back to the poorer grade, and to those who are using the poorer grade of oil I would recommend that you use the better grade of oil.

Chairman: I have been chairman of the superheater committee for a number of years. I hope ,with the elevation to my new position, I may be relieved as chairman of the Superheater committee, but I wish to say that I find this—it is a difficult matter to get information that is of interest on his one single subject. The superheater is an accomplished fact—one hundred per cent of the standard government locomotives were equipped with the superheater. Almost that percentage of new locomotives were being equipped with a superheater before the government standard was issued.

On your home roads you are equipping as many locomotives with superheaters as your facilities will permit, and there is no question that the equipment justifies the amount spent. Therefore I think it is fair to say that the superheater, as an economical feature of locomotive construction, is a fact, and it is hardly necessary for further investigation to be made as to what it has accomplished. It would like to suggest, if the committee is continued, that it go into the investigation of other economies brought about in firebox construction in the past few years. There is on the pier an exhibit of a decided improvement in firebox design, which I think is well worth investigation. I refer to the Nicholson siphon. On the railroad that the tests have been made on, the performance of it is remarkable.

H. R. Warnock (C. M. & St. P.): About one year ago we equipped the first engine with two of the Nicholson thermit siphons. This was a Consolidation engine, with 23 in by 30 in. cylinders. This class of engine was always considered overcylindered ,and for that reason it was relegated to yard work or short run work. On this test the engine was matched up against a sister engine of the same class and dimensions and put in as near the same condition as possible. The test showed an increase of boiler efficiency of 28 per cent, with an added increase of firebox heating surface of 53 sq. ft. There was 30 per cent decrease in fuel consumption per 1000 gross ton miles, with an average increase of 7 per cent in tonnage.

I might add, as a matter of information, that this test was run on a one-hundred-mile division in road service; the ruling grade was seventeen miles long and was from .5 to .7 per cent, so that it gave the crew a real test on what they could do with the new application. During this run there was no trouble in furnishing all the steam that was necessary. We thought that was quite a performance, in the absence of any figures.

The results were so gratifying that we have since equipped a Mallett with three syphons, also a Pacific type passenger engine which has a superheater, with two syphons, and later a long, narrow firebox, on a Ten-wheel engine, with one syphon. We have not the figures as yet on these latter tests, as they are being run now, but everything indicates that there will be a very good performance. The question has arisen as to the maintenance cost, and I would say that we have not had any maintenance cost in connection with those trials. There has been no indication of broken bolts in the syphon, nor have we had any trouble with leaky seams where the flanges are welded to the sheet. The water condition is not bad in this district, but there is a tendency for the formation of lime in the water. After about one year's service, the syphon is pratically as clean as when put in, indicating that the rapidity with which the water travels will take care of incrustation and things of that kind.

Mr. Redding: I would like to ask one question. This paper speaks of a satisfactory drift valve. Is there such a thing?

Mr. Gaines: In the case of engines which have slide valves, I advise you to throw the valves away, and do not equip any more engines with them, whether they have bronze or graphite lubricators.

B. H. Gray (Gulf, Mobile & Nor.): In answering the question about the drift valve, the company I represent has been using the drift valve known as the McVoy type for about two years, and they are very satisfactory. We have not had any carbozniation to speak of, and use the ordinary cylinder oil. It is such an improvement, that we have equipped all of our superheated engines with that device.

W. H. Codidngton (N. & W.): We have the McVoy valve and discarded it. It is operated by a vacuum in the cylinder, and depends on the vacuum produced in the cylinder for its operation. It is the vacuum that we want to get rid of, and we do not want to wait for the vacuum to be set up in the cylinder before the valve operates.

Mr. Curry: I presume Mr. Gaines refers to road engines, particularly.

Mr. Gaines: Yes, not the yard engines.

A. G. Trumbull (Erie): I have been considering Mr. Warnock's statement regarding the economy realized from the application of the device which he was discussing, and the figures are so startling that I would like to inquire if he has any data as to the ratios; that is, the evaporation per pound of fuel that the locomotive had under the application of this particular device. It seems to me that if it is such an important matter we ought not to let this occasion pass without geting all he informaion on it that is available.

Mr. Warnock: The entire test was published some time ago in the *Railway Age* and the *Railway Review*, and I will be glad to send Mr. Trumbull a copy of that matter. I will say, however, that there was no test made of the efficiency of the engine, before and after this particular test to which I have referred. Th engine was tested against a sister engine in the same class, put in as near the same condition as it was possible to do.

William Schlafge (Erie): Going back to Professor Endley's remarks on the subject of the pyrometer and its great value in the superheater locomotive, I may say that I am with him thoroughly on that proposition. I think it is as necessary as the steam gage on the locomotive, and you will find that the Committee on Fuel Econemy recommended that appliance very strongly in its first report. At that time the system was too delicate, but it has been improved on since, and we are getting ready to put them on our equipment.

H. T. Flanagan (C. & O.): I would like to know if the representatives of some of the other roads have made experiments with the shields to protect the necks of the superheaters because of their liability to be cut away by the sparks. We have very little trouble with leaky joints, or with any other part of the equipment, but we are having a considerable amount of trouble from the necks of heaters cutting in two, and having to be renewed on that account. I trust you will also help us to find out what system the roads are using most economically for grinding the joints of the superheaters. Are the roads using the forty-five degree angle on the header and ball joints on pipes, or have some gone to the ball joint on both? We have tried some of them, but it is more expensive to maintain, as the contour has to be exactly right.

F. P. Roesch (U. S. R. R. A): Before I became connected with the Conservation Section we had considerable experience through the cutting of the small superheater units at the neck, due to the cinder action We protected that by means of a shield, which relieved the situation materially.

We must admit that this cutting action is due to the abrasive action of the cinders passing through, and the more rapidly the cinders pass through, the greater will be the abrasive action. In pursuing some investigations, we found the conditions to be as stated in the fourth paragraph of the last page of this report: that the air leaks around the outside steam pipe entering the front ends were the most prolific cause of steam failures, and also the most prolific cause for bushing the nozzle. This, in turn, gave greater rapidity to the draft action and resulted in more cutting.

In the report of the committee it makes certain recommendations as to measures to prevent these air leaks. In traveling over the Northwest region I found that in a number of the so-called remedies the trouble is we are moving along the lines of least resistance, and trying to get something for nothing.

and we cannot get it The putty and other dope you put in will only last for a short time. In making some dynamometer tests on the Milwaukee road, in order to determine this feature, we had the pipe packed at one end of a ninety-mile division, and the packing was entirely gone before we got to the other end of the division.

The Milwaukee, however, has developed a permanent solution. After packing the gland around the pipe they weld on 10-gage sheet iron, the outer circumference being welded to the smoke arch and the inner circumference to the steam pipe. We believe that will make a good job.

As an illustration of the effect produced through the air leaks which resulted in the friction of nozzles; after we had this pipe welded up we again opened the nozzle with a resulting decrease in fuel consumption equated on the drawbar pull of 14.2, 17.2 and up to 21 per cent., and also an increase in the efficiency of the engine line in the same ratio due to the decrease in back pressure.

Mr. Trumbull: In view of the fact that the matter of drift valves has entered the discussion, I would like to say that so far as we are concerned we believe in them, because we believe that the results of their use, in respect to improved lubrication, justify their application. If there are any members here who are sufficiently interested we will be very glad to place them in possession of information which we believe will be of interest in connection with the drift valve, and to show that it will do the work for which it is intended.

A motion that the report be received, the committee continued, and the scope of its investigation broadened to include firebox economy was put to vote and carried.

Carbonization in Valve Chambers and Cylinders of Superheated Steam Locomotives

By F. P. Roesch, Supervisor, Fuel Conservation Section, United States Railroad Administration, Northwestern Region.

When I suggested the above subject to the Committee on Subjects, I thought it a good way to learn something more of a proposition in which I have always been deeply interested, and one which I felt was beyond me to solve. The committee, however, assigned the subject to me for an individual paper.

I shall refer first to the so-called carbonization or deposits of foreign matter in valve chambers, passages, etc., usually called carbonized oil. As a matter of fact this term is a misnomer, as shown by an analysis made by Dr. P. H. Conradson, Chief Chemist, Galena Signal Oil Company, (p. 169, March, 19, 1912, Proceedings o fthe Western Railway Club, and May, 1915, Proceedings of the Cincinnati Railway Club), the composition of four samples being as follows:

1st Sample.

13.35 per cent. thick oil.
2.60 per cent. oily, gummy matter.
57.15 per cent. carbonaceous combustible matter (coal and coke matter).
26.90 per cent. red ash, principally iron oxide, silicious matter.
After removing the oil and oily matter, the deposit was non-magnetic, indicating practical freedom from metallic iron.

2d Sample.

24.25 per cent. thick oil.
0.80 per cent. oily, gummy matter.
48.78 per cent. iron metal wearings.
8.18 per cent. iron oxides and silicious matter.
17.87 per cent. carbonaceous combustible matter.
After extracting the oil and oily matter, the deposit was very strongly magnetic, containing a large amount of metallic iron.

3rd Sample.

6.45 per cent. oil and oily matter.
35.70 per cent. coky, carbonaceous combustible matter.
57.28 per cent. metallic iron, iron oxides and silicious matter.
Mineral matter strongly magnetic from metallic iron wearings.

4th Sample.

4.2 per cent. oil and oily matter.
41.0 per cent. metal wearings, iron oxides, silicious matter.
54.0 per cent. coky, carbonaceous matter.
Mineral matter strongly magnetic.

From the above it will be seen that oil or oil products form but a small percentage of the whole, and the analysis also points directly to the cause, namely, smoke box gases drawn into the cylinders through the nozzle and there mixed with the oil adhering to the various ports, passages and surfaces not swept by either the valves or pistons in their movements. This combination, through the high temperatures obtaining at the moment the throttle is closed, together with practically the entire absence of steam, bakes on the surfaces above referred to almost in the form of an enamel. Again quoting Dr. Conradson: The above clearly illustrates the advisability of preventing smoke-stack gases, with their inherent dirt, dust, grit, etc., to be drawn into the cylinders while the engines are drifting. As seen from the analyses, a comparatively small amount of oil binds together a large amount of mineral matter, forming a sticky deposit which bakes on the metal much harder with superheated steam, especially high superheat, than would be the case with ordinary wet or saturated steam."

Effect on Lubrication and Maintenance

Oil is introduced into valve chambers and cylinders in order to separate the rubbing surfaces with a film of lubricant. The oils now furnished will admirably perform this function, regardless of temperature, under proper conditions, but this film of oil is infinitesimal in thickness, therefore when the throttle is closed and the locomotive so manipulated as to allow the entrance of smoke box gases, with their constituent properties of coal, coke, soot and cinders, these small particles will work their way between the pistons and cylinder walls, separating them to a degree far beyond the thickness of the oil film, so that effective lubrication, even though the quantity of oil introduced be materially increased, is practically destroyed, as the film of oil cannot fill the grooves or ridges in the rings and cylinders. Or again, this foreign matter may combine with the oil, forming an abrasive compound, causing wear of bushings, bull rings and packing rings, and thus accounting for the metallic iron, etc., found by Dr. Conradson. In fact, our investigation indicates that increasing the supply of oil beyond that required for effective lubrication simply aggravates instead of reducing the trouble.

The piston in the engine's cylinder cleans the walls of the cylinder of all the excess oil and drives out through the ports, exhaust passages and the nozzle what oil does not cling to the piston head and cylinder heads, to be carbonized at the first entrance of oxygen from the air; whereas the cylinder walls that need the lubrication for the next revolution do not have any unless the oil is injected into the steam the very next revolution.

As the lubrication is affected, so is the maintenance. Wear on valve rings and chambers, cylinder packing rings and cylinders is proportionately increased. Not only is wear through abrasion increased, but, through lack of lubrication, cylinder packing rings become overheated, resulting in their collapse, or breakage. Again, these so-called carbon deposits affect maintenance in other ways, as, for instance, cases have been observed where the deposits built up on piston and cylinder heads so as to take up practically all the clearance, in some cases knocking out cylinder heads, damaging cylinders, studs, etc., in others partially or wholly shearing rod bolts, etc.

Were the increased maintenance costs the only direct loss it might not be so serious, but, in addition to this, the deposits built up in the packing ring grooves, causing the rings to stick, producing valve and cylinder blows which materially impair the efficiency of the locomotive and result in proportionate increases in fuel and water consumption. Furthermore, cases have been observed where the exhaust passages were so constricted, due to the heavy deposits of this material, as to retard the exhaust sufficiently to greatly increase the back pressure.

A Possible Solution

In checking over the various measures adopted by different railroads to overcome the troubles mentioned above, we find a marked lack of unanimity. This is not surprising, however, when the conditions under which each operates is taken under consideration, and it is only by comparing and analyz-

ing the results obtained by the different methods that some plan can be formulated applicable to and meeting practically all conditions. Some roads block shut, or entirely remove, the steam chest relief valves, retaining the by-pass. Others block shut the by-pass and maintain the relief valve. Others again dispense with both by-pass and relief valves, while other roads maintain both. Some use a drifting throttle, some a so-called drifting valve, and others again use nothing. Some use special metal, some common grey iron, some use plain snap rings, some grooved and perforated snap rings, some segmental rings, etc. Some use a special oil, some the same as with saturated steam. Some advocate a reduction in the fatty constituents in the oil, others an increase. Some advocate the use of the hydrostatic lubricator, others favor forced feed.

Analyzing the possible effects of the various measures adopted:

The Steam Chest Relief Valve

This is a heritage handed down from the saturated steam engine. It had its place at that time and as a safety feature with certain modifications can no doubt be fittingly used on modern power. Blocking it shut or removing it entirely will certainly prevent the admission of air to the valve chamber through this source when the throttle is closed on a moving locomotive; but in this case the question arises, which is preferable in the cylinder, clean air from the outside, or smoke box gases? Inquiry seems to indicate that these valves were removed from steam locomotives, not so much to prevent carbonization, but to overcome cylinder failures which were attributed to the stresses set up by the cooling effect of air so introduced. It may be said in passing that some years ago these valves were removed from some locomotives using saturated steam, presumably to reduce maintenance costs, and it may also be well to here remark that in this case the same deposits were in evidence on cylinder and piston heads.

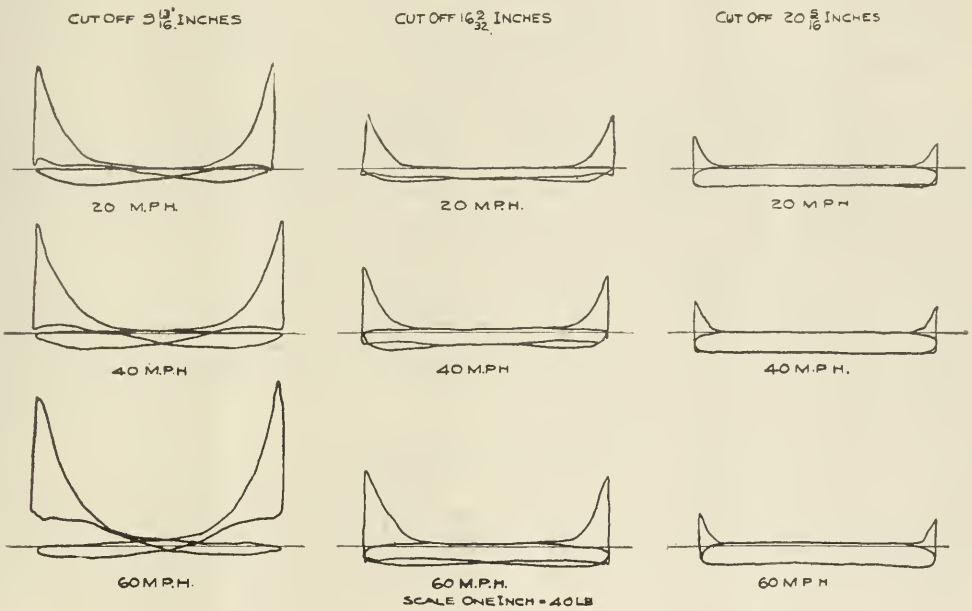
By-Pass Valves

The function of this valve is to reduce the vacuum and compression created in the cylinder of the moving locomotive employing piston valves, when the locomotive is drifting, especially at high speeds. In this particular discussion we are not so much concerned with the compression as the vacuum, as the only material effect due to compression, in so far as the so-called carbonization is concerned, is to increase the temperature of the air being compressed, which, while it undoubtedly adds to the adherence of the deposit, would not, however, be otherwise serious were it not for the presence of the smoke box gases in the cylinder, which are due solely to the vacuum created. The elimination of the by-pass valve, either by blocking or removal, can have but one effect, namely, increasing the degree of vacuum, which vacuum must and will be filled from some source, either through the open relief valve, if in use, or in its absence through the nozzle, or through the admission of steam from the boiler.

The Drifting Throttle

On roads where no drifting occurs to speak of, i. e., comparatively level roads, the use of the drifting throttle, so called, will undoubtedly prevent the admission of smoke box gases to the cylinders regardless of the presence or absence of either or both steam chest relief and cylinder by-pass valves, provided, the engineer does not forget. Here, however, is the danger—human fallibility. If the engineer fails to leave his throttle slightly cracked when coming to a stop, or when tipping the summit of a grade, the damage is done even though the throttle be left closed for but a few revolutions. Each succeeding oversight adds its mite to the deposit, thus accounting for the deposits where the drifting throttle is presumably always used. As stated above, on comparatively level roads the drifting throttle can be used to advantage if men will at all times comply with instructions, but where necessary to make long drifts other means must be provided, as the drifting throttle is not always practicable, the grade, tonnage, brakes, etc., governing.

The above explains why some roads find it to their advantage to block by-pass valves, while others maintain them presumably operative. In the absence of both by-pass and relief valves much higher compression and greater vacuum will obtain than



Drifting Cards Taken with No By-pass or Relief Valves on Engine

By their use, and in the case the vacuum can only be relieved through the nozzle.

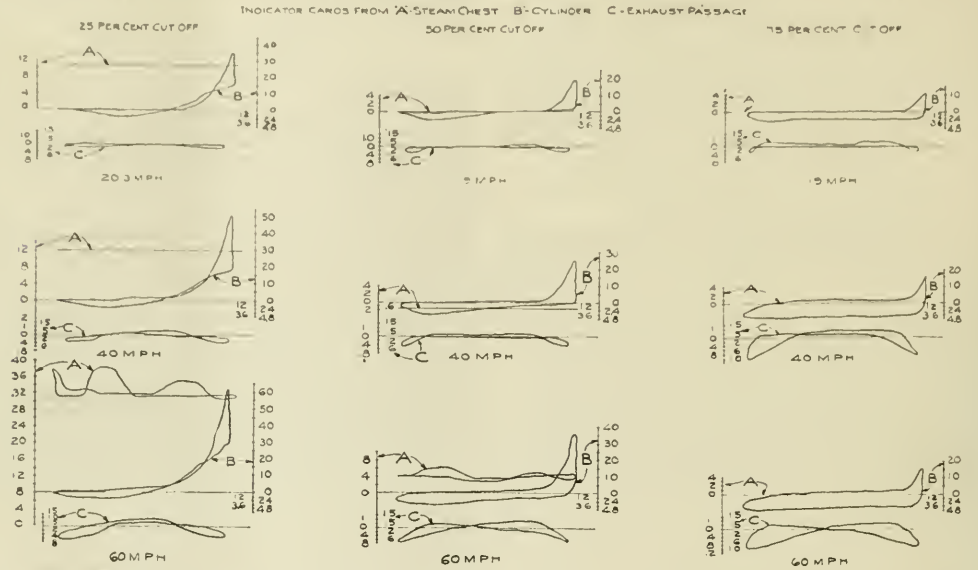
In order to make this clear drifting cards are shown below. The difference in the vacuum and compression at various speeds and cut-off should be noted. These cards also indicate another factor in the proposition, namely, if it were desired to entirely overcome cylinder vacuum under such conditions it would be necessary to proportion the by-pass valves to conform to cylinder volumes. As this is mechanically impractical, however, the problem must be considered with a view to finding relief under existing conditions.

Drifting Valves

Under this head can be classed all devices used to admit steam to the steam chest and cylinders through pipes, etc., i. e., not

through the main throttle as with a drifting throttle. It is through failure to properly coordinate or take into consideration the relative movements of valve and piston that so many devices have been discarded as unsatisfactory.

The average engineer drifts his engine with the lever well hooked up, *i. e.*, in a short cut-off. Following the movements is 90.54 cu. ft. A locomotive with cylinders 25 in. by 30 in., drivers 63 in. in diameter, has a piston displacement equal to 8.5 cu. ft. per cylinder. Assuming this locomotive to be drifting at the rate of 30 miles per hour it would take 90.44 cu. ft. of steam per second to keep the cylinders filled at this speed; therefore, it would appear that a 2 in. pipe would more than

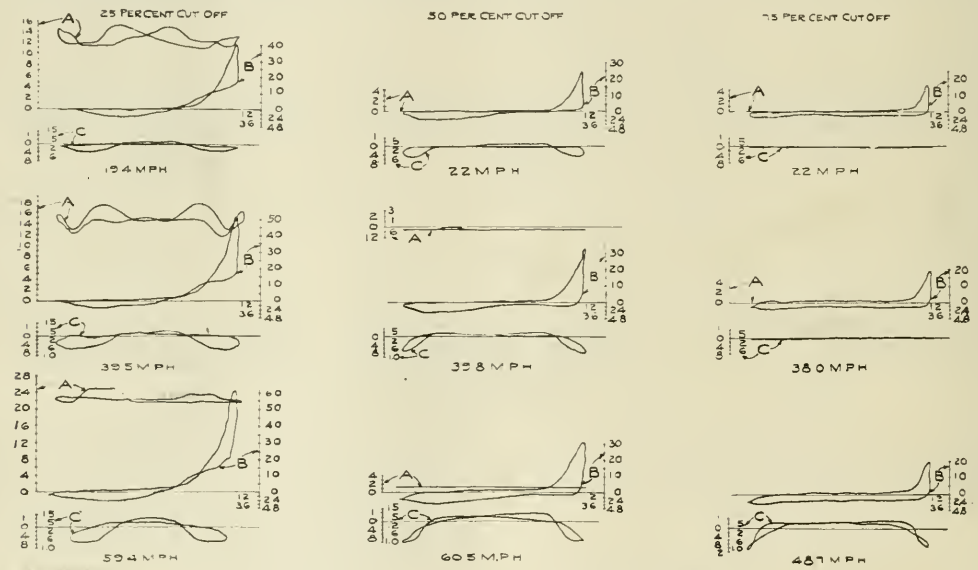


Drifting Cards Taken Without the Drifting Valve, By-pass Valve Blocked Shut

of the valve and piston and beginning the cycle with the initial port opening as the piston is beginning its stroke, the piston is moving back (assuming it starts from the front center), while the valve moves forward (inside admission) to complete the port opening. Continuing the cycle the valve now begins to

meet the requirements under the above conditions, viz.: keep both cylinders filled with steam above atmospheric pressure.

The above would be correct did the steam ports open directly to the boiler so there would be no drop in pressure between the boiler and the cylinders, or if the intervals between port open-



Drifting Cards Taken Without the Drifting Valve, By-pass Valve Open

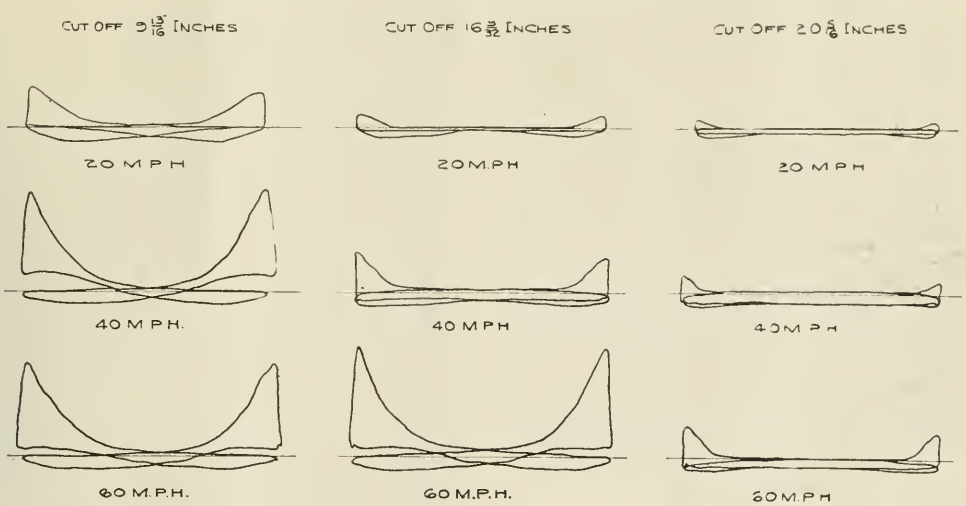
travel back, closing the port when the piston has traveled a distance proportionate to the cut-off.

Assume that steam is being admitted to the valve chamber through a pipe of 2 in. inside diameter. The flow of steam through a 2-in. pipe at 200 lb. absolute pressure is 9 lb. per second (Napier's formula). Its volume at 40 lb. absolute pressure

ings were so far apart as to allow the steam to bank up to boiler pressure. But as this is not the case and as the steam must decrease in pressure as the increase in volume into which it expands, and as the cylinders are continually drawing on this supply it follows, as shown by tests, that a 2-in. pipe extending from the cab to the steam chests will not maintain a pressure to

exceed 20-lb. gage or 35-lb. absolute in the valve chambers on a locomotive of the above dimensions, drifting at 30 miles per hour.

As the initial pressure in the cylinders cannot rise above the steam chest pressure, the pressure at cut-off will not exceed 35-lb. absolute; therefore, if the lever is carried at 30 per cent. stroke, the steam must again expand to three times its original volume before the piston begins its return stroke, and therefore its final pressure would not exceed 11.6 lb. providing no steam escaped at the moment the port opened to exhaust. As the pressure under such circumstances was



Drifting Cards Taken With By-pass and Relief Valves Attached to Engine

slightly above atmospheric at the point of exhaust port opening, however, the excess pressure passed out through the nozzle until the point of equilization was reached; on the further movement of the piston the steam continued to expand with a corresponding drop in pressure to a point well below atmosphere. As no more steam is being admitted, equalization can only take place through the admission of air, and as the only opening to atmospheric pressure is by way of the nozzle, equalization will take place through this source, the inrushing air carrying with it the front end gases with all their fouling constituents. A glance at the indicator cards showing a sustained steam chest pressure of 25 lb. will clearly verify this statement.

Here, then, apparently is where and when the trouble starts. As the cylinder pressure is less than atmospheric, air will flow in through the nozzle and the open exhaust port until the pressures equalize, the combined steam, air and smoke box gases being then expelled by the piston on its return stroke. However, as the valve, valve chamber and ports are at their highest temperature and exposed to the first inrush of the incoming gases, it follows that all carbonaceous matter in these gases coming into contact with any of the above surfaces will adhere, or, in other words, be baked on. This theory appears to satisfactorily account for the greater deposits obtaining in the exhaust cavity of the valve as well as the exhaust ports and passages. Superimposing the drifting cards taken with and without by-pass and relief valves may help to clarify the proposition.

The above hypothesis, if based on correct premises, would hold good in so far as the drifting throttle is concerned, except that through use of the drifting throttle a higher initial pressure may be obtained, resulting in a correspondingly higher terminal pressure. The only trouble is, as previously stated, in the fallibility of the human agent and also the fact that the total opening of a circular valve (throttle) is very indefinite where gauged by the position of the throttle lever.

If the correctness of the above theories is established, the remedy appears obvious, namely, prevent by automatic means as far as possible the intake of smoke box gases or neutralize their evil effects by diluting with steam. To accomplish this it would appear that we should turn to such devices as we already have at hand, viz.: the steam chest relief and the by-pass valve. While the former is not exactly necessary, yet its use under proper conditions presents no great difficulty and as a safety feature it has a distinct place. The use of the by-pass, however, is practically essential in that it will go far toward preventing the formation of a vacuum in the cylinders if properly maintained, and under right treatment its maintenance cost is negligible.

The last and most important requirement is the neutralization of such gases as might be drawn in through the nozzle through improper handling of the locomotive. This can only be accomplished by admission of a jet of steam to both the receiving and exhaust end of the valve, so that when the conditions obtain as mentioned previously, the steam jet so admitted will mingle with the front end gases before these gases have an opportunity to deposit their constitutent matter, and so neutralize their effects, it being universally conceded that carbonization of oil, or even the deposits of the so-called carbon, will not take place in the presence of steam.

Discussion

After presenting the paper, Mr. Roesch said: Doctor Conradson made an experiment to show that with valve oil heated to 1,000 deg., when he admitted air alone, he got an explosion. When he mixed a little steam with the air nothing happened.

A motion that the paper be received and included in the minutes of the convention was put to vote and carried.

Amalgamation of Other Associati ons with Section III—Mechanical

Mr. Thompson presented the following report: Your committee on this subject was appointed too late to obtain any definite results in the short time intervening between their appointment and the convention, and, at this time, can only report progress. However, considerable preliminary work has been done, several meetings have been held with some of the different organizations and we would recommend that your committee be continued or a new committee be appointed to continue the work.

The report is signed by W. A. Thompson (chairman), New York Central; T. L. Burton, New York Central; E. W. Pratt, Chicago & North Western; J. E. Fairbanks, American Railroad

Association, and V. R. Hawthorne, American Railroad Association.

A motion that the report be received and the committee continued was carried.

Drawbar Pull-Speed-Cut-off Calibration as an Adjunct to Efficient Locomotive and Train Operation

By B. B. Milner
Engineer of Motive Power, New York Central

IT IS A FACT RECOGNIZED upon most divisions that with the same engine and the same train, some enginemen are able to handle trains over ruling grades or other difficult places to satisfactorily move trains, while others generally fail to do so. The successful men are unable to very clearly state how the successful performance is accomplished, while the unsuccessful men cannot explain any reason for failure, although they make every effort possible. A study of the factors of operation in the hands of enginemen and subject to their manipulation develops the fact that there cannot be very much in throttle manipulation. Some may run with a full throttle, some with a partially closed throttle, but the crucial test of performance upon the tight places usually occurs at speeds so low that the difference between a full throttle and partial throttle with which some men may operate, under these conditions, is nil. The only other factor which an engineman can manipulate is the selection of his cut-off, that is, the position of the reverse lever, and it should be at once appreciated that the cut-off selection or the position of the reverse lever is a very important factor because it affects directly the drawbar pull developed. It should be rather apparent that there is, for each speed, a cut-off at which the drawbar pull developed will be a maximum and that the drawbar pull developed for any other cut-off, either longer or shorter, will be less than that developed by the cut-offs which should be used under conditions, where the maximum drawbar pull is necessary.

To the end that not only the maximum drawbar pull developed at various speeds might be ascertained, but also the cut-offs—reverse lever position—which must be used at the various speeds, in order to develop this maximum drawbar pull, a series of dynamometer car tests have been run in the following fashion: The engine under test was coupled immediately ahead of the dynamometer car, then between the dynamometer car and the train, a second engine; the engine under test being run at a selected fixed cut-off, while the engine next to the train and back of the dynamometer car was used for regulating speed. A series of tests with one engine was begun by placing the reverse lever of the forward engine under test in the first notch forward, and moving the train from rest at slowly increasing speed—the second engine regulating the speed by setting of brakes or by assisting as necessary—until the speed attained was such as to cause the engine under test to fail for steam at, say 15, 18 or 20 miles per hour, dependent upon the boiler capacity. Bear in mind that during this test the reverse lever of the first engine under test was allowed to remain in the full forward notch. During this test, the dynamometer car has been writing an accurate record of the drawbar pulls developed throughout the range of speeds attained, from zero to the highest speed at which the locomotive under test failed for steam.

After this test, the train was stopped and similar test was run on the first engine, with a somewhat shorter cut-off. In this case, the drawbar pull developed at the start will be lower than at the start of the previous test, and the decrease in drawbar pull with the gradual increase in speed, will be somewhat less than in the previous case, a point being reached in speed at which the shorter cut-off will develop the same drawbar pull as the previous longer cut-off, and, then at higher speeds, the drawbar pull developed by the shorter cut-off will be the greater. This test, like the preceding one, is continued until the engine again fails for steam, which, of course, will occur at a higher speed than attained in the previous test, because of the cut-off having been somewhat shorter.

The same program of procedure is represented for succeeding shorter cut-offs, until by means of the dynamometer car, there is obtained a record of the drawbar pulls developed at all speeds from zero up to that at which the boiler failed to supply the necessary steam. By assembling the data thus obtained, we have not only a record and knowledge of the maximum drawbar pulls, which the locomotive under test will develop at any speed, but we also have a knowledge of the precise cut-off which must be used at those speeds, in order to develop the maximum drawbar pull referred to.

By means of the tests referred to above, a Mikado type engine, cylinders 25 by 32 in., driver diameter 63 in., carrying a steam pressure of 180 lb., was found to develop the greatest drawbar pull with the reverse lever in notch 1, or full cut-off, from start up to a speed of 9 miles per hour; with reverse lever notch 2, or slightly shortened cut-off, at speeds from 9 to 10½ miles per hour; in reverse lever notch 3, or slightly further shortened cut-off at speeds from 10½ to 11½ miles per hour, with reverse lever in notch 4, or with cut-off further slightly shortened, at speeds from 11½ to 13 miles per hour, etc. With a Consolidation type engine, cylinders 23 by 32 in., driver diameter 63 in., and steam pressure 200 lb., maximum drawbar pulls were found to be developed with the reverse lever in notch 1, or in the full forward position, from start to 9 miles per hour. At speeds from 9 to 11 miles per hour, the maximum drawbar pull was developed with the reverse lever in notch 2, or with slightly reduced cut-off; from 11½ to 14 miles per hour with the reverse lever in notch 3; from 14 to 15½ miles per hour with the reverse lever in notch 4, etc.

With a second Consolidation type engine with cylinders 25 by 30 in., driving wheels 57 in., and steam pressure of 180 lb., the maximum drawbar pull was found to be developed with the reverse lever in notch 1, or full forward position from start to 8 miles per hour; from 8 to 10 miles per hour with reverse lever in notch 2; from 10 to 12½ miles per hour in notch 3; from 12½ to 13 miles per hour in notch 4, etc.

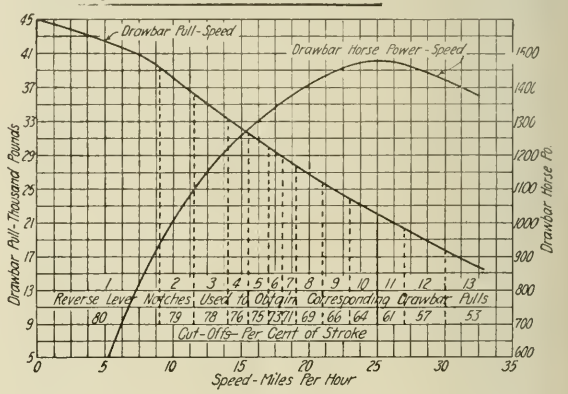


Fig. 1

It may appear at first thought that the above cut-offs are so great as to draw heavily on the capacity of the boiler for steam, but as a matter of fact, the boiler capacity, at these low speeds, namely below 15 miles per hour, should be no factor whatever in the selection of cut-off, because at such speeds, the horsepower developed by the locomotive is very much lower than that for which the boiler will supply easily the necessary steam. Maximum horsepower for average sized Mikado engines or large Consolidation engines, will be found to run from 2,000 to 2,500 h. p., these horsepowers being obtained at speeds from 22 to 28 miles per hour. For these same engines, the horsepower developed at 15 miles per hour is very much less than these referred to and the maximum for which the boilers will supply the necessary steam. These horsepowers will be further reduced

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as the speed drops below 15 miles per hour, to say, 12, 10 or 8 miles per hour.

The chart herewith shown as Fig. 1 shows graphically for a Consolidation engine, the relations existing between drawbar pull and horsepower output through a range of speeds up to a little more than 30 miles per hour. It will be noted that the maximum horsepower, amounting to 1,480, was developed at a speed of 25 miles per hour from which maximum point this horsepower drops off rapidly as the speed is decreased. During the course of this fall, the margin of boiler capacity is constantly increasing.

It was found that by working locomotives at properly selected cut-offs with reverse levers in the proper positions, better time could be made up grades and between stations and that the locomotives could handle more tonnage; due, of course, to the use of the cut-offs necessary to develop the maximum drawbar pulls whenever required. On momentum grades or short heavy grades following a trackage where speed may be used in assisting trains over the grade or in any movements requiring prompt accceleration, considerable and noticeable improvement in locomotive performance can be obtained by using the cut-offs (reverse lever positions) which tests have shown to be required for maximum drawbar pull development. On long, heavy, or non-momentum grades, by working engines at the cut-offs required at the different speeds, faster moves between stations have been obtained with some increases in tonnage.

The advantages to be derived from making use of the precise cut-offs which must be used at various speeds in the development of maximum drawbar pulls, is illustrated by the accompanying chart, identified as Fig. 2, upon which is shown a graph-

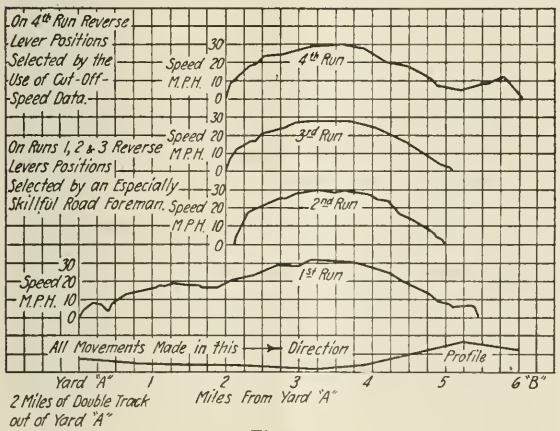


Fig. 2

ical exhibit of the speeds attained with an overloaded tonnage train moving from *A* toward *B*, over a profile slightly descending for a little over 3 miles and then rising to a summit ¼ mile west of the fifth mile, this grade being the principal grade on a division and governing its tonnage by a wide margin. All of the four runs covered were made upon the same day with the same train overloaded to 15 per cent more than the regular slow freight tonnage. The first run was begun well down in the yard at "A," so that the end of double track two miles from the start, the train was going at 18 miles per hour. This speed was accelerated to a maximum of a little over 31, then decelerated over the summit, which was satisfactorily negotiated. The man was in charge of an especially skillful road foreman, selected on that account, who was instructed to take out of the engine all there was in her.

After having passed the summit the train was backed into the clear at the end of the double track from which the start for the second run was made, this being necessary in order to make the results of the tests practical since, of course, some trains must make their start from a stop at this point. The same road foreman was again in charge of the engine and did his best; however, the train stalled, as the chart shows, some distance from the summit.

After this second run, the same train was then again backed to the end of the double track for the third run. The same road foreman ran the engine on this run and was exceedingly confident of being able to negotiate the grade, having had the benefit of the experience upon the two preceding trips, but as the chart indicates, was unable to do so. After this third run, the train was again returned to the starting point at the end of the double track for the fourth run, during which the position of the reverse lever was dictated from the dynamometer car speed indicator and a chart showing the reverse lever positions necessary for the development of the maximum drawbar pulls at various speeds. It will be noted that the grade was satisfactorily negotiated at a minimum speed of 5 miles per hour.

Graphic chart (Fig. 3), shows the general relations existing between the speeds and the drawbar pulls developed by the use of the various constant cut-offs as represented by reverse lever notches, numbered 1, 2, 3, etc., consecutively from the most forward or longest cut-off reverse lever position. This chart

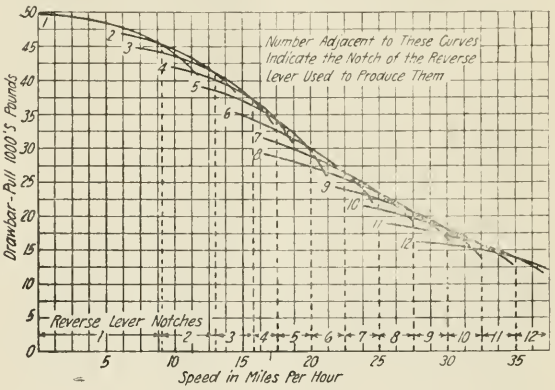


Fig. 3

indicates that the initial drawbar pull at zero speed, or when starting, decreases with decreases in the cut-off used; that is, a longer cut-off will develop a higher initial drawbar pull, whereas a shorter cut-off will develop a correspondingly lower initial drawbar pull. This chart also indicates that at successively higher speeds, successively shorter cut-offs develop maximum drawbar pulls, or in other words, for any speed there exists a definite cut-off at which the drawbar pulls will be maximum and that during operation at this particular speed, the selection of any other than the "maximum drawbar pull cut-off" either higher or lower, will develop a lesser drawbar pull.

It becomes, therefore, apparent that some knowledge of the precise cut-offs or reverse lever positions, which, at various speeds, will result in the development of the desired maximum drawbar pull, must obtain and be used, if the maximum results, which can, and with reason, may be currently expected, are to be obtained.

For the dissemination of this information to enginemen, cards which may be folded to convenient vest pocket size, as represented upon Figs. 4 and 5, are submitted. That portion of those cards headed "Statement showing reverse lever notches and cut-offs at which maximum drawbar pulls are developed" is addressed to the question of maximum drawbar pulls and operating covered thus far, these maximum drawbar pulls and operating conditions which will produce them being of paramount importance in the determination of tonnage ratings. The determination of such ratings may be viewed in the light of being in reply to the question: "Having given a locomotive and grade and alignment conditions, what maximum tonnage can be handled?" The second questiin consistently follows, namely: "Having determined the tonnage rating, what movement may the given locomotive be expected to make therewith?" under condition which require the maximum expected performance.

To the latter question the other portion of the suggested cards referred to is addressed. For individual runs between all points thereon, the time called for under Columns A, B. C and D, thereof, providing respectively for the moving time required in passing from one point to passing the next following point; from passing one point to pulling in the clear at the next following point; from standing in the clear at one point to passing the next succeeding point, and from standing in the clear

at one point to pulling in and clearing at the next point, should be filled out by those qualified to determine the performance which may be expected under conditions which particularly require the best. It is not submitted that the "moving time" which dispatchers have a right to expect from full tonnage trains shall be at all times met, but that this "moving time" may reasonably be expected, as the situations which confront dispatchers occasionally may demand. This "moving time" information should be equitably developed and placed in the hands of dispatchers, train-masters, enginemen, conductors, road foremen, master mechanics and others who are concerned in tonnage train performance.

As indicating rather definitely the probability of finding some general need among road foremen for information bearing upon the cut-offs obtaining upon the engines in their charge, for various positions of the reverse lever, and also for information as to what the position of the reverse lever should be used at various speeds in order to obtain the maximum results, the following tabular statements of such information filled in for each notch on a well established type of locomotive familiar to each of several road foremen involved, are shown. The columns of these statements headed "Cut-off Per Cent" and "Used at Speeds From—To," were filled in by 18 road foremen, very full explanations having been made to them prior to their filling in this information and during the time it was being filled in. The answers given by the first group are shown below:

First Group of Road Foremen Nos. 1 to 6.

Reverse Lever Notch.	(1) Road Foreman.			(2) Road Foreman.			(3) Road Foreman.			(4) Road Foreman.			(5) Road Foreman.			(6) Road Foreman.		
	Cut-off, Per Cent.	Used at Speeds. From	To	Cut-off, Per Cent.	Used at Speeds. From	To	Cut-off, Per Cent.	Used at Speeds. From	To	Cut-off, Per Cent.	Used at Speeds. From	To	Cut-off, Per Cent.	Used at Speeds. From	To	Cut-off, Per Cent.	Used at Speeds. From	To
1	95	0	4	90	0	2	97	0	2	80	0	3	80	0	3	90	0	2
2	92	4	7	85	2	4	90	2	4	70	3	4	72	3	4	85	2	4
3	90	7	9	80	4	6	88	4	6	65	4	6	64	4	5	80	4	6
4	87	9	12	78	10	12	83	6	8	60	6	10	55	5	6	75	6	8
5	85	12	15	76	14	16	78	8	12	55	10	12	46	6	7	70	8	10
6	83	15	17	68	16	22	73	12	15	55	12	14	37	7	10	65	10	12
7	80	17	25	60	22	24	68	15	20	50	14	16	40	10	12	60	12	14
8	75	25	30	55	26	30	63	20	30	45	16	20	25	12	15	55	14	16
9	72	30	40	50	30	.	60	30	50	40	20	25	20	15	20	50	....	.

From the above attention is especially called to the following abstracted therefrom:

Road Foreman.	A.	B.	C.	Road Foreman.	A.	B.	C.
1	4	95	72	10	3	90	60
2	4	90	50	11	7	100	0
3	5	97	60	12	4	80	25
4	5	80	40	13	5	80	27
5	7	80	20	14	4	93	70
6	6	90	50	15	5	93	40
7	5	100	20	16	3	80	27
8	7	85	55	17	5	93	70
9	3	80	25	18	5	97	20

A.—Reverse lever notches recommended for a period of 10 miles per hour.
B.—Cut-off said to be obtained in the first reverse lever notch.
C.—Cut-off said to be obtained in the ninth reverse lever notch.

Note that for a speed of 10 miles per hour, the judgment of these road foremen on the proper position of the reverse lever, under the conditions specified, varies from the third to the seventh notches, whereas, upon the engine in question, for this speed the first notch should be used when the development of the maximum drawbar pull is required.

This drawbar pull-speed-cut-off calibration data is needed, can be used especially with stoker fired engines advantageously, and can be obtained without a dynamometer car, as follows: An engine under test can be given a string of cars, about 25 per cent above the engine's rated capacity, on a selected section of track, the grade of which should be as nearly uniform as possible. An assisting engine should be coupled on the rear of the train for the regulation of the speed, while the engine at the head of the train should be run under constant cut-off conditions. A trial in the longest cut-off, at about two miles per hour, will locate immediately that portion of the train which the first engine will haul at that speed, this to be ascertained by observation of the slack between that portion of the train hauled by the leading engine under test and that portion of the train which is pushed by the engine which from the rear regulates the speed.

That portion of the train which the leading engine is thus found to be able to just handle can be reduced by about one car, and that portion of the train to the rear thereof cut off, leaving the engine under test at the head of the train coupled to a section thereof slightly less than it can just handle. Then, between two selected and marked points, 100 or 200 yards apart, the engine under test can be run at selected, fixed cut-offs and the difference precisely noted in the time required for the movement of the train between the two selected and marked points referred to. The differences in the drawbar pull developed by the locomotive under test, when being run at various fixed cut-offs, will be reflected immediately in the amount of time required for covering the marked distances. Any road foreman should be able to conduct such trials.

A motion that the paper be received and included in the proceedings was carried.

Railroad Mechanical Conventions in Russia*

By A. Lipetz,
Chief of the Russian
Mission of Ways of Communication.

You may be interested in knowing something about the conventions of the Russian Master Mechanics' and Master Car Builders' Associations, which we call Conventions of the Motive Power and Rolling Stock Mechanical Engineers of the Russian Railroads.

The first conventon of this kind took place, if my recollection is correct, in 1884. From that time on we held meetings almost every year. Our last convention, the twenty-ninth, took place in August, 1913, before the European war started.

I was very much pleased with the opportunity of attending the present convention because as a member of the Executive Committee of the last Russian convention, I am desirous of knowing what features of the Mechanical Section of the American Railroad Conventions it will be advisable to introduce into the Russian Association of Motive Power and Rolling Stock Mechanical Engineers.

Your association and our Russian association have much in common. While your association was busy with the standardization of details, our association from the beginning also started on standardization of rolling stock. The result is that all freight cars in Russia have been for over thirty years practically of a standard type; we had, before the war, about 500,000 of the so-called "normal" box cars of 22 tons capacity, about 80,000 "normal" flat cars, some standard gondola cars and standard tank cars, but very few cars of special design. These latter include milk cars, combined flat and rectangular tank cars, cars for special purposes belonging to private owners, which we call the "abnormal" cars. This enabled our railroads to adopt a general pooling system for car traffic where all cars are considered as general railroad property and are pooled over the entire railroad system. Every railroad is entitled to the use of as many "normal" box cars and as many "normal" flat car as it owns; if, therefore, one railroad delivers a certain number of cars to another road, the receiving road is obligated to deliver to the first road at the same point and on the same date, from midnight to midnight, an equal number of cars. The mechanical inspection and repairs take place wherever the cars happen to be at the particular time and the cost is charged to the railroad which owns the cars, at a certain schedule of rates. There can be no question of not having an axle, a wheel or another car part at any point as all cars are alike, and even cars of different types, as box cars, flat cars, gondola cars and tank cars have the same axles, wheels, couplers, buffers, brake parts, etc.

*Mr. Lipetz, at the invitation of Chairman Tollerton, made this address at the meeting of the Mechanical Section on Tuesday morning. By unanimous vote it was ordered that the address be incorporated in the association proceedings.

The locomotive standardization was taken up at the convention together with the Rolling Stock Committee, of the Railroad Administration in Petrograd, which practically means a "standardization committee." It was continuously, as the new traffic conditions required new types of engines. In 1876 there was established by law a standard railroad structure clearance diagram and a rolling stock clearance diagram, and in 1893 there was built the first standard freight locomotive—the so-called "normal" slow freight engine. In 1914, just before the war, there were 7,376 locomotives of this type, or 32.5 per cent of the total number of locomotives. In 1904 we started to design a fast freight engine and in 1914 there were 1300 or 5.7 per cent of this type. Then there were 600 slow heavy freight locomotives and in 1915 we designed and had built in the United States 1,075 Decapods, the standard fast heavy freight engine.

At almost every convention of our association a paper was presented by a committee about the results obtained from the service and performance of a standard type locomotive, usually the last, based on the data which could be obtained from different railroads.

It would be difficult for me to enumerate all the papers presented at our convention—I want to tell you only that every new question which came up, or every new device of some importance, was entrusted to a committee or to an individual for study and report. We started to investigate the superheating of steam in locomotives as early as 1898 and have made very extensive road tests with locomotives of different types with and without superheaters and the results were submitted to the convention; we have gone through very thoroughly the questions of tonnage rating, estimates of locomotive capacity and the investigation of the most economical design and operation of locomotives, etc.

But our conventions did not have the practical spirit, which I see here. Our railway supply industry is not so large and extensive as the American is, and our manufacturers never cared to exhibit their products. Therefore, we had to get acquainted with the new designs by visiting different railroads and shops. This developed the practice of changing the place of our conventions, choosing every year another place, usually one with large shops. This was also done with the purpose of giving to every road an opportunity for all their officials to attend the meetings of our conventions, as usually the long distance prevented them from attending every convention.

Comparing now our conventions with the present American Railroad Association, Section III, Mechanical Convention, I must state with pleasure that this convention is remarkable because of the extent of the knowledge which one can gather at the meetings, from papers, reports and discussions together with the practical information he receives at the exhibits. Here, in a week, he gets more than he can obtain in a year on his own road. By exchange of his practical knowledge with the other man's information he keeps himself on the level of the up-to-date mechanical science of railroading and absorbs sufficient information and inspiration to carry him over to the next convention. It is really—as Mr. W. T. Tyler said the other day—a "Post Graduate Course" for railroad men.

As a member of the Executive Committee of the Russian Conventions of Motive Power and Rolling Stock Mechanical Engineers, I want to convey to you the greetings and the best wishes of our association and to assure you that the honor which has been conferred upon me by including me into the membership of the best American Master Mechanics' Association will enable me to be more useful to my country in the expected reconstruction of our railroads.

The Enrollment Committee

EXCEPT THOSE who are intimately acquainted with the detail work over at the Enrollment Booth, few realize what a really big and oft-times thankless job it is. Registrants too often furnish inaccurate or incomplete information, such as giving the wrong hotel, room number or no hotel at all and then a correction has to be made in the official list. This one item alone runs into considerable extra work.

Again, someone sends an unknown secretary for a badge. Then it is that the committee must necessarily refuse to issue the badge, although the claimant may be of the highest character. It is obviously necessary that badges be issued to known parties and to no others, and when such a stand is taken by the committee it is only "playing the game according to the rules" and doing what is best for all interests.

Then there are the lost badges. No lost badge can be replaced, but in case of such accident, the owner is given a card which carries the privileges of the convention.

The getting out of the official list of enrollment is in itself an enterprising piece of publishing. Following the actual registration the registrant's number, name, title, business connection, hotel and room number must be transferred onto blanks prepared for the purpose in advance, they must be sorted as to classification, arranged by consecutive number and also alphabetized for cross reference. On certain days the registration is very heavy and it is necessary for the committee to buckle down to rapid detail work in order to get copy off by the last messenger to Philadelphia. The print shop works all night in order to print, bind and deliver 2,000 copies in Atlantic City by 6.30 A. M. each morning.

Added to all this work there always arise emergencies that have to be dealt with swiftly and accurately. One of those emergencies this year came because of the unexpectedly large attendance. The committee had arranged for a large number of badges, but before the end of the fourth day many of the classes of badges had been exhausted and cards had to be resorted to, which again drew on the diplomatic reserve of the committee in giving explanations.

President Walker in commenting upon the work of the Enrollment Committee says, "It has been this year an unusually trying task which the committee has handled with ability and tact and Mr. Gayetty, chairman, has voluntarily taken the responsibility and load from my shoulders in a very splendid way." The committee is certainly entitled to the gratitude of all attendants.

Baldwin Offices Abroad

WALLACE R. LEE is here from Philadelphia and reports that his company, the Baldwin Locomotive Works, will open a branch in Buenos Ayres in September under his direction. A Baldwin branch is also scheduled to open inMadrid, Spain, in July and will be in charge of H. P. Austin, a nephew of William L. Austin, until recently chairman of the board of directors of the Baldwin Locomotive Works.

Col. C. H. Crawford, recently discharged from service with the United States Government at the Eddystone munition plant will sail for Rio de Janeiro in August, where he will inaugurate the Brazilian branch for the same company.

Mr. Lee owes his appointment to the Argentina branch to his successful conduct of the West Indies office at Havana, Cuba, which under his direction grew into importance and favor.

A Topical Discussion of Air Brake Conditions

Spirited Exchange of Experiences by the East and the West; More Attention to Maintenance Needed

DURING THE SESSION of the convention held on Thursday of last week, the subject of air-brake conditions was taken up for discussion under the head of Questions Proposed by the Members. The universally unsatisfactory conditions of air-brake equipment was clearly developed during the long discussion which the subject provoked. An abstract of the discussion follows:

F. W. Brazier: I would like to call attention to the importance of the maintenance of the levers of air brakes. You would be surprised to read the Air Brake Association Proceedings in Chicago held last month. If you read Mr. Tatum's address, made before the Central Railroad Club in March and the discussion there, and see and know what you do know of the condition of air brakes on freight trains. At one time, up to February of this year we had 800 men in the car department of the New York Central doing nothing but maintaining air brakes. This included the men in the shops. That is an alarming situation, gentlemen, a payroll of $80,000 to $90,000 a month. Since the business dropped off we dropped off some of these men, but I am free to say that there is very little attention paid by some railroads to the condition of air brakes, and there is too much pneciling of tests made—the work is not done properly. I hope when you get home that you will take up with your officials the question of having men enough to maintain this important part of the equipment, that is, the condition of the brakes. Many operating officials think that inspection is a nuisance, but you must take time to properly repair and inspect, and get the brakes in first-class condition. This is one of the things that I can impress on every man that has charge of a car department throughout this country. The work we are trying to do and the work that you ought to be doing, if you are not, is the maintaining of the air brakes on the freight equipment.

C. E. Fuller (U. P.): I endorse what Mr. Brazier said. Cars come out to the West, where we have to go over mountains, and we have to stop trains on account of the brakes being practically out of date, retaining valves will not hold the pressure, and we cannot run the trains over the mountains. They do not need the retaining valves here in the East, but any one that goes out West and sees the condition of brakes and retainers will agree that we have got to get relief from the Eastern roads. We are hauling about 75 per cent foreign cars. We need the retainers on going over the mountains and we have to delay the loads for the purpose of cleaning them.

The Chairman: I was talking to a man the other day on an Eastern road about handling trains with air brakes. Of course, they only have hills, but there are some mighty stiff grades, and he said that those Western cars were so covered up with dust that it was impossible to handle them down grades, that they did not do any work on their cars out there—they don't need to.

Mr. Fuller: I agree with you fully. We just received some cars home within the last few days that were built in 1915 and 1916. I don't think they would hold anything. They have never been repaired. They send them home for us to repair them.

D. S. Watkins (S. P.): I am glad that Mr. Fuller and Mr. Brazier have brought up this question. I tried to get this body to include the draining of reservoirs in the report on Train Brake and Signal Equipment. A test of 251 cars was conducted in Los Angeles and in the case of 21 of them they had from one-half a cupful to a gallon and a half of water in the reservoir. Ninety-five per cent of them probably were foreign cars. The retainers are never touched. I do not believe that you pople here in the East realize what the retainer is there for. You put it on the car and when you paint the car daub up the exhaust port so they are perfectly useless. If it is not too late, and if it is in order, I would like to have my motion of yesterday reconsidered.

The Chairman: Every train that goes over the Jersey Central has the retainers used at some point on the Lehigh or Susquehanna division. We are probably more interested in retainers on the Jersey Central than eight-tenths of the roads in the United States, but it is a common complaint over there about the inattention to retainers on other people's cars.

P. P. Bartholomey (Great Nor.): We have found the same trouble on our road, and I would like to ask whether or not the kind of branch tee connection used in the train pipe has been noticed. I have found quite a number of cars with just a plain union tee that permits the water, if any gets in the train line, to go straight down into the branch pipe, and after the dust collector is filled there is no other place for it to go.

Mr. Watkins: Some of the cars were equipped with a tee; some were equipped with dust collectors, and the dust collectors were filled solid so you had to take a hammer and chisel to get the dust out.

C. F. Giles (L. & N.): Every one present remembers that we received instructions from the Federal Administration some time last fall to make a record and make a monthly report of the triple valves cleaned and other attention given to cars on repair tracks, and to the air brake equipment. Every man present who has been carrying out these instructions ought to know just exactly what he is doing. It was suggested in that order that if we succed in handling ten per cent that would take care of the air brake situation in good shape. We have exceeded that every month since that order came in. Last month we reached twelve per cent of the equipment handled on our line.

J. J. Tatum: Mr. Fuller says we have no grades in the East. We have some mountains to contend with, and inasmuch as I am somewhat acquainted with the other end of the country now, I believe we match up pretty well. If all of us did some work to get the air brakes in shape and put them in the condition the rules of this Association call for we will have good brakes, but we cannot do so by leaving the work to the other fellow.

I have some information that probably will surprise some of you. There were 175 cars tested at three different points as to air brake condition. The results were as follows:

Air Brakes—The number of cars with serviceable brakes, 135 out of 175; number of cars with non-serviceable brakes, 40 out of 175; number of cars cleaned within 12 months, 141; number of cars not cleaned within 12 months, 34; number of cars with train line leaks, 5 lb. per minute, or less, 60; number of cars, leaking more than 5 lb. per minute, 110.

Cylinder Leakage—Number of cars leaking 5 lb. per minute or less, 33; number of cars leaking more than 5 lb. per minute, 109.

Retaining Valves—Number of cars with serviceable retaining valves, 115; number of cars with non-serviceable retaining valves, 35.

Hand Brakes—Number of cars with operative hand brakes, 169; number of cars with hand brakes inoperative, 4.

Travel of Piston—Number of cars with travel of piston eight inches or less, 121; number of cars more than eight in. piston travel, 40.

The recapitulation of these figures is as follows:

Average train line leakage—5.5 lb. per min.
Average of cylinder leakage—16.5 lb. per min.
Train line test not taken on five cars on account of defects.
Cylinder tests not taken on 33 cars on account of defects.
Retaining valve test not taken on 25 cars on account of defects.
Piston travel tests not taken on 14 cars on account of defects.

That is more or less representative of the condition of the air brake equipment of this country. The air brakes were put under those cars at a very considerable cost to the railroads, and they surely should be maintained in serviceable condition, for the reason they were applied so that the locomotive engineer could properly control his train.

It is not the fault of this association that these conditions exist. The association is giving you information that will enable you to put the brakes under your cars in good condition. The difficulty is that we have not complied with the requirements of these instructions. That is no reflection on the association; it is a reflection on the individual railroad.

The fact has been stated that the Railroad Administration has suggested that the record be kept of the number of cars on which air brakes were cared for. The idea of that record is to inform the official responsible for the condition of these brakes whether or not they were taking care of a sufficient number of the equipment to maintain the air brakes in proper condition.

We find in various investigations that some of our car men say that the superintendents will not permit them to hold the trains. As a result of my investigations I believe that the car men do not always state their case fairly to the official who is responsible for these conditions, because I believe if the seriousness of the condition were made clear, the operating officer would give the car man opportunity to hold the cars and properly repair the brakes.

J. N. Milton (Rock Island): I was in Kansas a few days ago, and I find that the Western Lines are using to-day about 70 or 75 per cent of foreign equipment, and the equipment comes to our yards and our large terminals such as Chicago, Memphis or Kansas City, so rapidly that we cannot tie the cars up to give attention to the brakes in the proper manner without blocking the terminal. A railroad can handle just so much equipment, and the roads are compelled to let these cars go through as they are turned over to them in interchange.

J. J. Tatum: In regard to the blocking of terminals, I believe the existing conditions would almost bring that about, but if each railroad had performed the work it should have performed, we would not have had these conditions and our railroads would be open.

G. H. Wood (A. T. & S. F.): The members of the association have no dearth of instruction or information as to how to keep the brakes up. Mr. Tatum intimated that we had been talking about the thing too much and not doing it. That is the fact. Mr. Milton says we have not time to give the air brakes attention when the cars come to us. I do not know of a superintendent on any railroad who would tell you to run your train out without sufficient brakes, in order to control its safety. The superintendents want the trains controlled safely, and the reason we do not get the brakes fixed up is because we do not go at it and do it. I have seen hundreds of cars standing around in the yards, and standing there for days, and nobody looks at them as far as the brakes are concerned, and no provision is made that will compel them to do it. When we send the brakes out in improper condition, there is more delay on the road due to trouble with the brakes than would be required to put the brakes in proper order.

I want to appeal to the members to go at the thing along the lines we have laid down, and use the instructions and use them where you can use them. If the regional directors will check up the number of cars reported as cleaned, oiled and tested, on the railroads in their territory, they would find out that all over this country we are cleaning two or three times as many cars as there are in the country, and we are not doing a good job, simply because we do not take the time to do the job right. If the job is being done poorly, that is not the fault of the man doing the work, but our fault, because we do not insist upon its being done properly. At some points where brake work is done there is nobody directly in charge of the work. The only way to keep them in the best possible condition is to put them in that condition when we first clean them, and we will find by doing this that we will get much more satisfactory results.

Cast Steel Chain

The beginning of the world war found chain makers quite as unprepared as all other industries. The Government called for production of anchor chain and the answer from makers of forged chain indicated that the required amount could not be produced. Chain makers cannot learn their trade in a day. Then the new idea insisted on recognition. Chain had never been cast, but necessity met the emergency. Cast steel molders produced a chain stronger than the forged chain, cast in any desired length and in any size. Perhaps no more significant instance can be found of the far-reaching influence of the war. Forged iron chain, that for so long had held supremacy, almost in a day finds a rival which may be its master.

Conventionalities

"Big Dan" Cunningham's daughter, Miss Margaret, arrived here with her mother and sister, Dorothy, Sunday evening from Salt Lake City, and will remain until the end of the convention.



H. W. Ridgeway, Superintendent of Motive Power, Colorado & Southern, and Mrs. Ridgeway.

B. J. Coffman, acting mechanical engineer of the Richmond & Potomac, is attending his first convention. It is also his first visit to Atlantic City and he is enjoying every minute of it.



R. H. Dyer, Supervisor of Car Repairs, U. S. R. A.

This is the first convention George W. Wilden has attended as a railway supply man. He came to the last convention as superintendent of motive power of the New Haven. He is here this year as general manager of the Westinghouse Air Brake Company.

Mr. Michel, of A. Eugene Michel and Staff, advertising engineers, is here but is conspicuous by his absence from the pier, not that he hasn't the necessary headgear and overalls, but that he might the better serve his clients, he has been sticking pretty close to his temporary office in the Alamac Hotel.



John Winterstsen, Cornwall Railroad, and Edward Clark, General Mechanical Foreman, Cornwall Railroad

It is probable that among the convention visitors could be found men and women with almost every form of accomplishment; and there are not a few men among them who have won fame in the game of golf. For instance, R. C. Vilas, president of the Pyle National Company, is now champion of the Exmoor Club, at Chicago. Robert Gwaltney, of the Symington Company, has been champion of New Jersey. Clayton Ingraham, president of the National Waste Company, is a fine player, and recently gave Max Marston a hard contest in a tournament, being beaten only one down by Marston. E. Hoover Bankard, of the Globe Seamless Tube Company, who is chairman of the Entertainment Committee this year, is a splendid player, and long has been chairman of the Green Committee of the Midlothian Country Club at Chicago. D. E. Sawyer, who recently went with the Pollak Steel Company, long has been



C. F. Giles, Superintendent of Motive Power, L. & N., and Mrs. Giles

known as one of the best golf players in the country. A team of a dozen players could be organized from



A. L. Humphrey. W. S. Bartholomew. and George W. Wildin; the Latter Attending His First Convention as a Railway Supply Man

among the attendants at the convention which would give any other team of amateurs in the country mighty hard competition.



Left to Right. C. S. Patton, Supt. Motive Power, S. A. L.; J. W. Sasser, Supt. Motive Power, Norfolk Southern; Thomas Murcott, of Murcott & Campbell; C. H. Terrell, Assistant Supt. Motive Power, C. & O.; W. S. Butler, Master Mechanic, C. & O.; S. B. Andrews, Mechanical Engineer, S. A. L; E. A. Murray, Master Mechanic, C. & O.

To get a free ride in an aeroplane, and in addition receive a taxicab ride and $525 for taking it, would indicate that the man getting them was a business man as well as a sportsman. George Christianson, of the Johns-Manville Company, did it. Some of the other representa-



(Left) Willard Kells, General Superintendent of Motive Power, Atlantic Coast Line, and William Owens of the New York Air Brake Company

tives of the same company offered to bet him $50 to $25 that he would not take an air trip This started the conversation. Mr. Christianson took the aeroplane ride yes-



R. E. Mercur, Traffic Manager Westmoreland Coal Co., and his son, Henry.

terday, went in a taxicab to and from the place of ascension, all at the expense of his associates, and was $525 to the good at the expense of nine of them when he came down.

How's this for Friday, the thirteenth and persistency? R. D. Stevenson, president of the Safety Nut and Bolt Company, Cleveland, Ohio, left for Atlantic City in his machine at 4.30 P. M., Friday the thirteenth of June. His entire exhibit was loaded in the rear of the tonneau. After proceeding a half dozen blocks he turned into a street which had recently been paved with asphalt and was oily and slippery. A horse and wagon appeared from an alley and a street car running alongside of them closed the gap, preventing further progress. In applying the brakes the car slid sideways and crushed the right side



James Tierney, Master Mechanic, Louisiana & Arkansas, Mrs. Tierney and a future Master Mechanic, Stanley Tierney.

against the wagon; then the street car hit and crushed the left side of the car. After untangling the machine from the mix-up, he found the engine still running smoothly and the front axles in line—so he started again. When about 20 miles out of Cleveland the emergency brake, which had been set too tight in the beginning, burnt up and it was necessary to call in the assistance of a neighboring farm boy, who rushed a pail of water to the machine. After adjusting the brakes he proceeded, reaching Pittsburgh at 2.30 A. M. Saturday. Here ended his troubles as the balance of the trip to Atlantic City was without further troubles.



Guests at Dinner Given in Honor of Frank McManamy on Saturday Evening

P. C. Cady, well known in electric headlight circles, was seen in the Traymore dining room yesterday with



C. M. Dally, Machinist, C. R. R. of N. J.; H. L. Sandhas, General Inspector, C. R. R. of N. J.

five of the recently arrived Latin-American visitors. We don't know where Paul acquired his knowledge of Span-



George Thompson, M. C. B., New York Central, and George F. Laughlin, Superintendent Car Department, Armour Car Lines

ish, but he seemed to be following them closely. One of his guests admitted that on his first visit to the United



Franklin Hess, Son of George F. Hess, Mechanical Superintendent, Kansas City Southern, and Ellsworth L. Mills, American Reduction Sales Company

States some years ago he indicated his choice on the menu and was served with five different kinds of salads. He says that he didn't have the courage to send them back, so he ate them all and the waiter took him for a vegetarian.

Señor Juan M. Clark, formerly administrator of Central Perserverancia, one of the seventeen properties of the Cuba Cane Sugar Corporation, located in the Province of Santa Clara, Cuba, is the latest arrival of distinguished visitors from the "Pearl of the Antilles." Mr. Clark represents the corporation, which is said to be the largest producer of sugar in the world. It owns more



Left to Right: P. Vilaseca of J. Vileseca Bas, Importers; Ramon Morros of the Railway Construction and Materials Company, both of Barcelona

than 2,000 cars and over 100 locomotives, which, in addition to being equipped with electric headlights, are rapidly being converted into oil burners. Mr. Clark, who is at the Dennis, will return to Havana next Saturday. Mr. Clark was joined on Monday morning by several of his "amigos" from Cuba, consisting of Señor Alberto Gou, of Central Lequertio, in the Province of Santa Clara, also



W. O. Thompson and F. W. Brazier, New York Central

a property of the Cuba Cane Sugar Corporation. Mr. Cou is accompanied by his son "Albertico," who will enter one of the engineering schools in the United States. Other members of this group of distinguished visitors include Señor Santiago Estevez, general manager of the Cardenas-American Sugar Company, of Cardenas, Cuba, who is with his son, Santiago, Jr., a student at the University of Pennsylvania.



Deniston Wood, Assistant Mechanical Engineer, Southern Pacific



Andre Rhue, Engineer, Schneider et Cie. Creusot Works, Paris, France.



(Left) C. B. Keiser, Superintendent Motive Power, P. R. R., and (Right) J. L. Cunningham, Superintendent Motive Power, P. R. R.

The New England Railroad Club at its annual meeting usually presents a program purposely intended to "mix up" the members and furnish entertainment. At the last meeting in March, two of our conventionites



Left to Right: E. F. Durham, General Car Inspector, M. K. & T. R. R.; R. L. Burch, General Car Foreman, Kansas City Suothern R. R.; S. W. Devinnt, Joint Inter-Change Car Inspector, U. S. R. A.

put on a sketch that broke all encore records and made a decided hit. N. A. Campbell, with the New York Air Brake Company for over twenty years, much better known as "Sandy" or "Scotty," is an artist at telling Scotch stories. His friends say that he never has had



a "chestnut" in his "reservoir" and that he is in great demand as a story teller. George W. Denyven, of the Parkesburg Iron Company, Rome Iron Mills and the Pollak Steel Company, is also a dialect story teller and plays the bagpipe. He has been at all of the conventions for nine years and takes an active part in the

show, this year serving as a member of the Enrollment Committee. "Deny" says he can play grand opera on the bagpipe, but the best we have ever heard is "Cock of the North" and "How Dry I Am." As a result of the sketch put on at the N. E. R. R. Club, they were offered flattering terms to go on the stage, due to the fact that it is reported Harry Lauder is about to retire.

"Multum in Parvo"

"Lunch?"
"Bowl?"
"Well, good-bye."

Five words, and yet there is the whole story told about a friend of ours and yours—a prominent member of Section III, Mechanical, American Railroad Association; an ex-president of the M. C. B. or the M. M. Association, we will not say which. The gentleman is not given to the use of many words; he never was and never will be. And yet the sympathetic sign of approval or the rather stern sign of disapproval, always unmistakably noted in his eyes or in the nod of his head plainly indicate the trend of his thought to the listener.



Samuel Lynn, Master Car Builder, P. & L. E., and Karl Berg, Mechanical Engineer, P. & L. E.



The Visitors From Latin America

Left to Right: Ben Elliot, Master Car Builder, United Railways of Havara; Frank De Wolff, Locomotive Superintendent, Cuban Central Railway; O. R. Hale, Locomotive Superintendent, United Railways of Havana; Juan Henderson, General Inspector of Locomotives, United Railways of Havana, and Juan Romañach, Locomotive Superintendent of the Cuba Cane Sugar Corporation—all of Havana.



More Latin-American Visitors

Left to Right: "Albertico" Gou, Santiago Estevez, general manager, Cardenas American Sugar Co., Cardenas; Juan M. Clark, Cuba Cane Sugar Corporation, Havana; Alberto Gou, administrator Central Lequeitio; Lequeitio Santiago Estevez, Jr., of of the University of Pennsylvania

Well, one day a long-time friend from a distant city called. He was greeted with a hearty handshake and inasmuch as the hour of the day was about luncheon time our railroad friend looked into the eyes of the visitor in a kindly way and simply said:



Admiral C. W. Dyson, U. S. N., and Mrs. Dyson

"Lunch?"

The man from out of town thanked the gentleman for the invitation and the two men proceeded to a club where an attractive luncheon was served. Of course, the guest chose for the meal the appetizing things he desired and the host simply smiled in an approving way to the waiter. So the order was duplicated. During the meal the guest did quite all of the talking we are informed, but he was at all times listened to in a friendly and interestedly manner. As they rose from the table the host said simply:

"Bowl?"

"Why, yes, I'd like to," said the guest. So they went to a nearby bowling alley and enoyed two frames of the game. As the two men left the place the guest thanked his host for a most pleasant luncheon and said he must be on his way. A hearty hand shake followed as our railroad friend said simply:

"Good-bye."

A temporary illness in New York prevented the early arrival at Atlantic City of George W. Lyndon, president of the Association of Manufacturers of Chilled Car Wheels. Mr. Lyndon, however, was on hand shortly after the opening exercises and will remain until the close.



Left to Right: F. S. Gallagher, Assistant Engineer of Rolling Stock, N. Y. C.; T. J. Burns, Supt. Rolling Stock, M. C.; W. H. Flynn, Supt. Motive Power, M. C.; G. E. Parks, Mechanical Engineer, M. C., and D. F. Jennings, of Guilford S. Wood Co.



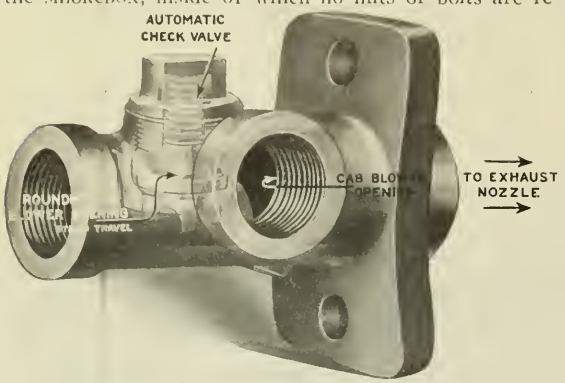
Left to Right: William Schlafge, General Mechanical Superintendent, Erie; Miss Carroll, sister of Mrs. Quinn; M. Quinn, General Foreman Car Repairs, Erie Lines, East; Mrs. Quinn; F. M. Graff, Superintendent Apprentices and Production, Erie; Stanley Bullard, Bullard Machine Tool Co.; A. G. Trumbull, Assistant General Mechanical Superintendent, Erie

New Devices Among the Exhibits

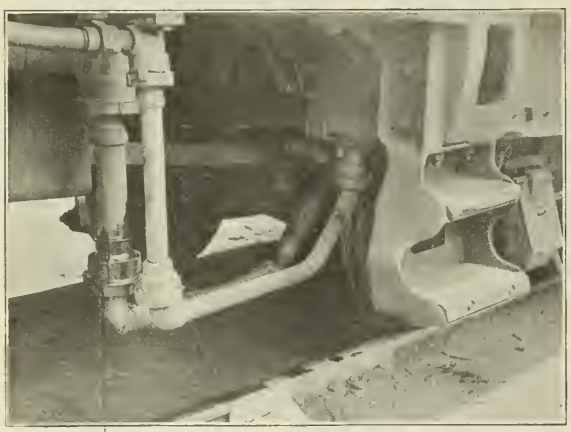
Automatic Smokebox Blower Fitting

LEAKLESS, PLUGLESS, THREADLESS, automatic in action, and always ready, are some of the claims made for the automatic smokebox blower fitting, which is so plainly illustrated in the photograph that it requires but slight description.

Cap screws secure the flange or body of the fitting to the smokebox, inside of which no nuts or bolts are required. All that is required in the attaching of the roundhouse steam hose is to screw it on and turn on the steam; the check valve is raised by the steam in its passage to the smokebox. When steam is up and the roundhouse pipe is disconnected, the blower valve in the cab furnishes the balance of the draft necessary and the check valve prevents leakage of steam to the atmosphere. This device, which is applied to all United States Standard locomotives is known as the Barco automatic smokebox blower fitting and is made by the Barco Manufacturing Company, Chicago.



Automatic Smoke Box Blower Fitting



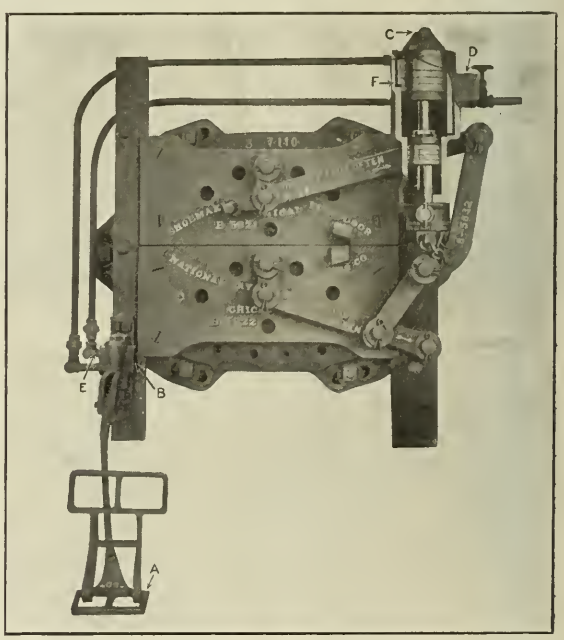
Barco 3-V Feed Water Connection

The Barco 3-V type engine tender connection which has been used for some time for air and steam lines, is now being used for water connections as well. The illustration below shows a typical application. For this purpose 2½-in. joints and 2½-in. extra heavy pipe are used. One of the important advantages of the arrangement is its reliability. There is no possibility of a loose lining obstructing the flow of water, the connection cannot collapse, and if "blowing back" is necessary there is no danger that it will burst or be blown off. In addition to the increase reliability it is claimed that a reduction in the cost of maintenance is secured by the use of the Barco water connection.

A Vertical Automatic Fire Door

THE NATIONAL RAILWAY DEVICES COMPANY, Chicago, is exhibiting the Shoemaker vertical automatic fire door as applied to the United States Railroad Administration locomotives. This door is of the balanced type and is pneumatically operated, both in the opening and closing movement.

The short leverage required to move the doors and the short piston travel necessary to operate the levers are distinctive features. In the opening operation of this door the pedal *A* is pressed downward, thus lifting a foot valve which closes the exhaust port *B*, admitting air through the foot valve and the admission valve *C* to the top side of the large piston, which forces both the pistons downward. The check valve *D* admits a constant air reservoir pressure into the cylinder between the two pistons, and at the same time as the downward movement reduces the volume between them, a proportionately greater pressure is built up, which near the completion



The Shoemaker Door In Closed Position

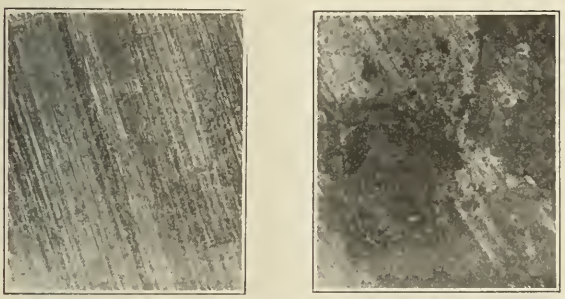
of the stroke balances with the reservoir pressure and brings the door to the open position without shock.

To close the door the pedal A is released, thus setting the foot valve which blocks the air at E. Port B opens, permitting the free escape of air through port F, forcing the pistons upward because of the greater pressure underneath. When port F is closed by the large piston an air cushion is formed in the top of the cylinder, and as this is relieved through a small hole in the plunger of the admission valve, the door closes without slamming. The doors can be cracked by means of the pawl at the lower end of the air cylinder.

This company is also showing a Shoemaker fire door of the vertical automatic twin type, designed for application to locomotives having wide fire door openings, such as those used in the anthracite regions. The design of this door permits the exposing of one-half of the door opening, while the other half remains closed, thus admitting less air into the firebox and at the same time providing ample opening for convenient firing.

Chemical Specialties for Railroad Use

WITHIN THE PAST YEAR the Dearborn Chemical Company, Chicago, has brought out a compound for rust prevention known as No-Ox-Id. This product is said to keep metal surfaces in perfect condition when exposed to the elements for months. It is used extensively by the War Department to protect guns, machinery, airplanes and munitions from rust. The illustration shows the condition of two pieces of metal,



Comparative Corrosion of Metal Protected by No-Ox-Id and by Oil

one coated with No-Ox-Id and the other covered with oil, after exposure to the weather. The part covered with No-Ox-Id was not rusted, while the other piece was badly corroded in spite of the coating of oil. No-Ox-Id has been adopted by manufacturers of steel products of every kind and, in view of the great need for a thoroughly efficient rust preventive, in railroad work, it is anticipated that it will find a wide field of application.

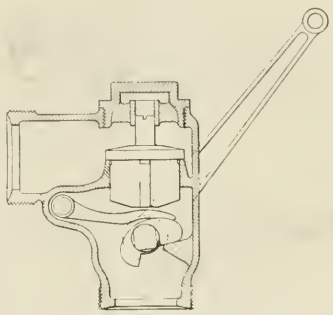
Dearboline is another article of interest to railway men and is intended for use in cleaning metals. It is adapted for washing steel cars and for general metal washing purposes and is economical and effective for cleaning locomotives and car trucks of accumulated dirt.

Dearboline is free from acid or other corrosive substances, and does not harm painted or varnished surfaces. It is extensively used to remove grease, cutting compounds, oils, iron filings, and other foreign substances, from iron or steel articles during the manufacturing process. Other new products of the Dearborn Chemical Company are cutting, quenching and drawing oils, and Kleen-Kleen, a cleansing preparation which has many uses.

Drifting Valve

A SAFE, QUICK-OPENING DRIFTING VALVE, easily operated by hand or by an extension rod, even under the highest boiler pressure, is being exhibited by William Sellers & Co., Inc., Philadelphia, Pa.

It is intended to be used in open or closed positions only. The special feature is the cam cast solid with the stem operating a latch, and which by compound leverage raises a loosely fitting winged check. It is a type of



Sectional View of Drifting Valve

valve which remains tight in service, is easily accessible and can be reground or the valve replaced without removing from the pipes.

The older form of quick-opening drifting valve consisted of a pilot and main valve placed on a horizontal step; this form was always difficult to keep steam tight; the present form by its simplicity and the special design of steam check, eliminates all the objections to the quick-opening hand operating drifting valve.

Electric Rivet Heater

THE BERWICK ELECTRIC RIVET HEATER is an inductive type of furnace. It consists of a primary coil to suit characteristics of the alternating current supply and a very heavy secondary coil of only one turn; this secondary is divided at one end into four electrodes.

The electrodes of the heater are opened and closed by foot pedals, and pedal connections are used with compression springs. The primary coil is so constructed that a free air circulation keeps the windings cool.

Rivet heating is done by inserting the cold rivet lengthwise between the electrodes and then closing the line switch, which is very conveniently located at the left side of the heater where the operator has control of the heating at all times, thereby saving unnecessary fuel loss and burned rivets.

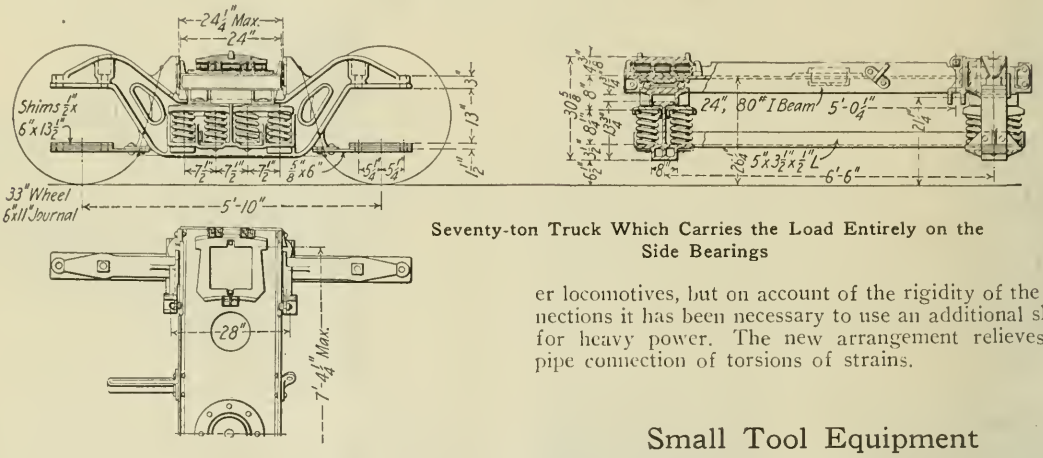
This heater is built in four sizes to heat rivets, ¼ in. by 2 in. up to 1⅜ in. by 10 in. It is claimed that the current consumption is 20 kilowatt hours per 100 lb. of rivets.

It embodies the feature of being portable, simple to operate, makes no smoke or fumes, and is economical.

The heater is made by the American Car and Foundry Company.

Barber 70-Ton Truck

A TRUCK OF 70 TONS CAPACITY in which the load is carried entirely on the side bearings has been developed by the Standard Car Truck Company, Chicago, and is being exhibited on the pier. This type of construction delivers the load from the body bolster directly over the center of each side frame and materially reduces stresses in the truck bolster. In the design which is being exhibited the side bearings are spaced 6 ft. 6 in. from center to center. Each side bearing has twelve rollers 2 in. in diameter and 3¼ in. long, located radially about the center pin. The base of the roller casing is bolted to the truck bolster. The center section, when assembled, locks the rollers in place and the top of the casing is curved to allow the bearing to adjust itself to the irregularities of the track. The center pin extends through the bolster but no load is carried at this point, the pin serving only to pivot the truck and to move it.



Seventy-ton Truck Which Carries the Load Entirely on the Side Bearings

Each end of the bolster rests on lateral rollers which seat in a casting fitting into the spring caps and bridging the compression member of the truck side frame. Eight M. C. B. Class B springs are used arranged in two nests of four each. If desired, six springs of greater capacity can also be used. The spring plank consists of two 5 in. by 3½ in. by ½ in. angles. The side frames are of cast steel, the compression member being lowered to pass under the bolster. This truck has been in service for some time and a car equipped with it is being exhibited at Mississippi Avenue.

Pneumatically Operated Cable Hoist

AMONG THE DEVICES EXHIBITED by the Independent Pneumatic Tool Company, Chicago, is a one-ton pneumatic hoist which is equipped with a motor similar to that used in corner drills. The main features of the hoist are the worm drive and automatic stop arrangement, which prevents jamming of the cables at any point. The worm drive is designed to suspend the load indefinitely. The reversing mechanism has a cam attached to a parallel shaft, which engages a geared tooth rack, shifting the position of the eccentric, and thereby giving the operator absolute control of the load at all times. It is equipped with roller bearings throughout, which, in addition to the oil splash design, reduces friction to a minimum. When in operation it is impossible for the cable to work out of the grooves and cross or jam, thus eliminating a trouble usually found in all pneumatic hoists. Hoists of this type are being manufactured in capacities ranging from one-half to three tons.

Increased Flexibility in Engine and Tender Pipe Connections

THE FRANKLIN RAILWAY SUPPLY COMPANY, New York, is exhibiting an application of the McLaughlin joints for engine and tender pipe connections which is made up of three double joints instead of the usual arrangement of two double and one single joint. The latter arrangement has proved satisfactory on smaller locomotives, but on account of the rigidity of the connections it has been necessary to use an additional sleeve for heavy power. The new arrangement relieves the pipe connection of torsions of strains.

Small Tool Equipment

THE WILLIAM BREWSTER COMPANY, 30 Church Street, New York, is exhibiting what is known as Bell-Mouth sockets and sleeves for drills. These tools are standard sockets and sleeves with a bell mouth or annular recess at the open end. This recess protects the taper tool seat no matter how badly the outside edge of the sleeve or socket is battered. This device overcomes the troubles so frequently encountered with a drill or reamer which is used in a socket that has been so battered that the tool seat is irregular and causes the tool to wabble. With the use of the Bell Mouth socket this cannot occur as the taper seat is protected by the bell mouth, and the life of both the socket and the tool itself is greatly prolonged.

De-Magnetizer

The Bulldog De-Magnetizer is a device designed for the purpose of de-magnetizing such tools as milling cutters, files, micrometers, etc., which, due to magnetism, collect small particles of metal which adhere to the cutting edges and lower the efficiency of the tool. The device consists of a de-magnetizer in a rectangular container with a flexible connection that may be readily attached to any lighting fixture.

The machine is ready to connect to 110 volts or 220 volts, 60-cycle ,single phase, alternating current circuit, or may be furnished to connect to other requencies and voltages. If direct current only is available, a D-C to A-C rotary converter can be used. There are no moving parts—therefore, no repairs. This device absolutely eliminates all magnetism instantly and the power consumed is approximately the same as used in burning an ordinary light bulb.

This company is also showing the Etchograph, which is an electric marking apparatus for use in marking tools,

micrometers, gages, etc., and is valuable because of its flexibility and the ease and speed with which it may be used. The only wearing part is the point of the pencil which may be replaced with ordinary copper wire. This device may be connected to a lighting fixture, and it uses power only when it is etching.

The Brewster Company also show the vertical drilling and counter sinking devices manufactured by the Liberty Tool Company, of Baltimore, Md., which were described in the daily *Railway Age* on June 20.

Oil Handling Apparatus

In connection with the discussion as to the advisability of eliminating the bottom outlet valve from tank cars it is interesting to note that there is being exhibited at the convention, equipment developed as the result of a careful survey and analysis of the conditions covered in the paper by A. W. Gibbs and the discussion on that subject. S. F. Bowser & Co., Fort Wayne, Ind., have developed equipment for unloading and measuring the contents of tank cars without opening the bottom outlet valve. To accomplish this a special suction connection of the rigid or non-rigid type is inserted in the manhole of the tank car to be emptied. This pipe is carried to a direct connected, motor driven pump, of a type adapted to the liquid or liquids to be handled. An automatic self-measuring and self-regulating control gives a record of the contents removed accurate to one-half of one per cent and also controls the operation of the pump.

The same equipment can be used for the distribution of oil to the point where it is used or to containers in which it is shipped, in any predetermined quantity. The advantages over the present methods secured by the use of this equipment consist in the elimination of the possibility of spillage and leakage and the saving of time and labor. It insures the safe and rapid transfer of the entire contents of the tank car to the permanent storage without the necessity for constant attendance, and is so designed as to be practically foolproof in its operation.

Murphy Solidsteel Plate Roof

In an endeavor to provide a design adapted to present conditions, the Standard Railway Equipment Company, Chicago, has developed a new type of roof known as the Murphy Solidsteel roof. This roof makes the steel superstructure a solid unit and not only protects the lading, but also serves as a cover plate for the superstructure. Weaving on a riveted joint very soon loosens rivets or crystalizes and breaks the metal, so that in steel car construction in order to obtain the best efficiency it is necessary to eliminate weaving. In this class of equipment the solid steel rigid roof ties the top securely and makes the entire body of the car act in unison to prevent weaving and a consequent enlargement of bolt holes and distortion of the wooden lining.

The Murphy Solidsteel roof has outside carlines formed by upstanding flanges on the roof sheets in combination with a seam cap secured together with horizontal rivets, both heads of which are outside the car, so that a loose or bad rivet cannot cause a leak. The outside edge of the roof is riveted to the side plate in such a manner that both heads are outside of the car, and no leaks can be caused by loose rivets. The outside carlines give the maximum inside clearance for lading. On double sheathed cars with wooden sides and ends it is impossible to prevent a certain amount of weaving due to the shrinkage of the lumber; therefore a flexible roof was necessary on that type of equipment. But on the modern steel underframe, steel frame box car, with underframe, ends and sides securely riveted together, a roof which will add to the strength of the entire structure is felt to be necessary.

A High Heat Resisting Brick

A specially prepared cellular insulating refractory brick for furnaces and other structures which is made in standard firebrick sizes and other special shapes, and whose weight is said to be about one-half of the ordinary firebrick, is the latest product of the Quigley Furnace Specialties Company, New York. This material, called Insulbrix, is shown in its booth. It is stated that insulbrix has a low thermo conductivity, one inch of insulbrix being equal to six to ten times the same thickness of fire or red brick. It is also said to have high heat resisting qualities, the fusing point being 2,900 deg. F. without showing shrinkage at as high a temperature as 1,800 deg. F. This material, it is said, will withstand a crushing strength of over 425 lbs. to the square inch.

The Quigley Company is also exhibiting a new and specially designed controller for the close regulation of fuel feed from furnace bins to individual burners in furnaces. By turning a handwheel the fuel feed may be adjusted for any range of control between minimum and maximum capacity. The feed screw is driven at constant speed, but the adjustment of the feed to the burner is accomplished by means of a diaphragm or pair of shutters closing around the screw, giving an adjustable opening leading to the discharge head.

Tuco North Pole Sanitary Drinking Fountain

The Tuco Products Corporation, New York, is exhibiting a sanitary drinking fountain, the construction and operation of which involves a number of interesting features. The fountain proper consists of three parts, a filter, a storage tank for filtered water and an ice compartment, in the bottom of which is placed a shallow, enclosed cooling pan, through which the water flows from the storage tank to the faucet. The water supply is drawn from the air pressure water system, first passing through a filter stone into the storage tank. The water is drawn from the faucet directly from the cooling tank, which holds about three cups. The ice compartment which is located below the storage tank, where it is readily accessible, is insulated to prevent undue thawing of the ice.

Provision is made for convenient and thorough cleaning of all parts of the cooler. By the removal of five clamps the filter casing may be removed and the stone taken out by unscrewing the pipe connection, with which it is attached to the fixed end of the filter case. It is then easily and thoroughly cleaned by steam or submersion in hot water. An opening is provided on the front of the storage tank near the bottom, which is closed by a plug. Removal of this plug permits the interior of the tank to be cleaned by the insertion of a steam nozzle. To drain the system a cock is opened in the bottom of the cooling tank, which permits the water in the storage tank to flow directly into the ice chamber and thence out through the drain. The drain from the ice chamber is closed by a tubular plug, the opening into which is located several inches above the bottom of the chamber. The removal of this plug allows the ice chamber to be drained.

These filters have been in service for several years in a large number of coaches on several railway systems. The service has demonstrated that the cooler is sanitary. The ice and drinking water are not in contact, and the filter removes all sediment which may pass to it from the compressed air storage system. The insulated ice tank has effected a saving of 50 to 60 per cent as compared with the ordinary type of water cooler. This saving was demonstrated in tests in comparison with both sleeping cars and ordinary day coaches, and it reduces the amount of labor required to keep the filter in operation because icing is less frequent. It also prevents the waste of water as the rate of flow is such that only one glass of water will flow freely at one time. It is also safer to keep in operation than the ordinary water coolers because filling does not require the use of ladders and buckets or hose, on top of the car.

The cooler equipment, complete, is enclosed in a compartment which opens on the inside of the car with the ice tank located at a convenient height for filling.

National Car Door

One of the devices exhibited on the pier which has been developed since the last convention is the National car door. This door is supported directly on the underframe on rollers of large diameter, mounted in brackets which do away with the track. This method of support was adopted to place the weight of the door at the point where the distortion of the frame would be a minimum. The rollers themselves are designed to prevent freezing up with snow or ice and can be loosened by a slight jar in case they clog. The bottom of the bracket is opened, permitting any foreign matter to fall through. The door being supported at the bottom brings the handle close to the line of support and prevents binding or cocking.

The top interlocking feature is so arranged that snow and ice cannot accumulate and prevent free movement of the door; with the front and back interlocking connection to the door post it forms a weather and spark-proof construction. By the use of beveled rollers in the brackets the door when shut is kept tight against the car. Flat rollers and a lug on the brackets keep the door away from the car when open, preventing binding and injury to the sheathing and insuring easy operation. This door is built by the Union Metal Products Company, Chicago, and has been specified for application to the entire 25,000 double sheathed box cars ordered by the United States Railroad Administration.

Moncrieff's Reflex Gage Glass

Prior to the war a large number of reflex water gage glasses were imported from Germany and this glass was considered the most satisfactory for the purpose. Since the supply of German glass has been cut off many inferior glasses have been thrown upon the market which have indirectly injured the reputation of the Klinger type gage. During the war a process was developed by John Moncrieff, Ltd., Perth, Scotland, manufacturers of tubular gage glasses, for the manufacture of a specially toughened reflex gage glass. The glasses are not moulded, but are cut from a special quality of plate glass and toughened. They are said to withstand a steam pressure of 350 lb. or more, and have withstood the severest acceptance tests. The British Admiralty tests glasses of this kind by dropping a six-ounce ball from a height of seven feet on the glass, which is supported at the ends. It has been tested in the same manner with an eight-ounce hard wood ball, without injuring or fracturing the glass. The Moncrieff reflex gage glasses are distributed in the United States by H. A. Rogers Company, New York.

Single Hoist Grab Bucket

The description of the automatic single hoist grab bucket, exhibited by Edgar E. Brosius, Pittsburgh, Pa., which appeared on page 1694 of the June 23d issue of the *Daily Railway Age*, was accompanied by an illustration showing a single hook grab bucket instead of an automatic single hoist grab bucket. The single hook bucket operates on a one-drum crane and can be taken off in the same manner as a sling chain. The automatic single hoist grab bucket differs from the one which was illustrated in that it is on the machine permanently, with the sheave block attached to the hinge frame and the rope extending up directly to the hoist drum. This type of bucket dumps automatically from a predetermined height.

Pulverized Coal Locomotive on Mississippi Avenue

On the Mississippi Avenue track, near Pacific Avenue, is a Lehigh Valley 10-wheel locomotive, which has just been equipped for burning pulverized coal, by the Fuller Engineering Company, Allentown, Pa. This locomotive arrived at Atlantic City too late to be exhibited during the first week of the convention, but is now ready for inspection.

The locomotive has a Wootten type boiler, and the equipment is designed to handle either all anthracite or all bituminous coal, or a 50 per cent mixture of both. The engine is being kept under steam in order to demonstrate the equipment in actual operation.

A New Departure in Sheet Metal Cutting

A machine which allows the cutting of a sheet of metal into practically any desired shape, leaving every portion of the material in its former flat condition, is being exhibited by the Swind Machinery Company, of Philadelphia, Pa. It is known as Gray's sheet metal cutter and is manufactured by the W. J. Savage Company, Inc., Knoxville, Tenn.

The process of cutting takes out a clean kerf much the same as a jig saw does in wood, the stock being guided in any direction at the will of the operator. The metal is automatically advanced to the cutter in a manner which resembles the feeding of the cloth to the needle of a sewing machine. The use of this machine is said to eliminate the necessity of straightening out material, which after being cut with the usual methods invariably tends to curl or buckle.

This machine at present is being made in four sizes and will cut metal up to and including $\frac{5}{8}$ in. in thickness; it is specially useful in cutting out lagging plates, liners and templates.

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WE GUARANTEE that of this issue, 15,925 copies were printed; that of these 15,925 copies, 15,406 were mailed to regular paid subscribers to the Railway Age and the Railway Mechanical Engineer; 119 were mailed to advertisers, 300 were provided for counter and news companies' sales, new subscriptions, bound volumes, copies lost in the mail and office use, and 100 copies for distribution at Atlantic City.

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Regulating Cut-off for Maximum Horsepower

The method of regulating cut-off with variations in speed in such a manner as to develop the maximum capacity of the locomotive, proposed in the individual paper by B. B. Milner, represents an important step toward the realization of the highest efficiency in the operation of locomotives. The object, as stated by Mr. Milner, is to increase the tonnage hauled or the speed developed. An incidental advantage which would probably be secured by setting up standards for road performance is improvement in the general condition of the motive power. The establishment of a standard running time for trains under fixed conditions presupposes that all engines of the same class can develop the same power. That this is not true under present conditions is shown by the aversion which enginemen express for certain individual locomotives that do not perform nearly as well as the average engines of the same class. Variation in the performance may be caused by the steam generated being abnormally low, due to defects of the boiler or draft appliances, or to lack of skill or energy on the part of the fireman. The condition of the machinery also influences the performance of the locomotive if it affects the steam consumption per unit of work. As an indication of the extent to which these defects may reduce the efficiency of the engine it is of interest to note the results of tests reported at the last Fuel Association convention. These investigations showed that a locomotive with valves out of square but no more than is found in ordinary practice, used from 8 to 21 per cent more coal per ton-mile than it did when the valves were properly set. If a standard performance was set up, failure to meet the requirements would lead to an investigation of the condition of such locomotives leading to higher maintenance standards. Thus the method proposed by Mr. Milner might bring about important savings in both wages and fuel.

Where Are the Younger Members?

The small number of men who have participated in the discussion has been very noticeable at the convention. A few of the past officers of the associations have spoken on practically every subject presented, and others have discussed matters in which they were particularly interested, but very few of the younger members have been heard on the floor during the meetings. Surely the rising generation is not devoid of ideas, but it seems to be extremely timid. It might be well for the officers and the older members to make a special effort to get young men to take an active part in the affairs of the Mechanical Section. There are at present many prominent members of the old associations who are represented on several committees. The majority of these men hold high positions and are extremely busy, so that necessarily they cannot give personal attention to committee work, and as a result it is delegated to their subordinates. The experience of attending committee meetings and doing the work on their own initiative would be of value to the younger officers who will be the future superintendents of motive power, and all involved should benefit if the amount of overlap in the committees of the Mechanical Section was reduced.

Equipment for Terminal Brake Tests

During the discussion on the report of the Committee on Fuel Economy and Smoke Prevention in Tuesday's session the importance of properly maintaining air brake equipment in order that the loss of fuel due to air leakage may be reduced to a minimum was brought out by several speakers and reference was made to the desirability of adhering strictly to the train line leakage limit of five to eight pounds advocated in Fuel Conservation Circular No. 13. Adherence to this circular is not only important from the standpoint of fuel economy and of the expense entailed by excessive train line leakage, but from the standpoint of safety as well. Strict adherence to this rule, however, in making terminal tests not infrequently results in the necessity for a large amount of switching in cutting out cars which cannot be made to meet the requirements without a visit to the repair tracks. It is evident, therefore, that the use of the road locomotive to charge the brakes for these tests results in the use of considerable fuel as well as in extensive terminal delays and overtime for the crews, and they also increase boiler maintenance. These delays and the entailed expense can be eliminated by the installation of terminal equipment for charging the train lines during the test, the necessary switching being performed by yard engines instead of by the road locomotives. Where such plants have been installed the saving effected has in some cases been found to offset the original cost of the installation within a year. Furthermore, they will undoubtedly tend to increase the effectiveness of the terminal tests. With a road locomotive attached to the train the incentive is very great to slight the test where conditions are bad, rather than to subject the train to

the excessive delay which would be required to cut out or make repairs necessary to bring the leakage within the limits.

Painting Steel Cars

THERE IS ONE PHASE of the maintenance of equipment that is badly neglected; that is the painting of steel cars. Much more attention can be given to the protection of both the bodies and underframes than is now being done, with big returns in added life for the cost of the material and labor used. Many difficulties are in the way of adequately protecting the interior of open top cars, owing to the abrasive action of the lading which these cars handle. This condition, however, is no excuse for neglecting the exterior and does not even justify failure to give attention to the interior as opportunity presents itself. The cost of paint application by spraying is small and the deterioration of the unprotected steel takes years off the life of the car. War conditions have been responsible for the cutting of many corners in maintenance, and the attention once given to painting has been one of the things which has suffered seriously on that account. Bad practice, once started, is very easily perpetuated and on that account special care should now be exercised to see that better conditions are restored.

The economic phase of this subject was clearly brought out in a study made several years ago by M. K. Barnum and reported in the *Railway Age Gazette* of March 3, 1916. The investigation developed that $30 or $35 spent for enough additional paint to preserve the protective coat might be expected to increase the life of the car by as much as a third of its life. Furthermore, the actual cost of painting was found usually to be greater where the cars are most infrequently repainted.

This matter was also investigated by a committee of the Master Car Builders' Association in its report to the convention in 1908, which emphasized the necessity for taking proper care of the exterior of the cars. This fact would indicate that there is no lack of appreciation of the value of paint on the part of car department officers, but their recommendations have failed to receive the approval of the managements, probably because no immediately apparent ill effects followed the practice of inadequately protecting the steel. Failure to have recommendations in this matter accepted immediately is no reason why continued effort should not be made to have it understood by the managements in its proper light and it is the duty of car department officers to make every possible effort to present it in such a way that the ultimate return for the money expended in better protection may be so evident that the necessary approval of proper practice will be forthcoming.

Innovations Which Should be Continued

THE FIRST ANNUAL CONVENTION of the Mechanical Section of the American Railroad Association has broken all records of previous conventions of the Master Car Builders' and American Railway Master Mechanics Associations in attendance, in the extent and character of the exhibits, and in the interest which has been taken, both in the proceedings and the exhibits. The Convention Hall has been filled at practically every session.

A number of innovations have been introduced this year. The entire membership of the executive committee of the American Railroad Association, including some of the foremost railway executives of the country attended the convention and inspected the exhibits. W. T. Tyler, director of the Division of Operation of the United States Railroad Administration, addressed sessions of the convention during both weeks. The chief of the Russian Mission of Ways of Communication gave the Mechanical Section a very interesting talk on the nature of the similar organizations in Russia. A record has been kept of those in attendance at each session.

These innovations have all added greatly to the attendance and interest in the convention and have been a means of real inspiration to the members. They are innovations this year, but why should they not be considered as precedents to be followed next year and at succeeding conventions? The practice of collecting registration cards at each session is a good one and should be kept up. If the members are once induced to attend the sessions consistently they may in time acquire an interest in the affairs of the Section which will make the association of greater value to them and they will become an asset to the association.

The mechanical departments of the railroads have never been accorded the recognition which their importance justifies. This has been due largely to a lack of understanding and appreciation of the scope of the work of the departments. The visit of the railway executives at this year's convention has done much to correct erroneous impressions as to the value of the work which the mechanical associations have been doing, and a visit to the exhibits alone is sufficient to inspire a high appreciation of the great variety and scope of the problems with which the mechanical departments have to deal. But what is of even greater importance is the inspiration which the interest manifested by these men in the Mechanical Section has been to the members and the higher respect and feeling of greater responsibility which they will feel individually toward the association. The practice of inviting such men to attend the sessions is a good one and should be followed up consistently.

The world war has broadened the interests of people in every civilized nation in affairs outside their own countries. It would be an excellent idea if representative foreign railway men can be induced to appear before the Mechanical Section at each year's convention to deliver short messages on the problems of other countries. The result could not help but be broadening.

The large attendance this year places a great responsibility upon the officers of the Mechanical Section to see that everything possible is done to retain and increase the interest of the members in its affairs. It is a notable fact that in spite of the large attendance, participation in the discussions was largely limited to a small group of the older and better known members. The value of the association to the members is measured largely by what they put into it and every possible effort should be made to induce the younger and newer members to enter into the discussions. The value of the discussions can also be increased if those who take part know how to do so most effectively. It is difficult to retain interest and follow the proceedings when, for instance, a member near the front of the hall faces the chairman, with his back to the rest of the audience. Could not printed instructions be issued, giving briefly the essentials of effectively addressing the convention, in order that what is said may be heard by those in the hall?

A bigger hall is needed to accommodate the Section if the present large attendance is to kept up and increased and more suitable arrangements in several respects should be made.

The officers of the section who have been responsible for the arrangements this year are to be congratu-

lated on the excellent results which they have secured. A large measure of this success is due especially to Secretary Hawthorne for the work he has done in the securing of almost complete advance distribution of the reports and papers this year. The convenience of the members in attendance has been greatly facilitated by the method in which the advance copies have been distributed at each session. The distribution of the papers for each session enclosed in an envelope not only avoids waste, but saves the members considerable annoyance in not having to hunt through a complete list of the papers for the whole convention, to locate each report as it comes up. The success of any association depends to a large extent upon the secretary and the way in which the affairs of the office have been conducted this year is sufficient indication that the association is in good hands.

The exhibits this year have been of exceptional value and the only return the members of the Railway Supply Manufacturers' Association receive for the trouble and expense entailed in assembling them is the interest which is manifested in them. A general feeling of satisfaction has been evidenced in this repect. No railroad man in attendance can return home without having secured much information which is of immediate or future value to him, if he has taken advantage of the opportunity which the exhibits offer. The practice which has been followed this year of calling for reports on the exhibits visited should be continued, if for no other reason than because it requires the visitor to review and analyze what he has seen.

Rolling Stock Conditions in Belgium

By Robert E. Thayer.

(European Editor of the *Railway Age.*)

Brussels, June 2, 1919.

If the mechanical men of the railways in the United States are at all discouraged with regard to the condition of the equipment on their roads they need only come to Belgium to find out what "bad conditions" really are. There are no figures here showing "percentage in bad order." If there were it would be very nearly a 100 per cent record with probably 25 per cent running. Locomotives are being run on the "crack" trains—to use a pre-war term—which would give the boilermaker a very satisfactory shower-bath when he entered the firebox. In America we speak of crown bolts "weeping." The word "crying" would apply much better here to-day, and the tears would be crocodile tears at that, with every appearance of a miniature rainstorm. And yet both the engineer and fireman referred to the engine as a "bonne locomotive." In other words, the equipment situation in Belgium is beyond description. One must see to adequately appreciate what the conditions are. It is a wonder men can work under such conditions.

At the beginning of the war the Belgian State Railways had in the neighborhood of 4,500 locomotives, 10,000 passenger cars and 94,000 freight cars—perhaps "wagons" is better after all, they are so small. To-day they have 4,000 locomotives, of which 1,615 were "picked" from German equipment under the terms of the armistice and the rest are what the Germans left behind and what France returned out of the 2,000 sent her at the time of the German invasion in 1914. Needless to say, the condition of the locomotives remaining in Belgium and those returned from France is deplorable—and furthermore there are practically no facilities for repairing them. Those left in the country by the Germans were not only badly in need of maintenance, but quantities were left with fires burning freely and no water in the boiler! The word "picked" in reference to the German locomotives is used advisedly, for out of the first 2,110 locomotives sent from Germany under the terms of the armistice only 350 were accepted as being in fit condition to run.

The same thing is true of the condition of both the passenger and freight cars. As against nearly 10,000 passenger cars in 1914, the Belgian State Railways have only 5,500 and only 74,500 freight cars as against 94,000 in the same year. The passenger cars now running on Belgian rails were also "picked," for out of 3,530 offered last Christmas day only 1,844 were accepted and out of 60,087 freight cars only 34,134 were accepted. As in the case of the locomotives both the passenger and freight cars left by the Germans and those returned from France were in an extremely bad state of repair. The passenger cars the Germans left behind were willfully damaged in a most shameful manner. The glass windows were broken, the upholstery was ripped from the seats, the air brakes were put out of commission, electric lighting fixtures were ruined, etc., etc., ad infinitum.

To still further complicate matters the repair shops were robbed of their machines and all belting was taken as fast as the Germans were through working the shops. That is to say, the shops in the western part of the country were absolutely denuded of all shop machinery and tools, while the shops in the east, which the Germans had to use up to the time of their evacuation, suffered in proportion to the time the Germans had for their departure from the country. The shop at Ghent has only recently been re-equipped with nondescript tools gathered up here and there as they could be found and spared and will be ready for business about the middle of June.

The fact that the German equipment used by the Belgians is entirely different from their own equipment —the 1,615 German locomotives were of a great many different designs—makes it impossible to keep them all in running condition for lack of repair parts. Many of the locomotives were furnished without any drawings for them. This has added further complication to the situation.

Such is the condition of the Belgian rolling stock and it presents a most distressing problem to the railway men here. The same wanton destruction was applied to the roadway. Bridges of no military value were destroyed very completely. The signal system, while not completely destroyed, was made so unfit for Belgian use that it will all have to be reconstructed. The spirit of the railway men here with all their reconstruction tasks ahead of them is wonderful. It is hard to account for it. Perhaps they are so glad to be rid of the Germans, after four long years of their domination, that they are happy to get their country back regardless of what shape it is in. The manner in which they are attacking the problems ahead of them is characteristic of the manner in which they resisted the invasion of the Boche in the early days of August, 1914.

Mardi Gras Dance

The feature of Tuesday evening's entertainment on the pier was the beautiful sight presented after the dancers had donned their vari-colored hats and caps and the streamers and inexpensive souvenirs had been distributed. Certain it is that the Mardi Gras dance of the 1920 convention was a great success. The entire entertainment committee was in charge.

General Committee Meeting

THE GENERAL COMMITTEE of the American Railroad Association, Section III, Mechanical, held a meeting on Monday afternoon and after reorganizing, took up several important matters. Chairman Tollerton of the section, is chairman of the General Committee.

It was decided to send the various questions referred to letter ballot to the members one at a time, rather than to combine them all into one bulky communication. This will insure closer attention on the part of the members and will also make it possible to decide first upon those questions which will affect the M. C. B. rules of interchange. It was also decided that any member voting in the negative should give the reasons therefore, thus assisting the committee in charge of that particular subject in developing a satisfactory report for the following year.

The secretary was instructed to prepare a bound booklet containing biographical sketches of the past presidents, together with their present addresses.

A Committee on Committees was appointed, whose duty it will be to study carefully the make-up of the different committees and see that the men best fitted to discuss the different subjects are placed on the committees. This committee consists of T. H. Goodnow, J. S. Lentz, J. E. O'Brien, C. F. Giles and J. T. Wallis.

The General Committee approved of the election to membership in the association of the following gentlemen:

Name	Title and Road	Address
Barthlemy, P. P.,	Asst. Gen. Car Fore.,	Great Northern.
Beaghen Thomas, Jr.,	Representative,	The Texas Co., New York City.
Beyer, F. A.,	Supt. Shops,	St. Louis-San Francisco, Springfield, Mo.
Blocker, R. V.,	Master Mechanic,	Erie Railroad, Marion, Ohio.
Bodeneet, C. J.,	Asst. Supt. Mchy.,	Louisville & Nashville, Louisville, Ky.
Brady, J. F.,	Supvr. Equip.,	U. S. R. A., Washington, D. C.
Brigham, E. D., Jr.,	Supt.,	North American Car Co., Coffeyville, Kan.
Burkhard, A. A.,	Gen. Fore.,	New York Central, West Albany, N. Y.
Caley, G. W.,	Master Mechanic,	New York Central, New York, N. Y.
Cooper, A.,	Asst. Loco. Supt.,	United Railways of Havana, Havana, Cuba.
Davis, B. H.,	Master Mechanic,	Delaware, Lackawanna & Western, Scranton, Pa.
Dugan, G. A.,	Master Mechanic,	Pennsylvania & Reading, Rutherford, Pa.
Emerson, C. H.,	M. C. B.,	Elgin, Joliet & Eastern, Joliet, Ill.
Farr, B. J.,	Supt. M. P. &C. D.,	Grand Trunk, Montreal, Can.
Flood, W. D.,	M. M.,	United Railways of Havana, Havana, Cuba.
Garber, O. A.,	M. M.,	Illinois Central, Memphis, Tenn.
Gimpel, J. H.,	Supvr. Car Repairs,	U. S. R. A., Denver, Col.
Gorman, T. F.,	M. M.,	Erie Railroad, Meadville, Pa.
Graham, A. A.,	M. M.,	St. Louis-San Francisco, Sherman, Tex.
Grimes, L.,	M. M.	Illinois Central Jackson Tenn
Greenough Grafton, V. P.,		Baldwin Locomotive Works, Philadelphia, Pa.
Harmison, W. E.,	M. M.,	Erie Railroad, Kent, Ohio.
Harris, W. M.,	Gen. Fore. Loco. & Car Dept.,	Wichita Falls & North Western, Woodward, Okla.
Henderson, J.,	Road Fore. of Engines,	United Railways of Havana, Havana, Cuba.
Hickok, W. H.,	Chief Insp. Car Department,	Delaware & Hudson, Watervliet, N. Y.
Huber, H. G.,	Asst. E. M. P.,	Pennsylvania, Pittsburgh, Pa.
Iffla, A. H.,	Asst. Loco. Supt.,	United Railways of Havana, Matanzas, Cuba.
Jennings, J. F.,	Div. M. M.,	Michigan Central, Bay City, Mich.
Kimbell, John F.,	M. M.,	El Paso & Seattle Western, Douglas, Ariz.
Kinney, C. D.,	M. M.,	Boyne City, Gaylord & Alpene, Boyne City, Mich.
Kirkman, W. B.,	President,	Cropley, Phillips Co., Chicago, Ill.
Langdon, H. A. W.,	Asst. Loco. Supt.,	United Railways of Havana, Sagna la Grande, Cuba.
Lightfoot, S. S.,	Equip. Eng.,	A., T. &S. F., Chicago, Ill.
McClennan, W. J.,	Asst. Eng. Rolling Stock,	New York Central, New York, N. Y.
Martin, K. H.,	Gen. Equipment Insp.,	M., St. P. & S. S. M., Washington, D. C.
Miscampbell, J.,		Ft. Smith & Western, Ft. Smith, Ark.
Moir, G. B.,	Asst. Supvr. Equipment,	U. S. R. A., Washington, D. C.
Moody, F. G.,	Supvr. Car Reprs.,	U. S. R. A., Washington, D. C.
Moody, W. O.,	M. E.,	Illinois Central, Chicago, Ill.
Needham, H. L.,	M. M.,	Illinois Central, Clinton, Ill.
Needham, R. J.,	Mech. & Elec. Engr.,	Grand Trunk, Montreal, Que.
Neesley, F. P.,	M. M.,	Michigan Central, Jackson, Mich.
Orancer, H.,	M. M.,	Seaboard Air Line, Jacksonville, Fla.
Ostrander, A. E.,		American Car & Foundry Co., New York, N. Y.
Owens, H.,	Shop Supt.,	United Railways of Havana, Havana, Cuba.
Pack, A. J.,	Chief Insp. of Locos.,	I. C. C., Washington, D. C.
Parsons, C. F.,	M. M.,	New York Central, West Albany, N. Y.
Peters, R. F.,	M. E.,	St. Louis-San Francisco, Springfield, Mo.
Quinnell, H. J.,	G. C. I.,	Illinois Central, Chicago, Ill.
Rankin, G. W.,	Asst. M. M.,	Louisville & Nashville, Louisville, Ky.
Rivet, R.,	Supvr. Car Repairs,	U. S. R. A., Marinette, Wis.
Robinson, A. L.,	Asst. Loco. Supt.,	United Railways of Havana, Cardenas, Cuba.
Robinson, Lee,	Shop Eng.,	Illinois Central, Chicago, Ill.
Romanach, J. A.,	Loco. Supt.,	Cuba Cane Sugar Corp., Havana, Cuba.
Seehrist, T. O.,	Asst. Supt. Mchy.,	Louisville & Nashville, Louisville, Ky.
Sultzker, J.,	M. M.,	Pennsylvania Railroad, Verona, Pa.
Smallwood, C. H.,	G. C. I.,	Illinois Central, Memphis, Tenn.
Smith, B. H.,	M. M.,	Chicago, Rock Island & Pacific, Fairbury, Neb.
Stackhouse, R. J.,	Gen. Storekeeper,	Pennsylvania & Reading & C. R. R. of N. J., Reading, Pa.
Stone, W. C.,	Supvr. Car Repairs,	U. S. R. A., De Soto, Mo.
Stuebing, A. F.,	Railway Age,	Chicago, Ill.
Taylor, C. S.,	M .M. ,A. C. L.	Railroad, Wilmington, Del.
Thayer, R. E.,	Railway Age,	London, Eng.
Thompson, E. H.,	Asst. Eng.,	Chicago & North Western, Chicago, Ill.
Umpleby, C. H.,	M. M.,	New York Central, Watertown, N. Y.
Walker, J. F.,	M. M.,	Illinois Central, Paducah, N. Y.
Wallace, F. C.,	M. M.,	Erie Railroad, Port Jervis, N. Y.
Webb, E. R.,	M. M.,	Michigan Central, St. Thomas, Ont.
Whyte, Arthur,	Asst. Sec.,	Loco. Dept., Rome Mfg. Co., Rome, N. Y.
Wilson, G. M.,	Supt. Motive Power,	Grand Trunk, Montreal, Can.
Winter, P. G.,	Mechl. Eng.,	C., M. & St. P., St. Paul, Minn.

Extra Convention Service on Pennsylvania Railroad

THE PENNSYLVANIA RAILROAD, in order to handle the unprecedentedly large crowd attending the convention, arranged for extra service from Atlantic City over its lines Wednesday.

The train left at two o'clock and connected with the Broadway Limited, which left North Philadelphia at 4.40, had ample accommodations and it was arranged that the Broadway Limited should run in two sections if necessary in order to handle the crowd desiring to go to Chicago and other western points.

At 4.45 P. M. another train ran from Atlantic City in two sections and connected with the Manhattan Limited at North Philadelphia at 8 P. M. The Manhattan Limited also ran in two sections.

The 2.30 train for New York ran in three sections and the three sections contained 20 parlor cars and sleeping cars used as parlor cars. This was the first time that this train was ever run in more than two sections.

At 8.45 P . M. a train left Atlantic City containing through sleepers to Pittsburgh and this train was provided with enough cars to accommodate those desiring to use them.

Heretofore it was necessary to telephone to Philadelphia for sleeping car service. On this occasion, however, arrangements were made to provide extra cars for those leaving Atlantic City and space on them was bought direct from the consolidated city ticket office at Pacific and South Carolina avenues, in Atlantic City.

The Pennsylvania Railroad found it no easy matter to provide service for the convention visitors for two reasons. The first was that the attendance at the convention was unprecedentedly large. The second was that the railroads, owing to war conditions, are short of sleeping and parlor car equipment. Not only have the normal numbers of parlor and sleeping cars not been built in recent years but about 100 parlor cars have been converted into coaches for handling military business. However, the special arrangements which were made enabled the Pennsylvania Railroad to handle the convention crowds better than they had ever been handled before.



The Baldwin Locomotive Works Track Exhibit at the Convention.

American Railroad Association, Section III, Mechanical

Proceedings of the Closing Session of a Remarkably Successful Convention

The closing session of the first annual convention of the American Railroad Association, Section III—Mechanical, was called to order at 9.40 o'clock on Wednesday morning, June 25, 1919.

Design, Maintenance and Operation of Electric Rolling Stock



C. H. Quereau
Chairman

THIS COMMITTEE SUBMITTED a report on the Heating of Passenger Trains Drawn by Electric Locomotives, an abstract of which is given below.

Under modern conditions and in states where there are laws which prohibit the use of fires in individual passenger cars, it is evident the successful electric operation of the through passenger trains over the usual steam railroad division, or for any distance approximating this, would be impracticable unless the locomotive can furnish sufficient steam to satisfactorily heat the train. A study of the problem was begun in 1902. This disclosed at once that there were almost no precedents to guide the investigators, either as to the design of the heating plant or the amount of steam required for heating purposes. The design of the present heating boilers has been, therefore, necessarily largely a matter of slow development. It seems appropriate that a brief sketch of the steps in this evolution should be given.

In the eleven years from 1902 to 1913 there were nine designs of boilers built and tested, four of them using electricity as the source of heat and five fuel oil. The electric boilers did not prove satisfactory for the reasons given in each case, while the oil-fired type was finally developed to a point where it has been quite generally adopted.

Oil-fired Boiler No. 1, 1902

During the years 1902 and 1903 a flash boiler was designed having a nominal capacity of 1,000 lb. of steam per hour, using kerosene as a fuel, having 650 ft. of 2½-in. water tubes in series. Its development was discontinued because the accumulation of carbon on the tubes made the boiler inefficient, and trouble was experienced because of back drafts.

Oil-fired Boiler No. 2, 1904

In 1904 and 1905 tests and experiments were made with a semi-flash type of boiler with a nominal capacity of 1,000 lb. of steam per hour. Vaporized kerosene was used as fuel to prevent the accumulation of soot, and a forced draft was applied to the stack to overcome the back draft. The steel water tubes were ½-in. extra strong seamless, and they were electrically welded to form two sections in multiple. Electrically driven pumps having ball valves were used, one for kerosene and another for water, each being controlled by a thermostat. This boiler design was abandoned because of the irregular action of the thermostats, the splitting of the tubes and the unreliability of the pumps.

Electrically Heated Boilers

From 1906 to 1913 four designs of electrically heated boilers were built. In two of these the water was heated by passing through metal tubes carrying a current of electricity. The other two were essentially upright boilers with electric heating units inside the tubes. All four designs proved costly to maintain and were finally abandoned.

Oil-fired Boiler No. 3, 1910

In 1910 the development of the oil-fired boiler was taken up again, with the result that finally this type has been perfected to a point where it is being used on most of the electric locomotives in the United States requiring steam heat. This oil-fired boiler consisted essentially of an upright boiler 22 in. in diameter, 16 in. high, having 856 copper tubes ½ in. in diameter, with 3/16-in. bridges in the tube sheets, a heating surface of 123.5 sq. ft., a working pressure of 80 lb. and a capacity of 400 lb. of steam per hour. This was not sufficient in cold weather to heat satisfactorily more than four-car suburban trains. As a number of these trains had seven and eight cars, it was imperative that the boiler capacity be increased at once.

The important changes made to increase the steam output to 800 lb. per hour were as follows: An automatic bonnet on the top of the stack, which decidedly improved the draft; increasing the steam supply to the burner, thus atomizing the oil more thoroughly and increasing the amount of oil burned; withdrawing the burner from the fire box till it projected just inside the door, resulting in a stronger inducted draft into the fire box, producing more perfect combustion.

During the early trails of the boiler the fact was noted that more steam was produced when the engine was standing still, or moving slowly, than when train speed was attained, smoke frequently coming from the fire box when the engine was making speed, particularly when passing under overhead bridges. The conclusion was reached that at speed and under bridges a horizontal air blanket over the stack prevented the free escape of the gases of combustion. This difficulty was overcome by the development of the automatic stack deflector, or bonnet, shown in Fig. 1. This device is operated by the air pressure developed by the movement of the engine, or may be thrown conveniently by hand. Its use increased the boiler capacity from 15 to 20 per cent by creating a partial vacuum at the top of the stack. The original form was open at the sides. Its efficiency was perceptibly decreased by strong side winds. The improved form remedies this defect.

Oil-fired Boiler No. 4, 1911

As soon as the fact was determined that the capacity of Oil-fired Boiler No. 3 could not be increased beyond 800 lb. of steam per hour, it became evident that it would not satisfactorily heat trains consisting of more than eight cars, and in 1911 plans were drawn and an experimental boiler of greater capacity built, differing from its predecessor only in size. This was 26½ in. in diameter, 30 in. high, having 1,180 copper flues ½ in. in diameter, a working pressure of 100 lb., 266 sq. ft. of heating surface and a steam capacity of 1,680 lb. of steam per hour. This boiler was used in a series of tests to determine not only the effect of increased heating surfaces, but the steam capacity necessary for through passenger trains.

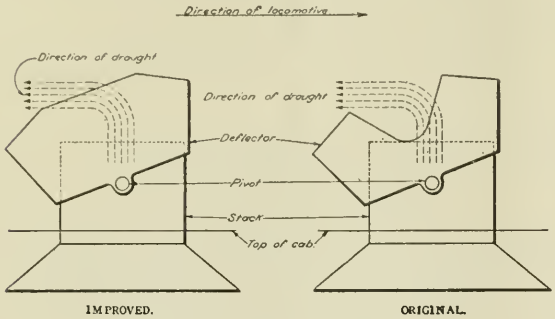


Fig. 1.—Stack Deflector or Bonnet

Oil-fired Boiler No. 5, 1912

As a result of these tests a still larger boiler was designed in 1912 and applied to twenty-nine electric locomotives. These boilers were 39 in. in diameter, had 1,380 copper flues 30 in. long and ½ in. in diameter, 436 sq. ft. of heating surface, a working pressure of 110 lb. and a capacity of 2,220 lb. of steam per hour.

Though based on the designs of Oil-fired Boilers Nos. 3 and 4, there were several radical changes, the most important being the use of a water leg 18 in. deep and 2½ in. wide; increasing the bridges between the tubes to ⅜ in.; the substitution of a forced draft in the fire box with a closed door for the natural draft used previously, and the use of two expansion joints of the bellows type in the boiler shell. A cross-section of this boiler is shown in Fig. 2 and a diagrammatic arrangement of the whole boiler plant, including the water and oil storage tanks and piping in Fig. 3.

Complete with oil and water storage tanks and piping, but without fuel oil or water, the heater equipment weighs 5,850 lb. and occupies a circular floor space somewhat less than five feet in diameter for the boiler and about the same for the storage tanks. Under service conditions these boilers evaporate something over 5 lb. of water per square foot of heating surface and something over 6 lb. of water per pound of oil, though in carefully conducted tests the evaporation per pound of oil has frequently been over 10 lb.

The fuel-oil burner used is shown in Fig. 4. This is very simple, very easily cleaned and adapted to eastern fuel oil, which has a paraffine base, or kerosene. It is worth noticing that the lower section of the burner, which carries the steam or air for atomizing the oil, projects beyond the oil orifice, forming a lip or shelf on which the excess oil may flow and still be atomized. Where it is more economical to use the heavy western oils having an asphalt base, it has been found necessary to leave off the lip, because of the liability of oil accumulating at that point and interfering with the steam jet, as shown by the experience of the Chicago, Milwaukee & St. Paul. Their burner is shown in Fig. 5. Only when the boiler is started is air from the main air reservoir turned into the stack blower to insure a draft and onto the burner to atomize the fuel oil. As soon as there is a steam pressure approximating 50 lb. a three-way cock is used to substitute steam for compressed air. With cold water in the boiler it requires only four minutes to develop a steam pressure of 10 lb. and ten minutes from starting the fire a steam pressure of 110 lb. is obtained.

Carefully checked recent tests have shown that the raising of the breeching, or smoke box, above the top flue sheet from its original height of 1½ in. to 10½ in. has resulted in increasing the steam capacity of these boilers 23.2 per cent. This is undoubtedly due to the fact that there is now a free exit for the gases from the outer tubes, which in effect increases the heating surface of the boiler, the products of combustion passing through these outer tubes having previously been choked by the limited area through which the gases from these flues could escape.

Particular attention is called to the fact that there is a superheater in connection with the boilers, as shown in Fig. 2.

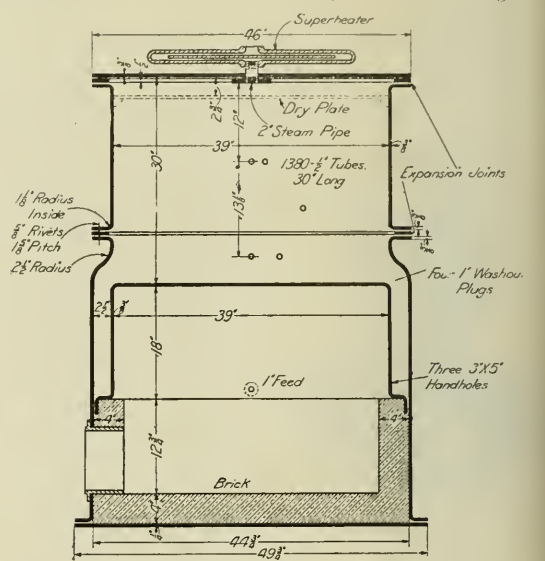


Fig. 2.—Cross-Section of Boiler

It is possible to obtain any reasonable degree of superheat required. Good practice indicates that about 15 degrees F. is desirable, as a high superheat damages the steam hose and gaskets. Tests show that when the steam is somewhat superheated it requires less steam per car per hour to satisfactorily heat it.

The type of boiler just described as Oil Fuel Boiler No. 5 is standard for the electric passenger locomotives on the New York Central, where their capacity is rated at 2,200 lb. of steam per hour; on the Chicago, Milwaukee & St. Paul, where it is rated as 2,600 lb. of steam per hour; on the New York, New Haven & Hartford, where the maximum capacity is given as 2,700 lb. and an average of 2,200 lb. per hour. It has been adopted for the electrified zone of the Canadian Northern Railway, where the heating plant is installed in a separate car, or trailer, instead of on the locomotive. Each of the railroads reports satisfactory results from these boilers. In each case the cars are heated from a steam header at terminals before the engines are attached or are delivered, properly heated, by the steam locomotives to the

electric engines. On the Chicago, Milwaukee & St. Paul the outside temperature is occasionally 40 degrees F. below zero, and their heating plant "appears to fully meet the requirements for the heating of the trains in the coldest weather." The New York, New Haven & Hartford reports that "in normal winter

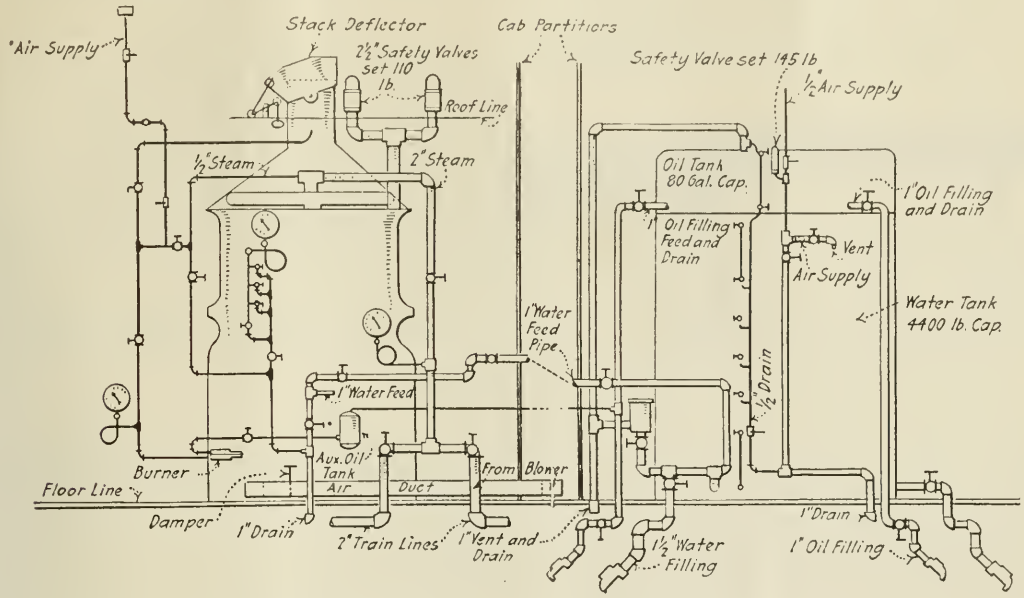


Fig. 3.—Assembly Diagram of Oil Fired Boiler

weather, with trains of nine cars or less, only one boiler is used, but with colder weather and longer trains we find it better to use two boilers, one from each locomotive."

It is evident that the heating plant should be designed to develop the amount of steam required by the most severe conditions, and that there are a number of conditions which influence the requirements. Among others are the following: The temperature of the outside air; the severity and direction of the prevailing winds; the number of cars in the train; the amount of radiating surface of the steam pipes; the cubical contents of the

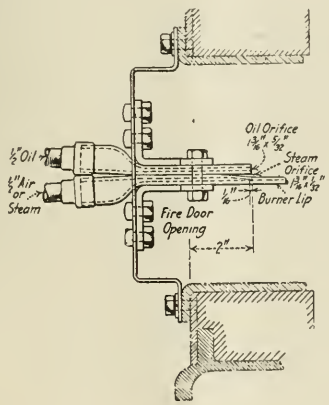


Fig. 4.—Burner for Paraffine Base Oils

cars; the ventilating system used in the cars; the presence or absence of double sash; the materials of which the cars are built, whether wood or steel, for instance; the efficiency of the heat insulation, especially in the case of steel cars, including, particularly, the steam line under and between the cars and the steam control on the cars, whether hand or automatic.

As far as the committee has been able to determine there are no data as to the amount of steam needed to satisfactorily heat passenger cars which can be generally applied. The results are usually given in pounds of steam per car per hour for various outside temperatures, without detailed information as to car dimensions, construction, ventilation or heating system. Under these circumstances the records are of no practical value except locally. These remarks apply to the following records:

A. & B. Ry.—Steel cars; running test:

Date.	Outside Temperature.	Lb. Steam Per Car Per Hour.
January 8, 1910.....	22 Degrees F.	161
February 7, 1910.....	5 Degrees F.	257
February 7, 1910.....	6 Degrees F.	267
February 7, 1910.....	6 Degrees F.	291
February 7, 1910.....	18 Degrees F.	203
February 7, 1910.....	18.5 Degrees F.	55.2 { train line only.

C. & D. Ry.—Wooden, 53-ft. suburban cars, single sash; running test:

Date.	Outside Temperature.	Lb. Steam Per Car Per Hour.
January, 1912	41 Degrees F.	95
January, 1912	35 Degrees F.	114
January, 1912	37 Degrees F.	90
January, 1912	32 Degrees F.	85
January, 1912	36 Degrees F.	90
January, 1912	25 Degrees F.	122
January, 1912	23 Degrees F.	133
January, 1912	23 Degrees F.	129
February, 1913	28 Degrees F.	147 { steel coaches double sash.

E. & F. Ry.—Yard tests. British thermal units per car per hour per degree Fahrenheit; difference between temperatures inside and outside car:

January, 1916..Pullman car, indirect steam heat..... 980 B. t. u.
January, 1916..Steel coach, direct steam, automatic control...1,450 B. t. u.
January, 1916..Wooden coach, direct steam, hand control.....1,530 B. t. u.
January, 1916..Wooden coach, direct steam, automatic control. 890 B. t. u.

"With outside temperatures between 20 and 32 degrees F. each car takes about 200 lb. of steam per hour, and with an outside temperature of 0 degrees F. the consumption of steam per car per hour approximates 225 to 250 lb."

So far as the committee is informed, no practical steam boiler has yet been developed which uses electricity as a source of heat. Assuming that such a heating plant is available, there are certain facts which should be borne in mind. The cost of electricity to produce a given amount of steam is from six to ten times that of fuel oil, omitting the item of fixed charges in the cost of current. The radio depends on the relative cost of fuels. If the peak load for propulsion and heating current come at the same time, during the Christmas holidays, for in-

stance, it will be necessary to increase the power station and substation capacity, not only increasing the capital invested, but incurring additional fixed charges, which continue during the whole year, though the additional apparatus is required for only a few months during the heating season. Estimates made a few years ago showed that electrically generated steam would cost about $45,000 a year more than from oil-fired boilers, the number of locomotives involved being less than 35, not including fixed

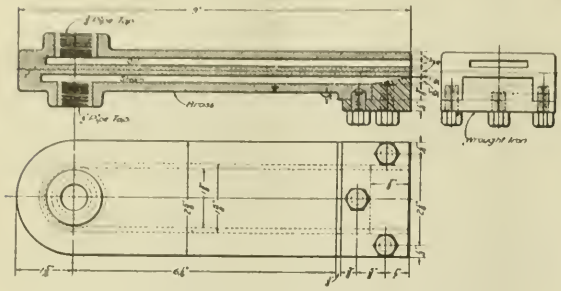


Fig. 5.—Burner for Asphalt Base Oils

charges in the cost of current. If fixed charges are included, there would be in this case a saving of over $100,000 a season in favor of oil as a source of heat.

There is undoubtedly an element of danger of fire in the use of fuel oil or kerosene. This was greater in the earlier designs of heating plants, when the oil was under air pressure, than with later designs, which feed the oil by gravity. Care in design, construction and operation has shown the hazard is small.

The experience with the electric steam boilers has been so very limited there are practically no facts on which to base an opinion as to the liability of fire and personal injury in their use. That there is an element of danger there can be no doubt. There are, however, certain conditions, such as long tunnels,

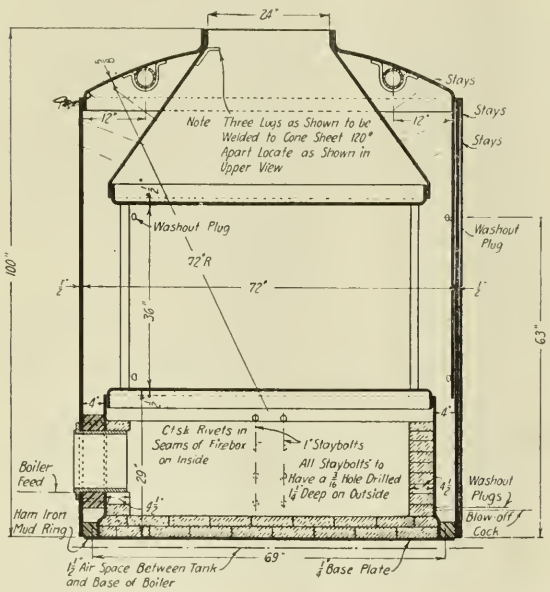


Fig. 6.—Vertical Fire Tube Boiler Used on C., M. & St P.

which make the electrically heated steam boiler very desirable and in all probability will result in a successful design.

The report is signed by C. H. Quereau (Chairman), New York Central; G. C. Bishop, Long Island; J. H. Davis, Baltimore & Ohio; Geo. McCormick, Southern Pacific; H. R. Warnock, Chicago, Milwaukee & St. Paul; W. L. Bean, New York, New Haven & Hartford; J. T. Wallis, Pennsylvania; J. E. Pilcher, Norfolk & Western, and A. C. Deverell, Great Northern.

In addition to the report of the committee, H. R. Warnock submitted an exhibit containing a description of the latest type of heating boiler used on the Chicago, Milwaukee & St. Paul.

Exhibit A

Oil-fired Boiler, 1918, Chicago, Milwaukee & St. Paul

In Circular No. N-1916-1917 of the American Railway Master Mechanics' Association is described this road's present practice under the heading "Oil Fired Boiler No. 5—1912," which covers a vertical fire tube boiler containing 1,380 ½-in. flues 30 in. long. These boilers had copper flues and the total heating surface is stated to be 436 sq. ft. with a rated capacity of 2,600 lb. of steam per hour. Approximately two years ago, when it was decided to build fifteen new road passenger locomotives, one of the things

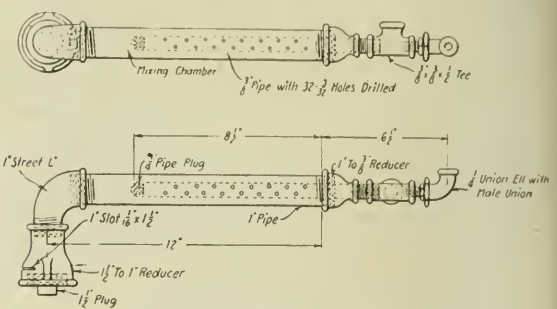


Fig. 7.—Details of Oil Burner

undertaken as an improvement was a new design of the heating-boiler. The undesirable features of our present boiler were maintenance costs and insufficient capacity. We have had much trouble in heating our through trains (which consist of ten cars, frequently), when the outside temperature gets much below zero.

After some preliminary tests or observations, it was decided that we needed a boiler of nearly twice the capacity of those in use at present. To this end was designed a vertical fire-tube boiler, as shown in Fig. 6. This boiler is 72 in. inside diameter, is of the submerged flue type, and contains 468 1½-in. flues 36 in. long. With this boiler we have a total heating surface of 624 sq. ft., a grate area of 21.8, which gives a ratio of heating surface of grate area of 28.6. This design of boiler has a light weight of approximately 10,500 lb., and with two gages of water, the weight becomes about 15,500 lb.

An experimental boiler was built in the summer of 1918, and mounted for testing. We were trying for a boiler that would produce 4,000 lb. of steam per hour, and, it being impossible to get this much with natural draft, we resorted to forced draft. The fire box is lined throughout with brick, excepting the flue-sheet. Air was forced through the door by a motor-driven blower. Quite a number of tests were run throughout a period of several months, the main object being to determine the maximum capacity, as well as the proper drafting arrangement. Two burners were used, made up as shown in Fig. 7, with a slot sawed in each to give a range of about one-half the fire box in each case. It is noted that this burner consists of ordinary pipe fittings, and is an adaptation of what is in use on the Southern Pacific. We have tried several other types of burners, but find this one to be the most satisfactory for our purpose. These burners are set to project 12½ in. from the inside of fire door. This just clears the inside of the fire-door frame.

Following are some data giving the maximum results we were able to obtain:

Test Data.	
Temperature of atmosphere, degrees F.	85
Temperature feed water, degrees F.	70
Average boiler pressure, lb. gage	106
Oil consumed per hour, lb.	403
Water evaporated per hour, actual, lb.	4,022
Pounds water per lb. oil	9.97
Equivalent Evaporation from and at 212 Degrees F.	
Water evaporated per hour	4,780
Pounds water per lb. oil	11.85
Horse-power developed	138

In getting these results, we find that it is desirable to have the oil pressure and the steam atomizing pressure about 40 lb. each. It is necessary that the steam atomizing pressure does not exceed the oil pressure, else the steam backs up in the oil line, causing saponfication, and consequently interrupting the flame. These boilers are intended to be operated at a working pressure of 110 lb. gage, and the fuel is atomized by an air jet when beginning the fire, but on reaching a pressure of about 40 lb., the turning of a three-way cock cuts out the air and introduces steam as an atomizing agent.

The amount of air delivered for the above maximum capacity was found to be 2,650 cu. ft. per minute against a static pressure of 2 in. of water at the blower outlet. It is expected that our normal requirements will rarely ever exceed 1,800 cu. ft. of air per minute against a static pressure of possibly 1¼ in. of water.

This test being conducted in the open air and with a fairly still atmosphere, we had no trouble in regulating the proper amount of air to produce a smokeless combustion. During the test the auxiliaries were driven by steam from the boiler. These auxiliaries will consist of the feed-water pump, oil pump and atomizers. The calculated consumption of these auxiliaries, when driving the boiler at maximum capacity, is 800 lb. per hour, which would leave a net amount of 3,200 lb. actual for train line. This amount is thought to be more than sufficient for weather 40 degrees below zero if all connections are tight. An assembly diagram is shown in Fig. 8. Generally speaking, we believe we have ample capacity without too careful firing.

Discussion

W. J. Bohan (N. P.): I would like to ask Mr. Warnock what it costs him to develop the boiler horsepower of that boiler, what he figures it will cost and about what your average heating per train mile is per annum?

Mr. Warnock: I don't think we have that data at hand. We probably have it in our report some place, but I don't have it with me.

A motion to receive the report and incorporate it in the proceedings was carried.

Use of Bronze for Valve Snap Rings and Piston Surfaces, and Bull Rings in Large Cylinders

By C. E. Fuller
Superintendent Motive Power, Union Pacific

UNDOUBTEDLY ONE of the most difficult and perplexing problems relating to locomotive operation is the proper and economical maintenance of pistons and cylinder walls, valves and bushings—those parts which, by their proper relation of sizes, and constantly varying relative positions, govern the correct and economical use of the steam which the boiler has generated. In this region may all too frequently be located the greatest wastes on the entire locomotive.

Since the introduction of modern outside valve gears has eliminated much of the old-time faulty and lame valve setting, the losses within the cylinder have easily taken first place. At no other point on the locomotive can the losses become so great, or so quickly aggravated, due to rapid cutting and wear; nor has the introduction of superheated steam, with increasing size of cylinders, tended to ameliorate conditions. Cylinder working temperatures, which have so direct a bearing on the rate of wear, have increased tremendously in the last ten years.

The extensive operation of cylinder bushings on modern power indicates the enormous increase in cylinder barrel wear and a desire to save cylinders, which otherwise would soon wear thin. Extended piston rods to carry the weight of the pistons in large cylinders are a compromise, and there appears a trend toward their abandonment. A decrease in the unit pressure between the piston and the cylinder walls can only be attained at the expense of increased reciprocating weight and dynamic augment. Cylinder and valve lubrication under increased superheat temperatures is surrounded by many difficulties. With these facts in mind, the mechanical department of the Union Pacific began experiments in 1913 with bronze valve snap rings, and in 1915 with bronze surfaces for pistons. No originality is claimed in this connection, as perhaps many of those present have experimented more or less along similar lines, but the results obtained are worthy of some consideration.

Bronze Valve Snap Rings

Two formulas have been used:

Composition A:		Composition B:	
Copper	82.96 per cent	Copper	80.80 per cent
Tin	14.66 per cent	Tin	5.83 per cent
Phosphor	.118 per cent	Phosphor	.10 per cent
Lead	none	Zinc	4.54 per cent
Impurities	2.26 per cent	Lead	6.58 per cent
		Impurities	2.15 per cent
Total	100 per cent	Total	100 per cent

Either composition gave good wearing qualities, but composition *A* has decided advantages in elasticity. We believe, however, that there is room for further improvement in the composition of the most suitable alloy for this purpose.

Valve rings are of the usual L-section for 15-in. piston valves of cast iron, working in gun-iron bushings. Information collected in 1915, or previous to the recent rise in wage rates and material, relative to comparative mileage and cost of cast-iron and bronze valve rings may be of interest, showing that against 117 cast-iron rings, making 216,495 engine miles, there were 45 bronze rings, making 381,337 engine miles—an increase in mileage in favor of the bronze ring of 358 per cent.

The average cost per one thousand engine miles was:

Bronze ring	8.73 cents
Cast-iron ring	20.0 cents

or an increase of 129 per cent for the cast-iron ring. This test covered a period of thirteen and one-half months, during which no valve gages were removed where bronze rings were used.

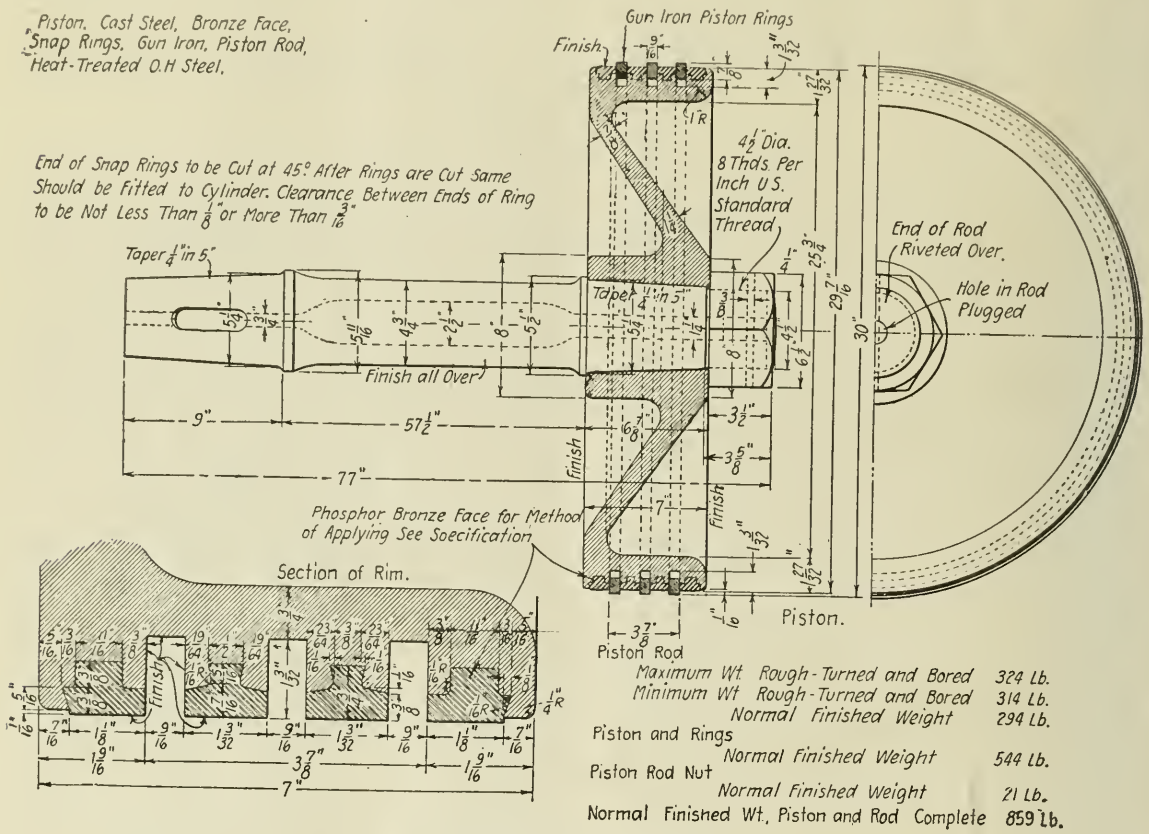
A Pacific type engine was equipped with bronze rings—composition "A," April 13, 1916: The rings were removed, worn out, on March 22, 1918, with a mileage of 145,285.

Piston Surfaces

In August, 1915, a Consolidation type engine with 22-in. cylinders was equipped with two cast-iron pistons having a bronze bull ring poured on while the pistons were at about 1,500 degrees F.—afterwards machined to size, including ring grooves which were fitted with gun-metal rings. This test was in contemplation of the use of bronze for surfacing 29½-in. diameter cast-steel Z-type pistons, designed for use on a proposed 2-10-2 type locomotive, which was then under consideration for the 60-ft. grades between Ogden and Evanston. If possible, it was desired to escape the necessity for using an extended rod on a large diameter cylinder. It was known that at least a year would intervene before a decision was necessary.

Frequent reports from this engine indicated that these pistons were performing quite satisfactorily, the rate of wear on pistons and cylinder walls being much below the average with cast-iron pistons. The bronze adhered to the piston head without fracture. In June, 1916, this engine was shopped, both pistons being reapplied without any work being done on them, mileage, 40,000. In March, 1918, this engine had a cracked cylinder necessitating shopping. The pistons, still in fair shape, were reapplied to another engine, after having made 120,000 miles, and up to December 31st last had made an additional 19,000 miles, and, to the best of my knowledge, are still in service. The success of this experiment led us to adopt the bronze face without hesitation for the new design 29½-in. pistons for the 2-10-2 type engines, and drawings were accordingly prepared. Upon being forwarded to the builders we received an immediate complaint that the design was impracticable from a manufacturing standpoint, as it was considered impossible to pour a bronze ring on a cast-steel head, on account of the different shrinkage coefficients. To this we replied by getting four steel castings from the same pattern, successfully pouring and machining them—sending photographs of the finished pistons to the builder as evidence, then putting the pistons in stock for the anticipated locomotives.

The builders had no difficulty in following the design, and ten engines arrived, equipped with the bronze-faced cast steel pistons, in the fall of 1917, and were placed in hard mountain service, where drifting is necessary for sixty miles, with little let up. After being in service six months the bronze had worn down to the cast steel lip at the edges of the piston, between 1/32 in. and 1/16-in. Pistons were then reversed, and gave four or five months' additional service. Since then, from time to time, this cast steel lip has been turned back slightly, exposing additional bronze surface, and at the end of nineteen months, several of these pistons are still in service, not having reached the limit of wear with their original bronze surface. The piston centers, however, are all intact and apparently capable of indefinite service. These pistons have made over 60,000 miles in most difficult service, and no cylinders have been rebored; in fact, showing remarkably little wear. Incidentally, the use of bronze permitted the adoption of a very light design of piston, which, though 29½-in. diameter, weighs only 544 lb. complete, without the piston rod.



29½-inch Cast Steel Piston with Bronze Face

The drawing indicates the detail application of the bronze in dovetail grooves for the purpose of preventing individual sections from leaving their place in case they become detached from the main mass of bronze.

The composition of the bronze on these pistons is as follows:

Copper	86 to 89 per cent
Phosphor—Tin	4 to 6 per cent
Tin	4 to 6 per cent

Oxwelding Bronze Surfaces on Cast-Iron Piston Heads

This practice is of more recent origin, having been in vogue about six months. It is purely a reclamation process, but indications to date are very favorable. Cast-iron piston heads, which, heretofore, have been scrapped on account of wear—which usually takes place mainly on the bottom half of the head—are now treated as follows: The pistons are preheated in a brick furnace over a charcoal fire to a temperature of 900 to 1,000 degrees F., without removing the rod. A small hole is then made through the sheet asbestos on top of the furnace over the piston, to permit the welding operator to work the piston being turned from time to time by means of the rod as the work progresses. A thin layer of bronze is first welded over the worn surfaces between and adjacent to the ring grooves for approximately one-half of the circumference of the head, then built up to the desired height, including finish, after which the furnace is closed and the fire is allowed to die out and cool over night. The piston is then machined, the grooves squared up, and is ready for service, being applied with the bronze shoe to the bottom of the cylinder. Tobin bronze welding rods are used—about 8 lb. average, per 26-in. piston.

It is contemplated from our previous experience with the fully bronzed circumference, and particularly in view of the fact that most of the wear is at the bottom of the cylinder, that these reclaimed pistons will not only show a considerable increased mileage, but will also show a material saving in cylinder-barrel wear, thus increasing the mileage between reborings.

A 26-in. worn cast-iron piston can be treated in accordance with the above process for approximately $9.35, while replacements with a new piston of the same design would cost $27.86. This results in a saving of $18.51—besides resulting in really a better piston than the original on account of decreasing the tendency toward wearing the barrel of the cylinder. Up to date about 50 pistons have been thus reclaimed and put into service, and there has not been a single failure reported.

By the use of bronze for valve snap rings and for piston surfaces, we have been able to materially reduce the rate of

wear and increase the life of the cylinder and valve bushings, as well as the pistons, and keep locomotives longer in service with a maximum of power due to tight and properly fitting parts.

Discussion.

J. Chidly (N. Y. C.): I ask Mr. Fuller how many engines he has equipped with the snap ring packing in the valves. I see that he has had the installation since 1913.

Mr. Fuller: I should say there are pretty close to 200 engines equipped, and they are mostly heavy Pacifics and Mikados.

Mr. Chidley: Do you intend putting the bronze rings in the cylinder packing?

Mr. Fuller: We have thought of it. I believe we tried it, but we have not been able to get a ring deep enough.. A bronze ring in the cylinder will have to be pretty nearly 1⅛ in. or 1¼ in. deep.

Mr. Chidley. You figure on snap rings?

Mr. Fuller: Yes, but we find it pretty hard to get over the solid head. In the case of a built up head you will have no trouble, but you will have to make your rings much deeper with any kind of cast iron.

B. P. Flory (N. Y., O. & W.): I would like to ask if in the tests of the valve snap rings the cast iron rings were the ordinary cast iron or whether they were gun iron.

Mr. Fuller: They were ordinary cast iron at first, but later on were of gun iron.

Mr. Bentley: The use of bronze rings for piston heads is not new. About thirty or forty years ago we used them, and found them rather satisfactory on cylinders that were very soft. They wore very much longer than the ordinary mild steel rings that we used in the rest of the cylinders. One thing that impresses me very much is the reclamation of worn parts by the Oxweld process. We are not having any particular difficulty. We have been using common cast iron recently and the reports from the master mechanics indicate that we are getting very good results, but we are still having some trouble with cylinder packing rings, although we have increased our average mileage from 12,000 miles per set of rings to over 41,000 miles. There is an opportunity for the reclamation of material that is now finding its way into the scrap, and I think with the one-piece piston head that is shown in the diagram here the building up of that piston head after it becomes worn will be of very great assistance to us in keeping the locomotive in service.

R. J. Mead: I would like to know if any of the members are using a built-up type of piston in the super-heated engine. We have used them, and came to grief, and I would like to know if you are having any success?

Mr. Bentley: That is our standard practice. We have about one thousand engines using superheated steam, that have built-up pistons.

Mr. Bohan: I would like to ask the gentlemen if they have tried reclamation with cast iron instead of bronze?

Mr. Fuller: Yes, we have tried it. We had difficulty in welding cast iron and keeping it sufficiently soft to do the work. I have no doubt, from the results that we are obtaining, in welding cylinders with cast iron, and in which we are getting a metal that is practically of the same consistency as the original casting, that a good operator will be able to weld cast iron to cast iron piston heads successfully, but we have not been able to do it yet. We had trouble to get the bronze to adhere and not have it too hard and break off.

I want to call attention to the depth of grooves in our piston heads. The grooves are 1 3/32 deep, and the packing rings are 7/8 in. deep. We found that a large percentage of our trouble is due to too many applications of packing; that the packing could not get below the grooves, or, in other words, the piston was riding on the packing. One of the important things in any piston is to have plenty of clearance, and I would not oppose going to a still deeper groove.

Mr. Bohan: The matter of depth of grooves on piston heads is one that has to be very carefully considered on account of the possibility of getting them so deep that the corners will break out on this particular grooved cast iron head.

Chairman: The depth of grooves in the piston heads should have sufficient limits to take care of the new ring applied in the head just before it reaches its full wear limit.

A motion to receive the report and incorporate it in the proceedings was carried.

Committee on Train Resistance and Tonnage Rating



O. P. Reese
Chairman

THE COMMITTEE REPORTED that on account of the conditions existing during the last year there have been no new developments with reference to train resistance and tonnage rating upon which the committee could take action.

The committee consists of O. P. Reese (Chairman), Pennsylvania Lines; H. C. Manchester, Delaware, Lackawanna & Western; C. E. Chambers, United States Railroad Administration; J. H. Manning, Delaware & Hudson; Frank Zeleny, Chicago, Burlington & Quincy; Major E. C. Schmidt, University of Illinois, and Jos. Chidley, New York Central.

Report of the Committee on Subjects

THE COMMITTEE SUBMITS the following suggestions for the consideration of the General Committee in preparing the program for the 1920 Convention:

I—That the present standing and special committees be continued.

II—That the following subjects be assigned to committees as recommended.

1.—Investigation of the proper number of crossties to be used on hopper coal cars. It is recommended that this subject be referred to the Committee on Car Construction.

2.—The proper fibre stress to be employed in the design of helical springs for different diameters of steel wire from ½ in. to 1½ in. diameter. The ordinary spring table calls for 80,000 lb. throughout for all sizes, but it is well known that this is not the manufacturers' practice, and in fact in many cases it is impossible to obtain a proper spring with the smaller sizes of wire. It is recommended that this subject be referred to the Committee on Tests and Specifications for materials.

3.—That consideration be given to adopting the standard half tape sizes for cast iron and rough rolled steel wheels.

4.—That in the manufacture of steel wheels the wheels be machined to exact diameters. It is recommended that these two subjects be referred to the Committee on Car Wheels.

5—Repairs to superheater units. It is recommended that this subject be referred to the Committee on Superheater Locomotives.

6.—The desirability of more water and steam space above the crown sheet. It is recommended that this subject be referred to the Committee on Design and Maintenance of Locomotive Boilers.

7.—Equated tonnage ratings. It is recommended that this subject be referred to the Committee on Train Resistance and Tonnage Rating.

8.—Auxiliary or safety connection between engine and tender. It is recommended that this subject be referred to the Committee on Standards.

9.—Design for coal space of locomotive tenders to allow the coal to flow within easy reach of the fireman, and to permit it to practically all feed into the hoppers of locomotive stokers. It is recommended that this subject be referred to the Committee on Mechanical Stokers.

10.—Specifications for tank hose. It is recommended that this subject be referred to the Committee on Specifications.

11.—Water glass fittings and mountings. It is recommended that this subject be referred to the Committee on Design and Maintenance of Locomotive Boilers.

12.—Standard practice for beading tools for boiler tubes or flues. It is recommended that this subject be referred to the Committee on Design and Maintenance of Locomotive Boilers.

13.—Proper location of blow-off cocks in locomotive boilers. It is recommended that his subject be referred to the Committee on Design and Maintenance of Locomotive Boilers.

III—That the following subjects be assigned to special committees:

1.—Feed water heaters for locomotives.

2.—Modernization of stationary boiler plants.

3.—The comparative merits of hydrostatic and force feed lubrication for locomotive cylinders and steam chests and best method of application.

4.—Front end netting and netting door and other draft appliances.

5.—The study of ash pit and coal chute operation including organization and supervision. Roundhouse operations as a whole.

6.—Modernization of existing old locomotives.

7.—Automatic hose connectors for freight and passenger equipment.

8.—Standard method of packing journal boxes on freight cars.

IV—That the following subject be assigned to a member as a subject for an individual paper.

A study of locomotive operation from the point of view of a large investment.

The report is signed by M. K. Barnum (Chairman), Baltimore & Ohio; C. E. Fuller, Union Pacific; D. R. MacBain, New York Central; T. H. Goodnow, Chicago & Northwestern, and J. C. Fritts, Lackawanna & Western.

Discussion

M. K. Barnum (B. & O.): You will have the printed report of the committee in your hands, and I will read only the additional subjects which have been suggested since this report was printed.

Additional subjects presented are: Electric Arc Welding in Railroad Repair Shops; Scheduling and Routing Systems for Locomotive Repair Shops; Combustion Chambers for Locomotive Boilers; Results as to Fuel Economy; Difficulties in Maintenance, and other points of interest; Economical Diameters of Piston Valves of Superheated Locomotives, with Recommendations for Standard Practice in connection with Various Cylinder Diameters.

The committee recommends that these subjects be referred to a special committee.

The next subject is Modernizing Freight Equipment.

The committee recommends that this be referred to the Committee on Car Construction .

The next subject is: "What Shape of Exhaust Nozzle Will Cause the Highest Vacuum and Least Back Pressure in Cylinders?"

The committee recommends that this subject be referred to a special committee in connection with "Front End Netting and Netting Door and other Draft Appliances" that was mentioned in the printed report.

Because of the suggestions made by your chairman in his opening address, the committee also wishes to recommend the following subjects:

"Designs with Complete Lay-Outs for Roundhouses of Various

The committee suggests that this could be treated in connection with subject No. 5, "Study of Ash Pit and Coal Chute Operation, Including Organization and Supervision. Roundhouse Operations as a whole."

If that suggestion does not meet with the approval of the chairman it will be subject to his revision as a member of the General Committee which will pass on all of these subjects.

Repair Shop Lay-Outs for both Passenger and Freight Car Repair Shops: also Lay-Outs for Freight Car Repair Tracks, including a study of results obtained and advantages gained by inclosing the Repair Tracks under roof.

The committee recommends that this subject be treated by a special committee.

Power Plants for both Roundhouse Terminals and Repair Shops and suitable Stokers for such Power Plants.

The committee suggests that this be treated in subject No. 2, "Modernization of Stationary Boiler Plants."

Ash Pit Lay-Outs for both Dry and Water Pits.

The committee suggests that this be treated in connection with subject No. 5, together with the lay-out for round houses and a study of the Ash Pit and Coal Chute operations.

Adequate Lighting of Engine Terminals for Night Work.

It is suggested that this be handled by a special committee.

Mr. Goodnow: I would move that the report be received and referred to the General Committee for such modifications as they may find desirable or necessary to adapt it to the programme arranged for the next convention.

C. F. Giles: I expect that the motion made by Mr. Goodnow would be the proper course to pursue is handling this report, but I would like to call attention to the fact that sometime ago it was stated that we would probably endeavor to handle the work at the next convention within one week instead of extending it over two weeks, and therefore the subjects to be handled next year should be given most careful consideration, and we should reduce them to the lowest possible number, is my opinion.

Mr. Barnum: I think there is a question as to whether the subjects that have been presented could be handled satisfactorily within one week. In checking over the list, I find there will be about forty-five committees, even with the combinations that have been suggested, and that is one reason why it seems advisable to pass the matter up to the General Committee for such modification as they may deem necessary when they are deciding upon the final programme for next year's convention. It is believed by the Committee on Subjects that all of these subjects suggested are important and should be considered.

Chairman: I believe that it is opportune at this time for the chair to say a word, inasmuch as the question of how the convention will be held next year has been brought up; whether it will be held within one week or spread over two weeks, as has been our practice for years.

I think all of the members appreciate the brief time that we have had at our disposal at this convention to inspect the exhibits; in fact, it was suggested by some of the members that we hold the convention, that is the exhibits, over until to-morrow evening, to give every one an opportunity to see them. That was not practicable this year, as many of the exhibitors have made their plans for leaving to-day. I am, however, very much impressed with the idea, and it is my intention to suggest something of that kind for consideration at the first meeting of the General Committee. I had the assurance that the question of how the convention would be held next year would be left entirely to the decision of the General Committee, and I want to say, for the information of the members, that as chairman of that General Committee it is my intention to make no change in our method of holding these conventions and I hope we get the entire support of the General Committee in that position. It would be most unfair, gentlemen, to all of these exhibitors who have gone to the expense and trouble to put on this vast display for the information and education of the railroad men of this country, to limit the time of this convention to such a short period that everyone would not have the opportunity of seeing what is on the pier and learning all that can possibly be learned, which is a very considerable amount.

Mr. Goodnow's motion was then put to vote and carried.

Report of the Committee on Powdered Fuel



C. H. Hogan
Chairman

AT THE TIME OF THE LAST REPORT of the committee in 1916 there were several experimental installations for burning powdered fuel on locomotives in the United States, but the increasing demands for transportation, due to the great war, and finally the entrance of this country into the conflict, made the setting aside of even a single locomotive for such experimental purposes an impossibility. Accordingly all locomotives that had been equipped for the burning of powdered fuel were stripped of the special appliances intended for that purpose and returned to their regular service. For this reason the committee asks to be relieved from making even a report of progress at this time.

The general principles involved in the burning of powdered fuel were set forth in our last report when the experiments were progressing so satisfactorily that they seemed about to spell success. That the principles were correct has been demonstrated and it remained to work out the practical details to meet the varying requirements that locomotive service demanded, as has been done for stationary plants. But this sudden stoppage of the work, immediately after the presentation of our last report, leaves matters almost exactly as they were at that time.

It is probable that, as soon as the affairs of the railroads are settled and normal conditions have been resumed, the experiments with and development of the devices for burning powdered fuel will be taken up again. With conditions as they are, the committee is asking to be relieved from the necessity of making a report at this time and to be continued pending the resumption of the experimental work which they were appointed to watch and lay before the association.

The report is signed by C. H. Hogan (Chairman), New York Central; E. W. Pratt, Chicago & North Western; Thomas Roope, Chicago, Burlington & Quincy; J. H. Manning, Delaware & Hudson; Charles James, Erie; G. L. Fowler and O. S. Beyer, University of Illinois.

Discussion

W. D. Woods (Fuller Engineering Co.): In the report of the committee there was no mention of the possibilities which might be obtainable in switching service from pulverized coal. I want to mention that there has been a switching locomotive in continuous service for some 18 months successfully using pulverized coal. It is at Fullerton, Pa, and there has been no difficulty with the locomotive at any time. The only cost of maintenance has been for one brick arch. Economies of about 40 per cent of the coal as fired over what was obtained with hand firing have been secured. There is a Lehigh Valley locomotive equipped with practically the same aparatus on exhibition here.

S. S. Riegel (D., L. & W.): I would like to ask the members if they have had any information concerning experiments on the colloidal mixture of powdered fuel and crude oil. I understand that for nearly a year experiments of that nature have been conducted with a mixture of powdered fuel and crude oil of any desired richness which justify the hope of success, and I would like to put the matter before the association for the uprpose of finding out any information that might have been derived. It seems to me that if this plan of using powdered fuel can be worked out, there is a great field for its application in industrial plants, furnaces and perhaps locomotives.

C. H. Hogan (N. Y. C.): I think it would be a difficult matter to feed a mixture of powdered fuel and oil. Possibly if there are any locomotives so equipped in this country those in charge can explain.

Mr. Wood: I happened to be present at some tests in April, May and June, 1918, of colloidal oil on the U. S. S. Gem, where colloidal oil in combination with 30 per cent. of pulverized coal mixed with 60 per cent of ordinary navy fuel oil was burned in the regulation oil burners very successfully. The tests demonstrated it could be burned with the regular equipment then used on the boats for the navy oil, the object of the test being at that time to conserve the oil supply on account of the scarcity of tank steamers.

(A motion was made that the discussion be closed, the committee continued, and the questions raised further looked into for next year's report.)

W. J. Bohan (Nor. Pac.): Before closing that discussion, I would like to add to the motion that this committee give more attention to the cost of producing steam. The Fuel Association made a careful inquiry all over the United States on the cost of producing power by means of powdered coal, without a single answer giving the information on this important subject. There has been a good deal of enthusiasm about burning powdered coal, and there has been too much academic discussion on it. The railroads are interested in paying dividends and we want to know what it is going to cost to produce power with powdered coal. I know of one instance indirectly where powdered coal did not compare favorably with ordinary mechanical stoking on the large stationary plants. In order that the investigation be complete and satisfactory to the man who is going to spend money for his railroad, it is necessary that we know approximately where we are going to arrive. There, probably, will be little difficulty in the successful burning of powdered coal. That does not mean that the coal must be pulverized to the extent that some of its supporters recommend. It may be possible to develop the pulverizing of coal to such an extent that we can get practically the same results at much less expense. The art of burning powdered coal is a progressive one, and we should not take a broad jump on this any more than we should on any other important subject, without laying a more firm foundation. There may be some proofs that two hundred mesh coal is the best form in which to burn this fuel, but everyone does not believe that. We should commence to investigate generally on this subject. The question of burning powdered coal is not one that was originally considered for burning slack coal, but its greatest field probably is the burning of the lower grades of coal. It may not be generally known, but there is enough locomotive coal in the State of Montana to operate the five railroads that run in that vicinity for five thousand years. There is plenty of it up that way, and powdering may be the way to burn it, and if that is the way to burn it we would like to have the facts to substantiate it. In continuing this commitee I would suggest that they spend a good deal more time in determining this fact than has been spent by past committees. This committee should co-operate with the Fuel Association Committee.

Mr. Chambers: With the consent of the seconder, I will include the comparative costs in this motion.

The motion was then put to vote and carried.

Resolutions

Mr. Dunham then read a report on "Resolution, Correspondence, Auditing, etc.," as follows: "Whereas, the Railway Supply Men's Association have gathered together, for our benefit, the largest and most comprehensive exhibit of railway machinery and appliances ever collected at one time, have carried out such an acceptable program of entertainment for the members of the Section with their friends and families, and, without any confusion, have enrolled the largest attendance of any mechanical convention, and

"Whereas, The Atlantic City Hotel Men's Association, on short notice, have in their usual manner provided so acceptably for our welfare and comfort, and

"Whereas, The United States Railroad Administration has done so much to insure the success of this convention, and

"Whereas, The Executive Committee of the American Railroad Association have indicated their fullest approval of the

work of the section in convention, together with enthusiastic inspiration for future work, and

"Whereas, The meetings have been so ably planned and guided by the officers and the Secretary, be it

"Resolved, That the appreciation of Section III—Mechanical of the American Railroad Association be extended to the Railway Supply Men's Association, the Atlantic Hotel Men's Association, the United States Railroad Administration, the Executive Committee of the American Railroad Association and the Secretary and retiring officers of the section."

Signed, W. E. Dunham, B. P. Flory, H. L. Kleine, Committee.

A motion that the resolution be adopted was carried.

Mr. Barnum: I would like to offer a resolution as follows: "That Mechanical Section Number III of American Railroad Association recognizes the need of a research bureau to investigate questions of mechanical practice, which should have the co-operation of all the railroads, and urges the appointment, by the chairman, of a committee of eight to study the question and report at the next convention."

This motion was put to vote and carried.

Chairman: I appoint on that committee C. B. Young, of the Railroad Administration, Chairman, and the following gentlemen from the various regions: Howard Ingersoll, Eastern; C. E. Chambers, Allegheny; W. J. Small, Southern; A. Kearney, Southeastern; H. T. Bentley, Northwestern; C. E. Fuller, Central Western; and J. E. O'Brien, Southwestern. I would suggest that the secretary notify these gentlemen of their selection, and also mail to them a copy of the resolution just passed.

Unfinished Business

Mr. Chambers: A great many of our older members, no doubt, will notice the absence of J. Snowden Bell, who has been a regular attendant for a great many years. Since coming to Atlantic City I had a letter from his daughter advising me that he had been in the Western Pennsylvania Hospital, at Pittsburgh, since May 25th, because of injuries received from a fall and while he is getting along satisfactorily he wished that the convention might be notified as to the reason for his absence.

Chairman: As Mr. J. Snowden Bell has been a valued member of this association for many years, I believe it would be entirely proper for this association to send to him an expression of their sympathy, with a wish for his early recovery.

A motion to do so was carried.

C. E. Chambers then took the chair and introduced Scott H. Blewett.

Mr. Blewett: Mr. President, the members of the Mechanical Section are your friends, and that you are the presiding officer of this association is testimony of their appreciation of your abilities to lead men. Not all decorations are given for deeds of courage performed in the time of personal danger. Peace has its victory as well as war, and for such the medals are as honorable as the Congressional Medal, the Victoria Cross or the Croix de Guerre. This association, for your intelligent, earnest, faithful leadership, deems you worthy of wearing its distinguished service medal, and has graced me with the privilege of placing on your breast its president's rosette, evidencing to the eyes of the world their esteem of you. You will keep it with your treasures, and when you look upon it the faces of companions and the voices of dear friends will come up out of the past, looking and speaking confidence and respect.

Mr. Tollerton: After the many years that I have been attending these conventions and have listened to the presentation of the badges to the past presidents of both associations by our good friend Mr. Scott Blewett, and the beautiful way in which he presented them, it seems hard, indeed, to find words to properly reply. I prize very much the token that he has just pinned on my coat, and will endeavor to keep it for all time. In closing the last session of the American Railway Master Mechanics' Association, and as your last president, I want to wish to all the members and their families a prosperous and happy future. I thank you.

The chairman then introduced Roy V. Wright, Managing Editor of the *Railway Age*.

Mr. Wright: I suppose very few of us recognize the tremendous amount of work that is involved in getting up an exhibition such as we have out on the pier. People who have visited our great expositions say that nowhere is there a finer exhibit of mechanical contrivances than we have on this pier, and all of it is gotten up for just eight days. The Railroad Supply Manufacturers' Association is at work all year getting it in shape. Many of their members have to give a great deal of time to the job. It is tedious; it is hard work. And within the last three years they have had another mighty difficult problem. They did not know whether you were going to have a convention in 1917 until at the last minute it had to be called off. It was not until the armistice was signed last November that they knew that there was a possibility of having a convention this year, and yet we have here one of the greatest exhibits that has ever been made. I want to take this opportunity, in behalf of the Railway Supply Manufacturers' Association, in acknowledging to Mr. Walker, the president, our appreciation of the fine piece of work that he has done. I have been rather fortunate in being close to him in recent months. I know something of the problems he has had to contend with and some of the troubles he has had. We owe him a great debt of gratitude. Mr. Walker, in behalf of the Railway Supply Manufacturers' Association, I take great pleasure in giving you this badge, which I hope you will honor greatly, because it represents to you our feelings—feelings of the very kindest—for the splendid work that you have done this past year. We hope that you will prize this badge all the days that you live, and that they may be long.

Mr. Walker: The custom of presenting to the president of the Railway Supply Manufacturers' Association a past president's badge, must be the result of an inspiration in past years for the association to pin a badge on itself, because that is what you are doing. The president does not make the exhibit. The members make the exhibit; the committees make the exhibit, and perhaps you pick out the titular head and pin a decoration on him to gratify your own sense of appreciation for what you have done with your own efforts. There is no one knows better than I and the past presidents of our association how much the president has to depend on the committees, and how much the committees make for the success of the conventions. Your exhibit committee works days and nights in the preparation for the exhibition. Your enrollment committee, a difficult committee, which stands at the door and guards it, is your insurance that the proper people come in and the improper people do not. And they have been most efficient this year. Your transportation committee up and down the Boardwalk, a lonesome job, leaning up against the rail waiting until somebody comes along and asks for a chair—can you imagine a more inspiring way to spend the time at Atlantic City? And yet we ask men to do that, and unless they do it and do it right, your convention would not be a success. Your entertainment committee begins planning with the Committee on Arrangements six months before the exhibition opens, planning the entertainment that will fit in, that will attract the greatest number, that will keep the greatest number together the longest time, because one of the values of this convention is the association of man with man—your fellows that you do not see through the year but meet at the convention—you exchange ideas with them; you get new thoughts in connection with your business as well as with running a railroad.

I wonder if a large percentage realize what it means when I tell you that the value of the exhibit on this pier is approximately $4,000,000; that it costs the exhibitors, talking now with gross figures, approximately $750,000—three-quarters of a million of dollars—to put this exhibit on and take it away safely. The railroads pay the bill, every cent of it. But if the railroads use the exhibits, take advantage of the exhibits, they save, through the exhibitors, several times that amount, running well into the millions, so that if the exhibits are used, instead of an expense item for the railroads to meet, they become an economy. This year we have witnessed, I think, one of the greatest uses of the exhibits that we have had in years. I am not now talking about the size of the exhibits or the attendance at the convention; I am talking about the number of men, the number of people, in the booths getting information.

I have been president for three years. I heard for the last three years: "You will never have another convention." We not only heard it once, but we have heard it a hundred times. It certainly has affected me very deeply, the number of people that have expressed personally their appreciation for the work that has been done, and I have received that expression as I am receiving this—as an expression of appreciation for the men

who have held my hands up and helped me represent them seemingly satisfactorily.

E. S. Barnum: I have a little testimonial which the association desires to present to our past president, Mr. Clark. I wish to say to Mr. Clark that while he was elected president of the Master Mechanics' Association at the last meeting held in Chicago, it was not properly considered a convention, but it was an official meeting of the association and Mr. Clark was for the first part of the year the president of the Railway Master Mechanics' Association. For reasons which seemed good to him, he thought it advisable to resign the position, and yet the General Committee, in considering the work of the year, unanimously voted that because of the great value of Mr. Clark's work to the Association during the many years which he has been a member, and also for the work which he did during the first part of this year, they wish to present him with a badge showing their appreciation of that work.

Mr. Clark, it is with regret that the members of the Association have heard of your resignation from the presidency, and it is with still further regret that we railroad men have heard of your leaving the active work of the railroad business. We hope that possibly that may not be for good, but in any case we wish you the very best of success in whatever walk of life you may take up, and I trust that you will wear this badge as a testimonial of the appreciation of your fellow-members of the American Railway Master Mechanics' Association. I wish to convey to you the heartfelt appreciation of the members of the association for your good work and our best wishes for your future success.

F. H. Clark: If I had been on the General Committee at the time that this question of presenting me a badge came up, I should have tried to persuade the members that I was not entitled to the badge. I have, as Mr. Barnum has said, done more or less work for the association, but it has been gladly done. I have enjoyed it, and I do not think I am entitled to anything for it. As for the presidency of this Association, which I occupied for a period of six months or so, I think that is sufficient recompense in itself. I consider it a good deal of an honor to be the president of this Association. I do, however, appreciate the token which Mr. Barnum has presented to me.

I want to assure you all I shall always keep it and preserve it and try to remember, as I know I shall, the pleasant associations formed as a member of this Association and the various activities connected with that work.

Mr. Chambers: I want to say that with all of Mr. Clark's modesty about not being deserving of the badge, or something to that effect, he was an invaluable associate at the time he served as president, during the work which came up in connection with the change which was made from the Master Carbuilders' Association and the American Railway Master Mechanics' Association to the American Railroad Association, Section III, Mechanical. Had he been at the general meeting when this matter of presenting him with a badge came up, I would have seen that he was gotten out of the room before the vote was taken.

Before turning the chair over to your chairman, I want to take this opportunity to thank you all for your splendid co-operation, not only during my three years' occupancy of the presidency and chairmanship of the organization, but also at this convention. It has been very agreeable to all of us to hear the favorable remarks made about the convention from the start to finish, and the exhibits as well; there has never been a time when they were equalled. I have heard a great many times during the past two years that the conventions were dead, and we would never again see a big convention like those we witnessed here for several years. We are glad to know that at this convention we have had the largest attendance at the meetings and the largest exhibit that we have ever had.

Chairman Tollerton: You probably notice how easy I slip out of one job into another. I am sure that the assistance which I will receive from all the members of the association will make my task a very pleasant one.

I hope that we may be able to meet here twelve months from now, assuming, of course, that the next meeting will be at Atlantic City. That is entirely an assumption on the part of the Chairman, because it is a matter that the General Committee will have to settle.

Combustion Chambers

By F. F. Gaines

Chairman, Board of Railway Wages and Working Conditions, U. S. R. R. Adm.

A careful analysis of any locomotive boiler test reveals the fact that the firebox is the factor that limits both the boiler capacity and efficiency. In other words, boiler capacity and efficiency are limited by the amount of heat that can be liberated within the firebox, rather than by the amount of heat that can be absorbed by the heating surfaces.

When burning high volatile bituminous coal, more than 50 per cent of the heat generated is liberated by the burning of the combustible gases above the fuel bed, and in order to burn

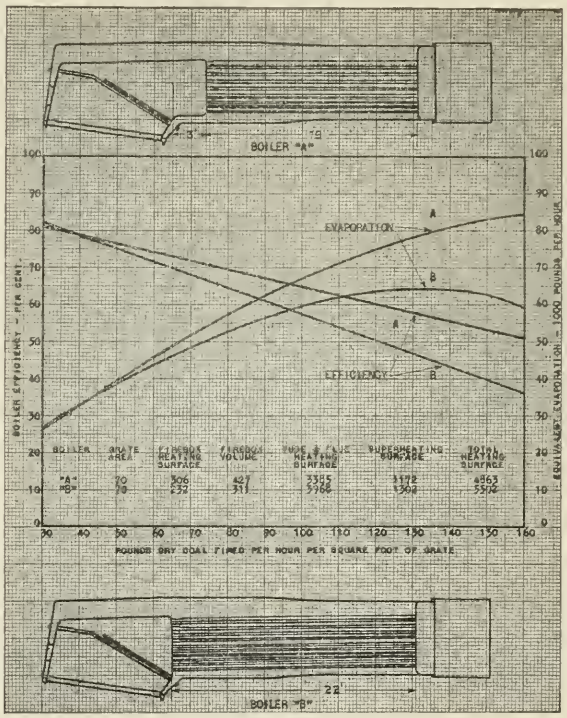


Fig. 1

these gases, it is necessary to have ample combustion chamber space or firebox volume.

The ratio of firebox volume to grate area has never received any careful or scientific investigation, but the value of firebox and combustion chamber volume is being demonstrated by the everyday operation of some 6,000 locomotives equipped with combustion chambers and is borne out by a few authentic tests.

The curves of Fig. 1 show the efficiency and capacity developed during tests of two Pacific engines equipped with boilers that were identical in every respect, except that one had a 36-inch combustion chamber and 19-foot flues, while the other had the ordinary firebox with 22-foot flues, the data as to the grate area and heating surfaces being shown in Fig. 1.

It will be noted that at low rates of combustion the capacity and efficiency developed by the two boilers are almost identical, but as the rate of combustion increased, the capacity and efficiency of the combustion chamber boiler showed a marked increase over that of the non-combustion chamber boiler, and while the non-combustion chamber boiler reached its maximum capacity at a rate of 130 pounds of coal per square foot of grate per hour, the capacity of the combustion chamber boiler continued to increase up to and beyond the rate of combustion of 160 pounds of coal per hour. At a rate of combustion of 120 pounds of coal per hour, the combustion chamber boiler showed an increase in efficiency and capacity of about 20 per

cent greater than that of the non-combustion chamber boiler, while at the maximum rate shown, the difference was more than 40 per cent.

The combustion chamber firebox had a volume of 427 cubic feet, or a ratio of firebox volume to grate area of 6.

The non-combustion chamber firebox had 311 cubic feet or a ratio of volume to grate area of 4.4.

At a rate of combustion of 120 pounds of coal per square foot of grate per hour, the combustion chamber boiler gave an equivalent evaporation of 75,000 pounds per hour, which is equal to 2174 boiler horse power.

Assuming that half of the heat was generated in the fuel bed and half above the fuel bed, we would have 1087 boiler horse power generated by the burning of combustible gases in a firebox volume of 427 cubic feet, or a generation of one boiler horse power per .4 cubic foot of firebox volume. At

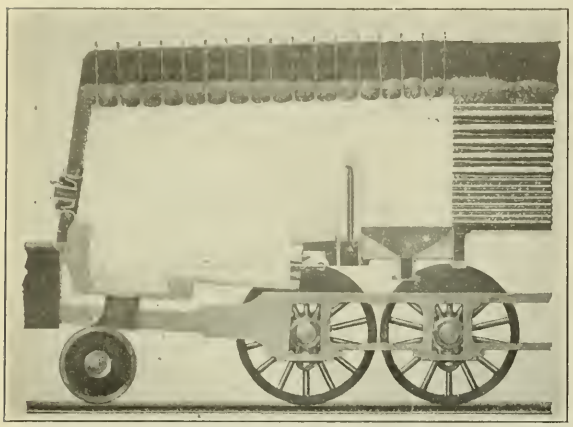


Fig. 2—Normal Grate Area = 70 sq. ft. Firebox Heating Surface = 307 sq. ft. Length of Combustion Chamber = 3′ 6″. Firebox Volume = 430 cu. ft. Flue Length = 18″. Flue Heating Surface = 3539 sq. ft. Superheater Surface = 886 sq. ft. Total Heating Surface = 4732 sq. ft.

the same rate of combustion, the non-combustion chamber boiler evaporated 63,000 pounds per hour and developed 1826 boiler horse power.

Assuming that the combustion conditions in the fuel bed were the same in both cases, we have 1826—1086=740 boiler horse power developed by the burning of combustible gases above the fuel bed of the non-combustion chamber boiler, which is equivalent to one boiler horse power per .42 cubic foot of firebox volume.

It will be seen from these figures that the increase in capacity and efficiency was in almost direct proportion to the increase in firebox volume. Of course, it goes without saying that there is a limit to the firebox volume needed for approximately perfect combustion, and when this limit is exceeded the capacity developed per cubic foot of volume will begin to fall off.

Increasing the firebox volume by the use of combustion chambers can only be accomplished by reducing the flue lengths and sacrificing flue heating surface, but it is a well-known fact that the additional firebox heating surface so gained has a much higher value per unit of area than the discarded flue heating surface, and while accurate tests are necessary to develop the absolute values of the different heating surfaces, the fact remains that boiler capacity and efficiency depend more upon efficient combustion than upon mere area and extent of heating surface.

The over-all boiler efficiency of the combustion chamber boiler referred to above varied from 82 to 51 per cent, and the furnace efficiency ranged between 97 and 66 per cent, while the heating surface efficiency ranged from 97 to 93 per cent.

Firebox volume is as essential in oil burning service as in bituminous coal burning, for in the former all of the heat is liberated by burning fuel in suspension. Fig. 2 shows an oil burning firebox of a Santa Fe type engine equipped with a Gaines combustion chamber. This boiler had 307 square feet of firebox heating surface, 3539 feet of flue and tube heating surface, and 886 square feet of superheating surface, or a total of 4,732 square feet with a grate area of 70 square feet and a firebox volume of 430 cubic feet. While burning oil under test at a rate of 4,000 pounds per hour, this boiler developed 2,000 boiler horse power, or 4.6 boiler horse power per cubic foot of firebox volume with an over-all efficiency of 85 per cent, which approximates the theoretical limit.

There is but little data available on combustion chamber tests in oil burning service, but that quoted is sufficient to give an idea of the value of combustion chambers in such service.

There are in use some 6,000 locomotives equipped with combustion chambers, of which 1425 are the U. S. Government standards and 460 are of the Gaines type. These combustion chambers range in length from 18 in. to 11 ft. and are used in conjunction with flues varying in length from 9 ft. to 25 ft. It is evident from these figures that there has been no logical method of procedure followed in proportioning combustion chamber and flue lengths, and there is room for a lot of scientific investigation to determine the correct ratios between firebox volume and grate area, and between firebox heating surface and flue heating surface. It is also desirable to arrive at some correct understanding as to the value of firebox heating surfaces and flue heating surfaces and the arrangement and location of heating surfaces, such as will give the maximum evaporation and efficiency per unit of surface.

Extensive tests have been carried out by the Bureau of Mines at its Pittsburgh laboratories in trying to determine the ratio of furnace volume to grate area for the different kinds of coal used in stationary service. These tests show that in order to reduce the heat loss due to unburned gases to 2 per cent, it was necessary to have the ratio of furnace volume to grate area about 13 to 1 when burning Illinois coal at a rate of combustion of 60 pounds with a 25 per cent excess of air. Under the same conditions, Pittsburgh run-of-mine coal required a surface volume of ten times the grate area, while Pocahontas low volatile coal required a volume five times the grate area. These tests are not strictly comparable to locomotive practice for the reason that in the latter much higher rates of combustion prevail, and the excess air supply is generally lower than that mentioned.

Under these conditions it might be necessary to have a higher ratio of volume to grate area than those required in stationary service, in order to secure approximately perfect combustion of the gases.

Fig. 3 shows a Mallet firebox with a grate area of 80 square

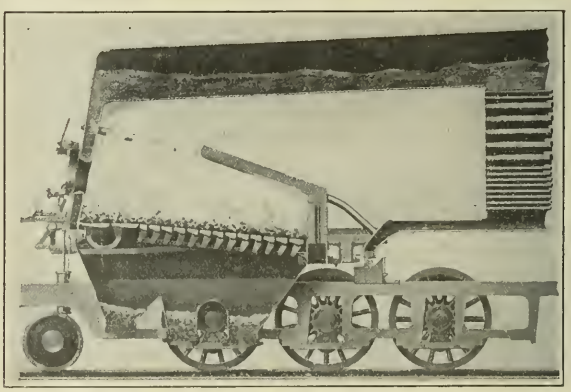


Fig. 3—Grate Area = 80 sq. ft. Firebox Heating Surface = 407 sq. ft. Firebox Volume = 570 cu. ft. Combustion Chamber Length = 7 ft. Length of Flameway from Center of Fuel Bed to Flue Sheet = 18 ft.

feet, 407 square feet of firebox heating surface, firebox volume of 570 cubic feet and a flameway 18 feet in length from center of fuel bed to flue sheet. In this firebox, the ratio of volume to grate area is about 7 and this probably represents the maximum at this time, with the exception of a locomotive now building which with a firebox volume of 860 cubic feet and a grate

area of 112 square feet, has a ratio of volume to grate area of 7.7.

If the tests on the stationary furnace referred to can be used as a criterion, it is apparent that our best designs of modern fireboxes are still shy in flameway and volume and that there is much room for investigation and improvement in this direction.

Future developments and improvements in the art of burning coal in the locomotive firebox will probably depend to a large extent upon the changes made in the design and proportions of the firebox itself, and it is in this direction that we must look for innovations that will successfully meet the constantly increasing demand for boiler capacity and efficiency.

As an indication of this, we might mention that while the oil burning locomotive referred to developed 4.6 boiler horse power per cubic foot of firebox volume, and the coal burner developed 2½ boiler horse power per cubic foot of firebox volume, stationary power plants are being designed and built for burning coal in suspension with furnaces of such size that the desired boiler capacity can be developed at a rate of ½ boiler horse power per cubic foot of furnace volume.

No mention has been made of the effect that the istroduction of combustion chambers has upon boiler maintenance; but it is a well-known fact that short flues give less trouble and fewer failures than long flues, and that moving the back flue sheet forward and away from the zone of high temperatures in the firebox materially reduces trouble due to flue leaks and failures.

Viewed from any angle, the combustion chamber firebox is apparently superior to that of the non-combustion chamber type; but there is a woeful lack of correct and authentic information concerning this most important subject, due to the fact that such knowledge can only come through a correct interpretation of experimental facts.

Appreciation from the Ordnance Department

MAJOR E. D. CAMPBELL, Railway and Seacoast Section, Artillery Division, Ordnance Department United States Army, who made the address on "Railroad Artillery" on Monday evening, received the following communication from C. C. Williams, Major General of the United States Army, Chief of Ordnance, conveying appreciation to the manufacturers and railroad representatives at Atlantic City:

"I am glad to have this opportunity to express the thanks and appreciation of the Ordnance Department for the noble efforts of the manufacturers and railroad representatives here assembled which resulted in the splendid production of ordnance material.

"Your assistance was not only invaluable in manufacturing ordnance, but your hearty co-operation in design, research and development of all kinds of equipment was of inestimable value.

"It is due largely to the high purpose and patriotic efforts of the manufacturers such as the American Car and Foundry Company and the railroads that a surprisingly quick end came to the great war."

Purchasing Officers Visit Convention

WHEN R. H. AISHTON, the newly elected president of the American Railroad Association visited Atlantic City last week, he was so impressed by the exhibits that he wired H. B. Spencer, director of the Division of Purchases, U. S. R. R. Administration, suggesting that he ask the purchasing officers within reasonable distance of Atlantic City to arrange to visit the exhibits. Mr. Spencer made this suggestion to the regional directors and through them to the federal managers. The result was that a very large number of the purchasing officers visited the convention before its close.

Registration, American Railroad Association, Sec. III, Mechanical

Bemet, J. J., Frd. Man., N. Y. C. & St. L.
Bennett, R. G., A. E. M. P., Penn., Chalfonte.
Brady, J. E., Asst. M. M., B. & O., Schlitz.
Crawford, C. W., Chrmn. Gen. Com., U. S. R. A.
Darlow, A. M., Fed. Mgr., B. & S., Chalfonte.
Deeter, D. M., M. M., P. & R.
Duval, J. E., Genl. Supt. Car Serv., Grand Trunk.
Edwards, J. S., M. M., Newberry & Laurens, Continental.
Evans, G. E., Staff Officer Oper., L. & M.
Galloway, W. S., M. M., B. & O.
Herlihy, J. J., Asst. M. M., B. & O., Schlitz.
Hines, J. P., M. M., B. & O.
Huber, H. G., Asst. Eng. M. P., Penn., Chalfonte.
Kendall, W. C., Mgr. Car. Serv. Sec., U. S. R. R. A.
Lanza, Coetano, Galen Hall.
Leach, W. B., Marlborough.
Linderman, F. A., Dis. S. M. P., N. Y. C., Pennhurst.
MacFarland, H. B., E. T., A. A. & S. F., Traymore.
Marsh, F. E., M. M., N. Y. P. & N.
Mengel, J. C., M. M., Penn.
Moll, George, R. F. E., P. & R., Netherland.
Ott, Wm. B., M. M., Penn.
Park, W. L., Fed. Mgr., C. G. W.
Pearson, E. J., Fed. Mgr., N. Y. N. H. & N.
Platt, J. C., Hunt-Spiller Mfg. Co., Dennis.
Rice, W. L., Supt., N. & C. S. P. & R., Monticello.
Shaeffer, C. M., Gen. Supt. Transp., Penn.
Simpson, G. E., Gen. Supvr. Transp., C. M. & St. P.
Smock, F. A., M. M., Penn.
Stevens, Geo. W., Fed. Mgr., C. & O., Marlborough.
Tate, M. K., Mgr. Service, Lima Loco. Works, Chelsea.
Taylor, G. W., Staff Officer Transportation, Southern.
Wagner, J. A., Genl. Mgr., Des Moines Union.
Wanamaker, E., E. E., Rock Island, Haddon Hall.

Special Guests

Atkinson, H. C., M. P. Dept., P. & R.
Atkinson, W. S., Pur. Agt., K. C. S., Traymore.
Bonfield, Chas. P., Car Fore., B. & O., Bouvier.
Bernal, Angel, Ch. Clk. to S. M. P. & M., Southeastern Lines of Mexico, Marlborough.
Bowler, Roland T. E., Supr. Tool Equip., B. & O., Craig Hall.
Boyer, John O., Road Fore. Eng., P. & R., Tennessee.
Braden, Wm. F., Welfare Agt., B. & O., Schlitz.
Burnham, M. G., Eng. of Tests, N. P., Traymore.
Caley, G. W., M. M., N. Y. C. & H., Fredonia.
Campbell, Johnston, Supt., L. V.
Camder, Wm. A., Dist. Elec. Super., B. & O., Bouvier.
Cathcart, H. W., Fuel & Loco. Inspr., P. & R.
Church, L. H., Loco. Insp., U. S. R. R. Ad.
Clarkson, A. J., Eng., N. Y. C.
Clemmitt, J. H., Pur. Agent, N. & W.
Conley, A. J., R. Fore. of Engines, Staten Island.
Cope, D. E., M. M., B. R. & P., Continental.
Dailey, Jerry, Asst. Fore. & Boiler Insp., C. R. R. of N. J., Conway.
Davis, A. C., M. M., Penn.
Dillon, H. W., Insp. Pur. Dept., Pa., Princess.
Doke, G. E., Insp., N. Y. C. Lines, Traymore.
Doyle, M. J., Reporter, A. R. A., Craig Hall.
Dravo, H. D., Asst. Rd. For. of Eng., N. Y. P. & N.
Edmunds, J. B., Trav. Sec. to Fed. Man., C. & O.
Eggleston, M. O., Rd. For. of Eng., P. & R.
Ehrenfeld, F., Supervisor, Retired, Pa.
Ely, Jacob W., Air Brake Supr., P. & R.
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Feehan, Benj., Asst. Fore., C. R. R. of N. J., Conway.
Fillmore, Jacob, Machinist, W. J. & S.
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Floyd, James F., Southern, Marlborough.
Foertsch, T. A., Fore., P. & R.
Force, Lawson H., D. L. & W., Pennhurst.
Force, N. J., Eng. Test., D. L. & W., Pennhurst.
Garcelon, H. I., Asst. Engr. of Tests, B. & O.
Glaser, Sidney, Insp. Car. Dept., C. & I. H., Espinlade.
Godard, E. E., Asst. Eng., Elec. Car Htg., Pa., Dennis.
Grabfelder, J., Insp., W. J. & S. S.
Griswold, W. W., Pur. Agt., W. & L. E., Marlborough.
Hardy, W. E., Gen. Fore., C. R. R. of N. J., Conway.
Heald, W. E., Const. Ele. Dept., B. & O.
Heazlitt, B. Y., P. A., Kentucky & Indiana Term.
Heinbach, W. F., For., P. & R.
Henry, Frank, Eng. of Tests, B. R. & P., Traymore.

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Hogan, Francis, Road For., P. & R.
Howe, John, Supt Shops, B. & O., Marlborough.
Jamison, William D., Draftsman, P. & R
Jones, G. J., Gen. Boiler For., B. & O., Grand Atlantic.
Jones, W. T., Asst. to Eng. of Tests, N. Y. N. H. & H. R. R.
Kahler, C. P., Elec. Engr., Oregon Short Line, De Ville.
Keller, R., For., C. R. R of N. J.
Kershaw, W. C., Fore., Pa., Traymore.
Kimball, John A., Asst. Rd. For. of Eng., P. & R.
Klingeman, J. D., Asst. Rd. For. of Eng., Penn.
Kissinger, Frank H., Insp., P. & R., Chalfonte.
Kleinkauf, E. G., M. M., L. V., Surf.
Koch, Philip, For. Eng. House, P. & R.
Kofammann, K. E., Test Dept., Penn., Kentucky.
Lagrange, Fred A., Tech. Insp., Argentine Government Rys., Traymore.
Lanza, Gaetana, Galen Hall.
Lacy, A. B., Pur. Agt., Virginian.
Lenderking, W. D., Safety Agt., B. & O., Schlitz.
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Lukens, H. A., Asst. P. A., Penna.
Lunn, E., Ch. Elec., Pullman Car Lines, Marlborough.
Leppington, W., Asst. Fore., C. R. R. of N. J., Sterling.
Markel, Chas. T., Ch. Loco. Const. Insp., U. S. R. R. A.
McCaffrey, J. A., Road Fore., S. I.
McCann, C. E., M. M., B. & O.
McClellan, R. D., Gen. For., L. V.
McConnell, Wm. H., Clerk M. P. & R. E. Dept., P. & R.
McCune, W. H., M. M., M. K. & T., Breakers.
McGinness, G. T., Secy. to Supt. Shops, B. & O., Wiltshire.
McPhail, O. G., M. M., A. B. & A., Sterling.
Martin, John J., R. H. Fore., C. R. R. of N. J., Conway.
Masson, Capt. C. H., Eng. Corp., U. S. A., Traymore.
Miller, B. F., M. Painter, D. L. & W., Osborne.
Milton, J. H., Supt. C. D., C. R. I. & P., Chalfonte.
Moor, L. D., Engr., M. P., Osborne.
Morgan, J. C., Safety Agt., B. & O., Schlitz.
Munster, A. W., Reg. Pur. Bd., U. S. R. R. A., Breakers.
Nichols, J. H., Gen. Storer, N. Y. C. & St. L., Traymore.
O'Donnell, John J., Gen. Fore., L. I., Dennis.
Oplinger, H. E., Gen. Fore., Atlantic Coast Line, Chalfonte.
Otto, C. A., Asst. Gen. Mat. Agt., Pa.
Owen, A. E., Equip. Agt., Pa.
Parker, R. J., Gen. Mgr., A. T. & S. Fe., Shelburne.
Parker, Wm. A., P. A., B. & B., Traymore.
Pastorius, D. B., Sup. Elec. Car Ltg., Penn., Galen Hall.
Perrin, Ernest, U. S. Official Representative of the Lyons Fair, Lyons, France.
Patten, G. Fred, Ch. Clk. to Gen. Supr. Car Repr., U. S. R.
Patenhall, F. P., S. E., B. & O., Breakers
R. A., Miller Cottage.
Pegran, R. B., Genl. Pur. Agt. Southern, Traymore.
Phillips, C. K., Examiner Div. 41, U. S. Patent Office, Jackson.
Pickard, F. C., M. M., D. L. & W., Traymore.
Pizzorno, V., Pres., Italian State Rys. Com., Marlborough.
Pyle, Leslie R., International Ry. Fuel Assn., Ambassador.
Quinn, M. A., R. H. F., D., L. & W., Richmond.
Ramond, Albert, French High Commission, Traymore.
Rausch, Edw., Loco. Insp., U. S. R. R. A.
Reichard, H. W., Road Fore. of Eng., R. V.
Reidinger, L. P., Fore. Car Insp., W. J. & S. S.
Reynolds, H. W., Mech. Insp., N. & W., Louella.
Riley, J. L., M. M., C. St. P. M. & O., Sterling.
Royer, A. C., Pur. Dept., Penn.
Ramond, Edmond, French High Commission.
Reardon, F. E., Supt. of Stores, D. & H. Dennis.
Rees, H., Asst. M. M., B. & O., Grand Atlantic.
Reynolds, D. E., Ch. Clk. Pur. Dept., B. & L. E., Traymore.
Richetson, W. E., Ch. of Eq. Div., N. Y. C.
Rickford, S. A., M. M., N. Y. C., Chelsea.
Roach, C. E., Insp., C. R. I. & P.
Roeser, Elmer J., Draftsman, P. & R.
Roderick, M. B., Insp. T. & M., Erie, Traymore.
Rule, Geo., Eng., B. & O., Bartram.
Rush, R., Genl. Hdlt. Insp., N. Y. N. H. & H.
Ryer, F. A., Pur. Agt., B. & A., Shelburne.
Ryerly, Wm. S., Asst. Supt. Shops, B. & O., Schlitz.
Saabye, H. J., Act. Pur. Agent, B. & W.
Sapia, Radup, Central Argentine, Dalso.
Scatchard, H., Gen. Strkpr., N. W.
Scatchard, H. F., N. & W.
Shand, A. C., Ch. Eng., Penn.
Shay, J. M., M. M., B. & O., Majestic.
Shea, Frank, Boiler Insp., N. Y. N. H. & H.
Sheehan, J. E., Gen. Car Insp., N. Y. N. H. & H., Osborne.
Shelton, F. M., Supr. Loco. Sup., D. L. & W., Raleigh.
Shepard, C. E., M. P. Insp., B. & O., Schlitz.
Shugers, Geo. C., Trav. Fir., P. & R.
Sisco, G. E., M. M., Penna., Haddon Hall.
Smith, George W., Asst. Gen. For., P. & R.
Smith, W. D., Shop Supt., C. & E. T., Arlington.
Smith, Asst. Erect. Shop Fore., B. & O., De Ville.
Spofford, Capt. H. N., Eng. Corps, U. S. A., Traymore.
Stahl, E. C. N., Insp., N. Y. C.
Stahl, J. J., Shop Eng., Southern, Glaslyn Chatham.
Stewart, C., S. S., B. & O., Schlitz.
Stewart, T. R., S. S., B. & O., Schlitz.
Silvestri, Ing. Cav. Vittorio, Principal Engineer, Italian State Rys., Marlborough.
Simpson, D., Mach. Shop Foreman, P. East Lines, Strathhaven.
Simpson, G. R., Primary Examiner, Patent Office, Wiltshire.
Slenker, C. A., For. Blksh., Long Island, 12 Ohio Ave.
Son, Frank P., Asst. to Pres., Copper Range.
Sprowl, S. C., Supt. of M. P., Atl. Coast Line, Chalfonte.
Stackhouse, R. J., Genl. Storekeeper, P. & R., Craig Hall.
Stadelman, J. H., Asst. Eng., Penn. E. L.
Stier, J. E., Draftsman, B. & O., Pennhurst.
Stone, W. S., Grand Chief, B. of L. E., Alamac.
Strohmer, J. L., Secy. to Supt. M. of E., B. & O.
Stockton, C. H., R. M., Raritan River, Worthington.
Stockwell, F. L., M. M., S. A. L., Berkshire
Stofflet, H. A., E. E., P. & R., Bouvier.
Stuart, R. T., M. M., Raritan River, Worthington.
Subrie, Norman, Travel. Eng., Penn., Continental.
Sullivan, J. S., Fore. Black. Col. Shop, Pa. Lines West, Ambassador.
Surrie, Norman, Pa.
Sutherby, A., M. M., Erie, Monticello.
Sweetman, E. M., M. M., Southern, Osborne.
Sykes, L. Gen., Foreman, P. & R., Strand.
Tencey, S. R., Supt., U. P., Shelburne.
Thayer, J. S., Material Insp., B. & O., Clarindon.
Terwilliger, G. E., Genl. Air Brake Insp., N. Y N H. & H, Haddon Hall.
Thomas, John H., C. of N. J., Louvan.
Thompson, C. E., Gen. Fore. Car Shops, Pa.
Thompson, F. V., Elec., P. & R.
Thompson, J. G., M. M., L. V., Surf.
Thornely, E. W., Reg. Supvr. of Stores, Allegheny Reg.
Thorpe, W. C., Chf. Loco. Insp., Penna., Harris Apts.
Thwaites, D. G., Insp., Pa., Traymore.
Toomey, T. H., Gen. For., Penn.
Topp, C. E., M. M., E. J. & E.
Torback, F. S., For., B. & O., Wittle.
Tiley, George E., Supt. Tank Car Eq., Crescent Tank Line, Lexington.
Trego, J. G., Asst. Fore. Eng., Penn., Eaton.
Turley, William, Shop Supt., Kan. City South., Chalfonte.
Urtel, E. J., Pur. Agent, B. & S., Chalfonte.
Utaka, Y., Agt. Japan Gov. Rys., Marlborough.
Van Derbogart, James, Gen. Fore., N. Y. C., New Biltmore.
Van Gundy, C. P., Chief Chem., B. & O., Dennis.
Voigt, A. E., Car. Ltg. Eng., Santa Fe, Marlborough.
Walker, E. B., Elec. Eng., Canadian National, Traymore.
Walker, J. E., M. M., I. C., Ambassador.
Walsh, M. F., Research Com., U. S. Shipping Bd., Traymore.
Wardlaw, J. W., G. E., Central Vermont, Chelsea.
Warwork, W. J., C. C., N. Y. C., Traymore.
Watkins, Thomas, Gen. For., P. & R.
Webb, M. L., Asst. Secy. to Dir. of Oper., U. S. R. R. A., Miller Cottage.
Webb, E. R., Div. M. M., M. C., Haddon Hall.
Webb, T. H., For., S. A. L., Osborne.
Weedom, R. E., Supt. Roadway Shop, Southern, Netherland.
Weeks, John, Pres, Norwood & St. Lawrence. Dennis.
Wellman, I., M. M., A., T. & S. F., Marlborough.
Whitehurst, S. A., M. M., Cent. of Ga., Schlitz
Widmaier, J., W. J. & S. S.
Wilson, G. M., Supt. M. P. Shops, G. T. R., Marlborough .
Wilson, D. C., Elec. Eng., C. of Geo., Osborne.
Wilson, D. H., Shop Supt., F. E. Coast, Sterling.
Williams, Capt. Cyril, Insp. Eng., South African Rys., Marlborough.
Winfield, J. H., Gen. Insp. M. P. Dept., Erie, Traymore.
Wright, C. W., Master Carpenter, L. I.
Wright, J. D., Gen. Fore. Painter, B. & O., Strand.
Wright, N. R., Asst. M. M., Lehigh & New England.
Young, J. H., Senior Asst. Dir. of Oper., U. S. R. R. A., Haddon Hall
Young, Jas., Jr., Asst. Eng. M. P., Pa.
Yost, James F. S., R. F. E., P. & R.
Zeigler, C J., Ch. Elec., Florida East Coast, Galen Hall.

Conventionalities

President Carr, of the Railway Supply Manufacturers' Association, has asked John C. Kluns, manager railroad sales, the Burden Iron Company, Chicago, to take the chairmanship of the Transportation Committee for next year. Mr. Kuhns has accepted.

Secretary George B. McGinty, of the Interstate Commerce Commission, who has been attending the convention, became ill after he arrived and was confined to his room for a while. He is feeling much better now and has been attending the sessions of the convention and inspecting the exhibits.

In the photograph of Franklin Hess, son of George F. Hess, mechanical superintendent, Kansas City Southern, accompanied by Ellsworth L. Mills, of the Air Reduction Sales Company, which appeared in the *Daily* for Wednesday, June 25, a typographical error was responsible for the writing of the company's title as American Reduction Sales Company. It should have read Air Reduction Sales Company.

Mr. and Mrs. Harry W. Frost have had as their guests, since they have been at the convention, their son, Harry, Jr., and their son-in-law and daughter, Mr. and Mrs. Webb C. Artz. Mr. and Mrs. Artz live in Philadelphia. During the war Mr. Artz was in the motor transport service of the army. Harry, Jr., is a lieutenant in the navy, having recently received announcement of his promotion to first lieutenant, and is stationed at present at the Brooklyn Navy Yard.

An H. B. O.
With a party of 4,
Strove motoring hither
Till She ran no more.
Said H. B. O.
When he left Flushing,
"Did not expect to do much pushing."
Oh! H. B. O.
You sure should know,
That trip would have been neater,
Behind a superheater.

Colonel C. H. Crawford, who has been attending the convention, will leave on July 1 for Rio de Janeiro, Brazil, where he will go as manager for the Baldwin Locomotive Works. The Baldwin works are establishing over a dozen branches in foreign countries, and the manager will go supplied with a complete library of catalogues and books regarding equipment and supplies produced in the United States, whether those of the Baldwin or other companies. Col. Crawford formerly was assistant to the president of the Nashville, Chattanooga & St. Louis. During the war he was in the Engineer Corps, and was to have gone to Europe to assist Samuel M. Vauclain, now president of the Baldwin Works, in carrying out this country's extensive program of tank production. Col. Crawford was actually on the Adriatic in New York harbor ready to sail, when the armistice was signed.

The losses by fire in the United States and Canada during the month of May, as compiled from the records of The Journal of Commerce, aggregated $16,516,300, as compared with $2,545,900 in May, last year.

The Man Who Saw

"Louder, Please!"

"Say," said the locomotive man from the Mormon capitol, "do you know what that meeting in the Convention Hall reminds me of?"

"What?" said The Man Who Saw, who was sure that the big westerner had a "good one."

"It reminds me of the delegation of boilermakers who 'waited on' the superintendent of a road. They were courteously received and stated their case for more pay, shorter hours, etc.

"The superintendent regretfully detailed his reasons for not being able to raise their pay and finished his address in 4½ hours flat.

"Just as he finished, the chairman of the delegation put his hand to his ear and said, 'how much did he say we got?' "

"Comers"

"Never run a one-man show."

The mechanical engineer of a prominent eastern road was explaining his record of success in response to the questions of The Man Who Saw.

"Train two of your best men for your own job. Put the ability of one against the other. When you are away, entrust the duties of your office to the one who seems to be able to assume them with the least swelling of the head.

"Encourage them all to add to their study of details by absorbing some of the bigger things. Try to create in them an interest in what the road is doing—whenever you can send them out on the line.

"Have them meet the other men from other departments when possible, so that the interest in their work will be tempered with a familiarity with the real object we all seek to attain—to safely haul as much as we can, as economically as possible."

Get Acquainted

The Man Who Saw 15 unexpected Latin-American visitors here this year begs to call attention to the significance of this event. Evidence of the importance of the Latin-American field for railway supplies is furnished in the announcement by a prominent locomotive works of the opening of Argentinian and Brazilian branches in addition to extended activities in Europe, Asia, Australia and Africa.

The Man Who Saw finds a slowly awakening interest among railway supply men in this development. Here and there he finds a manufacturer with vision who has studied or is quietly investigating South American possibilities on his own initiative. And he does not wish to urge the expenditure of a heavy appropriation which has so often accompanied the ill-advised excursion of a well-meaning but innocent explorer of the Latin-American mart. Rather he would suggest discussion and action which might lead to the attendance of as many influential officers of Latin-American railroads, sugar mills and other enterprises as can be induced to attend the next mechanical convention.

Why not tackle this problem now? The Man believes

that a sincere effort in this direction will not fail to bring forth fruits, of which, perhaps some day, we may well be proud.

The Trackless Train

The Man Who Saw feels that attention should be directed to the fact that the "greatest convention" is marked by the introduction of a new era of transportation in and around the factory and machine shop.

The setting up of exhibits from one end of the Pier to the other, owes their rapid completion to the new development—the "trackless train."

Man savers, time savers, money savers—these miniature motor trucks are said to be displacing the old hand truck about as fast as they can be manufactured. The popular type propelled by an electric motor which derives its power from a storage battery can be seen handling formerly impossible loads in modern shops. Some haul three or four trailers and negotiate crowded aisles and sharp corners with perfect ease.

Internal combustion tractors of the small type on the caterpillar or "tank" principle are likewise coming to the front and are making good out of doors; some of them equipped with a belt pulley find themselves trusty guardians of the power breakdown where they are able to slip in next to a disabled machine and furnish emergency power.

The Man Who Saw believes that the advice of one of his friends, an enthusiast on this subject, is well worth reading: "If you are thinking of putting these tractors into your works, analyze your problem from all angles; balance the desirability of the use of electricity vs. gasoline, visit a big plant and see what they are doing with it, then study the different types which are offered and choose for your needs."

Umbrellas and Soft Plugs

He had Asia's number. He could tell what province a Korean came from by the shade of blue on his shirt. He had watched them build and trade and his admiration of the Mongolians' methods was unqualified. There were, however, some phases of their reasoning which he could not explain and the pioneer of American machinery in the Far East proceeded to illustrate.

The Man Who Saw drew nearer to get the slant on the Asiatic from one who seemed to know.

"We were walking on one of the principal streets of Seoul accompanied by an Englishman and an enterprising Jap. It was the hour for trade. Push carts, bundles and junk of various descriptions seemed bound in a common direction. Among the throng appeared a picturesque old Korean and he carried two home-made umbrellas.

"'But, I say, why does he carry two?' inquired the Briton.

"'You ask him,' said I to the Jap.

"The Jap blocked the path of the tradesman, asked his question and returned to make his report.

"'He says,' said the Jap, 'that he carries two so that in case he loses one he will still have the other.'"

* * * * * * * * *

"Two years elapsed and I found myself in the company of the same enterprising Jap. He had come to inspect a shipment of locomotives for his company and was quite insistent.

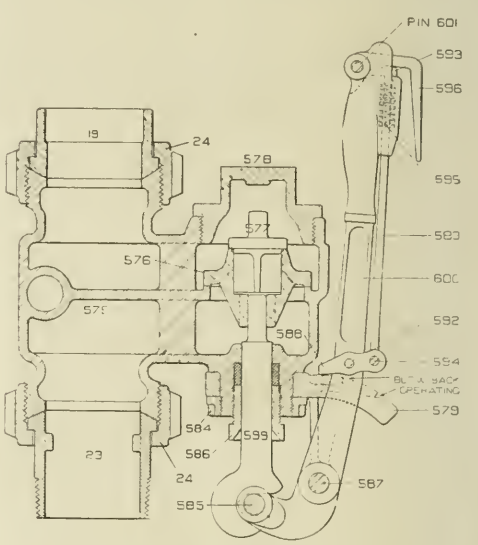
"'But the specifications only call for one soft plug in the crown sheet,' I protested.

"'Ah, yes, I know,' said the Jap, 'but you remember the Korean and his two umbrellas? We must have the two plugs—if one goes bad we have the other one to go good.'"

Balanced Lever Starting Valve for Non-Lifting Injectors

A LEVER STARTING VALVE, which will remain tight in service as long as needed, is being shown by William Sellers & Co., Inc., Philadelphia, Pa. It is known as style VC. It is radically different from the older forms in which the pilot and main valves are connected to and operated by a horizontal stem and with which it is difficult to maintain the valves in alignment.

The "VC" style has a main body with a supplemental steam receiving chamber containing two loosely guided flat seated checks, raised serially by a vertical stem. The valve is reseating, self-grinding and remains tight under the severe service to which valves of this type are subjected. It has a further advantage of safety, because the valves cannot be jammed open. As the steam pressure is always on top and the lift is vertical, the tendency is naturally to return to their seats. For this reason it is necessary that a latching device be provided



Balanced Lever Starting Valve

for holding the valve in operating position; this consists of the usual form of notched quadrant and tripping device for the latch. An initial notch is placed in the quadrant so that the valve may be held partially open, permitting the required amount of steam to warm the water in the tank during the cold weather. When the valve is placed outside of the cab a special notched hand pull is provided, which not only locks the valve wide open in operating position, but also permits eight positions of the valve when used as a heater, so that any required amount of steam can be blown back into the tank.

EDITORIAL
Railway Age

Table of Contents will be found on Page 5 of the Advertising Section

The Awakening of the Technical Societies

The present is a period of general unrest in all industries and strata of society. There is an almost universal clamor for new and changed standards to meet the conditions arising out of the war. This is as true of technical societies as elsewhere. It is particularly true of the older established engineering societies which, because of their large membership and their prominence, have been prone to move slowly and for this reason have become prominent targets for criticism. Recognizing this unrest, the American Society of Civil Engineers created a Development committee early last fall, with broad powers, to study the activities of the society. The other national societies of mechanical, electrical and mining engineers appointed similar committees soon after and all of them have been actively at work for several months. Two of these committees (the civil and mechanical) presented progress reports before the annual meetings of their respective societies last week. The report of the committee of the American Society of Civil Engineers is abstracted briefly elsewhere in this issue. A careful study of the tentative recommendations of this committee will show the comprehensive manner in which it is proposed to revise the society's activities in order that it may interest itself more directly in matters not purely technical or what may be termed welfare work for its members. The report presented to the mechanical society was equally progressive and equally well received. It is to be hoped that the membership at large of these societies may receive the reports with sympathetic attitude, realizing that the problem is theirs to solve and also realizing that they must be willing to render service to the society if they are to expect service from it.

Low Voltage Switch Machines

The low-voltage switch machine is being slowly popularized, but it would seem to be deserving of more general favor. It is in many situations the only practicable and satisfactory device by which a man can move a switch which is situated a long distance from his station, because the ordinary high-voltage dynamo is too costly; and the slowness of the low-voltage apparatus is tolerable because speed of operation is not essential. The use of low-voltage machines at the ends of certain passing sidings has enabled some roads to expedite the movement of trains very materially, and to reduce costs. The desire to operate switches beyond ordinary interlocking limits has led to the development of the low-voltage machine to a highly satisfactory degree. It is operated on 20 volts by a set of primary or secondary batteries, and it gives an indication to the operator as to the position of the switch point. These movements will operate a switch, switch lock, pipe connected derail and detector bar in approximately 35 seconds, while a signal will clear in about 15 seconds. One road has estimated that with the use of these movements the time saved to a train entering a siding will average seven minutes by doing away with the stop necessary to allow trainmen to set the switch by hand. Another road used such machines at switches that could not be seen from the point of operation and where large expenditures would otherwise have been necessary for additional interlocking plants. Their use in connection with power-operated train order signals located at blind sidings and controlled by an operator at a station train-order office a mile or more away also greatly facilitates train movements and cuts down expenses. The use of the low voltage movements at such points is one method worthy of the careful consideration of managements wishing to decrease the running time of trains and lower the operating costs; a study of conditions surrounding their installation at certain places can well be undertaken at the present time in order that work may be started as soon as conditions warrant.

Abatement of the Whistle Nuisance

The railroad superintendent who removes the public's grievances before the public has formulated them comes pretty near being an ideal officer, at least in one element. In the nature of the case, however, acts of that kind are not likely to come prominently before the public, and they remain unknown; so, therefore, we call the reader's attention particularly to that paragraph in the notice, on another page, of the abatement of the whistle nuisance at Tyrone, on the Middle Division of the Pennsylvania Railroad, which says that no complaints of loud whistling had been heard from residents of Tyrone. This bit of news is rather unusual, even novel; we recall nothing of the kind elsewhere. The New York Central formerly had a rule, on the busiest parts of its main line, under which flagmen of trains on the passenger tracks were never called in; and that, of course, abated the whistle nuisance in a very positive way; but if flagmen must go out, and must be called in, an electric circuit, with bells on fixed posts, as at Tyrone, is the ideal means of communication; simple and cheap. Former Commissioner J. E. Sague, speaking before the State Public Service Commission in New York city last week, again reminded us that our British cousins know how to handle a dense passenger traffic without flagging; but, judging by the present rate of progress the adoption of that refinement by our railroads is still far in the future; and the Tyrone experiment might well be considered for adoption at many other places. Reference was made in this column, last week, to the excellent rule, on another division of the Pennsylvania, which has been prescribed for the guidance of trainmen in affording decent treatment to the ears of the people, sick or well, who reside near the railroad; but, as to the noise nuisance, it is no more than right to say that the true way to cut off this dog's tail is to apply the axe directly behind the animal's ears. To put our rules in the best possible language is an important element of good railroading, as is constantly evidenced when clumsily worded rules cause annoyance and friction; but the foolish idea that good rules make good practice still seems to persist in some minds; it is a vigorous weed that has to be killed every Spring—or oftener. Our busiest railroads now have telephones strung along the line at very frequent intervals; and this facility is so inexpensive, comparatively, that many other roads must soon see the wisdom of providing it. With a communicating wire available at every telegraph pole, the continued free use of locomotive whistles is little less than barbarous.

Merely a Business Proposition

Like the adoption of a national budget system as a basis for making appropriations, the creation of a national department of public works embracing all engineering and architectural activities of the government is of such obvious advantage as to appear to require no argument. Yet we have been content to go on from year to year with these activities divided among several bureaus and departments, each ambitious to build up a large organization and without any pretense of coordinating its work with that of the other engineering branches. Thus, building construction is now handled by the Treasury department and river and harbor improvements by the War department; the Coast and Geodetic Survey and the Bureau of Standards are subordinated to the Department of Commerce, while the Bureau of Public Roads comes under the Department of Agriculture. Such a diversification of control necessarily results in much waste of money and energy which would not be tolerated in a business concern and should not be in national affairs. Engineers and business men in general throughout the country have long recognized the extravagance of this policy, or rather lack of policy, but as it is primarily a problem of engineering organization, agitation for its correction has rested primarily on engineers. They have agitated more or less actively and continuously for the correction of this situation for years. This agitation came to a head at a conference of representatives of engineering societies held in Chicago last April when delegates from over 75 organizations with a combined membership of over 100,000 engineers decided to inaugurate an intensive campaign for the concentration of these activities under one department. This has already borne fruit in the preparation of a bill to create a Department of Public Works which will be introduced in Congress in a few days. This bill should receive the active support not only of engineers but of all citizens interested in the economical, business-like conduct of governmental construction activities which run into the hundreds of millions of dollars expenditures annually. The only opposition which has so far manifested itself is that of the Engineers' Corps of the Army which is one of the principal engineering organizations in the present system, whose activities will be revised and placed upon a commercial basis in the proposed plan.

Wire Crossings Over Railways

The question of wire crossings over the tracks is a subject of considerable importance to the railroads from the standpoint of safety. Various associations and others interested in such matters have made extended investigations and studies which have been productive of what they believe to be adequate specifications for the construction and maintenance of such crossings. Some time ago the Bureau of Standards prepared and proposed a revision of a previous recommendation covering signal lines crossing over railways which provides for a distinction between crossings over "important" and "unimportant" railways. Such a distinction is contrary to the 1913 specifications of the Association of Railway Telegraph Superintendents, now the Telegraph and Telephone division, section 1, operation, of the American Railroad Association, which insists that there is no such a thing as an "unimportant" railway, or part thereof, insofar as wire crossings are concerned. It may be inferred by some that there are industry tracks, warehouse tracks, logging roads, spurs, etc., that are "unimportant." Such is the attitude of the Bureau of Standards. As a matter of fact, it is on such lines that the greatest danger frequently prevails. Industry tracks, warehouse tracks and passing tracks are almost always located in the towns along the road and it is at these points where wire crossings are more likely to occur. Trainmen have more occasion to ride the tops of cars while passing through towns than in traveling between them. Curvature, grades, and obstructions to view on account of buildings enter more largely into the problem at these points than on main lines. Another question which should be considered in a study of this matter relates to wire crossings of small line companies such as farmer lines. It is said that there are three such crossings to every one of larger line companies and that as a rule the crossings of the latter are installed and maintained in a safe manner; while as much cannot be said of the small line companies because of a lack of adequate facilities to do proper work on the wires. Several state commissions have advocated legislation which would force most wire crossings to go underneath the tracks, and thus entirely eliminate the hazard attending these crossings.

The Penalty for Deferred Maintenance

In his recent testimony before the House appropriations committee Mr. Hines indicated that deficiencies in maintenance of way and structures could be compensated for in considerable measure by an excess in the condition of equipment over that of January 1, 1918. Nothing was said as to the unit of measure to be applied in thus balancing maintenance of equipment against maintenance of way and structures, but owing to marked changes in values almost any unit that could be proposed would present serious objections. Whatever the unit, there is one phase of this plan of balancing over-maintenance against under-maintenance that cannot be readily measured. Maintenance deferred cannot be restored in the future for the same outlay as would have sufficed if undertaken in season. For instance, recent measures to reduce maintenance of way activities have been instrumental in curtailing the season's painting program. Not only will the postponement of this work entail the expenditure of a much greater amount of effort when the work is eventually done, in cleaning off rust and blistered paint, but it will result in a deterioration of the structures that cannot be restored by any process short of renewal. It is to be admitted that this is probably an extreme case. Nevertheless, the same principle applies to nearly all items of maintenance work and surely ought to receive proper recognition when the government undertakes to compensate the roads for inadequacies in maintenance expenditures.

Highways and Railways

The last decade has seen a marked increase in the use of motor vehicles for passenger and freight traffic on public highways with promise of even greater development in the near future. The resulting density and speed of highway travel have led to radical changes in the physical requirements of the public roads. Where steep grades and sharp curvature were formerly objected to as sources of discomfort, they are now considered positive obstructions to traffic and on all important routes of travel the demand for improvements in grade and alinement are most insistent. This condition has become manifest to railway men wherever a grade crossing elimination problem brings railway and highway officers together. Flat skew bridges are now often demanded where detoured square crossings would formerly have sufficed and long approach grades are now specified where short dips would have served in the past. This condition has an important bearing on the distribution of the cost of such work. It has been recognized for no little time that the public, as sponsor for the highway, should bear a fair share of the expense, but now that these costs are tending to increase rapidly because of the refinements in highway design, it is but justice that the increased costs should be borne by the public which benefits by the improvements.

A Useful Study of the Collision Problem

THE HEARING before the New York State Public Service Commission on the prevention of collisions, reported in our last issue, brought out many interesting statements of fact and opinion; and the full proceedings, when printed, will afford profitable reading and should mark progress. By this we do not mean that any one said much that was new; but it is a good thing to have the issues crystallized. Mr. Rhea, with his well-known frankness, set forth some of the fundamentals with a succinctness that might well be imitated in many quarters. Mr. Sprague, from his intensive studies, presents certain points of the problem in incisive terms. Extracts from his remarks will be found on another page of this issue. Messrs. Schweyer and Webb spoke with sanity and force, showing that they are not mere dreamers or promoters, but practical engineers. Mr. Sprague's gentle reminder that the old stagers do not know it all, and Mr. Patenall's call for more business-like co-operation between the railroads and the unorthodox inventors, both deserve attention.

A State Commission must recognize all interests, and it was proper to listen to the enginemen and firemen; but the spokesmen for these had nothing constructive to offer. Their urgent demand for more thorough protection of trains by flagging is logical enough, but they seem to forget that the diseases of the flagging system are incurable.

These commissioners may or may not have an important duty in connection with the settlement of the collision problem. The problem surely has to do very directly with the police power and therefore comes within the authority of the State of New York, although at the same time it is a national problem, demanding settlement on such lines of uniformity and conservatism as to insure the best progress, and the least waste, throughout the whole country. The New York commissioners have set forth, in their report on the South Byron collision, some very practical ideas; and if, by promptly propounding a very sound and practicable plan, they should forestall the slow-moving Washington authorities, their ideas would at least deserve careful attention. Just now they could not order the installation of apparatus on any important road without the consent of the United States Railroad Administration; but that condition will soon be changed.

It is fair to assume that Mr. Rhea sees straight when he says that public sentiment demands that the automatic stop problem be brought to a more definite issue. Why should the railroads of America longer delay the settlement of the question? Can discipline be further improved? Look at the more recent startling collisions. Mount Union (Feb. 27, 1917); Ivanhoe (June 22, 1918) and South Byron (Jan. 12, 1919) afford significant evidence that the further improvement of our methods of discipline is an exceedingly complicated problem. Those who say that the case is hopeless cannot be answered. In each of these cases the engineman had not had enough sleep, and the fireman was of no value as a monitor. Regulating enginemen's sleep appears to be an impossible task. The monitorship of the fireman has never been of any proved value. Where trains are not more than three minutes apart, the benefit from the flagman's function is very uncertain, and this degree of frequency of trains is now common on all of the principal roads.

Automatic stops have been used on the Boston Elevated for twenty years and their value as a disciplinary element has been well proved. The Chicago & Eastern Illinois has been using a stop on both passenger trains and freight trains for three or four years. The Great Western of England has 100 engines equipped with automatic stops and has been using cab signals for 12 years. With these several bodies of evidence before us can it not be said that some, at least, of the unsettled questions have been settled? The United States Railroad Administration began examining the question of prevention of collisions after the Nashville wreck in July, 1918; but the investigating committee was not appointed for six months thereafter, and has not yet made a report. The New York State Public Service Commission has been six months considering what to do about South Byron. What good reasons can be given for these delays? A very competent experienced and conservative signal engineer, who has studied this subject for many years, remarked recently that the minds of the people (railroad officers included) seem to work in a cycle; we have serious collisions which an automatic stop would have prevented, and everybody feels the need of such a device and the call for it is definitely voiced; and then there is a period when no very bad collision occurs and "everybody seems more or less contented with things as they are." This view of the case is old, and would scarcely be worthy to be quoted at this time, except that it comes from a railroad officer peculiarly well qualified to take a correct view; and it was spoken after he had had very good opportunity to know the feelings of the directors of his own road. It is the directors of the railroads to whom falls the duty of finally dealing with this problem.

Railway Rates and Cost of Living

A THEORY regarding the effect of railway rates upon the cost of living has been enunciated by persons in high positions, which requires discussion. Commissioner Woolley of the Interstate Commerce Commission has presented it in a recent address as an argument, as we understand it, why rates should not be advanced at all, at least for some time. The theory referred to is that an advance in freight rates results in an increase in the cost of living which exceeds the advance in rates, and may even be three or four times as large. This is attributed to the alleged fact that when freight rates are advanced, business concerns use the advance in rates as an excuse for advancing their prices much more than enough to cover the increase in rates.

If this argument were sound, it would be conclusive against advances in rates at any time, and especially at a time when the cost of living is so high as at present. But with all due respect to the eminent government officials who have made it, the *Railway Age* challenges its correctness and asserts that it cannot be successfully defended either on economic principles or by the concrete evidence of experience.

Why should an advance in freight rates have a different and greater effect upon prices to the consumer than an advance in any other kind of cost entering into the production and marketing of a commodity? To the manufacturer and merchant freight rates are merely one of their costs of doing business, like wages, prices of raw materials, cost of advertising, etc., and, considering the matter from a purely abstract point of view, there does not seem to be any more reason why it should be assumed that an advance in freight rates would result in a disproportionate increase of prices to the consumer than would an increase in wages, or taxes, or selling costs.

But it is not necessary to consider the question merely in the abstract. Freight rates actually have not produced any such effects. There were vast increases in the cost of living before any of the recent large advances in freight rates occurred. A little over a year ago the Railroad Wage Commission made an investigation of the increase in the cost of living and estimated that between December, 1915, and December, 1917, it had been about 45 per cent. During this period there had been no material advance in freight rates. On the contrary, the average rate per ton per mile was lower in 1917 than it was in 1915. It is a poor rule that does not work both ways in economics as well as in other matters. If an advance in freight rates would have such an important effect upon the cost of living, as is claimed, why did not the stationary position of railway rates

during this period keep down the cost of living? Mr. Woolley has indicated that freight rates ought to be "pegged" in future to prevent an increase in the cost of living. But they were very effectively pegged by the regulating authorities during the two years mentioned, and meantime the cost of living increased 45 per cent.

What has occurred since freight rates were advanced? The advance in eastern territory in 1918 was approximately 35 per cent and in the rest of the country 25 per cent. On the theory that any advance in freight rates results in a relatively much larger increase in the cost of living, it would appear that the increase in the cost of living, since these advances in rates were made, should have been much larger than it was before. If no advance in rates is accompanied by an advance of 45 per cent in the cost of living then it would appear that an advance in rates of 25 to 35 per cent should, on this theory, have resulted in an increase in the cost of living of at least 50 to 100 per cent; but really it has been much less than it was before.

Both reason and experience refute the argument that an advance in freight rates has any effects upon the cost of living which differ in kind or degree from the effects produced by an increase in any of the other costs of doing business. Freight rates are a factor in determining the prices at which goods are finally sold to the consumers and, therefore, affect the cost of living. But the same thing is true of every other element of industrial and commercial costs. Nobody would contend that the farmer, the manufacturer and the merchant should not advance their prices when an advance in prices is necessary in order to enable them, as classes, to offset increases in their expenses of doing business. There is no more ground for keeping down railway rates when an advance in rates is needed to cover advances in the cost of rendering the service of transportation, than there is for not advancing the prices of commodities when advances in them are needed to cover increases in the cost of producing and marketing them.

One most important point which seems to be overlooked by those who oppose advances in freight rates because of the supposed effect upon the cost of living is that if rates are not advanced and the government continues to guarantee the returns of the railroads, as Mr. Woolley suggests, taxes must be collected from the public in order to pay railroad deficits caused by the failure to advance the rates. Now, the effect which an increase in taxes produces is not exactly the same upon all classes of people as the effect of an advance in railway rates. The relative effects are influenced by the differences in the incidence of the taxes and railway rates. But, in the long run, a half billion dollars in taxes levied to pay a railroad deficit of that amount imposes as much of a burden upon the consuming public as would an advance in rates of a half billion dollars made to prevent the deficit from being incurred. Most taxes, like most freight rates, are finally passed along to the consumer. Furthermore, when all the cost of rendering transportation service is covered by the rates charged for it, the railways are almost certain to be more efficiently and economically operated than when the rates are made such that a deficit is incurred and the loss is recouped by taxation. One reason why government managed business almost always are extravagantly managed is that the managers know if they do not make them earn enough to pay expenses, the deficit can and will be defrayed from the public treasury.

Perhaps Director-General Hines is right in taking the position that an advance in rates should not be made until normal conditions have been restored and the amount of the advance which must be made, in order to cover all costs, including capital charges, can be accurately ascertained. But to talk about permanently keeping railway rates too low to cover the total cost of rendering the transportation service, as a means of holding down the cost of living, is, we submit, to talk economic nonsense.

Letters to the Editor

Reply of Corps of Engineers, U.S.A., to Proposed Dept. of Public Works

WASHINGTON, D. C.

TO THE EDITOR:

The long expected response of the Corps of Engineers, U. S. A., to the activities of the engineers, architects and constructors of the country looking toward the establishment of a National Department of Public Works has been made. It is in the form of a bill designated S. 1376, 66th Congress, 1st Session, introduced into the Senate on June 5, 1919, by Senator Ransdell, of Louisiana. It may be inferred that this senator is not prepared to father the measure for the customary legend at the head of the bill contains the additional words "by request" after Senator Ransdell's name.

The bill is 35 pages long and contains 29 sections. It proposes to create an "Auxiliary Engineer Corps" in the United States Army for duty on works of public improvement —a non-combative corps of engineers which shall be "under the command and direction of the Chief of Engineers, U. S. A. . . . "Its personnel shall be assigned by the chief of engineers to duties under his charge; specifically on river and harbor improvements, inland waterways, locks and canals, fortifications, embankments, levees, dykes, breakwaters, piers, and in the supervision and in the construction of national highways and bridges, and to any other public work that shall be now or hereafter assigned to the chief of engineers under the War Department. This organization shall also perform the duty of guarding and protecting all national public works."

Whether or not the foregoing language places the construction of national highways and bridges under the chief of engineers and thereby increases the authority of the engineer corps beyond that now conferred upon it, is a question for the lawyers to determine. It may be observed, however, that, even if such authority is not specifically conferred, the language creates an "open sesame" and one is reminded of the ancient legend concerning the camel who received permission to place his nose in the tent. The bill is too long and comprehensive to be reviewed adequately here, but those who read it will have no question that it is the first step in the attempt, of which many of us have been aware, to militarize the public works functions of the federal government.

The Engineers, Architects and Constructors Conference on National Public Works took action at the recent Chicago meeting directly opposite in spirit and purport to that proposed under S. 1376. Therefore the officers of this federation are in duty bound to oppose this bill. In order that the engineers, architects and constructors of the country may be informed concerning the first steps taken in opposition the letter to Wesley L. Jones, chairman of the senate committee on commerce, to which the bill has been referred, is reproduced below.

"On June 5, Senator Ransdell introduced into the Senate, 'by request' a bill to create an auxiliary engineer corps in the United States army for duty on works of public improvement. It is numbered S. 1376 and has been referred to the committee on commerce.

"I have the honor to be chairman of a federation of societies with an aggregate membership of 105,000 engineers, architects and constructors. This federation, which is known as the 'Engineers', Architects' and Constructors' Conference on National Public Works,' is opposed to the provisions of the bill above named, and at its convention in Chicago, April 23 to 25, adopted a program contrary thereto in all respects.

"On behalf of the federation aforesaid, I respectfully request that when the committee on commerce designates S. 1376 for hear-

ing, said federation be given an opportunity to prepare and present its views.

"For more than 40 years, the engineers, architects and constructors of the United States have almost unanimously been advocating the consolidation of the engineering and construction work of the government into a department of public works. The United States stands practically alone among the great and small nations of the world in that it has no such department. The matter has been considered and acted upon from time to time by various engineering societies throughout the country but all efforts have heretofore been futile for two reasons: (a) the engineers, architects and constructors of the country have given local and sporadic rather than united and continuous support; (b) the corps of engineers of the United States army has always been able to defeat any proposal that has thus far been advanced to Congress. The engineers, architects and constructors of the country are now united and they propose to present to Congress in the near future a well considered plan for a Department of Public Works that will correct the present chaos in our national construction matters and achieve economy and efficiency.

"I will not burden you now with a detailed statement of the reasons which, after more than 40 years of mature consideration by well balanced men, prompt the forthcoming recommendations. With respect to S. 1376, we shall in due time endeavor to substantiate our belief that there is no more sure, certain and insidious way of accomplishing militarism in the United States than through the militarization of our public works. Heretofore, this militarization has extended principally to the rivers and harbors operations with results that have repeatedly been characterized in a way not at all favorable to the corps of engineers. The bill S. 1376 extends army control to public roads, bridges 'and any other public work that be now or hereafter assigned.' This bill is merely a part of a very ambitious plan to place the army in the saddle over all engineering operations of the government.

"The genesis of S. 1376 is well known. You will find attached hereto a sample of propaganda circulated among the civilian force of the corps of engineers through the district office in New Orleans. It is hardly necessary to remind one as familiar with official army procedure as yourself that no civilian attached to the corps of engineers would be so venturesome as to distribute this amazing circular without 'knowledge and consent' of headquarters at Washington.

"It is a very long way from the war department to the capitol if one goes *via* New Orleans. The engineers, architects and constructors of the country are coming to the doors of Congress very soon, with a respectful petition which will be the result of 40 years of the best engineering thought. But in so doing, we shall remember the fundamental engineering axiom that a straight line is the shortest distance between two points."

Reference in the foregoing letter to organized propaganda will be made clear by the following abstract of the circular sent out from the district office of the engineer corps at New Orleans:

"*Strictly Personal.*—The purpose of this letter is to enlist all chief clerks in the U. S. engineer service in a 'push' to shove a bill through Congress for mobilizing an auxiliary engineer corps. A bill for this purpose was recently placed in the hands of Senator Joseph E. Ransdell with a view to having it introduced by request at the coming session of Congress. This bill provides for a complete organization from top to bottom—non-combative with a military status and under the direction of the chief of engineers, U. S. army, with the rank he now has—major-general—and the division engineers with the rank of brig.-general, and the district engineers with the rank of colonel; with provision for ranks for assistants below the district engineer. The corps is to be mobilized from the *experienced* men of *all* classes in the office and field now in the service. Its duties are as now—construction, care of maintenance of public works, and national highways and bridges to be added. Let us talk about national good roads; absolutely necessary for the welfare and prosperity of the nation.

"It provides for a three-year practical training period for all who enter the service and who have had no previous engineer experience before a man can get into the permanent corps, unless he qualifies for a commission before that time.

"It provides graded pay in the various classes of the personnel and also longevity pay of 5 per cent increase for every 3 years service, for eight three-year periods; besides the opportunity, if qualifications justify it, for promotion from class to class with higher pay in such class. It provides also for an efficiency board that shall pass upon the qualifications of the personnel—so that justice is done to all men; with reference to duties performed and rank and compensation, which any member of the corps is justly entitled to.

"It is essential to watch progress at Washington. Essential to have the bill introduced in the coming session, and essential to keep it going till passed

"*When you hear* that the bill is introduced call on your congressman or senator for printed copy.

"Talk for such legislation—be enthusiastic over it—get your business friends to write letters requesting the passage of the bill. Keep at it and don't let it rest. It will take time to get the bill through.

"It may be necessary to keep a man in Washington under pay to '*mark time*' and keep a sharp lookout. All the engineering districts, I feel sure, will rally to the necessary financial assistance."

M. O. LEIGHTON,
Chairman, National Service Committee, Engineering Council.

"Excess Earnings" and Better Transportation

NEW ORLEANS.

TO THE EDITOR:

It would be trite to say that probably the most serious and important problem confronting the people of the United States today is that regarding the future of the transportation lines; and there have been about as many plans put forward for solving it as there have been patented car couplers.

The greatest difficulty that has presented itself with regard to proper regulation of the railroads in the future seems to be how to make an adjustment of rates as between the strong and the weak lines, which will not allow the strong too great compensation and the weak too little.

A number of plans have been suggested to overcome this difficulty, but none seems to be practicable or a proper remedy for the situation. Some of the plans propose to fix a reasonable return as a maximum that should be accorded to any transportation line for its efforts, anything that might be earned in excess of that amount to revert to the government. Another plan—that of the labor organizations—is that the excess should go to the emplyoees or be divided between the government and employees. None of these plans would make for the greatest effort and efficiency in operation.

It seems to the writer that a proper solution would be for the excess to revert to the line which had earned it—not to be paid out in dividends to stockholders, but to be put back into the individual property which had demonstrated efficiency of operation in order to make that operation even more efficient, and to provide greater facilities to the patrons of that individual road who had furnished the business from which this excess had been derived, and who had thereby contributed this excess.

It should be the duty of some governmental agency, in combination with the railroad executives, to see that this money was spent in a way that would inure to the public benefit through increased facilities and better and safer transportation.

It has seemed to the writer that the government originally approached railroad regulation from the wrong angle. At the time it undertook to regulate the railroads many of them were newly built through sparsely settled regions, and if, instead of giving the principal attention to the regulation of rates, they had encouraged the carriers to charge rates reasonable but sufficiently high to show good returns, and then required a fair amount of those returns to be put back into the property for better facilities and conveniences for the public, much better results would have been obtained, not only for the public in general but for the carriers, than through simply reducing rates to a starvation basis.

Transportation as sold by railroads varies in value like any other commodity. Buyers of transportation can afford to pay a better price for good quality than for an inferior grade.

It is very doubtful if, under the most favorable conditions, even the most efficiently operated road will obtain any excessive amount beyond a fair return on its investment for many years to come, but such a plan as described above might be adopted for a period of, say, 5 to 10 years, and if condi-

tions so improve within that period as to make earnings in excess of a fair return on investment too large to be expended on a given property, it is reasonable to assume that the condition of the weaker lines would be likewise improved, making practicable a reduction in rates, thereby resulting in further benefits to shippers and the consuming public.

CHARLES S. FAY,
General Freight Agent, Southern Pacific Lines in Louisiana.

Water Treatment and Anti-Foaming Compound

CHICAGO, ILL.

TO THE EDITOR:

The description given by Mr. Koyl of the water treatment system in use on the Great Northern (*Railway Age*, April 25, 1919, page 1053) is most instructive and the problem as touched upon is of such tremendous importance as to warrant the most extensive and serious discussion. In his summary of the results obtained it seems a little disappointing that Mr. Koyl has not gone into the details of costs. It is evident that the results would justify very considerable expense, but, of course, there is a limit beyond which even the list of benefits recited would not justify the expenditures made necessary. This limit is very evidently the balance between the cost of boiler maintenance and the interest, maintenance and depreciation of the equipment installed for water treatment.

Mr. Koyl states that foaming has not been abolished, but he seems to convey the impression that the present foaming tendencies are only those due to the small amount of calcium carbonate left in the water after treatment. This is not believed to be quite a satisfactory impression under which to close the subject. On the contrary, it seems logical to assume that the sodium salts added and left in the solution by the treatment will actually tend to increase the foaming condition.

This is the experience of nearly every railroad which has installed the wayside treating system described by Mr. Koyl, and there is no good reason to deny or overlook this condition, because the benefits gained from water treatment seem so great as to make it a good and economical practice to acknowledge the foaming tendency and meet it with the consistent and conservative use of anti-foaming placed on the engines.

Curiously enough, there seems to be a decided tendency on the part of water engineers to avoid discussion of this detail, and yet nearly every railroad in the West, using treated water, is also using anti-foaming compound, and rightly so. It makes no difference whether the foaming tendency is natural or artificially created, the argument for its cure is simple and effective, since it is based on dollars and cents, and is not open to difference of opinion.

The use of treated water makes it unnecessary to wash boilers frequently, so far as getting rid of sludge is concerned. Under average conditions, with treated water the boilers could be run much farther without danger of mud burning than they could with the raw water usually available in the same districts, but, unfortunately, after the installation of the treating plants, the boilers must be washed for a new reason—to rid them of the concentration of foaming salts resulting from the treatment.

If, therefore, the foaming tendency can be obviated by increasing the surface tension through the conservative use of anti-foaming compound, we have for comparison the cost of a boiler washout as $4, while the compound used for an additional round trip costs from 40 cents to 80 cents. The sharper engine; the reduction in engine lay-over hours; the proportional obviation of evils resulting from strains of unequal temperatures in cooling and washing and firing up, are all in favor of the use of anti-foaming compound. The above being assumed as facts—and they are—every consideration of the cost of wayside treatment must carry the admission that compounds must still be used on the line and their cost must be added.

Mr. Koyl quotes a letter from the general master mechanic of the central district of his railroad, in which there appears the statement that the boilers are actually being washed every round trip. A later statement by Mr. Koyl is to the effect that the boiler washing in the treated water districts is about half what it was. It is assumed that in those districts not covered by the general master mechanic's letter the boiler washing has been remarkably reduced and probably by the use of anti-foaming compound placed on the engines.

Pitting and grooving not having been abolished, Mr. Koyl states that this is not due to chemical action of the water. It is probable that every operator of motive power west of the Mississippi river would be interested in discovering what does cause this pitting and grooving and how it can be proved that it is not at least partially a result of chemical action. It would also be interesting to know whether it was decreased or increased by the installation of the water treatment.

L. F. WILSON,
Vice-President, The Bird-Archer Company, Chicago.

A Ticket Agent's Reminiscences

KANSAS CITY, MO.

TO THE EDITOR:

I have read with much interest Mr. Cullen's address on the ticket salesman as printed in your issue of April 11, and it takes me back to the old days, the early eighties, when the ticket agent was a salesman of the first rank. Railroads at that time recognized this salesmanship. And not only your own road; connecting lines offered the agent a bonus in the way of commissions. Many an old-timer will recall going out into the country and soliciting passenger business for his road. Many a time the writer, when he had aroused sufficient interest to get them to come into town to start on the trip would explain the routes and rates, and then take the passengers to his home and have his wife entertain them until train time, to keep competitors away.

How different it is now! I went recently to a "modern" ticket office. There were about forty customers, and only ten men to wait on them. I waited 32 minutes before I could get attention; 30 people were waiting on an average 32 minutes; and yet the United States Railroad Administration calls this economy!

Three years ago you could telephone and a ticket would be sent to you by a courteous messenger. The ticket agents, not only in the larger cities but in the smaller towns as well, vied with each other in securing business. Now, you wait to buy a ticket, you wait for belated trains and you take an upper, if you are lucky enough to get one. There is, however, one redeeming feature in this—it makes old men young, in that they have learned to climb down from an upper without disturbing the porter.

In the old days, the dining car conductor would ask you if your meals were satisfactory. Now, you take what you can get, and if it isn't satisfactory, you can leave it. In the old days, the train conductor was proud of his train, and would remark to his friends, "We will reach your town on time," or if they were a few minutes late, he would apologize for it and explain the reason. Now, they are indifferent. The whole service has gone to H—— along with individual initiative.

E. J. KNICKERBOCKER.

Army Supply Bases Useful Adjuncts to Railroads

The Facilities Made Necessary by the War Were Planned to Meet Peace Time Conditions

INCLUDED IN AN ENGINEERING PROGRAM, involving the expenditure of more than $1,200,000,000, embracing 581 major projects, located in 547 different and widely separated localities, handled by the construction division of the Army during the 18 months that this country was at war, was a comprehensive scheme for the development of port and terminal facilities sufficient for the storage and transshipment of supplies for the expeditionary forces. The plans provided for the construction of port terminals at Boston, Mass.; at Brooklyn, N. Y.; Port Newark, N. J.; Philadelphia, Pa.; Norfolk, Va.; Charleston, S. C., and New Orleans, La., and for interior warehouses at Chicago; Columbus, Ohio; Jefferson, Ind.; Pittsburgh, Pa.; New Cumberland, Pa.; Schenectady, N. Y., and St. Louis, Mo.

Each of the 14 layouts was planned and built as a complete project in itself and each one is a part of a co-ordinated plan designed to relieve the congestion of transportation facilities resulting from the convergence of overseas freight at the seaboard, largely at New York; to permit continuous operation of manufacturing plants in the interior; to ensure maximum utilization of cars and permit the diversion of freight from one port to another to meet the changing conditions.

The storage areas provided in the port terminals supply the reservoirs to care for the material received at the seaboard during the lapses that are bound to occur in the schedules of ships. They are necessary not only because of the fact that a ship cannot arrive, discharge its cargo, load and depart on a rigidly fixed schedule, but also because of the irregularity in the arrival of shipments from the interior. The storage areas or interior warehouses at the sources of supply permit the manufacturing plants in the interior to work at all times to their maximum capacity by providing the outlet for the finished products without excessive storage space at the plants. In connection with the port terminals they give the opportunity for loading the materials in car load and train load lots, permitting the maximum use of cars, helping largely to overcome the necessity for using cars for storehouse purposes. To ensure flexibility in the system and to permit the diversion of freight from one port to another as occasion demands, traffic routes from each of the interior warehouses to all of the port terminals were definitely worked out prior to the final decision as to locations.

In taking up the studies of the amount of space required at the port terminals and for the proper handling of freight in the interior, the amount of tonnage that had to be shipped abroad each month was first ascertained. From this was deducted the amount of space required at the ports to accommodate this volume of freight, the number of cars to be handled daily and the size of the yards necessary to handle these cars. In other words, the terminals were planned as a complete whole to meet certain definite conditions, with allowances for increased demands. They were built on vacant land, with room for expansion and with adequate space for yards and docks. In all, a total area of about 1,200 acres was required at the seaboard for the seven port terminals.

Generally speaking, two types each of port terminals and interior warehouses were built. In addition to the railroad facilities, the port terminals consist of one-story buildings for one type and multi-story for the other, the same general division of type holding for the interior warehouses.



Administration Building, Main Building, Wharf Shed, Boston Terminal

The Port Terminals

Port Newark terminal is a typical example of the one-story type port terminal. It is located on the Jersey marshes about three miles from the city of Newark. It fronts on a ship canal extending from Newark Bay and has a direct rail connection with the Central Railroad of New Jersey.

The storage plant consists of nine warehouses and two open sheds, all of the buildings being 161 ft. wide and 1,150 ft. long. The warehouses furnish a storage area of 1,750,000 sq. ft. and the sheds 300,000 sq. ft. All of the buildings were placed at right angles to the waterfront, where a dock 3,300 ft. long and 80 ft. wide is provided.

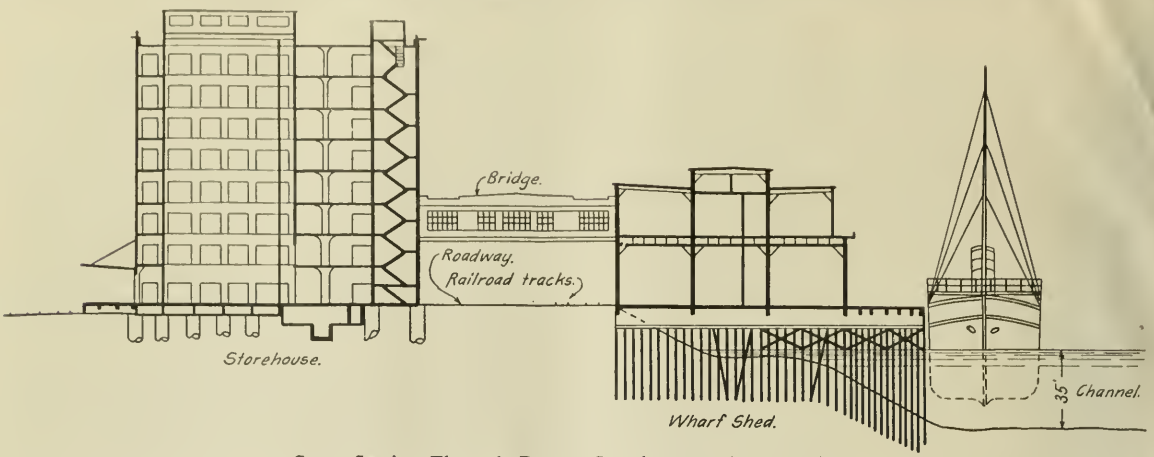
Each of the sheds and warehouses is provided with roadways on one side and with track facilities on the other. The arrangement of the roadways and tracks in reference to the buildings is shown on the general plan. It will be noted that the buildings are parallel to each other and separated by alternate roadways and railroad tracks. The warehouses are provided with platforms 18 ft. wide on both the track and roadway sides. At the open shed a platform also 18 ft. wide is provided on the track side. The roadways are 70 ft. wide and the tracks serving the platforms are spaced on 14

ft. centers with a distance from adjoining platforms to the center line of near track of 6 ft.

The warehouses are entirely on pile foundations and are all one story high with plank floor, 6-in. terra cotta block walls and mill construction roof, except one, which has brick

face of the many difficulties arising from weather conditions.

One of the multi-story type port terminals was built at Boston, Mass. This plant includes the army supply base and two navy structures with their supplemental docks and wharfs, the whole comprising a project costing approxi-

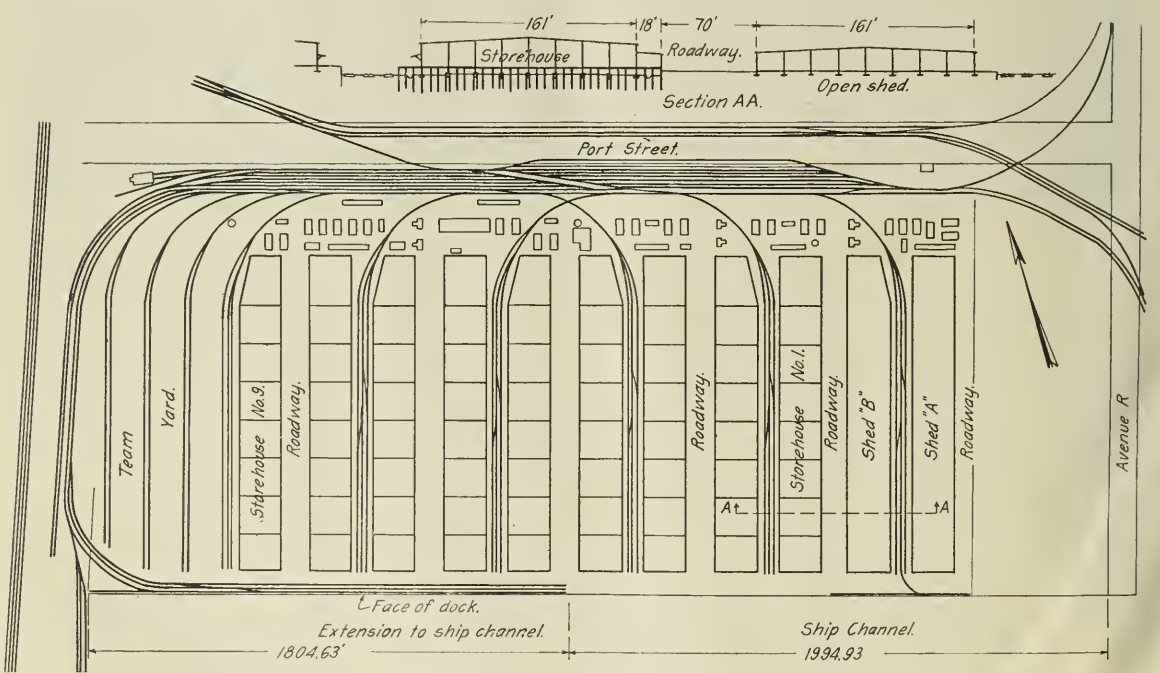


Cross Section Through Boston Storehouse and Wharf Shed

walls. This was carried up over a part of its length to provide space for office use.

The construction involved 800,000 cu. yd. of hydraulic fill, 600,000 piles in the foundations, 28,000,000 ft. B. M. of lumber, 3,500,000 bricks, 400,000 sq. ft. of terra cotta and

mately $28,000,000, and covering 37 acres of land and 20 acres of water. The main building is an eight-story reinforced concrete warehouse of flat slab construction, with the first floor designed to carry 500 lb. per sq. ft. and the upper floors 300 lb. per sq. ft. and having an area of 126 ft. by



General Plan of the Newark Terminal

approximately 15 miles of railway tracks. During the construction, which was completed within three months, more than 10,000 men were employed at one time and 67 pile drivers and other equipment in proportion were used simultaneously in order to complete the project promptly in the

1,638 ft. The exterior is finished concrete. The first concrete was poured on May 14, 1918, and the last on October 3 of the same year. There are 4,000 lineal feet of wharfs and 2,860,700 sq. ft. of storage space in the eight-story building and the adjacent pier shed. A railroad supporting yard has

been built providing 11½ miles of single track, with a capacity for 722 cars and a terminal yard with 6½ miles of track, giving a total of permanent track of approximately 18 miles.

The project includes the main building 126 ft. by 1,638 ft. 8 stories high, the power house and coal crusher, 80 ft. by 85 ft. by 78 ft. high, the main building wharf shed 2 stories high, 100 ft. by 1,638 ft., and the navy pier sheds,



A View of the Interior Warehouse at Chicago

two 3-story buildings, each 100 ft. by 924 ft., a one-story and basement electric sub-station, 86 ft. by 52 ft., a 3-story and basement administration building, 122 ft. by 88 ft., designed for three additional stories, the west open wharf, 120 ft. by 1,100 ft., and the east open wharf, 72 ft. by 580 ft.

The principal items in the construction of this project include 2,500,000 cu. yd. of dredging, 13,000 tons of reinforcing steel, 300 tons of structural steel, 7 miles of sewer and water pipes laid, 30,000 wood piles, 6,650 lb. Raymond concrete piles, 240,000 cu. yds. of concrete, 5,700,000 sq. ft. of forms built and erected, 30 miles of temporary and permanent tracks and 265,000 sq. ft. of windows set and glazed. In carrying out this project 720 cars of material were received and unloaded. This plant fronts for its entire length on a channel leading from the main ship canal in Boston harbor with a second channel back of the pier shed. The general layout map shows its location in reference to the water facilities and the supporting yard facilities, the yard having direct rail connection with the New York, New Haven & Hartford Railroad.

From north to south the service tracks include three tracks serving the storehouse on the north, two tracks between the storehouse and the wharf shed, and two tracks south of the wharf shed extending the full length of the pier. These are so arranged to permit freight to be unloaded simultaneously direct from the cars to ships, into the pier shed or wharf shed, or into the warehouse for storage or classification, from which it can later be moved to the piers by means of elevators and storage battery trucks.

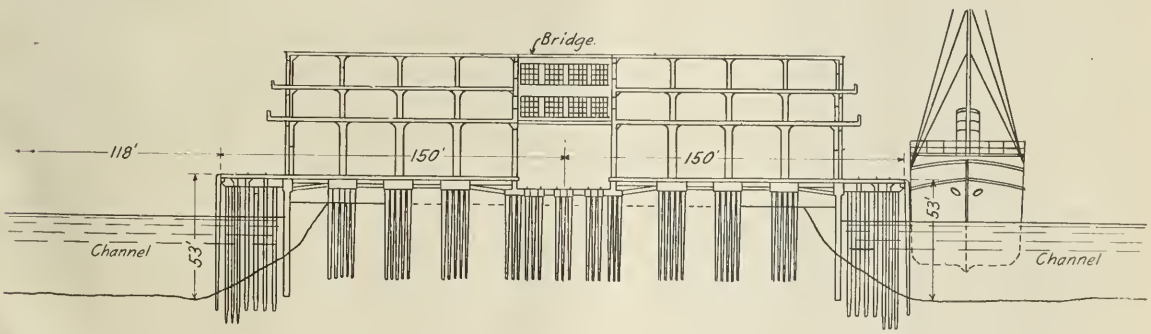
The sections through the pier sheds and the storehouse and wharf shed show the provisions made for the convenient handling of stored material. Bridges are provided at both the upper floors of the pier sheds and between the second floors of the wharf shed and the storehouse.

The Interior Warehouses

The storage warehouse at Columbus, Ohio, including nine warehouses supplying a total floor area of 2,000,000 sq. ft. on a site, including 300 acres of land, is an example of the one-story type of interior warehouses. The warehouses are 160 ft. wide and 1,540 ft. long, and are all one story high except one, which provides office space on the second floor of 2,200 sq. ft. One building is the open type shed with frame roof and timber floor, the remaining eight being constructed with tile exterior walls, 16 ft. high, on concrete foundations, with roofs of mill type construction and concrete floors. These buildings are each divided by brick firewalls into 11 sections. The track sides of the buildings are provided with covered unloading platforms 12 ft. wide, running the full length. A classification and storage yard of 500 cars capacity and of 12 miles of tracks is provided, allowing 100 cars per day to be unloaded. Four and a half miles of concrete roads have been constructed as well as a complete sewer and water system. Electric power is provided for the operation of tiering machines and battery-charging equipment, the batteries being for the tractors, which are used to facilitate the operation of the plant.



View of the Tracks, Main Building, Wharf Sheds and the Connecting Bridges, Boston Terminal



Cross Section of the Pier Shed

The second type of interior warehouse is of multi-story reinforced concrete fireproof construction throughout. The St. Louis warehouse, a reinforced concrete skeleton structure veneered with brick, is an example of this type. It is designed in flat slab construction for a live load of 500 lb. per sq. ft., and is 100 ft. wide and 600 ft. long. The center section is

7 stories, including basement, and end sections are six stories.

The plans for these facilities were developed under the direction of Francis Lee Stuart as chairman of a sub-committee appointed by the War Industries Board. The construction was by the construction division of the Army.

Abatement of the Whistle Nuisance

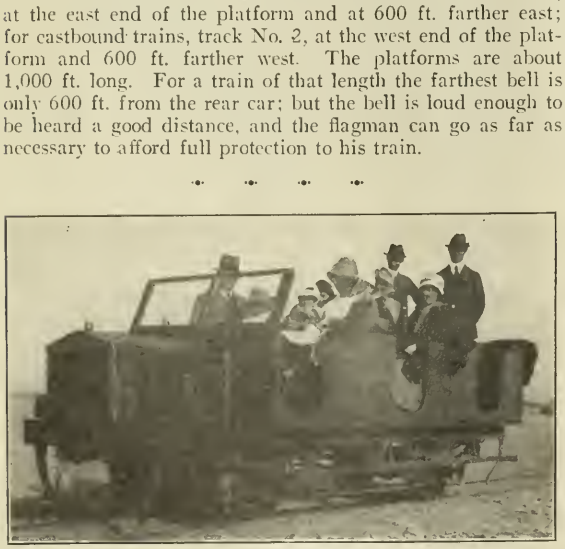
At Tyrone, Pa., on the Middle Division of the Pennsylvania Railroad, conductors of passenger trains who have to call in a flagman do it by means of an electric bell which is fixed on a post several hundred feet back of the train and is controlled by a push button on the station platform. This simple arrangement for reducing the disturbance to the neighborhood by the noise of the locomotive whistle was put into effect on June 4, and it does away with a large amount of whistling, as most of the passenger trains stopping at Tyrone have large quantities of baggage and mail to discharge or to take on. The station at this place is situated on a curve, and a high bank on the inner side of the curve interferes with easy communication between the standing train and any flagman who may be back the regulation distance, or even a shorter distance. There has been considerable inconvenience by reason of flagmen not hearing the engine whistle, particularly when the sound of the whistle was partly drowned by the noise of a moving freight train. There are four main tracks on this part of the road.

Bells are provided only for the passenger tracks. Each bell circuit is arranged to ring two bells, one a short distance from the standing train and one farther back; and for each circuit there are two push buttons so as to make it easy for the conductor to reach one or the other without loss of time.

The conductor, in sounding the bell, gives the regulation number of sounds, as prescribed by rules 14d and 14e. It has been found that there is in every case a saving of some seconds of time as compared with having first to inform the engineman and then have the signal given by the whistle.

The whistling of the large number of trains that stop at Tyrone in the course of every 24 hours, must, of course, have been something of an annoyance to the people of Tyrone; but the officer of the road who gives us this information says that, so far as he knows, no protest had been made.

The bells are located as follows: westbound, track No. 3, at the east end of the platform and at 600 ft. farther east; for eastbound trains, track No. 2, at the west end of the platform and 600 ft. farther west. The platforms are about 1,000 ft. long. For a train of that length the farthest bell is only 600 ft. from the rear car; but the bell is loud enough to be heard a good distance, and the flagman can go as far as necessary to afford full protection to his train.



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Auto Railroad Car in Egypt

Train Accidents in May

The following is a list of the most notable train accidents that occurred on the railways of the United States in the month of May, 1919:

Collisions

Date	Road	Place	Kind of accident	Kind of train	Kil'd	Inj'd
3.	Northern Pacific	Forsythe	xc	P. & F.	0	2

Derailments

Date	Road	Place	Cause of derailment	Kind of train	Kil'd	Inj'd
2.	Seaboard A. L.	Wadesboro	malice	P.	2	8
8.	Balt. & Ohio	Pittsburgh	d. switch	F.	1	0
11.	Wabash	Moulton, Ia.	b. rail	F.	3	2
12.	Central of N. J.	Jersey City	unx	P.	1	2
21.	N. Y., N. H. & H.	W. Mystic	b. rail	P.	0	2
21.	Mo. K. & Tex.	Alvarado	d. track	P.	0	3
23.	Texas & Pacific	Gordon	cow	P.	0	4
25.	Penn.	E. Palestine	boiler	F.	2	1
28.	Texas & Pacific	Marshall	ms	P.	0	16
†30.	Balt. & Ohio	Greenfield, O.	unx	P.	1	4

Other Accidents

Date	Road	Place	Cause of accident	Kind of train	Kil'd	Inj'd
13.	Seaboard A. L.	Method, N. C.	boiler	F.	3	0

The trains in collision at Forsythe, Mont., on the 3rd, about 1 a. m., were eastbound passenger No. 4 and a switching freight train, on a side track. The passenger train ran over a misplaced switch and into the switching engine, damaging both engines, two baggage cars and four freight cars. Two employees were injured. The yard train was switching on the main track without having protected against the passenger train, which was behind time.

The train derailed on the Seaboard Air Line at Wadesboro, N. C., on the 2d, was southbound passenger No. 13. The locomotive was overturned, and the engineman and fireman were killed. Six passengers and 2 trainmen were injured. The derailment was caused by a malicious obstruction.

The train derailed at Greenfield Avenue, Pittsburgh, Pa., on the 8th, was a westbound freight. The locomotive ran off the track at a defective switch and was overturned. T. W. Barrett, trainmaster of the Pittsburgh district, standing on the tender, was pinned under the wreck and was killed.

The train derailed near Moulton, Iowa, on the 11th, was through freight No. 95. One trainman and two trespassers were killed, and two trespassers were injured. The derailment was caused by a broken rail.

The train derailed on the 12th at Jersey City, N. J., was a local eastbound passenger. The locomotive was overturned, and four passenger cars were thrown off the rails. The engineman was killed and two other employees were injured. The train was nearing the terminal train shed, and was running at moderate speed.

The train derailed at West Mystic, Conn., on the 21st, was west bound passenger No. 5. The four leading cars in the train filled with mail and express matter were thrown off the track by a broken rail and fell down a bank. Two trainmen were slightly injured. The rail had been weakened by a transverse fissure.

The train derailed near Alvarado, Tex., on the 21st, was northbound passenger No. 28. Three passengers were slightly injured. The derailment was due to soft track, caused by very heavy rains.

The train derailed at Gordon, Tex., on the 23rd, was the westbound Sunshine Special. Three passengers and one trainman were injured. The train was thrown off the track by striking a cow.

The train derailed on the Pennsylvania Railroad near East Palestine, Ohio, on the 25th, was a westbound through freight. The locomotive, a new one, belonging to the Chi-

† Abbreviations and marks used in Accident List:
rc, Rear collision——bc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc, obst., Accidental obstruction——malice, Malicious obstruction of track, etc.——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

cago, Burlington & Quincy, was wrecked by the explosion of its boiler, and two men were killed, the engineman of the train and a messenger for the Baldwin Locomotive Works. The fireman was seriously injured. Five cars were knocked off the track. The explosion was due to low water.

The train derailed near Marshall, Tex., on the morning of the 28th, was westbound passenger No. 25. The locomotive was derailed and overturned at a misplaced switch. The fireman and 17 passengers were injured.

The train derailed at Greenfield, Ohio, on the 30th, was westbound passenger No. 3. Four coaches were ditched. These cars were occupied by soldiers returning home to Arizona and New Mexico; one soldier was killed and four were injured.

The train involved in the accident at Method, N. C., on the 13th, was southbound freight No. 89. The locomotive, a new Mallet, was wrecked by the explosion of the boiler, and the engineman, fireman and one brakeman were killed. No cars were derailed.

Electric Car Accidents.—Of accidents to electric cars reported in the newspapers as occurring in the month of May, the only one thus far noted in which there was a fatality is that at Noblesville, Ind., on the night of the 24th, when a runaway car was derailed in the business part of the city, killing one person and injuring 23, and wrecking ten automobiles.

Canada.—Westbound passenger train No. 3, of the Wabash Railroad was derailed by the falling of a brakebeam near Cayuga, Ont., on the 8th, and the engineman and fireman were killed. Forty passengers were slightly injured. A derailment on the Grand Trunk near Paris Junction, on the 22nd, resulted in the destruction by fire of ten cars containing oil, gasoline, coke and other merchandise.

Country-Wide Safety-First

A. F. DUFFY, manager of the Safety Section, Division of Operation, United States Railroad Administration, has issued a bulletin giving in brief form the results of the "no-accident month" campaign in the Southwestern Region. Full reports are not yet in, but "splendid results have been shown." The Pyeatt Lines record a reduction of 71 per cent; the Edson Lines, 70 per cent; the Whitehead Lines, 64 per cent, and the Johnson Lines, 67 per cent. The first three lines mentioned above, so far, are the only ones that have placed expert and experienced inspectors in the field.

This was for the month of May. For the first three months of the year there were marked reductions in deaths and injuries to employees. Interesting information is given in the bulletin concerning other Regions. One small road in the Northwestern Region, in the month of March, reported none killed and none injured, as compared with four killed and 31 injured in March of last year. The Central of Georgia reports that the Candler Silver Trophy has been awarded to the Macon Division, which, under the supervision of Superintendent M. B. Smith, worked 665,139 man-hours during the first three months of 1919, with *four* injuries reportable. The Columbus shops, under Master Mechanic E. G. Gross, worked, during the three months, 333,452 man-hours, with *no* injuries reportable.

One large road in the Allegheny Region, in its report for April makes prominent the fact that 46 per cent of all bodily injuries and 37.5 per cent of all fatalities were those of persons who had been in the service less than one year. In the shops more than one-half of all injuries were sustained by men in the service less than one year, and the three men killed were all new employees. The proper education of new men is a serious duty. Another road shows that a large number of personal injuries happened to men in places not properly provided with artificial light. Keeping reflectors clean and having the upper part of the walls of shops properly whitened at all times, are important elements of safety. Keeping windows clean usually increases natural light 25 per cent.

Mr. Duffy calls attention to the fact that the Safety Section has been endorsed by the votes of the Grand Lodges of all the railroad brotherhoods.

A tabular statement showing totals in each of the seven regions shows on class I railroads for the month of March, 2,072 meetings of safety committees at which the aggregate attendance was 32,249. The record shows that at each of these meetings some officers or employees who ought to have attended were absent, and the aggregate absences for the month of March were 5,530, or about one-seventh of the total membership. About 100 safety rallies were held, at which were present 19,268 employees. The total number of employees killed on these roads in the month of March was 169, as compared with 264 in March, 1918.

The Reorganization of the American Railroad Association

AT A MEETING of the Executive Committee of the reorganized American Railroad Association, which was held in Atlantic City on Thursday of last week, the following officers for the ensuing year were elected:

President, R. H. Aishton, regional director, Northwestern Region.



R. H. Aishton
President, American Railroad Association

First vice-president, W. T. Tyler, director of the Division of Operation, United States Railroad Administration.

Second vice-president, E. H. Coapman, federal manager Southern Railroad.

General secretary and treasurer, J. E. Fairbanks.

Assistant general secretary and assistant treasurer, H. J. Forster.

General Secretary Fairbanks will in future have headquarters in both New York and Chicago. The offices of the association in Chicago will be located in the Manhattan Building. Activities of the mechanical, engineering, traffic and transportation sections will be carried on from Chicago. The treasurer will be located in New York and activities of the operating, telegraph and telephone, signal, transportation and purchases and stores sections will be carried on from New York.

The Executive Committee now comprises 20 members, including the directors of operation, of accounting and of capital expenditures of the Railroad Administration, the seven regional directors and the federal managers of seven individual roads. The meeting of the Executive Committee in Atlantic City was fully reported in the *Railway Age Daily*, edition of Friday, June 20, page 1579.



W. T. Tyler,
First Vice-President, American Railroad Association



E. H. Coapman,
Second Vice-President, American Railroad Association

Great quantities of perishable freight were delayed at inbound freight stations in New York City this week because of a strike of the teamsters, employed by the wholesale dealers and jobbers in fruit and fresh vegetables, said to number 3,700 men. As we go to press the merchants appear to be making no concession to the strikers, having employed some new men, and having made arrangements for police protection to prevent interference with their wagons and trucks. On Monday the number of carloads of produce waiting at the piers of the Erie Railroad, to be delivered to consignees, was reported as 35 of green fruit, 52 of melons, 64 of oranges and 1 of apples. At the Pennsylvania piers there were 35 cars of peaches, 5 of melons, 42 of cucumbers, 39 of tomatoes, 123 of potatoes, 12 of onions and 31 cars of miscellaneous vegetables. The Old Dominion Steamship Company, at its docks on the North river had 10,000 barrels of potatoes, 3,800 barrels of cucumbers, 1,100 barrels of cabbages, 550 crates of onions, 100 barrels of squash and 5,000 packages of beans. Very large losses by deterioration of the fruit and vegetables are sure to be sustained, and on Wednesday some of the merchants estimated the total as $1,000,000.

Orders of the Regional Directors

STANDARD STEAM HOSE COUPLING.—Order 213 of the Southwestern regional director states that an investigation of complaints received has developed the fact that some railroads were using a steam hose coupling of an entirely different type from that prescribed by the Master Car Builders' Association. A committee on standards has made an exhaustive investigation of steam hose couplings and it has been agreed that the standard steam hose coupling shall have M. C. B. contour and bore and a common standard gasket. The angle of the coupler shall be 20 deg. and the locking arrangement shall be similar to the type S-4 coupler, gasket to be made of composition and to be of the fixed type. The standard must be adhered to by all railroads under federal control where is is necessary to buy new couplings.

Sampling Grain in Transit.—Circular 220 of the Southwestern regional director quotes a recommendation of the Grain Dealers' National Association that grain doors of cars should have, at the top, boards not more than 6 in. wide, so that inspectors may inspect without destroying an unnecessary quantity of lumber.

Public Improvements; Special Assessments.—Circular 223 of the Southwestern regional director quotes the announcement of the Director General issued on June 2, relative to the method of handling public improvements or special assessments against railroads involving charges against capital account. This order supersedes all previous circulars and orders in this region concerning special improvement assessments and other charges against capital account based on public improvements under either special or general law.

The War Finance Corporation has announced the following new loans to railroad companies: Missouri, Kansas & Texas, $976,000; Pennsylvania, $12,260,000; Lehigh Valley, $800,000; Illinois Central, $1,500,000; Wabash, $92,800; Erie, $800,000; Seaboard Air Line, $135,000; Chicago & Alton, $80,000.

Executive Suggests Relieving I. C. C. of Power*

E. P. Ripley, President of the Santa Fe, Favors Appointment of a New Body to Control Railways

ONE OF THE MANY PROBLEMS that is troubling the American public today is service. There is trouble with service everywhere; there is trouble with service in the shop, in the factory, in the trades, in the club. The trouble everywhere is that there is practically no service, or that service is inefficient; that it is not half what it used to be. I think the real trouble is that there is no master. I think the work done under a master is always the best work. It is not derogatory to anybody to have a master. Every one interested in the accomplishments of any concern, whatever may be the business of such concern, is responsible to some one as a master. Everybody must account to somebody for his actions. Today we seem to have gotten away from that, to such an extent that every one is a law unto himself. To this extent we are Bolshevists, and are imitating Russia. It is this disorganization which accounts for the lack of service and the actual lack of production.

It is a matter of common knowledge that the railroads of this country were taken over by the United States Government on the first of January, 1918. There may or there may not have been good reasons for this. West of Chicago there was no good reason for doing so; there had been no failure on the part of the railroads to do their work and things were going on as well as always. East of Chicago there may have been good reason because of the tremendous—fictitious—impetus given to business by the war throughout the country generally. At the same time it was an open question whether, if the railroads had been allowed to throw aside all laws and had been permitted to do what the Administration did in throwing the laws of the country into the discard, and do things they had prohibited us from doing, the results would not have been equally satisfactory. It is not for me to say what the results have been so far as service to the public is concerned; that is something they may judge for themselves. Every one has had experience and can judge for himself. At all events it seems to have been borne in upon the Administration and upon Congress that the experiment of government operation has not been an unmitigated success.

I noticed that the bulletin board downstairs says "What shall we do with the Railroads?" I find it a good deal easier to criticize plans that have been suggested than to offer plans of my own. Almost everybody in Congress and I think almost everybody out of Congress has an idea as to the plan which should be operative. They all admit that the present condition can not go on any longer, but the plans for a solution range from the plan of Mr. Plumb, in behalf of the employees, who has a suggestion that the government buy the railroads and form a directorate of which the employees should be in the majority, to the plan of Mr. Warfield, representing the security holders, who practically does not want any limitations put on the earnings.

I do not think that Congress will ever pass any law which does not provide for some kind of regulation, there being apparently a fixed idea in the minds of some people that a curb must be put on the "rapacity" of the railroads. What opportunity the railroads have had to demonstrate the possession of this quality I am unable to remember. I can not remember when we were not very strictly limited in our income and more or less affected by law in our outgo.

The plan of Mr. Cummins provides for a small guaranty—he says from 4 per cent to 4½ per cent on the value. He is indefinite as to how he defines value. Presumably it is the valuation now going on under the auspices of the Interstate Commerce Commission, which is based primarily so far on the prices of 1914. It is a well known fact that the prices of 1914 are at least 40 per cent below those of today, and that 4½ per cent today is equivalent to about 2¼ per cent in the former purchasing power of money, so that with the short valuation and short income it does not leave very much for the widows, orphans, insurance companies, etc., who hold the securities, and bought them when a 4½ per cent return meant 4½ per cent.

The plan of Mr. Warfield also provides, not in fact although in theory, for a guaranty of earnings; that is, the Interstate Commerce Commission shall be in full charge of rates and practically everything, including wages; that the country shall be divided into regional groups, and that the rates in those groups shall be so fixed as to bring about a certain amount of revenue within those groups. This is a very devious and complicated method. I do not believe there is any possible way of providing a set of rates which will bring about such results without doing away with all uniformity and without bringing about the very discrimination which it is the desire of the country to avoid. I do not believe it is possible to make a series of rates to bring about a given result which will not result in somebody either getting too much money or too little, as the case may be. It will vary also from year to year. It seems to me the plan is objectionable in that regard. It is also objectionable in my mind because it still allows a control of railroads by the states that have heretofore bedeviled the situation in their own interests. If states like Texas, which undertakes to say "Texas for the Texans" and to build a Chinese wall so that no one else can do business there, can do this sort of thing it seems as though there ought to be some national body which could intervene. The same spirit has taken possession of some other states, but notably Texas.

Still a third plan, one which is presented by Congressman Esch of Wisconsin and Senator Pomerene of Ohio. This bill attempts to restore the railroads on the 1st of January next to their owners, but without any recommendations other than that it provides for a large extension of the powers of the Interstate Commerce Commission, and practically makes them the court of last resort. It provides that the Interstate Commerce Commission shall take care of all facilities, distribution of power, cars, etc.—practically take the management of the railroads out of the hands of the owners, but does not make them responsible for anything. In other words, it gives absolute power to that body without any responsibility whatever. Of course, the owners will not look with much equanimity upon that kind of a proposition. It is doubtful whether the owners of any property would like to see it taken away from them and transferred absolutely into the hands of any political body, and it is particularly objectionable, I think, because of the character of the Interstate Commerce Commission. And here I am going to say something that perhaps will not be altogether agreeable to everybody present and which possibly may result in a good deal of criticism so far as I am concerned. But I have arrived at a time of life when it is immaterial what anybody thinks about it and what anybody says about it, and if they desire to criticize they are quite welcome to do so.

The Interstate Commerce Commission has been in existence about 32 years and during that time has had many able members. It has also had many not so able and many who

*Address by E. P. Ripley before the City Club, Chicago, June 12, 1919.

were appointed because of political activities, or had made the railroad business their objective in the way of criticism. It is a singular thing, however, that in all of its 32 years of existence, it has never had as a member either a railroad man, or a business man, or a shipper, or a farmer. There was appointed on it a railroad conductor who had no previous knowledge of the railroad business except as a conductor. He has made one of the best commissioners they have had because he has done as well as he could with the education that he had. There are other members who have been partially educated at our expense. They were absolutely without experience. Many of them have learned that there are two sides to a question and have proved valuable to the Commission. There are still some others who have not seen the light. They are still standing in the way of compromise, or a fair way out of this muddle. It is only ten days ago that one of the members of the Commission said he did not think any remedial measures were necessary; the roads were earning as much money now as ever before, and all that was necessary was to return them to their owners without any legislation This ignores absolutely the fact that the dollar is worth only about sixty cents, and we have to pay our bills on the basis of the depreciated dollar. It also ignores the fact that there is some five hundred or six hundred millions more of investment upon which interest must be earned.

In the Western Advance case of 1910 I testified for the Western Lines that of all the disbursements of a railway company more than half the total goes into labor. I showed that in the current year the wages of Santa Fe employees had been increased about $2,000,000 and that further advances of $2,500,000 were in prospect. I made the argument that to meet such outlays it was absolutely necessary that we have more money. Like testimony was given by witnesses for the Eastern Lines. Nevertheless, the United States Government, through the Interstate Commerce Commission, refused to give us a dollar.

It has seemed to me just now, when presumably every member of Congress admits something ought to be done, whatever is done should be in the direction of rather more intelligent regulation for the railroads. We do not care, as middlemen, it does not make any difference to us, what wages are, if we can pass it on—if we do as merchants do, charge our customers enough so as to recoup us for what the government says we must pay, we can stand it. We are exactly in the same position as you merchants are.

We shall probably be obliged to take over the railroads not later than January 1st next, but we can not take them back under the conditions as they have existed heretofore. With the Interstate Commerce Commission regulations there must accompany more responsibility for the payment of our bills, which have been enormously increased by concessions to labor. It is a bad situation and I would be glad if anyone could show me a way out of it. It is much easier to criticise the plans of others than to make new plans for others to criticize, and the question is often asked me what I would do if I could do just as I liked. That is always embarrassing because I do not know to what length I would go if I could do as I liked. But it has seemed to me that while the Interstate Commerce Commission ought to be in charge of regulation it ought to be shorn of its functions of prosecutor, judge and jury. It ought not to be permitted to prosecute an individual railroad for some infraction of the law and at the same time pass on the guilt of such railroad and fix the penalty. It is a dangerous thing to do. There ought to be somebody to whom appeal may be had. My thought has been that while the Interstate Commerce Commission should perhaps exist as heretofore there ought to be a body of three or five people, appointed by the President and acting for the people of the United States, holding almost the same rank as judges of the Supreme Court, and receiving salaries that would make it an object for the best class of men, who should have absolute legal power over anything presented either by the railroads, or by the Commission, and to whom decisions of the Commission could be appealed either by shipper, or by railroad. A body like that ought to be appointed for at least ten years—15 years would be better in my opinion—and ought to be independent of politics and ought to be the final body to protect the American people from any injury that might be done by the railroads, and the railroads from the injury that has been done them heretofore and which may be done to them again by ill-considered partisan legislation. I have made no effort to introduce a plan of that kind except by correspondence with my friends and people in Washington, but hope that something of that sort can be done. I am sick and tired of perpetual lawsuits. We have been at law with the people of the United States for the last thirty years, it has not resulted in anything but bad feeling and there is no occasion for it and for its existence.

Mr. Sprague's Automatic-Stop Proposals*

THE PROPER FUNCTION of the automatic train control system is to control the train only when the engineman has failed to perform his required duties. The sense of responsibility for safety of their trains which is almost universally felt by enginemen is not always effective, with present safeguards, to prevent collisions. As I said when I was called to testify at the investigation of the South Byron collision, there has been a two years' attempt to introduce automatic train control on the New York Central. After a very considerable development the matter was called to the attention of the president of the road and he ordered a thorough investigation. This investigation was conducted in a perfunctory sort of fashion over a period of several months and was accompanied by two proposals to co-operatively equip the Hudson Division from Croton to Rensselaer.

Subsequently, by further direction of the president, the matter was referred to an expert committee, which was enlarged, by my request, so as to represent the entire New York Central Lines, this comprising the chief signal engineers of the four principal divisions, the chief mechanical engineer, the general superintendent of telegraph and the assistant terminal manager, aided, of course, by their experts.

This committee spent several months in their investigation, during which, in reply to many criticisms, constructive developments were made in the system; also new proposals were considered, covering shorter sections of line and reduced equipment of such character as would fully test the character and sufficiency of this system of train control, without involving too great capital risk.

A unanimous report was made endorsing a trial; but on the entrance of the United States into the world war, negotiations were suspended. Although I have seen this report I have never had a copy of it . . . .

* * *

Engineers and firemen are subject to the same frailties, weaknesses and accidents as others, and cannot control weather or other conditions external to their cabs. Momentary inattention, varying degrees of color blindness or defects in color sense, temporary or serious illness from whatever cause, fatigue due to long hours of service or to domestic demands, sleepiness induced by a torpid liver, the use of alcohol, the rhythmic action of the locomotive or the pressure of the wind may make the engineer momentarily oblivious to warnings. An unexpected happening in the cab, the break-

*Extracts from a statement by Frank J. Sprague before the New York State Public Service Commission, Second District, at New York City, June 18, 1919. (See *Railway Age*, June 20, page 1553.) Mr. Sprague is the inventor of multiple-unit train control and other important elements of the art of electric railroad operation.

ing of a water gage, distraction by the fireman or a transient cab passenger, a blow from a passing obstruction, the clouding and frosting of windows, inclement weather, with driving rain, hail, snow or fog, and drifting smoke from passing trains add equal dangers. Curvature of road and uncertainty as to headlands along the route, the glare of an approaching headlight, the possible obscuring of signals from other causes, the dimming or failure of signal lights, the clogging of signal blades in winter storms, or a momentary hiatus or aberration of mind,—all increase the possibility of failure of response to a correctly initiated or given signal, and emphasize the necessity of supplementing the sense of sight by those of hearing and touch.

* * *

How has the demand for the development of the automatic train control been met by the railroads? Often, although happily not always, by skepticism, disbelief and even narrow-minded opposition, at much of which I am not surprised and with a good deal of which I am in entire sympathy. I had some experience with one particular road, whose general manager and signal officer could never find an hour to inspect my system although one of its vice-president stated that if a system could be devised to increase safety of operation he believed, and would so advise his directors, that it must in law be adopted. And I may be pardoned if I take exception to the conclusion expressed, although I am not one of those who responded to a grandiloquent advertisement, issued after a series of disasters, offering the munificent prize of $10,000 to that inventor who would produce a satisfactory system of automatic train control. Those familiar with this development are aware of the great cost of such work, running in individual instances to hundreds of thousands of dollars. My own company and I, despite all the technical resources at our command, my own experience of 37 years in several epochal developments connected with the electric art and the association of men skilled in signaling and braking, have spent not only several years of effort but over $350,000 in cash.

Personally, I have not been satisfied to limit myself to "automatic stops." It has seemed to me that something much more was necessary, and that something was to marry together the wayside signal system of the road and the braking equipment of the train in such fashion that there should be repeated directly into the cab certain signals, depending upon the same track and train conditions as initiate the action of the wayside signals; and that in response thereto there should be be established in [the approach to] every signal block the potentiality of both service and emergency braking, with the absolute minimum of interference with the normal judgment and action of an engineer.

It must be admitted that the development of an automatic train control system to meet all conditions is no mean problem, and the opinion has been expressed that it would perhaps be best done by the railroads themselves, working, I assume, through their signal engineers and brake experts. To this point of view I wish to take exception, one which is no reflection upon the individual capacity or ability of the men referred to. Something more is needed than they can give, both in the matter of time and of constructive knowledge. The employees on a road are well occupied in maintaining in operative condition apparatus designed, built and installed by equipment companies, each especially familiar with, and naturally prejudiced in favor of, its particular devices. Something beside the criticism which railway operatives can give is essential, and that is an outside point of view, a constructive agency well equipped, technically and financially, with concentration of thought and aim undiverted by daily operative duties, which, selecting and clarifying the essentials which must characterize a system having common application, shall have the advantage of the critical constructive comment of those who must eventually use and depend upon the apparatus.

It is this combination of private amply-backed initiation, using not only the known facts with regard to signaling and braking but other knowledge in the industrial art, and close co-operation with the railways for a common end, which is needed; and if this latter is accorded, the financial backing will be forthcoming, and an eminently satisfactory result will obtain.

In my automatic train control equipment the electrical circuits are the acme of simplicity, compared to the circuits of signal systems; the track equipment is simpler and more reliable than the motor-operated wayside signal, although dependent upon the same initiating causes; the air equipment is similar to and in many respects simpler than the standard braking equipment; and in the end I believe that each and every part of it will be at least equally fool-proof. . . .

Contaminating a Water Supply by Storage Coal

A RECENT EXAMPLE of water supply contamination occurring at a small middle western engine terminal, emphasizes conspicuously an unexpected source of pollution possible in railroad water supply. The water at this point is drawn from two shallow, gravel type wells approximately 45 ft. deep and 400 ft. apart, and is pumped by vertical centrifugal pumps run by electric motors. The usual delivery rate varies between 125 and 200 gal. per minute per well, and the consumption averages 200,000 gal. per day. The wells are located about 1,000 ft. from the roundhouse. The yard is built mostly on a sand fill with a comparatively small amount of cinder ballast. The terminal is situated in a small river bottom, with the surrounding country fairly level, drainage facilities being poor.

In the early summer of 1918, in view of a prospective coal shortage, this terminal was designated as one of the points for storing a surplus coal supply. The coal was of the bituminous type common to certain middle western districts, and was unloaded in piles of approximately 400 tons. The maximum storage of about 30,000 tons was reached in December, the piles covering ground adjacent to yard tracks and between and beyond the locations of the wells.

Early in January it was noted that trouble was being reported with engine boilers, leaky flues and cracked staybolts developing to a considerable extent beyond what would be warranted by ordinary circumstances. Flues removed showed a very hard scale accumulation not in keeping with the usual conditions and pitting was noticeable. Samples of the water supply were forwarded to the chemist about the middle of January. The original quality of the water was not extremely bad, having tested 15 grains per gallon of scaling matter present, mostly calcium and magnesium carbonates. However, results of analyses of these new samples developed the fact that a considerable change had taken place, the carbonates having been reduced to 8 grains and the total hardness increased to 25 with an increase also in the sodium chloride content, this water being one which would form a very hard flint-like scale.

An investigation was started at once to ascertain the source of contamination. Samples of water were furnished regularly from both wells, and these showed not only a variation between each other, but also a fluctuation of total solids of between 20 and 60 grains per gallon. Samples from wells in the vicinity showed similar contamination within a radius of one-quarter mile, but in wells beyond there had been no change. This indicated strongly that local drainage was the conveyor of the pollution with the storage coal piles as the possible source, this being the only changed condition from previous years.

Samples of coal from the storage piles were sent to the

laboratory, together with samples from cars fresh from the mines. When part of these samples were digested in water at the laboratory, water drawn from the storage coal showed that the carbonates were entirely eliminated, leaving residual acidity and a strong increase in hardness. The fresh coal had but little effect upon the water even after 30 days' leaching. This indicates that the weathering had oxidized the iron pyrites in the stored coal with the subsequent liberation of the sulphuric anhydride, which was changed to sulphuric acid or incrusting sulphates and carried away by drainage or soaked into the ground.

Government analyses of coal from the mines have shown from 2.86 to 5 per cent sulphur. Check analyses of the coal from storage piles tested but 1.45 per cent sulphur, indicating that some possible 200 tons of sulphur, or around 160,000 lb. of sulphate compounds had been leached out of the coal to be carried away by drainage, either surface or sub-surface.

As a measure of relief the coal was cleaned up between the wells and also removed from a radius of 300 feet. This helped and the wells are now gradually returning to normal, although one appears to be more in the channel of the underground flow from the coal pile drainage and consistently shows a poorer quality than the other. It is still noted that after heavy rains the hardness of both wells increases considerably and from 3 to 10 days are required before a decrease is noticeable. It will undoubtedly be some time before the trouble is entirely removed, as white discoloration remains on the ground around coal piles similar to alkali deposits on the western plains.

As a means of permanent relief for locomotive boiler troubles, a complete water treating plant is contemplated at this point, as this will also give economical returns with the normal quality of the water. As a temporary expedient, predetermined amounts of soda ash are added directly to the engine boilers when they are washed, and also in tenders when they are filled.

This incident emphasizes the fact that local water conditions and drainage, including porosity of soil, should be given careful consideration in the storing of coal.

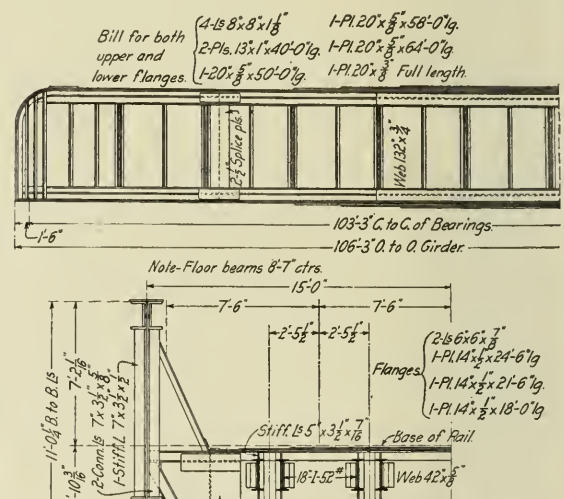
Big Four Increases Capacity at Congested Points*

The structures formed an important feature of the Zionsville project, chief among them being the Eagle Creek bridge which is located about centrally in the long embankment. This is a reinforced concrete arch structure of the filled-spandrel type consisting of five semicircular arches —three central openings of 45 ft. with one at each end of 39 ft. The total length of the bridge is 273 ft. with a maximum height of 62½ ft. from base of rail to bottom of footing. It requires the placing of 6,200 cu. yd. of concrete and 112,000 lb. of reinforcing steel. Pile foundations were used.

The construction of this bridge followed modern practice in concrete work, handling material from cars to storage and from storage to the hoppers over the concrete mixer with a clam shell bucket and derrick, while using towers and spouting for transporting the concrete. Three fourths of a mile of temporary track was required to haul the material to the site of the bridge. Bulk cement was used, being delivered in open top cars covered with tarpaulin and unloaded with a clam shell bucket into a storage shed of 12 cars capacity. The filling and emptying of this shed by means of the bucket was facilitated by having the roof made with removable sections.

Other structures included two highway under crossings, a number of over crossings and several culverts. One of the undercrossings is on a skew of 29 deg. 9 min., necessitating an excessively long span in order to obtain the 24-ft. clear width at right angles to the highway. The superstructure of this consists of two through girders connected by a floor of 20-in. Bethlehem I-beams covered with concrete. Just south of the long cut is an embankment 500 ft. long and 30 ft. deep occupied by a reinforced concrete flat-top undercrossing 13 ft. 10 in. high and 24 ft. wide for a highway and a 12-ft. arch for a creek. As most of the overcrossings will be of concrete construction, it has been necessary to install temporary timber overcrossings at a number of places in the course of progress on the excavation of the cuts. The contractor for the grading on this project is the Dunn, McCarthy Company of Chicago. The construction of the heavy masonry work was let to the A. J. Yawger Company of Indianapolis.

Another double-track project in the vicinity of Indianapolis is the provision of second track between Briar and Beech Grove a distance of about five miles, double track having previously been completed in the five miles between Indianapolis and Beech Grove. The reason for this improvement, like that between Augusta and Whitestown, is the necessity



Details of Heavy Girder Span Used at Columbus

for a stretch of double track next to a large terminal. There is a large yard at Beech Grove, the work is all light involving embankments aggregating 50,000 cu. yd. and cuts of 25,000 cu. yd. The project is entirely complete except for the laying of track which has been delayed on acount of the inability to secure rail.

At Columbus, terminal facilities are being improved by the construction of a yard at Avenue, about four miles southwest of the city, in connection with provision for double track throughout the terminal district. The present project covers the second tracking of 4⅓ miles on the line toward Springfield and the construction of a part of the Avenue yard which eventually will be the main terminal for the Big Four at Columbus. An important feature of this work is the reconstruction of two bridges about one fourth mile apart, one over the Scioto river and the other over Olentangy creek. In making these renewals the grade was raised 2 ft. 4 in. at the Scioto river bridge and 0.9 ft. at the other structure.

Of special interest in connection with these structures is the use of long heavy through girder spans, one of 106 ft. 3 in. and three of 95 ft. 9 in. for the first named bridge and

*An illustrated article was published last week on this subject.

three 104 ft. 3 in. spans at the second bridge. The bridges are designed for E-70 loading, New York Central Lines specifications, so that with a double-track, through-girder span 106 ft. long, the construction becomes exceedingly heavy, the steel in this one span weighing 250 tons. As the old span arrangement was not maintained throughout in the reconstruction, the work included considerable substructure work beside that of extending the piers for second track. The second track work here entailed 11,900 cu. yd. of cut and 47,500 cu. yd. of fill while the yard work, to the extent to which it is being constructed at the present, involves a cut containing 71,000 cu. yd.

All of the improvement work on the Cleveland, Cincinnati, Chicago & St. Louis has been conducted under the general direction of C. A. Paquette, chief engineer, Cincinnati, Ohio. The work on the Indianapolis-Cleveland line and at Columbus has been under the direction of W. C. Kegler, district engineer at Galion, Ohio, and W. S. Burnett, district engineer at Springfield, Ohio, (during the illness of Mr. Kegler). The work at Indianapolis has been under the direction of A. M. Turner, district engineer, Indianapolis, Ind. Resident engineers on this work are W. T. Taylor, Zionsville, Ind., T. E. Earle, Union City, Ohio, and F. N Johnson, Bellefontaine, Ohio.

Russia as a Field for American Railway Genius

Foreign Assistance Necessary in Rehabilitation and Extension of Transportation Facilities

By A. A. Boublikoff*
President, Atchinsk-Minoussinsk Railroad

THE FUNDAMENTAL CAUSE of Russia's economic weakness was the retarded development of her railway system. This was among the primary causes, if not the only cause, of her complete political, military and economic collapse.

From the very beginning of her railroad construction, the development of the Russian railroad system was constantly behind the increase of the country's productiveness. If we plot the curve of the increase of railroad mileage in Russia, together with the curve of the traffic density for the period of time from 1874, when the necessary statistical data first became available, until 1904, a remarkable phenomenon would become apparent; namely, the two curves will be almost mathematically parallel. Even war-times and bad crops failed to produce serious and lasting fluctuations in the curve of traffic density.

Let the aggregate mileage of Russian railroads in 1874 be 1. Then the mileage in 1884, 1894 and 1904 will be 1.5, 2 and 3, respectively. The traffic density, however, would also increase 1.5, 2 and 3 times for the respective years. It follows that the sum total of traffic carried by the railroads, the amount of ton-miles, increased directly as the square of the growth of the roads, or 2.25, 4 and 9 times for the respective years. Consequently it may be asserted categorically that during the 30 years from 1874 to 1904 the productivity of Russia was steadily and energetically eclipsing the growth of the railroads.

The Russo-Japanese war and the first Russian revolution caused in 1906 a respectively sharp downward turn in the curve of traffic density, but the effect of even these tremendous events was nowise lasting and as early as 1907-1908 the previously stated relation between the curve of mileage and of traffic density prevailed again. In the years following, up to the outbreak of the great European war, the curve of traffic density soared even high above that of mileage.

On the eve of the great war the average traffic density on the Russian roads, two-thirds of which are single-tracked, reached 1,200,000 ton-miles per mile. Russia had no rivals so far as the work done on each individual track is concerned. If a railroad, as a mechanism, had no limit of power and if furthermore, there was no limit of economically profitable loading,† the facts stated above would have insured the Russian railroads the largest income in the world.

In reality a large number of Russian railroads exceeded the limit of profitable loading, so that further increase in tonnage carried, instead of increasing the net profit, brought about, on the contrary, an enormous growth of costs and losses of operation. Moreover, a sharp divergence between the demand for freight traffic and the available means for meeting this demand became prominent. The freight capacity of many lines became utterly exhausted at length. As a result, it became practically necessary to renounce the principle of shortest distances‡ and to use on a large scale the so-called "circuits," *i. e.,* roundabout routes for shipments to avoid congested sections. The additional mileage necessary in this way, as against the shortest distance method, often amounts to as much as 400 versts (about 267 miles) and more. It not infrequently happened, however, that all possible circuitous routes were also completely clogged. In such an event, freight traffic for many routes would practically come to a standstill. The railroads, instead of stimulating the productive forces of the country, would instead become a drag on its economic development.

The war further revealed the fatal weakness of the Russian railroads. Not only did they prove unable to handle the volume of freight traffic swollen by military needs, thus causing a lasting economic crisis, but they also fell down in their share in the military defense of the country.

Weakness of the Railroad System

It is hardly necessary to demonstrate elaborately the essential and intimate connection between the destinies of the

*Mr. Boublikoff is also a director of the Central Caucasus Railroad, and vice-president of the Youroveta Home and Foreign Trade Company, Inc., New York. He was formerly a member of the Russian Duma.

†Most of the Russian single-track railroads have a theoretical road capacity of 20-21 pairs of trains per 24 hours. Not a few lines actually despatch this number of trains part of the time, so their yearly average reaches 17-18 pairs of trains per 24 hours. In individual cases Russian railroads develop a truly enormous road capacity. Thus, for instance, 7,000,000 tons of freight in addition to a lively passenger traffic passed over the single-track railroad running across the Dnieper bridge in Ekaterinoslav. This meant the passage of 96 trains a day on one track! The Kharkov-Penza line was at one time so congested that for the construction of the second track it was necessary to rely upon horse carts for the supply of rails and ties. Experience has taught, however, that so intense a use of road capacity is accompanied by an incredible decrease in the speed of freight movement. Thus, for example, on some sections in the Donetz region the average speed at times fell to 6 versts (4 miles) per hour and lower, as against the general average on the Russian lines of 11 versts (about 7 miles) per hour. This naturally leads to a big increase in cost of operation. It sometimes happens that an addition to the tonnage earned by a railroad decreases rather than increases the net profit. It has been found that the limit of profitable loading for a single-track railroad in Russia is 12-13 pairs of trains, which is also the number normal for American railroads.

‡It is noteworthy that in 1888, when the Russian Government undertook to regulate freight rates, one of the first steps taken was to introduce this principle and forbid competitive transportation along circuitous routes. This was also one of the first measures adopted by Mr. McAdoo's administration.

Russian railroads and the general trend of state policy in Russia. From times immemorial a police state (Polizei-Staat) has been the ideal of Russian statesmanship. The heavy arm of the state power has been laid on every manifestation of the life of the people. To this is due, it may be said in passing, the fierce reaction against state authority sweeping Russia at present.

Naturally a vast phase of economic activity, such as railroad construction, could not but come under the controlling power of state authorities. From the start railroads were constructed in Russia either by the direct order of the government or with its active financial assistance. The system of guaranteeing a net return on capital invested in private railroads—usually 4½ or 5 per cent on both bonds and stocks—was applied extensively. However, in view of the facts that enormous funds were usually misappropriated during the construction and that the amount of traffic was very small in the beginning, the newly built lines produced no net revenue at all and almost the whole burden of paying the interest on the "private" capital invested fell on the state treasurer. The result was that in Russia the control of the railroads was simultaneously vested in two agencies: the Ministry of Ways of Communication and the Ministry of Finances. The whole history of the railroads in Russia bears the imprints of the ceaseless struggle between these two institutions. Except during a few brief intervals, the Ministry of Finances, systematically and persistently championed private railroad construction, while the Ministry of Ways of Communication with equal zeal advocated state ownership of railroads.

The practical outcome of this conflict was an extraordinary systematic obstruction of railroad construction, without precedent in the history of any country, and extreme fortuitousness in the choice of lines to be built. Despite the energy of the entrepreneurs, their influence with politicians, their extensive and unscrupulous methods of bribery and "promissory" notes, the realization of projects of new railroads were delayed for decades, while, at the same time, railroads of doubtful utility would suddenly be started simply because the Ministry of Finances chanced to find means to finance the enterprise.

As a result, the Russian railroad scheme lacks system. Many accidental circumstances during construction caused transit distances to be longer than required by actual topographical conditions. Consequently, freight travels many unnecessary miles. For example, the distance between Odessa and Kiev, two very important centers, is 480 versts (320 miles) as the crow flies, whereas the railroad connection is 612 versts (408 miles), an excess mileage amounting to 28 per cent.*

Most of the through trunk lines are made up of separate feeders widely differing in their transversal sections. Many active trunk lines consist of sections with grades of .6, .8, 1.0 and 1.1 per cent. Since Russian locomotives are chiefly of one type this necessitates constant reforming of trains which means an enormous increase in the cost of operation. It often happens that while a new line is being constructed, the capacity of an old line which is to forward freight from the new road is not sufficiently increased, thus rendering the full utilization of the new line impossible. Especially backward was the development of junctions. Generally speaking the Russian railroads have never been a unified mechanism, with co-ordinate parts.

Completely clogged railroad sections adjacent to lines with ample unutilized traffic capacity were an everyday occurrence. The formation in the stations of enormous stores of grain during the realization of the crop was a regular event every year. The accumulation of mined products was prevented by artificially adjusting the output of the mines and mills to the capacity of railroads, by so-called "plans of transportation." All these circumstances taken together caused periodical financial crises in the Russian railroad business and constantly tended to lower the profits of the owners of the roads. . . .

Russia is the exact opposite of those countries which have more railroads than their economic development requires. As new lines are constructed in such countries the average traffic density of the railway system as a whole falls. Such, for instance, is the case of Argentina. Russia is, therefore, a vast field for intensive railway construction. There is not the slightest danger that Russia will be provided in the near future with a railroad mileage unwarranted by the productivity of the land and that the railroad business in Russia will thus become unprofitable.

Extent of Future Railway Construction

Here are the facts from which a notion may be derived of the amount of work to be undertaken for the purpose of providing Russia with the system of railways she needs

As has already been mentioned, Russian railroads developed accidentally, by fits and starts. In view of this circumstance, it was repeatedly proposed to draw up an inventory, so to speak, of the railroad needs throughout the country and to elaborate a detailed "Plan for the Development of the Russian Railway Net." . . . Only as late as 1916, however, was there finally formed a special inter-departmental commission, which drew up a detailed plan for railroad construction after the war. It also projected a list of lines, whose capacity to yield profit was beyond question and whose necessity for the state was incontestable. The list of these "first-class" lines included 35,000 versts (23,333 miles) of railroad.

These projected lines, almost without exception, were intended to meet the internal transportation needs of the country and did not solve the problem of opening up new and independent avenues of communication with the world markets. In the meantime the war and especially the Brest-Litovsk treaty have clearly shown that the sea outlets which Russia has at her disposal at present are not only insufficient commercially, but also fail to safeguard her freedom of political action. Thus, the creation of new outlets, more or less secure against German military and political aggression, has become a matter of vital importance. The following lines will meet this newly arisen need: the Caucasus-Persia, terminating at Bender-Abbas; the Turkestan-India, via Afghanistan; the Central Siberia-Peking, via Mongolia; the Amur Railway-City of Nikolayevsk-on-Amur, and two or three lines in the north of European Russia, terminating at Archangel and on the Murman coast. (The latter were included in the program because of their importance for the development of the exploitation of Russia's northern forests.)

Most of these lines were not covered by the official construction plans. They form an aggregate of 10,000 versts (6,667 miles) which must be added to the 35,000 versts (23,333 miles) of the governmental program.

Thus, Russia's immediate crying need for new railways amounts to a mileage of approximately 30,000 miles. But among the projected railroads which in the above-mentioned plan were set aside as secondary in value and profitableness, are a great many lines which, under conditions different from those now obtaining in Russia, would certainly be classed with the lines whose construction was recognized a matter of urgent national necessity and soundest investment. The mileage of such railways amounts to approximately 16,000 miles.

It is clear that Russia alone, in her present state of complete financial collapse, will not be able to achieve this colossal task without the assistance of Allied capital and

*The greatest Russian freight railroad east of Yekaterinoslav running to the Donetz Basin and carrying as many as 7,000,000 tons per mile a year, has in one section an unnecessary mileage of 20 per cent. In addition it has three entirely unnecessary gradients many hundreds of meters high.

Allied energy. Leaving aside the political conditions necessary for the work of this capital in Russia, it must be pointed out that the Allied nations, which in consequence of the war will have a number of domestic problems to solve, could only undertake such a vast investment of their treasure if Russia's reconstruction is considered in the light of its political significance and its magnificent economic potentialities. In this connection, it appears to be a generally accepted truth that universal peace and the prosperity of the peoples of the world demand the creation of a powerful Russian state which would be able to resist the economic and political aggression of Germany. Thus, from this standpoint, the necessity for Allied co-operation in rehabilitating Russia apparently needs no demonstration.

The economic possibility of this co-operation is still largely a debatable matter. The essential natural resources of European Russia fall into four groups: (1) Forests in the north, (2) peat in the northern and central sections, (3) anthracite in the Donetz basin, (4) mineral oil (naphtha) in the Caucasus and partly on the northern littoral of the Caspian Sea. If we further take into consideration that the deposits of bituminous coal in European Russia are altogether negligible, and that equally small are the deposits of rich iron ores in the Donetz basin, while on the European side of the Urals there is but one truly enormous bed of iron ores (the Komarov bed); we shall come to the conclusion that European Russia does not possess the necessary natural resources for such a broad, purely "American," economic development as will assure Russia's economic power and independence from Germany. With respect to its natural wealth, especially as regards that part of it which still lies hidden and unexploited, European Russia can by no means compare to a country like the United States, for instance.

The sources of the economic power of Russia, as a whole, must be sought not in its European portion, but in Siberia and central Asia. It is here that the potentialities of economic development are truly boundless. The country has practically inexhaustible deposits of mineral fuel of the highest qualities and possesses vast layers of gold and other precious minerals. It is stocked with rich metal ores to an extent exceeding all the other countries of the world. There are vast forests, endless stretches of most fertile alluvial soils (loess), which, when properly irrigated, would supply the whole world with cotton, and boundless meadows fit for the most intensive breeding of cattle. Siberia is that part of Russia in which the foundation for her economic strength can and must be laid. . . .

An Assured Market for American Industry

The world war has given a powerful impetus to American industry. The number of new factories and mills called into being in the United States by the needs of the war is enormous. When the war is over many of them will die a natural death, but a great many of them will have to be only slightly reorganized to continue their work along peace lines. . . . The natural tendency of American industry to maintain the war level of exports, if not to increase them, will meet with a systematic and persistent resistance on the part of both present foes and friends, especially of those of them who are able not only to meet their internal demand but also to offer their goods on the world market, *i. e.*, those who while seeking to develop their national industry have the necessary means therefor.

The only truly accessible market for the products of American industry are those countries which are unable to meet their own internal needs and in which the development of internal productivity is hindered by insurmountable financial difficulties. Only such countries can be truly willing buyers of the products of American industry. America will merely have to finance the buying needs of these countries.

The largest of these countries is Russia. Her need for the products of American industry is enormous. The size of this market, especially in Siberia, is so large that it will easily absorb a considerable part of American exports. It only remains to finance this consumption capacity. The best and soundest method of financing would be for America to take over various industrial concessions in Russia, especially railroad, forest and land concessions, which would be an excellent security for the capital loaned by America to the Russian consumer to enable him to buy the products of American industry.

Thus, in this matter, the interests of America and Russia are in complete harmony. America needs the Russian market for her capital and for the products of her industry fully as much as Russia stands in need of the products of American industry and of American capital for the development of her natural resources. Co-operation in this field can and will be obtained.

America's Political Interest in Russian Railroad Construction

There is, however, one circumstance, called into being by the war, which makes the achievement of this co-operation a matter of especially urgent necessity for America. . . . In the course of decades, the business of managing the industry of transportation by rail evolved a great group of prominent railway men who combine an immense amount of energy, knowledge and practical skill with wide financial and business connections. At present, a high sentiment of patriotism compels all these men to keep at their posts during the war. But when the war will be over there will be nothing to force them to act in the capacity of state officials in the business they had created and owned. Very many of them, and the best workers at that, are constitutionally, so to speak, incapable of adjusting themselves to the new situation, for the psychology of an owner differs too widely from that of a state official. Consequently it is permissible to expect that upon the expiration of the twenty-first month after the war there will arise a violent political struggle around the question of whether state or private ownership of the railroads should prevail. There is no doubt but that in this struggle all the best railroad experts will not be in favor of the historically inevitable transition of the railroads from private to state ownership.

This struggle cannot fail to arouse a violent commotion in the whole economic life of the United States,* a commotion which, judging from the example of other countries, can only be avoided by draining off, so to speak, the energy of these railroad experts and directing into channels, in other countries, of work the men are accustomed to. In this respect, America's undertaking to provide Russia with the railways she needs is of the highest internal value for the United States. If the industrial capital and energy, now engaged in the railroad business within the United States, will find a natural outlet in similar work in Russia, especially in Siberia, the problem of America's transition to State owned railroads may lose most if not all of its acuteness.

American leadership in Russian railroad construction will have highly beneficial consequences in many other respects. American capital will find a sound investment, American industry a reliable consumer, and America, as a body politic, will have a mighty buffer State against German or any other aggression in the East.

All these considerations taken together dictate the necessity of organizing, at the earliest possible moment, Russian-American co-operation in the field of Russian railroad con-

*That this will happen just so is best shown by the example of Russia, where the power of the government was so overwhelming that even experiments such as the introduction of liquor monopoly were accepted without a murmur. But even in Russia the taking over of the railroads by the government was accompanied by a struggle which agitated the whole society. In France and Italy the struggle around the railroad problem may be compared, for its intensity, perhaps only to the struggle against clericalism.

struction. The first step in this direction, it seems to us, would be the organization of something like an association of American railroad leaders, which should immediately commence to study Russia's needs for new railways, needs which, unfortunately, are entirely unknown here. This body should also elaborate the conditions on which American capitalists would be willing to invest their funds in Russia and draw up a program of financial and technical action. An individual person would hardly be equal to such a task. Without it the attempt of American railroad men to start work in Russia would, no doubt, meet with serious obstacles and unnecessary disappointments, and the work itself would not assume the dimensions corresponding to the magnitude of the problem.

The slightest delay in the work of the preliminary study of the problem will undoubtedly lead to results hardly desirable for America. As a matter of fact, Russia's need of individual railway lines was highly imperative even before the war, and, no doubt, as soon as order is restored in Russia her government will take all the necessary measures to inaugurate, at the earliest possible time, the construction of those most urgently necessary and, consequently, most profitable railways. Russia in that case will have the choice of many newly developed money markets. Some of them, for instance the Scandinavian market, have already become interested in Russian railroad construction. At the first signs of order in Russia they will make haste to take possession of the selected and partly investigated lines. Therefore, if America proves tardy, she may have to content herself with the less necessary and, consequently, less profitable lines.

We may have here a repetition of the recent story of the Russian banks; the absence of resolute action on the part of America resulted in that two banks (the Azov-Don and the Yunker Bank) are already in German hands, while the Siberian Bank is in the hands of English capitalists. It is more than probable that a similar fate will befall all the remaining Russian banks.*

This circumstance represents the greatest menace to all future American industrial work in Russia. It is particularly a menace to American action in the field of railroad construction.

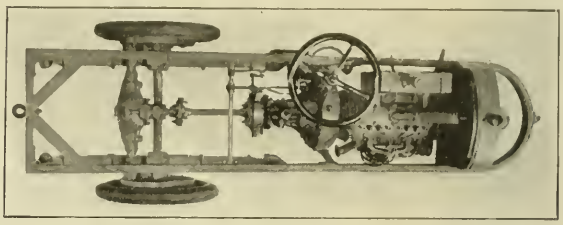
As a matter of fact, the majority holdings of the stock of the private railroad companies existing at present in Russia are in the hands of the banks. If the Germans are going to own the Russian banks, they will also, at the same stroke, become the owners of the now existing private railroads. It is a matter of common knowledge that the construction of new railway lines generally increases the revenue yielded by the old lines. Consequently, when, in compliance with the demands of international economic politics, the United States will begin to construct new railway lines in Russia, it may happen, if the Americans are not prompt enough, that they may have to work in the interest of the German capital owning the present Russian railroad system. This consideration is an additional argument in favor of recognizing as soon as possible the inevitability of Russian-American cooperation in Russian railway construction and of taking immediately the various preliminary steps and measures in this direction.

The War Finance Corporation has announced a loan of $392,000 to the Alabama Great Southern and one of $194,350 to the Cincinnati, New Orleans & Texas Pacific, both on the security of certificates of indebtedness issued by the Director General of Railroads.

*When the Bolsheviki, having discovered by experience what an incredible confusion their celebrated nationalization of the banks had introduced into the economic life of the country, unanimously decided to denationalize them. Count von Mirbach decidedly forbade them to do so. He did not conceal his motives: all Russian banks were not bought up yet by Germans!

A Gas Driven Industrial Truck

A RECENT DEVELOPMENT in industrial haulage is the use of gas driven vehicles modeled after the cars for street service, but adapted to indoor as well as outdoor use and designed for both direct haulage and tractor service. One example of this type of equipment, which has been in general service for some time, and is now being subjected to experimental use in several railroad freight houses, is of particular interest because of several characteristics which are such as to point towards some rather marked departures in the development of industrial truck service. Incidentally, the truck has several features of design that are in themselves unusual. For instance, it has three wheels rather than four



Chassis of the Tractor-truck

and is run backward, that is, with the two drive wheels ahead and the steering wheel in the rear.

The general makeup of the frame, power plant and transmission follow closely the standard layout of modern gas motor vehicles. This is illustrated by the photograph showing a top view of the machine with the body and hood removed. The engine is of 25-hp., four-cycle, four-cylinder (3⅛ in. by 4½ in.) type with a multiple disk, dry plate clutch, a selective type transmission with three speeds forward and one-speed reverse, and an internal-gear drive axle. The machine is equipped with cast steel wheels ordinarily provided with rubber tires, but which may be fitted with steel tractor rims so that the car may be used on rough ground.

The machine may be had with a plain platform, a fixed



The Truck in Tractor Service

rectangular box, a dumping box or a side dumping hopper, depending upon the service in which it is to be used. The fixed box body is commonly supplied where the car is used in tractor service with the idea of loading this box with whatever weight is necessary to obtain tractive power to meet the needs of the traffic in which it is to be used. A better idea of this is obtained from the fact that the weight of the car empty is 2,050 lb. while the capacity load which is placed directly over the driving wheels is 3,000 lb. The cars are said to run at speeds varying from ¼ mile to 15 miles an hour, giving great latitude in adapting the machine to various classes of service. For instance, the trucks have been used as the motive power for moving or spotting freight cars on

industrial side tracks. The practice of running the car with the driving wheels forward is said to be of considerable advantage in climbing inclines. Another feature to which attention is called is a three-gallon capacity welded gasoline tank, this capacity being enough for the operation of the car in ordinary service for an entire working day without recharging.

The small turning radius of 72 in. is of particular advantage in handling the car in close quarters. Other dimensions of the truck are: length over all 112 in., width 42 in., wheel base 72 in., tread 35½ in. This car is known as the Clark Tructractor, and is manufactured by the Clark Tructractor Company, Chicago.

Doings of the United States Railroad Administration

The Operating Statistics Section Reports Show That Economies Are Being Made in Train and Locomotive Service

WASHINGTON, D. C.

THE Fuel Conservation Section has issued a bulletin on locomotive fuel performance for January, February and March, 1919, as compared with the same period of the previous year, which shows an estimated saving in coal consumption by using less coal per 1,000 gross ton miles, or per car mile, amounting to $11,263,774. This is based on incomplete returns covering 76 per cent of the total mileage. In determining the estimated total saving for all roads in a region it has been assumed that the average per cent of saving for the whole region is the same as the average per cent for the roads in that region for which complete information is available. The grand total saving for all regions has been taken as the sum of the regional totals. In freight train service the estimated saving for all roads is $7,773,170. The saving on the roads for which information is available was 12.3 per cent. In passenger service the saving is estimated at $3,530,604, or 12½ per cent. The average cost of coal per ton shows increases in the various regions, as follows: Eastern region, from $3.48 to $3.92; Allegheny region, from $2.92 to $3.00; Pocahontas region, from $2.55 to $2.67; Southern region, for $2.82 to $3.40; Northwestern region, from $3.58 to $3.91; Central Western region, from $3.07 to $3.55; Southwestern region, from $3.13 to $4.14; Grand total, all regions, from $3.16 to $3.57.

The total tons of coal consumed in the three months amounted to 26,191,000 as compared with 30,943,000 in the corresponding period of 1918, and the total cost of coal was $93,503,000 as compared with $97,541,000. In freight service the pounds of coal per 1,000 gross ton miles averaged 220 as compared with 243.7 in the corresponding period of 1918. This is a decrease of 9.7 per cent. In passenger train service the pounds of coal per passenger train car mile averaged 20 as compared with 22½ last year, a decrease of 11.1 per cent.

Operations of Federally Operated Roads for April

The Operating Statistics Section has published complete figures for April and four months ending April 30 for all the large railroads in federal operation. 231,691 miles of road are included out of a total of 239,997 actually federally operated, comprising 96 per cent of the mileage and 98 per cent of the revenues.

	Month of April		Increase or decrease	
	1919	1918	Amount	Per cent
Operating revenues	$384,739,685	$365,540,408	$19,199,277	5.3
Operating expenses	339,229,299	276,446,983	62,782,316	22.7
Net operating revenues	45,510,386	89,093,425	d43,583,039	....
Taxes, rents, etc.	18,195,988	17,691,325	504,663	....
Net federal income	27,314,398	71,402,100	d44,087,702	....
Operating ratio	88.2	75.6	12.6	....

Note: d—Decrease.

One-twelfth of the annual rental due the companies covered by the report amounts to $74,017,136, so that the net loss to the government for the month was $46,702,738 for these properties. The loss from operation of all properties federally operated during the month was approximately $58,000,000.

In making further comparisons with 1918, it should also be borne in mind that the increased wages for April, 1918, were not charged into operating expenses until subsequent months.

The results for the four months ended April 30, were as follows:

(Class I railroads in federal operation)

	Four months ended April 30		Increase or decrease	
	1919	1918	Amount	Per cent
Operating revenues	$1,494,695,291	$1,294,322,364	$200,372,927	15.5
Operating expenses	1,355,661,499	1,078,979,007	276,682,492	25.6
Net operating revenues	139,033,792	215,343,357	d76,309,565	....
Taxes, rents, etc.	65,837,406	65,765,103	72,303	....
Net federal income	73,196,386	149,578,254	d76,381,868	....
4/12 of annual rental	296,068,544	296,068,544	.....	....
Operating loss	222,872,158	146,490,290	76,381,868	....
Operating ratio	90.7	83.4	7.3	....

FREIGHT TRAFFIC MOVEMENT

(Class I railroads in federal operation)

	Four months ended April 30		Increase or decrease	
	1919	1918	Amount	Per cent
Net ton miles (thousands)	113,692,228	133,056,686	d19,364,458	d14.6
Loaded car miles (thousands)	4,076,985	4,634,874	d557,889	d12.0
Total car miles (thousands)	6 044,944	6,616,732	d571,788	d 8.6
Freight train miles (thousands)	175,921	208,854	d 32,933	d15.8
Car load (tons)	27.9	28.7	d 0.8	d 2.8
Per cent loaded to total car miles	67.4	70.0	d 2.6	d 3.7
Train load (tons)	646	637	9	1.4

d—Decrease.

Excursion Travel Not to Interfere With Troop Movement

As a result of correspondence with the Secretary of War regarding the demands upon railroad equipment caused by the very large return movement of troops during June and July, Director General Hines has ordered a notice posted in all railroad station waiting rooms stating that during June and July the return movement of our soldiers from overseas will be at its height and that during the last week of June and the first week of July passenger equipment must be provided at the Atlantic ports for the transportation of several hundred thousand soldiers. It is stated that it is the paramount duty of the Railroad Administration to provide adequate facilities for the safe, prompt and comfortable return of these men to their homes and that every effort will be made to perform this duty with the minimum of inconvenience to those who travel for business or pleasure, but until the troops have been moved, coaches and sleeping cars will be crowded and temporary discomforts will result. The Secretary of War in a letter to Mr. Hines asked that the use of equipment for recreation purposes might be limited to an absolute minimum. He said: "The splendid co-operation received from the railroads, both in the prompt despatch of the troops overseas and to date in handling the return move-

ment is greatly appreciated by the War Department and the magnitude of this undertaking is the admiration of all."

Mr. Hines in reply said that every provision will be made for providing the necessary equipment and that the co-operation received from the railroads in connection with the overseas and return movements will be continued.

Division of Accounting Collects Maintenance Data

The Division of Accounting has issued its Accounting Circular No. 101 calling for the information required for the purpose of ascertaining facts incident to maintenance, repair, renewal, retirement and depreciation of roadway and structures and the expenditures and charges therefor required to meet the provisions of section 5, relating to upkeep, of the standard agreement between the director general and the companies and for the purpose of recording upon the operating books of the federal administration the necessary accounting data in connection with upkeep. The federal auditors are directed to take immediate steps to prepare, record and report the data called for on six forms included in the circular, which has been in course of preparation for several months. It takes the place of Circular No. 28 issued by the Division of Operation in March, which was suspended because it involved such a burden of clerical work on the roads and because the furnishing of the information then called for would involve a duplication of the work which was to be called for by the accounting department. The circular issued by the Division of Operation was expected not only to provide the data necessary to ascertain whether the contract obligation as to upkeep was being complied with, but also to set the maintenance program for 1919. The latter question, however, has become involved in complications and has required further instructions.

A considerable portion of the data required by the accounting circular has been or will be reported to the Interstate Commerce Commission, and this will form the basis so far as applicable of the returns required by the circular. Five copies of each report are to be made, one for the director of accounting, one for the director of operation, two to be sent to the regional director, one of which is to be sent by him to the proper officer of the corporation, and one for the federal manager. Federal auditors are also directed to discontinue the use of all maintenance of way and structures operating reserve accounts which may have been created by charges to operating expenses subsequent to December 31, 1917. Reserves of this kind arising out of charges prior to January 1, 1918, are not authorized and must not be shown on federal books.

Form 1 of the reports required is an analysis of maintenance of way and structures expenses designed to show the comparison between the test and federal control periods.

Form 2 is a comparison of labor costs for the two periods for the purpose of obtaining the factors for equating the cost of labor.

Form 3 is for the comparative cost of selected items of maintenance materials designed for the purpose of obtaining the factors for equating the net material charges.

Form 4, a comparison of maintenance of way and structures expenses, is designed to show the total expenses for each year and for the entire test period, the average for such period, the equated average expenses for the test period, the total expenses for one year of federal control and the increase or decrease in maintenance expenses for the year as compared with equated average expenses for the test period.

Form 5 covers maintenance of way and structures expenses on account of fire damage, maintenance of additional property taken over and improvements during federal control and a final summary designed to show by comparison of costs, in case the property has been improved through maintenance, the increase in maintenance expenses, and in case the property has not been maintained to normal standard, the decrease in maintenance expenses.

Form 6, operating statistics, is to secure data which may indicate the comparative use of the railroad during the test and federal control periods.

Cost of Train and Locomotive Service

The total cost of train service, including locomotive service, shows a steady decrease as compared with preceding months, although increases as compared with last year, according to the monthly reports compiled by the Operating Statistics Section. For the month of April it was 112.7 cents per 1,000 gross ton miles, as compared with 119.5 in March and 126.5 in February. The cost of locomotive service per locomotive mile in April was 115.2 cents, as compared with 98.5 cents in April, 1918; 119.2 cents in March, 1919, and 120.7 cents in February. The cost of train service per train mile was 162.2 cents, as compared with 141.7 in April, 1918, 167.5 cents in March, 1919, and 169.3 cents in February, 1919. The increase in the cost of locomotive service in March this year over March last year was 17 per cent, and the increase in the cost of train service was 14.5 per cent. All items of cost show increases as compared with last year. The figures are reported by roads and by regions. The combined averages for all regions with the comparative figures for last year and March and February of this year, are as follows:

	April, 1919	April, 1918
Cost of locomotive service per locomotive mile	115.2	98.5
Locomotive repairs	39.4	30.6
Enginehouse expenses	9.6	6.8
Train enginemen	18.9	18.1
Locomotive fuel	43.6	40.2
Other locomotive supplies	3.7	2.8
Cost of train service per train mile	162.2	141.7
Locomotive repairs	55.5	43.0
Enginehouse expenses		
Locomotive fuel	49.4	46.2
Other locomotive supplies	4.2	3.3
Train enginemen	21.4	20.8
Trainmen	25.3	23.9
Train supplies and expenses	6.4	4.5

	April, 1919	March, 1919	February, 1919
Cost of train service per 1,000 gross ton miles	112.7	119.5	126.5
Locomotive repairs	38.6	40.8	43.1
Enginehouse expenses			
Locomotive fuel	34.3	37.5	40.3
Other locomotive supplies	2.9	3.1	3.4
Enginemen and trainmen	32.4	33.5	34.8
Train supplies and expenses	4.4	4.6	4.8

Contracts Executed

The Railroad Administration has executed co-operative short line contracts with the Midland & North Western and the Miami Mineral Belt railroads.

Accounting Circular No. 99

Under the present instructions net ton-miles are being computed from conductors' wheel reports, while the same information is also being compiled from waybills covering revenue and company freight.

This causes a duplication of work, which seems to be unnecessary, and it has been decided that satisfactory net-revenue ton-mile figures can be obtained in the following manner:

(1) Compile from the waybills or other accounting documents the net ton-miles for nonrevenue freight (company material).

(2) From the total net ton-miles, as determined from the conductor's wheel reports, deduct the nonrevenue net ton-miles ascertained as directed in paragraph 1, thus producing the net-revenue ton-miles.

Effective as to all ton-mile statistics prepared for June, 1919, and thereafter, all federally operated lines are to discontinue the compilation of net ton-miles from way-bills and adopt the method prescribed above, except in cases where special statistics required by any state should render it impossible.

It is recognized that the same relation between ton-miles and revenue may not exist under this plan, as resulted from the former practice of securing this data from waybills. It is stated, however, that tests have demonstrated that the result is sufficiently accurate for all practical purposes.

Weekly Traffic Report

According to a report on traffic conditions for the week ended June 16, the volume of both freight and passenger business throughout the country shows an improvement, although for the country as a whole it is still considerably below normal. The shipment of grain is on the increase, but there is ample railroad equipment to handle the traffic.

The loading of grain in the Northwestern region has been exceedingly heavy, almost double the movement for the same period last year. Grain loading in the Central Western region showed an increase of 54 per cent as compared with the same period last year. Since the opening of navigation, 23,700,000 bushels of grain have been moved from the head of the lakes to Buffalo, and the Food Administration expects to move 150,000,000 bushels by this water route.

The total revenue freight handled in the Central Western region during the week amounted to 169,215 cars, which is a decrease of 6 per cent as compared with the same week a year ago but an increase of 19,017 cars over the preceding week. Passenger travel in this region has been so heavy that it was necessary to rearrange a great many schedules, establishing additional sleeping car routes as well as increasing the train service.

The recent advance of about $15 or $20 a bale in the price of cotton has stimulated the movement of that product in the Southwestern region. Harvest in the northern part of Texas is under way and wheat will begin to move from that territory within the next few days.

The movement of coal to the lakes is heavy, the total tonnage dumped into vessels to June 1 being one million tons in excess of the same period last year. The formation of the American Coal Exporters' Association and the Association's arrangement with the Shipping Board for definite allocation of ships is expected to stimulate the export business.

Demurrage Rates Reduced

In response to the pressure brought to bear by a committee of the National Industrial Traffic League, Director General Hines has issued supplement 2 to General Order No. 7 reducing demurrage charges from the rates established by Director General McAdoo early last year. Representatives of the American Railroad Association also recommended a reduction and Mr. Hines' action was taken after consideration of reports submitted to him by the divisions of public service, traffic and operation. The rates established last year are $3 per day for each of the first four days after the expiration of free time, $6 per day for each of the next three days, and $10 per day for each succeeding day. The new rates, which become effective on July 20, will be $2 per day for each of the first four days after free time and $5 per day for each day thereafter, which is approximately the basis in effect in 1917. The supplement also provides that the "average agreement," under which credits are allowed for unloading in less than the free time, will also be applied to cars held for loading, but the loading and unloading agreements will be kept separate. The average plan originally applied to both loading and unloading, but was changed on the ground that shippers naturally loaded their cars out as rapidly as possible and should not therefore be allowed credits which would enable them to waste time in unloading. On the other hand, some industries unload promptly, but waste car time by ordering cars in advance so as to have a supply always on hand for loading. The two averages are to be kept separate so that each class of car use will stand by itself.

In announcing the reduction in rates, Mr. Hines pointed out that demurrage charges are not imposed for the purpose of obtaining revenue, but to promote the punctual loading and unloading of equipment, and also that in view of the diminished purchasing power of the dollar and the increasing demand for equipment, it was doubtful whether the reduced rates would be sufficient to accomplish the desired purpose. He referred to the heavy movement of traffic expected within the next few months and announced that if the results were not successful he would feel impelled to increase the demurrage charges.

Imposing Sentence

UNITED STATES Judge Buffington in imposing sentence at Pittsburgh recently on certain railroad employees said:

The jury has found you guilty of stealing and having in possession goods stolen from an interstate shipment of freight. You were in a trusted position—the railroad service. You had been exempted from service on the other side of the seas; while other young men were risking their lives you were working at the railroad in the public service in the time of war. You have been generously treated by the Government in the way of wages. You had the esteem and respect of the people about you. You had a father who had carefully reared you; you had a wife and children. And it is a very painful thing for the court to have to pass sentence on you, but these are the things that courts cannot avoid. When a man comes up for sentence before the court there are three things to be considered; first, the man himself; he has already probably suffered enough and learned a lesson, but there are the interests of the public to be considered. These railroad thefts have grown to an extent during the time the government has had charge of them that have run up into the millions and millions of money. Now the money to pay for these goods that have been stolen has to be raised by other people—Liberty Bonds—those are the people who in the end have to make good those losses.

Then, my young friend, there is the interest of those who are engaged in the railroad business as well as yourself. All these things have to be borne in mind.

We have had in this District—in this circuit which is composed of New Jersey and Delaware and Pennsylvania—widespread evidence of this thing going on on all the railroads. We have had lots and lots of people who were taking, not as these goods of yours were, for your own family, but actually stopping the cars and taking quantities of copper and merchandise, not for their own personal use but for sale, making a business of stealing for profit and sale. Down in New Jersey we have had conductors, trainmen, in positions where others were influenced by their actions and their example, sentenced to five years imprisonment in the penitentiary. This has caused men to stop and think. Out here we have taken a milder course, but the thing goes on and it is quite evident that in order to save men from themselves the time has come when there must be more severe sentences imposed, and I can say to you for the judges that such heavier sentences will be imposed from this time, if this stealing continues.

I have taken all these matters into consideration, my young friend, because the court feels kindly towards you, kindly towards your wife, kindly towards your children, kindly towards your father; but the court has a solemn duty. I have taken into consideration the fact that these articles were not taken by you for the purpose of a trade and making money, and you were not in a position where your example would possibly lead other men. I am going to impose as light a sentence as I feel I can under the circumstances. I want to say to you, my young friend, that you made a serious mistake. Sometimes the mistakes that we make are the best things that ever happened to us; and this will be to you, if you learn

a lesson from the mistake. You will find in the penitentiary men who will drag you down, and you will find men there who will help build you up. You can build up your manhood. You can come back to where you lived; your friends are there and your family is there, and you can build up your manhood again, and you will do so. When you come back I want you to come and see me and talk it over as many another man has. I want you to take it like a man and make the best of it.

And I want to say to you on behalf of the judges here that the lightness of this sentence in your case is not to be taken as an example of what will come hereafter. I am following with you the lenient course that has been pursued here, but the judges, all of us feel, after consulting together, that the word should go out that hereafter those who come into the court charged and found guilty with offenses of this kind on the railroads will be dealt with more in the lines of what has had the effect of stopping things down in New Jersey, since that leniency has not resulted in stopping this epidemic of railroad crimes.

Checking Percentages By Chart

By William Wyer

Statistician, United States Railroad Administration, Operating Statistics Section

STATISTICS MUST BE REDUCED to significant percentages in order to attain their maximum value. This principle is generously illustrated in the summaries of the Operating Statistics Section of the Railroad Administration.

Such a large use of percentages, of course, means a great deal of office routine in the preparation of the summaries. As far as the Operating Statistics Section is concerned, however, much of this routine is limited to checking. Only percentages in the totals for districts and regions actually have to be computed, as figures for the individual roads are already computed on the O. S. forms. Not only percentages, but all figures derived from basic data must be checked before they are entered on the summaries, and this constitutes a large part of the work of preparation.

The chart has proved a great aid and time-saver, not only as an absolute check on percentages computed in a certain way, but also as an indirect check on all figures affecting the percentages in question. The chart applies to the following general case:

Suppose that one basic figure is divided by another basic figure to obtain an average. Suppose, further, that both basic figures are given for two consecutive months or years. The average will then be computed for these two periods, and there will, of course, be percentages of increase or decrease applying to both of the basic figures and to the average. The set of related figures numbers nine, as shown in the following illustration:

A. B. X. Railroad

Item	December, 1918	December, 1917	Per cent change
1. Net ton miles	124,337,000	108,808,000	14.3
2. Train miles	307,000	278,000	10.4
3. Net ton miles per train mile (1 ÷ 2)	405	392	3.3

Referring to the chart, and following the instructions thereon, its application as a check on the above figures may be readily seen.

Starting at the center (or origin)where the heavy lines cross, move straight to the right (along the horizontal axis) 14.3 spaces, thence straight up (parallel to the vertical axis) 10.4 spaces. The point arrived at is about seven-tenths of the distance from the diagonal line marked zero to the diagonal line marked five, and is below the zero line. The percent of change in the train load should, therefore, be an increase of about 3.5 per cent.

This simple operation not only checks the three computed percentages, but is also a close indirect check on the two computed figures for net ton miles per train mile. The operation of the chart can be mastered with a very little practice; and by interpolation to tenths between the diagonal lines, the reading on the chart will never vary more than two-tenths of one per cent from the correct calculated figure. A very slight mistake in any one of the four computed figures on which the final percentage depends will change this final figure more than two-tenths of one per cent. Any variation of more than two-tenths of one per cent is at once investigated. Errors of a smaller magnitude than this are negligible.

Additional sets of figures which the chart may be used to check are:

1. a—Net ton miles.
   b—Loaded freight car miles.
   c—Net ton miles per loaded car mile (or car load).
2. a—Loaded freight car miles.
   b—Total freight car miles.
   c—Per cent loaded to total car miles.
3. a—Total freight car miles.
   b—Total average number of freight cars on line daily.
   c—Car miles per car day.
4. a—Net ton miles.
   b—Total number of freight cars on line daily.
   c—Net ton miles per car day.

These are merely illustrations chosen from the monthly summary O. S. 5, of freight traffic movement and car performance. The application of the chart is, of course, much more general.

In constructing the chart, all the diagonal lines representing fixed values of P, the final percentage, start at a limiting point where both of the first two percentages are minus 100. This is natural; for, if both the basic factors on which the average depends decrease 100 per cent (that is, become zero), no computation is possible of the average or its percentage of change, which are thus made "indeterminate."

Another point on each diagonal line is fixed by the fact that these lines cross the heavy horizontal line at equal intervals. Thus the diagonal line along which P is always an increase of 25 per cent, crosses the horizontal axis 25 spaces to the right of the center. The logic of this may be seen if we consider that with no change in train miles, for example, the train load will follow fluctuations in net ton miles exactly. Or, mathematically, if P_2 (per cent change in train miles) is zero, we can only move backward or forward on the horizontal axis; and if the train load is to vary exactly with changes in net ton miles, the diagonal line with value 30 must cross this axis at value 30, and so on.

It should also be noted that when the two basic figures show identical increases or decreases, the chart will give a reading on the zero line. This is simply another way of saying that when net ton miles and train miles increase in the same proportion, the train load is stationary.

The proof that the lines joining the limiting point to the points on the horizontal axis are straight lines is purely mathematical, and is given below.

Let a = 1917 ton miles
b = 1918 ton miles
c = 1917 train miles
d = 1918 train miles

Then per cent increase in ton miles $= P_1 = \frac{b-a}{a} \times 100$ ..... (1)

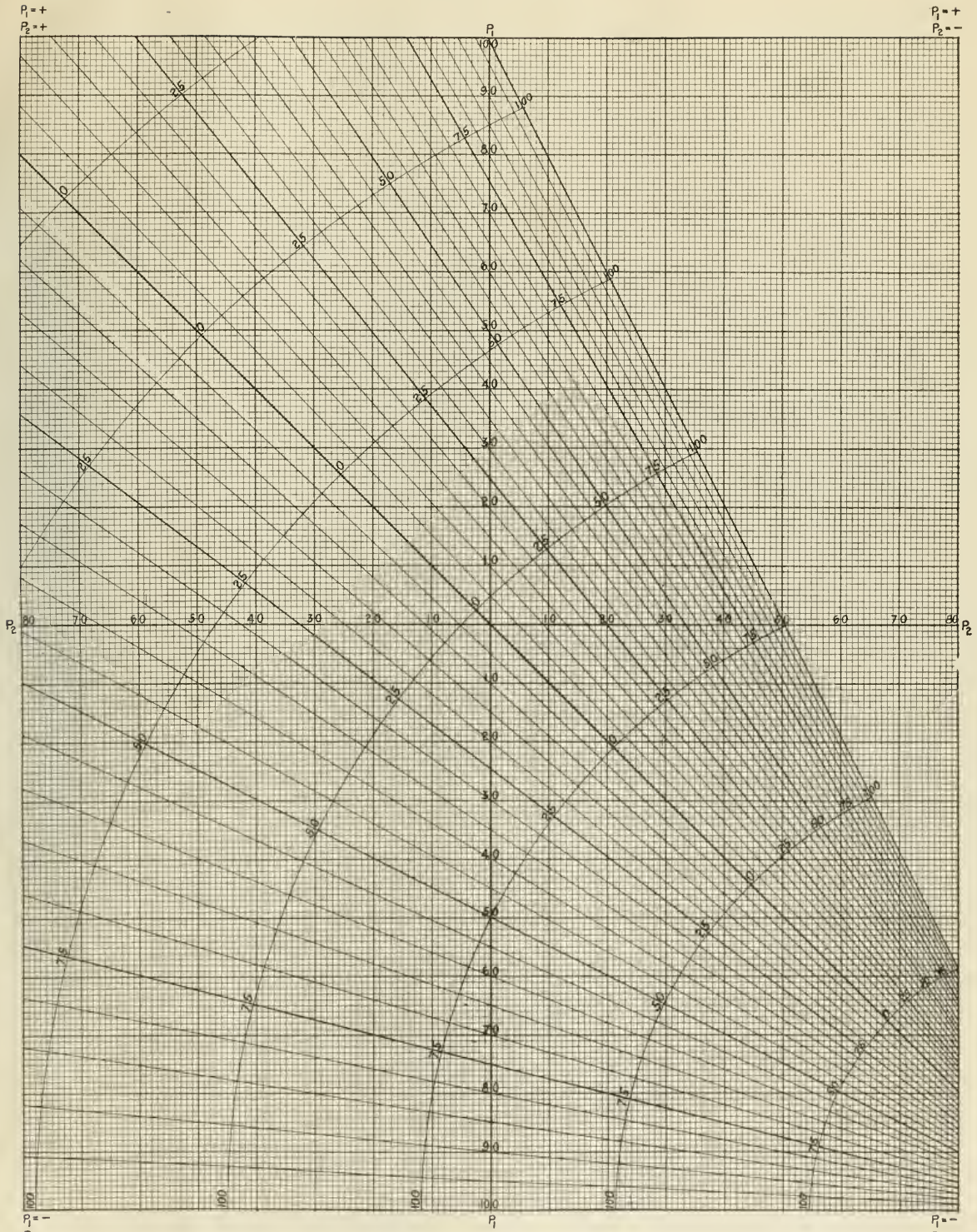
and per cent increase in train miles $= P_2 = \frac{d-c}{c} \times 100$ ..... (2)

1917 ton miles per train mile $= \frac{a}{c}$

1918 ton miles per train mile $= \frac{b}{d}$

and per cent increase in ton miles per train mile $= P = \frac{\frac{b-a}{d} - \frac{}{c}}{\frac{a}{c}} \times 100$ ... (3)

$$= \frac{1}{d} \times \frac{bc-ad}{a} \times 100 \text{ ... (4)}$$



Percentage of Change Chart

Where comparative figures are given for two years and one item is divided by a second to obtain a derived unit, and where the percentage of increase or decrease of the first and second item are known, the percentage of increase or decrease of the third, or derived unit, can be read from the chart. Read the percentage of increase of the first item (P_1) from the center of the chart along the vertical axis, and from this point move parallel with the horizontal axis to the left the amount of the percentage increase of the second item (P_2). The point found related to the diagonal lines will show the percentage increase of the third or derived unit (P). Increases for P_1 are measured up, and decreases down. Increases for P_2 are measured to the right, decreases to the left. All points to the right or above the diagonal zero line give plus values for P. All points below or to the left of this line give minus values for P.

Subtracting (2) from (1)

$$P_1 - P_2 = \frac{b-a}{a} \times 100 - \frac{d-c}{c} \times 100 \quad (5)$$

$$= \frac{100}{c} \times \frac{bc-ad}{a} \quad (6)$$

Substituting (4) in (6)

$$P_1 - P_2 = P\frac{d}{c} \quad (7)$$

$$P = (P_1 - P_2)\frac{c}{d} \quad (8)$$

From (2)

$$P_2 = \frac{d-c}{c} \times 100$$

$$= 100\frac{d}{c} - 100 \quad (9)$$

Whence

$$\frac{c}{d} = \frac{100}{P_2 + 100} \quad (10)$$

Substituting (10) in (8)

$$P = \frac{(P_1 - P_2)\,100}{P_2 + 100} \quad (11)$$

This is an equation in three variables. In order to plot it, one variable must, of course, be made constant, and this is what has been done by assuming various values for P. With P constant, the equation is of the first degree, and therefore represents a family of straight lines.

To determine the location of these lines,—

Let P = O and — 100

Equation (11) may be written:

$$P_1 = \frac{P\,(P_2 + 100) + 100\,P_2}{100} \quad (12)$$

If P = O, $P_1 = P_2$ (13)

If P = — 100, $P_1 = -100$ (14)

Solving equations (13) and (14), we find that the lines P= O and P= —100 intersect at the point ($P_1 = -100$, $P^2 = -100$). By substituting other values for P, it will be found that all the lines pass through this point.

If P_2 = O, we get from equation (12) that P_1 = P.

This determines the intersection of every line with the horizontal axis.

Equation (11) therefore represents a family of straight lines, all passing through the point (—100, —100), and intersecting the horizontal axis at distances from the origin proportional to the constant value assumed as noted above for P.

American Society of Civil Engineers Convention

The American Society of Civil Engineers held its forty-ninth annual convention at St. Paul and Minneapolis on June 17-20 with headquarters at the Radisson hotel, Minneapolis. Approximately 200 members were in attendance. Tuesday was devoted to the business of the association, the principal feature of interest being the presentation of a tentative report of the Committee on Development, the discussion of which consumed all of the afternoon session.

The committee tentatively recommended that while the society should continue to pursue the objects for which it was formed—the advancement of engineering knowledge and practice and the maintenance of a high professional standard among its members—the time has now come when it should adopt the principle of becoming an active national force in economic, industrial and civic affairs. To this end the committee recommended that a comprehensive organization be formed embracing: (1) The local affiliation of the branches of the national technical societies and the local technical societies, (2) A state council composed of representatives from the local affiliations, and (3) A national council consisting of representatives of the national technical societies and of the state councils or state group organizations in lieu thereof. The object of this council shall be to increase the usefulness of the engineering profession, and to bring about greater co-operation and to advance the welfare of engineers.

Dealing with the internal relations of the society, the committee recommended that every member of the society be a member of a local association; that there be created in each geographical district of the society an organization consisting of representatives of the local associations in that district; that the representatives of each district on the Board of Direction and the Nominating committee of the society be elected by ballot by the corporate members resident in the district; that there be an annual conference of representatives from the local associations for the purpose of discussing the welfare of the society and its members; that the Board of Direction refer for recommendation each application for membership to the local association in whose jurisdiction the applicant resides; that it be the duty of the local association to provide for the welfare of the younger members of the profession by (a) reasonable representation on the active committees; (b) encouraging their discussion of the general problems of the society; (c) arranging excursions to works of engineering interest; (d) promoting social intercourse between them and the older members; that a personal service bureau be maintained by each local affiliation, organized to co-operate in connection with a central service bureau to be maintained by the national council.

With reference to technical activities the committee recommended that local associations should hold not less than four stated meetings per year and should encourage joint meetings with kindred societies; that the fortnightly meetings of the parent society be discontinued; that the semi-annual meetings of the parent society be supplemented by the addition of a spring and a fall meeting to be held in different parts of the country; and that a more systematical and comprehensive system of securing papers be developed. The creation of special sections was disproved and the suggestion was made that such work be done by strong committees. It was also recommended that a book of recommended practices and standards be compiled.

Treating on the relation of the engineer to public affairs, it was recommended that a short code of ethics of broad scope, general character and positive rather than negative injunction be prepared; that a standing committee be created to consider questions of educational policy and to co-operate in carrying out such policies; that the society in co-operation with the other founder societies prepare a standard form of bill for the licensing or registration of engineers; that the national council maintain an agency in Washington, D. C., or elsewhere for the purpose of keeping advised of federal legislation and departmental rulings and regulations involving questions of engineering; and it was recommended that the creation of a national department of public works be supported.

The report was received favorably by the society and aroused active and extended discussion. The Board of Direction of the society has authorized another meeting of the committee to be held in the early fall at which an effort will be made to complete a final report for presentation at the annual meeting in January.

The remainder of the week was spent in visits to points of scenic and engineering interest in the vicinity of Minneapolis and St. Paul. On Friday the party left by special train for Duluth and the Missabe iron range where Saturday was spent in a tour of the range, returning to Duluth late Saturday evening.

A Department of Public Works

Senator Jones of Washington and Representative Reavis of Nebraska have introduced bills in Congress to create a Department of Public Works in which will be concentrated all the engineering and architectural activities of the government. It is proposed to change the name of the Department of the Interior to the Department of Public Works, to transfer to this department engineering activities now handled by other departments and to transfer from the Department of the Interior all functions not directly concerned with construction, engineering, and scientific matters. Present bureau organizations with their personnel are to be kept intact.

The activities not now included in the Department of the Interior which it is proposed to include in the Department of Public Works are the Supervising Architect's office, now subordinate to the Department of the Treasury; the Construction division of the United States Army; River and Harbor Improvements, the Mississippi River Commission and the California Debris Commission, now subordinate to the Department of War; the Coast and Geodetic Survey and the Bureau of Standards, now included in the Department of Commerce; and the Bureau of Public Roads and the Forest Service, now subordinate to the Department of Agriculture.

Among the activities to be transferred to other departments are the Patent Office, which is to go to the Department of Commerce; the Bureau of Pensions to the Treasury Department; the Bureau of Education to the Department of Labor; the Bureau of Indian Affairs and the Board of Indian Commissioners to the Department of Labor; St. Elizabeth's Hospital and the Freedman's Hospital to the Public Health Service of the Treasury Department and Columbia Institution for the Deaf and Howard University to the Bureau of Education, Department of Labor.

The bill provides that the secretary of the Department of Public Works shall, by training and experience, be qualified to administer the affairs of the department and to evaluate the technical principles and operation involved in the work thereof. Provision is made for four assistant secretaries to be appointed by the President with compensation of $7,500 each per annum and to have administrative jurisdiction respectively over engineering design and construction, architectural work and construction, scientific work and surveys, and land and legal matters.

The bill provides further that the engineering officers of the United States Army detailed to non-military duties in the Construction division of the United States Army, River and Harbor Improvements, the Mississippi River Commission and the California Debris Commission shall be detailed by the Secretary of War to like duties under the Department of Public Works for such period no exceeding two years as the Secretary of Public Works may find necessary to make the gradual transfer of these improvements to civil administration without detriment to the public interest.

The corps of engineers of the United States Army has expressed its opposition to this bill by arrangement for the introduction of a bill to create an "Auxiliary Engineering Corps" in the United States Army for duty on works of public improvement—a non-combative corps of engineers which shall be "under the command and direction of the Chief of Engineers, U. S. A. Its personnel shall be assigned by the Chief of Engineers to duties under his charge; specifically on river and harbor improvements, inland waterways, locks and canals, fortifications, embankments, levees, dykes, breakwaters, piers, and in the supervision and in the construction of national highways and bridges, and to any other public work that shall be now or hereafter assigned to the Chief of Engineers under the War Department. This organization shall also perform the duty of guarding and protecting all national public works."

The bill to create the Department of Public Works is the result of a conference of representatives of over 75 engineering societies in Chicago in April representing an aggregate membership of over 100,000 engineers. It has the backing of Engineering Council and the engineering societies of the United States in an effort to co-ordinate the extensive engineering and construction activities of the United States government which are now widely scattered in different departments with little or no attempt at co-ordination.

Railway Affairs in Congress

Washington, D. C.

Consideration of general railroad legislation was begun by the Senate committee on interstate commerce on Tuesday in executive session but the meeting was devoted mainly to an informal discussion of the course of procedure to be followed. It was decided to appoint a subcommittee of five members, headed by Chairman Cummins, to draft a tentative bill and report back to the full committee. The committee was to meet again on Thursday to consider the Poindexter fourth section bill on which hearings were concluded on June 19.

Chairman Esch of the House committee on interstate and foreign commerce now expects to begin hearings on the general railroad question about July 7.

Hearings before the House committee on Tuesday, Wednesday and Thursday of this week on the Cummins bill, S. 641, intended to restore the complete jurisdiction of the Interstate Commerce Commission over interstate rates, brought out a number of points which were overlooked by the Senate when it passed the bill without having held any hearings on it. E. E. Clark of the Interstate Commerce Commission, the first witness, indicated that the commission is not especially keen for being authorized to suspend rates initiated by the director general during the remaining period of federal control, and thereby sharing with the Railroad Administration the responsibility for the general advance in rates now generally believed to be forthcoming. Alfred P. Thom, representing the railroads, said the question of policy was one for the Railroad Administration to discuss. C. E. Elmquist, representing the state commissions, was sure the shippers wanted the former jurisdiction over rates of both the Interstate Commerce Commission and the state commissions restored. Director General Hines did not oppose giving the federal commission power to suspend his rates but did object to being made subject to 48 states. Both he and Mr. Thom expressed much greater concern over the provision of the act requiring the director general to pay final judgments for causes arising before federal control, out of the railroads' rentals.

Commissioner Clark informed the committee that the commission was not the proponent of the bill, and that while it understood there was considerable demand for it, it "had not felt the urgent necessity for legislation of this sort at this time." The commission, therefore, had nothing to say as to the question of policy but merely wished to point out several ambiguities in the language which Mr. Clark said amounted almost to fatal defects.

"The financial results of federal operation," he said, "have not been as satisfactory or as successful as we all might have wished, but the railroads were taken over as a war measure and we have not doubted for some time that the government would be obliged in the end to charge off a substantial deficit as a war cost. The responsibility heretofore has rested with the President. The commission has had no jurisdiction except to review his rates on complaint and the shippers have generally refrained from attacking the rates fixed by the director general, but that condition is gradually being changed. A continually increasing number of complaints is being filed, although they mainly involve questions of relationship. The enactment of this measure would give

a sort of divided responsibility. It would require the President to ask the permission of the commission before he could file any tariff carrying an increased rate, no matter how trivial. The commission does not shrink from any responsibility but some of us thought that suggestion ought to be made."

Regarding the defects in the bill, Mr. Clark said that as he interpreted its language it did not mean what the Senate committee said it was intended to mean, that it would preserve the authority of the director general over intrastate rates. It provides that the director general shall have the only right to initiate rates possessed by the carriers before federal control but shall be subject to all the limitations of the interstate commerce act and, therefore, Mr. Clark thought the jurisdiction over intrastate rates would revert to the states, while another section of the bill puts another limitation on the power to increase state rates by requiring 30 days' notice. He thought this provision was not sufficiently definite as to how the notice should be given.

The shippers, Mr. Clark said, seem to favor the restoration of the commission's power to suspend rates initiated by the director general, but the bill would also subject him to the limitation in the amended fifteenth section of the act, which requires the permission of the commission before a tariff increasing a rate can be filed and he thought Congress would hardly like to limit the director general in that way. He also pointed to other defects in the language.

The amendment to require the director general to pay out of the railroads' rental final judgments based on causes before federal control Mr. Clark said, he personally considered sound, because a man ought not to be kept out of his money merely because the government has control of the railroad property.

Alfred P. Thom, counsel for the Association of Railway Executives, said the question of policy is one for the Railroad Administration to discuss but he pointed out that the passage of the bill would result in a divided responsibility for the results of federal control. The railroad companies, however, are very much interested, he said, in the provision regarding the payment of judgments and in that suspending the statute of limitations as to claims to exclude the period of federal control. He said that the question of judgments does not involve merely the question of personal injury or freight loss and damage claims, but that the field includes the large contracts made by the director general for improvements to the property or for materials and supplies to replace those taken over. Under the federal control act, he said, the carriers may be sued for the acts of the director general for which they are not responsible and the corollary is a right to levy on their property. Therefore he suggested an amendment to provide that no process shall be levied on any property of a carrier for causes during federal control where the director general is liable, as between himself and the carrier. He also declared that the provision for payment of judgments out of the compensation due the companies is in direct contravention of the terms of the standard compensation contracts, which include a limitation as to what may be deducted from the rentals and he suggested an amendment to provide that deductions shall be made to pay judgments "except as otherwise provided in the standard contract."

Charles E. Elmquist, president of the National Association of Railway and Utilities Commissioners, said that before the bill is passed the peace treaty will be signed and, therefore, it should be considered in the light of normal peace conditions. The shippers demand the right to have an investigation and determination of the reasonableness of rates before they become effective and the bill should be passed as soon as possible to restore rights which the shippers had gained after years of struggle. There are indications, he said, that we are again facing a large increase in rates, possibly 25 to 30 per cent, and if that is so, it is especially important that the shippers should have the right to be heard before they become effective. He admitted that there might be some embarrassment to the director general in requiring him to ask the Interstate Commerce Commission's permission before filing an increased rate, but the protection required by shippers should have paramount consideration and any increases in rates during the expiring period of federal control should follow the former procedure and be filed with the fifteenth section board of the commission for a full report before the rates are made effective. He was particularly interested in preserving the authority of the state commissioners. The bill provides that a hearing shall be given, but does not say before what body. Mr. Elmquist suggested that it be amended to provide that no change or increase in intrastate rates be made without the approval of the proper state tribunals conformable to the laws of the several states. He argued that the state authorities realize the great increase in railroad expenses and thought there would be no difficulty because of their failure to act promptly, but when Representative Denison suggested that a state commission might consider it preferable for the federal government to bear a deficit rather than to impose a hardship on the shippers of the state, Mr. Elmquist said that the commission could deal with the question of discrimination under the Shreveport decision. If the jurisdiction is not restored, he said, there should be an amendment providing for review or suspension of intrastate rates initiated by the director general, by the Interstate Commerce Commission. Representative Winslow referred to the case of the Maine Central, which he said with an increase in traffic had an increase in expenses much greater than its increase in revenue and asked what the government should do for a road facing receivership by reason of such a condition. Mr. Elmquist said he was not prepared to say now what should be done in such a case.

Mr. Elmquist said that discipline and morale had suffered under federal control and he thought the railroads would be able to control their expenses by greater efficiency.

Director General Hines said he would discuss the bill on the assumption that it is the disposition of Congress to give the Interstate Commerce Commission power to suspend rates initiated by the President and that the relations of the Railroad Administration with the Interstate Commerce Commission are so close and cordial that the change would have little, if any, direct significance. It would not embarrass the Railroad Administration or change its procedure in any practical way. Mr. Hines said in an informal way the commission has been very helpful in giving advice on important rate matters and he felt that the Railroad Administration now should not undertake any important change in the rate structure without its advice. He pointed out, however, that because of the feeling that rates should not be decided entirely by railroad men, C. A. Prouty, a former interstate commerce commissioner, had been appointed in charge of the Division of Public Service and that its concurrence was required on all rates proposed by the Division of Traffic. In case of a disagreement, the matter was submitted to the director general. Later Max Thelen had been appointed director of the Division of Public Service and his concurrence is required. Moreover, the representation of shippers on the various local traffic committees has been increased so that they are evenly balanced between shippers and railroad men. The bill, however, goes beyond what is needed to accomplish the desired purpose, Mr. Hines said, because it apparently abolishes the machinery contemplated by the federal control act by which intrastate rates initiated by the director general are filed with the Interstate Commerce Commission. If this plan is abolished, the procedure for initiating intrastate rates would be relegated to the former procedure under the various state laws, under some of which the railroads had no power to initiate rates. Unless this was the purpose of Congress, he thought the entire situation could be met by a simple amend-

ment of the federal control act to provide that any rate initiated by the President in accordance with its provisions might be suspended by the Interstate Commerce Commission for a specified time pending an investigation. He pointed out that the bill in its present form would make the President subject to the fifteenth section amendment of August, 1917, requiring the permission of the commission before a tariff containing an increased rate can be filed, and would also subject him to the amendment of 1910, by which all increases in rates made after that date were presumed to be prima facie unreasonable and the burden of the proof was put on the carrier. The Senate bill, Mr. Hines said, would re-enact that presumption against any increase by the President, although that presumption is no longer reasonable in view of the diminished purchasing power of the dollar. He thought there was no great difference of opinion as to the intrastate rates, but that the question is important because the United States government has assumed responsibility for the railroad situation. The question of railroad revenues, therefore, becomes one of national policy. This represents an emergency situation of very great seriousness because the railroads will not remain under federal control for a very considerable time and if the government is left helpless as to intrastate rates because of the different conclusions of different states in no way responsible for the general policy, it will be impossible to carry out the conception of the federal control act. Mr. Elmquist's suggestion that the Interstate Commerce Commission control led the situation by its power over discriminations, he dismissed as impracticable, because, he said, if the government is to establish a rate structure which will protect the situation it must be in a position to act promptly and it would take many months to thresh out the question of discrimination in the way suggested by Mr. Elmquist.

As to the provision for the payment of judgments, Mr. Hines pointed out that the provision of the bill as to causes arising since federal control is unnecessary, because it is now the settled policy of the Railroad Administration to pay such judgments regularly and without question, but as to causes arising before federal control, the government should not be subjected to the burden of assuming the debts of the railroads without question. While the bill provides that such judgments shall be paid from the money owing to the railroads, Mr. Hines pointed out that this offered no protection to the government because nearly every railroad owes the government more for capital expenditures than the government owes it and the power of the government to deduct from the railroads' compensation is limited by the provisions of the standard contract. Therefore, if the government uses what it can deduct to pay judgments, it diminishes by that amount what it could deduct for the debts of the railroads to the government. This would leave it to get its money back in the best way it can. Moreover, he thought the only reason for such a provision arose from a very few instances of confusion or delay during the early period of federal control, because he was not aware of a single case now where a judgment against a railroad company remains unpaid because of inability to attach its property. Some railroads are insolvent but, generally speaking, it is incorrect to assume that the judgment creditor is without recourse because most companies have assets not under the control of the federal government which may be located and attached. The Railroad Administration will give every reasonable assistance to the creditor in locating such assets.

Mr. Hines also pointed out that the Senate bill omits the words "or with any order of the President" in the provision of the federal control act that carriers shall be subject to all laws and liabilities as common carriers except such as may be inconsistent with the provision of the act or with any order of the President. He said that within the scope and purpose of the federal control act it is necessary that the President shall have the right to make reasonable orders which are necessary in connection with the policy of unification. In spite of many technical obligations on the individual railroads, and that if these words are eliminated all sorts of things done reasonably in connection with the unification would be brought into question. He thought most of the dissatisfaction against such orders grew out of the necessity for emergency action during the early part of the period of federal control and that the causes of discontent have now been generally eliminated.

Hearings on the fourth section bill were concluded on June 19 after a large number of witnesses had been heard for and against the bill. Most of those in favor of it were the representatives of the intermountain section.

Receiving the German Railway Equipment

THE IMPORTANCE of the provision of the armistice calling for the delivery of 5,000 locomotives, and 150,000 freight cars to the Allied armies is best realized when it is understood that today a large share of the railway equipment in use on the railways of Belgium and northern France is of German origin. Some of the better fast passenger trains are equipped with German cars and still have the German signs and instructions in them. From the American point of view the further interesting fact is that Americans were assigned to the work of receiving a share of this equipment, of inspecting it and of putting it in condition for service.

By the terms of the armistice, Germany was ordered to deliver 5,000 locomotives, and 150,000 cars not including 19,021 cars needed to make up the quota of the railways of Al-



"U. S. Official" Photo

The Americans Who Received the Equipment and the Germans Who Handed It Over

sace-Lorraine which had to be "handed over together with their pre-war material and personnel."

The actual work of receiving the equipment was put in the hands of two Interallied Commissions for the Reception of German Railway material, one at Brussels consisting of a British, a French and a Belgian delegate and the other at Metz consisting of a French officer, Lieutenant Colonel Bachellery, and an American, Major N. F. Brown, was formerly an assistant engineer in the construction department of the Pennsylvania Railroad who was selected by Brigadier General W. W. Atterbury, Director General of Transportation of the A. E. F. to head the American section.

The locomotives to be delivered were originally divided into

three catagories based on hauling capacity, but later this was changed to include five categories, based on classes and types as follows: 1,000 capable of hauling a train of 900 tons minimum on a one per cent grade; 1,000 able to haul 800 to 900 tons on a similar grade; 1,500 and 1,200 able to haul 650 to 750 tons, and 300 able to haul from 650 to 700 tons. In each case the number acceptable in each series of Belgian, French and German locomotive was specified as well as the proportion of engines that might be supplied without separate tenders. The cars were similarly divided into eight classes as follows: 70,000 gondolas; 20,000 flat; 10,200 miscellaneous; 1,000 tank; 35,500 box; 2,500 freight baggage; 10,000 passenger and 800 passenger baggage cars.

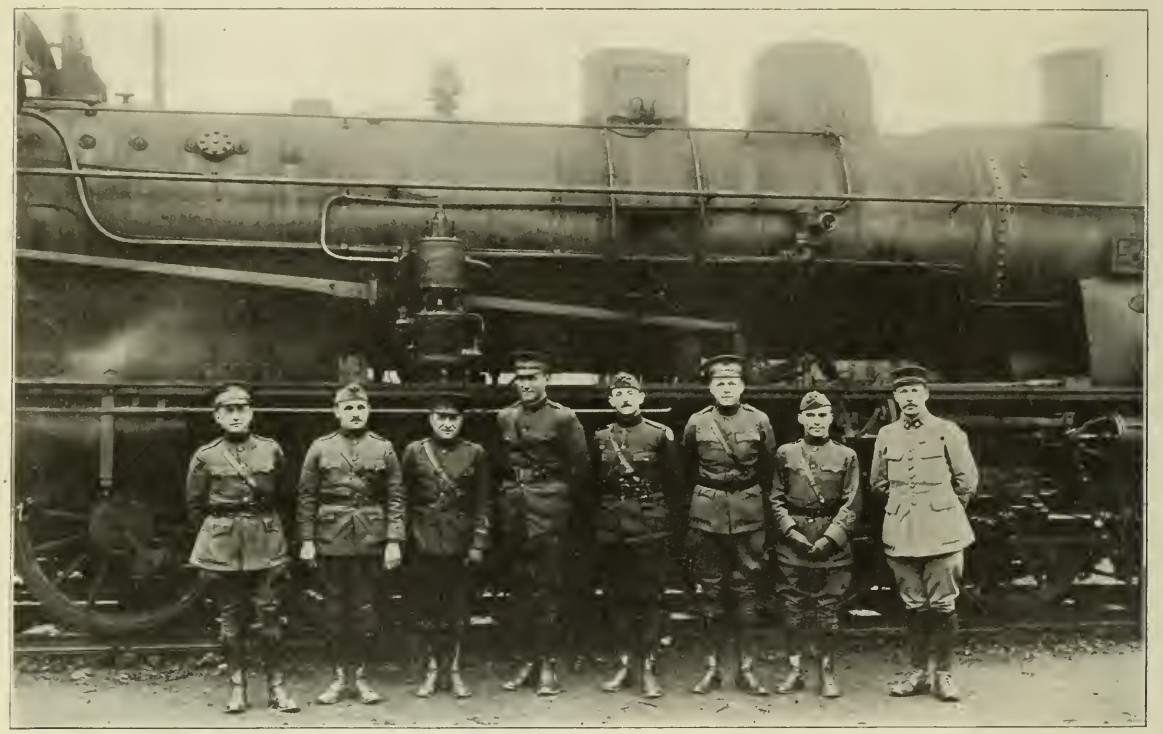
Of the total number of locomotives, half were to be delivered to each commission—the commission at Brussels receiving 1,300 for the British army, 600 for the Belgian and 600 for the French. The 2,500 delivered to the Metz commission were to be divided 500 for the A. E. F. and 2,000 for the French.

The Metz commission was originally supposed to receive 34,000 cars, which number was subsequently increased to approximately 40,000.

In the case of the locomotives delivered to the American Army the title was not to pass direct to the A. E. F., but the latter was to be given the use of the locomotives until such time as agreed upon. Great Britain had lost many of her imported locomotives in Flanders, also at Gouzecourt following the counter attack after the battle of Cambria in November, 1917. Belgium had lost heavily in engines during the invasion of her territory. Germany had also contrived to keep cars belonging to France in her country prior to the beginning of the war, and these, with what she subsequently destroyed and captured, made an immediate restitution to France imperative. Looked at in the broadest way the toll taken from Germany in cars and engines was, in the main, a replacement proposition, although of course, coming at such a time, the depriving her of this material had a retarding effect on a remobilization of her armies in case of an attempted renewal of hostilities.

The two commissions worked through a number of sub-commissions which handled the administrative work at the receiving stations—the Metz Commission having five French sub-commissions and two American, the latter being later combined to form a third.

One of the two American sub-commissions worked at Conflans. The other was at Audun Le Roman for a time and then moved its headquarters to Petange, in Luxembourg and when the two combined in January, moved the headquarters to Moselweiss near Coblentz.



The American Section of the Commission. From Left to Right: Major N. F. Brown; Major A. W. Byron, Assistant General Superintendent of Motive Power, A. E. F.; Captain V. Godshall; Captain W. G. Knight; Captain F. J. Snow; Lieutenant W. Smith; Lieutenant S. R. Harper; Adjutant Louis Loth

It is interesting to note that the Americans rejected more of the locomotives delivered to them than they accepted. Of a total of 8,383 cars inspected, the Americans accepted 6,717 and rejected 1,666; but of the 225 locomotives the Americans inspected, only 82 were accepted and 143 were rejected.

Each locomotive was to be delivered in good order with shovel, lanterns, hose, etc., and provision was made for the delivery of spare parts for repairs. An interesting story could be made of the details of inspecting and repairing the locomotives and cars for service, etc., but space does not permit.

It is not right, however, to omit some reference to the German personnel that was sent with the equipment. Each engine was delivered by two agents—the engineman and fire-

man. These agents not only delivered the locomotives to the receiving stations, but moved them to the interior of France to their ultimate destination. They were retained in the service of the French as long as considered necessary to take care of the traffic pending the re-establishment of normal conditions. The agents furnished to accompany locomotives destined to the American Army, remained with their engines until they delivered them to their ultimate destination, but were not retained in the American service, but were returned to Germany to bring over other locomotives.

During their stay within the Allied lines they were furnished protection, and guaranteed shelter and food at their expense. Their salaries, which were on the basis of those paid to them while in civil life, were charged to the service using them.

To insure their proper treatment and protection every agent was furnished with a passport printed in three languages.



The Personnel of the Inter-Allied Commission for the Reception of German Railroad Material at Metz. The Locomotive Is One of Engines Accepted and Has Already Received Its New U. S. A. Number

These passports were countersigned by the president of the sub-commission receiving and forwarding the locomotive. In addition to these passports each engineer was furnished with a travel order showing the station to which he was to move and the station to which he was to return after delivering his locomotive to the American service.

The *Railway Age* is indebted for the foregoing information to Major Norman Brown who since leaving the service, has become an assistant engineer (corporate) of the Pennsylvania Railroad and to Captain V. Godshall, formerly special agent of the accounting department of the Pennsylvania Railroad and since leaving military service, accountant in the corporate engineer's office of the Pennsylvania Railroad.

Reduction of damage to package freight is now the subject, on the Atchison Topeka & Santa Fe, of a campaign, conducted by special committee; and this committee gathers freight-house employees and gives them lectures. At Chicago it was shown that the loss and damage to freight shipments ten years ago amounted to 2 per cent of the gross freight revenues and by a campaign then carried on was reduced to 0.66 of 1 per cent; while in the past few years the percentage has steadily increased and at the present time is 2.12 per cent of the gross freight revenues. A comparison of the loss in freight during the first four months of 1919 with the same period of last year showed an excess of $350,000.

Standard Contracts Executed

THE Railroad Administration and the railroad companies up to June 23 had executed 83 standard compensation contracts providing for an annual compensation of $560,299,623 and three contracts providing for a lump sum payment of $129,734. The contracts cover 51 of the Class I roads and in many cases they include a number of subsidiaries. The total compensation covered by contracts compares with an estimate of $940,000,000 for all the roads under federal control. Most of the contracts with the larger roads which have not been signed are held up because of differences regarding the allocation of equipment or the matter of special compensation. The Railroad Administration has declined to sign a contract with a company until it has accepted the equipment allotted to it and many companies have not yet signed because they have claims pending for special compensation in addition to the standard return. The list of compensation contracts executed, which is in addition to a number of co-operative short line contracts which include no compensation is as follows:

Indentations indicate subsidiary parties to the one contract.
* Indicates Class I roads.
† Indicates contracts executed but not delivered.

	Compensation
Abilene & Southern Railway Company	$78,375
Alabama & Vicksburg Railroad	322,854
*Atchison, Topeka & Santa Fe	42,810,310
Grand Canyon Railroad	
Kansas & Southwestern Railroad	
Rio Grande, El Paso & Santa Fe	
*Gulf, Colorado & Santa Fe	
*Panhandle & Santa Fe	
Atlantic & Western Railroad Company	12,660
*Atlantic Coast Line Railroad	10,185,942
Washington & Van Demere	
Tampa Southern	
Augusta Southern Railway	22,587
†Baltimore, Chesapeake & Atlantic R. R. Co.	86,647
*Bangor & Aroostook Railroad	1,575,171
Van Buren Bridge Co.	
Bennettsville & Cheraw	29,077
Birmingham & Northwestern Railway	34,522
Brooklyn Eastern District Terminal	306,259
Buffalo Creek Railroad	409,397
*Buffalo, Rochester & Pittsburgh Railway	3,276,410
*Central New England Railway	1,468,123
*Central of Georgia Railroad	3,444,158
Wadley Southern	
Sylvania Central	
*Central Vermont Railway Company Central Vermont Transportation Company	835,402
*Charleston & Western Carolina Railway	466,921
*Chicago & North Western Railway Company	23,364,028
Missouri Valley & Blair Ry. & Bridge Co.	
Pierre & Fort Pierre Bridge & Ry. Co.	
Pierre, Rapid City & Northwestern	
Wolf River Valley	
Wyoming & Northwestern	

*Chicago, Rock Island & Gulf Railroad Company	3,390,679
Black Hill & Fort Pierre	
Deadwood Central	
Quincy, Omaha & Kansas City	
*Chicago Great Western Railroad Company	1,953,449
*Chicago, Milwaukee & St. Paul Railway Company	27,946,771
Tacoma Eastern Railroad Company	
Bellingham & Northern Railway Company	
Seattle, Port Angeles & Western Railway Co.	
Milwaukee Terminal Railway Company.	
Puget Sound & Willapa Harbor Railway Co.	
Gallatin Valley Railway Company	
Chicago Junction Railway	916,804
Chicago River & Indiana Railroad Company	108,525
*Chicago, St. Paul, Minneapolis & Omaha Ry.	4,934,789
*Cincinnati Northern Railroad	317,628
*Cleveland, Cincinnati, Chicago & St. Louis	9,945,738
Muncie Belt Railway	
*Colorado & Southern	2,833,573
*Wichita Valley	
Cumberland & Pennsylvania Railroad	255,692
*Detroit & Mackinac Railway Company	310,664
Detroit, Bay City & Western	85,967
Detroit Terminal Railroad	186,460
*Fort Worth & Denver City Railway Co.	1,891,386
Galveston Wharf Company	526,069
Georgia & Florida Railway	88,000
Georgia, Florida & Alabama Ry.	57,637
*Georgia Railroad	858,662
*Grand Rapids & Indiana	920,385
Green Bay & Western Railroad	331,954
Ahnapee & Western Railway Company	
Kewaunee, Green Bay & Western R. R. Co.	
*Great Northern Railway	28,771,360
Duluth & Superior Bridge	
Duluth Terminal	
Great Falls & Teton County	
Great Northern Equipment Company	
Great Northern Terminal	
Minneapolis Western	
Minneapolis Belt	
Montana Eastern	
Watertown & Sioux Falls	
Gulf, Texas & Western Railway (lump sum)	29,734
*Illinois Central	16,540,717
Chicago, Memphis & Gulf	
Dankeith & Dubuque Bridge	
Central Elevator & Warehouse Co.	
Mississippi Valley Corporation	
Indiana Harbor Belt	296,053
*Kansas City, Mexico & Orient Railroad	150,000
*The Kansas City, Mexico & Orient Ry. Co. of Texas	
Lake Erie & Eastern	127,081
*Lake Erie & Western	1,548,541
Leavenworth Terminal Railway & Bridge Co.	43,583
*Lehigh & Hudson River Railway	519,371
*Lehigh & New England Railroad Company	1,135,760
*Lehigh Valley Railroad	11,321,233
*Los Angeles & Salt Lake Railroad	3,414,751
*Louisville & Nashville Railroad	17,310,494
*Louisville, Henderson & St. Louis Ry.	343,915
Louisiana & Mississippi Railroad & Transfer Co.	41,689
Louisville & Wadley Railroad Company	5,367
Memphis, Dallas & Gulf Railroad	28,295
*Michigan Central Railroad	8,105,727
Chicago, Kalamazoo & Saginaw	
*Minnesota & International Railway Company	202,455
*Missouri & North Arkansas	175,000
*Nashville, Chattanooga & St. Louis Railroad	3,182,089
New England Steamship Company	1,050,753
The Hartford & New York Trans. Co.	
New Bedford, Martha's Vineyard & Nantucket Steamboat Company	
*New Orleans Great Northern Railroad Company	575,951
*New York Central Railroad	58,122,084
Kanawha & West Virginia	
Zanesville & Western	
*Kanawha & Michigan	
*Toledo & Ohio Central	
*New York, Ontario & Western	2,103,589
*Norfolk & Western Railway	20,540,899
New River, Holston & Western	
Tug River & Kentucky	
Virginia-Carolina Railway	
Williamson & Pond Creek	
*Northern Pacific Railway	30,130,068
Big Fork & International Falls	
Gilmore & Pittsburgh	
Ocean Steamship Company of Savannah	1,048,782
*Pennsylvania Lines (West)	15,154,719
Wheeling Terminal Ry.	
Cincinnati, Lebanon & Northern	
Ohio River & Western	
Manufacturers Railway	
*Pennsylvania Railroad	53,603,427
Baltimore & Sparrow's Point Railroad	
*Cumberland Valley	
*New York, Philadelphia & Norfolk	
Union Railroad Company of Baltimore	
Barnegat Railroad	
Philadelphia & Beach Haven	
Roselyn Connecting Railroad	
†Philadelphia & Camden Ferry	401,556
*Pittsburgh & Lake Erie Railroad	8,980,219
Port Huron Southern Railroad	11,025
*Richmond, Fredericksburg & Potomac	1,137,373
*Rutland Railroad	1,023,883
Salina Northern Railroad	15,000
St. Louis Merchants' Bridge Terminal Ry. Co.	412,427
*St. Joseph & Grand Island Ry. Co.	373,811
St. Paul Bridge & Terminal Railway Company	67,509
*Southern Pacific	47,559,988
*Arizona Eastern	
*Houston, Texas Central	
*Galveston, Harrisburg & San Antonio	
*Texas & New Orleans	
Houston & Shreveport	
*Houston East & West Texas	
*Morgan's Louisiana & Texas R. R. & S. S. Co.	
*Louisiana Western	
Lake Charles & Northern	
Iberia & Vermilion	
Terminal Railway Association of St. Louis	2,574,510
Trinity & Brazos Valley (lump sum)	100,000
Trans-Mississippi Terminal Railroad Company	665,391
Union Freight Railroad Company	32,009
*Union Pacific Railroad	38,416,110
*Oregon Short Line	
*Oregon & Washington Railway & Nav. Co.	
Des Schutes Railway	
Green River Water Company	
Rattlesnake Water Company	
Union Pacific Water Company	
*Washington Southern	468,432
*Western Railway of Alabama	488,237
Wrightsville & Tennille Railroad Company	41,027
Winston-Salem Southbound Railway	260,251
Wiggins Ferry Company	416,675
East St. Louis Connecting	
St. Louis Transfer	
*Vazoo & Mississippi Valley	3,862,317
51 Class I Roads	
89 Contracts with total annual compensation	560,299,623
3 Contracts with lump sum of	129,734

Preventing Deterioration by the Proper Use of Paint

By J. W. Gibbons

General Foreman Locomotive Painter, Atchison, Topeka & Santa Fe

ONE OF THE MOST FERTILE fields for saving in the railroad industry has been practically ignored by the officers of the roads; that is the preservation of the property by painting. This statement is not made in a spirit of criticism for the same mistake has been made by the public in general. Railroad officers have disregarded the savings that could be effected by giving more attention to painting, not because they are indifferent to promoting economy, but because their training and education have been along other lines. Professor H. H. King of Kansas State Agricultural College has made a study of this particular question and recently stated that the lack of paint protection causes a greater annual loss through deterioration than the aggregate fire loss for the same period. The truth of this statement cannot be questioned, yet the prevention of a property loss by protection against fire receives much more attention than the prevention of deterioration by painting. The railroads employ men especially trained in fire protection methods to travel over the line constantly watching conditions and suggesting improvements. In every shop and terminal there is a fire chief whose word is law in all things pertaining to his department. Why not give the foreman in charge of the paint department some voice in the protection of equipment, since the lack of protective measures is causing a greater loss than fire?

Some will say that the railroads of this country expend hundreds of thousands of dollars each year for paint protection. However, careful observation will disclose the fact that painting is generally done because of the ornamental effect, the prevention of loss through deterioration being given secondary consideration or entirely disregarded. These two objects should not be separated. One should be incidental to the other, but preservation should be the controlling factor.

It is easy to find examples of the use of paint to secure ornamental effects while no thought is given to the preservation of material by its use. Not long ago while riding on the observation platform the conversation turned to the subject of the protection by painting, and I was able to point out object after object that was corroding for want of such attention. One striking example was found in the general store building which was a frame structure with a shingle roof. The entire building was well painted in attractive colors, the roof being a bright red, but the outside sheds made of corrugated iron were badly corroded having never

been painted. There was paint enough on the shingle roof where it was of no value to have covered all the corrugated iron buildings.

What is the remedy for the condition that prevails? It is not because of ignorance that such practices exist on railroads, but rather because those who realize the trouble have not the authority to correct it, due to the division of authority. The Master Car and Locomotive Painters' Association has made experiments which prove conclusively that heat treated or processed linseed oil will give greater protection against moisture and the action of sulphuric and other acids commonly found in railroad operation than raw linseed oil. This was publicly demonstrated at the convention of the association and the results have been confirmed by independent investigation. Nevertheless, the standard paint vehicle is still raw linseed oil, the reason being that the chemist cannot analyze or determine the purity of the heat treated or processed linseed oil. The objection is raised that under these conditions there is an opportunity for the substitution of cheap materials. Why not disregard the composition so long as the paint mixed with processed linseed oil gives the best protection?

Similar conditions exist in regard to varnish. Chemists cannot determine the exact nature of the oil used in the manufacture of varnish, but this, the most expensive material used in the railroad paint department, is commonly purchased upon service tests and the reputation of the manufacturer for maintaining quality. Even this last is not necessary for a competent master painter can determine in a very short time the quality of paint or varnish by the film test. The proper means for correcting the great loss by deterioration is to give the master painters the recognition they deserve. The railroads hire painters but seldom take their advice. If this were done deterioration could be minimized without spending any more money for paint materials than has been done in the past.

Prouty Proposes Plan for Adequate Revenues

Revenue Situation at the Base of the Whole Problem. Roads Should Be Returned on December 31

Charles A. Prouty, former member of the Interstate Commerce Commission and now Director of the Division of Accounting of the Railroad Administration, who some time ago advocated a continuation of the experiment of government operation of railroads, has recently addressed a letter to a number of Congressmen and railroad men, declaring that the railroads should be returned to their owners on December 31 but that the government should retain a certain degree of control for another year while the financial relations between the railroads and the government are being adjusted. He estimated that the deficit for this year, if the first three months be taken as an index, will be $500,000,000 to $800,000,000. He also suggests some ideas for the future regulation of the carriers, in part as follows:

"The problem is to devise some method by which under private ownership rates shall be established which will yield to the carriers a sufficient revenue without imposing upon the public an unjust burden. Moreover, that plan must be such as can be adapted to the present exigency. As a contribution to the general discussion the following suggestions are made:

I. The Making of Rates

"Rates to be fixed by the Interstate Commerce Commission. Such rates to be absolute, with no right upon the part of the carrier to vary up or down.

"State rates to be fixed by the I. C. C. in collaboration with the state commission, or perhaps by the state commission, with the right of appeal to the I. C. C.

"The I. C. C. shall have power to fix divisions and also to approve agreements for the routing of traffic and the division of earnings from competitive traffic, but not until after full hearing upon notice to all interested parties, including the general public.

"The right to initiate rates, supervised as it is by the I. C. C., has been for the last five years of no advantage to the carrier. No advance in rates has been made which could not have been secured by an application to the Commission for a change in the rate.

"The right to reduce the rate without leave of the commission has not benefited the public, but has in the main proved a sort of vicious discrimination and disorganization.

"It is said that the commission could not make the railway rates of this country; and it could not with its present organization. With a proper organization it could make and publish those rates at a tithe of the expense under which the carriers now rest in that behalf. Still further, the rates so established would gradually assume a much more coherent, consistent, and permanent shape than they now have, to the immense advantage of the shipping public. As director of accounting I have charge of overcharge claims, and am satisfied that nineteen-twentieths of the undercharges and overcharges which so vex the shipper and which are so troublesome to the carrier, result from the complexities of our rate structures and the manner of the publication of our tariffs. All this might readily be removed if the commission itself made and published the rate.

"While the intrastate rate presents many difficulties in the solution, they are not at all insuperable. If some plan of actual co-operation can be put into effect they will disappear.

"The commission should have power to fix the divisions of a joint rate when the carriers themselves do not agree, thereby justly distributing the charge for the entire service among those carriers which participate in that service.

"In many cases competition might well be restrained with advantage to the carrier and without detriment to the public. To this end carriers should be permitted to enter into arrangements for the routing and division of traffic, or for the division of the earnings from competitive traffic. Such arrangements should only be permitted with the approval of the commission and upon conditions fixed by it.

II. The Basis for Such Rates

"The railroads should be self-supporting. To this end Congress should instruct the I. C. C. to establish such reasonable rates as will yield a fair return upon the value for rate-making purposes which it establishes.

"The amount of this return ought not to be prescribed. In the nature of things it cannot be the same upon the value of all carriers. To establish rates which would yield a given return (say, 6 per cent) upon the value of the most unfortunate carrier, would exact from the public too high transportation charges, while upon the other hand, to maintain rates so low as to yield only an adequate return upon the value of the most fortunate carrier would be extremely

unjust to its less favored competitors. The rates should produce an adequate return upon the average value affected by them.

"The value upon which this return should be allowed is that value which the commission is now fixing under the valuation act of 1913. Until now it has wisely refused to place a value upon any property until it could know from the facts before it what the result would be of applying the methods and principles adopted by it to the railroads of the entire country. Within the next two and one-half years it should have named the rate-making value of every considerable railroad property in the United States.

III. Disposal of Net Income from Operation

"Congress should provide that no carrier shall pay to its security holders out of its net operating income in any year more than a certain per cent upon the rate-making value fixed by the commission. The balance of its earnings should be distributed in the manner to be determined by Congress.

"All carriers in a given section must charge substantially the same rate. In the first place, many, and perhaps most, of these rates are directly or indirectly competitive and a carrier charging a higher rate would lose the business. But, in addition to that, there is a relation between communities within a given section which requires that a uniform scale of rates be maintained if serious discrimination is to be avoided. This means, of course, that one railroad will make a much larger net income than another, and perhaps the most difficult part of this whole problem is to find some way in which the weak road can be sustained without undue profit to the strong road.

"This can in a measure be accomplished by permitting the strong road to retain a sufficient amount to pay a fair return upon its value and by disposing of the balance in such a way as to encourage the carrier to secure the highest possible efficiency in operation and at the same time fairly protect the interest of the public. My own thought has been that this would be best accomplished under the following plan:

"The carrier should be allowed to pay to the owners of its securities which represent its carrier property, say, six per cent upon its rate-making value as determined by the commission. A few years ago this might have been too much; today less would be hardly fair. This would probably enable the carrier in the immediate future whose property was represented half by bonds and half by stock to pay a dividend upon its stock of at least 7 per cent.

"What remained over and above this in any year should be used for three purposes:

"(a) A certain amount, probably 2 per cent or 3 per cent upon the rate-making value, should be invested in the property itself, but upon condition that the amount of this investment shall not be made the basis of a claim for additional rates. There is in every railroad property, if the experience of the past be an index to the future, an invisible loss and a functional depreciation which cannot be taken care of in any other way. A reasonable rate should provide for this, just as much as for an adequate return to security holders.

"(b) In some way a guarantee must be provided for the payment of future interest and dividends. There will of necessity be lean years and fat years and the one should be made to offset the other. Rates cannot properly be varied every time the business increases or declines with a corresponding effect upon net returns. This guarantee fund should not be invested in the property, but should be held in the form of some quick asset.

"(c) Any balance remaining should be divided between the railway and the public, the public taking more as the amount increases; as, for example, the first 2 per cent to be divided equally, the next 3 per cent one to the carrier and two to the government, any additional amount one to the carrier and four to the government.

"Anything accumulated from this source by the government might be devoted in some form to the assistance of the weaker roads.

"Assuming that this scheme might be a workable one if the roads were once more in the possession of their owners, what steps should be taken to restore them and put in effect this plan?

"1. Government operation should continue as it is until January 1. Within that time the commission will be able to judge something of the future and to determine what changes, if any, in rates may be necessary.

"2. December 31, 1919, existing contracts should terminate and the properties be returned to the operation of their owners. The government should guarantee for one year a return equal to 75 per cent of the contract compensation in all cases where the contracts have been executed, and the carrier should be required to pay over to the government in all such cases 75 per cent of any excess which it may make over and above the contract compensation. If there is no contract there should be no guarantee and no payment.

"3. The government should retain for one year from January 1 a certain measure of control for certain purposes.

"Settlements must be made with the carriers, and to that end the government must have the right to call upon them for certain assistance and information.

"In restoring these properties there will be many adjustments as to the use of terminals, the joint use of equipment, etc., as to which the government must have power to act to avoid inconvenience to the public and due equity between the carriers.

"If the government is to guarantee a net income in any amount, it must have a certain supervisory power over the expenditures for maintainance of way and equipment.

"I also feel that it will be found necessary during this first year, while the financial status of these carriers is becoming re-established, so to speak, for the government to assist in the financing of improvements, including the purchase of equipment. This, however, ought not to involve any loss upon the part of the government.

"These suggestions do not profess to cover all the legislation which ought to be enacted at the present time. There is no mention of the supervision of securities, which certainly must be undertaken in some way by the federal government.

"Nothing is said as to control by the government of construction, maintenance and operation. While carriers should be left as free as possible in these respects, there are instances when the safety and convenience of the public must be protected. I have always myself believed that these matters could be best dealt with through some executive branch rather than by the commission.

"Another important subject not referred to is the consolidation of railroad properties. Today our railroads are, under government operation, consolidated into a single system, and the public is dissatisfied because there is no competition. To the extent that consolidation is permitted under private ownership, competition and the benefits of competition must disappear. There are, however, undoubtedly many instances where combination would result in economy of operation without injury to the service. Something should probably be done in this direction.

"Only the revenue situation, which really lies at the base of the whole problem, is covered here. The government must establish the rate, that is, the measure of compensation, while the private individual must furnish the service. Whether our system of transportation can be satisfactorily developed upon that theory is extremely doubtful, but it seems likely that some plan of the sort suggested will come as near meeting the difficulty as any."

General News Department

Brigadier General W. W. Atterbury, vice-president of the Pennsylvania Railroad, is now doctor of laws, that degree having been conferred upon him by the University of Pennsylvania.

Repeal of the daylight saving law, effective with the setting back of the clocks in October, has now been voted by both the House and the Senate and the bills are now in conference.

An appropriation of $2,500,000 for carrying on the railroad valuation being made by the Interstate Commerce Commission is provided in the sundry civil bill as passed by the House of Representatives.

The Veteran Employees' Association of the Middle Division of the Pennsylvania Railroad held its 23rd annual meeting and banquet at Harrisburg on June 19. J. C. Johnson, superintendent of the division, was elected president of the association for the ensuing year.

The American Association of Freight Agents, at a meeting held at Cleveland, Ohio, on June 17 and 18 authorized the executive committee of the Association to make application to the American Railroad Association for membership in that organization as a division of the Operating Section.

The Railway Mail Association at its 24th annual convention at St. Louis, Mo., June 17, 18, 19 and 20 discussed as paramount issues the establishment of a pension system whereby civil service employees of the government could be retired on a pension of $50 a month after 30 years service and the authorization of a Board of Appeal for postal employees.

The American Train Despatchers' Association held its annual convention at Chicago on June 17, 18, 19 and 20. Among those who addressed the delegates were James Davis, member of the War Industries Board, W. S. Stone, president of the Brotherhood of Locomotive Engineers, and A. B. Garretson, president of the Order of Railroad Conductors.

The Traffic Bureau of the New Orleans Association of Commerce has requested the Director General to have the headquarters of the New Orleans & Great Northern returned to New Orleans from Hattiesburg, Miss., in order that New Orleans merchants may have a greater opportunity to meet the requirements of the road in the matter of supplies.

The Brotherhood of Railway Express Employees held its first annual convention, opened at Chicago on June 23. Addison Bollinger, supreme president of the organization, urged the election of a committee to go to Washington to apply for a further increase in wages and also recommend the adoption by the brotherhood of a demand for a uniform wage scale in cities of the same size.

"Hunting Jack Rabbits with a Locomotive" is the title of an interesting pamphlet recently issued by George Bradshaw, supervisor of safety of the Pere Marquette and other Michigan railroads. He shows the similarity of action between jackrabbits, on the plains of western Canada, who race in front of trains, and trainmen and yard men who act in a similar manner while at work, to the detriment of the safety first movement.

The Brotherhood of Locomotive Firemen and Enginemen is holding its convention at Denver, Colo. Among those who have addressed the convention is Director General Walker D. Hines; also W. S. Stone, president of the Brotherhood of Locomotive Engineers, and other labor organization heads. J. F. McNamee, editor of the Brotherhood magazine was endorsed for a position on the Interstate Commerce Commission. An appropriation was voted to the Commercial Telegraphers' Union of America to sustain the members of that organization during the present strike.

The Trans-Siberian Railway

The President has agreed to advance $5,000,000, as the share of the United States in a fund of $20,000,000 contributed equally by Great Britain, France, Japan and the United States, for the relief of the Trans-Siberian Railway.

Five Years Wandering in the Wilderness

Pacific Electric box car 2586, which left the builders, American Car & Foundry Company, St. Louis, Mo., December, 1913, arrived on home rails (first appearance) May 18, 1919. It had made seventeen trips between the Middle West and Eastern States, three between Atlantic and Pacific ports, one trip between Colorado and Eastern states and two trips between Eastern states and Texas. On one road it stayed 108 days; another it visited nine times in one month. This is the last to arrive of ninety box cars bought in 1913.—Pacific Electric Magazine.

Improved Claim-Department Record

In fulfilling a promise made to shippers during the war that every effort would be made to dispose of outstanding claims as fast as competent help could be secured, the number of unsettled claims on hand in the Claim Departments of class 1 railroads in the Northwestern region has steadily decreased due to the re-employment of experienced clerks who have returned from service in the army and navy. The number of unsettled claims on hand February of this year totaled 150,019, which was decreased in March to 136,145, in April to 124,792 and in May to 113,443.

Automobiles on Crossings

During the first four months of the calendar year the records of the Southern Pacific show that of the 151 grade crossing accidents involving automobiles, 20 were cases where automobiles stalled on the crossing and were struck by trains; 68 automobiles attempted to cross in front of trains, 36 ran into the side of trains, 16 ran into and broke down crossing gates lowered to protect them, one skidded into the side of a car, one ran down and injured a crossing flagman, four ran into signal posts, and five accidents were unclassified. Nine deaths and 45 injuries resulted. This information, accompanied by a statement of what the railroads are doing to avoid crossing accidents, has been sent to the press by the Southern Pacific News Bureau.

Railway Executives

A. H. Harris, vice-president of the New York Central Lines, has retired from the standing committee of the Association of Railway Executives, and A. H. Smith, president of the New York Central, has been elected in his place. At a meeting held June 19 questions of accounting under the railroad contract were discussed. J. A. Taylor, chairman of the railroad corporate accounting conference, and G. A. Harwood, chairman of the Association of Railroad Corporate Engineers, were present by invitation. A conference was also held with a committee representing the American Short Line Railroad Association. The Short Line Committee was composed of Bird M. Robinson, chairman, and Ben B. Cain, L. S. Cass, F. J. Lisman, W. B. Dobson, H. B. Stewart and C. W. Pidcock.

REVENUES AND EXPENSES OF RAILWAYS

FOUR MONTHS OF CALENDAR YEAR, 1919—CONCLUDED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.)	Maintenance of—Way and structures.	Maintenance of—Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.			
St. Louis, Brownsville & Mex	548	1,042,352	448,684	1,583,178	256,775	276,809	19,557	499,843	64,337	1,117,321	70.57	465,857	40,000	425,721	33,460
St. Louis Merchants Bridge Terminal	9	.....	3,033	861,792	220,957	219,806	3,044	703,674	24,552	1,172,033	135.99	—310,242	32,000	—342,242	—381,080
St. Louis-San Fran	4,761	15,693,831	6,449,903	23,370,322	4,225,924	5,108,275	190,250	9,378,877	712,761	19,501,276	83.44	3,869,045	941,782	2,916,598	230,679
St. Louis, San Fran. & Texas	134	336,523	46,081	412,689	89,232	85,151	5,137	268,251	24,218	472,589	114.51	—59,900	5,756	—65,716	—236,752
St. L. Southwestern	939	3,211,308	628,590	3,998,854	908,623	953,775	68,279	1,288,305	151,952	3,403,355	85.11	595,499	155,949	438,356	—1,326,468
St. Louis, Southwestern Ry. of Texas	814	1,309,573	424,454	1,856,896	568,739	730,774	26,263	937,301	95,837	2,353,152	126.72	—496,256	84,000	—580,374	—735,014
San Anto. & Aransas Pass	732	870,297	321,117	1,280,675	380,500	428,376	23,975	725,518	72,899	1,629,093	127.20	—348,418	60,000	—409,267	—540,990
Seaboard Air Line	3,565	8,527,206	3,993,427	13,766,771	2,101,591	3,043,866	245,919	6,572,086	418,068	12,493,375	90.75	1,273,396	540,000	731,166	—1,221,061
St. Louis Transfer	6	.....	.....	320,393	43,213	65,806	825	174,502	8,410	292,755	91.37	27,638	400	27,238	—13,011
South Buffalo	11	157,338	.....	444,133	22,112	66,337	1,144	230,631	6,839	327,064	73.64	117,070	10,200	106,870	334
Southern Ry.	6,982	24,573,284	11,540,984	39,214,317	6,615,543	10,089,414	486,055	17,383,104	1,074,644	35,918,944	91.60	3,295,373	1,286,496	1,981,308	—7,440,240
Southern Ry. in Mississippi	278	321,848	190,700	551,464	157,937	88,553	8,822	304,163	17,068	576,539	104.54	—25,075	36,000	—61,210	—111,290
Southern Pacific	7,049	32,626,068	12,664,603	48,931,943	9,244,330	10,587,329	433,479	19,789,701	1,156,115	42,085,164	86.01	6,846,779	2,461,025	4,372,908	—4,002,838
Spokane International Ry.	156	214,565	58,452	280,766	54,576	29,530	6,351	108,999	17,281	215,944	76.91	64,822	19,969	44,852	—48,252
Southern Pacific Steamship Lines	.....	3,257,668	166,998	3,601,265	41,158	694,327	45,297	2,686,845	94,089	3,561,716	98.90	39,549	45,901	—6,352	—71,894
Spokane Portland & Seattle	554	1,591,413	466,974	2,227,347	482,908	384,922	24,346	788,834	76,737	1,763,563	79.17	463,783	236,800	226,822	—660,781
Staten Island Rapid Transit	25	306,491	259,816	660,535	93,060	98,419	3,754	371,931	36,016	603,181	91.32	57,354	44,000	13,311	109,121
Tennessee Central	293	645,037	172,565	874,058	351,742	235,203	12,028	396,374	26,376	1,021,722	116.89	—147,664	20,540	—168,308	—231,979
Terminal R. R. Assn. of St. L.	36	.....	13,102	1,171,534	289,155	283,240	3,292	585,043	25,251	1,199,735	102.41	—28,211	113,000	—141,212	—269,219
Texarkana & Ft. Smith	87	335,607	64,387	436,887	84,831	87,815	3,016	201,071	13,132	385,562	88.25	51,325	27,143	24,148	—101,247
Texas & New Orleans	469	1,604,737	645,910	2,411,342	491,678	756,827	21,020	926,438	57,962	2,320,604	96.23	90,739	84,343	3,596	—624,697
Texas & Pacific	1,946	7,169,990	2,720,037	10,400,301	1,815,145	2,281,797	102,401	5,346,693	289,110	9,914,575	95.32	485,726	339,882	144,955	—1,480,346
Toledo & Ohio Central	435	1,943,487	255,757	2,306,615	478,485	826,712	24,269	1,070,454	63,706	2,472,143	107.18	—165,528	126,561	—292,124	—173,322
Toledo, Peoria & Western	247	314,282	188,976	525,872	107,859	159,729	8,956	255,754	23,570	553,682	105.28	—27,811	34,000	—61,811	—21,116
Toledo, St. L. & Western	454	2,049,808	109,169	2,256,714	374,566	517,177	20,925	946,817	47,140	1,906,621	84.48	350,093	104,000	245,989	—131,419
Trinity & Brazos Valley	368	311,748	73,390	405,108	156,789	169,032	6,619	233,936	29,692	596,068	147.13	—190,960	20,859	—213,888	—136,806
Ulster & Delaware	128	171,073	45,872	288,827	39,473	75,750	5,012	244,152	18,709	385,317	133.41	—96,490	19,200	—115,743	—85,198
Union R. R.	35	.....	.....	2,382,459	220,514	634,452	1,026	1,260,160	29,949	2,144,987	90.03	237,472	25,712	211,760	—678,326
Union Pacific	3,614	24,102,018	6,284,561	32,782,686	5,044,787	6,142,527	184,575	9,949,513	898,934	22,947,662	69.99	9,836,024	776,844	9,056,096	1,867,481
Utah Ry.	98	348,560	1,919	355,200	37,972	90,421	988	74,084	7,923	211,388	59.51	143,812	16,298	127,513	—71,905
Vicksburg, Shreveport & Pacific	171	662,676	288,422	1,028,271	192,036	224,037	11,068	402,629	31,827	869,534	84.56	158,736	37,667	120,832	—117,565
Virginian Ry.	499	2,426,617	205,234	2,922,215	602,903	924,325	19,044	1,317,725	60,435	2,910,473	99.59	11,742	146,900	—135,165	—754,643
Wabash	2,519	10,727,993	2,799,153	14,449,065	2,043,974	2,885,489	205,523	7,976,868	434,768	13,622,489	94.27	826,576	428,090	397,866	—503,541
Washington Southern	35	526,368	793,657	1,470,576	147,335	154,174	10,817	477,923	25,528	832,895	56.63	637,681	26,704	610,954	256,890
West Jersey & Seashore	361	1,075,200	1,705,233	3,020,359	734,849	671,084	30,306	1,842,387	85,338	3,383,076	112.01	—362,717	171,793	—534,927	187,278
Wichita Falls & N. W.	328	410,769	135,161	574,664	191,575	102,623	5,084	322,097	28,746	650,125	113.13	—75,461	36,838	—112,413	—15,539
Western Maryland	707	3,707,667	304,372	4,378,020	880,864	1,524,592	73,991	2,611,753	165,884	4,699,269	107.34	—321,249	172,800	—494,049	—479,263
Western Pacific	1,011	2,633,250	424,581	3,191,942	951,084	715,456	43,112	1,216,233	89,575	3,074,816	96.33	117,125	182,257	—65,423	—907,723
Western Ry. of Alabama	133	507,805	317,424	885,329	106,476	189,664	11,309	336,092	25,378	682,186	77.05	203,143	30,000	173,141	—34,441
Wheeling & Lake Erie	511	2,561,942	198,097	3,046,637	709,338	893,500	25,225	1,472,575	100,279	3,209,684	105.35	—163,047	218,800	—382,446	—521,284
Yazoo & Miss.	1,382	5,309,837	1,709,268	7,836,040	1,282,737	1,632,210	59,896	3,042,346	200,051	6,083,467	77.63	1,252,573	272,666	979,454	—733,978

Wires to Be Returned to Owners

Both Houses of Congress have passed bills for the return of the telegraph and telephone lines of the country to their owners. The Senate acted first and its bill provides that existing rates shall be continued for a period of 90 days and that the return shall be "forthwith" upon the approval of the act by the President. The House bill would extend the existing rates for six months and provides that the return shall be within 30 days, and so timed as to complete a full calendar month for accounting purposes. The conferees have adopted the House plan for the date of the return, but adopted a provision that telephone rates shall remain effective for four months unless sooner changed by State authority.

Winnipeg Strike

After much rioting and the declaration of martial law, conditions at Winnipeg are again quiet and the soldiers called to police the city have been withdrawn. Rioting began on June 21, thousands of strikers being engaged. Conflicts ensued with the provincial police and one man was killed and many injured.

The strike of a number of firemen, switchmen and enginemen in sympathy with the general strike badly crippled freight yard service at Winnipeg last week although passenger service was maintained without serious interruption. The places of these men were rapidly filled, however, and the sympathetic strike, insofar as the railway workers are concerned, lost much of its force.

A New Federation?*

"The trend of thought today in labor organization seems to favor government ownership and operation of the railroads. I am not so sure this attitude is the correct one, as it was never intended by the founders of this government that it should be paternalistic. I believe that the government should give the workers the full opportunity of using the complete machinery of labor organizations in accomplishing a desired end, and rather than, to, through some idealistic notion, hold out as bait things that are known to be impossible. Through the unhampered use of these organizations, men will be able to see to it that equitable rates of wages are paid, sanitary and healthy working conditions obtained, that the eight-hour day should prevail, and such other conditions be made that the worker, whether on a railroad or wherever he may be, has the proper and necessary opportunities for rest and recreation. Not all these things are feasible under government administration. Simply having a desire for a certain condition or wanting it is not sufficient to obtain it. You must formulate some plan for your betterment, and then you must put that plan into effect. Just what such a plan may be, is not within my province to point out. Behooves you to "keep a clear track" of the many palliatives that are now being offered and promised, none of which are guaranteed, even under government administration. All that you attain and obtain must be brought about by your own and the combined efforts of your fellow workers, and with the co-operation of those only who have the interest of the worker at heart, and not those or those things now brought forward to blind issues in order that a select few may benefit by political preferment because of having trotted out some will-of-the-wisp.

Railroad managers and operators in the years gone by have taken advantage of the vast store of knowledge possessed by the members of the four big railroad brotherhoods and sought their co-operation for the benefit of both parties and much was accomplished by this co-operation. Greater efficiency can be obtained and better conditions and pay-rates can be effected if all railroad employees' organizations will work hand in hand along these lines. For some time back, our committees have been meeting with a great deal of opposition in Washington; just what or who may be back of all this undercurrent of opposition I am unable to say, but this I do know, that the time has come when we should get together the various units or organizations in railroad service now outside of the American Federation of Labor and bring about a federation strictly for railroad men, and I was authorized by my convention to go about arranging for a meeting of the chief executives or representatives of these various organizations. I have interviewed the representatives of a dozen different organizations, all of whom have expressed their desire to attend such a conference, and I have, therefore, called this meeting in Washington at the Continental Hotel for Monday, June 30.

*Extract from address delivered by President of the Order of Railroad Station Agents E. M. Morton at the American Train Despatchers' Convention, Chicago, June 18, 1919.

Efficient Airplane Mail Service

Second Assistant Postmaster General Otto Praeger reports that 58 consecutive trips of 325 miles each have been made by airplanes between Chicago and Cleveland without delays, without forced landings and without engine trouble of any sort. These flights have been made in weather which a short time ago would have been regarded prohibitive. Each day, each way, the "ships" carried 400 pounds of letter mail. As letters range from 40 to 45 to the pound, this means that 16,000 were transported on each trip.

Notwithstanding the inclement weather, the postal planes maintained an average speed of 98.5 miles an hour. On one occasion, when a squall prevailed throughout the Lake region, and was so severe as to paralyze shipping in Chicago harbor, the mail plane reached Chicago on time and made a perfect landing.

Twelve L. W. F. De Haviland planes are in the Cleveland service, four being stationed at each terminal and four at Bryan.

Henceforth, the mail planes will leave Chicago for the east at 2:30 p. m. It was found that 151 business concerns sent special messengers to the railroad stations each day (12:30 p. m.) to catch the two fast mail trains to the Atlantic seaboard. The 2:30 airplane service is expected thus to save much time. Mr. Praeger says that satisfactory operation of the air mail between Cleveland and Chicago has been the means of relieving rail congestion, and one distributing car each way each day has been cut from that division. Experiments are now being carried on looking toward the delivery and taking aboard of mail bags while the airplane is in flight. Another interesting development is the construction of fireproof walls between the mail compartment and the engine and the compartment and the gas tank.

As a result of protests registered at Washington by dealers and by the Minnesota Railroad & Warehouse Commission, proposed increases of 30 cents a ton in the freight rate on Illinois coal shipped to Minnesota points have been submitted by the Railroad Administration to the Interstate Commerce Commission for advice.



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One of General Haller's Polish Army Trains on Its Way Through Germany

Traffic News

L. D. Knowles, division freight agent of the Missouri Pacific at Kansas City, Mo., has resigned to become traffic manager of the H. & H. Refining Company at Kansas City.

H. D. Driscoll, secretary-manager of the Waco (Tex.) Chamber of Commerce for the past three years, has resigned to become manager of the Oklahoma Traffic Association at Oklahoma City, Okla.

D. R. Lincoln has resigned as chairman of the Kansas City, Mo., District Freight Traffic Committee and has been succeeded by J. R. Koontz, a member of the committee. F. J. Shubert has been appointed a member of the committee to succeed Mr. Koontz.

National Industrial Traffic League

The National Industrial Traffic League held a special meeting at Milwaukee, Wis., on June 11, 12 and 13, at which committee reports, held over from the New Orleans meeting of the league last March, were disposed of. The reports of the executive committee stated that since the New Orleans meeting the special committee and the executive committee had endorsed the recommendations *submitted by President Freer* with respect to railroad legislation. S. Davies Warfield, president of the National Association of Owners of Railroad Securities, and Max Thelen, director of the Division of Public Service, United States Railroad Administration, spoke at the dinner on the second night of the meeting. Mr. Warfield expounded his plan for solving the railroad problem and Mr. Thelen spoke on the Railroad Administration's side of matters interesting to members of the league.

The recommendations relative to remedial legislation oppose the extension of the period of government operation, but counsel due regard to the interests of the public, including investors in railroad securities. Pending the return of the railroads to corporate control it is recommended that section 10 of the Act of March 21, 1918, be amended to provide that during the continuance of government operation, present rates shall remain in effect until changed by the Interstate Commerce Commission. After return to corporate operation jurisdiction over rates, to be the same as prior to March 21, 1918. For the future the recommendations include repeal of anti-trust and anti-pooling legislation, as affecting railroads, and the encouragement of co-operative activities among common carriers. If pooling of traffic is permitted it should be under the approval of the Commission. The shipper should not be deprived of the right to route his freight. The Commission should have authority to prescribe minimum rates to regulate the issuance of railroad securities, including supervision of the expenditures of the proceeds to require extensions and additional facilities and to exercise general supervision over service, operation and maintenance. It should co-operate with State Commissions, and it should control interchange of traffic between rail and water carriers, establish joint routes and rates and the divisions of rates.

The League does not favor continuance of the law of August 9, 1917, which requires that tariffs be approved by the Commission before filing. Rates should be initiated by the carriers, subject to a suspension, as under Sec. 15; but the Commission should prescribe publicity by the carrier of contemplated rate changes, and provide for conference between the carriers and the interested public before tariffs are filed.

The League earnestly insists that federal regulation of common carriers be vested in the Interstate Commerce Commission exclusively, does not advocate regional commissions, believing that the Commission now has ample power to establish branch offices. As to intra-state commerce, no legislation is recommended; it is believed that, with the clarifying of the situation as the result of the Shreveport and other cases, the Interstate Commerce Commission can work out plans under which conflicts between federal and state regulation will largely disappear.

Commission and Court News

Interstate Commerce Commission

The commission has denied petitions of the director general of railroads and the Atchison, Topeka & Santa Fe for a rehearing in connection with its standard time zone investigation.

Perishable Freight Investigation

The Commission, at the request of the director general of railroads, has ordered an investigation concerning the charges and regulations contained in Perishable Freight Tariff No. 1 prepared by the Railroad Administration, which are intended to supersede, with a few exceptions, those in all other general tariffs. It is desired that this new tariff shall be filed to become effective as soon as possible and the director general, in accordance with a provision in the federal control act, has requested the commission to advise him whether it is desirable that its provisions should become effective or in what respect they should be modified. The tariff contains many changes in rules and regulations and many increases in accessorial charges. A proof copy of the proposed tariff has been the subject of extended conferences between officers of the Railroad Administration and representatives of the shippers. The commission announces a series of hearings before Attorney Examiner Marshall at the following places: Los Angeles, July 7; Portland (Ore.), July 16; Denver, July 23; Chicago, July 30; New York, September 2; Atlanta, September 11, and New Orleans, September 18.

State Commissions

The Public Service Commission of Pennsylvania, considering an application for a decision on switching charges at Towanda, announces that the case cannot be considered; the Supreme Court of the United States having ruled that the authority of the director general of railroads, acting for the federal government, is supreme in rate-making, the commission is without authority.

United States Supreme Court

Original B. L. Not Superseded By Subsequent Bills

The Supreme Court of the United States holds that the terms of the bill of lading given by the initial carrier are binding upon the shipper and all connecting carriers, and cannot be waived by subsequent bills of lading.

Leatherwood made, in 1913, a shipment of horses from Watrous, N. M., to Waco, Tex., over four connecting railroads. The initial carrier's through bill of lading barred any action for damages unless begun within six months. When the horses reached the Texas & Pacific and the M., K. & T., each insisted that the shipper accept and sign a new bill of lading, and he did so. In 1915 he brought suit in a Texas State Court for injury to the horses while in transit on the lines of those two companies. The bills of lading issued by them did not contain the provision requiring suit to be brought within six months; but the carriers set up as a defense the provision to that effect in the original bill of lading. The state courts ruled that the carriers could not rely on that provision. The Supreme Court of the United States takes a contrary view.

Under the Carmack Amendment to the interstate commerce act the parties to a bill of lading cannot waive its terms, nor can the carrier by its conduct give the shipper a right to ignore them. A different view would antagonize the plain policy of the act and open the door to the very abuses at which it was aimed. The receipt given by the initial carrier embodies the contract for transportation from point of origin to destination; and its terms are binding

upon the shipper and all connecting carriers. Texas & Pac. v. Leatherwood. Decided June 9, 1919.

Written Notice of Claim for Loss

The Supreme Court of the United States calls attention to the enlargement of the definition of the term "transportation" by the Hepburn Amendment to the interstate commerce law, in connection with the necessity of written claim for loss or damage.

The plaintiffs delivered to the Toledo, St. Louis & Western at East St. Louis, a car of horses for transportation under a Limited Liability Livestock bill of lading via the Erie to themselves at Suffern, N. Y. At Suffern the car was placed on track opposite a cattle chute and left in charge of plaintiffs for unloading. They were about to lead out four horses when other cars were pushed against it and injured the animals. No written claim was made for the loss or damage as provided in the bill of lading; and when sued the railroad defended upon that ground. The plaintiffs maintained that transportation had ended when the accident occurred and consequently no written claim was necessary. The state courts of New York accepted that view. But the United States Supreme Court granted the railroad's request for an instructed verdict in its behalf. The clause requiring presentation of a written claim is clearly valid and controlling. In C., C., C. & St. L. v. Dettlebach, 239 U. S. 588, the court said that Congress had recognized the duty of carriers to perform a variety of services that, according to the theory of the common law, were separable from the carrier's service as carrier. In the present case, if the railroad's employees had been doing the unloading there could be no doubt that transportation was still in progress; and giving charge of the removal to the plaintiffs, as agreed, was not enough to end the interstate movement. The animals were in the car; no adequate time for unloading had elapsed. The railroad had not fully performed the services incident to final delivery imposed by law. These included the furnishing of fair opportunity and proper facilities for safe unloading although the shippers had contracted to do the work of actual removal. Written notice of claim was therefore necessary. Erie v. Shuart. Decided June 9, 1919.

F. W. Burton, assistant manager of the Minneapolis Traffic Association, has been appointed manager of the Traffic Bureau of the Rochester (N. Y.) Chamber of Commerce, succeeding D. P. Chindblom.

A report of business conditions in the Northwestern region for week ending June 14, show that a total of 154,018 cars were loaded on lines, as compared with 163,859 cars loaded during the same period in 1918.

While this shows a decrease of 9,841 cars compared with 1918, there was an increase of 18,920 compared with the first week of June, this year. There was practically a 100 per cent increase in grain and grain products loaded, an increase in livestock and an increase of practically 2,000 cars in miscellaneous loading.

A very heavy ore movement is anticipated for the balance of the season. There is also a heavy movement of automobiles and manufactured articles, and a decided improvement in the shipment of cement and other building materials. The export situation at Puget Sound ports is in a very satisfactory condition, 661 cars being delivered to boats last week. Crop conditions generally are favorable except in the Western portion of North Dakota and portions of Montana where rain is needed.

A summary of passenger train performance in the Northwestern region for the month of May, as compared with the same period last year shows a marked improvement. Of a total of 9,595 trains operated during May this year, 8,608, or 89.71 per cent, were on time, whereas in 1918 of a total of 9,605, 7,974, 83.02 per cent were on time. A marked improvement is noted in the trains received from connections, the percentage of those on time increasing from 83.68 per cent in 1918 to 92.48 per cent in 1919.

Equipment and Supplies

Locomotive Deliveries

New locomotives were shipped to railroads under federal control during the week ended June 1 as follows:

Works.	Road	No.	Type	Individual Engine No.
American,..	G. T.	5	USRA 6W.Sw.	801-05
	E. J. & E....	5	USRA Mikado	802-06
	P. L. W....	11	USRA Santa Fe	9838, 9839, 9845, 9849, 9851, 9853-58
	B. & O.....	13	USRA 6W.Sw.	370-82
	P. L. W....	2	USRA 6W.Sw.	8174, 8262
		36		
Baldwin,....	B. & O.....	2	USRA Pacific	5200-01
	B. & O.....	1	USRA 6W.Sw.	369
	A. T. & S. F.	3	Pacific	3406-08
	S. P.	5	Santa Fe	3632-36
	Erie	1	USRA Pacific	2915
	N. & W.....	1	Mallet	1717
	C. C. & O..	1	Mallet	704
	A. T. & S. F.	1	Mountain	3710
	C. B. & Q...	1	Mikado	5359
	M. K. & T....	2	USRA 8W.Sw.	39-40
	Southern	1	USRA Mountain	1489
	Total.....	19		
	Total.....	55		

Locomotives

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., is in the market for a 36-in. gage climax locomotive, a 20 or 22-ton class A or a 25 to 35-ton class B.

Freight Cars

The Wisconsin & Northern, Appleton, Wis., is inquiring for inspection cars.

O. B. Cintas, Havana, Cuba, has ordered 40 cane cars from the American Car & Foundry Company, Chicago.

The A. J. Yawger Company, Indianapolis, Ind., is inquiring for one 40 ft. 50-ton steel underframe flat car.

The American Railway Equipment Company, Philadelphia, Pa., is inquiring for 25, 50-ton steel underframe flat cars.

The Providence Gas Company, Providence, R. I., is inquiring for one all-steel hopper car and one all-steel gondola car.

C. H. Hughes & Company, Altoona, Pa., has ordered 50 mine cars from the American Car & Foundry Company, Chicago.

The Northwestern Iron Company, Milwaukee, Wis., is inquiring for 3 steel underframes for 80,000-lb. capacity flat cars.

The Carrollton Coal Company, St. Benedict, Pa., has ordered 330 mine car trucks from the American Car & Foundry Company, Chicago.

The American Metal Company, New York, has ordered two 5,200-gal. tank cars from the American Car & Foundry Company, Chicago.

The Island Creek Coal Company, Huntington, W. Va., has ordered 350 mine cars from the American Car & Foundry Company, Chicago.

The Newport News Ship Building & Dry Dock Company, Newport News, Va., is inquiring for one 40 ft. 240,000 lb. capacity flat car.

The American Trading Company, Havana, Cuba, has ordered 30, 30-ton all-steel cane cars from the American Car & Foundry Company, Chicago.

The Pond Creek Coal Company, Huntington, W. Va., has ordered 250 composite mine cars from the American Car & Foundry Company, Chicago.

Signaling

The Chesapeake & Ohio has ordered from the Federal Signal Company, Albany, N. Y., an electro mechanical interlocking machine, 28 and 8 levers, for installation at Prince, W. Va.

The Chicago, Burlington & Quincy has ordered from the Federal Signal Company, Albany, N. Y., a 96-lever, type "4" electric interlocking and other material for installation at Hawthorne, Ill. The control will be Federal type "4" with direct current for operation and alternating current for indication.

Railway Construction

Denver & Rio Grande.—Immediate resumption of work on the extensive improvements at Soldier Summit, Utah, has been ordered by the United States Railroad Administration. About 40 or 50 freight train crews have their headquarters at Soldier Summit. The improvements include a station building, a hotel, 26 miles of yard tracks and several shop buildings.

The Toyah Valley Sulphur Company, New Orleans, La.—This firm plans to build a railroad approximately 15 miles long from its mines near Orla, Texas, to its property in Culberson county. Contracts for the work have not been let and it is not certain when construction will begin. M. J. Epley, president of the Toyah Valley Sulphur Company, will be president of the railroad company.

The Southern Railway has given a contract to M. M. Elkins, Macon, Ga., for building a bridge at Gaffney, S. C. The bridge and retaining wall approach will be of reinforced concrete construction. The structure will consist of three spans, one of which will be 35 ft. long and the other two 26 ft. long. The cost of the work will be about $30,000. The bridge near Spencer, N. C., over the Yadkin river, at mile post 330.8 to consist of four single track deck riveted steel spans about 160 ft. long designed for Cooper's E-60 loading. Repairs will be made to portions of the existing masonry. The estimated cost for the entire work is about $170,000. The American Bridge Company has the contract for fabricating and erecting the superstructure.

Supply Trade News

The Ball Engine Company, Erie, Pa., builder of Erie Ditchers, is putting up an addition to its erecting shops, 175 x 125 ft.

F. G. Echols, for many years general manager of the small tools department of Pratt & Whitney Company of Hartford, Conn., has accepted a position as vice-president of the Greenfield Tap & Die Corporation, of Greenfield, Mass.

Mudge & Company, Chicago, will open a district office July 1 in the Railway Exchange building, St. Louis, Mo., in charge of Sherman C. Amsden, assistant to president, who has been promoted to district manager of the Southwestern territory.

Samuel F. Joor, consulting engineer of Chicago, has joined the American Steam Conveyor Corporation, Chicago, in a capacity of sales engineer. Mr. Joor has had wide experience in the conveyor field, at one time being western manager and sales engineer of the Jeffrey Manufacturing Company, previously being with the Link Belt Company.

The Blaw-Knox Company, which recently sold its plant at Wheatland, Pa., will concentrate its entire manufacturing activities at its plant at Hoboken, Pa., which is being greatly enlarged. The complete plant at Hoboken occupies a site covering 50 acres and will employ about 1,200 men. Further developments at this plant include the purchase of 15 acres for the construction of working men's homes.

Following the return of Fred A. Poor, president of The P. & M. Company, Chicago, from a six weeks' trip abroad, announcement has been made of the organization of The P. & M. Company (England), Ltd., with offices at 31 Budge Row, London, E. C. This company has acquired license under patents held by L. P. Winby & Company, of London, and Gillespie Partners, Ltd., of London, as well as under all the foreign patents held by The P. & M. Company of Chicago. L. P. Winby, formerly of L. P. Winby & Company, Queen Anne's Chambers, Westminster, London, S. W., will be the managing director of The P. & M. Company (England), Ltd. The other directors are: F. C. Winby and Fred A. Poor.

At the initiative of the American Concrete Pipe Association, a joint committee has been organized for the study of



"U. S. Official" Photo

Roundhouse Personnel, R. T. O. Camp de Grasse, St. Pierre des Corps, Intre et Loire, France

specifications for concrete culvert pipe. The committee is to be composed of one representative from each of six associations which were invited to participate. All of these societies have appointed members except the American Society of Civil Engineers, which is still to be heard from. Members of the committee appointed thus far include **Paul Kircher,** sales engineer, Massey Concrete Products Company, Chicago, representing the American Concrete Pipe Association; T. R. Agg, Iowa, State College, Ames, Iowa, representing the American Association of Highway Officials; **F. L. Thompson,** chief engineer, Illinois Central, Chicago, representing the American Railway Engineering Association; **B. S. Pease,** American Steel & Wire Company, Chicago, representing the American Concrete Institute; **A. T. Shelley,** assistant engineer, sewer construction department, city of Philadelphia, representing the American Society for Testing Materials. The first meeting of this committee will be held at Atlantic City on June 27.

Aftermath of Government Contracts

The Director of Munitions reports that the total claims against the government on cancelled war contracts, settled and unsettled, will amount to $700,000,000. If these 24,199 contracts had been carried on and completed, the cost to the government would have been $6,000,000,000. The actual amount awarded thus far by reason of termination or curtailment is $152,000,000. Vast stores of material had been accumulated under rapidly accelerated efficiency of production in anticipation of continuation of the war. In machinery, there were 500 manufacturing plants in the United States which were working for the various War Department bureaus. To stimulate production, the War Department had largely provided the funds with which machinery had been purchased and additions constructed, so that on the cessation of hostilities, the War Department had to take over the surplus commodities and the plant facilities and equipment that assumption of war work had entailed. To flood the market at this time with the commodities held by the government contractors, and the machinery with which they had been manufactured, would have upset industrial conditions; so that a director of sales was created, with a corps of expert assistants; and all material was classified, and sections to attend to its disposition created. The selling of surplus war materials is now going on. Sales are made for cash, at auction, to highest bidder; or on sealed proposals, at current market price; or by negotiation under competitive conditions. —*The Bache Review.*

Trade Publications

Vane Relays.—The Union Switch & Signal Company, Swissvale, Pa., has issued bulletin No. 92, describing in great detail the company's single and double element vane relays. The different types are described, with illustrations, to the extent of a dozen pages, together with an explanation of the theory of the operation of the relays.

Force Pumps.—The Humphreys Manufacturing Company, Mansfield, Ohio, has issued the first of a series of bulletins illustrating and describing its new types of pumps. These bulletins are 7½ in. by 10⅝ in. in size and are punched for standard ring or post binders. They contain essential data and dimensions of the different types of pumps described.

Coal Storage.—The International Conveyor Corporation, New York City, has issued a 16-page booklet describing the Stuart system of ground storage and pointing out its adaptations in railway work. The book contains detailed descriptions of the coal handling layout at the East Buffalo, N. Y., terminal of the Erie, the government fuel storage and distributing yard at Washington, D. C. and Baltimore & Ohio installations for the handling of coal and bulk materials respectively at Baltimore. The booklet is well illustrated and well gotten up and gives a comprehensive idea of the possibilities of this form of ground storage and reclaiming as applied to a variety of railway problems.

Railway Financial News

Baltimore & Ohio.—A syndicate composed of Kuhn, Loeb & Co., Speyer & Co., and the National City Company, has purchased $35,000,000 Baltimore & Ohio ten-year 6 per cent secured gold bonds. The issue will be offered for public subscription at 96½ and accrued interest, to yield investors approximately 6½ per cent if the bonds are held until they mature, on July 1, 1929. The bonds are secured by the deposit and pledge of $6,000,000 par value Reading Company first preferred stock, $14,000,000 par value Reading Company second preferred, and $9,200,000 common stock, as well as $15,000,000 Baltimore & Ohio Railroad Company refunding and general mortgage 6 per cent bonds, series B, due Dec. 1, 1995. These securities have an estimated market value of $45,000,000, and it is understood that a 25 per cent margin is to be maintained. The bonds were sold by the company to enable it to meet all its maturing obligations, and will not materially increase the railroad's annual fixed charges.

The maturing obligations which will be taken up are $22,500,000 notes and bank loans which were extended from February, 1918, to July 1, 1919. These include $4,000,000 bank loans, $10,500,000 6 per cent notes, issued in June, 1918, for retiring $7,500,000 one-year 5 per cent notes, $3,000,000 bank loans, extended for four months from Sept. 30, 1918, and $8,000,000 notes issued in January, 1918, which were due last July but were extended.

Following a meeting of the Baltimore & Ohio directors on Wednesday, President Daniel Willard said the company had reached an agreement with the government on the question of compensation for the lease of the carrier's properties during the period of federal control, and that a contract had been executed calling for the payment each year by the government of $30,031,009. He also said the company's other income each year amounts to about $3,300,000, making the approximate annual income $33,331,009. This after the deduction of $22,063,000 fixed charges and corporate expenses, would leave a balance of $11,268,009 available for federal income taxes, reserves, dividends, and so forth.

At its meeting, the directors determined to set aside part of the income to be devoted to capital expenditures so that the company's credit would not have to be extended further under present conditions. Because of the adoption of this policy, it was decided temporarily to suspend dividend payments on the common stock. The usual semi-annual dividend of 2 per cent was declared on the preferred stock to holders of record July 19. This payment will be made September 2, provided the company receives funds from the government by that time.

Boston & Maine.—Minority stockholders have filed a bill in equity in the Massachusetts Supreme Court against this company attacking the validity of outstanding loans of the road and its leased lines amounting to $13,000,000, which the legislature of 1915 authorized the company to pay. It is claimed that the act is unconstitutional, in that the legislature exercised both executive and judicial powers, and also that it deprives persons of property without trial by jury.

Canadian Pacific.—The Hon. William J. Shaughnessy has been elected a director to succeed the Hon. James Dunsmuir, resigned.

Chicago, Indianapolis & Louisville.—This company has applied to the Public Utilities Commission of Illinois for an order authorizing the issue of additional first and general mortgage bonds to the amount of $867,198.

Peoria & Eastern.—W. A. Carnegie Ewen, New York, has been elected chairman of the protective committee for the 4 per cent income mortgage bondholders, to succeed John F. Wallace, resigned.

Terminal Railroad Association of St. Louis.—An application has been filed with the Missouri Public Service Commission for permission to issue $1,000,000 4 per cent bonds, payable in 1953.

Railway Officers

Railroad Administration

Regional

R. D. Starbuck, assistant to federal manager of the New York Central, has been appointed assistant regional director of the Eastern Region, with headquarters at New York.

Federal and General Managers

S. E. Burkhead, assistant general manager of the International & Great Northern, with headquarters at Houston, Texas, has resigned to enter business in Houston.

J. R. Hackett, general agent of the Georgia Northern, has been appointed general manager, with headquarters at Moultrie, Ga., succeeding **F. R. Pidcock,** who resigned as general manager, but will retain his position as vice-president of the road. **J. D. Weston, Jr.,** of Albany, will succeed Mr. Hackett as general agent.

Operating

A. B. McNaughton, superintendent of the Grand Trunk Lines in New England, with his staff, has moved from Island Pond, Vt., to Portland, Me.

L. L. Oliver, trainmaster of the eastern division of the Texas & Pacific, with headquarters at Marshall, Texas, has resigned and will return to his former position in the despatcher's office.

Financial, Legal and Accounting

F. Markoe Rivinus has been appointed general solicitor of the Norfolk & Western with headquarters at Roanoke, Va., to succeed **Theodore W. Reath,** who has resigned to accept service with the Norfolk & Western Railway Company.

Traffic

B. N. Austin, assistant traffic manager (passenger) of the Baltimore & Ohio, western lines, has been appointed general passenger agent, with headquarters at Chicago, Ill.

W. F. Conner, district passenger representative of the Pennsylvania, Lines West, with headquarters at Pittsburgh, Pa., has been promoted to assistant general passenger agent, with office at Chicago, succeeding **C. L. Kimball,** who retired from active duty after 51 years of continuous active service. **A. H. Shaw,** assistant to general passenger agent, has been appointed assistant general passenger agent, with office at Pittsburgh. **S. L. Shank** has been appointed district passenger representative, with office at Pittsburgh, succeeding Mr. Connor, and **A. B. Ritchie** has been appointed tfaveling passenger representative, with office at Pittsburgh, succeeding Mr. Shank.

Engineering and Rolling Stock

F. S. Kelly, master mechanic of the Louisiana division of the Texas & Pacific, with headquarters at Gouldsboro, La., has been transferred to Marshall, Texas, succeeding **R. E. Roe,** resigned.

Sidney U. Rhymer, whose appointment as signal engineer and superintendent of telegraph of the Chicago & Alton, the Chicago, Peoria & St. Louis, the Peoria & Pekin Union and the Peoria Railway Terminal, with headquarters at Bloomington, Ill., was announced in the *Railway Age* of June 6 (page 1,450), was born on December 20, 1876, at Union Grove, Ill. He began railway service in June, 1896, as a section laborer on the Chicago & North Western near Fulton, Ill., and on March 1, 1901, he was promoted to section foreman at Union Grove. On October 15, 1905, he entered the signal department of the same road as battery man at Fulton, in which capacity he remained until February, 1907, when he was promoted to signal maintainer with headquarters at Stanwood, Ia. In 1910 he was appointed signal supervisor of the Northern and Southern divisions of the Chicago & Alton with headquarters at Bloomington, Ill., and on January 1, 1913, he was promoted to general signal inspector with jurisdiction over the entire line in which position he acted as assistant to the signal engineer until his recent promotion.

Purchasing

Albert C. Mann, purchasing agent of the Illinois Central with headquarters in Chicago, has resigned to become vice-president of the American International Steel Corporation with headquarters in New York.

Corporate

Executive, Financial, Legal and Accounting

H. P. Hughes has been appointed auditor and general freight and passenger agent of the United Verde & Pacific Railway and the Verde Tunnel & Smelter Railroad Company, with headquarters at Clarkdale, Ariz., in place of **W. H. Archdeacon,** resigned.

Operating

J. McMillan, general manager of the Pacific Electric Railway Company, retires from active service July 1, after 45 years of service with the Southern Pacific lines and the Pacific Electric. The vacant position will not be filled.

U. E. Gillen, vice-president of the Grand Trunk Railway of Canada, with headquarters at Montreal, Que., has been appointed general manager of the Toronto Terminals Railway Company, with headquarters at Toronto, Ont., vice J. W. Leonard, deceased.

Engineering and Rolling Stock

C. C. Johnson, roadmaster at Campbellton, N. B., of the Canadian National Railways, has been transferred in the same capacity to the Mulgrave sub-division, with headquarters at New Glasgow, N. S., succeeding **H. I. Gray,** who has been transferred to the Bridgewater division of the Halifax & Southwestern. **William Sidwell** has been appointed roadmaster of the Dartmouth sub-division, with headquarters at Dartmouth, N. S., vice **James Myers.**

Obituary

Charles Carney, formerly supervisor on the Illinois Central, with headquarters at La Salle, Ill., died at his home in Chicago on June 21, at the age of 64 years.



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American Food Arriving in Warsaw, Poland

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